TRANSMITTAL LETTER

SUBJECT:

Revisions to
Standards for Bridge Construction
September 2016 Edition

INFORMATION AND SPECIAL INSTRUCTIONS:

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

These standards may be used immediately and can be adopted as soon as practical on all new and existing designs without affecting letting schedules. All projects let after June 28, 2019 must incorporate these new standards.

A description of the changes made to the 2016 Edition since Change 1 of August 4, 2017 are listed in the attached multi-sheet Table. On the standards, light green highlighting indicates Change 2 revisions to details and notes; light yellow highlighting indicates Change 1 revisions.

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:

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

<table>
<thead>
<tr>
<th>Standard</th>
<th>Sheet</th>
<th>Description of Changes</th>
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<tbody>
<tr>
<td>BC-710M</td>
<td>1 of 3</td>
<td>9 of 13 (cont.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 of 13 (cont.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DETAIL B: revised bolt designation from H.S. to ASTM F3125 GRADE A325.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SECTION A-A (two places): revised post anchorage from two bars to an anchor plate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SECTION A-A (TYPICAL): updated bolt designation from ASTM A325 to ASTM F3125 GRADE A325.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ELEVATION: updated bolt designation from A325 to ASTM F3125 GRADE A325.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added NOTE: SEE SHEET 10 FOR NOTES.</td>
</tr>
<tr>
<td>BC-711M</td>
<td>10 of 13</td>
<td>Added (SEE NOTE 2) to all bolt callouts (three instances).</td>
</tr>
<tr>
<td></td>
<td>11 of 13</td>
<td>DETAIL C: added ASTM F3125 GRADE A325 designation to bolt callout (two places).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Three C.I.P. Barrier Sections: revised post anchorage from two bars to an anchor plate.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS: increased #4 rebar's horizontal leg from 1'-0&quot; to 1'-7&quot;.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C.I.P. BARRIER WITH BITUMINOUS CONCRETE SHOULDER ON M.S.E. WALLS: increased #5 rebar's inclined leg from 1'-6&quot; MIN. to 2'-0&quot; MIN.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLAN - BARRIER MOMENT SLAB details: revised moment slab length from (VARIES) 30' MIN, 40' MIN, to 30' MIN, and in third line, revised ONE PAVEMENT JOINT to TWO PAVEMENT JOINTS, and revised RC-20M to RC-27M in NOTE B.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 of 13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PRECAST BARRIER WITH BITUMINOUS SHOULDER and PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER details: removed 1'-6&quot; MIN. dimension which is already shown in corresponding reinforcement detail at bottom of sheet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOTE A: revised RC-20M to RC-27M.</td>
</tr>
<tr>
<td>BC-719M</td>
<td>6 of 8</td>
<td>TEMPORARY BARRIER TYPICAL REINFORCEMENT BARS: revised a dimension from 1'-6&quot; to 1'-7&quot;.</td>
</tr>
<tr>
<td>BC-726M</td>
<td>5 shts.</td>
<td>Made numerous revisions throughout the standard based on recommendations from the Bridge Grid Flooring Manufacturers Association.</td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td></td>
<td>1 of 5</td>
<td>GENERAL NOTES: added Note 10 – USE THE 5 3/16″ MAIN BEARING BAR WITH OR WITHOUT THE MIDDLE RIB FOR FULL DEPTH CONCRETE DECKS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GENERAL NOTES: added Note 11 - HOT DIP GALVANIZE PANELS PER PUB. 408, SECTION 1105.02(5).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SECTION A-A: added callout of main bearing bar in full-depth section of detail with reference to Note 10.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SECTION C-C: added FORM pan SHIPPED LOOSE and FIELD INSTALLED callout; added SHOP INSTALLED to outer pan callout, and added reference to Note 10 in main bearing bar callout.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SECTION E-E: added 20 GA SHEET METAL FORM PAN SHIPPED LOOSE and FIELD INSTALLED callout.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MAIN BEARING BAR – 41/2″ BAR WITHOUT RIB: corrected dimension line for bottom flange thickness of 4 1/4&quot; bar.</td>
</tr>
<tr>
<td></td>
<td>2 of 5</td>
<td>TYPICAL EXPANSION JOINT DETAILS: added trim plate weld callout CONTRACTOR HAS OPTION TO SHOP WELD BEARING BAR TO TRIM PLATE; added ALLOW 2″ MIN BETWEEN GRID COMPONENTS AND TRIM PLATE callout for dimension between cross bar and trim plate, and added REMOVE BOTTOM ROUND BAR FOR FULL DEPTH DECK to bottom round bar callout.</td>
</tr>
</tbody>
</table>
TYPICAL HAUNCH FORM DETAIL: SECTION VIEW: added +1/2" TO -1" to end of bulkhead pan dimension callout; added FIELD INSTALLED to the beginning of MIN. and after 16 GAGE for haunch angle callout.

DETAIL A: revised TYPICAL to SEE EXTRUSION NOTE for top weld note; added 3/16" dimension callout for trim plate fillet weld; and added extrusion note ONE PIECE EXTRUSION IN LUE OR TWO PIECE MEMBER (EXTRUSION AND PLATE COMBINATION) IS PERMITTED. WELD IN ACCORDANCE WITH AASHTO/AWS D1.5M SPECIFICATIONS.

END SECTION DETAIL: moved flat pans to mid-depth of main bearing bars.

SCUPPER INSTALLATION DETAILS - PLAN VIEW: replaced weld note with WELD ALL BARS TO DRAIN FRAME; replaced dimensions with AS SHOWN ON PLANS; and revised callout for form pan to be cut.

FORMED ANGLE – WELDED STRAP: In strap callout deleted WELDED BETWEEN HAUNCH ANGLES and added (OR ALTERNATE THREADED ROD).

MAIN BAR SPlice AT PANEL ENDS: added and SUPPLEMENTAL BARS to weld callouts (three instances).

RENAMED FIELD WELD DETAIL TO OPTIONAL FIELD WELD DETAIL WITHOUT HAUNCH.

LEVELING BOLT DETAIL: revised bolt to consist of a threaded rod with a hex nut that is connected via a plug weld and added THREADED ROD (A307, F1545 GR 36, OR EQUAL) callout.

ADDED SHEAR CONNECTION AT PARTIALLY AND FULLY FILLED GRID DECKS detail.

PARTIAL TRANSVERSE SECTION THRU GRID DECK – SECTION VIEW: changed drip ledge to form pan dimension from 1/2" to 1/2" TO 1"; replaced FIELD FORMS AT OHVERHANG BY CONTRACTOR. FORM PANS IN GRID DECK OMITTED with FORM PANS SHOP INSTALLED. FIELD FORMED FORMS OPTIONAL. (FULL DEPTH OVERHAND) for form pan callout; added form pan line work; and added note MAIN BAR CAMBERING AS PERMITTED BY AWS D1.5 PUB.408.

END TRIM PLATE WELD DETAIL: revised 1 3/4" to 1 1/2" for dimension in between top of bearing bar and end trim plate.

LEVELING PLATE WELD DETAIL: added second note THE LEVELING NUT MAY BE PLACED UNDER THE MAIN BAR WHEN CONDITIONS PERMIT. ALTERNATE LEVELING DETAILS PERMITTED AS APPROVED BY THE DISTRICT BRIDGE ENGINEER.

LEVELING PLATE WELD DETAIL – PLAN VIEW: replaced dimensions with AS REQUIRED.

LEVELING PLATE WELD DETAIL – SECTION I-I: removed 5/8" and 11/16" from hex nut and plate hole centerline callout; changed 2" to AS REQUIRED for dimensions between hex centerline and inner cross bars; removed 3" x 1/2" x 5/8" LG. from end of leveling plate callout.

CONCRETE GRID TRANSVERSE SPlice BETWEEN PANELS (two places): added note OPTIONAL BOLTED SPlice PERMITTED AS APPROVED by the DISTRICT BRIDGE ENGINEER.

SECTION J-J and SECTION K-K: added solid lines for precast concrete surfaces; revised line work of pans; added FLAT PAN FIELD INSTALLED (TYP.) callout.; and added 8" C.C. spacing to stud callout.

CONCRETE GRID TRANSVERSE SPlice BETWEEN PANELS (two places): added note NOTE: SPLICE DETAILS CAN ALSO BE USED FOR CAST-IN-PLACE WITHOUT BLOCKOUT CLOSURE POURS.

SUPPORT AT P/S CONCRETE DEAM: added SEE DETAIL X callout and circle.

ADDED NEW DETAIL X detail.

NOTES: In Note 16 deleted text in last 2 lines after 'TABLES'. Removed notes below each portion of Table.

GENERAL NOTES, Note 1: inserted TRANSITION after GUIDE RAIL.

WELDED WIRE FABRIC: corrected designation W2,0xW2,0 to be W2,1xW2,1.

MOVED all content related to development length and lap splice length of deformed bars in tension (Table A, Notes, Guidelines) to sheet 3.

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ADDED SHEAR CONNECTION AT PARTIALLY AND FULLY FILLED GRID DECKS detail.

PARTIAL TRANSVERSE SECTION THRU GRID DECK – SECTION VIEW: changed drip ledge to form pan dimension from 1/2" to 1/2" TO 1"; replaced FIELD FORMS AT OHVERHANG BY CONTRACTOR. FORM PANS IN GRID DECK OMITTED with FORM PANS SHOP INSTALLED. FIELD FORMED FORMS OPTIONAL. (FULL DEPTH OVERHAND) for form pan callout; added form pan line work; and added note MAIN BAR CAMBERING AS PERMITTED BY AWS D1.5 PUB.408.

END TRIM PLATE WELD DETAIL: revised 1 3/4" to 1 1/2" for dimension in between top of bearing bar and end trim plate.

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ADDED NEW DETAIL X detail.

NOTES: In Note 16 deleted text in last 2 lines after 'TABLES'. Removed notes below each portion of Table.

GENERAL NOTES, Note 1: inserted TRANSITION after GUIDE RAIL.

WELDED WIRE FABRIC: corrected designation W2,0xW2,0 to be W2,1xW2,1.

MOVED all content related to development length and lap splice length of deformed bars in tension (Table A, Notes, Guidelines) to sheet 3.
GENERAL NOTES, Note 3: Revise note to require galvanized of steel in all cases and painting only if specified for consistency with changes to Pub. 408, Sec. 1025.

GENERAL NOTES, Note 4: added GALVANIZED after steel grade designation.

DIMENSION "A" TABLE: added USE 2 1/2" MIN. FOR DIMENSION "A" to note below table.

GENERAL NOTES, notes 3, 11, and 13: updated bolt designation from A325 to ASTM F3125 GRADE A325.

GENERAL NOTES, note 3: added DIAMETER after 7/8".

MATERIAL NOTES, Note 3: deleted second bullet regarding soft converted metric sizes.

LEGEND FOR WELDED WIRE FABRIC: for C and D definitions, replaced SIZE with CROSS SECTIONAL AREA IN SQ. INCHES MULTIPLIED BY 100.

LEGEND FOR WELDED WIRE FABRIC: for C and D definitions, replaced SIZE with CROSS SECTIONAL AREA IN SQ. INCHES MULTIPLIED BY 100.

GENERAL NOTES, Note 21: replaced statement in quotes with "I CERTIFY THAT ALL ASSUMPTIONS MADE IN DESIGNING THIS WALL HAVE BEEN VALIDATED THROUGH FABRICATOR, ERECTOR AND CONTRACTOR".

ACCESS DOOR DETAIL: revised lap splice length of #4 perimeter rebar from 11" -3/4" for uncoated or galvanized and from 1-4" -1-6" for epoxy coated.

TYPICAL C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER: revised vertical reinforcement across slab/barrier construction joint, replaced 90 degree hook with 180 degree hook at end of slab top rebar, and eliminated 90 degree hook from end of slab bottom rebar.

TYPICAL C.I.P. BARRIER WITH BITUMINOUS SHOULDER: increased #6 rebar's horizontal leg from 2'-3" -3/4" to 1'-6" -11/" for epoxy coated.

TYPICAL C.I.P. BARRIER WITH CEMENT CONCRETE SHOULDER: added MIN. to 1'-6" MIN. dimension; removed quantity from #4 DOWELS callout.

DETAIL A – ELEVATION: replaced EMBEDDED 12" INTO PANEL with DOWELS.

PCAST CONCRETE PANEL – ELEVATION details: revised lap splice length of #4 perimeter rebar from 11" -3/4" for uncoated or galvanized and from 1-4" -1-6" for epoxy coated.

SECTIONAL AREA IN SQ. INCHES MULTIPLIED BY 100.

ELEVATION – SLOPED TOP and ELEVATION – LEVEL TOP: revised lap splice length of #4 perimeter rebar from 11" -1-3/4" for uncoated or galvanized and from 1-4" -1-6" for epoxy coated.

LEGEND FOR WELDED WIRE FABRIC: for C and D definitions, replaced SIZE with CROSS SECTIONAL AREA IN SQ. INCHES MULTIPLIED BY 100.

LEGEND FOR WELDED WIRE FABRIC: for C and D definitions, replaced SIZE with CROSS SECTIONAL AREA IN SQ. INCHES MULTIPLIED BY 100.

ABUTMENT PLANS (two places): added SPONGE between NEOPRENE and WASHER in callouts.

DETAIL D: added joint dimension of 1 1/2" MAX.

TYP. BOX SECTION SHOWING STRAND LOCATIONS: removed H and S dimensions.

POST-TENSION CONNECTION DETAILS – TYPICAL STRAND & DETAILS: removed and ACCEPTANCE BY ENGINEER from callout for "CUT STRANDS".

INSTRUCTIONS FOR POST-TENSIONING NOTES, Item 11: removed and APPROVED after WITNESSED.

INSTRUCTIONS FOR POST-TENSIONING NOTES, Item 13: removed second sentence.

INSTRUCTIONS FOR POST-TENSIONING NOTES: added item 18 - ALTERNATE POST-TENSIONING SEQUENCE VARYING FROM DETAILS SHOWN ON THIS STANDARD MUST BE DETAILED ON SHOP DRAWINGS AND ACCEPTED BY DISTRICT BRIDGE ENGINEER.

INSTRUCTIONS FOR POST-TENSIONING NOTES: added item 19 - POST-TENSIONING DUCTS MUST BE ADEQUATELY SECURED TO PREVENT DEFLECTION DURING CONCRETE PLACEMENT. DUCTS THAT ARE NOT STRAIGHT MUST BE ACCEPTED BY CHIEF STRUCTURAL MATERIALS ENGINEER.

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TRANSMITTAL LETTER

OS-299 (7-08)  

Publication 219M  
September 2016 Edition  
Change No. 1

DATE:  
August 4, 2017

SUBJECT:  
Revisions to Standards for Bridge Construction  
September 2016 Edition

INFORMATION AND SPECIAL INSTRUCTIONS:

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

The revisions pertain primarily to:


* Adding a new Standard Drawing for Type 31 Strong Post Guide Rail (RC-51M) (31" height to top of W-beam rail element).

* Deleting an existing Standard Drawing for Type 2 Strong Post Guide Rail (RC-52M) (27 3/4" height to top of W-Beam rail element).

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

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>SHEET</th>
<th>DESCRIPTION OF CHANGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC-703M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised W-Beam to Thrie-Beam Transition Sections in the two elevation views between Post 3 and Post 5 from a symmetrical shape to an asymmetrical shape.</td>
</tr>
<tr>
<td>BC-706M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised Elevation A-A to indicate RC-51M.</td>
</tr>
<tr>
<td>BC-708M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised Note 4 to indicate RC-51M.</td>
</tr>
<tr>
<td>BC-712M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised W-Beam to Thrie-Beam Transition Section in Elevation View between Post 5 and Post 7 from a symmetrical shape to an asymmetrical shape. Revised Note 4 to indicate RC-51M.</td>
</tr>
<tr>
<td>BC-734M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised Note 5 and Section C-C to indicate RC-51M. Revised Note 6 to indicate Test Level 4 (TL-4) equivalence and Test Level 3 (TL-3) equivalence based on NCHRP Report 350 criteria. Sheets 1-2 Revised Elevation Views for Typical Concrete Bridge Barriers and Alternate Concrete Bridge Barrier to indicate Type 31-SC Guide Rail and RC-51M.</td>
</tr>
<tr>
<td>BC-739M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised details for Typical Shoulder Installations to indicate RC-51M. Revised Table &quot;A&quot; to indicate column as &quot;MINIMUM UNOBSTRUCTED DISTANCE&quot; rather than &quot;REQUIRED CLEARANCES&quot;. Revised values in Table &quot;A&quot; of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.</td>
</tr>
<tr>
<td>BC-741M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised details for Typical Shoulder Installations to indicate RC-51M. Revised Table &quot;A&quot; to indicate column as &quot;MINIMUM UNOBSTRUCTED DISTANCE&quot; rather than &quot;REQUIRED CLEARANCES&quot;. Revised values in Table &quot;A&quot; of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.</td>
</tr>
<tr>
<td>BC-743M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised details for Typical Shoulder Installations to indicate RC-51M. Revised Table &quot;A&quot; to indicate column as &quot;MINIMUM UNOBSTRUCTED DISTANCE&quot; rather than &quot;REQUIRED CLEARANCES&quot;. Revised values in Table &quot;A&quot; of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.</td>
</tr>
<tr>
<td>BC-744M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised details for Typical Shoulder Installations to indicate RC-51M. Revised Table &quot;A&quot; to indicate column as &quot;MINIMUM UNOBSTRUCTED DISTANCE&quot; rather than &quot;REQUIRED CLEARANCES&quot;. Revised values in Table &quot;A&quot; of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.</td>
</tr>
<tr>
<td>BC-745M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised details for Typical Shoulder Installations to indicate RC-51M. Revised Table &quot;A&quot; to indicate column as &quot;MINIMUM UNOBSTRUCTED DISTANCE&quot; rather than &quot;REQUIRED CLEARANCES&quot;. Revised values in Table &quot;A&quot; of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.</td>
</tr>
<tr>
<td>BC-747M</td>
<td>Sheet 1</td>
<td>Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised reference drawing to RC-51M (Type 31 Strong Post Guide Rail). Revised details for Typical Shoulder Installations to indicate RC-51M. Revised Table &quot;A&quot; to indicate column as &quot;MINIMUM UNOBSTRUCTED DISTANCE&quot; rather than &quot;REQUIRED CLEARANCES&quot;. Revised values in Table &quot;A&quot; of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.</td>
</tr>
<tr>
<td>STANDARDSheaT</td>
<td>DESCRIPTION OF CHANGES</td>
<td></td>
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<tr>
<td>---------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>BC-747M sheet 5 (cont.)</td>
<td>Revised values in Table &quot;A&quot; of minimum unobstructed distances for Type 31 Strong Post Guide Rail, Type 2 Weak Post Guide Rail, and Median Barrier.</td>
<td></td>
</tr>
</tbody>
</table>

**CANCEL AND DESTROY THE FOLLOWING:**

The following revised BC-700M Series standards need to be retained for projects under construction and for future rehabilitation work:

- Index Sheet - Sept. 30, 2016
- BC-703M - Sept. 30, 2016
- BC-734M - Sept. 30, 2016
- BC-739M - Sept. 30, 2016

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- DGS warehouse (PennDOT employees ONLY)

**APPROVED FOR ISSUANCE BY:**

LESLIE S. RICHARDS
Secretary of Transportation

**BY:**

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


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
<table>
<thead>
<tr>
<th>STANDARD</th>
<th>SHEET</th>
<th>DESCRIPTION OF CHANGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC-701M</td>
<td>1 of 3</td>
<td>Added Note 13 which was previously displayed on Typical Fence Elevation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOTE 6: added PERMIT after JOINTS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TYPICAL FENCE ELEVATION: added FABRIC after PROTECTIVE FENCE callouts.</td>
</tr>
<tr>
<td>2 of 3</td>
<td>POST BRACKET DETAIL: added 3 3/4&quot; vertical distance to horizontal shield pipe.</td>
<td></td>
</tr>
<tr>
<td>3 of 3</td>
<td>ELEVATION: added FABRIC after call-out for Mesh Diamond Chain Link Fence.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added 2&quot; MAX. dimension for space between mesh and top of wall.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SECTIONS D-D: removed 4&quot; dimension for height of bottom rail above top of wall.</td>
</tr>
<tr>
<td>BC-703M</td>
<td>2 shts.</td>
<td>Re-issued with no changes.</td>
</tr>
<tr>
<td>BC-706M</td>
<td>1 of 2</td>
<td>Added (BEHIND W-BEAM) to callout for 5/8&quot; Dia. Hex Head Bolt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TYPICAL SECTION - added DELINEATOR to steel post. Added TUBULAR BLOCKOUT to T5x7x3/16&quot;x4&quot;. Added ROUND HEAD for two bolt callouts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOTES: added Notes 12 &amp; 13.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ELEVATION A-A: added 5/8&quot; Dia. HEX HEAD BOLT (BEHIND RUBRAIL).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLAN - added ROADWAY ITEM to W-BEAM RAIL and OFFSET BRACKET. Added W6X9 STEEL POST (ROADWAY ITEM) callout.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RAIL TUBE END CAP - added PJP GRIND TO CONTOUR (TYP.) to weld symbol.</td>
</tr>
<tr>
<td>2 of 2</td>
<td></td>
<td>Added new sheet with nut and bolt details.</td>
</tr>
<tr>
<td>BC-707M</td>
<td>1 of 5</td>
<td>GENERAL NOTES: NOTE 3 - added ASTM C834 OR C920 to end of note.</td>
</tr>
<tr>
<td>BC-708M</td>
<td>2 shts.</td>
<td>Section letters revised.</td>
</tr>
<tr>
<td>BC-709M</td>
<td>3 of 12</td>
<td>TYPICAL WELD AT MITERS - added BENDING OF 1/2&quot; THICK PLATE IS PERMITTED INSTEAD OF WELDING to end of callout.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RAIL TUBE CAP DETAIL - decreased size of cap plate from 4 3/4&quot; to 4 5/8&quot;.</td>
</tr>
<tr>
<td>4 of 12</td>
<td>RAIL SPLICE - added OR 1/4&quot;x3/4&quot;x3/16&quot; PLATE ATTACHED WITH DUAL 3/16&quot;x5/8&quot; LONG FILLET WELDS to callout for pin/stud.</td>
<td></td>
</tr>
<tr>
<td>10 of 12</td>
<td>PLAN - BARRIER MOMENT SLAB - added (ROADWAY) to tie bars/bolts callout.</td>
<td></td>
</tr>
<tr>
<td>11 of 12</td>
<td>PRECAST BARREL WITH BIT. SHOULDER - increase spacing of lap transverse #5 reinforcement from 11&quot; to 12&quot;.</td>
<td></td>
</tr>
<tr>
<td>BC-711M</td>
<td>2 of 4</td>
<td>ACCIDENT PREVENTION SIGN - added R = 1/2&quot; (TYP.) callout to lower right corner of sign.</td>
</tr>
<tr>
<td>BC-712M</td>
<td>1 of 2</td>
<td>PLAN VIEW FOR THREE-BEAM TO PA BRIDGE BARRIER: Type C Inlet callout- replaced RC-34M with RC-45M and RC-46M.</td>
</tr>
<tr>
<td>BC-713M</td>
<td>1 of 13</td>
<td>NOTES: Note 9 - added THICK PLATE prior to LOCK WASHER and washer.</td>
</tr>
<tr>
<td>3 of 13</td>
<td>Added new PLATE WASHER DETAIL.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SECTION A-A: added &quot;AND PLATE WASHER DETAIL ON THIS SHEET&quot; to end of slotted hole callout.</td>
</tr>
<tr>
<td>5 of 13</td>
<td>TYPICAL RAIL TO POST DETAIL: added &quot;AND PLATE WASHER DETAIL ON SHEET 3&quot; to slotted hole callout.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added plate washer beneath two lock washer/nut connections.</td>
</tr>
<tr>
<td>11 of 13</td>
<td>CAST-IN-PLACE PA BRIDGE BARRIER ON M.S.E. WALLS: changed STYROFOAM to PREFORMED CELLULAR POLYSTYRENE (P.C.P.) at two locations.</td>
<td></td>
</tr>
<tr>
<td>12 of 13</td>
<td>PRECAST BARRIER WITH BITUMINOUS CONCRETE SHOULDER ON M.S.E. WALLS: changed STYROFOAM to PREFORMED CELLULAR POLYSTYRENE.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER ON M.S.E. WALLS: changed STYROFOAM to PREFORMED CELLULAR POLYSTYRENE.</td>
</tr>
<tr>
<td>BC-716M</td>
<td>1 of 2</td>
<td>Added ALTERNATE DETAIL A for attachment of pedestrian railing post with anchor bolts cast in deck slab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added ALTERNATE PLATE DETAIL DETAIL A: added galvanized anchor bolts callout.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>SHEET</th>
<th>DESCRIPTION OF CHANGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC-716M</td>
<td>2 of 2</td>
<td>TYPICAL DETAIL AT POST: added RAILING HEIGHT to two heights.</td>
</tr>
<tr>
<td>BC-718M</td>
<td>1 sht.</td>
<td>Re-issued with no changes.</td>
</tr>
<tr>
<td>BC-719M</td>
<td>1 of 8</td>
<td>NOTES: added NOTE 17 - BOLT THROUGH ANCHORS ARE NOT PERMITTED IN RECENTLY POURED DECKS WITHOUT APPROVAL OF DISTRICT BRIDGE ENGINEER.</td>
</tr>
<tr>
<td></td>
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<td>NOTE 8, TYPE B: added STANDARD WIDTH prior to LANES OF TRAFFIC in first line.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added Reference Drawings.</td>
</tr>
<tr>
<td>3 of 8</td>
<td>NOTES: added NOTE 3 - FOR SPACING AND MINIMUM REQUIRED ADHESIVE ANCHOR ULTIMATE CAPACITY SEE TABLE 1, SHEET 1.</td>
<td></td>
</tr>
<tr>
<td>BC-720M</td>
<td>1 sht.</td>
<td>ELEVATION: added 1 1/2&quot; spacings for railing posts to center of light pole.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SECTION A-A &amp; SECTION C-C: added MIN. to wall thickness dimension.</td>
</tr>
<tr>
<td>BC-721M</td>
<td>1 of 2</td>
<td>EXPANSION AND DEFLECTION JOINT FITTINGS - added (SEE NOTE 2) to deflection fitting's ground connection callout.</td>
</tr>
<tr>
<td>2 of 2</td>
<td>CONDUIT EXPANSION NOTES, Note 2: added ARTICLE prior to NEC314.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXPOSED CONDUIT CONNECTIONS AT EXPANSION JOINTS: added CONDUIT EXPANSION prior to NOTE 1 in conduit callout.</td>
</tr>
<tr>
<td>BC-722M</td>
<td>2 of 2</td>
<td>Barrier Pedestrian Fence Post to Light Pole spacing increased from 1'-0&quot; to 1'-1&quot;.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added 3&quot; space between end of Pedestrian Railing to light pole and removed 1'-8&quot; dimension.</td>
</tr>
<tr>
<td>BC-723M</td>
<td>10 shts.</td>
<td>Minor notes changes made throughout.</td>
</tr>
<tr>
<td>BC-726M</td>
<td>5 shts.</td>
<td>Initial release.</td>
</tr>
<tr>
<td>BC-731M</td>
<td>1 sht.</td>
<td>Re-issued with no changes.</td>
</tr>
<tr>
<td>BC-732M</td>
<td>1 of 3</td>
<td>TYPICAL LONGITUDINAL SECTION: added note regarding deck top reinforcement mat orientation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOTES: added Notes 14, 15 and 16.</td>
</tr>
<tr>
<td>BC-734M</td>
<td>3 shts.</td>
<td>Re-issued with no changes.</td>
</tr>
<tr>
<td>BC-735M</td>
<td>1 of 3</td>
<td>Re-issued with no changes.</td>
</tr>
<tr>
<td>BC-736M</td>
<td>3 shts.</td>
<td>Re-issued with no changes.</td>
</tr>
<tr>
<td>BC-739M</td>
<td>2 shts.</td>
<td>Re-issued with no changes.</td>
</tr>
<tr>
<td>BC-741M</td>
<td>1 of 6</td>
<td>NOTES TO FABRICATOR, 1st bullet point: rerecorded first word to recommend use of Center-mount structure types to carry DMS/VMS.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added mention of overhead sign structures not represented by BD-649M must be designed by PE.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>BC-743M</td>
<td>2 of 6</td>
<td>ALTERNATE FOUNDATION, Note: added #3-102-BD AND #14-603-BD TD FOR SUPPORT OF CENTER-MOUNT DMS SIGN STRUCTURES.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 of 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ALTERNATE CAISSON FOUNDATIONS table: caissons for unavailable larger wall thickness 24&quot; and 26&quot; pipe sizes were removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 of 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COLUMNS BASES: bases for unavailable larger wall thickness 24&quot; and 26&quot; pipe sizes were removed.</td>
</tr>
<tr>
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<td></td>
<td>5 of 6</td>
</tr>
<tr>
<td>BC-747M</td>
<td>1 of 10</td>
<td>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.</td>
</tr>
<tr>
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<td></td>
<td>3 of 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 of 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIPE CAPS table: pipe caps for unavailable larger wall thickness 24&quot; and 26&quot; pipe sizes were removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 of 10</td>
</tr>
</tbody>
</table>
CAISSON COMPONENT SELECTION - CANTILEVER STRUCTURES TABLE: remove 38' span selections. Also remove 27' span with a 400 SF panel area due to unavailability of larger pipe sizes.

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; columns 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: columns 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 AASHO 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’ spans due to unavailability of larger pipe sizes.

2 of 5 END CONNECTIONS - SECTION: changed H odd 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 & SPICE 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
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 VIEW SPLASH BLOCK PLAN: added SPLASH BLOCK INCIDENTAL TO DOWNSPOUT to cement concrete slab 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.

CORNCHER DETAIL: added: 0” TO after X = and Y =.

2 of 2 DETAIL A: revised to indicate web’s longitudinal stiffer running continuously and vertical stiffer 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 0.688”.

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 Replacement 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 nut and washer from 1/8” to 1/2”.

ELEVATION: added 5/8” DIA. BAR callout.

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.

BC-756M 1 of 6 ANCHOR BOLT DETAIL 1: replaced 6” DIA. with 2” LARGER THAN ANCHOR BOLT for breakout.

Construction to NONSHRINK grout.

GENERAL NOTE 9: replaced MIL-S-8660 with SAE-AS8660.

BC-757M 3 shis. Re-issued with no changes.

BC-762M 3 - 6 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 shis. 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.
| BC-775M (continued) | 2 of 3 | SHEAR KEY DETAIL: added OR CNS 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. |
3 & 4 of 9 | BARRIER MOUNTED/RETAINING WALL MOUNTED SOUND BARRIER ELEVATION: replaced SPECIFIED in steel cable connection callout.  
5 of 9 | PRECAST CONCRETE PANEL Elevations - replaced SPECIFIED with REQUIRED in steel cable connection 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 1/4".  
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. |
COMMONWEALTH OF PENNSYLVANIA

BUREAU OF PROJECT DELIVERY

STANDARDS FOR BRIDGE CONSTRUCTION

BC-700M SERIES

SEPTEMBER 2016 EDITION

PUB.#219M
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CHIEF BRIDGE ENGINEER
ACTING DIR. BUR. OF PROJECT DELIVERY

BC-701M (TYP. AND ALT. CONCRETE BARRIER SIMILAR)

N.T.S.
ALTERNATE SIDEWALK DETAIL SHOWN UNLESS NOTED OTHERWISE
ANCHOR SYSTEMS
BC-721M
BC-734M
RECOMMENDED
SHEET 1 OF 3
JAN. 31, 2019

(ALL DIMENSIONS ARE TYPICAL)
LIGHTING POLE ANCHORAGE
SECTION A-A
BASE PLATE DETAIL

TYPICAL FENCE ELEVATION
(5'-0" MIN. DISTANCE TO STRUCTURE EXPANSION JOINT)

NOTES:
1. PROVIDE MATERIALS AND WORKMANSHIP IN
   ACCORDANCE WITH PUBLICATION.
2. PROVIDE ITEMS FROM APPROVED MATERIAL.
3. ONLY TOUCH-UP PAINTING OF MATERIAL IS PERMITTED.
4. PLACE BARRIER POSTS AND ANCHOR BOLTS TRULY VERTICAL.
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 BARRIER TO EXPAND OR CONTRACT.
7. CLEAN THE TIE WIRE FASTENERS AND SEND AWAY FROM TRAFFIC.
8. COVER ALL SURFACES OF THE BASE PLATES IN CONTACT WITH CONCRETE WITH CAULKING COMPOUND PRIOR TO ERECTION AND ALIGNMENT. AFTER ERECTION AND ALIGNMENT, CLEAN AND APPLY SEPARATE PIECE OF FENCE FABRIC.
9. PLACE ANCHOR BOLTS WITH SIDEWALK OR BARRIER AND CONCRETE WITH CAULKING COMPOUND MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 705.8(b).
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 CEMENT POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL EDGES TO GRADE.
14. PLACE CORNER POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL EDGES.
15. POSTS AND RAIL MATERIAL PER PUBLICATION 408, SECTION 1016.2(a)3.
16. POSTS AND RAIL MATERIAL PER PUBLICATION 408, SECTION 1016.2(a)3.
17. PLACE ANCHOR BOLTS WITH SIDEWALK OR BARRIER AND CONCRETE WITH CAULKING COMPOUND MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 705.8(b).
18. AT BRIDGE EXPANSION JOINTS, PERMIT THE FENCE FABRIC AND BARRIER TO EXPAND OR CONTRACT.
19. CLEAN THE TIE WIRE FASTENERS AND SEND AWAY FROM TRAFFIC.
20. COVER ALL SURFACES OF THE BASE PLATES IN CONTACT WITH CONCRETE WITH CAULKING COMPOUND PRIOR TO ERECTION AND ALIGNMENT. AFTER ERECTION AND ALIGNMENT, CLEAN AND APPLY SEPARATE PIECE OF FENCE FABRIC.
21. PLACE ANCHOR BOLTS WITH SIDEWALK OR BARRIER AND CONCRETE WITH CAULKING COMPOUND MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 705.8(b).
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26. PLACE CORNER POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL EDGES.
27. POSTS AND RAIL MATERIAL PER PUBLICATION 408, SECTION 1016.2(a)3.
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29. DESIGN DRAINAGE SYSTEM IN ACCORDANCE WITH DM4, SECTION PP 3.2.3.
30. POSTS AND RAIL MATERIAL PER PUBLICATION 408, SECTION 1016.2(a)3.
31. REFER TO CONTRACT DOCUMENTS FOR POST SPACING.
32. PLACE CEMENT POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL EDGES TO GRADE.
33. PLACE CORNER POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL EDGES.
34. POSTS AND RAIL MATERIAL PER PUBLICATION 408, SECTION 1016.2(a)3.
35. PLACE ANCHOR BOLTS WITH SIDEWALK OR BARRIER AND CONCRETE WITH CAULKING COMPOUND MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 705.8(b).
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39. PLACE CEMENT POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL EDGES TO GRADE.
40. PLACE CORNER POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL EDGES.
41. POSTS AND RAIL MATERIAL PER PUBLICATION 408, SECTION 1016.2(a)3.
42. PLACE ANCHOR BOLTS WITH SIDEWALK OR BARRIER AND CONCRETE WITH CAULKING COMPOUND MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 705.8(b).
43. DESIGN DRAINAGE SYSTEM IN ACCORDANCE WITH DM4, SECTION PP 3.2.3.
44. POSTS AND RAIL MATERIAL PER PUBLICATION 408, SECTION 1016.2(a)3.
45. REFER TO CONTRACT DOCUMENTS FOR POST SPACING.
46. PLACE CEMENT POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL EDGES TO GRADE.
47. PLACE CORNER POSTS AT ANGLE POINTS IN HORIZONTAL AND VERTICAL EDGES.
LEVELING PAD DETAIL

POST BRACKET DETAIL

SECTION

SIDEWALK DETAIL

SECTION C-C

TYPICAL BRACE BAND

NOTE:

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

COMMONWEALTH OF PENNSYLVANIA
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STANDARD

POST 1
POST 2
POST 3
POST 4
POST 5

L

2 (NESTED) THRIE-BEAM RAIL ELEMENTS

ALT. CONCRETE BRIDGE BARRIER TRANSITION SECTION

TYP. CONCRETE BRIDGE BARRIER TRANSITION SECTION

2 (NESTED) THRIE-BEAM RAIL ELEMENTS

TYP. CONCRETE BRIDGE BARRIER TRANSITION SECTION

W-BEAM TO THRIE-BEAM TRANSITION SECTION

VERTICAL WALL TO BRIDGE BARRIER TRANSITION CONNECTION

VERTICAL WALL BRIDGE BARRIER TRANSITION SECTION

VERTICAL WALL BRIDGE BARRIER TRANSITION SECTION

W-BEAM RAIL ELEMENT

POST 6
POST 6
POST 6

4.5
1

NOTE:

VERTICAL WALL BRIDGE BARRIER TRANSITION SECTION

THRIE-BEAM TO VERTICAL WALL BRIDGE BARRIER TRANSITION CONNECTION

TYPE C INSERT ASSEMBLY (SEE BC-734M)

MIDSPAN TUBE ASSEMBLY

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.

CHIEF BRIDGE ENGINEER

RECOMMENDED

BC-703M
SHEET 1 OF 2

REFERENCE DRAWINGS

RC-51M    TYPE 31 STRONG POST GUIDE RAIL
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
BC-734M   ANCHOR SYSTEMS

ROADWAY CLEAR DISTANCE FOR VERTICAL WALL BARRIER

ELEVATION VIEW FOR THRIE-BEAM TO TYP. BRIDGE BARRIER

ELEVATION VIEW FOR THRIE-BEAM TO ALT. BRIDGE BARRIER

ELEVATION VIEW FOR TYP. VERTICAL WALL BRIDGE BARRIER

ELEVATION VIEW FOR ALTERNATE VERTICAL WALL BRIDGE BARRIER SIMILAR

6'-3"
60"
" 4 SPACES @ 3'-1"
"=12'-6"
"3'-0'
11""
"2'-1"
"1'-2"
"8"
"2'-1"

AS A TL-3 BARRIER DESIGNATION.

1. THRIE-BEAM TO BRIDGE BARRIER TRANSITION HAS BEEN ACCEPTED BY FHWA
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-51M FOR DETAILS AND HARDWARE NOT SHOWN.

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 FLARED ENDS TRANSITIONS FOR RECONSTRUCTED STRUCTURES WITH SAFETY WINGS.

1'-1" FOR ALTERNATE BARRIER.
1'-0" FOR TYPICAL BARRIER,
2…" FOR ALTERNATE BARRIER.
3…" FOR TYPICAL BARRIER,

NOTE:

THRIE-BEAM TO BRIDGE BARRIER TRANSITION HAS BEEN ACCEPTED BY FHWA AS A TL-3 BARRIER DESIGNATION.

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
2. USE PLAN DIMENSIONS WHEN DIFFERENT FROM THOSE SHOWN ON THIS STANDARD.
3. USE UNREINFORCED CONCRETE BARRIER AND EMBEDDED INSERTS ARE BRIDGE ITEMS.
4. SEE RC-50M AND RC-51M FOR DETAILS AND HARDWARE NOT SHOWN.
5. PROVIDE APPROACH END GUIDE RAIL TREATMENT AT CORNER OF APPROACH AND TRAILING ENDS OF BRIDGE BARRIER ON THIS SHEET, ALONG WITH APPROACH AND TRAILING ENDS OF BRIDGE BARRIER ON ALL DRAWINGS. GUTTER LINE IS NOT REQUIRED ON TRAILING ENDS OF BARRIERS UNLESS WARRANTED BY OTHER OBSTRUCTIONS.
6. THE APPROACH END TRANSITION COMPONENTS ARE ROADWAY ITEMS.
7. PROVIDE APPROACH END GUIDE RAIL TREATMENT AT CORNER OF APPROACH AND TRAILING ENDS OF BRIDGE BARRIER ON THIS SHEET, ALONG WITH APPROACH AND TRAILING ENDS OF BRIDGE BARRIER ON ALL DRAWINGS. GUTTER LINE IS NOT REQUIRED ON TRAILING ENDS OF BARRIERS UNLESS WARRANTED BY OTHER OBSTRUCTIONS.
8. THE APPROACH END TRANSITION COMPONENTS ARE ROADWAY ITEMS.

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 FLARED ENDS TRANSITIONS FOR RECONSTRUCTED STRUCTURES WITH SAFETY WINGS.

1'-1" FOR ALTERNATE BARRIER.
1'-0" FOR TYPICAL BARRIER,
2…" FOR ALTERNATE BARRIER.
3…" FOR TYPICAL BARRIER,
**MATERIAL**

1'-0"

**TS 4"x3"**

---

**ACTING DIR. BUR. OF PROJECT DELIVERY**

**BC-706M**

**ANCHOR SYSTEMS**

**RECOMMENDED**

**TYPE 31 STRONG POST GUIDE RAIL**

---

**SHEET 1 OF 2**

**JAN. 31, 2019**

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**WOOD BLOCK DETAIL**

**BASE PLATE DETAIL**

**ELEVATION A-A**

**SECTION B-B**

**SECTION C-C**

**ALTERNATE SPLICE TUBE FABRICATION**

**TUBE, SLEEVE AND RUBRAIL MEMBERS**

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<td>0.25&quot;</td>
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**NOTES:**

1. **PA STRUCTURE MOUNTED GUIDE RAIL BARRIER/INSTALLATIONS AND MANUFACTURES IN ACCORDANCE WITH THIS STANDARD DRAWING DOES NOT REQUIRE SHOP DRAWINGS.**

2. **PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION No. 408.**

3. **LOCATE RAIL SPLICES AT EXPANSION JOINTS AND AT OTHER LOCATIONS WHERE NECESSARY. POSTS ARE AS PLANTED AS REQUIRED FOR EXPANSION.**

4. **PROVIDE RAIL TUBE CONTINUOUS OVER LESS THAN TWO POSTS IN PLANTED POSTS, RAIL SPLICES WILL BE ALLOWED IN THE RAIL TUBE SECTIONS.**

5. **PLACE POLES AND POST ANCHOR BOLTS NORMAL TO GRADE.**

6. **PLANT POST AND POST ANCHOR BOLTS IN ACCORDANCE WITH SECTION 408.**

7. **DO NOT USE DEFORMATION JOINTS WITH PA STRUCTURE MOUNTED GUIDE RAIL BARRIER INSTALLATIONS.**

8. **STRUCTURAL STEEL FOR POST BASE PLATES AND POSTS IN ACCORDANCE WITH **

9. **COMPLETE JOINT PENETRATION GRID RAIL, GRID RAIL WITH OR WITHOUT POSTS, WELDING IN OR OUTSIDE RAIL, WELDING IN OR OUTSIDE RAIL.**

10. **RAIL TUBES IN ACCORDANCE WITH **

11. **CAYLUMANY ALL STEEL COMPONENTS IN ACCORDANCE WITH **

12. **THE APPROACH END TRANSITION COMPONENTS ARE ROADWAY ITEMS.**

13. **FOR POST ATTACHMENT BOLT DETAILS, SEE SHEET 2.**

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**TYPICAL SECTION**

**DECK / SLAB REMOVAL**

**NOT SHOWN FOR CLARITY**

---

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD**

**PA STRUCTURE MOUNTED**

**GUIDE RAIL BARRIER**

**MISCELLANEOUS DETAILS**

---

**REFERENCE DRAWINGS**

**BC-706M**

**RECOMMENDED JAN. 31, 2019**

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**SECTION**

**LENGTH**

**DATE**

**NOTE**

**SCALE**

**COPYRIGH**

**PAGE**
COMMONWEALTH OF PENNSYLVANIA
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PA STRUCTURE MOUNTED
GUIDE RAIL BARRIER
MISCELLANEOUS DETAILS

RUB RAIL TO POST BOLT
\( \frac{3}{8} \) " ROUND HEAD BOLT

W-BEAM TO POST BOLT
\( \frac{3}{8} \) " ROUND HEAD BOLT
**ELEVATION-POST**

**SECTION B-B**

- Anchor bolts: ASTM A490, grade 50, 1/2"-13 x 2 3/4" bolts, ASTM A325 nuts & ASTM A490 washers, galvanized, provide 4 ASTM A502 anchors (BC-704M)
- AFL: ASTM A709, grade 36 or 50
- 1" plate: ASTM A36, grade 50
- 1/4" plate: ASTM A36, grade 50

**ELEVATION-RAISED SIDEWALK POST**

- Anchor bolts: ASTM A490, grade 50, 2"-12 x 4" bolts, ASTM A325 nuts & ASTM A490 washers, galvanized, provide 4 ASTM A502 anchors (BC-704M)
- AFL: ASTM A709, grade 36 or 50
- 1" plate: ASTM A36, grade 50
- 1/4" plate: ASTM A36, grade 50

**ELEVATION-ALTERNATE SIDEWALK POST**

- Anchor plate: ASTM A36, grade 50
- 1/4" plate: ASTM A36, grade 50

**NOTES:**

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. GALVANIZE ALL RAILING COMPONENTS AFTER FABRICATION IN ACCORDANCE WITH SECTION 1202.06, PUBLICATION 408 UNLESS OTHERWISE SHOWN ON THE PLAN.
3. COAT ALL SURFACES OF THE BASE PLATE IN CONTACT WITH CONCRETE WITH GALVANIZING COMPPOUND PRIOR TO ERECTION.
4. WITHIN 2" LONG FROM END OF RAIL, PROVIDE 2 ANCHOR BOLTS, FULL COMMONMEETING THE REQUIREMENTS OF PUBICATION 408, SECTION 1202.06.
5. THE MAXIMUM AND MINIMUM DIAMETERS OF THE RAIL MUST BE 9/16" +/- 1/16" (TYP.) FROM PLAN DIMENSION.
6. THE OUT OF FLATNESS TOLERANCE FOR THE POST BASE PLATES SHALL NOT EXCEED 0.125 INCHES ALONG THE 45° AXIS OF THE RAIL.
7. IF FLAME CUTTING OR PLASMA CUTTING IS USED TO CREATE SLOTS, PLUGS MUST BE PROVIDED AND PROPER FLATS SUBMITTED ALONG THE HOLE.
8. THE ADJACENCY BETWEEN DEVICES IN THE PLATE IN ANY DIRECTION MAY NOT VARY MORE THAN 0.125 INCHES ALONG THE 45° AXIS OF THE RAIL. THE ADJACENCY BETWEEN DEVICES MAY NOT BE LESS THAN 0.0625 INches.
9. FOR SIDEWALK RAIL TUBE SPlice DETAILS, SEE BC-720M.

**SIDEWALK RAIL ROD SPlice**

SAME AS OPENING IN BARRIER FOR SPLICES ACROSS EXPANSION JOINTS IN SUPERSTRUCTURE. 3/8" FOR SPLICES AT OTHER LOCATIONS.
### PA HT BRIDGE BARRIER END DETAILS

**ALTERNATE SIDEWALK RAIL**

*Without inlet placement shown with inlet placement shown.*

**SECTION C-C**

- **TYPICAL WELD AT MITERS**

**SECTION D-D**

- **ELLIPSE RAILING SPLICE**

### TABLE 1

**APPROVED RAILING MATERIAL**

<table>
<thead>
<tr>
<th>SLEEVE MATERIAL</th>
<th>TYPICAL MATERIAL DISCRIPTION</th>
<th>MATERIAL TYPE</th>
<th>THICKNESS</th>
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<tbody>
<tr>
<td>Sleeve Material</td>
<td>Material Discrission</td>
<td>ASTM A53-B</td>
<td>0.335&quot;</td>
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<td>Material Discrission</td>
<td>ASTM A53-B</td>
<td>0.335&quot;</td>
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<tr>
<td>Sleeve Material</td>
<td>Material Discrission</td>
<td>ASTM A53-B</td>
<td>0.335&quot;</td>
</tr>
</tbody>
</table>

### NOTES:

1. Complete joint penetration groove weld. Grind flush on outside face. Show specific weld symbol on Shop Drawings.
PA HT BRIDGE BARRIER END DETAILS

RAISED SIDEWALK RAIL

ELEVATION

DETAIL B

SIDEWALK RAIL

PLAN

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.
Notes:
1. Provide materials and workmanship in accordance with publication 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 Division and RC-50M for details and hardward not shown.
5. Thrie-beam to PA Type 10M Bridge Barrier Transition without inlet placement has successfully passed TL-4 single unit truck single testing. Thrie-beam to PA Type 10M Bridge Barrier Transition with inlet placement has been granted TL-5 equivalence by NCHRP.
6. Provide approach end guide rail treatment at both the approach and trailing ends of bridge barriers on single 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 highway items.

Commonwealth of Pennsylvania
Department of Transportation
Bureau of Project Delivery

Thrie-beam to PA Type 10M Bridge Barrier Transition Connection

Standard

Elevation View for Thrie-beam to PA Type 10M Bridge Barrier (without inlet placement)

Plan View for Thrie-beam to PA Type 10M Bridge Barrier

Plan View for Thrie-beam to PA Type 10M Bridge Barrier

Elevation View for Thrie-beam to PA Type 10M Bridge Barrier

Reference Drawings:

RC-70M Guide Rail to Bridge Barrier Transitions
RC-50M Thrie-beam Strong Post Guide Rail

Recommended Date: 12/15/2016
Recommended Date: 12/15/2016

BC-78BM

Sheet 1 of 2

Director, Bureau of Project Delivery
AUG. 4, 2017

Chief Bridge Engineer
RECOMMENDED
AUG. 4, 2017
NOTES:

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

WITH WASHERS AND SELF LOCKING NUT OR NUT AND JAM NUT
END CONNECTION ANGLE
GRIND SMOOTH
EDGE FLUSH WITH SURFACE

RAIL ELEMENTS
THREE-BEAM

STANDARD BRIDGE BARRIER TRANSITION CONNECTION
THREE-BEAM TO PA TYPE 10M
THREE-BEAM TERMINAL SECTION BRIDGE CONNECTION
(SEE BC-709M)

(FOUR DETAILS, SEE SHEET 1.)
(FOUR DETAILS, SEE SHEET 1.)

FOR NOTES, SEE SHEET 1.
FOR NOTES, SEE SHEET 1.

CHIEF BRIDGE ENGINEER
RECOMMENDED
BC-708M
SHEET 2 OF 2

BUREAU OF PROJECT DELIVERY

DIRECTOR, BUR. OF PROJECT DELIVERY

AUG. 4, 2017
AUG. 4, 2017
**Notes:**

1. For details, see BC-709M
2. Ensure concrete recess area in curb and opening to provide smooth transition and prevent edge from catching. The use of smooth inserts will not affect appearance of interior wall.
3. Maintain 4" min. between edge of steel to the side of concrete to prevent deductions in finish, or 10" if 10" steel and top for PCC concrete.
4. Maximum distance from edge of extension to end to finish strip is 3'.
PA TYPE 10M BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM

1. FOR SECTION L-L, SEE SHEET 7.
2. FORM CONCRETE RECESS AREA IN CURB AND GRIND TO PROVIDE SMOOTH SURFACE.
3. MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF 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

DATE: JAN. 31, 2019

FILED BY: ACTING DIR. BUR. OF PROJECT DELIVERY
PA TYPE 10M BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM

1. FOR LOCATION OF SECTION L-L, SEE SHEET 6.
2. FORM CONCRETE INSERTS AREA IN CURB AND GRIND TO PROVIDE SMOOTH SURFACE.
3. USE ONE COAT OF ASPHALT CEMENT PA-1 OR PERFORMANCE GRADE ASPHALT.
4. APPLICATION 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMP. OF -10°F FOR STEEL AND 10°F FOR CONCRETE.
5. 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 JAN. 31, 2019
RECOMMENDED JAN. 31, 2019
SHEET 7 OF 12
STANDARD SHEET OF PROJECT DELIVERY
BC-709M
3. EXPANSION DETAILS, SLOTTED OPENINGS, AND CLEARANCES SHOWN ARE MODIFIED HERE.

1. PROVIDE ELASTOMERIC PADS OR WASHERS ½" MIN. THICKNESS COMPLIANT TO PUB. 408, SECTION 1107.02(p), TYPE I, BETWEEN CONTACT SURFACES WHERE ALUMINUM COMPONENTS COME IN CONTACT WITH GALVANIZED STEEL. ALSO PROVIDE FABRIC BUSHINGS WITH MATERIAL COMPLIANT TO SECTION 1107.02(p), TYPE 11, WHEREVER GALVANIZED STEEL COMPONENTS COME IN CONTACT WITH ALUMINUM.

2. PROVIDE ALL COMPONENTS AND DETAILS OF ALUMINUM PROTECTIVE BARRIER AS SHOWN ON BC-711M, EXCEPT AS REQUIRED FOR LARGER MOVEMENTS.

3. EXPANSION DETAILS, SLOTTED OPENINGS, AND CLEARANCES SHOWN ARE MODIFIED HERE. SEE DETAIL D. ADJUST ALL EXPANSION JOINT DETAILS SHOWN AND PROVIDE SPECIAL DETAILS AS REQUIRED FOR LARGER MOVEMENTS.

NOTE:
- FOR CLARITY, 96 x 18 HADING POSTS, RAIL TUBES, AND BASE PLATES NOT SHOWN IN ELEVATION VIEW.
- SET TRULY VERTICAL L ALUMINUM BARRIER POSTS AND ALUMINUM PROTECTIVE BARRIER POSTS MOUNTED VERTICALLY. ADJUST WELDED STUD WASHERS If 10M BARRIER POSTS TO PERMIT RAILS TO BE PARALLEL TO ROADWAY GRADE.  ALUMINUM BARRIER RAILS AND BOTTOM ANGLES TO RUN PARALLEL TO ROADWAY GRADE.
CHIEF BRIDGE ENGINEER

RECOMMENDED RAIL SPLICE SLEEVE ALTERNATE

COMPLETE JOINT PENETRATION GROOVE WELD. GRIND FLUSH ON OUTSIDE FACE. SHOW SPECIFIC WELD SYMBOL ON SHOP DRAWINGS. (TYP.)

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

JUNCTION BOX NOTES:
1. JUNCTION BOX MAY BE LOCATED EITHER TO THE LEFT OR TO THE POINT OF THE LIGHTING POLE.
2. JUNCTION BOXES ARE ONLY REQUIRED, IF SPECIFIED ON THE CONTRACT DRAWINGS.
3. FOR RAISED SIDEWALK, PLACE JUNCTION BOX ON TOP, ADJACENT TO REAR FACE.
4. FOR RAISED SIDEWALK, PLACE JUNCTION BOX ON TOP, ADJACENT TO REAR FACE.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY STANDARD

PA TYPE 10M BRIDGE BARRIER ALTERNATE JUNCTION BOX DETAIL

PA TYPE 10M BRIDGE BARRIER AT OPEN JOINT

COMPLETE JOINT PENETRATION GROOVE WELD. GRIND PLUG ON OUTSIDE FACE. SHOW SPECIFIC WELD SYMBOL ON SHOP DRAWINGS. (TYP.)

JUNCTION BOX NOTES:
1. JUNCTION BOX MAY BE LOCATED EITHER TO THE LEFT OR TO THE POINT OF THE LIGHTING POLE.
2. JUNCTION BOXES ARE ONLY REQUIRED, IF SPECIFIED ON THE CONTRACT DRAWINGS.
3. FOR RAISED SIDEWALK, PLACE JUNCTION BOX ON TOP.
4. FOR RAISED SIDEWALK, PLACE JUNCTION BOX ON TOP.
5. PROVIDE 2" CLEAR ON ALL REINFORCEMENT UNLESS NOTED.
6. FOR ADDITIONAL NOTES, SEE SHEET 1.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY STANDARD

PA TYPE 10M BRIDGE BARRIER MISCELLANEOUS DETAILS

END VIEW

ALTERNATE RAIL SPLICE SLEEVE

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY STANDARD

PA TYPE 10M BRIDGE BARRIER MISCELLANEOUS DETAILS
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 sign as shown on Sheet A, and do not space more than 50' apart.
5. Refer to Sheet 1 for other notes.
6. Protective barrier connection detail shown for typical concrete barrier section and alternate sidewalk section, and accessories as required on site. Side connection required with inside face flush.
7. See Sheet 1 for location of Section C-C and Section D-D.

ACCIDENT PREVENTION SIGN

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD ALUMINUM PROTECTIVE BARRIER

NOTES
DETAIL OF EXPANSION JOINT AT PIERS

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

- 1/4" BOLTS WITH HEX CAP NUT, HEX NUT, AND FLAT WASHERS.
- 5/16" x 3" SLOTTED HOLE IN CONCRETE CUSHION PLATE.
- 3/8" x 5.40 Channel C6 x 3.63
- 1" x 48" " C Channel C6 x 3.63
- 1 1/2" x 3" CHANNEL C6 x 5.40
- 2" @ 68°F
- 3" x 6" RAISED TREAD AT 12" SPACING.
- PLACED MIDWAY BETWEEN BOLTS
- FLANGE GASKET BETWEEN BOLTS AT 12" SPACING.
- 5/8" x 5/8" FEMALE NUT AND HEX JAM NUT, HEX NUT, AND FLAT WASHERS.
- 3/8" x 5.40 BENT TREAD 1/2".
- 12" SHEET METAL FOLDER AT JOINT OPENING.
- TOP OF BARRIER AT EXPANSION JOINT
PROTECTIVE BARRIER DETAIL AT OPEN JOINT IN BARRIER

1. Seal all open joints in the barrier barrier within the limits of the protective barrier with approved joint sealer.

SECTION L-L

- Connection similar to Section L-L, except there is no ground connection.

- Ground connections on the railroad side only.

- Drill & tap through slotted holes in L5 x 3 x 3 threads/IN for 1½" bolts.

SECTION N-N

- Connection similar to Section L-L, except there is no ground connection.

- Drill & tap through slotted holes in L5 x 3 x 3 threads/IN for 1½" bolts.

SECTION M-M

- Ground connections ½" x 4" x 6" for ground connection to be made by railroad co.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
ALUMINUM
PROTECTIVE BARRIER

NOTE:

- FOR DETAILS OF GROUND CONNECTIONS FOR PROTECTIVE FENCE.

- FOR GROUND CONNECTION TO BE MADE BY RAILROAD CO.
PLAN VIEW FOR THRIE-BEAM TO PA BRIDGE BARRIER

ELEVATION VIEW FOR THRIE-BEAM TO PA BRIDGE BARRIER
NOTES:
1. FOR SECTION D-D, SEE SHEET 3.
2. FOR GENERAL NOTES, SEE SHEET 1.
NOTES:
1. FOR LOCATION OF SECTION D-D, SEE SHEET 1.
2. FOR ADDITIONAL DETAILS, SEE BC-50M.
ALTERNATE SIDEWALK RAIL SPLICE

RAIL SPLICE TABLE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>RAIL SPLICE</th>
<th>SPlice TUBE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYP1</td>
<td>2&quot; x 2&quot; x 1/2&quot;</td>
<td>2&quot; x 2&quot; x 1/2&quot;</td>
</tr>
<tr>
<td>TYP2</td>
<td>2&quot; x 2&quot; x 1/4&quot;</td>
<td>2&quot; x 2&quot; x 1/4&quot;</td>
</tr>
</tbody>
</table>

NOTES:

1. See Sheet 1 for details.

SIDEWALK RAIL ROD SPLICE

DETAIL B

RAIL SPLICE

SECTION B-B

POST TO BASE PLATE WELD

SIDEWALK RAIL ROD SPLICE

ALTERNATE POST DETAIL

(ALTERNATE SIDEWALK)

ALTERNATE BARRIER SECTION

ALTERNATE SIDEWALK RAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD
PA BRIDGE BARRIER
MISCELLANEOUS RAILING DETAILS

NOTE:

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.
ACTING DIR. BUR. OF PROJECT DELIVERY

**BC-713M**

RAISED SIDEWALK RAIL

RECOMMENDED

JAN. 31, 2019

SHEET 3 OF 13

MISCELLANEOUS RAILING DETAILS

BARRIER SECTION

TYPICAL SIDEWALK RAIL

- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
- PROVIDE RAILING TUBES IN ACCORDANCE WITH ASTM A 500 GRADE B.
- PROVIDE RAILING POSTS AND BASE PLATES IN ACCORDANCE WITH ASTM A 709 GRADE 50 OR 50S KSI.
- THE RAILING TUBES ARE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE.
- ALL RAILING COMPONENTS SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 105.02(s), PUBLICATION 408 UNLESS OTHERWISE SHOWN ON THE PLANS.

Plate Washer Detail

**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 ASTM A 709 GRADE 50 OR 50S KSI.
4. ALL RAILING COMPONENTS SHALL BE GALVANIZED IN ACCORDANCE WITH SECTION 105.02(s), PUBLICATION 408 UNLESS OTHERWISE SHOWN ON THE PLANS.
5. THE RAILING TUBES ARE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE.
6. FOR ADDITIONAL NOTES, SEE SHEET 1.
7. FOR WELDING DETAILS, SEE SHEET 2.
8. FOR ADDITIONAL NOTES, SEE SHEET 1.
9. FOR ANCHOR STUD DETAILS, SEE SHEET 2.
RAISED SIDEWALK RAIL ELEVATION
(TOP VIEW)

TOP VIEW

SIDEWALK RAIL
ANCHOR STUD DETAIL

NOTES:
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. FOR THREE-BEAM RAIL TO PA BRIDGE BARRIER TRANSITION CONNECTION, SEE NOTE 7 ON SHEET 1 AND SCALE DETAIL ON SHEET 4.
3. FOR ADDITIONAL NOTES, SEE SHEET 1.

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

1. FOR A, SEE B-C VIEW.

2. FORM CONCRETE INSERTS AREA IN BARRIER WALL AND GIVING TO FACE SIDE OF EXPANSION DAM AT TEMPERATURES OF -9°F OR BELOW TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.

3. MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMPERATURES OF -9°F OR BELOW TO ALLOW BENT SLIDING PLATE TO MOVE FREELY WITHOUT FRICTION.

4. MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".

PA BRIDGE BARRIER AT TOOTH EXPANSION DAM

STANDARD

PA BRIDGE BARRIER DETAILS AT TOOTH EXPANSION DAM
CONSTRUCTION JOINT (CJ)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

LOW SIDE OF DAM
HIGH SIDE OF DAM
IN CONCRETE

SECTION A-A

PLAN - SKEW ANGLE ≥ 75°

LIMITS OF BLOCKOUT
CONCRETE INSERTS
SCREWS AND STEEL EXTRUSION (TYP.)

SECTION C-C

LIMITS OF BLOCKOUT
STEEL EXTRUSION (TYP.)
CONCRETE INSERTS
SCREWS AND STEEL

SECTION B-B

MIN. DESIGN TEMP.
MAX. JOINT OPENING AT (AT SIDEWALK)

MIN. JOINT OPENING AT (AT RAISED SIDEWALK)

NOTES:

1. FOR SECTION D-D DETAILS, SEE SHEET 8.
2. APPLY ONE COAT OF ASPHALT CEMENT PA-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
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 JAN. 31, 2019
RECOMMENDED JAN. 31, 2019

BUREAU OF PROJECT DELIVERY
ACTING DIR. BUR. OF PROJECT DELIVERY

SHEET 7 OF 13
PA BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM

SECTION D-D

SECTION F-F

SECTION E-E

NOTES:

1. For location of Section D-D, see Sheet 7.

2. Joint concrete recess area in barrier wall and barrier wall to provide smoother surface.

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".

* If 1/2"C” stud cannot be accommodated in the space, additional length of stud may be used with prior approval.

APPROVAL STAGE.

DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE ACTING DIR. BUR. OF PROJECT DELIVERY
NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.

2. PROVIDE ELASTOMERIC PADS OR WASHERS MIN. THICKNESS CONFORMING TO PUB. 408, SECTION 1113.03(h), TYPE II, BETWEEN CONTACT SURFACES WHEREVER ALUMINUM COMPONENTS COME IN CONTACT WITH GALVANIZED STEEL. ALSO PROVIDE PLASTIC BUSHINGS WHERE ALUMINUM COMPONENTS COME IN CONTACT WITH GALVANIZED STEEL, TYPE II, WHEREVER ALUMINUM COMPONENTS COME IN CONTACT WITH GALVANIZED STEEL HOMES IN CONTACT WITH GALVANIZED STEEL.

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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA BRIDGE BARRIER
ALUMINUM PROTECTIVE BARRIER DETAILS

RECOMMENDED JUL 15, 2019
RECOMMENDED AUG 22, 2019
THEMATIC ORACLE
SHEET 10 OF 13
NOTE A:
STANDARD SHEET 12 OF 13

M.S.E. WALL DETAILS

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 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.

CONCRETE SHOULDER ON M.S.E. WALLS

LEVELING CONCRETE AS REQUIRED TO ACHIEVE DESIGN PROFILE.
3" CLR.
#5 @ 12"
1' - 6"
(11 PER 10' UNIT)
#4 AS SHOWN
1'-0"
V-NOTCH 1/2" X 1/2"
4'-2"
4'-2"
R=9"CHAMFER 2'-0"
7"
2'-0"
PA BRIDGE BARRIER AT OPEN JOINT
TRAILING POST AND TUBE NOT SHOWN

PA BRIDGE BARRIER ALTERNATE JUNCTION BOX DETAIL

NOTES:
1. FOR LOCATION OF CONSTRUCTION JOINTS AND OPEN JOINTS, REFER TO DESIGN DRAWINGS.
2. PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH SECTION 705.9 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.
**ELEVATION**

- **LEVELING PAD**: 24 x 3.32 (bottom rail)
- **DETAIL A**: Place leveling pads integrally with sidewalk and edge tool edges of pads.

**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 nails 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 spacing by increasing or decreasing balusters spacing.
6. Place end caps flush with rails.
7. Coating all surfaces of the base plate in contact with concrete with a minimum thickness of 0.30 mils, provide uncoated metal surfaces and the concrete with cleaning and sealing to meet the requirements of Publication 641, Section 705.8(b)

**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF TRANSPORTATION**

**STANDARD**
**ALUMINUM PEDESTRIAN RAILING**

**SECTION A-A**
- **PLATE DETAIL**: SEE PLATE DETAIL
- **ALTERNATE DETAIL A**: SEE ALTERNATE DETAIL A
- **ALTERNATE PLATE DETAIL**: SEE ALTERNATE PLATE DETAIL

**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**CHIEF BRIDGE ENGINEER**

**DIRECTOR, BUR. OF PROJECT DELIVERY**

**DATE**: SEPT. 30, 2016

**SHEET**: 1 OF 2
TYPICAL EXPANSION PANEL DETAIL

BALUSTER DETAILS

BALUSTER DETAILS

BALUSTER DETAILS

BALUSTER DETAILS

TYPICAL DETAIL AT POST

TYPICAL DETAIL AT POST

TYPICAL DETAIL AT POST

TYPICAL DETAIL AT POST

THE OPENING IN DECK FOR SPLICES ACROSS EXPANSION JOINTS IN SUPERSTRUCTURE.

POST BASE DETAIL

NOTE:

SEPT. 30, 2016

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD ALUMINUM PEDESTRIAN RAILING

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BALUSTERS 1 1/8" O.D.
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 fc = 3.5 KSI
CLASS AA CONCRETE
3. PROVIDE STRUCTURAL STEEL CONFORMING TO ASTM A 572 GRADE 50, ASTM A 1018 GRADE 30, AND ASTM A 106 GRADE B.
4. PROVIDE 1'-0" DIAMETER BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153 OR ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.
5. PROVIDE 5'-0" DIAMETER BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.
6. PROVIDE 10'-0" DIAMETER BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.
7. PROVIDE 2'-0" DIAMETER BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.
8. PROVIDE 3'-0" DIAMETER BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.
9. PROVIDE 4'-0" DIAMETER BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.
10. PROVIDE 6'-0" DIAMETER BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.
11. PROVIDE 8'-0" DIAMETER BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.
12. PROVIDE 10'-0" DIAMETER BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.

TYPE A INSTALLATION: SPACING = 2'-0"
TYPE B INSTALLATION: SPACING = 4'-0"
TYPE C INSTALLATION: SPACING = 8'-0"

TABLE 1:

<table>
<thead>
<tr>
<th>BOLT SPACING</th>
<th>SHEAR (KIPS)</th>
<th>TENSION (KIPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'-0&quot;</td>
<td>2 4 6 9</td>
<td>N/A</td>
</tr>
<tr>
<td>2'-0&quot;</td>
<td>3 6 11</td>
<td>N/A</td>
</tr>
<tr>
<td>3'-0&quot;</td>
<td>4 12</td>
<td>N/A</td>
</tr>
<tr>
<td>4'-0&quot;</td>
<td>5 15 25</td>
<td>N/A</td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>6'-0&quot;</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

TABLE 1 NOTES:
*For conditions for Type A, B and C installation, see General Note 9.

SHEAR AND TENSION VALUES ARE MINIMUM CAPACITY REQUIRED FOR AN INSTALLATION.
SPACING VALUES ARE NOT SET AT EXCEEDS OF THE ARCH PROVIDER, A LOWER SPACING MUST BE SELECTED.

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 fc = 3.5 KSI
CLASS AA CONCRETE
3. PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270 GRADE 50,
CLASS AA CONCRETE
4. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
5. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
6. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
7. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
8. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
9. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
10. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
11. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
12. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
13. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
14. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
15. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
16. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
17. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
18. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
19. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
20. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
21. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
22. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
23. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
24. PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD), CHARPY IMPACT REQUIREMENTS AT -20°F.
CONSTRUCTION NOTES:

1. DRILL OF MEANS WHICH WILL NOT DAMAGE THE ADJACENT CONCRETE. SUPPORT BEHIND THE DECK AS NECESSARY TO AVOID DRILLING OF CONCRETE FOR BOLT THROUGH AND ADHESIVE ANCHOR HOLES.

2. DRILL INTO THE DECK USING THE HOLES IN THE TYPICAL BARRIER AS A TEMPLATE. THE BOLT MUST NOT BE LOCATED ANYWHERE WITHIN THE 2" SLOT, OR MUST BE MOUNTED VERTICALLY 2".

3. THE BARRIERS MAY BE REPOSITIONED TO AVOID DAMAGE TO THE DECK DURING DRILLING. MOVE THE BARRIER PARALLEL TO THE DIRECTION OF TRAFFIC UP TO 2" AND PERPENDICULAR TO TRAFFIC UP TO 1". MOVE THE BARRIER FACE WITH SLABS BEING REPLACED TO THE TRAFFIC FACED WITH THE SIDE OF THE SLAB CONTACTED BY THE WOMAN. USE A BORING MACHINE OR ALTERNATE BOLT POCKETS IN TYPES A AND C INSTALLATIONS. FOR EXISTING DECKS, TYPE C INSTALLATIONS WILL REQUIRE DRILLING THROUGH DECK REINFORCEMENT STEEL. ALTERNATIVELY, ONE BOLT PER BARRIERS SECTION MAY BE ELIMINATED WITH APPROVAL OF THE ENGINEER. FOR NEW DECKS WITH TYPE C INSTALLATIONS, PROPERLY PLANNED AND PLACE DECK REINFORCEMENT STEEL TO AVOID DAMAGE DURING DRILLING.

4. WITHIN THE END SEGMENT OF THE TEMPORARY BARRIER AT THE LOCATION OF THE END OF THE HOLES AND EXTEND IT UP TO THE BRIDGE. CONNECT THE END SEGMENT TO THE TEMPORARY BARRIER TO THE OPPOSITE SIDE OF THE TEMPORARY BARRIER. ALIGN TEMPORARY BARRIERS 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 END LENGTH ON THE BRIDGE.

5. BOLTING OF THE SEGMENTS TO THE DECKS IS NOT REQUIRED IF THE WIDTH OF THE SEGMENT IS 2'-0" OR LESS. PAYING TO THE SPACING USED ON THE TEMPORARY BARRIERS. REFER TO 5'-0" WHEN BOLT THROUGH ANCHORS OR ADHESIVE ANCHORS ARE NOT REQUIRED.

6. TREATMENT OF ANCHOR HOLES AFTER REMOVAL OF BARRIERS

   a. FOR ADHESIVE ANCHORS MOUNTED ON NEW DECKS AND EXISTING DECKS THAT WILL NOT BE DEMOLISHED IN A LATER STAGE OF CONSTRUCTION, CORE ANCHORS TO COMPLETELY REMOVE THE ANCHOR AFTER THE REMOVAL OF THE TEMPORARY BARRIERS. REMOVE THE EPOXY USING THE SAME SIZE HOLE OF THE ANCHOR ABOVE THE DECK AND GRIND SMOOTH AND PERMISSIBLE TAPER.

   b. FOR ADHESIVE ANCHORS MOUNTED ON EXISTING DECKS THAT WILL NOT BE DEMOLISHED IN A LATER STAGE OF CONSTRUCTION, CORE HOLES 3'-0" TO 6'-0" OR IF AN EFFECTIVE BARRIER EXISTS BEHIND THE WIDER OF THE DECKS BEHIND THE TEMPORARY BARRIER. INSTALL ANCHORS AT THE SAME SPACING USED ON THE BRIDGE BUT NOT TO EXCEED 2'-0" IN THE END LENGTH ON THE BRIDGE.

   c. FOR BOLT THROUGH ANCHORS MOUNTED ON NEW DECKS OR MOUNTED ON EXISTING DECKS THAT WILL BE DEMOLISHED IN A LATER STAGE OF CONSTRUCTION, CORE HOLES WITH ADHESIVE ANCHORS HOLES. THE HOLES MUST NOT BE LOCATED WITHIN THE 2" SLOT, OR MUST BE MOUNTED VERTICALLY 2".

7. THE END SEGMENT OF THE TEMPORARY BARRIER AT THE ENDS OF THE HOLES MAY BE TAPPED UP TO THE BRIDGE. CONNECT THE END SEGMENTS TO THE TEMPORARY BARRIER TO THE OPPOSITE SIDE OF THE TEMPORARY BARRIER. ALIGN TEMPORARY BARRIERS 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 END LENGTH ON THE BRIDGE.

8. TREATMENT OF ANCHOR HOLES AFTER REMOVAL OF BARRIERS

   a. FOR ADHESIVE ANCHORS MOUNTED ON NEW DECKS AND EXISTING DECKS THAT WILL NOT BE DEMOLISHED IN A LATER STAGE OF CONSTRUCTION, CORE ANCHORS TO COMPLETELY REMOVE THE ANCHOR AFTER THE REMOVAL OF THE TEMPORARY BARRIERS. REMOVE THE EPOXY USING THE SAME SIZE HOLE OF THE ANCHOR ABOVE THE DECK AND GRIND SMOOTH AND PERMISSIBLE TAPER.

   b. FOR ADHESIVE ANCHORS MOUNTED ON EXISTING DECKS THAT WILL NOT BE DEMOLISHED IN A LATER STAGE OF CONSTRUCTION, CORE HOLES 3'-0" TO 6'-0" OR IF AN EFFECTIVE BARRIER EXISTS BEHIND THE WIDER OF THE DECKS BEHIND THE TEMPORARY BARRIER. INSTALL ANCHORS AT THE SAME SPACING USED ON THE BRIDGE BUT NOT TO EXCEED 2'-0" IN THE END LENGTH ON THE BRIDGE.

   c. FOR BOLT THROUGH ANCHORS MOUNTED ON NEW DECKS OR MOUNTED ON EXISTING DECKS THAT WILL BE DEMOLISHED IN A LATER STAGE OF CONSTRUCTION, CORE HOLES WITH ADHESIVE ANCHORS HOLES. THE HOLES MUST NOT BE LOCATED WITHIN THE 2" SLOT, OR MUST BE MOUNTED VERTICALLY 2".

9. ANCHORS ARE REQUIRED FOR TRAFFIC SIDE ONLY.

10. FIELD TEST LOAD VALUES ARE ONE OF THE ADHESIVE ANCHOR TENSILE CAPACITY.

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TABLE 2

<table>
<thead>
<tr>
<th>BOLT SPACING</th>
<th>TENSION (KIPS) TYPE A</th>
<th>TENSION (KIPS) TYPE B</th>
<th>TENSION (KIPS) TYPE C</th>
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<tbody>
<tr>
<td>1'-0&quot;</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>2'-0&quot;</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>3'-0&quot;</td>
<td>24</td>
<td>N/A</td>
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ELEVATION - SLOT DETAIL

PARTIAL PLAN - SLOT DETAIL

SLOTTED PLATE CONNECTION

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

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

RECOMMENDED JAN. 31, 2019
RECOMMENDED JAN. 31, 2019
SHEET 2 OF 8
BC-719M
**NOTE:**

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.

**ADHESIVE ANCHOR**

- Concrete temporary barrier shown.
- Temporary median barrier similar at face(s) adjacent to traffic.

**ADHESIVE ANCHOR ON COMPOSITE ADJACENT BOX BEAMS**

- Concrete temporary barrier shown.
- Temporary median barrier similar at face(s) adjacent to traffic.

**TYPICAL BOLT THROUGH ANCHOR**

- Concrete temporary barrier shown.
- Temporary median barrier similar at face(s) adjacent to traffic.

**ALTERNATE DETAILS**

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

**TEMPORARY MEDIAN BARRIER SIMILAR AT FACE(s) ADJACENT TO TRAFFIC**

**COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY STANDARD TEMPORARY CONCRETE BARRIER Structure Mounted Adhesive and Bolt Through Anchor Details**
TRAFFIC FACE OF TYPICAL TEMPORARY CONCRETE BARRIER AND BOTH FACES OF TYPICAL TEMPORARY CONCRETE MEDIAN BARRIER

FOR INSTALLATION INCLINE = 4°
ON 2'-0" ANCHOR BOLT SPACING

ELEVATION

SECTION A-A

BARRIER DRAINAGE OPENING (TYP.)

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD TEMPORARY CONCRETE BARRIER, STRUCTURE MOUNTED
REINFORCEMENT DETAILS

SECTION A-A

TEMPORARY MEDIAN BARRIER 32"
TYPICAL REINFORCEMENT DETAIL
ELEVATION

CONCRETE MEDIAN BARRIER

BARRIER AND BOTH FACES OF TYPICAL TEMPORARY CONCRETE MEDIAN BARRIER

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

SECTION B-B

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
END SECTION DETAILS AND REINFORCEMENT DETAILS

RECOMMENDED JAN. 31, 2019
RECOMMENDED JAN. 31, 2019
BC-719M

SHEET 5 OF 8
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.
REFERENCE DRAWINGS

TOGGLE BOLTS WITH PLAIN WASHERS AND HEX BOLTS

L ANCHOR BOLTS

SMOOTHED CORNERS

SIDEWALK WIDTH

SEE DETAIL A

BURR THREAD OF THE BOLT

ADJUSTMENT SHIMS IF REQUIRED

HOLE (TYP.)

SECTION A-A

SECTION C-C

SECTION D-D

DETAIL A

VIEW B-B

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 SHOWN. SEE NOTE 2

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.

2. IN LIEU OF FABRICATED POST, USE CAST OR OTHER TYPE POST AS 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 SPLICING BETWEEN EXPANSION JOINTS AND AT LME LOCATIONS WHERE NECESSARY. THE RAILS AS LATERAL SUPPORT AT TYPICAL SPACINGS AS REQUIRED. SEE NOTE 7 FOR EXPANSION. LOCATE E RAIL SPLICE 1'-5" FROM TOP 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 PAINTING COMPOUND AND AS PER PUBLICATION 408.

8. FOR TYPICAL CONCRETE BARRIER OF 3'-6" WIDTH, PROVIDE DETAIL SHOWN TO BE DELETED WHEN AUTHORIZED BY THE DISTRICT TRAFFIC ENGINEER.
TYPICAL INSTALLATION OF JUNCTION BOX JB25
CONDUITS & FITTINGS FOR UNDERBRIDGE LIGHTING

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 510.
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 2".
5. MINIMUM CENTER TO CENTER SPACING OF JUNCTION BOXES IN BRIDGE PARAPETS TO BE 10'-0" MINIMUM spACING AS PER DESIGN DRAWINGS.
6. MINIMUM NUMBER OF CONDUITS TO BE PLACED IN BRIDGE PARAPETS IS FOUR. CONDUITS MUST BE STAGGERED AND AS WIDELY SPACED AS PRACTICAL.
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 INACCESSIBLE FROM GENERAL
   PUBLIC AND PLACED A MIN. 10'-0" ABOVE SURROUNDING GROUND.
4. SIZE BOX USE IS OPTIONAL, IF NEEDED, USE CAST IRON OR WELDED STEEL WHICH IS NOT
  DIPPED GALVANIZED PER PUB.408, SECTION 310.14.

EXPOSED CONDUIT CONNECTIONS
AT EXPANSION JOINTS

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.
NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. SET ANCHOR BOLTS ACCURATELY BY THE TEMPLATE FURNISHED BY THE MANUFACTURER. SEE FIG. 408.04.01 FOR LOCATION, ELEVATION AND ALINGNMENT. ALSO SEE 408.04.01 INSTALLATIONS.
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 SIDEWALK. ORIENT MOUNT ON TRUE VERTICAL USING LEVELING NUTS.
5. CONFORM ANCHOR MATERIALS TO SECTION 1104.04 OF PUB. 408.
6. CONFORM ANCHOR MATERIALS TO SECTION 1104.04 OF PUB. 408.
7. SET LIGHTING POLES TRULY VERTICAL WITH BASES LEVEL USING LEVELING NUTS.
8. PROVIDE 2" CLEAR ON ALL REINFORCEMENT (UNLESS NOTED).
9. PROVIDE A MINIMUM OF 2" CONCRETE COVER FOR CONDUIT.

PROVISIONS FOR FUTURE LIGHTING

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>P-BARRIER</th>
<th>F-BARRIER</th>
<th>G-BARRIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANCHOR BOLT DIAMETER</td>
<td>4-COUPLINGS 3&quot; LONG WELD</td>
<td>4-COUPLINGS 3&quot; LONG WELD</td>
<td>4-COUPLINGS 3&quot; LONG WELD</td>
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<td>CIRCLE DIA.</td>
<td>15&quot;</td>
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<td>MINIMUM THREAD</td>
<td>50'-0&quot; MAX.</td>
<td>50'-0&quot; MAX.</td>
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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
LIGHTING POLE ANCHORAGE

REFERENCE DRAWINGS

BC-722M
ELECTRICAL DETAILS

SEPT.30, 2016
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CHIEF BRIDGE ENGINEER
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
BRIDGE DECK PLAN

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE ANTI-ICING SYSTEM
GENERAL PLAN

RECOMMENDED MP-15, 15A
RECOMMENDED MP-15, 15A
SEPT.30, 2016
SEPT.30, 2016
RECOMMENDED
SEPT. 30, 2016

DIRECTOR, BUREAU OF PROJECT DELIVERY

TANGENT TO THE PERIMETER OF THE CORE HOLES, SEE DETAIL THIS SHEET.

5. LOCATE SPRAY DISKS AND SENSORS SUCH THAT NO TOP MAT REINFORCEMENT BAR LIES SUCH THAT MINIMUM GROUT THICKNESSES ARE SATISFIED.

INSTALLATION DOES NOT INTERFERE WITH THE BRIDGE DECK REINFORCING STEEL AND PROVIDE SPRAY DISKS AND SENSORS THAT ARE A MAXIMUM OF 2" THICK SO THAT ADJUSTMENTS TO THE SPRAY PATTERN AFTER INSTALLATION. ADJUSTMENT CHOICES ARE LIMITED TO THE DISTRICT BRIDGE ENGINEER.

4. INSTALL SPRAY DISKS SO THE TOP SURFACE IS 5" BELOW THE ROADWAY SURFACE.

GENERAL NOTES

EXCLUSION ZONE

TOP MAT

CORE HOLES

TOP OF DECK

RELIEF OF CORE HOLES

TOP MAT BAR

DECK REINFORCEMENT

TOP WASH

EXCLUSION ZONE

DETAIL

CARRIER CONDUIT PIPE NOTES:

1. PROVIDE ALL MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408 AND AASHTO/AWS D1.5 SPECIFICATIONS.

2. PROVIDE ALL ATTACHMENTS TO CONCRETE USING THREADED ROD IN ACCORDANCE WITH AASHTO M 270 (ASTM A 709) GRADE 50. FOR ATTACHMENT TO CONCRETE STRUCTURES MAKE A 0.25" MINIMUM DISTANCE BETWEEN THE ADHESIVE AND THE CONCRETE SURFACE IF THE STICKINESS OF THE ADHESIVE IS NOT FEASIBLE, BOLTED HARDWARE MAY BE USED WITH THE APPROVAL OF THE DISTRICT BRIDGE ENGINEER. BOLTED HARDWARE ARE PERMITTED FOR USE IN VERTICAL OPENING APPLICATIONS.

3. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS; HARDWARE DETAILS; AND ATTACHMENT METHODS.

4. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

5. LOCATE ALL SOLUTION CONDUIT AND VALVE BOX DRIVES SUCH THAT THEY ARE NOT DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

6. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

6. PROVIDE THREADED CARRIERS FOR ALL CARRIER CONDUIT/PIPES THAT REQUIRE SPACING. LOCATE COUPLERS APPROXIMATELY 5' APART FROM SUPPORT POINT, ALIGNABLE TO PREVENT TORSION. MINIMUM ZIP TO ZIP IS 1.5".

7. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

7. HEAD SIZE MUST MATCH THE CONNECTION PIPE MATERIAL PER THE MANUFACTURER'S SPECIFICATIONS.

8. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

9. LOCATE RWIS WITHIN 100' OF THE PAVEMENT SENSORS THAT ARE EMBEDDED ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

10. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

BRIDGE ANTI-ICING SYSTEM SPECIFICATIONS

GENERAL NOTES

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD BRIDGE ANTI-ICING SYSTEM

GENERAL NOTES

BUILDING AT THE YEAR OF BID-LETTER AND DEPARTMENTS AND APPROVED TO INSTALL IN THE MFG PLANS AS SHOWN ON THE CONCRETE DECK DETAILS. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

ROADWAY WEATHER INFORMATION SYSTEM (RWIS)

ROADWAY ITEM

1. LOCATE RWIS EITHER 100' OF THE PAVEMENT SENSORS THAT ARE EMBEDDED IN THE DECK.

2. MOUNT RWIS EITHER USING THE TRAFFIC CARRIER OR ADJACENT TO THE BRIDGE. INSTALL SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

3. LOCATE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

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10. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

DECK LOAD CALCULATIONS

USE THE FOLLOWING VALUES TO CALCULATE DESIGN LOADS

1. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

2. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

3. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

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10. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.

BUILDING AT THE YEAR OF BID-LETTER AND DEPARTMENTS AND APPROVED TO INSTALL IN THE MFG PLANS AS SHOWN ON THE CONCRETE DECK DETAILS. PROVIDE SPRAY DISKS AND SENSOR LOCATIONS SUCH THAT THEY ARE DIRECTLY ABOVE AND WITHIN 12" HORIZONTALLY OF ANY EXISTING OR PROPOSED UTILITY.
For installing an anti-icing system in a new bridge:

1. Provide shop drawings that show all proposed locations for value boxes, conduit/pipe hangars, spray disk, sensors, etc., as well as location and size of each. Drawings should be provided in accordance with the district bridge engineer. All locations will be approved by the district bridge engineer.

2. Locate all reinforcement prior to coring, cutting, or drilling into the deck. Before beginning installation, all reinforcement must be protected. Reinforcement damage will be reviewed and approved by the district bridge engineer.

3. Use non-premixed grout for void repair. The use of non-premixed grout is encouraged to prevent shrinkage. Grout may be used for void repair if approved by the district bridge engineer.

4. Install blockout in new concrete decks with shapes that accommodate and protect the proposed sensor or spray disk. Blockout shapes should be provided in accordance with the engineer's direction. Blockout locations will be approved by the district bridge engineer.

5. Install new overlay. The new overlay should be installed to match the proposed sensor or spray disk and provide an indication of the location of each. Blockout sizes should be provided in accordance with the engineer's direction. Blockout locations will be approved by the district bridge engineer.

6. Install new blockout in over existing concrete decks with shapes that accommodate and protect the proposed sensor or spray disk. Blockout shapes should be provided in accordance with the engineer's direction. Blockout locations will be approved by the district bridge engineer.

7. Install new overlay. The new overlay should be installed to match the proposed sensor or spray disk and provide an indication of the location of each. Blockout sizes should be provided in accordance with the engineer's direction. Blockout locations will be approved by the district bridge engineer.

8. Install temporary neoprene sponge around void perimeter, as indicated.

9. For installations in an existing asphalt overlay:

   a. Install temporary neoprene sponge around void perimeter, as indicated.

   b. Use non-premixed grout for void repair. The use of non-premixed grout is encouraged to prevent shrinkage. Grout may be used for void repair if approved by the district bridge engineer.

   c. Install new overlay. The new overlay should be installed to match the proposed sensor or spray disk and provide an indication of the location of each. Blockout sizes should be provided in accordance with the engineer's direction. Blockout locations will be approved by the district bridge engineer.

For installing an anti-icing system:

1. Provide shop drawings that show all proposed locations for value boxes, conduit/pipe hangars, spray disk, sensors, etc., as well as location and size of each. Drawings should be provided in accordance with the district bridge engineer. All locations will be approved by the district bridge engineer.

2. Locate all reinforcement prior to coring, cutting, or drilling into the deck. Before beginning installation, all reinforcement must be protected. Reinforcement damage will be reviewed and approved by the district bridge engineer.

3. Use non-premixed grout for void repair. The use of non-premixed grout is encouraged to prevent shrinkage. Grout may be used for void repair if approved by the district bridge engineer.

4. Install blockout in new concrete decks with shapes that accommodate and protect the proposed sensor or spray disk. Blockout shapes should be provided in accordance with the engineer's direction. Blockout locations will be approved by the district bridge engineer.

5. Install new overlay. The new overlay should be installed to match the proposed sensor or spray disk and provide an indication of the location of each. Blockout sizes should be provided in accordance with the engineer's direction. Blockout locations will be approved by the district bridge engineer.

6. Install new blockout in over existing concrete decks with shapes that accommodate and protect the proposed sensor or spray disk. Blockout shapes should be provided in accordance with the engineer's direction. Blockout locations will be approved by the district bridge engineer.

7. Install new overlay. The new overlay should be installed to match the proposed sensor or spray disk and provide an indication of the location of each. Blockout sizes should be provided in accordance with the engineer's direction. Blockout locations will be approved by the district bridge engineer.
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 Special Area of Bridge Deck and damaged reinforcing steel in accordance with BC-723M.
4. Existing bridges must have fully functional drainage systems, including stormwater conveyance systems, working sump, and adequate approach inlet boxes. All deficiencies in the drainage system must be corrected prior to installation of an anti-icing system.
5. For joint detail, see Sheet 6.
6. Measure existing deck formwork within 2" of the carrier conduit penetration deck.
7. For installation procedures, see Sheet 3.

**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 Special Area of Bridge Deck and damaged reinforcing steel in accordance with BC-723M.
4. Existing bridges must have fully functional drainage systems, including stormwater conveyance systems, working sump, and adequate approach inlet boxes. All deficiencies in the drainage system must be corrected prior to installation of an anti-icing system.
5. For joint detail, see Sheet 6.
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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**

**BC-723M**
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SHEET 6 OF 10

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 DISK/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 PRIOR TO INSTALLATION OF AN ANTI-ICING SYSTEM UNTIL THE OVERLAY IS COMPLETED.
6. EXISTING GROUT MUST BE FULLY FUNCTIONAL DRAINAGE SYSTEMS INCLUDING SATISFACTORY EXPANSION DAMS, WORKING SCUPPERS, AND ADEQUATE APPROACH INLET BOXES.

FOR INSTALLATION PROCEDURES, SEE SHEET 3.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD GIRDER ELEVATION

PLAN

CARRIER PIPE CONDUIT ATTACHMENT
FOR STEEL BRIDGES

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
STANDARD
BRIDGE ANTI-ICING SYSTEM
SHEET 8 OF 10
FOR STEEL BRIDGES

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 AT THE CONNECTION PLATE OR DIAPHRAGM CONNECTION PLATE OR SPRAY DISK. THE ALTERNATE DIAPHRAGM CONNECTIONS IS NOT PERMITTED ON BRIDGES THAT USE CURVED BEAM ALIGNMENTS. THE ALTERNATE DIAPHRAGM CONNECTION PLATE OR SPRAY DISK ATTACHMENTS INTERFERE WITH THE VALVE BOX DOORS. THE ALTERNATE DIAPHRAGM CONNECTIONS IS NOT PERMITTED ON BRIDGES THAT USE TANGENT BEAM ALIGNMENTS IF BRACING OR OTHER CONNECTION PLATES. USE THE ALTERNATE DIAPHRAGM CONNECTION ON BRIDGES WITH CURVED GIRDERS OR CURVED GIRDERS THAT MIMIC ANGLE ATTACHMENT ON THE STIFFENERS OR DIAPHRAGM CONNECTION PLATE.

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 AT THE CONNECTION PLATE OR DIAPHRAGM CONNECTION. THE ALTERNATE DIAPHRAGM CONNECTIONS IS NOT PERMITTED ON BRIDGES THAT USE CURVED BEAM ALIGNMENTS. THE ALTERNATE DIAPHRAGM CONNECTIONS IS NOT PERMITTED ON BRIDGES THAT USE TANGENT BEAM ALIGNMENTS IF BRACING OR OTHER CONNECTION PLATES. USE THE ALTERNATE DIAPHRAGM CONNECTION ON BRIDGES WITH CURVED GIRDERS OR CURVED GIRDERS THAT MIMIC ANGLE ATTACHMENT ON THE STIFFENERS OR DIAPHRAGM CONNECTION PLATE.

NOTE: DO NOT PLACE VALVE BOX ON JACKING DIAPHRAGM.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD GIRDER ELEVATION

NOTE: I-BEAM SHOWN, BOX BEAM SIMILAR

SECTION C-C

NOTE: I-BEAM SHOWN, BOX BEAM SIMILAR

SECTION D-D

SECTION B-B

DETAIL C

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.

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

COMMUNICATIONS OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
STANDARD BRIDGE ANTI-ICING SYSTEM CARRIER PIPE/CONDUIT ATTACHMENT FOR CONCRETE BRIDGES

BC-723M
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

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.

SECTION E-E
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
RECOMMENDED
BUREAU OF PROJECT DELIVERY

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
   RECOMMENDATION: DESIGN MANUAL PART A
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:
   AASHTO/MAPLE-AW3A.
5. CONCRETE:
   USE THE 5‰" MAIN BEARING BAR WITH OR WITHOUT THE MIDDLE RIB FOR FULL DEPTH CONCRETE DECKS.
   SEE SHEET 4 FOR DETAILS
6. PROVIDE 1½" CONCRETE COVER ON REINFORCEMENT BARS UNLESS OTHERWISE NOTED.
7. PROVIDE 1½" COVER OVER GRID. THE TOP 5/8" OF OVERFILL/OVERLAY IS CONSIDERED SACRIFICIAL WEARING SURFACE.
8. PROVIDE AN ERECTION DETAIL COMPLETE WITH PIECE MARKS WITH THE SHOP DRAWING SUBMISSION.
9. PROVIDE A 9" DIAMETER LEVELING BOLT THAT IS EITHER:
   a. A WELDED ASSEMBLY CONSISTING OF THREADED ROD AND HEX NUT:
      AASHTO/AWS D1.5-96 OR EQUIVALENT.
   b. ASTM A307 GRADE A HEADED BOLT OR EQUIVALENT.
10. PROVIDE FORM PANS ACCORDING TO PUB. 408, SECTION 1001.2(h)2.
11. ALL SHEET METAL AND FORM PANS TO MEET PUB. 408, SECTION 1001.2 GALVANIZING REQUIREMENTS.
12. PROVIDE LEVELING BOLTS UNCOATED UNLESS REQUIRED TO BE GALVANIZED.
13. PROVIDED AS SHOWN ON THE SHOP DRAWING SUBMISSION.
14. PROVIDE 1" COVER OVER GRID. THE TOP 1" OF OVERFILL/OVERLAY IS CONSIDERED SACRIFICIAL WEARING SURFACE.
15. PROVIDE 1½" CONCRETE COVER ON REINFORCEMENT BARS UNLESS OTHERWISE NOTED.
16. PROVIDE 1½" CONCRETE COVER ON REINFORCEMENT BARS UNLESS OTHERWISE NOTED.
17. PROVIDE 1½" CONCRETE COVER ON REINFORCEMENT BARS UNLESS OTHERWISE NOTED.

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

CAST-IN-PLACE OR PRECAST DECKS

SECTION A-A
TYPICAL GRID DECK DETAILS

SECTION B-B
PLAN VIEW
SECTION C-C
WELDLESS PLAN VIEW
SECTION D-D
FULL DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS

SECTION E-E
HALF DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS

CONCRETE BRIDGE DECK DETAILS
CAST-IN-PLACE OR PRECAST DECKS
Installation Notes:

1. During placement of the grid panels the contractor shall place the grid deck in position and verify that all grid components are installed as required. Field testing for alignment and level shall be performed to ensure 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 caulkings at the deck edges may be required to prevent excessive concrete and grout leakage.

4. Panels being positioned are nominal. Adjust elevation of panels to match the top of grid, adjust position as needed to prevent concrete from leaking.

5. Field install shear studs after panels are installed to avoid interference with grid components.

6. Have an experienced representative of manufacturer present during initial installation of grid decks and at any other times as the consultant may request.

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

**SECTION F-F**

1. **Main Bar Splice at Panel Ends**
   - Main Bar Splice at Panel Ends
   - Splice Bar Plan View
   - Section G-G
   - Bolted Plan View
   - Section H-H

**NOTE 1**
- See Section H-H

**NOTE 2**
- See Note 1

**FORMED ANGLE - WELDED STRAP**

**END SECTION DETAIL**

**PLAN VIEW**

- Section F-F

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

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

**RECOMMENDED JAN. 31, 2019**
**RECOMMENDED JAN. 31, 2019**

**BC-726M**
LEVELING BOLT DETAIL

- Leveling bolts to be field cut after deck elevation is set. Provide 1/4" cover per AWS D1.5 Pub. 408, Sec. 7 per final per cover. As required.
- Leveling bolts may be furnished uncoated. Welded to bearing bar. Not only may be on either side of bearing bar.
- The leveling nut may be placed under the main bar when conditions permit. Alternate leveling details permitted as approved by the district bridge engineer.

OPTIONAL FIELD WELD DETAIL WITHOUT HAUNCH

- Field note: After final leveling of deck, ensure any change to galvanizing. If galvanizing is zinc, thin gold applied coating to damage area.

GRID COMPONENT WELD DETAILS

- Weld every intersection. Weld may be in any quadrant.
- End trim plate weld detail:
  - End trim plate weld detail
  - End trim plate weld required
  - End trim plate weld detail

LEVELING PLATE DETAIL

- Leveling plate weld detail
- Leveling plate weld detail
- Leveling plate weld detail

SECTION VIEW

- Partial transverse section thru grid deck
- Main bar cambering as permitted by AWS D1.5 Pub. 408

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STEEL GRID REINFORCED CONCRETE BRIDGE DECK DETAILS FOR BEAM BRIDGES CAST-IN-PLACE OR PRECAST DECKS
FULL DEPTH CONCRETE GRID  
TRANSVERSE SPLICE BETWEEN PANELS

HALF DEPTH CONCRETE GRID  
TRANSVERSE SPLICE BETWEEN PANELS

NOTE: SPLICE DETAILS CAN ALSO BE USED FOR CAST-IN-PLACE WITHOUT BLOCKOUT CLOSURE PAIRS.
TYPICAL LONGITUDINAL SECTION

NOTE:
- The requirement for safety stops can be reduced if it is specified in the shop detail. However, each sheet of drawings shall be made to provide a clear fit on the drawings.

SUGGESTED SUPPORT DETAILS

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. CHECK INCTION AND SITE OF SUPPORTING ELEMENTS AND METAL DECK FORMS IN THE SHOP DRAWINGS ALONG WITH LENGTH, TYPE AND SPACING OF SHEETS.
4. METAL DECK FORM CLOSURES AND STYROFOAM FILLERS MAY BE USED AS SHOWN IN DRAWINGS TO REDUCE DEAD LOAD. SHEET CLOSURES TO ENSURE THAT SHEET RATER DOES NOT DRAW OUT.
5. DETAIL 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 ANY ADDITIONAL LOADS DUE TO FORMING OF HIGHWAY SHOULDER OR SIDEWALK.
7. ENSURE THAT THE DECK FORM SUPPORT ANGLES AND PROVIDE A MINIMUM CLEARANCE OF 3" 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 NEEDED.
9. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
10. USE THIS STANDARD AS A GUIDE IN THE PREPARATION OF SHOP DETAIL DRAWINGS.
11. SECURELY FASTEN ALL METAL DECK FORMS TO SUPPORT ANGLES AND PROVIDE A MINIMUM CLEARANCE OF 3" AT EACH END.
12. METAL DECK FORMS TO BE DESIGNED FOR MAXIMUM DEPTH OF CONCRETE IN THE FORM DOES NOT EXCEED 15 LB/FT.
13. FOR WELD DETAILS SEE SHEET 2.
14. FILL FORM HOLE TO ACCOUNT FOR A SUPERELEVATION CROWN FALLING BETWEEN BEAMS ADDING SIGNIFICANT ADDITIONAL DECK THICKNESS.
15. FOR WELD DETAILS SEE SHEET 2.
16. PROVIDE METAL DECK FORMS TO BE DESIGNED FOR MAXIMUM DEPTH OF CONCRETE IN THE FORM DOES NOT EXCEED 15 LB/FT.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
SHEET 1 OF 3
BC-732M
### Required Section Modulus and Moment of Inertia of Forms

#### Table: S, Section Modulus in^3/ft. | I, Moment of Inertia in^4/ft.

<table>
<thead>
<tr>
<th>T, Slab Thickness, Inches</th>
<th>1/16</th>
<th>1/8</th>
<th>3/32</th>
<th>1/4</th>
<th>1/2</th>
<th>3/4</th>
<th>1</th>
<th>1-1/2</th>
<th>2</th>
<th>2-1/2</th>
<th>3</th>
<th>3-1/2</th>
<th>4</th>
<th>4-1/2</th>
<th>5</th>
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<tbody>
<tr>
<td>3/16</td>
<td>0.016</td>
<td>0.032</td>
<td>0.048</td>
<td>0.064</td>
<td>0.080</td>
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<td>0.176</td>
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<tr>
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<td>0.096</td>
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<td>0.224</td>
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<td>0.320</td>
<td>0.352</td>
<td>0.384</td>
<td>0.416</td>
<td>0.448</td>
<td></td>
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<tr>
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<td>0.096</td>
<td>0.144</td>
<td>0.192</td>
<td>0.240</td>
<td>0.288</td>
<td>0.324</td>
<td>0.360</td>
<td>0.396</td>
<td>0.432</td>
<td>0.468</td>
<td>0.504</td>
<td>0.540</td>
<td>0.576</td>
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<tr>
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<td>0.192</td>
<td>0.288</td>
<td>0.384</td>
<td>0.480</td>
<td>0.576</td>
<td>0.672</td>
<td>0.768</td>
<td>0.864</td>
<td>0.960</td>
<td>1.056</td>
<td>1.152</td>
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<td>1.344</td>
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<tr>
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<td>0.288</td>
<td>0.432</td>
<td>0.576</td>
<td>0.720</td>
<td>0.864</td>
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<td>0.672</td>
<td>0.896</td>
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</table>

#### Example #1

**Given:** Steel 3-haunch composite design from spacing 3'-0" to 5'-0". Head flange width = 2.5". Slab thickness = 2.0". Y = 36 ksi. E = 29,000 ksi. Required section modulus and moment of inertia.

**Solution:**
- Design span 6 from Table 2 for condition. 6 = 2.5 x 6 x 0.625 = 9.375 in^3/ft. 7 = 2.0 x 5 x 0.625 = 15.625 in^4/ft. 8 = 36 x 29,000 x 0.625 = 6,810 in^4/ft. 9 = 0.6 x 0.625 = 0.375 in/ft. 10 = 0.5 x 0.625 = 0.3125 in/ft.

#### Example #2

**Given:** Steel 3-haunch composite design from spacing 3'-0" to 5'-0". Head flange width = 2.5". Slab thickness = 2.0". Y = 36 ksi. E = 29,000 ksi. Required section modulus and moment of inertia.

**Solution:**
- Design span 6 from Table 2 for condition. 6 = 2.5 x 6 x 0.625 = 9.375 in^3/ft. 7 = 2.0 x 5 x 0.625 = 15.625 in^4/ft. 8 = 36 x 29,000 x 0.625 = 6,810 in^4/ft. 9 = 0.6 x 0.625 = 0.375 in/ft. 10 = 0.5 x 0.625 = 0.3125 in/ft.
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH SPECIFICATIONS PUBLICATION 408.
2. PROVIDE THREADS STEEL INSERTS IN ACCORDANCE WITH ASTM DESIGNATION A 29.
3. PROVIDE OPERATIVE STEEL INSERTS IN ACCORDANCE WITH ASTM DESIGNATION A 510 GRADE 1018
4. PROVIDE HEXAGON HEAD CAP SCREWS IN ACCORDANCE WITH ASTM DESIGNATION A 307 GRADE B.
5. PROVIDE EPOXY COATED INSERT ASSEMBLIES.
6. PROVIDE DRILLED AND SAWED OPENINGS.
7. PROVIDE THREAD FOR SCREWS AND STEEL INSERTS CONFORMING TO SECTION 1105 OF PUBLICATION 408.
8. USE THE ANCHOR ASSEMBLIES AS AN ALTERNATIVE TO CAST-IN-PLACE ANCHOR BOLTS OR SLEEVE ANCHOR ASSEMBLIES FOR THE FOLLOWING LOCATIONS, AT NO ADDITIONAL COST TO THE DEPARTMENT.
9. ATTACHING BASE PLATES FOR GUIDE RAIL TRANSITION TO CONCRETE.
10. ATTACHING BASE PLATES FOR GUIDE RAIL TRANSITION TO CONCRETE.
11. DIA. DIRECTION INDICATED ON THE DRAWINGS IS NOMINAL BASE BOLT DIAMETER.
STEEL WIRE (TYPICAL)

STRUT WIRE (TYP.)

ELEVATION

PLAN

SECTION A-A

TYPE C INSERT ASSEMBLY

(INCLUDES CAP SCREWS AND WASHERS)

SECTION B-B

TYPE D INSERT ASSEMBLY

(INCLUDES CAP SCREWS AND WASHERS)

NOTES

1. FOR NOTES, SEE SHEET 1.

JAN. 31, 2019

ACTING DIR. BUREAU OF PROJECT DELIVERY

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD ANCHOR SYSTEMS
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT.
   SET RIBBON 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
KEYED EXPANSION JOINT
POLYVINYL CHLORIDE

CONSTRUCTION JOINTS
NOTE:
1. KEY DIMENSIONS ARE NOMINAL AND MAY VARY +/- %.01.
2. STOP KEYED JOINTS IN TOP OF EXPOSED WALL FLUSH TO A DEPTH OF 12".
3. STOP WATERSTOP 12" FROM TOP OF WALL.

NOTE:
1. KEY DIMENSIONS ARE NOMINAL AND MAY VARY +/- %.01.
2. PLACE WATERSTOP INSIDE OF REINFORCEMENT BARS.
3. CONTRACTOR HAS THE OPTION TO SELECT ANY OF THE WATERSTOPS SHOWN.

GENERAL NOTES:
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
2. WHEN TYPE C2 WATERSTOP IS USED TO FACILITATE INSTALLATION, JOIN THE WATERSTOP JOINTS IN TWO PARTS AS SHOWN ON CONTRACT DRAWINGS. SURFACES OF DEPRESSED KEY MUST BE ROUGHENED TO ENSURE ADEQUATE BOND WITH NEW CONCRETE.
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.

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.

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

WATERSTOPS FOR EXPANSION JOINTS
NOTE:
1. PROVIDE HOLES OR SLOTS IN WATERSTOP, AS REQUIRED, WHEN NECESSARY TO ACCOMMODATE REINFORCEMENT BARS, BUT DO NOT COMPROMISE SEAL.
**STANDARD REINFORCEMENT BARS**

<table>
<thead>
<tr>
<th>BAR SIZE</th>
<th>WEIGHT (LBS./F.T.)</th>
<th>NORMAL DIAMETER</th>
<th>NORMAL STRENGTH (Ft.-Lbs.)</th>
<th>NORMAL AREA (SQ. IN.)</th>
<th>NORMAL TENSION (LBS.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>7.78</td>
<td>0.25</td>
<td>2.2</td>
<td>0.15</td>
<td>35.8</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>5.21</td>
<td>0.21</td>
<td>1.5</td>
<td>0.11</td>
<td>24.3</td>
</tr>
<tr>
<td>5/32&quot;</td>
<td>1.91</td>
<td>0.18</td>
<td>1.2</td>
<td>0.09</td>
<td>9.5</td>
</tr>
</tbody>
</table>

**Recommended End Hook Dimensions**

<table>
<thead>
<tr>
<th>BAR SIZE</th>
<th>90° HOOK</th>
<th>180° HOOK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>9/32&quot;</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>7/32&quot;</td>
<td>1 1/4&quot;</td>
</tr>
<tr>
<td>5/32&quot;</td>
<td>1/8&quot;</td>
<td>7/32&quot;</td>
</tr>
</tbody>
</table>

**General Notes:**

1. Provide material and information in accordance with the appropriate specifications as outlined in the Pennsylvania Department of Transportation (PENNDOT) specifications.
2. Designate reinforcement bars as follows to avoid any misinterpretation:
   - Use letters to designate reinforcement bar sizes by inches. For example, "1", "2", "3", etc.
   - Indicate plain reinforcement bars by diameter in fractions of an inch, for example, 1/4", 3/8", 1/2", etc.
   - Indicate steel wire fabric by letter in the bar size. A bar designated "E" followed by a number indicates the area of the bar in square inches. For example, E12 indicates a bar with a cross-sectional area of 12 square inches.
3. Indicate smooth wire fabric plain-reinforcement bars. Refer to the Pennsylvania Department of Transportation (PENNDOT) specifications for details on the area of the transverse wire, the area of the transverse wire, and the area of the transverse wire for plain-reinforcement bars.
4. All reinforcement dimensions should be measured in feet and inches.

**Common Stock Styles of Welded Wire Fabric**

<table>
<thead>
<tr>
<th>STYLE</th>
<th>DESIGNATION</th>
<th>STEEL WIDTH</th>
<th>REYNT</th>
<th>DESIGNATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BARS</td>
<td>&quot;S&quot;</td>
<td>2&quot;</td>
<td>217</td>
<td>&quot;C&quot;</td>
</tr>
<tr>
<td>ROLLS</td>
<td>&quot;R&quot;</td>
<td>2&quot;</td>
<td>217</td>
<td>&quot;C&quot;</td>
</tr>
<tr>
<td>SBS</td>
<td>&quot;S&quot;</td>
<td>2&quot;</td>
<td>217</td>
<td>&quot;C&quot;</td>
</tr>
<tr>
<td>SBS</td>
<td>&quot;S&quot;</td>
<td>2&quot;</td>
<td>217</td>
<td>&quot;C&quot;</td>
</tr>
<tr>
<td>SBS</td>
<td>&quot;S&quot;</td>
<td>2&quot;</td>
<td>217</td>
<td>&quot;C&quot;</td>
</tr>
<tr>
<td>SBS</td>
<td>&quot;S&quot;</td>
<td>2&quot;</td>
<td>217</td>
<td>&quot;C&quot;</td>
</tr>
</tbody>
</table>

**Commonwealth of Pennsylvania Department of Transportation**

BUREAU OF PROJECT DELIVERY

**Standard Reinforcement Bar Fabrication Details**

- Bars that are required to be bent to a larger radius than shown in the following table may be bent in the field.
- B = 1% for No. 4 through No. 10, 1/2" for No. 11, 3/4" for No. 12, and 1 1/4" for No. 13.
- D = 1/2" for No. 12 and 1 1/4" for No. 13.

*1% & 10% = All bending prefabricated.
### Development Length and Lap Splice Length of Deformed Bars in Compression

**For Reinforcing Steel Grade 60**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>f' = 3,000 PSI</th>
<th>f' = 3,500 PSI</th>
<th>f' = 4,000 PSI</th>
<th>f' = 4,500 PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Class A)</td>
<td>(Class A)</td>
<td>(Class A)</td>
<td>(Class A)</td>
</tr>
<tr>
<td>#3</td>
<td>9</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>#4</td>
<td>12</td>
<td>15</td>
<td>15</td>
<td>15</td>
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<td>#5</td>
<td>16</td>
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<td>19</td>
<td>19</td>
</tr>
<tr>
<td>#6</td>
<td>23</td>
<td>27</td>
<td>27</td>
<td>27</td>
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<tr>
<td>#7</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
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<tr>
<td>#8</td>
<td>35</td>
<td>38</td>
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<td>38</td>
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<td>#9</td>
<td>42</td>
<td>46</td>
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<td>46</td>
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<td>51</td>
</tr>
<tr>
<td>#11</td>
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<td>68</td>
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<td>#14</td>
<td>77</td>
<td>77</td>
<td>77</td>
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<td>90</td>
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<td>90</td>
<td>90</td>
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</tbody>
</table>

**Note:**
- A factor of 0.8 can be applied for #11 bar and smaller if the side cover is not less than 3" 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".
- A factor of 0.75 can be applied if the reinforcement is enclosed within a spiral composed of bars not less than 3/4" in diameter and spaced at not more than 4" pitch. But the development length cannot be less than 8" and splice length cannot be less than 12".

### Development Length of Standard Hooks in Tension

**For Reinforcing Steel Grade 60**

<table>
<thead>
<tr>
<th>Bar Size</th>
<th>f' = 3,000 PSI</th>
<th>f' = 3,500 PSI</th>
<th>f' = 4,000 PSI</th>
<th>f' = 4,500 PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Class A)</td>
<td>(Class A)</td>
<td>(Class A)</td>
<td>(Class A)</td>
</tr>
<tr>
<td>#3</td>
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<td>8</td>
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<td>#4</td>
<td>8</td>
<td>13</td>
<td>13</td>
<td>13</td>
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<td>#5</td>
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<td>#18</td>
<td>60</td>
<td>68</td>
<td>68</td>
<td>68</td>
</tr>
</tbody>
</table>

**Notes:**
1. A factor of 0.75 can be applied for #11 bar and smaller if the side cover is not less than 3" 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".
2. Increase the development length, $d_h$, by 1.2 for epoxy coated hooks in tension.

---

**Commonwealth of Pennsylvania**

**Department of Transportation**

**Standard Reinforcement Bar Fabrication Details**

**BC-736M**
## DEVELOPMENT LENGTH AND LAP SPLICE LENGTH OF DEFORMED BARS IN TENSION

**AASHTO LRFD SPECIFICATIONS, ARTICLES 5.10.8.2.1, 5.10.8.2.2 AND 5.10.8.4.5c**

### TABLE A

<table>
<thead>
<tr>
<th>f'c</th>
<th>Class</th>
<th>Grade</th>
<th>Development Length</th>
<th>Lap Splice Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 PSI</td>
<td>A1</td>
<td>60</td>
<td>4.00</td>
<td>2.25</td>
</tr>
<tr>
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<td>AA</td>
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<td>4.50</td>
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<tr>
<td>4000 PSI</td>
<td>AA</td>
<td>60</td>
<td>5.00</td>
<td>2.25</td>
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</table>

### TABLE B

<table>
<thead>
<tr>
<th>f'c</th>
<th>Class</th>
<th>Grade</th>
<th>Development Length</th>
<th>Lap Splice Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 PSI</td>
<td>A1</td>
<td>60</td>
<td>4.00</td>
<td>2.25</td>
</tr>
<tr>
<td>3500 PSI</td>
<td>AA</td>
<td>60</td>
<td>4.50</td>
<td>2.25</td>
</tr>
<tr>
<td>4000 PSI</td>
<td>AA</td>
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### TABLE C

<table>
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<tr>
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<th>Class</th>
<th>Grade</th>
<th>Development Length</th>
<th>Lap Splice Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 PSI</td>
<td>A1</td>
<td>60</td>
<td>4.00</td>
<td>2.25</td>
</tr>
<tr>
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</tr>
<tr>
<td>4000 PSI</td>
<td>AA</td>
<td>60</td>
<td>5.00</td>
<td>2.25</td>
</tr>
</tbody>
</table>

### NOTES FOR DEFORMED BARS IN TENSION

1. **Development Length**
   - Refer to AASHTO/LRFD for applicable modification factors.
   - Tables are based on normal-weight concrete.
   - Development lengths are used if necessary to cover the depth of cover, and they are applied to the center of reinforcement, unless otherwise specified in the project documents.

2. **Lap Splice Length**
   - Lap splice lengths are based on 2 inches of cover. The length of cover and the depth of the lap splice are assumed to be less than the center-to-center spacing of the reinforcement.
   - Class A splices may be used inside the area of reinforcement, provided the lap is at least one-half the required lap length. The entire length of the lap splice on one or both sides of the horizontal bar is considered within the lap splice length.
   - Class B splices may be used in the absence of design analysis.

3. **Horizontal Reinforcement**
   - Where tensioned bars in fresh concrete cast under the reinforcement.

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

- **Uncased Rebars**
  - Use Table A

- **Epoxy Coated Rebars**
  - Use Table B when:
    - Cover is < 3x bar dia.
    - Clear spacing between bars is < 6x bar dia.

- **Use Table C for all other cases**
  - Applies the increase in lap splice length.

---

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD REINFORCEMENT BAR FABRICATION DETAILS**

**RECOMMENDED ON: 3/1/2022**

**BC-736M**
GENERAL NOTES

1. Provide 3-inch concrete cover on reinforcement bars, except as noted.
2. Class I-Cement concrete 7±0.5 M.P.S. in permeability, porosity and workability.
3. Provide grade 60 reinforcing steel bar that meet the requirements of ASTM A615, unless specified otherwise.
4. Splice hooks all horizontal construction joints, except as indicated.
5. Dimension based on a normal temperature of 60 degrees F.
6. Spread footings may be ordered by the engineer to be at any elevation or for any conditions necessary to provide a proper foundation.
7. Provide anchor bolts that meet the requirements of ASTM F1554, Grade 55 per Publication 408, unless otherwise indicated.
8. Provide concrete barriers in accordance with the current version of the Pennsylvania Department of Transportation Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

RECOMMENDED COLUMN & PIPE STRUTS:

- BC-741M: Single face concrete barrier placement at median piers
- TD-7200: Spanning concrete/duct applied letters, numerals, & arrows
- TC-8701E: Extruded aluminum channel sign
- TC-8701S: Flat sheet aluminum signs with etched glass sign holders
- BD-641M: Cantilever and center-mount structures, strut lengths up to 40'

CONSTRUCTION GENERAL NOTES

- MATERIALS AND WORKMANSHIP: Provide materials and workmanship in accordance with the current version of the Pennsylvania Department of Transportation Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Use Publication 408, unless noted.
- PROVIDE STRUCTURAL STEEL CONFORMING TO THE FOLLOWING:
  - Columns: A steel pipe strut (BC-741M, SHT. 6)
  - Columns and trusses: See Publication 408, Section 844
- ANGLE, SHAPES, AND PLATES: Use ASTM A36, except for structural steels

DEPARTMENT OF TRANSPORTATION

CHANGES

- CHANGE 4: Provide materials and workmanship in accordance with the current version of the Pennsylvania Department of Transportation Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Use Publication 408, unless noted.
- PROVIDE STRUCTURAL STEEL CONFORMING TO THE FOLLOWING:
  - Columns: A steel pipe strut (BC-741M, SHT. 6)
  - Columns and trusses: See Publication 408, Section 844
- ANGLE, SHAPES, AND PLATES: Use ASTM A36, except for structural steels

NOTES TO FABRICATORS

- CENTER-MOUNT STRUCTURES: Provide materials and workmanship in accordance with the current version of the Pennsylvania Department of Transportation Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Use Publication 408, unless noted.
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSION OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS. USE PUBLICATION 408, UNLESS NOTED.
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSION OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS. USE PUBLICATION 408, UNLESS NOTED.
FOUNDATION DETAILS AND #13-602-BDTD AND #14-603-BDTD FOR SUPPORT OF APPROVED PRODUCT DRAWINGS #95-290 PE REV.1, THIRD REGION OF FLAT SECTIONS BETWEEN BREAK POINTS.

ALTERNATE FOUNDATION TO CAISSON PER PENNDOT AND AT COLUMN CONNECTION SPLICE PLATE LOCATIONS, WELD SHALL START AND STOP IN THE MIDDLE ALTERNATE FOUNDATION OVERHEAD SIGN STRUCTURES ON DETAILS SHALL BE COMPLETE PENETRATION WELDS. COMPLETE PENETRATION LONGITUDINAL SEAM WELDS INDICATING TYPE OF WELD, WELD PENETRATION, EFFECTIVE DEPTH AND LENGTH OF EACH DESIGN CALCULATIONS AND DESIGN DRAWINGS FOR REVIEW AND ACCEPTANCE FOR LONGITUDINAL COMMONWEALTH OF PENNSYLVANIA SECTION C-C EQUIVALENT "PRESS-BREAK" MEMBERS ILLUSTRATION OF DIMENSION "R" FOR #4 TIES @ 12" (MINIMUM 3" CLEAR SPLICE LOCATIONS) LAP LENGTH, 30 BAR N.T.S. ALTERNATE PIPE CAP DETAIL

NOTES:
- ALTERNATE CAISSON FOUNDATIONS ARE PERMITTED IN PLACE OF THE SPREAD FOOTING SITE SHOWN ON THE CONTRACT DRAWINGS.
- DESIGN CALCULATIONS FOR THE REQUIRED CAISSON EMBEDMENT AND WELDING REQUIREMENTS MUST BE SUBMITTED TO THE DISTRICT OFFICE ENGINEER FOR REVIEW AND APPROVAL.
- IN PLACE OF #4 TIES AT 12", A #4 BAR SPIRAL WITH 1 1/4" TYP MAY BE USED. THE #4 TIES AT 12" ARE THE MINIMUM AS REQUIRED BY DESIGN.

TABLE CONTINUED FROM SHEET 2.

FOOTING DIMENSION FOOTING REINFORCEMENT

TABLE CONTINUED FROM SHEET 2.

NOTES:
- PROVIDE 50" OR 180" WORKS ON ALL "L" AND "T" BARS.
- LENGTH FOR "L" AND "T" BARS DOES NOT INCLUDE 90° BENDS IN PLACE OF #4 TIES AT 12", A #4 BAR SPIRAL WITH 1 1/4" TYP MAY BE USED. THE #4 TIES AT 12" ARE THE MINIMUM AS REQUIRED BY DESIGN.

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

REFERENCES...

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

ALTERNATE "PRESS-BREAK" MEMBERS ARE PERMITTED FOR COLONIAL. "PRESS-BREAK" MEMBERS MUST HAVE THE EQUIVALENT STRENGTH AND FATIGUE RESISTANCE OF THE CIRCULAR MEMBERS BEING REPLACED. A MINIMUM NUMBER OF 12 BARS IS REQUIRED. A CHANGE IN STEEL MATERIAL OF ALL "PRESS-BREAK" MEMBERS MUST B E SUBMITTED TO THE DISTRICT OFFICE ENGINEER FOR REVIEW AND APPROVAL.
CHIEF BRIDGE ENGINEER
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-741M
IS GALVANIZED.
SHOP IS TO APPLY SILICON CAULKING TO THIS LOCATION AFTER POLE ASSEMBLY
REMOVABLE AND ATTACHED TO BASEPLATE WITH STAINLESS STEEL HARDWARE.

FOR COLUMNS LESS THAN 19" DIA., THIS FILLET WELD IS NOT REQUIRED BUT
RECOMMENDED

AUG. 4, 2017
AUG. 4, 2017

SHT. 4 OF 6

ENTRY OF RODENTS WHILE PERMITTING DRAINAGE. SCREEN IS TO BE
1/8" BY 1/8" MESH AND 0.063" DIAMETER WIRES. SCREEN IS TO PREVENT

COLUMN BASE

DETAIL B NOTES:

1. ANCHOR BOLTS MUST BE ATTACHED TO THE PIPE COLUMN AND CONTINUOUSLY
ENGLISHED TO THE BASE PLATE BEFORE THE FULL PENETRATION GROOVE
WELD IS MADE. SHADING FINE MUST BE FABRICATED AT A CONTINUOUS SEAM.

2. FOR COLUMNS LESS THAN 19" DIA., THIS FILLET WELD IS NOT REQUIRED BUT
RECOMMENDED.

S H E E T 3

FOR ALTERNATE PIPE CAP DETAIL, SEE SHEET 3.

ANCHOR BOLT DETAIL

COLUMN, STIFFENERS, AND
ANCHOR BOLTS "F" HOLES FOR
ANCHOR BOLTS "F"
PROVIDE HOLES

STEEL TEMPLATE AND ANCHOR PLATE TO BE PROVIDED BY SIGN FABRICATOR.
STEEL TEMPLATE PLATE WITH NUTS ON BOTH SIDES SHALL BE USED TO
STEEL HEAVY HEX. NUT,
SCREW TYPE
CAP - 10 GAGE
STEEL ANCHOR BOLTS WITH
THICKNESS EXCEEDS 1"

F O R  2 "  AND  2 ' "  D I A .  B O L T S ,
F O R  1 ' "  AND  1 "  D I A .

NOTE: D DENOTES DIAMETER

SECT I O N  D - D

PRESS ST E E L
PIPE CAP DETAILS

NOTE: D DENOTES DIAMETER

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
OVERHEAD SIGN STRUCTURES
CANTILEVER AND CENTER-MOUNT STRUCTURES
STRUT LENGTHS UP TO 40'
OVERHEAD SIGN STRUCTURES
LIGHT SUPPORT AND HANDHOLE DETAILS
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
CHIEF BRIDGE ENGINEER

BC-741M
SHT. 6 OF 6

NOTE:
LUMINAIRE
30°
SEE DETAIL "X" AND TC-8715
WEATHERPROOF ENCLOSURE
SEE TC-8715
DETAILS,
FOR ELECTRICAL
SIGN
MIN.
SEE DETAIL Y
HAND HOLE DETAIL
HAND HOLE LOCATION
TYPICAL COLUMN DETAIL

SIGN SUPPORT BEAM SIZES

SIGN SUPPORT BEAM
SIZE
MIN.
MAX.
8'-6" + TO 9'-6"
W6x15
W6x20
W6x25
W8x28
W8x31
5'-6" + TO 6'-6"
6'-6" + TO 7'-6"
7'-6" + TO 8'-6"

NOTE:
- See Standard Drawings TC-8700C, TC-8701D,
TC-8701E, TC-8701S AND TC-8715.
- For sign panel details and lighting details,
see Standard Drawings TC-8700C, TC-8701D,
TC-8701E, TC-8701S AND TC-8715.
- CVN required for all thicknesses exceeding 0.500".

DIRECTOR, BUREAU OF PROJECT DELIVERY
AUG. 4, 2017

TYPICAL LIGHT FIXTURE SUPPORT DETAILS

SIGN SUPPORT BEAM SIZES

LEGEND FOR DETAIL Y

NOTE:
- 1/2" O.D. BR. STRUT
- (O.D. OF STRUT)
- (NOTCH HEIGHT) = 0.75 x A
- (INTERIOR ANGLE IN DEGREES)
- (FIELD LENGTH) = 0.75 x A / 100
- (NOTCH DEPTH) = C / 2 x (TAN D / 4)
- (LENGTH OF WT)
- (LENGTH OF WT)

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 AUG. 4, 2017
RECOMMENDED AUG. 4, 2017
SHT. 6 OF 6
BC-741M
GENERAL NOTES
1. PROVIDE 3-INCH CONCRETE COVER OVER REINFORCEMENT BARS, EXCEPT AS NOTED.
2. USE CLASS A CONCRETE: F’0 = 3000 PSI IN PERIODICALS, POSITIONS AND CASTINGS.
3. PROVIDE 4000-POUND STRESSING STEEL BARS THAT MEET THE REQUIREMENTS FOR H/R
4. FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS INDICATED.
5. VERIFY ALL DIMENSIONS AND GEOMETRY OF THE EXISTING STRUCTURES.
6. OWNER’S DIRECTION CONCRETE HOSES 1 INCH BY 1 INCH.
7. ALL CEMENTS SHOW AND HORIZONTAL, EXCEPT AS NOTED.
8. DIMENSIONS ARE BASED ON THE NORMAL TEMPERATURE OF 68 DEGREES F.
9. SPECIFIC PROPERTIES MAY BE OBTAINED FROM THE ENGINEER TO BE AT ANY ELEVATION OR AMOUNT OF THE PROJECT.
10. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CONTRACT.
11. PROVIDE MATERIALS AS NEEDED TO MEET THE REQUIREMENTS FOR THE PROPOSED CONSTRUCTION.
12. PROVIDE STRUCTURAL STEEL CONFORMING TO THE FOLLOWING:

NOTES TO FABRICATOR
- DIMMABLE/非常喜欢 SOMETHING IF CHANGES ARE PROMINENT IN this SPECIFICATION.
- PROVIDE STRUCTURAL STEEL CONFORMING TO THE CONTRACT.
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CONTRACT.
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- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CONTRACT.
OVERHEAD SIGN STRUCTURES

ALTERNATE CAISSON FOUNDATION

"D" DIAMETER

GROUND LINE FINISHED

N.T.S.

CAISSON ELEVATION

"N" BARS @ EQUALLY SPACED AS REQUIRED BY DESIGN

LAP LENGTH TO BAR SPLICE LOCATIONS

3" CLEAR

R4 TIE B 12" (MINIMUM ON AS REQUIRED BY DESIGN)

SECTION C-C

NOTES:

1. ALTERNATE CAISSON FOUNDATIONS ARE PERMITTED IN PLACE OF THE SPREAD FOOTING SIZE SHOWN ON THE CONTRACT DRAWINGS.

2. ALTERNATE CAISSON FOUNDATIONS MUST BE DESIGNED IN ACCORDANCE WITH DESIGN CRITERIA GIVEN ON SHEET 1.

3. ALTERNATE CAISSON FOUNDATIONS MUST BE DESIGNED IN ACCORDANCE WITH DESIGN CRITERIA GIVEN ON SHEET 1.

4. DESIGN COMPUTATIONS FOR THE REQUIRED CAISSON EMBEDMENT AND REINFORCEMENT MUST BE SUBMITTED TO THE DISTRICT ENGINEER FOR REVIEW AND APPROVAL.

5. IN PLACE OF #4 TIES @ 12", A #4 BAR SPIRAL WITH A 3" GAGE MAY BE USED. THE #4 TIES AT 12" ARE THE MINIMUM 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 AND APPROVED. CONTRACTOR SHALL SUBMIT DESIGN DRAWINGS FOR REVIEW AND APPROVAL.

LONGITUDINAL SEAM WELDS INDICATING TYPE OF WELD, WELD PENETRATION, EFFECTIVE DEPTH AND LENGTH OR AREA WELD TYPE. LONGITUDINAL SEAM WELDSshall have the equivalent minimum penetration. Except longitudinal seam welds within 1" of the end of the press break member or length shown on details shall be complete penetration welds. Complete penetration longitudinal seam welds must be "C" RADIOGRAPHICALLY INDICATED THE LENGTH OF EACH WELD TYPE. LONGITUDINAL SEAM WELDS SHALL HAVE 60 PERCENT MINIMUM LONGITUDINAL SEAM WELDS INDICATING TYPE OF WELD, WELD PENETRATION, EFFECTIVE DEPTH AND LENGTH OR AREA WELD TYPE. LONGITUDINAL SEAM WELDSshall have the equivalent minimum penetration. Except longitudinal seam welds within 1" of the end of the press break member or length shown on details shall be complete penetration welds. Complete penetration longitudinal seam welds must be "C" RADIOGRAPHICALLY INDICATED THE LENGTH OF EACH WELD TYPE. LONGITUDINAL SEAM WELDSshall have the equivalent minimum penetration. Except longitudinal seam welds within 1" of the end of the press break member or length shown on details shall be complete penetration welds. Complete penetration longitudinal seam welds must be "C" RADIOGRAPHICALLY INDICATED THE LENGTH OF EACH WELD TYPE. LONGITUDINAL SEAM WELDSshall have the equivalent minimum penetration. Except longitudinal seam welds within 1" of the end of the press break member or length shown on details shall be complete penetration welds. Complete penetration longitudinal seam welds must be "C" RADIOGRAPHICALLY INDICATED THE LENGTH OF EACH WELD TYPE.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

ALTERNATE CAISSON FOUNDATION

BC-743M
ANCHOR PLATE AND STEEL TEMPLATE DETAIL

PLAN OF COLUMN BASE TYPE Y:

- 1/2" MIN. CLEARANCE
- 2" MIN. NOSE
- 1/8" PLATE (TYP.)

COLUMN BASE PLATE (TYP.)

COLUMN CAPS

- 10" O.D. - 2" - 1/2" MIN.
- 12" O.D. - 2" - 1/2" MIN.
- 14" O.D. - 2" - 1/2" MIN.
- 16" O.D. - 2" - 1/2" MIN.
- 18" O.D. - 2" - 1/2" MIN.
- 20" O.D. - 2" - 1/2" MIN.
- 24" O.D. - 2" - 1/2" MIN.

COLUMN BASE PLATE (TYP.)

COLUMN CAPS

1/2" MIN.

SECTION D-D

PIPE CAP DETAILS

- 1/2" MIN.
- 2" MIN.

ANCHOR BOLT DETAIL

- SEE NOTE
- 1/8" MAX.
- 1/8" ANCHOR PLATE

NOTES:

- ADHESIVE BONDED SEAM WELD TO HAVE 60% MIN. PENETRATION.
- WELD TO BE COMPLETE PENETRATION GROOVE WELD.
- 1/2" MIN.
- 1/8" MAX.

ANCHOR PLATE AND STEEL TEMPLATE DETAIL

COLUMN BASES

- 1/4" STEEL TEMPLATE AND STEEL ANCHOR PLATE TO BE PROVIDED BY SIGN FABRICATOR.
- STEEL TEMPLATE AND ANCHOR PLATE TO BE PROVISIONED FOR ALTERNATE PIPE CAP DETAIL, SEE SHEET 10.
- PIPE CAP DETAILS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

RECOMMENDED JUL 4, 2017
RECOMMENDED JUL 4, 2017
SHR. 4 DE 10
BC-743M
**Gusset Plate Dimensions**

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<tr>
<th>Member</th>
<th>Qty.</th>
<th>Dia.</th>
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<tbody>
<tr>
<td>ST4x6.9</td>
<td>5</td>
<td>3&quot;</td>
</tr>
<tr>
<td>ST4x2.25</td>
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<td>1.5&quot;</td>
</tr>
<tr>
<td>ST4x2.25</td>
<td>2</td>
<td>1.5&quot;</td>
</tr>
<tr>
<td>ST4x2.25</td>
<td>8</td>
<td>1.125&quot;</td>
</tr>
</tbody>
</table>

Note: Gusset plate sizes provided as a guide only. Producers may provide plates of alternate size to provide minimum weld lengths specified.

**Alternate Panel Point Connection**

<table>
<thead>
<tr>
<th>Member</th>
<th>Qty.</th>
<th>Dia.</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>ST4x2.25</td>
<td>8</td>
<td>1.125&quot;</td>
</tr>
</tbody>
</table>

**Recommended Bolt Sizes:**

- **Min. Flange Weld Length:** 4 x Flange Thickness
- **Min. Plate Size:** Equal to 4 x Flange Thickness

**Connection Details**

- Provide a hole, bending at the edge of the gusset plate, in the connecting member equal to the minimum weld size required.

**Substitution Table**

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<thead>
<tr>
<th>Pipe Section</th>
<th>ST/WT Substitution Section</th>
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<tbody>
<tr>
<td>3&quot; x 3.085&quot;</td>
<td>ST4x6.9</td>
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<td>3&quot; x 3.085&quot;</td>
<td>ST4x2.25</td>
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<tr>
<td>3&quot; x 3.085&quot;</td>
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<td>4&quot; x 4.045&quot;</td>
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<td>6&quot; x 6.090&quot;</td>
<td>ST4x6.9</td>
</tr>
</tbody>
</table>

**Truss Details - 2**

Commonwealth of Pennsylvania
Department of Transportation
Bureau of Project Delivery

Overhead Sign Structures
2 Post Planar Truss
Spans from 30' to 100'

Recommended Jul 7, 2017
Sh. 6 of 10
SPECIAL LIGHT FIXTURE SUPPORT DETAILS-LUMINAIRE
FOR STRUCTURE MOUNTED ON HIGHWAY BRIDGE

NOTE:
BACK OF ANGLE ALIGN WITH C AS REQ'D.

SECTION B-B

SECTION S-S

SHIM DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
CHIEF BRIDGE ENGINEER
INFORMATION CONTAINED IN THE BD-644M DESIGN TABLES

1. Design tables are standard charts that are used to determine the required materials and elements for the design criteria.

2. The design tables include specific requirements for various components, such as concrete, steel, and reinforcement, as outlined in the design criteria.

3. The information contained in the tables is based on the current version of the AASHTO Bridge Design Specifications, the American Institute of Steel Construction (AISC) specifications, and other relevant standards.

4. The tables are designed to provide a comprehensive list of materials and construction specifications, including sizes, strengths, and other characteristics, to ensure the structures meet the required standards.

5. Additional information, such as design loads and construction notes, is included to guide the design and construction processes.

6. The tables are intended to be used in conjunction with the specific project requirements and the current state of practice in the field of engineering.

DESIGN CRITERIA FOR PENNDOT SIGN STRUCTURES

1. Steel Columns
   - Design columns to be round, square, or rectangular, as specified.
   - Consider the stability and load-bearing capacity of the columns, ensuring they meet the required standards.

2. Anchor Bolts
   - Use anchor bolts conforming to the following:
     - AASHTO M44 GRADE 55 PER PUBLICATION 408
     -Anchor bolts must be installed with a minimum embedment depth of 6 inches.

3. Steel Sections
   - Use standard steel shapes, such as H-sections, I-sections, and angles, conforming to the appropriate specifications.
   - Ensure the sections meet the required load-bearing capacity and stability criteria.

4. Reinforcement
   - Provide reinforcement conforming to the following:
     - AASHTO M44 GRADE 55 PER PUBLICATION 408
     -Concrete stirrups must be provided as specified in the design criteria.

5. Concrete
   - Use concrete conforming to the appropriate specifications, such as AASHTO M44 GRADE 55.
   - Ensure the concrete meets the required strength and durability criteria.

6. Design computations and load analysis should be performed to ensure the structural integrity and compliance with the specified design criteria.

7. Design computations should be submitted to the district bridge engineer for review and approval.

NOTES TO FABRICATOR

1. Dimensions shown in the design tables are based on the current version of the AASHTO Bridge Design Specifications, AISC specifications, and other relevant standards.

2. The design tables should be used in conjunction with the specific project requirements and the current state of practice in the field of engineering.

3. Additional information, such as design loads and construction notes, is included to guide the design and construction processes.

4. The design tables are intended to be used in conjunction with the specific project requirements and the current state of practice in the field of engineering.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

NOTES AND DESIGN CRITERIA

1. Materials and Reinforcements
   - Use materials and reinforcements conforming to the current version of the AASHTO Bridge Design Specifications, AISC specifications, and other relevant standards.
   - Material and reinforcement specifications should be provided for each structural member, including size, type, and location.

2. Design computations and load analysis should be performed to ensure the structural integrity and compliance with the specified design criteria.

3. Design computations should be submitted to the district bridge engineer for review and approval.

4. The design tables are intended to be used in conjunction with the specific project requirements and the current state of practice in the field of engineering.

5. Additional information, such as design loads and construction notes, is included to guide the design and construction processes.

BC-744M
### Table

<table>
<thead>
<tr>
<th>Footing</th>
<th>Bearing</th>
<th>Length</th>
<th>Width</th>
<th>Depth</th>
<th>T/C</th>
<th>C/Yds.</th>
<th>Notes</th>
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</thead>
<tbody>
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</tbody>
</table>

### Notes
- **Minimum Footing Size:**
- **Foundation Requirements:**
- **Additional Notes:**

---

**Section A A**

*Diagram of section A A with dimensions and measurements.*

---

**Commonwealth of Pennsylvania**

**Department of Transportation**

*Footer of the page.*
COLUMN BASE DETAILS

DETAIL B NOTES:
1. BACKING RING MUST BE ATTACHED TO THE COLUMNS AND CONTINUOUSLY ELBowed JOIN ON THE COLUMN TO PREVENT THE COLUMN END FROM WELDING. BACKING RING MUST BE ATTACHED TO THE COLUMN.
2. COLUMN AND COLUMN CAPS 1'-10", THEY END WELLS ARE NOT REQUIRED BIT CHROOM CASING TO THIS LOCATION AFTER THE COLUMN ASSEMBLY IS COMPLETE.

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

NOTES:
* 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.
* 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.
* For pipe cap details, see sheet 12.
* For alternate pipe cap details, see sheet 11.
* Sea base plate to foundation cap shall be galvanized steel screen. Selection shall be made in accordance with publication 408, section 948.3(b).
* Steel template and anchor plate to be provided by sign fabricator.
* For pipe cap details, see sheet 12.
* For alternate pipe cap details, see sheet 11.
* Sea base plate to foundation cap shall be galvanized steel screen. Selection shall be made in accordance with publication 408, section 948.3(b).
* Steel template and anchor plate to be provided by sign fabricator.
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* Steel template and anchor plate to be provided by sign fabricator.
* For pipe cap details, see sheet 12.
* For alternate pipe cap details, see sheet 11.
NOTES:

- All bolts to be ASTM A325 and galvanized in accordance with PUB. 408
- All stainless steel or ASTM A490
- See Standard Drawing TC-8701E
- All materials for sign seats and sign support brackets to be structural steel

SECTION A-A

CHORD SPLICE

CHORD SPLICE PLATE

MIN. WALL THICK. X

D

O

BOLTS

T

V

NOTE:

- Provide additional brackets as required at 6'-0" maximum spacing

TYPICAL SIGN SUPPORT Bracket SPACING DIAGRAM

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

CHIEF BRIDGE ENGINEER
DIRECTOR, BUR. OF PROJECT DELIVERY

MINIMUM BOLT SPACING OF 3 TIMES THE BOLT DIAMETER.

BRACING AND GUSSET PLATES. DO NOT VIOLATE

ADJUST BOLT PATTERN AS NECESSARY TO AVOID CHORD STRUCTURAL DETAILS-1

NOTES:

- CHORD SPLICE
  - Provide shims as necessary to align chord between sign support brackets.

OVERHEAD SIGN STRUCTURES

2 POST AND 4 POST TRI-CHORD TRUSS

SPANS FROM 60' TO 240'

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF TRANSPORTATION

BUREAU OF PROJECT DELIVERY
RECOMMENDED

DETAIL #1
AUG. 4, 2017

TO BACK OF TRI-CHORD TRUSS

ALTERNATE HANDRAIL HINGE BRACKET ASSEMBLY
SECTION C-C

FOR DETAILS NOT SHOWN, SEE SHEET 8.

FOR SECTION C-C, 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 JUL. 4, 2017
RECOMMENDED JUL. 4, 2017

DIMENSIONS TABLE
(Pipe Dimensions Table, in nominal)

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 JUL. 4, 2017
RECOMMENDED JUL. 4, 2017

DIMENSIONS TABLE
(Pipe Dimensions Table, in nominal)
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
   PERMANENT CAMBER.

3. PIPE DIAMETERS SHOWN UP TO AND INCLUDING 12 INCHES ARE NOMINAL DIAMETERS.

4. PROVIDE BOLTS CONFORMING TO THE FOLLOWING:
   TABLE 10.32.3AD-5
   TABLE 10.32.3B


6. PROVIDE ANCHOR BOLT HOLES 1/2" LARGER THAN BOLT DIAMETER.

7. PROVIDE DOUBLE NUTS AND WASHERS FOR EACH ANCHOR BOLT.

8. DIMENSIONS ARE BASED ON A NORMAL TEMPERATURE OF 68 DEGREES F.

9. USE CLASS A CEMENT CONCRETE f'c = 3000 PSI IN PEDESTALS, FOOTINGS AND
   PERMANENT CAMBER.

10. PROVIDE BOLTS CONFORMING TO THE FOLLOWING:
    TABLE 10.32.3AD-5
    TABLE 10.32.3B

11. PROVIDE A COMBINED BOLT SHEAR AND TENSION FOR ALL BOLTS IN ACCORDANCE WITH TABLE 10.32.3B.

12. PROVIDE ANCHOR BOLT HOLES 1/2" LARGER THAN BOLT DIAMETER.

13. PROVIDE DOUBLE NUTS AND WASHERS FOR EACH ANCHOR BOLT.

14. PROVIDE A COMBINED BOLT SHEAR AND TENSION FOR ALL BOLTS IN ACCORDANCE WITH TABLE 10.32.3B.

15. PROVIDE ANCHOR BOLT HOLES 1/2" LARGER THAN BOLT DIAMETER.

16. PROVIDE DOUBLE NUTS AND WASHERS FOR EACH ANCHOR BOLT.

17. PROVIDE A COMBINED BOLT SHEAR AND TENSION FOR ALL BOLTS IN ACCORDANCE WITH TABLE 10.32.3B.

18. PROVIDE ANCHOR BOLT HOLES 1/2" LARGER THAN BOLT DIAMETER.

19. PROVIDE DOUBLE NUTS AND WASHERS FOR EACH ANCHOR BOLT.

20. PROVIDE A COMBINED BOLT SHEAR AND TENSION FOR ALL BOLTS IN ACCORDANCE WITH TABLE 10.32.3B.

21. PROVIDE ANCHOR BOLT HOLES 1/2" LARGER THAN BOLT DIAMETER.

22. PROVIDE DOUBLE NUTS AND WASHERS FOR EACH ANCHOR BOLT.

23. PROVIDE A COMBINED BOLT SHEAR AND TENSION FOR ALL BOLTS IN ACCORDANCE WITH TABLE 10.32.3B.

24. PROVIDE ANCHOR BOLT HOLES 1/2" LARGER THAN BOLT DIAMETER.

25. PROVIDE DOUBLE NUTS AND WASHERS FOR EACH ANCHOR BOLT.

26. PROVIDE A COMBINED BOLT SHEAR AND TENSION FOR ALL BOLTS IN ACCORDANCE WITH TABLE 10.32.3B.

27. PROVIDE ANCHOR BOLT HOLES 1/2" LARGER THAN BOLT DIAMETER.

28. PROVIDE DOUBLE NUTS AND WASHERS FOR EACH ANCHOR BOLT.

29. PROVIDE A COMBINED BOLT SHEAR AND TENSION FOR ALL BOLTS IN ACCORDANCE WITH TABLE 10.32.3B.

30. PROVIDE ANCHOR BOLT HOLES 1/2" LARGER THAN BOLT DIAMETER.

31. PROVIDE DOUBLE NUTS AND WASHERS FOR EACH ANCHOR BOLT.

32. PROVIDE A COMBINED BOLT SHEAR AND TENSION FOR ALL BOLTS IN ACCORDANCE WITH TABLE 10.32.3B.

33. PROVIDE ANCHOR BOLT HOLES 1/2" LARGER THAN BOLT DIAMETER.

34. PROVIDE DOUBLE NUTS AND WASHERS FOR EACH ANCHOR BOLT.

35. PROVIDE A COMBINED BOLT SHEAR AND TENSION FOR ALL BOLTS IN ACCORDANCE WITH TABLE 10.32.3B.
**SHT. 4 OF 10**

**AUG. 4, 2017**

**CHIEF BRIDGE ENGINEER**

**DIRECTOR, BUR. OF PROJECT DELIVERY**

**BC-745M**

**RECOMMENDED**

**SHALL START AND STOP IN THE MIDDLE THIRD REGION OF FLAT SECTIONS BETWEEN BREAK POINTS.**

**COLUMN CONNECTION TO BASE PLATE, AND AT COLUMN CONNECTION SPLICE PLATE LOCATIONS, WELD PENETRATION LONGITUDINAL SEAM WELDS MUST BE 100% RADIOGRAPHICALLY INSPECTED. FOR THE COLUMN BASE DETAILS PENETRATION, EXCEPT LONGITUDINAL SEAM WELDS WITHIN 6" OF THE ENDS OF THE PRESS BREAK MEMBER OR WALL THICKNESS EXCEEDING 2" (.500")**

**SPANS FROM 100' TO 200'**

**MUST SUBMIT DESIGN CALCULATIONS AND DESIGN DRAWINGS FOR REVIEW AND ACCEPTANCE FOR NOTE: D DENOTES DIAMETER OR WALL THICKNESS REQUIRES A SPECIAL DESIGN TO BE SUBMITTED FOR REVIEW. CONTRACTOR**

---

**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 SEAMS IS REQUIRED. A CHANGE IN STEEL MATERIAL OR WALL THICKNESS REQUIRES A CIRCULAR SECTION TO BE CONTINUOUSLY NORTHERN DESIGN CALCULATIONS AND DESIGN DRAWINGS FOR REVIEW AND ACCEPTANCE WITH LIMITED THICKNESS, THIN WALLS REQUIRES A PRESS BREAK, INCLUDING SEAM WELD PENETRATION. EFFECTives 

<table>
<thead>
<tr>
<th>COLUMN BASES</th>
<th>PROJECTION</th>
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<tr>
<td>50% 375</td>
<td>W</td>
<td>4-5/16&quot;</td>
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**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 JUL. 1, 2017**

**SHR. 4 OF 10**

**BC-745M**
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
CHIEF BRIDGE ENGINEER
RECOMMENDED
BC-745M
TRUSS DETAILS
OVERHEAD SIGN STRUCTURES

NOTES:
- For general notes, see Sheet 1.
- Members sizes indicated on contract drawings obtained from BC-645M (Sheet 5).
- One or more splices in the truss may be added or eliminated at the option of the fabricated. 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 frames to be used to provide additional support, but are not part of the structure. The addition or elimination of splices, the heavier chord material must be extended toward the lighter chord material to the desired splice location.
- Cross bracing - alternating in direction at maximum spacing of 3' panels. Cross braces shall not be placed at end verticals nor at splice points.

TEMPORARY END FRAME DETAILS

FOR DETAILS SEE SHEET 6.
SHT. 6 OF 10
AUG. 4, 2017
DIRECTOR, BUR. OF PROJECT DELIVERY
**SNUG FIT (TYP.) FLAT WASHERS TO PROVIDE SHIM AS REQUIRED**

*View A-A at Intermediate Support View A-A at End Support*

**SMOOTH (TYP.) GRIND TOP EDGES**

*Support Intermediate End Support*

**RAILING**

*Section B-B Hinge Bracket*

**Detail 1**

**Elevation Detail #1**

**Alternate Handrail Hinge Bracket Assembly**

*ONE HALF UNIT SHOWN*

**Typical Handrail Details**

**Notes:**

- All bolts to be ASTM A325 and galvanized in accordance with Pub. 408 unless stainless steel or otherwise indicated.
- Use ASTM A307 galv. bolt with lock nut for 1/2" x 1 1/2" pipe railings.
- Use ASTM A490, grade 50 steel for catwalk supports.
- Special care shall be taken to ensure that the completed post hinge and catwalk 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. 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. Welded-type grating is a fastened, butt welded type. All welds shall be smooth and tight. Welding shall be executed by qualified personnel.
- Provide 3 clips evenly spaced at each grating support.
GENERAL NOTES
1. PROVIDE 3-INCH CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.
2. USE SINGLE FACE CONCRETE BARRIER PLACEMENT AT MEDIAN PIERS.
3. PROVIDE ANCHOR BOLT HOLES 3 LARGER THAN BOLT DIAMETER.
4. USE FULL PENETRATION WELDS FOR ALL LONGITUDINAL WELDS WITHIN 6 OF A STRUCTURAL MEMBER IN THE DIRECTION OF THE APPLIED BEARING FORCE SHALL BE CHECKED.
5. PROVIDE PROPER CONSTRUCTION DETAILS PRIOR TO ERECTION, DEMONSTRATE TO THE ENGINEER BY PREASSEMBLY OR OTHER APPROVED METHODS TO ACCURATELY SET BASE PLATE ANCHOR BOLTS TO CORRECT ELEVATION AND LOCATION.
6. PROVIDE MAXIMUM WELD UNDERCUT OF 0.01.
7. PROVIDE FULL PENETRATION GROOVE WELDS FOR ALL LONGITUDINAL WELDS WITHIN 6 OF A STRUCTURAL MEMBER IN THE DIRECTION OF THE APPLIED BEARING FORCE SHALL BE CHECKED.
8. PROVIDE STRUCTURAL STEEL CONFORMING TO AASHTO M270, GRADE 36 (ASTM A709, GRADE E50 STRAIN).
9. PROVIDE WELDED OR SEAMLESS STEEL PIPE CONFORMING TO PUBLICATION 408, SECTION 3.
10. PROVIDE BOLTS IN ACCORDANCE WITH FABRICATION NOTE 6 ON THIS SHEET.
12. PROVIDE RACKING STANDARDS AND HANGERS FOR EACH ANCHOR BOLT.
13. PROVIDE CHAMFER EXPOSED CONCRETE EDGES 1 INCH BY 1 INCH.
14. PROVIDE NUTS AND WASHERS FOR EACH BOLT.
15. PROVIDE 3-INCH CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.
16. PROVIDE PROPER CONSTRUCTION DETAILS PRIOR TO ERECTION, DEMONSTRATE TO THE ENGINEER BY PREASSEMBLY OR OTHER APPROVED METHODS TO ACCURATELY SET BASE PLATE ANCHOR BOLTS TO CORRECT ELEVATION AND LOCATION.
17. PROVIDE FULL PENETRATION GROOVE WELDS FOR ALL LONGITUDINAL WELDS WITHIN 6 OF A STRUCTURAL MEMBER IN THE DIRECTION OF THE APPLIED BEARING FORCE SHALL BE CHECKED.
18. PROVIDE WELDED OR SEAMLESS STEEL PIPE CONFORMING TO PUBLICATION 408, SECTION 3.
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25. PROVIDE PROPER CONSTRUCTION DETAILS PRIOR TO ERECTION, DEMONSTRATE TO THE ENGINEER BY PREASSEMBLY OR OTHER APPROVED METHODS TO ACCURATELY SET BASE PLATE ANCHOR BOLTS TO CORRECT ELEVATION AND LOCATION.
26. PROVIDE FULL PENETRATION GROOVE WELDS FOR ALL LONGITUDINAL WELDS WITHIN 6 OF A STRUCTURAL MEMBER IN THE DIRECTION OF THE APPLIED BEARING FORCE SHALL BE CHECKED.
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34. PROVIDE PROPER CONSTRUCTION DETAILS PRIOR TO ERECTION, DEMONSTRATE TO THE ENGINEER BY PREASSEMBLY OR OTHER APPROVED METHODS TO ACCURATELY SET BASE PLATE ANCHOR BOLTS TO CORRECT ELEVATION AND LOCATION.
35. PROVIDE FULL PENETRATION GROOVE WELDS FOR ALL LONGITUDINAL WELDS WITHIN 6 OF A STRUCTURAL MEMBER IN THE DIRECTION OF THE APPLIED BEARING FORCE SHALL BE CHECKED.
36. PROVIDE WELDED OR SEAMLESS STEEL PIPE CONFORMING TO PUBLICATION 408, SECTION 3.
37. PROVIDE BOLTS IN ACCORDANCE WITH FABRICATION NOTE 6 ON THIS SHEET.
38. 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.
39. PROVIDE RACKING STANDARDS AND HANGERS FOR EACH ANCHOR BOLT.
40. PROVIDE CHAMFER EXPOSED CONCRETE EDGES 1 INCH BY 1 INCH.
41. PROVIDE NUTS AND WASHERS FOR EACH BOLT.
**Caisson Component Selection Table**

<table>
<thead>
<tr>
<th>Span (Feet)</th>
<th>Panel (P.S.F.)</th>
<th>Caisson Diameter (Inches)</th>
<th>Caisson Embedment (Feet)</th>
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</table>

**Caisson Foundation Details**

**Frame Structures**

1. Contact the structure control engineer in any of the following situations:
   - New or changed existing conditions.
   - The structure will not support the height of the drilling rig.
   - The site is not visible.

2. Construct drilled caissons per plans, section 3. All caissons shall be identified on the plans.

**Caisson Drilling and Installation Notes**

1. Contact the structure control engineer in any of the following situations:
   - New or changed existing conditions.
   - The structure will not support the height of the drilling rig.
   - The site is not visible.

2. All caissons shall be identified on the plans.

**Caisson Foundation Details**

**Caisson Selection Notes**

1. The caisson selection criteria is based on the following:
   - New or changed existing conditions.
   - The structure will not support the height of the drilling rig.
   - The site is not visible.

2. All caissons shall be identified on the plans.

**Optional Caisson Component Selection Table**

<table>
<thead>
<tr>
<th>Span (Feet)</th>
<th>Panel (P.S.F.)</th>
<th>Caisson Diameter (Inches)</th>
<th>Caisson Embedment (Feet)</th>
<th>Vert. Depth (Feet)</th>
<th>No.</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>1,040</td>
<td>34</td>
<td>24</td>
<td>58</td>
<td>18</td>
<td>#8</td>
</tr>
<tr>
<td>760</td>
<td>48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>1,000</td>
<td>50</td>
<td>24</td>
<td>58</td>
<td>19</td>
<td>#8</td>
</tr>
<tr>
<td>116</td>
<td>1,000</td>
<td>60</td>
<td>24</td>
<td>58</td>
<td>20</td>
<td>#8</td>
</tr>
</tbody>
</table>

**Caisson Foundation Details**

**Median Barrier Installation**

**Plan**

Typical shoulder detail

Elevation

Caisson foundation details

**Notes:**

1. See general notes, see sheet 1.
2. For anchor bolt information, see sheet 2.
3. Caisson structures. See sheet 4 for additional information.

**Commonwealth of Pennsylvania**

Department of Transportation

Bureau of Project Delivery

**Monopile Sign Structures**

Frame structure spans up to 160' and cantilever monopile structure strut lengths up to 27'

**Foundation Details**

Recommended: Aug. 4, 2017

Signed: (Signature)
TABLE I

<table>
<thead>
<tr>
<th>SCUPPER DETAILS</th>
<th>TYPE A SCUPPER</th>
<th>TYPE B SCUPPER W/ GRATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC-751M</td>
<td>525 LB</td>
<td>295 LB</td>
</tr>
<tr>
<td>STANDARD BRIDGE DRAINAGE</td>
<td>380 LB</td>
<td>545 LB</td>
</tr>
</tbody>
</table>

**NOTE:**
- Use continuous fillet weld for inside and exterior, 1/16" min. size.
- Grating not shown.

**SECTION C-C**

1. Use continuous fillet weld for inside and exterior, 1/16" min. size.
2. Grating not shown.

**SECTION D-D**

**WELDED SCUPPER DETAILS**

**CAST GRATING PLAN**

**NOTES:**

- Use continuous fillet weld for inside and exterior, 1/16" min. size.
- Grating not shown.

**ALTERNATE**

**STRUCTURAL STEEL SCUPPER GRATE**

**TABLE II - U.S. CUSTOMARY UNITS**

<table>
<thead>
<tr>
<th>SCUPPER DETAILS</th>
<th>APPROXIMATE WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE A SCUPPER</td>
<td>295 LB</td>
</tr>
<tr>
<td>TYPE B SCUPPER</td>
<td>380 LB</td>
</tr>
<tr>
<td>TYPE C SCUPPER</td>
<td>465 LB</td>
</tr>
<tr>
<td>TYPE D SCUPPER</td>
<td>465 LB</td>
</tr>
</tbody>
</table>

**NOTE:**
- Grating not shown and outside. '" MIN. SIZE.
- Use continuous fillet weld for inside.

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**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD**

**BRIDGE DRAINAGE**

**SCUPPER DETAILS TYPE A, B, C & D**

**RECOMMENDED JAN. 31, 2019**

**SHEET 2 OF 7**

**BC-751M**
**PLAN SHOWING TYPICAL INSTALLATION OF SCUPPERS**

### INSTALLATION I **
- Locate drain box and downsout on far side of pier away from roadway or railroad.

### INSTALLATION II **
- Use installation III in spans over streams and over ground where discharge is not objectionable.

### INSTALLATION III **
- For installations I and II, connect downsout to storm drain.
- For installation III, use installation III in spans over streams and over ground where discharge is not objectionable.

---

**ELEVATION E-E**

For installations I and II, connect downsout to storm drain.

For installation III, use installation III in spans over streams and over ground where discharge is not objectionable.

---

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

**STANDARD**
**BRIDGE DRAINAGE**
**DOWNSPOUTING DETAILS**

**INSTALLATIONS I & II**
DRAINAGE NOTES:
1. EMBANKMENT HEIGHT OF SUBSTRUCTURE AT FRONT OF WALL IS NOT
   CONDITIONAL, OTHERWISE USE SCHEME B.
2. SPACE NECK HOLES SO AS TO NOT EXCEED 15'
3. SLOPE 4" STRUCTURE FOUNDATION DRAIN A MINIMUM
   OF 30 FT.
4. SWIM HOLES IF USED TO COLLECT WATER AT THE HEAD OF
   OTHER CRITICAL SPACES INSIDE THE WALL.
5. DRAIN PIPE UNDERGROUND TO OBSCURE CASTING DRAINAGE
   DETAILS ON A PLAN VIEW OF THE BRIDGE DRAWINGS. THE DRAINAGE
   DETAILS SHOW A DRAINAGE SCHEME WHICH INCLUDES PIPES
   ENCASED IN CONCRETE WALLS OR EXTENDING BEYOND THE
   WALL, BASED UPON FIELD CONDITIONS.
6. SEE SHEET 7 FOR ADDITIONAL DRAINAGE REQUIREMENTS FOR
   ABUTMENTS WITHOUT BACKWALLS.

MISCELLANEOUS DETAILS

LEGEND:
- P.V.C. = POLYVINYL CHLORIDE (SCHEDULE 40)
- STR.FDN. DRAIN = STRUCTURE FOUNDATION DRAIN
- P.V.C. PIPE = POLYVINYL CHLORIDE PIPE (SCHEDULE 40)
- 6" P.V.C. PIPE = 6" SCHEDULE 40 P.V.C. PIPE
- 6" CLAR = 6" CLOVER
- NO.57 COARSE AGGREGATE = NO. 57 COARSE AGGREGATE

INTEGRAL ABUTMENT SUBSTRUCTURE DRAINAGE

SCHEME A

NORMAL WATER ELEV.
6" X 6" DEEP MILE

SCHEME B

DRAINAGE SCHEMES

SECTION R-R

SECTION Q-Q

SECTION P-P

BUREAU OF PROJECT DELIVERY
DEPARTMENT OF TRANSPORTATION

COMMONWEALTH OF PENNSYLVANIA

STANDARD
BRIDGE DRAINAGE
MISCELLANEOUS DETAILS

RECOMMENDED JAN. 31, 2019

RECOMMENDED JAN. 31, 2019

DRAINAGE DETAILS:
- NO.57 COARSE AGGREGATE ENCASED IN GEOTEXTILE IS NOT REQUIRED IF NO. 57
  COARSE AGGREGATE 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.
ADDITIONAL DRAINAGE DETAIL
AT ABUTMENT WITHOUT BACKWALL

**If No. 57 coarse aggregate backfill is used. No. 57 coarse aggregate encased in geotextile is not required if No. 57 coarse aggregate backfill is used.**
TOOLED EDGES
V-NOTCH DETAIL

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH SECTION 706.
2. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A 615, A 302, 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: SLOPED CONCRETE MEDIAN BARRIER, ALTERNATE SPLIT CONCRETE MEDIAN BARRIER, ALTERNATE CONCRETE MEDIAN BARRIER, ALTERNATE CONCRETE GLARE SCREEN MEDIAN BARRIER, ALTERNATE CONCRETE MEDIAN BAR RIGHT-BARRIER DETAIL, ALTERNATE MEDIAN BARRIER DETAIL.
6. PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH SECTION 705.1 OF PUB. 408.
7. PROVIDE JOINT BACKING MATERIAL IN ACCORDANCE WITH SECTION 705.8 (b) OF PUB. 408.
8. PROVIDE PREMOLDED EXPANSION JOINT FILLER IN ACCORDANCE WITH SECTION 705.9 OF PUB. 408.
9. PROVIDE AN EPOXY BONDING COMPOUND, TYPE I, GRADE 3, IN ACCORDANCE WITH SECTION 705.1 OF PUB. 408.
10. PROVIDE PREMOLDED EXPANSION JOINT FILLER IN ACCORDANCE WITH SECTION 705.9 OF PUB. 408.

SECTION A-A
BARRIER OPEN JOINT DETAIL

SECTION B-B
SIDEWALK OPEN JOINT DETAIL

SECTION C-C
V-NOTCH DETAIL

SECTION V-V
MODIFIED DEFLECTION JOINT DETAILS

SECTION B-B
SIDEWALK OPEN JOINT DETAIL

SECTION C-C
V-NOTCH DETAIL

SECTION V-V
MODIFIED DEFLECTION JOINT DETAILS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
CONCRETE DECK SLAB DETAILS

BC-752M
HAUNCH REINFORCEMENT DETAILS

1. APPLY EPOXY TO 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 WITH TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

ALTERNATE TRANSVERSE CONSTRUCTION AND CRACK CONTROL JOINT

- FOR CONTINUOUS SPANS USING ALTERNATE PLACEMENT SEQUENCE SEE BD-660M.
- FOR DECK TOP REINFORCEMENT WITH 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

CONSTRUCTION JOINT DETAILS
GIRDER HAUNCH STIFFENER DETAIL

PARABOLIC WEB DEPTH VARIATION SHOWN
SIMILAR LINE TO DEPTH VARIATION SIMILAR

STAGGERED STUD ROW PLAN

FULL PENETRATION
INTERMEDIATE DIAPHRAGM FOR ROLLED SECTIONS

NOTE:
- WHEREVER POSSIBLE

END DIAPHRAGM FOR ROLLED SECTIONS

DIAPHRAGM CONNECTION PLATE DETAILS

NOTE:
- FOR NOTES, SEE SHEET 1.

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

LATERAL BRACING ATTACHMENTS
ELASTOMERIC BEARING PADS NOTES:
1. Elastomeric bearings are designed and manufactured in accordance with AASHTO/AWS Code 2015.6.3.19.
2. Elastomeric bearing pads are not to be used for the expansion of steel beam bridges.
3. Elastomeric bearing pads are not to be used for the expansion of steel beam bridges.
4. Elastomeric bearing pads are to be used for the expansion of steel beam bridges.
5. Elastomeric bearing pads are to be used for the expansion of steel beam bridges.
6. Elastomeric bearing pads are to be used for the expansion of steel beam bridges.
7. Elastomeric bearing pads are to be used for the expansion of steel beam bridges.
8. Elastomeric bearing pads are to be used for the expansion of steel beam bridges.
9. Elastomeric bearing pads are to be used for the expansion of steel beam bridges.
10. Elastomeric bearing pads are to be used for the expansion of steel beam bridges.

GENERAL NOTES:
1. Provide materials and workmanship in accordance with specifications.
2. Provide mechanical assembly of the bearing pads.
4. Provide minimum size weld in accordance with AASHTO/AWS Code 2015.6.3.19.
5. Provide a minimum size weld in accordance with AASHTO/AWS Code 2015.6.3.19.
6. Provide a minimum size weld in accordance with AASHTO/AWS Code 2015.6.3.19.
7. Provide a minimum size weld in accordance with AASHTO/AWS Code 2015.6.3.19.
8. Provide a minimum size weld in accordance with AASHTO/AWS Code 2015.6.3.19.

WELD TAIL NOTES:
- For beams that have been re-welded subsequent to welding, call out "WELD TAIL NOTES.
- For beams that are not galvanized subsequent to welding, call out "WELD TAIL NOTES.
- For beams that are not painted subsequent to welding, call out "WELD TAIL NOTES.

TABLE A:
<table>
<thead>
<tr>
<th>BOLT SIZE</th>
<th>CLEARANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>1/8&quot;</td>
</tr>
<tr>
<td>1 1/4&quot;</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>1 3/4&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>2&quot;</td>
<td>5/8&quot;</td>
</tr>
</tbody>
</table>

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD BEARINGS
ELASTOMERIC BEARING PADS
FOR STEEL BEAM BRIDGES
AND GENERAL
**Fixed Bearings IF & Expansion Bearings IE**

**FOR SPANS UP TO 50 FT.**

**Expansion Bearing Shows**

- **Fixed Bearings IF**
- **Expansion Bearings IE**

**Bronze Bearing Plate Detail**

- Minimum L = F + 9" for steel beam bridges
- Minimum = DIA. of hole in masonry plate + D (Metal Bearings)
- Which = Total longitudinal movement

**Expansion Bearings IIIE**

- When designing expansion bearings IIIE:
  - Use the following information as a guide when designing expansion bearings IIIE:
  - Use the following information as a guide when designing expansion bearings IIIE:
    - Minimum S = b + 1" but not less than (b + 3")
    - Minimum L = F + 9" for steel beam bridges
    - Minimum = DIA. of hole in masonry plate + D (Metal Bearings)
    - Which = Total longitudinal movement

**Metal Bearings Notes**

- For skews > 75°

**Commonwealth of Pennsylvania**

**Department of Transportation**

**Bureau of Project Delivery**

**Standard Bearings**

**Metal Bearings**

**FOR STEEL BEAM BRIDGES**

**Recommended Jan 31, 2019**

**Sheet 1 of 4**

**BC-755M**
A. GENERAL NOTES

1. PROVIDE MATERIALS AND WORKMANSHIP IN CONFORMITY WITH THE SPECIFICATIONS AND REQUIREMENTS OF THE DESIGNATION, INCLUDING THE WORKMANSHIP SPECIFICATIONS AND CONTRACT SPECIAL REQUIREMENTS.

2. SELECTA IS IN ACCORDANCE WITH THE SPECIFICATIONS AND REQUIREMENTS OF THE DESIGNATION, INCLUDING THE WORKMANSHIP SPECIFICATIONS AND CONTRACT SPECIAL REQUIREMENTS.

3. SANDBLAST ALL STEEL SURFACES AND BOLT HOLES AND THREADS AS REQUIRED.

4. HOT-DIP GALVANIZED STEELSURFACES AND BOLT HOLES AND THREADS AS REQUIRED.

5. PROVIDE MATERIALS AND WORKMANSHIP IN CONFORMITY WITH THE SPECIFICATIONS AND REQUIREMENTS OF THE DESIGNATION, INCLUDING THE WORKMANSHIP SPECIFICATIONS AND CONTRACT SPECIAL REQUIREMENTS.

B. MATERIALS

1. STRUCTURAL STEEL
   - A36 (
2. C-50) (
3. C-60) (
4. C-70) (
5. C-80) (
6. C-90) (
7. C-100) (
8. C-110) (TYP.)

2. ANCHOR BOLT: ASTM A320, GRADE 55

3. NUTS: ASTM A563, GRADE F1

4. WASHERS: ASTM A194, TYPE 1

5. Galvanizing of Anchor Bolts, Nuts and Washers: Specification M-511-0211P.

6. Stainless Steel: ASTM A276, GRADE 30, GRADE 40 (TYP.)

C. MATERIAL DESIGN PARAMETERS

1. ALLOWABLE PRESSURE IN ELASTOMER AND PIPE:
   - 25 ksi: 250 Bar: 1000 psi Elastomer
   - 50 ksi: 500 Bar: 2000 psi Elastomer

2. COMPRESSIBILITY OF PISTON BETWEEN PTFE AND STAINLESS STEEL: 0.05

3. CONCRETE BEARING STRENGTH: f'c = 3000 psi

4. ELASTOMERIC DISC: VIRGIN PLAIN NEOPRENE OR ELASTOMERIC SHEET: PUBLICATION 408, SECTION 1060.

5. WELDING MATERIALS: PUBLICATION 408, SECTION 1105.02(S).

D. ANCHOR BOLT INSTALLATION

1. IF ANCHOR BOLTS ARE INSTALLED BEFORE THE MASONRY CONCRETE IS PLACED, THE INSTALLATION MUST BE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1060.

2. IF ANCHOR BOLTS ARE INSTALLED AFTER THE MASONRY CONCRETE IS PLACED, THE INSTALLATION MUST BE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1060.

3. EXCEPT FOR SEATING BETWEEN PTFE AND STAINLESS STEEL, ALL ANCHOR BOLTS MUST BE INSTALLED AT THE BOTTOM SIDE OF THE SLEEVE.

4. PROVIDE MATERIALS AND WORKMANSHIP IN CONFORMITY WITH THE SPECIFICATIONS AND REQUIREMENTS OF THE DESIGNATION, INCLUDING THE WORKMANSHIP SPECIFICATIONS AND CONTRACT SPECIAL REQUIREMENTS.

INDEX OF SHEETS

- SHEET 1 (TYP.)
- SHEET 2 (TYP.)
- SHEET 3 (TYP.)
- SHEET 4 (TYP.)
- SHEET 5 (TYP.)
- SHEET 6 (TYP.)

NOTE:

The specified bearing components will be selected by the designer based on the specific requirements of the project, as indicated by the notes on the drawings.
SECTION A-A

FIXED POT BEARING PLAN

FOR FIXED BEARINGS ONLY

NOTE:

THE INDICATED BEARING COMPONENT DIMENSIONS VARIABLE TO BE TAKEN FROM CONTRACT DRAWINGS.
NOTE:

* 1/16" 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.

FOR ADDITIONAL DETAILS, SEE SHEETS 1 AND 6.
SECTION B-B

SECTION C-C

NOTE: POT BEARINGS - GUIDED DETAILS - 1

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

NOTE: THE INDICATED BEARING COMPONENT DIMENSIONS ARE TO BE TAKEN FROM CONTRACT DRAWINGS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

BC-756M
**Furnish a Certified Statement that the Tip Reinforcement Steel Complies with the Specification Requirements Including Certified Reports Showing the Chemical and Physical Properties, and Rolling Direction for Plates Used in the Prefabricated Tips.**

**Connection of Tip Reinforcement to Pile:**
- Bevel outside of each flange of the HP-pile for groove weld, where tip reinforcements are not.
- Attach a pile tip reinforcement on the square cut end of the pile and hold it in close contact against the welds shown. The welds shown are suggested acceptable groove welds. The contractor may use any prequalified groove welds approved by the engineer.

**Furnish and Install Tip Reinforcement Supplied by This Standard:**
- Covers only “Normal Duty” pile tip reinforcement. Designer may specify “Heavy-Duty” pile tip reinforcement for hard driving conditions.

**General Notes:**
- Provide materials and reinforcement in accordance with the code.
- The requirements in this section are based on standard reinforcement and pile/tip combinations required by the structure control engineer.

**Typical HP-Pile Tip**
- Elevation View
- Plan
- View Y-Y
- HP-Pile Tip Reinforcement Details
- Closed End Pile
- Open End Piles
- Alternate Detail A
- Scarfing End of Pile
- Alternate Detail B
- Pipe Pile Tip Reinforcement

**Commonwealth of Pennsylvania Department of Transportation Bureau of Project Delivery**

**Recommended Sept. 30, 2016**

**Recommended Sept. 30, 2016**
**GENERAL NOTES:**

1. **METHOD 1** shows groove welded flange and web splices.
2. **METHOD 2** shows splice details using splicers.

**FIELD WELDING NOTES:**

1. Submit a weld procedure specification to the engineer for approval before welding is performed.
2. Use the manual shielded arc process with electrodes meeting the requirements of AWS E8-12 or E7-11.
3. Dry the electrodes for at least 30 minutes at a temperature between 350°F and 400°F. Do not cover electrodes with any cloth material. Do not use any other materials to hold electrodes. Remember that most electrode manufacturer labels advise to hold any type of electrode at a temperature between 350°F and 400°F.
4. Do not weld when ambient temperature is below 60°F.
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 60°F.
8. Prevent metal to at least 60°F in an area at least 24" in diameter from welding. Maintain at this minimum temperature during welding.
9. Provide backing plates and weld, not less than 12" except for the ends, 6" minimum of the pipe to be spliced. May leave backing plates in place.
10. Only certified welders allowed to perform the welding.

**NOTE A:** End of weld to be ground smooth and flush with web cope. Extend bar "MB" a minimum of 2" beyond the flange edge to allow for weld initiation and termination.

**NOTE B:** Provide additional weld as per splicer manufacturer specification.

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD**

**STEEL PILE TIP REINFORCEMENTS & SPLICES**

**BC-757M**

**SEPT. 30, 2016**

**SHEET 2 OF 3**
PILE SHELL

CUT THIS END OF SHELL TO A CONFIGURATION SUCH THAT THE FILLET WELD ALONG THE CUT EDGE TO HAVE A TOTAL LENGTH NOT LESS THAN 6 TIMES THE DIAMETER OF THE SHELL.

STANDARD STEEL PILE TIP REINFORCEMENTS & SPLICES

NOTE:
1. DO NOT ALLOW PILE SPLICING ON ANY PORTION
2. PROVIDE SPLICED SLEEVE MATERIAL SAME AS PILE MATERIAL
3. USE EITHER THE SPLICER SLEEVE OR "ALL WELDED ALTERNATE"
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

PIECE PILE SPLICE DETAILS

ALL DIMENSIONS ARE MINIMUM

NOTE:
" MIN. FILLET WELD, " †" " 2 … " 6 " 6 "

MIN. " ROOT OPENING " MAX.

NOTE:
(PIPE PILE NOT SHOWN FOR CLARITY)

PIPE PILE SPLICE DETAILS

ELEVATION - SPLICE USING ALL WELDED ALTERNATE

SECTION F-F

ELEVATION - SPLICE (USING SPLICER SLEEVE)

SECTION G-G

DETAIL C

DETAIL D

FLUTED TUBE SPLICE DETAIL

** WELD SIZE DEPENDS ON PIPE WALL THICKNESS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD STEEL PILE TIP REINFORCEMENTS & SPLICES

RECOMMENDED SEP. 30, 2016
RECOMMENDED SEP. 30, 2016
SHEET 3 OF 3
SEPT. 30, 2016
CHANGE 2

PLAN AT PIER
SHEAR ANGLES ± 75°
PLAN AT PIER SIMILAR TO/ SECTION AT AVERTMENT, SEE SHEETS 3 AND 5.

BALL STUD DETAIL
(SEE GENERAL NOTE 01)

DESIGN INFORMATION

COMMENTS:

GENERAL NOTES:

1. DO NOT WELD GRADE 60 STEEL REINFORCEMENT BARS UNLESS SPECIFIED.
2. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 1106 AND AASHTO/AWS WELDING SPECIFICATIONS.
3. USE ALUMINUM STEEL IN ACCORDANCE WITH SECTION 1110.3 OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408. UNLESS OTHERWISE SPECIFIED, ALL ALUMINUM STEEL MUST BE BLED (HYDRAULIC). UNLESS OTHERWISE SPECIFIED, ALL ALUMINUM STEEL MUST BE BLED (HYDRAULIC).
4. PROVIDE ASBESTOS TO GRADE D IN CONFORMITY WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408 AND AASHTO/AWS WELDING SPECIFICATIONS.
5. USE PLATE STEEL ACTIVATED YE 672 OR 55 51 TYPE 50 FOR COMPRESSION CEMENTS, STEEL CONCRETE, ALL CONCRETE EXCEPT AS SPECIFIED OR INDICATED. ALL CONCRETE EXCEPT AS SPECIFIED OR INDICATED. THIS WORK IS INCIDENTAL TO DECK CONNECTIONS AND MUST BE APPROVED BY THE DEPARTMENT.
6. SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT Form CONCRETE RECESS AREA IN BARRIER AND GRIND TO PROVIDE A SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT.
7. JOINT OPENING FOR TOOTH EXPANSION DAMS MUST BE APPROVED BY THE DEPARTMENT.
8. USE NOTE AS A GUIDE TO THE PREPARATION OF SHOP DRAWINGS.
9. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408. STUDIES MAY BE PIGGY BACKED TO ACHIEVE REQUIRED LENGTH.
10. ALL JOINTS TO COMPLY WITH ASTM A 35.
11. PLACE PRE-CUT WELDS ON SHOP DRAWINGS. AFTER ERECTION, PROVIDE A CHART SHOWING JOINT OPENING FOR SECTIONS B-B AND C-C.
Plan at Sidewalk

Typical Section

Section at Alternate Sidewalk

Section C-C

Section D-D

Notes:
1. To ensure that inserts & screws are driven properly, use only approved hammer or device. Lintel SHC must be driven into concrete with ONLY hammering AS PICTURED.
2. Ends of drain trough to be closed and made water tight in a manner acceptable to the Department.
3. Type of resilience drainage is dependent upon the location of the structure.
4. Concrete drain box 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 definite minimum size of drain box, however, the size may be varied at the discretion of the design drawings.

Commonwealth of Pennsylvania
Department of Transportation

Standard
Tooth Expansion Dam for Prestressed Concrete & Steel I-Beam Bridges

Recommended Jan. 31, 2019
JAN. 31, 2019
BC-762M
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.

FOR P/S BEAMS

SECTION AT ABUTMENT (SHOULDER)

FOR DECK TOP REINFORCEMENT WITH 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.
SECTION AT PIER
FOR P/S BEAMS

[Diagram of Tooth Expansion Dam for Prestressed Concrete & Steel I-Beam Bridges]

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 Beams.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD
TOOTH EXPANSION DAM
FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

JAN. 31, 2019
RECOMMENDED
BC-762M
SEE SHEET 1 FOR DETAILS

SEE TYPICAL SECTION AT SIDEWALK FOR SCREW AND INSERT SPACING

SLOPED CURB & BARRIER

DIAPHRAGM

SKEW ANGLES > 75°

High Side of Dam

Low Side of Dam

SEE TYP. DRAIN BOX INSTALLATION

PEDESTRIAN RAILING, SIDEWALK PROTECTIVE FENCE OR BARRIER

TYP. SECTION AT SIDEWALK

FOR DETAIL, SEE DRAIN BOX MODIFICATION

CUT BOTTOM FLANGE TO FOR DOWNSPOUT LOCATION AT ABUTMENTS & PIERS, SEE DESIGN DRAWINGS.

DIAPHRAGM (TYP.)

TYP. DRAIN BOX INSTALLATION @ PIERS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TOOTH EXPANSION DAM
FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

NOTE:

1. ALL DETAILS ARE SHOWN WITH A SINGLE BOLTED CONNECTION. WHEN THIS CONSTRUCTION IS NOT USED, THE DETAIL MUST BE DRAWN IN THE DESIGN DRAWINGS.

DIAPHRAGM

ASPHALT PLATE

FOR STEEL BEAM

FOR P/S BEAMS

PLAN AT SIDEWALK

TYP. SECTION AT SIDEWALK

NOTE: SECTION IS SIMILAR FOR RAISED SIDEWALKS. FOR SIDEWALK DRAINAGE DEVICES, SEE B/T-565, SHEET 4.

SECTION H-H

SECTION G-G

SECTION F-F

NOTE 2 ON SHEET 2

SEE DETAIL A FOR DRAIN BOX MODIFICATION

FOR DRANS TROUGH OVER DRAIN BOX

TYP. DRAIN BOX INSTALLATION @ PIERS

INSTALLATION AT JOINTS SIMILAR

DRAIN BOX MODIFICATION

FOR DRAIN LOCATIONS MUST BE SHOWN ON THE DESIGN DRAWINGS. DRAIN LOCATIONS MUST BE SHOWN ON THE DESIGN DRAWINGS.

NOTE: SECTION IS SIMILAR FOR RAISED SIDEWALK. FOR SIDEWALK DRAINAGE SLOPES, SEE BC-767M, SHEET 4.
**Plan at Sidewalk**

Sidewalk separated by sloped barrier & curb

**Plan at Barrier**

**Plan at Sidewalk**

SIDEWALK

SIDEWALK

SIDEWALK

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, OR AS APPROVED BY THE DESIGNER, AND SHOWN ON THE DESIGN DRAWINGS.

3. PAINT ALL STEEL SURFACES WITH 3 COATS IN THE SHOP IN ACCORDANCE WITH SECTION 1060 OF PUBLICATION 408.

4. USE FLATHEAD STAINLESS STEEL ASTM F 738M (TYPE 304) OR COMPAETIBLE WITH MIL-STD-1394 FOR BOLTS AND NUTS FOR UNIVERSAL JOINTS. USE DOUBLE BLADE FLATHEAD STAINLESS STEEL ASTM F 738M (TYPE 304) OR COMPAETIBLE WITH MIL-STD-1394 FOR BOLTS AND NUTS FOR ESSENTIAL JOINTS, AND thread lockers in accordance with SECTION 1060 OF PUBLICATION 408.

5. USE THIS STANDARD AS A GUIDE IN THE PREPARATION OF SHOP DRAWINGS.

6. DIRECT EXPANSION DAM TO MATCH ROADWAY GRADE AND CROSS SLOPE.

7. MOVEMENT CLASSIFICATION OF THE SEAL TO BE CONSULTED WITH THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, INNOVATION AND SUPPORT SERVICES DIVISION, PENNSYLVANIA DEPARTMENT OF TRANSPORTATION. ALL SEALS CONFORM TO THE REQUIREMENTS AND CROSS SLOPE.

8. THE SEALED JOINT IS CONSTRUCTED AT VARIOUS STAGES OF CONSTRUCTION; THEREFORE, PRECISELY AND ACCURATELY CONTROL AND EXECUTE ALL OPERATIONS AS SPECIFIED IN SECTION 1008.3 OF PUBLICATION 408.

9. PROVIDE PREFORMED NEOPRENE COMPRESSION SEAL. USE DOUBLE BLADE FLATHEAD STAINLESS STEEL ASTM F 738M (TYPE 304) OR COMPAETIBLE WITH MIL-STD-1394 FOR BOLTS AND NUTS FOR ESSENTIAL JOINTS, AND thread lockers in accordance with SECTION 1060 OF PUBLICATION 408.

10. ASCERTAIN THAT THE TOP OF THE INSTALLED SEAL IS 6" MINIMUM TO 6" MAXIMUM BELOW THE DECK SURFACE AND THAT THE INTERSECTION OF THE VERTICAL AND HORIZONTAL SEALS AT THE GUTTER LINE IS WATERPROOF.

11. FOR JOINTS AT SHARP SKEWS, MODIFICATIONS TO BE MADE AS DESIGNED BY THE DESIGNER, AND SHOWN ON THE DESIGN DRAWINGS.

12. USE THIS STANDARD FOR PREFORMED COMPRESSION SEAL ADJACENT TO APPROACH SLABS.

13. EITHER SAW-CUT OR FORM JOINT FOR PREFORMED COMPRESSION SEAL. USE DOUBLE BLADE FLATHEAD STAINLESS STEEL ASTM F 738M (TYPE 304) OR COMPAETIBLE WITH MIL-STD-1394 FOR BOLTS AND NUTS FOR ESSENTIAL JOINTS, AND thread lockers in accordance with SECTION 1060 OF PUBLICATION 408.

14. MANUFACTURES TO PROVIDE A CHART SHOWING JOINT WIDTHS TO BE USED IN THE INSTALLATION OF THE SEAL AS WELL AS SUGGESTED SCREWS AND CONCRETE INSERTS, SPACED AT 12" C.C. MAX.

15. TO INSURE THAT INSERTS AND SCREWS ARE ALIGNED PROPERLY, PLACE CURBS AND SIDEWALKS WITH ½" SLIDING PLATES IN PLACE. APPLY BOND BREAKER TO LOWER PLATE PRIOR TO INSTALLATION.

16. TO INSURE THAT INSERTS AND SCREWS ARE ALIGNED PROPERLY, PLACE CURBS AND SIDEWALKS WITH ½" SLIDING PLATES IN PLACE. APPLY BOND BREAKER TO LOWER PLATE PRIOR TO INSTALLATION.

17. THE SEALED JOINT IS CONSTRUCTED AT VARIOUS STAGES OF CONSTRUCTION; THEREFORE, PRECISELY AND ACCURATELY CONTROL AND EXECUTE ALL OPERATIONS AS SPECIFIED IN SECTION 1008.3 OF PUBLICATION 408.

18. THE SEALED JOINT IS CONSTRUCTED AT VARIOUS STAGES OF CONSTRUCTION; THEREFORE, PRECISELY AND ACCURATELY CONTROL AND EXECUTE ALL OPERATIONS AS SPECIFIED IN SECTION 1008.3 OF PUBLICATION 408.

19. MINIMUM MOVEMENT CLASSIFICATION 1".

20. TO INSURE THAT INSERTS AND SCREWS ARE ALIGNED PROPERLY, PLACE CURBS AND SIDEWALKS WITH ½" SLIDING PLATES IN PLACE. APPLY BOND BREAKER TO LOWER PLATE PRIOR TO INSTALLATION.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PREFORMED NEOPRENE COMPRESSION SEAL JOINT FOR APPROACH SLABS

BC-766M

REFERENCE DRAWINGS

JAN. 31, 2019

JAN. 31, 2019

ACTING DIR. BUR. OF PROJECT DELIVERY
GENERAL NOTES:
1. DO NOT WELD TO NO STEEL REINFORCEMENT BARS UNLESS SPECIFIED.
2. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408 AND AASHTO/AWS SPECIFICATIONS.
3. CLARIFIED STEEL IN ACCORDANCE WITH SECTION 1050.2(B) OF PUBLICATION 408, REQUIREMENTS FOR STEEL DIAPHRAGM SHEET金属 THE FABRICATOR TO PROVIDE SEPARATE SHOP DRAWINGS FOR STEEL DIAPHRAGM SHEET METAL.
4. PROVIDE ADEQUATE PROTECTION FOR STEEL DURING WELDING OPERATIONS.
5. USE FLATHEAD STAINLESS STEEL ASTM TYPE 304-INCORPORATE A 3-3/4" PIPE TYPE 304-INCORPORATED IN ALL CONCRETE INSERTS AND N.D.
6. USE THIS STANDARD DRAWING AS A GUIDE IN THE PREPARATION OF SHOP DRAWINGS.
7. INSTALL CONTINUOUS NARROW EDGE SEAL IN THE FORM, PLACING 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, PROVIDED NON-DESTRUCTIVE TESTING OF WELDS IF REQUIRED BY THE ENGINEER. IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, REQUIREMENTS FOR STEEL DIAPHRAGM SHEET metallic THE FABRICATOR TO PROVIDE SEPARATE SHOP DRAWINGS FOR STEEL DIAPHRAGM SHEET METAL.
10. A LONGITUDINAL SEAL PAVEMENT HOLE IS REQUIRED TO JOIN THE TOP AND BOTTOM FRAMES OF THE DIAPHRAGM. HOW IT IS FURNISHED IN THE FABRICATOR TO PROVIDE SEPARATE SHOP DRAWINGS FOR STEEL DIAPHRAGM SHEET metallic THE FABRICATOR TO PROVIDE SEPARATE SHOP DRAWINGS FOR STEEL DIAPHRAGM SHEET METAL.
11. NO MORTAL CLASSIFICATION OF SEAL TO BE LESS THAN THE CLASSIFICATION OF THE SEAM OF DIAPHRAGM SHEET METAL.
12. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, REQUIREMENTS FOR INTERNAL USE OF THE SEAL FOR THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, BUREAU OF PROJECT DELIVERY.
13. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, REQUIREMENTS FOR INTERNAL USE OF THE SEAL FOR THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, BUREAU OF PROJECT DELIVERY.
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17. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, REQUIREMENTS FOR INTERNAL USE OF THE SEAL FOR THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, BUREAU OF PROJECT DELIVERY.
18. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, REQUIREMENTS FOR INTERNAL USE OF THE SEAL FOR THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, BUREAU OF PROJECT DELIVERY.
19. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, REQUIREMENTS FOR INTERNAL USE OF THE SEAL FOR THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, BUREAU OF PROJECT DELIVERY.
20. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, REQUIREMENTS FOR INTERNAL USE OF THE SEAL FOR THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, BUREAU OF PROJECT DELIVERY.

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY

STANDARD NEOPRENE STRIP SEAL DAM FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

SECTION B-B

PLAN AT FAR END OF BRIDGE APPROACH SLAB

SECTION A-A

EXPANSION DAM SKEW DETAIL

JOINT AT ALIGNMENT SHOWN WITH 20° SKEWS. JOINT AT FLAT SHOWN.

NOTE:
FORM CONCRETE RECESSION AREA IN BARRIERS AND GRIND TO PROVIDE ADMITTANCE CONTACT. APPLY OIL OR ASPHALT CEMENT PASTE NO. 3 OR PERFORMANCE GRADED ASPHALT CEMENT PASTE 40-70 TO A 3/4" SLEDGING PLATE TO WORK FRESHLY WITHIN 48 HOURS.

INDEX:
1. **NOTE**: DESIGNED FOR MORTAL CLASSIFICATION 29 AND 30 AS DEPTH OF CONCRETE DIAPHRAGM SHOWN.
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TYPICAL SECTION AT ABUTMENT

FIXED & EXPANSION
FOR P/S ADJACENT BEAMS

TYPICAL SECTION AT PIER

FIXED & EXPANSION
FOR P/S ADJACENT BEAMS

NOTE:
- "A" - SEE INSTALLATION NOTE AS PER DIMENSION "A", TABLE ON SHEET 2.
- "B" - SEE NOTE 20 ON SHEET 1. 

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
NEOPRENE STRIP SEAL DAM
FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

RECOMMENDED JAN. 31, 2019
SHEET 3 OF 6
**JOINT INSTALLATION NOTES:**

- The surface of the blockout must be completely tight when the joint is installed.
- The temperature of the joint device may be specified in the joint installation scheme to the temperature as shown on the plans.
- After the concrete of the blockout hardened, the direction and degree of the joint device is specified in the joint installation scheme.
- Apply touch-up paint.

**STRIP SEAL INSTALLATION NOTES:**

1. The proper width of strip seal and channel shall be inspected to ensure it is the width of the concrete and metal. The strip seal shall be protected from all possible damage, and all seal joints and sharp edges shall be removed.
2. Liberally coat the strip seal lugs with lubricant adhesive. Coat only the outermost edge of the strip seal and the joint is not to be adjusted for installation temperature until the seal is placed in the channel.
3. Collate the strip seal onto the joint opening, then utilize a bent bar to force the lug into the channel. (See Figure 2)
4. After the seal locks into place, push the top of the lug against the frame rail to secure proper seating. (See Figure 2)
5. As the work progresses, work both sides of the joint, noting both sides of the strip seal, and when the joint is installed.

**SECTION AT SPLIT CONCRETE DIVISOR:**

- Note: For concrete divider not split, use one piece ½" bent plate sliding over median.

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD**

**NEOPRENE STRIP SEAL DAM FOR Prestressed Concrete & Steel I-Beam Bridges**

**RECOMMENDED JAN. 31, 2019**

**SHEET 5 OF 6**

**BC-767M**

**RECOMMENDED JAN. 31, 2019**

**SHEET 5 OF 6**
SKEW ANGLES > 15° PERPENDICULAR

Expansion Dam Joint
Mitered at Barrier Face

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

SECTION
CHANGE 2

TYPICAL DIAPHRAGM DETAIL

ALTERNATE DIAPHRAGM DETAIL

GENERAL NOTES:
1. PROVIDE MATERIALS AND ERECTION 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 ASHTEA I-BEAM, GRADE 50, A709, GRADE 50 (MINIMUM DESIGN STRENGTH).
3. ALL FASTENERS ARE 1/4" DIAMETER ASTM A449 GRADE 50 BOLTS, EXCEPT AS NOTED.
4. MEMBERS, BOLTS AND PLATE SIZES SHOWN ARE VALID FOR STRAIGHT SPANS WITH LENGTH BETWEEN 10'-9" AND 13'-0" AND FOR SPANS BETWEEN 15'-0" AND 21'-10".
5. PROVIDE MULITION DETAIL TO THE MAIN MEMBERS FOR ALL SPANS, FOR SPANS LESS THAN OR EQUAL TO 10'-9" AND TYPICAL INTERIOR BEAM CONNECTIONS.
6. PROVIDE MULITION DETAIL TO THE MAIN MEMBERS FOR ALL SPANS.
7. PROVIDE FURTHER DESIGN FOR FABRICATION AND INSTALLATION OF STEEL MID-SPAN DIAPHRAGMS AND STEEL MID-SPAN DIAPHRAGMS NOT PERMITTED.
8. PROVIDE MULITION DETAIL TO THE MAIN MEMBERS FOR ALL SPANS.
9. PROVIDE STEEL MID-SPAN DIAPHRAGMS TO BE OF SAME MATERIAL TYPE; MIXING OF STEEL AND CONCRETE MULITION DETAIL IS NOT PERMITTED.
10. PROVIDE STEEL MID-SPAN DIAPHRAGMS TO BE OF SAME MATERIAL TYPE; MIXING OF STEEL AND CONCRETE MULITION DETAIL IS NOT PERMITTED.
11. PROVIDE MULITION DETAIL TO THE MAIN MEMBERS FOR ALL SPANS.
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16. PROVIDE MULITION DETAIL TO THE MAIN MEMBERS FOR ALL SPANS.

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 240"

NOTE:
1. FOR SECTIONS A-A, B-B AND 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.
ALTERNATE DIAPHRAGM DETAIL FOR UTILITY ACCESS

THIS DETAIL MAY BE USED IN BAYS WITH UTILITIES.
STRUCTURAL TEE CONNECTION SIMILAR. DOUBLE ANGLE CONNECTION SHOWN, SEE SECTION F-F FOR ALTERNATE DOUBLE ANGLE CONNECTION.

NOTE:
1. FOR GENERAL NOTES SEE SHEET 1.

VARIABLE MEMBER SIZES

<table>
<thead>
<tr>
<th>P/S BEAM WIDTH</th>
<th>DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>16&quot; x 35&quot;</td>
<td>3/4&quot;</td>
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<tr>
<td>20&quot; x 45&quot;</td>
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<td>20&quot; x 50&quot;</td>
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</table>

LEGEND

- SEE "VARIABLE MEMBER SIZES TABLE".

- APPLICABLE ONLY TO EXTERNAL BAYS FOR SPANS WITH VERTICAL CLEARANCE LESS THAN 16'-0" OVER VEHICULAR TRAFFIC.

SECTION G-G

NOTE: W-SECTION PLATE WASHER FOR W-SECTION.

PLATE WASHER FOR W-SECTION

NOTE:
1. FOR GENERAL NOTES SEE SHEET 1.
GENERAL
1. PURPOSE OF TLSB IS TO PROVIDE A STANDARD METHOD TO MAINTAIN A'S LATERAL STABILITY IN AN UPRIGHT POSITION DURING THE ERECTION PHASE. THE SPECIFICATIONS CONTAINED IN THIS STANDARD ARE INTENDED TO BE APPLIED TO PRESTRESSED CONCRETE I-BEAM TYPE GIRDER BRACINGS.
2. BRACING MACHINES SHOULD BE DESIGNED TO PROVIDE INSTALLATION, MOUNTING, AND TIGHTENING TO THE LOCKING MEANS, PRIOR TO RELEASE OF THE BARS.
3. BRACING MACHINES ARE TO BE USED IN SUCH A MANNER THAT THE RELAY SUPPORT IS NOT DISTURBED WITH MOUNTING, MOUNTING, OR TIGHTENING TO THE LOCKING MEANS, PRIOR TO RELEASE OF THE BARS.
4. BOX BEAM TYPE BRACINGS ARE NOT INCLUDED IN THIS STANDARD.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF THE BRACING SYSTEM.

DESIGN CRITERIA
1. PRIMARY BRACING
2. SECONDARY BRACING
3. NON-GUIDED HLMR BEARINGS
4. GUIDED HLMR BEARINGS
5. POINT SHEAR BLOCKS
6. MID-SPAN DIAPHRAGMS
7. MID-SPAN DIAPHRAGMS
8. END DIAPHRAGMS

DESIGN LOAD COMMENTARY
1. LOAD CASE I
2. LOAD CASE II
3. LOAD CASE III
4. LOAD CASE IV
5. LOAD CASE V
6. LOAD CASE VI
7. LOAD CASE VII
8. LOAD CASE VIII
9. LOAD CASE IX
10. LOAD CASE X
11. LOAD CASE XI
12. LOAD CASE XII
13. LOAD CASE XIII
14. LOAD CASE XIV
15. LOAD CASE XV
16. LOAD CASE XVI
17. LOAD CASE XVII
18. LOAD CASE XVIII
19. LOAD CASE XIX
20. LOAD CASE XX

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
NOTES

RECOMMENDED:
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
BC-772M
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 BAR REACTOR LINE OF BEAM AND BRACING AND LOWER BOTH ENDS.
3. CHAIN TO MAINTAIN CONTROL OF BEAM.
4. CRANE TO MAINTAIN CONTROL OF BEAM.
5. SLOWLY RELEASE BEAM FROM CRANE WHILE CHECKING FOR PLUMBNESS AT WEB.
6. RE-CHECK BEAM FOR PLUMBNESS AT WEB.
7. RELEASE BEAM.
8. ATTACH AND TIE BACK FASCIA BEAM TO ABUTMENT/PIER WITH CABLE AND TURNBUCKLE TAKING UP SLACK IN CABLE TO TIGHT CONDITION.
9. ERECT FIRST INTERIOR BEAM.
10. REPEAT AS REQUIRED.
10.a. ALL BEAMS TO BE SECURED TOGETHER BY CABLE AND TURNBUCKLE 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.
CONCEPTUAL PRIMARY BRACING DETAILS

ALTERNATE #1
(NO BEAM NOTCH)

ALTERNATE #2
(AT BEAM NOTCH)

ADDITIONAL BEAM REINFORCEMENT FOR BRACING

INSTALLATION

1. Holes in Abuts & Piers shall be located along centerline of bearings.
2. Holes shall be air-drilled.
3. Prior to drilling, holes shall be marked with centers, if needed.
4. Holes shall be aligned with centerline of bearings.
5. Holes shall be filled with grout or similar material.
6. Holes shall be filled with non-shrink grout.
7. Holes shall be filled with grout or similar material.
8. Holes shall be filled with non-shrink grout.
9. Holes shall be filled with grout or similar material.
10. Holes shall be filled with non-shrink grout.
11. Holes shall be filled with grout or similar material.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL PRIMARY BRACING
GUIDED POT BEARING LOCK DETAILS

INSTALLATION

GUIDED HLMR BEARING LOCK INSTALLATION:

1. Mate beam to bearing sole plate.
2. Move beam to maintain control of beam.
3. Place bearing lock and snug fasteners.

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.
CONCEPTUAL NON-GUIDED HLMR BEARING LOCK DETAILS

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

CONCEPTUAL NON-GUIDED HLMR BEARING LOCK INSTALLATION

1. MATE BEAM TO BEARING SOLE PLATE.
2. PLACE BEARING LOCK AND SNUG FASTENERS.
3. CRANE TO MAINTAIN CONTROL OF BEAM.
4. CRANE TO MAINTAIN CONTROL OF BEAM.
5. HOE CENTER LINE OF BEARING SOLE PLATE STATION AHEAD OR BEHIND AS DESIGNATED AT DESIGN TO AIR TEMPERATURE AT ERECTION OR TO BE LACED CONDITION.
6. CHECK CLEARANCE AND CLEARANCE BETWEEN BEAM AND SOLE PLATE.
7. ONE END OF BEAM TO BE LOCKED IN A LONGITUDINAL CONDITION.
8. 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 NON-GUIDED HLMR BEARING LOCK

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

SEPT. 30, 2016
BUREAU OF PROJECT DELIVERY
**PRESTRESS STRAND**  
**POLYMER CEMENT GROUT**

**BEAM NOTCH DETAIL**

**SPREAD BOX BEAM**

**ACCEPTABLE DRIP NOTCH DETAILS**

**NOTE:** Locate the vertex of the drip notch at the midpoint between the strands.

**CHAMFER DETAIL FOR SKewed END BLOCK**

---

**GENERAL NOTES**

1. Include applicable details shown on these sheets on fabrication shop drawings.
2. Situational top paper or schedule are permitted to be used as alternatives to written instructions where the metal sleeve, other bond breaker materials may be used, advance or slipped, or with the approval of the project manager.
3. Use preformed cellular polystyrene conforming to ASTM C578, Type I, except limit the water absorption to 2% by volume.
4. Use polymer modified cementitious matrix in accordance with Publication 408. Unless otherwise modified and special requirements, apply in accordance with the manufacturer's instructions.
5. Strand recess can be omitted if beam ends are to be incorporated in a continuity diaphragm. Where continuities are required, limit the length of internal steel sleeves, dimensioned in 6" of cast-in-place concrete beyond the end of the beam. See Publication 408 Section 1019.2(b). Only apply beam ends with epoxy resin or approved equivalent material in accordance with Publication 408 Section 1019.2(b) if specified.

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

**STANDARD MISCELLANEOUS PRESTRESS DETAILS**
**STANDARD SHEET 3 OF 3**

**BC-775M**

**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF TRANSPORTATION**

---

**ADJACENT BOX BEAMS**

**STAGE 2 CONSTRUCTION**

**STAGE 1 CONSTRUCTION**

---

**PARTIAL PLAN - BEAMS FOR STAGED CONSTRUCTION**

**SPLICE CHUCK ALTERNATE**

---

**PARTIAL PLAN - BEAMS FOR STAGED CONSTRUCTION**

**DOUBLE DUCT ALTERNATE**

---

**SECTION A-A**

**SECTION B-B**

**SECTION C-C**

---

**VERTICAL ADJUSTMENT DEVICE NOTES**

1. Vertical adjustment device shall be designed to resist two times the anticipated panel dead load plus superimposed stress.
2. Alternate leveling devices may be substituted by the contractor with the approval from the engineer.
3. If bolt is used or ordered to facilitate leveling and removal, insulate, clean and remove debris prior to filling voids with grout.

---

**VERTICAL ADJUSTMENT DEVICE**

(Vertical adjustment on steel reinforcement only)

---

**VERTICAL ADJUSTMENT SCHEDULE**

<table>
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<tr>
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<th>Bolt Dia.</th>
<th>Min.</th>
<th>Max.</th>
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<tr>
<td>10 kips</td>
<td>1&quot;</td>
<td>1/4&quot;</td>
<td>3/8&quot;</td>
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<tr>
<td>20 kips</td>
<td>1 1/2&quot;</td>
<td>3/16&quot;</td>
<td>1/4&quot;</td>
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</tbody>
</table>

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**STAGE 1 CONSTRUCTION**

**STAGE 2 CONSTRUCTION**

---

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

---

**STANDARD**

**MISCELLANEOUS PRESTRESS DETAILS**

**ADJACENT BOX BEAM AND VERTICAL ADJUSTMENT DEVICE DETAILS**

---

**ADJACENT BOX BEAM**

---

**SEPT. 30, 2016**
**GENERAL NOTES**

1. DESIGN SPECIFICATIONS:
2. CONSTRUCTION SPECIFICATIONS AND PROCEDURES:
   - All materials and methods of construction not specifically provided for in this standard shall be in accordance with current version of the Pennsylvania Department of Transportation Publication 408, Section 1000.1.1 or as otherwise provided in the contract documents.
3. WALL HEIGHTS MUST EQUAL OR EXCEED THE ACoustical PROFILE.
4. PANEL WEIGHTS:
   - *2'-0" MINIMUM TO 9'-0" MAXIMUM
5. HORIZONTAL PANEL JOINTS:
   - Minimum number of horizontal panel joints.
   - If steps are required, the elevation difference between adjacent panels is not permitted to be less than 3" or greater than 3'-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.
11. REFER TO PUBLICATION 408, SECTION 1086.3 AND/OR THE CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.
12. CHAMFER EXPOSED CONCRETE EDGES ON PANELS 3/4" x 3/4", 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. CONDOCTIONS, LOCATE, AND CONDUCT ALL WORK RELATED TO PUBLIC AND PRIVATE UTILITIES IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.06 AND 107.12, IF NEEDED.
17. IF STEPS ARE REQUIRED, THE ELEVATION DIFFERENCE BETWEEN ADJACENT PANELS IS NOT PERMITTED TO BE LESS THAN 3" OR GREATER THAN 3'-0".

**ARCHITECTURAL SURFACE TREATMENTS**

1. THE AVERAGE ARCHITECTURAL SURFACE TREATMENT THICKNESS, PER SIDE OF PANEL, IS PERMITTED TO VARY FROM 0 TO 1" (INCREDIBLE OR GREATER), BUT THE TOTAL VARIATION IN ARCHITECTURAL SURFACE TREATMENT THICKNESS MUST NOT BE GREATER THAN 1.00 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 105.06 AND/OR THE CONTRACT DOCUMENTS FOR ARCHITECTURAL SURFACE TREATMENT TOLERANCES.
5. REFER TO CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.

**ORDER OF SHEETS**

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**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD**

**GROUND MOUNTED SOUND BARRIERS**

**PRECAST CONCRETE PANELS**

**GENERAL NOTES - 1**

**BC-776M** RECOMMENDED DRY-CAST PANEL DETAILS

**BC-777M** PRECAST CONCRETE POSTS

**BC-778M** GROUND MOUNTED SOUND BARRIERS - STEEL POSTS

**ELECTRIC SIGNATURE PANELS, MOUNTED BARRIER SHELLS**

**REFERENCE DRAWINGS**

JAN. 31, 2019

ACTING DIR. BUR. OF PROJECT DELIVERY
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:
   - Fabrication Notes
   - Transportation Notes
   - Liftin and Erection Notes
   - Engineering Notes
   - Reinforcement Notes
   - Post and Panel Notes
   - Individual Post Details
   - Fabricator Notes
   - Individual Panel Details
   - Material List

3. THE SHOP DRAWINGS FOR THE PRECAST CONCRETE SOUND BARRIER PANELS AND THE PRECAST CONCRETE OR FABRICATED STRUCTURAL STEEL POSTS MUST BE SUBMITTED TO PENNDOT FOR APPROVAL.

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 temporary bracing calculations, as required.

5. LIFTING INSERTS:
   - Provide lifting inserts in accordance with Publication 408, Section 1080.2(c).
   - Provide lifting inserts in accordance with Publication 408, Section 1080.2(a).
   - Provide lifting inserts in accordance with Publication 408, Section 1080.2(b).

6. IF REQUIRED, PREPARE AND SUBMIT TEMPORARY BRACING CALCULATIONS AND DETAILS.

7. PREPARE AND SUBMIT CONCRETE MATERIALS IN ACCORDANCE WITH PUBLICATION 408, SECTION 1086.3.

8. GRADE 60 REINFORCEMENT BARS MAY BE SUBSTITUTE FOR GRADE 60 REINFORCEMENT BARS IN THE PANELS.

9. PANELS MUST BE STRENGTHENED FOR STRIPING, HANDLING, ERECTION AND TRANSPORTATION.

10. FABRICATION MUST BE PRE-APPROVED BY PENNDOT PER BULLETIN #15.
PRECAST CONCRETE PANEL WITH OPTIONAL SLOPED BOTTOM

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO SHEETS 1 AND 2.
2. FOR DETAIL D, REFER TO SHEET 4.
3. PANEL LENGTH MAY NEED ADJUSTED TO ACCOMMODATE ANGLED AND CORNER POSTS

LEGEND:
- AS REQUIRED BY DESIGN
- REFER TO CONTRACT DRAWINGS
- INDICATOR 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
PRECAST CONCRETE PANELS

GROUND MOUNTED SOUND BARRIERS

STANDARD

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.

TOOL PIPE SLEEVE (AS SPECIFIED)

FILL OPENING BETWEEN PIPE AND P.V.C. PIPE SLEEVE WITH CLOSING CELL NEOPRENE SPONGE AND CAULKING COMPOUND (COLOR TO MATCH PANEL)

ACCESS DOOR DETAIL

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. PROVIDE A 'T' MASONRY ANCHOR SPACED AT 1'-0" MAX. (GALVANIZED OR AS ACCEPTED BY THE ENGINEER).

4. PROVIDE A 1"

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 AT 3'-0" ABOVE THE FINISHED GRADE.

10. PROVIDE A WEATHER-RESISTANT TWO-SIDED TUBULAR LOCKING DEVICE WITH A STAINLESS STEEL PLATE KEY LOCKS AS SPECIFIED IN THE SPECIAL PROVISIONS OR AS DIRECTED BY THE ENGINEER.
RECOMMENDED JAN. 31, 2019

REFERENCE DRAWINGS
CLASSIFICATION OF EARTHWORK FOR STRUCTURES
RC-11M

BC-779M
STRUCTURE MOUNTED SOUND BARRIER WALLS

GROUND MOUNTED SOUND BARRIERS - STEEL POSTS

BC-776M
PRECAST CONCRETE POSTS

WALL CONSTRUCTION AND EXPANSION JOINT DETAILS

GROUND MOUNTED SOUND BARRIERS

BC-736M
ANCHOR SYSTEMS

BC-734M

PRECAST CONCRETE ANGLED POST EMBEDDED IN SPREAD FOOTING (WITH OR WITHOUT PEDESTAL)

PRECAST CONCRETE CORNER POST EMBEDDED IN SPREAD FOOTING

CONSTRUCTION NOTES

3. FILL ALL LIFTING INSERTS WITH NON-SHRINK GROUT. (COLOR TO WATER PANEL)

5. PROVIDE GRADE 50 AND GRADE 60 DEFORMED BAR IN ACCORDANCE WITH THE CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL PART 4.


12. A HIGHER STRENGTH CONCRETE, FOR CAST-IN-PLACE CONCRETE, MAY BE SUBSTITUTED UNLESS SPECIFIED. DO NOT USE RAIL STEEL A996 REINFORCEMENT BARS IN ANY CONCRETE.

13. PROVIDE STRUCTURAL STEEL CONFORMING TO ASTM A992 GRADE 50 OR ASTM A572 GRADE 50 IN ACCORDANCE WITH THE CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL PART 4.

DESIGN SPECIFICATIONS

1. REFER TO BC-776M FOR NOTES TO FABRICATOR.

2. REFER TO BC-774M FOR NOTES TO FABRICATOR.

2. REFER TO BC-774M FOR NOTES TO FABRICATOR.

REFERENCE DRAWINGS

INDEX OF SHEETS

1. PROJECT CONCRETE POSTS WITH BASE FLANGE - PRECAST CONCRETE POSTS

2. PROJECT CONCRETE POST EMBEDDED IN CASSET

3. PROJECT CONCRETE POST EMBEDDED IN SPREAD FOOTING WITH OR WITHOUT PEDESTAL

4. PROJECT ANCHOR POST EMBEDDED IN CASSET

5. PROJECT CONCRETE CORNER POST EMBEDDED IN CASSET

6. PROJECT ANCHOR POST EMBEDDED IN SPREAD FOOTING WITH OR WITHOUT PEDESTAL

7. PROJECT ANCHOR POST EMBEDDED IN SPREAD FOOTING WITHOUT PEDESTAL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

GENERAL NOTES

BC-774M
INCORPORATED COSTS FOR FEEDBACK AND EXPANSION JOINT DETAILS

BC-774M
REINFORCEMENT DESIGN DETAIL DETAILS

BC-774M
GROUND MOUNTED SOUND BARRIERS - PRECAST CONCRETE POSTS

BC-774M
GROUND MOUNTED SOUND BARRIERS - STEEL POSTS

BC-774M
EARTHWORK DESIGN FOR STRUCTURES

BC-777M
REFERENCES DRAWINGS

BC-777M
NOTES TO FABRICATOR

BC-777M
NOTES TO FABRICATOR

BC-777M
NOTES TO FABRICATOR
**NOTES:**
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET.
2. REFER TO SHEET 2 FOR LOCATION OF SECTION D-D.

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**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD**

**GROUND MOUNTED SOUND BARRIERS**

**PRECAST CONCRETE POSTS**

**POST DETAILS**

**RECOMMENDED JAN. 31, 2019**
**PLAN**

- **PLAN INSTRUCTIONS:**
  - Please note that the anchor bolt detail drawing may be referenced.
  - Adjust work as required to avoid interference.

**ELEVATION**

- **ELEVATION INSTRUCTIONS:**
  - Adjust work as required to avoid interference.

**SECTION C-C**

- **SECTION INSTRUCTIONS:**
  - Adjust work as required to avoid interference with the anchor bolts.

**DETAIL 1**

- **DETAIL 1 INSTRUCTIONS:**
  - Precast concrete post with base plate connection to caisson.
  - Refer to contract drawings.

**NOTES:**

1. For additional information refer to notes on Sheet 8.
2. For panel seat details refer to Sheet 4.
3. For oversized panel seat detail refer to Sheet 6.
4. Post M14 bars and hardware options.
   - Galvanized nuts: if the threaded portion of the 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 (A100, type I) and use either mechanically galvanized or hot-dip galvanized nuts.
   - Epoxy coated bars: coat threads with cold galvanizing and use either cold galvanizing mechanically galvanized nuts or hot-dip galvanized mechanically galvanized nuts (A100, type I).
   - Flat washer: for threaded portions, use washer (Galvanized).

**LEGEND:**

- **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 1**

- Recommended Jan 31, 2019
- Recommended Jan 31, 2019
- BC-777M
**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF TRANSPORTATION**
**BUREAU OF PROJECT DELIVERY**

**STANDARD**
**GROUND MOUNTED SOUND BARRIERS**
**PRECAST CONCRETE POSTS**

**DETAIL 3**
**PRECAST CONCRETE POST EMBEDDED IN CAISSON**

**LEGEND**
- As required by design
- Refer to contract drawings

**NOTES:**
1. See detail A.
2. For panel seat details refer to sheet 4.
3. Provide uncoated epoxy coated or galvanized bars in accordance with the contract drawings.

**WWF VERTICAL SPLICE DETAIL**
**FOR PRECAST CONCRETE POST**

1. See detail A.
2. Stagger the vertical splice locations of the WWF to avoid allowing the splices on opposing faces of the post.
3. Stagger the reinforcement splice not shown for clarity.
4. Provide uncoated, epoxy coated or galvanized bars in accordance with the contract drawings.

**DETAIL A**
**PARTIAL PLAN**

**SECTION J-J**
**ELEVATION**
**FLAT FACE OF END POST**
**NOTCHED FACE OF POST**

**EQUIVALENT (BARS MAY BE**
**CAISSON VERTICAL REINFORCEMENT**
**E AS REQUIRED BY DESIGN**
**TOP OF CAISSON LEVEL**

**PRECAST CONCRETE POST**

**VERTICAL SPLICE NOTES:**
1. SPLICE SHOWN IS FOR WWF VERTICAL SPLICE DETAIL (IN-LINE POST)
2. SPLICE SHOWN IS FOR WWF VERTICAL SPLICE DETAIL (IN-LINE POST)
3. SPLICE SHOWN IS FOR WWF VERTICAL SPLICE DETAIL (IN-LINE POST)
4. SPLICE SHOWN IS FOR WWF VERTICAL SPLICE DETAIL (IN-LINE POST)

**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 4

PRECAST CONCRETE POST
EMBEDDED IN SPREAD FOOTING
(WITH OR WITHOUT PEDESTAL)

SECTION L-L
PEDESTAL US DEF SP

SECTION K-K (WITH PEDESTAL)
ADJUST FOOTING TOP REINFORCING SPACING TO CLEAR POST.

NOTES:
1. SEE CONTRACT DRAWINGS.
2. PROVIDE UNCOATED OR EPOXY COATED BARS IN ACCORDANCE WITH CONTRACT DRAWINGS.
3. PROVIDE UNCOATED OR EPOXY COATED BARS IN ACCORDANCE WITH CONTRACT DRAWINGS.
4. PROVIDE UNCOATED OR EPOXY COATED BARS IN ACCORDANCE WITH CONTRACT DRAWINGS.

ELEVATION

PLAN

SPREAD FOOTING PLAN

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

DETAIL 4
**DETAIL 5**

**PRECAST CONCRETE ANGLED POST - TYPE E**

**EMBEDDED IN CAISSON**

**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 STEEL IN ACCORDANCE WITH THE CONTRACT DRAWINGS.
PRECAST CONCRETE CORNER POST
EMBEDDED IN CAISSON
**DETAIL 7**

**PRECAST CONCRETE ANGLED POST - TYPE E**

**EMBEDDED IN SPREAD FOOTING**

(WITH OR WITHOUT PEDESTAL)

---

**SECTION R-R**

PEDESTAL - IF SPECIFIED

**SECTION P-P (WITH PEDESTAL)**

ADJUST FOOTING TOP REINFORCING SPACING TO CLEAR POST.

---

**NOTES:**

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SHEET 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.

---

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD**

**GROUND MOUNTED SOUND BARRIERS**

**PRECAST CONCRETE POSTS**

**DETAIL 7**

---

**Jan. 31, 2019**

**ACTING DIR. BUREAU OF PROJECT DELIVERY**
DETAIL 8
PRECAST CONCRETE CORNER POST - TYPE F
EMBEDDED IN SPREAD FOOTING
(WITH OR WITHOUT PEDESTAL)

SECTION S-S (WITH PEDESTAL)
ADJUST FOOTING TOP REINFORCING SPACING TO CLEAR POST.

LEGEND:
- As required by design refer to contract drawings

NOTES:
1. For additional information refer to notes on Sheet 1.
2. For panel join details refer to Sheet 4.
3. Provision made for epoxy coated bars in accordance with the epoxy coating. Galvanized bars not permitted.
4. Bars may be bent after fabrication of post. Touch-up epoxy coated bars with an approved epoxy paint.
1. DESIGN SPECIFICATIONS:
   - Include interaction with other documents such as structural design of sound barriers.
   - Provide anchor bolt and post details consistent with this standard and design manual.

2. CONSTRUCTION SPECIFICATIONS AND WORKMANSHIP:
   - Provide all section details in accordance with the current version of the design manual.
   - Include all necessary components including footing details.

3. MASONRY STRUCTURAL STEEL:
   - Provide all masonry structural steel details in accordance with the current version of the design manual.
   - Include all necessary components including footing details.

4. INSTALL ANCHOR BOLTS, POSTS, AND PANELS PROPERLY:
   - Use ASTM A 563A for all anchor bolts and nuts.
   - Use ASTM A 572 for all bolts and posts.

5. PROVIDE CONCRETE COVER IN ACCORDANCE WITH THIS STANDARD AND DESIGN MANUAL:
   - Use ASTM C 33 for all concrete cover.
   - Use ASTM C 33 for all concrete cover.

6. REINFORCEMENT:
   - Use ASTM A 615 for all reinforcement steel.
   - Use ASTM A 615 for all reinforcement steel.

7. ANCHOR BOLTS, NUTS, AND WASHERS:
   - Use ASTM A 563A for all anchor bolts and nuts.
   - Use ASTM A 572 for all bolts and posts.

8. NON-SHRINK GROUT:
   - Use ASTM C 111 for all non-shrink grout.
   - Use ASTM C 111 for all non-shrink grout.

9. JOINTER BACKING MATERIAL (BACKER ROD):
   - Use ASTM C 450 for all jointer backing material.
   - Use ASTM C 450 for all jointer backing material.

10. JOINTER SEALING MATERIAL:
    - Use ASTM C 450 for all jointer sealing material.
    - Use ASTM C 450 for all jointer sealing material.

11. JOINTER SEALS:
    - Use ASTM C 450 for all jointer seals.
    - Use ASTM C 450 for all jointer seals.

12. DRILL AND DISCONNECT ALL WORK RELATED TO PUBLIC AND PRIVATE UTILITIES:
    - Use ASTM C 450 for all drill and disconnect work.
    - Use ASTM C 450 for all drill and disconnect work.

13. CEMENT CONCRETE PRODUCTS:
    - Use ASTM C 450 for all cement concrete products.
    - Use ASTM C 450 for all cement concrete products.

14. NON-STEEL CONSTRUCTION:
    - Use ASTM C 450 for all non-steel construction.
    - Use ASTM C 450 for all non-steel construction.

15. CONCRETE MASONRY:
    - Use ASTM C 450 for all concrete masonry.
    - Use ASTM C 450 for all concrete masonry.

16. THERMOPLASTIC FOAM:
    - Use ASTM C 450 for all thermoplastic foam.
    - Use ASTM C 450 for all thermoplastic foam.

17. FIBERGLASS MATTING:
    - Use ASTM C 450 for all fiberglass matts.
    - Use ASTM C 450 for all fiberglass matts.

18. RUBBER SEALS:
    - Use ASTM C 450 for all rubber seals.
    - Use ASTM C 450 for all rubber seals.

19. DRAINAGE MATERIALS:
    - Use ASTM C 450 for all drainage materials.
    - Use ASTM C 450 for all drainage materials.

20. OIL-RESISTANT MATERIALS:
    - Use ASTM C 450 for all oil-resistant materials.
    - Use ASTM C 450 for all oil-resistant materials.

21. ANTI-SLIDING PROVISIONS:
    - Use ASTM C 450 for all anti-sliding provisions.
    - Use ASTM C 450 for all anti-sliding provisions.

22. ANTIBURGLARY PROVISIONS:
    - Use ASTM C 450 for all antiburglary provisions.
    - Use ASTM C 450 for all antiburglary provisions.

23. ANTISNIPES PROVISIONS:
    - Use ASTM C 450 for all antisnipes provisions.
    - Use ASTM C 450 for all antisnipes provisions.

24. FLOOR PLATESE:
    - Use ASTM C 450 for all floor plates.
    - Use ASTM C 450 for all floor plates.

25. WELDING PROVISIONS:
    - Use ASTM C 450 for all welding provisions.
    - Use ASTM C 450 for all welding provisions.

26. INSTALLATION PROVISIONS:
    - Use ASTM C 450 for all installation provisions.
    - Use ASTM C 450 for all installation provisions.

27. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

28. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

29. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

30. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

31. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

32. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

33. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

34. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

35. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

36. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

37. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

38. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

39. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

40. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

41. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

42. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

43. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

44. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

45. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

46. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

47. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

48. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.

49. FIELD INSPECTION PROVISIONS:
    - Use ASTM C 450 for all field inspection provisions.
    - Use ASTM C 450 for all field inspection provisions.
NOTES:

LEGEND:

REFER TO CONTRACT DRAWINGS AS REQUIRED BY DESIGN

DETAIL 1

STEEL POST WITH BASE PLATE
CONNECTION TO CAISSON

DETAIL SHOWN MAY BE PATENTED

PLEASE NOTE THAT THE ANCHOR BOLT CAISSON
BASE PLATE
STEEL POST
PANEL, AND CAISSON

PLAN - ANCHOR PLATE ASSEMBLY

SECTION G-G

BUNDLED TIES

SECTION H-H

ANCHOR PLATE ASSEMBLY

ANCHOR PLATE ASSEMBLY

ELEVATION (ANCHOR BOLTS W/ANCHOR PLATE ASSEMBLY)

ELEVATION (ANCHOR BOLTS W/HOOKS)

ANCHOR PLATE ASSEMBLY

ANCHOR PLATE ASSEMBLY

ELEVATION (ANCHOR BOLTS W/ANCHOR PLATE ASSEMBLY)

ELEVATION (ANCHOR BOLTS W/HOOKS)

ANCHOR PLATE ASSEMBLY

ANCHOR PLATE ASSEMBLY

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

DETAIL 1

SHEET 5 OF 10
BC-778M

DECEMBER 13, 2016
NOTES:

LEGEND:

REFER TO CONTRACT DRAWINGS AS REQUIRED BY DESIGN

STEEL POSTs
GROUND MOUNTED SOUND BARRIERS
STANDARD

DETAIL 3
STEEL POST EMBEDDED IN CAISSON

SECTION K-K

SECTION L-L
WELDED STUDS
(REQUIRED ON BOTH PLANES)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUreau OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTs

DETAIL 3

SEPT. 30, 2016
DETAIL 4

STEEL POST EMBEDDED IN SPREAD FOOTING WITH PEDESTAL

SECTION M-M

SECTION N-N

ELEVATION

ADJUST POSTING TOP REINFORCEMENT SPACING TO CLEAR POST.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

DETAIL 4
PIPE CAP DETAIL

SECTION P-P

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR SECTION D-D REFER TO SHEET 3.

DETAIL 5
CORNER/ANGLED STEEL PIPE POST EMBEDDED IN CAISSON

SECTION R-R

LEGEND:

1. AS REQUIRED PER DESIGN
2. REFER TO CONTRACT DRAWINGS
3. FOR VIEW INFORMATION REFER TO SHEET 5.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD GROUND MOUNTED SOUND BARRIERS
STEEL POSTS
DETAIL 5

SEPT. 30, 2016
SEPT. 30, 2016
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

DETAIL 6

ELEVATION
ADJUST FOOTING TOP REINFORCEMENT SPACING TO CLEAR POST.

DETAIL 6
CORNER/ANGLED STEEL PIPE POST EMBEDDED
IN SPREAD FOOTING WITH PEDESTAL

NOTE:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 9.
2. FOR SECTION D-D REFER TO SHEET 3.
3. FOR SECTION T-T REFER TO CONTRACT DRAWINGS.

REPORTED
DIRECTOR, BUR. OF PROJECT DELIVERY

SEPT. 30, 2016

SEPT. 30, 2016
GENERAL NOTES

1. PROVIDE SHOP DRAWINGS IN ACCORDANCE WITH PUBLICATION 408, SECTION 108.04.
2. THE FOLLOWING INFORMATION MUST BE SHOWN ON THE SHOP DRAWINGS IF APPLICABLE:
   a. GENERAL NOTES
   b. DETAILS
   c. LAYOUT AND LOCATIONS
   d. INSTALLATION NOTES
   e. LIFTING AND ERECTION NOTES

3. REFERENCE THE FOLLOWING MINIMUM INFORMATION:
   a. OVERALL WALL LENGTH
   b. PANEL LENGTH
   c. HORIZONTAL JOINT LOCATIONS
   d. ELEVATIONS FOR THE FOLLOWING ITEMS:
      i. FINISHED GROUND ELEVATIONS
      ii. TOP OF WALL ELEVATIONS
   e. DRAWINGS OF ALL DRAWINGS

4. REFER TO PUBLICATION 408, SECTION 1086.3(f) FOR FABRICATION AND ERECTIONS
   a. PANELS SHOULD BE HANDLED AND ERECTED IN A MANOR THAT MINIMIZES THE NUMBER OF PANEL JOINTS.
   b. PROVIDE UNIFORM STEPS.
   c. PROVIDE FULL HEIGHT PANELS ON BARRIERS MOUNTED ON BRIDGES.
   d. PROVIDE STEEL POSTS.
   e. PROVIDE GALVANIZED INSERTS.
   f. PROVIDE LIFTING INSERTS WITH A MINIMUM CAPACITY OF AT LEAST TWO INSERTS FOR ACTUAL STRENGTH OF CONCRETE AT TIME OF STRIPPING, HANDLING, ERECTION, AND TRANSPORTATION. PROVIDE DESIGN CALCULATIONS FOR THE PANEL LIFTING INSERTS.
   g. BASE PLATE DETAILS
   h. LOCATION OF STEEL PIPE AND BOLTS FOR STEEL CABLE CONNECTION
   i. PANEL JOINTS
5. PANEL JOINTS:
   a. PROVIDE FULL HEIGHT PANELS IN BARRIERS MOUNTED ON BRIDS.
   b. PROVIDE PANELS UNDER GUIDANCE OF PANEL JOINTS.
   c. IF NOT PROVIDED, THE PANELS SHOULD BE BUILT AS SHOWN ON THE SHOP DRAWINGS.

6. PROVIDE CONCRETE PANELS ARE NOT PERMITTED FOR STRUCTURE MOUNTED SOUND BARRIERS, PROVIDE STEEL POSTS.
7. SLIP FORMING IS NOT PERMITTED FOR CONCRETE PANELS WITH STRUCTURE MOUNTED SOUND BARRIERS MOUNTED ON RETAINING WALLS AND MOMENT SLABS.
8. INSTALL ANCHOR BOLTS, POSTS, AND PANELS TRULY VERTICAL.
9. PROVIDE STEEL CHAINS IN THE CONCRETE PANELS AS INDICATED ON THE CONTRACT DRAWINGS.
10. PROVIDE CONCRETE COVER IN ACCORDANCE WITH THIS STANDARD AND DESIGN MANUAL, PART 4.
11. MATERIAL STRENGTH CONCRETE, AND CEMENT-LIQUID CONCRETE, MAY BE SUBMITTED FOR A LUMPED CONCRETE AT NO ADDITIONAL COST TO THE DEPARTMENT.
12. WILL ALL LIFTING INSERTS RHYTHMICALLY DISTRIBUTED, CONFORM TO PANEL DESIGN.
13. SEAL ALL OPEN JOINTS WITH CAULKING COMPOUND AND/OR JOINT SEALING MATERIAL.
14. REFER TO PUBLICATION 408, SECTION 1086.3(b) FOR FABRICATION AND ERECTIONS TOLERANCES.
15. CHAIRS EXPOSED CONCRETE EDGES IN THE PRECAST PANELS 1/4" X 1/4", EXCEPT AS NOTED.
16. ALL FELT/WOOL SHEETS 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. Information in some sections is not shown for clarity.
20. Coordinate, locate, and conduct all work related to_publication 408, section 1086.3(b), and the contract special provisions.
21. If a panel detail is not found in the sound barrier standard, or on the contract drawings, a special submission request for specific details must be made to the shop engineer.

NOTES TO FABRICATOR

1. PRECAST CONCRETE PANELS SHALL BE MANUFACTURED IN ACCORDANCE WITH PUBLICATION 408, SECTION 1086.3(a).
2. THE FOLLOWING INFORMATION MUST BE SHOWN ON THE SHOP DRAWINGS_IF APPLICABLE:
   a. GENERAL NOTES
   b. DETAILS
   c. LAYOUT AND LOCATIONS
   d. INSTALLATION NOTES
   e. LIFTING AND ERECTION NOTES

3. REFERENCE THE FOLLOWING MINIMUM INFORMATION:
   a. OVERALL WALL LENGTH
   b. PANEL LENGTH
   c. HORIZONTAL JOINT LOCATIONS
   d. ELEVATIONS FOR THE FOLLOWING ITEMS:
      i. FINISHED GROUND ELEVATIONS
      ii. TOP OF WALL ELEVATIONS
   e. DRAWINGS OF ALL DRAWINGS

4. REFER TO PUBLICATION 408, SECTION 1086.3(f) FOR FABRICATION AND ERECTIONS
   a. PANELS SHOULD BE HANDLED AND ERECTED IN A MANOR THAT MINIMIZES THE NUMBER OF PANEL JOINTS.
   b. PROVIDE UNIFORM STEPS.
   c. PROVIDE FULL HEIGHT PANELS ON BARRIERS MOUNTED ON BRIDGES.
   d. PROVIDE STEEL POSTS.
   e. PROVIDE GALVANIZED INSERTS.
   f. PROVIDE LIFTING INSERTS WITH A MINIMUM CAPACITY OF AT LEAST TWO INSERTS FOR ACTUAL STRENGTH OF CONCRETE AT TIME OF STRIPPING, HANDLING, ERECTION, AND TRANSPORTATION. PROVIDE DESIGN CALCULATIONS FOR THE PANEL LIFTING INSERTS.
   g. BASE PLATE DETAILS
   h. LOCATION OF STEEL PIPE AND BOLTS FOR STEEL CABLE CONNECTION
   i. PANEL JOINTS
5. PANEL JOINTS:
   a. PROVIDE FULL HEIGHT PANELS IN BARRIERS MOUNTED ON BRIDS.
   b. PROVIDE PANELS UNDER GUIDANCE OF PANEL JOINTS.
   c. IF NOT PROVIDED, THE PANELS SHOULD BE BUILT AS SHOWN ON THE SHOP DRAWINGS.

6. PROVIDE CONCRETE PANELS ARE NOT PERMITTED FOR STRUCTURE MOUNTED SOUND BARRIERS, PROVIDE STEEL POSTS.
7. SLIP FORMING IS NOT PERMITTED FOR CONCRETE PANELS WITH STRUCTURE MOUNTED SOUND BARRIERS MOUNTED ON RETAINING WALLS AND MOMENT SLABS.
8. INSTALL ANCHOR BOLTS, POSTS, AND PANELS TRULY VERTICAL.
9. PROVIDE STEEL CHAINS IN THE CONCRETE PANELS AS INDICATED ON THE CONTRACT DRAWINGS.
10. PROVIDE CONCRETE COVER IN ACCORDANCE WITH THIS STANDARD AND DESIGN MANUAL, PART 4.
11. MATERIAL STRENGTH CONCRETE, AND CEMENT-LIQUID CONCRETE, MAY BE SUBMITTED FOR A LUMPED CONCRETE AT NO ADDITIONAL COST TO THE DEPARTMENT.
12. WILL ALL LIFTING INSERTS RHYTHMICALLY DISTRIBUTED, CONFORM TO PANEL DESIGN.
13. SEAL ALL OPEN JOINTS WITH CAULKING COMPOUND AND/OR JOINT SEALING MATERIAL.
14. REFER TO PUBLICATION 408, SECTION 1086.3(b) FOR FABRICATION AND ERECTIONS TOLERANCES.
15. CHAIRS EXPOSED CONCRETE EDGES IN THE PRECAST PANELS 1/4" X 1/4", EXCEPT AS NOTED.
16. ALL FELT/WOOL SHEETS 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. Information in some sections is not shown for clarity.
20. Coordinate, locate, and conduct all work related to_publication 408, section 1086.3(b), and the contract special provisions.
21. If a panel detail is not found in the sound barrier standard, or on the contract drawings, a special submission request for specific details must be made to the shop engineer.
1. CAST-IN-PLACE CONCRETE:
   - Provide Class C cement in the cast-in-place footings and caissons, or as specified on the contract drawings.
   - Provide Class C cement in the cast-in-place barriers and moment slabs, or as specified on the contract drawings.
   - Unit weight of concrete = 150 lb./cu. ft.

2. PRECAST CONCRETE SOUND BARRIER PANELS:
   - Provide Class C cement concrete, modified in the precast concrete panels.
   - Provide Class C cement concrete, modified in the precast concrete panels.
   - Unit weight of normal concrete = 150 lb./cu. ft.
   - Provide Class C cement concrete, modified in the precast concrete panels.
   - The panel from the panels in the precast concrete panels.
   - Minimum compressive strength (T) of concrete in the panels, if specified on the contract drawings.

3. REINFORCEMENT STEEL:
   - Provide Class C rebar reinforcing bars that meet the requirements of ASTM A 416, Grade 40, or ASTM A 615, Grade 60, or as specified on the contract drawings.
   - Provide ASTM A 615, Grade 60 reinforcing bars in the precast concrete panels.
   - Provide ASTM A 706-08, Grade 50 reinforcing bars in the precast concrete panels.
   - Provide minimum yield strength of 50,000 PSI for reinforcing bars in the precast concrete panels.

4. WELDING STEEL:
   - Provide Class C welds, welding wire, and welding procedures that meet the requirements of ASTM A 5.1, Type E, in the precast concrete panels.
   - Provide Class C welds, welding wire, and welding procedures that meet the requirements of ASTM A 5.1, Type E, in the precast concrete panels.
   - Provide welding electrodes of Type E, in the precast concrete panels.
   - Provide welding electrodes of Type E, in the precast concrete panels.

5. PRECAST STRUCTURAL STEEL:
   - Provide a minimum compressive strength of 5,000 PSI in the precast concrete panels.
   - Provide a minimum compressive strength of 5,000 PSI in the precast concrete panels.
   - Provide ASTM A 606-08, Grade 60 steel in the precast concrete panels.
   - Provide ASTM A 606-08, Grade 60 steel in the precast concrete panels.

6. REINFORCEMENT BARS:
   - Provide ASTM A 615, Grade 60 reinforcing bars in the precast concrete panels.
   - Provide ASTM A 615, Grade 60 reinforcing bars in the precast concrete panels.
   - Provide ASTM A 820, Grade 50 reinforcing bars in the precast concrete panels.
   - Provide ASTM A 706-08, Grade 50 reinforcing bars in the precast concrete panels.

7. BOLTS, NUTS AND WASHERS FOR STEEL CABLE CONNECTIONS:
   - Provide Class C bolts, nuts, and washers for steel cable connections, as specified on the contract drawings.
   - Provide Class C bolts, nuts, and washers for steel cable connections, as specified on the contract drawings.
   - Provide ASTM A 307, Grade A, in accordance with publication 408, section 1080.2(c).
   - Provide ASTM A 307, Grade A, in accordance with publication 408, section 1080.2(c).
   - Provide ASTM A 307, Grade A, in accordance with publication 408, section 1080.2(c).

8. STEEL CABLES AND ACCESSORIES:
   - Provide ASTM A 417, Type E, in the steel cable connections.
   - Provide ASTM A 417, Type E, in the steel cable connections.
   - Provide Type E, in the steel cable connections.
   - Provide Type E, in the steel cable connections.

ARCHITECTURAL SURFACE TREATMENTS:

1. THE AVERAGE ARCHITECTURAL SURFACE TREATMENT, PER SIDE OF PANEL, IS PERMITTED TO BE 0.015 IN (0.381 MM) AT THE TOP OF THE PANEL AND 0.007 IN (0.178 MM) AT THE BOTTOM OF THE PANEL.
2. THE AVERAGE ARCHITECTURAL SURFACE TREATMENT AT THE EDGES OF PANELS IS PERMITTED TO BE 0.007 IN (0.178 MM).
3. STAMPED Finishes may be permitted if accepted by the Architectural Surface Treatment Special Provision.
4. REFER TO PUBLICATION 408, SECTION 1080.2, AND/OR THE CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.
LIFTING INSERT LOCATION DETAIL

SHEET 5 OF 9  JAN. 31, 2019

PRECAST CONCRETE PANEL

4. LIFTING INSERTS ARE REQUIRED ON THE SIDES:
   - FOUR POINT PICK-UP
   - TWO POINT PICK-UP

   TOP AND BOTTOM OF PANEL IS LEVEL.

   PRECAST CONCRETE PANEL DETAILS - 1

SLOPED. PROVIDE LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

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SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

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LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

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LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.

LEVEL STEEL ROPE IF BOTH PANELS (SEE NOTE 4)

SIDE LIFTING INSERTS FOR PANEL (COLOR 0.104 PH TO MATCH PANEL (COLOR 0.104 PL)

NOTE 4.
**SECTION A-A**

**WITH ARCHITECTURAL SURFACE TREATMENT**

**DETAIL A**
- No Architectural Surface Treatment
- See Detail A

**DETAIL B**
- No Architectural Surface Treatment
- See Detail C

**DETAIL C**
- No Architectural Surface Treatment
- See Detail C

**NOTES:**
1. For additional information refer to notes on sheet 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:**
- JAN. 31, 2019

**ACTING DIR. BUR. OF PROJECT DELIVERY**
**COMMUNE OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
DETAILS - 1

**SEQUENCE OF INSTALLATION**
PANEL TO STEEL POST

1. INSTALL POST AND BASE PLATE ASSEMBLY ON THE LEVELING NUTS AT CORRECT ELEVATION.
2. ERECT PRECAST PANEL USING THE LEVELING NUTS TO ADJUST PANELS TO MATCH CENTERLINE OF PANEL TO STEEL POST AND BASE PLATE ASSEMBLY TO ALIGN HOLES FOR STEEL REINFORCEMENT.
3. GLUE CLOSED CELL NEOPRENE SPONGE STRIP TO POST ON RESIDENTIAL BARRIER SIMILAR TO MATCH CENTERLINE OF PANEL TO FINISHED GRADE.
4. ERECT PRECAST PANEL USING THE LEVELING NUTS TO ADJUST PANELS TO MATCH CENTERLINE OF PANEL TO ROADWAY SIDE.
5. STOP CLOSED CELL NEOPRENE SPONGE STRIP 4" ABOVE BASE PLATE FOR DRAINAGE.
6. INSERT BACKER RODS IF OPENINGS ARE GREATER THAN 1'-6".
7. PLACE NON-SHRINK GROUT UNDER BASE PLATE.
8. INSTALL BOLTS (FOR STEEL CABLE CONNECTION) THRU FLANGES AND APPLY JOINT SEALING MATERIAL OR CAULKING COMPOUND.
9. PLACE NON-SHRINK GROUT UNDER BASE PLATE.

**LEGEND**
- D = REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS.
- FLAT WASHER (GALVANIZED) (TYP.)

**NOTES:**
- D = REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS.
ANCHOR PLATE ASSEMBLY

NOTE:
- BOLTS THRU POSTS AND PANEL NOT SHOWN.
- EDGE OF WEB AND BASE PLATE NOT SHOWN FOR LEFT SIDE PANEL.
- BOLTS THRU POSTS AND PANEL NOT SHOWN.
- EDGE OF WEB AND BASE PLATE NOT SHOWN.
- BOLTS THRU POSTS AND PANEL NOT SHOWN.
- EDGE OF WEB AND BASE PLATE NOT SHOWN.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
DETAILS - 2

SLOPE TO MATCH TOP OF SOUND PANEL AND TOP OF BARRIER/WALL

NOTE:
- 1. FOR ADDITIONAL INFORMATION REFER TO CONTRACT DRAWINGS.
GENERAL NOTES

1. DESIGN SPECIFICATIONS
   - This Manual: Specification for Structural Design of Sound Barriers, including design and construction details.
   - This Manual: Specification for Structural Design of Sound Barriers, including design and construction details.

2. CONSTRUCTION SPECIFICATIONS AND WORKMANSHIP
   - PRECAST CONCRETE PANEL DETAIL - REFERENCE TO PUBLICATION 408, SECTION 105.02
   - FABRICATION NOTES
     - HORIZONTAL JOINTS
     - HORIZONTAL JOINTS

3. WALL HEIGHTS MUST EQUAL OR EXCEED THE ACOUSTICAL PROFILE.

4. STANDARD PANEL HEIGHTS
   - 8'-0" PANELS
   - 8'-0" PANELS
   - PROVIDE HORIZONTAL JOINTS.

5. END PANEL HEIGHTS
   - 8'-0" PANELS
   - PROVIDE HORIZONTAL JOINTS.
   - PROVIDE HORIZONTAL JOINTS.

6. HORIZONTAL PANELS
   - PROVIDE HORIZONTAL PANELS.
   - PROVIDE HORIZONTAL PANELS.

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.

10. A HIGHER STRENGTH CONCRETE, FOR CAST-IN-PLACE CONCRETE, MAY BE SUBSTITUTED.

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.

13. PROVIDE GALVANIZED INSERTS.

14. CHAMFER EXPOSED CONCRETE EDGES ON PRECAST PANELS.

15. CHAMFER EXPOSED CONCRETE EDGES ON CAST-IN-PLACE CONCRETE.

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 DISTANCE FROM THE WALL EDGE.

21. REFER TO PUBLICATION 408, SECTION 1086.3 (f) FOR FABRICATION AND ERECTION.

22. PROVIDE A MINIMUM OF TWO CABLE CONNECTIONS FOR EACH PANEL-TO-PANEL CONNECTION.

23. IF NEEDED DETAIL IS NOT FOUND IN THE SOUND BARRIER STANDARDS OR ON THE CONTRACT DRAWINGS, A SPECIAL CONSTRUCTION PERMIT FOR SPECIFIC DETAILS MUST BE MADE TO THE CHIEF BRIDGE ENGINEER.

NOTES TO FABRICATOR

1. PROVIDE SHOP DRAWINGS IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.03.

2. THE FOLLOWING INFORMATION MUST BE SHOWN ON THE SHOP DRAWINGS (IF APPLICABLE):
   - PANEL CODES/DESIGNATIONS
   - PANEL CONNECTION LOCATIONS
   - ELEVATION VIEW INDICATING THE FOLLOWING MINIMUM INFORMATION:
     - PANEL CONNECTION LOCATIONS
     - PLAN VIEW INDICATING THE WALL GEOMETRY
     - TRANSPORTATION NOTES
     - SHEAR AND MOMENT DETAILS
     - INDIVIDUAL PANEL DETAILS


CHANGE 2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
GENERAL NOTES - 1

REFERENCE DRAWINGS
BC-784M ANCHOR SYSTEMS
BC-785M WALL CONSTRUCTION AND EXPANSION JOINT DETAILS
BC-786M END PANEL DETAIL - PRECAST CONCRETE PANEL
BC-787M AASHTO/AWS D1.5 - BRIDGE WELDING CODE
BC-788M AASHTO/AWS D1.5 - BRIDGE WELDING CODE
BC-789M LIFTING AND ERECTION NOTES
BC-781M GENERAL NOTES
BC-782M INDEX OF SHEETS
ARCHITECTURAL SURFACE TREATMENTS

1. CAST-IN-PLACE CONCRETE
   - PROVIDE CAST-IN-PLACE CONCRETE IN THE CAST-IN-PLACE FOOTINGS.
   - UNIT WEIGHT OF CONCRETE = 150 LB./CU. FT.

2. PRECAST CONCRETE SOUND BARRIER PANELS
   - PROVIDE CLASS A CEMENT CONCRETE, MODIFIED IN THE PRECAST CONCRETE PANELS.
   - 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 TYPICAL REINFORCEMENT STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A615, GRADE 60, OR GRADE 40 STEEL. THE STEEL BARS SHOULD BE CORROSION RESISTANT.
   - PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

4. РаSHED FINISHES MAY BE PERMITTED IF ACCEPTED BY THE DISTRICT BRIDGE ENGINEER.

5. PLAIN NEOPRENE BEARING PADS
   - PROVIDE PLAIN NEOPRENE BEARING PADS IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.8(b).

6. CLOSED CELL NEOPRENE SPONGE
   - PROVIDE CLOSED CELL NEOPRENE SPONGE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1113.02.

7. JOINT SEALING MATERIAL
   - PROVIDE JOINT SEALING MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 1085.2(m).

8. PROVIDE PVC PIPE (SCHEDULE 40) CONFORMING TO ASTM D1785 IN ACCORDANCE WITH PUBLICATION 408, SECTION 1105.02(s).

9. PLAIN NEOPRENE BONDING PADS
   - PROVIDE PLAIN NEOPRENE BONDING PADS IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.4(a).

10. JOINT SEALING MATERIAL
    - PROVIDE JOINT SEALING MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 1085.2(m).

11. PROVIDE CLOSED CELL NEOPRENE SPONGE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1113.02.

12. PROVIDE PLAIN NEOPRENE BONDING PADS IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.4(a).

13. JOINT SEALING MATERIAL
    - PROVIDE JOINT SEALING MATERIAL IN ACCORDANCE WITH PUBLICATION 408, SECTION 1085.2(m).

14. PROVIDE CLOSED CELL NEOPRENE SPONGE IN ACCORDANCE WITH PUBLICATION 408, SECTION 1113.02.

15. PROVIDE PLAIN NEOPRENE BONDING PADS IN ACCORDANCE WITH PUBLICATION 408, SECTION 705.4(a).

SEQUENCE OF CONSTRUCTION (FILL)

1. CHECK TOP OF FOOTING FOR SMOOTHNESS; GROUND IF NECESSARY SO THAT FUNCTIONAL USE CAN BE ACCOMPLISHED WITH NON-INVASIVE METHODS.

2. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

3. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

4. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

5. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

6. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

7. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

8. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

9. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

10. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

11. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

12. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

13. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

14. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

15. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

SEQUENCE OF CONSTRUCTION (CUT)

1. CHECK TOP OF FOOTING FOR SMOOTHNESS; GROUND IF NECESSARY SO THAT FUNCTIONAL USE CAN BE ACCOMPLISHED WITH NON-INVASIVE METHODS.

2. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

3. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

4. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

5. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

6. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

7. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

8. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

9. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

10. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

11. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

12. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

13. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

14. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

15. PROVIDE A MINIMUM REINFORCEMENT BARS IN THE FOOTING.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
GENERAL NOTES - 2
PLAN - OFFSET SOUND BARRIER

ELEVATION - OFFSET SOUND BARRIER

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO CONTRACT DRAWINGS.
2. FOR DETAILS A, B, AND C REFER TO SHEETS 1 AND 2.
3. FOR ADDITIONAL INFORMATION REFER TO CONTRACT DRAWINGS.

LEGEND:
- AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS.
- GRADE GRADING TO DRAIN WATER FROM WALL.
- MINIMUM STEP HEIGHT = 6" MAXIMUM STEP HEIGHT = 2'-0"
PANEL CONNECTOR ASSEMBLY
LENGTH AS REQUIRED

BC-780M
STANDARD
OFFSET SOUND BARRIER WALLS
SHEET 6 OF 8

45° CHAMFER
SECTION C-C

SECTION B-B

CONNECTOR PORT (SOCKET END) (SEE NOTE 5)
CONNECTOR PORT (BALL END) (SEE NOTE 5)
CONNECTOR PORTS

CONNECTOR PORTS

CONNECTOR PORT
CONNECTOR PORT

DETAIL D

DETAIL E

PANEL EDGE
CONCAVE
PANEL EDGE
CONVEX

PANEL JOINT
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. PORT LOCATIONS TO MATCH ADJACENT PANELS. PROVIDE A MINIMUM OF TWO CABLE CONNECTIONS PER PANEL. 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 JAN. 31, 2019
BC-780M
**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 oriented.

**LEGEND:**

- (TYP.)
- (LENGTH AS REQUIRED)
- (TAPER (TYP.)

**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**

**BC-780M**

**SHEET 7 OF 8**

**JAN. 31, 2019**

**ACTING DIR. BUR. OF PROJECT DELIVERY**
OFFSET SOUND BARRIER WALLS

DETAIL A

NO ARCHITECTURAL SURFACE TREATMENT

ARCHITECTURAL SURFACE TREATMENT

ARCHITECTURAL SURFACE TREATMENT WHEN SPECIFIED

DETAIL B

NO ARCHITECTURAL SURFACE TREATMENT

ARCHITECTURAL SURFACE TREATMENT

ARCHITECTURAL SURFACE TREATMENT WHEN SPECIFIED

DETAIL C

NO ARCHITECTURAL SURFACE TREATMENT

ARCHITECTURAL SURFACE TREATMENT

ARCHITECTURAL SURFACE TREATMENT WHEN SPECIFIED

DETAIL A

ARCHITECTURAL SURFACE TREATMENT

ARCHITECTURAL SURFACE TREATMENT WHEN SPECIFIED

DETAIL A

ARCHITECTURAL SURFACE TREATMENT

ARCHITECTURAL SURFACE TREATMENT WHEN SPECIFIED

DETAIL A

ARCHITECTURAL SURFACE TREATMENT

ARCHITECTURAL SURFACE TREATMENT WHEN SPECIFIED

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
1. PROVIDE MATERIALS AND WORKMANSHIP AND CONSTRUCT RANDOM STONE SLOPE WALL IN ACCORDANCE WITH SECTION 675 OF PUBLICATION 408.
2. PROVIDE DURABLE BARRIER WALL FROM DOWNSPOUT DRAINAGE WITH CONCRETE SPLASH BLOCK PROTECTION, SEE BC-751M FOR DETAILS.
3. ALL REINFORCEMENT STEEL CAGES SHALL MEET THE REQUIREMENTS OF ASTM A615, A996 OR A706.

SECTION A-A

SECTION C-C

ALTERNATE GABION TOEWALL

ALTERNATE SECTION B-B

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
RANDOM STONE SLOPE WALL

REFERENCE DRAWINGS
BC-751M
BC-782M
BC-781M

#4 @ 24" C.C.
1'-0" BLANKET
CANCELLED

SEPT. 30, 2016

SEPT. 30, 2016
SECTION C-C

SEE DETAIL A

SECTION D-D

GABION SIZES

ADDITIONAL SIZES MAY BE AVAILABLE ON A SPECIAL ORDER BASIS.

WIRE MESH BASKETS

SECTION A-A

NOTE:

SECTION B-B

ALTERNATE SECTION B-B

NOTES:

1. PROVIDE MATERIAL AND WORKMANSHIP IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATIONS AS OUTLINED IN THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408.

2. INSTALL CLASS 4 TYPE A GEOTEXTILE MATERIAL ALONG ALL INTERFACE AREAS WITH SOIL AND/OR CONCRETE CONTACT.

3. INSTALL CLASS A 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

CHIEF BRIDGE ENGINEER
RECOMMENDED

RECOMMENDED

DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT. 30, 2016
SEPT. 30, 2016
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 covered. Use Type 2.
2. Bridge decks with a single layer of reinforcement are required within the area of a Deck Repair Type 1.

DECK REPAIR TYPE 2

1. Deck repair Type 2 or Type 3 may be required within the area of a Deck Repair Type 2.

DECK REPAIR TYPE 3

1. Deck repair Type 3 may be required within the area of a Deck Repair Type 2.

GENERAL NOTES

1. Provide materials and workmanship in accordance with specification BC-736M.
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 fine wire brush. Strengthen and coat with an approved epoxy paint for epoxy coated reinforcement or concrete bridge deck repair must conform to Section 1042 of PUB 408.
5. Provide epoxy coated sleeves as required. Ensure and replace to kit form. All portion of damage may be corrected reinforcement bars by satisfactorily splicing to the remaining reinforcement bars.
6. Apply an epoxy grouting compound conforming to the requirements of Section 1040.2.1 of PUB 408.
7. Construction, equipment, surface preparation and patching materials for concrete bridge deck repair must conform to Section 1040.4 of PUB 408.
8. Provide additional information on design drawings as designed by engineer on construction site.
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 decks are damaged during deck repair, repairs must be deferred or replaced at no expense to the Department.

LEGEND

- DECK REPAIRS AND LATEX MODIFIED CONCRETE OVERLAY

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

STANDARD
REINFORCED CONCRETE REPAIR
BRIDGE DECKS

BC-783M

REFERENCE DRAWINGS

JAN. 31, 2019

ACTING DIR. BUR. OF PROJECT DELIVERY
REINFORCED CONCRETE REPAIR TYPE 2A NOTES:

1. SQUARE-OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAWCUT OF 1/2 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" DEEP TO AVOID EXISTING REINFORCEMENT.

4. APPLY AN EPOXY BONDING COMPOUND BETWEEN THE EXISTING AND NEW CONCRETE.

5. WIRE MESH MAY BE SUBSTITUTED FOR NEW REINFORCEMENT IF DETERIORATION IS GREATER THAN 1/4" AND EXISTING REINFORCEMENT IS SPACED GREATER THAN 12" ON CENTERS.

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.

REINFORCED CONCRETE REPAIR TYPE 2A LEGEND:

- REMOVE DETERIORATED CONCRETE.
RECOMMENDED

ACTING DIR. BUR. OF PROJECT DELIVERY
CHIEF BRIDGE ENGINEER

BC-783M
(PRESTRESSED CONCRETE I BEAM SIMILAR)

RECOMMENDED

SHEET 4 OF 4

JAN. 31, 2019

CONCRETE BOX BEAM

PRESTRESSED CONCRETE BEAM

CONCRETE REPAIR - PRESTRESSED

CONCRETE I-BEAM

CONCRETE REPAIR - PRESTRESSED

CONCRETE SPREAD BOX BEAM

(ADJACENT BOX BEAM SIMILAR)

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 GOOD CONCRETE. DO NOT REMOVE PRESTRESSING STRANDS DURING CONCRETE REMOVAL. USE SURFACE PREPARATION EQUIPMENT IN ACCORDANCE WITH PUBLICATION 15, SECTION 1001.3(h) AND SECTION 1001.3(l), AS REQUIRED.

3. SQUARE OFF DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAW CUT OR GRINDER. USE A SAW CUT OR GRINDER WITH A MINIMUM DEPTH OF CUT TO BE A MINIMUM OF 1/4", BUT NOT TO EXCEED 5/8" OR THE DEPTH OF THE REMOVAL, MINIMUM 1/4".

4. CLEAN ALL PRESTRESSING STANDARDS TO BE REMOVED AND PRESTRESSING STRANDS WITH A MECHANICAL ANCHORAGE. USE A BONDING AGENT AND REPAIR MATERIAL.
CHANGE 2

U-WING ABUTMENT PLAN - FULL DEPTH END DIAPHRAGM

PRESTRESSED I-BEAM BRIDGE

WITHOUT BACKWALL

SECTION C-C

SECTION A-A

SECTION D-D

TYPICAL FOR STEEL AND PRESTRESSED BRIDGES

(EXCEPT FOR CHANNEL BEAM BRIDGES)
ABUTMENT PLAN - U-WING

PRECAST CHANNEL BEAM BRIDGES

NOTES:
2. FOR SHEAR KEY DETAIL SEE STANDARD DRAWING BC-775M

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS - ABUTMENT
PRECAST CHANNEL BEAM
BRIDGES

NOTE: FLARED WING SHOWN U-WING SIMILAR
GENERAL SCHEMATIC
ABUTMENT PLAN WITH BACKWALL
FLARED AND U-WINGS

DETAIL FOR SKEWED ABUTMENT
WITH BACKWALL
FLARED AND U-WINGS

DETAIL FOR 90° ABUTMENT
WITH BACKWALL
FLARED AND 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 WING WALL.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS - ABUTMENT

RECOMMENDED JAN. 31, 2019

SHEET 6 OF 12
Prestressed I-Beam Section at Pier

Box Beam Section at Pier

Typical Pier and Abutment Expansion Bearing

Steel or Prestressed Rehabilitation
Sloped to Drain

Notes:
1. For additional notes see Sheet 1.
2. P.C.P. = Prefomed Cellular Polystyrene.

TYPICAL PIER AND ABUTMENT EXPANSION BEARING DETAILS

Steel or Prestressed Rehabilitation
Sloped to Drain
**SECTION G-G**

**WATERPROOFING (TYP.)**

**FULL DEPTH DIAPHRAGM WITHOUT BACKWALL AT JOINT**

**NOTES:**

1. FOR ADDITIONAL INFORMATION SEE DETAIL ON SHEET 12.

2. PROVIDE CONTINUOUS WATERSTOP.

3. PROVIDE 1'-6" MINIMUM Prefomed Cellular Polystyrene for Entire Length of Respectively Wall or Stem. Use an adhesive-backed, Prefomed Waterstop Membrane Per PUB 408, SECTION 680.2 (b). Provide 2'-0" Wide Waterstop Membrane to Fit Applicable Face(s) of the Abutment, Wingwall or Retaining Wall Stem Only Where Waterproofing Membrane and 1" Thick Prefomed Cellular Polystyrene to Be Used on Front Face of Abutment, Wingwall or Retaining Wall Stem. Provide the Distance from Edge of Paving to the Front Face of the Respectively Stem 1'-0" Min. Provide Watertight Membrane Placing in Each Direction Over Waterproofing Membrane as Protection.

**SECTION R-R**

**ADJUSTING WATERPROOFING INFORMATION SEE DETAILS ON SHEET 12.**

**PARTIAL DEPTH DIAPHRAGM**

**TYPICAL STRUCTURE SECTIONS - MEDIAN**

**TYPICAL STRUCTURE SECTIONS - MEDIAN**

**PARTIAL DEPTH DIAPHRAGM WITH MEDIAN**

**CONCRETE BARRELS SIMILAR**

**NOTES:**

1. PROVIDE CONTINUOUS WATERSTOP.

2. PROVIDE CONTINUOUS WATERPROOFING DETAIL.

3. PROVIDE 1'-6" MINIMUM Prefomed Cellular Polystyrene for Entire Length of Respectively Wall or Stem. Use an adhesive-backed, Prefomed Waterstop Membrane Per PUB 408, SECTION 680.2 (b). Provide 2'-0" Wide Waterstop Membrane to Fit Applicable Face(s) of the Abutment, Wingwall or Retaining Wall Stem Only Where Waterproofing Membrane and 1" Thick Prefomed Cellular Polystyrene to Be Used on Front Face of Abutment, Wingwall or Retaining Wall Stem. Provide the Distance from Edge of Paving to the Front Face of the Respectively Stem 1'-0" Min. Provide Watertight Membrane Placing in Each Direction Over Waterproofing Membrane as Protection.
MEMBRANE DRAIN DETAIL AT CURB

GUTTERLINE DETAIL

TYPICAL LONGITUDINAL SECTION

ALTERNATE DRAINS

AFTER INSTALLATION OF WATERPROOFING MEMBRANE, FOLLOW INSTRUCTIONS BELOW.

NOTE:
1. DETAILS SHOWN TO BE USED FOR PRESERVATION PROJECTS ONLY.
2. SPACE P/V.C. TUBES, WHERE PRACTICABLE AS FOLLOWS:
   - AT 20 FT. CENTERS (MAX.), OR
   - 6" MIN.
3. PROVIDE MASTIC IN ACCORDANCE WITH SECTION 680.2(a) OF PUB. 408.

NOTES:
1. CUT TUBE Flush WITH TOP OF MEMBRANE;
2. SEAL EDGES WITH MASTIC, AND
3. PROVIDE GALVANIZED SCREEN, 3/4" CALIBRATED FOR FREE FLOW OF WATER.
   USE MELTED MATERIAL.
   - CUT WATERPROOFING MEMBRANE AS DIRECTED BY THE ENGINEER BEFORE PAVING AND SEAL IN ACCORDANCE WITH MANUFACTURER’S RECOMMENDATIONS.

INSTRUCTIONS:
1. CUT TUBE FLUSH WITH TOP OF MEMBRANE;
2. SEAL EDGES WITH MASTIC, AND
3. PROVIDE 3" MASTIC OR PRECAST BEAM SIMILAR.

ADJACENT BOX BEAM OR PRECAST BEAM

ADJACENT BOX BEAM OR PRECAST BEAM

NOTE:
COUPLING AND PLUG; REMOVE PLUG AFTER FABRICATION OF SUBSTRUCTURE OR BARRIER OR BARRIER.

4.75 MM MIX, SRL-L HMA WEARING COURSE (LEVELING), 4.75 MM MIX, SRL-L BITUMINOUS WEARING COURSE, 4.75 MM MIX, SRL-L HMA WEARING COURSE (LEVELING).

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD
PRESTRESSED OR PRECAST BRIDGE

EXPANSION DETAILS-MISCELLANEOUS

TYPICAL WATERPROOFING AND
EXPANSION DETAILS-MISCELLANEOUS
PRESTRESSED OR PRECAST BRIDGE

MEMBRANE DRAIN DETAIL AT CURB

GUTTERLINE DETAIL
LIMITS OF WATERPROOFING AT SIDE OF PRECAST BOX SECTION JOINTS 2'-0" WIDTH AND 2'-0" WIDTH ALONG THE SIDE JOINTS FOR FILLS 2'-0". FOR FILLS 2'-0" PROVIDE 2'-0" WIDTH WATERPROOFING AT THE TOP AND SIDE JOINTS.

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 WATERPROOFING ON THE TOP AND SIDE JOINTS.
2. PROVIDE APPROVED WATERPROOFING DETAIL ALONG BOX SECTION JOINTS 2'-0" WIDTH 2'-0". PLACE THIS BEFORE THE TOP SLAB WATERPROOFING.

MEMBRANE WATERPROOFING DETAIL

NOTE:
- 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 WATERPROOFING ON THE TOP AND SIDE JOINTS.
SECTION 727.

ACCORDANCE WITH PUB. 408, BITUMINOUS PAPER IN TWO LAYERS OF TWO-PLY CAULK TO SEAL ASTM C578, TYPE 1 CELLULAR POLYSTYRENE 2" PREFORMED

PUB. 408, SECT. 680.2(b) MEMBRANE IN ACCORDANCE WITH TWO LAYERS OF WATERPROOFING

1'-0" MIN. 4" MIN.

1'-0" MIN. 3'-0" MIN.

3" MIN.

MEMBRANE WATERPROOFING DETAIL

BATTEN AND BATTEN WATERPROOFING NOT SHOWN

SEE NOTE 8 ON SHEET 1.

WING TURNOFF ALL STRUCTURES WITHOUT A BACKWALL

THE DECK SLAB AND END DIAPHRAGM. LOCATED AT THE JOINT BETWEEN AS REQUIRED SO SCREWS ARE NOT 10" PREFERRED, ADJUST LOCATION

STARBOARD BOX BEAMS. FOR I-BEAMS. FULL HEIGHT OF BEAM FOR 1'-0" MIN. ON CONCRETE END DIAPHRAGM

* EXPOSED BOX BEAMS.

FOR I-BEAMS. FULL HEIGHT OF BEAM FOR 1'-0" MIN. ON CONCRETE END DIAPHRAGM

1'-6" MIN.

9" MIN.

9" MIN.

9" MIN.

4" MIN.

3" MIN.

3" MIN.

5/8" SLAB

BONDBREAKER TO BE APPLIED TO DOWEL ABOVE BRIDGE SEAT.

FILL WITH NON-SHRINK GROUT.

TO DOWEL ABOVE BRIDGE SEAT.

FILL WITH NON-SHRINK GROUT.

2" | DOWEL HOLE TO BE DRILLED AFTER BEAMS ARE IN PLACE. (SEE ADJACENT BOX BEAM NOTES ON SHEET 3)

(SEE BC-788M, SHEET 12, WATERPROOFING SHEET 7. SEE DETAIL ON BC-751M, ADDITIONAL DRAINAGE, JAN. 31, 2019)

ACTING DIR. BUR. OF PROJECT DELIVERY

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY

STANDARD MISCELLANEOUS WATERPROOFING DETAILS

RECOMMENDED JAN. 31, 2019 RECOMMENDED JAN. 31, 2019 SHEET 12 OF 12 BC-788M
POST-TENSIONING OF CONCRETE GIRDERS

GROUTING SPECIFICATIONS

1. POST-TENSIONING OF CONCRETE GIRDERS:
   A. PRE-GROUTING OPERATIONS:
      1. A MINIMUM OF ONE PRESSURE BLEED TEST (SECTION 4.4.6) SHALL BE PERFORMED PER PROJECT DURING FILLING TESTS.
      2. WET DENSITY TEST SHALL BE PERFORMED AT THE MIXER INITIALLY AND EVERY TWO HOURS, AND AT THE DUCT OUTLET AT THE LAST OUTLET OF EACH TENDON PER MINIMUM VALUE IN 4.4.8.
      3. MINIMUM OF TWO FLUIDITY TESTS (FLOW CONE), ONE AT THE MIXER AND ONE AT THE DUCT OUTLET AT THE LAST OUTLET OF EACH TENDON.
      4. IF AN EXPANSIVE ADMIXTURE IS USED IN THE GROUT FOR EXTERNAL TENDONS USING PLASTIC TENDONS AND 3/8 IN FOR SINGLE BAR TENDONS. PLACE INLETS AND OUTLETS AT THE ANCHORAGE AREA OF THE TENDON.
      5. A MINIMUM OF ONE CHLORIDE ION CONCENTRATION TEST SHALL BE PERFORMED PER PROJECT DURING FILLING TESTS.
TIE BOLT DETAIL - PRECAST CHANNEL BEAM

1 7/8" DIA.
P.V.C. PIPE - used only on Fascia Side.

1 1/2" DIA.
Galvanized Tie Bolt (Grade 80) with min. tapered washer (Grade F436).

See design drawings for specific location.
SECTION A-A

ELEVATION CONNECTION STRAP

GALVANIZED STRAP CONNECTION DETAIL

H/4

H

A

JOINT BETWEEN BOX SECTIONS

OUTSIDE FACE OF BOX

INSIDE FACE OF BOX

BEDDING

PRECAST SECTION (TYP.)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD MECHANICAL CONNECTION DETAILS
PRECAST R.C. BOX CULVERT
CHIEF BRIDGE ENGINEER
RECOMMENDED
SHEET 3 OF 3

BUREAU OF PROJECT DELIVERY

10" 10"

2'-0" 1'-8"

2'-0" x 3" x …" GALV.

2"

3"

1"

1"

1"

3" x 3" x …" GALV.

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NOTE:
CRASH WALL REQUIREMENTS
FOR M.S.E. WALLS NEAR RAILROADS
1. PROVIDE CRASH WALL IN MOUTH OF PREHOLLOWED WALLS WHERE THE WALL IS 30' OR LESS.
2. CRASH WALLS SHALL BE 6" THICK AND 6' LONG (TYP.) ABOVE THE TOP OF RAILROAD TRACK.

C.I.P. CONCRETE
COPING DETAIL

DRAINAGE DITCH DETAIL

SECTION D-D

PRECAST COPING DETAIL

SECTION C-C

PRECAST PANEL

NOTE:
* COPING UNIT STANDARDS, LENGTHS 1'-6" AND 10'-6".
** VERTICAL AND HORIZONTAL LINES TO BE USED AS GUIDES, LINE OF COPING JOINTS TO BE ACCORDING TO PANEL JOINTS WITH PANEL JOINTS WITH 3'-12" REINFORCEMENT.
*** M.S.E. WALL PANEL SHOWN, RETAINING WALL PANEL DETAIL SIMILAR.

COMMONWEALTH OF PENNSYLVANIA
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BUREAU OF PROJECT DELIVERY

MECHANICALLY STABILIZED EARTH
RETAINING WALLS
CRASH WALL AND MISCELLANEOUS
WALL DETAILS

STANDARD

JAN. 31, 2019
BC-799M

NOTE:
1. USE 6-#4 BARS.
2. LONGITUDINAL REINFORCEMENT NOT REQUIRED.
3. ALL STEPS ARE TO BE COVERED BY OUTSIDE OF COPING.
4. WALL PANELS WITH ADHESIVE REQUIRED BY DESIGN.
5. DRAINAGE DITCH IF REQUIRED.
6. DRAINAGE DITCH IF REQUIRED.

SECTION B-B

ELEVATION - M.S.E. WALL
JUNCTION WITH C.I.P. WALL

ELEVATION - C.I.P. CONCRETE

WEEPHOLE REINFORCEMENT

SHEET 3 OF 13
JAN. 31, 2019
RECOMMENDED
BC-799M

NOTE:
* USE #4 DOWELS PLUS JOINTS.
* DRAINAGE DITCH IF REQUIRED.
* JOINTS REQUIRED BY DESIGN.
* JOINTS REQUIRED BY DESIGN.
1. Place expansion joint in barrier with pavement joint, except not standard barrier dimensions.

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
DEPARTMENT OF TRANSPORTATION

STANDARD
MECHANICALLY STABILIZED EARTH
RETAILING WALLS
C.I.P. TRAFFIC BARRIER

BC-799M
1. Place expansion joints in precast barrier to match with pavement panel thickness.

2. Provide a minimum precast barrier length of 10'-0".

3. Provide special design and detailing of the moment slab and barrier for dock 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.

COMMONWEALTH OF PENNSYLVANIA
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BUREAU OF PROJECT DELIVERY
STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
PRECAST TRAFFIC BARRIER

SHEET 5 OF 13
BC-799M
NOTE A: PROVIDE OPEN JOINTS IN BARRIER AT SAME LOCATIONS AS THOSE PROVIDED FOR THE MOMENT SLAB.

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

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

BARRIER MOMENT SLAB NOTES:
1. All open joints in the barrier must be filled with backing rod and sealed with resilient joint sealing material, as per Publication 408, Sec. 705.4.(i).
2. Exposed joints in barrier must vary from 1/2" to 1" width for Type 1 open joint and 1/4" to 1/2" width for Type 2 open joint, to allow for horizontal and/or vertical curvature in wall.

NOTE: FOR LEGEND OF SYMBOLS, SEE SHEET 2.
REINFORCED EARTH WALL PANELS

RETAINING WALLS

MECHANICALLY STABILIZED EARTH (AS SPECIFIED)

5" x …" x …" OF PANEL (TYP.)

WALL COMPLETION 4" x 3" x 1" (TYP.)

LEVELING PAD 2 PADS POLYMERIC PAD

LEVELING JOINT 2" x 3" x 1" (TYP.)

FABRIC, CLASS 4, TYPE A

GEOTEXTILE FABRIC CENTER GEOTEXTILE FABRIC

12" MIN. (TYP)

TIE STRIP LOCATION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

MECHANICALLY STABILIZED EARTH RETAINING WALLS
REINFORCED EARTH WALL PANELS

NOTES:
1. ALL REINFORCEMENT BARS ARE EPOXY COATED AND A 615 POUND FORCE IS INDICATED. SEE BC-736M FOR REINFORCEMENT BAR REQUIREMENTS.
2. PROVIDE A 3° x 4" CHAMFER ON ALL EXPOSED EDGES OF PANELS (FRONT FACE ONLY)
3. ALL PANEL TYPES AND OTHER RELATED ELEMENTS WILL BE DETAILLED ON THESE SHEETS, INCLUDING LAYOUT PLAN AND ELEVATIONS OF COMPLETE WALL. INCLUDE FEATURES SUCH AS LOCATION OF POLES, INLETS, LIGHTS, AND OTHER OBSTRUCTIONS (TYP.). PROVIDE 4" MIN. LEVELING PAD AT JOINT DETAILS. DETAIL LOCATION OF BOLTS, JOINT DEPTH, JOINT LOCATION, AND OTHER CONSTRUCTION DETAILS ARE IMPORTANT. INCLUDE CONSTRUCTION DECORATIVE DETAILS AND SHOP DRAWINGS.
4. ALL PANELS SHALL HAVE TWO LIFTING INSERTS OF 2 TON CAPACITY EACH. DETAILS IN ACCORDANCE WITH PUBLICATION 408 AS SPECIFIED.
5. PROVIDE AN ARCHITECTURAL TREATMENT TO INCREASE TO ACCOMMODATE ANY ARCHITECTURAL SURFACE FINISH THAT MAY BE SPECIFIED.
6. CALCULATE ALL REINFORCING STRIPS, CONNECTION APPURTENANCES AND LIFTING MATERIAL.
7. THE STEP SIZE MAY BE INCREASED TO 25° MAXIMUM PROVIDED THAT CALCULATIONS SHOW THAT THE STRUCTURAL CAPACITY OF ALL AFFECTED M.S.E. WALL COMPONENTS ARE SUBMITTED AND ACCEPTED.
8. BOTTOM OF BOTTOM PANEL, TOP OF TOP PANEL, AND LIFTING HARDWARE.
9. COVER ALL JOINTS BETWEEN PANELS ON BACK SIDE OF THE WALL USING GEOTEXTILE FABRIC CLASS 4, TYPE A. APPLY ADHESIVE CONCRETE PASTE ON PANEL AND APPLY GEOTEXTILE FABRIC, CLASS 4, TYPE A OVER BOTTOM PANEL. PLACE FOAM STRIP FILLER IN HORIZONTAL JOINTS.

SECTION M-M

SECTION N-N

SECTION P-P

SECTION Q-Q

LEVELED PAD DETAIL FOR MOST COMMON ARRANGEMENT OF PANELS

PARTIAL ELEVATION - FRONT FACE

TIE STRIPS 5½ " 3½ " Architectural Treatment

AS PER DESIGN

LEVELED PAD 6" LEVELING PAD

FRONT FACE OF PANEL

1½ " Lifting Insert

3½ " CHAMFER

2½ " After Wall Completion

BICALY.1 (TYP)

FRONT FACE OF PANEL 3½ " CHAMFER

SECTION 1105.02 (S).

4. ALL PANELS SHALL HAVE TWO LIFTING INSERTS OF 2 TON CAPACITY EACH. GALVANIZE IN ACCORDANCE WITH PUBLICATION 408 AS SPECIFIED.
5. PANEL DESIGN THICKNESS IS 5½". THICKNESS OF CONCRETE MAY INCREASE TO ACCOMMODATE ANY ARCHITECTURAL SURFACE FINISH THAT MAY BE SPECIFIED.
6. PROVIDE A …" x …" CHAMFER ON ALL EXPOSED EDGES OF PANELS (FRONT FACE ONLY).
7. ALL PANEL TYPES AND OTHER RELATED ELEMENTS WILL BE DETAILLED ON THESE SHEETS, INCLUDING LAYOUT PLAN AND ELEVATIONS OF COMPLETE WALL. INCLUDE FEATURES SUCH AS LOCATION OF POLES, INLET LOCATIONS, LIGHTPOLES, ETC. DETAIL LOCATION OF BOLTS, JOINT DEPTH, JOINT LOCATION, AND OTHER CONSTRUCTION DETAILS ARE IMPORTANT. INCLUDE CONSTRUCTION DECORATIVE DETAILS AND SHOP DRAWINGS.
8. PROVIDE AN ARCHITECTURAL TREATMENT TO INCREASE TO ACCOMMODATE ANY ARCHITECTURAL SURFACE FINISH THAT MAY BE SPECIFIED.
9. COVER ALL JOINTS BETWEEN PANELS ON BACK SIDE OF THE WALL USING GEOTEXTILE FABRIC CLASS 4, TYPE A. APPLY ADHESIVE CONCRETE PASTE ON PANEL AND APPLY GEOTEXTILE FABRIC, CLASS 4, TYPE A OVER BOTTOM PANEL. PLACE FOAM STRIP FILLER IN HORIZONTAL JOINTS.
REINFORCING STRIP DETAIL

PARTIAL ELEVATION - FRONT FACE

If covering all joints between panels on each side of the wall with geotextile fabric, Class F, Type A, apply adhesive at all joints. Do not apply adhesive within 2" of the joints. Do not place foam strip filler in horizontal joints.

PARTIAL ELEVATION - REAR FACE

TIE STRIP LOCATION

LEVELING PAD STEP DETAIL

COMMONWEALTH OF PENNSYLVANIA
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STANDARD
MECHANICALLY STABILIZED EARTH RETAINING WALLS REINFORCED EARTH WALL PANELS

BC-799M

RECOMMENDED
JAN. 31, 2019

BUREAU OF PROJECT DELIVERY

NOTE:
1. FOR ADDITIONAL NOTES SEE SHEET 10.
2. ALL PANELS SHALL HAVE TWO LIFTING INSERTS OF 2-TON CAPACITY EACH.
3. STAGGERED HORIZONTAL PANEL JOINTS, MINIMUM DISTANCE 2'-5/".
4. FOR LEGEND OF NOTES AND SYMBOLS, SEE SHEET 2.
TYPICAL PANEL LAYOUT
PARTIAL ELEVATION - FRONT FACE

- All connectors must align within 1/8" of alignment.
- 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).
- Panel dollies may be 6" x 10" x 10" concrete or 1½" x 1½" x 12" galvanized steel rod.
- Galvanize all reinforcing mesh, connection appurtenances and lifting hardware.
- Panel joint reinforcement bars are to be spaced 16" o.c. (minimum 2 bars).
- All panels, types and other related elements on shop drawings, elevation, section and plan details, location of reinforcement, size and location of all appurtenances, etc. shall be shown in detail and on the construction drawings.
- All panels should be fabricated with a flat surface square to the face of panel.
- For details, see this sheet and sheet 2.
- See shop drawings.
- All Galv. welded loop connections shall be on front face only.
- Only and not on geotextile fabric.
- Do not apply adhesive within 1/2" of joint (typ.).
- Galv. welded loop detail (center on panel joint).
- Section T-T.
- Geotextile fabric detail (this sheet).
- TYPICAL CHAMFER
- COVER ALL JOINTS BETWEEN PANELS ON BACK SIDE OF THE WALL WITH GEOTEXTILE FABRIC, CLASS A, TYPE A. APPLY ADHESIVE COATING IN PANELS ONLY AND NOT ON GEOTEXTILE FABRIC. DO NOT APPLY ADHESIVE WITHIN 2" OF THE JOINT. DO NOT PLANK FROM TOP FILLER IN HORIZONTAL JOINTS.

NOTES:
- Panels should be fabricated with a flat surface square to the face of panel.
- Do not apply adhesive within 1/2" of joint (typ.).
- Panel joint reinforcement bars are to be spaced 16" o.c. (minimum 2 bars).
- All panels, types and other related elements on shop drawings, elevation, section and plan details, location of reinforcement, size and location of all appurtenances, etc. shall be shown in detail and on the construction drawings.
- All panels should be fabricated with a flat surface square to the face of panel.
- For details, see this sheet and sheet 2.
- See shop drawings.
- All Galv. welded loop connections shall be on front face only.
- Only and not on geotextile fabric.
- Do not apply adhesive within 1/2" of joint (typ.).
- Galv. welded loop detail (center on panel joint).
- Section T-T.
- Geotextile fabric detail (this sheet).
- TYPICAL CHAMFER
- COVER ALL JOINTS BETWEEN PANELS ON BACK SIDE OF THE WALL WITH GEOTEXTILE FABRIC, CLASS A, TYPE A. APPLY ADHESIVE COATING IN PANELS ONLY AND NOT ON GEOTEXTILE FABRIC. DO NOT APPLY ADHESIVE WITHIN 2" OF THE JOINT. DO NOT PLANK FROM TOP FILLER IN HORIZONTAL JOINTS.

COMMONWEALTH OF PENNSYLVANIA
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STANDARD
MECHANICALLY STABILIZED EARTH
RETAILING WALLS
RETAIRED EARTH WALL PANELS

RECOMMENDED JAN. 31, 2019
SHEET 12 OF 13
BC-799M
QUALITY CONTROL PLAN

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 1/4", AS SHOWN IN DETAIL A.

2. SUBMIT A QUALITY CONTROL PLAN DESCRIBING METHODS AND PROCEDURES USED TO ACHIEVE A MAXIMUM 1/4" GAP, AS PER DETAIL A. INCLUDE THE FOLLOWING IN THE QUALITY CONTROL PLAN:

   A. METHOD OF POSITIONING/Maintaining the Clevis loops in the Panel and Wire Mesh.
   B. Proposed Panel Fabrication Tolerances of the Clevis loops with respect to alignment and alignment.
   C. Proposed Panel Fabrication Tolerances of the Wire Mesh loops with respect to alignment and alignment.
   D. Proposed Panel Fabrication Tolerances of the Wire Mesh loops with respect to alignment and alignment.
   E. Method of releasing, tightening, and positioning the Panels to avoid contact with and/or change in position of the Clevis loops.

3. AS AN ALTERNATIVE TO THE PREPARATION OF A QUALITY CONTROL PLAN, OR PRIOR TO ACCEPTANCE OF THE SHOP DRAWINGS, THE QUALITY CONTROL PLAN IS REQUIRED TO BE SUBMITTED TO THE CHIEF STRUCTURAL MATERIALS ENGINEER AND THE DISTRICT STRUCTURAL CONTROL ENGINEER FOR REVIEW.

4. METHOD FOR ESTABLISHING ACCEPTANCE OF WIRE MESH CONNECTION DURING CONSTRUCTION

   1. CONNECT WIRE MESH TO PANEL WITH CONNECTING BAR(S).
   2. FULL WIRE MESH STAT FROM THE PANEL WITH SUFFICIENT EFFORT SO THAT THE CONNECTING BAR(S) MAKE FULL CONTACT WITH THE PANEL LOOPS AND THE PANEL LOOPS AT A MAXIMUM OF 1/4" WIRE MESH LOOP LOCATIONS.
   3. MEASURE THE GAP, 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 1/4".

5. USE OF ADHESIVE BOLTS DRIVEN BETWEEN THE PANEL AND CONNECTOR BAR(S) TO ASSIST IN ENGAGING THE CONNECTOR BAR(S) WITH THE LOOPS TO ACHIEVE A MAXIMUM 1/4" GAP WILL NOT BE PERMITTED. THE USE OF ADHESIVE BOLTS TO STABILIZE THE WIRE MESH INTERIOR DURING BACKFILL WILL RESULT IN A MAXIMUM GAP RELATIVE TO THE GAP BETWEEN THE CONNECTORS AND BETWEEN THE PANEL LOOP AND WIRE MESH LOOPS IF GAPS ARE MEASURED AND FOUND TO BE WITHIN TOLERANCE.

6. METHOD FOR ESTABLISHING ACCEPTANCE OF WIRE MESH CONNECTION DURING CONSTRUCTION

   1. CONNECT WIRE MESH TO PANEL WITH CONNECTING BAR(S).
   2. FULL WIRE MESH STAT FROM THE PANEL WITH SUFFICIENT EFFORT SO THAT THE CONNECTING BAR(S) MAKE FULL CONTACT WITH THE PANEL LOOPS AND THE PANEL LOOPS AT A MAXIMUM OF 1/4" WIRE MESH LOOP LOCATIONS.
   3. MEASURE THE GAP, 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 1/4".

7. THE USE OF ADHESIVE BOLTS DRIVEN BETWEEN THE PANEL AND CONNECTOR BAR(S) TO ASSIST IN ENGAGING THE CONNECTOR BAR(S) WITH THE LOOPS TO ACHIEVE A MAXIMUM 1/4" GAP WILL NOT BE PERMITTED. THE USE OF ADHESIVE BOLTS TO STABILIZE THE WIRE MESH INTERIOR DURING BACKFILL WILL RESULT IN A MAXIMUM GAP RELATIVE TO THE GAP BETWEEN THE CONNECTORS AND BETWEEN THE PANEL LOOP AND WIRE MESH LOOPS IF GAPS ARE MEASURED AND FOUND TO BE WITHIN TOLERANCE.

8. PANEL LOOP AND WIRE MESH LOOP TOLERANCES

   A. PANELS: FABRICATE PANELS WITH LOOPS THAT ARE POSITIONED WITHIN 1/4" OF THE DEFINED POSITION. ACCEPTANCE WILL BE ESTABLISHED BY PLACEMENT OF A STRAIGHT BAR THROUGH ALL LOOPS IN A ROW OF A PANEL, TYPICAL TO DETAIL A.
   B. WIRE MESH: FABRICATE LOOPS OF WIRE MESH TO WITHIN 1/4" MAXIMUM GAP BETWEEN THE CONNECTOR BAR(S) AND THE WIRE MESH LOOPS. REFER TO DETAIL A.
   C. MEASUREMENT METHOD (INCLUDING TOOLS) USED TO VERIFY WIRE MESH TOLERANCES.
   D. METHOD OF HANDLING, STORING AND SHIPPING THE PANELS TO AVOID DAMAGE TO PANEL LOOPS AT A MINIMUM OF TWO WIRE MESH LOOP LOCATIONS.
   E. METHOD OF POSITIONING/Maintaining the Clevis loops in the Panel and Wire Mesh.
   F. Proposed Panel Fabrication Tolerances of the Clevis loops with respect to alignment and alignment.
   G. Proposed Panel Fabrication Tolerances of the Wire Mesh loops with respect to alignment and alignment.
   H. Proposed Panel Fabrication Tolerances of the Wire Mesh loops with respect to alignment and alignment.
   I. Method of releasing, tightening, and positioning the Panels to avoid contact with and/or change in position of the Clevis loops.

9. PANEL LOOP AND WIRE MESH LOOP TOLERANCES

   A. PANELS: FABRICATE PANELS WITH LOOPS THAT ARE POSITIONED WITHIN 1/4" OF THE DEFINED POSITION. ACCEPTANCE WILL BE ESTABLISHED BY PLACEMENT OF A STRAIGHT BAR THROUGH ALL LOOPS IN A ROW OF A PANEL, TYPICAL TO DETAIL A.
   B. WIRE MESH: FABRICATE LOOPS OF WIRE MESH TO WITHIN 1/4" MAXIMUM GAP BETWEEN THE CONNECTOR BAR(S) AND THE WIRE MESH LOOPS. REFER TO DETAIL A.
   C. MEASUREMENT METHOD (INCLUDING TOOLS) USED TO VERIFY WIRE MESH TOLERANCES.
   D. METHOD OF HANDLING, STORING AND SHIPPING THE PANELS TO AVOID DAMAGE TO PANEL LOOPS AT A MINIMUM OF TWO WIRE MESH LOOP LOCATIONS.
   E. METHOD OF POSITIONING/Maintaining the Clevis loops in the Panel and Wire Mesh.
   F. Proposed Panel Fabrication Tolerances of the Clevis loops with respect to alignment and alignment.
   G. Proposed Panel Fabrication Tolerances of the Wire Mesh loops with respect to alignment and alignment.
   H. Proposed Panel Fabrication Tolerances of the Wire Mesh loops with respect to alignment and alignment.
   I. Method of releasing, tightening, and positioning the Panels to avoid contact with and/or change in position of the Clevis loops.