DESIGN VALUES ARE PRESENTED IN THIS DOCUMENT IN BOTH METRIC AND U.S. CUSTOMARY UNITS AND WERE DEVELOPED INDEPENDENTLY WITHIN EACH SYSTEM. THE RELATIONSHIP BETWEEN THE METRIC AND U.S. CUSTOMARY VALUES IS NEITHER AN EXACT (SOFT) CONVERSION NOR A COMPLETELY RATIONALIZED (HARD) CONVERSION. THE METRIC VALUES ARE THOSE THAT WOULD HAVE BEEN USED HAD THIS DOCUMENT BEEN PRESENTED EXCLUSIVELY IN METRIC UNITS; THE U.S. CUSTOMARY VALUES ARE THOSE THAT WOULD HAVE BEEN USED IF THIS DOCUMENT HAD BEEN PRESENTED EXCLUSIVELY IN U.S. CUSTOMARY UNITS. THEREFORE, THE USER IS ADVISED TO WORK COMPLETELY IN ONE SYSTEM AND NOT ATTEMPT TO CONVERT DIRECTLY BETWEEN THE TWO.
SECTION I - BARRIER

B-L (2010) — BARRIER LEGEND

B-1 — GUARDRAIL APPLICATIONS (TYPES 1-31, 2-31, AND 3-31)

B-2 — GRADING FOR GUARDRAIL END TREATMENTS (TYPES 1, 2, AND 3)

B-3 — GUARDRAIL OVER CULVERTS (TYPES 1-31, 2-31, AND 3-31)

B-4 (2012) — END ANCHORAGE, TYPE 31

B-5 — GUARDRAIL TO BARRIER CONNECTION (TYPES 1-31, 2-31, AND EXIT TYPE 31)

B-6 — BRIDGE RAIL RETROFIT (TYPES 1, 2, 3, AND 4)

B-7 (2010) — W-BEAM, TYPE 1-27 TO TYPE 1-31 TRANSITION SECTION

B-8 — RESERVED

B-9 — RESERVED

B-10 — RESERVED

B-11 — RESERVED

B-12 — RESERVED

B-13 — HARDWARE

B-14 — CONCRETE SAFETY BARRIER (F SHAPE)

B-15 — GUARDRAIL APPLICATIONS (TYPES 1-27, 2-27, AND 3-27)
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C-2  - CURB RAMPS.
  (2013) - 1 TYPE 1.
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D-3  - SAFETY GRATES.
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D-R (2014) - DRAINAGE INLET REFERENCE SHEET.

D-4 (2009) - INLET BOX DETAILS.

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  (2010) - 4 DRAINAGE INLET COVER SLAB DETAILS.
  (2010) - 5 DOUBLE INLET COVER SLAB DETAILS.
  (2010) - 6 34 x 18" DRAINAGE INLET AND COVER SLAB DETAILS.
  (2010) - 7 34 x 18" DRAINAGE INLET DETAILS.
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  (2010) - 9 DOGHOUSE INLET BOX.
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<td>[2001] - 2 ROUND MAHOLE ASSEMBLY</td>
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<td>[2007] - 3 MAHOLE TOP UNIT, FRAME AND COVER</td>
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<td>[2003] - 4 BOX MAHOLE COVER SLAB</td>
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<td>D-7</td>
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<td>D-8 (2010)</td>
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<td>D-9 (2008)</td>
<td>PERFORATED PIPE UNDERDRAIN</td>
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<td>SILT FENCE</td>
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<td>INLET SEDIMENT CONTROL, CULVERT INLET</td>
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<td>STILLING WELL</td>
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<td>RIPRAP ENERGY DISSIPATOR</td>
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<td>JUNCTION WELL, GROUNDING &amp; BONDING FOR STEEL FRAMES &amp; LIDS</td>
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<td>CONDUIT JUNCTION WELL, TYPE 7</td>
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<td>EMERGENCY PREEMPTION RECEIVER</td>
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<td>T-15</td>
<td>BREAKAWAY SIGN POST AND PIN ASSEMBLY DETAILS</td>
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<td>WOOD BARRICADE DETAILS</td>
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<td>T-17</td>
<td>ELECTRICAL SERVICE PEDESTAL - LIGHTING, SIGNAL &amp; ‘ITMS’ COMPONENT INSTALLATIONS</td>
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**DETAILED REMOVED IN 2012 REVISION**
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<td>1</td>
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<td>2</td>
<td>W6 X 9 (W150 x 13.5) STEEL POST</td>
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</table>
| 3A 3B    | 3A - 6" (150) x 12" (300) x 14" (350) OFFSET BLOCK  
            3B - 6" (150) x 8" (200) x 14" (350) OFFSET BLOCK |
| 4        | SPLICE - REQUIRES EIGHT (8) %" (16) GUARDRAIL BOLTS (L=1¼" (35)) WITH RECESS NUTS |
| 5        | W-BEAM TERMINAL CONNECTOR |
| 6        | %" (16) GUARDRAIL BOLT (L=1¼" (35)) AND RECESS NUT |
| 7A 7B    | 7A - %" (16) GUARDRAIL BOLT (L=14" (455)) AND RECESS NUT  
            7B - %" (16) GUARDRAIL BOLT (L=10" (255)) AND RECESS NUT |
| 8        | %" (16) GUARDRAIL BOLT (L=10" (255)), STEEL WASHER, AND RECESS NUT |
| 9        | %" (22) HIGH STRENGTH STRUCTURAL HEX BOLT (L=VARIES)  
            AND HEX NUT |
| 10       | %" (16) CARRIAGE BOLT (L=VARIES), STEEL WASHER, AND HEX NUT |
| 11       | BEARING PLATE |
NOTE: OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.
GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1

1) FLARE THE END TREATMENT AT 25:1 BEGINNING 50'-0" FROM THE END OF THE IMPACT HEAD, UNLESS THE CONSTRUCTION PLANS OR SPECIFICATIONS SPECIFY A SMALLER FLARE.
2) THIS DETAIL WAS SOLELY CREATED TO SHOW THE GRADING REQUIRED FOR THIS TYPE OF ATTENUATOR AND IS APPLICABLE REGARDLESS OF THE HEIGHT OF THE GUARDRAIL SYSTEM.
3) THE GUARDRAIL END TREATMENT ATTENUATOR SHALL BE INSTALLED AS PER THE MANUFACTURER'S AND THE DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS.
4) IF CURB IS PRESENT, DEPRESS THE CURB TO A MAXIMUM HEIGHT OF 2" WITHIN THE LIMITS OF THE END TREATMENT AND THROUGHOUT THE LENGTH OF THE TAPER GRADING.

NOTES:
- 10:1 OR FLATTER
- 4:1 MAX SLOPE
- 3'-3" MIN
- 5'-0" MIN
- 25'-0" MIN
- 75'-0" MIN

SECTION A-A

OFFSET TO GUARDRAIL
TAPE MAINTENANCE

PCOMMENDED
SIGNATURE ON FILE
01/14/2014

DELAWARE
DEPARTMENT OF TRANSPORTATION

GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1

APPROVED
SIGNATURE ON FILE
02/14/2014

STANDARD NO. B-2 (2013)
SHT. 1 OF 3

1/9/2014

SCALE: NTS

NOTE: NO OBSTRUCTIONS IN SHADeD AREA
1) Flare shall be 4'-0" unless the construction plans or specifications specify a smaller flare. Flare may be parabolic or straight based on manufacturer's specifications.

2) This detail was solely created to show the grading required for this type of attenuator and is applicable regardless of the height of the guardrail system.

3) The guardrail end treatment attenuator shall be installed as per the manufacturer's and the department of transportation's specifications.

4) If curb is present, depress the curb to a maximum height of 2" within the limits of the end treatment and throughout the length of the taper grading.
Notes:

1. This detail was solely created to show the grading required for this type of attenuator and is applicable regardless of the height of the guardrail system.
2. 6' or flatter grading is allowable when the barrier is located 12'-15' (3.65m) or more from the outside edge of the shoulder.
3. This end treatment can also be used in ramp cores or other areas where two rails of W-beam come together and terminate with one end treatment.
4. When opposing roadways have equal elevations the traffic barrier system should be placed on the opposite side of the ditch line from approaching traffic.
5. The guardrail end treatment attenuator shall be installed as per the manufacturer's and the Department of Transportation's specifications.
6. If curb is present, express the curb to a maximum height of 2" (50mm) within the limits of the end treatment and throughout the length of the taper grading.

DELWARE
DEPARTMENT OF TRANSPORTATION

GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3

APPROVED  SIGNATURE ON FILE  12/28/2010
STANDARD NO.  B-2 (2010)  SHT.  3 OF 3  RECOMMENDED  SIGNATURE ON FILE  12/27/2010
GUARDRAIL OVER CULVERTS, TYPE 1-31

NOTES:
1. ALL W-BEAMS ARE 13'-6" IN LENGTH.
2. PLACE GUARDRAIL DELINATERS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3. POSTS 1 THROUGH 6 ARE TO BE TYPE 31 LONG, WOOD BREAKAWAY POSTS. POST 7 IS TO BE A W6x9 STEEL POST.
4. THE RAIL SHALL BE ATTACHED AT POSTS 1 THROUGH 6 WITH A 5/8" x 22" GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.
5. CULVERT HEADWALL SHALL NOT EXTEND MORE THAN 2" ABOVE GRADE.
6. THERE SHALL BE A MINIMUM OF 6" FROM THE BACK OF POST TO THE CULVERT WINGWALLS.
NOTES:
1. ALL W-BEAMS ARE 13'-6" IN LENGTH.
2. PLACE GUARDRAIL DELINATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3. POSTS 1 & 8 ARE TO BE W8x9 STEEL POSTS. POSTS 2 THROUGH 6 ARE TO BE TYPE 31 LONG, WOOD BREAKAWAY POSTS.
4. THE RAIL SHALL BE ATTACHED AT POSTS 2 THROUGH 6 WITH A 1/2" x 22" GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.
5. CULVERT HEADWALL SHALL NOT EXTEND MORE THAN 2" ABOVE GRADE.
6. THERE SHALL BE A MINIMUM OF 8" FROM THE BACK OF POST TO THE CULVERT WINGWALL.

DELAWARE DEPARTMENT OF TRANSPORTATION

GUARDRAIL OVER CULVERTS, TYPE 2-31

STANDARD NO. B-3 (2013) SHT. 2 OF 3

APPROVED

SIGNATURE ON FILE 02/14/2014

SIGNATURE ON FILE 01/14/2014

RECOMMENDED

SIGNATURE ON FILE 01/14/2014

1/9/2014
NOTES:

1. All W-beams are 13'-6" in length.
2. Place guardrail delineators at the intervals specified in the Delaware Manual on Uniform Traffic Control Devices.
3. Posts 1, 2, 9, & 10 are to be W40 steel posts. Posts 3 through 8 are to be Type 31 long, wood breakaway posts.
4. The rail shall be attached at posts 3 through 8 with a \( \frac{3}{8} \) x 2" guardrail bolt, steel washer, and recess nut.
5. Culvert headwall shall not extend more than 27" above grade.
6. There shall be a minimum of 8" from the back of post to the culvert wingwalls.
NOTES:
1. ADDITIONAL HOLES FOR ANCHOR PLATE SHALL BE DRILLED PRIOR TO GALVANIZING. (SEE STANDARD HARDWARE SHEET FOR HOLE SPACING INFORMATION).
2. CONTRACTOR HAS THE OPTION OF USING A 6'-0" STEEL TUBE WITHOUT A SOIL PLATE OR A 5'-0" STEEL TUBE WITH A SOIL PLATE.
3. PLACE A 3" WIDE PLASTIC RETAINING TIE STRAP AROUND THE SHORT TIMBER BREAKAWAY POST AND TIMBER BEARING PLATE TO ENSURE THE PROPER ORIENTATION OF THE TIMBER BEARING PLATE.
4. REFER TO DETAIL B-13, SHEET 8 OF 10 FOR PROPER TIMBER BEARING PLATE ORIENTATION.
RUB RAIL OFFSET BLOCKS

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<td>5&quot; (150)</td>
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<tr>
<td>2</td>
<td>3 3/8&quot; (83)</td>
<td>4&quot; (100)</td>
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<tr>
<td>3</td>
<td>2&quot; (50)</td>
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<tr>
<td>4</td>
<td>1 1/2&quot; (25)</td>
<td>2&quot; (50)</td>
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NOTES:
1. THE RUB RAIL TO BARRIER CONNECTION END MUST BE ATTACHED FLUSH WITH THE SLOPED TOE OF THE SAFETY BARRIER, INSTALLATION CAN BE SIMPLIFIED BY FABRICATING OR SHOP TWISTING THE RUB RAIL END TO BE CONSISTENT WITH THE SLOPE OF THE BARRIER, HOWEVER, FIELD BENDING USING HEAT IS PERMITTED.
2. STEEL SPACER TUBE IS SCHEDULE 40 GALVANIZED PIPE, 6" (150) X 9" (225)
3. ALL HARDWARE ON THIS DETAIL IS COMPATIBLE WITH GUARDRAIL TO BARRIER CONNECTION TYPES 4-31 AND 1-27.

DELAWARE DEPARTMENT OF TRANSPORTATION
GUARDRAIL TO BARRIER CONNECTION, TYPE 1 HARDWARE
STANDARD NO. B-5 (2010) SHT. 2 OF 6
APPROVED
RECOMMENDED

12/06/2010
GUARDRAIL TO BARRIER CONNECTION, APPROACH, TYPE 2-31

NOTES:
1. CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.
2. POSTS 1, 2, 3, 4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH OFFSET BLOCKS AND/OR BENT RAIL.
3. DO NOT ATTACH RAILS TO POSTS 1, 2, 3, 5, OR 7.
4. POSTS 1 AND 2 ARE W8x13, 7'-6" LONG. ALL OTHER POSTS IN TRANSITION ARE W6x9, 6'-0" LONG.
5. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
6. BENT RAIL MAY BE SHOP BENT TO FACILITATE INSTALLATION OR MAY BE FIELD BENT USING HEAT.
7. APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTORS TO PARAPET.
8. PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
9. FOR INSTALLATIONS WHERE CURB EXISTS, IF THE EXISTING CURB IS 8" (200) OR HIGHER AND CANNOT BE REMOVED, THE BOTTOM RAIL CAN BE ELIMINATED.
10. A 6" x 6" x 14" OFFSET BLOCK IS USED AT POSTS 1 THROUGH 6 AND A 6" x 12" x 14" OFFSET BLOCK IS USED AT POSTS 7 THROUGH 9.

DELWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL TO BARRIER CONNECTION, APPROACH, TYPE 2-31

STANDARD NO.  B-5 (2012)  SHT.  4  OF  6

APPROVED  RECOMMENDED

SIGNATURE ON FILE  01/07/2013  SIGNATURE ON FILE  12/20/2012

11/4/2012
CUT FLANGE, BEND AND WELD (SEE NOTE NO. 11)

BENT RAIL
SCALE: 1"=1'-0"

THICKNESS VARIES (SEE TABLE)

BENT RAIL OFFSET BLOCKS
SCALE: 3"=1'-0"

BENT RAIL OFFSET BLOCKS
1'-2" (360) x 4 1/2" (115)

<table>
<thead>
<tr>
<th>BLOCK</th>
<th>THICKNESS</th>
<th>BOLT LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5&quot; (125)</td>
<td>8&quot; (200)</td>
</tr>
<tr>
<td>2</td>
<td>4&quot; (100)</td>
<td>6&quot; (150)</td>
</tr>
<tr>
<td>3</td>
<td>3&quot; (75)</td>
<td>6&quot; (150)</td>
</tr>
<tr>
<td>4</td>
<td>2&quot; (50)</td>
<td>4&quot; (100)</td>
</tr>
</tbody>
</table>

NOTES:
1. BOTTOM OFFSET BLOCKS LOCATED ON POSTS 1'-4'. ARE OFFSET DRILLED TO 5/8" SQUARELY ON THE POST FLANGE AND SECURED WITH 3/8" (16) CARRIAGE BOLTS. SEE BENT RAIL OFFSET BLOCK TABLE FOR BOLT LENGTH.
2. ALL HARDWARE ON THIS DETAIL IS COMPATIBLE WITH GUARDRAIL TO BARRIER CONNECTION, TYPES 2-31 AND 2-27.

DELAWARE DEPARTMENT OF TRANSPORTATION

GUARDRAIL TO BARRIER CONNECTION, TYPE 2 HARDWARE

APPROVED

STANDARD NO. B-6 (2010)  SHT. 5 OF 6  RECOMMENDED

SIGNATURE ON FILE  12/28/2010  12/27/2010

09/15/2010
NOTES:
1. CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTOR TO PARAPET.
2. GUARDRAIL SECTION AND TERMINAL CONNECTIONS SHALL BE OVERTAPPED IN THE DIRECTION OF TRAVEL.
3. INSTALLATION SHOWN ABOVE WITH AN T-TYPE BARRIER FACE GUARDRAIL SECTION OF BARRIER CONNECTION SHALL BE ADJUSTED HORIZONTALLY IN ORDER TO NOTI LUSH AGAINST VARIOUS TYPES OF WALLS AND BARRIERS.
THREE BEAM TRANSITION SECTION
SYMMETRIC W-BEAM TO
LIMIT OF PAYMENT
SYMMETRIC W-BEAM TO
TRANSITION TO TYPE 1-27 GUARDRAIL
OR APPROPRIATE END TREATMENT
TRANSITION TO TYPE 1-31 GUARDRAIL
OR APPROPRIATE END TREATMENT
BRIDGE RAIL RETROFIT, TYPE 1, 2, OR 4 (SEE NOTE 3)
SEE NOTE 6
2 SECTIONS OF THREE BEAM, ONE NESTED INSIDE THE OTHER
LIMIT OF PAYMENT
SYMMETRIC W-BEAM TO
TRANSITION TO TYPE 1-31 GUARDRAIL
OR APPROPRIATE END TREATMENT
ENTRANCE END APPLICATION
SEE DETAIL B-6, SHEETS 4 AND 5 FOR NOTES PERTAINING TO THE BRIDGE RAIL RETROFIT SECTIONS.

NOTES:
1. POSTS 1, 2, 8, & 9 ARE W6 x 9, 6'-0" LONG, STEEL POSTS AND POSTS 3 THRU 7 ARE 10" x 10" x 6'-6" TIMBER POSTS.
2. POSTS 2 THRU 8 HAVE STANDARD THREE BEAM OFFSET BLOCKS. POSTS 1 & 9 HAVE STANDARD W-BEAM OFFSET BLOCKS.
3. SEE DETAIL B-6, SHEETS 4 AND 5 FOR NOTES PERTAINING TO THE BRIDGE RAIL RETROFIT SECTIONS.
4. THE EXIT END APPLICATION SHALL BE USED ONLY ON DIVIDED HIGHWAYS. FOR ALL OTHER CONDITIONS, THE EXIT END APPLICATION SHALL BE USED ON BOTH ENDS OF THE BRIDGE PARAPET.
5. USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR 5/8" BOLT) BETWEEN BOLT HEADS AND RUBRAIL.
6. PLACE P.C.C. CURB, TYPE 1-8, STARTING AT PARAPET WALL AND TERMINATING AFTER POST 5. TAPER CURB TO FLUSH AT A 1:1 RATIO.

B-6 (2013)

DELAWARE DEPARTMENT OF TRANSPORTATION
BRIDGE RAIL RETROFIT, ENTRANCE AND END APPLICATIONS
STANDARD NO. B-6 (2013)
SHT. 1 OF 5
APPROVED SIGNATURE ON FILE 02/14/2014
RECOMMENDED SIGNATURE ON FILE 01/14/2014
1/9/2014
**Bridge Rail Retrofit, Types 1 & 2**

**Notes:**

1. **Bridge Rail Retrofit, Type 1 shall be used when the parapet monolithic curb is 18" (450) or less.**
2. Bridge Rail Retrofit, Type 2 shall be used when the parapet monolithic curb is 22" (550) or wider, and dead load considerations are a concern when using Bridge Rail Retrofit, Type 3 (see detail B-8, Sheet 4 of 5 for details).
3. Adhesive anchors shall be installed per manufacturer's specifications and shall be galvanized.
4. Offset block thickness shall be adjusted to allow the face of the thrie beam to be flush with the bottom of the curb. Minimum thickness shall be 4" (100).
5. See detail B-6, Sheet 3 of 5 for Bridge Rail Retrofit, Type 2 hardware details.
6. Typical lateral spacing of offset blocks or steel posts throughout the bridge rail section shall be 6'-3" (1905). However, spacing may need to be reduced to accommodate lining up blocks or posts at the end of the parapet.
7. Use a thrie beam expansion section at bridge expansion joints.
8. Place curbral delimiters in the upper valley of the thrie beam at the intervals specified in the Delaware manual on uniform traffic control devices.
9. See detail B-6, Sheet 10 of 5 for entrance and end application details.

**DELTA MOUNT**

**DEPARTMENT OF TRANSPORTATION**

**STANDARD NO. B-6 (2010)**

**SHT. 2 OF 5**

**APPROVED SIGNATURE ON FILE 12/28/2010**

**RECOMMENDED SIGNATURE ON FILE 12/27/2010**
NOTE: STANDARD GUARDRAIL TO BARRIER CONNECTIONS SHALL BE CONNECTED TO THE ENDS OF THE NEW BRIDGE BARRIER AND TRANSITIONED TO THE EXISTING GUARDRAIL.

**SECTION A-A**

- Drill 1" (25) dia. hole, fill with high strength, non-shrink grout
- 6 (15) bars spaced 15" (375) longitudinally, front and back rows shall be staggered
- 1/2 (12.7) chamfer (typ.)
- 2" (50) min. cover (typ.)
- 4" (100) min.
- 3/4" (20) galv. (typ.)
- 3/4" (20) (16) galv. (typ.)

**PLAN**

- Type 1-27 or Type 1-31 guardrail placement or appropriate end treatment
- Guardrail to barrier connection
- Limit of payment
- End of sidewalk
- Taper end of wall to top of guardrail at a slope of 4:1 or flatter
- Direction of travel
- Existing bridge rail
- Contraction joints
- Bridge barrier
- 15" (375) (typical bar spacing)
- 15" (375) (typical bar spacing)
NOTES:

1. BRIDGE RAIL RETROFIT, TYPE 4 SHALL BE USED WHEN THE EXISTING PARAPET HEIGHT IS BETWEEN 22" (550) AND 24" (600).
2. USE A THREE-BEAM EXPANSION ELEMENT AT BRIDGE EXPANSION JOINTS.
3. PLACE GUARDRAL DEVICES IN THE UPPER VALLEY OF THE THREE-BEAM AT THE INTERVAL SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
4. SEE DETAIL B-5, SHEET 1 OF 5 FOR ENTRANCE AND EXIT APPLICATION DETAILS AND NOTES.
5. SPACING OF WOOD POSTS MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP POSTS AT THE END OF THE PARAPET.
6. USE APPROPRIATE EPoxy Bolt ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR 1/2" HD BOLT) BETWEEN BOLT HEADS AND RUBBER.
7. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
W-Beam Elevation

W-Beam Section

Note:
- Four additional 3/4" (20) x 2 1/2" (65) slots shall be provided at 3-1 1/2" (952) spacing for a 20-2 1/2" (740) beam length.
THREE BEAM STEEL POST AND OFFSET BLOCK

**NOTE:**
Where conditions require, use alternate lengths in increments of 6" (150).

Optional for handling during galvanizing.

**NOTE:**
All holes shall be 3/4" (20) O.A. BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXIS OF THE POST.
THIS APPLICATION FOR USE IN END ANCHORAGE ONLY

STEEL POST SLEEVE

POST SLEEVE

SWAGED CABLE ASSEMBLAGE AND RELATED HARDWARE ASSEMBLY

SWAGE CONNECTION SLEEVE

1/8" DIA. (6x19) SWAGE CONNECTED GALVANIZED CABLE

1/2" DIA. (6x19) SWAGE CONNECTED GALVANIZED CABLE

ANCHOR PLATE TO W-BEAM CONNECTION DETAIL

SWAGED CABLE ASSEMBLAGE AND RELATED HARDWARE ASSEMBLY

NOTES:
1. PLACE A 3/8" WIDE GALVANIZED RETAINING TIE STRAP AROUND THE SHORT TIMBER BREAKAWAY POST AND TIMBER BEARING PLATE TO ENSURE PROPER ORIENTATION OF THE TIMBER BEARING PLATE.
2. TIGHTEN ASSEMBLY UNTIL CABLE IS TIGHT.
3. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
NOTES:
1. RAIL SHALL BE MOUNTED ON GUARDRAIL ADJACENT TO A BRIDGE OR SIDEWALK.
2. ALL COMPONENTS OF THE RAIL SHALL BE SHOP FABRICATED. ALL CUTTING AND DRILLING SHALL BE DONE IN THE SHOP.
3. ALL EXPOSED THREADS HARDWARE SHALL BE BURIED.
4. GUARDRAIL POSTS UPON WHICH RAIL IS TO BE INSTALLED SHALL BE SHOP DRILLED FOR THE RAIL BRACKETS DURING FABRICATION.
5. ALL RAIL SPACES WILL BE AT RAIL SUPPORT BROCKETS, THE SAME BOLT USED TO ATTACH THE RAIL TO THE BRACKET WILL BE USED TO SECURE THE SPACER TUBE.
6. RAILS SHALL BE INSTALLED ONLY ON STANDARD WIDTH SECTIONS AND AT LEAST ONE POST AWAY FROM THE PAYMENT LIMITS OF THE END TREATMENT.
SECTION

P.C.C. FOOTING

ELEVATION

TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION

BAR OFFSETS

<table>
<thead>
<tr>
<th>NOMINAL LENGTH OF BARRIER SECTION (L)</th>
<th>X</th>
<th>NO. REQD. FOR EACH BARRIER SECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10'-0&quot;</td>
<td>5'-0&quot;</td>
<td>4</td>
</tr>
<tr>
<td>16'-0&quot;</td>
<td>6'-0&quot;</td>
<td>4</td>
</tr>
<tr>
<td>14'-0&quot;</td>
<td>3'-0&quot;</td>
<td>4</td>
</tr>
<tr>
<td>12'-0&quot;</td>
<td>2'-0&quot;</td>
<td>4</td>
</tr>
</tbody>
</table>

BAR LIST

<table>
<thead>
<tr>
<th>MAX</th>
<th>SIZE</th>
<th>NUMBER IN EACH SECTION</th>
<th>LENGTH</th>
<th>TYPE</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>481</td>
<td>4</td>
<td>**</td>
<td>5'-4&quot;</td>
<td>1</td>
<td>7'</td>
<td>30&quot;</td>
</tr>
<tr>
<td>482</td>
<td>4</td>
<td>*</td>
<td>STR.</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* THE LENGTH OF BAR 482 SHALL BE 4" LONGER THAN THE NOMINAL SIZE OF THE BARRIER IN WHICH IT IS USED.
** SEE "BAR OFFSETS" CHART ON THIS SHEET FOR MORE INFORMATION.

NOTES:
1. CONCRETE CLEAR COVER FOR REINFORCING BARS SHALL BE 1-1/2" MIN.
2. FOR SLIP-FORM CONSTRUCTION, THE 482 BARS SHALL BE PLACED AS ONE CONTINUOUS PIECE. THE BARS SHALL OVERLAP A MINIMUM OF 24" IN THIS CASE.
3. FOR SLIP-FORM CONSTRUCTION, A JOINT SHALL BE CUT IN THE BARRIER EVERY 10'-0" AT A MAX DEPTH OF 3".

DELTAIRER DEPARTMENT OF TRANSPORTATION

32" CONCRETE SAFETY BARRIER (F SHAPE)

APPROVED SIGNATURE ON FILE

STANDARD NO. B-14 (2012)  SHT. 1 OF 4  RECOMMENDED SIGNATURE ON FILE

DATE 01/07/2013  12/20/2012

12/4/2012
DELAWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL APPLICATIONS

APPROVED

SIGNATURE ON FILE
12/27/2010

STANDARD NO. B-15 (2010) SHT. 2 OF 3 RECOMMENDED

NOTE: OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.

SCALE: 1/16" = 1'-0"
DELAWARE DEPARTMENT OF TRANSPORTATION

GUARDRAIL OVER CULVERTS, TYPE 1-27

STANDARD NO. B-16 (2013) SHIT. 1 OF 3

APPROVED SIGNATURE ON FILE 02/14/2014

RECOMMENDED SIGNATURE ON FILE 02/14/2014

1. PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
2. POSTS 1 THRU 4 AND 11 THRU 14 ARE TO BE W6X10 STEEL POSTS. POSTS 5 THRU 10 ARE TO BE 6"x8"x6'-0" BREAKAWAY WOOD POSTS WITH 2 WOOD BLOCKS AT EACH OF THESE 6 POSTS.
3. THE SPLICES AT POSTS 5, 7, 8, & 10 ARE TO USE 1/8" GUARDRAIL BOLT (L=26").
4. TOP OF HEADWALL SHALL NOT EXCEED 2" ABOVE FINISHED GRADE.
5. TOP OF HEADWALL OR TOP OF BANK SHALL NOT BE CLOSER THAN 5'-0" TO FACE OF GUARDRAIL.

NOTE:
- FIVE SECTIONS OF W-BEAM, ONE NESTED INSIDE THE OTHER
- 2'-6" MIN. TO CULVERT (TYP.)
- 6'-3"
- SEE NOTE 4
NOTES:
1) PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
2) POSTS 1 THRU 4 AND 11 THRU 15 ARE TO BE W6X9 STEEL POSTS. POSTS 5 THRU 10 ARE TO BE 6"x8"x6'-0" BREAKAWAY WOOD POSTS WITH 2 WOOD BLOCKS AT EACH OF THESE 6 POSTS.
3) THE SPLICES AT POSTS 5, 7, & 9 ARE TO USE 5/8" GUARDRAIL BOLT (L=26")
4) TOP OF HEADWALL SHALL NOT EXCEED 2" ABOVE FINISHED GRADE.
5) TOP OF HEADWALL OR TOP OF BANR SHALL NOT BE CLOSER THAN 5'-0" TO FACE OF GUARDRAIL.
**NOTES:**

1. Place guardrail delineators at the intervals specified in the Delaware manual on uniform traffic control devices.
2. Posts 1 thru 4 and 11 thru 14 are to be W6x9 steel posts. Posts 5 thru 10 are to be 6"x8"x6'-0" breakaway wood posts with 2 wood blocks at each of these 6 posts.
3. The splices at posts 5, 7, 8, & 10 are to use 8" guardrail bolt (L=26").
4. Top of headwall shall not exceed 2" above finished grade.
5. Top of headwall or top of berm shall not be closer than 5'-0" to face of guardrail.

**SEE NOTE 4**

**GROUND LINE**

**LIMIT OF PAYMENT**

**2'-0" MIN. TO CULVERT (TYP.)**

**PLAN**

**ELEVATION**

**SCALE: NTS**

**DELAWARE DEPARTMENT OF TRANSPORTATION**

**GUARDRAIL OVER CULVERT, TYPE 3-27**

**STANDARD NO.** B-16 (2013) **SHIT.** 3 **OF** 3 **APPROVED**

**SIGNATURE ON FILE**

**SIGNATURE ON FILE**

**DATE** 01/14/2014 **DATE** 02/14/2014

1/9/2014
DELWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL END TREATMENT, TYPE 4-27

STANDARD NO. B-17 (2010) SHT. 1 OF 1 APPROVED SIGNATURE ON FILE 12/28/2010

NOTE:
1. ADDITIONAL HOLES IN W-BEAM FOR ANCHOR PLATE SHALL BE DRILLED PRIOR TO GALVANIZING. SEE DETAIL B-12, SHEET B OF 10 FOR HOLE SPACING INSTRUCTIONS.
2. CONTRACTOR HAS THE OPTION OF USING A 6-1/2" (165.0) STEEL PLATE WITHOUT A SOIL PLATE OR A 5-1/2" (135.0) STEEL PLATE WITH A SOIL PLATE.
3. PLATE WASHERS SHALL BE INSTALLED AT POSITIONS 3 & 4 ONLY.
4. THE END TREATMENT SHALL ONLY BE USED ON TRAVEL WAYS WITH A POSTED SPEED LIMIT OF 40 MPH (64 KPH) OR LESS.

PLATE WASHER MOUNTING POSITION

PLATE WASHER DETAIL

PLAN

ELEVATION
**Delaware Department of Transportation**

**Curved Guardrail Section**

**Standard No.**  B-16 (2010)  
**SHT.** 1  
**OF 1**

**Recommended**

**Approved**

**Signature on File**

**Scale:** N.I.S.

**Notes:**
1. No washers are used on the rail side of the long wood breakaway posts.
2. The curved guardrail section shall be shop bent.
3. Place guardrail delineators at the intervals specified in the Delaware Manual on Uniform Traffic Control Devices.
4. If curb is used in conjunction with curved guardrail section, the curb cannot be higher than 2" (50).
5. On the 8° 20' (2000) radius system only, the rail is not to be bolted to the center post.

**Entrance Special End Anchorage**

**Type 27 Long Wood Breakaway Post**

**Section A-A**

**Plan**

**Approach Roadway or Driveway**

**Line & Spacing**

**Main Highway**

**Radius**

<table>
<thead>
<tr>
<th>Radius</th>
<th>Min. Required Area Free of Fixed Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>8° 20' (2000)</td>
<td>20 x 20 (1760 x 1760)</td>
</tr>
<tr>
<td>17° 30' (5500)</td>
<td>30 x 30 (1944 x 1944)</td>
</tr>
<tr>
<td>25° 30' (7800)</td>
<td>40 x 40 (1200 x 1200)</td>
</tr>
<tr>
<td>35° 0' (10700)</td>
<td>50 x 50 (10200 x 10200)</td>
</tr>
</tbody>
</table>

**Scale:** 1/50

**Figure:**

- ¾ (19) cable

**SEE Anchor Plate Detail, Sheet B-15, B-9 of 13**

**Concrete Anchor**

**Secure Cable Loop with 5 Cable Clips**

**1/4" (12) x 7-3" (223) Calibrated Rod w/ Welded Eye**

**6" (150) Hook or 5" (125) Dia Washer & Nut.**
NOTES:
1. ADDITIONAL HOLES FOR ANCHOR PLATE SHALL BE DRILLED PRIOR TO GALVANIZING.
   (SEE STANDARD HARDWARE SHEET FOR HOLE SPACING INFORMATION).
2. CONTRACTOR HAS THE OPTION OF USING A 6'-0" STEEL TUBE WITHOUT A SOIL PLATE
   OR A 5'-0" STEEL TUBE WITH A SOIL PLATE.
3. PLACE A WIDE PLASTIC RETAINING TIE STRAP AROUND THE SHORT TIMBER
   BREAKAWAY POST AND TIMBER BEARING PLATE TO ENSURE THE PROPER ORIENTATION
   OF THE TIMBER BEARING PLATE.
4. REFER TO DETAIL B-13, SHEET 8 OF 10 FOR PROPER TIMBER BEARING PLATE ORIENTATION.
NOTES:

1. CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.
2. POSTS 1, 2, 3, 4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH WOOD BLOCKS AND/OR BENT RAIL.
3. DO NOT ATTACH RAILS TO POSTS 1, 2, 3, 5, OR 7.
4. BENT RAIL MAY BE SHAPED TO FACILITATE INSTALLATION OR MAY BE FIELD BENT USING HEAT.
5. APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTORS TO PARAPET.

ELEVATION

1. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
2. PLACE GUARDRAIL DELINERATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
3. FOR INSTALLATIONS WHERE CURB EXISTS, IF THE CURB IS 8" (200MM) OR HIGHER AND CANNOT BE REMOVED, THE BOTTOM RAIL CAN BE ELIMINATED.
4. SEE DETAIL B-5 SHEET 5 OF 6 FOR HARDWARE DETAILS.
5. BENT RAIL SHALL BE BOLTED TO THE BACK OF POST 6 WITH A 3/4" (19MM) GUARDRAIL BOLT 4" (100MM) LONG, WASHED, AND NUT.
1. Concrete inserts may be used in new construction to attach terminal connectors to parapet.
2. Guardrail section and terminal connectors shall be overlapped in the direction of travel.
3. Installation shown above with an "F"-type barrier face. Guardrail section of barrier connection shall be adjusted horizontally in order to meet flush against various types of walls and barriers.
1. WHEN P.C.C. CURB OR INTEGRAL P.C.C. CURB AND GUTTER IS PLACED ADJACENT TO PORTLAND CEMENT CONCRETE PAVEMENT, CONSTRUCT THE JOINT AS PER THE LONGITUDINAL JOINT SEALANT DETAIL ON DETAIL P-2, SHEET 3 OF 5. USE APPROVED JOINT FILLER TO SEAL. WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.

2. DEPRESS CURB AT ENTRANCES AS DETAILED ON THIS SHEET.

3. DEPRESS CURB FLUSH WITH PAVEMENT AT CURB RAMPS. MAXIMUM SLOPE OF CURB AT CURB RAMPS IS 20:1 IN THE DIRECTION OF PEDESTRIAN TRAVEL. SEE DETAIL C-2, SHEET 1 OF 4.

4. DEPRESS CURB FLUSH WITH PAVEMENT OR ADJACENT AREA AT LEADING EDGE OF TRIANGULAR ISLANDS, TAPERING BACK TO FULL HEIGHT AT A SLOPE OF 4:1.

5. DEPRESS END OF CURB RUNS NOT PART OF AN ISLAND OR MEDIAN FLUSH WITH PAVEMENT OR ADJACENT AREA AT A SLOPE OF 12:1.

6. FOR SUBDIVISION APPLICATIONS, A MINIMUM OF 6" OF STONE IS REQUIRED.
NOTES:
1. WHEN P.C.C. CURB OR INTEGRAL P.C.C. CURB AND GUTTER IS PLACED ADJACENT TO PORTLAND CEMENT CONCRETE PAVEMENT, CONSTRUCT THE JOINT AS PER THE LONGITUDINAL JOINT SEALANT DETAIL ON DETAIL P-2, SHEET 3 OF 5. USE APPROVED JOINT FILLER TO SEAL. WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.
2. DEPRESS CURB AT ENTRANCES AS DETAIL ON THIS SHEET.
3. DEPRESS CURB FLUSH WITH PAVEMENT AT CURB RAMPS. MAXIMUM SLOPE OF CURB AT CURB RAMPS IS 20:1 IN THE DIRECTION OF PEDESTRIAN TRAVEL. SEE DETAIL C-2, SHEET 1  OF 4.
4. DEPRESS CURB FLUSH WITH PAVEMENT OR ADJACENT AREA AT LEADING EDGE OF TRIANGULAR ISLANDS, TAPERING BACK TO FULL HEIGHT AT A SLOPE OF 4:1. SEE DETAIL C-1, SHEET 1 OF 2 FOR TYPICAL SECTION OF TAPER AT NOSE OF MEDIAN ISLANDS.
5. 4" OF GABC, TYPE B SHALL BE PLACED UNDER ALL P.C.C. CURB AND P.C.C. CURB AND GUTTER. SEE DETAIL C-1, SHEET 1 OF 2 FOR TYPICAL SECTION.
6. DEPRESS CURB RUNS NOT PART OF AN ISLAND OR MEDIAN FLUSH WITH PAVEMENT OR ADJACENT AREA AT A SLOPE OF 12:1.
**NOTES:**

1. **FOR ALTERATIONS WITHOUT A GRASS STRIP OR WHERE THE EXISTING ROAD PROFILE IS STEEPER THAN 7% AND A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE WITHIN A LENGTH OF 15'-0", THE RAMP LENGTH MAY BE LIMITED TO 15'-0" AT A CONSTANT SLOPE, AND THE RAMP SLOPE ALLOWED TO EXCEED 12:1.**
2. **RAMP AND SIDEWALK CROSS SLOPE SHALL BE 50:1 (2%) MAXIMUM. FOR REHABILITATION WORK, THE RAMP CROSS SLOPE SHALL MATCH THE SLOPE OF THE ADJACENT ROADWAY.**
3. **IF GRADING WILL BE STEEPER THAN 6:1 ADJACENT TO THE CURB RAMP OR SIDEWALK, THEN A TYPE I-B CURB OR RETAINING WALL SHOULD BE USED TO ELIMINATE THE NEED FOR THE STEEP SLOPE DOMES.**
4. **ENTIRE DEPRESSED AREA OF CURB SHALL HAVE DETECTABLE WARNING TRUNCATED DOMES.**
5. **THE MAXIMUM DIFFERENCE IN GRADE BETWEEN THE SIDEWALK OR CURB AND THE PAVEMENT SHALL BE 13%, HOWEVER 12% IS PREFERRED. SEE STANDARD NO. C-2, SHEET 1 OF 3.**
6. **REFER TO DELAWARE MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES FOR DETAILS REGARDING THE LOCATION OF PEDESTRIAN PUSH BUTTONS.**
7. **LANDING AREA SHALL BE DELINEATED WITH JOINTS.**
8. **THE EDGE OF THE LANDING SHALL BE A MAXIMUM OF 10'-0" FROM THE FACE OF THE CURB.**
9. **FOR REHABILITATION WORK, PLACE TRANSITION SLAB TO TRANSITION FROM THE NEW RAMP TO THE EXISTING SIDEWALK WHEN THE EXISTING SIDEWALK HAS A NON-CONFORMING RUNNINGSLOPE, CROSS SLOPE, OR WIDTH. ADJACENT CURB SHOULD MATCH THE SLOPE OF THE TRANSITION SLAB.**
10. **LANDING AREAS SHALL BE EXTENDED 18" BEYOND THE PEDESTRIAN PUSH BUTTON FOR ALL CURB RAMP TYPES. WHEN NO PEDESTRIAN PUSH BUTTON EXISTS, THE 18" EXTENSION CAN BE OMITTED.**
11. **CONSTRUCTION JOINTS ARE REQUIRED AT THE INTERVALS SPECIFIED IN NOTE 6 ON DETAIL M-3, SHEET 1 OF 1. HOWEVER, EXPANSION MATERIAL SHALL NOT BE USED IN THE RAMP SECTION.**
12. **PEDESTRIAN SIGNALS SHALL BE ACCESSIBLE WITH A LEVEL LANDING, WHOSE EDGE IS NO MORE THAN 10" FROM ALL PEDESTRIAN BUTTONS.**

**DELTAPE: DEPARTMENT OF TRANSPORTATION**

<table>
<thead>
<tr>
<th>Curb Ramps, Types 2, 3, &amp; 4</th>
<th>Approved</th>
<th>Recommended</th>
<th>Date</th>
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<tr>
<td>Standard No. C-2 (2013)</td>
<td>SHT. 2</td>
<td>OF 3</td>
<td>02/14/2014</td>
</tr>
</tbody>
</table>

**Sections: C-C, D-D**

**SCALE: NTS**
1. A cut-through level with the street is the preferred treatment for islands, although, ramps can be used where the island width is sufficient to accommodate them. Positive surface drainage must be provided for either treatment. Either treatment is acceptable.
2. For alterations without a grass strip where the existing road profile is steeper than 7% and a 1:2.5 maximum slope ramp will not meet the sidewalk grade within a length of 15'-0", the ramp length may be limited to 15'-0" at a constant slope, and allowed to exceed 12:1.
3. A continuous path must be provided between adjacent curb ramps in islands and medians, with a maximum running slope of 10:1.
4. Ramps and sidewalk cross slope shall be 50:1 (2%) maximum. For rehabilitation work, the ramp cross slope shall match the slope of the adjacent roadway.
5. Where there is no depressed curb at a cut-through or curb ramp, the detectable warning shall be installed 3" from the roadway pavement.
6. Detectable warnings shall be installed when the length W in the direction of pedestrian travel is 6'-0" or greater.
7. Pedestrian signals shall be accessible with a level landing, whose edge is no more than 12" from all pedestrian push buttons.
8. Landing area shall be extended 18" min beyond pedestrian push button for all curb ramp types. When no pedestrian push button exists, the 18" extension can be omitted.
9. Landing area shall be clearly delineated with joints.
10. Intermediate landing is only required when the two ramps intersect before reaching the full height.
11. Construction joints are required on ramp at the interval specified in Note 5 on detail M-3, Sheet 1 of 1. However, expansion material shall not be used in the ramp section.
ENTRANCES

C-3 (2012)

DEPRESSED CURB

NORMAL CURB

SAW CUT

SIDEWALK

GRASS STRIP

4:1 TRANSITION
NORMAL CURB

6" CONCRETE
6" GABC

8" CONCRETE
8" GABC

2'-0" MIN.

10'-0" MIN.

ENTRANCE WITH SIDEWALK
AND GRASS STRIP

* - JOINT
** - EXPANSION MATERIAL

SECTION A-A

SECTION B-B

SECTION C-C

NOTE:
- IF WIDTH OF DRIVEWAY IS 15'-0" OR GREATER, THE FLARE AND EXTENSIONS CAN BE OMITTED.

ENTRANCE WITHOUT SIDEWALK

NOTE:
- IF WIDTH OF DRIVEWAY IS 15'-0" OR GREATER, THE FLARE AND EXTENSIONS CAN BE OMITTED.

ENTRANCE WITH SIDEWALK
AND NO GRASS STRIP

* - JOINT
** - EXPANSION MATERIAL

ENTRANCE WITHOUT SIDEWALK

NOTE:
- IF WIDTH OF DRIVEWAY IS 15'-0" OR GREATER, THE FLARE AND EXTENSIONS CAN BE OMITTED.
ISOMETRIC VIEW
SHOWN WITH INTEGRAL CURB & GUTTER, TYPE 1-8

APPROPRIATE SRBM OR RIPRAP

4% SLOPE

SECTION A-A
ON GRADE OR SLOPE

PLAN VIEW
IN SUMP LOCATION

CURB OPENING DETAILS
SHOWN WITH INTEGRAL CURB & GUTTER, TYPE 1-8

SECTION C-C
IN SUMP LOCATION

APPRIOPRIATE SRBM OR RIPRAP

4% SLOPE

NOTE:
1. DESIGNER SHALL ESTABLISH WIDTH OF OPENING BASED ON DRAINAGE CALCULATIONS.
2. THE WIDTH OF THE APRON (SHOWN IN SECTION C-C) SHALL MATCH THE WIDTH OF THE CURB OPENING (SHOWN IN PLAN VIEW).
MAY BE PRECAST. HOWEVER, WHEN THE SIDEWALK IS DIRECTLY BEHIND THE CURB, THE ENTIRE UNIT MUST BE CAST-IN-PLACE.

NOTE:
**Curb Retaining Wall Section**

For heights greater than 12' but less than or equal to 2'-0".

- **2" x 3" Shear Key**
- **Portland Cement Concrete (4500 psi min)**
- **Min Side Walk Width**
- **2'-0" Min Side Walk**
- **GABC**

**Optional Toewall Placement**

- **Curb Retaining Wall Section**
  - For heights greater than 2'-6"
  - **2" Minimum**
  - **Portland Cement Concrete (4500 psi min)**
  - **Min Side Walk**
  - **5'-0" Min Side Walk**
  - **GABC**

**Notes:**

1. The curb retaining wall details are for quick field changes with approval of the engineer.
2. When H is greater than 2'-6" to 2'-0", cast the curb retaining walls in place. When H is greater than 12" and less than 2'-6", the walls can be either precast or cast-in-place.
3. Chamfer edges 6" at the top of the wall. Place a 6" round edge at the front of sidewalk.
4. The retaining wall has been designed to resist earth pressure only. Additional reinforcement may be required if any surcharge is applied beyond the retaining wall within a distance equal to 2 times H and would require an approved shop drawing.
5. Minimum bar cover is 2" unless otherwise specified on this sheet.
6. Bend the RW03 and RW02 bars into a single continuous U-shaped bar.
7. Bend the TW02 bars into a single continuous U-shaped bar.
8. See details M-3 for sidewalk details and notes, including construction joints and expansion material.
9. Do not place RW03 and TW02 bars through expansion joints. Stop reinforcement and maintain minimum bar cover as specified in previous notes.
10. The toewall can optionally be placed at midpoint of the sidewalk.
11. All reinforcing steel must be epoxy coated.
12. If a curb is constructed adjacent to the structure, coat the front face of the sidewalk/toewall with an approved bond breaker agent prior to the placement of concrete for the curb.
13. For curb retaining walls where H is 12" or less, a modified P.C.C. curb type 1-8 can be used.
14. Curb has been omitted from these details for clarity purposes. For installations where the toe wall is placed at the edge of the sidewalk, the toewall is not a replacement for curb.

- **RWO2 Bars**
- **Construction Joint with Expansion Material (see note 6)**
- **Portland Cement Concrete (4500 psi min)**
- **TW02 Bars (only applicable for walls with a height greater than 2'-6")**

**Table:**

<table>
<thead>
<tr>
<th>Wall Height (H)</th>
<th>Toewall Depth (T)</th>
<th>Required Transverse Reinforcement</th>
<th>Required Longitudinal Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 12' to 2'-6&quot;</td>
<td>No Toewall Needed</td>
<td>#4 Bars @ 6&quot; (RWO2, RW03E)</td>
<td>#4 Bars @ 12&quot; (RWO2 &amp; TW01E)</td>
</tr>
<tr>
<td>Greater than 2'-6&quot; to 3'-0&quot;</td>
<td>6&quot;</td>
<td>#4 Bars @ 6&quot; (RWO3E, TW01E) &amp; (RW02E, RW03E)</td>
<td>#4 Bars @ 6&quot; (RWO2 &amp; TW01E)</td>
</tr>
<tr>
<td>Greater than 3'-0&quot; to 3'-6&quot;</td>
<td>12&quot;</td>
<td>#4 Bars @ 6&quot; (RWO2, RW03E) &amp; (TW01E)</td>
<td>#4 Bars @ 6&quot; (RWO2 &amp; TW01E)</td>
</tr>
</tbody>
</table>

**Notes:**

- See detail M-3 for sidewalk details and notes, including construction joints and expansion material.
- Do not place RW03 and TW02 bars through expansion joints. Stop reinforcement and maintain minimum bar cover as specified in previous notes.
- The toewall can optionally be placed at midpoint of the sidewalk.
- All reinforcing steel must be epoxy coated.
- If a curb is constructed adjacent to the structure, coat the front face of the sidewalk/toewall with an approved bond breaker agent prior to the placement of concrete for the curb.
- For curb retaining walls where H is 12" or less, a modified P.C.C. curb type 1-8 can be used.
- Curb has been omitted from these details for clarity purposes. For installations where the toe wall is placed at the edge of the sidewalk, the toewall is not a replacement for curb.
PLAN VIEW

SHOWN WITHOUT GRATE

NOTE: SAFETY END STRUCTURE TO BE PRECAST
PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: 10" SAFETY END STRUCTURE TO BE PRECAST

SECTION A-A
* REQUIRED ONLY FOR PPE SIZE OF 24" (625) OR 24" (600)

DELARTA
DEPARTMENT OF TRANSPORTATION

181 SAFETY END STRUCTURE

STANDARD NO. D-2 (2001) SHT. 1 OF 2

APPROVED
RECOMMENDED

04/17/2001
1. Personnel safety grates (PSG) shall only be installed on the inlets of storm water pipes 12" (300) or larger in diameter that are not straight from the inlet to the open outlet, regardless of the length.
2. The grate shall be made to fit the outside perimeter of the flared end section (FES) ± 1/32".
3. All bolt holes are to be drilled in the field.
4. A stiffener is to be installed where two or more bars are used.
5. Bottom bar shall be 6" (150) above invert of FES.
6. All hardware attached to concrete shall be attached using approved tamper proof anchors.
**INLET BOX SIZE** | **COVER SLAB SIZE (L x W)** | **DRAINAGE INLET** | **INLET TOP UNIT** | **INLET TOP UNIT REBAR LENGTH** | **INLET TOP UNIT LIMIT OF PAYMENT** | **INLET TOP UNIT BAR BENDING DIAGRAM** | **FRAME & GRATE COMBO** | **MAXIMUM PIPE SIZE (SEE NOTE 5)** | **MAXIMUM HEIGHT (TO TOP OF BOX)** |
|----------------|--------------------------|------------------|------------------|-----------------------------|-----------------------------------|---------------------------------|----------------|---------------------------------|-----------------------------|
| 17 1/2" x 11 1/2" | NO COVER SLAB | TYPE 5 (FRAME & GRATE COMBO) | N/A | N/A | N/A | N/A | TYPE 5 (FRAME & GRATE COMBO) | N/A | N/A | 4' 0"
| 24" x 24" | NO COVER SLAB | TYPE 6 (FRAME & GRATE COMBO) | N/A | N/A | N/A | N/A | TYPE 6 (FRAME & GRATE COMBO) | 15" | 15" | 4' 0"
| 34" x 18" | NO COVER SLAB | TYPES A, B, C, D, E & S (SEE NOTE 4) | 79" | 82" | S504 (DETAIL D-5, SHEET 4) | TYPES 1 THRU 4 AND 7 DRAINAGE INLET FRAME | 24" | 12" | 11' 4"
| 34" x 24" | NO COVER SLAB | TYPES A, B, C, D, E & S (SEE NOTE 4) | 79" | 82" | S501 (DETAIL D-5, SHEET 4) | TYPES 1 THRU 4 AND 7 DRAINAGE INLET FRAME | 24" | 15" | 11' 4"
| 48" x 42" | TYPES A, B, C, D, E & S (SEE NOTE 5) | 93" | 96" | S501 (DETAIL D-5, SHEET 4) | TYPES 1 THRU 4 AND 7 DRAINAGE INLET FRAME | 36" | 21" | 11' 4"
| 48" x 48" | TYPES A, B, C, D, E & S (SEE NOTE 5) | 93" | 96" | S501 (DETAIL D-5, SHEET 4) | TYPES 1 THRU 4 AND 7 DRAINAGE INLET FRAME | 36" | 36" | 11' 4"
| 66" x 42" | TYPES A, B, C, D, E & S (SEE NOTE 5) | 111" | 114" | S504 (DETAIL D-5, SHEET 4) | TYPES 1 THRU 4 AND 7 DRAINAGE INLET FRAME | 48" | 21" | 11' 4"
| 66" x 48" | TYPES A, B, C, D, E & S (SEE NOTE 5) | 111" | 114" | S501 (DETAIL D-5, SHEET 4) | TYPES 1 THRU 4 AND 7 DRAINAGE INLET FRAME | 48" | 36" | 11' 4"
| 72" x 78" | TYPES A, B, C, D, E & S (SEE NOTE 5) | 111" | 114" | S501 (DETAIL D-5, SHEET 4) | TYPES 1 THRU 4 AND 7 DRAINAGE INLET FRAME | 48" | 48" | 11' 4"
| 72" x 84" | TYPES A, B, C, D, E & S (SEE NOTE 5) | 111" | 120" | S501 (DETAIL D-5, SHEET 4) | TYPES 1 THRU 4 AND 7 DRAINAGE INLET FRAME | 54" | 15" | 11' 4"
| 72" x 90" | TYPES A, B, C, D, E & S (SEE NOTE 5) | 111" | 120" | S501 (DETAIL D-5, SHEET 4) | TYPES 1 THRU 4 AND 7 DRAINAGE INLET FRAME | 54" | 36" | 11' 4"

**NOTES:**
1. MAXIMUM PIPE SIZES ARE CALCULATED USING REINFORCED CONCRETE PIPE PERPENDICULAR TO THE BOX WALL. FOR OTHER PIPE SIZES, TYPES AND SKEW ANGLES OTHER THAN PERPENDICULAR, SEE CHART ON DELDOT DESIGN RESOURCE CENTER.
2. STEPS ARE REQUIRED ON ALL BOXES WHOSE DEPTHS ARE GREATER THAN 4' 0".
3. SEE DETAIL D-5 OR APPROPRIATE DETAIL SHEET FOR ADDITIONAL NOTES.
4. FOR A 14" X 24" DRAINAGE INLET, SEE DETAIL D-5, SHEET 6 FOR INLET TOP UNIT TYPES A, B, C, D, E, F. FOR INLET TOP UNIT TYPES 6, 7, SEE DETAIL D-5, SHEET 8.
5. FOR MORE INFORMATION ON DRAINAGE INLET TOP UNIT TYPES A, B, C, D, E & S SEE DETAIL D-5, SHEET 4 AND FOR DRAINAGE INLET TOP UNIT, TYPE S, SEE DETAIL D-5, SHEET 9.
6. ONLY USE THE TYPE 7 DRAINAGE INLET GRATE WHEN SPECIFIED ON THE PLANS OR AFTER APPROVAL BY THE ENGINEER.
SECTION A-A

OPTIONAL PIPE OPENING DETAIL
SEE NOTE 5

SECTION B-B

CAST-IN-PLACE CONCRETE FLOW CHANNEL (TYP)

TOP VIEW

INLET BOX SCHEDULE

<table>
<thead>
<tr>
<th>L</th>
<th>F</th>
<th>FABRICATION ALLOWANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>17½&quot; (450)</td>
<td>6&quot; (150)</td>
<td>+½&quot; (13)</td>
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<tr>
<td>24½&quot; (625)</td>
<td>6&quot; (150)</td>
<td>+½&quot; (13)</td>
</tr>
<tr>
<td>34½&quot; (870)</td>
<td>8½&quot; (215)</td>
<td>+½&quot; (13)</td>
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<tr>
<td>48½&quot; (1220)</td>
<td>8½&quot; (215)</td>
<td>+½&quot; (13)</td>
</tr>
<tr>
<td>66½&quot; (1680)</td>
<td>10½&quot; (270)</td>
<td>+½&quot; (13)</td>
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<tr>
<td>72½&quot; (1830)</td>
<td>10½&quot; (270)</td>
<td>+½&quot; (13)</td>
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WALL REINFORCEMENT SCHEDULE

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<tr>
<th>INTERIOR WALL</th>
<th>AREA OF HORIZONTAL REINFORCEMENT PER FOOT (mm²)</th>
<th>AREA OF VERTICAL REINFORCEMENT PER FOOT (mm²)</th>
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</thead>
<tbody>
<tr>
<td>4½&quot; (110)</td>
<td>0.132 (85)</td>
<td>0.132 (85)</td>
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<tr>
<td>5½&quot; (140)</td>
<td>0.239 (150)</td>
<td>0.315 (195)</td>
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<tr>
<td>6½&quot; (165)</td>
<td>0.284 (185)</td>
<td>0.315 (195)</td>
</tr>
</tbody>
</table>

NOTES:
5. INLET BOXES SHALL BE PRECAST OR CAST-IN-PLACE.
6. PIPES SHALL NOT BE INSTALLED THROUGH ANY CORNER OF THE INLET BOX.
7. RISER SECTIONS MAY BE USED FOR DEEP INLET BOXES.
8. PIPES MAY BE INSTALLED NEAR OR THROUGH JOINTS FOR RISER SECTIONS.
10. CONCRETE FLOW CHANNEL SHALL BE WARPED FOR POSITIVE DRAINAGE.
11. WHEN INLET BOX IS PRECAST, PIPE OPENING SHALL BE BETWEEN 3½" (89) AND 4½" (110) LARGER THAN OUTSIDE DIAMETER OF PIPE AND SHALL NOT ENGROSS ON ADJACENT WALL.
12. REINFORCEMENT FOR LAWN INLET BOXES SHALL BE 4½" (110) X 4½" (110) X 4½" (110) X 4½" (110) WELDED WIRE.

INLET BOX DETAILS

24½" (625) X 24½" (625) LAWN INLET BOX DETAIL

17½" (450) X 5½" (140) LAWN INLET BOX DETAIL

DELAWARE DEPARTMENT OF TRANSPORTATION

INLET BOX SCHEDULE

INLET BOX DETAILS

APPROVED

STANDARD NO.: D-4 (2009)
SHT: 1 OF 1

01/12/2010
01/14/2010

08/23/2009
TYPE 1 JOINT DETAIL

Dimensions will vary

Joint sealant as per specifications

Only between 2 precast units

TYPE 2 JOINT DETAIL

TYPE 3 JOINT DETAIL

DOUBLE INLET SECTION

SECTION A-A

SECTION B-B

DELTA ESTATE
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET ASSEMBLY

APPRAISED

STANDARD NO. D-6 (2010) SHT. 1 OF 9 RECOMMENDED

SIGNATURE ON FILE 12/28/2010

12/28/2010
DRAINAGE INLET FRAME AND GRATES

DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD NO. D-5 (2014) SHIT. 2 OF 9

APPROVED
SIGNATURE ON FILE
12/30/2014

RECOMMENDED
SIGNATURE ON FILE
12/11/2014

1. Only install the Type 2 drainage inlet grate where bicycle traffic is not expected to be present.

2. Label the top of all drainage inlet grates, except Type 7, with "only rain down the storm drain" and an arrow indicating flow direction as shown in the Example Detail.

3. Label the top and bottom of the Type 1 drainage inlet grate with "curbside" as shown on the Example Detail.

4. Only use the Types 5 & 6 drainage inlet frame and grate combinations on lawn inlet drainage boxes. See Schedule on Detail D-4, Sheet 1 for which box sizes are considered lawn inlet drainage boxes.

5. The Type 6 drainage inlet frame and grate combination shown is the Neenah Foundry frame and grate combination model NF-1878-A5G, an acceptable alternative is the East Jordan Iron Works frame and grate combination model V-5622.

6. Only use Types 5 & 6 drainage inlet frame and grate combinations on lawn inlet drainage boxes. See Schedule on Detail D-4, Sheet 1 for which box sizes are considered lawn inlet drainage boxes.

7. The Type 6 drainage inlet frame and grate combination shown is the Neenah Foundry frame and grate combination model NF-1878-A5G, an acceptable alternative is the East Jordan Iron Works frame and grate combination model V-5622.
SECTION A-A
FOR TYPE A TOP UNITS

SECTION B-B
FOR TYPES B, C, D, & E TOP UNITS

NOTES:
31. ALL BARS ARE TO BE #5 (16L) SPACED @ 6" (150) UNLESS NOTED OTHERWISE. TOP REINFORCEMENT SHALL BE 0.11 IN^2/FT^2 (70 mm^2/m^2). HORIZONTAL REINFORCEMENT PER FOOT IN BOTH DIRECTIONS.
32. MINIMUM BAR COVER = 1 1/2" (38).
33. DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.

RECOMMENDED SIGNATURE ON FILE 12/27/2010

APPROVED SIGNATURE ON FILE 12/28/2010

DELAWARE DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET COVER SLAB DETAILS

STANDARD NO. D-6 (2010) SHT. 4 OF 9

SCALE: 1:15"
NOTE: SEE DETAIL D-5, SHEET 3 OF 9 FOR INLET TOP UNIT APPLICATIONS.
DELAWARE
DEPARTMENT OF TRANSPORTATION

34" (865) x 18" (455) DRAINAGE INLET DETAILS

STANDARD NO. D-6 (2010) SHT. 7 OF 9

NOTES:
1. REFER TO PREVIOUS SHEETS FOR REINFORCEMENT REQUIREMENTS.
2. THE HEIGHT OF THE INLET IS LIMITED TO 4" (100) MAXIMUM. THEREFORE, STEPS WILL NOT BE REQUIRED AND SHOULD NOT BE INSTALLED ON THIS INLET.
3. REFER TO DETAIL D-5, SHEET 3 OF 9 FOR INLET TOP UNIT APPLICATION.

TOP VIEW
SECTION A-A
SECTION B-B
CAST-IN-PLACE CONCRETE FLOW CHANNEL (TYP.)

5504 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.

APPROVED
SIGNATURE ON FILE 12/28/2010

RECOMMENDED
SIGNATURE ON FILE 12/27/2010

10/28/2010
LIMITS OF PAYMENT 11'-6" (3505) FOR DOUBLE GRATE

TRANSITION FROM PCC CURB AND GUTTER TYPE 2 TO 6" (200) PCC CURB TYPE 1 WITH CURB OPENING (TYP.)

50" (1270) FOR SINGLE GRATE
44" (1115) (TYP.)

BACK OF CURB

0" (250)

R-B'-O" (244D) (TYP.)

COVER SLAB OPENING

FLOW LINE

EDGE OF GUTTER

STEPS IN FRONT WALL

3½" (95)

SINGLE GRATE SETUP

"4" (100) REBAR & "34" (860) FOR SINGLE GRATE,
172" (4370) FOR DOUBLE GRATE (TYP.)
SEE NOTE 4.

NORMAL GUTTER SLOPE
NORMAL ROADSIDE CROSS SLOPE

N-10 STOPLINE

5501

MIN

S-10 STREET

COVERSLAB WIDTH

SUBDIVISION TOP & CONFIGURATION

NOTES:
1. MINIMUM BOX SIZE TO BE 34" (850) X 24" (600).
2. PIPE OPENINGS IN THE FRONT WALL SHALL NOT INTERFERE WITH THE STEPS. THE PIPE SHALL BE SHIFTED HORIZONTALLY TO AVOID THE STEPS. IT MAY BE NECESSARY TO USE A LARGER BOX TO AVOID CONFLICT BETWEEN STEPS AND PIPE OPENING.
3. SEE DETAIL D-5, SHEET 3 OF 9, FOR 5501 BAR DIAGRAM.
4. THE REBAR IN THE HEAD IS PREFERRED TO BE 1 CONTINUOUS PIECE; HOWEVER, IF MULTIPLE PIECES ARE TO BE USED, EACH PIECE SHALL OVERLAP BY 12" (300)
MINIMUM AND THE FINAL LENGTH OF THE SPICED REBAR SHALL BE AS NOTED ON THIS DETAIL.

DELaware
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET TOP UNIT, TYPE S

STANDARD NO. D-6 (2010) SHT. 8 OF 9

APPROVED SIGNATURE ON FILE 12/28/2010

RECOMMENDED SIGNATURE ON FILE 12/27/2010

12/23/2010
ROUND MANHOLE ASSEMBLY

NOTE: ROUND MANHOLES SHALL BE CONSTRUCTED IN AGREEMENT WITH AASHTO M 199.

DELAWARE
DEPARTMENT OF TRANSPORTATION

MANHOLE DETAILS

STANDARD NO. D-6 (2001) SHT. 2 OF 4

APPROVED

RECOMMENDED

06/06/2001
NOTE: TOP UNIT IS TO BE CAST IN PLACE TO GRACE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.
1. COVER SLABS SHALL BE PRE-CAST.
2. ALL BARS SHALL BE #5 (#16) SPACED AT 6" (150) UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1/" (38).

- DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.

NOTES:

1. COVER SLABS SHALL BE PRE-CAST.
2. ALL BARS SHALL BE #5 (#16) SPACED AT 6" (150) UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1/" (38).
4. DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.
JUNCTION BOX COVER SLAB DETAILS

8" (200)

6 BARS

48" (1220) x 30" (760)
JUNCTION BOX

6 BARS

48" (1220) x 48" (1220)
JUNCTION BOX

8 BARS

66" (1675) x 30" (760)
JUNCTION BOX

8 BARS

66" (1675) x 48" (1220)
JUNCTION BOX

5 BARS

66" (1675) x 66" (1675)
JUNCTION BOX

8 BARS

66" (1675) x 66" (1675)
JUNCTION BOX

NOTES:
1. COVER SLABS ARE TO BE PRE-CAST.
2. ALL BARS ARE TO BE #5 (#16) SPACED @ 12" (305) ± UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1" (38).
4. DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.

SECTION A-A

TYPE 3 JOINT

SECTION B-B

JUNCTION BOX COVER SLAB DETAILS

DELAWARE
DEPARTMENT OF TRANSPORTATION

JUNCTION BOX DETAILS

STANDARD NO. D-7 (2007)  SHT. 2 OF 2

APPROVED  08/01/2007

RECOMMENDED  10/23/67
NOTE:
1. USE CLASS C BEDDING UNLESS OTHERWISE INDICATED.
2. FOR CLASS A BEDDING, WOODED PILE IN CONCRETE 6" (152) FOR PIPES SMALLER THAN 60" (152) (10") (250) FOR PIPES 24" (610) TO 60" (152), AND FOR PIPES LARGER THAN 60" (152) SEE PROJECT DETAILS.
NOTES:
0. THE PERFORATED PIPE UNDERDRAIN SHALL BE LOCATED AS SHOWN ON THE TYPICAL SECTIONS OF THE CONSTRUCTION PLANS.
1. GEOTEXTILE FILTER FABRIC SHALL BE PLACED ENTIRELY OVER THE TOP OF UNDERDRAIN TRENCH AND LAPPED AS SHOWN.
3. SLOPE OF UNDERDRAINS SHALL MATCH ROADWAY GRADE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
4. OUTLET PIPE CONFIGURATIONS SHALL USE 45 DEGREE ELBOWS OR SHALL USE STRAIGHT PIPE WITH A MINIMUM RADIUS OF 3' (1000) TO DIRECT UNDERDRAIN PIPE INTO SIDE OF DRAINAGE INLET OR TO POSITIVE GRADE. PIPE SHALL ALSO BE NON-PERFORATED AND HAVE A SMOOTH INTERIOR.
5. RODENT SCREEN SHALL SNUGLY FIT THE PROVIDED SLOT WITH THE SCREEN UP FITTING TIGHT TO THE BOTTOM FLOW LINE.
7. WHEN TWO LINES OF PIPE UNDERDRAIN DRAIN TO A LOW POINT, EACH PIPE MUST HAVE ITS OWN OUTLET.
8. PERFORATED PIPE UNDERDRAIN SHALL NOT BE PLACED UNDER GUARDRAIL, IN ORDER TO AVOID PUNCTURING.
THE CONTRACTOR SHALL FURNISH MATERIAL AND PLUG ABANDONED DRAINAGE PIPES WITH CONCRETE AS DIRECTED BY THE ENGINEER.

NOTE:
THE CONTRACTOR SHALL FURNISH MATERIAL AND PLUG ABANDONED DRAINAGE PIPES WITH CONCRETE AS DIRECTED BY THE ENGINEER.
CONCRETE WASHOUT SIGN

MORE INFORMATION.

STABILIZED CONSTRUCTION ENTRANCE. SEE DETAIL E-13 FOR MORE INFORMATION.

ACCESS DRIVE SHOULD MATCH MINIMUM REQUIREMENTS OF STABILIZED CONSTRUCTION ENTRANCE. SEE DETAIL E-13 FOR MORE INFORMATION.

SIDES (EXCLUDING ACCESS DRIVE LOCATION)

BERM REQUIRED ON ALL SIDES (EXCLUDING ACCESS DRIVE LOCATION)

SANDBAG OR CONCRETE BLOCK ANCHOR

COMPACTED BERM WITH LINER OVERTOP AND A SANDBAG OR CONCRETE BLOCK ANCHOR

OPTIONAL LINER/BERM INSTALLATION

CONCRETE WASHOUT SIGN

ACTIONS

1. A PREFABRICATED CONCRETE WASHOUT UNIT MAY BE USED IN LIEU OF THE DESIGN SHOWN ON THIS DETAIL. THE DIMENSIONS ARE 4'-0" x 4'-0" x 1'-0" DEEP WITH A 4 MIL POLYETHYLENE PLASTIC LINER. FOLLOW THE DIMENSIONS IN THIS DETAIL FOR CONSTRUCTED CONCRETE WASHOUT AREAS.

2. THE LINER MUST BE FREE OF TEARS OR HOLES AND PLACED OVER SMOOTH SURFACES TO PREVENT PUNCTURING. FOR EXCAVATED WASHOUTS, ANCHOR THE LINER UNDERNEATH THE BERM OR OVERTOP WITH SANDBAGS OR CONCRETE BLOCKS TO HOLD IN PLACE, AS DIRECTED ON THIS DETAIL.

3. ALLOW WASHED OUT CONCRETE MIXTURE TO HARDEN THROUGH EVAPORATION OF THE WASTEWATER. ONCE THE FACILITY HAS REACHED 75% OF ITS CAPACITY, REMOVE THE HARDENED CONCRETE BY REUSING THE BROKEN AGGREGATE ON SITE, RECYCLING, OR DISPOSING OFFSITE. THE HARDENED MATERIAL CAN BE BURIED ON SITE WITH A MINIMUM OF 1'-0" OF CLEAN, COMPACTED FILL.

4. APPLY A NEW LINER BEFORE REUSING THE STATION FOR ADDITIONAL WASHOUTS AFTER MAINTENANCE HAS OCCURRED.
SILT FENCE

GEOTEXTILE SEE NOTE 2

FLOW

GEOTEXTILE WIRE MESH POST

SECURE WITH STAPLES THE ENTIRE LENGTH OF THE POST

FLOW

GEOTEXTILE FASTENER (TYP.)

FLOW

GEOTEXTILE POST

FLOW

GEOTEXTILE FASTENER (TYP.)

REINFORCING STRIP OVER GEOTEXTILE FABRIC FOR SILT FENCE (TYP. AT EACH STAKE) SEE NOTE 2.

EMBED APPROX. 12" OF GEOTEXTILE, BACKFILL TRENCH WITH SOIL, AND COMPACT THOROUGHLY.

EXISTING GROUND 24" MIN.

4' MIN.

FLOW

FASTEN AT 4 PLACES, EQUALLY SPACED

SECTION B-B

WIRE MESH DETAIL (REINFORCED SILT FENCE ONLY)

SECTION A-A

CONSTRUCTION AREA

ISOMETRIC VIEW

SILT FENCE CONNECTION DETAIL

REINFORCED SILT FENCE CONNECTION DETAIL

NOTES:
1. THIS DEVICE IS INTENDED TO CONTROL SHEET FLOW ONLY AND IS NOT TO BE USED IN AREAS OF CONCENTRATED FLOW.
2. TURN ENDS OF SILT FENCE UPSLOPE TO CONTAIN RUNOFF.
3. REINFORCING STRIP IS TO BE ONE COMPLETE STRIP COVERING ALL GEOTEXTILE FABRIC AT POST.

DELWARE DEPARTMENT OF TRANSPORTATION

STANDARD NO. E-2 (2014) SHT. 1 OF 1

APPROVED 12/20/2014

RECOMMENDED 12/11/2014

SIGNATURE ON FILE

SIGNATURE ON FILE
1. Sediment traps are intended for use in existing, proposed, and temporary ditches of all types with a maximum drainage area of 15 acres, as shown on plans or as directed by the engineer.

2. Stabilize side slopes with temporary grass seeding as per specifications.

3. An outlet structure is required and is noted on the plans.

4. For size, location, etc. of sediment trap, see plans.

5. All fill slopes are to have a slope of 2:1.

6. The sediment trap length to width ratio is to be 2:1. Special designs are permitted to increase the flow time after approval by the stormwater engineer.

Notes:

- The sediment trap length to width ratio is 2:1.
- Special designs are permitted to increase the flow time after approval by the stormwater engineer.
- All fill slopes are to have a slope of 2:1.
- An outlet structure is required and is noted on the plans.
- For size, location, etc. of sediment trap, see plans.
IF THE INLET IS NOT AT A LOW POINT, INSTALL STONE CHECK DAM DOWNSTREAM FROM INLET.

EXISTING GROUND

EXCAVATE AND RE-COMPACT SOIL (TYP)

2" x 4" (NOMINAL) POST, DRIVEN INTO GROUND

2" x 4" (NOMINAL) FRAME, NAILED AT JOINTS (TYP)

2" x 4" (NOMINAL) NAIL STRIP, BOTH SIDES (TYP)

GEOTEXTILE

WIRE MESH

RE-COMPACT SOIL (TYP) EXCAVATE AND

WEIR

INLET SEDIMENT CONTROL, DRAINAGE INLET
NOTE:

1. The engineer will adapt size and shape of the stone check dam to meet field conditions. Intercepting swales and grades need to be considered as well.

SCALE: NTS

DELAWARE DEPARTMENT OF TRANSPORTATION

INLET SEDIMENT CONTROL, CULVERT INLET

APPROVED SIGNATURE ON FILE 12/30/2014

RECOMMENDED SIGNATURE ON FILE 12/11/2014

STANDARD NO. E-5 (2014) SHT. 1 OF 1

10/24/2014
SECTION B-B

PLAN

96" C.M.P.

72" C.M.P. (PERFORATE WITH 1" HOLES AT 6" ON CENTER AND AT 6" INTERVALS FOR THE LENGTH OF THE ENTIRE PIPE)

INFLOW

GEOTEXTILE

EYE BOLTS (TYP. ALL FOUR CORNERS)

INFLOW

C.M.P.

FLOW

GEOTEXTILE

SECTION A-A

8'-4" x 3" 23 GAGE WIRE MESH

3" DIA. METAL PIPE THROUGH OUTER C.M.P. ONLY.

3" DIA. METAL PIPE THRU GEOTEXTILE AND WIRE MESH

2'-0" CLADON 20TH

2'-0"

EYE BOLTS OF SUFFICIENT STRENGTH TO LIFT TANK AND SEDIMENT (TYP. ALL FOUR CORNERS)

1/2" METAL PLATE WELD TO PIPE

NOTES:

1) THE MAXIMUM PUMP DISCHARGE IN THIS TYPICAL PORTABLE SEDIMENT TANK IS 125 GALLONS PER MINUTE. REPLACE THE GEOTEXTILE WHEN THE PORTABLE SEDIMENT TANK CAN NO LONGER ALLOW THIS FLOW RATE, WHEN THERE IS A TEAR, OR WHEN DIRECTED BY THE ENGINEER.

2) SEVERAL UNCONNECTED OR CONNECTED IN PARALLEL PORTABLE SEDIMENT TANKS MAY BE USED WHEN A HIGHER FLOW RATE IS NEEDED TO DEWATER THE JOB.

3) PLACE 72" C.M.P. SO THAT IT IS CENTERED IN THE 96" C.M.P. AND THERE IS AN EQUAL AMOUNT OF SPACE BETWEEN THE TWO PIPES.

DELTA DEPARTMENT OF TRANSPORTATION

PORTABLE SEDIMENT TANK

STANDARD NO. E-6 (2014) SHT. 1 OF 1 RECOMMENDED

APPROVED SIGNATURE ON FILE 
12/30/2014 12/11/2014

SIGNATURE ON FILE 10/24/2014
NOTES:

1. ALL PERFORATIONS ARE 1" IN DIAMETER AND 12" ON CENTER IN ALL DIRECTIONS.
2. PLACE WIRE MESH AROUND THE REMOVABLE 24" C.M.P. BEFORE ATTACHING THE GEOTEXTILE TO INCREASE FLOW THROUGH THE GEOTEXTILE.
3. WELD PERFORATED CAP TO THE BOTTOM OF BOTH PIPES.
4. REPLACE GEOTEXTILE FOR THE 24" C.M.P. WHEN CLOGGED WITH SEDIMENT.

A TO PUMP DELAWARE NO. 57 STONE.

TO PUMP W.S. EL. GRADE TO DRAIN DELAWARE NO. 57 STONE.

Dewatering hose (clean water discharge to stabilized outfall)

6" MIN. FREEBOARD

SUMP PIT 12'-0" MIN.

WOOD WEDGE 2" X 4" (NOM) (SEE NOTE 4)

24" C.M.P.

36" C.M.P. (SEE NOTE 4)

SECTION A-A

SECTION B-B

FLOW GEOTEXTILE WIRE MESH 23 GAGE 4" X 4"

24" C.M.P.

36" C.M.P.

24" C.M.P.

36" C.M.P.

SEE SECTION B-B

REPLACE GEOTEXTILE FOR THE 24" C.M.P. WHEN CLOGGED WITH SEDIMENT.

1) ALL PERFORATIONS ARE 1" IN DIAMETER AND 12" ON CENTER IN ALL DIRECTIONS.
2) PLACE WIRE MESH AROUND THE REMOVABLE 24" C.M.P. BEFORE ATTACHING THE GEOTEXTILE TO INCREASE FLOW THROUGH THE GEOTEXTILE.
3) WELD PERFORATED CAP TO THE BOTTOM OF BOTH PIPES.
4) REPLACE GEOTEXTILE FOR THE 24" C.M.P. WHEN CLOGGED WITH SEDIMENT.
NOTES:
1. ALL PVC PIPES ARE 4" I.D., SCHEDULE 40.
2. SOLVENT WELD ALL JOINTS OF THE FLOTATION SECTION.
3. ATTACH A 4" HDPE FLEXIBLE DRAIN PIPE TO THE POND OUTLET STRUCTURE USING WATER TIGHT CONNECTIONS.

PLAN VIEW

SIDE VIEW

FRONT VIEW

ATTACH FLEXIBLE PIPE TO PVC WITH TWO NO. 8 WOOD SCREWS

OVERLAPPING CONNECTING BANDS

ATTACH A 4" HDPE FLEXIBLE DRAIN PIPE TO THE POND OUTLET STRUCTURE USING WATER TIGHT CONNECTIONS.

FLANGE WITH RUBBER GASKET MATERIAL (ATTACH TO STRUCTURE WITH CONCRETE SCREWS OR OTHER SUITABLE ATTACHMENT AS APPROVED BY THE ENGINEER)

12 ROWS OF 5/8" DIA.
4 HOLES, 1 1/2" C.C.

ADD REBAR GUIDE POST (TYP.) WITH WIRE STOP AT TOP OF RISER

1" STEEL STRAP (TYP.)

4" DIAMETER HDPE FLEXIBLE DRAIN PIPE

12" DEPTH OF SKIMMER DEWATERING DEVICE USING WATER TIGHT CONNECTIONS.

ATTACH A 4" HDPE FLEXIBLE DRAIN PIPE TO THE POND OUTLET STRUCTURE (ATTACH TO STRUCTURE WITH CONCRETE FLANGE WITH RUBBER GASKET MATERIAL)

4'-0" x 6'-0" DELAWARE #57 STONE PAD FOR SKIMMER. 4" MINIMUM THICKNESS.

DELAWARE DEPARTMENT OF TRANSPORTATION

SKIMMER DEWATERING DEVICE

STANDARD NO.  E-8 (2014)  SHT. 1 OF 1

APPROVED SIGNATURE ON FILE  12/30/2014

RECOMMENDED SIGNATURE ON FILE  12/11/2014

10/24/2014
NOTES:
1. CONSTRUCT CHECK DAM SO THAT THE CENTER OF THE DAM IS 6" LOWER THAN THE OUTER EDGES, FORMING A WEIR THAT WATER CAN FLOW ACROSS.
2. INSTALL GEOTEXTILE FABRIC UNDERNEATH RIPRAP ON PERMANENT CHECK DAMS ONLY.
3. SPACE DAMS SO THAT THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE TOP OF THE WEIR OF THE DOWNSTREAM DAM. PLACE DAMS NO FURTHER THAN 20'-0" APART WHEN THE SLOPE IS LESS THAN 1%. 

DELWARE
DEPARTMENT OF TRANSPORTATION
STONE CHECK DAM
STANDARD NO. E-9 (2014) SHT. 1 OF 1
APPROVED SIGNATURE ON FILE 12/20/2014
RECOMMENDED SIGNATURE ON FILE 12/11/2014
10/24/2014

SCALE : NTS

PLAN

SECTION A-A

SECTION B-B

ISOMETRIC VIEW
TEMPORARY SLOPE DRAIN

1. USE TEMPORARY SLOPE DRAINS AT THE TOP OF FILL SLOPES AS EMBANKMENT IS CONSTRUCTED TO PREVENT EXCESSIVE EROSION UNTIL SHOULDERs ARE CONSTRUCTED AND THE SLOPES ARE SEEDED AS PER SPECIFICATIONS.

2. RESTRICT MOVEMENT OF SLOPE DRAINS TO THE SLOPE BY A METHOD APPROVED BY THE ENGINEER.

3. DISCHARGE ALL TEMPORARY SLOPE DRAINS INTO A STABILIZED OUTFALL AND THEN INTO A SEDIMENT TRAPPING DEVICE.

NOTES:

1. SEE NOTE 1

2. 24" MIN.

3. CORRUGATED PIPE - SEE PLANS FOR LOCATIONS OR AS DIRECTED BY THE ENGINEER.

4. COMPACT SOIL AROUND ANTI-SEEP COLLAR

5. INTERCEPTOR BERM, 24" MIN. HEIGHT, LENGTH AS REQUIRED TO CONTAIN SURFACE DRAINAGE AND DIRECT INTO TEMPORARY SLOPE DRAIN.

6. EDGE BERM AT TOP OF FILL SLOPE

7. EDGE BERM

8. FILL SLOPE

9. PHASE 1 FILL

10. PHASE 1 DRAIN

11. GEOTEXTILE UNDER RIPRAP

12. R-4 RIPRAP

13. TOP OF FILL SLOPE AS EMBANKMENT IS CONSTRUCTED

14. ANTI-SEEP COLLAR

15. TEMPORARY FLOW LINE

16. FLOW

17. 2" x 4" PLYWOOD COLLAR

18. SCALE: NTS

19. 4'-0"

20. 24" MIN.

21. 2" x 4"
PERIMETER/DIKE SWALE USED AS A CLEAN WATER DIVERSION

LIMIT OF CONSTRUCTION

EXISTING GROUND

INTERMEDIATE PHASE(S) EMBANKMENT

PHASE 1 EMBANKMENT

EXISTING GROUND

FINAL PHASE EXCAVATION

PHASE I EXCAVATION

INTERMEDIATE PHASE(S) EXCAVATION

NOTE:

AS A CLEAN WATER DIVERSION PERIMETER/DIKE SWALE USED BY THE ENGINEER FLOW LEFT OR RIGHT AS DIRECTED ELIMINATED TO DIRECT SURFACE BREAK IN CROSS SLOPE MAY BE COMPLETELY STABILIZED.

AND USED UNTIL SLOPE IS THE END OF EACH WORK DAY EDGE BERM TO BE PLACED AT MINIMUM 5'-0" OFFSET FOR MORE INFORMATION SILT FENCE, SEE DETAIL E-2

TEMPORARY SWALE

FILL SECTION

CUT SECTION

MINIMUM OF 5'-0" OFFSET FROM TOE OF SLOPE

NOTE:

1. CONSTRUCT EDGE BERM AND TEMPORARY SLOPE DRAINS ALONG THE TOP OF ALL SLOPES TO INTERCEPT RUNOFF AND CONVEY IT DOWN THE SLOPE FACES WITHOUT CREATING GULLIES OR WASHOUTS.
2. TRACK SLOPE FACES WITH CLEATED EQUIPMENT SUCH THAT THE CLEAT MARKS ARE ORIENTED HORIZONTALLY.
3. STABILIZE ALL CUT AND FILL SLOPES OF THE HIGHWAY EMBANKMENT WITH TEMPORARY OR PERMANENT SEED AS WORK PROGRESSES IN INCREMENTS NOT TO EXCEED 10'-0" OF EMBANKMENT HEIGHT.
4. CONSTRUCT EMBANKMENT CROSS SLOPES SO THAT THEY ARE NO FLATTER THAN 2% AND NO STEEPER THAN 6%.

DELAWARE

DEPARTMENT OF TRANSPORTATION

INCREMENTAL STABILIZATION

APPROVED

SIGNATURE ON FILE

DATE

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DATE

STANDARD NO. E-11 (2014) SHT. 1 OF 1

RECOMMENDED

12/30/2014

12/11/2014

11/19/2014
NOTES:

1. TRACK AND SEED TOPSOIL UNDER EROSION CONTROL BLANKET.
2. ADDITIONAL STAPLES ARE REQUIRED AT OVERLAPS. SEE OVERLAP DETAIL ON THIS SHEET FOR STAPLE PLACEMENT.
3. STAGGER ALL STAPLES ACROSS EROSION CONTROL BLANKET AS SHOWN.

STABILIZATION OF DITCHES

SECTION A-A

OVERLAP DETAIL

STAPLES TO BE STAGGERED AT 6" SPACING.

TERMINAL TRENCH ANCHOR DETAIL

STAPLES TO BE PLACED AT 12" SPACING ACROSS DOMINANT FLOW

APPLICATION AT THE UPSTREAM END OF DITCH

STAPLES

COMPACTED AND SEEDED BACKFILL

DOMINANT FLOW

6" OVERLAP

STAPLES (TYP.)

18" MAX.

PLAN

STABILIZATION OF DITCHES

EROSION CONTROL BLANKET TO BE CENTERED ALONG FLOW LINE OF DITCH.

STAPLES (TYP.)

6" OVERLAP

(SEE DETAIL THIS SHEET)

DOMINANT FLOW

APPLIED AT THE DOWNSTREAM END OF DITCH

SPACING ACROSS DOMINANT FLOW

STAPLES TO BE PLACED AT 12"

12"

STAPLES TO BE STAGGERED AT 6" SPACING.

INIAL TRENCH ANCHOR DETAIL

APPLIED AT THE DOWNSTREAM END OF DITCH

STAPLES

COMPACTED AND SEEDED BACKFILL

DOMINANT FLOW

6" OVERLAP

STAPLES (TYP.)

18" MAX.
STABILIZATION OF DITCHES

**INITIAL TRENCH ANCHOR DETAIL**
Applied at the downstream end of ditch

**TERMINAL TRENCH ANCHOR DETAIL**
Applied at the upstream end of ditch

**LONGITUDINAL TRENCH ANCHOR DETAIL**

**CHECK SLOT DETAIL**
(PLACE AS PER MANUFACTURER)

**OVERLAP DETAIL**

**STAPLES (TYP.)**
DOMINANT FLOW
OVERLAP

TURF REINFORCEMENT MAT TO BE CENTRED ALONG FLOW LINE OF DITCH.

**DESIGN SHEAR STRESS**

<table>
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<th>TYPE</th>
<th>GREATER THAN 2 lb/sf BUT LESS THAN 6 lb/sf</th>
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<tbody>
<tr>
<td>TYPE 1</td>
<td>GREATER THAN 6 lb/sf BUT LESS THAN 8 lb/sf</td>
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**NOTES:**

1. TRACK AND SEED TOPSOIL UNDER TURF REINFORCEMENT.
2. ADDITIONAL STAPLES ARE REQUIRED AT OVERLAPS, ENDS, CHECK SLOTS, AND EDGES AS DETAILED ON THIS SHEET.
3. STAGGER ALL STAPLES AS SHOWN ON THIS SHEET.
NOTES:
1. PIPE ALL SURFACE WATER THAT IS FLOWING OR DIVERTED TOWARDS THE CONSTRUCTION ENTRANCE UNDER THE ENTRANCE. A MOUNTABLE BERM AS SHOWN ON THIS DETAIL, IS PERMITTED TO FACILITATE PLACEMENT OF PIPES IN SHALLOW CONDITIONS.
2. SEE PLANS FOR LOCATION AND NUMBER OF STABILIZED CONSTRUCTION ENTRANCES. PRIOR APPROVAL BY THE ENGINEER IS REQUIRED FOR ANY CHANGE IN LOCATION OR NUMBER OF ENTRANCES.
3. REMOVE AND REPLACE TOP 2" OF STONE WITH 2" OF CLEAN STONE WHEN VOIDS ARE FILLED OR AS DIRECTED BY THE ENGINEER.
NOTES:
1) INSTALL SANDBAG DIKE IN UPSTREAM LOCATION FIRST.
2) CONSTRUCT SANDBAG DIKE SUCH THAT THE HEIGHT IS 1'-0" ABOVE THE PEAK ELEVATION OF THE 1 YEAR STORM, OR 1'-0" BELOW THE TOP OF THE BANK, WHICHEVER IS LESS. SEE PLANS FOR MORE INFORMATION.
3) CONSTRUCT WEIR SUCH THAT IT WILL PASS A 1 YEAR STORM EVENT PEAK FLOW. SEE PLANS FOR MORE INFORMATION.
4) SIZE THE PIPE SUCH THAT IT WILL ALLOW PASSAGE OF THE STREAM BASE FLOW.

THE NOTES BELOW FOR HEIGHT, REFER TO TOP OF BANK (EXISTING OR PROPOSED) BOTTOM OF CHANNEL
FLEXIBLE PIPE WITH IMPERVIOUS SHEETING

OVERLAP 2'-0" MIN. 2
(TYP.) 1
HEIGHT x 2

SANDBAG DIKE
SECTION A-A

DELAWARE DEPARTMENT OF TRANSPORTATION
STANDARD NO. E-15 (2014) SHT. 1 OF 1
APPROVED 12/20/2014
RECOMMENDED 12/11/2014

CHIEF ENGINEER
DESIGN ENGINEER
SIGNATURE ON FILE 10/24/2014
SIGNATURE ON FILE
SANDBAG DIVERSION

NOTES:

1. INSTALL DIVERSION STRUCTURE FROM UPSTREAM TO DOWNSTREAM.
2. SIZE EFFECTIVE CHANNEL WIDTH SO THAT IT WILL PASS A 1 YEAR STORM EVENT PEAK FLOW, OR 3\% OF STREAM WIDTH, WHICHEVER IS GREATER.
3. CONSTRUCT SANDBAG DIVERSION HEIGHT SUCH THAT TOP OF THE DIVERSION STRUCTURE IS 2\% ABOVE THE 1 YEAR STORM PEAK ELEVATION.

DELTADEARWE
DEPARTMENT OF TRANSPORTATION

SANDBAG DIVERSION

APPROVED

SIGNATURE ON FILE

DATE

12/30/2014

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DEPARTMENT OF TRANSPORTATION

SANDBAG DIVERSION

APPROVED

SIGNATURE ON FILE

DATE

12/11/2014

10/24/2014
**Floating Turbidity Curtain**

**Note:**

1. **Additional Panel Required for Depths Greater Than 5'-0".**
2. Use 2 Turbidity Curtain Panels to Reach Bottom Depths of 10'-0". Special depth Turbidity Curtain Panels are required for depths greater than 10'-0" and their use will be called out in the plans as directed by the Engineer.

**PLAN VIEW**
- Open Water Application
- Shoreline Application

**ELEVATION**
- Top Load Line
- Bottom Load Line
- Floation Unit
- 5'-0" Additional Panel

**DELTADE**
- Department of Transportation
- Approved
- Recommended
- Signature on File

**DELAWARE DEPARTMENT OF TRANSPORTATION**

**TURBIDITY CURTAIN**

**APPROVED**

**SIGNATURE ON FILE**

**DATE**

11/19/2014
12/30/2014
12/11/2014
The dimensions of the stilling well are shown on the plans or directed by the engineer. The minimum size of the stilling well is 5' x 5' x 5'.

1:1 or flatter

6" min. freeboard

Clean water inflow

R-4 riprap

Geotextile

Float

Dewatering hose

Clean water discharge to stabilized outfall

To pump

Length varies

NOTE:
**NOTES:**

1. PLACE RIPRAP PRIOR TO PLACING PIPE.
2. PLACE DELAWARE NO. 3 STONE UNDER PIPE.
3. CONSTRUCT DISSIPATOR SUCH THAT THE ELEVATION (EL.) IS LOWER THAN PIPE INVERT.
4. REFER TO THE PIPE ENERGY DISSIPATOR SCHEDULE ON THE PLANS FOR THE VALUE OF DIMENSION VARIABLES.

**SECTION A-A**

- Rip-rap (see plans for type)
- Geotextile

**PLAN VIEW**

- Proposed pipe
- Rip-rap (see plans for type)
- Level bottom
- Existing ground
- Securing pin

**DETAIL B**

- Geotextile
- Existing ground
- Securing pin

**DELAWARE DEPARTMENT OF TRANSPORTATION**

**RIPRAP ENERGY DISSIPATOR**

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**SIGNATURE ON FILE**

- **DATE:** 12/20/2014
- **SIGNATURE ON FILE:** 12/20/2014

**SCALE:** NTS

**DATE:** 10/24/2014

**SIGNATURE ON FILE:** 12/11/2014
NOTES:

1. GUARDRAIL DEPICTED ON THIS SHEET IS FOR ILLUSTRATIVE PURPOSES ONLY. REFER TO THE GUARDRAIL DETAILS FOR ACTUAL PLACEMENT. PLACEMENT OF SLOPE DRAIN MAY NEED TO BE ADJUSTED TO AVOID CONFLICT WITH GUARDRAIL POSTS.

2. PLACE CURB OPENING AT EACH SLOPE DRAIN LOCATION.

3. SEE DETAILS C-4 AND C-5 FOR MORE INFORMATION.

DELAWARE DEPARTMENT OF TRANSPORTATION

STANDARD NO. E-21 (2014)

APPROVED SIGNATURE ON FILE 12/30/2014

RECOMMENDED SIGNATURE ON FILE 12/11/2014

11/19/2014
ALL DEAD, BROKEN, & CROSSING BRANCHES SHALL BE PRUNED OFF FOLLOWING INSTALLATION.

ROOT BALL SHALL BE SET FLUSH TO GRADE OR 1'-0" TO 2'-0" ABOVE GRADE IF SOILS ARE SLOW TO DRAIN, DO NOT COVER THE TOP OF THE ROOTBALL WITH SOIL.

ALL SOIL SHALL BE EXCAVATED FROM THE PIT, MIXED WITH APPROVED AMENDMENTS AND USED AS BACKFILL DURING INSTALLATION OF SHRUB.

MULCH IN ACCORDANCE WITH SPECIFICATIONS, DO NOT PLACE MULCH AGAINST THE SHRUB STEMS.

REMOVE BURLAP & WIRE BASKETS TO 1/3 OF THE ROOTBALL. DO NOT LEAVE BURLAP, BASKET, OR ROPE DEBRIS IN THE PIT.

ROOT BALL SHALL BE PLACED ON TAMPED OR UNEXCAVATED SOIL.

NOTES:
1. BASE OF PLANTING PIT SHALL BE A MINIMUM WIDTH OF TWICE THE ROOT BALL SIZE AND A MAXIMUM OF THREE TIMES THE ROOT BALL SIZE.
2. SHRUBS SHALL BE INSTALLED IN MASSES OF NO LESS THAN 3 PLANTS. A MINIMUM OF 3'-0" WIDTH IS REQUIRED FROM THE BACK OF CURB TO THE EDGE OF SIDEWALK FOR INSTALLATION OF SHRUBS.
3. ALL PRUNING SHALL BE DONE BY AN UIWA CERTIFIED ARBORIST, CERTIFIED NURSERY PROFESSIONAL, OR UNDER THE DIRECTION THEREOF. DO NOT HEAVILY PRUNE SHRUBS AT PLANTING.
4. AUGERED HOLES SHALL BE HANG DIG TO FINAL WIDTH AND TO ELIMINATE GLAZING.
5. ALL SHRUB MASSES SHALL BE MULCHED AS ONE CONTINUOUS BED.

ROADSIDE SHRUB PLANTING DETAIL

DELWARE DEPARTMENT OF TRANSPORTATION

PLANTING DETAILS

STANDARD NO. L-1 (2006) SHT. 1 OF 3

APPROVED

RECOMMENDED

08/04/2006
DO NOT PRUNE THE DOMINANT LEADER OR TERMINAL BUDS OF THE CROWN.

NOTES:
1. ALL PRUNING SHALL BE DONE BY OR UNDER THE DIRECTION OF AN ISA CERTIFIED ARBORIST OR CERTIFIED NURSERY PROFESSIONAL. DO NOT HEAVILY PRUNE TREES AT PLANTING.
2. ALL DEAD, BROKEN, & CROSSING BRANCHES SHALL BE PRUNED OFF FOLLOWING INSTALLATION.
3. BASE OF PLANTING PIT SIZE SHALL BE A MINIMUM WIDTH OF TWICE THE ROOT BALL SIZE AND A MAXIMUM OF THREE TIMES THE ROOT BALL SIZE.
5. WHEN PLANTING TREES ALONG SIDEWALKS, THE TREE SHALL BE LIMED TO 7' (2100) FOR PEDESTRIAN CLEARANCE.

STAKE & GUY TREES, GUY WIRE, STAKES, & RUBBER HOSE SHALL BE AS SPECIFIED IN SECTION 1ST.

SET ROOT BALL FLUSH TO GRADE OR 1/2(50) TO 2'(50) ABOVE GRADE IF SOILS ARE SLOW TO DRAIN. PLANT TREES SUCH THAT THE TRUNK FLARE IS VISIBLE. ANY TREE WHERE TRUNK FLARE IS NOT VISIBLE SHALL BE REJECTED. DO NOT COVER THE TOP OF THE ROOT BALL WITH SOIL.

TAMP SOIL AROUND THE ROOT BALL BASE WITH FOOT PRESSURE SO ROOT BALL DOES NOT SHIFT.

MULCH IN ACCORDANCE WITH SPECIFICATIONS. DO NOT PLACE MULCH AGAINST THE TRUNK.

ALL SOIL SHALL BE EXCAVATED FROM THE PIT MIXED WITH APPROVED AMENDMENTS AS PER SPECIFICATIONS AND USED AS BACKFILL. DURING INSTALLATION OF TREES, PLACE ROOT BALL ON TAMPED OR UNEXCAVATED SOIL.

REMOVE BURLAP AND BASKETS TO 1/2 OF THE ROOT BALL. DO NOT BURY EXCESS BURLAP, ROPE, OR REMNANTS OF BASKET IN THE PLANTING HOLE.
NOTES:
1. SEE PLANT LIST FOR SPACING CO.

PERENNIAL/GROUND COVER
FINISHED GRADE
3" (75MM) MULCH - NOT TO COVER LEAVES
ROOT MASS
6" (150MM) PREPARED SOIL MIX, AS PER SPECIFICATION.
SUBGRADE TILLED TO 6" (150MM) DEPTH

PLAN VIEW

SECTION VIEW

PERENNIAL/GROUND COVER PLANTING DETAIL
NOTES:
1) LATERAL STEEL SHALL BE HELD IN PLACE BY CRADLES.
2) LETTERS ON CONCRETE MONUMENT TO BE COUNTERSUNK IN TOP OF MARKER 16".
3) FLEXIBLE DELINEATORS ARE ONLY TO BE USED ON ROADS WITH A SPECIFIED DENIAL OF ACCESS OR CLASSIFIED AS MINOR ARTERIALS OR HIGHER. ON ALL OTHER ROAD CLASSIFICATIONS, A WOODEN STAKE SHALL BE PLACED WITH "ROW" HANDWRITTEN VERTICALLY IN 1" TALL LETTERS.
4) PLACE CAP ON CONCRETE MONUMENT SO THAT TOP OF CAP IS FLUSH WITH THE TOP OF THE CONCRETE MONUMENT.

DELAWARE Right Of Way Monumentation
DEPARTMENT OF TRANSPORTATION

TOP
2 1/8" HOLE TO ACCOMPOMODATE SURVEY CAP

SECTION A-A

TOP DETAIL

REBAR AND CAP WITH FLEXIBLE DELINEATOR DETAIL

ELEVATION

2" ALUMINUM CAP [SEE DETAIL THIS PAGE]
SET CAP FLUSH WITH TOP OF GRADE

FLEXIBLE DELINEATOR SEE NOTE 3

2" BLACK LETTERS

DE LAWARE (LICENSE #)
RIGHT OF WAY
ALUMINUM CAP STAMP DETAIL
SHARED-USE PATH & SIDEWALK DETAILS

NOTES:
2. THE LANDING SECTION SHALL BE A MINIMUM OF 5'-0" IN LENGTH AND SHALL HAVE A MAXIMUM CROSS SLOPE AND RUNNING SLOPE OF 2%. THE ENTIRE LANDING SECTION MUST ALSO BE CONCRETE.
3. THE RAMP SECTION SHALL HAVE A MAXIMUM CROSS SLOPE OF 2% AND A MAXIMUM RUNNING SLOPE OF 12:1. HOWEVER, IF A 12:1 RUNNING SLOPE DOES NOT ALLOW THE RAMP TO MEET EXISTING GRADE WITHIN 15'-0", THE RUNNING SLOPE MAY EXCEED 12:1.
4. A 6:1 MAX SLOPE IS REQUIRED FOR 2'-0" ON BOTH SIDES OF THE SHARED-USE PATH. WHERE A 6:1 SLOPE CANNOT BE ACHIEVED, AN APPROVED HANDRAIL OR HEADWALL SHALL BE REQUIRED.
5. TOPSOIL, SEED, & MULCH ANY DISTURBED AREA ADJACENT TO THE SHARED-USE PATH UP TO A MAXIMUM OF 2'-0".
6. FOR SIDEWALKS AND CONCRETE SHARED-USE PATHS, CONSTRUCTION JOINTS SHALL BE PLACED EVERY 20'-0" AND EXPANSION MATERIAL EVERY 20'-0". HOWEVER, EXPANSION MATERIAL SHALL NOT BE USED IN THE RAMP SECTION.
7. SEE DETAIL C-2, SHEETS 1, 2 OR 3 FOR CURB RAMP TREATMENTS WHEN THE SIDEWALK INTERSECTS WITH A TRAVELWAY.
8. A 6:1 MAX SLOPE IS REQUIRED FOR 2'-0" ON BOTH SIDES OF THE SIDEWALK.
9. TOPSOIL, SEED, & MULCH ANY DISTURBED AREA ADJACENT TO THE SIDEWALK UP TO A MAXIMUM OF 2'-0".
10. ON REHABILITATION PROJECTS, WHEN EXISTING OBSTRUCTIONS (FIRE HYDRANT, UTILITY POLE, ETC...) ARE LOCATED IN THE SIDEWALK, THE SIDEWALK PATH SHALL NOT BE LESS THAN 32" WIDE AND THE OBSTRUCTION SHALL NOT EXTEND FOR MORE THAN 2'-0".

DELAWARE DEPARTMENT OF TRANSPORTATION

SHARED-USE PATH & SIDEWALK DETAILS

DELTAWEST DESIGN ENGINEER

DATE

SIGNATURE ON FILE

SCALE: NTS

1/9/2014

2/14/2014

2/14/2014

1/9/2014

1/9/2014

BIKE RACK LAYOUT DETAILS

NOTES:

1. BIKE RACK SHALL BE ANCHORED AS PER MANUFACTURER'S RECOMMENDATIONS AFTER APPROVAL FROM ENGINEER IN THE FIELD.
2. DETAIL SHOWN WITH P.C.C. CURB TYPE 1-8, HOWEVER ACTUAL CURB VARIES AND SHOULD BE PLACED AS SHOWN ON PLANS.
3. SPECIAL CONSIDERATIONS SHOULD BE TAKEN WHEN PLACING BIKE RACKS NEAR CURB RAMPS AND MAY REQUIRE A DETAIL ON THE PLANS.

BIKE RACK DETAIL

DELAWARE DEPARTMENT OF TRANSPORTATION

BIKE RACK LAYOUT DETAILS

APPROVED

STANDARD NO. M-4 (2011) SHT. 1 OF 1 RECOMMENDED

SIGNATURE ON FILE 12/22/2011 SIGNATURE ON FILE 12/21/2011

04/15/2011
NOTES:
1. ALL RAIL JOINTS SHALL BE CENTERED AT THE POSTS.
2. ALL JOINTS SHALL BE ATTACHED WITH 3 - 10D NAILS AND TWO ADJACENT RAILS SHALL NOT END ON THE SAME POST.
3. RAILS SHALL BE FLUSH TO THE POSTS AT THE END POSTS.

WOOD RAIL FENCE DETAILS
STANDARD NO. M-5 (2004) SHT. 1 OF 1
APPROVED 1/1/05
RECOMMENDED 1/1/05

PATH

POSTS 8' (2.4m) O.C. ON STRAIGHT RUNS, 4' (1.2m) O.C. AROUND CURVES

4" (100) x 4" (100) (NOMINAL) TREATED POSTS (TYP.)
ATTACH WITH 4-12d HOT DIP GALVANIZED RING NAILS (TYP.)

4" (100) x 6" (150) (NOMINAL) TREATED RAILS (TYP.)
MITER TOP AT 3:12 SLOPE
1. Actual pattern to be used shall be specified on the plans. Color is to be “brick red” unless otherwise noted on the plans.
2. Materials and pavement boxes vary depending on plans.
3. For crosswalk applications, refer to the Delaware Manual on Uniform Traffic Control Devices for Stripping Width.
4. The patterns above are the preferred patterns available for sidewalk or crosswalk applications.

**NOTES:**

**BRICK PAVER SIDEWALK DETAIL**

**NOTES:**

1. When sidewalk is confined by a rigid structure on both sides, expansion joint material shall be used from top of brick to bottom of concrete base on at least one side of the sidewalk.
2. Edge restraint must be approved by the engineer in the field and shall be installed as per manufacturer’s recommendations.
**Bus Stop Pad, Type 1**

- To be used when the pad is placed behind curb and includes a sidewalk without a grass strip.

**Bus Stop Pad, Type 2**

- To be used when the pad is placed behind curb and includes a sidewalk with a grass strip.

**Bus Stop Pad, Type 3**

- To be used when the pad is placed flush with the travelway and no curb or sidewalk is included.

Notes:

1. Bus stop pad locations must be approved by both DART and DelDOT prior to any construction.
2. Reference the Delaware Manual on Uniform Traffic Control Devices for general information on placement of signs.
3. See construction plan signing and striping sheets for specific sign and sign location details.
4. Typical bus stop pads may be used in conjunction with bus stop shelter locations in the event of land constraints at the shelter locations. An interconnecting pedestrian access path must exist that is accessible to bus stop alighting areas, shelters, curb ramps, crosswalks, and sidewalks.
5. A 6:1 max slope is required for 2'-0" on all sides of the bus stop pad and approaching sidewalk.
6. Where this cannot be achieved, an approved handrail or curb/shoulder is required.
7. Curb type varies, see plans for correct curb type.
8. See detail M-3, Sheet 1 of 1 for additional sidewalk details and requirements.
9. Ramps are only required when the vertical height of the approaching sidewalk differs from that of the adjacent curb and the bus stop pad must be raised or lowered to match the curb height.
NOTES:

1). BUS STOP SHELTER PAD LOCATIONS MUST BE APPROVED BY DART AND DELDOT PRIOR TO ANY CONSTRUCTION.
2). REFERENCE THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR GENERAL INFORMATION ON PLACEMENT OF SIGNS.
3). SEE CONSTRUCTION PLANS SIGNING AND STRIPING SHEETS FOR SPECIFIC SIGN AND SIGN LOCATION DETAILS
4). BUS STOP CONFIGURATIONS MAY VARY DUE TO TOPOGRAPHIC OBSTRUCTIONS OR GRADES. CONSULT DART OR DELDOT FOR OPTIONAL PAD DETAILS.
5). A 6:1 MAX SLOPE IS REQUIRED FOR 2'-0" ON ALL SIDES OF THE BUS STOP PAD AND APPROACHING SIDEWALKS. WHERE THIS CANNOT BE ACHIEVED, AN APPROVED HANDRAIL OR HEADWALL IS REQUIRED.
6). CURB TYPE VARIES. SEE PLANS FOR CORRECT CURB TYPE.
7). TRASH RECEPTACLE PAD CAN BE PLACED ON EITHER SIDE OF THE SHELTER PAD, AT THE DIRECTION OF THE ENGINEER IN THE FIELD.
8). SEE DETAIL M-3, SHEET 1 FOR ADDITIONAL SIDEWALK DETAILS.
SECTION A-A
BRIDGE SAFETY FENCE, TYPE 1

- **SCREEN LINK FENCE**
  - 1"-#9 GA CHAIN
  - SPACE AS SHOWN

- **ATTACHMENT**
  - STRETCHER BAR

- **REAR FACE**
  - CONCRETE BARRIER

- **MAXIMUM SPACING**
  - 10'-0" (TYP)

- **ALL POSTS**
  - CAP (TYP)
  - HEX NUTS AND WASHERS
  - WITH HEX. NUTS AND " DIA. ANCHOR STUDS (4)

- **LONGITUDINAL PIPE**
  - 2.875" O.D. PIPE (TYP)
  - PIPE (TYP)
  - 1.66" O.D. PIPE

- **SCREEN**
  - 5'-0"
  - 3"

- **LINK FENCE**
  - 1"-#9 GA CHAIN
  - SCREEN (TYP)

- **ANTI-CLIMB SHIELD**
  - SINGLE 99 GA OR DOUBLE 433 GA TIE WINS @ 2'-0" C/C. TYPICAL EACH LONGITUDINAL RAIL. MINIMUM OF 25 TURNS

- **EXPANSION JOINT**
  - PLACE ANTI-CLIMB SHIELD AT SECOND INTERIOR POST OF BRIDGE DECK. TYPICAL FOR BOTH ENDS AND BOTH SIDES OF EACH BRIDGE.

- **ELEVATION**

- **SECTION B-B**

- **SECTION A-A**

NOTES:
1. IF A TAPER EXISTS AT THE END OF THE BARRIER, PLACE POST 6" FROM THE TOP OF TAPER.
2. MINIMUM 9" TO MAXIMUM 1" OF CLEARANCE BETWEEN TOP OF BARRIER AND BOTTOM OF CHAIN LINK FENCE SCREEN.
3. LINE UP EXPANSION JOINTS IN TOP AND BOTTOM FENCE RAILS WITH EXPANSION JOINTS IN BARRIER.
4. ATTACH ANTI-CLIMB SHIELD TO FENCE POST BY SMALL SECTION OF PIPE TO EACH VERTICAL POST WITH 1/2" FILLET WELD. SHAPE PIPE CONNECTOR TO HAVE FULL CONTACT WITH EACH POST.
**BRIDGE SAFETY FENCE, TYPE 2**

**SECTION D-D**

- 10'-0" MAXIMUM SPACING FOR BOTH ENDS AND BOTH SIDES OF INTERIOR POST OF MAIN SPAN.
- TYPICAL PLACE ANTI-CLIMB SHIELD AT SECOND ANTI-CLIMB SHIELD (SHOWN DASHED).
- ALL POSTS CAP (TYP).

**ATTACHMENT**

- STRETCHER BAR ATTACHMENT
- HEX NUTS AND WASHERS (TYP)
- WASHERS (TYP) WITH HEX NUTS AND 8 1/2" DIA. ANCHOR STUDS (4)

**SECTION C-C**

- BARRIER ON APPROACH SLAB
- EXPANSION JOINT IN BARRIER
- ELEVATION

**NOTES:**

1. IF A TAPER EXISTS AT THE END OF THE BARRIER, PLACE POST 6" FROM THE TOP OF TAPER.
2. MINIMUM 3/4" TO MAXIMUM 1" OF CLEARANCE BETWEEN TOP OF BARRIER AND BOTTOM OF CHAIN LINK FENCE SCREEN.
3. LINE UP EXPANSION JOINTS IN TOP AND BOTTOM FENCE RAILS WITH EXPANSION JOINTS IN BARRIER.
4. ATTACH ANTI-CLIMB SHIELD TO FENCE POST BY SMALL SECTION OF PIPE TO EACH VERTICAL POST WITH 8 1/2" FILLET WELD. SHAPE PIPE CONNECTOR TO HAVE FULL CONTACT WITH EACH POST.
5. WELD ADDITIONAL STRAIGHT POST TO CURVED POST AT SECOND INTERIOR POST OF MAIN SPAN. (TYPICAL FOR BOTH ENDS OF THE BRIDGE.)

**DESIGNER NOTE:** BRIDGE SAFETY FENCE, TYPE 2 SHOULD BE USED WHEN A SIDEWALK EXISTS ADJACENT TO THE BARRIER. OTHERWISE, USE BRIDGE SAFETY FENCE, TYPE 1.

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**DELaware DEPARTMENT OF TRANSPORTATION**

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**SIGNATURE ON FILE**

- DATE: 12/30/2014
- DATE: 12/11/2014
- DATE: 11/19/2014
NOTES:
1. TRANSVERSE JOINTS ARE PERPENDICULAR TO THE CENTERLINE OF THE PAVEMENT WHEN THE PAVEMENT IS STRAIGHT.
2. TRANSVERSE JOINTS ARE PERPENDICULAR TO A TANGENT LINE TO THE OUTSIDE ARC OF THE PAVEMENT WHEN THE PAVEMENT IS CURVED.
3. ALIGN THE TRANSVERSE JOINTS FOR ALL ADJACENT SLABS WITH EACH OTHER.
4. ABRUPT CHANGES IN PAVEMENT WIDTH MAY OCCUR ONLY AT THE TRANSVERSE JOINT LINE; LONGITUDINAL JOINTS SHALL BE CONTINUOUS WHENEVER POSSIBLE.
5. LONGITUDINAL JOINTS SHOULD NOT BE LOCATED WITHIN PROPOSED WHEEL PATHS. THE WHEEL PATH IS GENERALLY LOCATED 2' (600 mm) INSIDE OF THE LANE EDGE LINE OR CENTERLINE.

SLAB PLAN (WITH DOWEL AND TIE LOCATIONS)
NOTES:
1. AS DIMENSIONED, THE WIDTH OF THE TRANSVERSE SEALANT RESERVOIR IS APPLICABLE WHEN THE TEMPERATURE OF THE PAVEMENT SURFACE IS BETWEEN 60°F (16°C) AND 80°F (27°C). WHEN THE TEMPERATURE IS BELOW 60°F (16°C), THE SEALANT RESERVOIR SHALL BE CUT 0.3T WIDER. WHEN THE TEMPERATURE IS ABOVE 80°F (27°C), THE SEALANT RESERVOIR SHALL BE CUT 0.2T WIDER.
2. "T" REFERS TO THE ACTUAL CONSTRUCTED SLAB THICKNESS.
3. TOLERANCE ON ALL JOINT SEALANT DETAIL DIMENSIONS SHOWN WITHOUT RANGES SHALL BE PLUS OR MINUS 0.1T.
4. THE TOP EDGES OF THE CONTACT SURFACES OF THE SEALANT MATERIAL ON BOTH SIDES OF THE JOINT RESERVOIR SHALL BE AT THE SAME ELEVATION.
5. TRANSVERSE JOINT MATERIAL SHALL BE PLACED BEFORE LONGITUDINAL JOINT MATERIAL. THE TRANSVERSE JOINT MATERIAL SHALL BE CONTINUOUS FOR THE FULL WIDTH OF ALL ADJACENT P.C.C. PAVEMENT SLABS.
6. LONGITUDINAL JOINT MATERIAL SHALL BE PLACED WITHOUT GAPS WHENEVER INTERRUPTED BY THE TRANSVERSE JOINT MATERIAL.
7. TRANSVERSE JOINT SEAL TO BE RECESSED 0.15T TO 0.3T BELOW THE TOP OF THE SLAB.
8. A 45° CHAMFER SHALL BE CUT 0.1T TO 0.3T DEEP AT THE TOP OF THE SLAB ALONG BOTH SIDES OF THE TRANSVERSE SEALANT RESERVOIR.
9. THE TOP EDGES OF THE COMPRESSION SEAL SHALL BE IN FULL CONTACT WITH THE SLAB SIDES.
DOWEL & TIE BAR PLACEMENT TOLERANCES

DELAWARE DEPARTMENT OF TRANSPORTATION

P.C.C. PAVEMENT

STANDARD NO. P-1 (2001) SHT. 5 OF 5

APPROVED

RECOMMENDED

04/18/2001
SECTION A-A

SECTION B-B
TRANVERSE SAW-CUT USED FOR JOINTS LOCATED WITHIN THE PATCH

SECTION C-C
TRANSVERSE CONSTRUCTION JOINT USED ON JOINTS BETWEEN EXISTING PAVEMENT AND PATCH

EXIST. HOT-MIX OVER P.C.C. PAVEMENT

EXIST. P.C.C. PAVEMENT

FULL DEPTH PATCH
1. As dimensioned, the width of the transverse sealant reservoir is applicable when the temperature of the pavement surface is between 60°F (16°C) and 80°F (27°C). When the temperature is below 60°F (16°C), the sealant reservoir shall be cut \( \frac{1}{2} " \) wider.

2. "T" refers to the existing "AS-BUILT" slab thickness.

3. Tolerance on all joint sealant detail dimensions shown without ranges shall be plus/minus \( \frac{1}{16} " \).

4. The top edges of the contact surfaces of the sealant material on both sides of the joint reservoir shall be at the same elevation.

**NOTES:**

- Hot-poured joint sealant is applicable when the temperature of the pavement surface is between 60°F (16°C) and 80°F (27°C). When the temperature is below 60°F (16°C), the sealant reservoir shall be cut \( \frac{1}{2} " \) wider.

- Exisiting P.C.C. slab thickness:

- Top of slab:

- Sealant detail:

- Dowel bar:

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**FULL DEPTH PATCH**

- P.C.C. Pavement Patching

**DELWARE DEPARTMENT OF TRANSPORTATION**

**DATE:** 11/10/05

**SIGNED:**

**SCALE: N.T.S.**
Dowel & Tie Bar Placement Tolerances

**Full Depth Patch**
NOTE: CLOSED CELL POLYETHYLENE FOAM SHALL BE THE SAME WIDTH AS THE JOINT AND 1'-0"(300MM) DEPTH. AFTER THE CONCRETE IN THE REPAIR AREA HAS ACHIEVED THE SPECIFIED STRENGTH, THE FOAM SHALL BE REMOVED AND REPLACED WITH BACKER ROD AND HOT-POUR SEALANT MEETING ALL APPLICABLE STANDARD DETAILS AND SPECIFICATIONS.

SECTION WITH SPALL NOT ADJACENT TO JOINT

NOTE: WHEN X > 12'-0"(3000MM) THEN Y'-0"(150MM) AND POLYETHYLENE FOAM IS NOT USED.

WHEN 0 ≤ X ≤ 12'-0" (3000MM), THEN Y'-X AND POLYETHYLENE FOAM IS USED.
NOTES:
1. Adjust the profile of the overlay paving to assure a smooth transition through the butt joint.
2. Crack seal the joint between the butt joint and the existing pavement.

CONDITION SLOPE FEET:INCHES
GREATER THAN OR EQUAL TO 35 MPH 40:1
LESS THAN 35 MPH 30:1
STOP CONTROLLED INTERSECTION 15:1
**NOTES:**

1. Patch widths are measured along the roadway centerline and shall be the full width of the lane or lanes disturbed.
2. This is a minimum patch. If the existing roadway has a heavier cross section than shown here, it will be replaced with that cross section, or as directed by the Engineer.
3. See DETAIL D-8, SHEET 1 FOR PIPE BEDDING DETAILS.
CONDUIT JUNCTION WELL, TYPE I

1. TYPE 1 CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" DIAMETER COMPLETELY THROUGH THE WALL. UNSUED HOLES SHALL BE PLUGGED.

2. CONDUIT JUNCTION WELLS SHALL NOT BE PLACED UNDER A TRAVELWAY.

3. ALL CONDUIT JUNCTION WELLS PLACED IN PAVED AREAS SHALL BE CONSTRUCTED FLUSH WITH THE FINISHED GRADE. ALL CONDUIT JUNCTION WELLS PLACED IN UNPAVED AREAS SHALL BE CONSTRUCTED ABOVE FINISHED GRADE AND GRADED TO DRAIN AWAY FROM THE WELL, AS DETAILED.

4. ALL CRACKS, GAPS, OR OPENINGS IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.
**SECTION A-A**

NOTES:

1. TYPE 4 CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" DIAMETER COMPLETELY THROUGH THE WALL, UNUSED HOLES SHALL BE PLUGGED.

2. ALL CONDUIT JUNCTION WELLS PLACED IN PAVED AREAS SHALL BE CONSTRUCTED FLUSH WITH THE FINISHED GRADE. ALL CONDUIT JUNCTION WELLS PLACED IN UNPAVED AREAS SHALL BE CONSTRUCTED ABOVE FINISHED GRADE, AND GRADED TO DRAIN AWAY FROM THE WELL, AS DETAILED.

3. ALL CRACKS, GAPS, OR OPENINGS IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.
NOTES:

1. TYPE 5 CONDUIT JUNCTION WELL SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 5" DIAMETER COMPLETELY THROUGH THE WALL. UNUSED HOLES SHALL BE PLUGGED.

2. ALL CONDUIT JUNCTION WELLS PLACED IN PAVED AREAS SHALL BE CONSTRUCTED FLUSH WITH THE FINISHED GRADE. ALL CONDUIT JUNCTION WELLS PLACED IN UNPAVED AREAS SHALL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM THE WELL, AS DETAILED.

3. ALL CRACKS, GAPS, OR OPENINGS IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.

CONDUIT JUNCTION WELL, TYPE 5

CONSTRUCTION DETAILS:

- Del DOT ELECTRIC
- Cast Iron Cover
- Cast Iron Frame
- Pry Hole

DETAIL "A"

- 2"-0" Braided Strap with 1/2" Eyelets
- 3" Diameter Cast Iron Cover
- 3" Diameter Cast Iron Frame
- 1" Diameter Pickup Holes

SECTION B-B

- 3" Diameter Pre-Cast Well
- 18" Diameter Well Cover
- 16" Diameter Well Frame
- 2'-0" Braided Strap with 1/2" Eyelets
- No. 6 AWG Grounding Conductor (Color - Green)

CONDUIT INSTALLATION:

- 3" Max. (Typ.) Conduit
- 1" Min. Non-Metallic Conduit
- Bushing
- DEL 57 Stone

FINISHED GRADE:

- See Detail "A"
- Paved Area
- Unpaved Area

FINISHED GRADE [Paved Area]

FINISHED GRADE [Unpaved Area]

CONCRETE WALL:

- 3" TYP.
- 1" MIN.

CAST IRON COVER:

CAST IRON FRAME:

PRECAST WELLS:

- 5" Diameter
- Complete Through the Wall
- Unused Holes Plugged

GROUNDING:

- 6" x 13" Stainless Steel Bolt with Stainless Split Lock Washer and Nut
- Drill and Tap Up and Support Frame
- Anti-Corrosion Compound Applied to Each Assembly

ELECTRIC:

- Del DOT
- 3" Max. (Typ.) Conductor
- 1" Min. - Braided Strap

DEL. DOT

DEL. 57 STONE

PLAN VIEW

SECTION A-A

SECTION B-B

NOTE:

- Each Assembly
- Compound Shall Be Applied to Support Frame
- Anti-Corrosion and Nut
- Drill and Tap Lid
- With Stainless Split Lock Washer

STANDARD NO.

T-1 (2013)

DELAWARE DEPARTMENT OF TRANSPORTATION

APPROVED

SIGNATURE ON FILE 02/14/2014

SIGNATURE ON FILE 01/14/2014

RECOMMENDED

SIGNATURE ON FILE 02/14/2014

SIGNATURE ON FILE 01/14/2014

DATE 1/9/2014
**JUNCTION WELL BONDING**

**GALVANIZED TO GALVANIZED**

- 2"-0" BRAIDED STRAP WITH 3/8" EYELETS
- STEEL LID
- STEEL FRAME
- GALV. CONDUIT
- BUSHING
- No. 6 AWG GROUNDING CONDUCTOR (color)
- 5/8" x 1-1/4" STAINLESS STEEL BOLT WITH SPLIT LOCK WASHER AND NYLON INSERT LOCKOUT AND SPLIT LOCK WASHER AND SUPPORT FRAME. ANTI-CORROSION COMPOUND SHALL BE APPLIED TO EACH ASSEMBLY.

**DETAIL "A"**

- SEE DETAIL "A"
- RECESSED COVER
- FINISHED GRADE (PAVEMENT)
- 2"-0" BRAIDED STRAP WITH 3/8" EYELETS
- STEEL LID
- STEEL FRAME
- GALV. CONDUIT
- BUSHING
- No. 6 AWG GROUNDING CONDUCTOR (color)

**BONDING AN EXISTING JUNCTION WELL COVER & FRAME**

- SEE DETAIL "A"
- RECESSED COVER
- FINISHED GRADE (PAVEMENT)
- 2"-0" BRAIDED STRAP WITH 3/8" EYELETS
- STEEL LID
- STEEL FRAME
- GALV. CONDUIT
- BUSHING
- No. 6 AWG GROUNDING CONDUCTOR (color)
- U.L. LISTED DIRECT BURIAL SPLICE KIT
- NONMETALLIC CONDUIT
- No. 6 AWG GROUNDING CONDUCTOR (color)

**JUNCTION WELL, GROUNDING & BONDING FOR STEEL FRAMES & LIDS**

- DELAWARE DEPARTMENT OF TRANSPORTATION
- T-2 (2011)
- CHIEF ENGINEER
- DESIGN ENGINEER
- SCALE: NTS
- 11/14/2011

**APPROVED**

- SIGNATURE ON FILE
- 12/22/2011

**RECOMMENDED**

- SIGNATURE ON FILE
- 12/21/2011

**DATE**

- 11/24/2011
NOTES:
1. TYPE 11 CONDUIT JUNCTION WELL LID SHALL BE PRECAST POLYMER CONCRETE WITH A HEAVY-WEAVE FIBERGLASS FRAME, INSTALLED ON A PRECAST CONCRETE WELL.
2. TYPE 11 CONDUIT JUNCTION WELL BODY SHALL BE PRECAST CONCRETE. AT LEAST ONE HOE IN PRECAST WELLS WILL BE OF A 5" DIAMETER COMPLETELY THROUGH THE WALL. UNUSED HOLES SHALL BE PLUGGED.
3. ALL CONDUIT JUNCTION WELLS PLACED IN PAVED AREAS SHALL BE CONSTRUCTED FLUSH WITH THE FINISHED GRADE. ALL CONDUIT JUNCTION WELLS PLACED IN UNPAVED AREAS SHALL BE CONSTRUCTED ABOVE FINISHED GRADE AND GRADED TO DRAIN AWAY FROM THE WELL, AS DETAILED.
4. ALL CRACKS, GAPS, OR OPENING IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.
NOTES:

1. TYPE 14 CONDUIT JUNCTION WELL LID SHALL BE PRECAST POLYMER CONCRETE WITH A HEAVY-WEAVE FIBERGLASS FRAME. INSTALLED ON A PRECAST CONCRETE WELL.

2. TYPE 14 CONDUIT JUNCTION WELL BODY SHALL BE PRECAST CONCRETE. AT LEAST ONE HOLE IN PRECAST WELLS WILL BE OF A 3" DIAMETER COMPLETELY THROUGH THE WALL. UNUSED HOLES SHALL BE PLUGGED.

3. TYPE 14 CONDUIT JUNCTION WELLS SHALL BE CONSTRUCTED FLUSH WITH THE SURFACE OF THE SAME. INSTALLATION IN UNPAVED AREAS WILL BE CONSTRUCTED ABOVE GRADE AND GRADED TO DRAIN AWAY FROM THE CONDUIT JUNCTION WELL.

4. ALL CRACKS, GAPS, OR OPENINGS IN JUNCTION WELL WALL SHALL BE SEALED WITH CONCRETE.
NOTES:
1. Type 15 conduit junction well lid shall be precast polymer concrete with a heavy-weave fiberglass frame. Installed on a precast concrete well.
2. Type 15 conduit junction well body shall be precast concrete. At least one hole in precast wells will be of a 5" diameter completely through the wall. Unused holes shall be plugged.
3. Type 15 conduit junction wells shall be constructed flush with the surface of the same. Installation in unpaved areas will be constructed above grade and graded to drain away from the conduit junction well.
4. All cracks, gaps, or openings in junction well wall shall be sealed with concrete.
NOTE:
1. CONCRETE APRON IS REQUIRED ONLY WHEN CABINET BASE IS INSTALLED IN UNPAVED AREAS OR AS DIRECTED ON PLAN.
2. CONDUITS SHALL BE EVENLY SPACED, WITH MINIMUM 2" WIDTH SPACING ESTABLISHED BETWEEN ALL CONDUITS.

DELAWARE DEPARTMENT OF TRANSPORTATION
CABINET BASES, TYPES M & F
STANDARD NO. T-4 (2013) SHIT. 1 OF 2
APPROVED SIGNATURE ON FILE 02/14/2014
RECOMMENDED SIGNATURE ON FILE 01/14/2014
1/9/2014
**NOTE:**

1. CONCRETE APRON IS REQUIRED ONLY WHEN CABINET BASE IS INSTALLED IN EARTH AREAS OR AS DIRECTED ON PLAN.
2. CONDUITS SHALL BE EVENLY SPACED, WITH MINIMUM 2" WIDTH ESTABLISHED BETWEEN ALL CONDUITS.

---

**PLAN VIEW**

"P & R" CABINET BASES, TYPES P & R

**SECTION A-A**

- INSTALL INSULATING BUSHINGS AT THIS END OF CONDUIT
- 2" PVC CONDUIT
- 1/2" x 1 1/4" GALVANIZED HEX BOLT
- FINISHED-GRADE HEX BOLT

**SECTION B-B**

- CABINET BASE
- 2" PVC CONDUIT
- 2" PVC SWEEP
- 2" PVC SERVICE CONDUIT
- CONCRETE APRON
ROUND BASE

CONNECTED TO AN EXISTING CONDUIT

THREADED CONDUIT PLUG UNLESS SHALT BE CAPPED WITH A GALVANIZED
UNDERGROUND CONDUIT ENDS

6" M

#8 REINFORCING BARS

8 EQUALLY SPACED

#4 REINFORCING BARS

EQUALLY SPACED

3"

x 240")

GROUND ROD (BE ATTACHED TO
GROUND FOR POLE TO
3" CONDUIT SWEEPS

6" M

(MAST ARM OR SPAN)

DIRECTION OF LOAD

REQUIREMENTS

BY POLE MANUFACTURE

TO BE AS DIRECTED

BOLT CIRCLE DIAMETER

FOUNDATION HEADER

ROUND BASE w/ SQUARE FOUNDATION HEADER

NOTE: SQUARE FOUNDATION HEADER SHALL HAVE A 6" MINIMUM DEPTH.
ANCHOR BOLTS
INSTALLATION IN SOIL
ROUNDED CORNERS FOR AREA TO BE GROUTED
FINISHED GRADE
HEX NUT
ANCHOR BOLT COVER
AS DIRECTED BY THE ENGINEER.
PLUMB OR CANT POLE SQUARE NUT USED TO CONDUIT
GRADE (SOIL) FINISHED
7˝ 3˝ 5˝ 24˝
3” CONDUIT SWEEP
BAR (TYP.) #4 REINFORCING
BAR (TYP.) #8 REINFORCING
3” CONDUIT SWEEP
EMBED 8’-0” INTO UNDISTURBED SOIL
EXPANSION MATERIAL
FINISHED GRADE (SIDWALK, PAVEMENT, ETC.)
GROUND ROD (3” X 240”) VENTS IN THE GROUT AS DIRECTED IN THE PLACE 2 EACH 6’ LONG X 2” DIA. P.V.C., SCHEDULE 40 (TYP.) VENTS IN THE GROUT AS DIRECTED IN THE FIELD BY ENGINEER.
SEE POLE BASE DATA CHART ON DETAIL T-5, SHEET 3 OF 4, FOR POLE BASE DIMENSIONS.
ANCHOR BOLTS AND BOLT PATTERN TO BE PROVIDED BY DELDOT'S SIGNAL CONSTRUCTION INSPECTOR UNLESS NOTED OTHERWISE.
NOTES:
1) PLACE 2 EACH 6’ LONG X 2” DIA. P.V.C., SCHEDULE 40 (TYP.) VENTS IN THE GROUT AS DIRECTED IN THE FIELD BY ENGINEER.
2) SEE POLE BASE DATA CHART ON DETAIL T-5, SHEET 3 OF 4, FOR POLE BASE DIMENSIONS.
3) ANCHOR BOLTS AND BOLT PATTERN TO BE PROVIDED BY DELDOT'S SIGNAL CONSTRUCTION INSPECTOR UNLESS NOTED OTHERWISE.
TYPICAL SECTION (BASES 1, 2, 2A, 2B, 3A, AND 3B)
TYPICAL INSTALLATION (BASES 1, 2, 2A, 2B, 3A, AND 3B)
1/9/2014
02/14/2014
01/14/2014
NOTE:
ANCHOR BOLTS AND BOLT PATTERN FOR TYPES 5, 6, & 7 POLE BASES TO BE PROVIDED BY THE MANUFACTURER.

POLE BASE DATA CHART

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<th>DIAMETER (IN.)</th>
<th>DEPTH (FT)</th>
<th>#4 HORIZONTAL REINFORCING BARS</th>
<th>#8 VERTICAL REINFORCING BARS</th>
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ANCHOR BOLTS AND BOLT PATTERN FOR TYPES 5, 6, & 7 POLE BASES TO BE PROVIDED BY THE MANUFACTURER.

NOTE:
ANCHOR BOLTS AND BOLT PATTERN FOR TYPES 5, 6, & 7 POLE BASES TO BE PROVIDED BY THE MANUFACTURER.

DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD NO. T-5 (2014) SHT. 3 OF 4

APPROVED  SIGNATURE ON FILE 12/30/2014

RECOMMENDED  SIGNATURE ON FILE 12/11/2014

DELTA DEPARTMENT OF TRANSPORTATION

STANDARD NO. T-5 (2014) SHT. 3 OF 4

APPROVED  SIGNATURE ON FILE 12/30/2014

RECOMMENDED  SIGNATURE ON FILE 12/11/2014

12/4/2014
TYPICAL SECTION (BASE 4A)

- Expansion Anchor
- Ground Rod (1/2" x 120")
- Conduit Sweep (Typ) 2'-0" Min
- Conduit Sweep (Typ) 2'-0" Min

TYPICAL SECTION (BASE 4B)

- Expansion Anchor
- Ground Rod (1/2" x 120")
- Conduit Sweep (Typ) 2'-0" Min
- Conduit Sweep (Typ) 2'-0" Min

ANCHOR DETAIL

- Stainless Steel Flat Washer 1/2" x 1 1/8" x 2-1/2" (Welded to Anchor)
- 304 Stainless Steel Threaded Ferrule 1/2"-8 UNC Threads
- 1 1/8" Minimum Depth of Threads
- Steel Rod, 1/2" Diameter
- AISI 1008
- 1 1/8" O.D.
- 2" Long, 6 Revolutions

NOTE:
- Bolt pattern to be provided by DELDOT's Signal Construction Inspector.

DELTA FEMALE ANCHOR BREAKAWAY COUPLING BASE PLATE POLE PEDESTRIAN LOWER WRENCH FLATS THAN TWO IF REQUIRED FOR LEVELING) AND/OR 18 GAUGE THICKNESS (NO MORE GALVANIZED STEEL SHIM, 14 GAUGE

24" DIAMETER BREAKAWAY COUPLING DETAIL ANCHOR DETAIL

- 1/2"-8 UNC NUT A563 Grade DH
- Flat Washer F436 (1/2" x 1 1/8" x 2")
- Pole Base Plate (See Pole Details)
- Breakaway Support Coupling 1/2"-8 UNC External Threads, Both Ends (Typ)
- (With Exceptions to Decarbonization and Microstructure Clauses)
- Breakaway Support Coupling 1/2"-8 UNC External Threads, Both Ends (Typ)
- Galvanized Steel Shim, 14 Gauge and/or 18 Gauge Thickness (No More Than Two if Required for Leveling)

NOTE:
- Bolt pattern to be provided by DELDOT's Signal Construction Inspector.

BOLT PATTERN TO BE PROVIDED BY DELDOT'S SIGNAL CONSTRUCTION INSPECTOR.

DELAWARE DEPARTMENT OF TRANSPORTATION

STANDARD NO. T-5 (2014) SHT. 4 OF 4

APPROVED SIGNATURE ON FILE 12/30/2014

CHIEF ENGINEER

SIGNATURE ON FILE 12/11/2014

DESIGN ENGINEER

SIGNATURE ON FILE 10/28/2014

SCALE : NTS
NOTES:

1. UNDERGROUND CONDUIT ENDS SHALL BE CAPPED WITH A GALVANIZED THREADED CONDUIT PLUG UNLESS CONNECTED TO AN EXISTING CONDUIT.

2. PLACE 2 EACH 6" x 9" P.V.C., SCHEDULE 40 (TYP) VENTS IN THE GROUT AS DIRECTED IN THE FIELD BY THE ENGINEER.
NOTES:

1. ALL SAWCUTS SHALL BE A DEPTH OF 3\(\frac{1}{2}\)" ON ALL SURFACES.
2. CONTRACTOR SHALL INSTALL LEAD-IN WIRE IN THE MOST DIRECT ROUTE TO THE JUNCTION WELL USING THE CLOSEST CONCRETE CURB JOINT.
3. ALL SAWCUTS SHALL BE PATCHED WITH NON-SHRINK CONCRETE CAULK.
4. CONTRACTOR SHALL CORE AT FULL DEPTH OF SAWCUT, 3\(\frac{1}{2}\)"
5. CONTRACTOR SHALL CONSOLIDATE LEAD-INS TO A SINGLE DRILL HOLE, WHENEVER FEASIBLE.
6. CONTRACTOR SHALL INSTALL DETECTABLE WARNING TAPE IN TRENCH FOR LEAD-IN CONDUIT.
NOTES:
1) ALL SAWCUTS SHALL BE A DEPTH OF 3/4" ON ALL SURFACES.
2) CONTRACTOR SHALL INSTALL LEAD-IN WIRE IN THE MOST DIRECT ROUTE TO THE JUNCTION WELL USING THE CLOSEST CONCRETE CURB JOINT.
3) ALL SAWCUTS SHALL BE PATCHED WITH NON-SHRINK CONCRETE CAULK.
4) CONTRACTOR SHALL CORE AT FULL DEPTH OF SAWCUT, 3/4".
5) CONTRACTOR SHALL CONSOLIDATE LEAD-INS TO A SINGLE DRILL HOLE, WHENEVER FEASIBLE.
CONCRETE ISLAND

TYPE 2 P.C.C. CURB

FINISHED PAVEMENT SURFACE

PAVEMENT)

INSTALL BELOW LEAD-IN WIRE

JUNCTION WELL

CONDUIT

LEAD-IN WIRE INSTALLATION

LOOP DETECTOR

LEAD-IN WIRE INSTALLATION

CONTRACTOR SHALL CONSOLIDATE LEAD-INS TO A SINGLE DRILL HOLE, WHENEVER FEASIBLE.

5).

ALL SAWCUTS SHALL BE CORED AT FULL DEPTH OF SAWCUT, 3/4".

2).

CONTRACTOR SHALL CORE AT FULL DEPTH OF SAWCUT, 3/4".

1).

ALL SAWCUTS SHALL BE PATCHED WITH NON-SHRINK CONCRETE CAULK.

3).

CONTRACTOR SHALL INSTALL LEAD-IN WIRE IN THE MOST DIRECT ROUTE TO THE JUNCTION WELL USING THE CLOSEST CONCRETE CURB JOINT.

4).

CONTRACTOR SHALL CONSOLIDATE LEAD-INS TO A SINGLE DRILL HOLE, WHENEVER FEASIBLE.

NOTES:
NOTES:
1. ALL SAWCUTS SHALL BE A DEPTH OF 3/4" ON ALL SURFACES.
2. CONTRACTOR SHALL INSTALL LEAD-IN WIRE IN THE MOST DIRECT ROUTE TO THE JUNCTION WELL USING THE CLOSEST CONCRETE CURB JOINT.
3. ALL SAWCUTS SHALL BE SEALED WITH AN APPROVED LOOP DETECTOR SEALANT.
4. CONTRACTOR SHALL CORE AT FULL DEPTH OF SAWCUT, 3/4".
5. CONTRACTOR SHALL CONSOLIDATE LEAD-INS TO A SINGLE DRILL HOLE, WHenever FEASIBLE.
6. CONTRACTOR SHALL INSTALL DETECTABLE WARNING TAPE IN TRENCH FOR LEAD-IN CONDUIT.
LOOP DETECTOR SAWCUT TYPICAL
REFER TO DETAIL T-8, SHEETS 1 THROUGH 4 FOR LOOP DETECTOR LEAD-IN INSTALLATION REQUIREMENTS.

NOTES:
1) WHEN A PROPOSED LOOP DETECTOR SAWCUT CROSSES A LATERAL ROADWAY JOINT OR OTHER OBSTRUCTION (VALVE COVER, MANHOLE, JUNCTION WELL, ETC.), LOOP DETECTOR INSTALLATION SHALL BE MODIFIED INTO TWO SEPARATE LOOP DETECTORS WHICH SHALL NOT TRAVERSE JOINTS OR OBSTRUCTION.
2) THE LOOPS SHALL BE PLACED IN THE CENTER OF THE LANE UNLESS NOTED OTHERWISE ON PLANS.
3) PRESENCE LOOP DETECTORS ARE TO BE PLACED 12" BEHIND THE EXISTING OR PROPOSED STOP LINE.
4) LOOP DETECTOR AND LEAD-IN SAWCUTS SHALL BE 5/8" WIDE.

DELACARE DEPARTMENT OF TRANSPORTATION

<table>
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<tr>
<th>LOOP DETECTOR INSTALLATION &amp; SPLICE KIT</th>
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<td>SHT. 1 OF 3 RECOMMENDED</td>
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<td>DATE 1/9/2014</td>
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NOTES
1) Orange bands shall designate the lane assignment. All lanes shall be designated from left to right in the direction of travel. Example: for a double left turn with 2 thru lanes for northbound, the cables will be identified as 1-red w/ 1-orange (lt lane 1), 1-red w/ 2-orange (lt lane 2), 2-red w/ 1-orange (thru lane 1) and 2-red w/ 2-orange (thru lane 2). This code is then followed for the remaining approaches to the intersection.
2) The optical pre-emption detector "home run" cable(s) shall be identified within the control cabinet by a violet band plus a color band, as noted to denote the direction of the detector.
Notes:

1. One five conductor wire will be pulled to each ped module of the intersection.
2. Each five conductor wire will have color bands indicating the corner of the ped:
   - One grey band identifying main street
   - Two grey bands identifying side street.

5 Conductor Cable
- RED: Don't Walk
- GREEN: Walk
- WHITE: Neutral
- BLACK: Push Button Return
- YELLOW: Push Button Common
SPAN WIRE ATTACHMENT BETWEEN POLES

Wood Pole

Strain Plate (2 required, in front and in rear of pole)

Guy Hook

Galvanized Screw 
1/4" x 1/8" (64)

GALVANIZED 3/8" X 60 BOLTS

Span Wire

SERVICE SLEEVE

MATCH LINE A - A

GALVANIZED 3/8" X 60 NUTS

MATCH LINE A - A

Span Wire 1/2" wraps around pole

NOTE: Span wire attachment between metal poles is the same as shown for wood poles except that the strain plates and guy hooks are not used. For detail, see T-14 Sheet 2 - "Dead End Messenger Wire Attachment, Metal Poles".

DELAWARE
DEPARTMENT OF TRANSPORTATION

SPAN WIRE ATTACHMENT BETWEEN POLES

STANDARD NO. T-12 (2005)
SHT. 1 OF 2

APPROVED

RECOMMENDED

09/09/05
WOOD POLES

SERVICE WEDGE CLAMP
MESSER WIRE
MESSER CLAMP
LASHING WIRE
CABLE SPACER

ELECTRICAL CABLE

WOOD POLE

GALVANIZED 3/4" X 3" X 3/16" W/ 3/4" CB HOLE
GALVANIZED 3/4" X 1/2" EYEBOLT
GALVANIZED 3/4" X 3" X 3/16" W/ 3/4" CB HOLE

METAL POLES

SERVICE SLEEVE

6" (150)
12" (300)
30" (750)
36" (900) MIN.

GALVANIZED 3-BOLT 3/8"-16
GUY CLAMPS (2 REQUIRED)
Messer WIRE 1/2 WRAPS AROUND POLE

NOTES: II. INSTALLATION METHOD SHOWN FOR DEAD END MESSER WIRE ATTACHMENT TO METAL POLES SHALL BE USED FOR SPAN WIRE ATTACHMENT BETWEEN METAL POLES.

DELAFORD
DEPARTMENT OF TRANSPORTATION

DEAD END MESSER WIRE ATTACHMENT

STANDARD NO. T-12 (966) SHT. 2 OF 2

APPROVED

RECOMMENDED

09/09/2005
NOTES:

1. **TYPE 7 CONDUIT JUNCTION WELL** shall be precast polymer concrete.
2. All conduit junction wells constructed within pavement, sidewalks, etc. will be constructed flush with the surface of the same. Installation in unpaved areas will be constructed above grade and graded to drain away from the conduit junction well.
3. Polymer concrete covers shall be the heavy duty type with a design load of 15,000 lbs over a 10" square.
5 WRAPS OF SCOTCH SUPER 33 TAPE

TO CONTROLLER CABINET

SPAN WIRE

SPAN WIRE CLAMP

SEE NOTE 3

MOUNTING NUT

WIRING ACCESS DOOR WEATHER PROOF

GREEN BLACK WHITE RED

4-POSITION TERMINAL STRIP

ACCESS DOOR SCREW HOLE

TUBE ASSEMBLIES

SIDE VIEW

TUBE SHELLS

CAP SCREW

1/8”X13I Weep Hole

LOWER POINT OF DRIP LOOP
MUST BE LOWER THAN CABLE ENTRY POINT

METAL CAP (SEE NOTE 4)

CABLE ENTRY PORT

4-CONDUCTOR 18 AWG SHIELDED LEAD-IN CABLE

DRIP LOOP

NOTES:
0. INVERTED CONFIGURATION SHALL BE USED FOR SPAN MOUNT.
1. SPAN WIRE MOUNTING HARDWARE SHALL BE SUPPLIED BY THE DEPARTMENT.
3. TEFLOM TAPE SHALL BE APPLIED TO THREADS BEFORE MOUNTING.
4. ROUTE THE LEAD-IN CABLE THROUGH THE METAL CAP AND THE RUBBER PLUG.
   REPLACE THE METAL CAP, SEALING THE CABLE ENTRY PORT. TIGHTEN THE METAL CAP SO THE CABLE WILL NOT SLIDE THROUGH THE RUBBER PLUG.

DELAWARE DEPARTMENT OF TRANSPORTATION

EMERGENCY PREEMPTION RECEIVER, INVERTED MOUNT

STANDARD NO. T-14 (060)

SHT. 2 OF 2

APPROVED __________________________ 12/5/05

RECOMMENDED __________________________ 11/6/05

02/09/05
NOTE: THE PIN ASSEMBLY IS TO BE USED WITH THE INSTALLATION OF BACK TO BACK STREET BLADE SIGNS WITH 6" LETTERS.

NOTES:

1. SQUARE TUBES ARE TO BE FORMED FROM GALVANIZED SHEET STRUCTURAL (PHYSICAL) QUALITY, ASTM A 446, GRADE A, COATING DESIGNATION G 90, REGULAR SPANGLE, OR HOT ROLLED CARBON SHEET STEEL STRUCTURAL (PHYSICAL) QUALITY, ASTM A 57, GRADE 33.
2. NOMINAL OUTSIDE DIMENSIONS ARE AS FOLLOWS:
   - A. 2" x 2" +/- 0.008
   - B. 2 1/4" x 2 1/4" +/- 0.010
   - C. 2 1/8" x 2 1/8" +/- 0.010
3. ALL FOUR SIDES ARE TO HAVE EVENLY SPACED 1/8" DIAMETER HOLES ON 1" CENTERS THE ENTIRE LENGTH OF THE TUBE.
4. STANDARD CORNER RADIUS SHALL BE 3/16".
5. THE FASTENERS TO BE SUPPLIED UNDER THIS SPECIFICATION SHALL BE 5/16" x 5/8" INCHES LONG GRADE 5 UNC CORNER BOLTS WITH CADMIUM OR ZINC PLATING. INSTALLATION OF SIGNS SHALL BE WITH 5/16" x 5/8" BOLT WITH LOCKNUT AND WASHER.
6. THE CONTRACTOR SHALL PROVIDE AND INSTALL PVC SLEEVES (4" INSIDE DIAMETER MINIMUM, 6" INSIDE DIAMETER MAXIMUM) IN PROPOSED CONCRETE SIDEWALKS, ISLANDS, AND MEDIA FOR FUTURE TRAFFIC SIGN POSTS AS DIRECTED BY THE ENGINEER. THE LOWER END OF THE SLEEVE SHALL BE SET ON TOP OF THE SOIL.
7. THE PIN POST SHALL EXTEND A MINIMUM OF 4" INTO THE 2" SQUARE TUBING.
NOTE:}

1. INSTALLATION OF EQUIPMENT BETWEEN SERVICE PEDESTAL AND LIGHTING/CONTROLLER CABINET SHALL BE AS PER CONTRACT DRAWINGS/DETAILS.
2. SEE DETAIL T-15, SHEET 1, FOR SIGN POST AND BREAKAWAY ASSEMBLY DETAILS.
3. ATTACH ALUMINUM PANEL TO SIGN POSTS WITH (6) 1/4" x 2 1/2" LONG GRADE 5 BOLTS, FLAT WASHERS, AND NYLON LOCK NUTS, 3 ON EACH SIDE.
4. MOUNT METER SOCKET TO ALUMINUM PANEL WITH (4) 3/8" x 3" STAINLESS STEEL BOLTS AND NYLON LOCK NUTS.
5. MOUNT DISCONNECT SWITCH TO ALUMINUM PANEL WITH (4) 3/8" x 3" STAINLESS STEEL BOLTS AND NYLON LOCK NUTS.
6. ALL CONDUIT, CONDULET, AND OTHER ASSOCIATED PIECES SHALL BE 2" GALVANIZED UNLESS SPECIFIED DIFFERENTLY ON THE PLANS OR BY LOCAL UTILITY COMPANY.
7. FOR SIGNAL AND TIME COMPONENT INSTALLATIONS, TYPE 'C' CONDULET SHALL HOUSE INLINE FUSE KITS FOR EACH DEVICE POWERED.

DELAWARE
DEPARTMENT OF TRANSPORTATION

ELECTRICAL SERVICE PEDESTAL - LIGHTING, SIGNAL & TTMS/COMPONENT INSTALLATIONS

STANDARD NO. T-17 (2013)  SHT. 1 OF 1  APPROVED  02/14/2014

SIGNATURE ON FILE

01/14/2014