THE STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD CONSTRUCTION DETAILS

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.
<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1 (2010)</td>
<td>BARRIER LEGEND</td>
</tr>
<tr>
<td>B-2</td>
<td>GRADING FOR GUARDRAIL END TREATMENTS (TYPES 1, 2, AND 3)</td>
</tr>
<tr>
<td>B-3</td>
<td>GUARDRAIL OVER CULVERTS (TYPES 1-31, 2-31, AND 3-31)</td>
</tr>
<tr>
<td>B-4 (2012)</td>
<td>END ANCHORAGE, TYPE 31</td>
</tr>
<tr>
<td>B-5</td>
<td>GUARDRAIL TO BARRIER CONNECTION (TYPES 1-31, 2-31, AND EXIT TYPE 31)</td>
</tr>
<tr>
<td>B-6</td>
<td>BRIDGE RAIL RETROFIT (TYPES 1, 2, 3, AND 4)</td>
</tr>
<tr>
<td>B-7 (2010)</td>
<td>W-BEAM, TYPE 1-27 TO TYPE 1-31 TRANSITION SECTION</td>
</tr>
<tr>
<td>B-8</td>
<td>RESERVED</td>
</tr>
<tr>
<td>B-9</td>
<td>RESERVED</td>
</tr>
<tr>
<td>B-10</td>
<td>RESERVED</td>
</tr>
<tr>
<td>B-11</td>
<td>RESERVED</td>
</tr>
<tr>
<td>B-12</td>
<td>RESERVED</td>
</tr>
<tr>
<td>B-13</td>
<td>HARDWARE</td>
</tr>
<tr>
<td>B-14</td>
<td>CONCRETE SAFETY BARRIER (F SHAPE)</td>
</tr>
<tr>
<td>B-15</td>
<td>GUARDRAIL APPLICATIONS (TYPES 1-27, 2-27, AND 3-27)</td>
</tr>
</tbody>
</table>

DELAWARE
DEPARTMENT OF TRANSPORTATION

INDEX OF SHEETS (2017)
SECTION I - BARRIER (CONT’D)

B-16  - GUARDRAIL OVER CULVERTS (TYPES 1-27, 2-27, AND 3-27)
       (2013) - 1 GUARDRAIL OVER CULVERTS, TYPE 1-27
       (2013) - 2 GUARDRAIL OVER CULVERTS, TYPE 2-27
       (2013) - 3 GUARDRAIL OVER CULVERTS, TYPE 3-27
B-17 (2010)  - GUARDRAIL END TREATMENT (TYPE 4-27)
B-18 (2010)  - CURVED GUARDRAIL SECTION
B-19 (2012)  - END ANCHORAGE (TYPE 27)
B-20  - BURIED END SECTION
       (2010) - 1 BURIED END SECTION - SINGLE RAIL
       (2010) - 2 BURIED END SECTION - DOUBLE RAIL
       (2010) - 3 POST, CONCRETE BLOCK, AND RUBRAIL DETAILS
B-21  - GUARDRAIL TO BARRIER CONNECTION (TYPES 1-27, 2-27, AND EXIT TYPE 27)
       (2010) - 1 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-27
       (2010) - 2 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2-27
       (2010) - 3 GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE 27

SECTION II - CURB & GUTTER

C-1  - P.C.C. CURB AND INTEGRAL P.C.C. CURB & GUTTER
       (2013) - 1 P.C.C. CURB, TYPICAL CURB SECTION, AND TYPICAL TAPER SECTION AT NOSE OF MEDIANS
       (2013) - 2 INTEGRAL P.C.C. CURB & GUTTER
       (2017) - 3 INTEGRAL P.C.C. CURB & GUTTER (FOR USE AT CURB RAMPS ONLY)
C-2  - CURB RAMPS
       (2013) - 1 TYPE 1, 2, 3, AND 4
       (2013) - 2 TYPE 5
C-3 (2012)  - ENTRANCES
C-4 (2017)  - CURB OPENING WITH SIDEWALK DETAIL
C-5 (2017)  - CURB OPENING DETAILS
C-6 (2017)  - CURB RETAINING WALL

SECTION III - DRAINAGE

D-1  - 6:1 SAFETY END STRUCTURE
       (2001) - 1 DETAIL VIEWS
D-2  - 10:1 SAFETY END STRUCTURE
       (2001) - 1 DETAIL VIEWS
D-3  - SAFETY GRATES
       (2005) - 1 SAFETY END STRUCTURE GRATE AND ASSEMBLY DETAIL
D-R (2017)  - DRAINAGE INLET REFERENCE SHEET
D-4 (2005)  - INLET BOX DETAILS
D-5  - DRAINAGE INLET DETAILS
       (2010) - 1 DRAINAGE INLET ASSEMBLY
       (2014) - 2 DRAINAGE INLET FRAME AND GRATES
       (2012) - 3 DRAINAGE INLET TOP UNITS
       (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
       (2010) - 8 DRAINAGE INLET TOP UNIT, TYPE 5
       (2010) - 9 DOGHOUSE INLET BOX
SECTION III - DRAINAGE (CONT'D)

D-6 - MAHOLE DETAILS
(2009) - 1 BOX MAHOLE ASSEMBLY
(2001) - 2 ROUND MAHOLE ASSEMBLY
(2001) - 3 MAHOLE, TOP UNIT, FRAME AND COVER
(2007) - 4 BOX MAHOLE COVER SLAB

D-7 - JUNCTION BOX DETAILS
(2009) - 1 JUNCTION BOX ASSEMBLY
(2007) - 2 JUNCTION BOX COVER SLAB

D-8 (2010) - PIPE BEDDING
D-9 (2008) - PERFORATED PIPE UNDERDRAIN
D-10 (2011) - PIPE PLUGGING DETAIL

SECTION IV - EROSION

E-1 (2014) - CONCRETE WASHOUT
E-2 (2014) - SILT FENCE
E-3 (2014) - SEDIMENT TRAP
E-4 (2014) - INLET SEDIMENT CONTROL, DRAINAGE INLET
E-5 (2014) - INLET SEDIMENT CONTROL, CULVERT INLET
E-6 (2014) - PORTABLE SEDIMENT TANK
E-7 (2014) - SUNP PIT
E-8 (2014) - SKIMMER DEWATERING DEVICE
E-9 (2014) - STONE CHECK DAM
E-10 (2014) - TEMPORARY SLOPE DRAIN
E-11 (2014) - INCREMENTAL STABILIZATION
E-12 (2014) - EROSION CONTROL BLANKET APPLICATIONS
E-13 (2014) - TURF REINFORCEMENT MAT APPLICATIONS
E-14 (2014) - STABILIZED CONSTRUCTION ENTRANCE
E-15 (2014) - SANDBAG DIKE
E-16 (2014) - SANDBAG DIVERSION
E-17 (2014) - GEOTEXTILE-LINED CHANNEL DIVERSION
E-18 (2014) - TURBIDITY CURTAIN
E-19 (2014) - STILLING WELL
E-20 (2014) - RIPRAP ENERGY DISSIPATOR
E-21 (2014) - STONE OUTLET DETAIL
### SECTION V - LANDSCAPING

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-1</td>
<td>PLANTING DETAILS</td>
</tr>
<tr>
<td>(2017) -</td>
<td>1 ROADSIDE SHRUB PLANTING DETAIL</td>
</tr>
<tr>
<td>(2017) -</td>
<td>2 TREE PLANTING DETAIL</td>
</tr>
<tr>
<td>(2017) -</td>
<td>3 PERENNIAL/GROUND COVER PLANTING DETAIL</td>
</tr>
</tbody>
</table>

### SECTION VI - MISCELLANEOUS

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-1 (2001)</td>
<td>RIGHT-OF-WAY FENCE</td>
</tr>
<tr>
<td>M-2 (2017)</td>
<td>RIGHT-OF-WAY MONUMENTATION</td>
</tr>
<tr>
<td>M-3 (2013)</td>
<td>SHARED-USE PATH &amp; SIDEWALK DETAILS</td>
</tr>
<tr>
<td>M-4 (2011)</td>
<td>BIKE RACK LAYOUT DETAILS</td>
</tr>
<tr>
<td>M-5 (2004)</td>
<td>WOOD RAIL FENCE</td>
</tr>
<tr>
<td>M-6 (2011)</td>
<td>PATTERED HOT-MIX OR CONCRETE &amp; BRICK PAVER DETAILS</td>
</tr>
<tr>
<td>M-7 (2006)</td>
<td>CHAIN LINK FENCE DETAILS</td>
</tr>
<tr>
<td>M-8 (2014)</td>
<td>P.C.C. PARKING BUMPER</td>
</tr>
<tr>
<td>M-9</td>
<td>BUS STOP PAD DETAILS</td>
</tr>
<tr>
<td>(2013) -</td>
<td>1 BUS STOP PAD DETAILS, TYPES 1, 2, &amp; 3</td>
</tr>
<tr>
<td>(2013) -</td>
<td>2 BUS STOP PAD WITH SHIELD DETAILS, TYPES 1 &amp; 2</td>
</tr>
<tr>
<td>M-10</td>
<td>BRIDGE SAFETY FENCE</td>
</tr>
<tr>
<td>(2014) -</td>
<td>1 BRIDGE SAFETY FENCE, TYPE 1</td>
</tr>
<tr>
<td>(2014) -</td>
<td>2 BRIDGE SAFETY FENCE, TYPE 2</td>
</tr>
<tr>
<td>(2017) -</td>
<td>3 HARDWARE</td>
</tr>
<tr>
<td>M-11 (2017)</td>
<td>STEEL PLATE</td>
</tr>
</tbody>
</table>

### SECTION VII - PAVEMENT

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-1</td>
<td>P.C.C. PAVEMENT</td>
</tr>
<tr>
<td>(2001) -</td>
<td>1 SLAB PLAN (WITH DOWEL AND TIE LOCATIONS)</td>
</tr>
<tr>
<td>(2004) -</td>
<td>2 JOINT AND SEALANT DETAILS</td>
</tr>
<tr>
<td>(2003) -</td>
<td>3 W BOLT, HOOK BOLT, DOWEL AND TIE BAR DETAILS</td>
</tr>
<tr>
<td>(2001) -</td>
<td>4 DOWEL SUPPORT BASKET</td>
</tr>
<tr>
<td>(2001) -</td>
<td>5 DOWEL AND TIE BAR PLACEMENT TOLERANCES</td>
</tr>
<tr>
<td>P-2</td>
<td>P.C.C. PAVEMENT PATCHING</td>
</tr>
<tr>
<td>(2008) -</td>
<td>1 FULL DEPTH PATCH, PLAN VIEWS</td>
</tr>
<tr>
<td>(2008) -</td>
<td>2 FULL DEPTH PATCH, SECTION VIEWS</td>
</tr>
<tr>
<td>(2004) -</td>
<td>3 FULL DEPTH PATCH, SEALANT DETAILS, GROUT RETENTION DISK, AND DOWEL BAR</td>
</tr>
<tr>
<td>(2002) -</td>
<td>4 FULL DEPTH PATCH, DOWEL AND TIE BAR PLACEMENT TOLERANCES</td>
</tr>
<tr>
<td>(2001) -</td>
<td>5 PARTIAL DEPTH PATCH, PLAN AND SECTION VIEWS</td>
</tr>
<tr>
<td>P-3 (2014)</td>
<td>BUTT JOINTS</td>
</tr>
<tr>
<td>P-4 (2013)</td>
<td>PERMANENT CROSS-ROAD PATCH OVER PIPE TRENCH DETAIL</td>
</tr>
</tbody>
</table>
## SECTION VIII - TRAFFIC

<table>
<thead>
<tr>
<th>SHEET NO.</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-1</td>
<td>CONDUIT JUNCTION WELLS</td>
</tr>
<tr>
<td>(2013)</td>
<td>1 TYPE 1,</td>
</tr>
<tr>
<td>(2013)</td>
<td>2 TYPE 2,</td>
</tr>
<tr>
<td>(2013)</td>
<td>3 TYPE 3,</td>
</tr>
<tr>
<td>T-2</td>
<td>JUNCTION WELL, GROUNDING &amp; BONDING FOR STEEL FRAMES &amp; LIDS</td>
</tr>
<tr>
<td>(2011)</td>
<td>1 TYPE 11,</td>
</tr>
<tr>
<td>(2012)</td>
<td>2 TYPE 14,</td>
</tr>
<tr>
<td>(2012)</td>
<td>3 TYPE 15,</td>
</tr>
<tr>
<td>T-3</td>
<td>CABINET BASES</td>
</tr>
<tr>
<td>(2013)</td>
<td>1 TYPES M &amp; F,</td>
</tr>
<tr>
<td>(2017)</td>
<td>2 TYPE &quot;P &amp; R&quot;</td>
</tr>
<tr>
<td>T-4</td>
<td>POLE BASES</td>
</tr>
<tr>
<td>(2017)</td>
<td>1 ROUND BASE &amp; ROUND BASE WITH SQUARE FOUNDATION HEADER</td>
</tr>
<tr>
<td>(2012)</td>
<td>2 TYPICAL SECTION AND INSTALLATION (BASES 1, 2, 2A, 2B, 3, 3A, AND 3B)</td>
</tr>
<tr>
<td>(2013)</td>
<td>3 TYPICAL SECTION (BASES 6) AND POLE BASE DATA CHART</td>
</tr>
<tr>
<td>(2014)</td>
<td>4 TYPICAL SECTION (BASE 4A AND 4B) AND ANCHOR DETAIL</td>
</tr>
<tr>
<td>T-5</td>
<td>SPECIAL POLE BASE</td>
</tr>
<tr>
<td>T-6</td>
<td>LOOP DETECTOR LEAD-IN WIRE INSTALLATION</td>
</tr>
<tr>
<td>(2005)</td>
<td>1 JUNCTION WELL BEHIND CURB OR CURB AND GUTTER WITH GRASS STRIP</td>
</tr>
<tr>
<td>(2013)</td>
<td>2 JUNCTION WELL BEHIND CURB OR CURB &amp; GUTTER WITH SIDEWALK AND JUNCTION WELL DIRECTLY BEHIND CURB OR CURB &amp; GUTTER</td>
</tr>
<tr>
<td>(2013)</td>
<td>3 JUNCTION WELL IN CONCRETE ISLAND</td>
</tr>
<tr>
<td>(2013)</td>
<td>4 JUNCTION WELL WITHOUT CURB OR CURB &amp; GUTTER WITH SIDEWALK AND GRASS STRIPS AND JUNCTION WELL DIRECTLY ADJACENT TO PAVED SURFACE</td>
</tr>
<tr>
<td>T-7</td>
<td>LOOP DETECTOR INSTALLATION</td>
</tr>
<tr>
<td>(2013)</td>
<td>1 LOOP DETECTOR SAWCUT TYPICAL, HOT MIX SURFACE TYPICAL SECTION, AND SPICE KIT</td>
</tr>
<tr>
<td>(2013)</td>
<td>2 TYPICAL INTERSECTION LAYOUT</td>
</tr>
<tr>
<td>(2013)</td>
<td>3 PEDESTRIAN CROSSING TYPICAL LAYOUT</td>
</tr>
<tr>
<td>T-8</td>
<td>MESSERGER WIRE ATTACHMENT</td>
</tr>
<tr>
<td>(2005)</td>
<td>1 INTERMEDIATE MESSERGER WIRE ATTACHMENT ON WOOD POLES</td>
</tr>
<tr>
<td>(2005)</td>
<td>2 ANGULAR INTERMEDIATE MESSERGER WIRE ATTACHMENT</td>
</tr>
<tr>
<td>T-9</td>
<td>MESSERGER WIRE ATTACHMENT</td>
</tr>
<tr>
<td>(2005)</td>
<td>1 SPAN WIRE ATTACHMENT BETWEEN POLES</td>
</tr>
<tr>
<td>(2005)</td>
<td>2 DEAD END MESSERGER WIRE ATTACHMENT</td>
</tr>
<tr>
<td>T-10</td>
<td>CONDUIT JUNCTION WELL, TYPE 7</td>
</tr>
<tr>
<td>(2013)</td>
<td>1 UPRIGHT MOUNT,</td>
</tr>
<tr>
<td>(2005)</td>
<td>2 INVERTED MOUNT</td>
</tr>
<tr>
<td>T-11</td>
<td>LOOP DETECTOR INSTALLATION</td>
</tr>
<tr>
<td>T-12</td>
<td>LOOP DETECTOR INSTALLATION</td>
</tr>
<tr>
<td>T-13</td>
<td>LOOP DETECTOR INSTALLATION</td>
</tr>
<tr>
<td>T-14</td>
<td>EMERGENCY PREEMPTION RECIEVER</td>
</tr>
<tr>
<td>T-15</td>
<td>BREAKAWAY SIGN POST AND PIN ASSEMBLY DETAILS</td>
</tr>
<tr>
<td>T-16</td>
<td>WOOD BARRICADE DETAILS</td>
</tr>
<tr>
<td>T-17</td>
<td>ELECTRICAL SERVICE PEDESTAL - LIGHTING, SIGNAL &amp; 'ITMS' COMPONENT INSTALLATIONS</td>
</tr>
<tr>
<td>ITEM NO.</td>
<td>DESCRIPTION</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>1</td>
<td>W-BEAM</td>
</tr>
<tr>
<td>2</td>
<td>W6 X 9 STEEL POST</td>
</tr>
<tr>
<td>3A</td>
<td>6” x 12” x 14” OFFSET BLOCK</td>
</tr>
<tr>
<td>3B</td>
<td>6” x 8” x 14” OFFSET BLOCK</td>
</tr>
<tr>
<td>4</td>
<td>SPLICE - REQUIRES EIGHT(8) ¾” GUARDRAIL BOLTS (L=1 ¾”) WITH RECESS NUTS</td>
</tr>
<tr>
<td>5</td>
<td>W-BEAM TERMINAL CONNECTOR</td>
</tr>
<tr>
<td>6</td>
<td>¾” GUARDRAIL BOLT (L=1 ¾”) AND RECESS NUT</td>
</tr>
<tr>
<td>7A</td>
<td>¾” GUARDRAIL BOLT (L=14”) AND RECESS NUT</td>
</tr>
<tr>
<td>7B</td>
<td>¾” GUARDRAIL BOLT (L=10”) AND RECESS NUT</td>
</tr>
<tr>
<td>8</td>
<td>¾” GUARDRAIL BOLT (L=10”), STEEL WASHER, AND RECESS NUT</td>
</tr>
<tr>
<td>9</td>
<td>¾” HIGH STRENGTH STRUCTURAL HEX BOLT (L=VARIES) AND HEX NUT</td>
</tr>
<tr>
<td>10</td>
<td>¾” CARRIAGE BOLT (L=VARIES), STEEL WASHER, AND HEX NUT</td>
</tr>
<tr>
<td>11</td>
<td>BEARING PLATE</td>
</tr>
</tbody>
</table>
3'-0" CLEARANCE TO THE OBSTRUCTION IS AVAILABLE
TYPICAL GUARDRAIL TREATMENT WHEN THE REQUIRED CLEARANCE TO OBSTRUCTION IS AVAILABLE
2'-0" MIN FROM BACK OF POST
SEE NOTES 1 & 2

25'-0" MIN
SEE NOTES 1 & 2

4'-0" MIN
SEE NOTES 1 & 2

POST SPACING 6'-3"
TYPES 1-31, 2-31, AND 3-31 GUARDRAIL APPLICATIONS
NOTES:
1. MAXIMIZE THE DISTANCE FROM THE EDGE OF THE TRAVEL LANE OR SHOULDER TO THE FACE OF GUARDRAIL. THIS AREA SHALL BE GRADED 10:1 OR FLATTER.
2. GRADE THIS AREA 10:1 OR FLATTER

DELTA DEPARTMENT OF TRANSPORTATION
STANDARD NO. B-1 (2017)
SHT. 1 OF 3
APPROVED
SIGNATURE ON FILE 5/31/2017
5/18/2017
5/10/2017

TYPICAL GUARDRAIL TREATMENT WHEN THE REQUIRED CLEARANCE TO THE OBSTRUCTION IS AVAILABLE
EDGE OF SHAPE

SHOULDER

SOLID OBSTRUCTION

3'-0" MIN FROM BACK OF POST

SEE NOTES 1 & 2

POST SPACING 3'-1"

TYPE 1-31 GUARDRAIL
TYPE 2-31 GUARDRAIL
TYPE 3-31 GUARDRAIL

FLARE RATES

DESIGN SPEED FLARE RATE

70 MPH 15:1

60 MPH 14:1

55 MPH 12:1

50 MPH 11:1

45 MPH 10:1

40 MPH 9:1

30 MPH 7:1

DELAWARE DEPARTMENT OF TRANSPORTATION
STANDARD NO. B-1 (2017)
SHT. 1 OF 3
APPROVED
SIGNATURE ON FILE 5/31/2017
5/18/2017
5/10/2017

TYPICAL GUARDRAIL TREATMENT WHEN 2'-0" TO 3'-0" OF CLEARANCE TO OBSTRUCTION IS AVAILABLE
EDGE OF TRAVEL LANE

EDGE OF TRAVEL LANE

EDGE OF TRAVEL LANE
SEE DETAIL B-L, SHEET 1 FOR MORE INFORMATION

1). OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.

2). SEE DETAIL B-L, SHEET 1 FOR MORE INFORMATION
**GUARDRAIL SECTION**

**RURAL SHOULDER APPLICATION**

- Edge of shoulder or travel lane: 2'-0" if shoulder present, 4'-0" if no shoulder is present
- Offset distance (D): 10:1 or flatter
- Offset area: 2'-0" if shoulder present, 4'-0" min.
- Guardrail section: 1

**GUARDRAIL SECTION**

**MEDIAN APPLICATION**

- Hinge point
- Additional pavement (as indicated on the plans)
- 4'-0' rounding

**GUARDRAIL SECTION**

**URBAN SHOULDER APPLICATION**

- Offset distance (D): 10:1 or flatter
- Curb to be used only when indicated on plans
- Additional pavement

<table>
<thead>
<tr>
<th>TYPE</th>
<th>POST SPACING</th>
<th>CLEAR AREA BEHIND POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6'-0&quot;</td>
<td>3'-0&quot; MIN</td>
</tr>
<tr>
<td>2</td>
<td>3'-15/16&quot;</td>
<td>2'-0&quot; MIN</td>
</tr>
</tbody>
</table>

**DESIGN SPEED**

- 
  - < 50 MPH: 6'-0" D
  - ≥ 50 MPH: 13'-0" D

**NOTE:** See standard specifications concerning the use of alternative offset block materials.
GUARDRAIL SECTION
RURAL SHOULDER APPLICATION

<table>
<thead>
<tr>
<th>TYPE</th>
<th>POST SPACING</th>
<th>CLEAR AREA BEHIND POST</th>
<th>DESIGN SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6'-3&quot; (1905)</td>
<td>3'-0&quot; (900) MIN</td>
<td>50 MPH (80 km/h)</td>
</tr>
<tr>
<td>2</td>
<td>3'-11½&quot; (92.5)</td>
<td>2'-0&quot; (600) MIN</td>
<td>50 MPH (80 km/h)</td>
</tr>
</tbody>
</table>

CURB SHALL BE USED ONLY WHEN INDICATED ON THE PLANS

GUARDRAIL SECTION
MEDIUM APPLICATION

CURB TO BE USED ONLY WHEN INDICATED ON PLANS

GUARDRAIL SECTION
URBAN SHOULDER APPLICATION

Pavement shall be used only when indicated on plans

DELAWARE
DEPARTMENT OF TRANSPORTATION

TYPES 1-31, 1-31, AND 3-31 GUARDRAIL APPLICATIONS

STANDARD NO. B-I (2010) SHT. 1 OF 1

APPROVED

SIGNATURE ON FILE 12/28/2010

RECOMMENDED

SIGNATURE ON FILE 12/27/2010

12/6/2010
NOTES:

1. FLARE THE END TREATMENT AT 25:1 BEGINNING 5'-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.

DELTAthur
DEPARTMENT OF TRANSPORTATION

GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1

APPRIRED

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

RECOMMENDED

SIGNATURE ON FIOE 02/14/2014

01/14/2014

1/9/2014
NOTES:
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.

DELAWARE
DEPARTMENT OF TRANSPORTATION

GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2

APPROVED
SIGNATURE ON FILE
02/14/2014

STANDARD NO. B-2 (2013)
SHT. 2 OF 3
RECOMMENDED
SIGNATURE ON FILE
01/14/2014

SCALE : NTS

= NO OBSTRUCTIONS IN SHAD ED AREA
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. A FLAT OR FLATTENED GRADING IS ALLOWABLE WHEN THE BARRELS ARE LOCATED 12'
   (3.65m) OR MORE FROM THE OUTSIDE EDGE OF THE SHOULDER.
3. THIS END TREATMENT CAN ALSO BE USED IN RAMPS COVERS 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.

SECTION A-A
GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3

DELAWARE DEPARTMENT OF TRANSPORTATION

GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3
STANDARD NO. B-2 (2010) SHT. 3 OF 3
APPROVED
SIGNATURE ON FILE 12/28/2010

RECOMMENDED
SIGNATURE ON FILE 12/27/2010

09/03/2010
NOTES:
1. ALL W-BEAMS ARE 13'-6" IN LENGTH.
2. PLACE GUARDRAIL DELINATOR 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 \( \frac{3}{4} \times 22" \) 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 WINGWALLS.
NOTES:
1. 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 & 8 are to be W6x9 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 1/4" 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.
NOTES:
1. ALL W-BEAMS ARE 13'-6½" 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 W30 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 ½" 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 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-3, SHEET 8 OF 10 FOR PROPER TIMBER BEARING PLATE ORIENTATION.
**Rub Rail Offset Blocks**

**RUB RAIL OFFSET BLOCKS**

<table>
<thead>
<tr>
<th>POST NO.</th>
<th>THICKNESS</th>
<th>BOLT LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4 1/2&quot; (108)</td>
<td>5&quot; (150)</td>
</tr>
<tr>
<td>2</td>
<td>3 5/8&quot; (85)</td>
<td>4&quot; (100)</td>
</tr>
<tr>
<td>3</td>
<td>2&quot; (50)</td>
<td>4&quot; (100)</td>
</tr>
<tr>
<td>4</td>
<td>1&quot; (25)</td>
<td>2&quot; (50)</td>
</tr>
</tbody>
</table>

**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 1-31 and 1-27.

**Guardrail to Barrier Connection, type 1 hardware**

**Delaware Department of Transportation**

**Approved**

**Recommended**

|--------------|------------|------|--------|-------------------|------------|

**Scale:** N.I.S.
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 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH OFFSET BLOCKS AND/OR BENT RAIL.

3. DO NOT ATTACH RAILS TO POSTS 1, 2, 3, 4, OR 5.

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 8" 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
BENT RAIL

OFFSET BLOCKS

THICKNESS VARIES (SEE TABLE)

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 BOLTED TO 51/8 SQUARELY ON THE POST FLANGE AND SECURED WITH 1/2" (18) 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 SIGNATURE ON FILE 12/28/2010

1. Concrete inserts may be used in new construction to attach terminal connector to parapet.
2. Guardrail section and terminal connections shall be overlapped in the direction of travel.
3. Installation shown above with an 90-degree barrier face. Guardrail section of barrier connection shall be adjusted horizontally in order to meet flush against various types of walls and barriers.
TRANSACTION TO TYPE 1-27 GUARDRAIL OR APPROPRIATE END TREATMENT

TRANSITION TO TYPE 1-31 GUARDRAIL OR APPROPRIATE END TREATMENT

LIMIT OF PAYMENT

SYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION

ASYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION

BRIDGE RAIL RETROFIT, TYPE 1, 2, OR 4 (SEE NOTE 3)

2 SECTIONS OF THRIE BEAM, ONE NESTED INSIDE THE OTHER

SEE NOTE 3

SEE NOTE 6

NOTES:

1). POSTS 1, 2, 8, & 9 ARE 6x6 x 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 THRIE 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.

EXIT END APPLICATION

ENTRANCE END APPLICATION

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.

USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR 1/2" BOLT) BETWEEN BOLT HEADS AND RUBRAIL.

PLACE F.C.C. CURB TYPE 1-4, STARTING AT PARAPET WALL AND TERMINATING AFTER POST 5. TAPER CURB TO FLUSH AT A 1:1 RATIO.
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 24" (600) OR WIDER, AND DEAD LOAD CONSIDERATIONS ARE A CONCERN WHEN USING BRIDGE RAIL RETROFIT, TYPE 3 (SEE DETAIL B-3 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 THRE BEAM TO BE FLUSH WITH THE BOTTOM OF THE CURB MINIMUM THICKNESS SHALL BE 4" (100).

5. 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 THRE BEAM EXPANSION SECTION AT BRIDGE EXPANSION JOINTS.
8. PLACE GUARDRAIL DELEMATORS IN THE UPPER VALLEY OF THE THRE BEAM AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
9. DETAIL B-6 SHEET 10 OF 5 FOR ENTRANCE AND EXIT APPLICATION DETAILS.
NOTE: STANDARD GUARDRAIL TO BARRIER CONNECTIONS SHALL BE CONNECTED TO THE ENDS OF THE NEW BRIDGE BARRIER AND TRANSITIONED TO THE EXISTING GUARDRAIL.
W-BEAM ELEVATION

W-BEAM SECTION

NOTE:
D. FOUR ADDITIONAL 3/8" (20) x 2 1/4" (65) SLOTS SHALL BE PROVIDED AT 3-1 1/2" (952) SPACING FOR A 20-1/2" (7440) BEAM LENGTH.
THREE BEAM STEEL POST AND OFFSET BLOCK

NOTE:
WHERE CONDITIONS REQUIRE, USE ALTERNATE LENGTHS IN INCREMENTS OF 6" (150)

OFFSET BLOCK

NOTE:
ALL HOLES SHALL BE 3/4" (20) 3/4" BOLT HOLE
PATTERN IS SYMMETRICAL, WITH RESPECT TO THE VERTICAL AXIS OF THE POST.
This application for use in end anchorage only.

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 taught.
3. All holes shall be drilled prior to galvanizing.

This diagram illustrates the setup of the SWAGED CABLE ASSEMBLAGE AND RELATED HARDWARE ASSEMBLY. It includes details such as the use of anchor plates, post sleeves, and swage connection sleeves. The notes emphasize the importance of proper installation and tightening to ensure the stability and safety of the system.
1). Use this rail adjacent to a pedestrian access route.
2). Shop fabricate all components of the rail including cutting and drilling.
3). Bury all exposed threaded hardware to ensure nuts can not be removed.
4). Prior to galvanizing, shop drill guardrail posts that rail brackets will be attached to.
5). Place rail splices at rail support brackets, using the same bolt to attach the rail to the bracket, to secure the splice tube.
6). Only install rails to standard W-beam sections and at least one post away from the payment limits of the end treatment.

NOTES:

REAR VIEW WITH START & END SECTION

SIDE VIEW

SECTION A-A AT RAIL SPLICE

SIDE VIEW WITH START & END SECTION

ISOMETRIC VIEW WITH START & END SECTION

DELAWARE DEPARTMENT OF TRANSPORTATION

GUARDRAIL MOUNTED RAIL

STANDARD NO. B-13 (2017) SHT. 10 OF 10

APPROVED 5/18/2017

RECOMMENDED 5/31/2017

SIGNATURE ON FILE 5/10/2017
**NOTES:**
1. Concrete clear cover for reinforcing bars shall be 1 1/2" min.
2. For slip form construction, the 4B2 bars shall be placed as one continuous piece. The bars shall overlap a minimum of 12" 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".

**SCHEDULE BELOW**

**SEE BAR OFFSETS**

**BAR LIST**

<table>
<thead>
<tr>
<th>MAX</th>
<th>SIZE</th>
<th>NO. IN EACH SECTION</th>
<th>LENGTH</th>
<th>TYPE</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>481</td>
<td>4</td>
<td>**</td>
<td>5'-0&quot;</td>
<td>1</td>
<td>7</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>482</td>
<td>4</td>
<td>*</td>
<td>6'-0&quot;</td>
<td>**</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* The length of bar 482 shall be 6" shorter in length than the nominal size of the barrier in which it is used.

**SEE "BAR OFFSETS" CHART ON THIS SHEET FOR MORE INFORMATION.**

**P.C.C. FOOTING**

**JOINT**

**TYPE '1' BAR**

**SECTION**

**ELEVATION**

**TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION**
STEEL CONNECTOR PLATE

SECTION A-A

SLOT DIMENSIONS
CONCRETE SAFETY BARRIER, PRECAST CONSTRUCTION
T-SHAPE BARRIER SECTION

SECTION B-B

STANDARD NO. B-14 (2009)  SHT. 4 OF 4  APPROVED  SIGNATURE ON FILE  12/28/2010
RECOMMENDED  SIGNATURE ON FILE  12/27/2010

DELaware DEPARTMENT OF TRANSPORTATION
TYPE 1-27 GUARDRAIL
POST SPACING 6'-3" (1905mm)
REQUIRED CLEARANCE, 4' (1220mm) MINIMUM
SEE NOTE *1
EDGE OF SHOULDER
SHOULDER
EDGE OF TRAVEL LANE

TYPE 1-27 GUARDRAIL
TYPICAL GUARDRAIL TREATMENT
WHEN THE REQUIRED 4' (1220mm) CLEARANCE TO OBSTRUCTION IS AVAILABLE

TYPE 2-27 GUARDRAIL
POST SPACING 3'-10½" (1180mm)
2'-8" (800mm) MINIMUM
SEE NOTE *1
EDGE OF SHOULDER
SHOULDER
EDGE OF TRAVEL LANE

FLARE RATES

<table>
<thead>
<tr>
<th>DESIGN SPEED (MPH)</th>
<th>FLARE RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>15:1</td>
</tr>
<tr>
<td>60</td>
<td>14:1</td>
</tr>
<tr>
<td>55</td>
<td>12:1</td>
</tr>
<tr>
<td>50</td>
<td>11:1</td>
</tr>
<tr>
<td>45</td>
<td>10:1</td>
</tr>
<tr>
<td>40</td>
<td>9:1</td>
</tr>
<tr>
<td>30</td>
<td>7:1</td>
</tr>
</tbody>
</table>

TYPE 2-27 GUARDRAIL
TYPICAL GUARDRAIL TREATMENT
WHEN 2'-8" (800mm) TO 4' (1220mm) OF CLEARANCE TO OBSTRUCTION IS AVAILABLE

TYPE 3-27 GUARDRAIL
TYPICAL MEDIAN GUARDRAIL TREATMENT

NOTE: 1. THE DISTANCE FROM THE EDGE OF THE TRAVEL LANE OR SHOULDER TO THE FACE OF GUARDRAIL SHOULD BE MAXIMIZED. THIS AREA SHALL BE GRADED 5% OR FLATTENED.
2. PLACE GUARDRAIL DELINERATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROLS DEVICES.
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" x 8" x 6'0" 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 bank shall not be closer than 5'-0" to face of guardrail.

NOTES:

DELTAIR
DEPARTMENT OF TRANSPORTATION

GUARDRAIL OVER CULVERTS, TYPE 1-27

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

APPROVED SIGNATURE ON FILE 02/14/2014

RECOMMENDED SIGNATURE ON FILE 01/14/2014

1/9/2014
SIX SECTIONS OF W-BEAM, ONE NESTED INSIDE THE OTHER

PLAN

ELEVATION

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 1/2" GUARDRAIL BOLT (L=26").

4) TOP OF HEADWALL SHALL NOT EXCEED 2" ABOVE FINISHED GRADE.

5) TOP OF HEADWALL OR TOP OF BARRIERS SHALL NOT BE CLOSER THAN 5'-0" TO FACE OF GUARDRAIL.

SEE NOTE 4

DELAWARE DEPARTMENT OF TRANSPORTATION

GUARDRAIL OVER CULVERTS, TYPE 2-27

STANDARD NO. B-16 (2013) SHIT. 2 OF 3

APPROVED

SIGNATURE ON FILE 02/14/2014

RECOMMENDED

SIGNATURE ON FILE 01/14/2014

2/3/2014
6'-3" SIX SECTIONS OF W-BEAM, ONE NESTED INSIDE THE OTHER

TREATMENT APPROPRIATE END

GUARDRAIL OVER CULVERT, TYPE 3-27

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 'B' 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.

DELAWARE DEPARTMENT OF TRANSPORTATION

GUARDRAIL OVER CULVERT, TYPE 3-27

APPROVED

STANDARD NO. B-16 (2013) SHI. 3 OF 3 RECOMMENDED

SIGNATURE ON FILE 02/14/2014

SIGNATURE ON FILE 01/14/2014

1/9/2014
PLAN

LIMIT OF PAINTMENT

ELEVATION

NOTES:
1. ADDITIONAL HOLES IN W-BEAM FOR ANCHOR PLATE SHALL BE DRILLED PRIOR TO GAPPING. SEE DETAIL B-13, SHEET B OF 10 FOR HOLE SPACING INSTRUCTIONS.
2. CONTRACTOR HAS THE OPTION OF USING A 6"-O" (1524) STEEL TUBE WITHOUT A SOIL PLATE OR A 5"-O" (1270) STEEL TUBE WITH A SOIL PLATE.
3. PLATE WASHERS SHALL BE INSTALLED AT POSTS 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.
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 1/2" 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.

DELAWARE
DEPARTMENT OF TRANSPORTATION

END ANCHORAGE, TYPE 27

APPROVED
SIGNATURE ON FILE

12/20/2012

SIGNATURE ON FILE

12/4/2012

STANDARD NO. B-19 (2012) SHT. 1 OF 1

REFERENCES

SEE NOTE 5
SEE NOTE 3
SEE NOTE 4
THREADED INSERT FOR 3/8 (22) HIGH STRENGTH HEX BOLT (125,500 LB (56,750 Kg)) ULTIMATE ADHESIVE BOND STRENGTH 10" (254) MINIMUM ENGAGEMENT.

SQUARE WASHER
1/4 (6) THICK - GALVANIZED

STAINLESS WASHER
1/4 (6) THICK - GALVANIZED

NOTE: ALL HOLES TO BE DRILLED PRIOR TO GALVANIZING.

CONCRETE BLOCK ANCHOR

BOLT PLATE TO POST WITH 3 - 1/8 (6) DIA HEX BOLTS 2" (50) LONG WITH HEX NUTS.

EXTRA 1/8 (6) DIA HOLE IN POST FLANGE ON EACH SIDE.

1/4 (6) DIA HOLES IN RAIL AND THROUGH POST FLANGE FOR 3RD BOLT. ATTACHED TO STEEL PLATE WITH 3/8 (16) DIA HEX BOLTS 2" (50) LONG WITH SQUARE WASHER.

DELAWARE
DEPARTMENT OF TRANSPORTATION

BURIED END SECTION

APPROVED
SIGNATURE ON FILE 12/28/2010

RECOMMENDED
SIGNATURE ON FILE 12/27/2010

STANDARD NO. B-20 (2010)
SHT. 3 OF 3
STEEL SPACER TUBE
8" (203) I.D., SCHEDULE 40
GALVANIZED PIPE 10-9/16" (250) -

4 SPACES @ 1'-6 1/2" (475) -
4 SPACES @ 3'-1 1/2" (105)

4 SPACES @ 3'-1 1/2" (105)

4 SPACES @ 3'-1 1/2" (105)

TYPE 1-27 GUARDRAIL OR
APPROPRIATE END TREATMENT

OVERLAP W BEAMS IN DIRECTION OF TRAVEL

DIRECTION OF TRAVEL

2-SECTIONS OF W BEAM, ONE NESTED INSIDE THE OTHER

PLAN

LIMIT OF PAYMENT FOR GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-27

4'-8" (1420)

7'-0" (2135)

4'-6"

WOOD BLOCKOUT - 4'-0"

(1220)

0" (0)

BENT PLATE RUBRAIL

RUB RAIL TO BARRIER
CONNECTION (SEE NOTE 4)

6 3/8" (10) x 3" (75)
LAG BOLT

NOTES:
1. THE W-BEAM AND RUB RAIL ARE NOT BOLTED TO POSTS AT POSTS 2 THROUGH 4.
2. POSTS 1 THROUGH 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER WOOD BLOCKS AND/OR RUBRAIL AND WOOD BLOCK
3. USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS FOR 3/8" (10) BOLT BETWEEN HEADS AND RUB RAIL.
4. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

5. PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
6. APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTOR TO PARAPET.
7. POSTS 1 & 2 ARE W6x13 (W202x19,3), 7'-6" (2.3m) LONG. ALL OTHER POSTS IN TRANSITION ARE W6x8 (W202x13,5), 5'-6" (1.7m) LONG.
8. SEE DETAIL D-5, SHEETS 2 AND 3 OR 6 FOR HARDWARE DETAILS.

DELTA
DEPARTMENT OF TRANSPORTATION

GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-27

APPROVED

STANDARD NO. B-21 (2010)
SHT. 1 OF 3
RECOMMENDED

09/20/2010
12/27/2010

SIGNATURE ON FILE
SIGNATURE ON FILE
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. POSTS 1 AND 2 ARE W61 x 13 (W200x19.3), 7'-6" (2.3m) LONG. ALL OTHER POSTS IN TRANSITION ARE W69 x 165 (W500x25.5), 6'-0" (1.8m) LONG.
5. BENT RAIL MAY BE SHOWN BENT TO FACILITATE INSTALLATION OR MAY BE FIELD BENT USING HEAT.
6. APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTORS TO PARAPET.
7. ALL HOLES SHALL BE DRILLED PRIOR TO CEMENTING.
8. PLACE GUARDRAIL DELINERATORS 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'-0" (2400mm) OR HIGHER AND CANNOT BE REMOVED, THE BOTTOM RAIL CAN BE ELIMINATED.
10. SEE DETAIL B-5, SHEET 5 OF 6 FOR HARDWARE DETAILS.
11. BENT RAIL SHALL BE BOLTED TO THE BACK OF POST 6 WITH A 3/8" (10mm) GUARDRAIL BOLT. 4' (1200mm) LONG, WASHED AND NUT.
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 1. USE APPROVED JOINT FILLER TO SEAL. WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.

2. THE DEPRESSED CURB DIMENSIONS (INCLUDING 1" LIP) ON THIS SHEET ARE FOR USE AT ENTRANCES ONLY. FOR CURB DEPRESSIONS AT CURB RAMPS, SEE NOTE 3.

3. AT CURB RAMPS, DEPRESS CURB FLUSH WITH THE PAVEMENT WITH NO LIP, SLOPE THE TOP OF THE CURB 8.3% OR FLATTER IN THE DIRECTION OF PEDESTRIAN TRAVEL.

4. DEPRESS CURB FLUSH WITH PAVEMENT OR ADJACENT AREA AT ALL CORNERS OF TRIANGULAR ISLANDS, TAPERING BACK TO FULL HEIGHT AT A RATE OF 4:1.

5. TAPER END OF CURBS RUNS NOT PART OF AN ISLAND OR MEDIAN FLUSH WITH PAVEMENT OR ADJACENT AREA AT A RATE OF 12:1.

6. FOR SUBDIVISION APPLICATIONS, A MINIMUM OF 6" OF GABC IS REQUIRED.

TYPICAL CURB SECTION

TYPICAL TAPER SECTION

AT NOSE OF MEDIANS

TYPE 1-8 CURB SHOWN

NOTES:

P.C.C. CURB

TYPE 1-8

P.C.C. CURB

TYPE 1-6

P.C.C. CURB

TYPE 1-4

P.C.C. CURB

TYPE 1-2

P.C.C. CURB

TYPE 1-4
INTEGRAL P.C.C. CURB & GUTTER

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. JOINT FILLER TO SEAL. WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM. SEE DETAIL C-1, SHEET 3 FOR DEPRESSING AT CURB RAMPS.

3. ENTRIES ONLY. FOR CURB DIMENSIONS AT CURB RAMPS, SEE NOTE 3.

4. "DEPRESSED CURB DIMENSIONS (INCLUDING 1" LIP) ON THIS SHEET ARE FOR USE AT CURB DEPRESSED 10" AT 2'-0" ROUNDED EDGE 4" BATTER 1" LIP WITH 1/8" ROUNDED EDGE.

5. "DEPRESSED CURB DIMENSIONS (INCLUDING 1" LIP) ON THIS SHEET ARE FOR USE AT CURB DEPRESSED 15" AT 2'-0" ROUNDED EDGE 4" BATTER 1" LIP WITH 1/8" ROUNDED EDGE.

6. "DEPRESSED CURB DIMENSIONS (INCLUDING 1" LIP) ON THIS SHEET ARE FOR USE AT CURB DEPRESSED 20" AT 2'-0" ROUNDED EDGE 4" BATTER 1" LIP WITH 1/8" ROUNDED EDGE.

INTEGRAL P.C.C. CURB AND GUTTER

DELAWARE DEPARTMENT OF TRANSPORTATION

INTEGRAL P.C.C. CURB & GUTTER

APPROVED SIGNATURE ON FILE 5/31/2017

STANDARD NO. C-1 (2017) SHEET 2 OF 3 RECOMMENDED SIGNATURE ON FILE 5/18/2017

5/10/2017
INTEGRAL P.C.C. CURB & GUTTER
TYPES 1-2 THRU 1-8

INTEGRAL P.C.C. CURB & GUTTER
TYPES 3-2 THRU 3-8

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 LATERAL JOINT SEALANT DETAIL ON DETAIL P-2, SHEET 3. USE APPROVED JOINT FILLER TO SEAL WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.
2. DEPRESS CURB Flush with pavement [WITH NO LIP], SLOPE THE TOP OF THE CURB 8.3% OR FLATTER IN THE DIRECTION OF PEDESTRIAN TRAVEL. THE MAXIMUM SLOPE OF THE GUTTER PAN IN CURB RAMPS IS 5%. SEE DETAIL C-2, SHEET 1.
3. SEE TYPICAL CURB SECTION DETAIL AND NOTE 6 ON DETAIL C-1, SHEET 1 FOR PLACEMENT OF CABC UNDER CURB AND GUTTER.
4. TRANSITION FROM STANDARD GUTTER SLOPE TO SLOPE SHOWN ON THIS DETAIL OVER A DISTANCE OF 5'-0".

INTEGRAL P.C.C. CURB AND GUTTER
 TYPE 2

DELTAURE
DEPARTMENT OF TRANSPORTATION
INTEGRAL P.C.C. CURB & GUTTER
(FOR USE AT CURB RAMPS ONLY)
STANDARD NO. C-1 (2017)
SHT. 3 OF 3
APPROVED 5/31/2017
RECOMMENDED 5/18/2017
SIGNATURE ON FILE 5/10/2017
CHIEF ENGINEER
DESIGN ENGINEER
SCALE : NTS
NOTE

THIS DETAIL IS TO BE USED ONLY FOR THE SECTIONS OF CURB & GUTTER THAT ARE DIRECTLY IN FRONT OF THE CURB RAMPS. REFER TO DETAIL C-2, SHEET 2 FOR TYPICAL CURB DIMENSIONS AND FOR DEPRESSING CURB AT ENTRANCES.
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. GRADE RAMP WILL BE STEEPER THAN 6:1 ADJACENT TO THE CURB RAMP OR SIDEWALK, THEN A TYPE 1-8 CURB OR RETAINING WALL SHOULD BE USED TO ELIMINATE THE NEED FOR THE STEEP SLOPE.

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. IF GRADING WILL BE STEEPER THAN 6:1 ADJACENT TO THE CURB RAMP OR SIDEWALK, THEN A TYPE 1-8 CURB OR RETAINING WALL SHOULD BE USED TO ELIMINATE THE NEED FOR THE STEEP SLOPE.

9. CONSTRUCTION JOINTS ARE REQUIRED AT THE INTERVALS SPECIFIED IN NOTE 6 ON DETAIL M-3, SHEET 1 OF 1. HOWEVER, 11% IS PREFERRED. SEE STANDARD NO. C-2, SHEET 1 OF 3.

10. 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.

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.
NOTES:

1. A cut-through level with the street is the preferred treatment for islands, although ramps can be used where the island width is insufficient to accommodate them. Positive surface drainage must be provided for either treatment. Either treatment is acceptable.

2. 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 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 20:1.

4. 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.

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 warning 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 10" 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.

DELTA RAMP TYPE 5 & SECTIONS

DEPARTMENT OF TRANSPORTATION

STANDARD NO. C-2 (2013)

SHT. 3 OF 3

APPROVED

RECOMMENDED

SIGNATURE ON FILE 02/14/2014

SIGNATURE ON FILE 01/14/2014

SCALE: NTS

1/9/2014
ENTRANCE WITH SIDEWALK AND GRASS STRIP
- JOINT
- EXPANSION MATERIAL

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

4'-0" RADIUS (TYP)
CURB TYPE VARIES

APPROPRIATE SRBM OR RIPRAP

SECTION C-C

APPROPRIATE SRBM OR RIPRAP

ISOMETRIC VIEW
SHOWN WITH INTEGRAL CURB & GUTTER, TYPE 1-8

4% SLOPE

PLAN VIEW
IN SUMP LOCATION

SECTION A-A

SHOULDERS, ROADWAY, OR NORMAL GUTTER SLOPE

NOTES:
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).

DELAWARE
DEPARTMENT OF TRANSPORTATION
CURB OPENING DETAILS
STANDARD NO. C-4 (2012) SHT. 1 OF 1
APPROVED RECOMMENDED
SIGNATURE ON FILE 01/07/2013 12/4/2012
DATE
SIGNATURE ON FILE
DATE
ISOMETRIC

PLAN

CURB / SIDEWALK OPENING

SECTION A-A

SECTION B-B

SECTION C-C

SECTION D-D

CURB OPENING WITH SIDEWALK DETAIL

DELAWARE DEPARTMENT OF TRANSPORTATION

STANDARD NO. C-5 (2017) APPROVED 5/31/2017

SIGNATURE ON FILE

5/18/2017

NOTE:


2. SIDEWALK WIDTHS LESS THAN SHOWN ON THIS SHEET REQUIRE DEPARTMENT APPROVAL.

3. THE SLAB WIDTH OVER THE CONCRETE SPILLWAY SHALL BE 12" WIDER THAN THE SIDEWALK WIDTH ON THE APPROACH TO THE CURB OPENING

SEE PEDESTRIAN ACCESSIBILITY STANDARDS MANUAL FOR MORE GUIDANCE.

SIDEWALK WIDTHS LESS THAN SHOWN ON THIS SHEET REQUIRE DEPARTMENT APPROVAL.

NOTE:

1. When a grass strip is present between the back of curb and sidewalk, the sidewalk portion of this structure may be precast. However, when the sidewalk is directly behind the curb, the entire unit must be cast-in-place.

2. Sidewalk widths less than shown on this sheet require department approval.

3. The slab width over the concrete spillway shall be 12" wider than the sidewalk width on the approach to the curb opening.

See Pedestrian Accessibility Standards Manual for more guidance.

Sidewalk widths less than shown on this sheet require department approval.

NOTE:

1. When a grass strip is present between the back of curb and sidewalk, the sidewalk portion of this structure may be precast. However, when the sidewalk is directly behind the curb, the entire unit must be cast-in-place.

2. Sidewalk widths less than shown on this sheet require department approval.

3. The slab width over the concrete spillway shall be 12" wider than the sidewalk width on the approach to the curb opening. See Pedestrian Accessibility Standards Manual for more guidance.

Sidewalk widths less than shown on this sheet require department approval.
**Notes:**
1. The curb retaining wall details are for quick field changes with approval of the engineer. Modular block walls or any other small retaining walls are the preferred choice during plan development.
2. When H is greater than 2'-6", cast the curb retaining wall in place. When H is greater than 12" and less than 2'-6", the wall can be either precast or cast-in-place.
3. Chamfer edges 1/8" at the top of wall. Place a 1/2" rounded 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 behind 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 RW02E and RW03E bars into one continuous L-shaped bar.
7. Bend the TW02E bars into a continuous U-shaped bar.
8. See detail M-3 for sidewalk details and notes, including construction joints and expansion material.
9. Do not place RW01E and TW01E bars through expansion joints. Stop reinforcement and material. See detail M-3 for sidewalk details and notes, including construction joints and expansion material.
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 toewall, 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-B can be used.
14. Curb has been omitted from these details for clarity purposes. For installations where the toewall is placed at the toe of the sidewalk, the toewall is not a replacement for the curb.
15. Sidewalk widths less than shown on this sheet require department approval. See pedestrian accessibility standards manual for more guidance.
### Dimensions

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot; (175)</td>
<td>9-6&quot; (289)</td>
<td>2-5&quot; (75)</td>
<td>8-4&quot; (254)</td>
</tr>
<tr>
<td>8&quot; (175)</td>
<td>8-6&quot; (210)</td>
<td>2-9&quot; (74)</td>
<td>8-2&quot; (203)</td>
</tr>
<tr>
<td>2&quot; (52) OR 24&quot; (600)</td>
<td>14-6&quot; (366)</td>
<td>3-2&quot; (46)</td>
<td>12-6&quot; (320)</td>
</tr>
</tbody>
</table>

### Approximate Quantities

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Concrete F™ (ft)</th>
<th>Reinforced Steel (lbs/kg)</th>
<th>No. of Grates</th>
<th>Length to be Cut from 1 Grate</th>
<th>Weight of Full Size Grate (lbs/kg)</th>
<th>Weight of Cut Grate (lbs/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot; (175)</td>
<td>25 (0.70)</td>
<td>15.43 (0.720)</td>
<td>2</td>
<td>--</td>
<td>270.92</td>
<td>422.89</td>
</tr>
<tr>
<td>8&quot; (175)</td>
<td>30 (0.85)</td>
<td>17.07 (0.908)</td>
<td>3</td>
<td>2-1/4&quot; (63)</td>
<td>270.92</td>
<td>422.89</td>
</tr>
<tr>
<td>2&quot; (52) OR 24&quot; (600)</td>
<td>40.75 (1.58)</td>
<td>16.17 (0.729)</td>
<td>3</td>
<td>--</td>
<td>270.92</td>
<td>422.89</td>
</tr>
</tbody>
</table>

### Bending Diagram

#### Pipe Size
- 6" (175)
- 8" (175)
- 2" (52) OR 24" (600)

#### Reinforcing Steel
- X
- Y
- G-Bars

### Schedule of Reinforcing Steel

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>A-Bars</th>
<th>B-Bars</th>
<th>C-Bars</th>
<th>D-Bars</th>
<th>G-Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; (175)</td>
<td>4 (M3)</td>
<td>2</td>
<td>8&quot; (200)</td>
<td>12&quot; (305)</td>
<td>4 (M3)</td>
</tr>
<tr>
<td>8&quot; (175)</td>
<td>4 (M3)</td>
<td>2</td>
<td>8&quot; (200)</td>
<td>12&quot; (305)</td>
<td>4 (M3)</td>
</tr>
<tr>
<td>2&quot; (52) OR 24&quot; (600)</td>
<td>4 (M3)</td>
<td>2</td>
<td>8&quot; (200)</td>
<td>12&quot; (305)</td>
<td>4 (M3)</td>
</tr>
</tbody>
</table>

### Delaware Department of Transportation

61 Safety End Structure

Standard No. D-1 (2001)  
Sh. 2  OF  2  
Approved  
Recommended  

Date: 04/17/2001
PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: SAFETY END STRUCTURE TO BE PRECAST

SECTION A-A
* REQUIRED ONLY FOR PPE SIZE OF 2" (525) OR 24" (600)

DELWARE
DEPARTMENT OF TRANSPORTATION

181 SAFETY END STRUCTURE

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

APPROVED

RECOMMENDED
### Dimensions

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>A (15&quot;)</th>
<th>B (15&quot;)</th>
<th>C (18&quot;)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; (1575)</td>
<td>15&quot; (4615)</td>
<td>15&quot; (4615)</td>
<td>14&quot; (4465)</td>
</tr>
<tr>
<td>8&quot; (1950)</td>
<td>19&quot; (6495)</td>
<td>19&quot; (6495)</td>
<td>18&quot; (6375)</td>
</tr>
<tr>
<td>2&quot; (520)</td>
<td>24&quot; (6090)</td>
<td>24&quot; (6090)</td>
<td>22&quot; (5685)</td>
</tr>
</tbody>
</table>

### Approximate Quantities

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Concrete Ff (ft² in²)</th>
<th>Reinforced Steel lbs.(kg)</th>
<th>No. of Grates</th>
<th>Length to Be Cut from 1 Grate</th>
<th>Weight of Full Size Grate lbs.(kg)</th>
<th>Weight of Cut Grate lbs.(kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; (1375)</td>
<td>61.35 (117)</td>
<td>41.18 (185)</td>
<td>4</td>
<td>2'-1&quot; (635)</td>
<td>217.92</td>
<td>228.89</td>
</tr>
<tr>
<td>8&quot; (1450)</td>
<td>159.88 (419)</td>
<td>106.68 (483)</td>
<td>5</td>
<td>2'-1&quot; (635)</td>
<td>217.92</td>
<td>228.89</td>
</tr>
<tr>
<td>2&quot; (520)</td>
<td>158.40 (966)</td>
<td>107.39 (480)</td>
<td>6</td>
<td>2'-1&quot; (635)</td>
<td>217.92</td>
<td>228.89</td>
</tr>
</tbody>
</table>

### Bending Diagram

#### Pipe Size

- 6" (1575): 6" (1575)
- 8" (1950): 8" (1950)
- 2" (520): 2" (520)

#### Approximate X Value

- X: 24 (609)

#### Approximate Y Value

- Y: 32 (812)

### Schedule of Reinforcing Steel

#### Pipe Size

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; (1575)</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>6&quot; (1016)</td>
<td>8&quot; (2032)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4&quot; (102)</td>
<td>8&quot; (2032)</td>
<td>4</td>
<td>24</td>
<td>8&quot; (2032)</td>
<td>4&quot; (102)</td>
<td>8&quot; (2032)</td>
<td>4</td>
<td>4</td>
<td>8&quot; (2032)</td>
<td>4&quot; (102)</td>
<td>8&quot; (2032)</td>
</tr>
<tr>
<td>8&quot; (1950)</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>6&quot; (1016)</td>
<td>8&quot; (2032)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4&quot; (102)</td>
<td>8&quot; (2032)</td>
<td>4</td>
<td>30</td>
<td>8&quot; (2032)</td>
<td>4&quot; (102)</td>
<td>8&quot; (2032)</td>
<td>4</td>
<td>37</td>
<td>8&quot; (2032)</td>
<td>4&quot; (102)</td>
<td>8&quot; (2032)</td>
</tr>
<tr>
<td>2&quot; (520)</td>
<td>4</td>
<td>2</td>
<td></td>
<td></td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>6&quot; (1016)</td>
<td>8&quot; (2032)</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4&quot; (102)</td>
<td>8&quot; (2032)</td>
<td>4</td>
<td>8&quot; (2032)</td>
<td>4&quot; (102)</td>
<td>8&quot; (2032)</td>
<td>4</td>
<td>4</td>
<td>8&quot; (2032)</td>
<td>4&quot; (102)</td>
<td>8&quot; (2032)</td>
<td>4</td>
</tr>
</tbody>
</table>

### Delaware Department of Transportation

163 Safety End Structure

1016

Approved: 6/18/00

Standard No: D-2 (2001)

SH. 2 OF 2

Recommended: 6/18/00

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 (13).
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.

Personnel Safety Grate

Plan View

Section A-A

Notes:

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 (13).
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.
<table>
<thead>
<tr>
<th>Inlet Box Size</th>
<th>Cover Slab Size (L x W)</th>
<th>Drainage Inlet Top Unit</th>
<th>Inlet Top Unit Rebar Length</th>
<th>Inlet Top Unit Limit of Payment</th>
<th>Inlet Top Unit Bar Bending Diagram</th>
<th>Frame &amp; Grate (Found on Detail D-5, Sheet 2)</th>
<th>See Note 6</th>
<th>Maximum Pipe Size (See Note 5)</th>
<th>Maximum Height (To Top of Box)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17&quot; x 11&quot;</td>
<td>No Cover Slab</td>
<td>Type 5 (Frame &amp; Grate Combo)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Type 5 (Frame &amp; Grate Combo)</td>
<td>N/A</td>
<td>N/A</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>24&quot; x 24&quot;</td>
<td>No Cover Slab</td>
<td>Type 6 (Frame &amp; Grate Combo)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Type 6 (Frame &amp; Grate Combo)</td>
<td>15&quot;</td>
<td>15&quot;</td>
<td>4'-0&quot;</td>
</tr>
<tr>
<td>34&quot; x 18&quot;</td>
<td>No Cover Slab</td>
<td>Types A, B, C, D, &amp; E (See Note 4)</td>
<td>79&quot;</td>
<td>82&quot;</td>
<td>S504</td>
<td>Types 1 thru 4 &amp; 7 Grate Standard Drainage Inlet Frame</td>
<td>24&quot;</td>
<td>12&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>34&quot; x 24&quot;</td>
<td>No Cover Slab</td>
<td>Types A, B, C, D, &amp; E (See Note 4)</td>
<td>79&quot;</td>
<td>82&quot;</td>
<td>S501</td>
<td>Types 1 thru 4 &amp; 7 Grate Standard Drainage Inlet Frame</td>
<td>24&quot;</td>
<td>15&quot;</td>
<td>11'-4&quot;</td>
</tr>
<tr>
<td>48&quot; x 42&quot;</td>
<td>60&quot; x 60&quot; (Detail D-5, Sheet 4)</td>
<td>Types A, B, C, D, &amp; E (See Note 4)</td>
<td>93&quot;</td>
<td>96&quot;</td>
<td>S501</td>
<td>Types 1 thru 4 &amp; 7 Grate Standard Drainage Inlet Frame</td>
<td>36&quot;</td>
<td>21&quot;</td>
<td>11'-4&quot;</td>
</tr>
<tr>
<td>48&quot; x 48&quot;</td>
<td>60&quot; x 60&quot; (Detail D-5, Sheet 4)</td>
<td>Types A, B, C, D, &amp; E (See Note 4)</td>
<td>93&quot;</td>
<td>96&quot;</td>
<td>S501</td>
<td>Types 1 thru 4 &amp; 7 Grate Standard Drainage Inlet Frame</td>
<td>36&quot;</td>
<td>36&quot;</td>
<td>11'-4&quot;</td>
</tr>
<tr>
<td>66&quot; x 30&quot;</td>
<td>78&quot; x 42&quot; (Detail D-5, Sheet 4)</td>
<td>Types A, B, C, D, &amp; E (See Note 5)</td>
<td>111&quot;</td>
<td>114&quot;</td>
<td>S501</td>
<td>Types 1 thru 4 &amp; 7 Grate Standard Drainage Inlet Frame</td>
<td>48&quot;</td>
<td>21&quot;</td>
<td>11'-4&quot;</td>
</tr>
<tr>
<td>66&quot; x 48&quot;</td>
<td>78&quot; x 42&quot; (Detail D-5, Sheet 4)</td>
<td>Types A, B, C, D, &amp; E (See Note 5)</td>
<td>111&quot;</td>
<td>114&quot;</td>
<td>S501</td>
<td>Types 1 thru 4 &amp; 7 Grate Standard Drainage Inlet Frame</td>
<td>48&quot;</td>
<td>36&quot;</td>
<td>11'-4&quot;</td>
</tr>
<tr>
<td>72&quot; x 54&quot;</td>
<td>84&quot; x 60&quot; (Detail D-5, Sheet 5)</td>
<td>Types A, B, C, D, &amp; E (See Note 5)</td>
<td>113&quot;</td>
<td>120&quot;</td>
<td>S501</td>
<td>Types 1 thru 4 &amp; 7 Grate Standard Drainage Inlet Frame</td>
<td>54&quot;</td>
<td>15&quot;</td>
<td>11'-4&quot;</td>
</tr>
<tr>
<td>72&quot; x 72&quot;</td>
<td>84&quot; x 60&quot; (Detail D-5, Sheet 5)</td>
<td>Types A, B, C, D, &amp; E (See Note 5)</td>
<td>113&quot;</td>
<td>120&quot;</td>
<td>S501</td>
<td>Types 1 thru 4 &amp; 7 Grate Standard Drainage Inlet Frame</td>
<td>54&quot;</td>
<td>36&quot;</td>
<td>11'-4&quot;</td>
</tr>
</tbody>
</table>

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 depth is 4'-0" or greater.
3. See detail D-4 or appropriate detail sheet for additional notes.
4. A 34" x 24" drainage inlet, see detail D-5, Sheet 6 for inlet top unit types A, B, C, D, & E. For inlet top unit type 5, see detail D-5, Sheet 8.
5. For more information on drainage inlet top unit types A, B, C, D, & E see detail D-5, Sheet 3 and for drainage inlet top unit, type 5, see detail D-5, Sheet 8.
6. Only use the type 7 drainage inlet grate when specified on the plans or after approval by the engineer.
7. See detail D-5, Sheet 7 for more information on the maximum height for the 34" x 18" drainage inlet.
TYPES 1 THROUGH 4 GRATES ONLY

THIS FRAME IS TO BE USED WITH

TYPE 6 DRAINAGE INLET FRAME AND GRATE COMBINATION SHOWN IS THE

5). WHICH BOX SIZES ARE CONSIDERED LAWN INLET DRAINAGE BOXES.

ONLY USE THE TYPES 5 & 6 DRAINAGE INLET FRAME AND GRATE COMBINATIONS ON

2). LABEL THE TOP AND BOTTOM OF THE TYPE 1 DRAINAGE INLET GRATE WITH

3). LABEL THE TOP OF ALL DRAINAGE INLET GRATES, EXCEPT TYPE 7, WITH "ONLY RAIN

DOWN THE STORM DRAIN". ALSO, LABEL DRAINAGE INLET GRATES TYPE 1 AND

4). USE ONLY THE TYPES 5 & 6 DRAINAGE INLET FRAME AND GRATE COMBINATIONS ON

LAWN INLET DRAINAGE BOXES. SEE SCHEDULE ON DETAIL D-4, SHEET 1 FOR

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.

NOTES:

1). ONLY INSTALL THE TYPE 2 DRAINAGE INLET GRATE WHERE BICYCLE TRAFFIC IS NOT

EXPECTED TO BE PRESENT.

2). LABEL THE TOP AND BOTTOM OF THE TYPE 1 DRAINAGE INLET GRATE WITH

"CURBIDE" AS SHOWN ON THE EXAMPLE DETAIL.

3). ONLY USE THE TYPES 5 & 6 DRAINAGE INLET FRAME AND GRATE COMBINATION ON

LAWN INLET DRAINAGE BOXES. SEE SCHEDULE ON DETAIL D-4, SHEET 1 FOR

WHICH BOX SIZES ARE CONSIDERED LAWN INLET DRAINAGE BOXES.

4). ONLY 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.

THE ENGINEER. WITHOUT APPROVAL BY

SHOULD NOT BE RETROFITTED

WITHOUT APPROVAL BY

BY THE ENGINEER.

THIS INLET GRATE

IS ONLY TO BE USED WHEN

SPECIFIED ON THE PLANS AND

SHOULD NOT BE RETROFITTED

APPROVED

SIGNATURE ON FILE

12/20/2014

12/20/2014

DEPARTMENT OF TRANSPORTATION

STANDARD NO. D-5 (2014)

SHT. 2 OF 9

RECOMMENDED

SIGNATURE ON FILE

12/11/2014

12/20/2014

DELAWARE

DRAINAGE INLET FRAME AND GRATES

APPROVED

SIGNATURE ON FILE

12/20/2014

12/20/2014

DEPARTMENT OF TRANSPORTATION

STANDARD NO. D-5 (2014)

SHT. 2 OF 9

RECOMMENDED

SIGNATURE ON FILE

12/11/2014

12/20/2014
NOTE: LENGTH OF #4 REBAR SHALL BE THE OUTSIDE OF THE DRAINAGE INLET BOX PLUS 2'-9".

INLET TOP UNIT APPLICATIONS

<table>
<thead>
<tr>
<th>TOP UNIT</th>
<th>CURBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE A</td>
<td>USE IN DRAINAGE SWALE</td>
</tr>
<tr>
<td>TYPE B</td>
<td>INTEGRAL PCC CURB &amp; GUTTER, TYPES 1-8 &amp; 3-8, PCC CURB TYPE 1-8</td>
</tr>
<tr>
<td>TYPE C</td>
<td>INTEGRAL PCC CURB &amp; GUTTER, TYPES 1-8, 3-8, 1-4, 3-4, 1-2 AND 3-2, AND PCC CURB TYPE 1-8, 1-4, AND 1-2</td>
</tr>
<tr>
<td>TYPE D</td>
<td>INTEGRAL PCC CURB &amp; GUTTER, TYPE 2</td>
</tr>
<tr>
<td>TYPE E</td>
<td>PCC CURB TYPE 2</td>
</tr>
</tbody>
</table>

OUTSIDE OF DRAINAGE INLET BOX + 2'-9"

* - THIS DIMENSION VARIES BASED ON THE HEIGHT OF THE CURB AND GUTTER OR CURB USED:
- INTEGRAL P.C.C. CURB AND GUTTER, TYPES 1-6 AND 3-6 & CURB, TYPE 1-6 - 12" MIN.
- INTEGRAL P.C.C. CURB AND GUTTER, TYPES 1-4 AND 3-4 & CURB, TYPE 1-4 - 10" MIN.
- INTEGRAL P.C.C. CURB AND GUTTER, TYPES 1-2 AND 3-2 & CURB, TYPE 1-2 - 8" MIN.

NOTE: LENGTH OF #4 REBAR SHALL BE THE OUTSIDE OF THE DRAINAGE INLET BOX PLUS 2'-9".

DELTAWARE DEPARTMENT OF TRANSPORTATION

STANDARD NO. D-5 (2012) SHT. 3 OF 9

APPROVED SIGNATURE ON FILE 01/07/2013

SIGNATURE ON FILE 12/20/2012

12/4/2012
NOTES:

1. RELocate ENCROACHING REINFORCING BARS WHEN USING TYPE B UNIT.
2. COVER SLABS SHALL BE PRECAST AND MUST BE SIZED TO FIT INLET BOX DIMENSIONS.
3. ALL BARS ARE TO BE #5 (1/2") SPACED @ 6" (150) UNLESS NOTED OTHERWISE.
   TOP REINFORCEMENT SHALL BE 0.11 IN2/FT2 @ 4.5" (115 mm) HORIZONTAL REINFORCEMENT
   PER FOOT IN BOTH DIRECTIONS.
4. MINIMUM BAR COVER = 1 1/2" (38).

* - DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.
**Notes:**

1. Refer to previous sheets for reinforcement requirements.
2. The height of the inlet is limited to 4' (1220) 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.

DELWARE DEPARTMENT OF TRANSPORTATION

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

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

APPROVED SIGNATURE ON FILE 12/28/2010

RECOMMENDED SIGNATURE ON FILE 12/27/2010
ROUND MANHOLE ASSEMBLY

NOTE: ROUND MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE 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 GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.

SECTION A-A

SECTION B-B

SECTION C-C

TOP UNIT

FRAME

COVER

DELAWARE DEPARTMENT OF TRANSPORTATION

MANHOLE DETAILS

STANDARD NO. D-6 (2001) SHT. 3 OF 4 APPROVED RECOMMENDED

05/2/2001
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).

- DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.

** SECTION A-A  
** SECTION B-B  

BOX MANHOLE COVER SLAB DETAILS

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.
JUNCTION BOX COVER SLAB DETAILS

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

SECTION B-B

DELAWARE
DEPARTMENT OF TRANSPORTATION

JUNCTION BOX DETAILS

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

APPROVED

RECOMMENDED

DATE 08/01/2007

DATE 10/23/07

SCALE 1 N.T.S.
NOTE:
1. USE CLASS C BEDDING UNLESS OTHERWISE INDICATED.
2. FOR CLASS A BEDDING, WEDGE PAVE IN CONCRETE 6" (150) FOR PIPES SMALLER THAN 24" (600), 10" (250) FOR PIPES 24" (600) TO 60" (1500), AND FOR PIPES LARGER THAN 60" (1500) 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.
2. SLOPE OF UNDERDRAINS SHALL MATCH ROADWAY GRADE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3. OUTLET PIPE CONFIGURATIONS SHALL USE 45 DEGREE ELBOWS OR SHALL USE STRAIGHT PIPE WITH A MINIMUM RADIUS OF 3'
(900) TO DIRECT UNDERDRAIN PIPE INTO SIDE OF DRAINAGE INLET OR TO POSITIVE GRADE. PIPE SHALL ALSO BE NON-PERFORATED
AND HAVE A SMOOTH INTERIOR.
4. RODENT SCREEN SHALL SNUGLY FIT THE PROVIDED SLOT WITH THE SCREEN UP FITTING TIGHT TO THE BOTTOM FLOW LINE.
5. A 4’X1200’ FLEXIBLE DELINERATOR SHALL BE FITTED AND INSTALLED AT THE DIRECTION OF THE ENGINEER TO MARK THE
LOCATION OF THE CONCRETE HEADWALL.
6. WHEN TWO LINES OF PIPE UNDERDRAIN DRAIN TO A LOW POINT, EACH PIPE MUST HAVE ITS OWN OUTLET.
7. PERFORATED PIPE UNDERDRAIN SHALL NOT BE PLACED UNDER GUARDRAIL IN ORDER TO AVOID PUNCTURING.
CONCRETE PLUG DIAMETER IN DRAINAGEPIPES WITH CONCRETE AS DIRECTED BY THE ENGINEER.

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.
A CONCRETE WASHOUT SIGN

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

SIDES (EXCLUDING ACCESS BERM REQUIRED ON ALL SIDES (EXCLUDING ACCESS DRIVE LOCATION))

A C C E S S  D R I V E

10'-0" MINIMUM
6'-0" MIN
6'-0" MIN
50:1 SLOPE

25'-0" MIN

SECTION A-A

PLAN VIEW

A OVERTOP AND A SANDBAG OR CONCRETE BLOCK ANCHOR

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

OPTIONAL LINER/BERM INSTALLATION

CONCRETE WASHOUT

BACKFILL WITH 10 MIL POLYETHYLENE PLASTIC LINER. FOLLOW THE DIMENSIONS IN THIS DETAIL FOR CONSTRUCTED CONCRETE WASHOUT AREAS.

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.

CONCRETE WASHOUT

DELAWARE DEPARTMENT OF TRANSPORTATION

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

APPROVED SIGNATURE ON FILE DATE

DELAWARE DEPARTMENT OF TRANSPORTATION

SIGNATURE ON FILE DATE

DELAWARE DEPARTMENT OF TRANSPORTATION

SIGNATURE ON FILE DATE

DELAWARE DEPARTMENT OF TRANSPORTATION
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.

SILT FENCE

CONSTRUCTION AREA

ISOMETRIC VIEW

SECTION A-A

FASTEN AT 4 PLACES, EQUALLY SPACED

REINFORCING STRIP OVER GEOTEXTILE FABRIC FOR SILT FENCE (TYP. AT EACH STAKE) SEE NOTE 1.

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

EXISTING GROUND

SECTION B-B

SECURE WITH STAPLES THE ENTIRE LENGTH OF THE POST

WIRE MESH DETAIL

(REINFORCED SILT FENCE ONLY)

SILT FENCE CONNECTION DETAIL

REINFORCED SILT FENCE CONNECTION DETAIL

DELWARE DEPARTMENT OF TRANSPORTATION

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

APPROVED SIGNATURE ON FILE

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

RECOMMENDED

10/24/2014
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. 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.

Section A-A

Section B-B

Notes:

- Ditch Flow Line
- Top of Ditch Slope
- Ditch Flow Line
- Length to Width Ratio (Min.)
- Zero Gradient if Possible (2% Max.)

Plan

Scale: NTS

Delaware Department of Transportation

Sediment Trap

Approved

Recommended

Standard No. E-3 (2014)

Signature on File 10/29/2014

Signature on File 12/11/2014

Date 10/24/2014
IF THE INLET IS NOT AT A LOW POINT, INSTALL STONE CHECK DAM DOWNSTREAM FROM INLET.

EXCAVATE AND RE-COMPACT SOIL (TYP)

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

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

EXISTING GROUND

GEOTEXTILE

WIRE MESH

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

RE-COMPACT SOIL (TYP)

EXISTING GROUND

WIRE MESH

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

EXISTING GROUND
SECTION A-A

PLAN VIEW

INLET SEDIMENT CONTROL, CULVERT INLET

E-5 (2014)

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.

DELAWARE
DEPARTMENT OF TRANSPORTATION

DELTAWIRE
DEPARTMENT OF TRANSPORTATION

INLET SEDIMENT CONTROL, CULVERT INLET

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

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

RECOMMENDED
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.

Several unconnected or connected in parallel portable sediment tanks may be used when a higher flow rate is needed to dewater the job.

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.

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.
PLANT

SECTION A-A

TO PUMP DELAWARE NO. 57 STONE.

TO PUMP W.S. EL.

GRADE TO DRAIN DELAWARE NO. 57 STONE.

DISCHARGE TO STABILIZED OUTFALL

DEWATERING HOSE (CLEAN WATER FREEBOARD 6" MIN.

12" 4'-0" MIN.

SUMP PIT

WOOD WEDGE 2" X 4" (NOM)

WOOD WEDGE 2" X 4" (NOM)

12" 6'-0"

(SEE NOTE 4)

24" C.M.P.

(SEE NOTE 4)

36" C.M.P.

(SEE NOTE 4)

(SEE NOTE 4)

E-7 (2014)

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

3). WELD PERFORATED CAP TO THE BOTTOM OF BOTH PIPES.

2). PLACE WIRE MESH AROUND THE REMOVABLE 24" C.M.P. BEFORE ATTACHING THE GEOTEXTILE TO INCREASE FLOW THROUGH THE GEOTEXTILE.

1). ALL PERFORATIONS ARE 1" IN DIAMETER AND 12" ON CENTER IN ALL DIRECTIONS.

SECTION B-B

WIRE MESH AND GEOTEXTILE SEE SECTION B-B

WIRE MESH AND GEOTEXTILE SEE SECTION B-B

DELAWARE NO. 57 STONE.

1/8" X 1/8" 23 GAGE WIRE MESH

1/4" X 1" 23 GAGE WIRE MESH

GEOTEXTILE

GEOTEXTILE

24" C.M.P.

24" C.M.P.

36" C.M.P.

36" C.M.P.

SEE SECTION B-B

DELAWARE NO. 57 STONE.

SCALE: NTS 12/30/2014

NOTE:

DELAWARE DEPARTMENT OF TRANSPORTATION

STANDARD NO. STANDARD NO.

E-7 (2014) E-7 (2014)

SHT. SHT.

1 OF 1

APPROVED SIGNATURE ON FILE

12/30/2014

SIGNATURE ON FILE

12/11/2014

SIGNATURE ON FILE

10/30/2014

RECOMMENDED

DATE

DATE

SIGNATURE ON FILE

DATE
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.

NOTES:
- Drain pipe 4" Dia. HDPE Flexible
- 4'-0" x 6'-0" Delaware #57 Stone Pad for Skimmer
- 4" Minimum thickness

- Using water-tight connections.
- Attach a 4" HDPE flexible drain pipe to the Pond Outlet Structure

SKIMMER DEWATERING DEVICE

DELAWARE DEPARTMENT OF TRANSPORTATION

STANDARD NO. E-8 (2014)

APPROVED SIGNATURE ON FILE 12/20/2014

RECOMMENDED SIGNATURE ON FILE 12/11/2014

10/24/2014
NOTES:

1. The maximum height of the check dam is 2'-0" at the center of the weir.
2. 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.
3. Install geotextile fabric underneath riprap on permanent check dams only.
4. 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 1:2.

DELTA CHECK DAM

DEPARTME LOT OF TRANSPORTATION

STANDARD NO. E-9 (2014) SHIT. 1 OF 1

APPROVED 12/20/2014

SIGNATURE ON FILE 12/11/2014

RECOMMENDED 10/24/2014
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 onto a stabilized outfall and then into a sediment trapping device.

NOTES:

PLAN

ANTI-SEEP COLLAR

SLOPE DRAIN PROFILE
(FOR FILL SLOPES)

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

EMBANKMENT IS CONSTRUCTED TOP OF FILL SLOPE AS EMBANKMENT IS CONSTRUCTED

COMPACT SOIL AROUND ANTI-SEEP COLLAR

RIPRAP

GEOTEXTILE UNDER RIPRAP

NOTE 1: SEE NOTE 1

24" MIN.

DELTA DEPARTMENT OF TRANSPORTATION

TEMPORARY SLOPE DRAIN

STANDARD NO. E-10 (2014)

APPROVED SIGNATURE ON FILE 12/30/2014

SIGNATURE ON FILE 12/11/2014

10/24/2014

RECOMMENDED
LIMIT OF CONSTRUCTION

EXISTING GROUND

INTERMEDIATE PHASE(S) EMBANKMENT

PHASE 1 EMBANKMENT

EXISTING GROUND

FINAL PHASE EXCAVATION

PHASE 1 EXCAVATION

INTERMEDIATE PHASE(S) EXCAVATION

LIMIT OF CONSTRUCTION

PERIMETER/DIKE SWALE USED AS A CLEAN WATER DIVERSION

BREAK IN CROSS SLOPE MAY BE ELIMINATED TO DIRECT SURFACE FLOW LEFT OR RIGHT AS DIRECTED BY THE ENGINEER

EDGE BERM TO BE PLACED AT THE END OF EACH WORK DAY AND USED UNTIL SLOPE IS COMPLETELY STABILIZED.

MINIMUM OF 3'-0" OFFSET FROM TOE OF SLOPE

SILT FENCE, SEE DETAIL E-2 FOR MORE INFORMATION

NOTES:

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

DELWARE DEPARTMENT OF TRANSPORTATION

INCREMENTAL STABILIZATION

APPROVED

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

SIGNATURE ON FILE 12/30/2014

SIGNATURE ON FILE 12/11/2014

SCALE : NTS

11/19/2014

1. CONSTRUCT EDGE BERRMS 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%.
NOTES:

INITIAL TRENCH ANCHOR DETAIL
TERMINAL TRENCH ANCHOR DETAIL
STABILIZATION OF DITCHES
SECTION A-A

OVERLAP DETAIL
STAPLES TO BE STAGGERED AT 6” SPACING.

TERMINAL TRENCH ANCHOR DETAIL
APPLIED AT THE UPSTREAM END OF DITCH

STAPLES TO BE PLACED AT 12” SPACING ACROSS DOMINANT FLOW

COMPACTED AND SEEDED BACKFILL

STAPLES TO BE PLACED AT 12” SPACING ACROSS DOMINANT FLOW

INITIAL TRENCH ANCHOR DETAIL
APPLIED AT THE DOWNSTREAM END OF DITCH

6” OVERLAP

DOMINANT FLOW

COMPACTED AND SEEDED BACKFILL

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

SECTION A-A

STAPLES (TYP.)

18” MAX.

PLAN

STABILIZATION OF DITCHES

6” OVERLAP

SEE DETAIL THIS SHEET

EROSION CONTROL BLANKET APPLICATIONS

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.

DELTAH VERIFICATION

DEPARTMENT OF TRANSPORTATION

SIG NE NO. E-12 (2014) SIIT. 1 OF 1 RECOMMENDED

12/30/2014

SIGNATURE ON FILE

APPROVED

12/11/2014

SIGNATURE ON FILE

10/24/2014
TURF REINFORCEMENT MAT APPLICATIONS

TURF REINFORCEMENT MAT TO BE APPLIED AT THE DOWNSTREAM END OF DITCH

COMPACTED AND SEED BACKFILL

STAPLES TO BE PLACED AT 12" SPACING ACROSS DOMINANT FLOW

INITIAL TRENCH ANCHOR DETAIL

APPLIED AT THE DOWNSTREAM END OF DITCH

Compacted and Seeded Backfill

Staples to be placed at 12" spacing across dominant flow

OVERLAP DETAIL

Staples to be placed at 12" spacing across dominant flow

STABILIZATION OF DITCHES

STAPLES (TYP.)

12"

6"

18" MAX.

DOMINANT FLOW

OVERLAP

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.

DESIGN SHEAR STRESS

TYPE 1: GREATER THAN 2 lb/sf BUT LESS THAN 6 lb/sf

TYPE 2: GREATER THAN 6 lb/sf BUT LESS THAN 8 lb/sf

DELUXE DEPARTMENT OF TRANSPORTATION

STANDARD NO. E-13 (2014)

SHEET 1 OF 1

APPROVED

SIGNATURE ON FILE

DATE 12/30/2014

SIGNATURE ON FILE

DATE 12/11/2014

RECOMMENDED

SIGNATURE ON FILE

DATE 10/24/2014
5:1
EXISTING PAVEMENT
DE. # 3 STONE
EXISTING GROUND
DRAINAGE PIPE
50'-0" MIN.
20'-0"

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.

SECTION A-A
* 6'-0" MIN (< 3 AXLE) - 10'-0" MIN (> 3 AXLE)
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.

DELWARE DEPARTMENT OF TRANSPORTATION

SANDBAG DIKE

STANDARD NO. E-15 (2014)
SHT. 1 OF 1
APPROVED
SIGNATURE ON FILE 12/30/2014

RECOMMENDED
SIGNATURE ON FILE 12/11/2014

10/24/2014
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 3/4 OF STREAM WIDTH, WHICHER IS GREATER.
3. CONSTRUCT SANDBAG DIVERSION HEIGHT SUCH THAT TOP OF THE DIVERSION STRUCTURE IS 2'-0" ABOVE THE 1 YEAR STORM PEAK ELEVATION.

DELAWARE DEPARTMENT OF TRANSPORTATION
SANDBAG DIVERSION

STANDARD NO. E-16 (2014) SHT. 1 OF 1 APPROVED RECOMMENDED

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

10/24/2014
TURBIDITY CURTAIN

E-18 (2014)

PLAN VIEW

CLEAR WATER
TURBID WATER
MOORING LINE WITH FLOATATION (TYP.)
ANCHOR (TYP.)
DREDGE, FILL AREA, OR BRIDGE PIER

PLAN VIEW

OPEN WATER APPLICATION

SHORELINE
AREA OF CONSTRUCTION
ANCHOR (TYP.)
MOORING LINE WITH FLOATATION (TYP.)
FLAT WAVE 5'-0" SINGLE PANEL
100'-0"
50'-0"

PLAN VIEW

SHORELINE APPLICATION

FLOW

NOTE:
1. ADDITIONAL PANEL REQUIRED FOR DEPTHS GREATER THAN 10'-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 WITHIN BE CALLED OUT IN THE PLANS OR DIRECTED BY THE ENGINEER.

DELaware DEPARTMENT OF TRANSPORTATION

TURBIDITY CURTAIN

APPROVED SIGNATURE ON FILE 12/30/2014
STANDARD NO. E-18 (2014)
SHT. 1 OF 1 RECOMMENDED SIGNATURE ON FILE 12/11/2014

SCALE: NTS

11/19/2014
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'.
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

SEE NOTES 1 & 2
SEE NOTE 3

SEE DETAIL B

EXISTING GROUND

GEOTEXTILE

GEOTEXTILE

SECURING PIN

PROPOSED PIPE

SEE PLANS FOR TYPE

RIP-RAP

12" MIN (TYP)

LEVEL BOTTOM

30' 40" R (TYP)

3' 40"

A

A

PLAN VIEW

2 x T1

T1

L

L

D

6"

10'-0" R

3'-0"

W 2

W 1

6"

E-20 (2014)

DELAWARE DEPARTMENT OF TRANSPORTATION

RIPRAP ENERGY DISSIPATOR

APPROVED

SIGNATURE ON FILE

DATE

STANDARD NO. E-20 (2014) SHT. 1 OF 1

RECOMMENDED

SIGNATURE ON FILE

DATE

10/24/2014
DELAWARE DEPARTMENT OF TRANSPORTATION

STONE OUTLET DETAIL

STANDARD NO.  E-21 (2014)  SHT.  1  OF  1

APPROVED  SIGNATURE ON FILE

12/30/2014

NOTE:

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.

11/19/2014
Roadside Shrub Planting Detail

- Prune all dead, broken, and crossing branches following installation.
- Set rootball flush to grade or 1" to 2" above grade where heavy soils exist. Do not cover the top of the rootball with soil.
- Excavate all soil from the pit, mix with approved amendments and use as backfill during installation of shrub.
- Mulch in accordance with specifications. Do not place mulch against the shrub stems.
- Remove burlap & wire baskets to 1/2 of the rootball. Do not leave burlap, basket, or rope debris in the pit.
- Place root ball on tamped or unexcavated soil.
- Prune all dead, broken, & crossing branches following installation.

**Notes:**
1. Dig base of planting pit a minimum of two and a maximum of three times the size of the root ball.
2. Install shrubs in masses of no less than 3 plants. A minimum of 3'-0" is required from middle of shrub to any permanent structure (i.e. curb, sidewalk, building, etc...).
3. Shrub pruning is to be performed by an I.S.A. certified arborist, certified nursery professional, or under the direction thereof. Do not heavily prune shrubs at planting.
4. Hand dig augered holes to final width and depth to eliminate glazing.
5. Mulch all shrub masses in one continuous bed.

---

**Roadside Shrub Planting Detail**

**DELAWARE DEPARTMENT OF TRANSPORTATION**

<table>
<thead>
<tr>
<th>PLANTING DETAILS</th>
<th>APPROVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>STANDARD NO.</td>
<td>L-1 (2017)</td>
</tr>
<tr>
<td>SHT.</td>
<td>1</td>
</tr>
<tr>
<td>OF</td>
<td>3</td>
</tr>
<tr>
<td>RECOMMENDED</td>
<td>5/11/2017</td>
</tr>
<tr>
<td>SIGNATURE ON FILE</td>
<td>5/11/2017</td>
</tr>
<tr>
<td>SIGNATURE ON FILE</td>
<td>5/16/2017</td>
</tr>
<tr>
<td>DATE</td>
<td>5/31/2017</td>
</tr>
</tbody>
</table>
**DO NOT PRUNE THE DOMINANT LEADER OR TERMINAL BUDS OF THE CROWN.**

**NOTES**

1. **TREE PRUNING** is to be performed by an I.S.A. Certified Arborist, Certified Nursery Professional, or under the direction thereof. Do not heavily prune trees at planting.

2. Prune all dead, broken, and crossing branches following installation.

3. **Dig Base of Planting Pit** A Minimum of two and a maximum three times the size of the root ball.

4. A Minimum of 3’0” is required from the middle of the tree to any permanent structure (i.e. curb, sidewalk, building, etc...)

5. Limb tree to 7’-0” for pedestrian clearance when planting adjacent to sidewalks.

**PLANTING DETAILS**

1. Mix soil excavated from pit with approved amendments as per specifications and use as backfill during installation of tree.

2. Stake & guy trees. Refer to specifications for material guidelines.

3. Set root ball flush to grade or 1” to 2” above grade if soils are slow to drain and so that trunk flare is visible. Do not cover the top of the root ball with soil.

4. Tamp soil around the root ball base with foot pressure so root ball does not shift.

5. Remove burlap and baskets to 1/2 of the root ball. Do not bury excess burlap, rope or remnants of basket in the planting pit.

6. Mulch in accordance with specifications. Do not place mulch against the trunk.

7. Do not place mulch against the trunk.

8. Do not prune the dominant leader or terminal buds of the crown.

**DELTA**

**DEPARTMENT OF TRANSPORTATION**

**PLANTING DETAILS**

**STANDARD NO.** L-1 (2017)  **SHR.** 2  **OF** 3  **APPROVED**  **RECOMMENDED**

**SIGNATURE ON FILE**  **SIGNATURE ON FILE**

**DATE** 5/11/2017  **DATE** 5/18/2017  **DATE** 5/31/2017
NOTE:
1. SEE PLANT LIST FOR SPACING (X).

PERENNIAL/GROUND COVER
FINTISHED GRADE
3" MULCH - NOT TO COVER LEAVES
ROOT MASS
6" PREPARED SOIL MIX, AS PER SPECIFICATION.
SUBGRADE TILLED TO 6" DEPTH

PLAN VIEW

SECTION VIEW

PERENNIAL/GROUNDCOVER PLANTING DETAIL
NOTES:
1. LONGITUDINAL STEEL SHALL BE HELD IN PLACE BY CRADLES.
2. LETTERS ON CONCRETE MONUMENT TO BE COUNTERSUNK IN TOP OF MARKER ½".
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 2" TALL LETTERS.
4. PLACE CAP ON CONCRETE MONUMENT SO THAT TOP OF CAP IS FLUSH WITH THE TOP OF THE CONCRETE MONUMENT.
5. IN HOT-MIX OR CONCRETE, PLACE A CONCRETE SURVEY MARKER IN LIEU OF A REBAR AND CAP. SEE REBAR AND CAP ITEM SPECIFICATION FOR MORE INFORMATION.

FLEXIBLE DELINERATOR
SEE NOTE 3

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

2"BLACK LETTERS
SET IN 2" ALUMINUM CAP

2" HOLE TO ACCOMODATE SURVEY CAP

#5 REBAR, 24" LONG

8 1/2" TYP 24" LONG #5 REBAR,
SEE REBAR AND CAP ITEM SPECIFICATION FOR MORE INFORMATION.

5). IN HOT-MIX OR CONCRETE, PLACE A CONCRETE SURVEY MARKER IN LIEU OF A REBAR AND CAP.

2" DIAMETER

DELAWARE (LICENSE)
RIGHT OF WAY
ALUMINUM CAP
STAMP DETAIL

2" BLACK LETTERS
ROW

TOP DETAIL

TYP 24" LONG #5 REBAR,
SEE REBAR AND CAP ITEM SPECIFICATION FOR MORE INFORMATION.

NOTE 3: "ROW" HANDWRITTEN VERTICALLY IN 2" TALL LETTERS.
NOTES:
2. THE RAMP SECTION 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".

SHARED-USE PATH & SIDEWALK DETAILS

DELAWARE
DEPARTMENT OF TRANSPORTATION

STANDARD NO. M-3 (2013)

SHARED-USE PATH & SIDEWALK DETAILS

APPROVED
SIGNATURE ON FILE
02/14/2014

RECOMMENDED
SIGNATURE ON FILE
01/14/2014

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

3'-0" MIN
8'-0" WITH SIDEWALK
3'-0" WITHOUT SIDEWALK
10'-6" MIN
3'-0" MIN
8'-0" WITH SIDEWALK
3'-0" WITHOUT SIDEWALK
8'-0" WITH SIDEWALK
3'-0" WITHOUT SIDEWALK
12" RADIUS
1 1/2" MIN.
2" MAX.

DELAWARE
DEPARTMENT OF TRANSPORTATION

BIKE RACK LAYOUT DETAILS

STANDARD NO. M-4 (2011)
SHT. 1 OF 1
APPROVED
SIGNATURE ON FILE 12/22/2011
RECOMMENDED
SIGNATURE ON FILE 12/21/2011

04/15/2011
WOOD RAIL FENCE DETAILS

1. All rail joints shall be centered at the posts.
2. All joints shall be attached with 3 - 12d nails and two adjacent rails shall not end on the same post.
3. Rails shall be flush to the posts at the end posts.

CLASS B CONCRETE

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

NOTES:

- TYPICAL JOINT DETAIL
- ATTACH WITH 4-12d HOT DIP GALVANIZED RING NAILS (TYP.)
- 4" (100) x 4" (100) (NOMINAL) TREATED POSTS (TYP.)
- 1½" (38) x 6" (150) (NOMINAL) TREATED RAILS (TYP.)
- MITER TOP AT 3:12 SLOPE
4" x 8" RUNNING BOND PATTERN

4" x 8" HERRINGBONE PATTERN

NOTES:
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 BOX VARY DEPENDING ON PLANS.
3. FOR CROSSWALK APPLICATIONS, REFER TO THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STRIPING WIDTH.
4. THE PATTERNS ABOVE ARE THE PREFERRED PATTERNS AVAILABLE FOR SIDEWALK OR CROSSWALK APPLICATIONS.

DELTA 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 RESTRRAINT MUST BE APPROVED BY THE ENGINEER IN THE FIELD AND SHALL BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATIONS.

DELAWARE DEPARTMENT OF TRANSPORTATION

PATTERNED HOT-MIX OR CONCRETE & BRICK PAVER DETAILS

STANDARD NO. M-6 (2011) SIIT. 1 OF 1

APPROVED

SIGNATURE ON FILE 01/17/2012

RECOMMENDED

SIGNATURE ON FILE 01/17/2012

09/06/2011
DELAWARE
DEPARTMENT OF TRANSPORTATION

P.C.C. PARKING BUMPER

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

APPROVED  SIGNATURE ON FILE  12/30/2014

RECOMMENDED SIGNATURE ON FILE

SCALE: NTS

ELEVATION VIEW

SECTION A-A
**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 / HEADWALL 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.
M-9 (2013)  

**BUS STOP PAD WITH SHELTER DETAILS**

**SHELTER AREA**

- 17'-0" CONCRETE PAD FOR 5'-0" x 10'-0" SHELTER
- 22'-0" CONCRETE PAD FOR 5'-0" x 13'-0" SHELTER

**TRASH RECEPTACLE**

- 8'-0" MIN
- 1'-0" TYP

**ALIGHTING AREA**

- 5'-0" x 8'-0"

**ROAD SLOPE**

- MATCH 50:1 MAX

**SHELTER ROOF LINE**

- SEE NOTE 5

**SECTION A-A**

- 8" CONCRETE
- 8" GABC
- 4" CONCRETE
- 4" GABC

**SECTION B-B**

- 8" CONCRETE
- 8" GABC

NOTES:

1. BUS STOP 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-9, SHEET 1 FOR ADDITIONAL SIDEWALK DETAILS.
STEEL PLATES MUST HAVE A SURFACE THAT IS MANUFACTURED WITH A MINIMUM NOMINAL COEFFICIENT OF FRICTION OF 0.35 AT THE TIME OF PLACEMENT.

STEEL PLATES AND DOWELS WILL CONFORM TO ASTM A36 STANDARDS.

USING STEEL PLATE BRIDGING IS NOT TO EXCEED FOUR (4) CONSECUTIVE WORKING DAYS IN ANY GIVEN WEEK AND MUST NOT BE LEFT IN PLACE OVER THE WEEKEND, UNLESS DIRECTED BY THE ENGINEER IN THE FIELD.

A STRUCTURE DESIGN IS REQUIRED FOR TRENCH WIDTHS GREATER THAN 6'-0". DESIGN WILL BE APPROVED BY THE CHIEF ENGINEER.

THE CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE OF STEEL PLATES, SHORING, ASPHALT CONCRETE RAMPS, AND ENSURING THEY MEET ALL MINIMUM SPECIFICATIONS. DEFORMATIONS OF ANY KIND ARE NOT ACCEPTABLE ON STEEL PLATES. EXAMPLES OF DEFORMATIONS COULD BE, BUT NOT LIMITED TO, ANY OF THE FOLLOWING: FREE FROM ANY CLIPS, CHAINS, ATTACHMENTS, WELDMENTS, SURFACE IRREGULARITIES, ETC.

USE OF STEEL PLATES MUST BE APPROVED BY THE DEPARTMENT AND IS NOT PERMITTED BETWEEN NOVEMBER 1ST AND MARCH 31ST.

1. USE OF STEEL PLATES MUST BE APPROVED BY THE DEPARTMENT AND IS NOT PERMITTED BETWEEN NOVEMBER 1ST AND MARCH 31ST.
2. STEEL PLATE BRIDGING ON FREEWAYS AND EXPRESSWAYS IS STRICTLY PROHIBITED.
3. STEEL PLATES AND DOWELS WILL CONFORM TO ASTM A36 STANDARDS.
4. ADEQUATELY SHORE THE TRENCH IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS TO SUPPORT THE BRIDGING AND TRAFFIC LOADS.
5. SECURE BRIDGING AGAINST DISPLACEMENT BY USING ADJUSTABLE CLEATS, SHIMS, OR OTHER DEVICES.
6. USE OF STEEL PLATE BRIDGING IS NOT TO EXCEED FOUR (4) CONSECUTIVE WORKING DAYS IN ANY GIVEN WEEK AND MUST NOT BE LEFT IN PLACE OVER THE WEEKEND, UNLESS DIRECTED BY THE ENGINEER IN THE FIELD.
7. THE CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE OF STEEL PLATES, SHORING, ASPHALT CONCRETE RAMPS, AND ENSURING THEY MEET ALL MINIMUM SPECIFICATIONS. DEFORMATIONS OF ANY KIND ARE NOT ACCEPTABLE ON STEEL PLATES. EXAMPLES OF DEFORMATIONS COULD BE, BUT NOT LIMITED TO, ANY OF THE FOLLOWING: FREE FROM ANY CLIPS, CHAINS, ATTACHMENTS, WELDMENTS, SURFACE IRREGULARITIES, ETC.
8. A STRUCTURE DESIGN IS REQUIRED FOR TRENCH WIDTHS GREATER THAN 6'-0". DESIGN WILL BE APPROVED BY THE DEPARTMENT PRIOR TO USE.
9. INSTALL STEEL PLATE BRIDGING AND SHORING USING EITHER OF THE METHODS BELOW:
   METHOD 1: FOR SPEEDS GREATER THAN 45 MPH, MILL THE PAVEMENT TO A DEPTH EQUAL TO THE THICKNESS OF THE PLATE AND TO A WIDTH AND LENGTH EQUAL TO THE DIMENSION OF THE PLATE. ATTACH THE PLATE TO THE ROADWAY BY A MINIMUM OF TWO DOWELS PRE-DRILLED INTO EACH CORNER OF THE PLATE AND DRILLED INTO THE PAVEMENT AS SHOWN ON THIS DETAIL.
   METHOD 2: FOR SPEEDS 45 MPH OR LESS, ATTACH THE PLATE TO THE ROADWAY BY A MINIMUM OF TWO DOWELS PRE-DRILLED INTO EACH CORNER OF THE PLATE AND DRILLED INTO THE PAVEMENT AS SHOWN ON THIS DETAIL.
10. FOR BOTH METHODS, WHEN THE STEEL PLATES ARE REMOVED, BACKFILL THE HOLE DOWEL HOLES IN THE PAVEMENT WITH EITHER GRADED FINE ASPHALT CONCRETE MIX, CONCRETE SLURRY, OR EQUIVALENT SLURRY TO THE SATISFACTION OF THE ENGINEER.
11. STEEL PLATES MUST HAVE A SURFACE THAT IS MANUFACTURED WITH A MINIMUM NOMINAL COEFFICIENT OF FRICTION OF 0.35 AT THE TIME OF PLACEMENT.

### Notes:

<table>
<thead>
<tr>
<th>Trench Width</th>
<th>Min. Plate Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'-0&quot;</td>
<td>5/16&quot;</td>
</tr>
<tr>
<td>2'-0&quot;</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>3'-0&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>4'-0&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>1-1/2&quot;</td>
</tr>
<tr>
<td>6'-0&quot;</td>
<td>2'-0&quot;</td>
</tr>
</tbody>
</table>

BASED ON HL-93 TRUCK LOAD.
SLAB PLAN (WITH DOWEL AND TIE LOCATIONS)

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'-1600' INSIDE OF THE LANE EDGE LINE OR CENTERLINE.

DELWARE DEPARTMENT OF TRANSPORTATION

P.C.C. PAVEMENT

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

APPROVED

RECOMMENDED
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 0.2" WIDER. WHEN THE TEMPERATURE IS ABOVE 80°F (27°C), THE SEALANT RESERVOIR SHALL BE CUT 0.1" NARROWER.
2. "T" REFERS TO THE ACTUAL CONSTRUCTED SLAB THICKNESS.
3. TOLERANCE ON ALL JOINT SEALANT DETAIL DIMENSIONS SHOWN WITHOUT RANGES SHALL BE PLUS 0.1/32".
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 NECESSARY INTERRUPTED BY THE TRANSVERSE JOINT MATERIAL.
7. TRANSVERSE JOINT SEAL TO BE RECESSED 0.1" TO 0.5" DEEP AT THE TOP OF THE SLAB ALONG BOTH SIDES OF THE TRANSVERSE SEALANT RESERVOIR.
8. THE TOP EDGES OF THE COMPRESSION SEAL SHALL BE IN FULL CONTACT WITH THE SLAB SIDES.

P.C.C. PAVEMENT

DELAWARE DEPARTMENT OF TRANSPORTATION

STANDARD NO. P-1 (2000)

SHT. 2 OF 5

APPROVED

RECOMMENDED

1/10/05

CONSTRUCTION OFFICE

DATE
EDGE OF SLAB

SLAB WIDTH

EDGE OF SLAB

3\(\text{"} \pm 1/2\) MIN.

WELD SIDE WIRE FRAME TO DOWELs ON 1' ON 2' ALTERNATE ENDS (TYP.)

Dowel

Installation Stake

Lower Side Wire

Upper Side Wire

Transverse Joint

Installation Stake

Upper Side Wire

Lower Side Wire

Side Wire Frame (TYP.)

TOP OF SLAB

SIDE WIRE FRAME (TYP.)

BOTTOM OF SLAB

Upper Side Wire

Lower Side Wire

1/4" (6.35) DIA INSTALLATION STAKE, 24"I600 LoO (MAX.)

Weld at all intersections of the side wire frame and the upper and lower side wires (TYP.)

Dowel Support Basket
Dowel & Tie Bar Placement Tolerances
**PLAN**

- Proposed locations for transverse joints shall exactly match the alignment of the final existing or relocated transverse joints in all immediately adjacent lanes.

**NOTES**

1. When repairing existing transverse joints, the patch shall extend a minimum of 2' (600mm) through the existing joint, which will relocate the joint.
2. Proposed locations for transverse joints, when not aligned with the final expected transverse joint locations in the immediately adjacent lanes, shall be offset a minimum of 2' (600mm) from the aforementioned joints.
3. The longitudinal joint alignment shall be straight and continuous through the repaired area.

**SLAB PLAN (WITH DOWEL AND TIE LOCATIONS)**
SECTION A-A

SECTION B-B

SECTION C-C

FULL DEPTH PATCH

DELAWARE DEPARTMENT OF TRANSPORTATION

P.C.C. PAVEMENT PATCHING

STANDARD NO. P-2 (2003) SHT. 2 OF 5

APPROVED  

1/14/2008

Dowel Support Base Required For This Application
(Rerfer To Standard Construction Detail For P.C.C. Pavement.)

Transverse Saw-Cut Used For Joints Located Within The Patch

Transverse Construction Joint Used On Joints Between Existing Pavement And Patch

Full Depth Patch
SEALANT DETAIL - LONGITUDINAL JOINT

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 1/8" (3.2MM) 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/1/16" (1.6MM), MINUS 0.010".
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.
Dowel & Tie Bar Placement Tolerances

Full Depth Patch
NOTE: CLOSED CELL POLYETHYLENE FOAM SHALL BE THE SAME WIDTH AS THE JOINT AND 2" (50) IN 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" (300), THEN 1" (25) AND POLYETHYLENE FOAM IS NOT USED. WHEN X ≤ 12" (300), THEN 1" (25) AND POLYETHYLENE FOAM IS USED.
TO CLEAN STRAIGHT EDGE
SAWCUT EXISTING PAVEMENT
EXISTING PAVEMENT
OVERLAY
SEE SCHEDULE

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

DELTA NEW ENGLAND TRANSPORTATION
DEPARTMENT OF TRANSPORTATION
STANDARD NO. P-3 (2014)
SHT. 1 OF 1
APPROVED
12/30/2014
SIGNATURE ON FILE
12/11/2014
RECOMMENDED
10/28/2014
LONGITUDINAL: FULL WIDTH OF LANE(S) DISTURBED

MINIMUM BCBC (PLACED IN TWO 6" LIFTS)

8" (MIN) CLASS A CONCRETE OR 12"

SAW CUT FULL DEPTH

SAW CUT FULL DEPTH

PERMANENT CROSS-ROAD OR LONGITUDINAL PATCH DETAIL

18" MIN

18" MIN

1'-0"

2'-0"

BACKFILL BORROW TYPE C PLACED IN 8" LIFTS LOOSE MEASUREMENT AND COMPACTED PER DELDOT SPECIFICATIONS

DELDOT SPECIFICATIONS AND COMPACTED PER LOOSE MEASUREMENT PLACED IN 8" LIFTS

BACKFILL BORROW TYPE C PLACED IN 8" LIFTS LOOSE MEASUREMENT AND COMPACTED PER DELDOT SPECIFICATIONS

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.

PERMANENT CROSS-ROAD OR LONGITUDINAL PATCH DETAIL

* EXISTING CONCRETE PAVEMENT OVERLAYED WITH HOTMIX LOCATIONS

DELAWARE
DEPARTMENT OF TRANSPORTATION

PERMANENT CROSS-ROAD PATCH OVER PIPE TRENCH DETAIL

APPROVED

SIGNATURE ON FILE 02/14/2014

DATE

RECOMMENDED

SIGNATURE ON FILE 01/14/2014

DATE
NOTES:
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. UNUSED 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.

DEL. 57 STONE NONMETALLIC CONDUIT

BUSHING

20" X 20"

18" X 18"

CAST IRON FRAME

CAST IRON COVER

1 1/2" Dia. Pick Pry Hole

Standard Diamond Grid

25" X 25"

SECTION A-A

FINISHED GRADE

(PAVEMENT)

FINISHED GRADE

(UNPAVED)

1"

2 1/2"

2 1/2"

3 1/2"

4"

4" CONCRETE WALL (TYP)

CAST IRON COVER

Pry Hole

DIAMOND GRID

STANDARD

25" X 25"

CAST IRON FRAME

Del DOT ELECTRIC

PLAN VIEW

CAST IRON FRAME

CAST IRON COVER

JUNCTION WELL COVER

JUNCTION WELL FRAME

No. 6 AWG GROUNDING CONDUCTOR (COLOR - GREEN)

3/8" x 1 1/2", STAINLESS STEEL BOLT WITH STAINLESS SPLIT LOCK WASHER AND NUT. DRILL AND TAP LID AND SUPPORT FRAME. ANTI-CORROSION COMPOUND SHALL BE APPLIED TO EACH ASSEMBLY.

DETAIL "A"

GROUNDING LUGS

4" CONCRETE WALL (TYP)

BUSHING

4"

2 1/2"

2 1/2"

3 1/2"

3" MIN.

2" MAX. (TYP)

24"

37" X 37"

WALL (TYP)

4" CONCRETE

37" X 37"

ELECTRIC

Del DOT

3" MAX. (TYP)

1" MIN.

DELAWARE DEPARTMENT OF TRANSPORTATION

CONDUIT JUNCTION WELL, TYPE 1

APPROVED

SIGNATURE ON FILE 02/14/2014

2013 RECOMMENDED

SIGNATURE ON FILE 01/14/2014

1/9/2014

STANDARD NO.  T-1 (2013)  SHT.  1 OF 3

1124/2014

DATE  DATE

SCALE : NTS  SCALE : NTS

No. 6 AWG GROUNDING CONDUCTOR (COLOR - GREEN)

3/8" x 1 1/2", STAINLESS STEEL BOLT WITH STAINLESS SPLIT LOCK WASHER AND NUT. DRILL AND TAP LID AND SUPPORT FRAME. ANTI-CORROSION COMPOUND SHALL BE APPLIED TO EACH ASSEMBLY.
NOTES:

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. 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 S 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.
JUNCTION WELL, GROUNDING & BONDING FOR STEEL FRAMES & LIDS

DELAWARE DEPARTMENT OF TRANSPORTATION

STANDARD NO. T-2 (2011)

JUNCTION WELL COVER & FRAME

BONDING AN EXISTING JUNCTION WELL COVER & FRAME

JUNCTION WELL BONDING GALVANIZED TO GALVANIZED

JUNCTION WELL BONDING NONMETALLIC CONDUIT

No. 6 AWG GROUNDING CONDUCTOR (color)

2'-0" BRAIDED STRAP WITH 8' EYELETS

STEEL FRAME

FINISHED GRADE (PAVEMENT)

REESED COVER

STEEL LID

5/8" x 1 1/2" STAINLESS STEEL BOLT WITH SPLIT LOCK WASHER AND NYLON INSERT LOCKOUT WELDED TO FRAME AND TO COVER. ANTI-CORROSION COMPOUND SHALL BE APPLIED TO EACH ASSEMBLY.

5/8" x 1 1/2" STAINLESS STEEL BOLT WITH SPLIT LOCK WASHER AND NYLON INSERT LOCKOUT WELDED TO FRAME AND TO COVER. ANTI-CORROSION COMPOUND SHALL BE APPLIED TO EACH ASSEMBLY.

BURIAL SPLICE KIT

U.L. LISTED DIRECT CONDUIT

NONMETALLIC CONDUIT

2'-0" BRAIDED STRAP WITH 8' EYELETS

STEEL FRAME

FINISHED GRADE (PAVEMENT)

REESED COVER

STEEL LID

5/8" x 1 1/2" STAINLESS STEEL BOLT WITH SPLIT LOCK WASHER AND NYLON INSERT LOCKOUT WELDED TO FRAME AND TO COVER. ANTI-CORROSION COMPOUND SHALL BE APPLIED TO EACH ASSEMBLY.

5/8" x 1 1/2" STAINLESS STEEL BOLT WITH SPLIT LOCK WASHER AND NYLON INSERT LOCKOUT WELDED TO FRAME AND TO COVER. ANTI-CORROSION COMPOUND SHALL BE APPLIED TO EACH ASSEMBLY.

GALV. CONDUIT

BUSHING

No. 6 AWG GROUNDING CONDUCTOR (color)

No. 6 AWG GROUNDING CONDUCTOR (color)

JUNCTION WELL BONDING NONMETALLIC CONDUIT

JUNCTION WELL, GROUNDING & BONDING FOR STEEL FRAMES & LIDS

APPROVED SIGNATURE ON FILE 12/22/2011

SIGNATURE ON FILE 12/21/2011

RECOMMENDED 11/14/2011
**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 HOLE 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.

---

**PLAN VIEW**

**SECTION A-A**
NOTES:
1. TYPE 14 CONDUIT JUNCTION WELL LID SHALL BE PREFABRICATED 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 3" 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.
3) FOR VIEW OF SECTION A-A AND SECTION B-B, SEE DETAIL T-4, SHEET 2 OF 2.
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.

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

DELAWARE DEPARTMENT OF TRANSPORTATION

CABINET BASES, TYPES P & R

STANDARD NO. T-4 (2017) SHT. 2 OF 2 APPROVED SIGNATURE ON FILE

5/31/2017 5/18/2017 5/11/2017

RECOMMENDED SIGNATURE ON FILE

5/11/2017

CHIEF ENGINEER

DESIGN ENGINEER

SIGNATURE ON FILE

SIGNATURE ON FILE
CONNECTED TO AN EXISTING CONDUIT UNLESS THREADED CONDUIT PLUG UNLESS SHALL BE CAPPED WITH A GALVANIZED UNDERGROUND CONDUIT ENDS 6" MIN.

#8 REINFORCING BARS 8 EQUALLY SPACED

#5 REINFORCING BARS EQUALLY SPACED 3" x 240"

GROUND ROD (BE ATTACHED TO GROUND FOR POLE TO 3" CONDUIT SWEEPS 6" MIN. (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.
POLE BASE DATA CHART

<table>
<thead>
<tr>
<th>POLE BASE TYPE</th>
<th>DIAMETER</th>
<th>DEPTH</th>
<th>#5 HORIZONTAL REINFORCING BARS</th>
<th>#8 VERTICAL REINFORCING BARS</th>
<th>CONDUITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36&quot;</td>
<td>7'-0&quot;</td>
<td>5</td>
<td>8</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>2</td>
<td>36&quot;</td>
<td>10'-0&quot;</td>
<td>6</td>
<td>8</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>2A</td>
<td>48&quot;</td>
<td>8'-0&quot;</td>
<td>5</td>
<td>8</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>2B</td>
<td>60&quot;</td>
<td>7'-0&quot;</td>
<td>5</td>
<td>8</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>3</td>
<td>48&quot;</td>
<td>10'-0&quot;</td>
<td>14</td>
<td>17</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>3A</td>
<td>48&quot;</td>
<td>12'-0&quot;</td>
<td>17</td>
<td>17</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>3B</td>
<td>48&quot;</td>
<td>15'-0&quot;</td>
<td>21</td>
<td>17</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>3C</td>
<td>48&quot;</td>
<td>20'-0&quot;</td>
<td>27</td>
<td>17</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>4A &amp; 4B</td>
<td>24&quot;</td>
<td>2'-4&quot;</td>
<td>NONE</td>
<td>NONE</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>6</td>
<td>24&quot;</td>
<td>6'-0&quot;</td>
<td>4</td>
<td>8</td>
<td>2 - 3&quot;</td>
</tr>
</tbody>
</table>

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

TYPICAL SECTION (BASE 6)
**POLE BASE DATA CHART**

<table>
<thead>
<tr>
<th>POLE BASE</th>
<th>DIAMETER</th>
<th>DEPTH</th>
<th>#4 HORIZONTAL REINFORCING BARS</th>
<th>#8 VERTICAL REINFORCING BARS</th>
<th>CONDUITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36&quot;</td>
<td>7' 0&quot;</td>
<td>5</td>
<td>8</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>2</td>
<td>36&quot;</td>
<td>10' 0&quot;</td>
<td>6</td>
<td>8</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>2A</td>
<td>48&quot;</td>
<td>8' 0&quot;</td>
<td>5</td>
<td>8</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>2B</td>
<td>60&quot;</td>
<td>7' 0&quot;</td>
<td>5</td>
<td>8</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>3</td>
<td>48&quot;</td>
<td>16' 0&quot;</td>
<td>14</td>
<td>17</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>3A</td>
<td>48&quot;</td>
<td>12' 0&quot;</td>
<td>17</td>
<td>17</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>3B</td>
<td>48&quot;</td>
<td>15' 0&quot;</td>
<td>21</td>
<td>17</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>3C</td>
<td>48&quot;</td>
<td>20' 0&quot;</td>
<td>27</td>
<td>17</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>4A &amp; 4B</td>
<td>48&quot;</td>
<td>24' 0&quot;</td>
<td>NONE</td>
<td>NONE</td>
<td>2 - 3&quot;</td>
</tr>
<tr>
<td>6</td>
<td>24&quot;</td>
<td>6' 0&quot;</td>
<td>4</td>
<td>8</td>
<td>2 - 3&quot;</td>
</tr>
</tbody>
</table>

**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**  **RECOMMENDED**

**DATE** 12/30/2014  **SIGNATURE ON FILE**

**DATE** 12/11/2014  **SIGNATURE ON FILE**

**DATE** 12/4/2014
**NOTE:** BOLT PATTERN TO BE PROVIDED BY DELDOT'S SIGNAL CONSTRUCTION INSPECTOR.
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.
1 - #3 (M2) SPIRAL BAR, 504" (12800) LONG AT 8" (200) PITCH

8 - #5 (M6) BARS, 4' (1200) LONG

NOTE: STUB POST TO BE SUPPLIED BY THE DEPARTMENTS OF TRAFFIC, ENGINEERING, AND MANAGEMENT SECTION.
NOTES:

1. ALL SAWCUTS SHALL BE A DEPTH OF 3½" ON ALL SURFACES.
2. CONTRACTOR SHALL INSTALL LEAD-INS 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, 3½".
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 3½" 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, 3½".
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
LOOP DETECTOR
DEL. 57 STONE

NOTES:
1. ALL SAWCUTS SHALL BE A DEPTH OF 3" 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.
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.

DEL. 57 STONE

LOOP DETECTOR
LEAD-IN WIRE INSTALLATION

CONTRACTOR SHALL INSTALL DETECTABLE WARNING TAPE IN TRENCH FOR LEAD-IN CONDUIT.

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

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.

DEL. 57 STONE

LOOP DETECTOR
LEAD-IN WIRE INSTALLATION

CONTRACTOR SHALL INSTALL DETECTABLE WARNING TAPE IN TRENCH FOR LEAD-IN CONDUIT.

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

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.
NOTE:
1) WHEN A PROPOSED LOOP DETECTOR SAWCUT CROSS A LATERAL ROADWAY JTVNT OR OTHER OBSTRUCTION (VALVE COVER, MANHOLE, JUNCTION WELL, ETC.), LOOP DETECTOR INSTALLATION SHALL BE MODIFIED INTO TWO SEPARATE LOOP DETECTORS WHICH SHALL NOT TRAVESIE 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 1/2" WIDE.
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 LANE 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.

PUSH BUTTON COMMON - YELLOW
PUSH BUTTON RETURN - BLACK
NEUTRAL - WHITE
WALK - GREEN
DON'T WALK - RED

5 CONDUCTOR CABLE
RED - DON'T WALK
GREEN - WALK
WHITE - NEUTRAL
BLACK - PUSH BUTTON RETURN
YELLOW - PUSH BUTTON COMMON

DELAWARE
DEPARTMENT OF TRANSPORTATION

LOOP DETECTOR INSTALLATION & SPlice KIT

STANDARD NO. T-9 (2013)
SIT. 3 OF 3

APPROVED
SIGNATURE ON FILE 02/14/2014
CHIEF ENGINEER

RECOMMENDED
SIGNATURE ON FILE 01/14/2014
DESIGN ENGINEER

1/9/2014
SPAN WIRE ATTACHMENT BETWEEN POLES

STANDARD NO. T-12 (2006) SHT. 1 OF 2

DEPARTMENT OF TRANSPORTATION

NOTE: SPAN WIRE ATTACHMENT BETWEEN METAL POLES IS THE SAME AS SHOWN FOR WOOD POLES EXCEPT THAT THE STRAIN PLATES AND GUY HOOPS ARE NOT USED. FOR DETAIL SEE T-14 SHEET 2 - "DEAD END MESSENGER WIRE ATTACHMENT, METAL POLES."

APPROVED  gestures  12/5/05

DELAWARE

RECOMMENDED  (signed)  11/05/05

09/09/2005
3. 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.
CABLE CONNECTIONS
TO TERMINAL STRIP

FRONT VIEW
(CABLE IS NOT SHOWN)

SIDE VIEW

TUBE SHELLS
CAP SCREW
TUBE ASSEMBLIES
BASE
WIRING ACCESS DOOR WEATHER PROOF
MOUNTING NUT

4-CONDUCTOR #18 AWG SHIELDED LEAD-IN CABLE
CABLE ENTRY PORT

1/4" NPT MIP HOLE (AT THE BOTTOM OF THE BASE)

TO MAST ARM

NOTES:
1. UPRIGHT CONFIGURATION SHALL BE USED FOR MOUNTING ON MAST ARMS, SIGNAL HEAD FRAMEWORKS AND PEDESTALS.
2. UPRIGHT MOUNTING HARDWARE SHALL BE SUPPLIED BY THE DEPARTMENT.
3. TEFELON TAPE SHALL BE APPLIED TO THREADS BEFORE MOUNTING.

BLACK
GREEN
RED
WHITE

ACCESS DOOR SCREW HOLE
4-POSITION TERMINAL STRIP

TO CONTROLLER CABINET

DELAWARE
DEPARTMENT OF TRANSPORTATION

EMERGENCY PREEMPTION RECEIVER, UPRIGHT MOUNT
APPROVED

STANDARD NO. T-14 (2006) SHT. 1 OF 2 RECOMMENDED

06/21/2006
NOTES:
0. INVERTED CONFIGURATION SHALL BE USED FOR SPAN MOUNT.
1. SPAN WIRE MOUNTING HARDWARE SHALL BE SUPPLIED BY THE DEPARTMENT.
2. TEFLOM TAPE SHALL BE APPLIED TO THREADS BEFORE MOUNTING.
3. ROUTE THE LEAD-IN CABLE THROUGH THE METAL CAP AND THE RUBBER PLUG.
4. REPLACE THE METAL CAP, SEALING THE CABLE ENTRY PORT, TIGHTEN THE METAL CAP SO THE CABLE WILL NOT SLIDE THROUGH THE RUBBER PLUG.
**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 1/2" x 2 1/2" +/- 0.010
   c. 2 3/4" x 2 3/4" +/- 0.020

3. ALL FOUR SIDES ARE TO HAVE EVENLY SPACED 5/8" DIAMETER HOLES ON 1" CENTERS THE ENTIRE LENGTH OF THE TUBE.

4. STANDARD CORNER RADIUS SHALL BE 5/32".

5. THE FASTENERS TO BE SUPPLIED UNDER THIS SPECIFICATION SHALL BE 1/4", GRADE 5 UNC CORNER BOLTS WITH CADMIUM OR ZINC PLATING. INSTALLATION OF SIGNS SHALL BE WITH 2 1/2" x 2 1/2" 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 MEDIANS 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 SIGN POST SHALL EXTEND A MINIMUM OF 4" INTO THE 2" SQUARE TUBING.
DELWARE
DEPARTMENT OF TRANSPORTATION

WOOD BARRICADE POST CHART

ROADWAY WIDTH

NUMBER OF

BARRICADES

TYPE OF POST

OUTSIDE

OVERHANGING

4"-0" (1.2m)

1-POST

2-0" (600)

1-0" (300)

6'-0" (1.8m)

1-POST

3'-0" (900)

1-0" (300)

8'-0" (2.4m)

2-POST

4'-0" (1200)

2-0" (600)

10'-0" (3.0m)

2-POST

5'-0" (1500)

3-0" (900)

12'-0" (3.6m)

2-POST

6'-0" (1800)

4-0" (1200)

14'-0" (4.2m)

2-POST

7'-0" (2100)

5-0" (1500)

16'-0" (4.8m)

2-POST

8'-0" (2400)

6-0" (1800)

18'-0" (5.4m)

2-POST

9'-0" (2700)

7-0" (2100)

20'-0" (6.0m)

2-POST

10'-0" (3000)

8-0" (2400)

22'-0" (6.6m)

2-POST

11'-0" (3300)

9-0" (2700)

24'-0" (7.2m)

2-POST

12'-0" (3600)

10-0" (3000)

26'-0" (7.8m)

2-POST

13'-0" (3900)

11-0" (3300)

28'-0" (8.4m)

2-POST

14'-0" (4200)

12-0" (3600)

30'-0" (9.0m)

2-POST

15'-0" (4500)

13-0" (3900)

32'-0" (9.6m)

2-POST

16'-0" (4800)

14-0" (4200)

34'-0" (10.2m)

2-POST

17'-0" (5100)

15-0" (4500)

36'-0" (10.8m)

2-POST

18'-0" (5400)

16-0" (4800)

38'-0" (11.4m)

2-POST

19'-0" (5700)

17-0" (5100)

40'-0" (12.0m)

2-POST

20'-0" (6000)

18-0" (5400)

42'-0" (12.6m)

2-POST

21'-0" (6300)

19-0" (5700)

44'-0" (13.2m)

2-POST

22'-0" (6600)

20-0" (6000)

46'-0" (13.8m)

2-POST

23'-0" (6900)

21-0" (6300)

48'-0" (14.4m)

2-POST

24'-0" (7200)

22-0" (6600)

50'-0" (15.0m)

3-POST

CENTRED

(12 3-POST CLEAR)

1'-0" (300)

NOTES:

13. BARRICADES SHALL BE PLACED COMPLETELY ACROSS THE ROADWAY FROM EDGE OF ROAD TO EDGE OF ROAD, IF NECESSARY, THE BARRICADE OVERHANGING BEYOND THE OUTSIDE POSTS TYPICALLY 4"-0" (1200) MAY BE REDUCED TO THE "OUTSIDE OVERHANG VALUE INDICATED IN THE TABLE ABOVE IF OBSTACLES ARE PRESENT BEYOND THE ROADWAY EDGE.

16. MARKINGS FOR BARRICADE RAILS SHALL BE ALTERNATING FLUORESCENT RED AND WHITE STRIPES, SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES, USING PRISMATIC, RETROREFLECTIVE SHEETING. STRIPES SHALL SLOPE DOWNWARD TOWARDS THE CENTER OF THE CLOSURE.

16. ATTACH BARRICADE RAIL AND OBJECT MARKER TO THE 4"x4"x(100) PRESSURE TREATED WOOD POST USING GORBOLTS (2"x50) LONG, MINIMUM WITH WASHERS. TWO BOLTS PER RAIL PER POST SHALL BE REQUIRED.

16. ALL WOOD SHALL BE PRESSURE TREATED.

16. THE END OF ROAD OBJECT MARKER (NOTE CODE OM-31) SHALL BE 18"x18"x18" (450x450) WITH RED PRISMATIC, RETROREFLECTIVE SHEETING.

17. TREATED WOOD POST SHALL BE PLACED IN PRE-DRILLED HOLE, BACKFILLED USING SUITABLE MATERIAL, AND TAMPERED THERMALLY TO PROVIDE A ROAD SUB-SURFACE CONDITION AROUND THE POST.

18. BARRICADE RAILS MAY BE CONSTRUCTED USING PLASTIC OR WOOD AND SHOULD NOT BE METAL.

19. LONGER WIDTH CLOSERS CAN BE ACCOMMODATED BY VARIOUS COMBINATIONS OF 2-POST AND 3-POST BARRICADES.
NOTES:

1. INSTALLATION OF EQUIPMENT BETWEEN SERVICE PEDESTAL AND LIGHTING/CONTROLLER CABINET SHALL BE AS PER CONTRACT DRAWINGS/DDetails.

2. SEE DETAIL T-15, SHEET 1, FOR SIGN POST AND BREAKAWAY ASSEMBLY DETAILS.

3. ATTACH ALUMINUM PANEL TO SIGN POSTS WITH [4] #6 x 2½" LONG GRADE 5 BOLTS, FLAT WASHERS, AND NYLON LOCK NUTS, 3 ON EACH SIDE.

4. MOUNT METER SOCKET TO ALUMINUM PANEL WITH [4] #6 x 6" STAINLESS STEEL BOLTS AND NYLON LOCK NUTS.

5. MOUNT DISCONNECT SWITCH TO ALUMINUM PANEL WITH [4] #6 x 1" STAINLESS STEEL BOLTS AND NYLON LOCK NUTS.

6. ALL CONDUIT, CONDULETS AND OTHER ASSOCIATED PIECES SHALL BE 2" GALVANIZED UNLESS SPECIFIED DIFFERENTLY ON THE PLANS OR BY LOCAL UTILITY COMPANY.

7. FOR SIGNAL AND TIME'S COMPONENT INSTALLATIONS, TYPE 'C' CONDULET SHALL HOUSE INLINE FUSE KITS FOR EACH DEVICE POWERED.