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.

ADDITIONAL COPIES ARE AVAILABLE FROM:

☑ PennDOT SALES STORE
(717) 787-6746 phone
(717) 525-5180 fax
ra-penndotsalesstore@pa.gov

☑ PennDOT website - www.dot.state.pa.us
Click on Forms, Publications & Maps

☐ DGS warehouse (PennDOT employees ONLY)

APPROVED FOR ISSUANCE BY:

Leslie S. Richards – Secretary of Transportation
By: [Signature]

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></td>
<td></td>
<td>2 of 3 POST BRACKET DETAIL: added 3 3/4” vertical distance to horizontal shield pipe.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 of 3 ELEVATION: added FABRIC after call-out for Mesh Diamond Chain Link Fence.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added 2” MAX. dimension for space between mesh and top of wall.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SECTIONS D-D: removed 4” dimension for height of bottom rail above top of wall.</td>
</tr>
<tr>
<td>BC-703M</td>
<td>2 sths.</td>
<td>Re-issued with no changes.</td>
</tr>
<tr>
<td>BC-709M</td>
<td>1 of 2</td>
<td>Added (BEHIND W-BEAM) to callout for 5/8” Dia. Hex Head Bolt.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TYPICAL SECTION - added DELINEATOR to steel post.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added TUBULAR BLOCKOUT to 7Sx7x3/1/4”. 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” 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></td>
<td></td>
<td>2 of 2 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 sths.</td>
<td>Section letters revised.</td>
</tr>
<tr>
<td>BC-709M</td>
<td>3 of 12</td>
<td>TYPICAL WELD AT MITTERS - added BENDING OF 1/2” 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” to 4 5/8”.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 of 12 RAIL SPlice - added OR 1/4”x 3/4”x 3/16” PLATE ATTACHED WITH DUAL 3/16”x5/8” LONG WELD to callout for pin/stud.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FILLET WELDS to callout for pin/stud.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 of 12 PLAN - BARRIER MONTOM SLAB - added (ROADWAY) to tie bars/bolts callout.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 of 12 PRECAST BARRIER WITH BIT. SHOULDER - increase spacing of top transverse #5 reinforcement from 11” to 12”.</td>
</tr>
<tr>
<td>BC-711M</td>
<td>2 of 4</td>
<td>ACCIDENT PREVENTION SIGN - added R = 1/2” (Typ.) callout to lower right corner of sign.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 of 12 PARTIAL INSIDE ELEVATION - removed GROUND CONNECTIONS TO BE MADE BY RAILROAD statement from lapped holes callout.</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></td>
<td></td>
<td>3 of 13 Added new PLATE WASHER DETAIL.</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></td>
<td></td>
<td>Added plate washer beneath two lock washer/nut connections.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 of 13 TYPICAL RAIL TO POST DETAIL: added &quot;AND PLATE WASHER DETAIL ON SHEET 3” to slotted hole callout.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added plate washer beneath two lock washer/nut connections.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11 of 13 CAST-IN-PLACE PA BRIDGE BARRIER ON M.S.E. WALLS: changed STYROFOAM to PREFORMED CELLULAR POLYSTYRENE (P.C.P.) at two locations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 of 13 PRECAST BARRIER WITH BITUMINOUS CONCRETE SHOULDER ON M.S.E. WALLS: changed STYROFOAM to PREFORMED CELLULAR POLYSTYRENE.</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></td>
<td></td>
<td>BC-716M 1 of 2 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 sth.</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 PIERCED DECKS WITHOUT APPROVAL OF DISTRICT BRIDGE ENGINEER.</td>
</tr>
<tr>
<td></td>
<td></td>
<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></td>
<td></td>
<td>3 of 8 NOTES: added NOTE 3 - FOR SPACEING AND MINIMUM REQUIRED ADHESIVE ANCHOR ULTIMATE CAPACITY SEE TABLE 1, SHEET 1.</td>
</tr>
<tr>
<td>BC-720M</td>
<td>1 sth.</td>
<td>ELEVATION: added 1-5” 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></td>
<td></td>
<td>2 of 2 CONDUIT EXPANSION NOTES, Note 2: added ARTICLE prior to NEC314.</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” space between end of Pedestrian Railing to light pole and removed 1'-8&quot; dimension.</td>
</tr>
<tr>
<td>BC-723M</td>
<td>10 sths.</td>
<td>Minor notes changes made throughout.</td>
</tr>
<tr>
<td>BC-726M</td>
<td>5 sths.</td>
<td>Initial release.</td>
</tr>
<tr>
<td>BC-731M</td>
<td>1 sth.</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 sths.</td>
<td>Re-issued with no changes.</td>
</tr>
<tr>
<td>BC-739M</td>
<td>2 sths.</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: rewrote 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 #13-602-BDDT AND #14-603-BDDT FOR SUPPORT OF CENTER-MOUNT DMS SIGN STRUCTURES.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 of 6 ALTERNATE FOUNDATION, Note: added #13-602-BDDT AND #14-603-BDDT FOR SUPPORT OF CENTER-MOUNT DMS SIGN STRUCTURES.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ALTERNATE CAISSON FOUNDATIONS table: caissons for unavailable larger wall thickness 24” and 26” pipe sizes were removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 of 6 PIPE CAPS table: pipe caps for unavailable larger wall thickness 24” and 26” pipe sizes were removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>COLUMN BASES: bases for unavailable larger wall thickness 24” and 26” pipe sizes were removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 of 6 NOTES, 3rd bullet point: removed TC-8716.</td>
</tr>
<tr>
<td>BC-743M</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>
<td></td>
<td></td>
<td>3 of 10 ALTERNATE CAISSON FOUNDATIONS table: caissons for unavailable larger wall thickness 24” and 26” pipe sizes were removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 of 10 COLUMN BASES table: column bases for unavailable larger wall thickness 24” and 26” pipe sizes were removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PIPE CAPS table: pipe caps for unavailable larger wall thickness 24” and 26” pipe sizes were removed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHORD SPlice table: chord splices for unavailable larger wall thickness 24” and 26” pipe sizes were removed.</td>
</tr>
</tbody>
</table>


**Table: DESCRIPTION OF CHANGES**

<table>
<thead>
<tr>
<th>STANDARD SHEET</th>
<th>DESCRIPTION OF CHANGES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BC-743M (continued)</strong></td>
<td>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&quot; and 26&quot; pipe sizes were removed.</td>
</tr>
<tr>
<td><strong>BC-744M</strong></td>
<td>7 of 10 SADDLE BLOCK DIMENSIONS table: saddle blocks for unavailable larger wall thickness 24&quot; and 26&quot; pipe sizes were removed. TRUSS SEAT table, truss seats for unavailable larger wall thickness 24&quot; and 26&quot; pipe sizes were removed.</td>
</tr>
<tr>
<td><strong>BC-743M</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>BC-750M</strong></td>
<td>4 of 12 ALTERNATE CAISSON FOUNDATIONS table: caissons for unavailable larger wall thickness 24&quot; and 26&quot; pipe sizes were removed.</td>
</tr>
<tr>
<td><strong>BC-750M</strong></td>
<td>5 of 12 COLUMN BASES table; column bases for unavailable larger wall thickness 24&quot; and 26&quot; pipe sizes were removed. PLAN OF COLUMN BASE TYPE Y: added 1/2&quot; MIN. CLR. (TYP.) for space from 2&quot; holes to inside of column.</td>
</tr>
<tr>
<td><strong>BC-745M</strong></td>
<td>6 of 12 COLUMN BASES - 4 POST STRUCTURES table: column bases for unavailable larger wall thickness 24&quot; and 26&quot; pipe sizes were removed. PLAN OF COLUMN BASE TYPE W: added 1/2&quot; MIN. CLR. (TYP.) for space from 2&quot; holes to inside of column.</td>
</tr>
<tr>
<td><strong>BC-744M</strong></td>
<td>8 of 12 SIGN SUPPORT BRACKET DETAIL: U-bolt dimension equation revised to 7/8&quot; instead of 3/4&quot;. CHORD SPlice table, removed splices.</td>
</tr>
<tr>
<td><strong>BC-747M</strong></td>
<td>9 of 12 TRUSS SEAT table: truss seats for unavailable larger wall thickness 24&quot; and 26&quot; pipe sizes were removed.</td>
</tr>
<tr>
<td><strong>BC-750M</strong></td>
<td>11 of 12 SECTION C-C: added CHORD O.D. + 5/8&quot; (TYP.)</td>
</tr>
<tr>
<td><strong>BC-744M</strong></td>
<td>12 of 12 TYPICAL LIGHT FIXTURE SUPPORT DETAILS: U-bolt dimension equation revised to be CHORD O.D. plus 7/8&quot; instead of 3/4&quot;. PIPE CAPS table: pipe caps for unavailable larger wall thickness 24&quot; and 26&quot; pipe sizes were removed.</td>
</tr>
</tbody>
</table>

**Table: DESCRIPTION OF CHANGES**

<table>
<thead>
<tr>
<th>STANDARD SHEET</th>
<th>DESCRIPTION OF CHANGES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BC-751M</strong></td>
<td>1 of 7 NOTES, No. 3: added CONFORMING TO AASHTO prior to M270.</td>
</tr>
<tr>
<td><strong>BC-751M</strong></td>
<td>2 of 7 SECTION C-C: pipe wall thickness changed from 3/4&quot; to 3/8&quot; at two places.</td>
</tr>
<tr>
<td><strong>BC-752M</strong></td>
<td>3 of 7 DRAIN BOX PLAN &amp; DETAIL F: added * EMBEDMENT LENGTH ACCORDING TO MANUFACTURER'S SPECIFICATIONS to adhesive anchor bolt callout.</td>
</tr>
<tr>
<td><strong>BC-753M</strong></td>
<td>4 of 7 SPLASH BLOCK PLAN: added SPLASH BLOCK INCIDENTAL TO DOWNSPOUT to cement concrete slab callout.</td>
</tr>
<tr>
<td><strong>BC-750M</strong></td>
<td>2 of 2 ALTERNATE TRANSVERSE CONSTRUCTION AND CRACK CONTROL JOINT detail was added.</td>
</tr>
<tr>
<td><strong>BC-752M</strong></td>
<td>1 of 2 BEARING STIFFENER: replaced MILL with FINISHED- in callout for end of plate at flange.</td>
</tr>
<tr>
<td><strong>BC-753M</strong></td>
<td>2 of 2 DETAIL A: revised to indicate web's longitudinal stiffener running continuously and vertical stiffener being disrupted. Added fillet weld symbol. Added reference to CORNER CHAMFER DETAIL on Sheet 1.</td>
</tr>
<tr>
<td><strong>BC-754M</strong></td>
<td>1 of 2 DETAIL A and DETAIL B: modified to match the changes made to the end diaphragm configuration.</td>
</tr>
<tr>
<td><strong>BC-755M</strong></td>
<td>2 of 2 Replaced STRINGER with BEAM at eight locations.</td>
</tr>
<tr>
<td><strong>BC-747M</strong></td>
<td>1 of 4 TABLE A ANCHOR BOLT CLEARANCE: Dimension A values were decreased.</td>
</tr>
<tr>
<td><strong>BC-750M</strong></td>
<td>2 of 4 OPTION I - PLAN VIEW: slot thickness and hole diameter in sole plate changed from D + 5/8&quot; to D + 13/16&quot;. ELEVATION - EXPANSION BEARING: increased gap between hex nut and washer from 1/8&quot; to 1/2&quot;.</td>
</tr>
<tr>
<td><strong>BC-756M</strong></td>
<td>3 of 4 LEGEND was added.</td>
</tr>
<tr>
<td><strong>BC-757M</strong></td>
<td>4 of 4 EXPANSION BEARINGS IE and IIE: increased gap between hex nut and washer from 1/8&quot; to 1/2&quot;.</td>
</tr>
<tr>
<td><strong>BC-757M</strong></td>
<td>5 of 6 ANCHOR BOLT DETAIL 1: replaced 6&quot; DIA. with 2&quot; LARGER THAN ANCHOR BOLT for blockout.</td>
</tr>
<tr>
<td><strong>BC-760M</strong></td>
<td>6 of 6 CHORD SPlice table, removed splices.</td>
</tr>
<tr>
<td><strong>BC-750M</strong></td>
<td>3 of 6 GENERAL NOTES: added CONFORMING TO AASHTO prior to M270.</td>
</tr>
<tr>
<td><strong>BC-762M</strong></td>
<td>4 of 7 SIMILAR WHEN LONGITUDINAL BARS ON TOP.</td>
</tr>
<tr>
<td><strong>BC-756M</strong></td>
<td>1 of 2 SECTION AT BARRIER: replaced STANDARD CURB with TYPICAL BARRIER.</td>
</tr>
<tr>
<td><strong>BC-756M</strong></td>
<td>2 of 2 SECTION C-A: added preformed expansion joint MATERIAL with FILLER in callout.</td>
</tr>
<tr>
<td><strong>BC-765M</strong></td>
<td>3 of 2 SECTION C-C: added WIDTH to Joint dimension.</td>
</tr>
<tr>
<td><strong>BC-767M</strong></td>
<td>1 of 6 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.</td>
</tr>
<tr>
<td><strong>BC-770M</strong></td>
<td>2 of 3 SECTIONS: added FOR DECK TOP REINFORCEMENT MAT: TRAVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.</td>
</tr>
<tr>
<td><strong>BC-772M</strong></td>
<td>3 of 6 PLAN: added &gt; 15 degrees to SKEW ANGLE callout.</td>
</tr>
<tr>
<td><strong>BC-775M</strong></td>
<td>4 of 6 GENERAL NOTES: added Note 5 regarding recessing of strands at end of beam.</td>
</tr>
</tbody>
</table>

**Table: DESCRIPTION OF CHANGES**

<table>
<thead>
<tr>
<th>STANDARD SHEET</th>
<th>DESCRIPTION OF CHANGES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BC-754M</strong></td>
<td>3 of 6 PLAN: added &gt; 15 degrees to SKEW ANGLE callout.</td>
</tr>
<tr>
<td><strong>BC-755M</strong></td>
<td>4 of 6 PLAN: added &gt; 15 degrees to SKEW ANGLE callout.</td>
</tr>
<tr>
<td><strong>BC-772M</strong></td>
<td>5 of 6 GENERAL NOTES: added Note 5 regarding recessing of strands at end of beam.</td>
</tr>
<tr>
<td>STANDARD SHEET</td>
<td>DESCRIPTION OF CHANGES</td>
</tr>
<tr>
<td>----------------</td>
<td>------------------------</td>
</tr>
<tr>
<td><strong>BC-775M (continued)</strong></td>
<td>2 of 3 SHEAR KEY DETAIL: added OR CNS WITH DOUBLE SIDED ADHESIVE STRIP after backer rod in callout.</td>
</tr>
<tr>
<td><strong>BC-776M</strong></td>
<td>1 of 7 GENERAL NOTES: minor changes within the notes.</td>
</tr>
<tr>
<td></td>
<td>4 of 7 PRECAST CONCRETE PANEL: added symbol to Panel Height which refers to the first note under LEGEND.</td>
</tr>
<tr>
<td></td>
<td>5 of 7 PRECAST CONCRETE PANEL: added symbol to Panel Height which refers to the first note under LEGEND.</td>
</tr>
<tr>
<td></td>
<td>7 of 7 ACCESS DOOR DETAIL: added symbol to Panel Length which refers to the first note under LEGEND.</td>
</tr>
<tr>
<td><strong>BC-777M</strong></td>
<td>7 of 12 WWF VERTICAL SPLICE DETAIL FOR PRECAST CONCRETE POST detail relocated from Sht. 3 and was revised.</td>
</tr>
<tr>
<td><strong>BC-778M</strong></td>
<td>1 of 10 GENERAL NOTES: Note 16 - ENGINEER was replaced with REPRESENTATIVE.</td>
</tr>
<tr>
<td></td>
<td>2 of 9 MATERIAL NOTES: Note 7, 4th bullet point - increased Closed Cell Neoprene Sponge thickness from 1/4&quot; to 1/2&quot; THICKER THAN BEARING PAD.</td>
</tr>
<tr>
<td></td>
<td>5 of 9 ELEVATION, SECTION F-F and BOLT DETAIL: replaced A325 with ASTM A307, GRADE A in bolt callouts.</td>
</tr>
<tr>
<td></td>
<td>7 of 8 LEGEND: added circle symbol which denotes AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS.</td>
</tr>
<tr>
<td><strong>BC-780M</strong></td>
<td>1 of 8 GENERAL NOTES: Note 20 - ENGINEER was replaced with REPRESENTATIVE.</td>
</tr>
<tr>
<td></td>
<td>5 of 8 ELEVATION &amp; SECTION E-E: added circle symbol to various footing dimensions which refers to the first note under LEGEND.</td>
</tr>
<tr>
<td><strong>BC-781M</strong></td>
<td>1 sht. Re-issued with no changes.</td>
</tr>
<tr>
<td><strong>BC-782M</strong></td>
<td>1 sht. Note 4, which restricted use of slope walls in urban or suburban environments, was removed.</td>
</tr>
<tr>
<td><strong>BC-783M</strong></td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>12 of 13 TYPICAL PANEL LAYOUT: removed Panel Dowels &amp; Tapered Holes centerlines from square panels on right side of detail.</td>
</tr>
<tr>
<td><strong>BC-784M</strong></td>
<td>1 of 3 Removed solid triangle note regarding tendon placement in walls and slabs of culvert.</td>
</tr>
<tr>
<td><strong>BC-785M</strong></td>
<td>1 sht. AT ABUTMENTS: replaced UTILITY with PIPE OR MAIN.</td>
</tr>
<tr>
<td><strong>BC-786M</strong></td>
<td>3 of 12 In three details, increased Closed Cell Neoprene Sponge thickness from 1/4&quot; to 1/2&quot; THICKER THAN BEARING PAD at four callouts.</td>
</tr>
<tr>
<td><strong>BC-787M</strong></td>
<td>8 of 12 In two details, increased Closed Cell Neoprene Sponge thickness from 1/4&quot; to 1/2&quot; THICKER THAN BEARING PAD at three callouts.</td>
</tr>
<tr>
<td><strong>BC-788M (continued)</strong></td>
<td>11 of 12 SECTION AT ABUTMENT &amp; PANEL ANCHOR details: increased Closed Cell Neoprene Sponge thickness from 1/4&quot; to 1/2&quot; THICKER THAN BEARING PAD.</td>
</tr>
<tr>
<td></td>
<td>12 of 13 TYPICAL FILL SECTION: revised vertical dimension from ground line to weep hole from 1'-6&quot; to 6'.</td>
</tr>
<tr>
<td><strong>BC-790M</strong></td>
<td>7 of 13 SIDEWALK BARRIER SECTION: added Railing on top of wall with callout regarding authorization.</td>
</tr>
<tr>
<td></td>
<td>10 of 13 SECTIONS M-M, N-N, P-P &amp; Q-Q: revised shape of panel's horizontal joint.</td>
</tr>
<tr>
<td><strong>BC-791M</strong></td>
<td>12 of 13 TYPICAL PANEL LAYOUT: removed Panel Dowels &amp; Tapered Holes centerlines from square panels on right side of detail.</td>
</tr>
<tr>
<td><strong>BC-792M</strong></td>
<td>12 of 13 TYPICAL PANEL LAYOUT: removed Panel Dowels &amp; Tapered Holes centerlines from square panels on right side of detail.</td>
</tr>
<tr>
<td><strong>BC-793M</strong></td>
<td>13 of 13 TYPICAL PANEL LAYOUT: removed Panel Dowels &amp; Tapered Holes centerlines from square panels on right side of detail.</td>
</tr>
</tbody>
</table>

**DESCRIPTION OF CHANGES**

- **BC-788M (continued)**
  - 5 of 12 BOX BEAMS WITHOUT BACKWALL & P/S AND STEEL I-BEAM WITHOUT BACKWALL details: increased Closed Cell Neoprene Sponge thickness from 1/4" to 1/2" THICKER THAN BEARING PAD. |
  - 8 of 12 In two details, increased Closed Cell Neoprene Sponge thickness from 1/4" to 1/2" THICKER THAN BEARING PAD at three callouts. |
  - 11 of 12 SECTION AT ABUTMENT & PANEL ANCHOR details: increased Closed Cell Neoprene Sponge thickness from 1/4" to 1/2" THICKER THAN BEARING PAD. |
- **BC-794M**
  - 1 sht. AT ABUTMENTS: replaced UTILITY with PIPE OR MAIN. |
- **BC-795M**
  - 1 of 3 Removed solid triangle note regarding tendon placement in walls and slabs of culvert. |
  - 2 of 3 TIE BOLT DETAIL - PRECAST CHANNEL BEAM: washer specification revised from ASTM 436-86 to ASTM F436. |
- **BC-799M**
  - 1 of 13 TYPICAL FILL SECTION: revised vertical dimension from ground line to weep hole from 1'-6" to 6'. |
  - 7 of 13 SIDEWALK BARRIER SECTION: added Railing on top of wall with callout regarding authorization. |
  - 10 of 13 SECTIONS M-M, N-N, P-P & Q-Q: revised shape of panel's horizontal joint. |
  - 12 of 13 TYPICAL PANEL LAYOUT: removed Panel Dowels & Tapered Holes centerlines from square panels on right side of detail. |
  - **NOTE 8:** increased PVC Rod diameter from 5/8" to 3/4". Also changed length of 5/8" diameter galvanized steel to 12".
<table>
<thead>
<tr>
<th>STD. DWG. NO.</th>
<th>TITLE</th>
<th>NO. OF SHTS.</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC-700M</td>
<td>INDEX OF STANDARDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC-701M</td>
<td>PROTECTIVE FENCE</td>
<td>3</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-703M</td>
<td>THREE-BEAM TO VERTICAL WALL BRIDGE BARRIER TRANSITION CONNECTION</td>
<td>2</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-706M</td>
<td>PA STRUCTURE MOUNTED GUIDE RAIL BARRIER</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC-707M</td>
<td>PA H T BRIDGE BARRIER</td>
<td>5</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-708M</td>
<td>THREE-BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION CONNECTION</td>
<td>2</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-709M</td>
<td>PA TYPE 10M BRIDGE BARRIER</td>
<td>12</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-711M</td>
<td>ALUMINUM PROTECTIVE BARRIER</td>
<td>4</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-712M</td>
<td>THREE-BEAM TO PA BRIDGE BARRIER TRANSITION CONNECTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BC-713M</td>
<td>PA BRIDGE BARRIER</td>
<td>13</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-716M</td>
<td>ALUMINUM PEDESTRIAN RAILING</td>
<td>2</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-718M</td>
<td>ALTERNATE RAILING DETAILS</td>
<td>1</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-719M</td>
<td>TEMPORARY CONCRETE BARRIER, STRUCTURE MOUNTED</td>
<td>8</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-720M</td>
<td>ALUMINUM OR STEEL BRIDGE HAND RAILING</td>
<td>1</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-721M</td>
<td>ELECTRICAL DETAILS</td>
<td>2</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-722M</td>
<td>LIGHTING POLE ANCHORAGE</td>
<td>2</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-723M</td>
<td>BRIDGE ANTI-ICING SYSTEM</td>
<td>10</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-725M</td>
<td>STEEL GRID REINFORCED CONCRETE BRIDGE DECK FOR BEAM BRIDGES</td>
<td>5</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-731M</td>
<td>CEMENT CONCRETE SLOPE WALL</td>
<td>1</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-732M</td>
<td>PERMANENT METAL DECK FORMS</td>
<td>3</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-734M</td>
<td>ANCHOR SYSTEM</td>
<td>3</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-735M</td>
<td>WALL CONSTRUCTION AND EXPANSION JOINT DETAILS</td>
<td>1</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-736M</td>
<td>REINFORCEMENT BAR FABRICATION DETAILS</td>
<td>3</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-739M</td>
<td>BRIDGE BARRIER TO GUIDE RAIL TRANSITION</td>
<td>2</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-741M</td>
<td>OVERHEAD SIGN STRUCTURES-CANTILEVER AND CENTER-MOUNT STRUCTURES STRUT LENGTHS UP TO 40'</td>
<td>6</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-743M</td>
<td>OVERHEAD SIGN STRUCTURES-2 POST PLANAR TRUSS SPANS FROM 30' TO 100'</td>
<td>10</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-744M</td>
<td>OVERHEAD SIGN STRUCTURES-2 POST AND 4 POST TRUSS SPANS FROM 60' TO 240'</td>
<td>12</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-745M</td>
<td>OVERHEAD SIGN STRUCTURES-4 POST 4 CHORD TRUSS SPANS FROM 100' TO 200'</td>
<td>10</td>
<td>SEPT. 30, 2016</td>
</tr>
<tr>
<td>BC-747M</td>
<td>MONOPIPE SIGN STRUCTURES</td>
<td>5</td>
<td>SEPT. 30, 2016</td>
</tr>
</tbody>
</table>

INDEX OF STANDARDS FOR BRIDGE CONSTRUCTION

THESE STANDARDS MAY BE REFERRED TO ON THE DESIGN DRAWINGS IN LIEU OF SHOWING SPECIFIC DETAILS PROVIDED OR COORDINATING INFORMATION IS SHOWN ON THE DESIGN DRAWINGS.
11. POSTS AND RAIL MATERIAL PER PUBLICATION 408, SECTION 1016.2(a)

**Normal Post Spacing**

- **Rail End**
- **Limit of Fence Measurement**
- **Top Rail**
- **Brace Rail**
- **Brace End (Typ.)**
- **Knutted Selvages**
- **Top of Barrier**
- **Bottom Rail**
- **Stretcher Bar**
- **Brace End (Typ.)**

**Adjustment Notes:**

- **Shims (If Required)**
- **Barrier Fence to Tooled Edges of Sidewalk**
- **Protective Fence to Protective Fence**
- **Protective Fence to Sidewalk**

**References:**

- **BC-701M**
- **Commonwealth of Pennsylvania Department of Transportation**
- **Sheet 1 of 3**

**Typical Fence Elevation:**

- 9'-0" Max. distance to structural expansion joint.

**Base Plate Detail:**

- **Base Plate**
- **Leveling Pad**
- **Top of Barrier**
- **Intermediate Rail 1.66" O.D. Steel Pipe**

**Notes:**

1. Provide materials and craftsmanship in accordance with Publication 408.
2. Provide shims from approved material.
3. Only touch-up painting of material is permitted.
4. Place fence posts and anchor bolts truly vertical. Place rails parallel to grade.
5. If lighting poles are not installed, close gaps with separate piece of fence fabric.
6. At design expansion joints, permit the fence fabric and rails to expand or contract.
7. Clean the tie rod fasteners and bend away from traffic.
8. Coat all surfaces of the base plates in contact with concrete with sealant after setting and alignment, in accordance with separation requirements of Publication 408, Section 704.8(b).
9. Place anchor bolts with sides of the base plate in contact with the concrete, and then place the leveling pad and then drive anchor bolts.
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).
12. Refer to contract documents for post spacing.
13. Place corner posts at angle points in horizontal and vertical alignment of fence.

**Reference Drawings:**

- **BC-734M**
- **Lighting Pole Anchorages**
- **BC-721M, BC-722M**

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

**Standard Protective Fence**
CHIEF BRIDGE ENGINEER
DIRECTOR, BUR. OF PROJECT DELIVERY

BC-701M
CURB MOUNTED DETAILS

RECOMMENDED
SHEET 3 OF 3
SEPT.30, 2016

NOTE: SHOWN FOR CLARITY

(SIDEWALK/DECK SLAB REINFORCEMENT
TYPICAL SIDEWALK
OVER RAILROADS
CURB REINFORCEMENT DETAIL
SECTION D-D

STANDARD
DRAINAGE DISCHARGE
SLOPE
CURB (TO PREVENT
12"
MAX.
1"
8"
MIN. CONTINUOUS
THIS SHEET

DEPARTMENT OF TRANSPORTATION
COMMONWEALTH OF PENNSYLVANIA

LEVELING PAD DETAIL
(BASE PLATE DETAIL
FOR TRUSS ROD
END BAY)

LEVELING PAD DETAIL
(BASE PLATE DETAIL
FOR TRUSS ROD
END BAY)

SECTION D-D
ALTERNATE SIDEWALK
BARREL MOUNTED DETAILS

BASE PLATE DETAIL
(TYPICAL CONCRETE BARREL
AND NO SIDEWALK

ELEVATION
ALTERNATE SIDEWALK
SUPPLEMENT TO SHEET 1

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

1. THRIE-BEAM TO BRIDGE BARRIER TRANSITION HAS BEEN ACCEPTED BY FHWA AS A "6"" BARRIER DESIGNATION.
2. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUB. 408.
3. USE PLAN DIMENSIONS WHEN DIFFERENT FROM THOSE SHOWN ON THIS STANDARD.
4. REINFORCED CONCRETE BARRIER AND EMBEDDED INSERTS ARE BRIDGE ITEMS.
5. SEE RC-50M AND RC-52M FOR DETAILS AND HARDWARE NOT SHOWN.
6. PROVIDE APPROACH END GUIDE RAIL TREATMENT AT STRUCTURE: SEE APPROACH END TRANSITION SECTION.
7. THE APPROACH END TRANSITION COMPONENTS ARE ROADWAY ITEMS.
TRANSITION CONNECTION PLAN

TRANSITION CONNECTION ELEVATION

BARRIER PLAN

BARRIER ELEVATION

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

DETAILS SHOWN INCLUDE CURB FOR INLET PLACEMENT. DELETE CURB IF NO INLET IS PRESENT.
### Tube Splice Details

**Notes:**

1. **Pa Structure Mounted Guide Rail Barrier** designed and manufactured in accordance with this standard drawing does not require shop drawings.
2. Provide materials and workmanship in accordance with published drawing.
3. Locate rail splice at expansion joints and at other locations where necessary. Provide rail as long as practical, with a minimum of three posts between splices, unless otherwise required for expansion.
4. Provide rail tubes continuous over not less than two expansion joints. No welded butt splices will be allowed in the rail tube sections.
5. Place post and post anchor bolts normal to grade and rail parallel to grade.
6. Coat all surfaces of the base plate in contact with concrete with calcium silicate. After placement and settlement of the concrete and the concrete has reached 100% of the compressive strength, the metal shall be galvanized in accordance with the requirements of the publication for traction barriers.
7. Do not use deflection joints with **Pa Structure Mounted Guide Rail Barrier**.
8. Structural steel for base plates and posts in accordance with **Pa Structure Mounted Guide Rail Barrier**.
9. Complete joint penetration galvanic bond, grouting, and other work as required.
10. Rail tubes to be in accordance with **Pa Structure Mounted Guide Rail Barrier**, grade 36 or 50, unless otherwise specified for the project.

**Commonwealth of Pennsylvania Department of Transportation**

**Bureau of Project Delivery**

**Standard**

**Pa Structure Mounted Guide Rail Barrier**

**Miscellaneous Details**

**Notes:**

**Tube Rail Specifications**

<table>
<thead>
<tr>
<th>RAIL MEMBER</th>
<th>SLEEVE</th>
<th>RUBRAIL MEMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATERIAL</td>
<td>THICKNESS</td>
<td>MATERIAL</td>
</tr>
<tr>
<td>AS316</td>
<td>0.188&quot;</td>
<td>AS316</td>
</tr>
<tr>
<td>AS316</td>
<td>0.188&quot;</td>
<td>AS316</td>
</tr>
<tr>
<td>AS316</td>
<td>0.25&quot;</td>
<td>AS316</td>
</tr>
<tr>
<td>AS316</td>
<td>0.313&quot;</td>
<td>AS316</td>
</tr>
</tbody>
</table>

**Tube, Sleeve and Rubrail Members**

**Elevation A-A**

**Typical Section**

**Wood Block Details**

**Base Plate Detail**

**Rail at End of Bridge**

**Notes:**

1. Provide all dimensions, see Figure C.
2. For tube thickness, see tube rail specifications table.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
SHEET 2 OF 2
BC-706M
STANDARD
CHIEF BRIDGE ENGINEER
RECOMMENDED
PA STRUCTURE MOUNTED
GUIDE RAIL BARRIER
MISCELLANEOUS DETAILS
DIRECTOR, BUR. OF PROJECT DELIVERY

SEPT. 30, 2016

SIDE VIEW
NUT
NOT DETAIL IS DRAWN PROPORTIONAL TO LARGER THAN THE BOLT DETAILS FOR EASIER.

FRONT VIEW

RUB RAIL TO POST BOLT

1/4" ROUND HEAD BOLT

1/2" ROUND HEAD BOLT

W-BEAM TO POST BOLT

1/4" ROUND HEAD BOLT

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

PA HT BRIDGE BARRIER  
MISCELLANEOUS DETAILS  

NOTE: PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 424.
1. GALVANIZE ALL BRIDGE COMPONENTS AFTER FABRICATION IN ACCORDANCE WITH SECTION 1105.02(s), PUBLICATION 424 UNLESS OTHERWISE SHOWN ON THE PLANS.
2. COAT ALL SURFACES OF THE BASE PLATE IN CONTACT WITH CONCRETE WITH CALKING COMPOSITES BEFORE BACK-FILLING.
3. AFTER DIRECTION AND ALIGNMENT, SEAL SPACING BETWEEN THE METAL SURFACES AND THE CONCRETE WITH SEALING COMPOUNDS MEETING THE REQUIREMENTS OF PUBLICATION 424, SECTION 1105.02(s), PUBLICATION 424.
5. THE MINIMUM GAP ALONG THE 45° AXIS OF THE SLEEVE MAY VARY +/- 0.1875 INCHES FROM PLAN DIMENSION.
6. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND HORIZONTAL TO GRADE.
7. THE OUT OF FLATNESS TOLERANCE FOR THE POST BASE PLATES IS 1/16" CHECKED BETWEEN EDGES OF THE PLATE IN AND DIRECTION NORMAL TO THE GRADE AND RAILS PARALLEL TO GRADE.
8. THE METAL SURFACES AND THE CONCRETE WITH CAULKING MATERIAL AND MILL THE BASE PLATE TO A FINISHING OF NO LESS THAN 3/16" TO MEET THIS TOLERANCE.
9. PROVIDE MATERIALS TO CREATE SLOTTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND HORIZONTAL FLAT SURFACES ALONG THE HOLE.
10. IF FLAME CUTTING OR PLASMA CUTTING IS USED TO CREATE SLIGHTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND HORIZONTAL FLAT SURFACES ALONG THE HOLE.

SECTION B-B  
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 424.
2. GALVANIZE ALL RAILING COMPONENTS (AFTER FABRICATION) IN ACCORDANCE WITH SECTION 1105.02(s), PUBLICATION 424 UNLESS OTHERWISE SHOWN ON THE PLANS.
3. COAT ALL SURFACES OF THE BASE PLATE IN CONTACT WITH CONCRETE WITH CALKING COMPOSITES BEFORE BACK-FILLING.
4. AFTER DIRECTION AND ALIGNMENT, SEAL SPACING BETWEEN THE METAL SURFACES AND THE CONCRETE WITH SEALING COMPOUNDS MEETING THE REQUIREMENTS OF PUBLICATION 424, SECTION 1105.02(s), PUBLICATION 424.
5. THE MAJOR AND MINOR DIAMETERS OF THE RAIL MEMBER SHALL BE AT LEAST 1.5 TIMES THE MINOR DIAMETERS OF THE BAR AND THE MINOR DIAMETERS OF THE SLEEVE AND THE INSIDE DIAMETERS OF THE RAIL SHALL NOT BE LESS THAN 0.5 TIMES THE MINOR DIAMETERS OF THE BAR.
6. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND HORIZONTAL TO GRADE.
7. THE OUT OF FLATNESS TOLERANCE FOR THE POST BASE PLATES IS 1/16" CHECKED BETWEEN EDGES OF THE PLATE IN AND DIRECTION NORMAL TO THE GRADE AND RAILS PARALLEL TO GRADE.
8. THE METAL SURFACES AND THE CONCRETE WITH CAULKING MATERIAL AND MILL THE BASE PLATE TO A FINISHING OF NO LESS THAN 3/16" TO MEET THIS TOLERANCE.
9. PROVIDE MATERIALS TO CREATE SLOTTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND HORIZONTAL FLAT SURFACES ALONG THE HOLE.

SECTION A-A  
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 424.
2. GALVANIZE ALL RAILING COMPONENTS (AFTER FABRICATION) IN ACCORDANCE WITH SECTION 1105.02(s), PUBLICATION 424 UNLESS OTHERWISE SHOWN ON THE PLANS.
3. COAT ALL SURFACES OF THE BASE PLATE IN CONTACT WITH CONCRETE WITH CALKING COMPOSITES BEFORE BACK-FILLING.
4. AFTER DIRECTION AND ALIGNMENT, SEAL SPACING BETWEEN THE METAL SURFACES AND THE CONCRETE WITH SEALING COMPOUNDS MEETING THE REQUIREMENTS OF PUBLICATION 424, SECTION 1105.02(s), PUBLICATION 424.
5. THE MAJOR AND MINOR DIAMETERS OF THE RAIL MEMBER SHALL BE AT LEAST 1.5 TIMES THE MINOR DIAMETERS OF THE BAR AND THE MINOR DIAMETERS OF THE SLEEVE AND THE INSIDE DIAMETERS OF THE RAIL SHALL NOT BE LESS THAN 0.5 TIMES THE MINOR DIAMETERS OF THE BAR.
6. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND HORIZONTAL TO GRADE.
7. THE OUT OF FLATNESS TOLERANCE FOR THE POST BASE PLATES IS 1/16" CHECKED BETWEEN EDGES OF THE PLATE IN AND DIRECTION NORMAL TO THE GRADE AND RAILS PARALLEL TO GRADE.
8. THE METAL SURFACES AND THE CONCRETE WITH CAULKING MATERIAL AND MILL THE BASE PLATE TO A FINISHING OF NO LESS THAN 3/16" TO MEET THIS TOLERANCE.
9. PROVIDE MATERIALS TO CREATE SLOTTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND HORIZONTAL FLAT SURFACES ALONG THE HOLE.

SIDEWALK RAIL ROJ SPlice  
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 424.
2. GALVANIZE ALL RAILING COMPONENTS (AFTER FABRICATION) IN ACCORDANCE WITH SECTION 1105.02(s), PUBLICATION 424 UNLESS OTHERWISE SHOWN ON THE PLANS.
3. COAT ALL SURFACES OF THE BASE PLATE IN CONTACT WITH CONCRETE WITH CALKING COMPOSITES BEFORE BACK-FILLING.
4. AFTER DIRECTION AND ALIGNMENT, SEAL SPACING BETWEEN THE METAL SURFACES AND THE CONCRETE WITH SEALING COMPOUNDS MEETING THE REQUIREMENTS OF PUBLICATION 424, SECTION 1105.02(s), PUBLICATION 424.
5. THE MAJOR AND MINOR DIAMETERS OF THE RAIL MEMBER SHALL BE AT LEAST 1.5 TIMES THE MINOR DIAMETERS OF THE BAR AND THE MINOR DIAMETERS OF THE SLEEVE AND THE INSIDE DIAMETERS OF THE RAIL SHALL NOT BE LESS THAN 0.5 TIMES THE MINOR DIAMETERS OF THE BAR.
6. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND HORIZONTAL TO GRADE.
7. THE OUT OF FLATNESS TOLERANCE FOR THE POST BASE PLATES IS 1/16" CHECKED BETWEEN EDGES OF THE PLATE IN AND DIRECTION NORMAL TO THE GRADE AND RAILS PARALLEL TO GRADE.
8. THE METAL SURFACES AND THE CONCRETE WITH CAULKING MATERIAL AND MILL THE BASE PLATE TO A FINISHING OF NO LESS THAN 3/16" TO MEET THIS TOLERANCE.
9. PROVIDE MATERIALS TO CREATE SLOTTED HOLES, GRIND SMOOTH TO PROVIDE VERTICAL AND HORIZONTAL FLAT SURFACES ALONG THE HOLE.
**Commonwealth of Pennsylvania**

**Department of Transportation**

**Miscellaneous Details**

**PA HT Bridge Barrier**

**Standard**

**PA HT Bridge Barrier End Details**

**Notes:**

1. The concrete portion of PA HT Bridge Barriers is the same as the Alternate Barrier. For reinforcement details in the transition, see the structure plans.
2. For general transition details, see BC-739M.
3. For additional notes, see sheet 1.
4. Complete joint penetration groove welds, ground flush on outside face. Show specific weld symbols on shop drawings.

**Table 1**

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot; x 3.50</td>
<td>ASTM A36</td>
<td>0.350&quot;</td>
</tr>
<tr>
<td>3/8&quot; x 3.50</td>
<td>ASTM A709, Grade 36</td>
<td>0.350&quot;</td>
</tr>
<tr>
<td>3/8&quot; x 3.50</td>
<td>ASTM A709, Grade 50</td>
<td>0.350&quot;</td>
</tr>
<tr>
<td>3/8&quot; x 3.50</td>
<td>ASTM A500, Grade B</td>
<td>0.350&quot;</td>
</tr>
<tr>
<td>3/8&quot; x 3.50</td>
<td>ASTM A500, Grade C</td>
<td>0.350&quot;</td>
</tr>
<tr>
<td>3/8&quot; x 3.50</td>
<td>STAINLESS STEEL, 304</td>
<td>0.200&quot;</td>
</tr>
</tbody>
</table>

**Section C-C**

The dimensions between the outer diameters of the sleeves and the inner diameters of the main rail are not to exceed ± 0.062 in (± 1.6 mm). The difference between the inside diameters of the sleeve splice and the inside diameters of the main rail is not to exceed ± 0.125 inches (± 3.2 mm) along the major and minor axes. Gaps exceeding this amount up to ± 0.062 in (± 1.6 mm) along the major axes and 0.125 inches (± 3.2 mm) along the minor axes are permissible. When the outside face of the sleeve splice rail is level or nearly level, place drain hole in the higher side of the sleeve splice rail.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

MISCELLANEOUS DETAILS

PA HT BRIDGE BARRIER

STANDARD

PA HT BRIDGE BARRIER END DETAILS

SHEET 3 OF 5

NOTES:

1. THE CONCRETE PORTION OF PA HT BRIDGE BARRIER IS THE SAME AS THE ALTERNATE BARRIER. FOR DETAIL ENDS 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 RC-52M AND RC-50M FOR DETAILS AND HARDWARE NOT SHOWN.

5. THREE-BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION WITHOUT INLET PLACEMENT HAS SUCCESSFULLY PASSED TL-4 SINGLE UNIT TRUCK O C C E S S TESTING. THREE-BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION WITH INLET PLACEMENT HAS BEEN GRANTED TL-4 EQUIVALENCE BY FHWA.

6. PROVIDE APPROACH END GUIDE RAIL TREATMENT AT BOTH THE APPROACH AND TRAILING ENDS OF STRUCTURAL BARRIERS ON THE LANES FACILITIES WITH HIGHWAY TRAFFIC. ON FOUR LANE DIVIDED HIGHWAYS, GUIDE RAIL TRANSITION IS NOT REQUIRED TO TRAILING END OF BARRIERS UNLESS WARRANTED BY OTHER OBSTRUCTIONS.

7. THE APPROACH END TRANSITION COMPONENTS ARE ROADWAY ITEMS.

**REFERENCE DRAWINGS**

- BC-708M  PA TYPE 10M BRIDGE BARRIER
- RC-50M   GUIDE RAIL TO BRIDGE BARRIER TRANSITIONS
- RC-52M   TYPE 2 STRONG POST GUIDE RAIL
- RC-45M   INLET TOPS, GRATES AND FRAME
- RC-52M   TYPE 2 STRONG POST GUIDE RAIL

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**STANDARD**

**THREE-BEAM TO PA TYPE 10M BRIDGE BARRIER TRANSITION CONNECTION**

**RECOMMENDED DATE:**

- Sept. 30, 2016
- Oct. 30, 2016
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

TRANSITION CONNECTION
THREE-BEAM TO PA TYPE 10M
THREE-BEAM TERMINAL SECTION BRIDGE CONNECTION
( FOR DETAILS, SEE RC-50M)
THREE-BEAM TERMINAL SECTION BRIDGE CONNECTION (10 GA. ELEMENT)
( FOR DETAILS, SEE RC-50M)
WITH INLET SIMILAR
(WITHOUT INLET SHOWN; BACK OF ANGLE CONCRETE CURB)
SEE BC-709M (FOR DETAILS, RAIL TUBE CAP, 6" x 5\frac{1}{2}" x 1\frac{1}{2}"
RAILING POST 6" x 1\frac{1}{2}
6" ANCHOR STUD (SEE RC-709M)
1\frac{1}{2}" Holes in RAILING TUBE
1\frac{1}{2}" Holes in RAILING TUBE
1\frac{1}{2}" Connection Plate
( FOR DETAILS, SEE RC-709M)

DETAIL A
(WITHOUT SHEET SHOWN WITH INLET SIMILAR)

SECTION A-A

SECTION B-B

CONCRETE CURB

L 6" x 3\frac{1}{2}" x 3\frac{1}{2}"
END CONNECTION

RAILING TUBE

TS 5" x 5" x 6"
(ROADWAY ITEM)

( FOR DETAILS, SEE RC-50M)

SEPT. 30, 2016
**ELEVATION-POST**

**SECTION B-B**

**RAISED SIDEWALK RAIL**

- **rail tube** (typ.)
- **pillars**
- **washed (typ.)
- **clipped washers, and lock tube)**
- **with hex nuts, hardened anchor bolts**
- **grade 105, anchor bolts 2-1/2" x 1'-3" ASTM F1554**
- **with ASTM A563 nuts, grade 105, anchor bolts 2-1/2" x 1'-3" ASTM F1554**
- **hex nuts, hardened anchor bolts (at raised sidewalk)**
- **(at sidewalk)**
- **levels**
- **drain hole**
- **horizontal slots.**
- **toggles (at sidewalk)**
- **bolts with hex nuts, hardened anchor bolts (at raised sidewalk)**
- **delineator at each post (typ.)/side detail, sheet 1)**

**RAILING JOINTS ELEVATION**

- **bolts with hex nuts, hardened anchor bolts (at raised sidewalk)**
- **delineator at each post (typ.)/side detail, sheet 1)**
- **drain hole**
- **horizontal slots.**
- **toggles (at sidewalk)**

**RAIL TUBE (typ.) TS 5 x 3 x ...**

**WASHERS AND HEX BOLTS**

- **rear face**
- **side detail a**
- **side detail b**
- **side detail c**
- **side detail d**
- **side detail e**
- **side detail f**
- **side detail g**
- **side detail h**
- **side detail i**
- **side detail j**
- **side detail k**
- **side detail l**
- **side detail m**
- **side detail n**
- **side detail o**
- **side detail p**
- **side detail q**
- **side detail r**
- **side detail s**
- **side detail t**
- **side detail u**
- **side detail v**
- **side detail w**
- **side detail x**
- **side detail y**
- **side detail z**

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**PA TYPE 10M BRIDGE BARRIER**

**MISCELLANEOUS DETAILS**

**SEPT. 30, 2016**
1. FOR \( \theta \) SEE BC-762M
2. FORM CONCRETE RECESS AREA IN CURB AND GRIND TO PROVIDE SMOOTH SURFACE. ALLOW ENOUGH SPACE IN CURB TO ALLOWS CONCRETE TO MOVEMENT \( \pm 5'\).\( \pm 6\) ALLOW ENOUGH SPACE IN CURB TO MOVE ALL HOLES WITHOUT OBSTACLES.

3. MINIMUM 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT RD. OR 1'-0" TO 1'-10" DEPTH OF CONCRETE AND STEEL

4. MINIMUM DISTANCE FROM EDGE OF EXTENSION TO FIRST STOP IS 3'.
CHIEF BRIDGE ENGINEER
RECOMMENDED
BUREAU OF PROJECT DELIVERY

PLAN - SKEW ANGLE ≥ 75°

PLAN AT SIDEWALK - SKEW ANGLE ≥ 75°

PLAN AT SIDEWALK - SKEW ANGLE < 75°

SECTION H-H

SECTION K-K

SECTION J-J

PA TYPE 10M BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM

NOTES:
1. FOR SECTION L-L SEE SHEET 7.
2. FORM CONCRETE RECESS AREA IN CURB AND GRIND TO PROVIDE SMOOTH SURFACE. APPLY ONE COAT OF ASPHALT CEMENT PAINT WA-1 OR PERFORMANCE GRADED ASPHALT.
3. MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL TO THE EDGE OF CONCRETE AT TEMP. OF 40°F FOR STEEL AND 10°F FOR P/S CONCRETE.
4. MAXIMUM DISTANCE FROM EDGE OF EXTENSION OR BEND TO FIRST STUD IS 3".

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

PA TYPE 10M BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM
TRAILING POST AND RAIL RAILS NOT SHOWN
1. For location of Section L-L, see sheet 6.
2. Pour cementitious grout in area to provide smooth surface. Allow joint to cure 10 to 15 days to allow bent sliding plate to move freely without friction.
3. Maintain 4" min. between edge of steel to the edge of concrete at temp. 0°F to 10°F for steel and 10°F to 40°F for concrete.
4. Maximum distance from edge of extension or bend to first stud is 3".

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

RECOMMENDED 9/1/2015
RECOMMENDED 9/1/2015
SHEET 7 OF 12
BC-709M

PA TYPE 10M BRIDGE BARRIER AT NEOPRENE STRIP SEAL DAM
(REALISING POST AND RAIL RAILS NOT SHOWN)
ALUMINUM PROTECTIVE BARRIER AT PA TYPE 10M BRIDGE BARRIER

SECTION P-P
(TYPICAL)

SECTION P-P
(WITH ALTERNATE SIDEWALK)

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

SECTION R-R

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

SEPT. 30, 2016
1. PROVIDE ELASTOMERIC PADS OR WASHERS 1/2" MIN. Thickness conforming to PUB. 408, SECTION 1107.02(p), between contact surfaces of aluminum components coming in contact with galvanized steel. Provide fabric bushings with material conforming to PUB. 408, SECTION 1107.02(p),TAB II, wherever aluminum components come in contact with galvanized steel bolts come in contact with aluminum.

2. PROVIDE ALL COMPONENTS AND DETAILS OF ALUMINUM PROTECTIVE BARRIER AS SHOWN ON BC-709M, EXCEPT AS MODIFIED HERE.

3. EXPANSION DETAILS, SLOTTED OPENINGS, AND CLEARANCES SHOWN ARE FOR MOVEMENT UP TO 2" EXPANSION OR 2" CONTRACTION. ADJUST ALL EXPANSION JOINT DETAILS SHOWN AND PROVIDE SPECIAL DETAILS AS REQUIRED FOR LARGER MOVEMENTS.
CHIEF BRIDGE ENGINEER

RECOMMENDED

SEE BC-799M, SHEET 1.

1. FOR GENERAL NOTES ON CONSTRUCTION OF PREFABRICATED WALLS, BUREAU OF PROJECT DELIVERY

ANCHOR BOLTS (TYP.)

CHAMFER

\( \frac{3}{8} " \times \frac{3}{8} " \)

OR \( \frac{3}{8} " \times \frac{3}{8} " \)

#4

2" CLR. (TYP.)

CURB CONCRETE

1'-1"

2" 3'-3"

1'-1"

MAX.

\( \frac{7}{6} " \)

\( \frac{7}{6} " \)

CHAMFER 9" MIN. OR (CONTINUOUS)

1" C.C.N.S. 5" MIN.

#4

2" CLR.

#5 @ 12"

#4

0"

3" CLR.

12"

PLACEMENT OF C.I.P. CONCRETE.

P.C.P. IN PLACE DURING PANEL AS REQUIRED TO KEEP CONCRETE IS CURED). GLUE TO P.C.P. (REMOVE AFTER C.I.P.

#5 @ 12" MAX.

#6 @ 12"

2" ALT.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

MISCELLANEOUS DETAILS

PRECAST PANEL
FRONT FACE OF PANEL THICKNESS
TOP AND BOTTOM PANEL THICKNESS
(RAISED FINISH)
TOP AND BOTTOM PANEL THICKNESS
(RAISED FINISH)
CONTINUOUS
1" C.C.N.S.
MAX.
3'-0"
3" CLR.
2'-3" MIN.
3" CLR.
12"
1'-6" MAX.
8" MIN., 1'-2" MAX. AT FLUSH JOINTS.

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

MOMENT SLAB LENGTH \( L \) (VARIES) 30'-0" MIN., 40'-0" MAX.

MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT. MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT.

MOMENT SLAB WIDTH

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

PLAN - BARRIER MOMENT SLAB

PRECAST PANEL
FRONT FACE OF PANEL THICKNESS
TOP AND BOTTOM PANEL THICKNESS
(RAISED FINISH)
TOP AND BOTTOM PANEL THICKNESS
(RAISED FINISH)
CONTINUOUS
1" C.C.N.S.
MAX.
3'-0"
3" CLR.
2'-3" MIN.
3" CLR.
12"
1'-6" MAX.
8" MIN., 1'-2" MAX. AT FLUSH JOINTS.

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

MOMENT SLAB LENGTH \( L \) (VARIES) 30'-0" MIN., 40'-0" MAX.

MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT. MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT.

MOMENT SLAB WIDTH

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

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

MOMENT SLAB LENGTH \( L \) (VARIES) 30'-0" MIN., 40'-0" MAX.

MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT. MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT.

MOMENT SLAB WIDTH

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

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

MOMENT SLAB LENGTH \( L \) (VARIES) 30'-0" MIN., 40'-0" MAX.

MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT. MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT.

MOMENT SLAB WIDTH

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

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

MOMENT SLAB LENGTH \( L \) (VARIES) 30'-0" MIN., 40'-0" MAX.

MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT. MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT.

MOMENT SLAB WIDTH

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

PRECAST BARRIER WITH CEMENT CONCRETE SHOULDER

TRAFFIC BARRIER AND MOMENT SLAB NOTES:
1. PLACE EXPANSION JOINTS IN CONCRETE CURB TO MATCH PAVEMENT JOINT AND TO IDENTIFY CONCRETE JOINTS BY EXPANSION JOINT BETWEEN JUNCTION BOX. PLACE SUPPORT FOR LIGHT POLE OR K-RAMP BETWEEN CENTERLINES OF JUNCTION BOX.
2. PROVIDE A MINIMUM PRECAST BARRIER WIDTH OF 10'-0".
3. PROVIDE SPECIAL DESIGN AND DETAILING OF THE MOMENT SLAB AND BARRIER FOR INLET INSTALLATIONS.
4. USE SILICONE JOINT SEALING MATERIAL AS PER PUB. 408 SECTION 705.4(a).
5. PROVIDE REINFORCEMENT AS PER DETAIL A, SHEET 3, BC-799M.

NOTE:
1. FOR NOTES, SEE SHEET 10.

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA TYPE 10M BRIDGE BARRIER
MISCELLANEOUS DETAILS

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

BUREAU OF PROJECT DELIVERY
ADHESIVE PANEL WITH WATERPROOF GLUE TO P.C.P. (TO REMAIN BITUMINOUS SHOULDER)

NOTE:
1. FOR SPACING SEE CONCRETE CURB ELEVATION, SHEET 10.
2. TIE BOLTS SEE NOTE A.

NOTE A:
1. FOR NOTES, SEE SHEET 10.

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

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

PA TYPE 10M PRECAST BARRIER ON M.S.E. WALLS
JUNCTION BOX NOTES:
1. Junction box may be located either to the left or to the right of the lighting pole.
2. Junction boxes are only required, if specified on the contract drawings.
3. For sidewalks, place junction box on sidewalk side.
4. For raised sidewalks, place junction box on top, adjacent to rear face.
5. For additional notes, see sheet 1.

OPEN JOINT NOTES:
1. For location of construction joints and open joints, refer to Section 705.1 of PUB. 408.
2. Provide joint filler material 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 705.6 of PUB. 408.
5. Provide 2" clear on all reinforcement unless noted.
6. For additional notes, see sheet 1.

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.)

END VIEW

ALTERNATE RAIL SPLICE SLEEVE
NOTES:
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PLACE POSTS AND ANCHOR BOLTS TRULY VERTICAL, PLATE NAILS PARALLEL TO GRADE.
3. ALL MINIMUM SIZE OF FILLET WELDS R=1'-6".
4. FOR SPACING OF POSTS, LOCATION OF EXPANSION JOINTS AND OPEN JOINTS IN CONCRETE BARRIER, REFER TO DESIGN DRAWINGS.
5. DO NOT PAINT ANY MATERIALS.
6. Omit welds if tread plate is made continuous.
7. PLACE LEVELING PADS INTEGRALLY WITH CONCRETE BARRIER. TROW ALL SIDES OF PADS.
8. FOR SECTIONS C-C AND D-D, SEE SHEET 2.
9. DESIGNATE ALL FABRICATION IN ACCORDANCE WITH ALUMINUM INDUSTRY STANDARD.

SECTION A-A
- Cut Flanges ON 1/2" MILES IN CONN. PLATES 3/4" X 1/2"付け目関係。SUBSTITUTE 3" x 1/2" FILLET WELDS FOR EACH 1/2" - 1/2".
- PLACE RAILS PARALLEL TO GRADE.

SECTION B-B
- Concrete Barrier
- PLACE LEVELING PADS INTEGRALLY WITH CONCRETE BARRIER.

SECTION C-C
- Concrete Barrier
- PLACE LEVELING PADS INTEGRALLY WITH CONCRETE BARRIER.

SECTION D-D
- Concrete Barrier
- PLACE LEVELING PADS INTEGRALLY WITH CONCRETE BARRIER.

SECTION E-E
- Aluminum Protective Barrier - Inside Elevation

SECTION F-F
- Aluminum Protective Barrier - Inside Elevation

SECTION G-G
- Aluminum Protective Barrier - Inside Elevation

SECTION H-H
- Aluminum Protective Barrier - Inside Elevation

REFERENCE DRAWINGS
- BC-739M LIGHTING POLE ANCHORAGE
- BC-734M ALUMINUM OR STEEL BRIDGE HAND RAILING
- BC-722M BRIDGE BARRIER TO GUIDE RAIL TRANSITION
- BC-720M BEGIN BRIDGE BARRIER
- BC-719M BRIDGE BARRIER TO GUIDE RAIL TRANSITION
1. Fabricate sign from aluminum and conform to Section 1103 of Publication 408.
2. Mount sign with aluminum bolts, nuts, and washers which conform to Section 1103 of Publication 408.
3. Mount signs as shown on Sheet 4, and do not space more than 50' apart.
5. Refer to Sheet 1 for other notes.
6. Protective barrier connection detail shown for typical concrete barrier section, alternate sidewalk section, and convention deck.
7. See Sheet 1 for location of Section C-C and Section D-D.
DETAIL OF EXPANSION JOINT AT PIERS

NOTES:
- 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.

- 5/8" bolts with hex jam nut, hex nut and plate washer. 3/8" x 5" slotted holes in concrete and 3/8" hole in channel.

- 3" x 6" channel in concrete.

- Distance based on joint opening.

- Top of barrier at expansion joint.
PARTIAL INSIDE ELEVATION

GROUND CONNECTIONS

SECTION L-L

NOTE:

FOR DETAILS OF GROUND CONNECTIONS FOR PROTECTIVE FENCE.

SECTION N-N

USE THESE CLEARANCE DIMENSIONS FOR PROTECTIVE BARRIER.

SECTION M-M

GROUND CONNECTION

TOP OF BARRIER

NOTE:

FOR DETAILS OF GROUND CONNECTIONS ON OPPOSITE SIDE.

NOTE:

FOR GROUND CONNECTION TO BE MADE BY RAILROAD CO.

4 POST NEAREST TO ½" OPEN JOINT IN BARRIER

1½" x 2½" SLOT HOLES IN LS x 3 x ⅝" FOR 1" BOLTS

⅝" OPEN JOINT IN BARRIER

8 POST NEAREST TO ½" OPEN JOINT IN BARRIER

⅝" x ½" SLOT HOLES IN LS x 3 x ⅝" FOR 1¼" BOLTS

⅝" TREAD E ⅝"

1½" x 1½" SLOT HOLES IN CONN. E 6½" x 1½" HOLES IN CHANNEL-TYED RAILING TO REMOVE SLIDING FIT.

⅝" TREAD E ⅝"

⅝" x ⅝" FOR (2) ½" BOLTS

1½" x ⅝" HOLES IN CS x ⅝" FOR GROUND CONNECTION TO BE MADE BY RAILROAD CO.

ACCIDENT PREVENTION SIGN DETAILED ON SHEET 2.

DETAIL G

GROUNDING PLATE

WELD ALL AROUND TO PROTECTIVE BARRIER SEE, PARTIAL INSIDE ELEVATION, ON THIS SHEET.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD ALUMINUM PROTECTIVE BARRIER

BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY

CHIEF BRIDGE ENGINEER
RECOMMENDED

DATE: SEPT. 30, 2016

BC-711M
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

STANDARD BRIDGE BARRIER TRANSITION CONNECTION

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

PLAN VIEW FOR THRIE-BEAM TO PA BRIDGE BARRIER
(WITH INLET ELEMENT SHOWN; WITHOUT INLET ELEMENT SIMILAR)

ELEVATION VIEW FOR THRIE-BEAM TO PA BRIDGE BARRIER
(WITH INLET ELEMENT SHOWN; WITHOUT INLET ELEMENT SIMILAR)
NOTES:

1. FOR LOCATION OF SECTION D-D, SEE SHEET 1.
2. FOR ADDITIONAL DETAILS, SEE BC-700M.
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 BASE PLATES AND ANCHOR BOLTS IN ACCORDANCE WITH ASTM A 572.
4. PROVIDE WELDING PROCESS IN ACCORDANCE WITH ASTM A 500.
5. ALL RAILING TUBES SHALL BE MILL-FINISHED TO REMOVE SHARP EDGES AND HAZARDS.
6. THE RAILING TUBES ARE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE.
7. MILLING TO BEAR IS DEFINED AS FOLLOWS:
   A. SHORT SPACING WELDING PROCEDURE NOT COVERED IN D1.5-2002.
   B. TWIST: SPECIFIED DIMENSION OF THE LONGEST SIDE IN INCHES FROM OVER
      TUBE PARALLEL TO THE SURFACE PLATE AND NOTING THE HEIGHT
      DIFFERENCE BETWEEN THE TWO CORNERS AT THE OPPOSITE END OF THE
      TUBE.
   C. END OF TUBE:
      1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE RAILING TUBES IN ACCORDANCE WITH ASTM A 500 GRADE B.
3. PROVIDE BASE PLATES AND ANCHOR BOLTS IN ACCORDANCE WITH ASTM A 572.
4. PROVIDE WELDING PROCESS IN ACCORDANCE WITH ASTM A 500.
5. ALL RAILING TUBES SHALL BE MILL-FINISHED TO REMOVE SHARP EDGES AND HAZARDS.
6. THE RAILING TUBES ARE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE.
7. MILLING TO BEAR IS DEFINED AS FOLLOWS:
   A. SHORT SPACING WELDING PROCEDURE NOT COVERED IN D1.5-2002.
   B. TWIST: SPECIFIED DIMENSION OF THE LONGEST SIDE IN INCHES FROM OVER
      TUBE PARALLEL TO THE SURFACE PLATE AND NOTING THE HEIGHT
      DIFFERENCE BETWEEN THE TWO CORNERS AT THE OPPOSITE END OF THE
      TUBE.
   C. END OF TUBE:
      1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.

TYPICAL PA BRIDGE BARRIER ELEVATION
[Diagram of typical PA bridge barrier elevation]

TYPICAL SECTION
[Diagram of typical section]

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PA BRIDGE BARRIER
MISCELLANEOUS DETAILS

REFERENCE DRAWINGS
BC-713M
NOTES:
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE ONE U-WASHER PER STUD AS REQUIRED.

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE ONE U-WASHER PER STUD AS REQUIRED.

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE ONE U-WASHER PER STUD AS REQUIRED.
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. JOIN CONCRETE RECESS AREA IN BARRIER WALL AND LEVEL TO PROVIDE SMOOTH SURFACE.
3. MAINTAIN 4" MIN. BETWEEN EDGE OF STEEL AND EDGE OF CONCRETE.
4. MAXIMUM DISTANCE FROM SIDE OF EXTENSION OR BEND TO FIRST STUD IS 3".

APPROVAL STAGE.
DISTRICT BRIDGE ENGINEER AT THE SHOP DRAWINGS AVAILABLE, REQUEST SPECIFIC LENGTH APPROVAL FROM THE

* IF 10" STUDS CANNOT BE ACCOMMODATED IN THE SPACE PROVIDED, REQUEST TO LEVEL DIFFERENCE FROM THE

APPROVAL STAGE.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

STANDARD
PA BRIDGE BARRIER
ALUMINUM PROTECTIVE BARRIER DETAILS

SECTION A-A (TYPICAL)
(WITH ALTERNATE SIDEWALK)

SECTION A-A (TYPICAL)
WITH DETAILS NOT SHOWN, SEE SECTION A-A (TYPICAL).

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

SECTION B-B: PLAN

SECTION C-C

ALUMINUM PROTECTIVE BARRIER AT PA BRIDGE BARRIER

BC-713M
PA BRIDGE BARRIER AT OPEN JOINT

TRAILING POST AND TUBE NOT SHOWN

NOTES:
1. FOR LOCATION OF CONSTRUCTION JOINTS AND OPEN JOINTS, REFER TO SECTION 705.8 (b) OF PUB. 408.
2. PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH SECTION 705.9 OF PUB. 408.
3. PROVIDE JOINT BACKING MATERIAL IN ACCORDANCE WITH SECTION 505.4 OF PUB. 408.
4. PROVIDE 2" CLEAN ON ALL REINFORCEMENT UNLESS NOTED.
5. FOR ADDITIONAL NOTES, SEE SHEET 1.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

STANDARD
PA BRIDGE BARRIER
MISCELLANEOUS DETAILS

SHEET 13 OF 13
TYPICAL SIDEWALK SECTION

SIDEWALK AREA
SIDEWALK MAY BE AT CURB HEIGHT.

SEE SECTION A-A & DETAIL A

VEHICULAR AREA

NOTES:

Burr thread of bolt or tack
Weld the nut to bolt after tightening the nut (Typ.)

Post

Typical Sidewalk Section

Leveling Pad

Details:

Leveling Pad

Detail A

Alternate Detail A

Alternate Plate Detail

Plate Detail

Section A-A

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD ALUMINUM PEDESTRIAN RAILING

REFERENCE DRAWINGS

SEPT. 30, 2016

BC-716M

ANCHOR SYSTEM

PUBLICATION 408.
TYPICAL EXPANSION PANEL DETAIL

TYPICAL DETAIL AT POST

THE OPENING IN DECK FOR SPLICES ACROSS EXPANSION JOINTS IN SUPERSTRUCTURE

NOTE:
SEE SHEET 1 FOR OTHER NOTES.
**GENERAL NOTES:**

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

2. MATERIAL STRENGTH: REINFORCEMENT STEEL fy = 60 KSI CONCRETE FOR RETAINING WALLS f'c = 3,500 KSI (CLASS AA CONCRETE)

3. PROVIDE STRUCTURAL STEEL CONFORMING TO ASTM A 992 GRADE 50, ASTM 4 F 1954 GRADE 105 OR ASTM A 153 GRADE B 1-P (60 KSI) STEEL.


6. PROVIDE HEAVY HEX NUTS IN ACCORDANCE WITH PUBLICATION 408 SECTION 1106.02. PROVIDE 1.25" DIA. ASTM A 193 GRADE B7 (105 KSI YIELD) ANCHOR BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153. WASHERS ARE TO BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.

7. PROVIDE 1.25" DIAMETER HOLE IN THE MIDDLE. ALL OTHER HOLES ARE 3" DIAMETER. PROVIDE 2" DIAMETER HOLE IN THE MIDDLE. ALL OTHER HOLES ARE TO BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.

8. THREE TYPES OF INSTALLATION ARE ALLOWED.

   TYPE A: USE FOR SINGLE LANE(S) OF TRAFFIC PRESLIZED AND SPEED DOES NOT EXCEED 60 MPH.

   TYPE B: USE FOR THE STANDARD NUMBER OF LANES OF TRAFFIC IN THE SAME DIRECTION OR IN OPPOSITE DIRECTIONS, WITHOUT ENDS OF THE OUTSIDE LANE AND THE SPEED DOES NOT EXCEED 80 MPH.

   TYPE C: USE FOR CONDITIONS OF SPEED AND TRAFFIC LINES AND ENDMEN STS (NOT COVERED BY TYPE A AND B ABOVE).

9. SPACING OF BOLT THROUGH ANCHORS FOR BARRIERS AND FOR THE FACADES OF MEDIAN BARRIERS ADJACENT TO TRAFFIC.

   TYPE A INSTALLATION: SPACING = 2'-0"

   TYPE B INSTALLATION: SPACING = 2'-0"

10. INDICATE INSTALLATION TYPE ON THE CONTRACT DRAWINGS.

11. ANCHORS MUST BE INSTALLED IN THE END HOLES OF EACH BARRIER OR MEDIAN BARRIER SEGMENT. KEEP BOLT SPACING ALONG THE FULL LENGTH OF THE BRIDGE TO THE EVENT MOUNTING.

12. WHEN USING ADHESIVE ANCHORS FOR THE PSUEDO INSTALLATIONS, ADHESIVE ANCHORS WILL BE USED. INSTALL ANCHORS TO SATISFY THE SPACING AND STRENGTH REQUIREMENTS OF TABLE 1. SPACING OF ADHESIVE ANCHORS VARIES FROM 2'-0" TO 1'-0" AS SHOWN IN THE TABLE.

13. ADHESIVE ANCHORS MAY BE USED FOR ALL INSTALLATIONS EXCEPT WHERE THE DECK IS COMPLETELY COVERED OR THE DECK COATING IS THICKER THAN 3000 PSI, IS IN POOR CONDITION OR UNDERGROUND WATER FLOW IS PRESENT. ADHESIVE ANCHORS MAY BE USED FOR INSTALLATIONS WHERE THE DECK IS COVERED OR UNDERGROUND WATER FLOW IS PRESENT. ADHESIVE ANCHORS MAY BE USED FOR INSTALLATIONS WHERE THE DECK IS COVERED OR UNDERGROUND WATER FLOW IS PRESENT.

14. ADHESIVE ANCHORS FOR TEMPORARY BARRIERS ARE PERMITTED ON BRIDGE CONSTRUCTION PROJECTS THAT EXTEND UNINTERRUPTED FOR A MAXIMUM OF THREE YEARS.

15. IDENTIFY THE PLAN LOCATION OF THE BARRIERS ON THE BRIDGE. POSITION BARRIERS TO LOGICALLY ACCOMMODATE THE END OF THE STRUCTURE, EXPANSION JAWS AND OTHER INSTALLATIONS.

16. TRAFFIC TRANSITIONS AND LANE MERGING MUST BE OFF THE BRIDGE.

17. BOLT THROUGH ANCHORS ARE NOT PERMITTED IN RECENTLY POURED CONCRETE WITHOUT APPROVAL OF DISTRICT BRIDGE ENGINEER.

### TABLE 1

<table>
<thead>
<tr>
<th>Bolt Spacing</th>
<th>BOLT TYPE</th>
<th>SHEAR</th>
<th>TENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2'-0&quot;</td>
<td>TYPE A</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>2'-0&quot;</td>
<td>TYPE B</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>2'-0&quot;</td>
<td>TYPE C</td>
<td>9</td>
<td>28</td>
</tr>
</tbody>
</table>

### TABLE 1 NOTES:

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

5.  PROVIDE 1" DIAMETER ASTM A 193 GRADE B7 (105 KSI YIELD) ANCHOR BOLT, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.

6. PROVIDE 3" DIAMETER x 1" THICK PLATE WASHER WITH CHARPY IMPACT REQUIREMENTS AT -20°F, HOT-DIPPED GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF CLASS C OF ASTM A 153.

7. PROVIDE 3" DIAMETER WASHERS AS Type C INSTALLATION: SPACING = 2'-0" TYPE B INSTALLATION: SPACING = 4'-0" TYPE C INSTALLATION: SPACING = 4'-0"

8. THREE TYPES OF INSTALLATION ARE ALLOWED.

   TYPE A: USE FOR SINGLE LANE(S) OF TRAFFIC PRESLIZED AND SPEED DOES NOT EXCEED 60 MPH.

   TYPE B: USE FOR THE STANDARD NUMBER OF LANES OF TRAFFIC IN THE SAME DIRECTION OR IN OPPOSITE DIRECTIONS, WITHOUT ENDS OF THE OUTSIDE LANE AND THE SPEED DOES NOT EXCEED 80 MPH.

   TYPE C: USE FOR CONDITIONS OF SPEED AND TRAFFIC LINES AND ENDMEN STS (NOT COVERED BY TYPE A AND B ABOVE).

9. SPACING OF BOLT THROUGH ANCHORS FOR BARRIERS AND FOR THE FACADES OF MEDIAN BARRIERS ADJACENT TO TRAFFIC.

   TYPE A INSTALLATION: SPACING = 2'-0"

   TYPE B INSTALLATION: SPACING = 2'-0"

10. INDICATE INSTALLATION TYPE ON THE CONTRACT DRAWINGS.

11. ANCHORS MUST BE INSTALLED IN THE END HOLES OF EACH BARRIER OR MEDIAN BARRIER SEGMENT. KEEP BOLT SPACING ALONG THE FULL LENGTH OF THE BRIDGE TO THE EVENT MOUNTING.

12. WHEN USING ADHESIVE ANCHORS FOR THE PSUEDO INSTALLATIONS, ADHESIVE ANCHORS WILL BE USED. INSTALL ANCHORS TO SATISFY THE SPACING AND STRENGTH REQUIREMENTS OF TABLE 1. SPACING OF ADHESIVE ANCHORS VARIES FROM 2'-0" TO 1'-0" AS SHOWN IN THE TABLE.

13. ADHESIVE ANCHORS MAY BE USED FOR ALL INSTALLATIONS EXCEPT WHERE THE DECK IS COMPLETELY COVERED OR THE DECK COATING IS THICKER THAN 3000 PSI, IS IN POOR CONDITION OR UNDERGROUND WATER FLOW IS PRESENT. ADHESIVE ANCHORS MAY BE USED FOR INSTALLATIONS WHERE THE DECK IS COVERED OR UNDERGROUND WATER FLOW IS PRESENT. ADHESIVE ANCHORS MAY BE USED FOR INSTALLATIONS WHERE THE DECK IS COVERED OR UNDERGROUND WATER FLOW IS PRESENT.

14. ADHESIVE ANCHORS FOR TEMPORARY BARRIERS ARE PERMITTED ON BRIDGE CONSTRUCTION PROJECTS THAT EXTEND UNINTERRUPTED FOR A MAXIMUM OF THREE YEARS.

15. IDENTIFY THE PLAN LOCATION OF THE BARRIERS ON THE BRIDGE. POSITION BARRIERS TO LOGICALLY ACCOMMODATE THE END OF THE STRUCTURE, EXPANSION JAWS AND OTHER INSTALLATIONS.

16. TRAFFIC TRANSITIONS AND LANE MERGING MUST BE OFF THE BRIDGE.

17. BOLT THROUGH ANCHORS ARE NOT PERMITTED IN RECENTLY POURED CONCRETE WITHOUT APPROVAL OF DISTRICT BRIDGE ENGINEER.
CONSTRUCTION NOTES:

1. DRILL W/ ADHESIVE WILL NOT DAMAGE THE ADJACENT CONCRETE.
   SUPPORT NECESSARY TO AVOID SPALLING OR BOLT THROUGH AND ADHESIVE ANCHOR HOLE.

2. DRILL INTO THE DECK USING THE HOLES IN THE TEMPORARY BARRIER AS A TEMPLATE. THE DRILL BIT IS LOCATED 2 IN. ABOVE THE TEMPORARY BARRIER. SUPPORT NECESSARY TO AVOID SPALLING OR BOLT THROUGH AND ADHESIVE ANCHOR HOLE.

3. THE BARRIERS MAY BE REPOSITIONED TO AVOID DAMAGING THE DECK REINFORCEMENT DURING DRILLING. MOVE THE BARRIER PARALLEL TO THE JUNCTION OF TRAFFIC UP TO 1 IN. AND PERPENDICULAR TO TRAFFIC UP TO 6". DRILL INTO THE DECK USING THE HOLES IN THE TEMPORARY BARRIER AS A TEMPLATE. THE DRILL BIT IS LOCATED 2 IN. ABOVE THE TEMPORARY BARRIER. SUPPORT NECESSARY TO AVOID SPALLING OR BOLT THROUGH AND ADHESIVE ANCHOR HOLE.


5. THE END SEGMENT OF THE EXPANSION SEGMENT AT THE END OF THE OBSTACLE MUST BE INSTALLED UP TO THE BRIDGE. CONNECT THE END SEGMENT TO THE OBSTACLE SEGMENT TO THE TEMPORARY BARRIER. POSITION BARRIER SEGMENTS SUCH THAT THE LARGEST POSSIBLE PORTION OF THE END SEGMENT IS PLACED ON THE OBSTACLE. INSTALL ANCHORS AT THE SAME SPACING USED ON THE OBSTACLE BUT NOT TO EXCEED 3'-0" IN THE LENGTH OF THE OBSTACLE.


7. TREATMENT OF ANCHOR HOLES AFTER REMOVAL OF BARRIERS
   • FOR ADHESIVE ANCHOR MOUNTED ON NEW DECKS AND EXISTING DECKS THAT WILL NOT BE DAMAGED OR REPAIRED IN A LATER STAGE OF CONSTRUCTION, CORE THE ANCHOR HOLES COMPLETELY ALONG THE ANCHOR OR THE REMOVAL OF THE TEMPORARY BARRIER.
   • FOR ADHESIVE ANCHOR INSTALLED USING A MANUFACTURER'S RECOMMENDED METHOD, THE CONTRACTOR MAY REMOVE THE ANCHOR. REMOVE THE HOLE TO REMOVE THE EPOXY USING THE SAME SIZE HOLE WHEN INSTALLING THE ADHESIVE ANCHOR.
   • FOR ADHESIVE ANCHOR MOUNTED ON EXISTING DECKS THAT WILL BE DAMAGED OR REPAIRED IN A LATER STAGE OF CONSTRUCTION, CORE THE ANCHOR HOLES COMPLETELY ALONG THE ANCHOR OR THE REMOVAL OF THE TEMPORARY BARRIER.
   • FOR BOLT THROUGH ANCHOR MOUNTED ON NEW DECKS OR MOUNTED ON EXISTING DECKS THAT WILL BE DAMAGED OR REPAIRED IN A LATER STAGE OF CONSTRUCTION, CORE THE ANCHOR HOLES COMPLETELY ALONG THE ANCHOR OR THE REMOVAL OF THE TEMPORARY BARRIER.
   • FOR BOLT THROUGH ANCHOR MOUNTED ON NEW DECKS OR MOUNTED ON EXISTING DECKS THAT WILL BE DAMAGED OR REPAIRED IN A LATER STAGE OF CONSTRUCTION, CORE THE ANCHOR HOLES COMPLETELY ALONG THE ANCHOR OR THE REMOVAL OF THE TEMPORARY BARRIER.

8. THE W/ ADHESIVE MUST REMAIN A HORIZONTAL BARRIER A HORIZONTAL BARRIER MUST BE MOUNTED SUCH THAT TRAFFIC EXISTS ALONG THE FACE IS 2" FOR DECKS WITHOUT OVERLAYS AND 12" FOR DECKS WITH AN OVERLAY. ADJUSTABLE OFFSET MAY BE IDENTIFIED ON THE CONTRACT DRAFTING. IF PRACTICAL, TO AVOID CONTRACT ACCESS FOR PARTIAL WIDTH CONSTRUCTION.

9. ANCHORS ARE REQUIRED FOR TRAFFIC SIDE ONLY.

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

---

TABLE 2

<table>
<thead>
<tr>
<th>BOLT SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'-0&quot;</td>
</tr>
<tr>
<td>TENSION (KIPS)</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>TYPE A INSTALLATION *</td>
</tr>
<tr>
<td>TYPE B INSTALLATION *</td>
</tr>
<tr>
<td>TYPE C INSTALLATION *</td>
</tr>
</tbody>
</table>

TABLE 2 NOTE:

* FOR CONDITIONS FOR TYPE A, B AND C INSTALLATION, SEE SHEET 1, GENERAL NOTE #9.

---

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

RECOMMENDED SATURDAY, NOVEMBER 12, 2022
RECOMMENDED SATURDAY, NOVEMBER 12, 2022
SHEET 2 OF 6

[Image]
TRAFFIC FACE OF TYPICAL TEMPORARY CONCRETE BARRIER AND BOTH FACES OF TYPICAL TEMPORARY CONCRETE MEDIAN BARRIER

CONCRETE MEDIAN BARRIER

ELEVATION

BARRIER DRAINAGE OPENING (TYP.)

SECTION A-A

TEMPORARY BARRIER 42" TYPICAL REINFORCEMENT DETAIL

NOTES:
1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR CONSTRUCTION NOTES, SEE SHEET 2.
TRAFFIC FACE OF ALTERNATE TEMPORARY CONCRETE BARRIER AND BOTH FACES OF TYPICAL TEMPORARY CONCRETE MEDIAN BARRIER

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

NOTES:

- B50 (TYP.)
- 12" M6 (TYP.)
- 6" M8 (TYP.)
- 4" M10 (TYP.)
- 2" CLR. UNLESS OTHERWISE NOTED
- #5 (TYP.)
- R=1" (TYP.)
- R=9" (TYP.)
- $x$ (TYP.)

SECTION B-B

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

SEPT. 30, 2016
REFERENCES

TOGGLE BOLTS WITH PLAIN WASHERS AND HEX BOLTS

L ANCHOR BOLTS

SMOOTHED CORNERS

SIDEWALK WIDTH

SEE DETAIL A

NORMAL POST SPACING

LIGHTING POST

NOTE: SEE BC-722M FOR DETAIL AT LIGHTING POLE

LIMIT OF RAILING PAVEMENT

NORMAL POST SPACING

STANDARD ALUMINUM OR STEEL BRIDGE HAND RAILING

NOTES:

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

2. IN LIEU OF FABRICATED POST, USE CAST OR OTHER TYPE ANCHORS AS APPROVED BY THE DISTRICT TRAFFIC ENGINEER.

3. DO NOT PAINT ANY MATERIALS.

4. PLACE POST AND POST ANCHOR BOLTS NORMAL TO GRADE AND PARALLEL TO GRADE.

5. LOCATE RAIL SPLICES BETWEEN EXPANSION JOINTS AND AT SOME LOCATIONS WHERE EXCESSIVE THICKNESS OF THE RAILS AS RECOMMENDED BY THE DISTRICT TRAFFIC ENGINEER. FOR EXTENSION, LOCATE E RAIL SPLICE 1'-6" FROM 6" 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 CLEAR WATER BASE SEALANT.

8. FOR TYPICAL CONCRETE BARRIER OR 3'-6" HIGH CONCRETE BARRIER TO BE CONSIDERED DEPENDENT TO BE APPROVED BY THE DISTRICT TRAFFIC ENGINEER.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

SEPT. 30, 2016

SEPT. 30, 2016
STAINLESS STEEL CLAMPING BANDS
TEETH TO GRIP NEOPRENE SLEEVE
MOLDED NEOPRENE SLEEVE
SILICON BRONZE COUPLINGS

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

OPENING IN BARRIER AS PER DESIGN DRAWINGS

EXPOSED CONDUIT CONNECTIONS
AT EXPANSION JOINTS

STAINLESS STEEL CLAMPING BANDS
TEETH TO GRIP NEOPRENE SLEEVE
MOLDED NEOPRENE SLEEVE
SILICON BRONZE COUPLINGS

OPTIONAL PVC CONDUIT EXPANSION AND DEFLECTION JOINT FITTINGS

CONDUIT EXPANSION NOTES
1. APPROXIMATE LENGTH OF FLEXIBLE CONDUIT IS 2 TIMES ANTICIPATED MOVEMENT OR 1'-0" MIN. PLUS 3'-0".
2. BOX SIZE PER ARTICLE 314.
3. SIZE BOX FOR LARGER MOVEMENTS.
4. FULL BOX USE IS OPTIONAL, IF BLACK, USE CAST IRON OR VALVED STEEL WHICH IS NOT SIZED GALVANIZED PER PUB 408, SECTION 1101.10.

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, TO THE CORRECT ELEVATION AND ALIGNMENT AND SECURELY BRACE AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED. ANCHOR BOLT DIAMETER AS REQUIRED BY LIGHTING POLE MANUFACTURER. FOR FUTURE LIGHTING PROVISIONS, SEE CHART ON THIS SHEET.
3. PROVIDE MATERIALS TO SECTION 1104.04 OF PUB. 408. ANCHOR ANGLES ARE PERMITTED TO BE GALVANIZED.
4. PROVIDE A MINIMUM OF 2" CONCRETE COVER FOR EACH CONDUIT.
5. PROVIDE 2" CLEAR ON ALL REINFORCEMENT UNLESS NOTED.
6. PROVIDE 2" CLEAR LAYOUT BED FOR FUTURE LIGHTING INSTALLATIONS.
7. SEPARATE CONDUIT AND PROTECT THREADS FOR FUTURE LIGHTING INSTALLATIONS.
8. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
9. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.

**PROVISIONS FOR FUTURE LIGHTING**

<table>
<thead>
<tr>
<th>Provisions</th>
<th>Light Pole Size</th>
<th>Bore Size</th>
<th>Anchor Bolt Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>50'-0&quot; max</td>
<td>15&quot;</td>
<td>1&quot;</td>
<td></td>
</tr>
</tbody>
</table>

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD LIGHTING POLE ANCHORAGE**

**REFERENCE DRAWINGS**

**BC-721M**

**BC-722M**

**SEPT. 30, 2016**
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.
   B. PLACE RAILING POSTS AS SHOWN BUT DO NOT INTERRUPT RAILING.

NOTE:
SEE SHEET 1 FOR NOTES.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD BRIDGE ANTI-ICING SYSTEM
SHEET 1 OF 10

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 HIGHWAY WEATHER INFORMATION SYSTEM (HWIS).
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 IN 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.

BRIDGE DECK PLAN

BRIDGE DECK SECTION

REFERENCE DRAWINGS

COMMUNEAL OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD BRIDGE ANTI-ICING SYSTEM
GENERAL PLAN

BC-721M REFERENCE DRAWINGS
BC-722M ELECTRICAL DETAILS
BC-723M STRUCTURAL DETAILING
BC-724M WATERPROOFING AND EXPANSION DETAILS
BC-725M UTILITY ATTACHMENT & SUPPORT DETAILS
BC-726M REINFORCED CONCRETE DETAILS
BC-727M REINFORCED METAL DECK FORMS
BC-728M PRESTRESSED CONCRETE DETAILS
BC-729M OPEN SPANNING JOINTS
BC-730M TEMPORARY METAL DECK FORMS
BC-731M REINFORCEMENT & SUPPORT DETAILS
BC-732M PRESTRESSED BRIDGES
BC-733M REFERENCE DRAWINGS
BC-734M UTILITY ATTACHMENT & SUPPORT DETAILS
BC-735M PRESTRESSED BRIDGES
BC-736M OPEN SPANNING JOINTS
BC-737M TEMPORARY METAL DECK FORMS
BC-738M REINFORCEMENT & SUPPORT DETAILS
BC-739M PRESTRESSED BRIDGES
BC-740M OPEN SPANNING JOINTS
BC-741M TEMPORARY METAL DECK FORMS
BC-742M REINFORCEMENT & SUPPORT DETAILS
BC-743M PRESTRESSED BRIDGES
BC-744M OPEN SPANNING JOINTS
BC-745M TEMPORARY METAL DECK FORMS
BC-746M REINFORCEMENT & SUPPORT DETAILS
BC-747M PRESTRESSED BRIDGES
BC-748M OPEN SPANNING JOINTS
BC-749M TEMPORARY METAL DECK FORMS
BC-750M REINFORCEMENT & SUPPORT DETAILS
BC-751M PRESTRESSED BRIDGES
BC-752M OPEN SPANNING JOINTS
BC-753M TEMPORARY METAL DECK FORMS
BC-754M REINFORCEMENT & SUPPORT DETAILS
BC-755M PRESTRESSED BRIDGES
BC-756M OPEN SPANNING JOINTS
BC-757M TEMPORARY METAL DECK FORMS
BC-758M REINFORCEMENT & SUPPORT DETAILS
BC-759M PRESTRESSED BRIDGES
BC-760M OPEN SPANNING JOINTS
BC-761M TEMPORARY METAL DECK FORMS
BC-762M REINFORCEMENT & SUPPORT DETAILS
BC-763M PRESTRESSED BRIDGES
BC-764M OPEN SPANNING JOINTS
BC-765M TEMPORARY METAL DECK FORMS
BC-766M REINFORCEMENT & SUPPORT DETAILS
BC-767M PRESTRESSED BRIDGES
BC-768M OPEN SPANNING JOINTS
BC-769M TEMPORARY METAL DECK FORMS
BC-770M REINFORCEMENT & SUPPORT DETAILS
BC-771M PRESTRESSED BRIDGES
BC-772M OPEN SPANNING JOINTS
BC-773M TEMPORARY METAL DECK FORMS
BC-774M REINFORCEMENT & SUPPORT DETAILS
BC-775M PRESTRESSED BRIDGES
BC-776M OPEN SPANNING JOINTS
BC-777M TEMPORARY METAL DECK FORMS
BC-778M REINFORCEMENT & SUPPORT DETAILS
BC-779M PRESTRESSED BRIDGES
BC-780M OPEN SPANNING JOINTS
BC-781M TEMPORARY METAL DECK FORMS
BC-782M REINFORCEMENT & SUPPORT DETAILS
BC-783M PRESTRESSED BRIDGES
BC-784M OPEN SPANNING JOINTS
BC-785M TEMPORARY METAL DECK FORMS
BC-786M REINFORCEMENT & SUPPORT DETAILS
BC-787M PRESTRESSED BRIDGES
BC-788M OPEN SPANNING JOINTS
BC-789M TEMPORARY METAL DECK FORMS
BC-790M REINFORCEMENT & SUPPORT DETAILS
BC-791M PRESTRESSED BRIDGES
BC-792M OPEN SPANNING JOINTS
BC-793M TEMPORARY METAL DECK FORMS
BC-794M REINFORCEMENT & SUPPORT DETAILS
BC-795M PRESTRESSED BRIDGES
BC-796M OPEN SPANNING JOINTS
BC-797M TEMPORARY METAL DECK FORMS
BC-798M REINFORCEMENT & SUPPORT DETAILS
BC-799M PRESTRESSED BRIDGES
BC-800M OPEN SPANNING JOINTS
BC-801M TEMPORARY METAL DECK FORMS
BC-802M REINFORCEMENT & SUPPORT DETAILS
BC-803M PRESTRESSED BRIDGES
BC-804M OPEN SPANNING JOINTS
BC-805M TEMPORARY METAL DECK FORMS
BC-806M REINFORCEMENT & SUPPORT DETAILS
BC-807M PRESTRESSED BRIDGES
BC-808M OPEN SPANNING JOINTS
BC-809M TEMPORARY METAL DECK FORMS
BC-810M REINFORCEMENT & SUPPORT DETAILS
BC-811M PRESTRESSED BRIDGES
BC-812M OPEN SPANNING JOINTS
BC-813M TEMPORARY METAL DECK FORMS
BC-814M REINFORCEMENT & SUPPORT DETAILS
BC-815M PRESTRESSED BRIDGES
BC-816M OPEN SPANNING JOINTS
BC-817M TEMPORARY METAL DECK FORMS
BC-818M REINFORCEMENT & SUPPORT DETAILS
BC-819M PRESTRESSED BRIDGES
BC-820M OPEN SPANNING JOINTS
BC-821M TEMPORARY METAL DECK FORMS
BC-822M REINFORCEMENT & SUPPORT DETAILS
BC-823M PRESTRESSED BRIDGES
BC-824M OPEN SPANNING JOINTS
BC-825M TEMPORARY METAL DECK FORMS
BC-826M REINFORCEMENT & SUPPORT DETAILS
BC-827M PRESTRESSED BRIDGES
BC-828M OPEN SPANNING JOINTS
BC-829M TEMPORARY METAL DECK FORMS
BC-830M REINFORCEMENT & SUPPORT DETAILS
BC-831M PRESTRESSED BRIDGES
BC-832M OPEN SPANNING JOINTS
BC-833M TEMPORARY METAL DECK FORMS
BC-834M REINFORCEMENT & SUPPORT DETAILS
BC-835M PRESTRESSED BRIDGES
BC-836M OPEN SPANNING JOINTS
BC-837M TEMPORARY METAL DECK FORMS
BC-838M REINFORCEMENT & SUPPORT DETAILS
BC-839M PRESTRESSED BRIDGES
BC-840M OPEN SPANNING JOINTS
BC-841M TEMPORARY METAL DECK FORMS
BC-842M REINFORCEMENT & SUPPORT DETAILS
BC-843M PRESTRESSED BRIDGES
BC-844M OPEN SPANNING JOINTS
BC-845M TEMPORARY METAL DECK FORMS
BC-846M REINFORCEMENT & SUPPORT DETAILS
BC-847M PRESTRESSED BRIDGES
BC-848M OPEN SPANNING JOINTS
BC-849M TEMPORARY METAL DECK FORMS
BC-850M REINFORCEMENT & SUPPORT DETAILS
BC-851M PRESTRESSED BRIDGES
BC-852M OPEN SPANNING JOINTS
BC-853M TEMPORARY METAL DECK FORMS
BC-854M REINFORCEMENT & SUPPORT DETAILS
BC-855M PRESTRESSED BRIDGES
BC-856M OPEN SPANNING JOINTS
BC-857M TEMPORARY METAL DECK FORMS
BC-858M REINFORCEMENT & SUPPORT DETAILS
BC-859M PRESTRESSED BRIDGES
BC-860M OPEN SPANNING JOINTS
BC-861M TEMPORARY METAL DECK FORMS
BC-862M REINFORCEMENT & SUPPORT DETAILS
BC-863M PRESTRESSED BRIDGES
BC-864M OPEN SPANNING JOINTS
BC-865M TEMPORARY METAL DECK FORMS
BC-866M REINFORCEMENT & SUPPORT DETAILS
BC-867M PRESTRESSED BRIDGES
GENERAL NOTES:

1. PROVIDE SUPPORT HARDWARE IN ACCORDANCE WITH PUB. 408 AND ANSI SPECIFICATIONS.

2. IT IS THE RESPONSIBILITY OF THE DESIGNER TO VERIFY THAT THE BRIDGE MEETS ALL CLEARANCE AND COVER REQUIREMENTS STATED IN THESE STANDARDS PRIOR TO DESIGNING THE SYSTEM. IF THE REQUIRED CLEARANCE TO THE TOP OF DECK REQUIREMENTS ARE NOT SATISFIED, ADDITIONAL CLEARANCE MUST BE ADDED TO THE SUPPORT HARDWARE. IF THE BRIDGE CANNOT BE DESIGNED TO SATISFY THE CLEARANCE REQUIREMENTS, THE BRIDGE IS NOT SUITABLE FOR AN ANTI-ICING SYSTEM INSTALLATION.

3. PROVIDE SUPPORT HARDWARE IN ACCORDANCE WITH PUB. 408, Sec. 105.20. ALLOW SUPPORT ANGLES IN ACCORDANCE WITH PUB. 408, Sec. 105.22. ALLOW SUPPORT ANGLES IN ACCORDANCE WITH PUB. 408, Sec. 105.20. PERMISSION TO USE NON-COMMERCIALLY AVAILABLE SUPPORT HARDWARE MUST BE OBTAINED FROM THE DISTRICT BRIDGE ENGINEER PRIOR TO INSTALLATION.

4. PROVIDE tablet computer connectivity in accordance with PUB. 408, Sec. 105.20. INSTALL ALL HARDWARE IN ACCORDANCE WITH PUB. 408, Sec. 105.20. PROVIDE SUPPORT HARDWARE IN ACCORDANCE WITH PUB. 408, Sec. 105.20. PROVIDE SUPPORT HARDWARE IN ACCORDANCE WITH PUB. 408, Sec. 105.20.

CARRIER CONDUIT/PIPE NOTES:

1. CONSTRUCT SPRAY DISK AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

2. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

3. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

4. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

5. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

6. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

7. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

8. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

9. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

10. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

11. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

12. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

13. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

14. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

15. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

16. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

17. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

18. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.

19. PROVIDE SPRAY DISKS AND ELECTRICAL MOUNTING SUPPORTS IN SUCH A MANNER THAT MINIMUM GRADE THICKNESSES ARE SATISFIED.
**PROCEDURE FOR INSTALLING ANTI-ICING SYSTEM IN A NEW BRIDGE**

1. PROVIDE SHOP DRAWINGS THAT SHOW ALL PROPOSED LOCATIONS FOR VALVE BOXES, CONDUIT/PIPE HANGERS, SPRAY DISKS, SENSORS, ETC. AS WELL AS LOCATION WHERE ATTACHMENTS FOR THE ANTI-ICING SYSTEM COMPONENTS ARE TO BE INSTALLED. THE FINAL LOCATIONS WILL BE APPROVED BY THE DISTRICT BRIDGE ENGINEER.

2. INSTALL BLOCKOUTS IN NEW CONCRETE DECKS WITH SHAPES THAT MATCH THE PROPOSED SENSOR OR SPRAY DISK SIZE AND PROVIDE AN ACCESS HOLE FOR CONNECTION TO THE SOLUTION SUPPLY LINE. PROVIDE BLOCKOUTS MANUFACTURED OF SOFT WOOD OR SIMILAR MATERIAL.

3. INSTALL BLOCKOUTS A MINIMUM DECK ELEVATION TO PREVENT CONTACT WITH DECK ELEVATION RELATIVE TO THE FINISHED DECK IS AS INDICATED.

4. REMOVE SPRAY DISK SHELL AND SENSOR BY EITHER MILLING OR CORING AROUND ITS PERIMETER AND THEN BY USING A PNEUMATIC HAMMER WITH MAXIMUM NOMINAL MASS OF 30-LB. DO NOT OPERATE PNEUMATIC HAMMERS OR MACHINERY THAT WILL DAMAGE CONCRETE UNDER THE SUPERVISION OF THE ENGINEER.

5. CORE INTO DECK USING METHODS THAT WILL NOT SHATTER/DAMAGE THE CONCRETE SURFACE ADJACENT TO THE HOLES OR RESULT IN MECHANICAL CHIPPING TOOLS AT AN ANGLE IN EXCESS OF 45 DEGREES RELATIVE TO THE SURFACE OF THE SLAB. ENTIRELY REMOVE EXISTING SPRAY DISK SHELL AND SENSOR BY EITHER MILLING OR CORING AROUND ITS PERIMETER AND THEN BY USING A PNEUMATIC HAMMER WITH MAXIMUM NOMINAL MASS OF 30-LB. DO NOT OPERATE PNEUMATIC HAMMERS OR MACHINERY THAT WILL DAMAGE CONCRETE UNDER THE SUPERVISION OF THE ENGINEER.

6. INSTALL NEW OVERLAY.

7. INSTALL BLOCKOUTS IN DECK, AND/OR OVERLAY. PROVIDE BLOCKOUTS MANUFACTURED OF SOFT WOOD OR SIMILAR MATERIAL.

8. INSTALL NEW OVERLAY.

9. SEAL THE CONCRETE DECK WITH SILANE SEALER.

10. AFTER SPRAY DISK/SENSOR IS PROPERLY LOCATED, SEAL UNIT IN DECK WITH A PREPARED FLUORINE NON-SHRINK CEMENT IN ACCORDANCE WITH THE ENGINEER'S DIRECTION. PERFORM ALL MILLING OR CORING AROUND ITS PERIMETER AND THEN BY USING A PNEUMATIC HAMMER WITH MAXIMUM NOMINAL MASS OF 30-LB. DO NOT OPERATE PNEUMATIC HAMMERS OR MACHINERY THAT WILL DAMAGE CONCRETE UNDER THE SUPERVISION OF THE ENGINEER.

11. REMOVE ALL SALVAGEABLE PARTS OF THE ANTI-ICING SYSTEM.

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

1. PROVIDE SHOP DRAWINGS THAT SHOW ALL PROPOSED LOCATIONS FOR VALVE BOXES, CONDUIT/PIPE HANGERS, SPRAY DISKS, SENSORS, ETC. AS WELL AS LOCATION WHERE ATTACHMENTS FOR THE ANTI-ICING SYSTEM COMPONENTS ARE TO BE INSTALLED. THE FINAL LOCATIONS WILL BE APPROVED BY THE DISTRICT BRIDGE ENGINEER.

2. THE FOLLOWING COMPONENTS OF THE ANTI-ICING SYSTEM ARE ANTICIPATED TO BE SALVAGEABLE, INSIDE COMPONENTS OF THE SPRAY DISKS, AND SOLUTION/ELECTRICAL SUPPLY LINES.

3. REMOVE ALL SALVAGEABLE PARTS OF THE ANTI-ICING SYSTEM.

4. INSTALL TEMPORARY NEOPRENE SPONGE AROUND VOID PERIMETER, RELATIVE TO THE FINISHED DECK IS AS INDICATED.

5. INSTALL NEW OVERLAY.

6. INSTALL NEW OVERLAY.

7. INSTALL NEW OVERLAY.

8. REMOVE BLOCKOUTS AND INSTALL TEMPORARY NEOPRENE SPONGE AROUND VOID PERIMETER, AS INDICATED.

9. AFTER SPRAY DISK/SENSOR IS PROPERLY LOCATED, SEAL UNIT IN DECK WITH A PREPARED FLUORINE NON-SHRINK CEMENT IN ACCORDANCE WITH THE ENGINEER'S DIRECTION. PERFORM ALL MILLING OR CORING AROUND ITS PERIMETER AND THEN BY USING A PNEUMATIC HAMMER WITH MAXIMUM NOMINAL MASS OF 30-LB. DO NOT OPERATE PNEUMATIC HAMMERS OR MACHINERY THAT WILL DAMAGE CONCRETE UNDER THE SUPERVISION OF THE ENGINEER.

10. REMOVE ALL SALVAGEABLE PARTS OF THE ANTI-ICING SYSTEM.

11. INSTALL NEW OVERLAY.

**NOTES**

1. FOR FURTHER DETAILS, SEE SHEET 2.

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BRIDGE ANTI-ICING SYSTEM INSTALLATION PROCEDURES**

**STANDARD BRIDGE ANTI-ICING SYSTEM INSTALLATION PROCEDURES**
1. FOR GENERAL NOTES, SEE SHEET 2.
2. SEAL DISK/SENSOR USING A PREMIXED FLOWABLE NON-SHRINK GROUT AS REQUIRED.
3. FOR BRIDGE DECKS WITH A GROOVED SURFACE, MEASURE DISK/SENSOR LOCATION FROM THE TOP OF THE GROOVES.
4. PROVIDE REMOVABLE DECK FORMWORK WITHIN 3'-0" OF THE CARRIER CONDUIT PENETRATION INTO DECK.
5. FOR PLAN VIEW, SEE SHEET 1.
6. FOR INSTALLATION PROCEDURES, SEE SHEET 3.
7. FOR ADDITIONAL DETAIL DETAILS, SEE SHEET 5.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD
BRIDGE ANTI-ICING SYSTEM
DISK AND SENSOR
INSTALLATION IN NEW BRIDGE DECK

REMOVABLE DECK FORMWORK PLAN AT CARRIER CONDUIT PENETRATION

TYPICAL SPRAY DISK SECTION - CONDUIT THROUGH DECK

TYPICAL SENSOR SECTION - CONDUIT THROUGH DECK

NOTES:
1. FOR GENERAL NOTES, SEE SHEET 2.
2. SEAL DISK/SENSOR USING A PREMIXED FLOWABLE NON-SHRINK GROUT AS REQUIRED.
3. FOR BRIDGE DECKS WITH A GROOVED SURFACE, MEASURE DISK/SENSOR LOCATION FROM THE TOP OF THE GROOVES.
4. PROVIDE REMOVABLE DECK FORMWORK WITHIN 3'-0" OF THE CARRIER CONDUIT PENETRATION INTO DECK.
5. FOR PLAN VIEW, SEE SHEET 1.
6. FOR INSTALLATION PROCEDURES, SEE SHEET 3.
7. FOR ADDITIONAL DETAIL DETAILS, SEE SHEET 5.
TYPICAL SPRAY DISK SECTION - DECK WITHOUT OVERLAY
TYPICAL SPRAY DISK SECTION - DECK WITH OVERLAY

TYPICAL SENSOR SECTION - DECK WITHOUT OVERLAY
TYPICAL SENSOR SECTION - DECK WITH OVERLAY

1. FOR GENERAL NOTES, SEE SHEET 2.
2. FOR BRIDGE DECKS WITH A GROOVED SURFACE, MEASURE DISK/SENSOR LOCATION FROM THE TOP OF THE GROOVES.
3. IF CORING OR DRILLING OPERATIONS RESULT IN DAMAGE TO EXISTING DECK, REPAIR SPALLED AREAS OF BRIDGE DECK AND DAMAGED REINFORCING STEEL IN ACCORDANCE WITH BC-783M.
4. EXISTING BRIDGES MUST HAVE FULLY FUNCTIONAL DRAINAGE SYSTEMS, INCLUDING EXTERNAL INLET BOXES AND APPROPRIATE INLET BOXES. ANY SYSTEMS IN THE DECK SYSTEM MUST BE CONNECTED PRIOR TO INSTALLATION OF AN ANTI-ICING SYSTEM.
5. FOR JOINT DETAIL, SEE SHEET 6.
6. REMOVE EXISTING DECK FORMWORK WITHIN 12" OF THE BLOCKOUT WIDTH FOR SENSOR OR SPRAY DISK INSTALLING SPRAY DISK.
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
TYPICAL SPRAY DISK SECTION - CONDUIT THROUGH DECK

TYPICAL SENSOR SECTION - CONDUIT THROUGH DECK

TYPICAL SPRAY DISK SECTION - CONDUIT IN DECK

TYPICAL SENSOR SECTION - CONDUIT IN DECK

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD
BRIDGE ANTI-ICING SYSTEM
DISK AND SENSOR
ADJUSTMENT FOR OVERLAYS

SEPT. 30, 2016
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD
BRIDGE ANTI-ICING SYSTEM
FOR STEEL BRIDGES

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

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

BC-723M
CHIEF BRIDGE ENGINEER
RECOMMENDED
BC-723M
RECOMMENDED
SEPT. 30, 2016
SEPT. 30, 2016
NOTES:
1. FOR GENERAL NOTES, SEE SHEET 2.
2. FOR INSTALLATION PROCEDURES, SEE SHEET 3.
3. PREFERRED VALVE BOX MOUNTING METHOD IS USING THE DOUBLE ANGLE ATTACHMENT ON THE STIFFENER OR DIAPHRAGM CONNECTION PLATE. THE ALTERNATE DIAPHRAGM CONNECTION ON BRIDGES WITH CURVED GIRDERS OR CHORDED STRAIGHT GIRDERS THAT MIMIC THE CURVE UNLESS APPROVED BY THE DISTRICT BRIDGE ENGINEER.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD
BRIDGE ANTI-ICING SYSTEM
VALVE BOX ATTACHMENT
FOR STEEL BRIDGES

PREFERRED VALVE BOX ATTACHMENT DETAIL
AT STIFFENER OR DIAPHRAGM CONNECTION PLATE

ALTERNATE VALVE BOX ATTACHMENT DETAIL
AT INTERMEDIATE DIAPHRAGM

ALTERNATE VALVE BOX ATTACHMENT DETAIL
AT CHANNEL DIAPHRAGM

ALTERNATE VALVE BOX ATTACHMENT DETAIL
AT END DIAPHRAGM

NOTE: DO NOT PLACE VALVE BOX ON JACKING DIAPHRAGM

1. FOR GENERAL NOTES, SEE SHEET 2.
2. FOR INSTALLATION PROCEDURES, SEE SHEET 3.
3. PREFERRED VALVE BOX MOUNTING METHOD IS USING THE DOUBLE ANGLE ATTACHMENT ON THE STIFFENER OR DIAPHRAGM CONNECTION PLATE. THE ALTERNATE DIAPHRAGM CONNECTION ON BRIDGES WITH CURVED GIRDERS OR CHORDED STRAIGHT GIRDERS THAT MIMIC THE CURVE UNLESS APPROVED BY THE DISTRICT BRIDGE ENGINEER.

LENGTH
UNSUPPORTED
TOTAL
10'-0" MAX.

O.D. PLUS 2" MIN.

PROVIDE GAP OF PIPE O.D. PLUS 2" MIN.

BACKING PLATE 3" MIN. THICKNESS
HALF PLATE 3/4" MIN. THICKNESS

1/2" MINIMUM LEG
3/4" MINIMUM LEG

VALVE BOX SIZE PER VENDOR

BC-723M
CHIEF BRIDGE ENGINEER
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
SEPT.30, 2016
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD
GIRDER ELEVATION

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

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

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

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

DETAIL C
NOTE: I-BEAM SHOWN, BOX BEAM SIMILAR

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD
BRIDGE ANTI-ICING SYSTEM
CARRIER PIPE/CONDUIT ATTACHMENT
FOR CONCRETE BRIDGES

SEPT. 30, 2016

BUREAU OF PROJECT DELIVERY
CHIEF BRIDGE ENGINEER
RECOMMENDED
RECOMMENDED

10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
10'-0" MAX.
**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF TRANSPORTATION**

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

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

**SECTION E-E**
1. All reinforcement bars to meet the requirements of PUB. 408, SECTION 709.1.
2. Design specification:
   • Use AASHTO/AWS D1.5 (DATE AS NOTED IN PUB. 408) for grid design.
   • Use AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND COMMENTARY.
3. Fabrication according to AASHTO/AWS D1.5 as noted in PUB. 408, SECTION 1005.2.
4. Material strengths:
   • See PUB. 408, SECTION 1105.2.
5. Concrete:
   • Use ASTMA302, CLASS A, AASHTO.
6. Provide 1½” concrete cover on reinforcement bars unless otherwise noted.
7. Provide 1½” cover over grid. The top ½” of overfill/overlay is considered sacrificial wearing surface.
8. Provide an erection detail complete with piece marks with the shop drawing submission.
9. For leveling bolts, use ASTM A325 BOLT OR EQUIVALENT AS APPROVED.
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 709.2. In consultation with the flooring manufacturer.
12. Provide Form Pans according to PUB. 408, SECTION 1105.2. In consultation with the flooring manufacturer.
13. Material strengths:
   • Use AASHTO/AWS D1.5 (DATE AS NOTED IN PUB. 408) for grid design.
   • Use AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND COMMENTARY.
14. Steel Grid Reinforced Concrete Bridge Deck for Beam Bridges
15. Cast-in-Place Deck Details
16. Half depth concrete grid
17. Transverse splice between panels
18. Full depth concrete grid
19. Transverse splice between panels
20. Typical grid deck details
21. Plan view
22. Section B-B
23. Section A-A
24. Section C-C
25. Section D-D
26. Section E-E
27. Typical grid deck details
28. Plan view
29. Section B-B
30. Section A-A
31. Section C-C
32. Section D-D
33. Section E-E
34. Full depth concrete grid
35. Transverse splice between panels
36. Half depth concrete grid
37. Transverse splice between panels
38. General notes:
39. Plan view
40. Section B-B
41. Section A-A
42. Section C-C
43. Section D-D
44. Section E-E
45. Full depth concrete grid
46. Transverse splice between panels
47. Half depth concrete grid
48. Transverse splice between panels
49. General notes:
50. Plan view
51. Section B-B
52. Section A-A
53. Section C-C
54. Section D-D
55. Section E-E
56. Full depth concrete grid
57. Transverse splice between panels
58. Half depth concrete grid
59. Transverse splice between panels
60. General notes:
61. Plan view
62. Section B-B
63. Section A-A
64. Section C-C
65. Section D-D
66. Section E-E
67. Full depth concrete grid
68. Transverse splice between panels
69. Half depth concrete grid
70. Transverse splice between panels
TYPICAL MID-SPAN EXPANSION JOINT DETAIL

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

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

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.

4. PANEL WIDTHS SHOWN ARE NOMINAL. ADJUST DIMENSION BETWEEN BEARING BARS AT FIELD JOINT TO ACCOUNT FOR TEMPERATURE EXPANSION JOINT DETAIL

5. FIELD INSTALL SHEAR STUDS AFTER PANELS ARE PLACED TO PREVENT CONCRETE AND GROUT LEAKAGE.

6. HAVE AN EXPERIENCED REPRESENTATIVE OF MANUFACTURER PRESENT DURING INITIAL INSTALLATION OF GRID DECKING AND AT SUCH OTHER TIMES AS THE ENGINEER MAY REQUEST.

INSTALLATION NOTES:

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

2. PANELS WITH THE SAME ERECTION MARK ARE INTERCHANGEABLE.

3. AS WITH OTHER DECKS THIS IS NOT A LEAK PROOF BRIDGE DECK SYSTEM AND MINOR CONCRETE AND GROUT SEEPAGE MAY OCCUR.

4. PANEL WIDTHS SHOWN ARE NOMINAL. ADJUST DIMENSION BETWEEN BEARING BARS AT FIELD JOINT TO ACCOUNT FOR TEMPERATURE EXPANSION JOINT DETAIL

5. FIELD INSTALL SHEAR STUDS AFTER PANELS ARE PLACED TO PREVENT CONCRETE AND GROUT LEAKAGE.

6. HAVE AN EXPERIENCED REPRESENTATIVE OF MANUFACTURER PRESENT DURING INITIAL INSTALLATION OF GRID DECKING AND AT SUCH OTHER TIMES AS THE ENGINEER MAY REQUEST.
SCUPPER INSTALLATION DETAILS

**SCUPPER PROFILE BEARING BAR CUT TO:**

- See profile at top of deck

**BEARING BAR ASSEMBLY TYPE 2 SCUPPER**

- See note above

**SECTION F-F**

- See note above

**NOTE 1**

- See note

**NOTE 2**

- See note

**H WIRING**

- See note

**SPLICE BAR PLAN VIEW**

- See note

**SECTION G-G**

- See note

**SECTION H-H**

- See note

**MAIN BAR SPLICE AT PANEL ENDS**

- See note

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

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

- See note

**SEPT. 30, 2016**

- See note

**BC-726M**

- See note
LEVELING BOLT DETAIL
LEVELING BOLTS MAY BE FURNISHED UNCOATED
(TYP.)

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

GRID COMPONENT WELD DETAILS

LEVELING PLATE WELD DETAIL
LEVELING PLATE, 3 PER PANEL
NOTE: HEX NUT CAN BE TAPPED CONCRETE FOR GALVANIZING

END TRIM PLATE WELD DETAIL
WELD CAN BE ON EITHER SIDE OF CROSS BAR

SECTION 1-1
LEVELING PLATE WELD DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD
BUREAU OF PROJECT DELIVERY

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

BC-726M SHEET 4 OF 5
RECOMMENDED SEPTEMBER 30, 2016
FULL DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS

SECTION J-J

PLAN VIEW

HALF DEPTH CONCRETE GRID
TRANSVERSE SPLICE BETWEEN PANELS

SECTION K-K

PLAN VIEW
RECOMMENDED CHIEF BRIDGE ENGINEER

BC-731M
SEPT. 30, 2016

C.I.P. CEMENT CONCRETE SLABS (SIMILAR)

(PRECAST CEMENT CONCRETE BLOCKS SHOWN; WHEN THE COVER ON THE FOOTING IS LESS THAN 1'-6"

SECTION D-D
DETAIL J

SLOPE WALL JT. (TYP.) BETWEEN SLOPE SECTION C-C

CEMENT CONCRETE

4" EXP. JT. FILLER

COLUMN 1'-2"

PREM.

#4 @ 15" C.C.

4" EXP. JT. FILLER

APPROVED SEALER

BUREAU OF PROJECT DELIVERY

DEPARTMENT OF TRANSPORTATION

COMMONWEALTH OF PENNSYLVANIA

NOTES:

1. ALL REINFORCEMENT STEEL SHOWN MEET THE REQUIREMENTS OF ASTM A 615, A 996 OR A 706.

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

3. CONSTRUCT SLOPE WALL OF EITHER PRECAST CEMENT CONCRETE BLOCKS OR CAST-IN-PLACE CEMENT CONCRETE SLABS IN ACCORDANCE WITH SECTION B-B OR F-F (SPECIAL CASES)

(SEE DETAIL J FOR SPECIAL CASES)

SCORE DETAIL

SECTION B-B (SEE DETAIL J FOR SPECIAL CASES)

SECTION C-C

SECTION D-D

PRECAST CEMENT CONCRETE BLOCKS

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF TRANSPORTATION

BUREAU OF PROJECT DELIVERY

STANDARD CEMENT CONCRETE SLOPE WALL

RECOMMENDED 11/21/2016

RECOMMENDED 11/23/2016

SHEET 1 OF 1

BC-731M
TYPICAL LONGITUDINAL SECTION

For Steel Beam Systems, Steel Girder Systems, Girder-Floor Beam Systems and Girder-Floor Beam-Stringers Systems

SUGGESTED SUPPORT DETAILS

- Prefenced
- Butt
- Alternate Deck Form End Closures
- Channel or Angle
- Angle or Channel

Types of End Closures

NOTES:
1. Provide materials and workmanship in accordance with PUB. 408.
2. Use this standard as a guide in the preparation of shop detail drawings.
3. Shrink inserts and site of supporting elements and metal deck forms in the shop drawings along with location, size and spacing of holes.
4. Metal deck form closures and expansion fillers may be used as shown in detail A. Use a minimum of 10 ga. steel for end closure plates. Dimensions of closures shall be as shown on the drawings.
5. All metal deck form supports and their attachments to carry dead load only unless shown. Support shall be secure. Provide safety stop. See Composite Design, Sheet 2.
6. Support at P/S Concrete Beam
- Provide materials and workmanship in accordance with PUB. 408.
- Use this standard as a guide in the preparation of shop detail drawings.
- All metal deck form supports and their attachments to carry dead load only unless shown. Support shall be secure. Provide safety stop.

SUPPORT AT P/S CONCRETE BEAM

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

S. I. P. INSERT

DETAIL A

- Prefenced
- Butt
- Alternate Deck Form End Closures
- Channel or Angle
- Angle or Channel

This detail not permitted

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

SHEET 1 OF 3

BC-732M
DETAIL X

REMOVABLE FORMS
BENT P OR L, SIZE AS REQUIRED

TENSION BAR, ANGLE OR CHANNEL, SIZE/SPACING AS
HAUNCH ANGLE OR CHANNEL, SIZE/SPACING AS

DETAIL AT
CONCRETE DIAPHRAGM

TENSION FLANGE (AS REQUIRED)

HOLD DOWN CLIP
FULL LENGTH
SEE NOTE 2

SUPPORT ANGLE
SEE NOTE 2

COMPRESSION FLANGE
SEE NOTE 2

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

NOTE 1:

NOTE 2:

SUPPORT ANGLE
SEE NOTE 2

FULL LENGTH
AS REQUIRED

NOTE 1:

NOTE 2:

END CLOSURE REQUIRED WHERE FORM IS CUT ON THE
SKEW. SEE "TYPES OF END CLOSURES".

EXPANSION JOINT DETAILS
NOT SHOWN

UNLESS SHOWN ON THE
DESIGN DRAWINGS (TYP.)

DETAILS AT EXPANSION JOINTS

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

DETAIL AT
CONCRETE DIAPHRAGM

** REMOVABLE ROOF FRAMES
** AS SHOWN ON THE DESIGN DRAWINGS. 6" MAX.

TOP FLANGE - TENSION

NOTE 1:

SOURCE: ANGLE OR CHANNEL, SIZE/SPACING AS
HAUNCH ANGLE OR CHANNEL, SIZE/SPACING AS

END CLOSURES SEE TYPES OF END CLOSURES.

SHEET 1 (TYP.)

"TYPES OF END CLOSURES", SHEET 1 (TYP.)

STOPS (SIZE & SPACING AS REQUIRED TO
OF FORMS) BETWEEN BEAM AND SUPPORT ANGLE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD
PERMANENT METAL
DECK FORMS

BC-732M

SEPT.30, 2016
REQUIRED SECTION MODULUS AND MOMENT OF INERTIA OF FORMS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3'</td>
<td>3.1565</td>
<td>2.8615</td>
</tr>
<tr>
<td>4'</td>
<td>3.3763</td>
<td>3.5242</td>
</tr>
<tr>
<td>5'</td>
<td>3.6763</td>
<td>3.9393</td>
</tr>
<tr>
<td>6'</td>
<td>3.9393</td>
<td>3.9393</td>
</tr>
<tr>
<td>7'</td>
<td>4.2095</td>
<td>4.2095</td>
</tr>
<tr>
<td>8'</td>
<td>4.4775</td>
<td>4.4700</td>
</tr>
<tr>
<td>9'</td>
<td>4.7455</td>
<td>4.7455</td>
</tr>
<tr>
<td>10'</td>
<td>4.9995</td>
<td>4.9995</td>
</tr>
<tr>
<td>11'</td>
<td>5.2495</td>
<td>5.2495</td>
</tr>
<tr>
<td>12'</td>
<td>5.4895</td>
<td>5.4895</td>
</tr>
<tr>
<td>13'</td>
<td>5.7255</td>
<td>5.7255</td>
</tr>
<tr>
<td>14'</td>
<td>5.9595</td>
<td>5.9595</td>
</tr>
<tr>
<td>15'</td>
<td>6.1895</td>
<td>6.1895</td>
</tr>
<tr>
<td>16'</td>
<td>6.4165</td>
<td>6.4165</td>
</tr>
<tr>
<td>17'</td>
<td>6.6395</td>
<td>6.6395</td>
</tr>
<tr>
<td>18'</td>
<td>6.8595</td>
<td>6.8595</td>
</tr>
<tr>
<td>19'</td>
<td>7.0775</td>
<td>7.0775</td>
</tr>
<tr>
<td>20'</td>
<td>7.2925</td>
<td>7.2925</td>
</tr>
</tbody>
</table>

LEGEND

1. Design span measured parallel to the form plate. For steel sections design span is the lesser of the flanges of the supporting beams when the edges of the section are greater than 12 inches or for condition 2.

2. Compute physical design properties in accordance with the American Iron and Steel Institute specification for the design of cold formed steel structural shapes, latest published edition.

3. Do not allow deflection under the weight of the floor, plastic concrete and re-temperature to exceed 1/240 of the span or 1/4 inch whichever is less. In no case is the loading for deflection calculation to be less than 100% of wind load, for spans in excess of ten feet the permissible deflection is not to exceed 1/3 inch. Steel I-beam bridge, non-composite design.

4. Multiply values of S shown in table by:
   - 1.00 for spans 50 and 50.
   - 1.25 for span 50.
   - 1.30 for span 100.

5. Additional deflections due to thermal expansion and deflections of concrete structure must be determined for design span of slab.

TYPICAL LONGITUDINAL SECTION
OF DECK SLAB WITH METAL FORM

EXAMPLE #1
Steel 3-Beam Design, Composite Design
Beam spacing 10'-0", C = 5000
Beam flange width = 10'/3 = 3.33'
Beam thickness = s = 12'/3 = 4'0".

EXAMPLE #2
Steel 3-Beam Design, Non-Composite Design
Beam spacing 10'-0", C = 5000
Beam flange width = 10'/3 = 3.33'
Beam thickness = s = 12'/3 = 4'0".

DESIGN SPAN (FROM SHEET 2 FOR CONDITION 1) = 10'-0"
1. Provide materials and workmanship in accordance with specifications Publication 408.
2. Provide threaded steel inserts in accordance with ASTM designation A 29, Grade 10.18. Provide stud wire of either ASTM designation A 510 Grade 70 or A 510 Grade 1018.
3. Provide galvanized ASTM A 307 Grade A cap screws and washers conforming to Section 1105 of Publication 408.
4. Provide welded connection between stud, embeds and struts equal to or greater than the strength of the ASTM A 307 Grade A cap screw.
5. Accurately set anchor assembly by template to the correct elevation and alignment, and brace securely against displacement before the surrounding concrete is placed.
6. Use the installation procedure and type of inserts, whether closed bottom or open bottom, in accordance with the manufacturer's recommendations. Take care to keep the inside of the insert clean.
7. Provide threaded stud and steel inserts conforming to Section 1106 of Publication 408.
8. Use the anchor assemblies as an alternate to cast-in-place anchor bolts or sleeve anchor assemblies for the following locations, at no additional cost to the department:
   a. Attaching base plates for guide rail to concrete.
   b. Attaching base plates for fence, pedestrian railing, protective barriers and guard railing posts to concrete decks or parapets.
9. Use epoxy-coated anchor assemblies.
10. Provide thread for screws and steel inserts conforming to Section 1106 of Publication 408.
11. Use the anchor assemblies as an alternate to cast-in-place anchor bolts or sleeve anchor assemblies for the following locations, at no additional cost to the department.

**Notes:**
- **Type A Insert Assembly** (includes cap screws and washers)
- **Type B Insert Assembly** (includes cap screws and washers)
STEEL WIRE
(TYPICAL)

STRUT WIRE
(TYP.)

ELEVATION

PLAN

TYPE C INSERT ASSEMBLY
(EIFS INCLUDES CAP SCREWS AND WASHERS)

SECTION A-A

STEEL INSERT, THREADED

SECTION B-B

STEEL INSERT, THREADED

SECTION 3-3

TYPE D INSERT ASSEMBLY
(EIFS INCLUDES CAP SCREWS AND WASHERS)

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

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

SHEET 3 OF 3
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT.30, 2016
CONSTRUCTION NOTES

1. SET ANCHOR ASSEMBLY BY TEMPLATE TO THE CORRECT ELEVATION AND ALIGNMENT, AND BRACE SECURITY AGAINST DISPLACEMENT BEFORE THE SURROUNDING CONCRETE IS PLACED.

2. THE USE OF A BACK UP NUT OR PLATE, AS SHOWN IN DETAIL 2 OR 3, WILL FACILITATE SETTING OF ANCHOR BOLTS TO THEIR CORRECT ELEVATION AND ALIGNMENT. THREADED LENGTH OF ANCHOR BOLTS DEPENDS ON THE METHOD OF INSTALLATION CHOSEN BY THE CONTRACTOR.

3. TEMPLATE THICKNESS = BASE OR BASE PLATE THICKNESS
KEYED EXPANSION JOINT

Polyvinyl Chloride

CONSTRUCTION JOINTS

WATERSTOPS FOR EXPANSION JOINTS

NOTE:

Provide holes or slots in Waterstop, as required, when necessary to accommodate reinforcement bars, but do not compromise seal.

POLYVINYL CHLORIDE

TYPE C1

TYPE C2

WATERSTOPS FOR CONSTRUCTION JOINTS

NOTE:

Provide holes or slots in Waterstop, as required, when necessary to accommodate reinforcement bars, but do not compromise seal.
### DEVELOPMENT LENGTH AND LAP SPlice LENGTH OF DEFORMED BARS IN TENSION

**AASHTO LRFD Specifications, Articles 5.11.2.1.1, 5.11.2.1.2 and 5.11.5.3.1**

#### TABLE A

<table>
<thead>
<tr>
<th>Size</th>
<th>All Bars Except</th>
<th>All Bars Except</th>
<th>All Bars Except</th>
<th>All Bars Except</th>
<th>All Bars Except</th>
<th>All Bars Except</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes for Deformed Bars in Tension (Tables A, B and C):**

1. Development length: Refer to AASHTO-LRFD for applicable modification factors.
2. Tables are based on normal-strength concrete.
3. Top horizontal or nearly horizontal reinforcement may have more than 1% of fresh concrete cast below the reinforcement.
4. Embedment is development length, i.e., it is a length of bars spaced laterally at least 6 in. in center and 7.5 in. on center for bars spaced in the direction of the spacing, but the development length cannot be less than 12 in.
5. Lap splice length: Classes of lap splice lengths.

#### DEVELOPMENT LENGTH OF STANDARD HOOKS IN TENSION

For reinforcing steel grades 40 and 60 (AASHTO LRFD Specification, Article 5.11.2.4.1)

<table>
<thead>
<tr>
<th>Size</th>
<th>Top Bars</th>
<th>Top Bars</th>
<th>Top Bars</th>
<th>Top Bars</th>
<th>Top Bars</th>
<th>Top Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Guidelines for Use of Development Length and Splice Length of Deformed Bars in Tension**

- Use Table A when:
  - Top bars have end distance of bar diameter or less, or clear spacing between bars is less than bar diameter.
  - Top bars include increase in lap splice length.

- Use Table A when:
  - Cover is less than 3x bar dia.

- Use Table A when:
  - Clear spacing between bars is less than bar dia.

- Use Table B when:
  - Cover is less than 3x bar dia.
  - Clear spacing between bars is less than bar dia.

- Use Table C when:
  - Clear spacing between bars is less than bar dia.

**Notes for Deformed Bars in Tension:**

1. **Development length:**
   - Refer to AASHTO-LRFD for applicable modification factors.
   - Tables are based on normal-strength concrete.
   - Top horizontal or nearly horizontal reinforcement may have more than 1% of fresh concrete cast below the reinforcement.

2. **Lap splice length:**
   - Classes of lap splice lengths.

**DEVELOPMENT LENGTH AND LAP SPlice LENGTH OF DEFORMED BARS IN COMPRESSION**

**AASHTO LRFD Specifications, Articles 5.11.2.2.1 and 5.11.5.1**

<table>
<thead>
<tr>
<th>Size</th>
<th>Top Bars</th>
<th>Top Bars</th>
<th>Top Bars</th>
<th>Top Bars</th>
<th>Top Bars</th>
<th>Top Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes for Deformed Bars in Compression:**

1. **Development length:**
   - Refer to AASHTO-LRFD for applicable modification factors.
   - Tables are based on normal-strength concrete.
   - Top horizontal or nearly horizontal reinforcement may have more than 1% of fresh concrete cast below the reinforcement.

2. **Lap splice length:**
   - Classes of lap splice lengths.

**COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY STANDARD REINFORCEMENT BAR FABRICATION DETAILS**

**BC-736M**

**Recommended September 2001, Revised January 2004.**

**Sheet 2 of 3**
### DEVELOPMENT LENGTH AND LAP SPlice LENGTH OF DEFORMED BARS IN TENSION

AASHTO LRFD SPECIFICATIONS, ARTICLES 5.11.2.1.1, 5.11.2.1.2, 5.11.3.1

#### TABLE A

- **f'c = 3000 PSI (CLASS A)**
- **f'c = 3500 PSI (CLASS AA)**
- **f'c = 4000 PSI (CLASS AAA OR AAAP)**

#### TABLE B

- **f'c = 4000 PSI (CLASS AAA OR AAAP)**
- **f'c = 4500 PSI**

#### TABLE C

- **f'c = 4500 PSI**

#### TABLE D

- **f'c = 5000 PSI or AAAP**

---

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD REINFORCEMENT BAR FABRICATION DETAILS**
GENERAL NOTES

1. PROVIDE 3-INCH CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.
2. PROVIDE A CEMENT CONCRETE 1:1:2:3 OR 1:1:4:3.
3. PROVIDE 60 TONS PER SQUARE FEET, AT A MINIMUM OF 100 TONS PER SQUARE FEET, AS NECESSARY FOR PROPER FIT OF THE PROPOSED CONSTRUCTION.
4. PROVIDE ANCHOR BOLTS FOR EACH ANCHOR BOLT HOLE, AS NECESSARY, FOR EACH ANCHOR BOLT HOLE.
5. PROVIDE GRADE 60 REINFORCING STEEL BARS THAT MEET THE REQUIREMENTS OF ASTM A615 FOR CONCRETE REINFORCEMENT. DO NOT WELD REINFORCING STEEL BARS.
6. PROVIDE STEEL MEMBER COMPONENTS REQUIRING CHARPY V-NOTCH TESTING ARE DESIGNATED ON THE PROJECT DRAWINGS.
7. PROVIDE ANCHOR BOLT HOLES "LARGER THAN BOLT DIAMETER.
8. PROVIDE A MINIMUM ANCHOR BOLT EMBEDMENT LENGTH OF 20 DIAMETERS.
9. PROVIDE A MINIMUM NUTS AND WASHERS FOR EACH ANCHOR BOLT.
10. PROVIDE A MINIMUM AT LEAST 1 INCH BY 1 INCH.
11. PIPE DIAMETERS SHOWN UP TO AND INCLUDING 12 INCHES ARE NOMINAL DIAMETERS.
12. PIPE DIAMETERS SHOWN FROM 14 INCHES AND UP ARE ACTUAL DIAMETERS.
13. PIPE DIAMETERS SHOWN FROM 18 INCHES AND UP ARE ACTUAL DIAMETERS.
14. PIPE DIAMETERS SHOWN FROM 24 INCHES AND UP ARE ACTUAL DIAMETERS.
15. PIPE DIAMETERS SHOWN FROM 30 INCHES AND UP ARE ACTUAL DIAMETERS.
16. PIPE DIAMETERS SHOWN FROM 36 INCHES AND UP ARE ACTUAL DIAMETERS.
17. PIPE DIAMETERS SHOWN FROM 42 INCHES AND UP ARE ACTUAL DIAMETERS.
18. PIPE DIAMETERS SHOWN FROM 48 INCHES AND UP ARE ACTUAL DIAMETERS.
19. PIPE DIAMETERS SHOWN FROM 54 INCHES AND UP ARE ACTUAL DIAMETERS.
20. PIPE DIAMETERS SHOWN FROM 60 INCHES AND UP ARE ACTUAL DIAMETERS.
21. PIPE DIAMETERS SHOWN FROM 66 INCHES AND UP ARE ACTUAL DIAMETERS.
22. PIPE DIAMETERS SHOWN FROM 72 INCHES AND UP ARE ACTUAL DIAMETERS.
23. PIPE DIAMETERS SHOWN FROM 78 INCHES AND UP ARE ACTUAL DIAMETERS.
24. PIPE DIAMETERS SHOWN FROM 84 INCHES AND UP ARE ACTUAL DIAMETERS.
25. PIPE DIAMETERS SHOWN FROM 90 INCHES AND UP ARE ACTUAL DIAMETERS.
26. PIPE DIAMETERS SHOWN FROM 96 INCHES AND UP ARE ACTUAL DIAMETERS.
27. PIPE DIAMETERS SHOWN FROM 102 INCHES AND UP ARE ACTUAL DIAMETERS.
28. PIPE DIAMETERS SHOWN FROM 108 INCHES AND UP ARE ACTUAL DIAMETERS.
29. PIPE DIAMETERS SHOWN FROM 114 INCHES AND UP ARE ACTUAL DIAMETERS.
30. PIPE DIAMETERS SHOWN FROM 120 INCHES AND UP ARE ACTUAL DIAMETERS.
31. PIPE DIAMETERS SHOWN FROM 126 INCHES AND UP ARE ACTUAL DIAMETERS.
32. PIPE DIAMETERS SHOWN FROM 132 INCHES AND UP ARE ACTUAL DIAMETERS.
33. PIPE DIAMETERS SHOWN FROM 138 INCHES AND UP ARE ACTUAL DIAMETERS.
34. PIPE DIAMETERS SHOWN FROM 144 INCHES AND UP ARE ACTUAL DIAMETERS.
35. PIPE DIAMETERS SHOWN FROM 150 INCHES AND UP ARE ACTUAL DIAMETERS.
36. PIPE DIAMETERS SHOWN FROM 156 INCHES AND UP ARE ACTUAL DIAMETERS.
37. PIPE DIAMETERS SHOWN FROM 162 INCHES AND UP ARE ACTUAL DIAMETERS.
38. PIPE DIAMETERS SHOWN FROM 168 INCHES AND UP ARE ACTUAL DIAMETERS.
39. PIPE DIAMETERS SHOWN FROM 174 INCHES AND UP ARE ACTUAL DIAMETERS.
40. PIPE DIAMETERS SHOWN FROM 180 INCHES AND UP ARE ACTUAL DIAMETERS.
41. PIPE DIAMETERS SHOWN FROM 186 INCHES AND UP ARE ACTUAL DIAMETERS.
42. PIPE DIAMETERS SHOWN FROM 192 INCHES AND UP ARE ACTUAL DIAMETERS.
43. PIPE DIAMETERS SHOWN FROM 198 INCHES AND UP ARE ACTUAL DIAMETERS.
44. PIPE DIAMETERS SHOWN FROM 204 INCHES AND UP ARE ACTUAL DIAMETERS.
45. PIPE DIAMETERS SHOWN FROM 210 INCHES AND UP ARE ACTUAL DIAMETERS.
46. PIPE DIAMETERS SHOWN FROM 216 INCHES AND UP ARE ACTUAL DIAMETERS.
47. PIPE DIAMETERS SHOWN FROM 222 INCHES AND UP ARE ACTUAL DIAMETERS.
48. PIPE DIAMETERS SHOWN FROM 228 INCHES AND UP ARE ACTUAL DIAMETERS.
49. PIPE DIAMETERS SHOWN FROM 234 INCHES AND UP ARE ACTUAL DIAMETERS.
50. PIPE DIAMETERS SHOWN FROM 240 INCHES AND UP ARE ACTUAL DIAMETERS.
51. PIPE DIAMETERS SHOWN FROM 246 INCHES AND UP ARE ACTUAL DIAMETERS.
52. PIPE DIAMETERS SHOWN FROM 252 INCHES AND UP ARE ACTUAL DIAMETERS.
53. PIPE DIAMETERS SHOWN FROM 258 INCHES AND UP ARE ACTUAL DIAMETERS.
54. PIPE DIAMETERS SHOWN FROM 264 INCHES AND UP ARE ACTUAL DIAMETERS.
55. PIPE DIAMETERS SHOWN FROM 270 INCHES AND UP ARE ACTUAL DIAMETERS.
56. PIPE DIAMETERS SHOWN FROM 276 INCHES AND UP ARE ACTUAL DIAMETERS.
57. PIPE DIAMETERS SHOWN FROM 282 INCHES AND UP ARE ACTUAL DIAMETERS.
58. PIPE DIAMETERS SHOWN FROM 288 INCHES AND UP ARE ACTUAL DIAMETERS.
59. PIPE DIAMETERS SHOWN FROM 294 INCHES AND UP ARE ACTUAL DIAMETERS.
60. PIPE DIAMETERS SHOWN FROM 300 INCHES AND UP ARE ACTUAL DIAMETERS.
61. PIPE DIAMETERS SHOWN FROM 306 INCHES AND UP ARE ACTUAL DIAMETERS.
62. PIPE DIAMETERS SHOWN FROM 312 INCHES AND UP ARE ACTUAL DIAMETERS.
63. PIPE DIAMETERS SHOWN FROM 318 INCHES AND UP ARE ACTUAL DIAMETERS.
64. PIPE DIAMETERS SHOWN FROM 324 INCHES AND UP ARE ACTUAL DIAMETERS.
65. PIPE DIAMETERS SHOWN FROM 330 INCHES AND UP ARE ACTUAL DIAMETERS.
66. PIPE DIAMETERS SHOWN FROM 336 INCHES AND UP ARE ACTUAL DIAMETERS.
67. PIPE DIAMETERS SHOWN FROM 342 INCHES AND UP ARE ACTUAL DIAMETERS.
68. PIPE DIAMETERS SHOWN FROM 348 INCHES AND UP ARE ACTUAL DIAMETERS.
69. PIPE DIAMETERS SHOWN FROM 354 INCHES AND UP ARE ACTUAL DIAMETERS.
70. PIPE DIAMETERS SHOWN FROM 360 INCHES AND UP ARE ACTUAL DIAMETERS.
71. PIPE DIAMETERS SHOWN FROM 366 INCHES AND UP ARE ACTUAL DIAMETERS.
72. PIPE DIAMETERS SHOWN FROM 372 INCHES AND UP ARE ACTUAL DIAMETERS.
73. PIPE DIAMETERS SHOWN FROM 378 INCHES AND UP ARE ACTUAL DIAMETERS.
74. PIPE DIAMETERS SHOWN FROM 384 INCHES AND UP ARE ACTUAL DIAMETERS.
75. PIPE DIAMETERS SHOWN FROM 390 INCHES AND UP ARE ACTUAL DIAMETERS.
76. PIPE DIAMETERS SHOWN FROM 396 INCHES AND UP ARE ACTUAL DIAMETERS.
77. PIPE DIAMETERS SHOWN FROM 402 INCHES AND UP ARE ACTUAL DIAMETERS.
78. PIPE DIAMETERS SHOWN FROM 408 INCHES AND UP ARE ACTUAL DIAMETERS.
79. PIPE DIAMETERS SHOWN FROM 414 INCHES AND UP ARE ACTUAL DIAMETERS.
80. PIPE DIAMETERS SHOWN FROM 420 INCHES AND UP ARE ACTUAL DIAMETERS.
81. PIPE DIAMETERS SHOWN FROM 426 INCHES AND UP ARE ACTUAL DIAMETERS.
82. PIPE DIAMETERS SHOWN FROM 432 INCHES AND UP ARE ACTUAL DIAMETERS.
83. PIPE DIAMETERS SHOWN FROM 438 INCHES AND UP ARE ACTUAL DIAMETERS.
84. PIPE DIAMETERS SHOWN FROM 444 INCHES AND UP ARE ACTUAL DIAMETERS.
85. PIPE DIAMETERS SHOWN FROM 450 INCHES AND UP ARE ACTUAL DIAMETERS.
86. PIPE DIAMETERS SHOWN FROM 456 INCHES AND UP ARE ACTUAL DIAMETERS.
87. PIPE DIAMETERS SHOWN FROM 462 INCHES AND UP ARE ACTUAL DIAMETERS.
88. PIPE DIAMETERS SHOWN FROM 468 INCHES AND UP ARE ACTUAL DIAMETERS.
89. PIPE DIAMETERS SHOWN FROM 474 INCHES AND UP ARE ACTUAL DIAMETERS.
90. PIPE DIAMETERS SHOWN FROM 480 INCHES AND UP ARE ACTUAL DIAMETERS.
91. PIPE DIAMETERS SHOWN FROM 486 INCHES AND UP ARE ACTUAL DIAMETERS.
92. PIPE DIAMETERS SHOWN FROM 492 INCHES AND UP ARE ACTUAL DIAMETERS.
93. PIPE DIAMETERS SHOWN FROM 498 INCHES AND UP ARE ACTUAL DIAMETERS.
94. PIPE DIAMETERS SHOWN FROM 504 INCHES AND UP ARE ACTUAL DIAMETERS.
95. PIPE DIAMETERS SHOWN FROM 510 INCHES AND UP ARE ACTUAL DIAMETERS.
96. PIPE DIAMETERS SHOWN FROM 516 INCHES AND UP ARE ACTUAL DIAMETERS.
97. PIPE DIAMETERS SHOWN FROM 522 INCHES AND UP ARE ACTUAL DIAMETERS.
98. PIPE DIAMETERS SHOWN FROM 528 INCHES AND UP ARE ACTUAL DIAMETERS.
99. PIPE DIAMETERS SHOWN FROM 534 INCHES AND UP ARE ACTUAL DIAMETERS.
100. PIPE DIAMETERS SHOWN FROM 540 INCHES AND UP ARE ACTUAL DIAMETERS.
101. PIPE DIAMETERS SHOWN FROM 546 INCHES AND UP ARE ACTUAL DIAMETERS.
102. PIPE DIAMETERS SHOWN FROM 552 INCHES AND UP ARE ACTUAL DIAMETERS.
103. PIPE DIAMETERS SHOWN FROM 558 INCHES AND UP ARE ACTUAL DIAMETERS.
104. PIPE DIAMETERS SHOWN FROM 564 INCHES AND UP ARE ACTUAL DIAMETERS.
105. PIPE DIAMETERS SHOWN FROM 570 INCHES AND UP ARE AC...
ALTERNATE CAISSON FOUNDATIONS

#13-602-BDTD AND #14-603-BDTD FOR SUPPORT OF THIRD REGION OF FLAT SECTIONS BETWEEN BREAK POINTS. AND AT COLUMN CONNECTION SPLICE PLATE LOCATIONS, WELD SHALL START AND STOP IN THE MIDDLE.

WELDS MUST BE 100% RADIOGRAPHICALLY INSPECTED. FOR THE COLUMN CONNECTION TO BASE PLATE, OVERHEAD SIGN STRUCTURES ON DETAILS SHALL BE COMPLETE PENETRATION WELDS. COMPLETE PENETRATION LONGITUDINAL SEAM WELDS WITHIN 6" OF THE ENDS OF THE PRESS BREAK MEMBER OR LENGTH SHOWN MUST HAVE THE EQUIVALENT STRENGTH AND FATIGUE RESISTANCE OF THE CIRCULAR MEMBER BEING "PRESS-BREAK" NOTE: EQUIVALENT "PRESS-BREAK" MEMBERS CIRCULAR MEMBERS AND OR AS REQUIRED BY DESIGN) #4 TIES @ 12" (MINIMUM SPLICE LOCATIONS) "PRESS-BREAK" MEMBERS ARE PERMITTED IN PLACE OF #4 TIES AT 12", A #4 BAR SPiral WITH A 12" CIRCLE MAY BE USED. THE #4 TIES AT 12" ARE THE MINIMUM AS REQUIRED BY DESIGN.

NOTES:
- PROVIDE 500 OR 1000 WORKS ON ALL "L" AND "T" BARS.
- LEMON FOR "L" AND "T" BARS MUST NOT INCLUDE 500 OR 1000 WORK LENGTH.
- COUNT AND SIZE OF PENETAL DETAILS "L" BARS TO BE SPECIFIED ON THE CONTRACT DOCUMENTS, BASED ON INFORMATION OBTAINED FROM DESIGN TABLES ON BD-641M, SHEETS 6, 7, AND 8.
- FOR ADDITIONAL FOUNDATION NOTES, SEE SHEET 2.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES CANTILEVER AND CENTER-MOUNT STRUCTURES STRUT LENGTHS UP TO 40' FOUNDATION DETAILS AND ALTERNATE CAISSON FOUNDATION

RECOMMENDED SEPT. 30, 2016

ALTERNATE PIPE CAP DETAIL

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

"PRESS-BREAK" NOTE:
ALTERNATE "PRESS-BREAK" MEMBERS ARE PERMITTED FOR COLUMNS. "PRESS-BREAK" MEMBERS MUST HAVE THE EQUIVALENT STRENGTH AND FATIGUE RESISTANCE OF CIRCULAR MEMBERS BEING REPLACED. A MINIMUM NUMBER OF 12 BARS IS REQUIRED. A CHANGE IN STEEL MATERIAL IN ALL REPLACEMENT BARS IS NOT PERMITTED.

SECTION C-C

ALTERNATE FOUNDATION

NOTES:
- PROVIDE 500 OR 1000 WORKS ON ALL "L" AND "T" BARS.
- LEMON FOR "L" AND "T" BARS MUST NOT INCLUDE 500 OR 1000 WORK LENGTH.
- COUNT AND SIZE OF PENETAL DETAILS "L" BARS TO BE SPECIFIED ON THE CONTRACT DOCUMENTS, BASED ON INFORMATION OBTAINED FROM DESIGN TABLES ON BD-641M, SHEETS 6, 7, AND 8.
- FOR ADDITIONAL FOUNDATION NOTES, SEE SHEET 2.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES CANTILEVER AND CENTER-MOUNT STRUCTURES STRUT LENGTHS UP TO 40' FOUNDATION DETAILS AND ALTERNATE CAISSON FOUNDATION

RECOMMENDED SEPT. 30, 2016

ALTERNATE PIPE CAP DETAIL

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

"PRESS-BREAK" NOTE:
ALTERNATE "PRESS-BREAK" MEMBERS ARE PERMITTED FOR COLUMNS. "PRESS-BREAK" MEMBERS MUST HAVE THE EQUIVALENT STRENGTH AND FATIGUE RESISTANCE OF CIRCULAR MEMBERS BEING REPLACED. A MINIMUM NUMBER OF 12 BARS IS REQUIRED. A CHANGE IN STEEL MATERIAL IN ALL REPLACEMENT BARS IS NOT PERMITTED.

SECTION C-C

ALTERNATE FOUNDATION

NOTES:
- PROVIDE 500 OR 1000 WORKS ON ALL "L" AND "T" BARS.
- LEMON FOR "L" AND "T" BARS MUST NOT INCLUDE 500 OR 1000 WORK LENGTH.
- COUNT AND SIZE OF PENETAL DETAILS "L" BARS TO BE SPECIFIED ON THE CONTRACT DOCUMENTS, BASED ON INFORMATION OBTAINED FROM DESIGN TABLES ON BD-641M, SHEETS 6, 7, AND 8.
- FOR ADDITIONAL FOUNDATION NOTES, SEE SHEET 2.
RECOMMENDED

DIRECTOR, BUR. OF PROJECT DELIVERY

REMOVABLE AND ATTACHED TO BASEPLATE WITH STAINLESS STEEL HARDWARE.

FILLET WELDED TO THE BASE PLATE BEFORE THE FULL PENETRATION GROOVE

BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY MAINTAIN THE SPACING AND ALIGNMENT OF ANCHOR BOLTS.

NOTE: D DENOTES DIAMETER

COLUMN BASES

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

NOTE: D DENOTES DIAMETER

NOTE: GAGE REQUIRED FOR WALL THICKNESS EXCEEDING \( \frac{1}{8} \) ″, 0.500 MIN.

DETAIL B NOTES:

1. BACKING RING MUST BE ATTACHED TO THE PIPING COLUMN AND CONTINUOUSLY FILLED UP TO THE BASE PLATE BEFORE THE FULL PENETRATION GROOVE.

2. FOR COLUMN LESS THAN \( 12" \) ″ DIAMETER, THE FILLET MELD IN THE DETAIL Shown IS NOT REQUIRED BUT IS RECOMMENDED. FOR COLUMN DIAMETER OF \( \geq 12" \) ″, THE FILLET MELD IN THIS DETAIL SHOWN IS REQUESTED.
NOTE:
- The column (CVN*) is required for wall thicknesses exceeding 1 1/8" (0.500")
- CVN is required for wall thicknesses exceeding 1 1/8" (0.500")

DETAIL V

SECTION H-H

SECTION J-J

SECTION K-K

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

SIGN SUPPORT BEAM SIZES

SIGN SUPPORT BEAM

SIZE

1 TO 10'-0"
3x5" W40-15
10'-0" TO 12'-0"
4x6" W6x15
12'-0" TO 16'-0"
5x8" W6x20
16'-0" TO 20'-0"
6x10" W6x25
20'-0" TO 24'-0"
7x12" W8x28
24'-0" TO 30'-0"
8x14" W8x31
30'-0" TO 40'-0"
9x16" W8x35

NOTE:
- For sizes not shown, 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-8701E, TC-8715 and TC-8715.
- CVN is required for all thicknesses exceeding 1 1/8" (0.500").
GENERAL NOTES

1. PROVIDE 3-INCH CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.
2. USE CLASS C CEMENT CONCRETE, 3000 PSI IN PERPENDICULAR AND CROSSTRACTION.
3. PROVIDE 0.5 PERCENT FLEXURAL STEEL THAT MEET THE REQUIREMENTS OF ASTM FOR CONCRETE RETAINING WALLS. AS AST Steele RETAINING WALLS.
4. RUN-FINISH ALL HORIZONTAL CONSTRUCTION JOINTS, EXCEPT AS INDICATED.
5. PROVIDE 0.5 PERCENT FLEXURAL STEEL THAT MEET THE REQUIREMENTS OF ASTM FOR CONCRETE RETAINING WALLS. AS AST Steele RETAINING WALLS.
6. PROVIDE 3-INCH CONCRETE COVER ON REINFORCEMENT BARS, EXCEPT AS NOTED.
7. PROVIDE ALL MATERIALS AND WORKMANSHIP, AS NOTED, IN THIS SHEET.
8. DESIGN CRITERIA FOR PENNDOT SIGN STRUCTURES

NOTES TO FABRICATOR

1. PROVIDE 0.5 PERCENT FLEXURAL STEEL THAT MEET THE REQUIREMENTS OF ASTM FOR CONCRETE RETAINING WALLS. AS AST Steele RETAINING WALLS.
2. PROVIDE ALL MATERIALS AND WORKMANSHIP, AS NOTED, IN THIS SHEET.
3. DESIGN CRITERIA FOR PENNDOT SIGN STRUCTURES

DESIGN CRITERIA FOR PENNDOT SIGN STRUCTURES

- **DEAD LOADS**: PENNDOT Std. Cond. (U.N.0.0)
- **LIGHT LOADS**: PENNDOT Std. Cond. (U.N.0.0)
- **EXTERNAL LOADS**: PENNDOT Std. Cond. (U.N.0.0)
- **GROUP LOADS**: PENNDOT Std. Cond. (U.N.0.0)

**BOLT CRITERIA**: PENNDOT Std. Cond. (U.N.0.0)

**CONSTRUCTION GENERAL NOTES**

- **MATERIALS AND WORKMANSHIP**: PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE AASHTO MATERIAL SPECIFICATIONS AND THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION DESIGN CRITERIA.
- **EARTHWORK FOR STRUCTURES**: PENNDOT Std. Cond. (U.N.0.0)
- **PLANT HOOK-UP**: PENNDOT Std. Cond. (U.N.0.0)
- **REFERENCES**: PENNDOT Std. Cond. (U.N.0.0)

**OVERHEAD SIGN STRUCTURES**

- **2 POST PLANAR TRUSSES**: PENNDOT Std. Cond. (U.N.0.0)
- **SPANS FROM 30' TO 100'**: PENNDOT Std. Cond. (U.N.0.0)

**NOTES AND DESIGN CRITERIA**

- **REFERENCES**: PENNDOT Std. Cond. (U.N.0.0)
- **RECOMMENDED SPANS**: PENNDOT Std. Cond. (U.N.0.0)
- **BC-743M**: PENNDOT Std. Cond. (U.N.0.0)

**COMMUNICATING INFORMATION BETWEEN PENNDOT AND FABRICATORS**

- **PROJECT SPECIFICATIONS**: PENNDOT Std. Cond. (U.N.0.0)
- **CONTRACT DRAWINGS**: PENNDOT Std. Cond. (U.N.0.0)
- **REFERENCE DRAWINGS**: PENNDOT Std. Cond. (U.N.0.0)
OVERHEAD SIGN STRUCTURES

ALTERNATE CAISSON FOUNDATION

"D" DIAMETER

GROUND LINE

FINISHED

N.T.S.

CAISSON ELEVATION

"L" LENGTH

EMBEDMENT

CAISSON

NOTES:

THE SPREAD FOOTING SIZE SHOWN ON THE CONTRACT DRAWINGS.

ALTERNATE CAISSON FOUNDATIONS ARE PERMITTED IN PLACE OF

WITH DESIGN CRITERIA GIVEN ON SHEET T.

ALTERNATE CAISSON FOUNDATIONS MUST BE DESIGNED IN ACCORDANCE

"N" QUANTITY AND BAR SIZE

REINFORCEMENT

CAISSON

BRIDGE ENGINEER FOR REVIEW AND APPROVAL.

AND REINFORCEMENT MUST BE SUBMITTED TO THE DISTRICT

DESIGN COMPUTATIONS FOR THE REQUIRED CAISSON EMBEDMENT

EQUIVALENT "PRESS-BREAK" MEMBERS

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF TRANSPORTATION

CHIEF BRIDGE ENGINEER

RECOMMENDED

BC-743M

SHT. 3 OF 10

SECTION C-C

#4 TIES @ 12"

6"

MIN.

SPANS FROM 30' TO 100'

2 POST PLANAR TRUSS

SCREEN

GALV. RODENT

OVERHEAD SIGN STRUCTURES

2 POST PLANAR TRUSS

SPANS FROM 30' TO 100'

ALTERNATE CAISSON FOUNDATION
CHIEF BRIDGE ENGINEER
DIRECTOR, BUR. OF PROJECT DELIVERY

SEPT. 30, 2016

BC-743M

POLE ASSEMBLY IS GALVANIZED.

RECOMMENDED
SCREEN
B /2

2. FOR COLUMNS AND CHORDS LESS THAN 19" DIA., THIS FILLET WELD IS NOT REQUIRED BUT SHOP IS TO APPLY SILICON CALKING TO THIS LOCATION AFTER WELD IS MADE. BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY WRAPPED AROUND THE PIPE COLUMN. THE FULL PENETRATION GROOVE WELD TO BE COMPLETE PENETRATION. SEAM MUST HAVE 100% PENETRATION.

1. BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY WRAPPED AROUND THE PIPE COLUMN. THE FULL PENETRATION GROOVE WELD TO BE COMPLETE PENETRATION. SEAM MUST HAVE 100% PENETRATION.

SCREEN IS TO BE ENTRY OF RODENTS WHILE PERMITTING DRAINAGE. SCREEN IS TO BE REMOVABLE AND ATTACHED TO BASEPLATE WITH STAINLESS STEEL HARDWARE.

NOTES:

1. BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY WRAPPED AROUND THE PIPE COLUMN. THE FULL PENETRATION GROOVE WELD TO BE COMPLETE PENETRATION. SEAM MUST HAVE 100% PENETRATION.

2. FOR COLUMNS AND CHORDS LESS THAN 19" DIA., THIS FILLET WELD IS NOT REQUIRED BUT SHOP IS TO APPLY SILICON CALKING TO THIS LOCATION AFTER WELD IS MADE. BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY WRAPPED AROUND THE PIPE COLUMN. THE FULL PENETRATION GROOVE WELD TO BE COMPLETE PENETRATION. SEAM MUST HAVE 100% PENETRATION.

DETAIL B NOTES:

1. BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY WRAPPED AROUND THE PIPE COLUMN. THE FULL PENETRATION GROOVE WELD TO BE COMPLETE PENETRATION. SEAM MUST HAVE 100% PENETRATION.

2. FOR COLUMNS AND CHORDS LESS THAN 19" DIA., THIS FILLET WELD IS NOT REQUIRED BUT SHOP IS TO APPLY SILICON CALKING TO THIS LOCATION AFTER WELD IS MADE. BACKING RING MUST BE FITTED/SIZED TO THE PIPE COLUMN AND CONTINUOUSLY WRAPPED AROUND THE PIPE COLUMN. THE FULL PENETRATION GROOVE WELD TO BE COMPLETE PENETRATION. SEAM MUST HAVE 100% PENETRATION.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

SHEET 4 OF 10

RECOMMENDED SEP 30, 2016
RECOMMENDED OCT 13, 2016

BC-743M

SEPT. 30, 2016

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

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

NOTES:
- ALL STEEL TO BE ASTM A36 AND UTILITY GRADE, UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
- ALLOWS FOR PIERS AS PER SECTION 948.3.
- ALL MATERIALS TO BE ASTM A36 AND UTILITY GRADE, UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.

MINIMUM THICKNESS EXCEEDS 0.70xINSIDE DIAMETER CHORD (CNW) WHEN WALL THICKNESS EXCEEDS 0.55xINSIDE DIAMETER.

ELEVATION
MID-PANEL CHORD SPLICE

SECTION THRU TRUSS AT PANEL POINT

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

SECTION E-E
HOLES IN SPLICE PLATE TO BE HIGHER STRENGTH STEEL BOLTS.

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

MINIMUM THICKNESS EXCEEDS 0.70xINSIDE DIAMETER CHORD (CNW) WHEN WALL THICKNESS EXCEEDS 0.55xINSIDE DIAMETER.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
OVERHEAD SIGN STRUCTURES
2 POST PLANAR TRUSS
SPANS FROM 30' TO 100'
TRUSS DETAILS - 1

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

MINIMUM THICKNESS EXCEEDS 0.70xINSIDE DIAMETER CHORD (CNW) WHEN WALL THICKNESS EXCEEDS 0.55xINSIDE DIAMETER.
TRUSS DETAILS - 2
SPANS FROM 30' TO 100'

1. Post Planar Truss

2. Overhead Sign Structures

### GUSSET PLATE DIMENSIONS

<table>
<thead>
<tr>
<th>CHORD MATERIAL</th>
<th>MIN. WEB THICKNESS</th>
<th>WEB WELD LENGTH</th>
<th>MEM.</th>
<th>MIN. VERT. MEMBER</th>
<th>MIN. PANEL POINT CONNECT P</th>
<th>GUSSET PLATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; x 20.5&quot;</td>
<td>3/16&quot;</td>
<td>1/16&quot;</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>6&quot; x 25.5&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>6&quot; x 30.5&quot;</td>
<td>5/32&quot;</td>
<td>5/32&quot;</td>
<td>5/32&quot;</td>
<td>5/32&quot;</td>
<td>5/32&quot;</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>6&quot; x 35.5&quot;</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>6&quot; x 40.5&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
</tr>
</tbody>
</table>

**NOTE:**
- When replacing gusset plates, keep flange backout to be equal to or larger than the flange thickness in the connection detail. If used with no substitution, the backout shall be equal to or larger than the flange thickness in the connection detail. If used with substitution, it shall be at the fabricator's discretion.
- **WEB AND VERTICAL MEMBER SUBSTITUTION TABLE**

<table>
<thead>
<tr>
<th>PIPE SECTION</th>
<th>ST/WT SUBSTITUTION SECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>3&quot; x 20.5&quot;</td>
<td>ST/WT 5.5</td>
</tr>
<tr>
<td>3&quot; x 25.5&quot;</td>
<td>ST/WT 7.5</td>
</tr>
<tr>
<td>3&quot; x 30.5&quot;</td>
<td>ST/WT 10</td>
</tr>
<tr>
<td>3&quot; x 35.5&quot;</td>
<td>ST/WT 12</td>
</tr>
<tr>
<td>3&quot; x 40.5&quot;</td>
<td>ST/WT 14</td>
</tr>
</tbody>
</table>

**WEB AND VERTICAL PIPE SECTION MAY BE REPLACED WITH THE ST/WT SUBSTITUTION SECTION SHOWN IN THE TABLE. WHEN USED AS SUBSTITUTION, THE CONNECTION DETAIL OF THE SUBSTITUTION IS SHOWN. IT WILL BE AT THE ADDITIONAL COST TO THE DEPARTMENT.**

**WEB HOLES:**
- Provided for panel thickness equal to or larger than the flange thickness in the connection detail. If used with no substitution, the backout shall be equal to or larger than the flange thickness in the connection detail. If used with substitution, it shall be at the fabricator's discretion.

**BOLTS REQUIRED FOR ST/WT ALTERNATE PANEL POINT CONNECTION detail:**

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>CTRY.</th>
<th>DIA.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST/WT 1&quot;</td>
<td>5</td>
<td>1&quot;</td>
</tr>
<tr>
<td>ST/WT 3/4&quot;</td>
<td>6</td>
<td>1&quot;</td>
</tr>
<tr>
<td>ST/WT 1/2&quot;</td>
<td>8</td>
<td>1&quot;</td>
</tr>
<tr>
<td>ST/WT 5/8&quot;</td>
<td>10</td>
<td>1/8&quot;</td>
</tr>
</tbody>
</table>

**NOTE:**
- Where no gusset plate size provides adequate size, provide bolts equal to the minimum weld size specified.
NOTE:

- BACK OF ANGLE ALIGN WITH C AS REQ'D.
- SIGN SUPPORT BEAMS NOT SHOWN.
- PLACE ONE ADDITIONAL LUMINAIRE SUPPORT BEAM WHEN TWO OR MORE LIGHT FIXTURES ARE REQUIRED.

**SPECIAL LIGHT FIXTURE SUPPORT DETAILS-LUMINAIRE**

FOR STRUCTURE MOUNTED ON HIGHWAY BRIDGE

SECTION B-B

- PROVIDE 1/8" x 3" STEEL HOLE AND FLANGE NUTS AND PLAIN WASHER AT EACH SUPPORT.
- 1/8" BOLT WITH LOCK NUT AND PLAIN WASHER (2 REQD. AT EACH SUPPORT).
- 7'-0" MAX. SIGN SUPPORT BEAM SPACING.

SECTION S-S

- 2 1/8" x 3/4" x 4/0" NOS.
- 1/8" BOLT WITH LOCK NUT AND FLANGE WASHER.
- 1 1/4" x 3/4" x 4/0" NOS.
- 1/8" BOLT WITH LOCK NUT AND FLANGE WASHER.

SECTION 2-B

- SIGN SUPPORT BEAM ANGLE CENTER OF GRAVITY.

**SHIM DETAIL**

- PROVIDE TIGHT FIT, SHIM AS REQUIRED TO PROVIDE TIGHT FIT.

**SIGN SUPPORT DETAIL**

FOR SECTION E-E SEE SHEET 5

**FOR DETAIL OF SUPPORT CONNECTION, SEE SHEET 3.

**FOR SPECIAL LIGHT FIXTURE SUPPORT DETAIL, SEE SHEET 10.

**FOR TYPICAL SUPPORT BRACKET SPACING DIAGRAM, SEE SHEET 5.

**FOR TYPICAL SIGN SUPPORT CONNECTION ANGLE, SEE SHEET 4.

**COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY OVERHEAD SIGN STRUCTURES 2 POST PLANAR TRUSS SPANS FROM 30' TO 100' SPECIAL LIGHT SUPPORT DETAILS FOR BRIDGE MOUNTED STRUCTURES

RECOMMENDED SEP. 10, 2016 RECOMMENDED SEP. 10, 2016

BC-743M
AND AT COLUMN CONNECTION SPLICE PLATE LOCATIONS, WELD SHALL START AND STOP IN THE MIDDLE.

WELDS MUST BE 100% RADIOGRAPHICALLY INSPECTED. FOR THE COLUMN CONNECTION TO BASE PLATE, ON DETAILS SHALL BE COMPLETE PENETRATION WELDS. COMPLETE PENETRATION LONGITUDINAL SEAM WELDS WITHIN 6" OF THE ENDS OF THE PRESS BREAK MEMBER OR LENGTH SHOWN.

WELD TYPE. LONGITUDINAL SEAM WELDS SHALL HAVE 60 PERCENT MINIMUM PENETRATION, EXCEPT WELDS INDICATING TYPE OF WELD, WELD PENETRATION, EFFECTIVE DEPTH AND LENGTH OF EACH.

SPANS FROM 60' TO 240'

2 POST AND 4 POST TRI-CHORD TRUSS


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 40 DIAMETERS IS REQUIRED. A CHANGE IN STEEL MATERIAL IS REQUIRED IN THE REGION WHERE THE COLUMN CHANGES SIZE. SEE NOTE 2.

NOTE: WELDING MUST BE PERFORMED AS A CONTINUOUS RING. BACKING RING MAY BE FABRICATED AS A CONTINUOUS RING.

BACKING RING MAY BE FABRICATED AS A CONTINUOUS RING. BACKING RING MAY BE FABRICATED AS A CONTINUOUS RING.

FOR PIPE CAP DETAILS, SEE SHEET 12.

ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. SEE NOTE 2.

NOTES:

- ANCHOR BOLTS MAY BE PROVIDED FROM FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS MUST BE GALVANIZED AFTER THREADING.
- USE STEEL TEMPLATE TO SET ANCHOR BOLTS IN ACCORDANCE WITH PUBLICATION 408, SECTION 948.3(b). ANCHOR BOLTS SHALL BE GALVANIZED AFTER THREADING.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.

NOTES:

- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
- ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL. ANCHOR BOLTS SHALL BE PROVIDED WITH FOUR HEAVY HEX NUTS, ONE JAM NUT AND TWO WASHERS AS SHOWN ON THE ANCHOR BOLT DETAIL.
MINIMUM BOLT SPACING OF 3 TIMES THE BOLT DIAMETER.

**NOTES:**

- **CHORD SPLICE**
  - All bolts to be ASTM A449 threaded rod and galvanized in accordance with Pub. 408 unless stainless steel or other materials are specified.
  - Bolts per publication 408, Section 5.9.2. Unless noted otherwise.
  - For details of mounting signs to sign support beams, see standard drawing TC-8701E.
  - All materials for plug seats and sign support brackets to be structural steel unless noted, Grade 4.8.
  - For detail D, see Sheet 5.

- **TYPICAL SIGN SUPPORT BRACKET SPACING DIAGRAM**
  - Provide additional brackets as required at 6'-0" maximum spacing.

- **SECTION A-A**
  - Mid-panel chord splice.

- **DETAIL W**
  - See shim detail on this sheet.

- **CHORD SPLICE**
  - Nominal chord size may exceed 3" (CVN required for wall thickness exceeding 1" (0.500") and standard wall thickness of 2".
  - Provide tight fit.
  - If weld needed, 3/8" thickness may be required for wall thickness exceeding 1/2" (0.625).
TYPICAL LIGHT FIXTURE SUPPORT DETAILS

FOR SECTION A-A, SEE SHEET 8.

SECTION D-D

FOR SIGN SUPPORT BRACKETS IS 400 lbs. BASED ON 10'-0" WEIGHT OF LUMINAIRE AND SUPPORT BRACKETS OF SIGN SUPPORT BEAM, LUMINAIRE CAP (BY OTHERS)

SECTION E-E


FOR ELECTRICAL PANEL DETAILS, SEE DETAIL "X" AND TC-8715.

FOR ALTERNATE PIPE CAP DETAIL SEE SHEET 11.

ALL MATERIAL FOR SIGN SUPPORT BRACKETS TO BE STAINLESS STEEL OR OTHERWISE INDICATED.

ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.

SECURE HOLES (BY OTHERS)

LIMITED TO CHANNEL ONLY.

COLUMN CAP HOLE (SEE NOTE 5 ON SHEET 10)

CENTRAL COLUMN O. D.

GAGE IS 2".

NOTE:

ALL BOLTS TO BE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.

ALL MATERIAL FOR SIGN SUPPORT BRACKETS TO BE STAINLESS STEEL OR OTHERWISE INDICATED.

FOR ALTERNATE PIPE CAP DETAIL SEE SHEET 11.

GASKET CEMENTED WITH GASKET CEMENT.

** SPECIFY DEPTH OF DRILL AND TORQUE SPECIFIED. FOR SECTION A-A, SEE SHEET 8.
INFORMATION CONTAINED IN THE BS-446M DESIGN TABLES

- DESIGN TABLES ON STANDARD DRAWING BS-446M WERE DEVELOPED USING A COMPUTER PROGRAM AND ARE BASED ON THE DESIGN CRITERIA SHOWN ON THIS SHEET.
- THE MEMBER SIZES INCLUDES ALL REQUIREMENTS FOR VARIOUS COMBINATIONS OF LOADS, WIND, ICE, AND SOIL PRESSURES. THEY ALSO INCLUDE REQUIREMENTS FOR DIFFERENT CONSTRUCTION METHODS AND CONNECTIONS.
- THE DESIGN TABLES INCLUIDE ALL REQUIREMENTS FOR VARIOUS COMBINATIONS OF LOADS, WIND, ICE, AND SOIL PRESSURES. THEY ALSO INCLUDE REQUIREMENTS FOR DIFFERENT CONSTRUCTION METHODS AND CONNECTIONS.

GENERAL NOTES

- PROVIDE 3-INCH CONCRETE COVER IN REINFORCEMENT BARS, EXCEPT AS NOTED.
- PROVIDE 1/8-INCH CONCRETE COVER IN REINFORCEMENT BARS, EXCEPT AS NOTED.
- PROVIDE ALL REINFORCEMENT SECTIONS, BARS AND RODS TO MEET THE REQUIREMENTS OF ASTM A 416 KIN TO CONCRETE REQUIREMENTS AND ANY OTHER REQUIREMENTS OF THE PROJECT.
- PROVIDE ALL REINFORCEMENT SECTIONS, BARS AND RODS TO MEET THE REQUIREMENTS OF ASTM A 416 KIN TO CONCRETE REQUIREMENTS AND ANY OTHER REQUIREMENTS OF THE PROJECT.
- PROVIDE ALL REINFORCEMENT SECTIONS, BARS AND RODS TO MEET THE REQUIREMENTS OF ASTM A 416 KIN TO CONCRETE REQUIREMENTS AND ANY OTHER REQUIREMENTS OF THE PROJECT.
- PROVIDE ALL REINFORCEMENT SECTIONS, BARS AND RODS TO MEET THE REQUIREMENTS OF ASTM A 416 KIN TO CONCRETE REQUIREMENTS AND ANY OTHER REQUIREMENTS OF THE PROJECT.

CONSTRUCTION GENERAL NOTES

- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN ON THIS SHEET.
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN ON THIS SHEET.
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN ON THIS SHEET.
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN ON THIS SHEET.

REFERENCES

- DESIGN CRITERIA FOR PENNDOT SIGN STRUCTURES
- PENNDOT STD. DWGS. (U.N.O.)
- PENNDOT STD. DWGS. (U.N.O.)
- PENNDOT STD. DWGS. (U.N.O.)
- PENNDOT STD. DWGS. (U.N.O.)

NOTES AND DESIGN CRITERIA

- MATERIALS AND WORKMANSHIP
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN ON THIS SHEET.
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN ON THIS SHEET.
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN ON THIS SHEET.
- PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE SPECIFICATIONS SHOWN ON THIS SHEET.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

OVERHEAD SIGN STRUCTURES

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

NOTES AND DESIGN CRITERIA
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

FOUNDATION DETAILS

RECOMMENDED ONLY
SEE RC-52M OR RC-53M

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

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

PLAN OF FOUNDATION

** SEE "TOP ELEVATION" ON SHEET 3 FOR VALUE
OF "A".

EQUAL SPACING 24".
ALTERNATE ROWS, MAXIMUM
ONE SET OF "N" BARS IN
A

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

FOUNDATION DETAILS

RECOMMENDED ONLY
SEE RC-52M OR RC-53M

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

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

PLAN OF FOUNDATION

** SEE "TOP ELEVATION" ON SHEET 3 FOR VALUE
OF "A".

EQUAL SPACING 24".
ALTERNATE ROWS, MAXIMUM
ONE SET OF "N" BARS IN
A

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

FOUNDATION DETAILS

RECOMMENDED ONLY
SEE RC-52M OR RC-53M

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

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

PLAN OF FOUNDATION

** SEE "TOP ELEVATION" ON SHEET 3 FOR VALUE
OF "A".

EQUAL SPACING 24".
ALTERNATE ROWS, MAXIMUM
ONE SET OF "N" BARS IN
A
SECTION A-A SHOWN, ELEVATION SIMILAR

SECTION A-A

DOWN BETWEEN THE TOP AND 3 SETS OF "M",

"T2" BARS

FOR INSTALLATION DETAILS, SEE SHEET 2.

"L2" BARS

NOTES:

2'-0"

6"

FOR PEDESTAL

90° OR 180° HOOK LENGTHS.

LENGTH FOR "L" AND "T" BARS DOES NOT INCLUDE

PLAN VIEW - FOOTING REINFORCEMENT

FOOTING REINFORCEMENT

PROVIDE 90° OR 180° HOOKS ON ALL "L" AND "T" BARS.

LENGTH FOR "L" AND "T" BARS DOES NOT INCLUDE

NOTES:

* PEDESTAL TYPE AND FOOTING TYPE INDICATED ON CONTRACT
  DRAWINGS DEPICTED ON SHEETS 5, 6, AND 7.

* FOR INSTALLATION DETAILS, SEE SHEET 2.

* PROVISION OF 3" HOOKS ON "L" BARS MUST BE ADDED TO FULL LENGTHS A - C PT.

* USE STANDARD SIZING BC-745M FOR REINFORCING BAR FABRICATION DETAILS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

FOUNTION DETAILS

BAR TYPE

CONSTRUCTION JOINT

SECTION A-A SHOWN, ELEVATION SIMILAR

DETAIL C

DETAIL D
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 MUST HAVE THE EQUIVALENT STRENGTH AND FATIGUE RESISTANCE OF THE CIRCULAR MEMBER.

NOTES:
1. Anchor bolts shall be provided with four heavy hex nuts with two washers as shown on the anchor bolt detail.
2. Anchor bolts shall be galvanized after threading.
3. Use steel template to set anchor bolts in accordance with publication 403, section 948.3(b).
4. Complete penetration welds, except longitudinal seam welds within 6" of the ends of the press-break members or length shown on details, shall be complete penetration welds. Complete penetration longitudinal seam welds must be 100% radiographically inspected. For the column connection to base plate, and at column connection splice plate locations, welds shall start and stop in the middle third region of flat sections between break points.

<table>
<thead>
<tr>
<th>COLUMN BASE</th>
<th>COLUMN BASE PLATE</th>
<th>COLUMN BOLT</th>
<th>COLUMN BIUM</th>
<th>COLUMN CHORD</th>
<th>COLUMN CONNECTOR</th>
<th>COLUMN DETAIL</th>
<th>COLUMN NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C) NEMA H.</td>
<td>(C) NEMA H.</td>
<td>(C) NEMA H.</td>
<td>(C) NEMA H.</td>
<td>(C) NEMA H.</td>
<td>(C) NEMA H.</td>
<td>(C) NEMA H.</td>
<td>(C) NEMA H.</td>
</tr>
<tr>
<td>10% 1.500</td>
<td>2&quot; x 2&quot; x O.D. PIP</td>
<td>1/4&quot; STEEL TUBE</td>
<td>1/4&quot; STEEL TUBE</td>
<td>1/4&quot; STEEL TUBE</td>
<td>1/4&quot; STEEL TUBE</td>
<td>1/4&quot; STEEL TUBE</td>
<td>1/4&quot; STEEL TUBE</td>
</tr>
<tr>
<td>20% 1.500</td>
<td>2&quot; x 2&quot; x O.D. PIP</td>
<td>1/4&quot; STEEL TUBE</td>
<td>1/4&quot; STEEL TUBE</td>
<td>1/4&quot; STEEL TUBE</td>
<td>1/4&quot; STEEL TUBE</td>
<td>1/4&quot; STEEL TUBE</td>
<td>1/4&quot; STEEL TUBE</td>
</tr>
</tbody>
</table>

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
OVERHEAD SIGN STRUCTURES
4 POST 4 CHORD TRUSSES SSAN FROM 100' TO 200' COLUMN BASE DETAILS

RECOMMENDED MET. 30, 2016
RECOMMENDED ME. 30, 2016
SHR. 4 OF 10
BC-745W
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
CHIEF BRIDGE ENGINEER
RECOMMENDED
BC-745M
TRUSS DETAILS
OVERHEAD SIGN STRUCTURES

TOP VIEW OF TRUSS
FRONT VIEW OF TRUSS

- PANEL LENGTH (TYP.)
- DIAGONAL (TOP B)
- DIAGONAL (FRONT B)
- DIAGONAL (REAR B)
- DIAGONAL (BOTTOM B)

SECTION A-A
- L COLUMN
- SECTION B-B
- DIAGONAL (BOTTOM B)
- DIAGONAL (REAR B)
- DIAGONAL (TOP B)

SEE NOTES.
- CROSS BRACING,
- END VERTICAL FRONT/REAR
- END VERTICAL TOP/BOTTOM

ON SHEET 7.
- SEE DETAIL #2
- SEE DETAIL #3
- SEE DETAIL #4
- SEE DETAIL #5

NOTES:
- TEMPORARY END FRAME DETAILS
- PLATE SPLICE 8-BOLT PLATE SPLICE 12-BOLT PLATE SPLICE 16-BOLT

SEE NOTES.
- ANGLE FRAME, WELDED STEEL

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

FOR DETAILS SEE SHEET 8.
- L SIGN SUPPORT BRACKET,
- CATWALK SUPPORT HANGER,

WALL THICKNESS
- TOP REAR TRUSS CHORD (CVN WHEN WALL THICKNESS EXCEEDS 7/8")
- TOP FRONT TRUSS CHORD (CVN WHEN WALL THICKNESS EXCEEDS 7/8")
- BOTTOM FRONT TRUSS CHORD (CVN WHEN WALL THICKNESS EXCEEDS 7/8")

FOR GENERAL NOTES, SEE SHEET 1.
- MEMBER SIZES INDICATED ON CONTRACT DRAWINGS OBTAINED FROM BD-645M SHEETS 5-7.
- TEMPORARY END FRAME TO BE USED TO PROVIDE ADDITIONAL MATERIAL TO THE DESIRED SPLICE LOCATION.
- TEMPORARY FRAME IS NOT PART OF THE STRUCTURE AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR.
- TEMPORARY ENDS MUST BE ALLOWED AT THE CENTER OF THE SPAN EQUAL TO THE VALUE GIVEN BY THE CAMBER DIAGRAM ON THE CONTRACT DRAWING. ALL SPLICES SHALL BE ASSEMBLED IN THE SHOP IN A NO LOAD CONDITION TO ENSURE FIT AT THE ENDS AND TO CHECK ALIGNMENT.
- CROSS BRACING - ALTERNATING IN DIRECTION AT MAXIMUM SPANS OF 2 FRAME LENGTHS AND SHALL NOT BE PLACED AT END VERTICALS NOT AT SPLICE POINTS.

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

PROVIDE ADDITIONAL BRACKETS AS REQUIRED AT 6'-0" MAXIMUM SPACING
UPPER SIGN SUPPORT CONNECTION ANGLE.

SHT. 8 OF 10
SEPT. 30, 2016

RECOMMENDED

PROVIDE 1 AT 3", 3 AT 9"

TYPICAL SIGN SUPPORT BRACKET SPACING DIAGRAM

TYPICAL SIGN SUPPORT BRACKET DETAIL

NOTE:
1. FOR GENERAL NOTES, SEE SHEET 1.
2. FOR HANDRAIL DETAILS, SEE SHEET 9.
3. SPECIAL CARE SHALL BE TAKEN TO INSURE THAT THE COMPLETED STRUCTURE SPANS.
4. SIGN SUPPORT BEAM HANGERS SHALL BE PLACED AS NEAR TO TRUSS SUPPORTS AS PRACTICABLE CONSISTENT WITH FABRICATION, EASE OF HANDLING AND ASSEMBLY.
5. SPECIAL TREATMENT OF INSTRUCTIONS ON SHEET 9 CAN BE DETERMINED ONLY BY CONSIDERATION OF THE HANGERS IN A TRUSS Unted ASSEMBLY.
6. PROVIDE 3 CLIPS EVERY SPACED AT EACH BRACKET SUPPORT.
7. USE ASTM A325 AND GALVANIZED IN ACCORDANCE WITH PUB. 408 UNLESS STAINLESS STEEL OR OTHERWISE INDICATED.
8. USE ASTM A53 GRADE B STEEL PIPE FOR RAILING.
9. USE AASHTO M270, GRADE 36 STEEL FOR CATWALK SUPPORTS.
10. USE 304/316 STAINLESS STEEL OR OTHERS AS REQUIRED TO PROVIDE MAXIMUM L CHORD O.D. + 3".
FABRICATION

1. Construct sign structures due to dimension, free from jams, twists or bends, so horizontal and square shape are maintained. Provide complete fabrication details in the shop and check for straightness, alignment, dimensions, and the alignment of the splice plates. Correct any deviations brought to the attention of the buyer.

2. Wood signs for sign plates shown on plans in accordance with the shop and shop specifications, referencing for induction bonding of pipe and tube (AASHTO M43-91).

3. After each, each, or removable brackets to all signs and signs as necessary to prevent the sign from bending or twisting and to prevent signs from being dislodged or removed. The brackets shall be attached to the sign structures, and any brackets or arms shall be securely fastened to the sign structures. Include details of such devices on the shop drawings.

4. Provide all sign structures into the structural support, including the following sections prior to galvanizing. Submit a drawing locating to the engineer for approval. Do not compound fabrication until sign spaces locations are approved.

5. Ensure all doors to be panel to panel details that meet, do not meet, and are not required. Provide all structural design drawings for the following sections and the sign structures, and any brackets or arms shall be securely fastened to the sign structures. Include details of such devices on the shop drawings.

6. Provide all sign structures into the structural support, including the following sections prior to galvanizing. Submit a drawing locating to the engineer for approval. Do not compound fabrication until sign spaces locations are approved.

7. Provide all sign structures into the structural support, including the following sections prior to galvanizing. Submit a drawing locating to the engineer for approval. Do not compound fabrication until sign spaces locations are approved.

8. Provide all sign structures into the structural support, including the following sections prior to galvanizing. Submit a drawing locating to the engineer for approval. Do not compound fabrication until sign spaces locations are approved.

9. Provide all sign structures into the structural support, including the following sections prior to galvanizing. Submit a drawing locating to the engineer for approval. Do not compound fabrication until sign spaces locations are approved.

10. Provide all sign structures into the structural support, including the following sections prior to galvanizing. Submit a drawing locating to the engineer for approval. Do not compound fabrication until sign spaces locations are approved.

NOTES TO FABRICATOR

- Specify all non-structural equipment in accordance with the standards set forth by the AASHTO Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Cones.

- The commonwealth of Pennsylvania Department of Transportation publishes the standards for structural supports for highway signs, luminaires, and traffic cones. The latest edition of these specifications is the Most recent version. The specifications are available online from the commonwealth of Pennsylvania Department of Transportation website.

- The specifications include the following sections:
  1. Design computations for all portions of a structure for which calculations are required, including the design of the various components of the structure, such as the design of the structural steel, concrete, and masonry elements.
  2. Specifications for steel and concrete materials, including the specification of steel used for structural purposes, the specification of concrete used for structural purposes, and the specification of masonry materials used for structural purposes.
  3. Specifications for other materials used in the construction of the structure, such as the specification of electrical materials, the specification of plumbing materials, and the specification of other materials used in the construction of the structure.

- The commonwealth of Pennsylvania Department of Transportation publishes the standards for structural supports for highway signs, luminaires, and traffic cones. The latest edition of these specifications is the Most recent version. The specifications are available online from the commonwealth of Pennsylvania Department of Transportation website.

- The specifications include the following sections:
  1. Design computations for all portions of a structure for which calculations are required, including the design of the various components of the structure, such as the design of the structural steel, concrete, and masonry elements.
  2. Specifications for steel and concrete materials, including the specification of steel used for structural purposes, the specification of concrete used for structural purposes, and the specification of masonry materials used for structural purposes.
  3. Specifications for other materials used in the construction of the structure, such as the specification of electrical materials, the specification of plumbing materials, and the specification of other materials used in the construction of the structure.

- The commonwealth of Pennsylvania Department of Transportation publishes the standards for structural supports for highway signs, luminaires, and traffic cones. The latest edition of these specifications is the Most recent version. The specifications are available online from the commonwealth of Pennsylvania Department of Transportation website.

- The specifications include the following sections:
  1. Design computations for all portions of a structure for which calculations are required, including the design of the various components of the structure, such as the design of the structural steel, concrete, and masonry elements.
  2. Specifications for steel and concrete materials, including the specification of steel used for structural purposes, the specification of concrete used for structural purposes, and the specification of masonry materials used for structural purposes.
  3. Specifications for other materials used in the construction of the structure, such as the specification of electrical materials, the specification of plumbing materials, and the specification of other materials used in the construction of the structure.

- The commonwealth of Pennsylvania Department of Transportation publishes the standards for structural supports for highway signs, luminaires, and traffic cones. The latest edition of these specifications is the Most recent version. The specifications are available online from the commonwealth of Pennsylvania Department of Transportation website.

- The specifications include the following sections:
  1. Design computations for all portions of a structure for which calculations are required, including the design of the various components of the structure, such as the design of the structural steel, concrete, and masonry elements.
  2. Specifications for steel and concrete materials, including the specification of steel used for structural purposes, the specification of concrete used for structural purposes, and the specification of masonry materials used for structural purposes.
  3. Specifications for other materials used in the construction of the structure, such as the specification of electrical materials, the specification of plumbing materials, and the specification of other materials used in the construction of the structure.
### MAST ARM & END CONNECTION COMPONENT SELECTION TABLE (CANTILEVER STRUCTURES)

<table>
<thead>
<tr>
<th>Spn (Ft)</th>
<th>Panel Area</th>
<th>Thi Max (In)</th>
<th>Diam Max (In)</th>
<th>Thi Min (In)</th>
<th>Diam Min (In)</th>
<th>Wld Ht Thi</th>
<th>Thi Width</th>
<th>Thi H.S. B.</th>
<th>Thi Diam</th>
<th>Encrgy</th>
<th>%-Min.</th>
<th>%-Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>300</td>
<td>6/27</td>
<td>31</td>
<td>1</td>
<td>27/1/2</td>
<td>2</td>
<td>2/4</td>
<td>1/4</td>
<td>3/8</td>
<td>+1/4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MAST & BASE CONNECTION COMPONENT SELECTION TABLE (CANTILEVER STRUCTURES)**

<table>
<thead>
<tr>
<th>Spn (Ft)</th>
<th>Panel Area</th>
<th>Thi Max (In)</th>
<th>Diam Max (In)</th>
<th>Thi Min (In)</th>
<th>Diam Min (In)</th>
<th>Wld Ht Thi</th>
<th>Thi Width</th>
<th>Thi H.S. B.</th>
<th>Thi Diam</th>
<th>Encrgy</th>
<th>%-Min.</th>
<th>%-Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>300</td>
<td>6/27</td>
<td>31</td>
<td>1</td>
<td>27/1/2</td>
<td>2</td>
<td>2/4</td>
<td>1/4</td>
<td>3/8</td>
<td>+1/4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### END CONNECTION DETAILS

1. For general notes, see Sheet 1.
2. Provide maximum 2'-0" space between adjacent sign panels when present.
3. Trimplate weld 1/4" short of stiffener chamfer.
4. Provide stiffeners as indicated in connection component selection tables.
5. For casing information, see Sheet 6.
6. See sign panel support beam details, see Sheet 4.

### MAST ARM END DETAIL

- **Weld Detail Note:**
  - Backing ring may be retracted to the pipe column and continuous bar welded to the base plate after the bolt sensation groove weld is made. The ring must be made of a continuous ring.

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

**MONOPipe Sign Structures**
Frame structure spans up to 160' and cantilever monopipe structure strut lengths up to 27'.
### MAST & SPLICE CONNECTION COMPONENT SELECTION TABLE

<table>
<thead>
<tr>
<th>SPAN FEET</th>
<th>PANEL No.</th>
<th>MAST ARM</th>
<th>SEGMENT</th>
<th>M.S. BOLTS</th>
<th>SPLICE PLATE</th>
<th>THICKNESS</th>
<th>MAST ARM</th>
<th>SEGMENT</th>
<th>M.S. BOLTS</th>
<th>SPLICE PLATE</th>
<th>THICKNESS</th>
<th>PANEL No.</th>
<th>SPAN FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>1,040</td>
<td>24</td>
<td>1 1/4</td>
<td>30 1/2</td>
<td>35</td>
<td>2</td>
<td>1 3/4</td>
<td>5 1/4</td>
<td>35 1/2</td>
<td>35 1/2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>200</td>
<td>24</td>
<td>1 1/4</td>
<td>30 1/2</td>
<td>35</td>
<td>2</td>
<td>1 3/4</td>
<td>5 1/4</td>
<td>35 1/2</td>
<td>35 1/2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>300</td>
<td>24</td>
<td>1 1/4</td>
<td>30 1/2</td>
<td>35</td>
<td>2</td>
<td>1 3/4</td>
<td>5 1/4</td>
<td>35 1/2</td>
<td>35 1/2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### MAST & BASE CONNECTION COMPONENT SELECTION TABLE

<table>
<thead>
<tr>
<th>SPAN FEET</th>
<th>PANEL No.</th>
<th>MAST</th>
<th>ANCHOR BOLTS</th>
<th>BASE PLATE</th>
<th>SPLICE PLATE</th>
<th>THICKNESS</th>
<th>PANEL No.</th>
<th>SPAN FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>1,040</td>
<td>24</td>
<td>1 1/4</td>
<td>30 1/2</td>
<td>35</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>130</td>
<td>200</td>
<td>24</td>
<td>1 1/4</td>
<td>30 1/2</td>
<td>35</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>300</td>
<td>24</td>
<td>1 1/4</td>
<td>30 1/2</td>
<td>35</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
MONOPRIE SIGN STRUCTURES

**FRAME STRUCTURE SPANS UP TO 160FT**

**MAST AND MAST ARM DETAILS - 2**

**NOTES:**

1. FOR ADDITIONAL NOTES, SEE SHEET 2.
2. FABRICATOR HAS THE OPTION TO ADD OR ELIMINATE SPACERS ALONG MAST ARM.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
MONOPIPE SIGN STRUCTURES
FRAME STRUCTURE SPANS UP TO 160'
AND CANTILEVER MONOPIPE STRUCTURE
STRUT LENGTHS UP TO 27'
SIGN PANEL SUPPORT BEAM DETAILS
MONOPIPE SIGN PANEL SUPPORT BEAM DETAILS
NOTE:
1. FOR GENERAL NOTES, SEE SHEET 1.
2. SEE DETAIL A ON SHEET 2.
3. USE PANEL DETAILS, SEE Panel Control Standards No. 2-42.
4. LOCATE SUPPORT BEAM AT MAST AND AT SPLICE CONNECTIONS.
5. See panel support beam details given in this sheet. See details on Sheet 2.
6. Use panel support beam details at splice connections. See details on Sheet 2.
7. Shear panel support beam details given in this sheet are only valid for sign where the horizontal centroid line of the sign panel is at the same location as the centroid of the mast arm.
### CAISSON COMPONENT SELECTION TABLE

<table>
<thead>
<tr>
<th>PANEL</th>
<th>CAISSON</th>
<th>SPAN (FEET)</th>
<th>NO.</th>
<th>PANEL</th>
<th>CAISSON</th>
<th>SPAN (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>360</td>
<td>400</td>
<td>16</td>
<td>150</td>
<td>360</td>
<td>400</td>
</tr>
<tr>
<td>102</td>
<td>250</td>
<td>480</td>
<td>14</td>
<td>102</td>
<td>250</td>
<td>480</td>
</tr>
<tr>
<td>78</td>
<td>200</td>
<td>480</td>
<td>12</td>
<td>78</td>
<td>200</td>
<td>480</td>
</tr>
</tbody>
</table>

### CAISSON FOUNDATION DETAILS

**ROADSIDE INSTALLATION**

- Vertical clearances required for construction joints.
- Use Table A for typical shoulder detail.
- Anchor bolts must be placed at the top of the caisson.
- See Table A for tie requirements.

**CAISSON DRILLING AND INSTALLATION NOTES**

1. Complete the structure control plan and review it with the project team.
2. Ensure that the drilling rig is suitable for the soil conditions.
3. Monitor the drilling process and adjust as necessary.

### CAISSON FOUNDATION DETAILS

**MID-SPAN INSTALLATION**

- Anchor bolts must be placed at the top of the caisson.
- See Table A for tie requirements.

**ELEVATION**

- See Elevation Installation Details Sheet A for additional information.

### COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF TRANSPORTATION

BUREAU OF PROJECT DELIVERY

**MONOPHILE SIGN STRUCTURES**

- Frame structure spans up to 100' and cantilever monophile structure strut lengths up to 27'.

**FOUNDATION DETAILS**

- See additional installation details sheet A for foundation details.

### OPTIONAL CAISSON COMPONENT SELECTION TABLE

<table>
<thead>
<tr>
<th>PANEL</th>
<th>CAISSON</th>
<th>SPAN (FEET)</th>
<th>NO.</th>
<th>PANEL</th>
<th>CAISSON</th>
<th>SPAN (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>1,040</td>
<td>40</td>
<td>16</td>
<td>60</td>
<td>1,040</td>
<td>40</td>
</tr>
<tr>
<td>70</td>
<td>1,000</td>
<td>40</td>
<td>20</td>
<td>70</td>
<td>1,000</td>
<td>40</td>
</tr>
<tr>
<td>80</td>
<td>1,000</td>
<td>40</td>
<td>20</td>
<td>80</td>
<td>1,000</td>
<td>40</td>
</tr>
</tbody>
</table>

### FOUNDATION DETAILS

- See foundation installation details sheet A for additional information.
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO BRIDGE WELDING CODE (1991) AND CONTRACT SPECIAL PROVISIONS.

2. DO NOT USE TYPE 2 SCUPPER UNLESS TYPE 1 SCUPPER CANNOT BE ACCOMMODATED.

3. WELDED CONSTRUCTION: USE STRUCTURAL STEEL CONFORMING TO A606-69 OR ASTM A572, GRADE 50.

4. PROVIDE WELDED STUDS CONFORMING TO PUB. 408, SECTION 1105.02(s).

5. GALVANIZE ALL MATERIALS IN ACCORDANCE WITH PUB. 408, SECTION 1105.02(s)

6. REPAIR ALL DAMAGED GALVANIZED SURFACES IN ACCORDANCE WITH PUB. 408, SECTION 1105.02(s).

7. CAST-IRON DOWNSPOUTS: PROVIDE PIPE JOINTS AS INDICATED. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH STEEL PIPE. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH ALUMINUM PIPE.

8. DO NOT WELD CAST MATERIAL.

9. PROVIDE EITHER STANDARD 8"| OR 10"| NPS STEEL PIPE (ASTM A615/A615M OR A706/A706M) AS INDICATED. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH STEEL PIPE. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH ALUMINUM PIPE.

10. PROVIDE EITHER STANDARD 8"| OR 10"| NPS STEEL PIPE (ASTM A615/A615M OR A706/A706M) AS INDICATED. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH STEEL PIPE. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH ALUMINUM PIPE.

11. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A615 FOR HORIZONTAL.

12. ALL DIAMETERS SHOWN ARE NOMINAL.

13. MANUFACTURE METAL CURB DRAIN PER PUB. 408, SECTION 1105.02(e).


15. PROVIDE FLOOR DRAINS OF EITHER GALVANIZED STEEL OR ALUMINUM PIPE AS INDICATED UNLESS FIBERGLASS OR PVC PIPE IS SPECIFIED BY THE EXHIBIT BRIDGE ENGINEER.

16. ALUMINUM CURB OR FLOOR DRAINS IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALKALINE-RESISTANT BITUMINOUS PAINT.

NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH THE CURRENT VERSIONS OF THE PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408, AASHTO BRIDGE WELDING CODE (1991) AND CONTRACT SPECIAL PROVISIONS.

2. DO NOT USE TYPE 2 SCUPPER UNLESS TYPE 1 SCUPPER CANNOT BE ACCOMMODATED.

3. WELDED CONSTRUCTION: USE STRUCTURAL STEEL CONFORMING TO A606-69 OR ASTM A572, GRADE 50.

4. PROVIDE WELDED STUDS CONFORMING TO PUB. 408, SECTION 1105.02(s).

5. GALVANIZE ALL MATERIALS IN ACCORDANCE WITH PUB. 408, SECTION 1105.02(s).

6. REPAIR ALL DAMAGED GALVANIZED SURFACES IN ACCORDANCE WITH PUB. 408, SECTION 1105.02(s).

7. CAST-IRON DOWNSPOUTS: PROVIDE PIPE JOINTS AS INDICATED. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH STEEL PIPE. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH ALUMINUM PIPE.

8. DO NOT WELD CAST MATERIAL.

9. PROVIDE EITHER STANDARD 8"| OR 10"| NPS STEEL PIPE (ASTM A615/A615M OR A706/A706M) AS INDICATED. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH STEEL PIPE. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH ALUMINUM PIPE.

10. PROVIDE EITHER STANDARD 8"| OR 10"| NPS STEEL PIPE (ASTM A615/A615M OR A706/A706M) AS INDICATED. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH STEEL PIPE. PROVIDE PIPE JOINTS OF COMPARABLE MATERIALS FOR USE WITH ALUMINUM PIPE.

11. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A615 FOR HORIZONTAL.

12. ALL DIAMETERS SHOWN ARE NOMINAL.

13. MANUFACTURE METAL CURB DRAIN PER PUB. 408, SECTION 1105.02(e).


15. PROVIDE FLOOR DRAINS OF EITHER GALVANIZED STEEL OR ALUMINUM PIPE AS INDICATED UNLESS FIBERGLASS OR PVC PIPE IS SPECIFIED BY THE EXHIBIT BRIDGE ENGINEER.

16. ALUMINUM CURB OR FLOOR DRAINS IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALKALINE-RESISTANT BITUMINOUS_PAINT.
**TABLE I**

<table>
<thead>
<tr>
<th>Type A Scupper</th>
<th>Type B Scupper W/ Grate</th>
<th>Standard Bridge Drainage</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC-751M</td>
<td>COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION</td>
<td>REMOVABLE GRATING</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>APPROXIMATE WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1'-0&quot;</td>
<td>295 LB</td>
</tr>
<tr>
<td>1'-6&quot;</td>
<td>525 LB</td>
</tr>
<tr>
<td>3'-9&quot;</td>
<td>465 LB</td>
</tr>
<tr>
<td>5'</td>
<td>400 LB</td>
</tr>
</tbody>
</table>

**NOTES:**
1. USE CONTINUOUS FILLET WELD FOR INSIDE AND OUTSIDE, 1/16" MIN. SIZE.
2. GRATING NOT SHOWN.

**Section C-C**

1. **Type A Scupper**
2. **Type B Scupper W/ Grate**
3. **Standard Bridge Drainage**

**Section D-D**

**Welded Scupper Details**

**Alternate Structural Steel Scupper Grate**

**Cast Grating Plan**

**COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD BRIDGE DRAINAGE SCUPPER DETAILS**

**Type A, B, C & D**

**NOTE:**
- **BC-751M**
- **COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION**
- **REMOVABLE GRATING**

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

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>APPROXIMATE WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1'-0&quot;</td>
<td>295 LB</td>
</tr>
<tr>
<td>1'-6&quot;</td>
<td>525 LB</td>
</tr>
<tr>
<td>3'-9&quot;</td>
<td>465 LB</td>
</tr>
<tr>
<td>5'</td>
<td>400 LB</td>
</tr>
</tbody>
</table>

**NOTES:**
1. **Type A Scupper for Z up to 1'-6"**
2. **Type B Scupper for Z over 1'-6" to 3'-0"**
3. **Type C Scupper for Z up to 1'-10"**
4. **Type D Scupper for Z over 1'-10" to 2'-8"**

**SCUPPER WEIGHTS LISTED ARE FOR A SCUPPER ASSEMBLY DEPTH OF 1'-3".**
PLAN SHOWING TYPICAL INSTALLATION OF SCUPPERS

PLAN INSTALLATION I

INSTALLATION II

INSTALLATION III

SIDE OF PIER

SIDE OF PIER

SCUPPER

LOCATE DRAIN BOX AND DOWNSPOUT ON FAR SIDE OF PIER AWAY FROM ROADWAY OR RAILROAD

EXTEND PIPE FROM SCUPPER INTO BOX

ELEVATION

DRAIN BOX DETAIL

ELEVATION

DRAIN BOX DETAIL

DOWNSPOUTING JOINT NOTES:

FOR STEEL PIPE: PROVIDE MECHANICAL COUPLINGS.

FOR PVC OR FIBERGLASS PIPE: PROVIDE MECHANICAL COUPLINGS.

AT THE DISCRETION OF THE ENGINEER, DELETE JOINT FROM INSTALLATION III.

FOR ALL MECHANICAL COUPLINGS, PROVIDE COUPLING AS PER PIPE MANUFACTURER'S RECOMMENDATIONS.

INSTALLATIONS I & II

FOR SUPPORT AND DETAILS NOT SHOWN, SEE DETAIL E.

FOR ADDITIONAL INFORMATION SEE INSTALLATION III.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

BUREAU OF PROJECT DELIVERY

SEPT. 30, 2016

BC-751M
ADDITIONAL DECK REINFORCEMENT AT SCUPPER
Cut and/or reposition deck reinforcement to accommodate scuppers or drains.

ALTERNATE DECK REINFORCEMENT AT SCUPPER
Cut and/or reposition deck reinforcement to accommodate scuppers or drains.

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

Optional coupling at this application.

FOR DEMOLITION PROJECTS ONLY.
For a permit or equivalent, to locate all reinforcement and precast strand, as required, casting in place is required. No drilling of prestressed I-beams is permitted.

Any drilling of a precast strand requires the prior approval of the District Bridge Engineer.

All cast-in-place elements are to be used in new I-beams.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE DRAINAGE
MISCELLANEOUS DETAILS

SEPT. 30, 2016
SEPT. 30, 2016
ELEVATION - CONCRETE DECK
ELEVATION - BITUMINOUS DECK ONLY

PLAN
VIEW L-L

FILL SLOT WITH WELD TUBE ALLOY 6061-T6
FIT IN FIBERGLASS OR PVC PIPE

WELDED ALUMINUM TUBE FRICTION
ASTM: B 211M ALLOY 6061-T6

DOWNSPOUT
45° DIRECTION OF FLOW

SLOPE BITUMINOUS SURFACE (WHEN USED)

METAL DRAIN

FACE OF INSIDE

SIDEWALK

RAISED SIDEWALK DRAIN DETAIL

RAISED SIDEWALK DRAINAGE DETAIL

BARRIER DRAIN BLOCKOUTS

TYPICAL METAL CURB DRAIN DETAILS

TYPICAL FLOOR DRAIN DETAILS

SECTION M-M

SECTION O-O

SECTION AT BARRIER (FLOOR DRAIN )

BARRIER DRAINAGE DETAIL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
BRIDGE DRAINAGE
METAL CURB AND FLOOR DRAINS
DRAINAGE NOTES:
1.奥巴马要为(当管道形成时)的交点墙墙是否由管道冲刷，可以在设计时考虑。否则使用方案A。
2.在必要时，使用方案A的高程
3.方案A的结构将使用基础的管道沟沟，其长度为方案B的管道沟沟。
4.在方案A的使用时，需考虑方案B的管道沟沟，其长度为方案B的管道沟沟。
5.方案A的结构将使用方案B的管道沟沟，其长度为方案B的管道沟沟。
6.方案A将使用方案B的管道沟沟，其长度为方案B的管道沟沟。

BRIDGE DRAINAGE

INTEGRAL ABUTMENT SUBSTRUCTURE DRAINAGE
**CONTINUOUS 2" x 2" OF NO. 57 COARSE AGGREGATE, ENGAGED IN GEOTEXTILE, CLASS 1 (PUB. 408, SECT. 1001.3 (d)) INSERTION INCIDENTAL TO COARSE AGGREGATE.**

- 6" STRUCTURE FOUNDATION DRAIN PLACED 6" MIN. TO 1'-0" MAX. BEHIND BRIDGE REAR FACE OF DIAPHRAGM OR END OF BEAM.

**ADDITIONAL DRAINAGE DETAIL AT ABUTMENT WITHOUT BACKWALL**

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

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

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

SIMILAR TO SECTION P-P ON SHEET 6. TO LOWER STRUCTURE FOUNDATION DRAIN OR OUTLET TO GRADE SLOPE FOUNDATION DRAIN A MINIMUM OF 1/4" PER FOOT. CONNECT TO STRUCTURE FOUNDATION DRAIN OR OUTLET TO GRADE SIMILAR TO SECTION P-P ON SHEET 6.
NOTE: LONGITUDINAL REINFORCEMENT IS CONTINUOUS THROUGH THE JOINT

NOTES:
1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE REQUIREMENTS OF ASTM A 615, A 996, OR A 706.
3. FOR LOCATION OF CONSTRUCTION JOINTS AND OPEN JOINTS, REFER TO DESIGN DRAWINGS.
4. REMOVE ALL REMAINING MATERIAL AT THE CONSTRUCTION JOINT AFTER HARDENING OF THE CONCRETE. APPLY AN EPOXY BONDING COMPOUND TO THE HARDENED CONCRETE AT THE JOINT PRIOR TO PLACING NEW CONCRETE.
5. OPEN JOINT DETAILS AND MODIFIED DEFLECTION JOINTS APPLY TO THE FOLLOWING TYPES OF BARRIERS: TYPICAL CONCRETE BARRIER, ALTERNATE CONCRETE BARRIER, SPLIT CONCRETE GLARE SCREEN MEDIAN BARRIER, ALTERNATE BARRIER DETAIL, ALTERNATE SPLIT CONCRETE MEDIAN BARRIER DETAIL, ALTERNATE SLOPED BARRIER DETAIL, ALTERNATE SIDEWALK DETAIL, ALTERNATE RAISED SIDEWALK DETAIL.
6. PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH SECTION 705.4 OF PUB. 408.
7. FOR DEEP NOTCH DETAILS, SEE BC-775M.
8. PROVIDE JOINT BACKING MATERIAL IN ACCORDANCE WITH SECTION 705.8 (b) 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 705.4 OF PUB. 408.

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
2. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
3. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.
STEEL BEAMS
Provide when haunch thickness is 3" or greater anywhere across width of haunch.

AASHTO TYPE P/S CONC. I-BEAM
(P/S SPREAD BOX BEAM SIMILAR)
Provide when haunch thickness is 3" or greater anywhere across width of haunch.

HAUNCH REINFORCEMENT DETAILS
1. Epoxy coat all reinforcement in deck slab (includes haunch reinforcement) with epoxy bonding compound, see Note 9.
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.
4. Fill joint opening with epoxy bonding compound, see Note 9.

ALTERNATE TRANSVERSE CONSTRUCTION AND CRACK CONTROL JOINT
* For continuous bridges 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.

CONSTRUCTION JOINT DETAILS

LONGITUDINAL DETAIL

TRANSVERSE DETAIL


**INTERMEDIATE DIAPHRAGM DETAIL**

1. **Material Compatibility:** Ensure all materials are compatible with each other. Refer to the material specifications for compatibility details.

2. **Aluminum and Steel:** Aluminum and steel must be compatible to prevent galvanic corrosion. Refer to the reference drawings for specific material compatibility requirements.

3. **Connection Design:** Connection design should be based on the load-bearing capacity and the stiffness of the connected members. Refer to the connection design guidelines provided in the reference drawings.

4. **Load Transfer:** Load transfer must be ensured through proper connection details. Refer to the load transfer requirements in the reference drawings.

5. **Welding:** Welding must be performed according to the welding procedure specifications. Refer to the welding procedures in the reference drawings.

6. **Inspection:** Inspections must be performed to ensure compliance with the quality control standards. Refer to the inspection requirements in the reference drawings.

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

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

BC-754M
PERMANENT METAL DECK FORMS
BC-754G
ALTERNATE DIAPHRAGM DETAILS
REFERENCE DRAWINGS

RECOMMENDED Sept. 30, 2016
BC-754M
BC-754G

SHEET 1 OF 2

NOTE: Provide materials and workmanship in accordance with Pub. 408 and all other relevant construction guidelines.
Provide A = \( \frac{1}{2} \) * bar anchors

Use \( \frac{1}{2} \) * steel anchor bolt

\( L = \) Bearing pad length

\( W = \) Beam flange width

\( T = \) Bearing pad thickness

** Provide flatness tolerance in accordance with design manual Part 4, D14.7.6.3.9P.

*** For very large pads, this 1" may be eliminated.
A. GENERAL NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN CONFORMANCE WITH PUBLICATION 408, SECTION 1001.02.

2. SCHEDULE IN ACCORDANCE WITH SPECIFICATION 9.02.13.

3. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

4. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

5. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

6. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

7. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

8. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

9. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

10. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

11. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

12. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

13. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

14. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

15. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

16. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

17. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

18. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

19. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

20. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

21. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

22. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

23. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

24. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

25. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

26. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

27. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

28. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

29. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

30. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

31. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

32. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

33. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

34. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

35. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

36. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

37. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

38. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

39. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

40. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

41. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

42. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

43. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

44. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

45. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

46. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

47. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

48. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

49. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

50. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

51. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

52. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

53. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

54. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

55. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

56. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

57. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

58. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

59. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

60. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

61. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

62. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

63. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

64. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

65. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

66. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

67. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

68. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.

69. PROVIDE SMOOTH ALL STEEL SURFACES AND EDGES AND REMOVE ALL SURFACE FINISH OR LESS.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

SECTION A-A

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

FOR ADDITIONAL DETAILS, SEE SHEETS 1 AND 6.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

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

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

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

SECTION B-B

SECTION C-C

NOTE: PISTON NOT SHOWN FOR CLARITY.

CHIEF BRIDGE ENGINEER
RECOMMENDED
BUREAU OF PROJECT DELIVERY

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

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

BC-756M
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

PISTON
SEE DETAIL B

SECTION A-A

STANDARD
HIGH LOAD MULTI ROTATIONAL
POT BEARINGS
GUIDED DETAILS - 2

NOTE:
The indicated bearing component dimensions are variables to be taken from contract drawings.

FOR ADDITIONAL DETAILS, SEE SHEETS 1, 4 AND 6.
FURNISH A CERTIFIED STATEMENT THAT THE TIP REINFORCEMENT STEEL COMPLIES WITH THE SPECIFICATION REQUIREMENTS INCLUDING CERTIFIED REPORT SHOWING THE CHEMICAL AND PHYSICAL PROPERTIES, AND ROLLING DIRECTION FOR PLATES USED IN THE PREFABRICATED TIPS.

CONNECTION OF TIP REINFORCEMENT TO PILE:

BEVEL OUTSIDE OF EACH FLANGE OF THE HP-PILE FOR GROOVE WELD, WHERE TIP REINFORCEMENTS ARE NOT ATTACHED.

ATTACH PILE TIP REINFORCEMENT ON THE SQUARE CUT END OF THE PILE AND HOLD IT IN CLOSE CONTACT AGAINST THE PILE OR TO ACHIEVE THE MINIMUM GROOVE WELD SIZE.

THE WELDS SHOWN ARE SUGGESTED ACCEPTABLE GROOVE WELDS. THE CONTRACTOR MAY USE ANY PREQUALIFIED GROOVE WELDS APPROVED BY THE ENGINEER.

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.

THE DEPARTMENT MAY REJECT AN APPROVED PILE TIP TYPE, IF FOUND UNSUITABLE FOR A JOB SITE BASED UPON DRIVING RECORDS.

DO NOT USE FILLET WELD FOR ATTACHING CAST TIP REINFORCEMENT TO HP-PILES.

CONNECTION OF TIP REINFORCEMENT TO PILE:

JOIN HP PILE TO CAST TIPS USING GROOVE WELDS ONLY. WELD SIZE TO BE THE GREATER OF 1⁄2" OR MINIMUM GROOVE WELD SIZE RECOMMENDED BY THE TIP MANUFACTURER FOR THE TIP/TIP COMBINATION REQUIRED.

APPLY A GROOVE WELD ON THE SQUARE CUT END OF THE PILE AND HOLD IT IN CLOSE CONTACT AGAINST THE PILE OR TO ACHIEVE THE MINIMUM GROOVE WELD SIZE.

WELD SIZE TO BE THE GREATER OF 1⁄2" OR MINIMUM GROOVE WELD SIZE RECOMMENDED BY THE TIP MANUFACTURER FOR THE TIP/TIP COMBINATION REQUIRED.

THE WELDS SHOWN ARE SUGGESTED ACCEPTABLE GROOVE WELDS. THE CONTRACTOR MAY USE ANY PREQUALIFIED GROOVE WELDS APPROVED BY THE ENGINEER.

THE DEPARTMENT MAY REJECT AN APPROVED PILE TIP TYPE, IF USING UNAUTHORIZED FOR A JOB SITE BASED UPON DRIVING RECORDS.
**DIRECTOR, BUR. OF PROJECT DELIVERY**

**CHIEF BRIDGE ENGINEER**

**BC-757M**

**HP-PILE SPLICE DETAILS**

**OR B-U2 IN LIEU OF DETAILS B-U4 OR B-U2a.**

**SHEET 2 OF 3**

**RECOMMENDED**

**SEPT.30, 2016**

---

**RECOMMENDED**

**SEPT.30, 2016**

---

**C-C** FOR DETAILS. THE CONTRACTOR MAY ELECT **WEB COPE** NOT SHOWN, SEE SECTION **B-B AND D-D**.

---

**1.** DO NOT ALLOW PILE SPLICING ON ANY PORTION OF THE PILE THAT IS TO REMAIN EXPOSED ABOVE FINISHED GROUND LINE IN COMPLETED STRUCTURE.

---

**2.** PROVIDE ADDITIONAL HEAT AS PER SPICER MANUFACTURER.

---

**3.** USE EITHER THE "SPLICER SLEEVE" OR "ALL LOW HYDROGEN ELECTRODES" AS SHOWN.

---

**4.** LET WELDS COOL TO AIR TEMPERATURE BEFORE WELDING.

---

**5.** SPLICE MUST DEVELOP THE YIELD STRENGTH OF THE PILE IN BEARING AND BENDING.

---

**6.** REFER TO SEC. 1005.2(c) OF PUB. 408 FOR SPLICE LOCATION REQUIREMENTS.

---

**7.** GRIND WELD SMOOTH WITH EDGE OF FLANGE IF WELD AREA SUCH AS:

---

**8.** DO NOT WELD WHEN THE AMBIENT TEMPERATURE IS BELOW 0°F.  PREHEAT METAL TO AT LEAST 70°F LEAST 3" AWAY FROM THE WELD IN ALL DIRECTIONS.

---

**9.** PROVIDE BACKING PLATES AND WELD TABS FOR FLANGE WELDS OF THE SAME MATERIAL AS THE PILE TO BE SPLICED.

---

**10.** PROVIDE WIND BREAKS TO PROTECT WORKING AREAS FROM DIRECT WIND.

---

**11.** FOR SCARFING DETAILS, SEE SHEET 1.

---

**SPLICE NOTES:**

**1.** DO NOT ALLOW PILE SECTIONS TO BE IN CONTACT DURING WELDING.

---

**2.** PROVIDE ADDITIONAL HEAT AS PER SPICER MANUFACTURER.

---

**3.** USE THE MANUAL SHIELDED METAL ARC WELDING PROCEDURE WITH ELECTRODES CONFORMING TO AWS CLASSIFICATION E-7016, E-7018 OR E-7028.

---

**4.** DO NOT USE ELECTRODES WHICH HAVE DRIED OUT AND REDRY ELECTRODES IF NOT USED WITHIN FOUR HOURS.

---

**5.** PROVIDE ADDITIONAL WELD AS SHOWN USING CLAMPS TO HOLD WELDING POSITION ONLY PER THE AWS CODE.

---

**6.** REFER TO SEC. 1005.2(c) OF PUB. 408 FOR SPLICE LOCATION REQUIREMENTS.

---

**7.** DO NOT REDRY ELECTRODES MORE THAN ONE TIME.

---

**8.** PROVIDE BACKING PLATES AND WELD TABS FOR FLANGE WELDS OF THE SAME MATERIAL AS THE PILE TO BE SPLICED.

---

**9.** PROVIDE WIND BREAKS TO PROTECT WORKING AREAS FROM DIRECT WIND.

---

**10.** DO NOT WELD WHEN THE AMBIENT TEMPERATURE IS BELOW 0°F.

---

**11.** FOR SCARFING DETAILS, SEE SHEET 1.

---

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD STEEL PILE TIP REINFORCEMENTS & SPLICES**

**RECOMMENDED SEPT.30, 2016**

**BC-757M**
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

SPLICE NOTES:

PIECE THICKNESS WALL

ON PIPE WALL WELD SIZE DEPENDS

OF PILE.

SPLICER SLEEVE

AFTER SEATING PILE, WELD WITH CONTINUOUS TOP AND BOTTOM.

DETAIL C

BACKING RING TO BE CUT FROM SAME PILE SIZE AS IS BEING THICKNESS BACKING RING

PIPE PILE SPLICE DETAILS

ELEVATION - SPLICE (USING SPLICER SLEEVE)

SECTION F-F

ELEVATION - SPLICE USING ALL WELDED ALTERNATE

SECTION G-G

FLUTED TUBE SPLICE DETAIL

"MIN. FILLET WELD, "

MIN.

" MAX.

INCREASE WELD SIZE BASED ON ROOT OPENING.

NOTE:

" FILET WELD, TOP AND BOTTOM.

SEE NOTE C

DETAIL B-U2a OR B-U4a SHOWN ON SHEET 2 OF 3.

IF PIPE WALL THICKNESS EXCEEDS ", USE WELD

DIRECTOR, BUR. OF PROJECT DELIVERY

SEPT.30, 2016

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD

STEEL PILE TIP REINFORCEMENTS & SPLICES

RECOMMENDED SEPT.30, 2016
RECOMMENDED SEPT.30, 2016

SHEET 3 OF 3

BC-757M
**SECTION A-A**

**SECTION B-B**

**BALL STUD DETAIL**

**DESIGN INFORMATION**

- **CONCRETE**
  - Initial temperature range: -10°F to 100°F for steel and 10°F to 100°F for P/S.
  - Temperature change: 40°F rise, 10°F fall for steel and 40°F rise, 10°F fall for P/S.
  - Thermal coefficient: 0.00000537°F/°F for steel and 0.00000537°F/°F for P/S.
  - Design live load: 100 PSF + GSE [impact: 60 PSF]

- **RECESS AREA**
  - Expansion: Min. 7/300

- **JOINT**
  - Expansion: Min. 7/300

- **CONCRETE**
  - Place concrete in the blockout area except for recess area. After concrete has cured, inspect the holes and fill with approved sealer.

- **SPECS**
  - Use flathead stainless steel ASTM F 738 or F 593 (Type 304) for countersunk screws. All concrete inserts, including screws and washers, have the same diameter unless otherwise noted.

- **GENERAL NOTES**
  1. All reinforcement steel bars shown meet the requirements of ASTM A 615, A 996 or A 706. Do not weld grade 60 steel bars unless specified.
  2. Provide materials and workmanship in accordance with PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408 and aashto/aws welding specifications.
  3. Paint all steel surfaces with the shop in accordance with section 10.01 of publication 408. Paint all items shown to be painted in section 1105.01 of publication 408 can be used as an alternative.
  4. Provide all joint faces with the shop in accordance with section 10.01 of publication 408. Joint faces are to be painted in accordance with section 1105.01 of publication 408. Studs may be painted to match the required lengths.
  5. Use stainless steel ASTM F 738 or F 593 for countersunk joint inserts. All concrete inserts, including screws and washers, have the same diameter unless otherwise noted.
  6. Ball type or solid steel knock-off studs should be provided. Steel knock-off studs are to be 5/8" MIN. Diameter by 2" height. Knock-off studs must be anti-skid bonding agent to transverse deck construction joints.
  7. All bolts to conform to ASTM A 325.
  8. Use this drawing as a guide in the preparation of shop drawings.
  9. Construct expansion dams to match roadway grade and cross slope.
  10. Place concrete under the dam and verify the concrete is placed through the 3" diameter by 8" long knock-off studs. Excess concrete is to be removed using an 8" long knock-off stud. The holes are to be filled with an approved sealer.
  11. Control the maximum depth of the hole such that it does not come into contact with the structure of the bridge.
  12. Open joints after adequate concrete has hardened. Do not place concrete in the blockout area until the beams, deck and deck slab have been placed.
  13. Use a chart listing joint opening for temperatures (°F) to 10°F to 100°F for steel structures and 10°F to 100°F for P/S concrete structures. In 10°F increments on shop drawings.
  14. Provide non-destructive testing of welds as required in accordance with section 1105.02(e) of PUB 408. Studs and P/S must be approved by the department.
  15. Place AASHTO M 270, GRADE 36 (ASTM A 709, GRADE 36) UNLESS OTHERWISE SPECIFIED ON DESIGN DRAWINGS. Anchor studs to be provided.
  16. Provide all concrete and reinforcement in accordance with AASHTO/AWS specifications.
  17. Place joints in accordance with AASHTO/AWS specifications. Provide all reinforcing in accordance with AASHTO/AWS specifications.
  18. Place concrete in accordance with AASHTO/AWS specifications.

**REFERENCE DRAWINGS**

- BC-751M
- BC-752M
- BC-755M
- BC-756M
- BC-762M

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

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

**RECOMMENDED SHEET NO.: 1 OF 7**
SECTION AT ABUTMENT (E) SHOULDER
FOR STEEL BEAMS

FOR DECK TOP REINFORCEMENT WITH TRANSVERSE BARS SHOWN ON TOP, SIMILAR WHEN LONGITUDINAL BARS ON TOP.

1. ALL VERTICAL STUDS ARE 1/8" x 10" LONG.
2. HORIZONTAL STUDS IN ABUTMENT ARE 1/8" x 12" LONG.
3. HORIZONTAL STUDS IN SLAB ARE 1/8" x 16" LONG.
4. MINIMUM DEPTH OF CONCRETE OVER DIAPHRAGMS IS 12".
5. BEFORE HEATING SOLUTION APPLY NON-SKID REBUILDING AGENT TO TRANSVERSE CONSTRUCTION JOINTS.

STANDARDS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

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

RECOMMENDED SEPT. 30, 2016
SEPT. 30, 2016

BC-762M
SECTION AT ABUTMENT (O SHOULDER)
FOR P/S BEAMS
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 TO BEAM BRIDGES.

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

SEPT. 30, 2016

BC-762M
SECTION AT PIER FOR P/S BEAMS

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.
GENERAL NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PENNSYLVANIA DEPARTMENT OF TRANSPORTATION PUBLICATION 408.

2. ALL STEEL TO CONFORM TO AASHTO M 270, GR. 36 (ASTM A 709 GR.36) UNLESS OTHERWISE SPECIFIED ON DESIGN DRAWINGS.

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

4. USE FLAMECUT STAINLESS STEEL ASTM F 738 (TYPE 304) FOR CONSTRUCTION SCREWS WITH INSERTS. ALL CONCRETE INSERTS AND INJECTED MACHINE SCREWS ARE 3/8" DIAMETER.

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

6. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH SECTION 1060 OF PUBLICATION 408.

7. MOVEMENT CLASSIFICATION OF THE SEAL TO BE NOT LESS THAN THE CLASSIFICATION SHOWN ON THE DESIGN DRAWINGS.

8. PROVIDE PREFORMED NEOPRENE COMPRESSION SEAL, USE DOUBLE BLADE FOR SAW-CUTTING WHERE PERMITTED.

9. PROVIDE PREFORMED NEOPRENE COMPRESSION SEAL. USE DOUBLE BLADE FOR SAW-CUTTING WHERE PERMITTED. TEMPORARY SEAL MAY BE REQUIRED DEPENDING ON STAGES OF CONSTRUCTION.

10. ASCERTAIN THAT THE TOP OF THE INSTALLED SEAL IS OPENING FOR TEMPERATURES BETWEEN -9°F TO 109°F ON STEEL STRUCTURES AND 10°F TO 100°F FOR P/S CONCRETE STRUCTURES, IN 5° INTERVALS ON SHOP DRAWINGS.

11. FOR JOINTS AT SHARP SKEWS, MODIFICATIONS TO BE MADE AS REQUIRED OPERATING ON STAGES OF CONSTRUCTION.

12. THE SEALED JOINT IS CONSTRUCTED AT VARIOUS STAGES OF CONSTRUCTION, ON SITE. ALL STAGES ARE DESIGNED IN SECTION 1008.3 OF PUBLICATION 408.

13. EITHER SAW-CUT OR FORM JOINT FOR PREFORMED COMPRESSION SEAL. USE DOUBLE BLADE FOR SAW-CUTTING WHERE PERMITTED.

14. PREPARE A CHART SHOWING JOINT MOVEMENT CLASSIFICATION FOR AASHTO M 270.

15. MINIMUM MOVEMENT CLASSIFICATION 1".

16. TO INSURE THAT INSERTS AND SCREWS ARE ALIGNED PROPERLY, PLACE CURBS AND SIDEWALKS WITH MIN. AND MAX. DEPTH + 6" (TYP.) DEPARTMENT OR AS APPROVED BY THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, INNOVATION AND SUPPORT SERVICES DIVISION, BUREAU OF PROJECT DELIVERY.

REFERENCE DRAWINGS:

1. BC-735M

2. BC-766M

3. COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY

4. STANDARD FOR PREFORMED COMPRESSION SEAL JOINT FOR APPROACH SLABS

5. SHEET 1 OF 2

6. BC-766M

7. BC-735M

8. SEAL JOINT FOR APPROACH SLABS

9. WALL CONSTRUCTION & EXPANSION JOINT DETAILS

10. SECTION THRU JOINT WITH TYPICAL BARRIER ON SHEET 2.

11. TYPICAL JOINT DETAIL

12. JOINED WIDTH CONCRETE

13. WALL CONSTRUCTION & EXPANSION JOINT DETAILS

14. EXPANSION DAM TO MATCH ROADWAY GRADE AND CROSS SLICE.

15. PROVIDE PROPERLY, PLACE CURBS AND SIDEWALKS WITH MIN. AND MAX. DEPTH + 6" (TYP.) DEPARTMENT OR AS APPROVED BY THE CHIEF MATERIALS ENGINEER, LABORATORY TESTING SECTION, INNOVATION AND SUPPORT SERVICES DIVISION, BUREAU OF PROJECT DELIVERY.

16. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH SECTION 1060 OF PUBLICATION 408.

17. REFERENCE DRAWINGS
GENERAL NOTES:
1. All reinforcement steel bars shown meet the requirements for AASHTO M 270, Grade 36 ASTM A 709 Grade 36 for steel fabrication and welding per Section 1105.02 (S) of Publication 408 and AASHTO/AWS WELDING SPECIFICATIONS.
2. Note: All drawings are developed in accordance with PennDOT Design Manual, Erection of Bridge Steel Structures, 4th Edition, October 2010, Section 919.100.
3. Full Penetration Groove Welds may be used if required by the engineer, in accordance with AASHTO/AWS WELDING SPECIFICATIONS.
4. Welds may, at the discretion of the fabricator, have the retainers for the steel plate bonded to the concrete diaphragm.
5. The seals shown with the retainers must be compatible with the retainers and provide a watertight joint.
6. Blockout concrete is to be specified on the drawings.
7. Proper joint opening is shown on the drawings in the event of expansion, contraction, and rotation of the structure.
8. The seals are to be of the specified type, except as noted on the drawings.
9. Removal of joint face is shown on the drawings for expansion, contraction, and rotation of the structure.
10. Note: All drawings are developed in accordance with PennDOT Design Manual, Erection of Bridge Steel Structures, 4th Edition, October 2010, Section 919.100.
**STRIP SEAL INSTALLATION NOTES**

1. The project manager shall inform the consultant to ensure the seal channels shall be inspected to ascertain the absence of concrete and debris. The seal channels shall also be inspected at all field splices, and all field adjustments and/or repairs during the installation. The installation temperature shall be noted in the installation documents.

2. After the seal locks into place, the top of the lug against the frame rail to ensure proper seating. See Figure 1.

3. As the work progresses down the length of the joint, work both sides of the joint to be flush. (See Figure 1)

4. **APPLICATION**
   - **TIGHTEN BOLT** and make sure to adjust for installation temperature.
   - **DO NOT TIGHTEN BOLT** and make sure to adjust for installation temperature.
   - **LOosen BOTTOM NUT ON STUD BOLT** and adjust for installation temperature.
   - **IMMEDIATELY AFTER BLOCKOUT IS CAST**, **IMMEDIATELY AFTER BLOCKOUT IS CAST**, **LOosen BOTTOM NUT ON STUD BOLT** and adjust for installation temperature.
   - **REFLECT THE INSTALLATION TEMPERATURE**.

**NOTE:** The thickness of the seal shall be measured to a distance between supports.

**BOLT** IMMEDIATELY AFTER BLOCKOUT IS CAST. **ASSEMBLY AND GRIND OFF TACK WELD UNTIL SMOOTH.** **CLEAN WHEN THE JOINT IS INSTALLED.** **COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION**

**STANDARD**

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

**SECTION AT SPLIT CONCRETE DIVISOR**

**NOTE:** For concrete divider not split, use one piece ½" BENT SLIDING PLATE.

**SECTION AT BARRIER**

**NOTE:** See Diagram 1, for typical procedure. **STEEL EXTRUSION SPACING OF THE SCREWS IS THE SAME FOR THE ALTERNATE SCHEMES ONLY WITH:** **STEEL EXTRUSION SPACING OF THE SCREWS IS THE SAME FOR THE ALTERNATE SCHEMES ONLY WITH:** **STEEL EXTRUSION SPACING OF THE SCREWS IS THE SAME FOR THE ALTERNATE SCHEMES ONLY WITH:** **STEEL EXTRUSION SPACING OF THE SCREWS IS THE SAME FOR THE ALTERNATE SCHEMES ONLY WITH:**

**SECTION C-C**

**FOR LOCATION OF SECTION C-C SEE SHEET 4.**

**NOTE:** **COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**JOINT INSTALLATION SCHEME**

**NOTE:** For concrete divider not split, use one piece ½" BENT SLIDING PLATE.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD NEOPRENE STRIP SEAL DAM
FOR PRESTRESSED CONCRETE & STEEL I-BEAM BRIDGES

MISCELLANEOUS DETAILS

SKEW ANGLES > 15° PERPENDICULAR
SKEW ANGLES ≤ 15° PERPENDICULAR

EXPANSION DAM JOINT MITERED AT BARRIER FACE

VERTICAL WALL BARRIER

4" + JOINT WIDTH x

1" MIN. x

TH x

SLIDING PLATE

PLAN SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY

SECTION EXPANSION DAM JOINT MITERED AT BARRIER FACE

SKEW ANGLES > 15° PERPENDICULAR

SKEW ANGLES ≤ 15° PERPENDICULAR

OUTSIDE FACE OF VERTICAL WALL BARRIER

PLAN SHOWN WITHOUT BENT SLIDING PLATE FOR CLARITY
1. All members, welds and plate sizes shown are valid for straight girders with span length of 16'-0" or less. Slopes shown for straight girders with span length of 16'-0" to 30'-0" in a downward direction and for skew angles less than 45°.

2. Steel mid-span diaphragms shall be of the same material type as that of steel and concrete web mid-span diaphragms normally not permitted.

3. All structural steel shall conform to AASHTO M270, Grade 50 (ASTM A709, Grade 50S) unless otherwise noted.

4. Plate size and connection size shall be determined by the connection type as shown in AISC tables of beam dimensions.

5. All slotted holes shall be covered by a 1" plate washer with standard bolts. The plate washer shall provide a 1" bearing distance in the direction of the slot and 1" bearing distance in the direction perpendicular to the slot.

6. The 1/2" diameter hole in connection WT's or double angles shall have an unthreaded shank of sufficient length to allow the shank to exist in the plane of the connection when the girder spacing is equal to 10'-9" or less. Special designs for all the diaphragm members, welds and connections when the girder spacing exceeds 10'-9" and the skirt angle is less than 30°.

7. All mid-span diaphragms shall be of the same material type as that of steel and concrete web mid-span diaphragms normally not permitted.

8. Steel mid-span diaphragms shall be level.

9. All slotted holes to be covered by a 1" plate washer with standard bolts. The plate washer shall provide a 1" bearing distance in the direction of the slot and 1" bearing distance in the direction perpendicular to the slot.

10. Provide diaphragms normal to the main members for all skews. For skews less than or equal to 45°, stagger diaphragms and use backer plates on interior beam connections.

11. Provide diaphragms normal to the main members for all skews. For skews less than or equal to 45°, stagger diaphragms and use backer plates on interior beam connections.

12. All welds shown are for the web and flanges shown are cast into the beam web using 1/2" I.D. pipes. May be used with 1" thick end plates.

13. terminates welds 1/2" short of each end of each end plate.

14. Provide a 1/8" minimum bearing distance in accordance with AASHTO D-1.5 unless otherwise noted.

15. Provide a 1/8" minimum bearing distance in accordance with AASHTO D-1.5 unless otherwise noted.

16. Provide a 1/8" minimum bearing distance in accordance with AASHTO D-1.5 unless otherwise noted.

17. Provide a 1/8" minimum bearing distance in accordance with AASHTO D-1.5 unless otherwise noted.

18. Provide a 1/8" minimum bearing distance in accordance with AASHTO D-1.5 unless otherwise noted.

19. Provide a 1/8" minimum bearing distance in accordance with AASHTO D-1.5 unless otherwise noted.

20. Provide a 1/8" minimum bearing distance in accordance with AASHTO D-1.5 unless otherwise noted.
ALTERNATE DIAPHRAGM DETAIL FOR UTILITY ACCESS

NOTE:
1. FOR GENERAL NOTES SEE SHEET 1.

SECTION A-A

SECTION B-B
**RECOMMENDED**

**LB**

LATERAL BOW = ECCENTRICITY RESULTING FROM 2" LATERAL BOW WHICH ADDS TO WIND AND TILT

**CHIEF BRIDGE ENGINEER**

**BC-772M**

**SEPT.30, 2016**

**NOTES**

**PRESTRESSED CONCRETE BEAM BRACING**

**a.** THE QUANTITY OF DRILLED ANCHORS TO BE LOAD TESTED SHALL BE 2 ANCHORS PER SUBSTRUCTURE UNIT.

**b.** PRIMARY BRACING SHALL BE DESIGNED TO RESIST THE LOADS DESCRIBED FOR STABILITY CRITERIA.

**c.1.** THE LATERAL LOAD TRANSFERRED TO THE BEARING SHALL BE LESS THAN OR EQUAL TO 20% OF THE BEAM WIND PRESSURE.

**c.2.** THE MOUNTING PLATE AND BRACKETS SHALL BE DESIGNED TO RESIST THE SUM OF THE LATERAL LOADS AND THE SUM OF THE MOUNTING PLATE AND BRACKETS.

**c.3.** GUIDED HLMR BEARINGS SHALL BE LOCATED AT THE MOUNTING PLATE AND BRACKETS' END, AND OTHER GUIDED HLMR BEARINGS SHALL BE LOCATED AT THE MOUNTING PLATE AND BRACKETS' END.

**c.4.** NON-GUIDED HLMR BEARINGS SHALL BE LOCATED AT THE MOUNTING PLATE AND BRACKETS' END.

**c.5.** PRIMARY BRACING MUST BE INSTALLED PRIOR TO THE BEAM BEING RELEASED FROM THE CRANE.

**d.** BEAMS WHICH ARE DETERMINED TO BE INHERENTLY STABLE, OR BEAR ON HIGH LOAD MULTIROTATIONAL BEARINGS (HLMR BEARINGS), SHALL BE RESTRAINED BY PRIMARY BRACING.

**e.** THE QUANTITY OF DRILLED ANCHORS TO BE LOAD TESTED SHALL BE 2 ANCHORS PER SUBSTRUCTURE UNIT.

**REVIEWED SHEET 1 OF 5**

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**BC-772M**
**CONCEPTUAL SECONDARY BRACING DETAILS**

**INSTALLATION**

**SECONDARY BRACING INSTALLATION:**

1. Install all-thread bar anchors in extension side of each end of all fascia beams as per primary bracing specification.
2. Center beam about center line of beam and bearing and lower both ends.
3. Drive beam to vertical; control beam with crane.
4. Slowly release beam from crane while checking for plumbness at web.
5. Repeat for opposite beam end.
7. Attach and tie Fascia Beam to anchor point with cable and turnbuckle taking up slack to cable to tension condition.
8. Direct foot of fascia beam.
10. Repeat as required.
11. Install all-thread bar anchors on exterior side of each end of fascia beams as per primary bracing specification.
12. Attach and tie fascia beam to anchor point with cable and turnbuckle taking up slack to cable to tension condition.
13. The last beam placed during a work shift will be tied back to substructure as at fascia beam.

**PRESTRESSED CONCRETE BEAM BRACING**

**S-GRN NO. 2 OR EQUAL (TYP.)**

- Steel Angle (TYP.)
- Top Flange Edge Protection
- Steel Angle (TYP.)
- Top Flange Edge Protection
- Steel Angle (TYP.)
- Top Flange Edge Protection

**RECOMMENDED BC-772M**

- Beam Lifter (TYP.)
- Load Cases.
- Beams for higher beams required between timber braces may be additional for forces due to anchor.

**SECONDARY BRACING INSTALLATION:**

1. Install all-thread bar anchors in extension side of each end of all fascia beams as per primary bracing specification.
2. Center beam about center line of beam and bearing and lower both ends.
3. Drive beam to vertical; control beam with crane.
4. Slowly release beam from crane while checking for plumbness at web.
5. Repeat for opposite beam end.
7. Attach and tie fascia beam to anchor point with cable and turnbuckle taking up slack to cable to tension condition.
8. Direct foot of fascia beam.
10. Repeat as required.
11. Install all-thread bar anchors on exterior side of each end of fascia beams as per primary bracing specification.
12. Attach and tie fascia beam to anchor point with cable and turnbuckle taking up slack to cable to tension condition.
13. The last beam placed during a work shift will be tied back to substructure as at fascia beam.
CONCEPTUAL PRIMARY BRACING DETAILS

ADDITIONAL BEAM REINFORCEMENT FOR BRACING

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL PRIMARY BRACING

INSTALLATION

1. DRILLED HOLE SHALL BE AIR DRILLED.
2. HOLES IN ABUTS & PIERS SHALL BE GENERALLY LOCATED ALONG CENTER LINE OF BEARING.
3. ALL-THREAD BARS SHALL BE EMBEDDED IN CONCRETE AT LEAST 6" DEEP.
4. DRILLED HOLE SHALL BE PNEUMATICALLY CLEARED OF DEBRIS (ROCK, DIRT, ETC.) PRIOR TO DRILLING.
5. DRILLED HOLE SHALL BE ABANDONED AND FILLED WITH NON-SHRINK GROUT.
6. ALL-THREAD BARS SHALL BE EMBEDDED IN CONCRETE AT LEAST 2" DEEP.
7. ALL-THREAD BARS SHALL BE ANCHORED IN HOLES DRILLED IN CONCRETE AT LEAST 1" DEEP.
8. HOLES SHALL BE AIR DRILLED AND CONCRETE TO BEALED WITH CONCRETE BLOCKED OUT.
9. ALL-THREAD BARS SHALL BE EMBEDDED IN CONCRETE AT LEAST 2" DEEP.
10. HOLES SHALL BE AIR DRILLED AND CONCRETE TO BEALED WITH CONCRETE BLOCKED OUT.
11. HOLES SHALL BE AIR DRILLED AND CONCRETE TO BEALED WITH CONCRETE BLOCKED OUT.

NOTE:
ALL-THEARD BAR ANCHORS MAY BE EMBEDDED IN THE SUPERSTRUCTURE AT THE CONTRACTOR'S OPTION.

CONCEPTUAL PRIMARY BRACING DETAILS

ADDITIONAL BEAM REINFORCEMENT FOR BRACING

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL PRIMARY BRACING

INSTALLATION

1. DRILLED HOLE SHALL BE GENERALLY LOCATED ALONG CENTER LINE OF BEARING.
2. HOLES IN ABUTS & PIERS SHALL BE GENERALLY LOCATED ALONG CENTER LINE OF BEARING.
3. ALL-THREAD BARS SHALL BE EMBEDDED IN CONCRETE AT LEAST 6" DEEP.
4. DRILLED HOLE SHALL BE PNEUMATICALLY CLEARED OF DEBRIS (ROCK, DIRT, ETC.) PRIOR TO DRILLING.
5. DRILLED HOLE SHALL BE ABANDONED AND FILLED WITH NON-SHRINK GROUT.
6. ALL-THREAD BARS SHALL BE EMBEDDED IN CONCRETE AT LEAST 2" DEEP.
7. ALL-THREAD BARS SHALL BE ANCHORED IN HOLES DRILLED IN CONCRETE AT LEAST 1" DEEP.
8. HOLES SHALL BE AIR DRILLED AND CONCRETE TO BEALED WITH CONCRETE BLOCKED OUT.
9. ALL-THREAD BARS SHALL BE EMBEDDED IN CONCRETE AT LEAST 2" DEEP.
10. HOLES SHALL BE AIR DRILLED AND CONCRETE TO BEALED WITH CONCRETE BLOCKED OUT.
11. HOLES SHALL BE AIR DRILLED AND CONCRETE TO BEALED WITH CONCRETE BLOCKED OUT.

NOTE:
ALL-THEARD BAR ANCHORS MAY BE EMBEDDED IN THE SUPERSTRUCTURE AT THE CONTRACTOR'S OPTION.

CONCEPTUAL PRIMARY BRACING DETAILS

ADDITIONAL BEAM REINFORCEMENT FOR BRACING

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL PRIMARY BRACING

INSTALLATION

1. DRILLED HOLE SHALL BE GENERALLY LOCATED ALONG CENTER LINE OF BEARING.
2. HOLES IN ABUTS & PIERS SHALL BE GENERALLY LOCATED ALONG CENTER LINE OF BEARING.
3. ALL-THREAD BARS SHALL BE EMBEDDED IN CONCRETE AT LEAST 6" DEEP.
4. DRILLED HOLE SHALL BE PNEUMATICALLY CLEARED OF DEBRIS (ROCK, DIRT, ETC.) PRIOR TO DRILLING.
5. DRILLED HOLE SHALL BE ABANDONED AND FILLED WITH NON-SHRINK GROUT.
6. ALL-THREAD BARS SHALL BE EMBEDDED IN CONCRETE AT LEAST 2" DEEP.
7. ALL-THREAD BARS SHALL BE ANCHORED IN HOLES DRILLED IN CONCRETE AT LEAST 1" DEEP.
8. HOLES SHALL BE AIR DRILLED AND CONCRETE TO BEALED WITH CONCRETE BLOCKED OUT.
9. ALL-THREAD BARS SHALL BE EMBEDDED IN CONCRETE AT LEAST 2" DEEP.
10. HOLES SHALL BE AIR DRILLED AND CONCRETE TO BEALED WITH CONCRETE BLOCKED OUT.
GUIDED POT BEARING LOCK DETAILS

CONCEPTUAL GUIDED HLMR BEARING LOCK

INSTALLATION

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. ONLY ONE END OF BEAM IS TO BE LOCKED IN A LONGITUDINAL CONDITION. POSITION. OPPOSITE END IS TO HAVE FREEDOM OF MOVEMENT LONGITUDINALLY.

NOTE:

CONCEPTUAL DETAILS INDICATED ARE BASED ON "POT" HLMR BEARINGS. FOR OTHER HLMR BEARINGS, CONTRACTOR TO DEVELOP REQUIRED LOCK DETAILS AND SUBMIT WITH ERECTION DRAWINGS.
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. PLACE BEARING SOLE PLATE
2. PLACE BEARING LOCK AND SNUG FASTENERS.
3. CRANE TO MAINTAIN CONTROL OF BEAM. MATE BEAM TO BEARING SOLE PLATE.

NOTE:
CONCEPTUAL NON-GUIDED HLMR BEARING LOCK DETAILs BASED ON SOLE PLATE DIMENSION VARIATION BASED ON MASONRY BEARING DIMENSION.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
PRESTRESSED CONCRETE BEAM BRACING
CONCEPTUAL NON-GUIDED HLMR BEARING LOCK

BC-772M
**BEAM NOTCH DETAIL**

**SPREAD BOX BEAM**

**ACCEPTABLE DRIP NOTCH DETAILS**

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

**CHAMFER DETAIL FOR SKewed END BLOCK**

**TYPICAL CORNER BLOCKOUT-SKEws < 85°**

**NOTES:**
1. No chamfer required for skew < 75°.

**GENERAL NOTES:**
1. Include applicable details shown on these sheets on fabrication shop drawings.
2. Sitewide shop drawings or schedule of P.V.C. pipe are permitted to be used as alternate bond breaker materials in lieu of the metal sleeve. Other bond breaker materials may be used subject to the approval of the District Engineer.
3. Use selected cellular polyurethane conforming to ASTM C578, TYPE I, except limit the water absorption to 2% by volume.
4. Use selected cellular polyurethane from a manufacturer listed in Bulletin 14, under miscellaneous polyurethane bonding and special cement mortars, and approved. Apply in accordance with manufacturer's instructions.
5. Strand recess can be omitted if beam ends are to be incorporated in a continuity diaphragm, or if approved equivalent material in accordance with Publication 408 Section 1019.2(b) is specified.

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD MISCELLANEOUS PRESTRESS DETAILS**

**DIRECTOR, BUREAU OF PROJECT DELIVERY**

**CHIEF BRIDGE ENGINEER**

**RECOMMENDED**

**RECOMMENDED**

**BUREAU OF PROJECT DELIVERY**

**FABRICATOR'S SHOP DRAWINGS.**

1. Include applicable details shown on these sheets on fabrication shop drawings.
2. Sitewide shop drawings or schedule of P.V.C. pipe are permitted to be used as alternate bond breaker materials in lieu of the metal sleeve. Other bond breaker materials may be used subject to the approval of the District Engineer.
3. Use selected cellular polyurethane conforming to ASTM C578, TYPE I, except limit the water absorption to 2% by volume.
4. Use selected cellular polyurethane from a manufacturer listed in Bulletin 14, under miscellaneous polyurethane bonding and special cement mortars, and approved. Apply in accordance with manufacturer's instructions.
5. Strand recess can be omitted if beam ends are to be incorporated in a continuity diaphragm, or if approved equivalent material in accordance with Publication 408 Section 1019.2(b) is specified.

**NOTES:**
1. No chamfer required for skew < 75°.
2. No chamfer required for skew < 75°.
STAGE 1 CONSTRUCTION

1. VERTICAL ADJUSTMENT DEVICES SHALL BE DESIGNED TO RESIST TWO TIMES THE ANTICIPATED PANEL DEAD LOAD PLUS 5% OF PANEL SUPERIMPOSED LOAD.

2. ALTERNATE LEVELING DEVICES MAY BE SUBSTITUTED BY CONSENT OF THE ENGINEER.

3. IF BOLT IS OILED OR GREASED TO FACILITATE LEVELING AND REMOVAL, ADEQUATELY CLEAN AND REMOVE OIL PRIOR TO INSTALLING LEVELING BOLT.

VERTICAL ADJUSTMENT DEVICE NOTES:
1. VERTICAL ADJUSTMENT DEVICES SHALL BE DESIGNED TO RESIST TWO TIMES THE ANTICIPATED PANEL DEAD LOAD PLUS 5% OF PANEL SUPERIMPOSED LOAD.
2. ALTERNATE LEVELING DEVICES MAY BE SUBSTITUTED BY CONSENT OF THE ENGINEER.
3. IF BOLT IS OILED OR GREASED TO FACILITATE LEVELING AND REMOVAL, ADEQUATELY CLEAN AND REMOVE OIL PRIOR TO INSTALLING LEVELING BOLT.

VERTICAL ADJUSTMENT DEVICES:
- LEVELING BOLT
- STEEL PLATE
- PIPE SLEEVE
- HEAVY HEX NUT

SERVICE LOAD BOLT SIZES FOR BOLT DEVICES:
<table>
<thead>
<tr>
<th>Service Load</th>
<th>Bolt Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 kips</td>
<td>1-1/4&quot; x 7/8&quot;</td>
</tr>
<tr>
<td>20 kips</td>
<td>1-1/4&quot; x 7/8&quot;</td>
</tr>
</tbody>
</table>

LEVELING BOLT AND STEEL PLATE:
- LEVELING BOLT
- STEEL PLATE
- PIPE SLEEVE
- HEAVY HEX NUT

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD
MISCELLANEOUS PRESTRESS DETAILS
ADJACENT BOX BEAM AND VERTICAL ADJUSTMENT DEVICE DETAILS

SEPT. 30, 2016

RECOMMENDED: SEP. 30, 2016
DATE: SEP. 30, 2016
MATERIALS: BC-775M
GENERAL NOTES

1. DESIGN SPECIFICATIONS:
   - PennDOT Design Manual Part H, "Guide Specifications for Structural Design of Sound Barriers", Including the "Pennsylvania Department of Transportation PUBLICATION 408, Section 1086.3(f) for Fabrication and Erection.

2. CONSTRUCTION SPECIFICATIONS AND REQUIREMENTS:

3. PANEL HEIGHTS:
   - Provide Stacked Panels when the Panel Height Exceeds 9'-6".

4. HORIZONTAL PANEL Joints:
   - Provide strapped panels when the panel must be greater than 1'-0".

5. INSTALL PANELS TRULY VERTICAL.

6. PROVIDE CONCRETE COVER IN ACCORDANCE WITH THIS STANDARD AND DESIGN.

7. SEAL ALL OPEN JOINTS WITH CAULKING COMPOUND AND/OR JOINT SEALING MATERIAL.

8. PROVIDE STEEL CABLES IN THE PRECAST CONCRETE PANELS AS INDICATED ON THE CONTRACT DOCUMENTS.

9. INSTALL STEEL CABLES IN THE PRECAST CONCRETE PANELS AS INDICATED ON THE CONTRACT DOCUMENTS.


11. REFER TO CONSTRUCTION DOCUMENTS FOR ADDITIONAL INFORMATION.

ARCHITECTURAL SURFACE TREATMENTS

1. THE AVERAGE ARCHITECTURAL SURFACE TREATMENT THICKNESS, PER SIDE OF PANEL, IS PERMITTED TO VARY FROM 0 TO 1'-0". BUT THE TOTAL AVERAGE ARCHITECTURAL SURFACE TREATMENT ON BOTH SIDES OF THE PANEL MUST NOT BE GREATER THAN 2'-0" UNLESS OTHERWISE INDICATED ON THE CONTRACT DOCUMENTS.

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. PANELS 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.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS

REFERENCE DRAWINGS

INDEX OF SHEETS

<table>
<thead>
<tr>
<th>SHEET TITLE</th>
<th>SHEET NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC-776M REINFORCEMENT SEE DETAIL DRAWINGS</td>
<td>1</td>
</tr>
<tr>
<td>BC-777M PRECAST CONCRETE PANELS</td>
<td>2</td>
</tr>
<tr>
<td>BC-778M GROUND MOUNTED SOUND BARRIERS - STEEL POSTS</td>
<td>3</td>
</tr>
<tr>
<td>BC-779M STRUCTURE MOUNTED SOUND BARRIERS</td>
<td>4</td>
</tr>
</tbody>
</table>

SEPT. 30, 2016
NOTES TO FABRICATOR

1. PROVIDE SHOP DRAWINGS IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.02(d) AND 1086.3.

2. THE FOLLOWING INFORMATION MUST BE SHOWN ON THE SHOP DRAWINGS IF APPLICABLE:
   - GENERAL NOTES
   - FABRICATION NOTES
   - INSTALLATION NOTES
   - DESIGN CALCULATIONS
   - DETAILS

3. THE FABRICATOR MUST ENSURE THAT THE PANELS ARE ADEQUATELY DESIGNED FOR FABRICATION, TRANSPORTATION, ERECTION, PROVIDE AND INSTALL JOINT SEALING MATERIALS, AS REQUIRED.

4. PRECAST CONCRETE PANELS:
   - PROVIDE SHOP DRAWINGS IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.02(d)
   - PROVIDE CONTRACTOR WITH DESIGN CALCULATIONS, AS REQUIRED.

5. LIFTING INSERTS:
   - PROVIDE SKETCH DESIGN CALCULATIONS AND PANEL LIFTING INSERTS FOR ALL PANELS WITH A MINIMUM CAPACITY OF 30 TIMES THE CALCULATED LOAD ON THE PANEL.
   - PROVIDE TEMPORARY BRACING CALCULATIONS AND DETAILS.
   - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS.

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

7. PROVIDE CONCRETE STRENGTH OF 4,000 PSI BEFORE STRIPPING THE PANELS FROM THE FORMS.

8. REINFORCEMENT STEEL:
   - PROVIDE GRADE 60 DEFORMED REINFORCING BARS OF 30 DIAMETERS.
   - PROVIDE GRADE 65 PLAIN WELDED WIRE FABRIC THAT MEET THE REQUIREMENTS OF AASHTO M241.

9. FABRICATORS MUST BE PRE-APPROVED BY PENNDOT PER BULLETIN #15.

10. PANELS MUST BE STORED, TRANSPORTED, HANDLED, AND ERECTED ON EDGES AT ALL TIMES.

MATERIAL NOTES

1. PRECAST CONCRETE SOUND BARRIER PANELS:
   - PROVIDE Class A cement concrete, modified in the precast concrete panels.
   - PROVIDE A MINIMUM CONCRETE STRENGTH OF 4,000 PSI BEFORE STRIPPING THE PANELS FROM THE FORMS.

2. REINFORCEMENT STEEL:
   - PROVIDE GRADE 60 DEFORMED REINFORCING BARS OF 30 DIAMETERS.
   - PROVIDE GRADE 65 PLAIN WELDED WIRE FABRIC THAT MEET THE REQUIREMENTS OF AASHTO M241.

3. JOINT SEALING MATERI:
   - PROVIDE JOINT SEALING MATERIALS FOR JOINTS BETWEEN PANELS.

4. CASTING COMPOUNDS:
   - PROVIDE A SUFFICIENT HIGHLY FLEXIBLE JOINT SEALING MATERIALS FOR JOINTS WITH A MINIMUM WEATHER RESISTANCE OF 50 YEARS.

5. MATERIALS:
   - PROVIDE RIGHT-OF-WAY MATERIALS.
   - PROVIDE ANCHOR BOLT DETAILS.

6. CONNECTION DETAILS:
   - PROVIDE DESIGN CALCULATIONS FOR POST AND PANEL LIFTING INSERTS FOR CONCRETE STRENGTH.

7. REINFORCEMENT STEEL:
   - PROVIDE GRADE 60 DEFORMED REINFORCING BARS OF 30 DIAMETERS.
   - PROVIDE GRADE 65 PLAIN WELDED WIRE FABRIC THAT MEET THE REQUIREMENTS OF AASHTO M241.

8. REINFORCEMENT STEEL:
   - PROVIDE GRADE 60 DEFORMED REINFORCING BARS OF 30 DIAMETERS.
   - PROVIDE GRADE 65 PLAIN WELDED WIRE FABRIC THAT MEET THE REQUIREMENTS OF AASHTO M241.

9. JOINT BACKING MATERIAL (BACKER ROD):
   - PROVIDE GRADE 60 DEFORMED REINFORCING BARS OF 30 DIAMETERS.
   - PROVIDE GRADE 65 PLAIN WELDED WIRE FABRIC THAT MEET THE REQUIREMENTS OF AASHTO M241.

10. JOINT SEALING MATERI:
    - PROVIDE JOINT SEALING MATERIALS FOR JOINTS BETWEEN PANELS.

11. REINFORCEMENT STEEL:
    - PROVIDE GRADE 60 DEFORMED REINFORCING BARS OF 30 DIAMETERS.
    - PROVIDE GRADE 65 PLAIN WELDED WIRE FABRIC THAT MEET THE REQUIREMENTS OF AASHTO M241.
LEVEL PANEL
GROUND MOUNTED SOUND BARRIER ELEVATION

NOTES:
1. REFER TO CONTRACT DRAWINGS AS SPECIFIED OR REQUIRED.
2. WALL HEIGHT IS DEFINED AS FOLLOWS:
   a. WALL HEIGHT = DIFFERENCE FROM TOP OF FOOTING/CAISSON TO TOP OF POST WITHOUT BASE PLATE: H = HEIGHT FROM TOP OF POSTING/CAISSON TO TOP OF WALL
   b. WALL HEIGHT = DIFFERENCE FROM TOP OF BASE PLATE TO TOP OF WALL: H = HEIGHT FROM TOP OF POSTING/CAISSON TO TOP OF WALL
3. PANEL EMBEDMENT MAY NEED TO BE INCREASED WHERE SPECIFIED ON SHEETS 1 AND 2.
4. FOR SECTION C-C, REFER TO SHEET 6.
5. PANEL EMBEDMENT MAY NEED TO BE INCREASED WHERE INDICATED.
6. DIMENSIONS BASED ON FOOTING LEVEL AS REQUIRED BASED ON GEOMETRY AND LAYOUT.
7. COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION CHIEF BRIDGE ENGINEER RECOMMENDED.

LEGEND:
- DIMENSION TO MEET ADJACENCY OF LIFTING INSERTS
- DIMENSION AS REQUIRED BY DESIGN
- GRADE GROUND TO DRAIN AWAY FROM WALL. FILL DEPTH ON EACH SIDE OF WALL TO BE WITHIN 1'-0" DIFFERENCE.
- LEVEL AS REQUIRED BASED ON CAISSON/HORIZONTAL DIMENSIONS
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
- LEVEL AS REQUIRED (SEE DETAIL B ON SHEET 6-LEVEL)
FALSE JOINT

BC-776M

SHEET 7 OF 7

PRECAST CONCRETE PANELS

GROUND MOUNTED SOUND BARRIERS

STANDARD NOTES:

TO NOTES ON SHEETS 1 AND 2.
1. FOR ADDITIONAL INFORMATION REFER (SCHEDULE 40) P.V.C. PIPE SLEEVE (AS SPECIFIED) AND CAULKING COMPOUND (COLOR OF PANEL)

AND CLOSED CELL NEOPRENE SPONGE (TYP.) FILL OPENING BETWEEN PIPE AND P.V.C. PIPE SLEEVE WITH OPENING BETWEEN PIPE SLEEVE DETAIL AT OPENINGS

GROUND PROPOSED EXISTING OR PANEL SIDE OF 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 1'-6" TYP. ACCESS DOOR WITH A SMALL CELL HONEYCOMB OR A POLYURETHANE CORE. CORE TO BE COVERED WITH GALVANIZED STEEL WITH A 16 GAUGE THICKNESS.
4. PROVIDE A 1'-4" MIN. (TYP.) THICKNESS REQUIRED FOR Architectural surface treatments
5. MOUNT DOORS USING THREE HINGES.
6. PROVIDE A 1'-4" MIN. (TYP.) THICKNESS REQUIRED FOR Architectural surface treatments
7. ATTACH DOOR FRAME TO PRECAST CONCRETE PANEL USING GALVANIZED STEEL WITH A 14 GAUGE THICKNESS.
8. DOOR FRAME WIDTH TO BE FLUSH WITH THE STRUCTURAL THICKNESS OF THE PRECAST CONCRETE PANEL.
9. PROVIDE STAINLESS STEEL DOOR PULLS (TWO NEEDED, ONE PER SIDE). MOUNT DOOR PULLS USING STAINLESS STEEL THRU-BOLTS OR AN ACCEPTABLE ALTERNATE APPROVED BY THE ENGINEER. CENTER DOOR PULLS AT 3'-0" ABOVE FINISHED GRADE.
10. PROVIDE A WEATHER-RESISTANT TWO-SIDED TUBULAR LOCKING DEVICE WITH A STAINLESS STEEL PIN LATCH, KEY LOCK AS SPECIFIED IN THE SPECIAL PROVISIONS OR AS DIRECTED BY THE ENGINEER.

LEGEND:

¢ AS REQUIRED BY DESIGN

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO CONTRACT DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE PANELS

PRECAST CONCRETE PANEL DETAILS - 4

BC-776M

SEPT. 30, 2016

SEPT. 30, 2016
1. **GENERAL NOTES**
   - **CAST-IN-PLACE CONCRETE:**
     - Provide Class C-7 concrete in the cast-in-place footings, pedestals, and caissons.
     - Unit weight of concrete: 150 lb. to 180 lb. per cu. ft.
   - **PRECAST CONCRETE POSTS:**
     - Provide Class B-3 concrete, modified in the precast concrete posts.
     - Unit weight of concrete: 150 lb. to 180 lb. per cu. ft.
   - **GENERAL NOTES:**
     - Coordinate, locate, and construct all work related to public and private utilities, including the electrical, gas, and telephone lines.

2. **DIRECTOR, BUR. OF PROJECT DELIVERY**
   - Provide all necessary temporary and permanent work associated with the design, construction, and maintenance of the project.
   - Coordinate with the Chief Bridge Engineer for the design and construction of the project.

3. **REFERENCE DRAWINGS**
   - Refer to BC-776M for details on the design of the project.

4. **NOTES TO FABRICATOR**
   - Provide materials and perform work in accordance with the current version of the Bureaus' Reference Drawings.

5. **MATERIAL NOTES**
   - **CONCRETE:**
     - Provide Class C-7 concrete in the cast-in-place footings, pedestals, and caissons.
     - Unit weight of concrete: 150 lb. to 180 lb. per cu. ft.
   - **REINFORCEMENT STEEL:**
     - Provide steel to conform to AASHTO/AWS/D1.5 specifications.
   - **MATERIAL NOTES:**
     - Provide materials and perform work in accordance with the current version of the Bureaus' Reference Drawings.

6. **NOTES TO FABRICATOR**
   - Provide materials and perform work in accordance with the current version of the Bureaus' Reference Drawings.
Note A:

1. For additional information refer to notes on Sheet 1.
2. Wall height is defined as follows:
   - H = Height from top of footing/to notes on sheet 1.
   - H = Height from top of base plate to top of wall.
   - PS = Post spacing: 20'-0" max.

BEARING PAD

LEVEL OR SLOPED TOP PANEL

LEVEL PANEL

GROUND MOUNTED SOUND BARRIER ELEVATION

CONCRETE CAISSON

LOW SEAT

PRECAST CONCRETE POST, NOTCH,

LIMITS OF ARCHITECTURAL SURFACE TREATMENT WHEN LIMITS OF ARCHITECTURAL SURFACE TREATMENT WHEN

LEVEL (TYP.)

TOP OF POST

SECTION B-B

IN-LINE POST

SECTION C-C

ANGLED IN-LINE POST

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

GEOMETRY AND LAYOUT

RECOMMENDED SEPT. 30, 2016
SHEET 2 OF 12
PRECAST CONCRETE POSTS
GROUND MOUNTED SOUND BARRIERS
STANDARD
STEEL BASE PLATE

DETAIL FOR FOOTING IS SIMILAR
DETAIL FOR CAISSON IS SIMILAR

SECTION E-E
RAISED PANEL SEAT TYPICAL PANEL SEAT
PANEL SEAT ELEVATION
WITHOUT BASE PLATE
DETAILED FOR FOOTING IS SIMILAR

SECTION F-F
RAISED PANEL SEAT TYPICAL PANEL SEAT
PANEL SEAT ELEVATION
WITH BASE PLATE
DETAILED FOR FOOTING IS SIMILAR

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. DETAILS FOR ANGLED POST AND CORNER POST NOT SHOWN, BUT SIMILAR TO DETAILS SHOWN. PROVIDE DETAILS ON CONTRACT DRAWINGS.
3. DETAILS FOR RAISED PANEL SEAT TO NOTES ON SHEET 1.

LEGEND:
# AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS
* BASE PLATE THICKNESS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS

SEPT.30, 2016
PRECAST CONCRETE POSTS
GROUND MOUNTED SOUND BARRIERS
STANDARD

SPREAD FOOTING PLAN

SECTION L-L

POST
PRECAST CONCRETE

K

H = WALL HEIGHT

H = WALL HEIGHT

DETAIL 4
PRECAST CONCRETE POST
EMBEDDED IN SPREAD FOOTING
(WITH OR WITHOUT PEDESTAL)

ELEVATION

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

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SEAT DETAILS REFER TO SHEET 4.
3. PROVIDE UNCOATED OR EPOXY COATED BARS IN ACCORDANCE WITH THE CONTRACT DRAWINGS. GALVANIZED BARS NOT PERMITTED.
4. BARS MAY BE BENT AFTER FABRICATION OF POST. TOUCH-UP EPOXY COATED BARS WITH AN APPROVED EPOXY PAINT.

LEGEND:
φ 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 4

SEPT. 30, 2016
SEPT. 30, 2016
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 BARS IN ACCORDANCE WITH THE CONTRACT DRAWINGS.

LEGEND:
- REQUIREMENTS TO CONTRACT DRAWINGS

CD = CAISSON DIAMETER

COMMENTS:
- AS REQUIRED BY DESIGN
- REFER TO CONTRACT DRAWINGS

DETAIL 5
PRECAST CONCRETE ANGLED POST - TYPE E
EMBEDDED IN CAISSON

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
PRECAST CONCRETE POSTS
DETAIL 5

SEPT. 30, 2016
SEPT. 30, 2016
DETAIL 6
PRECAST CONCRETE CORNER POST 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 bars in accordance with the contract drawings.

Legend:
- As required by design
- Refer to contract drawings

Commonwealth of Pennsylvania
Department of Transportation
Bureau of Project Delivery

Sept. 30, 2016
**DETAIL 7**

**PRECAST CONCRETE ANGLED POST - TYPE E**

**EMBEDDED IN SPREAD FOOTING (WITH OR WITHOUT PEDESTAL)**

**ELEVATION**

**PLAN**

**SECTION R-R**

**SPREAD FOOTING PLAN**

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

**SHEET 11 OF 12**

**NOTES:**

1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET L.

2. FOR PANEL SEAT DETAILS REFER TO SHEET L.

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.
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR PANEL SHEET DETAILS REFER TO SHEET 1.
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.
5. EPOXY COATED BARS WITH AN APPROVED EPOXY PAINT.
GENERAL NOTES

1. DESIGN SPECIFICATIONS
   - Refer to the Pennsylvania Department of Transportation Manual, Part 9.
   - Refer to the "Manual of Steel Construction" for ASD and LRFD.
   - Refer to the "Manual of Uniform Precast Concrete Products" for precast concrete.
   - Refer to the "ACI Building Code" for concrete structures.

2. CONSTRUCTION SPECIFICATIONS AND REQUIREMENTS
   - All work must be performed in accordance with the current edition of this manual.
   - All work must be performed in accordance with the latest edition of the American Concrete Institute (ACI) Building Code.
   - All work must be performed in accordance with the latest edition of the American Society of Testing and Materials (ASTM) standards.

3. GENERAL NOTES
   - Masonry units shall be of the type and size specified in the contract documents.
   - Masonry units shall be laid in accordance with the masonry contractor's specification.
   - Masonry units shall be laid in accordance with the masonry contractor's installation instructions.
   - Masonry units shall be laid in accordance with the masonry contractor's quality control procedures.

4. INSTALLATION OF STRUCTURAL STEEL
   - Structural steel shall be designed and fabricated in accordance with the American Institute of Steel Construction (AISC) specifications.
   - Structural steel shall be installed in accordance with the American Institute of Steel Construction (AISC) guidelines.
   - Structural steel shall be installed in accordance with the American Institute of Steel Construction (AISC) installation instructions.

5. CONCRETE COVER
   - Concrete cover shall be in accordance with the current edition of the American Concrete Institute (ACI) Building Code.
   - Concrete cover shall be in accordance with the current edition of the American Concrete Institute (ACI) Building Code.
   - Concrete cover shall be in accordance with the current edition of the American Concrete Institute (ACI) Building Code.

6. PLAIN REINFORCEMENT
   - Plain reinforcement shall be in accordance with the American Concrete Institute (ACI) Building Code.
   - Plain reinforcement shall be in accordance with the American Concrete Institute (ACI) Building Code.
   - Plain reinforcement shall be in accordance with the American Concrete Institute (ACI) Building Code.

7. SPECIAL REINFORCEMENT
   - Special reinforcement shall be in accordance with the American Concrete Institute (ACI) Building Code.
   - Special reinforcement shall be in accordance with the American Concrete Institute (ACI) Building Code.
   - Special reinforcement shall be in accordance with the American Concrete Institute (ACI) Building Code.

8. FIBER OPTIC CABLES
   - Fiber optic cables shall be installed in accordance with the American Society of Testing and Materials (ASTM) standards.
   - Fiber optic cables shall be installed in accordance with the American Society of Testing and Materials (ASTM) installation instructions.
   - Fiber optic cables shall be installed in accordance with the American Society of Testing and Materials (ASTM) quality control procedures.

9. WELDING
   - Welding shall be in accordance with the American Welding Society (AWS) specification.
   - Welding shall be in accordance with the American Welding Society (AWS) guidelines.
   - Welding shall be in accordance with the American Welding Society (AWS) installation instructions.

10. REFERENCE DRAWINGS
    - Reference drawings shall be in accordance with the current edition of the American Society of Civil Engineers (ASCE) guidelines.
    - Reference drawings shall be in accordance with the current edition of the American Society of Civil Engineers (ASCE) installation instructions.
    - Reference drawings shall be in accordance with the current edition of the American Society of Civil Engineers (ASCE) quality control procedures.
SECTION D-D (STEEL PIPE POST)

**POST DETAILS**

- **ANGELED PANELS**
  - STEEL POST (GALVANIZED AND PAINTED) (TYP.)
  - GROUNDED SOUND BARRIERS
  - \( 20" \times 0.594" \) STEEL PLATE

- **STRAIGHT PANELS**
  - STEEL POST (GALVANIZED AND PAINTED) (TYP.)
  - BACKER ROD REQUIRED

**SEQUENCE OF INSTALLATION**

1. GLUE CLOSED CELL NEOPRENE SPONGE STRIP TO POST OR HORIZONTAL SIDE OF PANELS USING AN APPROVED ADHESIVE. Apply at minimum joint sealing material or caulking compound to face of elastomeric pad and apply joint sealing material or caulking compound on inside face of joint.
2. ERECT PRECAST PANEL AND JOIN SEALING MATERIAL OR CAULKING COMPOUND AND WEDGE TIGHT AGAINST POST AND PANEL TO FACE OF ELASTOMERIC PAD. STOP PAD AT TOP AND BOTTOM OF PANEL FOR DRAINAGE.
3. GLUE CLOSED CELL NEOPRENE SPONGE STRIP TO POST ON ROADWAY SIDE OF BARRIER.
4. INSERT BACKER RODS IF OPENINGS ARE GREATER THAN \( 1/2" \) AND APPLY JOINT SEALING MATERIAL OR CAULKING COMPOUND.
5. PRECAST CONCRETE PANEL (TYP.)

**NOTES**

- FOR ADDITIONAL INFORMATION REFER TO SHEETS 9 AND 10:
  - WHERE NO CLOSED CELL NEOPRENE SPONGE STRIP IS REQUIRED, SEASON PANEL TO FLANGE USING APPROVED ADHESIVE.
  - REQUIREMENT FOR JOINT BETWEEN PANEL AND FLANGE WHEN CLOSED CELL NEOPRENE SPONGE STRIPS ARE REGULAR INTERVALS FOR THICKNESS OF PANEL FOR DRAINAGE OR APPLICATION OF JOINT SEALING MATERIAL OR CAULKING COMPOUND.

- WHERE NO CLOSED CELL NEOPRENE SPONGE STRIP IS REQUIRED, SEAL PANEL TO FLANGE WITH JOINT SEALING MATERIAL OR CAULKING COMPOUND, LEAVE 2" UNSEALED.

**COMMONWEALTH OF PENNSYLVANIA**

**DEPARTMENT OF TRANSPORTATION**

**BUREAU OF PROJECT DELIVERY**

**STANDARD GROUND MOUNTED SOUND BARRIERS**

**STEEL POSTS**

**POST DETAILS**

- **CORNER PANELS**
- **ANGELED PANELS**
NOTES:

LEGEND:

REFER TO CONTRACT DRAWINGS AS REQUIRED BY DESIGN

DETAIL 1

STEEL POST WITH BASE PLATE CONNECTION TO CAISSON

ELEVATION (ANCHOR BOLTS W/ANCHOR PLATE ASSEMBLY)

ELEVATION (ANCHOR BOLTS W/HOOKS)

CAISSON REINFORCEMENT NOT SHOWN FOR CLARITY

PLEASE NOTE THAT THE ANCHOR BOLT DETAIL SHOWN MAY BE ALTERED.

DETAIL 1

STEEL POST WITH BASE PLATE CONNECTION TO CAISSON

SECTION G-G

SECTION H-H

PLAN - ANCHOR PLATE ASSEMBLY

PANEL SEAT PLAN

PANEL SEAT ELEVATION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS

DETAIL 1

SEPT. 30, 2016

RECOMMENDED 09-30-16
ADAPTED TO SHEET 5 OF 10
DETAIL 3
STEEL POST
EMBEDDED IN CAISSON

SECTION K-K

SECTION L-L

WELDED STUDS
(REQUIRED ON BOTH PLANES)

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO CONTRACT DRAWINGS
2. FOR PANEL SEAT DETAILS REFER TO SHEET 1.
DETAIL 4
STEEL POST EMBEDDED IN
SPREAD FOOTING WITH PEDESTAL

SECTION M-M

SECTION N-N

ELEVATION
ADJUST POSTING TOP TEMPERAMENT SPACING TO CLEAR POST.

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
2. FOR SECTION L-L REFER TO SHEET 7.
3. FOR PANEL DETAIL REFER TO SHEET 6.

LEGEND:
@ AS REQUIRED BY DESIGN
REFER TO CONTRACT DRAWINGS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
GROUND MOUNTED SOUND BARRIERS
STEEL POSTS
DETAIL 4

SEPT.30, 2016
SEPT.30, 2016
**BC-778M**

**STEEL POSTS**

**GROUND MOUNTED SOUND BARRIERS**

**STANDARD**

**SHEET 9 OF 10**

**PIPE CAP DETAIL**

**TOP OF CAISSON (LEVEL)**

**SECTION P-P**

**NOTES:**

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

**SECTION R-R**

**PRESSIGNED STEEL CAP - 10 GAUGE THICKNESS (GALVANIZED AND PAINTED)**

**20" OD x 0.594" WALL THICKNESS (STEEIP PIPE (GALVANIZED AND PAINTED)**

**3/4" x 4" LONG STUD (TYP.) WELDED TO PIPE (5 ROWS OF 6 STUDS)**

**STEEL PLATE (TYP. EACH SIDE)**

**PLACEMENT INSIDE PIPE TO ALLOW CONCRETE 6" DIA. HOLES IN CENTERLINE PANEL P PANEL (PARALLEL TO PRECAST CONCRETE STEEL PLATE FOR 3/8" x 4"]**

**STEEL PIPE (GALVANIZED AND PAINTED)**

**20" OD x 0.594" WALL THICKNESS, STEEL PIPE (TYP.)**

**SHOWN EQUALLY AROUND SET SCREWS SPACED 3 - 1/4" DIA. (TYP.)**

**SECTI0N**

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

**GROUND MOUNTED SOUND BARRIERS**

**STEEL POSTS**

**DETAIL 5**

**CORNER/ANGLES STEEL PIPE POST EMBEDDED IN CAISSON**

**ELEVATION**

**SECTION P-P**

**SECTION R-R**

**LEGEND:**

- @ AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS
- **NOTES:**
  1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 1.
  2. FOR SECTION D-D REFER TO SHEET 3.
DETAIL 6
CORNER/ANGLED STEEL PIPE POST EMBEDDED IN SPREAD FOOTING WITH PEDESTAL

ELEVATION
ADJUST FOOTING TOP REINFORCEMENT SPACING TO CLEAR POST.

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEET 9.
2. FOR SECTION D-D REFER TO SHEET 3.
GENERAL NOTES

1. DESIGN SPECIFICATIONS:
   - Provide shop drawings in accordance with Publication 408, Section 105.20(d) and (e).

2. THE FOLLOWING INFORMATION MUST BE SHOWN ON THE SHOP DRAWINGS IF APPLICABLE:
   - Architectural notes
   - Transportation notes
   - Acoustic profile elevations
   - Top of grade elevations

3. WALL HEIGHTS MUST EQUAL OR EXCEED THE ACOUSTICAL PROFILE:
   - Provide concrete sound barrier panels and the fabricated structural steel posts must be submitted concurrently.

4. PANEL HEIGHTS:
   - Provide concrete sound barrier panels and the fabricated structural steel posts must be submitted concurrently.

5. PANEL JOINTS:
   - Provide full height panels on barriers mounted on bridges.
   - Provide stacked panels for the precast concrete panels as indicated on the contract drawings.

6. FRAMING NOTES:
   - Provide framing details.

7. INSTALL ANCHOR BOLTS, POSTS, AND PANELS TRULY VERTICAL.

8. INSTALL CABLE DETAILS.

9. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH THE CURRENT VERSION OF THE PUBLICATION 408, SECTION 105.02(d).

10. PROVIDE CONCRETE SOUND BARRIER PANELS AND THE FABRICATED STRUCTURAL STEEL POSTS MUST BE SUBMITTED CONCURRENTLY.

NOTES TO FABRICATOR

1. PROVIDE SHOP DRAWINGS IN ACCORDANCE WITH PUBLICATION 408, SECTION 105.20(d) AND (e).

2. THE FOLLOWING INFORMATION MUST BE SHOWN ON THE SHOP DRAWINGS IF APPLICABLE:
   - Architectural notes
   - Transportation notes
   - Acoustic profile elevations
   - Top of grade elevations

3. WALL HEIGHTS MUST EQUAL OR EXCEED THE ACOUSTICAL PROFILE:
   - Provide concrete sound barrier panels and the fabricated structural steel posts must be submitted concurrently.

4. PANEL HEIGHTS:
   - Provide concrete sound barrier panels and the fabricated structural steel posts must be submitted concurrently.

5. PANEL JOINTS:
   - Provide full height panels on barriers mounted on bridges.
   - Provide stacked panels for the precast concrete panels as indicated on the contract drawings.

6. FRAMING NOTES:
   - Provide framing details.

7. INSTALL ANCHOR BOLTS, POSTS, AND PANELS TRULY VERTICAL.

8. INSTALL CABLE DETAILS.

9. PROVIDE MATERIALS AND PERFORM WORK IN ACCORDANCE WITH THE CURRENT VERSION OF THE PUBLICATION 408, SECTION 105.02(d).

10. PROVIDE CONCRETE SOUND BARRIER PANELS AND THE FABRICATED STRUCTURAL STEEL POSTS MUST BE SUBMITTED CONCURRENTLY.
MATERIAL NOTES

1. CAST-IN-PLACE CONCRETE:
   - Provide single,identical concrete in the cast-in-place footings and caissons, unless otherwise noted on the contract drawings.
   - Provide single,identical concrete in the cast-in-place barriers and moment slabs, unless otherwise noted on the contract drawings.
   - Unit weight of concrete = 150 lb./cu.ft.

2. PRECAST CONCRETE SOUND BARRIER PANELS:
   - Provide class "A" concrete, identical to the precast concrete panels, unless otherwise noted on the contract drawings.
   - Unit weight of concrete = 150 lb./cu.ft.
   - Unit weight of cast-in-place concrete = 150 lb./cu.ft.
   - Provide primary and secondary reinforcement fabricated in the panels as specified on the contract drawings.

3. REINFORCEMENT STEEL:
   - Provide grout of reinforced concrete that meets the requirements of ASTM A 416, with a minimum of 4,000 psi, or ASTM A 709, with a minimum of 4,000 psi.
   - Provide primary and secondary reinforcement fabricated in the panels as specified on the contract drawings.

4. WELDED WIRE FABRIC:
   - Provide 0.020" thick welded wire fabric that meets the requirements of ASTM A 416, with a minimum of 4,000 psi.
   - Provide primary and secondary reinforcement fabricated in the panels as specified on the contract drawings.

5. FABRICATED STRUCTURAL STEEL:
   - Provide structural steel conforming to ASTM A 36, Grade 30.
   - Provide primary and secondary reinforcement fabricated in the panels as specified on the contract drawings.

6. ANCHOR BOLTS:
   - Provide minimum grade of 30, with a minimum of 4,000 psi.
   - Provide primary and secondary reinforcement fabricated in the panels as specified on the contract drawings.

7. BOLTS, NUTS AND WASHERS FOR STEEL CABLE CONNECTION:
   - Provide 8.8 grade bolts conforming to ASTM A 325, Grade 8.8, in accordance with Publication 408, Section 1105.02(j).
   - Provide 10.9 grade bolts conforming to ASTM A 325, Grade 10.9, in accordance with Publication 408, Section 1105.02(j).

8. STEEL CABLES AND ACCESSORIES:
   - Provide steel cables conforming to ASTM A 416, Grade 41, in accordance with Publication 408, Section 1113.02.

9. JOINT BACKING MATERIAL (BACKER ROD):
   - Provide joint backing material in accordance with Publication 408, Section 1113.02.

10. JOINT SEALING MATERIAL:
    - Provide joint sealing material in accordance with Publication 408, Section 1113.02.

11. ANTIGRAFFITI COATING:
    - Provide antigraffiti coating in accordance with Publication 408, Section 1113.02.

12. NON-SHRINK GROUT:
     - Provide non-shrink grout in accordance with Publication 408, Section 1113.02.

13. CAULKING COMPOUND:
    - Provide caulk in accordance with Publication 408, Section 1113.02.

14. JOINT SEALING MATERIAL:
    - Provide joint sealing material in accordance with Publication 408, Section 1113.02.

15. CAST-IN-PLACE CONCRETE:
    - Provide class "A" concrete in the cast-in-place footings and caissons, unless otherwise noted on the contract drawings.

16. ARCHITECTURAL SURFACE TREATMENTS:
    - Provide architectural surface treatments in accordance with the manufacturer's recommendations.

ARCHITECTURAL SURFACE TREATMENTS:

1. THE AVERAGE ARCHITECTURAL SURFACE TREATMENT, PER SIDE OF PANEL, IS PERMITTED TO VARY FROM 0 TO 1", BUT THE TOTAL AVERAGE ARCHITECTURAL SURFACE TREATMENT, ON BOTH SIDES OF THE PANEL, MUST NOT BE GREATER THAN 1".

2. IF A SMOOTH ARCHITECTURAL SURFACE TREATMENT IS PROVIDED, THE TREATMENT MAY VARY FROM 0 TO 1", BUT THE TOTAL AVERAGE ARCHITECTURAL SURFACE TREATMENT, PER SIDE OF PANEL, IS PERMITTED TO VARY FROM 0 TO 1".

3. THE AVERAGE ARCHITECTURAL SURFACE TREATMENT, PER SIDE OF PANEL, IS PERMITTED TO VARY FROM 0 TO 1".

4. REFER TO CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.
RETAINING WALL MOUNTED
SOUND BARRIER ELEVATION (STEPPED ALTERNATE)
(TOP OF WALL LEVEL)

NOTES:
1. FOR ADDITIONAL INFORMATION REFER
   TO NOTES ON SHEETS 1 AND 2.
2. FOR SECTION A-A, SEE SHEET 6.
3. FOR SECTION B-B, SEE SHEET 7.

LEGEND:
# AS REQUIRED BY DESIGN REFER
TO CONTRACT DRAWINGS.
PRECAST CONCRETE PANEL DETAILS - 2

SECTION A-A
WITH ARCHITECTURAL SURFACE TREATMENT

DETAIL B
NO ARCHITECTURAL SURFACE TREATMENT

DETAIL C
NO ARCHITECTURAL SURFACE TREATMENT

DETAIL A
WITH ARCHITECTURAL SURFACE TREATMENT

DETAIL A
WITH ARCHITECTURAL SURFACE TREATMENT AND NO CAP

DETAIL A
WITH ARCHITECTURAL SURFACE TREATMENT AND CAP

FALSE JOINT

CORNER PERMITTED

NOTE:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. REFER TO SHEETS 3 AND 4 FOR LOCATION OF DETAIL A.
3. FOR SLEEVE DETAIL AT OPENINGS AND CORNER 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

BUREAU OF PROJECT DELIVERY
SEPT. 30, 2016

DIRECTOR, BUR. OF PROJECT DELIVERY
SECTION C-C

NOTE:
- Anchor bolts and panel not shown.
- Bolt thru panels and edge of web.
- Edge of post.

SECTION D-D

ANCHOR PLATE ASSEMBLY

NOTE:
- Bolt thru posts and panel not shown.
- Bolt thru posts.

SECTION E-E

DETAIL G

LEGEND
- A as required by design.
- T Base plate thickness.

NOTES:
1. For additional information refer to notes on sheets 1 and 2.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
STRUCTURE MOUNTED SOUND BARRIER WALLS
DETAILS - 2

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

1. DESIGN SPECIFICATIONS:
   - Refer to Section A, Structure Panel Details, of the 2002 Pennsylvania AASHTO Guide Specifications for Structural Design of Sound Barriers.
   - Refer to Section A, Structure Panel Details, of the 2002 Pennsylvania AASHTO Guide Specifications for Structural Design of Sound Barriers.

2. CONSTRUCTION SPECIFICATIONS AND WORKMANSHIP:

3. GENERAL NOTES:

NOTES TO FABRICATOR

1. PROVIDE SHOP DRAWINGS IN ACCORDANCE WITH SECTION 105.001(d):
   - Provide shop drawings for each panel.

2. THE FOLLOWING INFORMATION MUST BE SHOWN ON THE SHOP DRAWINGS (IF APPLICABLE):
   - General notes.
   - Fabrication notes.
   - Transportation notes.
   - Lifting and erection notes.

3. GENERAL NOTES:

INDEX OF SHEETS

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
GENERAL NOTES - 1
1. CAST-IN-PLACE CONCRETE:
   - PROVIDE SMOOTH 5/8" EMBEDMENT IN THE CAST-IN-PLACE FOOTINGS.
   - UNIT WEIGH OF CONCRETE = 150 lb. cu. ft.

2. PRECAST CONCRETE SOUND BARRIER PANELS:
   - PROVIDE CLASS C EMBED CONCRETE, MODIFIED IN THE PRECAST CONCRETE PANELS.
   - UNIT WEIGH OF CONCRETE = 150 lb. cu. ft.
   - PROVIDE A MINIMUM CONCRETE STRENGTH OF 4,000 PSI BEFORE STRIPPING.

3. REINFORCEMENT STEEL:
   - PROVIDE STEEL REINFORCEMENT STEEL THAT MEETS THE REQUIREMENTS OF ASTM A416, ASTM F1554, OR ASTM F1008. PROVIDE STEEL CONFORMING TO THE CONTRACT DOCUMENTS.
   - PROVIDE ALL STEEL REINFORCEMENT STEEL THAT MEETS THE REQUIREMENTS OF ASTM A416, ASTM F1554, OR ASTM F1008. PROVIDE STEEL CONFORMING TO THE CONTRACT DOCUMENTS.
   - PROVIDE WELDED WIRE FABRIC IN ACCORDANCE WITH ASTM A706.
   - PROVIDE REINFORCEMENT WIRE IN ACCORDANCE WITH ASTM A706.

4. REFER TO CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.

5. REFER TO PUBLICATION 408, SECTION 1086.3 AND/OR THE CONTRACT DOCUMENTS FOR SPECIAL PROVISIONS.
   - APPLY ANTIGRAFFITI COATING IN ACCORDANCE WITH CONTRACT DRAWINGS AND SPECIAL PROVISIONS.
   - PROVIDE JOINT SEALING MATERIAL IN ACCORDANCE WITH PUBLICATION 408, ARCHITECTURAL SURFACE TREATMENTS.

6. CAULKING COMPOUND:
   - PROVIDE CLOSED CELL NEOPRENE SPONGE IN ACCORDANCE WITH PUBLICATION 408, SEQUENCE OF CONSTRUCTION (FILL).
   - PROVIDE PLAIN NEOPRENE PADS WITH A DUROMETER HARDNESS OF 50 (±5) ON BOTH SIDES OF THE PANEL.
   - PROVIDE PVC PIPE (SCHEDULE 40) CONFORMING TO ASTM D1785 IN ACCORDANCE WITH CONTRACT DRAWINGS.

7. ANCHOR BOLTS, NUTS, AND WASHERS:
   - PROVIDE MINIMUM LAP FOR WELDED WIRE FABRIC IN ACCORDANCE WITH CURRENT AASHTO SPECIFICATIONS AS MODIFIED BY THE DESIGN MANUAL PART 4.
   - PROVIDE UNCOATED, EPOXY COATED, OR GALVANIZED WELDED WIRE FABRIC IN THE PANELS AS SPECIFIED IN THE CONTRACT DRAWINGS.
   - PROVIDE WELDING COMPOUND CONFORMING TO ASTM A416 IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
   - PROVIDE HEAVY HEX NUTS CONFORMING TO ASTM A563A IN ACCORDANCE WITH PUBLICATION 408,

8. METAL SHEET:
   - PROVIDE SHEET METAL CONFORMING TO ASTM A1008 IN ACCORDANCE WITH PUBLICATION 408,
   - PROVIDE SHEET METAL CONFORMING TO ASTM A653 IN ACCORDANCE WITH PUBLICATION 408,
   - PROVIDE WELDING COMPOUND IN ACCORDANCE WITH PUBLICATION 408,

9. JOINT SEALING COMPOUND:
   - PROVIDE CEMENT BASED JOINT SEALING MATERIAL IN ACCORDANCE WITH SECTION 705.4(a).
   - PROVIDE PLASTIC BASED JOINT SEALING MATERIAL IN ACCORDANCE WITH SECTION 705.4(b).

10. STEEL CABLES AND ACCESSORIES:
    - PROVIDE STEEL CABLES COMPLYING WITH ASTM A578.
    - PROVIDE FASTENING DEVICES TO THE PANEL FACE IN ACCORDANCE WITH PUBLICATION 408,

11. PLUMBING IN EXISTING CONDUIT:
    - PROVIDE PLUMBING IN EXISTING CONDUIT CONFORMING TO ASTM A530.

12. GROUT:
    - PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH PUBLICATION 408,

ARCHITECTURAL SURFACE TREATMENTS:

1. THE AVERAGE ARCHITECTURAL SURFACE TREATMENT THICKNESS, PER SIDE OF PANEL, MUST BE
   - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS
   - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS
   - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS
   - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS

2. PROVIDE WASHERS CONFORMING TO ASTM F436 IN ACCORDANCE WITH PUBLICATION 408,
   - PROVIDE WASHERS CONFORMING TO ASTM F436 IN ACCORDANCE WITH PUBLICATION 408,
   - PROVIDE HEAVY HEX NUTS CONFORMING TO ASTM A563A IN ACCORDANCE WITH PUBLICATION 408,
   - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS

3. REFER TO PUBLICATION 408, SECTION 1105.02(c)2b.
   - PROVIDE „OUTSIDE DIAMETER STAINLESS STEEL (302 OR 304) INTERNALLY FINISHED (AIRCRAFT CABLE) IN ACCORDANCE WITH MIL-W-83420.
   - MINIMUM BREAKING STRENGTH PROVIDED BY CABLE TIES, AS INDICATED.
   - INSTALL CABLE TIES, AS INDICATED IN NOTES, BEFORE RELEASING PANEL.

4. REFER TO PUBLICATION 408, SECTION 1105.02(c)3a.
   - PROVIDE „OUTSIDE DIAMETER STAINLESS STEEL (302 OR 304) FLEXIBLE WIRE ROPE

5. REFER TO PUBLICATION 408, SECTION 1105.02(c)3b.
   - PROVIDE „OUTSIDE DIAMETER STAINLESS STEEL (302 OR 304) FLEXIBLE WIRE ROPE

6. ANCHOR BOLTS, NUTS, AND WASHERS:
   - PROVIDE WASHERS CONFORMING TO ASTM F436 IN ACCORDANCE WITH PUBLICATION 408,
   - PROVIDE WASHERS CONFORMING TO ASTM F436 IN ACCORDANCE WITH PUBLICATION 408,
   - PROVIDE HEAVY HEX NUTS CONFORMING TO ASTM A563A IN ACCORDANCE WITH PUBLICATION 408,

7. WELDED WIRE FABRIC:
   - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS
   - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS
   - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS
   - PROVIDE MINIMUM LAP AND EMBEDMENT LENGTH FOR REINFORCING BARS OF 30 DIAMETERS

8. STEEL CABLES AND ACCESSORIES:
   - PROVIDE STEEL CABLES COMPLYING WITH ASTM A578.
   - PROVIDE FASTENING DEVICES TO THE PANEL FACE IN ACCORDANCE WITH PUBLICATION 408,
   - PROVIDE PLUMBING IN EXISTING CONDUIT CONFORMING TO ASTM A530.

9. PLUMBING IN EXISTING CONDUIT:
    - PROVIDE PLUMBING IN EXISTING CONDUIT CONFORMING TO ASTM A530.

10. GROUT:
    - PROVIDE CAULKING COMPOUND IN ACCORDANCE WITH PUBLICATION 408,
**CONCRETE CLASS A GROUND FINISHED SECTION A-A**

SEE DETAIL A

BC-780M

D = Offsets

STANDARD OFFSET SOUND BARRIER WALLS

WORKING POINT (TYP.)

LEVEL OR SLOPED PANELS AS SPECIFIED THE ACOUSTIC PROFILE. PROVIDE TOP OF PANEL TO MATCH OR EXCEED (STEP AS SPECIFIED)

COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY

STANDARD OFFSET SOUND BARRIER WALLS GEOMETRY AND LAYOUT

RECOMMENDED SEPT. 30, 2016

NOTES:

1. FOR ADDITIONAL INFORMATION REFER TO CONTRACT DRAWINGS.
2. FOR DETAILS A, B, AND C REFER TO NOTES ON SHEETS 1 AND 2.
3. FOR ADDITIONAL INFORMATION REFER TO DETAILS ON THE CONTRACT DRAWINGS.

A - LEVEL OF A-PANEL UNIT

LAYOUT CONTROL WORKING POINTS (TYP.)

ACOUSTIC PROFILE (TOP OF WALL) (SEE GENERAL NOTE 3 ON SHEET 1)

LIMITS OF ARCHITECTURAL SURFACE TREATMENTS WHEN SPECIFIED

DIFFERENCE IN PANEL HEIGHT 2'-0" MAX. WHERE INDICATED AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS.

GRADE GROUND TO DRAIN WATER AWAY FROM WALL. LEVEL OR SLOPED PANELS AS SPECIFIED THE ACOUSTIC PROFILE. PROVIDE TOP OF PANEL TO MATCH OR EXCEED (STEP AS SPECIFIED)

MAXIMUM STEP HEIGHT = 2'-0"

MINIMUM STEP HEIGHT = 6"

LEGEND:

\( \theta \) AS REQUIRED BY DESIGN REFER TO CONTRACT DRAWINGS.

\( \delta \) GRADE GROUND TO DRAIN WATER AWAY FROM WALL. LEVEL OR SLOPED PANELS AS SPECIFIED THE ACOUSTIC PROFILE. PROVIDE TOP OF PANEL TO MATCH OR EXCEED (STEP AS SPECIFIED)
**PANEL CONNECTOR ASSEMBLY**

**LENGTH AS REQUIRED**

**BC-780M STANDARD**

**OFFSET SOUND BARRIER WALLS**

**SHEET 6 OF 8**

**45° (OPTIONAL) (TYP.)**

**45° CHAMFER**

**SECTION C-C**

**SECTION B-B**

**PANEL EDGE CONCAVE**

**PANEL EDGE CONVEX**

**(SEE NOTE 5)**

**(SOCKET END) CONNECTOR PORT**

**(BALL END) CONNECTOR PORT**

**CONVEX PANEL EDGE**

**CONCAVE PANEL EDGE**

**T**

**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. **REBAR AS SHOWN #3 @ 18" TIES**

5. **LOCATION OF CONNECTOR PORTS MUST BE DETAILED ON THE SHOP DRAWINGS. PORTS LOCATING TO MATCH ADJACENT PANELS. PROVIDE A VIEW OF THE CABLE CONNECTIONS FOR EACH PANEL TO PANEL CONNECTION (PER SIDE OF PANEL).**

**COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY STANDARD OFFSET SOUND BARRIER WALLS PRECAST CONCRETE PANEL DETAILS - 1**

**SEPT. 30, 2016**
DETAIL A

NO ARCHITECTURAL SURFACE TREATMENT

DETAIL B

NO ARCHITECTURAL SURFACE TREATMENT

DETAIL C

NO ARCHITECTURAL SURFACE TREATMENT

DETAIL A

WITH ARCHITECTURAL SURFACE TREATMENT

DETAIL B

WITH ARCHITECTURAL SURFACE TREATMENT

DETAIL C

WITH ARCHITECTURAL SURFACE TREATMENT

NOTES:
1. FOR ADDITIONAL INFORMATION REFER TO NOTES ON SHEETS 1 AND 2.
2. FOR SLEEVE DETAIL AT OPENINGS AND DOOR DETAILS REFER TO BC-776M.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
OFFSET SOUND BARRIER WALLS
PRECAST CONCRETE PANEL DETAILS - 3

SEPT.30, 2016
NOTES:

1. PROVIDE MATERIALS AND WORKMANSHIP AND CONCRETE SPLASH BLOCK PROTECTION, SEE BC-751M FOR DETAILS.
2. PROTECT STONE SLOPE WALL FROM DOWNSPOUT DRAINAGE WITH REQUIREMENTS OF ASTM A615, A996 OR A706.
3. ALL REINFORCEMENT STEEL BARS SHOWN MEET THE PRECAST BARRIER TOE WALL REQUIREMENTS.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

SEPT.30, 2016

REFERENCE DRAWINGS

BC-782M
BC-751M
GABION SLOPE WALL DETAILS
BRIDGE DRAINAGE

CHIEF BRIDGE ENGINEER

RECOMMENDED

CLASS 4, TYPE A
SAME FOR ABUTMENT SECTION.

THE CLASS 4, TYPE A GEOTEXTILE DETAIL IS BARRIER OR SIDEWALK SAME FOR ABUTMENT SECTION.

BUREAU OF PROJECT DELIVERY
DIRECTOR, BUR. OF PROJECT DELIVERY

SEPT.30, 2016
**STANDARD GABION SLOPE WALL DETAILS**

**SECTION A-A**
- Provide material and workmanship in accordance with the appropriate specifications as outlined in the Pennsylvania Department of Transportation Publication 408.

**SECTION B-B**
- Bend gabions to fit around footings.

**SECTION C-C**
- Geotextile: See note 3

**SECTION D-D**
- Geotextile: See note 3

**GABION SIZES**
- See detail A

**WIRE MESH BASKETS**
- Additional sizes may be available on a special order basis.

**ALTERNATE SECTION B-B**
- Geotextile: See note 3

**NOTES:**
1. All reinforcement steel bars shown meet the requirements of ASTM A 615, Grade 60 (or A 416, Grade 40) as indicated in the contract drawings.
2. Provide material and workmanship in accordance with the appropriate specifications as outlined in the Pennsylvania Department of Transportation Publication 408.
3. Install Class 4 Type A geotextile material along all interface areas with soil, earth, or concrete contact.

**CONTRACT DRAWINGS.**
DECK REPAIR TYPE 1

**Deck Repair Type 1 Notes:**
1. Bridge decks with a single layer of reinforcement may be repaired. See Exhibit A.
2. Deck Repair Type 2 or Type 3 may be required within the area of a Deck Repair Type 1.

**Deck Repair Type 2 Notes:**
1. Deck Repair Type 2 may be required within the area of a Deck Repair Type 2.

**Deck Repair Type 3 Notes:**
1. Deck Repair Type 3 may be required within the area of a Deck Repair Type 2.
2. If a flexible approach pavement (bituminous) exists, provide the transition entirely on the bridge approach slab, if present.
3. If bridge beams are damaged during deck repair, beams must be replaced at no expense to the department.

**General Notes:**
1. Provide materials and workmanship in accordance with publication 408.
2. Provide reinforcement bars conforming to the requirements of ASTM A 615, A 616 or A 706.
3. Provide lap splice lengths and embedment lengths in accordance with Publication 408.
4. Clean all existing reinforcement bars to be retained with a wire brush or sand blast. Taper and coat with an approved epoxy paint for epoxy coated reinforcement.
5. Provide epoxy coated reinforcement meeting the requirements of Section 1046.1 of Publication 408.
6. Apply an epoxy bonding compound conforming to the requirements of Section 1040.3(e)1 of Publication 408.
7. Provide the transition entirely on the bridge approach slab, if present.
8. Construct, equipment, surface preparation, patching material and concrete bridge deck repair must comply with Section 1042 of Publication 408.
9. Provide reinforcement bars conforming to Section 1040 of Publication 408.
10. Provide materials and workmanship consistent with the requirements of publication 408.

**Deck Repairs and Latex Modified Concrete Overlay**

**Details for Latex Modified Concrete Overlay**

- **Transverse Section:**
  - Adjust scarification for overlay thickness other than 1".

- **Longitudinal Section:**
  - Transition length more than 24'-0" requires district bridge engineer's approval.

**Vertical Transition Detail for**

- **1/4" Latex Modified Concrete Bridge Deck Overlay**

**Legend**

- **T** = Thickness of concrete deck slab.
- **P** = Provide reinforcement steel or neat cement for non-epoxy coated existing reinforcement steel.

**Commonwealth of Pennsylvania Department of Transportation**

**Bureau of Project Delivery**

**Recommended 9/30/16**

**Sheet 1 of 4**

**BC-783M**
CONCRETE REPAIR TYPE 1

1. Square off deteriorated concrete to sound concrete with a sawcut of \( \frac{\pi}{6} \) in. maximum but not to the depth of the deteriorated steel. Back peel side beyond sound concrete.
2. Use hand tools to remove all loose and delaminated concrete that is not adequately developed by lapping with existing reinforcement. Back peel side beyond sound concrete.
3. If deteriorated concrete extends beyond the primary reinforcement, remove the concrete to at least \( \frac{\pi}{6} \) behind the reinforcement.
4. Apply a bond breaker compound between the existing and the new class A cement concrete.
5. If repairs extend beyond the primary reinforcement.
6. Use dowels only when dimension of deteriorated concrete is greater than \( \frac{\pi}{6} \) in. and new of existing reinforcing cannot adequately be developed by lapping with existing reinforcement.
7. Use a redwood or similar material to locate existing reinforcement when drilling. Dowels to be spaced 6" on centers.
8. An approved epoxy anchoring system is required for the dowels. For the dowels, use a 4" minimum embedment and in accordance with manufacturer's instructions.
9. As a minimum requirement, the dowels should be installed to go through the deteriorated concrete to the bottom of the repair area.
10. Alternately, the new may be supported by 3x3 welded wire mesh or spirals. The spirals or mesh may be 2x2x2" of reinforcing steel, and exceed existing reinforcement.
11. Clean existing reinforcement by mechanical means.
12. Lap equivalent new reinforcement to the existing reinforcement as directed.
13. Reinforcement bars to be 12" on center.
14. Concrete repairs indicated are payable under 1040.3(f)2.

CONCRETE REPAIR TYPE 2

1. Square off deteriorated concrete to sound concrete with a sawcut of \( \frac{\pi}{6} \) in. maximum but not to the depth of the repair area. Back peel side beyond sound concrete.
2. Apply a rapid hardening concrete patching material from a manufacturer listed in Bulletin 15 under miscellaneous products, modified and special cements, mortars and concretes, in accordance with manufacturer's instructions.
3. Apply a RAPID HARDENING CONCRETE REPAIR TYPE 1 NOTES:
4. CONCRETE REPAIR TYPE 2 DETAIL FOR AREAS THAN 2" OF COVER.
5. REPAIR TYPE 2 IS USED WHEN DEPTH OF DETERIORATED CONCRETE IS LESS THAN OR EQUAL TO \( \frac{\pi}{6} \).
CONCRETE REPAIR TYPE 2A NOTES:

1. Square off deteriorated concrete to sound concrete with a SAWCUT of 0.5" 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. In H-shaped or L-shaped girders, concrete extending beyond the primary reinforcement shall be removed to at least 0.5" from the primary reinforcement.
4. Provide epoxy coated wire ties to connect existing and new concrete.
5. Wire mesh may be substituted for new reinforcement if determined to achieve better results.
6. Concrete repair type 2A are payable as concrete repairs type 2.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD
REINFORCED CONCRETE REPAIR

REINFORCED CONCRETE REPAIR TYPE 2A LEGEND:
- Removable deteriorated concrete.

SECTION C-C
BLISTER DETAIL
CONCRETE REPAIR TYPE 2A

NOTE: SHALLOW REMOVAL CONDITION IF PATCH IS LARGER THAN 6" OR LESS.

CLEAN EXISTING REINFORCEMENT BY MECHANICAL MEANS.

NEW REINFORCEMENT TO BE EPOXY COATED.

CONCRETE REPAIR TYPE 2A ARE PAYABLE AS CONCRETE REPAIRS TYPE 2.
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 DETERIORATION AREA TO EXPOSE SOUND CONCRETE.

2. REMOVE DELAMINATED CONCRETE, ADJACENT TO AND AROUND THE PRESTRESSING STRANDS, PRIOR TO EXPOSING CONCRETE. DO NOT REMOVE PRESTRESSING STRANDS DURING CONCRETE REMOVAL. USE SURFACE PREPARATION EQUIPMENT IN ACCORDANCE WITH SECTION 3090.2 OF PUBLICATION 408, HOWEVER, THE WEIGHT OF SURFACE PREPARATION EQUIPMENT MUST NOT EXCEED A NOMINAL 15-POUND CLASS.

3. REMOVE DETERIORATED CONCRETE TO SOUND CONCRETE WITH A SAW CUT OR DREMEL, DEPTH OF CUT IS A MINIMUM OF 1/4", BUT NOT TO EXCEED 5/8" OR THE DEPTH OF THE REMOVAL INTERFACE, WHICHEVER IS SMALLER.

4. CLEAN ALL EXISTING REMOVAL AREAS TO BE REMOVED AND PREFEITURE CONCRETE IS REPLACED. USE SURFACE PREPARATION EQUIPMENT IN ACCORDANCE WITH SECTION 3090.2 OF PUBLICATION 408, HOWEVER, THE WEIGHT OF SURFACE PREPARATION EQUIPMENT MUST NOT EXCEED A NOMINAL 15-POUND CLASS.

5. PROVIDE A A SAWN CONCRETE SURFACE WITH EXPOSED AGGREGATE WITH A MINIMUM SURFACE PROFILE OF 1/8" OR AS REQUIRED BY REPAIR MATERIAL MANUFACTURER'S RECOMMENDATIONS.

6. DRILL AND INSERT 3/8" DIAMETER GALVANIZED STEEL EXPANSION ANCHOR PINS ON 4" CENTERS FOR REPAIR AREAS WITH DEPTHS GREATER THAN 3 INCHES WHEN REPAIR MATERIALS ARE NOT APPLICABLE (CORROSION-RESISTANT THAN 3 PSI, ESTATE EXPANSION ANCHOR PINS ARE NOT APPLICABLE) OR CLEAN SPACING BETWEEN PRESTRESSING STRANDS.

7. APPLY MECHANICAL ANCHORAGE USING GALVANIZED 4"x4"-W8xW8 MIN. WELDED WIRE FABRIC AT MIDPOINT OF CLEAR SPACING BETWEEN PRESTRESSING STRANDS.

8. AREA TO BE REPAIRED MUST BE CLEAN, SOUND AND FREE OF CONTAMINANTS PRIOR TO APPLICATION OF REPAIR MATERIAL.

9. REPAIR CRACKS IN EXISTING CONCRETE AFTER REMOVING DETERIORATED CONCRETE AND PRIOR TO CONSTRUCTION OF REPAIR AREAS. REFER TO CONCRETE BLISTER DETAIL, SHEET 2.

10. APPLY AN APPROVED BONDING AGENT, AS LISTED IN BULLETIN 15 UNDER MISCELLANEOUS POLYMERS MODIFIED AND SPECIAL CEMENTS, IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

11. APPLY A RAPID HARDENING CONCRETE PATCHING MATERIAL FROM A MANUFACTURER LISTED EXPRESSLY STATE THAT A BONDING AGENT IS NOT REQUIRED.

12. APPLY REPAIR MATERIAL THAT HAS A COMPRESSIVE STRENGTH EQUAL TO OR GREATER THAN THAT OF THE ORIGINAL CONCRETE (IF KNOWN), BUT NOT LESS THAN 4,500 PSI AND 5,500 PSI AT 7 AND 28 DAYS, RESPECTIVELY.

13. CURE REPAIR MATERIAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS FOR A MINIMUM OF 24 HOURS. EXPAND ADDITIONAL CURING PROTECTION IN ACCORDANCE WITH PUBLICATION 408, SECTION 1091.

14. PROVIDE MECHANICAL ANCHORAGE USING GALVANIZED 4"x4"-W8xW8 MIN. WELDED WIRE FABRIC AT MIDPOINT OF CLEAR SPACING BETWEEN PRESTRESSING STRANDS.

15. CONCRETE BLASTERS MAY BE USED FOR AREAS WITH EXISTING REINFORCEMENT HAVING UNREACHABLE COVER OF REBAR MERGED CONCRETE placement IN FORM. REFER TO RELIEF DETAIL, SHEET 2. DO NOT REDUCE VERTICAL UNDERCLEARANCE WITHOUT DISTRIBUTE DESIGNER APPROVAL.

16. FOR ADJACENT BOX BEAM, PLACE 1/2" LIGHT W/STEM BETWEEN BEAMS AND FRAME THROUGH PORT AT BOTTOM PLANE BARS. PROVIDE 1" VENTS AT TOP OF REPAIR AREA.

17. APPLY AN APPROVED PENETRATING SEALER AFTER REPAIR MATERIAL HAS CURED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

18. APPLY CONCRETE REPAIR TYPE 2 TO CONCRETE DIAPHRAGMS AS NEEDED. SEE SHEET 2 FOR DETAILED.

19. FOR GENERAL NOTES, SEE SHEET 1.

LEGEND

- REMOVE DETERIORATED CONCRETE.
U-WING ABUTMENT PLAN - FULL DEPTH END DIAPHRAGM

PRESTRESSED I-BEAM BRIDGE WITHOUT BACKWALL

SECTION D-D

TYPICAL FOR STEEL AND PRESTRESSED BRIDGES (EXCEPT FOR CHANNEL BEAM BRIDGES)

SECTION C-C

NOTE:
1. PLANS AND DETAILS ARE APPLICABLE FOR COMPOSITE BRIDGE DECKS.
2. DOWEL, SHEAR BLOCK AND BACKWALL REQUIREMENTS ARE LISTED IN DESIGN STANDARDS.
3. PREFORMED CELLULAR POLYSTYRENE (P.C.P.) MUST MEET ASTM C578.
4. SHEAR AND INSTALL THE 3'-6" WIDE CLOSED CELL POLYSTYRENE STABILIZER SHEET UNDER SECTION 1020.05 BOX BEAM LUG.
5. OPEN SECTIONS MUST BE STABILIZED WITH A POLYSTYRENE SHEET AS REQUIRED.
6. WATERPROOFING IDENTICAL TO PARTIAL PLAN FOR SPREAD BOX BEAMS WITHOUT DOUBLES.
7. R.F. DENOTES REAR FACE, P.F. DENOTES FRONT FACE.
8. EXTEND 2'-0" TYPE 1 P.C.P. TO BOTTOM OF THE PAVING NOTCH OR TO TOP OF SUBBASE FOR CONCRETE PAVEMENT AND 1'-0" BELOW TOP OF SURFACE FOR REFINISHED MATERIAL PAVEMENTS.
9. PROVIDE WATERPROOFING MEMBRANE IN ACCORDANCE WITH SECTION 1000.08 ADHESIVE BACKED POLYSTYRENE MEMBRANE.
10. PROVIDE NEOPRENE BEARING PAD MATERIAL WITH A DUROMETER THICKNESS OF 50 (+/-5).
11. PROVIDE MATERIALS AND WORKMANSHIP IN ACCORDANCE WITH PUBLICATION 408.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS - ABUTMENT PRESTRESSED I-BEAM BRIDGES

BC-788M SHEET 1 OF 12
REF. SHEET 12, FIG. 2-2
SHEET TITLE: INSTALLATION DETAILS - PRESTRESSED I-BEAM BRIDGES
REFERENCE DRAWINGS
PLAN
U-WING ABUTMENT WITHOUT BACKWALL
FULL DEPTH END DIAPHRAGM
AND ELASTOMERIC BEARING

SECTION L-L

SECTION M-M

SECTION N-N

NOTES:
1. FOR ADDITIONAL NOTES, SEE SHEET 1.
2. FOR SECTION D-D, SEE SHEET 1.
3. FOR ADDITIONAL INFORMATION, REFER TO DETAILS ON SHEET 12.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
STANDARD
TYPICAL WATERPROOFING AND
EXPANSION DETAILS - ABUTMENT
STEEL I-BEAM
BRIDGES

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

STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS - ABUTMENT PRECAST CHANNEL BEAM BRIDGES

SECTION U-U
PRECAST CHANNEL BEAM BRIDGES

SECTION E-E
PRECAST CHANNEL BEAM BRIDGES

STEPS TO BE TAKEN

1. FOR ADDITIONAL NOTES, SEE SHEET 1.
2. FOR SHEAR KEY DETAIL, SEE STANDARD DRAWING BC-775M
3. FOR SECTION G-G, SEE SHEET 8.

NOTES:

1. FOR ADDITIONAL NOTES, SEE SHEET 1.
2. FOR SHEAR KEY DETAIL, SEE STANDARD DRAWING BC-775M
3. FOR SECTION G-G, SEE SHEET 8.

Sept. 30, 2016
SECTION G-G

WATERPROOFING (TYP.)

FULL DEPTH DIAPHRAGM

NOTES:

(SEEN SECTION J-J ON SHEET 2)

BRGS.

BRG. PAD (TYP.)

40) IN CENTER OF EACH CHLORIDE PIPE (SCHEDULE MEDIAN PANEL)

WATERSTOP

ABUTMENT WITH MEDIAN BARRIER RAISED MEDIAN SIMILAR TYPICAL STRUCTURE SECTIONS - MEDIAN

PARTIAL DEPTH DIAPHRAGM

WITH MEDIAN

CONCRETE BARRIER SIMILAR

SECTION R-R

(ADJACENT BOX BEAMS)

SECTION

ABUTMENT, WINGWALL OR RETAINING WALL

WATERPROOFING DETAIL

MATERIAL EXPANSION JOINT

1" PREMOLDED RUBBERIZED JOINT SEALING MATERIAL

1" JT.

3" MEDIAN PANEL MATERIAL EXPANSION JOINT

1" OPEN RUBBERIZED JOINT SEALING MATERIAL

1" POLY-VINYL membrane

1" JT. SEALING MATERIAL

1" P.C.P.

1" SAW-CUT JOINT, FILL WITH AN APPROVED JOINT SEALING MATERIAL

1" POLYSTYRENE (P.C.P.)

1" THICK POLYSTYRENE (P.C.P.)

1" SAW-CUT JOINT, FILL WITH AN APPROVED JOINT SEALING MATERIAL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS - MISCELLANEOUS
P/S CONCRETE I-BEAM AND BOX BEAM BRIDGES

BC-788M

RECOMMENDED SEPT. 30, 2016

SEPT. 30, 2016
After installation of waterproofing membrane, follow instructions below.

**Typical Drain Detail**

**Notes:**
1. Details shown to be used for preservation projects only.
2. Space 3" P.V.C. tubes, where practicable as follows:
   a. At 20 ft. centers (max.), or
   b. In the interior diaphragm or end diaphragm.
3. Use 45° fitting turned away from substructure until the clearance is less than 2'-0".
4. Provide mastic in accordance with Section 680.2(a) of Pub. 408.

**INSTRUCTIONS:**

1. Cut tube flush with top of membrane.
2. Seal edges with mastic, and

**Typical Longitudinal Section**

**Alternate Drains**

**Notes:**
1. Details shown to be used for preservation projects only.
2. Space 3" P.V.C. tubes, where practicable as follows:
   a. At 20 ft. centers (max.), or
   b. In the interior diaphragm or end diaphragm.
3. Use 45° fitting turned away from substructure until the clearance is less than 2'-0".
4. Provide mastic in accordance with Section 680.2(a) of Pub. 408.

**INSTRUCTIONS:**

1. Cut tube flush with top of membrane.
2. Seal edges with mastic, and

**Membrane Waterproofing Detail**

**Gutterline Detail**
NOTES:

1. PROVIDE APPROVED WATERPROOFING MEMBRANE FOR THE ENTIRE TOP WIDTH AND LENGTH OF THE BOX AND 2'-0" WIDTH A ALONG THE SIDE JOINTS FOR FILLS 2'-0". FOR FILLS > 2'-0" PROVIDE 2'-0" WIDTH A ON THE TOP AND SIDE JOINTS.

2. LIMITS OF WATERPROOFING AT SIDE OF PRECAST BOX SECTION JOINTS 2'-0" WIDTH A. PLACE THIS BEFORE THE TOP SLAB WATERPROOFING.

SECTION Q-Q

JOINT DETAIL

SEAL AROUND EACH DUCT JOINT WITH A NEOPRENE SPONGE DONUT.

POST TENSIONING DUCTS MAY BE PLACED WITHIN THE WALL OF SLAB AVOID THE SLOPED PORTION OF THE JOINT OR SLAB ANYWHERE BETWEEN LAYERS OF REINFORCEMENT.

PVC DUCT FOR POST TENSIONING STRAND.

PROTECTIVE BOARD (SECTION 680.2(c) OF PUB. 408)

INSIDE FACE

OUTSIDE FACE

CLOSED CELL NEOPRENE SPONGE GASKET (BOTH FACES, ALL AROUND) IN ACCORDANCE WITH PUB. 408, SECTION 1085.2(m).

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
TYPICAL WATERPROOFING AND EXPANSION DETAILS
PRECAST R.C. BOX CULVERTS

SEPT.30, 2016
SEPT.30, 2016
**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 " MIN. PAVING NO TCH ABUTMENT 1'-3 " MIN. 3 " MIN. MIN." STRUCTURE) INCIDENTAL TO PERMANENT @ 18" MAX. (ATTACHMENT STEEL CONCRETE SCREWS, " WITH SELF-TAPPING STAINLESS BATTEN SECURED TO CONCRETE (ASTM A709, GR 36 OR 50) 2"x" GALVANIZED STEEL**

**Membrane Waterproofing Detail**

- **RAT T AND BATTEN WATERPROOFING NOT SHOWN**
- **SEE NOTE 8 ON SHEET 1.**
- **SEE DETAIL ON BC-751M, ADDITIONAL DRAINAGE, SHEET 7.**

**Typical Longitudinal Section**

**FOR PLANK BEAMS**

- **ONE LAYER OF WATERPROOFING MEMBRANE IN ACCORDANCE WITH PUB. 408, SECT. 680.2(b) IN ACCORDANCE WITH PUB. 408, SECT. 680.2(b) IN ACCORDANCE WITH PUB. 408, SECT. 680.2(b)**
- **BASE LAYER OF WATERPROOFING MEMBRANE IN ACCORDANCE WITH PUB. 408, SECT. 680.2(b)**
- **TOP LAYER OF WATERPROOFING MEMBRANE IN ACCORDANCE WITH PUB. 408, SECT. 680.2(b)**
- **2"x" GALVANIZED STEEL LATH, 60 OR 70 GAUGE, SECURED TO CONCRETE WITH SELF-TAPPING STAINLESS STEEL CONCRETE SCREWS, IN " X 2" MIN. ATTACHMENT INCIDENTAL TO PERMANENT STRUCTURE**

**Waterproofing Detail at Abutment Without Backwall**

- **WITH PAVING NOTCH**
- **WITHOUT PAVING NOTCH**

**COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION BUREAU OF PROJECT DELIVERY STANDARD MISCELLANEOUS WATERPROOFING DETAILS**

**RECOMMENDED SEPT. 30, 2016**
INSTRUCTIONS FOR POST-TENSIONING

1. Always use post-tensioning when end walls are not used.
2. Complete tensioning in three passes: 1/3, 1/2, and full post-tensioning force.
3. Provide a minimum of 2" diameter polystrand or approved equal having a yield strength of 270 ksi.
4. Snug fit all joints before post-tensioning.
5. Tension strands in precast sections; every strand in an effective area of the specified length to maintain alignment of the culvert.
6. After stressing, grout all strand ducts, refer to the section for time limitations associated with grouting.
7. Place gusset wire into the grout using pressure grout.
8. Provide post-tensioning operations and materials in accordance with specification for, section 907. Shop drawings are required.
9. Place post-tensioning computations with shop drawings showing the strand pattern and required post-tensioning force, base design, and acceptance by the engineer.

POST-TENSIONING SEQUENCE:

1. After post-tensioning is approved, cut strands to provide a minimum of 2" clear from outside face of concrete and coat recess with epoxy bonding compound. Fill all recesses with an approved product listed in the section.
2. Place seals or gaskets around the ducts at the joints to make the ducts airtight.
3. Provide seals or gaskets around the ducts at the joints to make the ducts airtight.
4. Place corner strands at the location of centerlines between wall and slab or at a maximum distance of 2'-0" from the location.
5. Locate strands so as to not interfere with reinforcement details.
6. Use a minimum of 4 strands.
7. Maximum strand spacing is 8'-0", except for culverts less than 12'-0" span.
8. Provide post-tensioning operations and materials in accordance with specification for, section 907. Shop drawings are required.
9. Place post-tensioning computations with shop drawings showing the strand pattern and required post-tensioning force, base design, and acceptance by the engineer.
10. Provide seals or gaskets around the ducts at the joints to make the ducts airtight.
11. All post-tensioning must be witnessed and approved by the engineer.
12. After post-tensioning is approved, cut strands to provide a minimum of 2" clear from outside face of concrete and coat recess with epoxy bonding compound.
13. Maximum total post-tension force shall not create a pressure greater than 50 psi over the cross section of any segment.
14. Total post-tension force is 100 kips.
15. Maximum load on a 1/2" diameter strand is 25 kips.
16. Use a coefficient of soil friction of 0.6.
17. Place strands symmetrically about both axes of the culvert cross section.
18. Use a minimum of a 4 strands.
19. Maximum strand spacing is 3'-0", except for culverts less than 12'-0" span.
20. Maximum total post-tension force shall not create a pressure greater than 50 psi over the cross section of any segment. Check ram pressure of 270 ksi.
21. Weekly maintenance of the equipment by the contractor at the cost of the owner, including the equipment furnished for gage pressures.
22. Use this detail for all post-tensioning in three passes: 1/3, 1/2, and full post-tensioning force.
TIE BOLT DETAIL - PRECAST CHANNEL BEAM
SECTION A-A

CONNECTION STRAP

GALVANIZED STRAP CONNECTION DETAIL

H/4

H /2

H/4

H

A

A

JOINT BETWEEN
BOX SECTIONS

OUTSIDE FACE OF BOX

INSIDE FACE

OF BOX

NOTE:
- H indicates wall height
- B indicates bolt

ELEVATION

PRECAST BOX SECTIONS (TYP.)

GUTTER LINE

TRAFFIC SIDE

BLANK OS

SECTIONS (TYP.)

PRECAST BOX CULVERT

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD MECHANICAL CONNECTION DETAILS
PRECAST R.C. BOX CULVERT

CHIEF BRIDGE ENGINEER

RECOMMENDED

SEPT. 30, 2016

BC-798M

SHEET 3 OF 3
CRASH WALL REQUIREMENTS
FOR BRIDGES OVER RAILROADS

1. PROVIDE CRASH WALLS IN FRONT OF PREFABRICATED HANDS WHEN THE WALL IS WITHIN 50'.
   PROVIDE CRASH WALLS IN FRONT OF PREFABRICATED HANDS WHEN THE WALL IS WITHIN 50'.
2. CRASH WALLS SHALL BE 8" THICK AND 6' ABOVE THE TOP OF RAILROAD TRACK.

CRASH WALL TYPICAL SECTION

DETAIL A

C.I.P. CONC. FILL

SECTION C-C

C.I.P. CONCRETE

DRAINAGE DITCH DETAIL

NOTE:

PRECAST COPING

PARTIAL ELEVATION

ELEVATION - M.S.E. WALL

JUNCTION WITH C.I.P. WALL

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY

STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
CRASH WALL AND MISCELLANEOUS WALL DETAILS

RECOMMENDED: SEPT. 30, 2016
RECOMMENDED: SEPT. 30, 2016
SHEET 3 OF 13
BC-799M
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
BUREAU OF PROJECT DELIVERY
STANDARD
MECHANICALLY STABILIZED EARTH RETAINING WALLS C.I.P. TRAFFIC BARRIER

SEPT. 30, 2016
SEPT. 30, 2016
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 inlet installations.

4. Begin vertical reinforcement at 3" from either end of 10'-0" panel.

5. For inside 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.

Traffic and Moment Slab Notes:
1. Place expansion joints in precast barrier to match with pavement joints. Do not locate the barrier expansion joint within 0'-0" from centerline of light pole or 2'-0" from centerline of junction box.

2. Provide a minimum precast barrier length of 10'-0".

3. Provide special design and detailing of the moment slab and barrier for inlet installations.

4. Begin vertical reinforcement at 3" from either end of 10'-0" panel.

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

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

MAXIMUM ONE PAVEMENT JOINT MAY OCCUR BETWEEN MOMENT SLAB JOINTS.
MOMENT SLAB JOINTS MUST OCCUR AT A PAVEMENT JOINT.

NOTE 1: SEE NOTE 2

NOTE 2: EXPOSED JOINTS AT BARRIER MAY VARY FROM ¾” TO 1” WIDTH
FOR TYPE 1 OPEN JOINT AND 1½” TO 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.
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
FRONT FACE
BACKFILL
BACK-UP PANEL
OF PANEL
SOIL STABILIZING ELEMENTS (TYP)
FRONT FACE
OF PANEL
SOIL STABILIZING ELEMENTS (TYP)
(SEE NOTES)
AS PER DESIGN
(TYP)
HOLE SPACING
AS SPECIFIED
BY THE PANEL
MANUFACTURER
CONNECTOR ANGLE
IN CONN. ANGLE FOR
GALVANIZED STEEL
PANEL
1.
2.
3.
4.
6.

SPECIFIED
AS REQUIRED
BACK-UP PANEL,
PIPE
DRAIN
DETAIL "C"
(SEE DETAIL "B"
FOR BEND LIMITATIONS.
STRIP OR MESH BEND DETAIL ON SHEET 2
THE LESSER DISTANCE.  SEE REINFORCING ELEMENT AROUND PIPE.  BEND
SOIL STABILIZING ELEMENT.  GRADUALLY
FLANGE
DUCTILE IRON
TYPE M INLET
R
R
THIS SHEET
SEE DETAIL C
TYPICAL SECTION
INLET BEHIND WALL
IN SPECIFIED BACKFILL
BACK-UP PANEL, AS REQUIRED
SEE DETAIL "B" THIS SHEET
SOIL STABILIZING ELEMENTS (TYP)
DETAIL C - WITHOUT BACKUP PANEL
DRAINAGE PIPE BEHIND WALL
USE FOR PIPES LARGER THAN 12" AND LESS THAN 30" O.D. DRAINAGE INSTALLATIONS
WITH PANEL LARGER THAN 30" O.D. REQUIRED APPROVAL FROM THE DEPT. OF ENGINEERING.
SEE NOTE 7 FOR ADDITIONAL INFORMATION.
NOTE:
FOR LEGEND OF NOTES, ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.
TYPICAL SECTION
SECTION G-G
SECTION H-H
DETAIL B
DETAIL C - WITH BACKUP PANEL
DETAIL C - WITHOUT BACKUP PANEL
DRAINAGE PIPE NOTES:
1. For horizontal drain pipes, provide nondurable pipe with a 100-year design life and maintenance joints. Provide galvanized pipe, meeting requirements of this section, as provided on the plan sheets, for bent or curved pipes. Provide approved joints in accordance with ASTM C755, for concrete pipe. Provide corrosion-resistant joints of approved design for other types of pipe. See special note in detailing for specific information.
2. Take special care to properly compact drainable backfill around pipe so as not to damage it. Use lamp mechanic tamp.
3. The number of backup panels are to be determined by the Contractor and approved by the Engineer.
4. The cost for connector devices is incidental to the bid price for contract items.
5. Galvanize all connector angles, bolts and anchors.
6. If necessary, make modifications to these details on the construction plans.
7. Drainage pipes within mechanically stabilized earth walls is not recommended. The Contractor, with approval from the Chief Engineer, may install drainage in accordance with the inlet behind wall details. This sheet, however, is to be used for vertical pipes.
8. The non-ferrous pipe requirements in note 1 do not apply to vertical pipes.

NOTE:
EXP. JT. MATERIAL PROVIDE 1" THICK EXP. JT. MATERIAL
APPROVED SEALER AT THE TOP OF THE ROCK APRON
12" DUCTILE IRON PIPE
SEE NOTE 8.

GALVANIZE ALL CONNECTOR ANGLES, BOLTS AND ANCHORS.

RECOMMENDED DIRECTOR, BUR. OF PROJECT DELIVERY
SEPT. 30, 2016
BC-799M
STANDARD
MECHANICALLY STABILIZED EARTH
RETTAINING WALLS
DRAINAGE INSTALLATIONS

SHEET 8 OF 13
SEPT. 30, 2016
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
CHIEF BRIDGE ENGINEER
RECOMMENDED
SEPT. 30, 2016
BUREAU OF PROJECT DELIVERY
SEPT. 30, 2016
BC-799M
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION

PLAN - SHOULDER DETAILS AT INLET

NOTE:
1. FOR DIMENSIONS AND REINFORCEMENT NOT SPECIFIED, SEE DETAILS ON SHEET 4.
2. FOR ADDITIONAL INLET INSTALLATION DETAILS, SEE SHEET 8.

RECOMMENDED BY: CHIEF BRIDGE ENGINEER

SECTION J-J

SECTION K-K

SECTION L-L

SHOULDER RELIEF JOINT

NOTE:
FOR LEGEND OF ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.

FOR LEGEND OF ABBREVIATIONS AND SYMBOLS, SEE SHEET 2.
**Commonwealth of Pennsylvania**
**Department of Transportation**

**Standard**
**Mechanically Stabilized Earth Retaining Walls**
**Reinforced Earth Wall Panels**

**BC-799M**

**Plan View**
Limit shown.

**Min. Clearance and Strip Inclination**
Note: Size of obstruction limited by the limits shown.

**Tie Strip Location**

**Section R-R**

**Reinforcing Strip**

**Skew Detail**

**Alternate Reinforcing Strip**

**Galvanized Steel Angle**

**Tie Strip (Typ.)**

**Galvanized Steel Angle**

**Tie Strip**

**GALVANIZED STEEL ANGLE**

**TIE STRIP**

**Notes:**
1. For additional notes see Sheet 10.
2. All panels shall have two lifting inserts of 2 ton capacity each.
3. Staggered horizontal panel joints, minimum distance 2' - 3 ½".
4. For legends of Notes and Symbols, see Sheet 10.
TYPICAL PANEL LAYOUT

PARTIAL ELEVATION - FRONT FACE

SECTION V-V

MESH CONNECTOR LOCATION

EXCLUSIVE OF ANY AESTHETIC ENHANCEMENTS

SECTION U-U

SECTION 5-5

SECTION T-T

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF TRANSPORTATION
BUREAU OF PROJECT DELIVERY
STANDARD
MECHANICALLY STABILIZED EARTH
RETAINING WALLS
RETAINED EARTH WALL PANELS

RECOMMENDED SEPT. 30, 2016
RECOMMENDED SEPT. 30, 2016
WASHINGTON, D.C. 20590-0001

BC-799M

© 2016 COMMONWEALTH OF PENNSYLVANIA
RIGHTS RESERVED
Panel Loop and Wire Mesh Loop Tolerances

1. Fabricate panels and wire mesh to properly achieve full contact of the wire mesh to the panel connection. The maximum permissible gap between the connecting bar(s) and panel wire loops after assembly will be 1/8", as shown in Detail A.

2. Submit a quality control plan describing methods and procedures used to achieve a maximum 1/8" gap as per Detail A. Include the quality control plan with the final shop drawings. As a minimum, include the following in the quality control plan:

   a. Method of postioning/maintaining the clevis loops in the panel and wire mesh mesh alignment, contact and fixtures.
   b. Proposed panel fabrication tolerances of the clevis wire mesh with respect to alignment and contact.
   c. Acceptance criteria for panel fabrication, tolerances and contact with the following to aid in achieving the 1/8" max. gap.

3. As an alternative to the preparation of a quality control plan, or when the quality control plan is rejected by the chief structural materials engineer and/or the district structural control engineer, comply with the following:

   a. Fabricate clevis loops that are positioned within 1/8" of the defined position. Acceptance will be established by placement of a straight bar through all loops in a row of a panel. Refer to Detail A.
   b. Wire mesh: Fabricate wire mesh loops as shown in Detail A. Pull wire mesh away from the panel with sufficient effort so that the panel loops at a maximum 1/8" gap from the wire mesh loops. Refer to Detail A.
   c. Method of handling, storing and shipping the panels to avoid panel loop and wire mesh contact. Acceptance will be established by placement of a straight bar through all loops in a row of a panel. Refer to Detail A.
   d. Method of positioning/maintaining the clevis loops in the panel and wire mesh mesh alignment, contact and fixtures.

4. Method for establishing acceptance of wire mesh connection during construction:

   a. Complete all supplementary parts and fasteners for the panel connections.
   b. Full wire mesh may be used in the panel with sufficient effort so that the panel loops at a maximum 1/8" gap from the wire mesh loops. Refer to Detail A.
   c. Measure the gap, if any, between the connecting bar(s) and the panel wire mesh loops. Refer to Detail A.
   d. Maximum acceptable gap between the connecting bar(s) and the panel wire mesh loops is 1/8".
   e. The use of wooden wedges driven between the panel and connector bar(s) to assist in engaging the connector bar(s) with the loops to achieve the 1/8" max. gap will not be permitted. The use of wooden wedges to stabilize the wire mesh movement during backfill operations will be accepted. The wedges must be removed and found to be within tolerance.

5. The use of wooden wedges driven between the panel and connector bar(s) to assist in engaging the connector bar(s) with the loops to achieve a maximum 1/8" gap will not be permitted. The use of wooden wedges to stabilize the wire mesh movement during backfill operations will be accepted. The wedges must be removed and found to be within tolerance.

6. Method for establishing acceptance of wire mesh connection during construction:

   a. Complete all supplementary parts and fasteners for the panel connections.
   b. Full wire mesh may be used in the panel with sufficient effort so that the panel loops at a maximum 1/8" gap from the wire mesh loops. Refer to Detail A.
   c. Measure the gap, if any, between the connecting bar(s) and the panel wire mesh loops. Refer to Detail A.
   d. Maximum acceptable gap between the connecting bar(s) and the panel wire mesh loops is 1/8".
   e. The use of wooden wedges driven between the panel and connector bar(s) to assist in engaging the connector bar(s) with the loops to achieve the 1/8" max. gap will not be permitted. The use of wooden wedges to stabilize the wire mesh movement during backfill operations will be accepted. The wedges must be removed and found to be within tolerance.

7. Refer to the mechanically stabilized earth retaining wall systems special provision for additional wire mesh tolerances.

8. Refer to the typical panel detail for additional tolerances.

9. Refer to the typical panel detail for additional tolerances.

10. Method for establishing acceptance of wire mesh connection during construction:

    a. Complete all supplementary parts and fasteners for the panel connections.
    b. Full wire mesh may be used in the panel with sufficient effort so that the panel loops at a maximum 1/8" gap from the wire mesh loops. Refer to Detail A.
    c. Measure the gap, if any, between the connecting bar(s) and the panel wire mesh loops. Refer to Detail A.
    d. Maximum acceptable gap between the connecting bar(s) and the panel wire mesh loops is 1/8".
    e. The use of wooden wedges driven between the panel and connector bar(s) to assist in engaging the connector bar(s) with the loops to achieve the 1/8" max. gap will not be permitted. The use of wooden wedges to stabilize the wire mesh movement during backfill operations will be accepted. The wedges must be removed and found to be within tolerance.

11. Refer to the typical panel detail for additional tolerances.

12. Method for establishing acceptance of wire mesh connection during construction:

    a. Complete all supplementary parts and fasteners for the panel connections.
    b. Full wire mesh may be used in the panel with sufficient effort so that the panel loops at a maximum 1/8" gap from the wire mesh loops. Refer to Detail A.
    c. Measure the gap, if any, between the connecting bar(s) and the panel wire mesh loops. Refer to Detail A.
    d. Maximum acceptable gap between the connecting bar(s) and the panel wire mesh loops is 1/8".
    e. The use of wooden wedges driven between the panel and connector bar(s) to assist in engaging the connector bar(s) with the loops to achieve the 1/8" max. gap will not be permitted. The use of wooden wedges to stabilize the wire mesh movement during backfill operations will be accepted. The wedges must be removed and found to be within tolerance.

13. Refer to the typical panel detail for additional tolerances.