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Sheet No. Name
B-15  PORTABLE CONCRETE SAFETY BARRIER (F SHAPE)
  (02001 - PLAN, ELEVATION, AND SECTION VIEW DETAIL, DELETED - SEE SPECIFICATIONS)
  (02002 - CURVE SECTION DETAIL, DELETED - SEE SPECIFICATIONS)
  (02003 - TAPERED END SECTION DETAIL, DELETED - SEE SPECIFICATIONS)
  (02004 - TYPICAL REINFORCEMENT DETAILS DETAIL, DELETED - SEE SPECIFICATIONS)
  (02004 - JOIN CONNECTION DETAIL, DELETED - SEE SPECIFICATIONS)

SECTION II - CURB & GUTTER

Sheet No. Name
C-1 (02005) - P.C.C. CURB, P.C.C. CURB & GUTTER, AND HOT-MIX CURB
  C-2 - CURB RAMPS
    (02004 - TYPE 1)
    (02004 - TYPE 2, 3, & 4)
    (02004 - SECTIONS FOR TYPES 2, 3, & 4)
    (02004 - TYPE 5)
  C-3 (02005) - ENTRANCES
  C-4 - CURB OPENINGS
    (02001 - TYPES A & B)
    (02001 - TYPES D & E)
    (02001 - TYPES F & G)

SECTION III - DRAINAGE

Sheet No. Name
D-1 - 6D SAFETY END STRUCTURE
  (02001 - DETAIL VIEWS)
  (02002 - SCHEDULES)
D-2 - 6D SAFETY END STRUCTURE
  (02001 - DETAIL VIEWS)
  (02002 - SCHEDULES)
D-3 - SAFETY GRATES
  (02005 - SAFETY END STRUCTURE, BARRIERS, DETAIL, & ASSEMBLY DETAIL)
  (02005 - PERSONNEL SAFETY GRATE FOR PIPE INLET DETAIL)
D-4 (02025) - INLET BOX DETAILS
D-5 - DRAINAGE INLET DETAILS
  (02021 - DRAINAGE INLET ASSEMBLY)
  (02021 - DRAINAGE INLET FRAMES AND GRATES)
  (02041 - DRAINAGE INLET TOP DETAILS)
  (02041 - DRAINAGE INLET COVER SLAB DETAIL)
  (02041 - DRAINAGE INLET COVER SLAB DETAILS)
  (02041 - DRAINAGE INLET 3" x 6" x 24" x 24" DRAINAGE)
  (02041 - DRAINAGE INLET 3" x 6" x 18" x 18" DRAINAGE)
  (02041 - DRAINAGE INLET 3" x 6" x 24" x 24" DRAINAGE)
  (02041 - DRAINAGE INLET 3" x 6" x 18" x 18" DRAINAGE)
  (02041 - DRAINAGE INLET 3" x 6" x 24" x 24" DRAINAGE)
  (02041 - DRAINAGE INLET 3" x 6" x 18" x 18" DRAINAGE)
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D-6  MANHOLE DETAILS
    D-6 1 BOX MANHOLE ASSEMBLY
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    D-6 3 MANHOLE FRAME AND COVER
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D-7  JUNCTION BOX DETAILS
    D-7 1 JUNCTION BOX ASSEMBLY
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D-8  (0201) PIPE BEDING

D-9  (0204) PERFORATED PIPE UNDERDRAIN

SECTION IV - EROSION

E-1  (0200) INCREMENTAL STABILIZATION
E-2  (0200) SLT FENCE
E-3  (0205) DRAINAGE INLET SEDIMENT CONTROL
E-4  (0206) CURB INLET SEDIMENT CONTROL
E-5  (0206) STONE CHECK DAM
E-6  (0205) SEDIMENT TRAP
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E-8  (0205) RISP PIPE ASSEMBLY FOR SEDIMENT TRAP
    E-8 1 ELEVATION
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E-9  (0205) EROSION CONTROL BLANKET APPLICATIONS
E-10 (0205) RRRAPE DITCH
E-11 (0205) TEMPORARY SWALE
E-12 (0205) PERIMETER Dike/SWALE
E-13 (0205) EARTH Dike
E-14 (0205) TEMPORARY SLOPE DRAIN
E-15 (0205) STILLING WELL
E-16 (0205) SWMP PIT, TYPE 1 & 2
E-17 (0205) DEMATERING BASIN
E-18 (0205) GEOTEXTILE-LINED CHANNEL DIVERSION
E-19 (0205) SANDBAG DIVERSION
E-20 (0205) SANDBAG Dike
E-21 (0205) STABILIZED CONSTRUCTION ENTRANCE
E-22 (0205) SUMMER Dewatering Device
E-23 (0205) TURBIDITY CURTAIN
    E-23 1 FLOATING TURBIDITY CURTAIN
    E-23 2 STAKED TURBIDITY CURTAIN
E-24 (0205) PORTABLE SEDIMENT TANK
E-25 (0205) TURF REINFORCEMENT MAT APPLICATIONS
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<td>M-1 0200</td>
<td>RIGHT-OF-WAY FENCE</td>
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<tr>
<td>M-2 0200</td>
<td>CONCRETE MONUMENT</td>
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<tr>
<td>M-3 0200</td>
<td>REMOVABLE BOLLARD</td>
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<tr>
<td>M-4 0204</td>
<td>BIKE RACK</td>
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<tr>
<td>M-5 0204</td>
<td>WOOD RAIL FENCE</td>
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<tr>
<td>M-6 0204</td>
<td>PATTERED HOT-MIX OR CONCRETE &amp; BRICK PAVING</td>
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<td>P.C.C. PAVEMENT</td>
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<tr>
<td>0200-1</td>
<td>SLAB PLAN WITH DOWEL AND TIE LOCATIONS</td>
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<tr>
<td>02001-2</td>
<td>JOINT AND SEALANT DETAILS</td>
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<tr>
<td>02001-3</td>
<td>BOLT, HOOK BOLT, DOWEL &amp; TIE BAR</td>
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<td>02001-4</td>
<td>DOWEL SUPPORT BASES</td>
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<tr>
<td>02001-5</td>
<td>DOWEL &amp; TIE BAR PLACEMENT TOLERANCES</td>
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<td>P-2</td>
<td>P.C.C. PAVEMENT PATCHING</td>
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<td>FULL DEPTH PATCH PLAN VIEW</td>
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<td>FULL DEPTH PATCH SECTION VIEW</td>
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<td>02004-3</td>
<td>FULL DEPTH PATCH SEALANT DETAILS, GROUT RETENTION BOX, AND DOWEL BAR</td>
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<td>FULL DEPTH PATCH DOWEL BAR PLACEMENT TOLERANCES</td>
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<tr>
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<td>PARTIAL DEPTH PATCH PLAN AND SECTION VIEW</td>
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<td>T-1 0205</td>
<td>CONDUIT JUNCTION WELL, TYPES L2, AND 3</td>
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<tr>
<td>T-2 0205</td>
<td>CONDUIT JUNCTION WELL, TYPE 4</td>
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<tr>
<td>T-3 0205</td>
<td>CONDUIT JUNCTION WELL, TYPE 5</td>
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<tr>
<td>T-4 0205</td>
<td>CABINET BASES (TYPES &quot;A&quot; AND &quot;B&quot;)</td>
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<tr>
<td>T-5</td>
<td>POLE BASES</td>
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<tr>
<td>02005-1</td>
<td>ROUND BASE, SQUARE BASE</td>
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<tr>
<td>02005-2</td>
<td>TYPICAL SECTION BASES 1, 2, 3, 3A, 3B, AND 3C</td>
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<td>02005-3</td>
<td>TYPICAL SECTIONS 1, 2, 3, 3A, 3B, 3C, AND 3D</td>
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<td>T-6 0205</td>
<td>SPECIAL POLE BASE</td>
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<td>T-7 0205</td>
<td>SIGN FOUNDATION</td>
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<td>T-8 0205</td>
<td>LOOP DETECTOR TO CONDUIT JUNCTION WELL CONNECTION</td>
</tr>
<tr>
<td>T-9 0205</td>
<td>TYPE &quot;A&quot; LOOP DETECTOR</td>
</tr>
<tr>
<td>T-10 0205</td>
<td>TYPE &quot;B&quot; LOOP DETECTOR</td>
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DELAWARE DEPARTMENT OF TRANSPORTATION

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1/23/2005
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<thead>
<tr>
<th>SHEET NO.</th>
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<tr>
<td>T-1</td>
<td>MESSENGER WIRE ATTACHMENT</td>
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<tr>
<td>12001-1</td>
<td>INTERMEDIATE MESSENGER WIRE ATTACHMENT ON WOOD POLES</td>
<td></td>
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<tr>
<td>12005-1</td>
<td>ANGULAR INTERMEDIATE MESSENGER WIRE ATTACHMENT</td>
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<tr>
<td>T-2</td>
<td>MESSENGER WIRE ATTACHMENT</td>
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<td>12005-2</td>
<td>DEAD END MESSENGER WIRE ATTACHMENT</td>
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<tr>
<td>T-3</td>
<td>CONDUIT JUNCTION WELS</td>
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<tr>
<td>12001-1</td>
<td>TYPE A</td>
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<tr>
<td>12004-1</td>
<td>TYPE B</td>
<td></td>
</tr>
<tr>
<td>12004-2</td>
<td>TYPES B &amp; ID</td>
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<tr>
<td>T-4</td>
<td>EMERGENCY PREEMPTION RECEIVER</td>
<td></td>
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<tr>
<td>12001-1</td>
<td>UPRIGHT MOUNT</td>
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</tr>
<tr>
<td>12005-2</td>
<td>INVERTED MOUNT</td>
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# BARRIER LEGEND

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<tr>
<th>ITEM NO.</th>
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<tr>
<td>1</td>
<td>W-BEAM</td>
</tr>
<tr>
<td>2</td>
<td>W6 X 9 (W50 x 13.5) STEEL POST</td>
</tr>
<tr>
<td>3</td>
<td>WOOD OFFSET BLOCK</td>
</tr>
<tr>
<td>4</td>
<td>SPlice - REQUIRES EIGHT(8) 5/8&quot;(16) GUARDRAIL BOLTS (L=3/4&quot; (35)) WITH RECESS NUTS, AND ONE(1) 5/8&quot;(16) GUARDRAIL BOLT (L=10&quot; (255)) WITH RECESS NUT.</td>
</tr>
<tr>
<td>5</td>
<td>W-BEAM TERMINAL CONNECTOR</td>
</tr>
<tr>
<td>6</td>
<td>3/8&quot; (16) GUARDRAIL BOLT (L=3/4&quot; (35)) AND RECESS NUT</td>
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<tr>
<td>7</td>
<td>5/8&quot; (16) GUARDRAIL BOLT (L=10&quot; (255)) AND RECESS NUT</td>
</tr>
<tr>
<td>8</td>
<td>5/8&quot; (16) GUARDRAIL BOLT (L=10&quot; (255)), STEEL WASHER, AND RECESS NUT</td>
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<tr>
<td>9</td>
<td>1/2&quot; (22) HIGH STRENGTH STRUCTURAL HEX BOLT (L=VARIES) AND HEX NUT</td>
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<tr>
<td>10</td>
<td>5/8&quot; (16) CARRIAGE BOLT (L=VARIES), STEEL WASHER, AND HEX NUT</td>
</tr>
<tr>
<td>11</td>
<td>BEARING PLATE</td>
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</table>
TYPE 1 GUARDRAIL
TYPICAL GUARDRAIL TREATMENT
WHEN THE REQUIRED 4' (1200) CLEARANCE TO OBSTRUCTION IS AVAILABLE

TYPE 1 GUARDRAIL PLACEMENT
POST SPACING 6'-3'' (1905)
OR APPROPRIATE END TREATMENT

NOTES:
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 10:1 OR FLATTER.
2. POST SPACING 6'-3'' (1905) REQUIRED CLEARANCE, 4' (1200) MINIMUM

TYPE 2 GUARDRAIL
TYPICAL GUARDRAIL TREATMENT
WHEN 2' (600) TO 4' (1200) OF CLEARANCE TO OBSTRUCTION IS AVAILABLE

FLARE RATES

<table>
<thead>
<tr>
<th>DESIGN SPEED</th>
<th>FLARE RATE</th>
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<tbody>
<tr>
<td>70 MPH (110 km/h)</td>
<td>6d</td>
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<tr>
<td>60 MPH (100 km/h)</td>
<td>6d</td>
</tr>
<tr>
<td>55 MPH (90 km/h)</td>
<td>6d</td>
</tr>
<tr>
<td>50 MPH (80 km/h)</td>
<td>6d</td>
</tr>
<tr>
<td>45 MPH (70 km/h)</td>
<td>6d</td>
</tr>
<tr>
<td>40 MPH (60 km/h)</td>
<td>6d</td>
</tr>
<tr>
<td>30 MPH (50 km/h)</td>
<td>6d</td>
</tr>
</tbody>
</table>

TYPE 3 GUARDRAIL
TYPICAL GUARDRAIL TREATMENT WHEN A MINIMUM OF 10' (3000) IS AVAILABLE FOR MEDIAN

NOTES:
1. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.

DELTAUARE DEPARTMENT OF TRANSPORTATION

GUARDRAIL APPLICATIONS

STANDARD NO. B-1 (2000) SHT. 1 OF 6

APPROVED

RECOMMENDED
DELAWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL APPLICATIONS

STANDARD NO. B-1 (2004) SHT. 2 OF 6

NOTE: OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.
**GUARDRAIL SECTION**

**RURAL SHOULDER APPLICATION**

1. **TYPE**
   1. 6' (1.83M)
   2. 3 1/2' (1.07M)

2. **POST SPACING**
   1. 2' (600MM)
   2. 4' (1200MM)

3. **CLEAR AREA BEHIND POST**
   1. 4' (1200MM)
   2. 2' (600MM)

4. **DESIGN SPEED**
   1. < 50 MPH (80 km/h)
   2. > 50 MPH (80 km/h)

5. **D**
   1. 6' (1.83M)
   2. 10' (3000M)

6. **Hinge Point**
7. **Curb to be used only when indicated on the plans**
8. **Guardrail Section**
   **Median Application**
   **Urban Shoulder Application**

---

**DELTA WIRE GROUP**

**DEPARTMENT OF TRANSPORTATION**

**GUARDRAIL APPLICATIONS**

**STANDARD NO.** B-1 (2002)

**SHT.** 3 OF 6

**APPROVED**

**RECOMMENDED**

**01/31/2002**
NOTES:
1. FLARE THE END TREATMENT AT 25" BEGINNING 50' 0" 85 M 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.
3. THE GUARDRAIL END TREATMENT ATTENUATOR SHALL BE INSTALLED AS PER THE MANUFACTURER'S AND THE DEPARTMENT OF TRANSPORTATION'S SPECIFICATIONS.

GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE I
NOTES:
1. FLARE SHALL BE 4' (1200) 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. THE GUARDRAIL END TREATMENT ATTENUATOR SHALL BE INSTALLED AS PER THE MANUFACTURER’S AND THE DEPARTMENT OF TRANSPORTATION’S SPECIFICATIONS.

SECTION A-A

GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2

DELAWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL APPLICATIONS

STANDARD NO. B-1 (2002)  SHT. 5  OF 6  

APPROVED

RECOMMENDED
NORMAL DOUBLE FACE W-BEAM BARRIER
ON TRANSITION TO CONCRETE BARRIER
50' 05" LIMIT OF PAYMENT

DIRECTION OF TRAFFIC

SHOULDER

10' (3000 mm)

TRANSITION GRADING SHOWN ON PLANS
OF REQUIRED

50' 05" LIMIT OF PAYMENT

MEDIAN DITCH

10' OR FLATTER SLOPE

SHOULDER

DIRECTION OF TRAFFIC

PLAN VIEW

YARDS

1'300 mm OFFSET FROM FLOW LINE

SHOULDER

10' OR FLATTER SLOPE

SHOULDER

POST

SECTION B-8
GRADING FOR END TREATMENT ATTENUATOR, TYPE 3

NOTES:
1. THIS DETAIL WAS SOLELY CREATED TO SHOW THE GRADING REQUIRED FOR THIS TYPE OF ATTENUATOR.
2. 10' OR FLATTER GRADING IS ALLOWABLE WHEN THE BARRIER IS LOCATED 2' (610 mm) OR MORE FROM THE OUTSIDE EDGE OF THE SHOULDER.
3. THIS END TREATMENT CAN ALSO BE USED IN RAMP CORES OR OTHER AREAS WHERE 2 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.
**NOTES:**
1. All W-beams are 12'-6" (3810) in length.
2. Place guardrail reflector every fifth post.

**PLAN**

- Two sections of W-beam, one nested inside the other.
- Since no post or offset block is present at this location, 3/4" (10) guardrail bolt (L=16" [405]) is not required.

**ELEVATION**

- 2' (600) min. to culvert (typ.)
**DELAWARE DEPARTMENT OF TRANSPORTATION**

**GUARDRAIL OVER CULVERTS, TYPE 2**

**APPROVED**

<table>
<thead>
<tr>
<th>STANDARD NO.</th>
<th>B-3</th>
<th>SHT. 1 OF 1</th>
<th>RECOMMENDED</th>
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</thead>
</table>

**NOTES:**

1. ALL W-BEAMS ARE 13' (4000) IN LENGTH.
2. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
PLAN

AREA BEHIND GUARDRAIL TO BE MAINTAINED FREE OF FIXED OBJECTS OR OTHER HAZARDS.

SLOPE = 15:1 OR FLATTER

TYPICAL GUARDRAIL PLACEMENT OR APPROPRIATE END TREATMENT OR GUARDRAIL TO BARRIER CONNECTION

NOTES:
1. NO WASHERS ARE USED ON THE RAIL SIDE OF THE LONG WOOD BREAKAWAY POSTS.
2. THE CURVED GUARDRAIL SECTION SHALL BE SHOP BUILT.
3. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.

<table>
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<tr>
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<td>8'-6&quot; (2600)</td>
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<td>17'-0&quot; (5200)</td>
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<td>25'-6&quot; (7800)</td>
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<tr>
<td>35'-0&quot; (10700)</td>
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</table>

MIN. REQUIRED AREA FREE OF FIXED OBJECTS

<table>
<thead>
<tr>
<th>L x W</th>
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<tbody>
<tr>
<td>25' x 18' (7600 x 4500)</td>
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<tr>
<td>30' x 18' (9144 x 4500)</td>
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<tr>
<td>40' x 20' (12000 x 6000)</td>
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<tr>
<td>50' x 20' (15200 x 6000)</td>
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LONG WOOD BREAKAWAY POST

SECTION A-A

4' (1200) Rounding

4' (1200)
END SECTION PLAN

END SECTION ELEVATION

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' (030) STEEL TUBE WITHOUT A SOIL PLATE OR A 5' (025) STEEL TUBE WITH A SOIL PLATE.

DELAWARE DEPARTMENT OF TRANSPORTATION

END ANCHORAGE

STANDARD NO. B-5 (2002) SHT. 1 OF 1

APPROVED

RECOMMENDED
**Type 1 Guardrail Placement**

**Plan**
- **Typical**
  - GUARDRAIL FLARE RATE
  - EDGE OF SHOULDER
  - DIRECTION OF TRAVEL

**Elevation**
- **Section A-A**
  - SEE NOTE # 3 LENGTH VARES

**Notes**
1. BURIED END SECTION PAYMENT INCLUDES THE CONCRETE OR POST ANCHORAGE, EXCAVATION, BACKFILL, AND ALL APPPLICABLE ITEMS INCLUDING LABOR NECESSARY TO COMPLETE END ANCHORAGE.
2. THE CONTRACTOR HAS THE OPTION OF USING EITHER A CONCRETE BLOCK ANCHOR OR A POST ANCHOR TO TERMINATE THE BURIED END SECTION.
3. WHEN PLACING GUARDRAIL ON A 10% OR FLATTER SLOPE, THE HEIGHT OF THE GUARDRAIL SHALL BE HELD CONSTANT RELATIVE TO THE GROUND DIRECTLY UNDER THE FACE OF THE GUARDRAIL.
4. ALL POSTS SHALL BE 6" (150MM) FOR SINGLE RAIL INSTALLATION.
5. WHEN USING THE BURIED END SECTION, THE DESIGN MUST PROVIDE A MINIMUM OF 10' 2" (3.1M) FROM WHERE THE GUARDRAIL CROSSES THE DITCH LINE TO THE BEGINNING OF THE HAZARD.
6. MAINTAIN THE FLARE OF THE GUARDRAIL UNTIL THE 0' (0MM) COVER HAS BEEN ATTAINED. IF THE 0' (0MM) COVER CANNOT BE ATTAINED BEFORE THE RAIL IS 7' (2130MM) BEHIND THE BOTTOM OF THE DITCH, THEN SLOPE THE GUARDRAIL FROM THE POINT WHERE IT CROSSES THE DITCH TO WHERE IT IS 7' (2130MM) BEHIND THE DITCH. SO THAT IT HAS 0' (0MM) COVER.

**Flare Rates**

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>Flare Rate</th>
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<tbody>
<tr>
<td>70 MPH (110 km/h)</td>
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<tr>
<td>60 MPH (96 km/h)</td>
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<td>50 MPH (80 km/h)</td>
<td>10d</td>
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<tr>
<td>45 MPH (72 km/h)</td>
<td>10d</td>
</tr>
<tr>
<td>40 MPH (64 km/h)</td>
<td>9d</td>
</tr>
<tr>
<td>30 MPH (48 km/h)</td>
<td>7d</td>
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**DELAWARE DEPARTMENT OF TRANSPORTATION**

**STANDARD NO.** B-6 (2002) **SHR. 1 OF 3** **APPROVED**

**01/31/2002**
STEEL SPACER TUBE
6'1500' L.D., SCHEDULE 40
GALVANIZED PIPE 4'-8' (137h)

2-SECTIONS OF W BEAM, ONE NESTED INSIDE THE OTHER
OVERLAP W BEAMS IN DIRECTION OF TRAVEL

PLAN

LIMIT OF PAYMENT FOR GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE I

DRILL 3/4" (20) HOLE IN W BEAM TO INSERT STEEL SPACER TUBE & ATTACH WITH 3/8" X 4" (10L) CARRIAGE BOLT (1/4"-20 C.S.D.)

ELEVATION

NOTES:
1. W BEAM IS NOT BOLTED TO POSTS AT POSTS 2 THROUGH 4.
2. RUB RAIL IS NOT BOLTED AT POSTS 2 AND 4.
3. POSTS 1 THROUGH 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER WOOD BLOCKS AND/OR RUBRAIL AND WOOD BLOCK.
4. USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE.
5. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
6. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
7. APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTOR TO PARAPET.
8. POSTS 1 & 2 ARE 6@3 (152x63), ALL OTHER POSTS IN TRANSITION ARE 6@3 (152x63).

POSTS NO. 3, 4, & 5
SECTION A-A

POSTS NO. 1 & 2
SECTION B-B

DELAWARE DEPARTMENT OF TRANSPORTATION
GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1
STANDARD NO. B-7 (2004) SHT. 1 OF 3

APPROVED
12/5/05

RECOMMENDED
11/6/06

08/08/05
ELEVATION
WOOD BLOCKOUT DETAIL

ELEVATION
WIDTH VARIES (SEE TABLE)

RUB RAIL WOOD BLOCKS

RUB RAIL TO BARRIER CONNECTION

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 WROUGHT 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 SCHEDULED 40 GALVANIZED PIPE, 6" (152) OD x 3" (76) ID

<table>
<thead>
<tr>
<th>POST NO.</th>
<th>WIDTH</th>
<th>BOLT LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4/&quot;(100)</td>
<td>6&quot; (152)</td>
</tr>
<tr>
<td>2</td>
<td>3/&quot;(76)</td>
<td>4&quot; (100)</td>
</tr>
<tr>
<td>3</td>
<td>2&quot; (51)</td>
<td>4&quot; (100)</td>
</tr>
<tr>
<td>4</td>
<td>1&quot; (25)</td>
<td>2&quot; (51)</td>
</tr>
</tbody>
</table>
NOTES:

0. CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.
1. POSTS 1, 2, 3, 4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH WOOD BLOCKS AND/OR BENT RAIL.
2. POSTS 1 AND 2 ARE N8x43 (N200x9.5), ALL OTHER POSTS IN TRANSITION ARE N8x9 (N50x18.3).
3. ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
4. BENT RAIL MAY BE SHO PrERENT TO FACILITATE INSTALLATION OR MAY BE FIELD BENT USING HEAT.
5. APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTORS TO PARAPET.
6. PLACE GUARDRAIL REFLECTOR EVERY FIFTH POST.
7. FOR INSTALLATIONS WHERE CURB EXISTS, IF THE EXISTING CURB IS 8" (200) OR HIGHER AND CANNOT BE REMOVED, THE BOTTOM RAIL CAN BE ELIMINATED.

DELAWARE DEPARTMENT OF TRANSPORTATION

GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2

STANDARD NO. B-8 (2005) SHT. 1 OF 2

APPROVED

CONSTRUCTION

12/31/05

10/17/05
BENT RAIL WOOD BLOCKS

<table>
<thead>
<tr>
<th>BLOCK</th>
<th>WIDTH</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>5&quot; (125)</td>
</tr>
<tr>
<td>4</td>
<td>2&quot; (50)</td>
<td>4&quot; (100)</td>
</tr>
</tbody>
</table>

NOTE: BOTTOM WOOD BLOCKS LOCATED ON POSTS 1-4 ARE OFFSET DRILLED TO SIT SQUARELY ON THE POST FLANGE AND SECURED WITH 5/8" CARRIAGE BOLTS (L VAREIS), SEE BENT RAIL WOOD BLOCKS TABLE.
NOTES:

1. CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTOR TO PARAPET.
2. GUARDRAIL SECTION AND TERMINAL CONNECTORS SHALL BE OVERLAPPED IN THE DIRECTION OF TRAVEL.
3. INSTALLATION SHOWN ABOVE WITH AN 'F'-TYPE BARRIER FACE. GUARDRAIL SECTION OF BARRIER CONNECTION SHALL BE ADJUSTED HORIZONTALLY IN ORDER TO MEET FLUSH AGAINST VARIOUS TYPES OF WALLS AND BARRIERS.

DELWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE

STANDARD NO. B-9 (2002)  SHT. 1  OF 1  APPROVED  RECOMMENDED

04/23/2002
THREE BEAM GUARDRAIL WITH WOOD POSTS SPACED AT 6'-3" (1905)
SEE NOTE

THREE BEAM GUARDRAIL WITH WOOD POSTS SPACED AT 6'-3" (1905)
SEE NOTE

THREE BEAM GUARDRAIL WITH WOOD POSTS SPACED AT 6'-3" (1905)
SEE NOTE

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SEE NOTE

THREE BEAM GUARDRAIL WITH WOOD POSTS SPACED AT 6'-3" (1905)
SEE NOTE

NOTES:
1. THIS INSTALLATION SHALL BE USED WHEN THE EXISTING Sidedale IS 6'-3" (1905) OR LESS.
2. USE A THREE BEAM EXPANSION SECTION AT BRIDGE EXPANSION JOINTS.
3. PLACE GUARDRAIL REFLECTOR IN THE UPPER VALLEY OF THE THREE BEAM EVERY FIFTH POST.
4. TIMBER BLOCK THICKNESS SHALL BE ADJUSTED TO ALLOW FACE OF THE THREE BEAM TO BE FLUSH WITH BOTTOM OF CURB.
5. THE EXIT END APPLICATION SHALL BE USED ONLY ON DIVIDED HIGHWAYS. FOR ALL OTHER SITUATIONS, THE ENTRANCE END APPLICATION SHALL BE USED ON BOTH ENDS OF THE BRIDGE PARAPET.
6. SPACING OF WOOD POSTS MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP POSTS AT THE END OF THE PARAPET.
DELAWARE DEPARTMENT OF TRANSPORTATION

BRIDGE RAIL RETROFIT, TYPE 2

STANDARD NO. B-11 (2004) SHT. 1 OF 4

APPROVED

NOTE: 1. THIS INSTALLATION SHALL BE USED WHEN THE EXISTING SIDEWALK IS 18” (450) OR WIDER, AND DEAD LOAD CONSIDERATIONS ARE A CONCERN WHEN USING BRIDGE RAIL RETROFIT, TYPE 3.

2. ADHESIVE ANCHORS SHALL BE INSTALLED PER MANUFACTURER’S SPECIFICATIONS AND SHALL BE GALVANIZED.

3. PLACE GUARDRAIL REFLECTOR IN THE UPPER VALLEY OF THE THREE BEAM EVERY FIFTH POST.

4. THE EXIT END APPLICATION SHALL BE USED ONLY ON DIVIDED HIGHWAYS. FOR ALL OTHER SITUATIONS, THE ENTRANCE END APPLICATION SHALL BE USED ON BOTH ENDS OF THE BRIDGE PARAPET.

5. SPACING OF STEEL POSTS MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP POSTS AT THE END OF THE PARAPET.

SECTION A-A

THREE BEAM GUARDRAIL WITH STEEL POSTS SPACED AT 6'-3" (1905) CENTER TO CENTER

SEE NOTE

EXISTING CURB LINE (BOTTOM OF CURB)

SEE NOTE

ENTRY END APPLICATION

EXIT END APPLICATION

SEE NOTE

LIMIT OF PAYMENT

2 SECTIONS OF THREE BEAM, ONE NESTED INSIDE THE OTHER

SEE NOTE

18" (450) MIN.

1'-2" (350) PLATE

1/4" (25) TYP.

6'-3" (1905)

10" (250) x 10" (250) x 6'-6" (1980) TIMBER POSTS

6" (150) x 8" (200) TIMBER BLOCKS

NOTE: 1. THIS INSTALLATION SHALL BE USED WHEN THE EXISTING SIDEWALK IS 18” (450) OR WIDER, AND DEAD LOAD CONSIDERATIONS ARE A CONCERN WHEN USING BRIDGE RAIL RETROFIT, TYPE 3.

2. ADHESIVE ANCHORS SHALL BE INSTALLED PER MANUFACTURER’S SPECIFICATIONS AND SHALL BE GALVANIZED.

3. PLACE GUARDRAIL REFLECTOR IN THE UPPER VALLEY OF THE THREE BEAM EVERY FIFTH POST.

4. THE EXIT END APPLICATION SHALL BE USED ONLY ON DIVIDED HIGHWAYS. FOR ALL OTHER SITUATIONS, THE ENTRANCE END APPLICATION SHALL BE USED ON BOTH ENDS OF THE BRIDGE PARAPET.

5. SPACING OF STEEL POSTS MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP POSTS AT THE END OF THE PARAPET.
W6 x 15 (W150 x 22) STEEL GUARDRAIL POST

BASE PLATE DETAIL

WELD ALL AROUND INCLUDING EXTERIOR FLANGE SURFACE

SIDE

FRONT

SECTION B-B

PLAN

DELAWARE
DEPARTMENT OF TRANSPORTATION

BRIDGE RAIL RETROFIT, TYPE 2

STANDARD NO.  B-11 (2001)  
SHT.  2 OF 2  
APPROVED

RECOMMENDED

04/05/2001
**Type I Guardrail Placement or Appropriate End Treatment**

Guardrail to Barrier Connection

Limit of Payment

**Plan**

End of Sidewalk

Taper End of Wall to Top of Guardrail at a Slope of 4:1 or Flatter

Existing Bridge Rail

Contraction Joints

Bridge Barrier

Direction of Travel

**Section A-A**

Existing Rail - Do Not Disturb

2.5" (65) MNL Cover

Typ.

3/8" (9.5) Chamfer (Typ.

Drill 3/4" Dia. Hole, Fill with High Strength Non-Sagging Grout

#6 (5/8) Bars Spaced 15" (375) Laterally (Typ.)

Front and Back Rows Shall Be Staggered

**Notes:** Standard Guardrail to Barrier connections shall be connected to the ends of the new bridge barrier and transitioned to the existing guardrail.

**Delaware Department of Transportation**

**Bridge Rail Retrofit, Type 3**

Standard No. B-12 (2001)

Sht. 1 of 1

Approved

Recommended

05/02/01
W-BEAM ELEVATION

W-BEAM SECTION

NOTES:
1. TWO ADDITIONAL \( \frac{3}{4} \times 2 \times 16 \) SLOTS SHALL BE PROVIDED AT 6'-3" (1905) SPACING FOR BEAM LENGTH OF 26'-3" (7940)

DELTAWORE DEPARTMENT OF TRANSPORTATION

HARDWARE

STANDARD NO. B-13 (2004) SHT. 1 OF 13

APPROVED

Beker with 11/10/05

RECOMMENDED

11/05
NOTE: WHERE CONDITIONS REQUIRE, ALTERNATE LENGTHS IN INCREMENTS OF 6" (150) MAY BE USED.

NOTE: ALL HOLES SHALL BE 3/4" (20) DBL. BOLT. HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXIS OF THE POST.
DELAWARE
DEPARTMENT OF TRANSPORTATION

HARDWARE


APPROVED DATE

RECOMMENDED DATE

W-BEAM TERMINAL CONNECTOR

ELEVATION

PLAN

SCALE: N.T.S.
THREE BEAM ELEVATION

THREE BEAM SECTION

THREE BEAM EXPANSION ELEMENT

DELTA \( \frac{12}{2} \times \frac{1}{6} \) x (30)
SLOTS (TYP)

\( \frac{1}{4} \) x (20) x (1/2) x (65) SLOTS (TYP)

\( \frac{1}{4} \) x (20) x (1/2) x (65) SLOTS (TYP)

\( \frac{1}{4} \) x (20) x (1/2) x (65) SLOTS (TYP)

\( \frac{1}{4} \) x (20) x (1/2) x (65) SLOTS (TYP)

HARDWARE

B-13 (2004)

APPROVED

11/14/05

DELTA

DEPARTMENT OF TRANSPORTATION


RECOMMENDED

11/14/05

01/31/2005
THREE BEAM STEEL POST AND WOOD OFFSET BLOCK

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

POST

SIDE

FRONT

OFFSET BLOCK

NOTE: ALL HOLES SHALL BE 3/8" (20) OR BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXIS OF THE POST.