



# 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.

# SECTION I - BARRIER

SHEET NO.	NAME	
B-L (2010)	— BARRIER LEGEND	.....
B-1	— GUARDRAIL APPLICATIONS (TYPES 1-31, 2-31, AND 3-31)	.....
	(2010) - 1 PLAN VIEWS	.....
	(2010) - 2 ELEVATION VIEWS AND SPLICE DETAIL	.....
	(2010) - 3 SECTION VIEWS	.....
B-2	— GRADING FOR GUARDRAIL END TREATMENTS (TYPES 1, 2, AND 3)	.....
	(2010) - 1 GUARDRAIL END TREATMENT, TYPE 1	.....
	(2010) - 2 GUARDRAIL END TREATMENT, TYPE 2	.....
	(2010) - 3 GUARDRAIL END TREATMENT, TYPE 3	.....
B-3	— GUARDRAIL OVER CULVERTS (TYPES 1-31, 2-31, AND 3-31)	.....
	(2010) - 1 GUARDRAIL OVER CULVERTS, TYPE 1-31	.....
	(2010) - 2 GUARDRAIL OVER CULVERTS, TYPE 2-31	.....
	(2010) - 3 GUARDRAIL OVER CULVERTS, TYPE 3-31	.....
B-4 (2010)	— END ANCHORAGE, TYPE 31	.....
B-5	— GUARDRAIL TO BARRIER CONNECTION (TYPES 1-31, 2-31, AND EXIT TYPE 31)	.....
	(2010) - 1 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-31	.....
	(2010) - 2 GUARDRAIL TO BARRIER CONNECTION, TYPE 1 HARDWARE	.....
	(2010) - 3 GUARDRAIL TO BARRIER CONNECTION, BENT PLATE RUB RAIL	.....
	(2010) - 4 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2-31	.....
	(2010) - 5 GUARDRAIL TO BARRIER CONNECTION, TYPE 2 HARDWARE	.....
	(2010) - 6 GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE 31	.....
B-6	— BRIDGE RAIL RETROFIT, TYPES 1, 2, 3, AND 4	.....
	(2010) - 1 BRIDGE RAIL RETROFIT, ENTRANCE AND END APPLICATIONS	.....
	(2010) - 2 BRIDGE RAIL RETROFIT, TYPES 1 AND 2	.....
	(2010) - 3 BRIDGE RAIL RETROFIT, TYPE 2 HARDWARE	.....
	(2010) - 4 BRIDGE RAIL RETROFIT, TYPE 3	.....
	(2010) - 5 BRIDGE RAIL RETROFIT, TYPE 4	.....
B-7 (2010)	— W-BEAM, TYPE 1-27 TO TYPE 1-31 TRANSITION SECTION	.....
B-8	— RESERVED	.....
B-9	— RESERVED	.....
B-10	— RESERVED	.....
B-11	— RESERVED	.....
B-12	— RESERVED	.....
B-13	— HARDWARE	.....
	(2010) - 1 W-BEAM ELEVATION AND SECTION VIEWS	.....
	(2010) - 2 W-BEAM STEEL POST AND OFFSET BLOCK	.....
	(2010) - 3 W-BEAM TERMINAL CONNECTOR	.....
	(2010) - 4 THRIE BEAM AND THRIE BEAM EXPANSION ELEMENT ELEVATION AND SECTION VIEWS	.....
	(2010) - 5 THRIE BEAM STEEL POST AND OFFSET BLOCK	.....
	(2010) - 6 ASYMMETRIC AND SYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION	.....
	(2010) - 7 SHORT AND LONG WOOD BREAKAWAY POSTS, STEEL TUBE, SOIL PLATE, AND OFFSET BLOCKS	.....
	(2010) - 8 SWAGED CABLE ASSEMBLAGE AND HARDWARE	.....
	(2010) - 9 GUARDRAIL DELINEATOR AND W-BEAM BEARING PLATE	.....
	(2010) - 10 GUARDRAIL MOUNTED RAIL	.....
B-14	— CONCRETE SAFETY BARRIER (F SHAPE)	.....
	(2009) - 1 32" (960) CONCRETE BARRIER, TYPICAL CAST-IN-PLACE OR SLIP-FORM ELEVATION AND SECTION VIEWS	.....
	(2009) - 2 32" (960) CONCRETE BARRIER, TYPICAL PRE-CAST ELEVATION AND SECTION VIEWS	.....
	(2009) - 3 42" (1050) CONCRETE BARRIER, TYPICAL CAST-IN-PLACE OR SLIP-FORM ELEVATION AND SECTION VIEWS	.....
	(2009) - 4 SLOTTED PLATE CONNECTION DETAILS	.....
B-15	— GUARDRAIL APPLICATIONS (TYPES 1-27, 2-27, AND 3-27)	.....
	(2010) - 1 PLAN VIEWS	.....
	(2010) - 2 ELEVATION VIEWS AND SPLICE DETAIL	.....
	(2010) - 3 SECTION VIEWS	.....



## SECTION I - BARRIER (CONT'D)

SHEET NO.	NAME
B-16	<ul style="list-style-type: none"> <li>- GUARDRAIL OVER CULVERTS (TYPES 1-27, 2-27, AND 3-27).....</li> <li>(2010) - 1 GUARDRAIL OVER CULVERTS, TYPE 1-27.....</li> <li>(2010) - 2 GUARDRAIL OVER CULVERTS, TYPE 2-27.....</li> <li>(2010) - 3 GUARDRAIL OVER CULVERTS, TYPE 3-27.....</li> </ul>
B-17 (2010)	- GUARDRAIL END TREATMENT, TYPE 4-27.....
B-18 (2010)	- CURVED GUARDRAIL SECTION.....
B-19 (2010)	- END ANCHORAGE, TYPE 27.....
B-20	<ul style="list-style-type: none"> <li>- BURIED END SECTION.....</li> <li>(2010) - 1 BURIED END SECTION - SINGLE RAIL.....</li> <li>(2010) - 2 BURIED END SECTION - DOUBLE RAIL.....</li> <li>(2010) - 3 POST, CONCRETE BLOCK, AND RUBRAIL DETAILS.....</li> </ul>
B-21	<ul style="list-style-type: none"> <li>- GUARDRAIL TO BARRIER CONNECTION (TYPES 1-27, 2-27, AND EXIT TYPE 27).....</li> <li>(2010) - 1 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-27.....</li> <li>(2010) - 2 GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 2-27.....</li> <li>(2010) - 3 GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE 27.....</li> </ul>

## SECTION II - CURB & GUTTER

SHEET NO.	NAME
C-1 (2009)	- P.C.C. CURB, P.C.C. CURB & GUTTER, AND HOT-MIX CURB.....
C-2	<ul style="list-style-type: none"> <li>- CURB RAMPS.....</li> <li>(2008) - 1 TYPE 1.....</li> <li>(2008) - 2 TYPE 2, 3, AND 4.....</li> <li>(2008) - 3 SECTIONS FOR TYPES 2, 3, AND 4.....</li> <li>(2006) - 4 TYPE 5.....</li> </ul>
C-3 (2010)	- ENTRANCES.....
C-4 (2010)	- CURB OPENING DETAILS.....

## SECTION III - DRAINAGE

SHEET NO.	NAME
D-1	<ul style="list-style-type: none"> <li>- 6:1 SAFETY END STRUCTURE.....</li> <li>(2001) - 1 DETAIL VIEWS.....</li> <li>(2001) - 2 SCHEDULES.....</li> </ul>
D-2	<ul style="list-style-type: none"> <li>- 10:1 SAFETY END STRUCTURE.....</li> <li>(2001) - 1 DETAIL VIEWS.....</li> <li>(2001) - 2 SCHEDULES.....</li> </ul>
D-3	<ul style="list-style-type: none"> <li>- SAFETY GRATES.....</li> <li>(2005) - 1 SAFETY END STRUCTURE GRATE AND ASSEMBLY DETAIL.....</li> <li>(2007) - 2 PERSONNEL SAFETY GRATE FOR PIPE INLET DETAIL.....</li> </ul>
D-4 (2009)	- INLET BOX DETAILS.....
D-5	<ul style="list-style-type: none"> <li>- DRAINAGE INLET DETAILS.....</li> <li>(2010) - 1 DRAINAGE INLET ASSEMBLY.....</li> <li>(2010) - 2 DRAINAGE INLET FRAME AND GRATES.....</li> <li>(2010) - 3 DRAINAGE INLET TOP UNITS.....</li> <li>(2010) - 4 DRAINAGE INLET COVER SLAB DETAILS.....</li> <li>(2010) - 5 DOUBLE INLET COVER SLAB DETAILS.....</li> <li>(2010) - 6 34" (865) x 24" (610) DRAINAGE INLET AND COVER SLAB DETAILS.....</li> <li>(2010) - 7 34" (865) x 18" (455) DRAINAGE INLET DETAILS.....</li> <li>(2010) - 8 DRAINAGE INLET TOP UNIT, TYPE S.....</li> <li>(2010) - 9 DOGHOUSE INLET BOX.....</li> </ul>



## SECTION III - DRAINAGE (CONT'D)

SHEET NO.	NAME
D-6	- MANHOLE DETAILS.....
	(2009) - 1 BOX MANHOLE ASSEMBLY.....
	(2001) - 2 ROUND MANHOLE ASSEMBLY.....
	(2001) - 3 MANHOLE, TOP UNIT, FRAME AND COVER.....
	(2007) - 4 BOX MANHOLE 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 (2007)	- PIPE PLUGGING DETAIL.....

## SECTION IV - EROSION

SHEET NO.	NAME
E-1 (2001)	- INCREMENTAL STABILIZATION.....
E-2 (2006)	- SILT FENCE.....
E-3 (2005)	- DRAINAGE INLET SEDIMENT CONTROL.....
<del>E-4 (2004)</del>	<del>CURB INLET SEDIMENT CONTROL</del> ** DETAIL REMOVED - SEE SPECIFICATIONS **.....
E-5 (2006)	- STONE CHECK DAM.....
E-6 (2005)	- SEDIMENT TRAP.....
E-7 (2005)	- SEDIMENT TRAP, USING DRAINAGE INLET AS OUTLET.....
E-8	- RISER PIPE ASSEMBLY FOR SEDIMENT TRAP.....
	(2006) - 1 ELEVATION.....
	(2006) - 2 TRASH HOOD DETAILS.....
E-9 (2005)	- EROSION CONTROL BLANKET APPLICATIONS.....
E-10 (2005)	- RIPRAP DITCH.....
E-11 (2005)	- TEMPORARY SWALE.....
E-12 (2005)	- PERIMETER DIKE/SWALE.....
E-13 (2005)	- EARTH DIKE.....
E-14 (2005)	- TEMPORARY SLOPE DRAIN.....
E-15 (2005)	- STILLING WELL.....
E-16 (2005)	- SUMP PIT, TYPES 1 AND 2.....
E-17 (2005)	- DEWATERING BASIN.....
E-18 (2005)	- GEOTEXTILE-LINED CHANNEL DIVERSION.....
E-19 (2005)	- SANDBAG DIVERSION.....
E-20 (2005)	- SANDBAG DIKE.....
E-21 (2005)	- STABILIZED CONSTRUCTION ENTRANCE.....
E-22 (2006)	- SKIMMER DEWATERING DEVICE.....
E-23	- TURBIDITY CURTAIN.....
	(2005) - 1 FLOATING TURBIDITY CURTAIN.....
	(2005) - 2 STAKED TURBIDITY CURTAIN.....
E-24 (2005)	- PORTABLE SEDIMENT TANK.....
E-25 (2005)	- TURF REINFORCEMENT MAT APPLICATIONS.....
E-26 (2006)	- RIPRAP ENERGY DISSIPATOR DETAIL.....



## SECTION V - LANDSCAPING

SHEET NO.	NAME
L-1	- PLANTING DETAILS.....
	(2006) - 1 ROADSIDE SHRUB PLANTING DETAIL.....
	(2006) - 2 TREE PLANTING DETAIL.....
	(2006) - 3 PERENNIAL/GROUND COVER PLANTING DETAIL.....

## SECTION VI - MISCELLANEOUS

SHEET NO.	NAME
M-1 (2001)	- RIGHT-OF-WAY FENCE.....
M-2 (2008)	- CONCRETE MONUMENT.....
M-3 (2009)	- BOLLARD AND SHARED-USE PATH DETAILS.....
M-4 (2007)	- BIKE RACK.....
M-5 (2004)	- WOOD RAIL FENCE.....
M-6 (2004)	- PATTERNED HOT-MIX OR CONCRETE & BRICK PAVER.....
M-7 (2006)	- CHAIN LINK FENCE DETAILS.....
M-8 (2007)	- P.C.C. PARKING BUMPER.....

## SECTION VII - PAVEMENT

SHEET NO.	NAME
P-1	- P.C.C. PAVEMENT.....
	(2001) - 1 SLAB PLAN (WITH DOWEL AND TIE LOCATIONS).....
	(2004) - 2 JOINT AND SEALANT DETAILS.....
	(2001) - 3 W BOLT, HOOK BOLT, DOWEL AND TIE BAR DETAILS.....
	(2001) - 4 DOWEL SUPPORT BASKET.....
	(2001) - 5 DOWEL AND TIE BAR PLACEMENT TOLERANCES.....
P-2	- P.C.C. PAVEMENT PATCHING.....
	(2008) - 1 FULL DEPTH PATCH, PLAN VIEW.....
	(2008) - 2 FULL DEPTH PATCH, SECTION VIEWS.....
	(2004) - 3 FULL DEPTH PATCH, SEALANT DETAILS, GROUT RETENTION DISK, AND DOWEL BAR.....
	(2001) - 4 FULL DEPTH PATCH, DOWEL AND TIE BAR PLACEMENT TOLERANCES.....
	(2001) - 5 PARTIAL DEPTH PATCH, PLAN AND SECTION VIEWS.....
P-3	- BUTT JOINT DETAILS.....

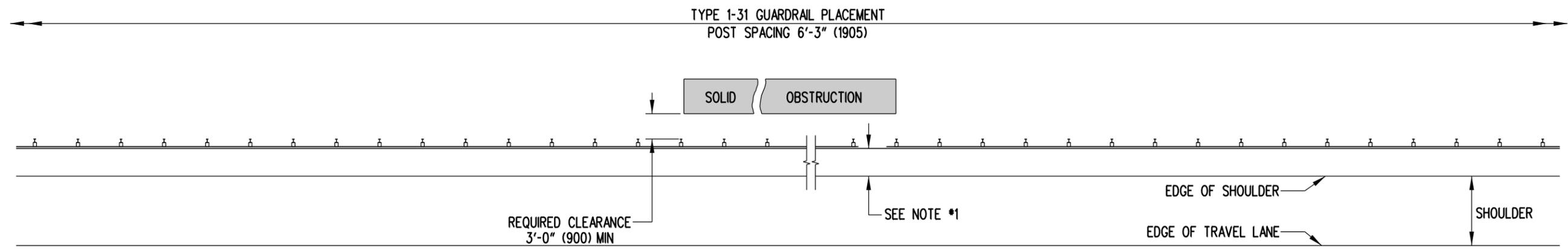


# SECTION VIII - TRAFFIC

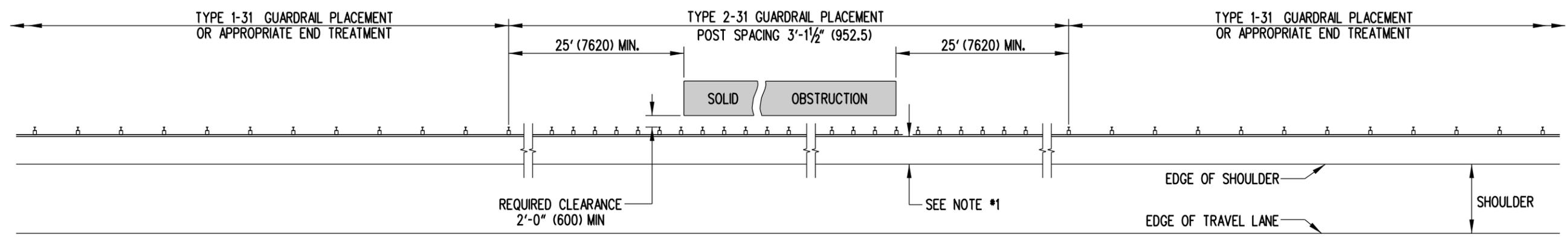
SHEET NO.	NAME
T-1 (2005)	– CONDUIT JUNCTION WELL, TYPES 1, 2, AND 3.....
T-2 (2005)	– CONDUIT JUNCTION WELL, TYPE 4.....
T-3 (2005)	– CONDUIT JUNCTION WELL, TYPE 5.....
T-4 (2005)	– CABINET BASES, TYPES M AND P.....
T-5	– POLE BASES.....
	(2005) - 1 ROUND BASE, SQUARE BASE.....
	(2005) - 2 TYPICAL SECTION AND INSTALLATION (BASES 1, 2, 2A, 2B, 3, 3A, 3B, 4 AND 7).....
	(2008) - 3 TYPICAL SECTION (BASES 5 AND 6) AND POLE BASE DATA CHART.....
T-6 (2006)	– SPECIAL POLE BASE.....
T-7 (2005)	– SIGN FOUNDATION.....
T-8 (2005)	– LOOP DETECTOR TO CONDUIT JUNCTION WELL CONNECTION.....
T-9 (2005)	– TYPE #1 LOOP DETECTOR.....
T-10 (2005)	– TYPE #2 LOOP DETECTOR.....
T-11	– MESSENGER WIRE ATTACHMENT.....
	(2005) - 1 INTERMEDIATE MESSENGER WIRE ATTACHMENT ON WOOD POLES.....
	(2005) - 2 ANGULAR INTERMEDIATE MESSENGER WIRE ATTACHMENT.....
T-12	– MESSENGER WIRE ATTACHMENT.....
	(2005) - 1 SPAN WIRE ATTACHMENT BETWEEN POLES.....
	(2005) - 2 DEAD END MESSENGER WIRE ATTACHMENT.....
T-13	– CONDUIT JUNCTION WELLS.....
	(2005) - 1 TYPE 6.....
	(2006) - 2 TYPE 7.....
	(2006) - 3 TYPES 8 AND 10.....
T-14	– EMERGENCY PREEMPTION RECEIVER.....
	(2006) - 1 UPRIGHT MOUNT.....
	(2005) - 2 INVERTED MOUNT.....
T-15 (2009)	– BREAKAWAY SIGN POST AND PIN ASSEMBLY DETAILS.....
T-16 (2010)	– WOOD BARRICADE DETAILS.....



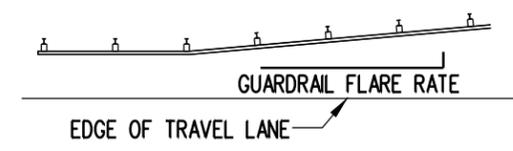
BARRIER LEGEND	
ITEM NO.	DESCRIPTION
①	W-BEAM
②	W6 X 9 (W150 x 13.5) STEEL POST
③A    ③B	③A - 6" (150) x 12" (300) x 14" (350) OFFSET BLOCK ③B - 6" (150) x 8" (200) x 14" (350) OFFSET BLOCK
④	SPLICE - REQUIRES EIGHT(8) 5/8" (16) GUARDRAIL BOLTS (L=1 1/4" (35)) WITH RECESS NUTS
⑤	W-BEAM TERMINAL CONNECTOR
⑥	5/8" (16) GUARDRAIL BOLT (L=1 1/4" (35)) AND RECESS NUT
⑦A    ⑦B	⑦A - 5/8" (16) GUARDRAIL BOLT (L=14" (455)) AND RECESS NUT ⑦B - 5/8" (16) GUARDRAIL BOLT (L=10" (255)) AND RECESS NUT
⑧	5/8" (16) GUARDRAIL BOLT (L=10" (255)), STEEL WASHER, AND RECESS NUT
⑨	7/8" (22) HIGH STRENGTH STRUCTURAL HEX BOLT (L=VARIES) AND HEX NUT
⑩	5/8" (16) CARRIAGE BOLT (L=VARIES), STEEL WASHER, AND HEX NUT
⑪	BEARING PLATE



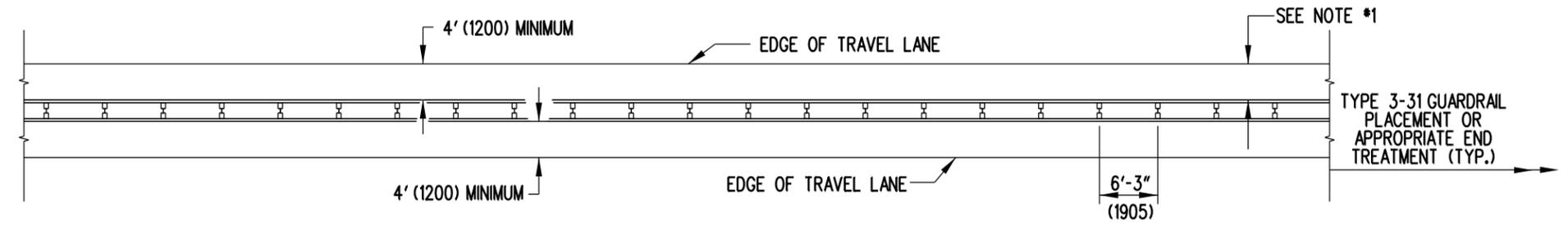
**TYPE 1-31 GUARDRAIL**  
TYPICAL GUARDRAIL TREATMENT  
WHEN THE REQUIRED 3'-0" (900) CLEARANCE TO OBSTRUCTION IS AVAILABLE



**TYPE 2-31 GUARDRAIL**  
TYPICAL GUARDRAIL TREATMENT  
WHEN 2'-0" (600) TO 3'-0" (900) OF CLEARANCE TO OBSTRUCTION IS AVAILABLE

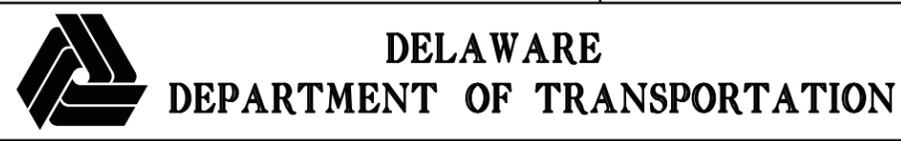


FLARE RATES	
DESIGN SPEED	FLARE RATE
70 MPH (110 km/h)	15:1
60 MPH (100 km/h)	14:1
55 MPH (90 km/h)	12:1
50 MPH (80 km/h)	11:1
45 MPH (70 km/h)	10:1
40 MPH (60 km/h)	9:1
30 MPH (50 km/h)	7:1



**TYPE 3-31 GUARDRAIL**  
TYPICAL MEDIAN GUARDRAIL 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). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.



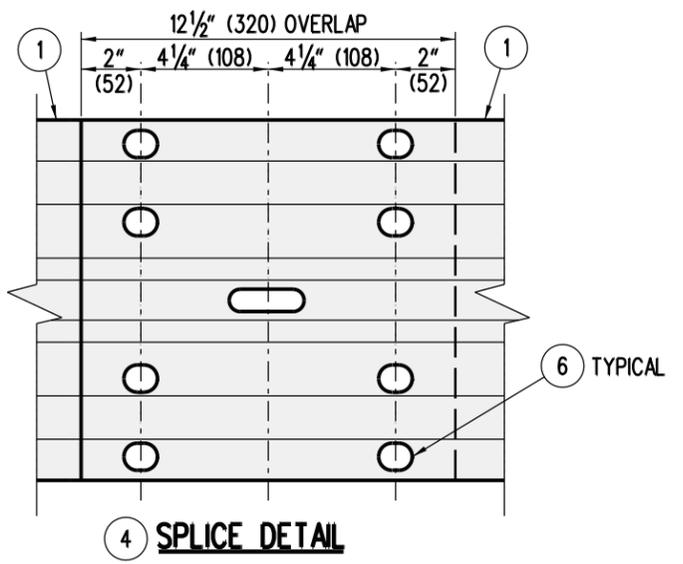
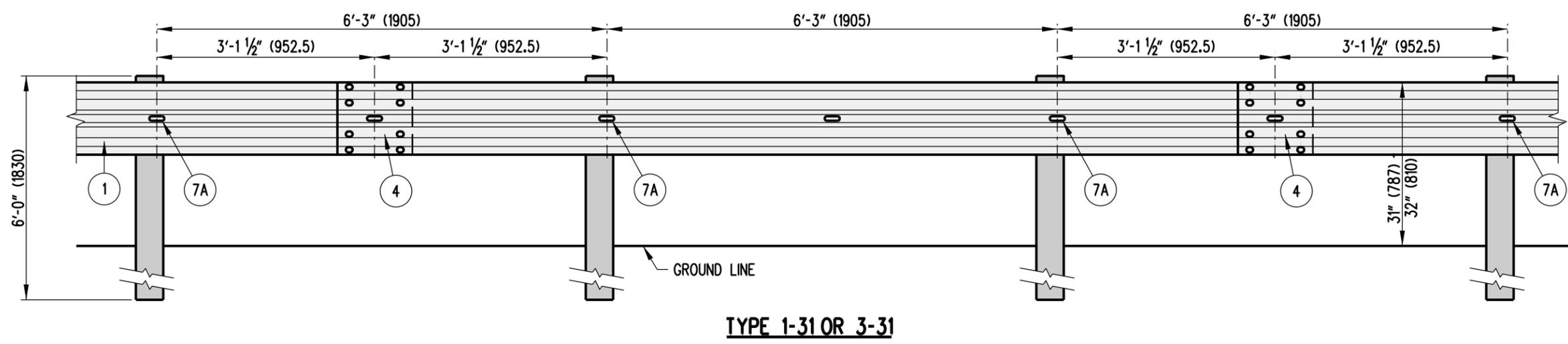
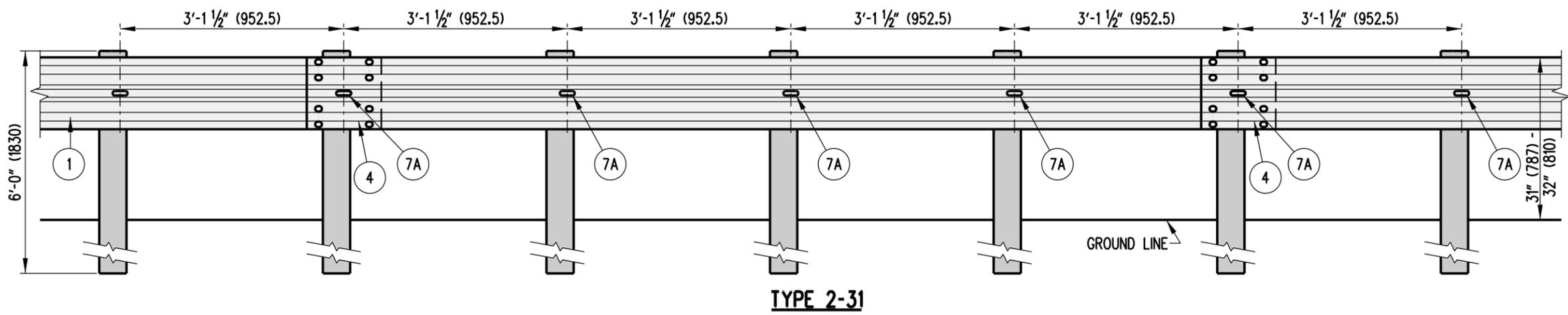
**TYPES 1-31, 2-31, AND 3-31 GUARDRAIL APPLICATIONS**

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

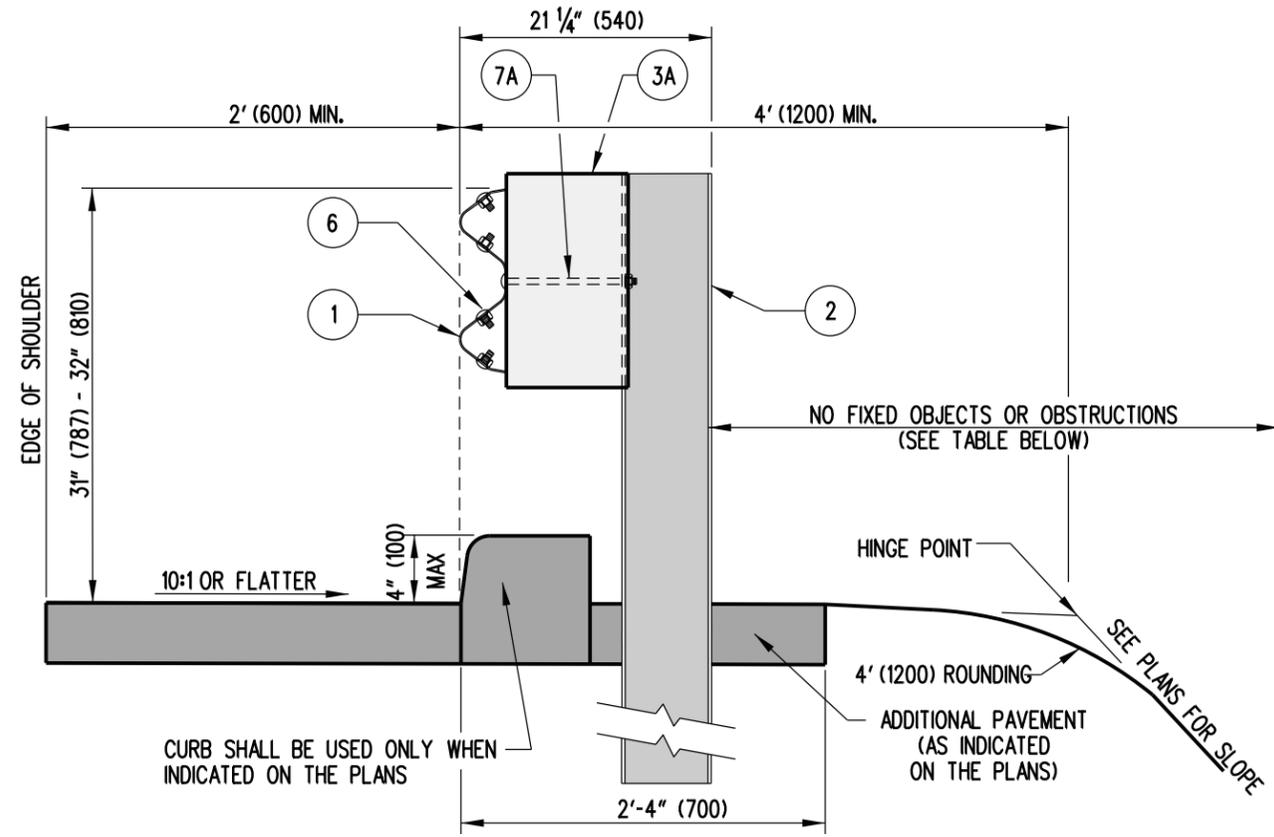
**APPROVED** SIGNATURE ON FILE 12/28/2010  
CHIEF ENGINEER DATE

**RECOMMENDED** SIGNATURE ON FILE 12/27/2010  
DESIGN ENGINEER DATE

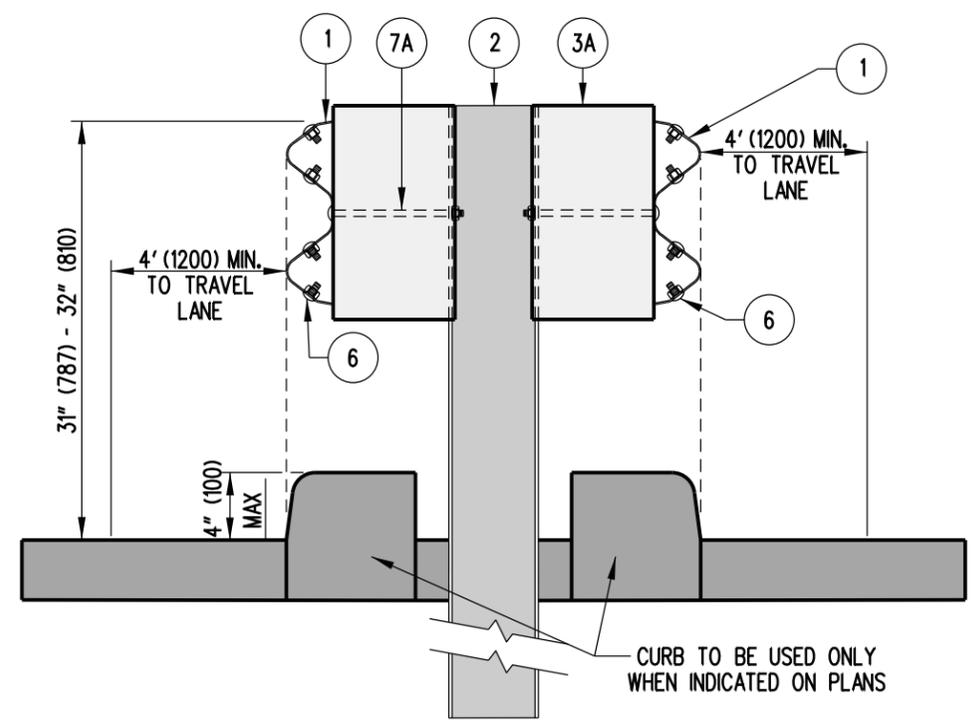
SCALE : N.T.S.



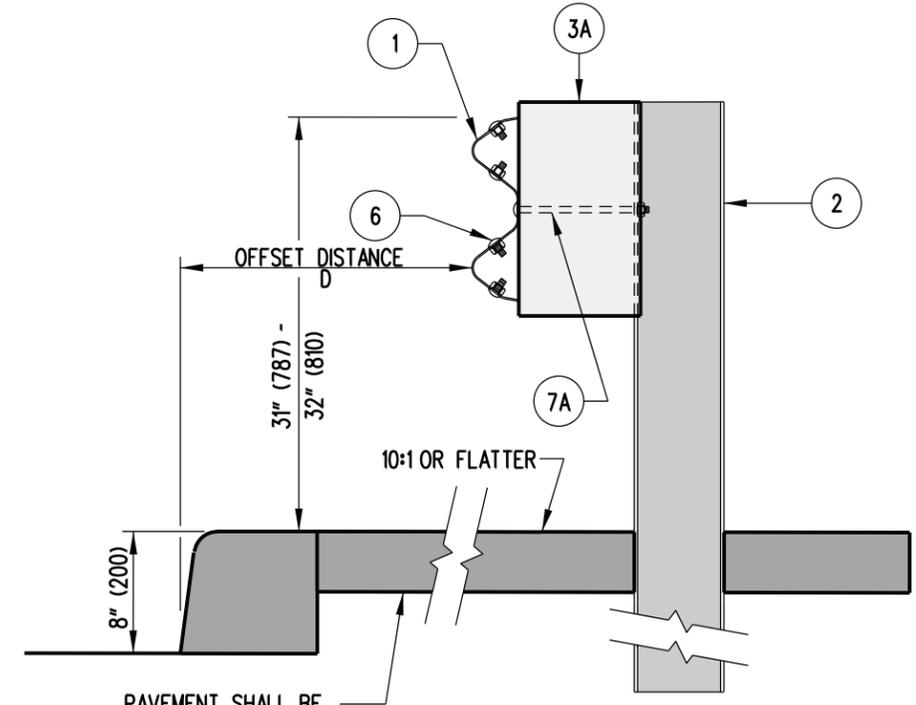
NOTE : OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.



**GUARDRAIL SECTION**  
RURAL SHOULDER APPLICATION



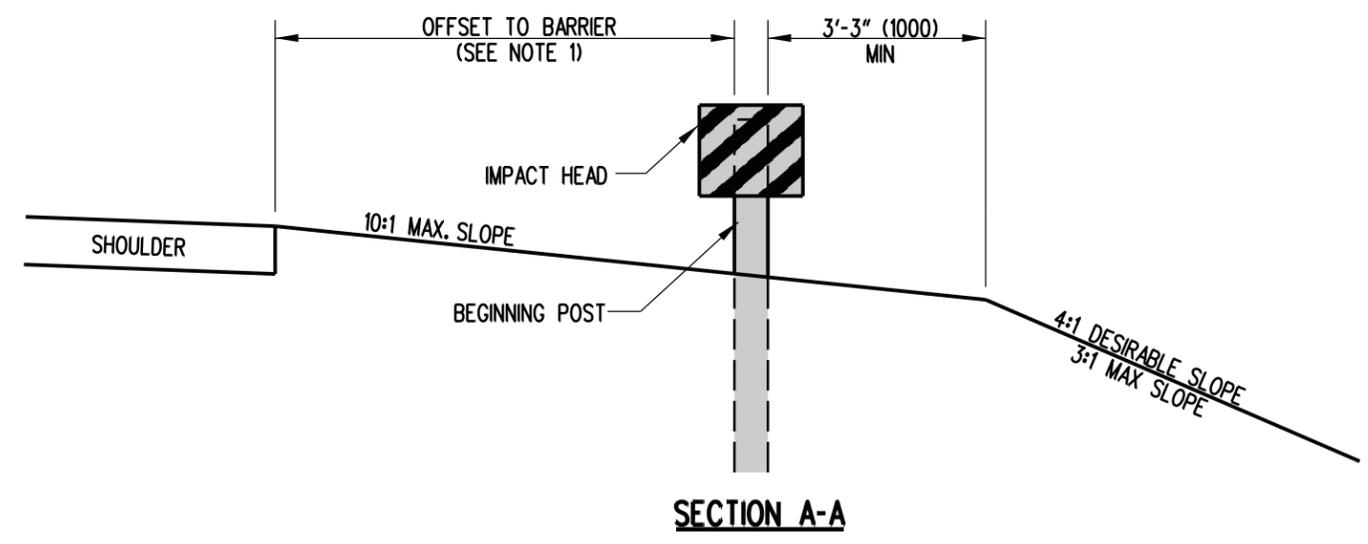
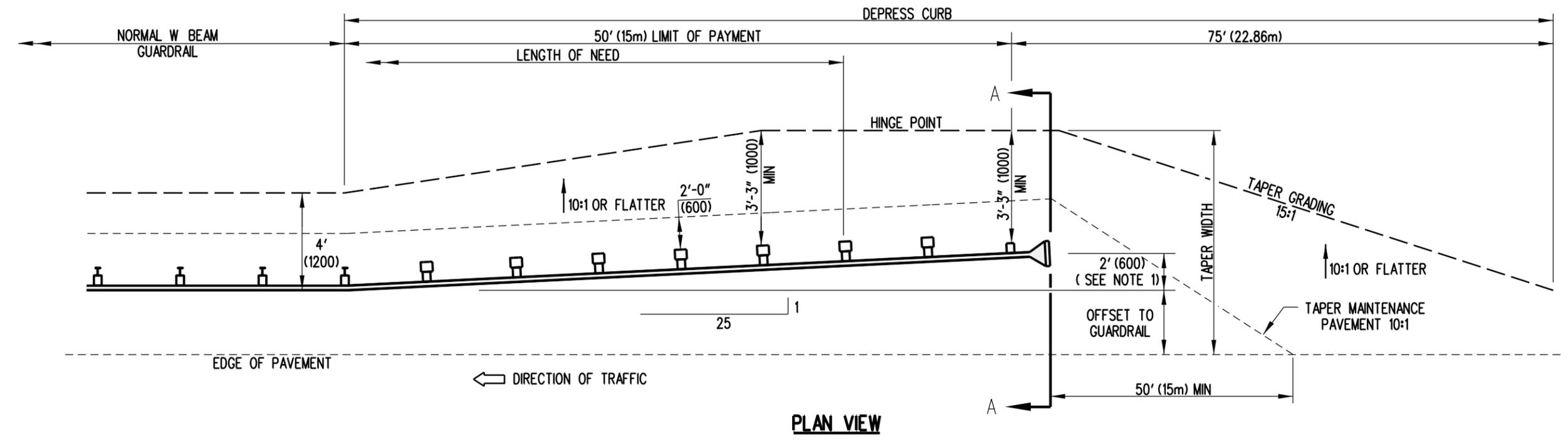
**GUARDRAIL SECTION**  
MEDIAN APPLICATION



**GUARDRAIL SECTION**  
URBAN SHOULDER APPLICATION

TYPE	POST SPACING	CLEAR AREA BEHIND POST
1	6'-3" (1905)	3'-0" (900) MIN
2	3'-1 1/2" (952.5)	2'-0" (600) MIN

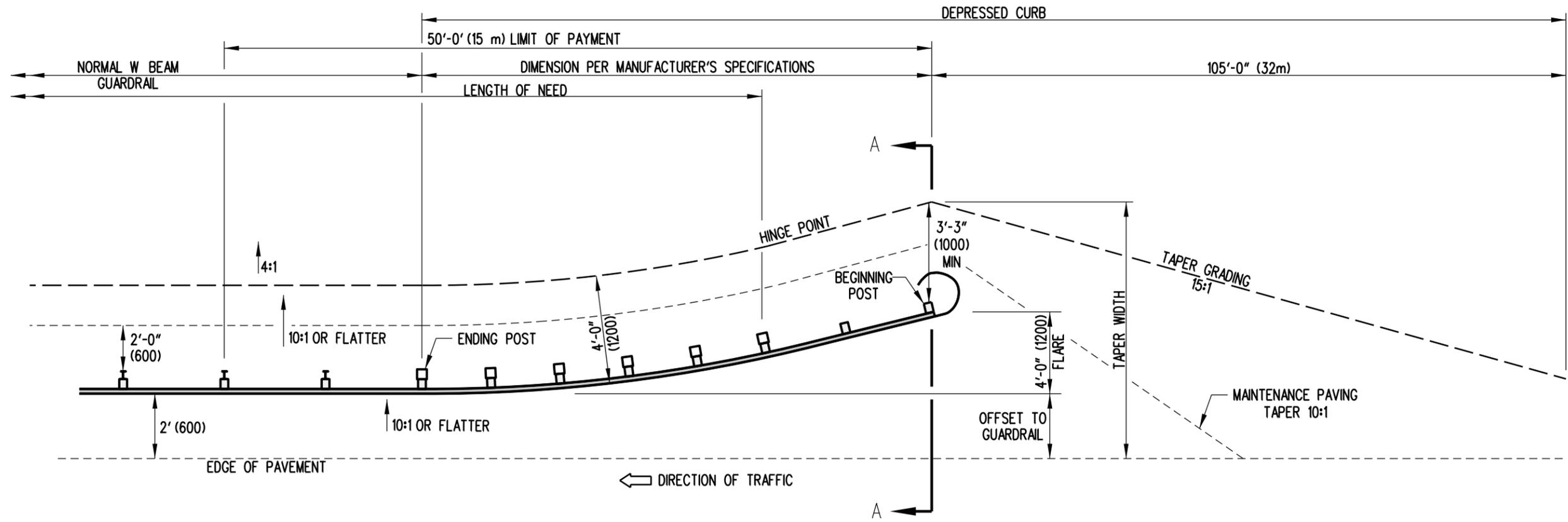
DESIGN SPEED	D
< 50 MPH (80 km/h)	8'-0" (2400)
> 50 MPH (80 km/h)	13'-0" (3900)



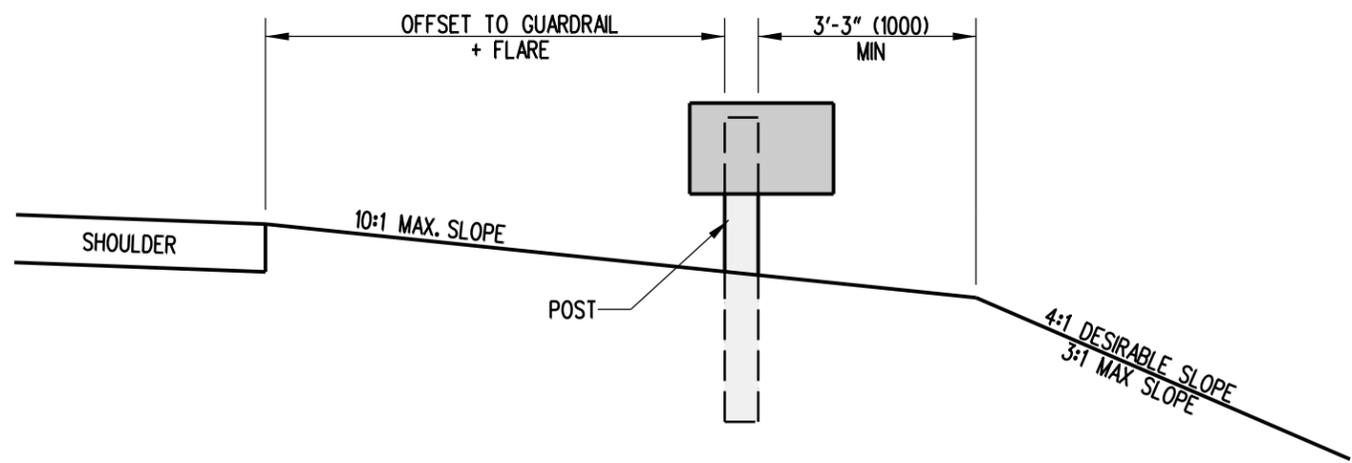
- NOTES:**
- 1). FLARE THE END TREATMENT AT 25:1 BEGINNING 50' (15 m) FROM THE END OF THE IMPACT HEAD, UNLESS THE CONSTRUCTION PLANS OR SPECIFICATIONS SPECIFY A SMALLER FLARE.
  - 2). THIS DETAIL WAS SOLELY CREATED TO SHOW THE GRADING REQUIRED FOR THIS TYPE OF ATTENUATOR AND IS APPLICABLE REGARDLESS 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" (50) WITHIN THE LIMITS OF THE END TREATMENT AND THROUGHOUT THE LENGTH OF THE TAPER GRADING.

 <b>DELAWARE</b> <b>DEPARTMENT OF TRANSPORTATION</b>	<b>GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 1</b>		<b>APPROVED</b>	SIGNATURE ON FILE CHIEF ENGINEER	12/28/2010 DATE
	STANDARD NO. <b>B-2 (2010)</b>	SHT. <b>1</b> OF <b>3</b>	<b>RECOMMENDED</b>	SIGNATURE ON FILE DESIGN ENGINEER	12/27/2010 DATE

SCALE : N.T.S.



**PLAN VIEW**

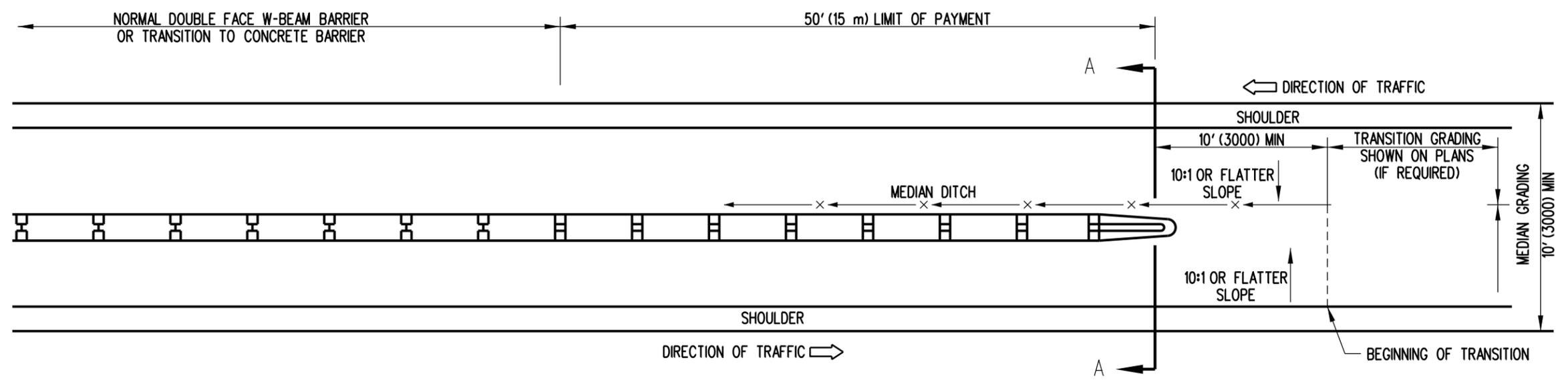


**SECTION A-A**

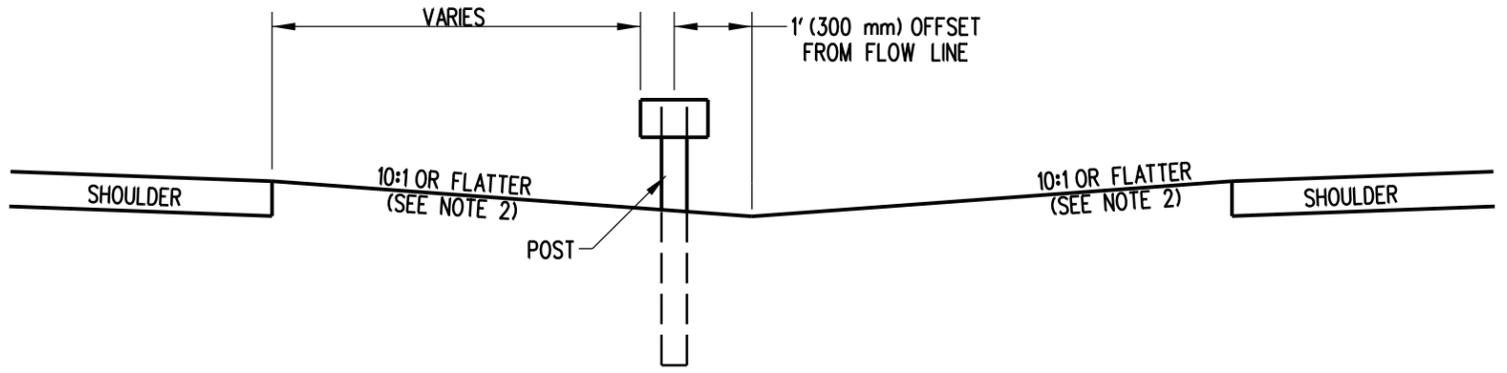
**NOTES:**

- 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 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" (50) WITHIN THE LIMITS OF THE END TREATMENT AND THROUGHOUT THE LENGTH OF THE TAPER GRADING.

<b>DELAWARE</b> <b>DEPARTMENT OF TRANSPORTATION</b>	<b>GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 2</b>		<b>APPROVED</b>	SIGNATURE ON FILE <small>CHIEF ENGINEER</small>	12/28/2010 <small>DATE</small>
	STANDARD NO. <b>B-2 (2010)</b>	SHT. <b>2</b> OF <b>3</b>	<b>RECOMMENDED</b>	SIGNATURE ON FILE <small>DESIGN ENGINEER</small>	12/27/2010 <small>DATE</small>



**PLAN VIEW**



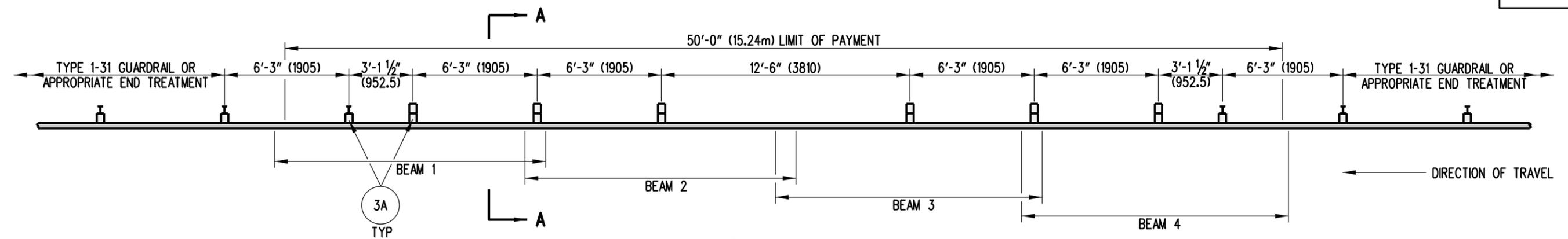
**SECTION A-A**

**GRADING FOR END TREATMENT ATTENUATOR, TYPE 3**

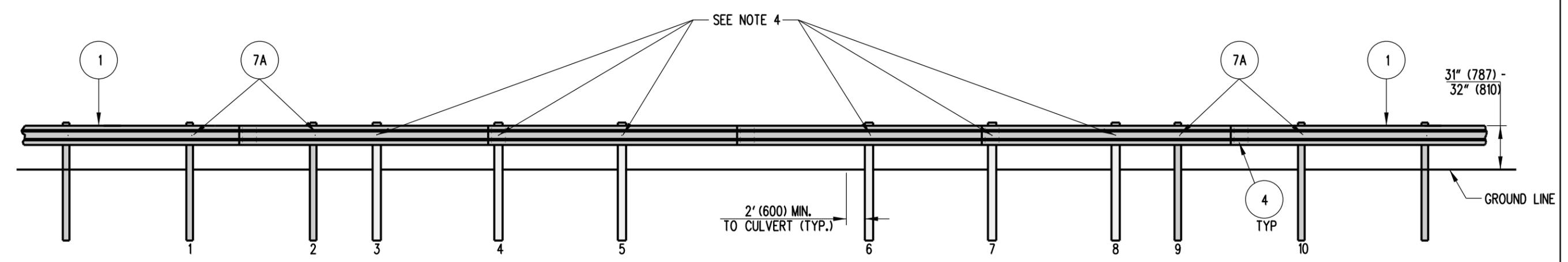
**NOTES:**

- 1). THIS DETAIL WAS SOLELY CREATED TO SHOW THE GRADING REQUIRED FOR THIS TYPE OF ATTENUATOR AND IS APPLICABLE REGARDLESS OF THE HEIGHT OF THE GUARDRAIL SYSTEM.
- 2). 6:1 OR FLATTER GRADING IS ALLOWABLE WHEN THE BARRIER IS LOCATED 12' (3.65m) OR MORE FROM THE OUTSIDE EDGE OF THE SHOULDER.
- 3). THIS END TREATMENT CAN ALSO BE USED IN RAMP GORES 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, DEPRESS THE CURB TO A MAXIMUM HEIGHT OF 2" (50) WITHIN THE LIMITS OF THE END TREATMENT AND THROUGHOUT THE LENGTH OF THE TAPER GRADING.

<p><b>DELAWARE</b> <b>DEPARTMENT OF TRANSPORTATION</b></p>	<b>GRADING FOR GUARDRAIL END TREATMENT ATTENUATOR, TYPE 3</b>			<b>APPROVED</b>	SIGNATURE ON FILE <small>CHIEF ENGINEER</small>	12/28/2010 <small>DATE</small>
	STANDARD NO. <b>B-2 (2010)</b>	SHT. <b>3</b>	OF <b>3</b>	<b>RECOMMENDED</b>	SIGNATURE ON FILE <small>DESIGN ENGINEER</small>	12/27/2010 <small>DATE</small>

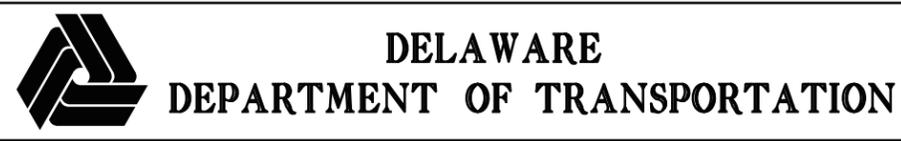


**PLAN**



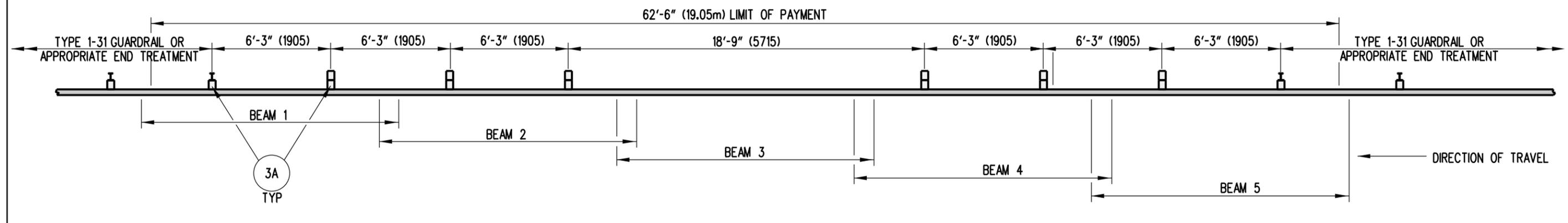
**ELEVATION**

- NOTES:**
- 1). ALL W-BEAMS ARE 13'-6 1/2" (4130) 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 W6x9 (W15x13.5) 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 5/8" (16) x 22" (560) GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.

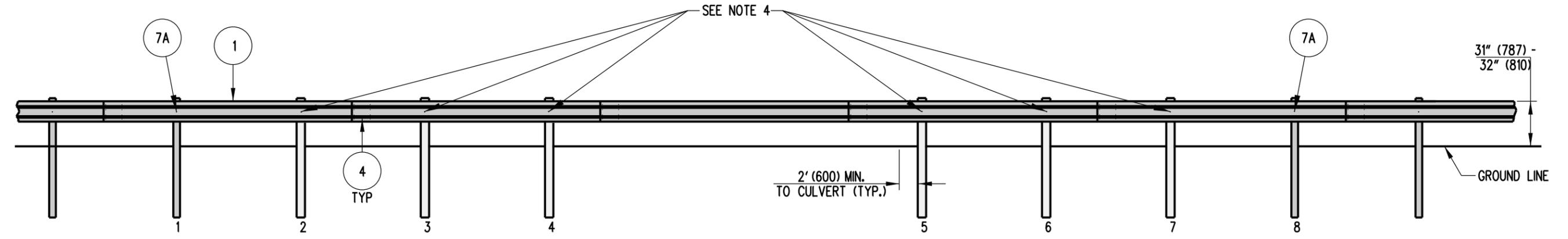


<b>GUARDRAIL OVER CULVERTS, TYPE 1-31</b>	
STANDARD NO. <b>B-3 (2010)</b>	SHT. <b>1</b> OF <b>3</b>

<b>APPROVED</b>	SIGNATURE ON FILE	12/28/2010
	CHIEF ENGINEER	DATE
<b>RECOMMENDED</b>	SIGNATURE ON FILE	12/27/2010
	DESIGN ENGINEER	DATE

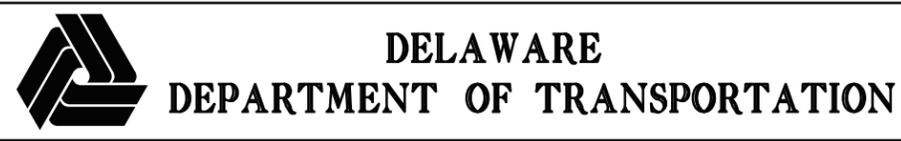


**PLAN**



**ELEVATION**

- NOTES:**
1. ALL W-BEAMS ARE 13'-6 1/2" (4130) IN LENGTH.
  2. PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
  3. POSTS 1 AND 8 SHALL BE W6x9 (W15x13.5) STEEL POSTS. POSTS 2 THROUGH 7 SHALL BE TYPE 31 LONG WOOD BREAKAWAY POSTS.
  4. THE RAIL SHALL BE ATTACHED TO POSTS 2 THROUGH 7 WITH A 5/8" (16) x 22" (560) GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.

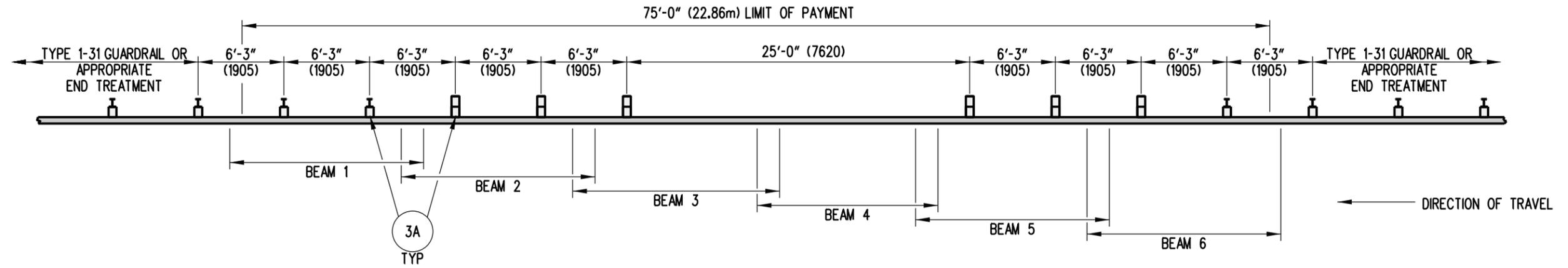


**GUARDRAIL OVER CULVERTS, TYPE 2-31**

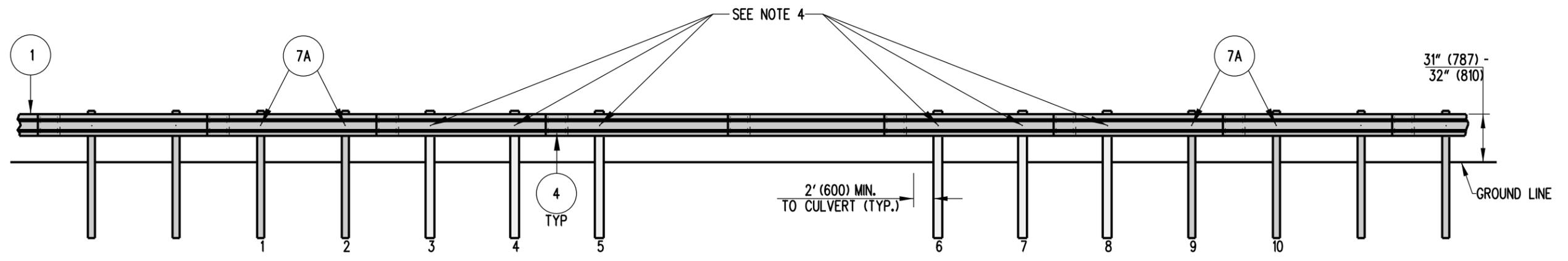
**STANDARD NO. B-3 (2010)**      **SHT. 2 OF 3**

**APPROVED** \_\_\_\_\_ **SIGNATURE ON FILE**      **12/28/2010**  
CHIEF ENGINEER      DATE

**RECOMMENDED** \_\_\_\_\_ **SIGNATURE ON FILE**      **12/27/2010**  
DESIGN ENGINEER      DATE

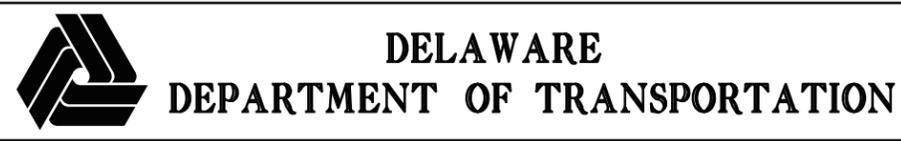


**PLAN**



**ELEVATION**

- NOTES:**
1. ALL W-BEAMS ARE 13'-6 1/2" (4130) 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 W6x9 (W15x13.5) 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 5/8" (16) x 22" (560) GUARDRAIL BOLT, STEEL WASHER, AND RECESS NUT.

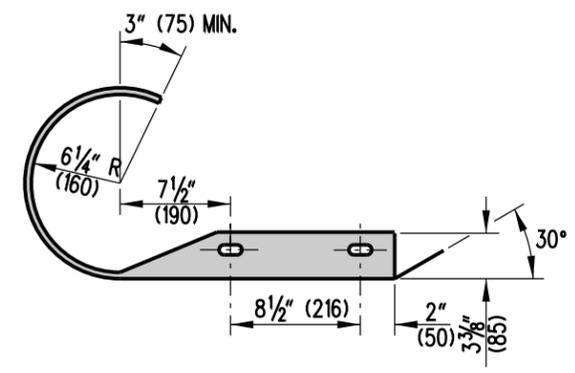


**GUARDRAIL OVER CULVERTS, TYPE 3-31**

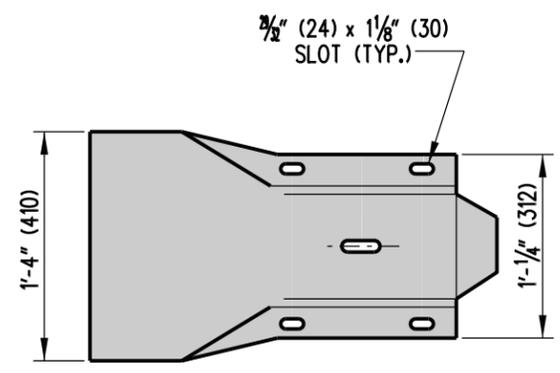
**STANDARD NO. B-3 (2010)**      **SHT. 3 OF 3**

**APPROVED** \_\_\_\_\_ **SIGNATURE ON FILE**      **12/28/2010**  
CHIEF ENGINEER      DATE

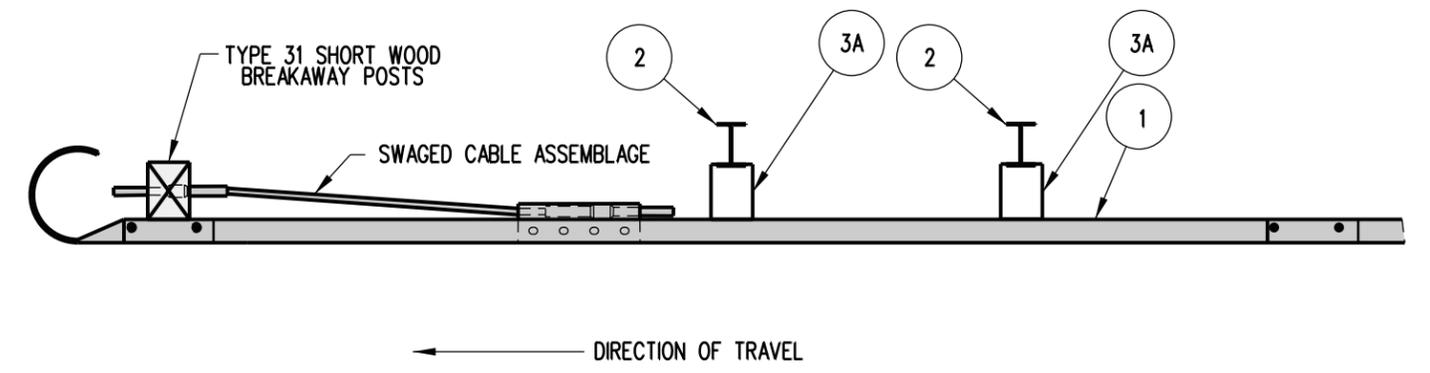
**RECOMMENDED** \_\_\_\_\_ **SIGNATURE ON FILE**      **12/27/2010**  
DESIGN ENGINEER      DATE



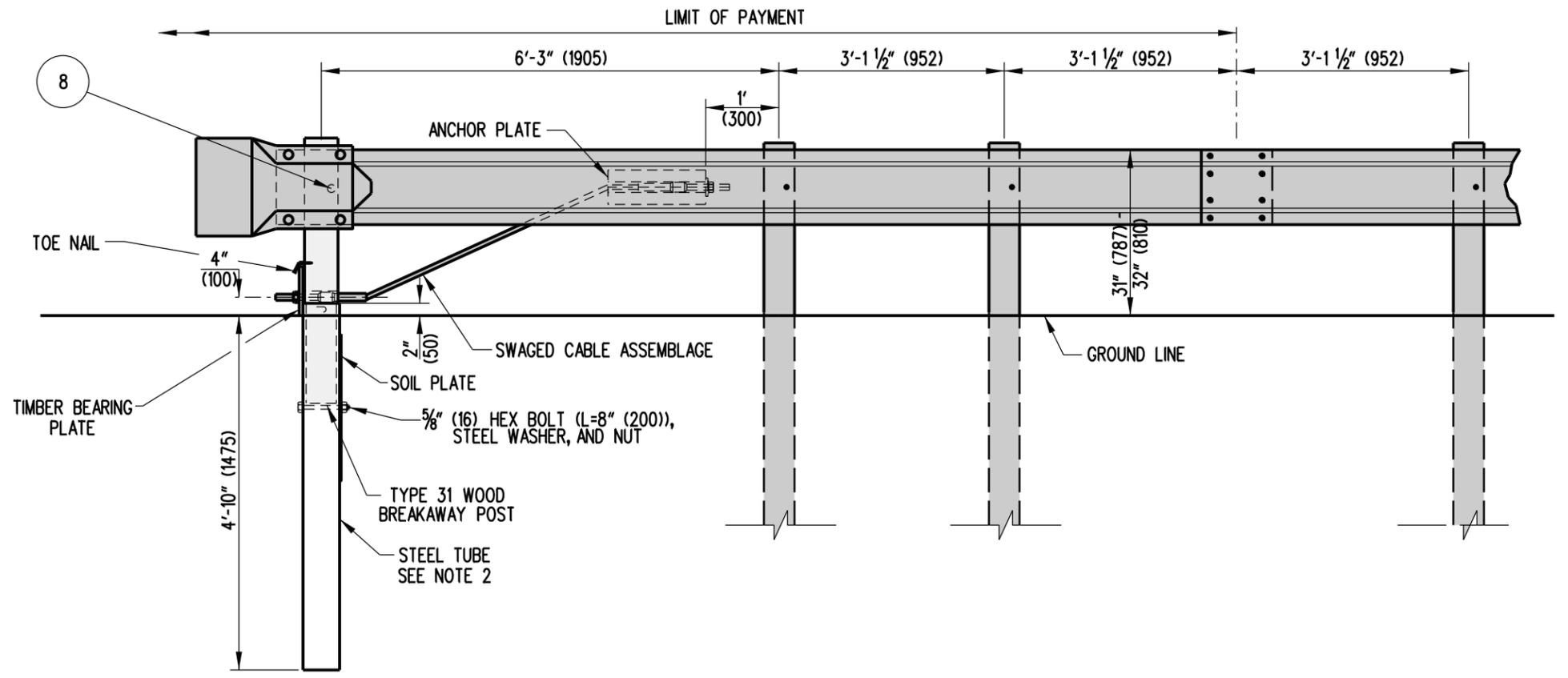
**END SECTION PLAN**



**END SECTION ELEVATION**



**PLAN**



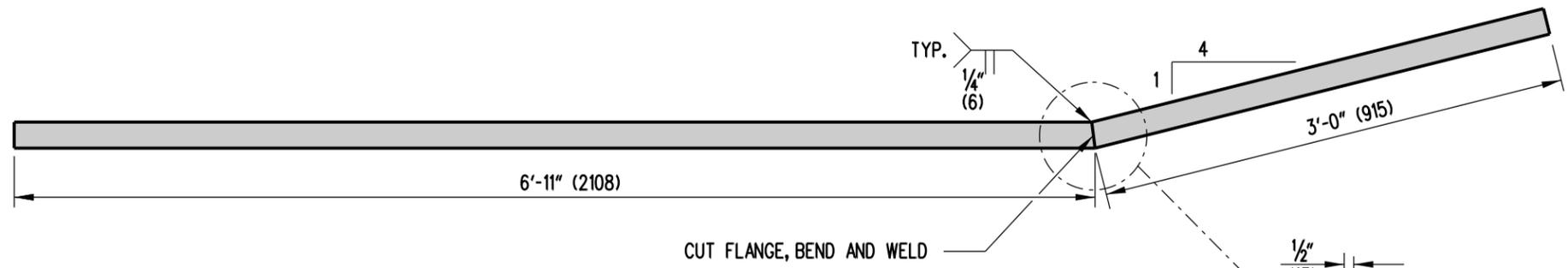
**ELEVATION**

- 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' (1830) STEEL TUBE WITHOUT A SOIL PLATE OR A 5' (1525) STEEL TUBE WITH A SOIL PLATE.

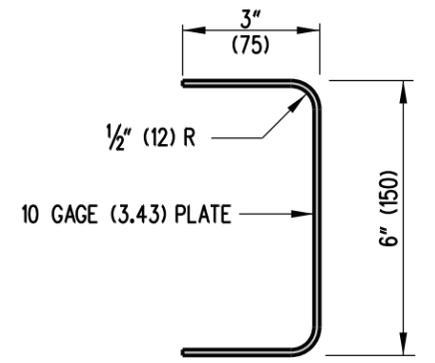
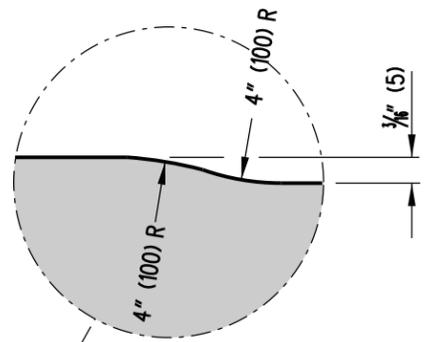
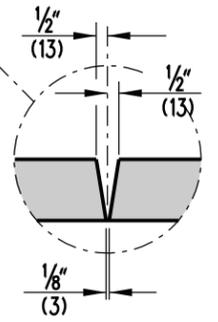
 <b>DELAWARE</b> <b>DEPARTMENT OF TRANSPORTATION</b>	<b>END ANCHORAGE, TYPE 31</b>			<b>APPROVED</b>	SIGNATURE ON FILE CHIEF ENGINEER	12/28/2010 DATE
	STANDARD NO. <b>B-4 (2010)</b>	SHT. <b>1</b>	OF <b>1</b>	<b>RECOMMENDED</b>	SIGNATURE ON FILE DESIGN ENGINEER	12/27/2010 DATE



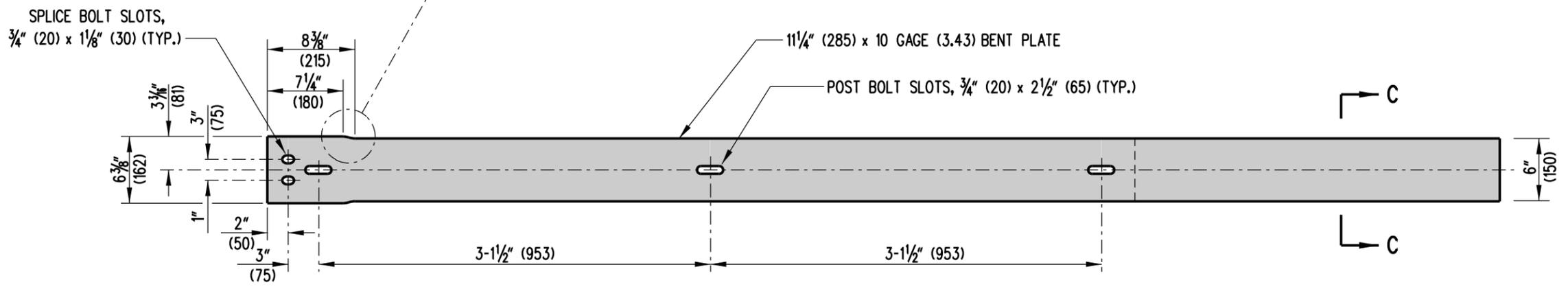




**PLAN**  
SCALE: 1"=1'-0"



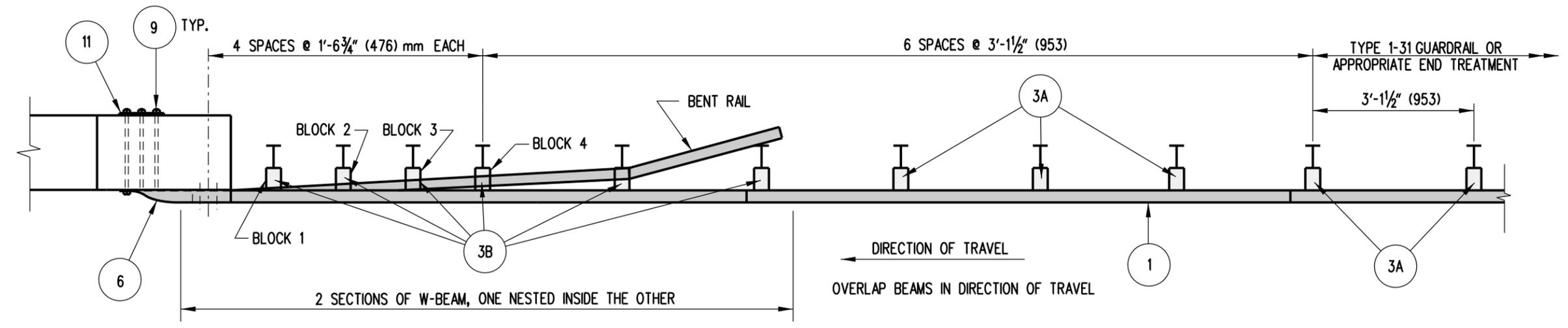
**SECTION C-C**  
SCALE: 3" = 1'-0"



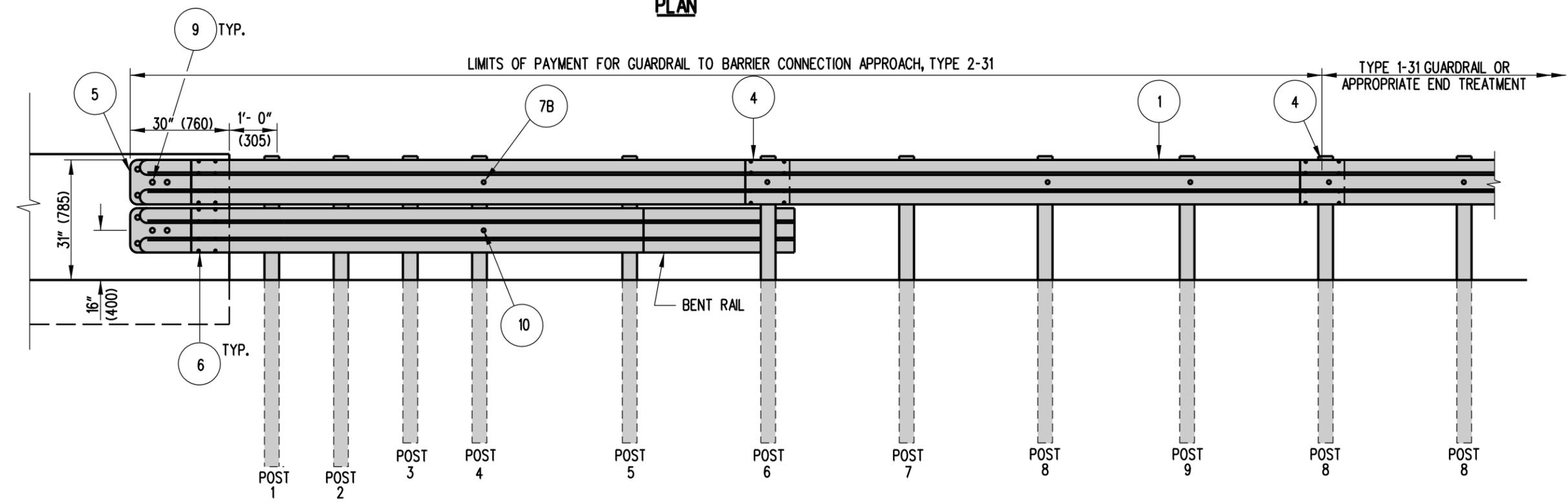
**ELEVATION**  
SCALE: 1"=1'-0"

**NOTE:**  
ALL HARDWARE ON THIS DETAIL IS COMPATIBLE WITH GUARDRAIL TO BARRIER CONNECTION, TYPES 1-31 AND 1-27.

<p><b>DELAWARE</b> <b>DEPARTMENT OF TRANSPORTATION</b></p>	<p><b>GUARDRAIL TO BARRIER CONNECTION, BENT PLATE RUB RAIL</b></p>			<p><b>APPROVED</b> _____</p> <p>CHIEF ENGINEER</p>	<p>12/28/2010</p> <p>DATE</p>
	<p>STANDARD NO. <b>B-5 (2010)</b></p>	<p>SHT. <b>3</b> OF <b>6</b></p>	<p><b>RECOMMENDED</b> _____</p> <p>DESIGN ENGINEER</p>	<p>12/27/2010</p> <p>DATE</p>	



**PLAN**



**ELEVATION**

**NOTES :**

- 1). CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.
- 2). POSTS 1, 2, 3, 4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH OFFSET BLOCKS AND/OR BENT RAIL.
- 3). DO NOT ATTACH RAILS TO POSTS 1, 2, 3, 5, OR 7.
- 4). POSTS 1 AND 2 ARE W8x13 (W200x19.3), 7'-6" (2.28m) LONG. ALL OTHER POSTS IN TRANSITION ARE W6x9 (w150x13.5), 6'-0" (1.82m) 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.

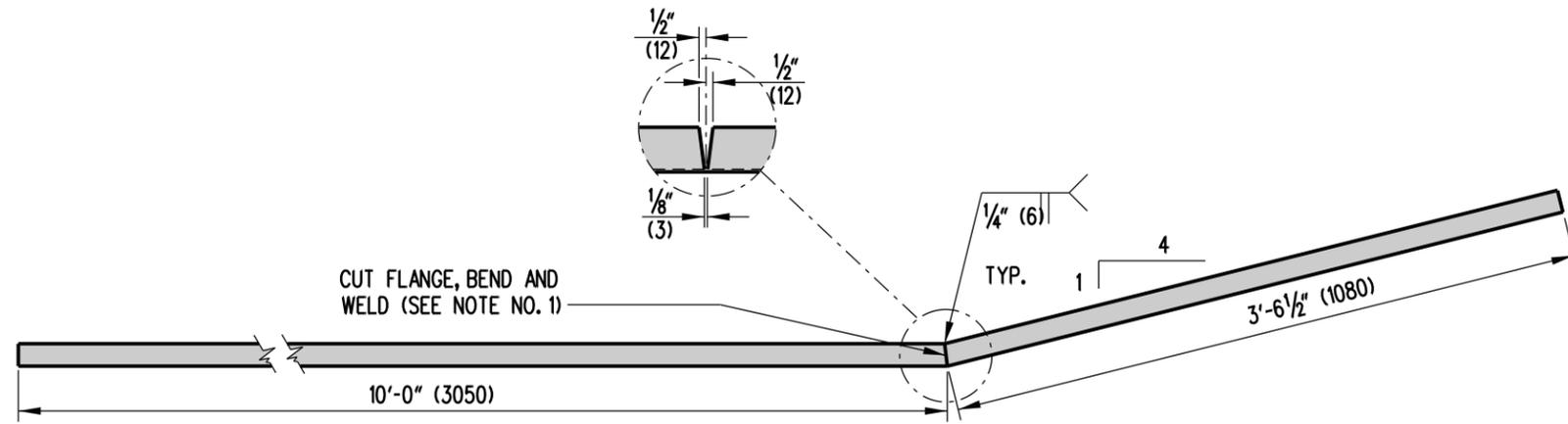
- 7). APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTORS TO PARAPET.
- 8). PLACE GUARDRAIL DELINEATORS AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- 9). FOR INSTALLATIONS WHERE CURB EXISTS, IF THE EXISTING CURB IS 8" (200) OR HIGHER AND CANNOT BE REMOVED, THE BOTTOM RAIL CAN BE ELIMINATED.
- 10). A 6" (150) x 8" (200) x 14" (350) OFFSET BLOCK IS USED AT POSTS 1 THROUGH 6 AND A 6" (150) x 12" (300) x 14" (350) OFFSET BLOCK IS USED AT POSTS 7 THROUGH 9.



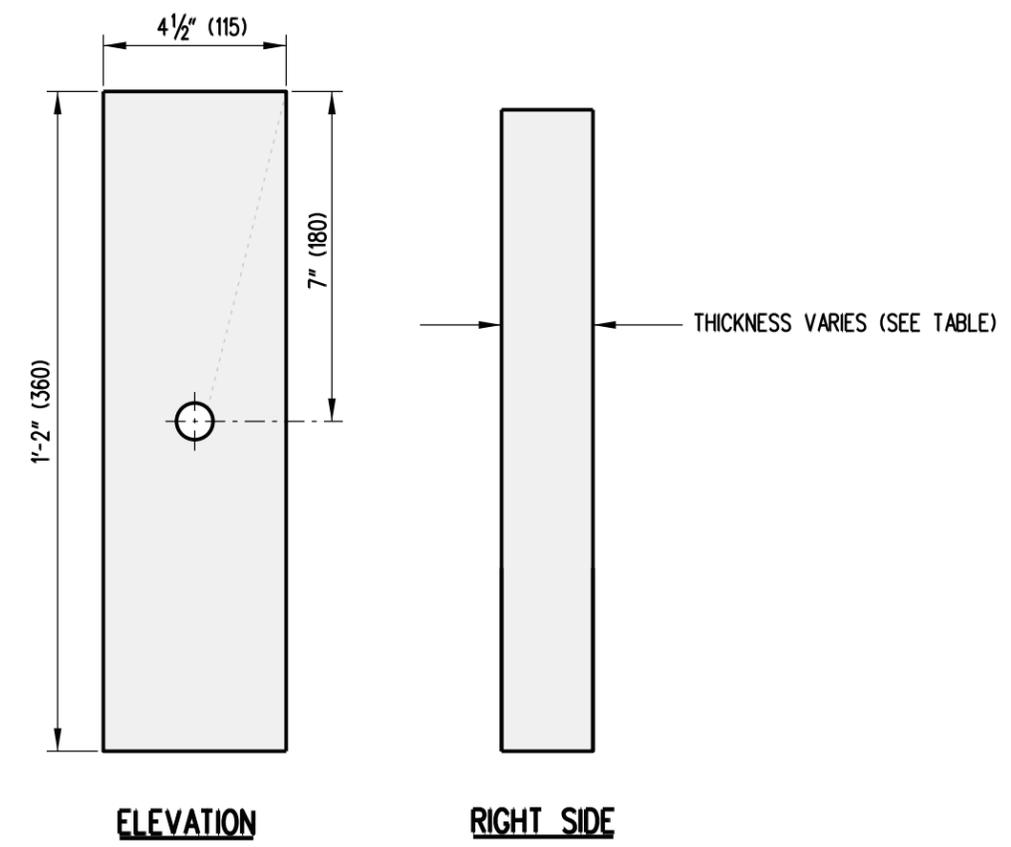
**DELAWARE  
DEPARTMENT OF TRANSPORTATION**

**GUARDRAIL TO BARRIER CONNECTION, APPROACH, TYPE 2-31**  
STANDARD NO. **B-5 (2010)** SHT. **4** OF **6**

**APPROVED** SIGNATURE ON FILE 12/28/2010  
CHIEF ENGINEER DATE  
**RECOMMENDED** SIGNATURE ON FILE 12/27/2010  
DESIGN ENGINEER DATE



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

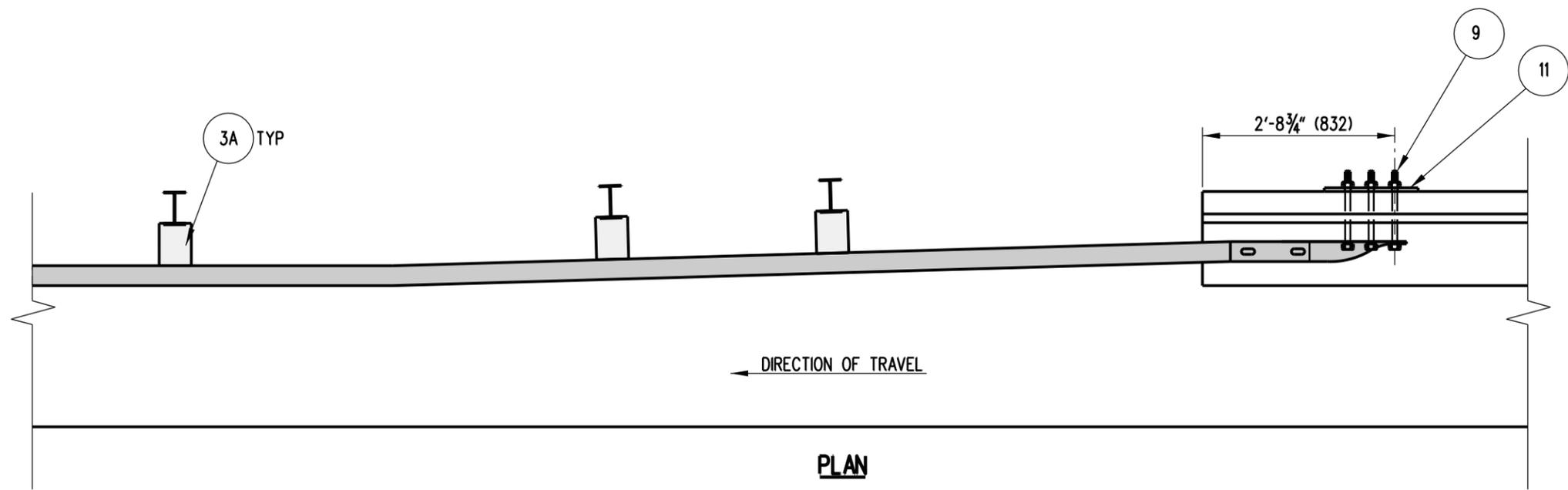


**BENT RAIL OFFSET BLOCKS**  
SCALE: 3"=1'-0"

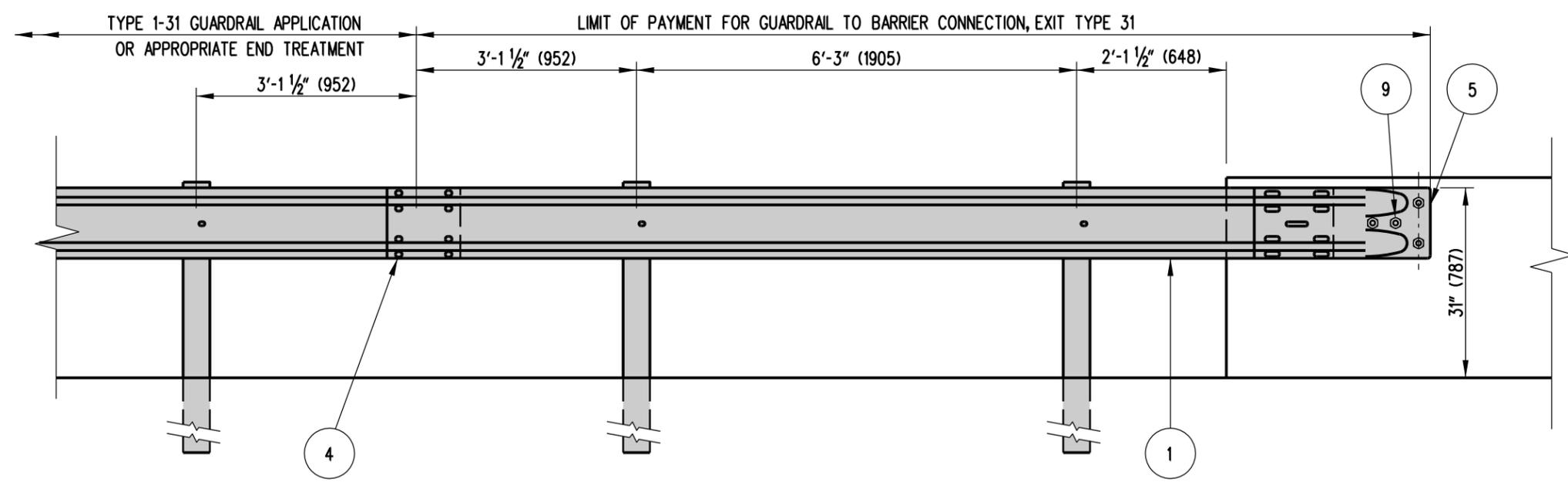
BENT RAIL OFFSET BLOCKS 1'-2" (360) x 4 1/2" (115)		
BLOCK	THICKNESS	BOLT LENGTH
1	5" (125)	8" (200)
2	4" (100)	6" (150)
3	3" (75)	6" (150)
4	2" (50)	4" (100)

**NOTES:**

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



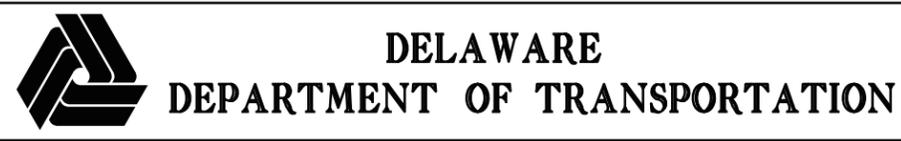
**PLAN**



**ELEVATION**

**NOTES:**

- 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 '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.

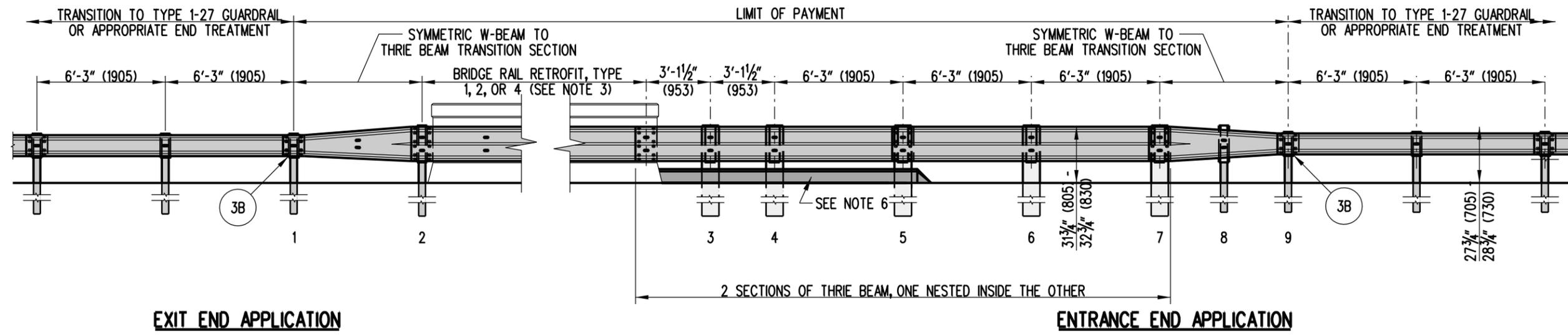


**GUARDRAIL TO BARRIER CONNECTION, EXIT TYPE 31**

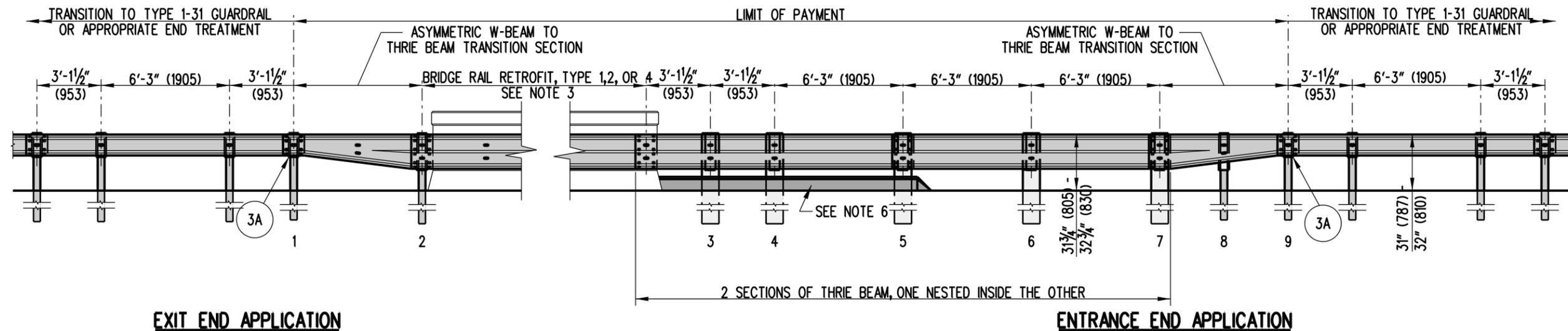
STANDARD NO. **B-5 (2010)**      SHT. **6**      OF **6**

**APPROVED** \_\_\_\_\_ SIGNATURE ON FILE      12/28/2010  
CHIEF ENGINEER      DATE

**RECOMMENDED** \_\_\_\_\_ SIGNATURE ON FILE      12/27/2010  
DESIGN ENGINEER      DATE



**27" GUARDRAIL**



**31" GUARDRAIL**

**NOTES:**

- 1). POSTS 1, 2, 8, & 9 ARE W6 x 9 (W150 X 13.5), 6'-0" (1.89m) LONG, STEEL POSTS AND POSTS 3 THRU 7 ARE 10" (250) x 10" (250) X 6'-6" (1980) 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 & 5 OF 5 FOR NOTES PERTAINING TO THE BRIDGE RAIL RETROFIT SECTIONS.
- 4). THE EXIT END APPLICATION SHALL BE USED ONLY ON DIVIDED HIGHWAYS. FOR ALL OTHER CONDITIONS, THE ENTRANCE END APPLICATION SHALL BE USED ON BOTH ENDS OF THE BRIDGE PARAPET.
- 5). USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR 5/8" (16) BOLT) BETWEEN BOLT HEADS AND RUBRAIL.
- 6). PLACE P.C.C. CURB, TYPE 1, STARTING AT PARAPET WALL AND TERMINATING AFTER POST 5. TAPER CURB TO FLUSH AT A 1:1 RATIO.



**DELAWARE  
DEPARTMENT OF TRANSPORTATION**

**BRIDGE RAIL RETROFIT, ENTRANCE AND END APPLICATIONS**

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

**SHT. 1 OF 5**

**APPROVED**

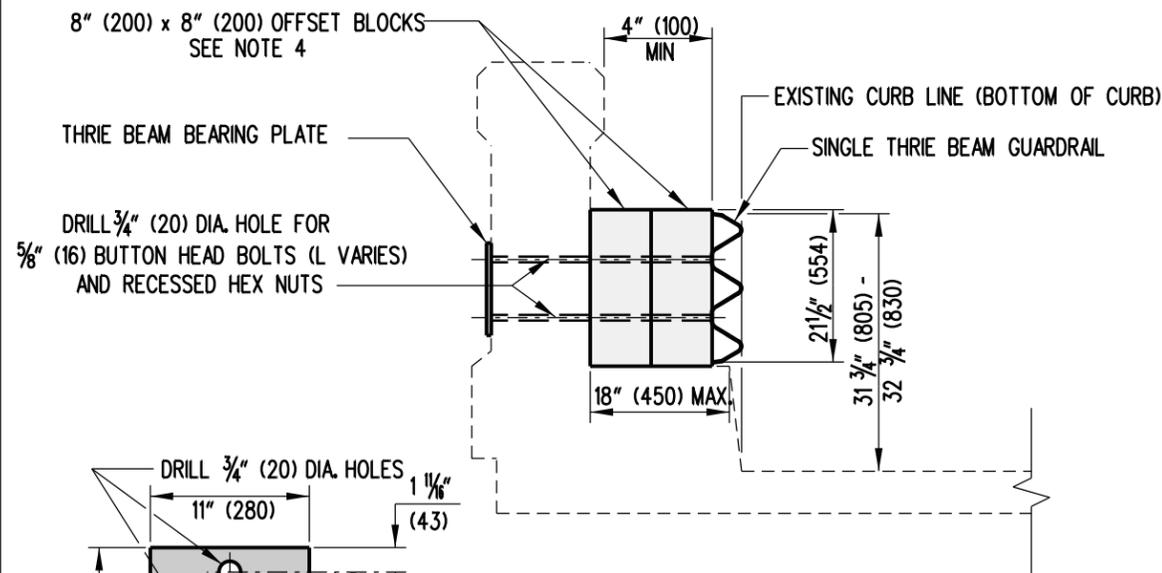
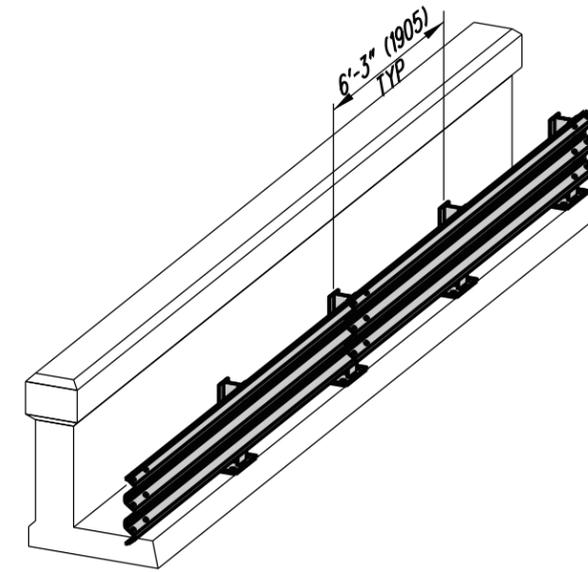
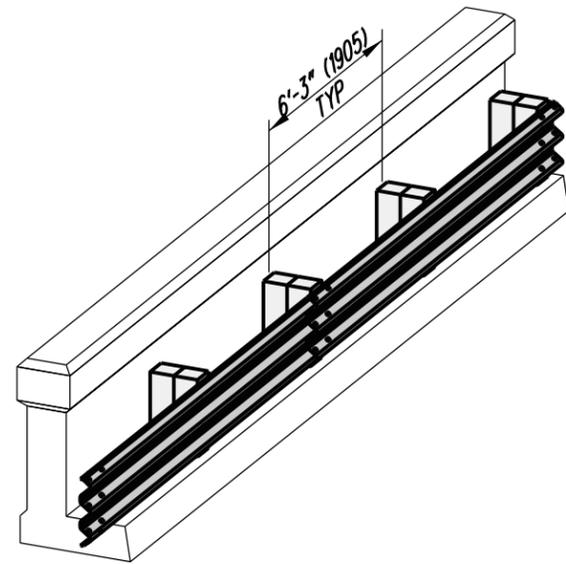
SIGNATURE ON FILE  
CHIEF ENGINEER

12/28/2010  
DATE

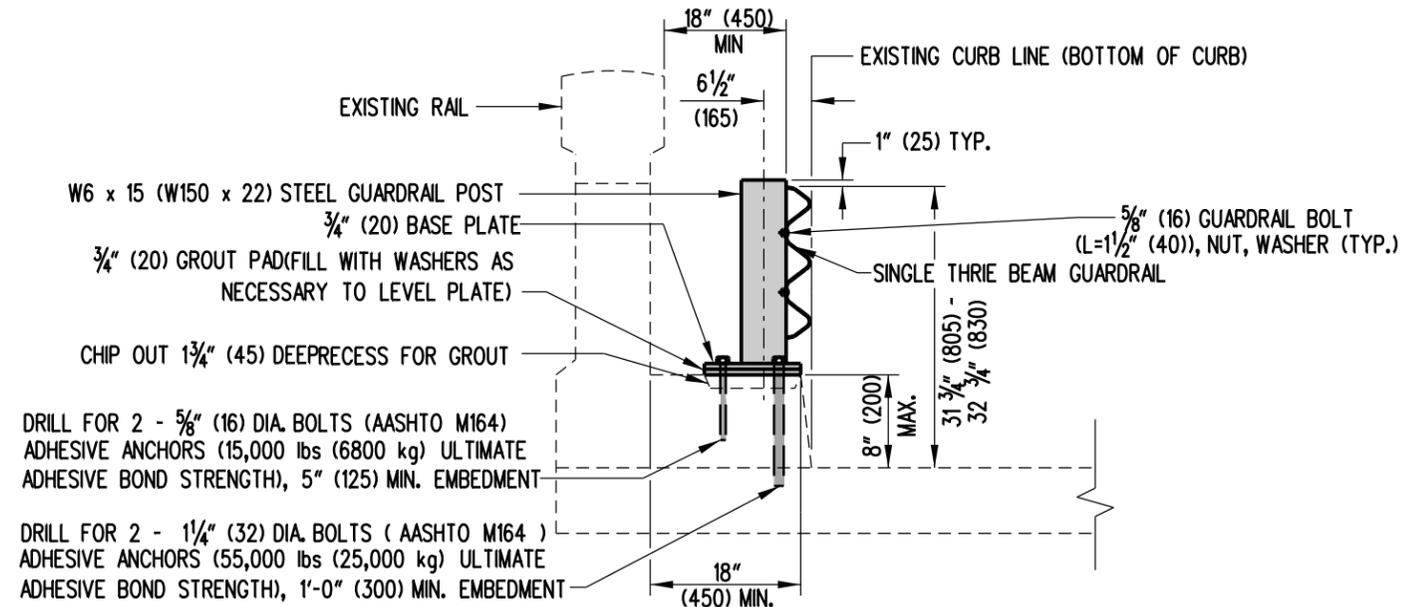
**RECOMMENDED**

SIGNATURE ON FILE  
DESIGN ENGINEER

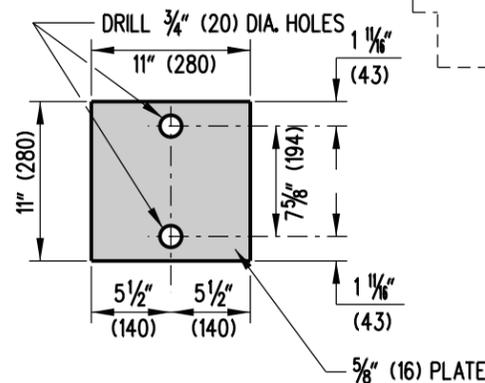
12/27/2010  
DATE



**BRIDGE RAIL RETROFIT, TYPE 1**  
SEE NOTE 1



**BRIDGE RAIL RETROFIT, TYPE 2**  
SEE NOTE 2



**THRIE BEAM BEARING PLATE DETAIL**

**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 18" (450) OR WIDER, AND DEAD LOAD CONSIDERATIONS ARE A CONCERN WHEN USING BRIDGE RAIL RETROFIT, TYPE 3 (SEE DETAIL B-6, SHEET 4 OF 5 FOR DETAILS).
- 3). ADHESIVE ANCHORS SHALL BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS AND SHALL BE GALVANIZED.
- 4). OFFSET BLOCK THICKNESS SHALL BE ADJUSTED TO ALLOW THE FACE OF THE THRIE BEAM TO BE FLUSH WITH THE BOTTOM OF THE CURB (MINIMUM THICKNESS SHALL BE 4" (100)).

- 5). SEE DETAIL B-6, SHEET 3 OF 5 FOR BRIDGE RAIL RETROFIT, TYPE 2 HARDWARE DETAILS.
- 6). TYPICAL LATERAL SPACING OF OFFSET BLOCKS OR STEEL POSTS THROUGHOUT THE BRIDGE RAIL SECTION SHALL BE 6'-3" (1905). HOWEVER, SPACING MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP BLOCKS OR POSTS AT THE END OF THE PARAPET.
- 7). USE A THRIE BEAM EXPANSION SECTION AT BRIDGE EXPANSION JOINTS.
- 8). PLACE GUARDRAIL DELINEATORS IN THE UPPER VALLEY OF THE THRIE BEAM AT THE INTERVALS SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- 9). SEE DETAIL B-6, SHEET 1 OF 5 FOR ENTRANCE AND END APPLICATION DETAILS.



**DELAWARE  
DEPARTMENT OF TRANSPORTATION**

**BRIDGE RAIL RETROFIT, TYPES 1 & 2**

STANDARD NO.

**B-6 (2010)**

SHT. **2**

OF **5**

**APPROVED**

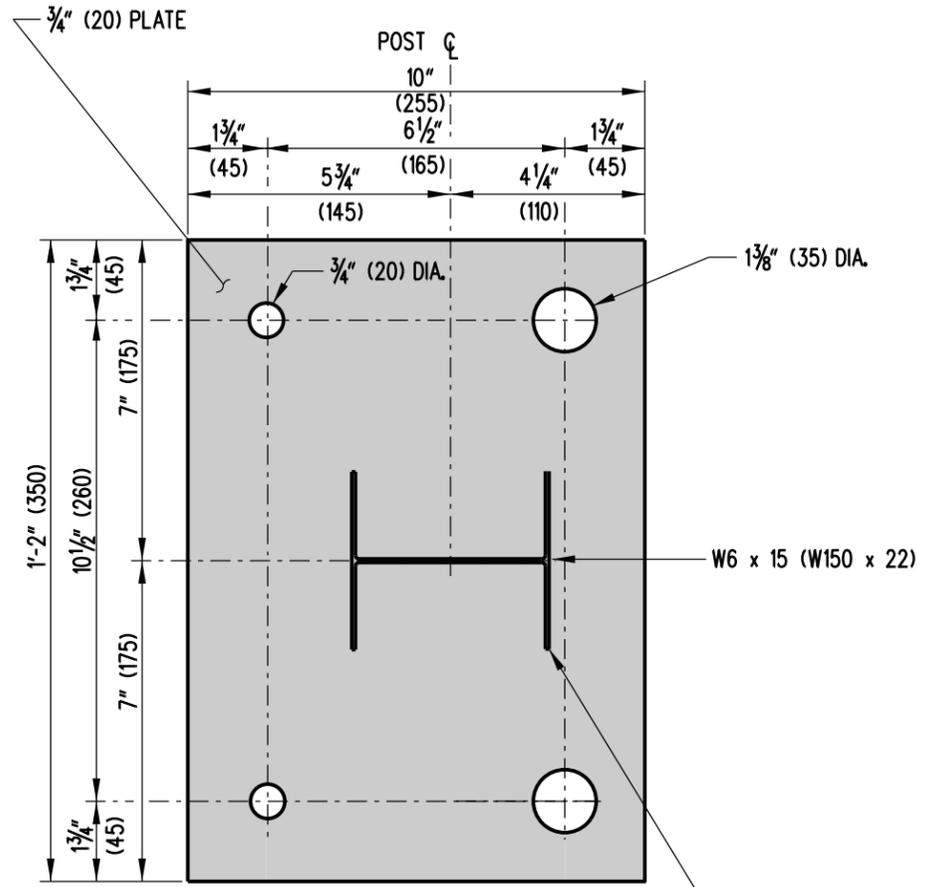
SIGNATURE ON FILE  
CHIEF ENGINEER

12/28/2010  
DATE

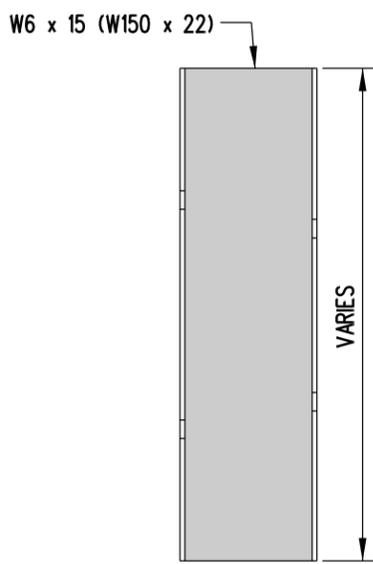
**RECOMMENDED**

SIGNATURE ON FILE  
DESIGN ENGINEER

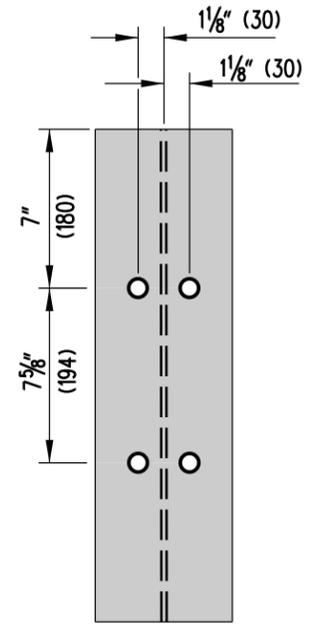
12/27/2010  
DATE



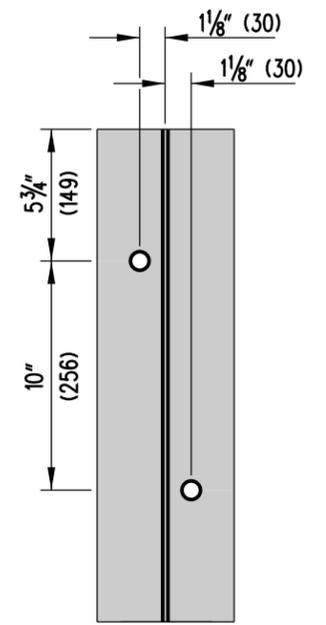
**BASE PLATE DETAIL**



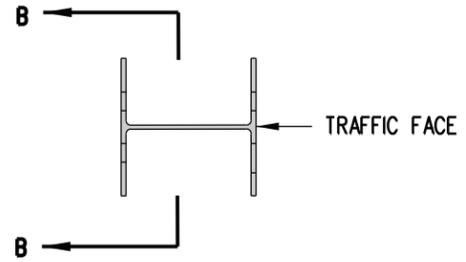
**SIDE**



**FRONT**



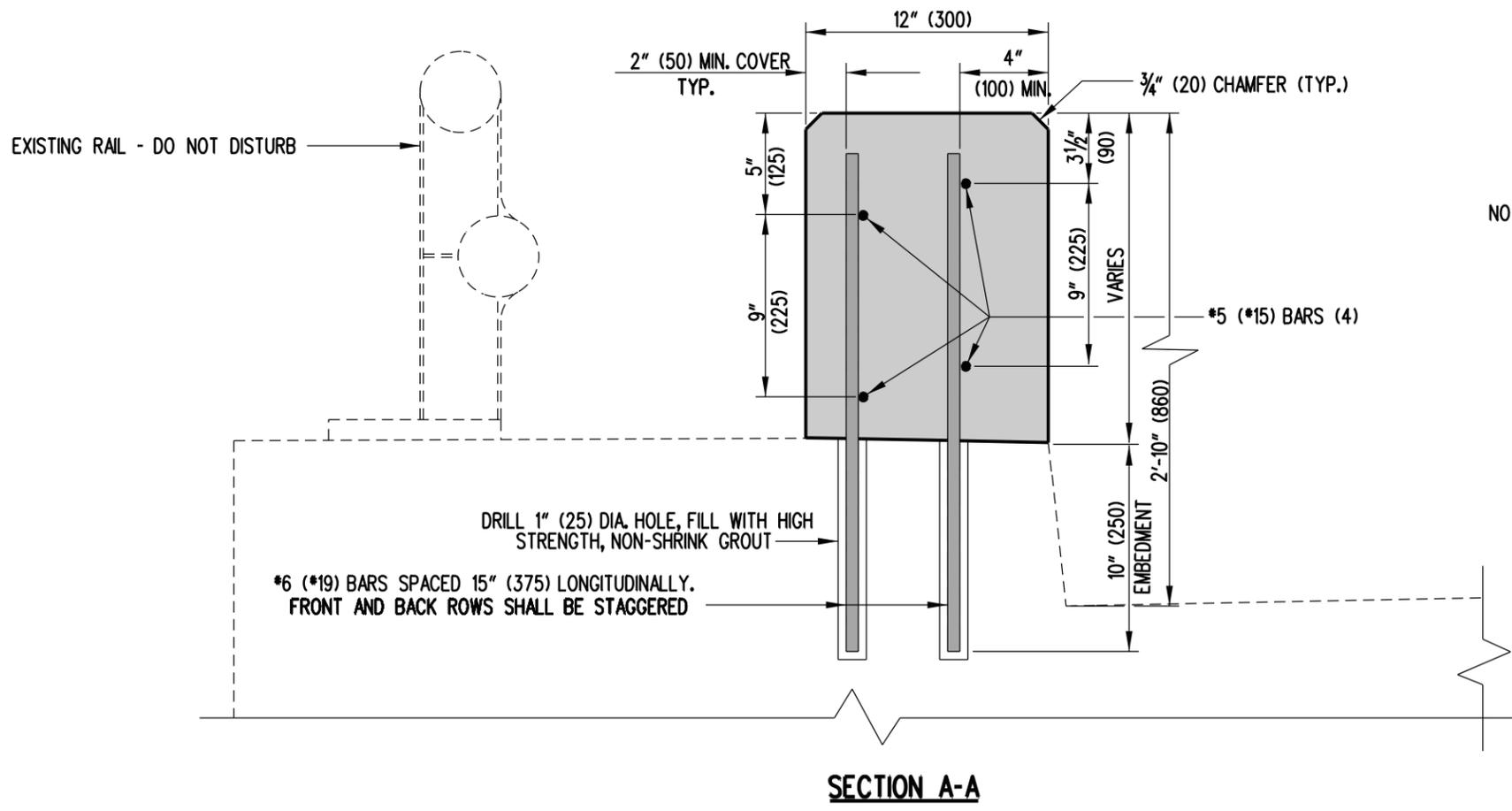
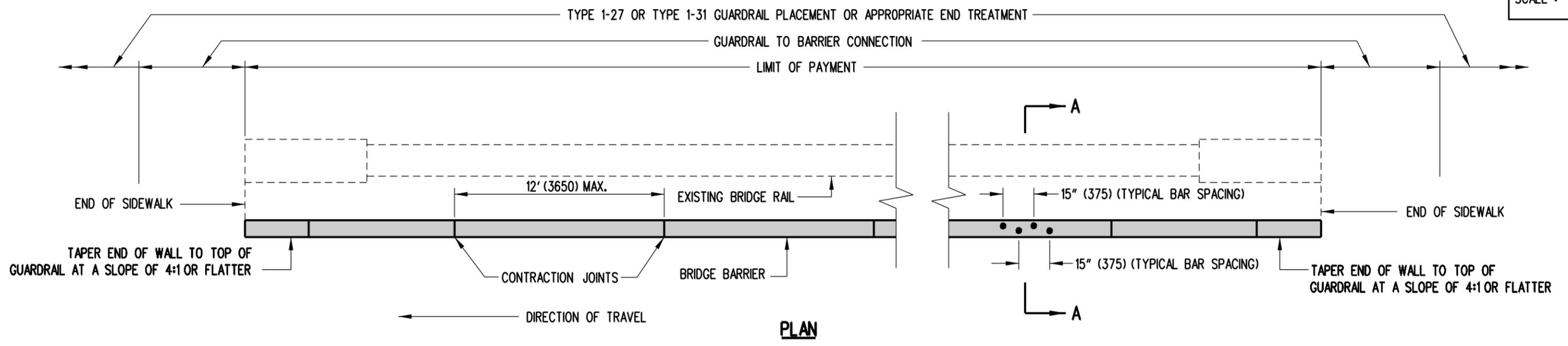
**SECTION B-B**



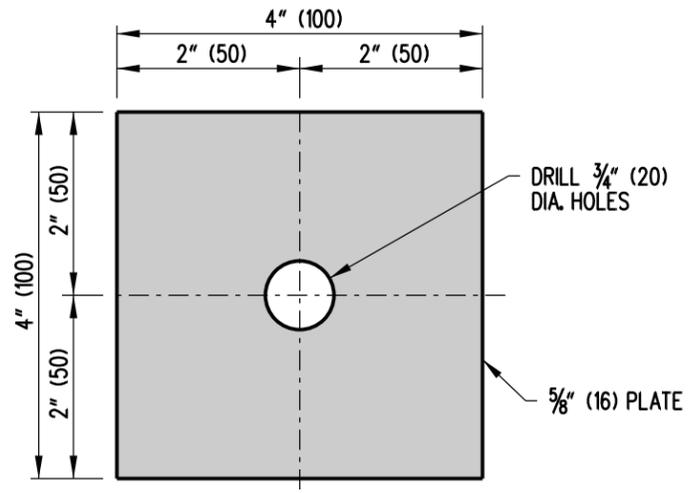
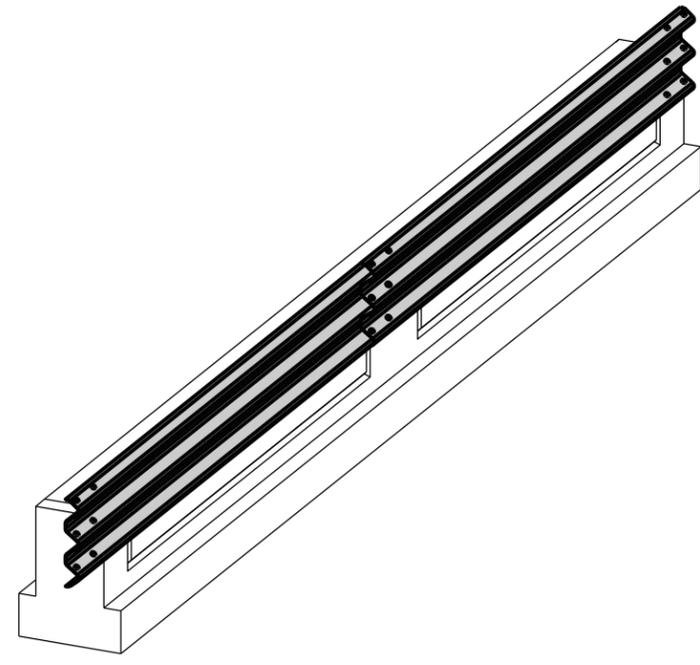
**PLAN**

WELD ALL AROUND INCLUDING EXTERIOR FLANGE SURFACE

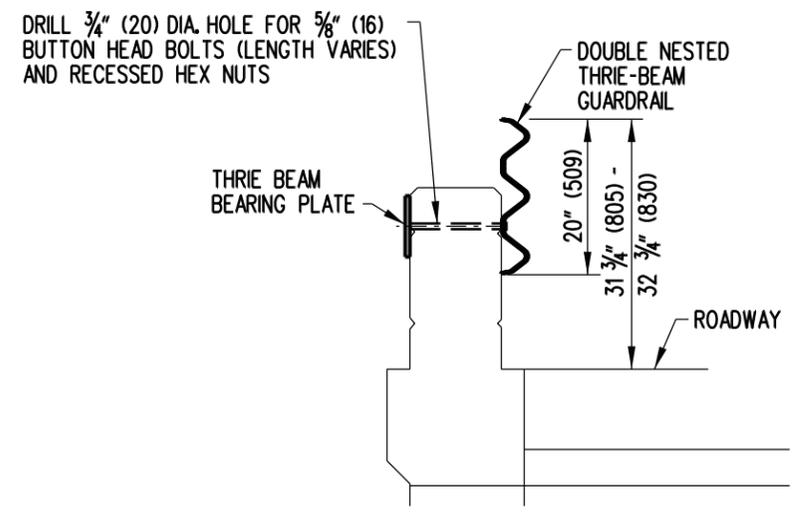
**W6 x 15 (W150 x 22) STEEL GUARDRAIL POST**



NOTE: STANDARD GUARDRAIL TO BARRIER CONNECTIONS SHALL BE CONNECTED TO THE ENDS OF THE NEW BRIDGE BARRIER AND TRANSITIONED TO THE EXISTING GUARDRAIL.



**THRIE-BEAM BEARING PLATE DETAIL**

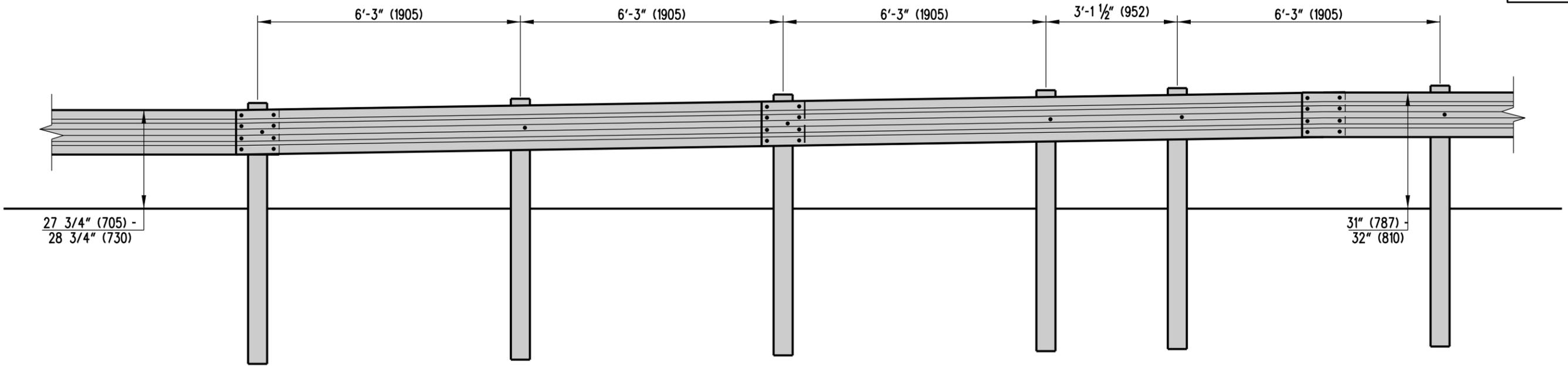


**SECTION VIEW**

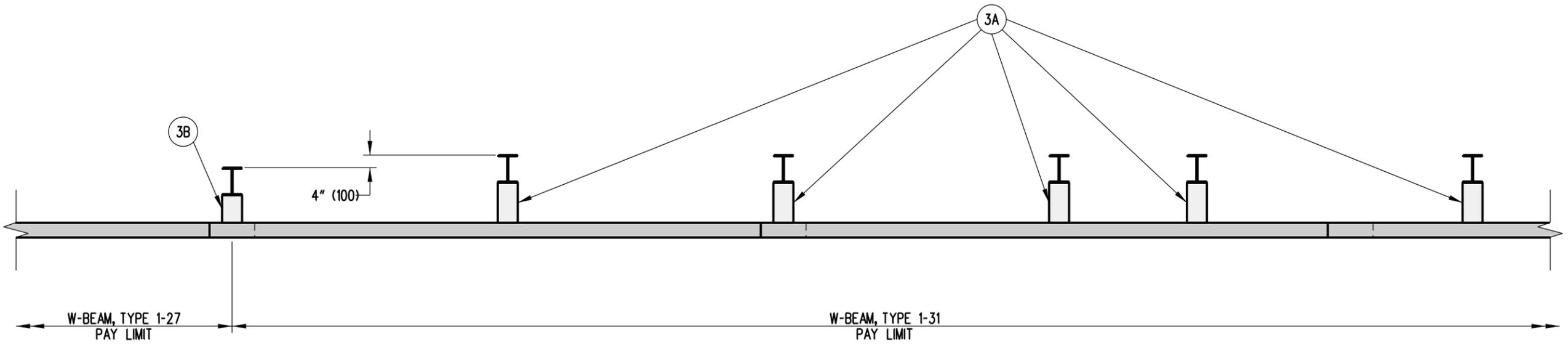
**NOTES:**

- 1). BRIDGE RAIL RETROFIT, TYPE 4 SHALL BE USED WHEN THE EXISTING PARAPET HEIGHT IS BETWEEN 22" (559) AND 26" (660).
- 2). USE A THRIE-BEAM EXPANSION ELEMENT AT BRIDGE EXPANSION JOINTS.
- 3). PLACE GUARDRAIL DELINEATORS IN THE UPPER VALLEY OF THE THRIE-BEAM AT THE INTERVAL SPECIFIED IN THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- 4). SEE DETAIL B-6, SHEET 1 OF 5 FOR ENTRANCE AND EXIT APPLICATION DETAILS AND NOTES.
- 5). SPACING OF WOOD POSTS MAY NEED TO BE REDUCED TO ACCOMMODATE LINING UP POSTS AT THE END OF THE PARAPET.
- 6). USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR 5/8" (16) BOLT) BETWEEN BOLT HEADS AND RUBRAIL.
- 7). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

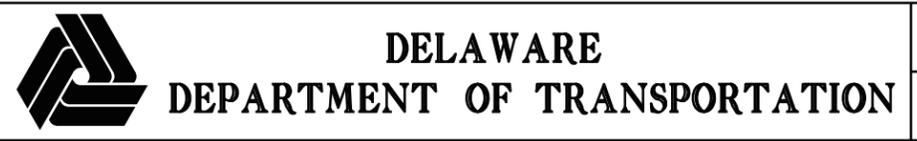
SCALE : N.T.S.



**ELEVATION**



**PLAN**

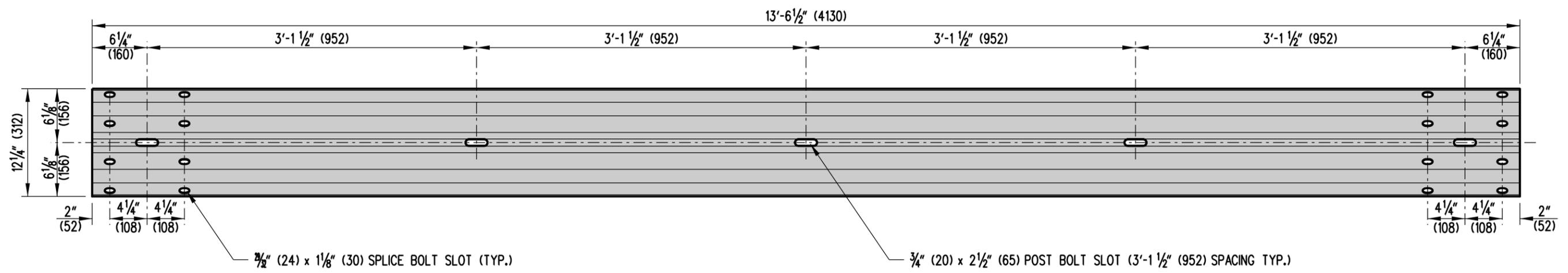


**W-BEAM, TYPE 1-27 TO TYPE 1-31 TRANSITION SECTION**

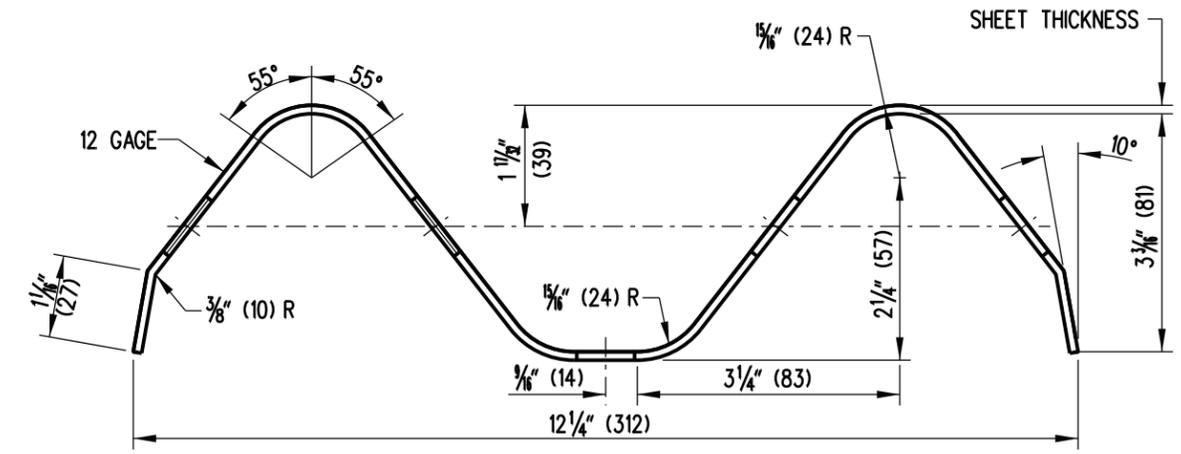
STANDARD NO. **B-7 (2010)**      SHT. **1** OF **1**

**APPROVED**      SIGNATURE ON FILE      12/28/2010  
CHIEF ENGINEER      DATE

**RECOMMENDED**      SIGNATURE ON FILE      12/27/2010  
DESIGN ENGINEER      DATE

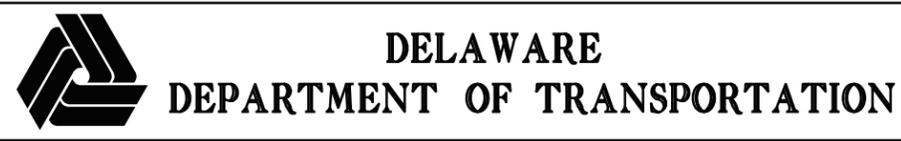


**W-BEAM ELEVATION**



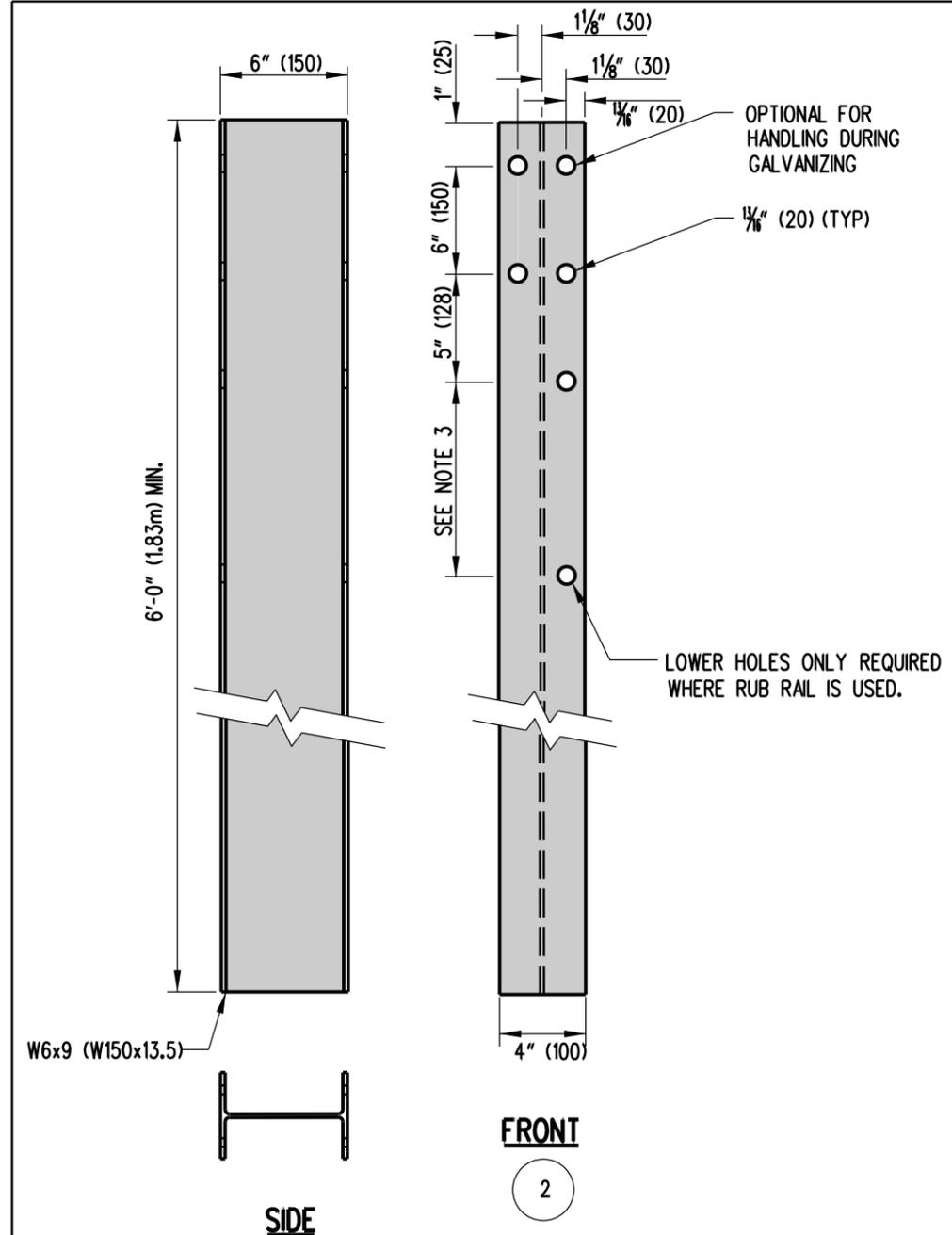
**W-BEAM SECTION**

**NOTE:**  
 1). FOUR ADDITIONAL 3/4" (20) x 2 1/2" (65) SLOTS SHALL BE PROVIDED AT 3'-1 1/2" (952) SPACING FOR A 26'-1/2" (7940) BEAM LENGTH.



<b>HARDWARE</b>	
STANDARD NO. <b>B-13 (2010)</b>	SHT. <b>1</b> OF <b>10</b>

<b>APPROVED</b>	SIGNATURE ON FILE	12/28/2010
	<small>CHIEF ENGINEER</small>	<small>DATE</small>
<b>RECOMMENDED</b>	SIGNATURE ON FILE	12/27/2010
	<small>DESIGN ENGINEER</small>	<small>DATE</small>

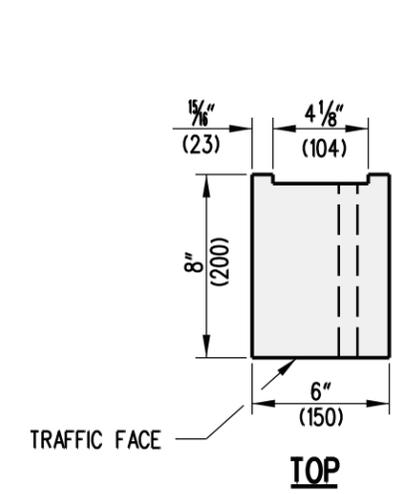


**FRONT**

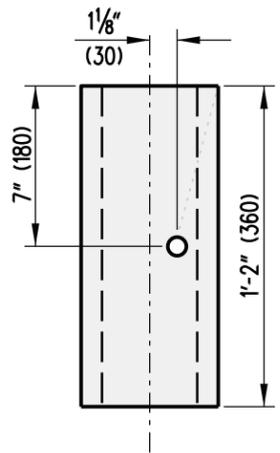
2

**SIDE**

**POST**



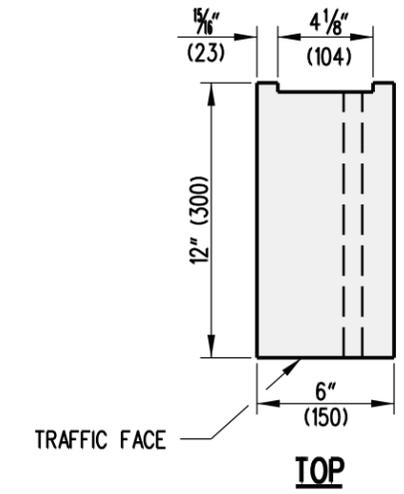
**TOP**



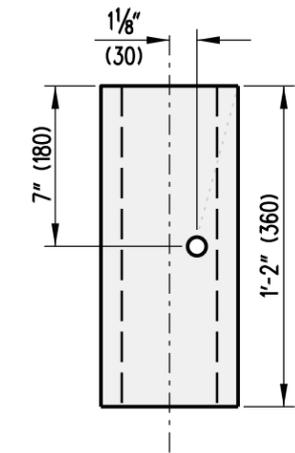
**FRONT**

**OFFSET BLOCK, TYPE 27**

3B



**TOP**



**FRONT**

**OFFSET BLOCK, TYPE 31**

3A

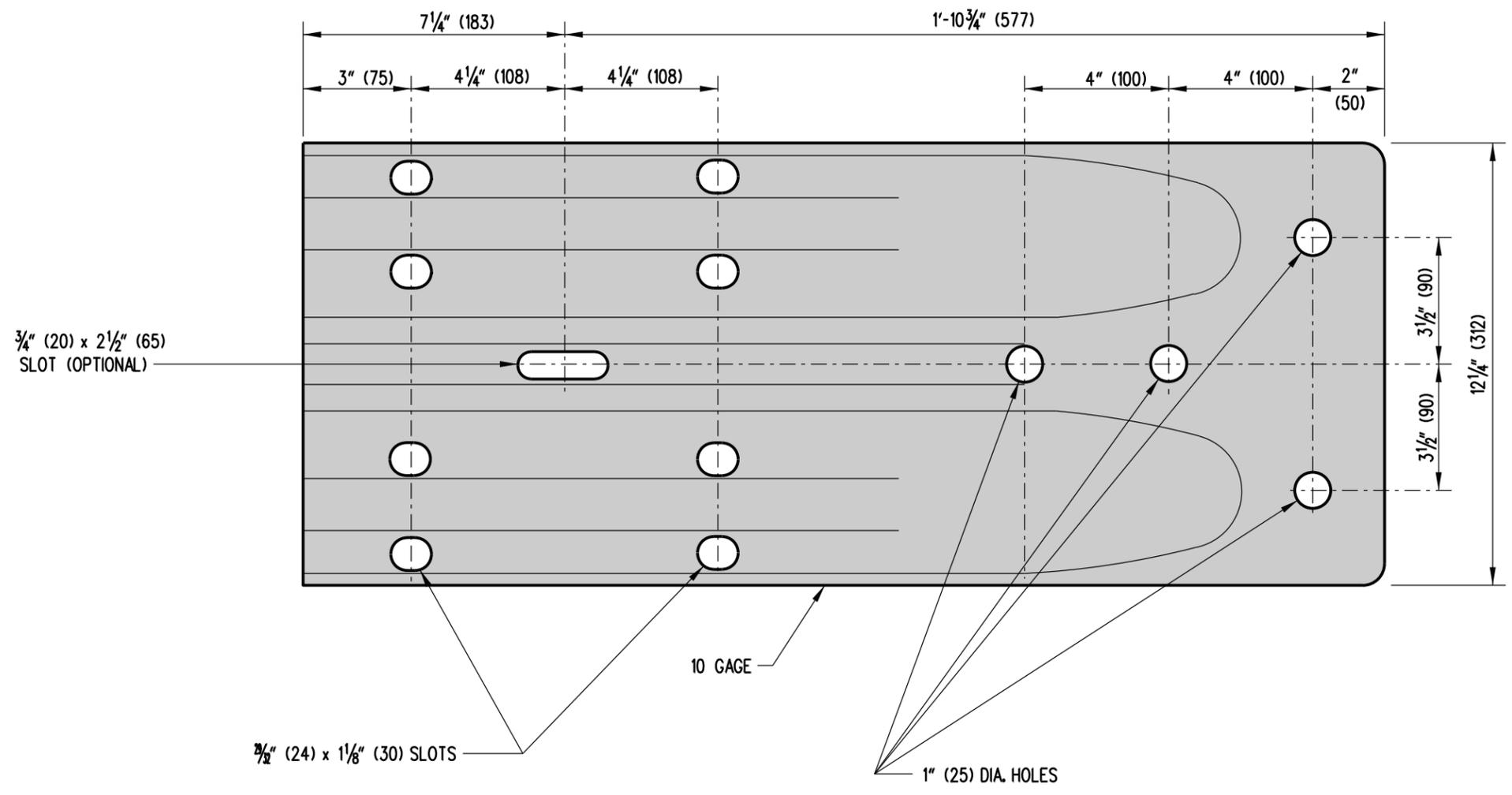
**W-BEAM STEEL POST AND OFFSET BLOCK**

- NOTE:**
- 1). ALL HOLES SHALL BE 5/16" (20) DIA. BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXIS OF THE POST.
  - 2). WHERE CONDITIONS REQUIRE, ALTERNATE POST LENGTHS IN INCREMENTS OF 6" (150) MAY BE USED.
  - 3). THE RUB RAIL HOLE OFFSET DISTANCE IS 12" (300) FOR GUARDRAIL TO BARRIER CONNECTION, TYPE 1-27 AND 1-31, 1'-2" (360) FOR GUARDRAIL TO BARRIER CONNECTION, TYPE 2-27, AND 1'-6" (460) FOR GUARDRAIL TO BARRIER CONNECTION, TYPE 2-31.

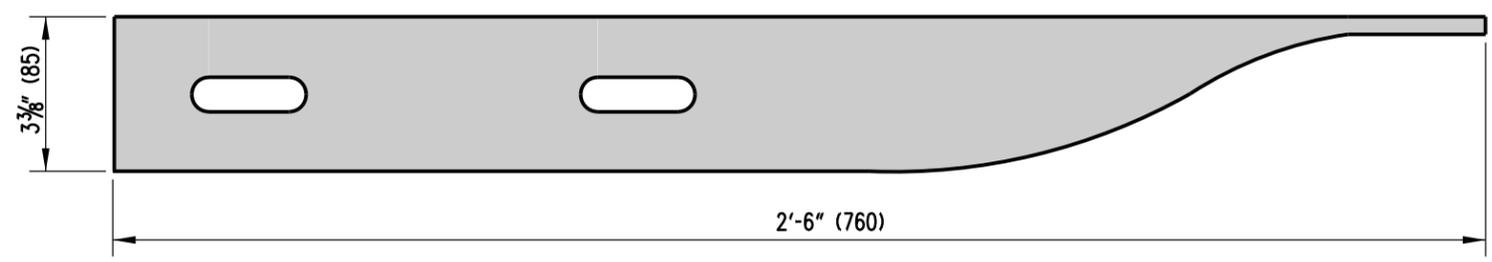
**DELAWARE**  
**DEPARTMENT OF TRANSPORTATION**

<b>HARDWARE</b>			
<b>STANDARD NO.</b>	<b>B-13 (2010)</b>	<b>SHT.</b>	<b>2 OF 10</b>

<b>APPROVED</b>	SIGNATURE ON FILE	12/28/2010
	CHIEF ENGINEER	DATE
<b>RECOMMENDED</b>	SIGNATURE ON FILE	12/27/2010
	DESIGN ENGINEER	DATE

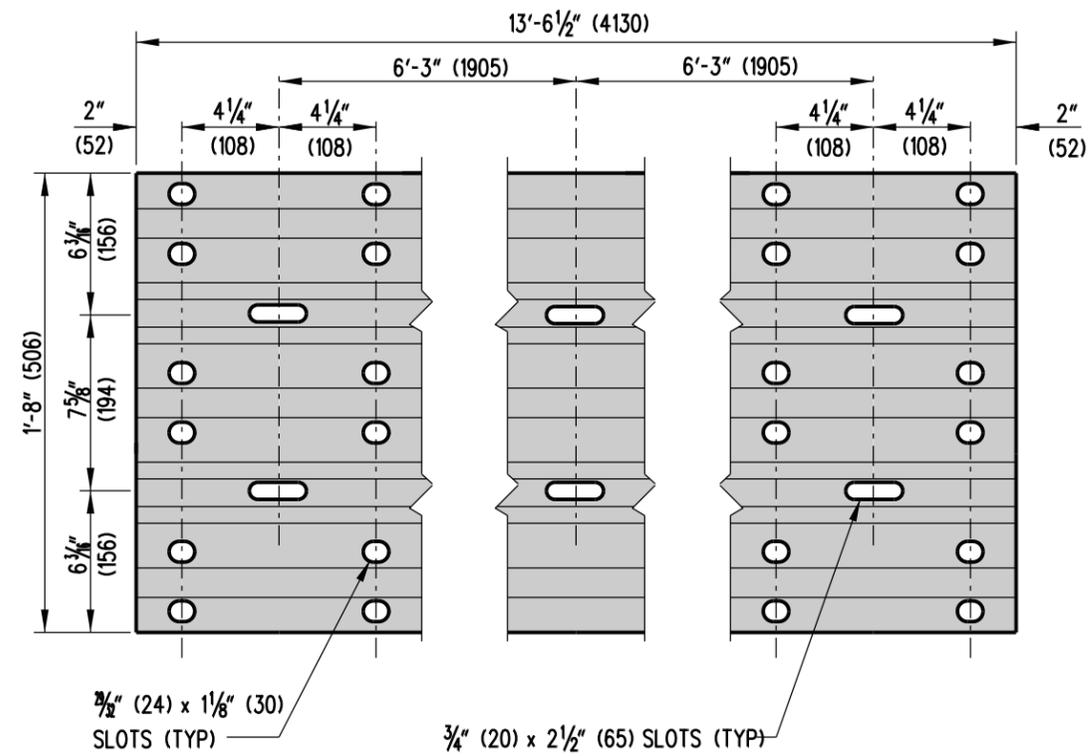


**ELEVATION**

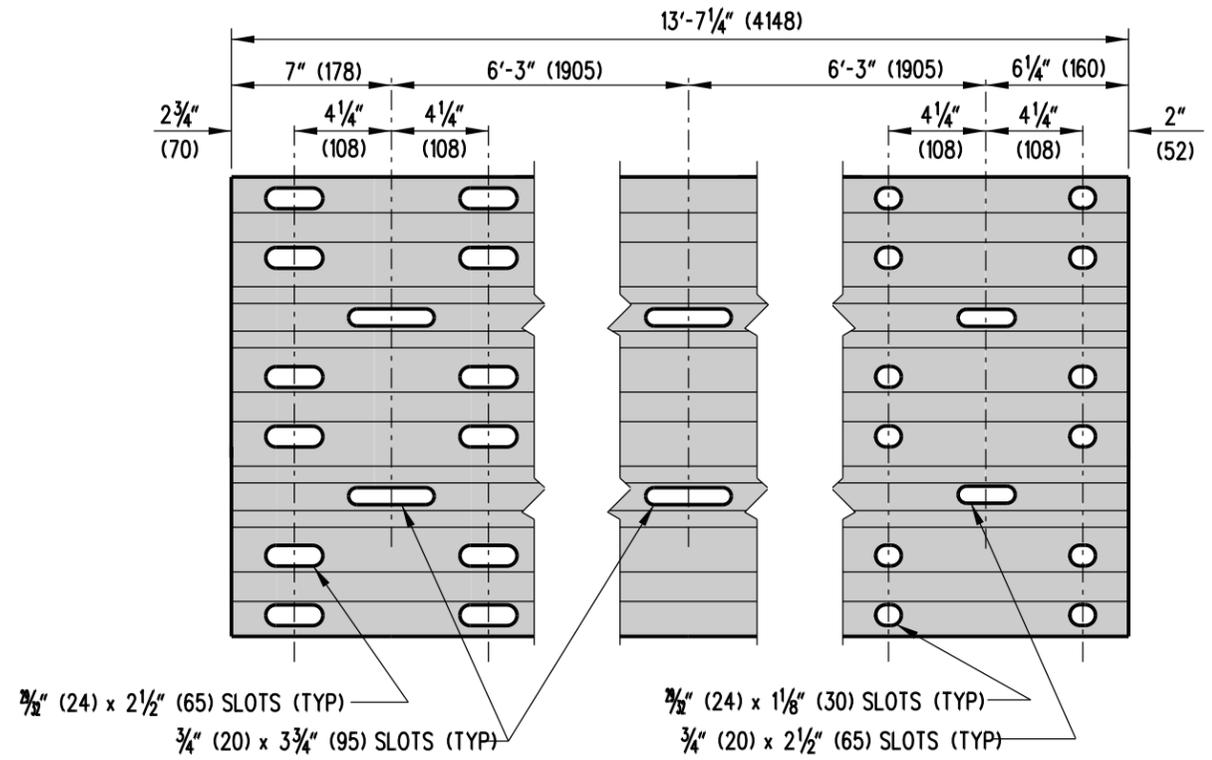


**PLAN**

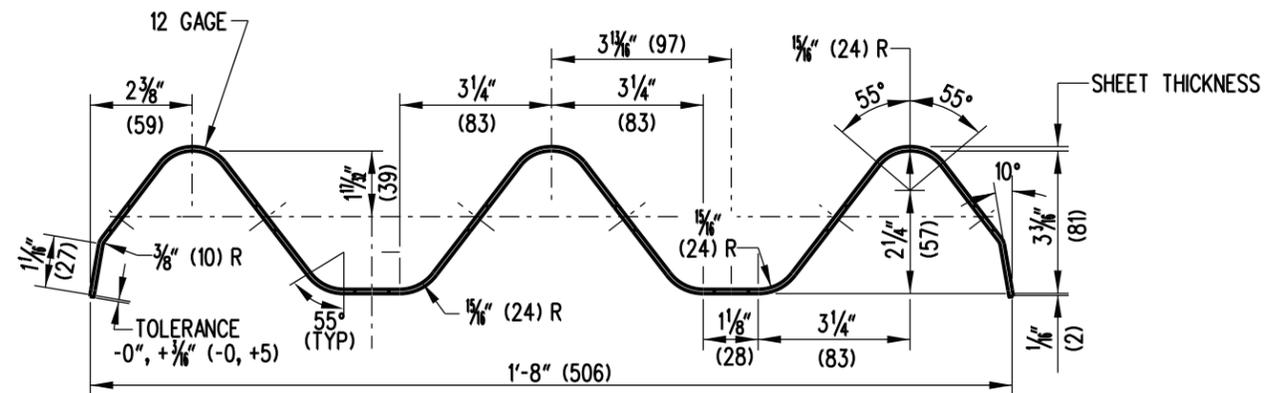
**W-BEAM TERMINAL CONNECTOR** (5)



**THRIE BEAM ELEVATION**



**THRIE BEAM EXPANSION ELEMENT**



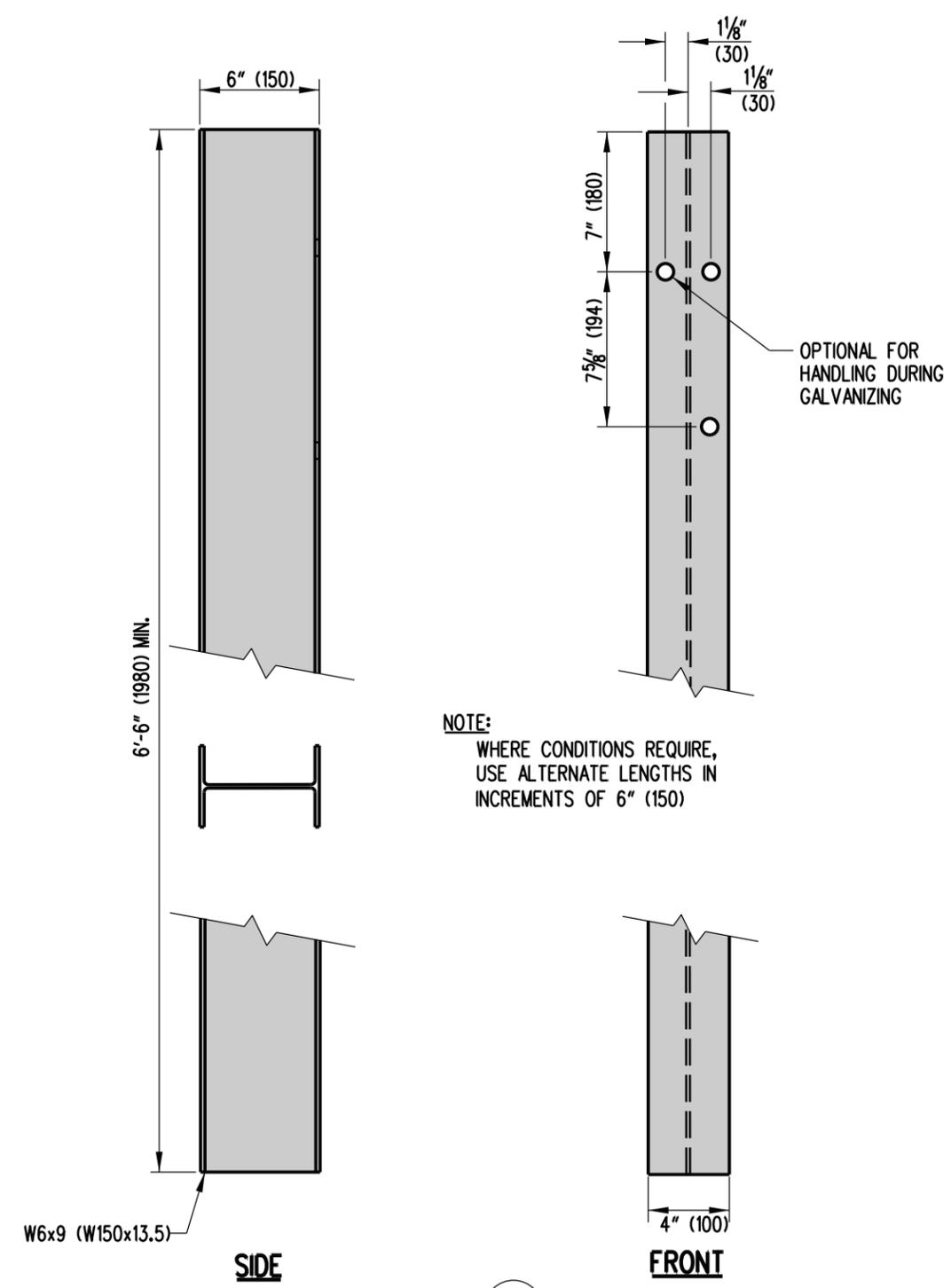
**THRIE BEAM SECTION**



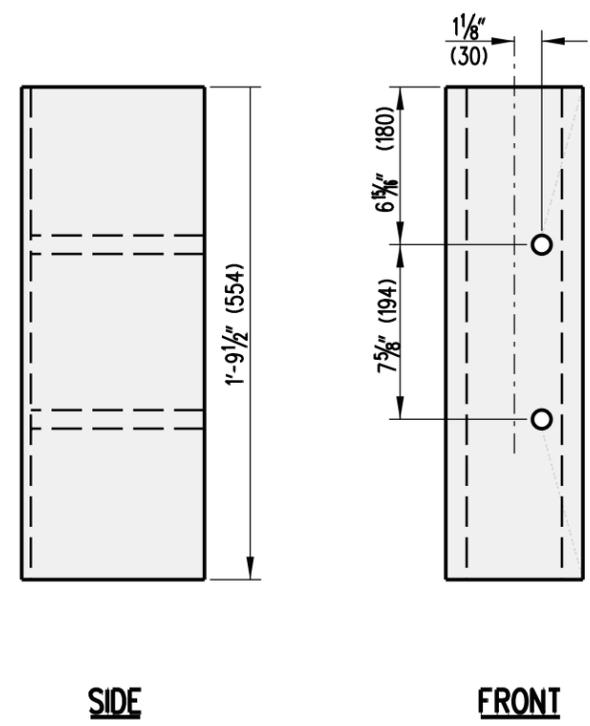
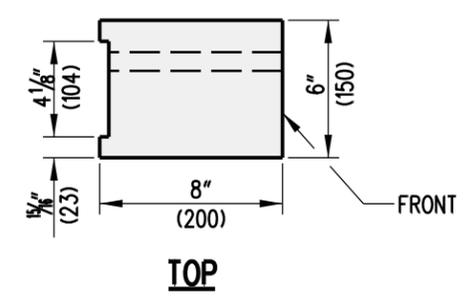
**DELAWARE**  
**DEPARTMENT OF TRANSPORTATION**

<b>HARDWARE</b>			
<b>STANDARD NO.</b>	<b>B-13 (2010)</b>	<b>SHT.</b>	<b>4 OF 10</b>

<b>APPROVED</b>	SIGNATURE ON FILE	12/28/2010
	CHIEF ENGINEER	DATE
<b>RECOMMENDED</b>	SIGNATURE ON FILE	12/27/2010
	DESIGN ENGINEER	DATE



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

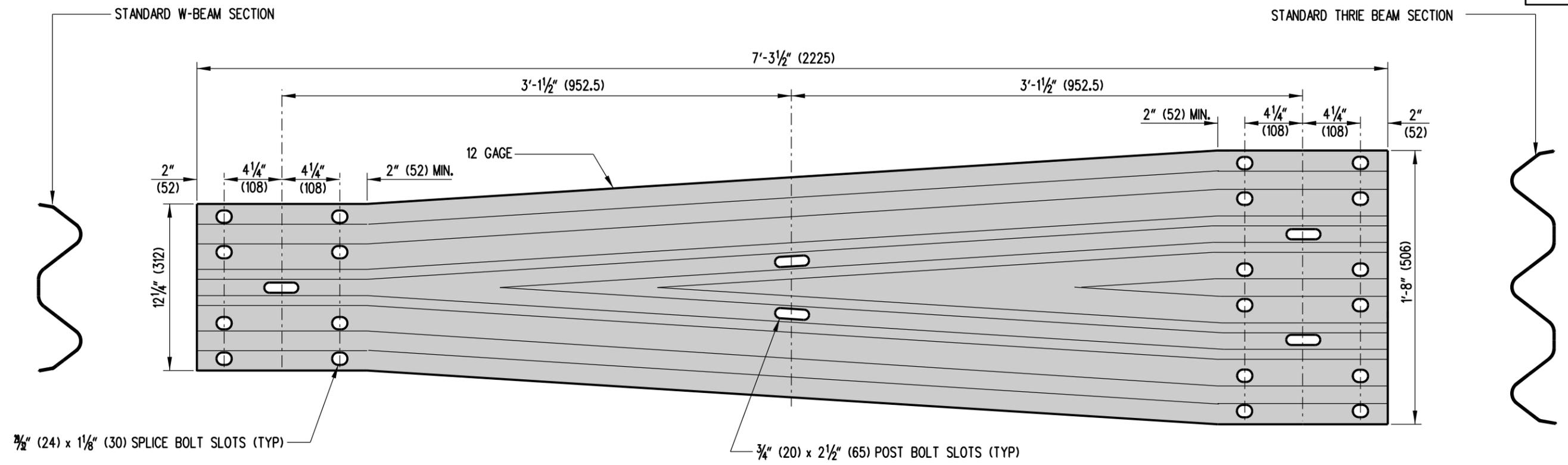


**OFFSET BLOCK**

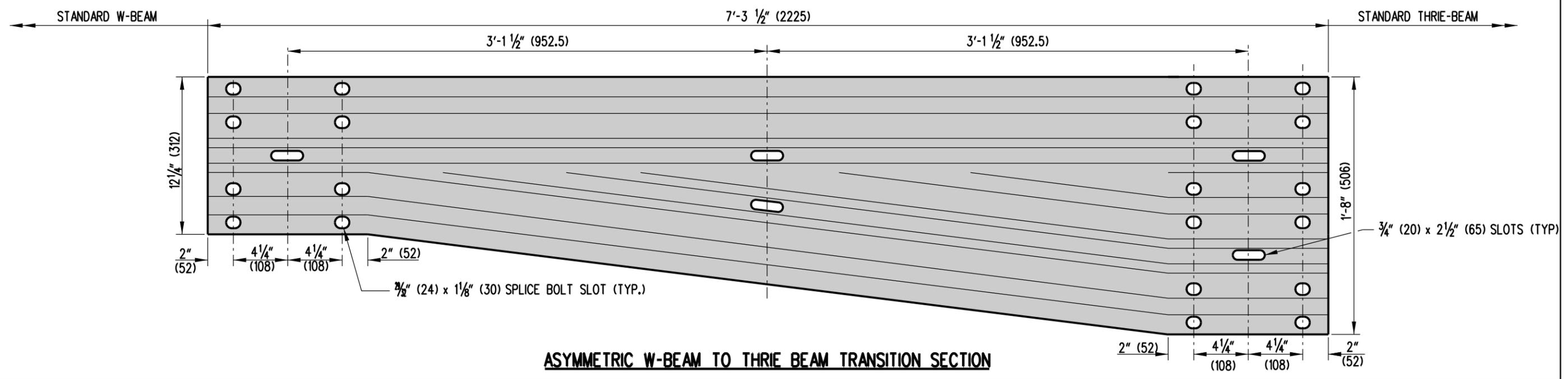
**NOTE:**  
ALL HOLES SHALL BE 1/4" (20) DIA. BOLT HOLE  
PATTERN IS SYMMETRICAL WITH RESPECT TO THE  
VERTICAL AXIS OF THE POST.

**POST** 2

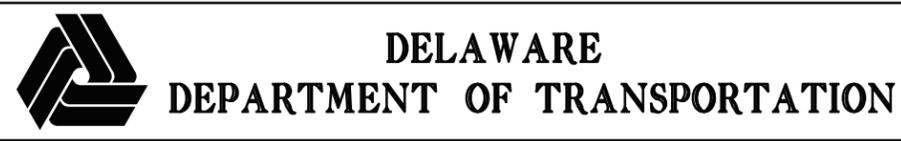
**THRIE BEAM STEEL POST AND OFFSET BLOCK**



**SYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION**



**ASYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION**



<b>HARDWARE</b>	
STANDARD NO. <b>B-13 (2010)</b>	SHT. <b>6</b> OF <b>10</b>

<b>APPROVED</b>	SIGNATURE ON FILE	12/28/2010
	CHIEF ENGINEER	DATE
<b>RECOMMENDED</b>	SIGNATURE ON FILE	12/27/2010
	DESIGN ENGINEER	DATE