



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	- GUARDRAIL OVER CULVERTS (TYPES 1-27, 2-27, AND 3-27)
	(2010) - 1 GUARDRAIL OVER CULVERTS, TYPE 1-27
	(2010) - 2 GUARDRAIL OVER CULVERTS, TYPE 2-27
	(2010) - 3 GUARDRAIL OVER CULVERTS, TYPE 3-27
B-17 (2010)	- GUARDRAIL END TREATMENT (TYPE 4-27)
B-18 (2010)	- CURVED GUARDRAIL SECTION
B-19 (2010)	- 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

SHEET NO.	NAME
C-1	- P.C.C. CURB AND INTEGRAL P.C.C. CURB & GUTTER
	(2011) - 1 P.C.C. CURB, TYPICAL CURB SECTION, AND TYPICAL TAPER SECTION AT NOSE OF MEDIANS
	(2011) - 2 INTEGRAL P.C.C. CURB & GUTTER
C-2	- CURB RAMPS
	(2008) - 1 TYPE 1
	(2008) - 2 TYPE 2, 3, AND 4
	(2008) - 3 SECTIONS FOR TYPES 2, 3, AND 4
	(2006) - 4 TYPE 5
C-3 (2010)	- ENTRANCES
C-4 (2010)	- CURB OPENING DETAILS
C-5 (2011)	- CURB OPENING WITH SIDEWALK DETAIL

SECTION III - DRAINAGE

SHEET NO.	NAME
D-1	- 6:1 SAFETY END STRUCTURE
	(2001) - 1 DETAIL VIEWS
	(2001) - 2 SCHEDULES
D-2	- 10:1 SAFETY END STRUCTURE
	(2001) - 1 DETAIL VIEWS
	(2001) - 2 SCHEDULES
D-3	- SAFETY GRATES
	(2005) - 1 SAFETY END STRUCTURE GRATE AND ASSEMBLY DETAIL
	(2007) - 2 PERSONNEL SAFETY GRATE FOR PIPE INLET DETAIL
D-R (2011)	- DRAINAGE INLET REFERENCE SHEET
D-4 (2009)	- INLET BOX DETAILS
D-5	- DRAINAGE INLET DETAILS
	(2010) - 1 DRAINAGE INLET ASSEMBLY
	(2010) - 2 DRAINAGE INLET FRAME AND GRATES
	(2011) - 3 DRAINAGE INLET TOP UNITS
	(2010) - 4 DRAINAGE INLET COVER SLAB DETAILS
	(2010) - 5 DOUBLE INLET COVER SLAB DETAILS
	(2011) - 6 34" x 24" DRAINAGE INLET AND COVER SLAB DETAILS
	(2010) - 7 34" x 18" DRAINAGE INLET DETAILS
	(2010) - 8 DRAINAGE INLET TOP UNIT, TYPE S
	(2010) - 9 DOGHOUSE INLET BOX



SECTION III - DRAINAGE (CONT'D)

SHEET NO.	NAME
D-6	– MAHOLE 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 (2011)	– 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
E-4	– RESERVED
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 (2011)	- RIGHT-OF-WAY MONUMENTATION
M-3 (2009)	- BOLLARD AND SHARED-USE PATH DETAILS
M-4 (2011)	- BIKE RACK LAYOUT DETAILS
M-5 (2004)	- WOOD RAIL FENCE
M-6 (2011)	- PATTERNED HOT-MIX OR CONCRETE & BRICK PAVER DETAILS
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 JOINTS

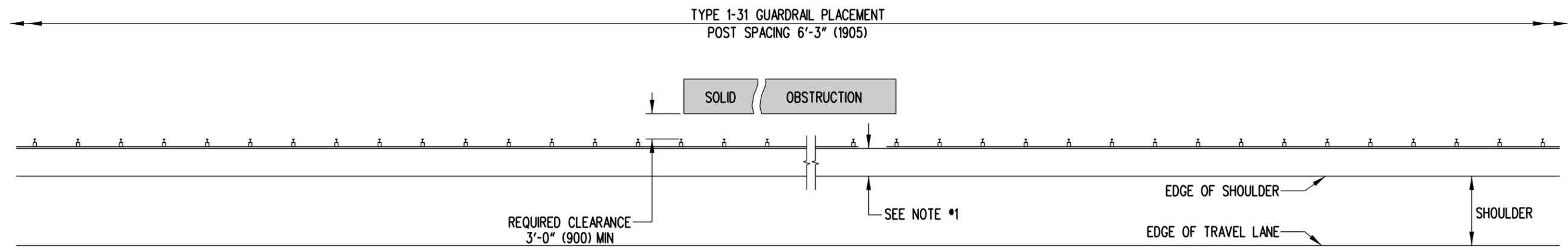


SECTION VIII - TRAFFIC

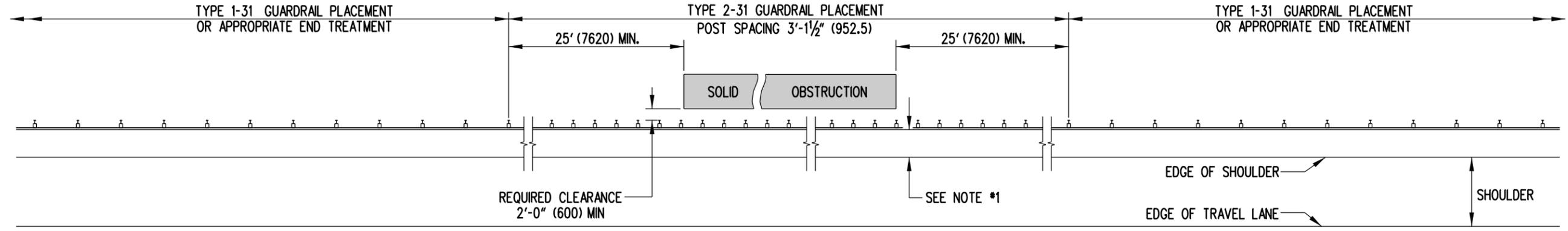
SHEET NO.	NAME
T-1	<ul style="list-style-type: none"> - CONDUIT JUNCTION WELLS (2011) - 1 TYPES 1, 2, & 3 (2011) - 2 TYPE 4 (2011) - 3 TYPE 5
T-2 (2011)	- JUNCTION WELL, GROUNDING & BONDING FOR STEEL FRAMES & LIDS
T-3	<ul style="list-style-type: none"> - CONDUIT JUNCTION WELLS (2011) - 1 TYPE 11 (2011) - 2 TYPE 14 (2011) - 3 TYPE 15
T-4	<ul style="list-style-type: none"> - CABINET BASES (2011) - 1 TYPES M & F (2011) - 2 TYPES P & R
T-5	<ul style="list-style-type: none"> - POLE BASES (2011) - 1 ROUND BASE, SQUARE BASE (2011) - 2 TYPICAL SECTION AND INSTALLATION (BASES 1, 2, 2A, 2B, 3, 3A, 3B, AND 7) (2011) - 3 TYPICAL SECTION (BASES 5 AND 6), TYPE 7 GROUND ROD DETAIL, AND POLE BASE DATA CHART (2011) - 4 TYPICAL SECTION (BASE 4) AND ANCHOR DETAIL
T-6 (2011)	- 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	<ul style="list-style-type: none"> - MESSENGER WIRE ATTACHMENT (2005) - 1 INTERMEDIATE MESSENGER WIRE ATTACHMENT ON WOOD POLES (2005) - 2 ANGULAR INTERMEDIATE MESSENGER WIRE ATTACHMENT
T-12	<ul style="list-style-type: none"> - MESSENGER WIRE ATTACHMENT (2005) - 1 SPAN WIRE ATTACHMENT BETWEEN POLES (2005) - 2 DEAD END MESSENGER WIRE ATTACHMENT
T-13	<ul style="list-style-type: none"> - CONDUIT JUNCTION WELLS (2005) - 1 TYPE 6 (2006) - 2 TYPE 7 (2006) - 3 TYPES 8 AND 10
T-14	<ul style="list-style-type: none"> - EMERGENCY PREEMPTION RECIEVER (2006) - 1 UPRIGHT MOUNT (2005) - 2 INVERTED MOUNT
T-15 (2009)	- BREAKAWAY SIGN POST AND PIN ASSEMBLY DETAILS
T-16 (2010)	- WOOD BARRICADE DETAILS



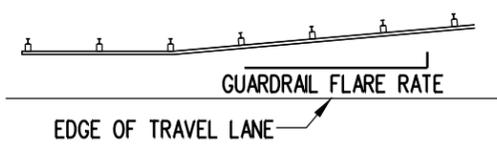
BARRIER LEGEND	
ITEM NO.	DESCRIPTION
①	W-BEAM
②	W6 X 9 (W150 x 13.5) STEEL POST
③A ③B	③A - 6" (150) x 12" (300) x 14" (350) OFFSET BLOCK ③B - 6" (150) x 8" (200) x 14" (350) OFFSET BLOCK
④	SPLICE - REQUIRES EIGHT(8) 5/8" (16) GUARDRAIL BOLTS (L=1 1/4" (35)) WITH RECESS NUTS
⑤	W-BEAM TERMINAL CONNECTOR
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



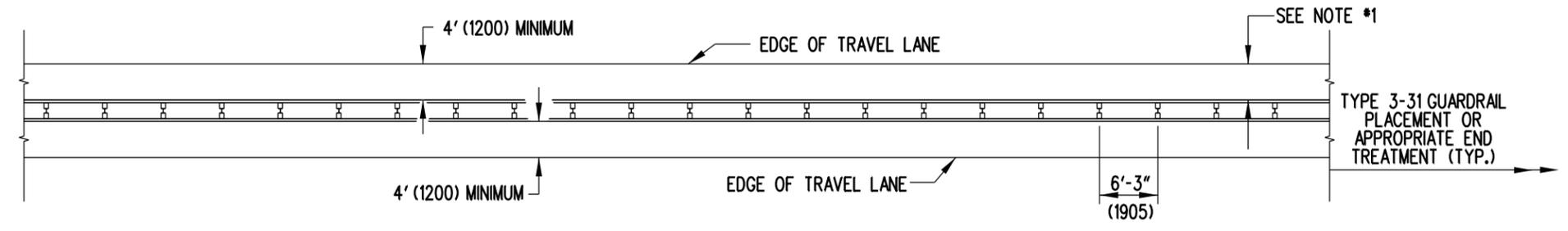
TYPE 1-31 GUARDRAIL
TYPICAL GUARDRAIL TREATMENT
WHEN THE REQUIRED 3'-0" (900) CLEARANCE TO OBSTRUCTION IS AVAILABLE



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

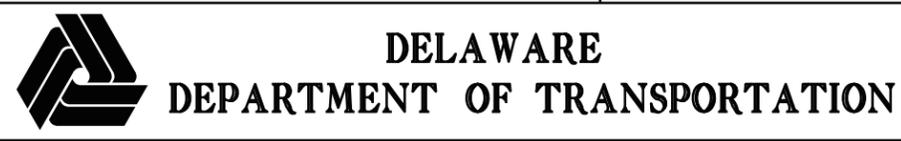


FLARE RATES	
DESIGN SPEED	FLARE RATE
70 MPH (110 km/h)	15:1
60 MPH (100 km/h)	14:1
55 MPH (90 km/h)	12:1
50 MPH (80 km/h)	11:1
45 MPH (70 km/h)	10:1
40 MPH (60 km/h)	9:1
30 MPH (50 km/h)	7:1



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.



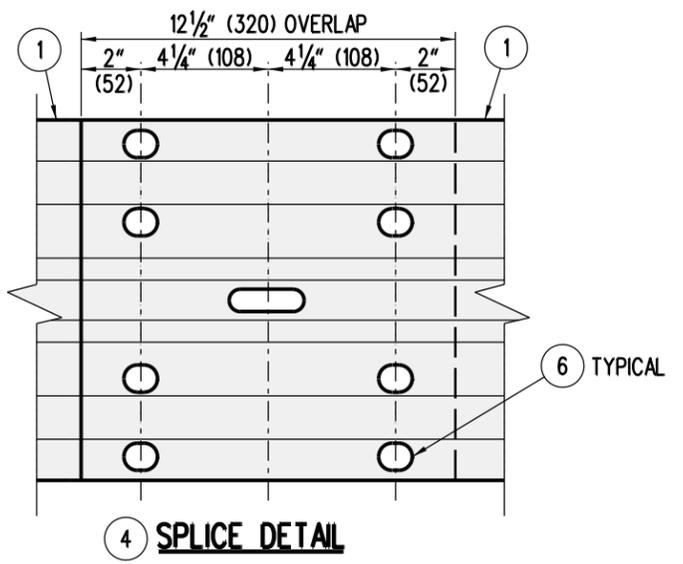
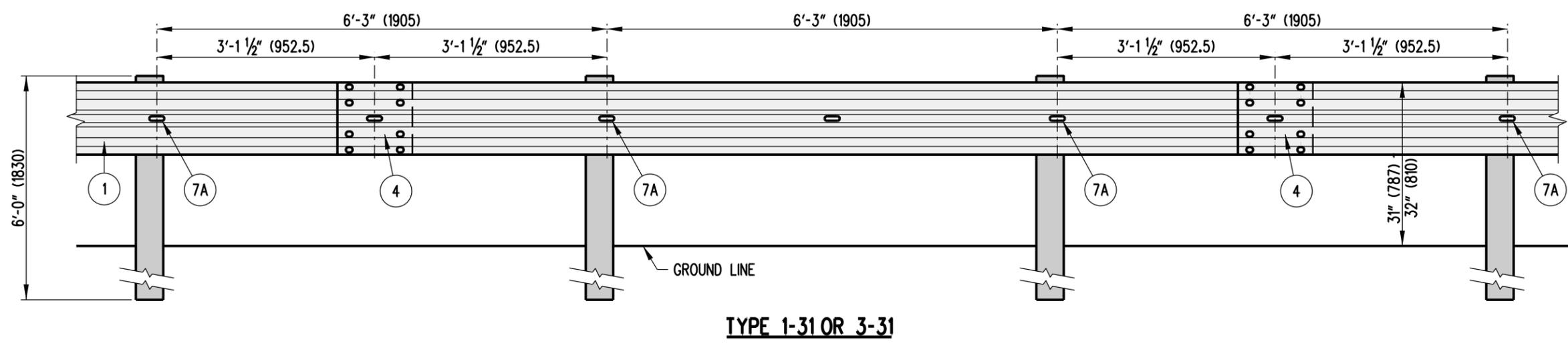
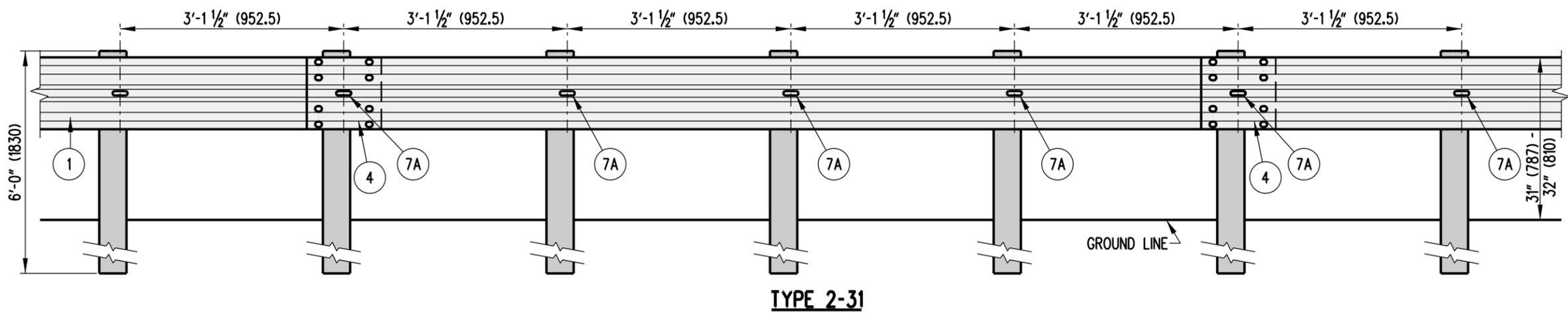
TYPES 1-31, 2-31, AND 3-31 GUARDRAIL APPLICATIONS

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

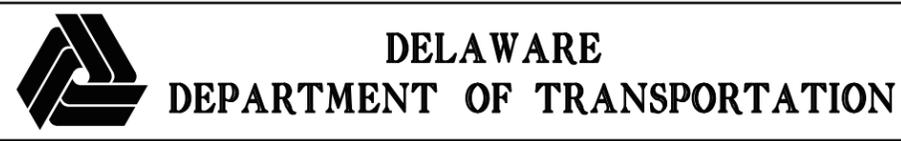
APPROVED SIGNATURE ON FILE 12/28/2010
CHIEF ENGINEER DATE

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

SCALE : N.T.S.



NOTE : OVERLAP W-BEAMS IN DIRECTION OF TRAVEL.

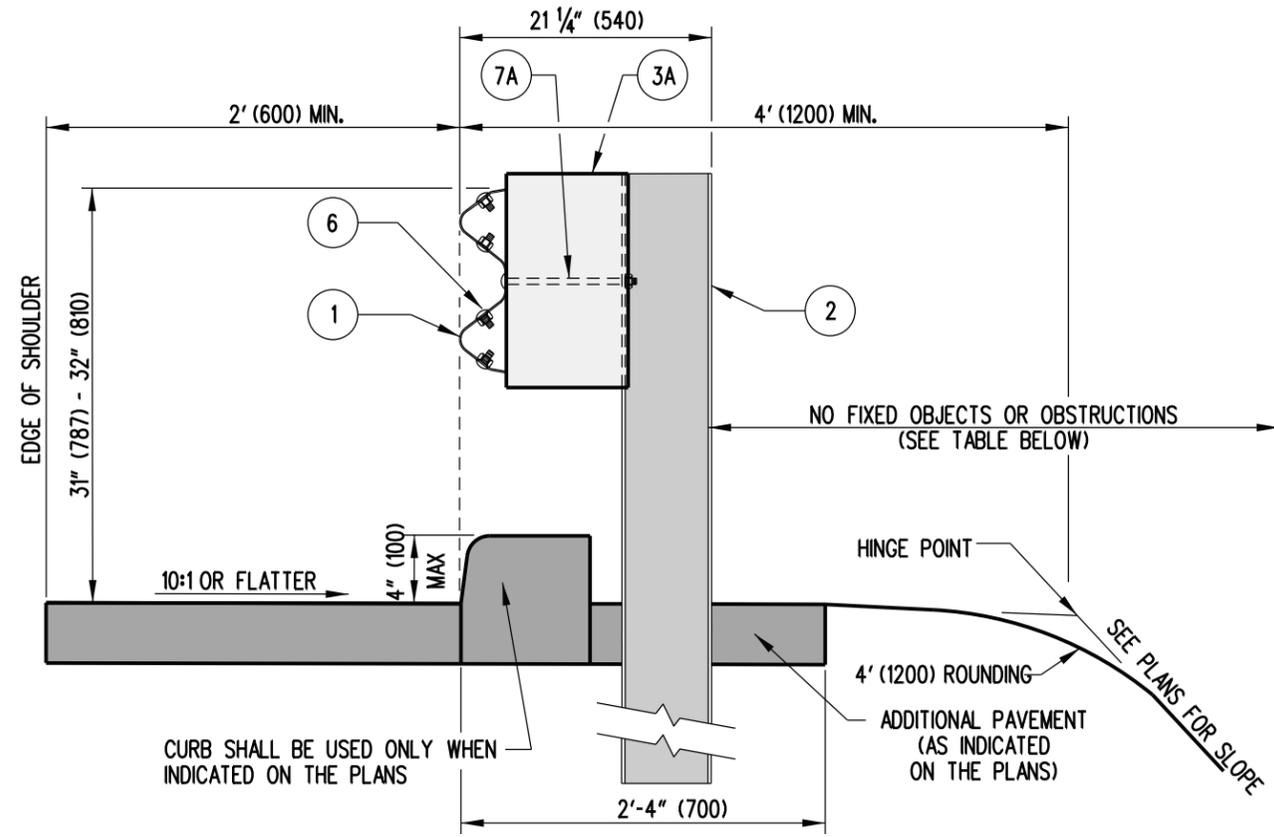


TYPES 1-31, 2-31, AND 3-31 GUARDRAIL APPLICATIONS

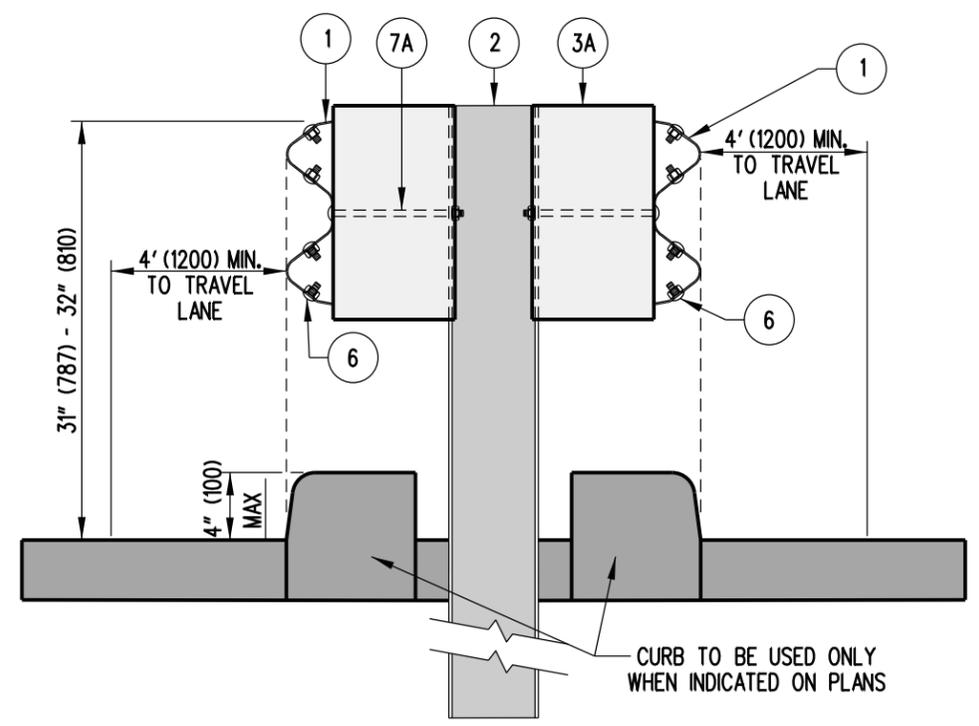
STANDARD NO. **B-1 (2010)** SHT. **2** OF **3**

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

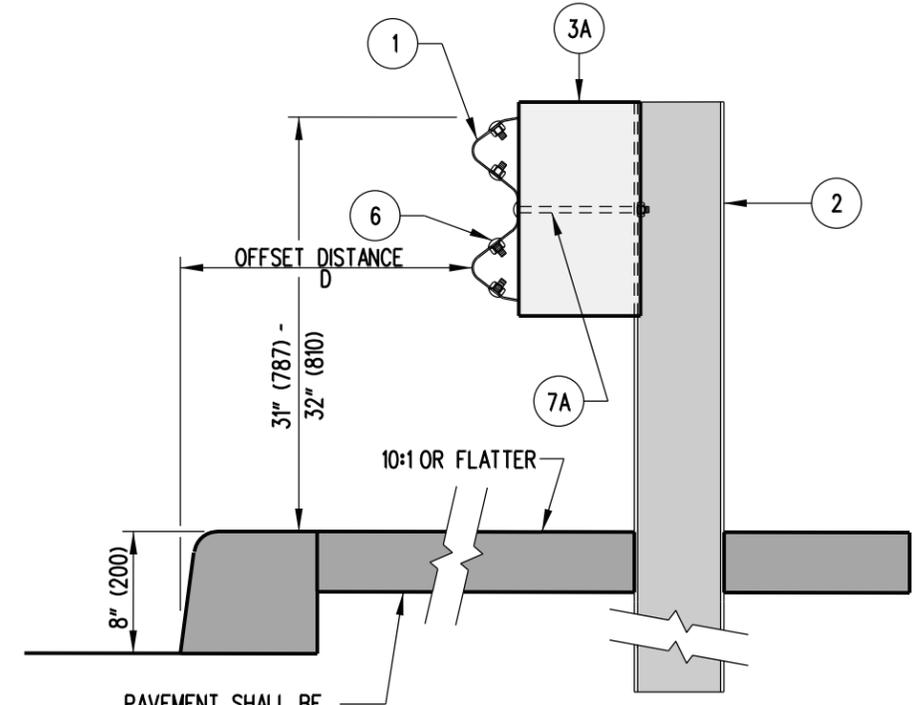
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DESIGN ENGINEER DATE



GUARDRAIL SECTION
RURAL SHOULDER APPLICATION



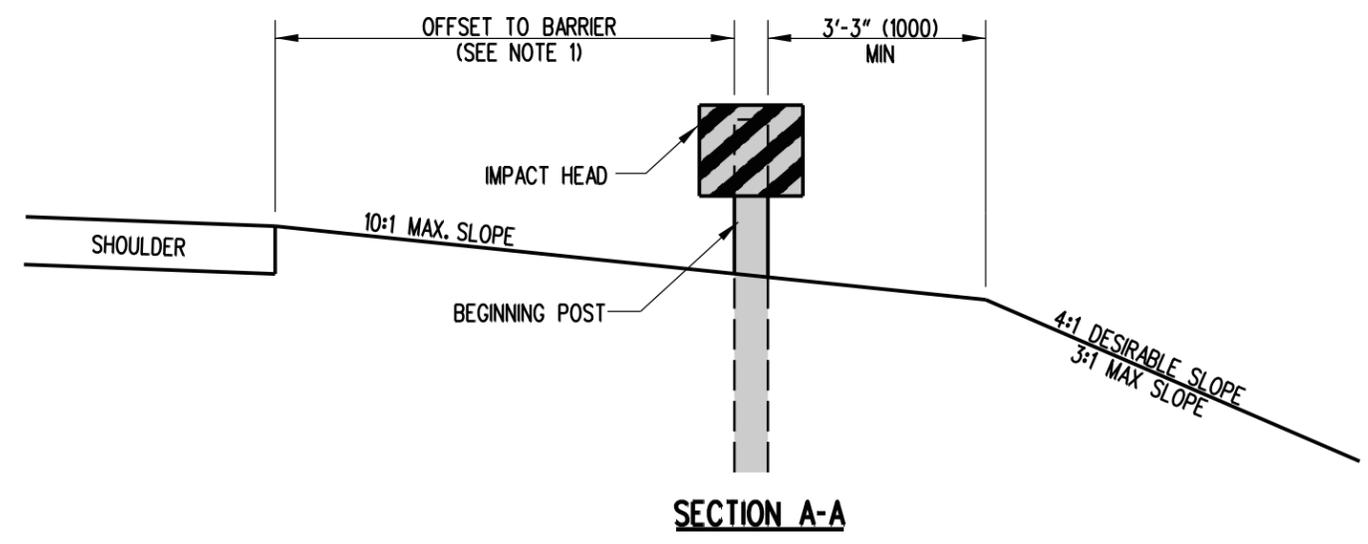
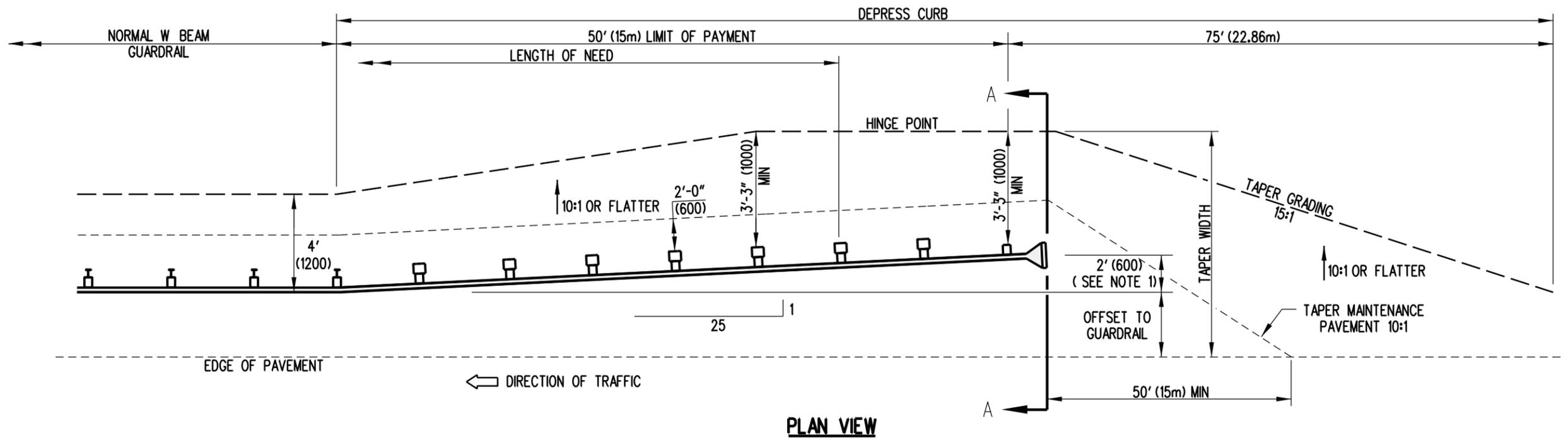
GUARDRAIL SECTION
MEDIAN APPLICATION



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

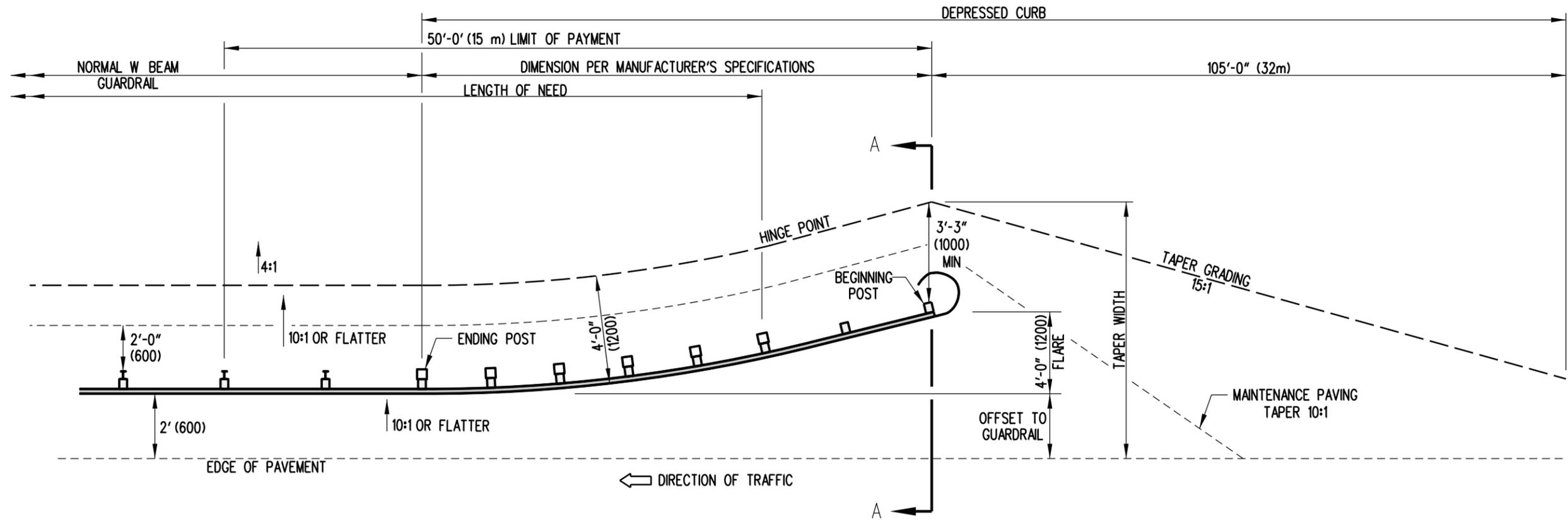
DESIGN SPEED	D
< 50 MPH (80 km/h)	8'-0" (2400)
> 50 MPH (80 km/h)	13'-0" (3900)



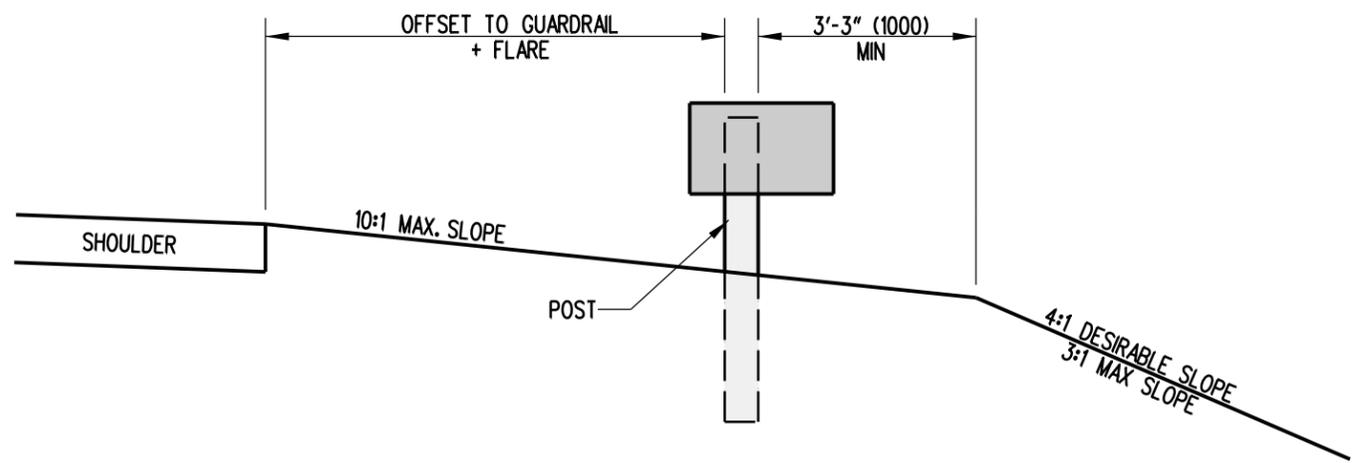
- NOTES:**
- 1). FLARE THE END TREATMENT AT 25:1 BEGINNING 50' (15 m) FROM THE END OF THE IMPACT HEAD, UNLESS THE CONSTRUCTION PLANS OR SPECIFICATIONS SPECIFY A SMALLER FLARE.
 - 2). THIS DETAIL WAS SOLELY CREATED TO SHOW THE GRADING REQUIRED FOR THIS TYPE OF ATTENUATOR AND IS APPLICABLE REGARDLESS OF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

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

SCALE : N.T.S.



PLAN VIEW

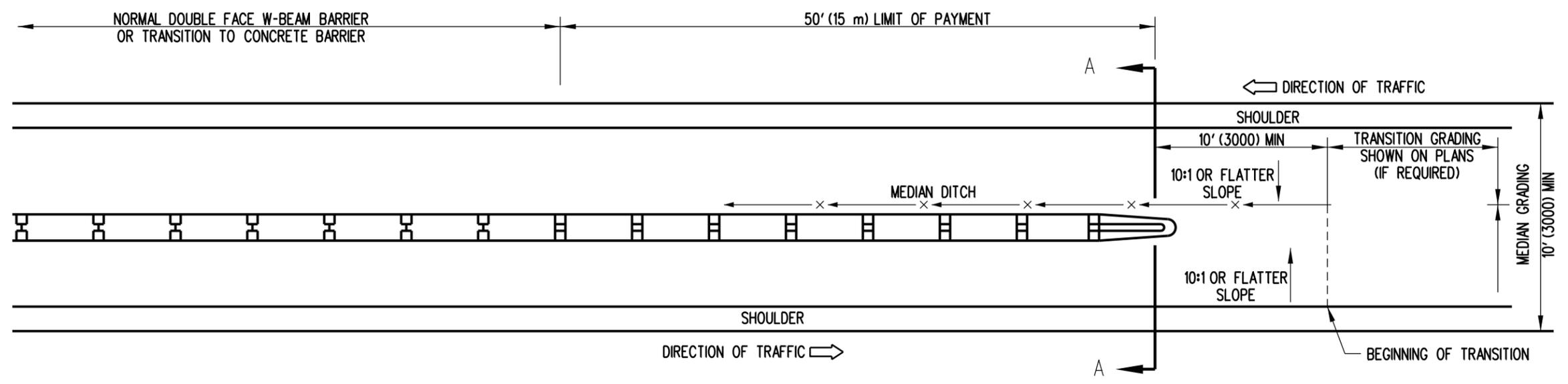


SECTION A-A

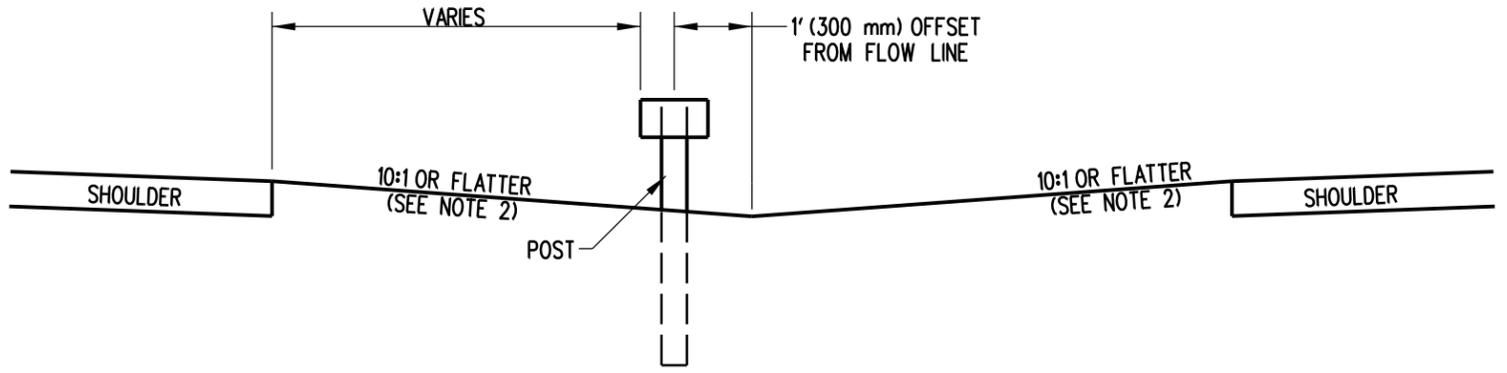
NOTES:

- 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.

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



PLAN VIEW



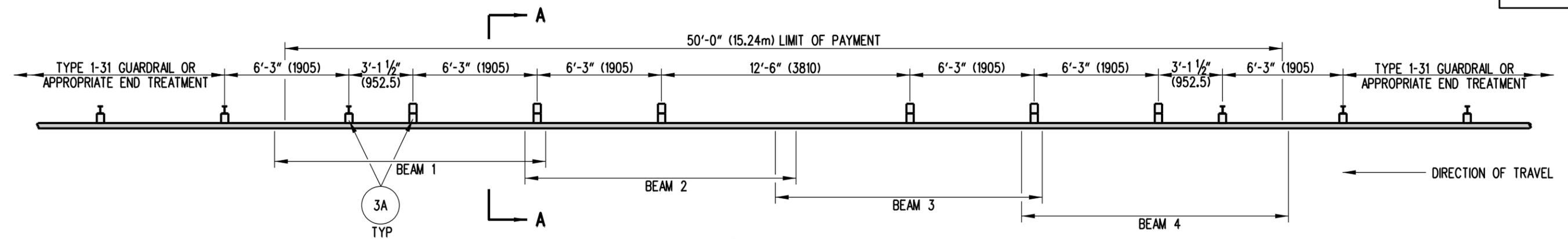
SECTION A-A

GRADING FOR END TREATMENT ATTENUATOR, TYPE 3

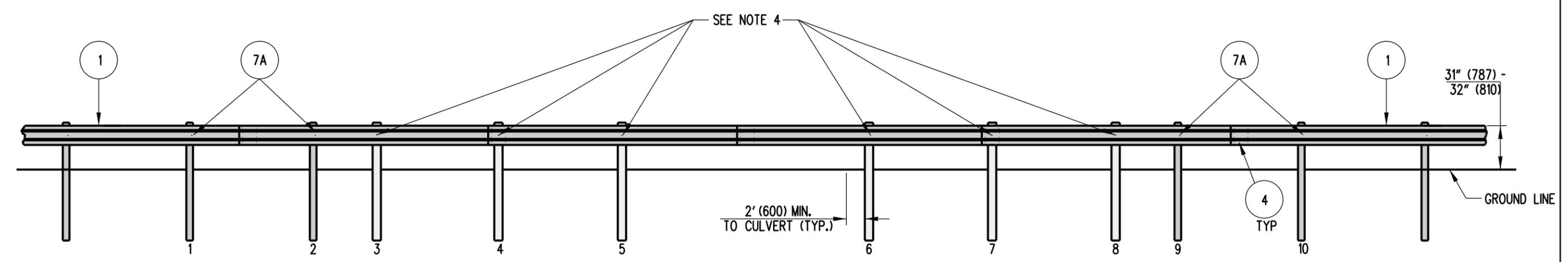
NOTES:

- 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.

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



DELAWARE
DEPARTMENT OF TRANSPORTATION

GUARDRAIL OVER CULVERTS, TYPE 1-31

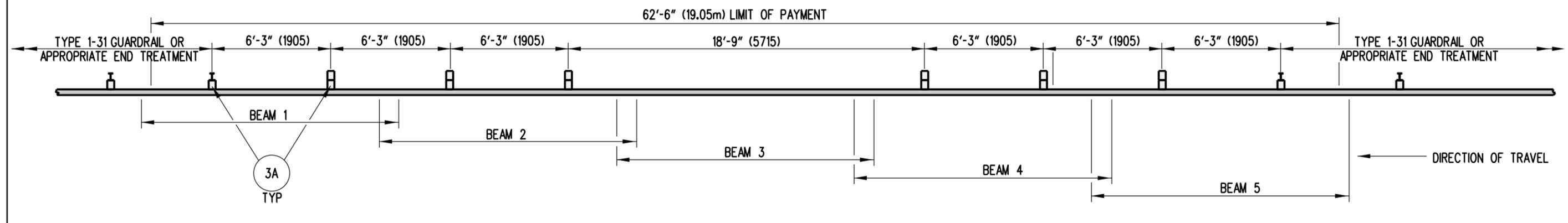
STANDARD NO. **B-3 (2010)** SHT. **1** OF **3**

APPROVED

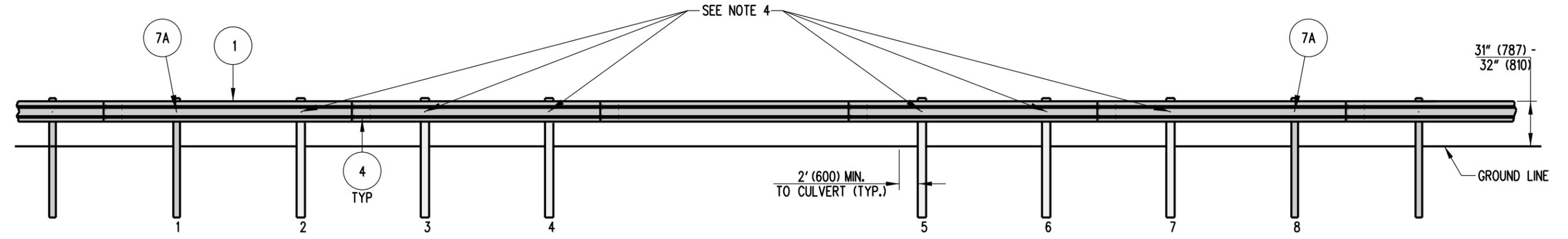
SIGNATURE ON FILE _____ 12/28/2010
CHIEF ENGINEER DATE

RECOMMENDED

SIGNATURE ON FILE _____ 12/27/2010
DESIGN ENGINEER DATE

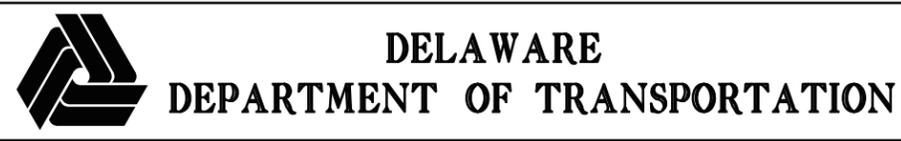


PLAN



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.

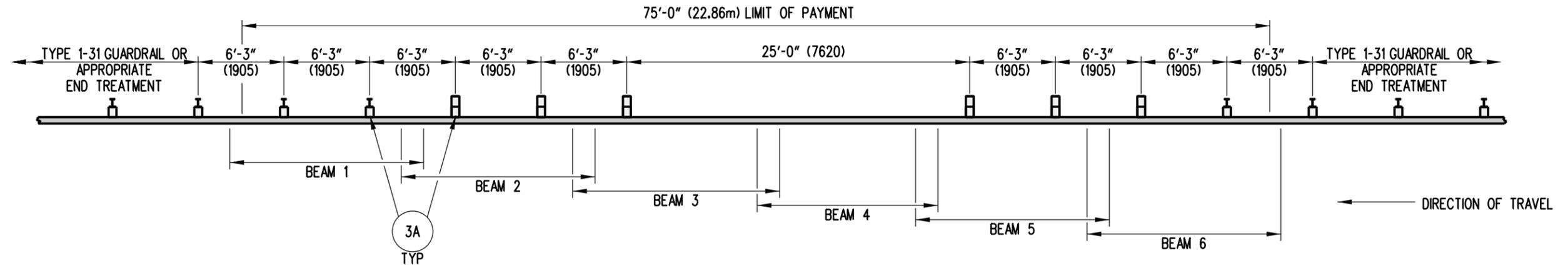


GUARDRAIL OVER CULVERTS, TYPE 2-31

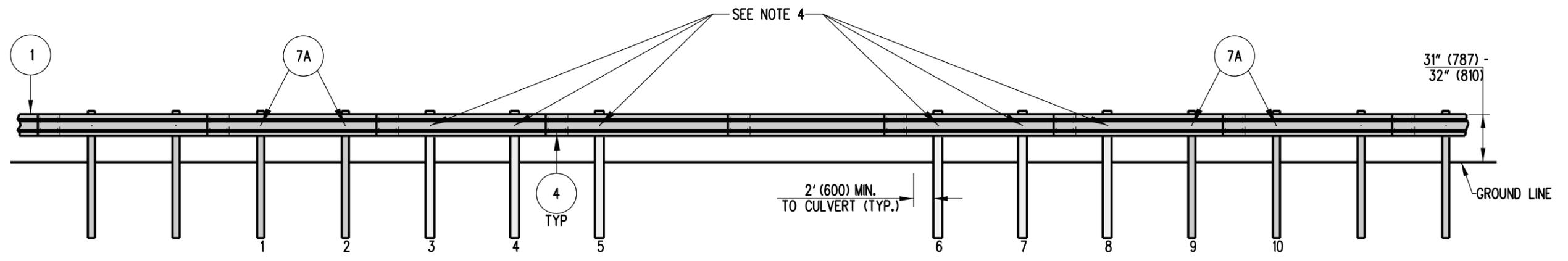
STANDARD NO. B-3 (2010) **SHT. 2 OF 3**

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

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

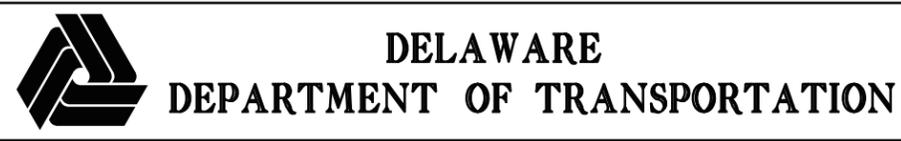


PLAN



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.

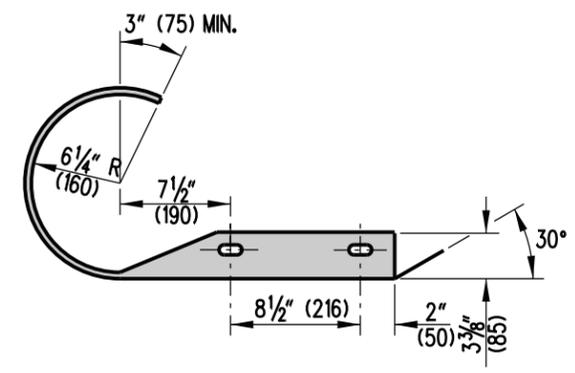


GUARDRAIL OVER CULVERTS, TYPE 3-31

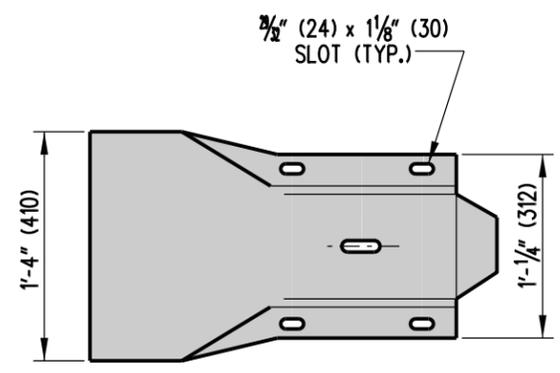
STANDARD NO. B-3 (2010) **SHT. 3 OF 3**

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

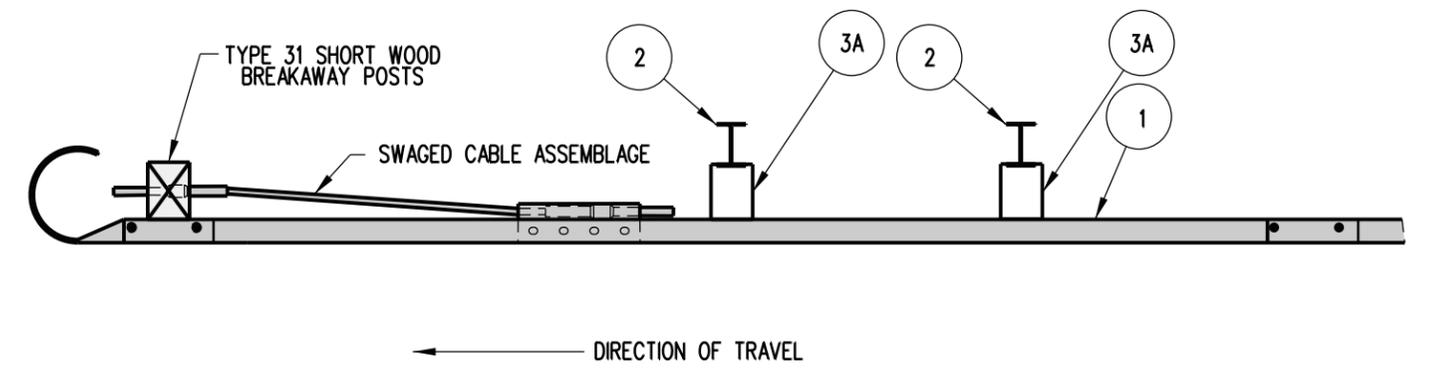
RECOMMENDED _____ **SIGNATURE ON FILE** **12/27/2010**
DESIGN ENGINEER DATE



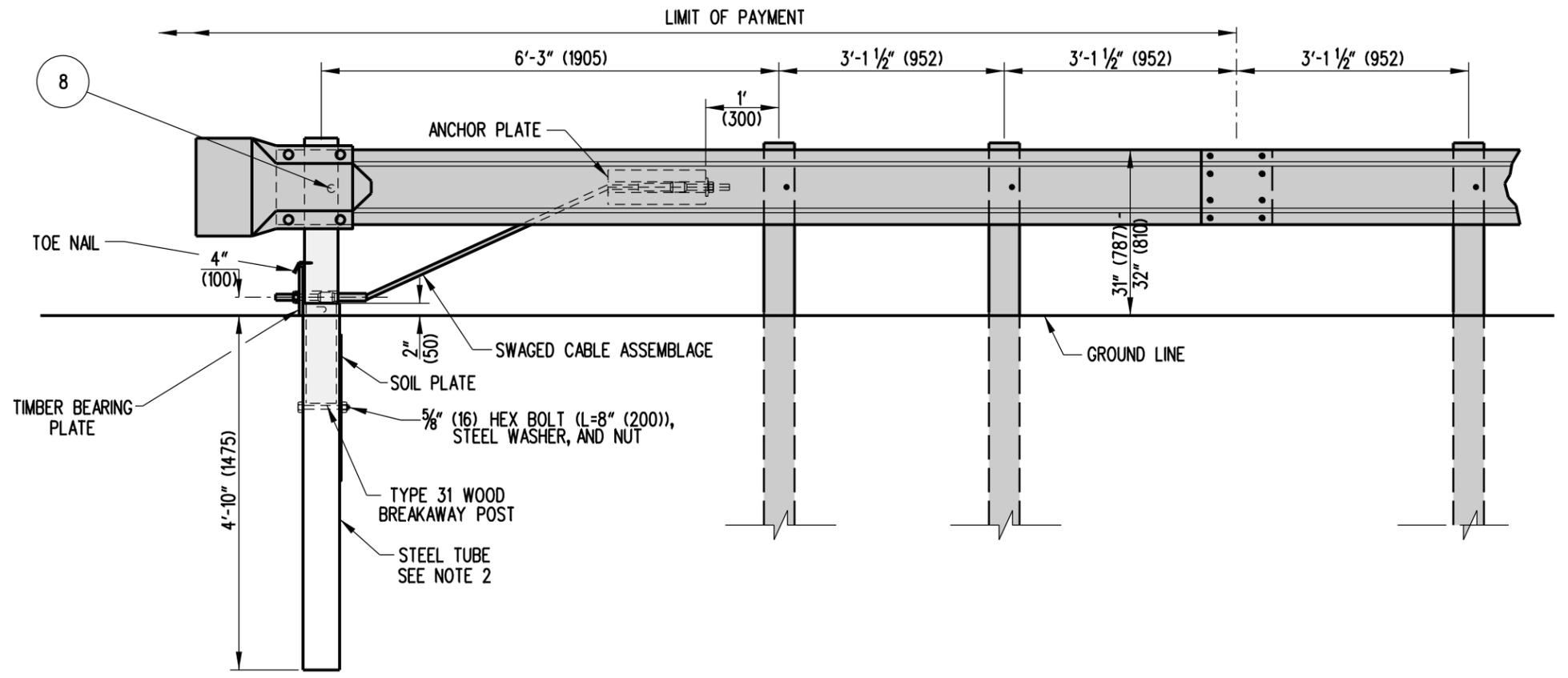
END SECTION PLAN



END SECTION ELEVATION



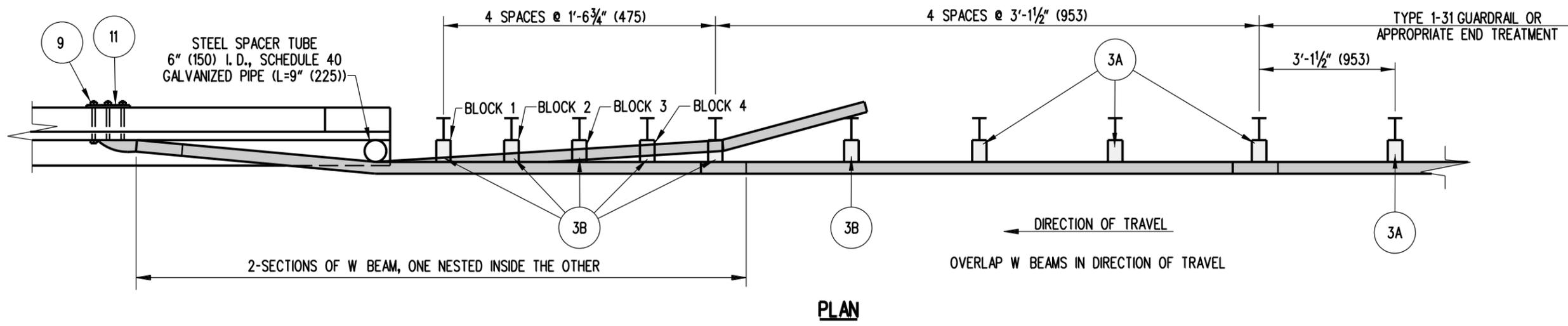
PLAN



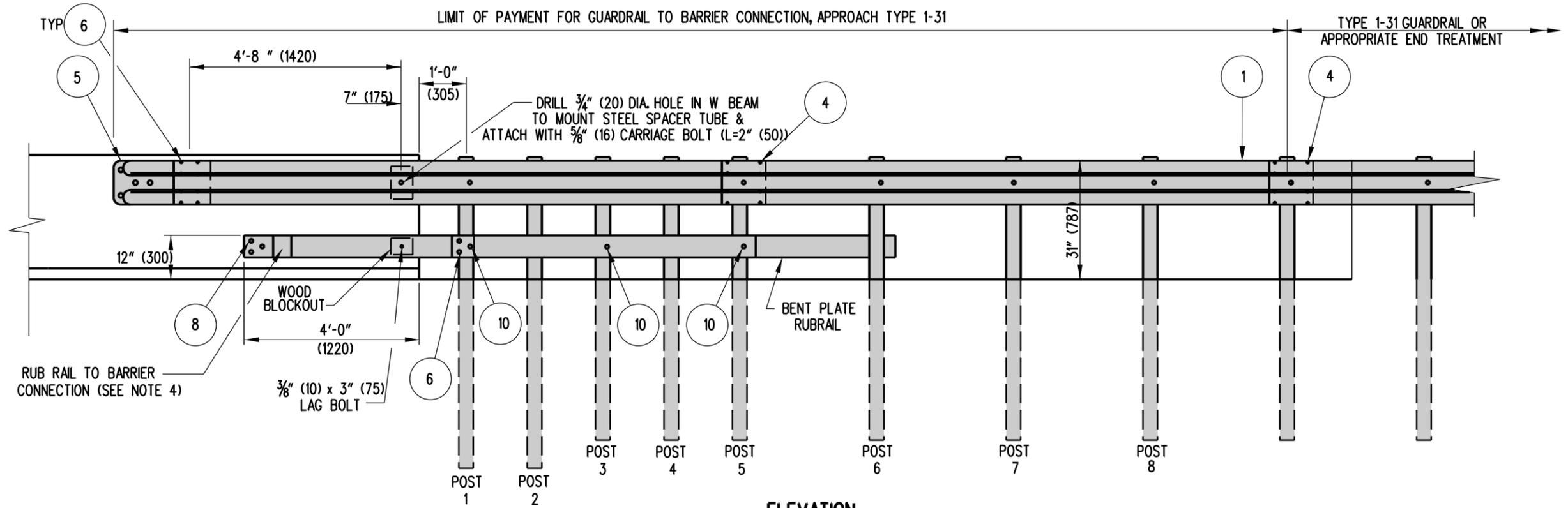
ELEVATION

- 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.

	END ACHORAGE, TYPE 31			APPROVED	SIGNATURE ON FILE CHIEF ENGINEER	12/28/2010 DATE
	STANDARD NO. B-4 (2010)	SHT. 1	OF 1	RECOMMENDED	SIGNATURE ON FILE DESIGN ENGINEER	12/27/2010 DATE



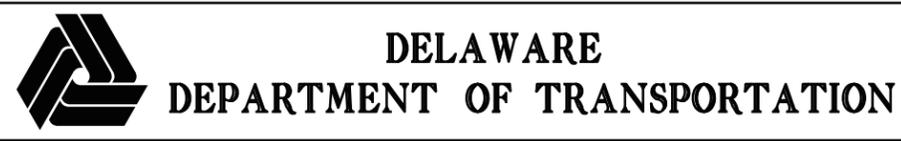
PLAN



ELEVATION

NOTES:

- 1). DO NOT ATTACH W BEAM TO POSTS 2 THROUGH 4.
- 2). DO NOT ATTACH RUB RAIL TO POSTS 2 AND 4.
- 3). POSTS 1 THROUGH 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER OFFSET BLOCKS AND/OR RUBRAIL AND WOOD BLOCK.
- 4). USE APPROPRIATE EPOXY BOLT ANCHORS TO REDUCE THE CHANCE OF SPLITTING THE CONCRETE. PLACE STEEL WASHERS (FOR 5/8" (16) BOLT) BETWEEN HEADS AND RUB RAIL.
- 5). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
- 6). PLACE GUARDRAIL REFLECTOR AS PER THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- 7). APPROVED CONCRETE INSERTS MAY BE USED IN NEW CONSTRUCTION TO ATTACH TERMINAL CONNECTOR TO PARAPET.
- 8). POSTS 1 & 2 ARE W8x13 (W200x19.3), 7'-6" (2.3m) LONG. ALL OTHER POSTS IN TRANSITION ARE W6x9 (W150x13.5), 6'-0" (1.82m) LONG.
- 9). 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.

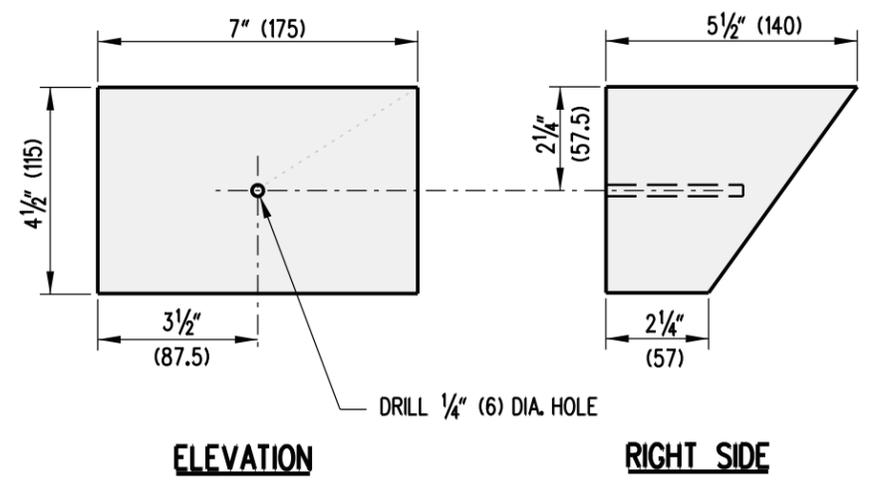


GUARDRAIL TO BARRIER CONNECTION, APPROACH TYPE 1-31

STANDARD NO. **B-5 (2010)** SHT. **1** OF **6**

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

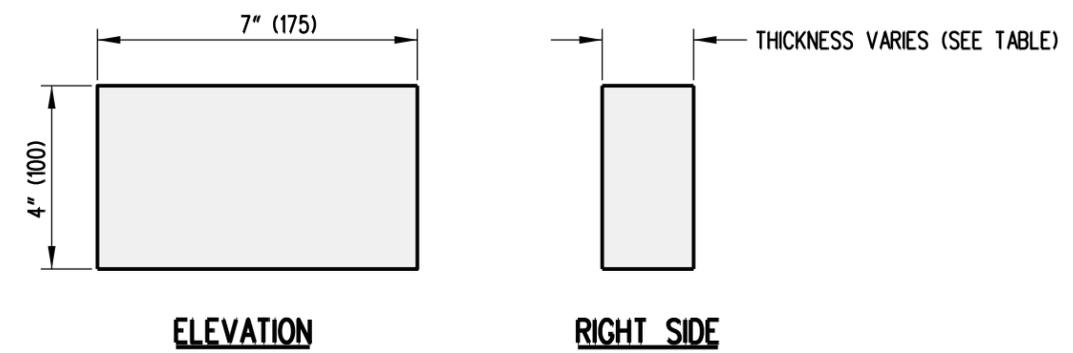
RECOMMENDED SIGNATURE ON FILE 12/27/2010
DESIGN ENGINEER DATE



ELEVATION **RIGHT SIDE**

OFFSET BLOCK DETAIL

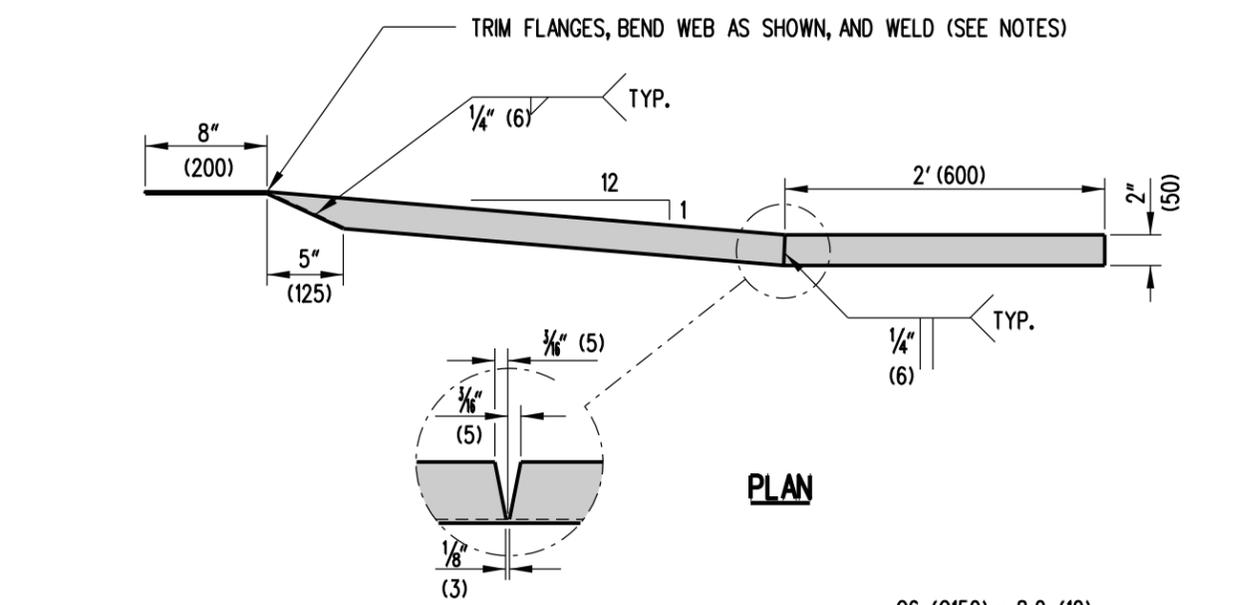
DRILL 1/4" (6) DIA. HOLE



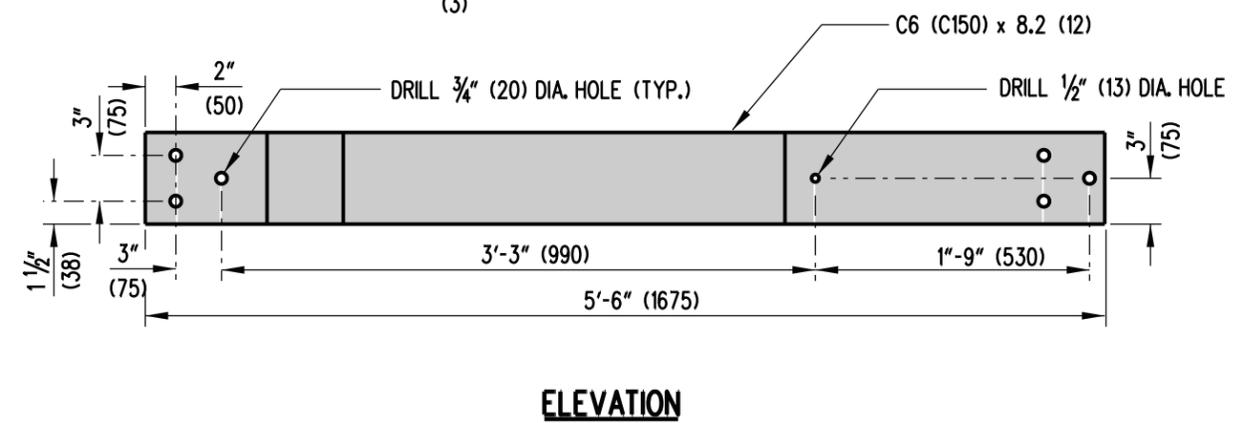
ELEVATION **RIGHT SIDE**

RUB RAIL OFFSET BLOCKS

RUB RAIL OFFSET BLOCKS (7" (175) x 4" (100))		
POST NO.	THICKNESS	BOLT LENGTH
1	4 1/4" (108)	6" (150)
2	3 1/4" (83)	4" (100)
3	2" (50)	4" (100)
4	1" (25)	2" (50)



PLAN

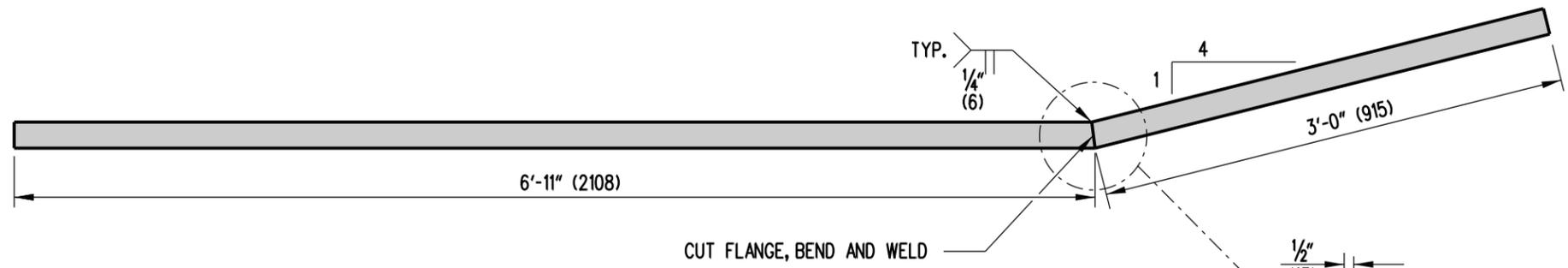


ELEVATION

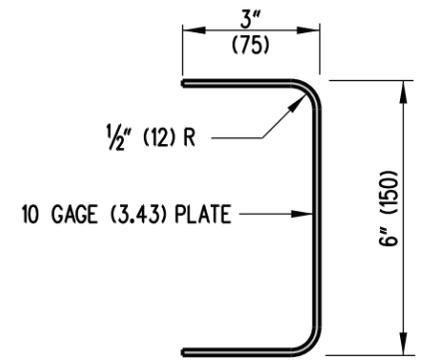
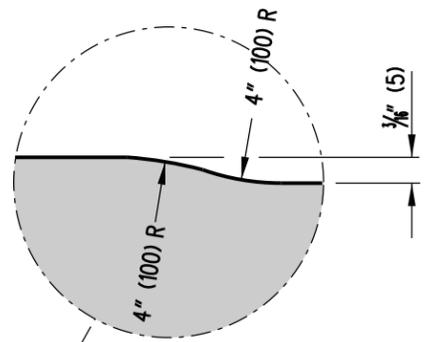
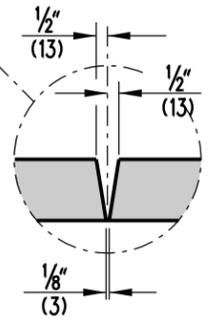
RUB RAIL TO BARRIER CONNECTION

NOTES:

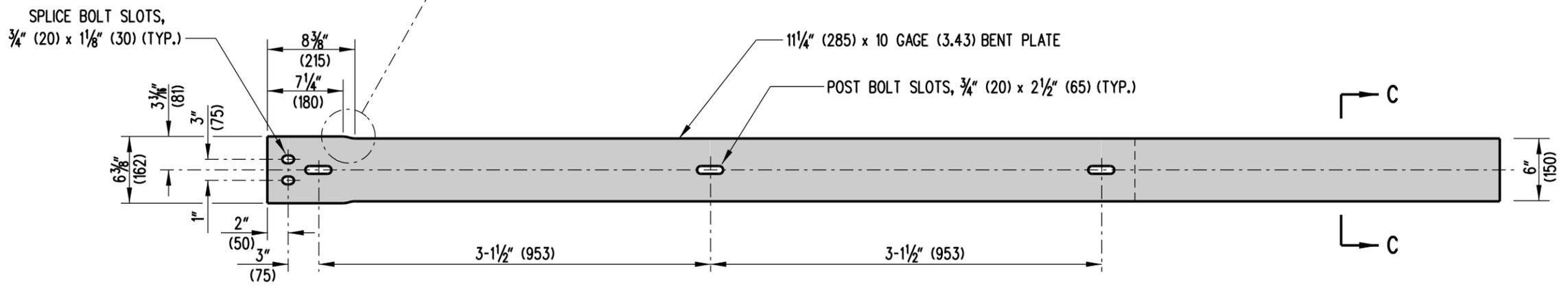
- 1). THE RUB RAIL TO BARRIER CONNECTION END MUST BE ATTACHED FLUSH WITH THE SLOPED TOE OF THE SAFETY BARRIER. INSTALLATION CAN BE SIMPLIFIED BY FABRICATING OR SHOP TWISTING THE RUB RAIL END TO BE CONSISTENT WITH THE SLOPE OF THE BARRIER, HOWEVER, FIELD BENDING USING HEAT IS PERMITTED.
- 2). STEEL SPACER 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.



PLAN
SCALE: 1"=1'-0"



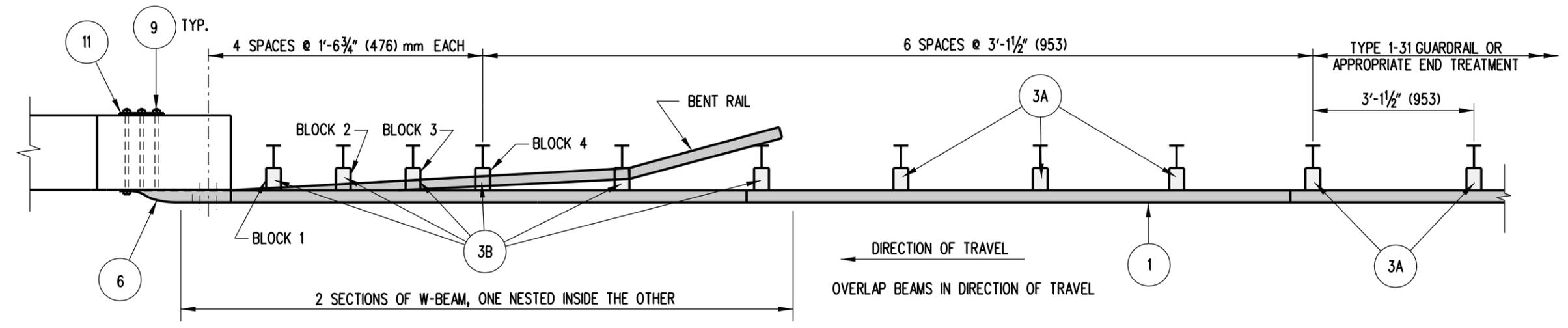
SECTION C-C
SCALE: 3" = 1'-0"



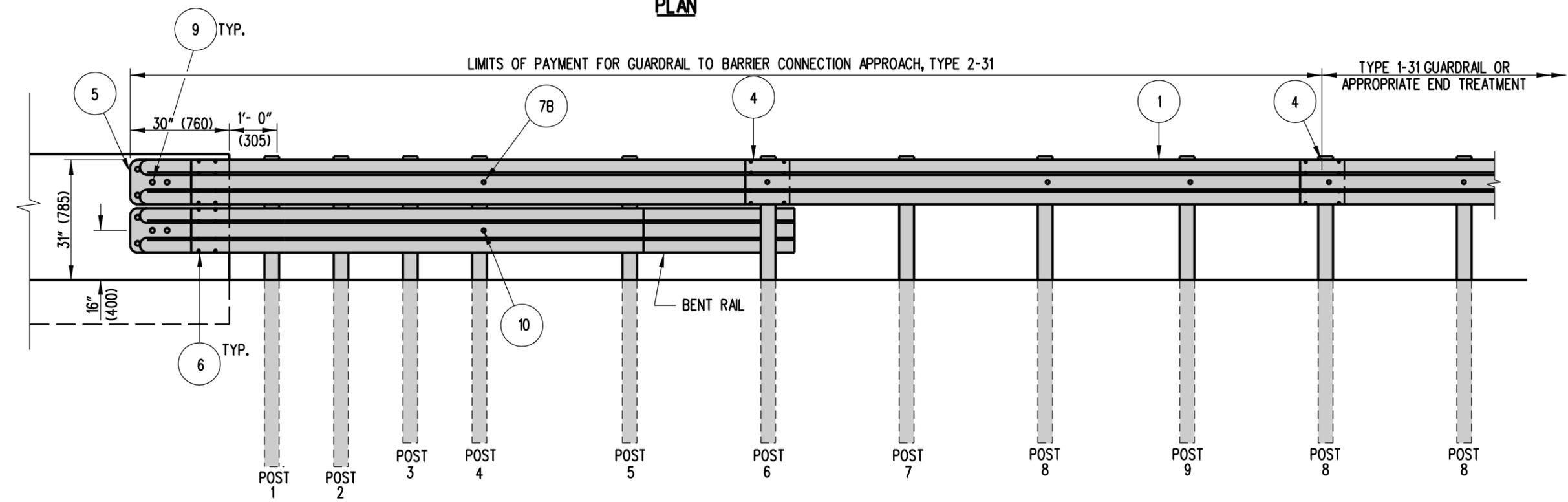
ELEVATION
SCALE: 1"=1'-0"

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

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



PLAN



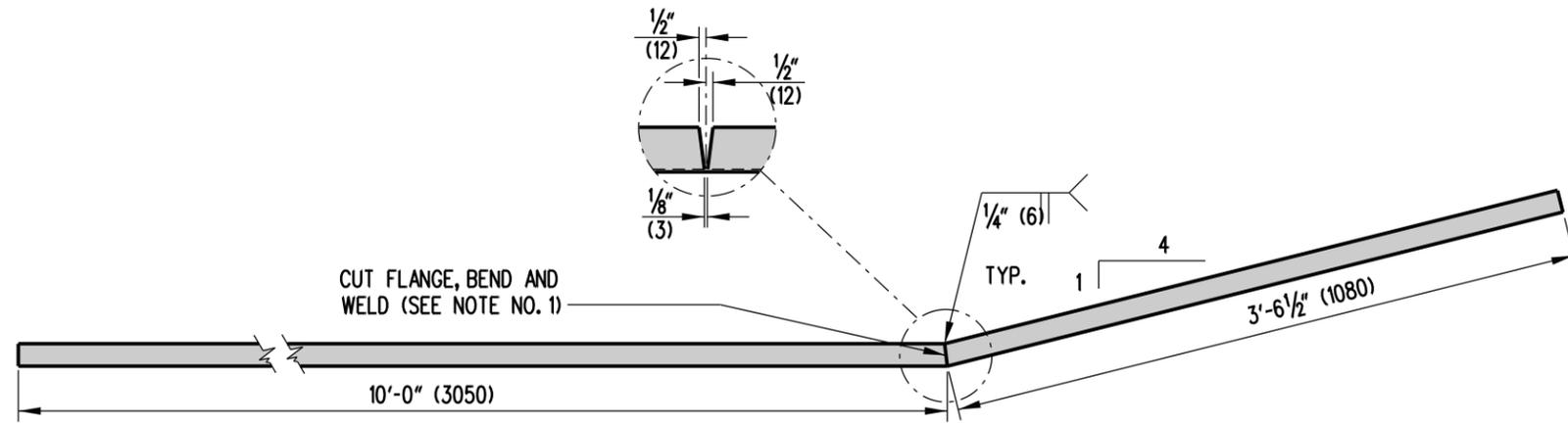
ELEVATION

NOTES :

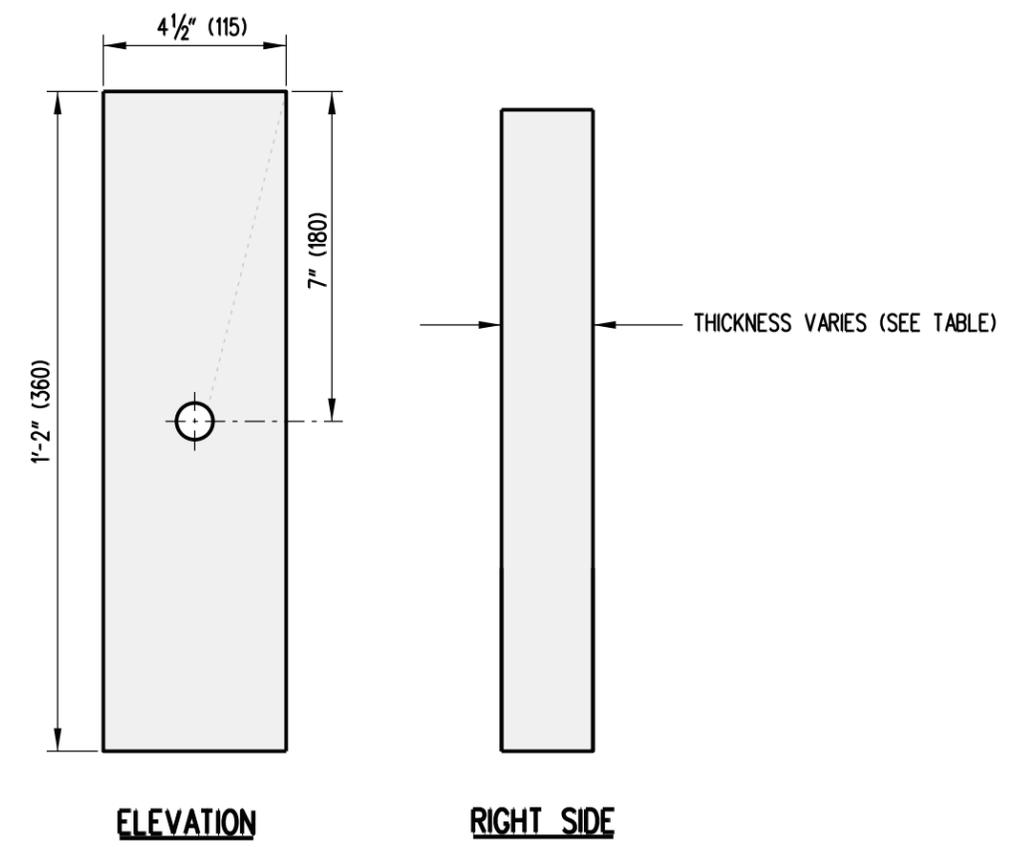
- 1). CURB SHALL NOT BE USED AT THE FACE OF RAIL WITHIN THE LIMITS OF THIS INSTALLATION.
- 2). POSTS 1, 2, 3, 4, AND 6 REQUIRE AN ADDITIONAL HOLE TO ATTACH OFFSET BLOCKS AND/OR BENT RAIL.
- 3). DO NOT ATTACH RAILS TO POSTS 1, 2, 3, 5, OR 7.
- 4). POSTS 1 AND 2 ARE W8x13 (W200x19.3), 7'-6" (2.28m) LONG. 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			APPROVED	SIGNATURE ON FILE _____ CHIEF ENGINEER	12/28/2010 DATE
	STANDARD NO. B-5 (2010)	SHT. 4 OF 6		RECOMMENDED	SIGNATURE ON FILE _____ DESIGN ENGINEER	12/27/2010 DATE



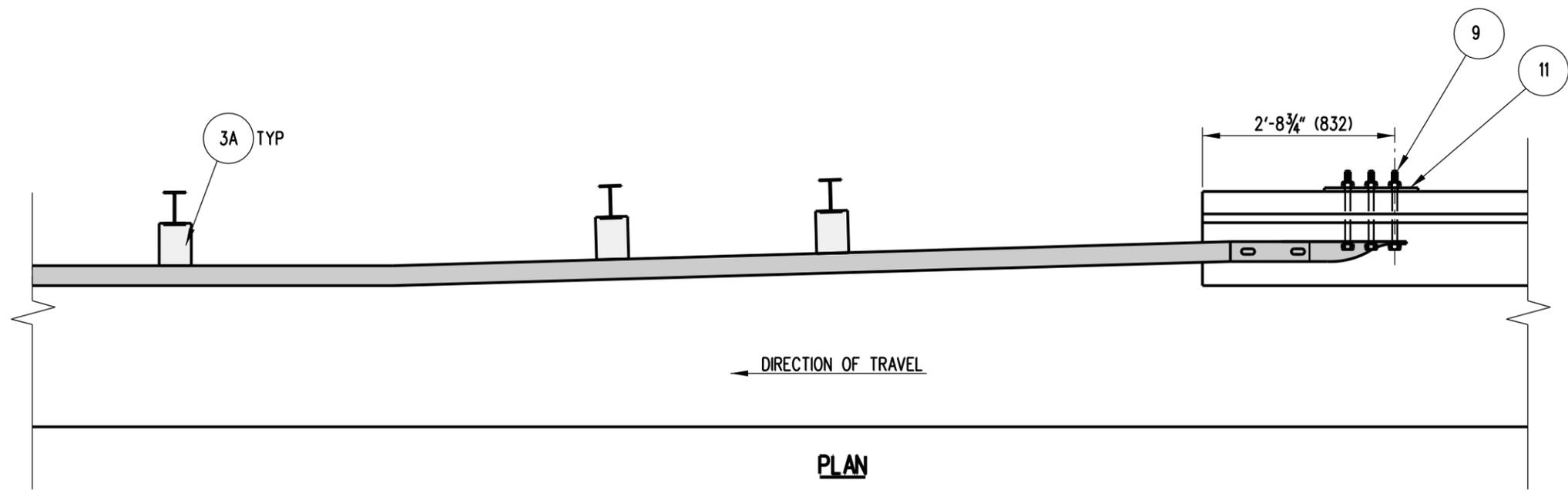
BENT RAIL
SCALE: 1"=1'-0"



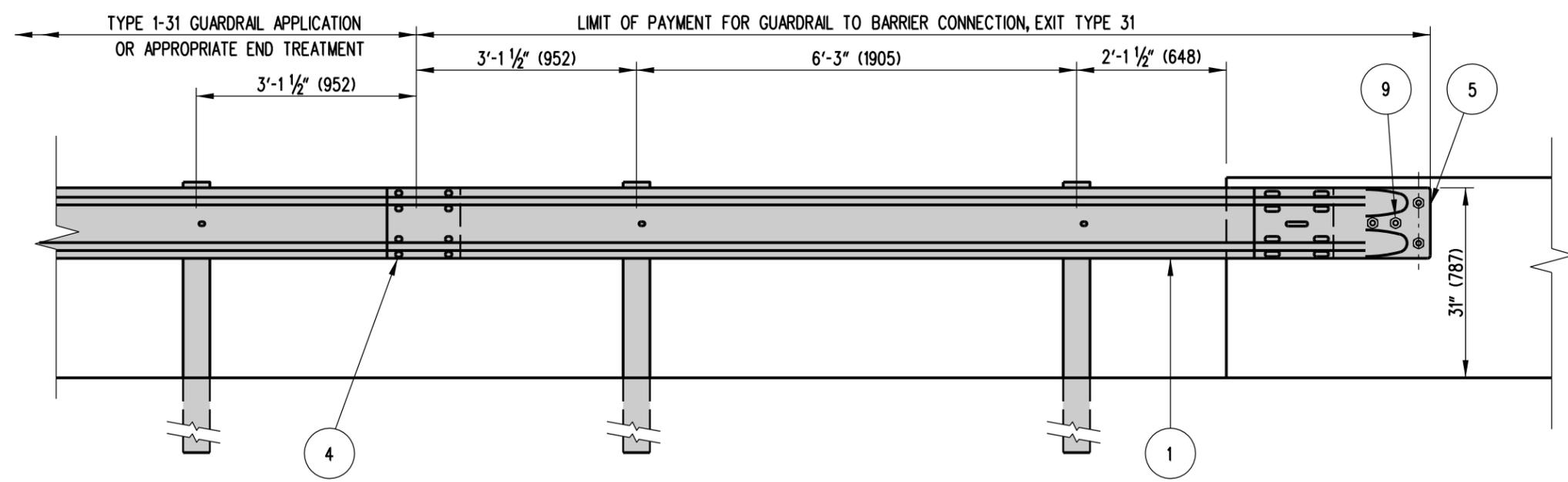
BENT RAIL OFFSET BLOCKS
SCALE: 3"=1'-0"

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.



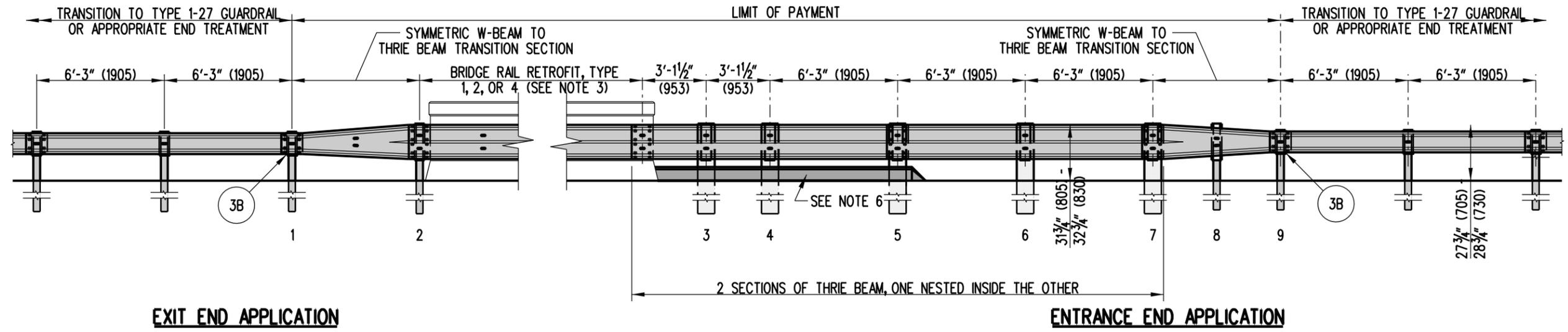
PLAN



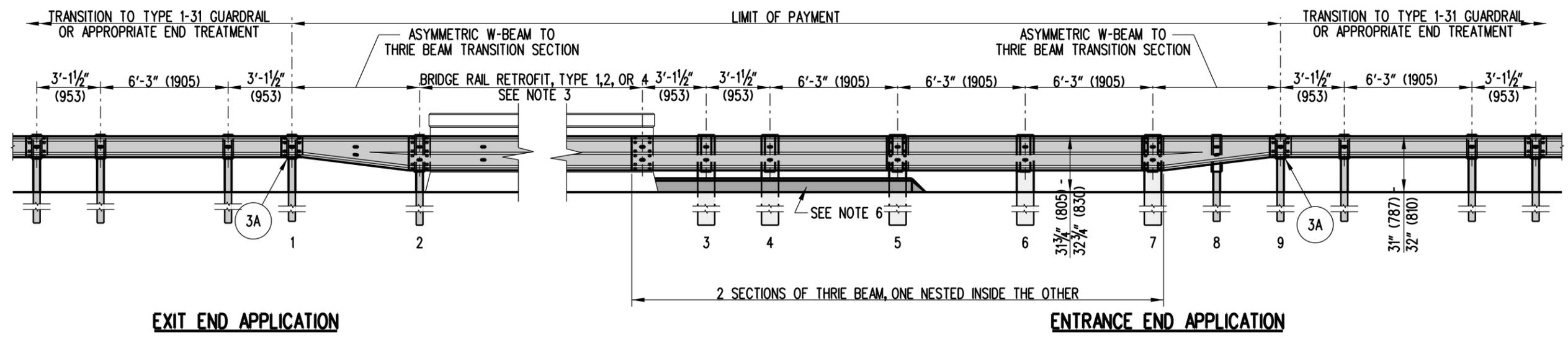
ELEVATION

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.



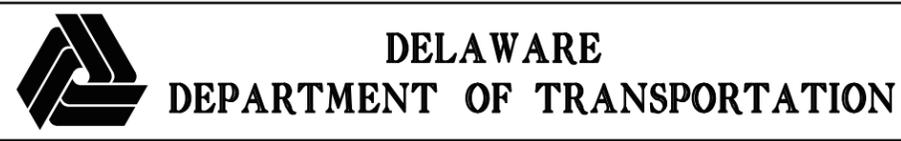
27" GUARDRAIL



31" GUARDRAIL

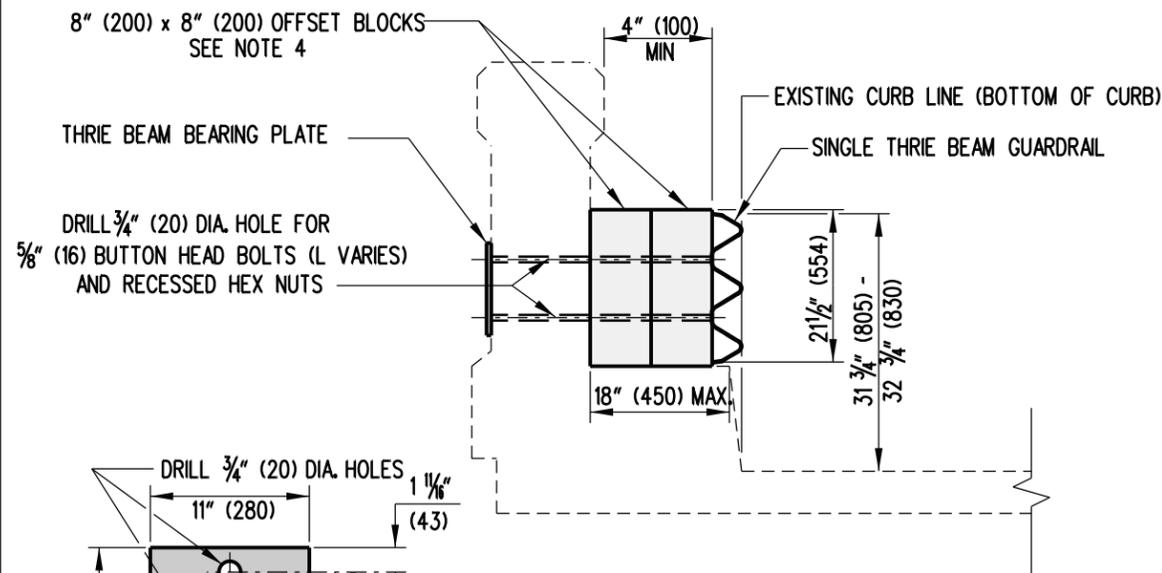
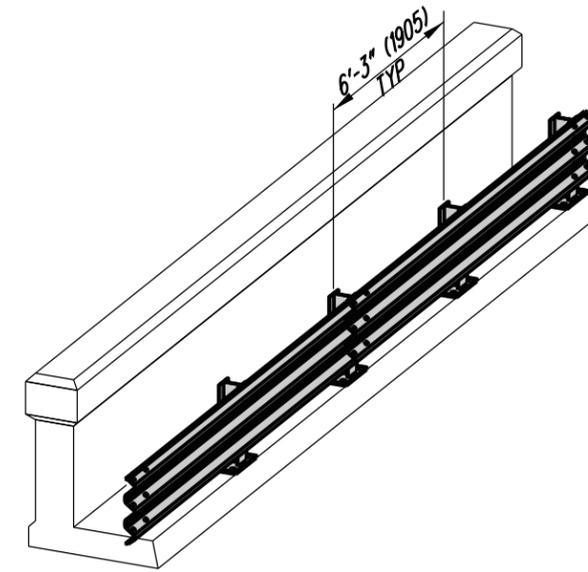
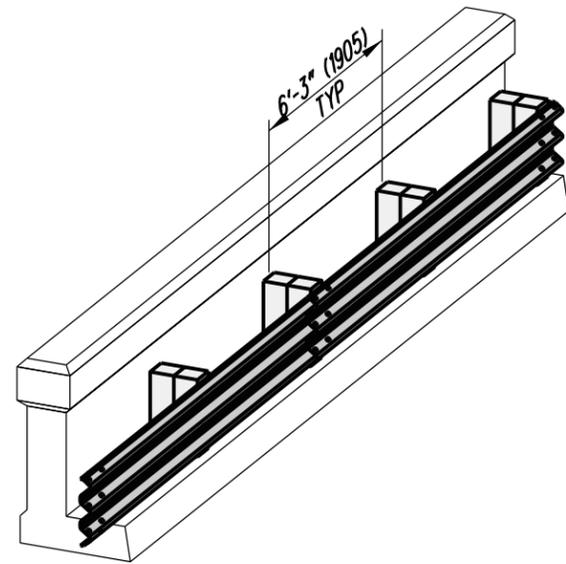
NOTES:

- 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.

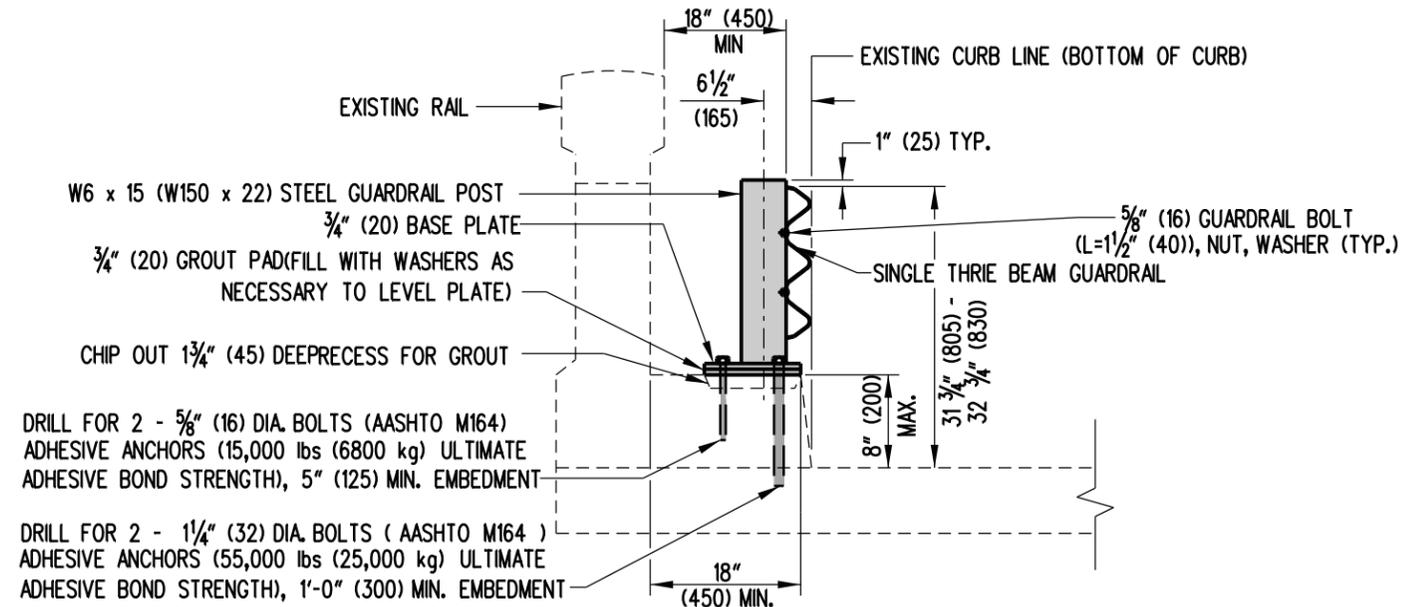


BRIDGE RAIL RETROFIT, ENTRANCE AND END APPLICATIONS			
STANDARD NO.	B-6 (2010)	SHT.	1 OF 5

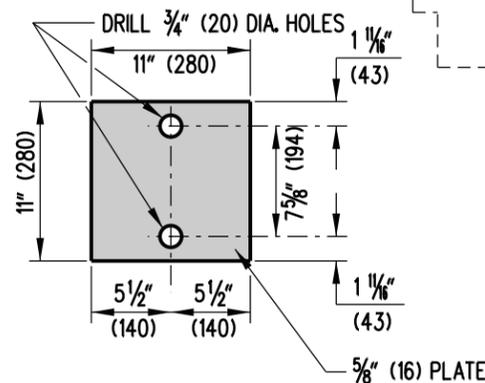
APPROVED	SIGNATURE ON FILE	12/28/2010
	<small>CHIEF ENGINEER</small>	<small>DATE</small>
RECOMMENDED	SIGNATURE ON FILE	12/27/2010
	<small>DESIGN ENGINEER</small>	<small>DATE</small>



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

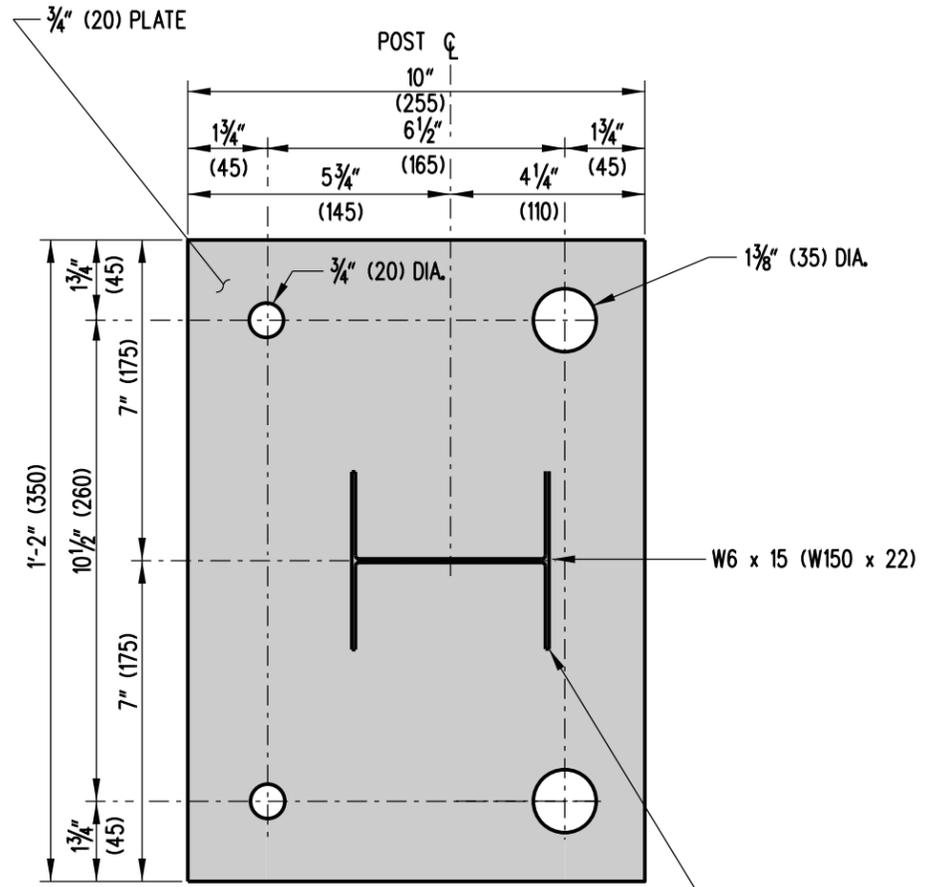
SIGNATURE ON FILE
CHIEF ENGINEER

12/28/2010
DATE

RECOMMENDED

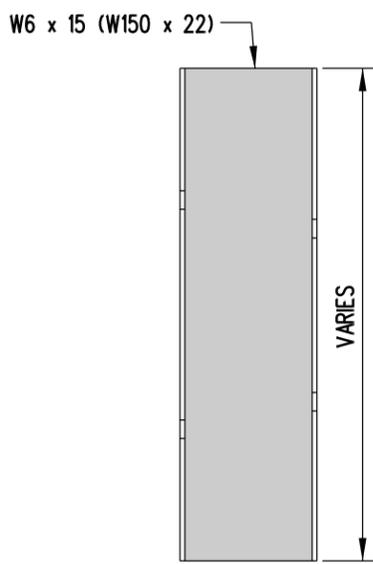
SIGNATURE ON FILE
DESIGN ENGINEER

12/27/2010
DATE

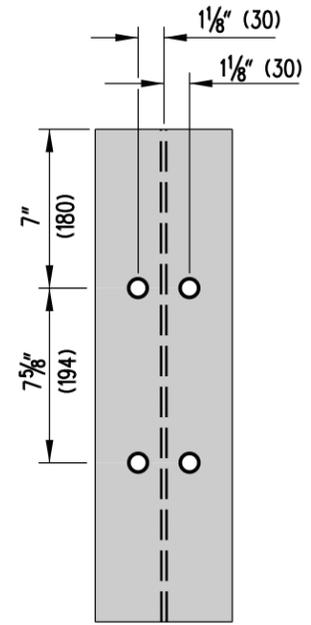


BASE PLATE DETAIL

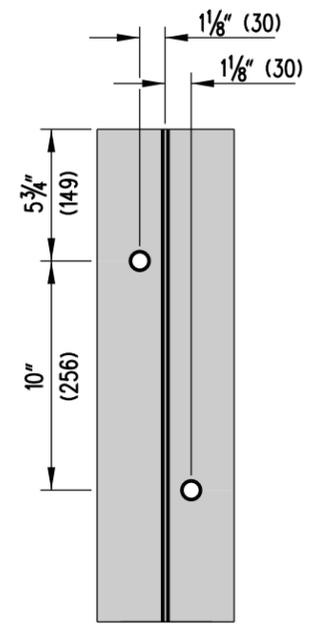
1/4" (6) WELD ALL AROUND INCLUDING EXTERIOR FLANGE SURFACE



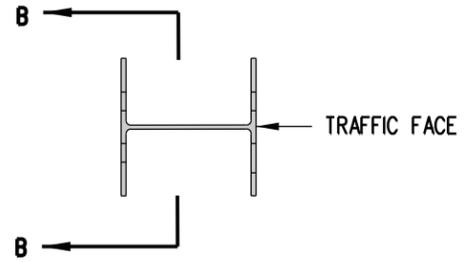
SIDE



FRONT

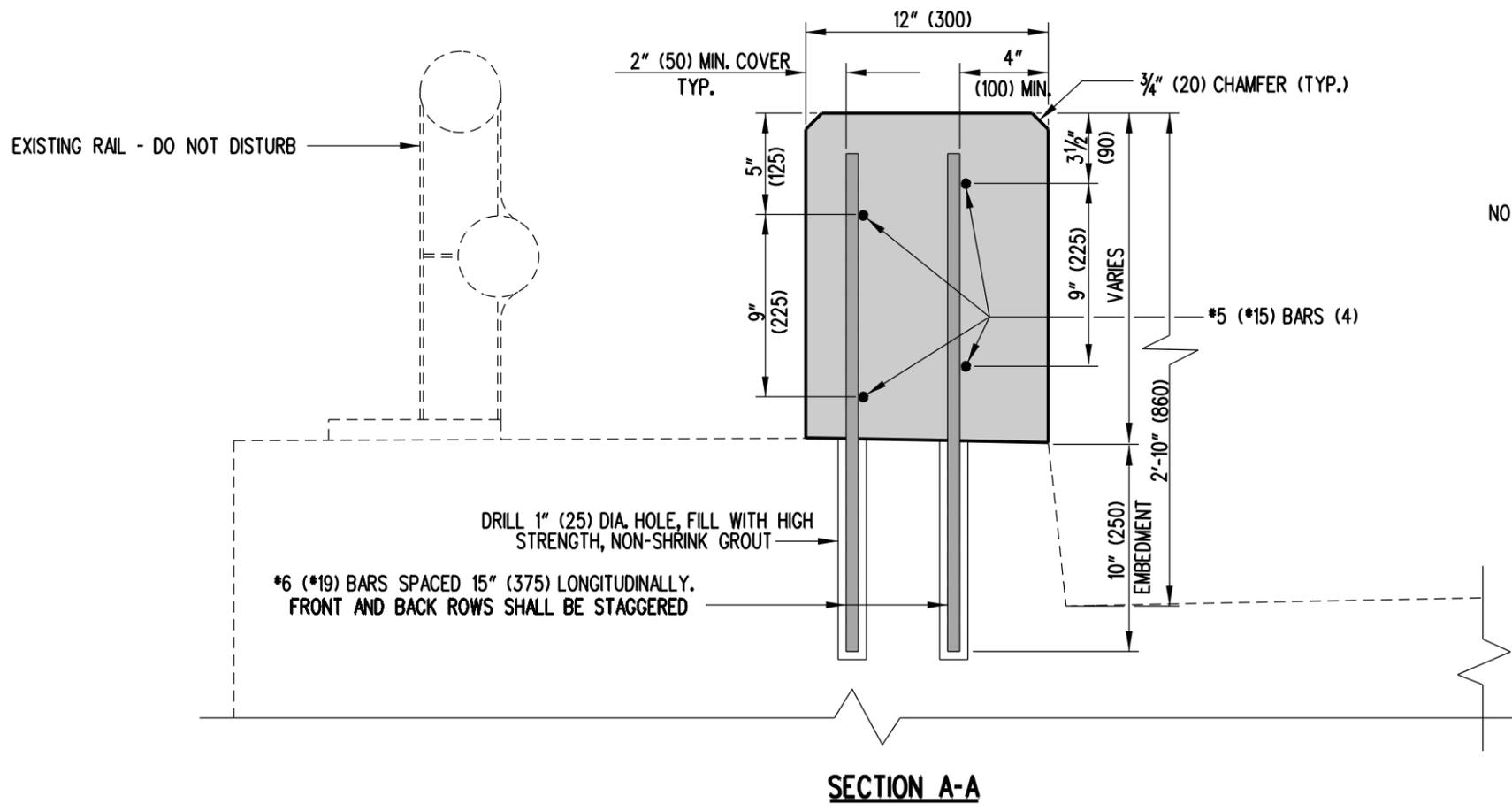
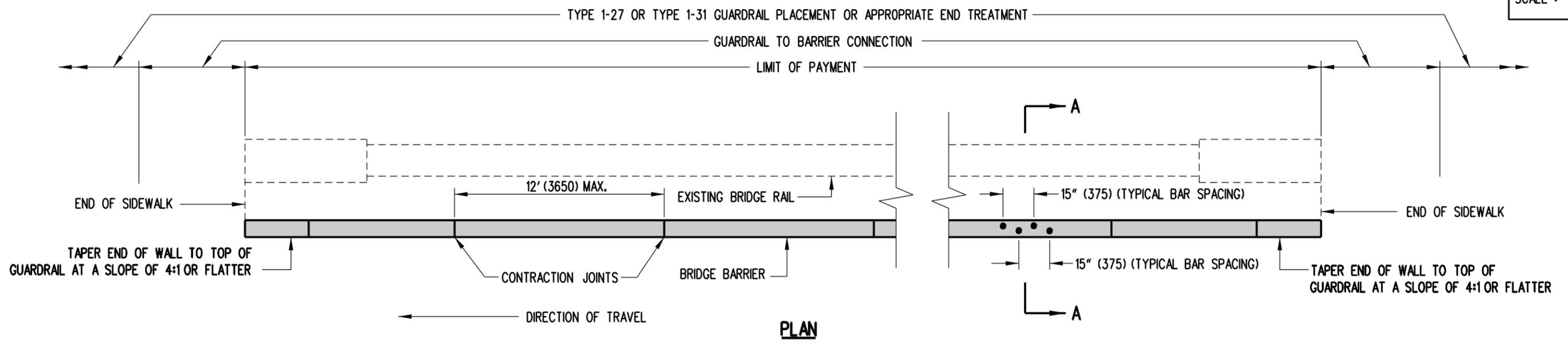


SECTION B-B

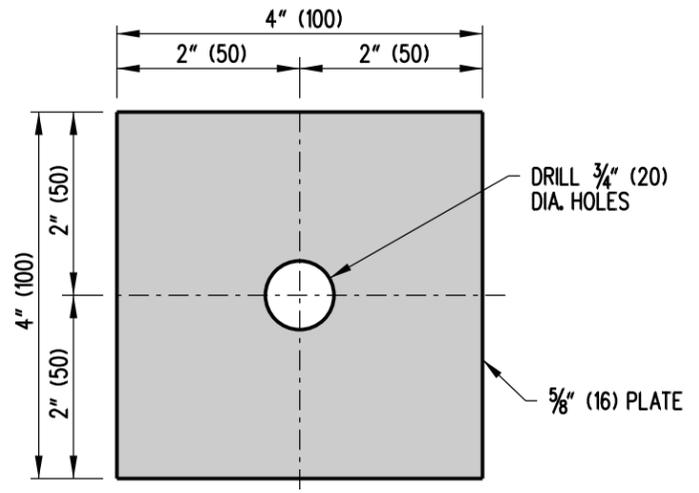
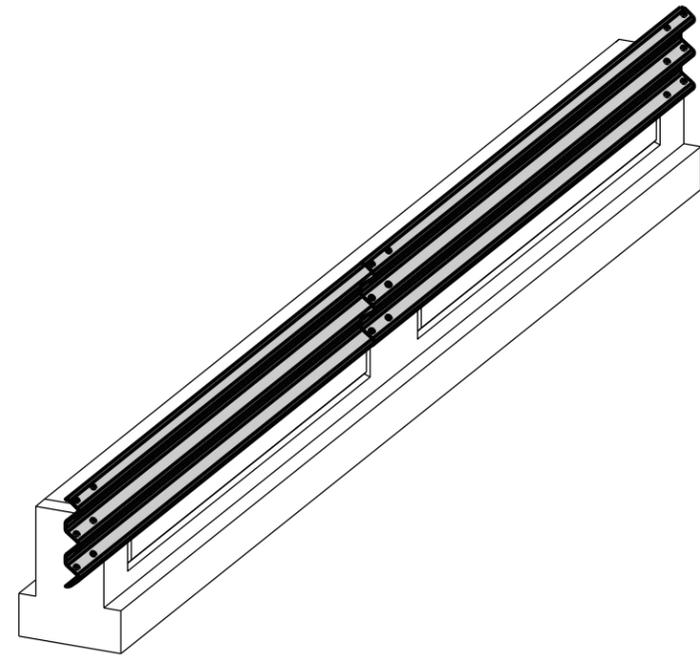


PLAN

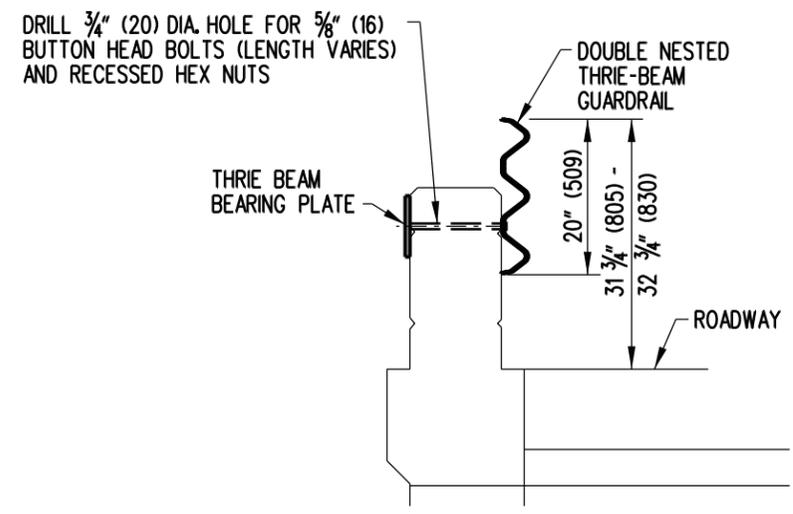
W6 x 15 (W150 x 22) STEEL GUARDRAIL POST



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

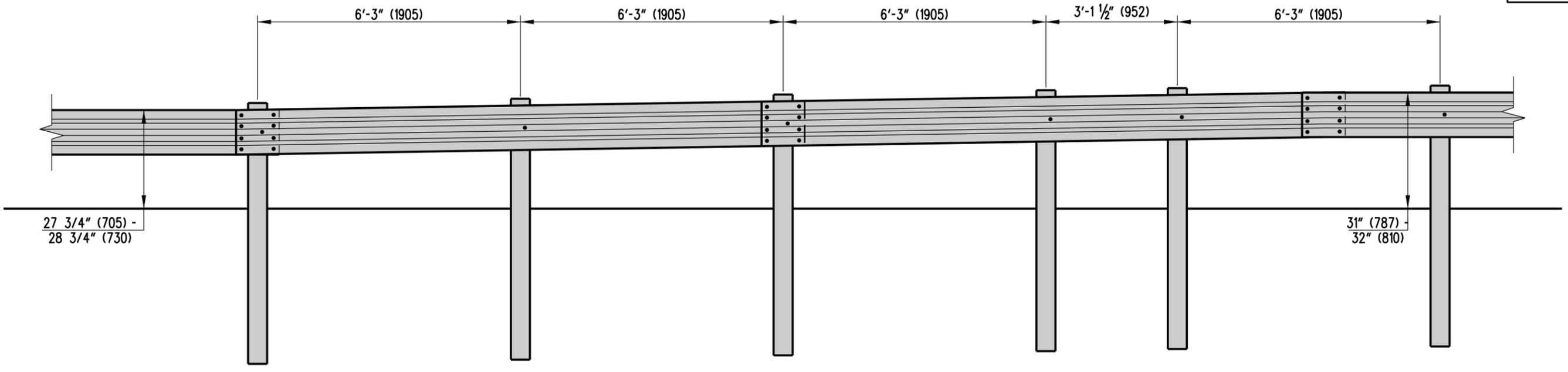


SECTION VIEW

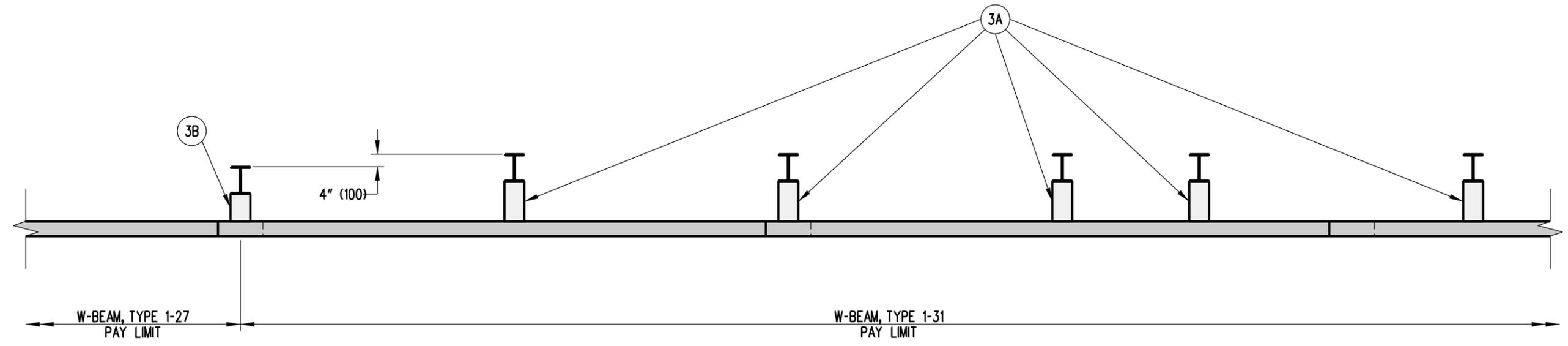
NOTES:

- 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.

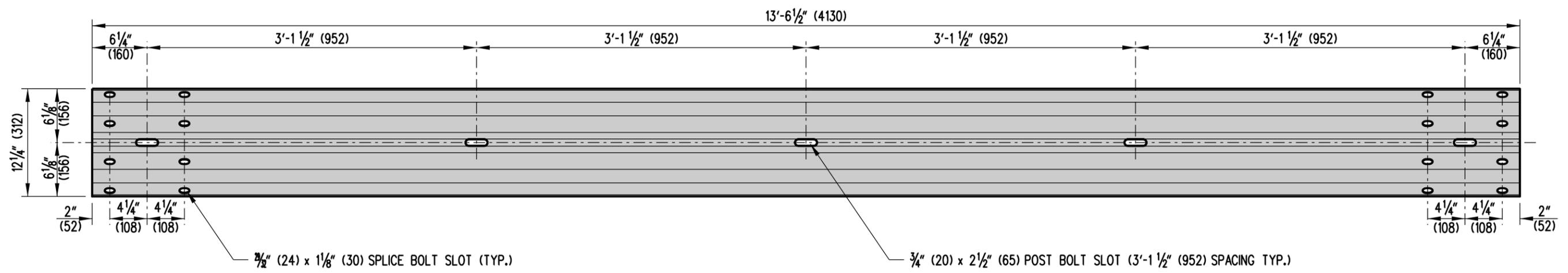


ELEVATION

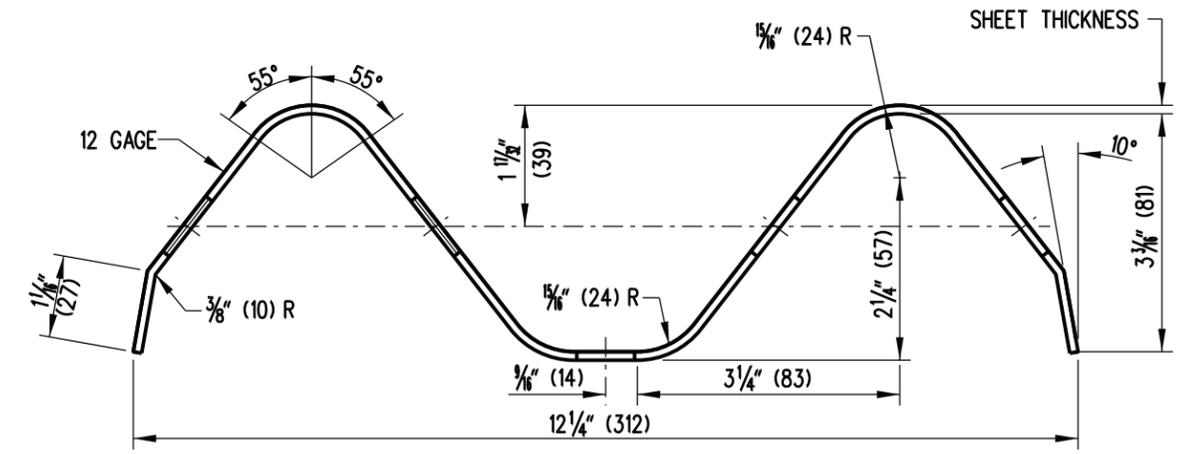


PLAN

 DELAWARE DEPARTMENT OF TRANSPORTATION	W-BEAM, TYPE 1-27 TO TYPE 1-31 TRANSITION SECTION		APPROVED	SIGNATURE ON FILE CHIEF ENGINEER	12/28/2010 DATE
	STANDARD NO. B-7 (2010)	SHT. 1 OF 1	RECOMMENDED	SIGNATURE ON FILE DESIGN ENGINEER	12/27/2010 DATE

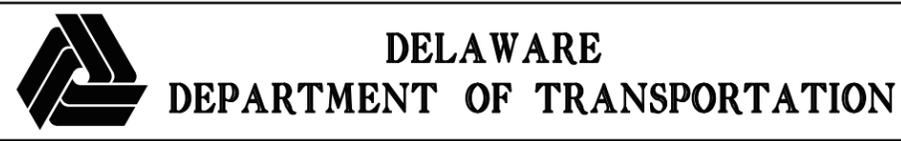


W-BEAM ELEVATION



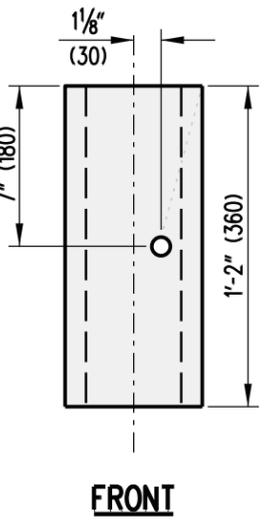
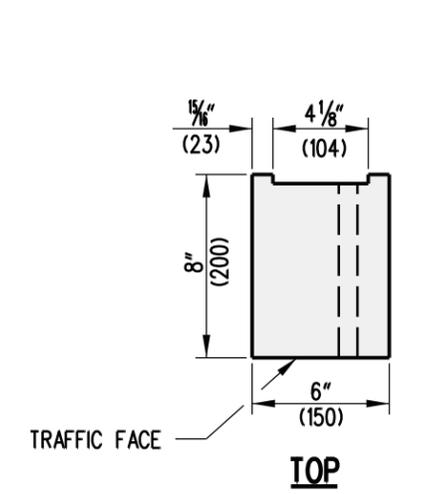
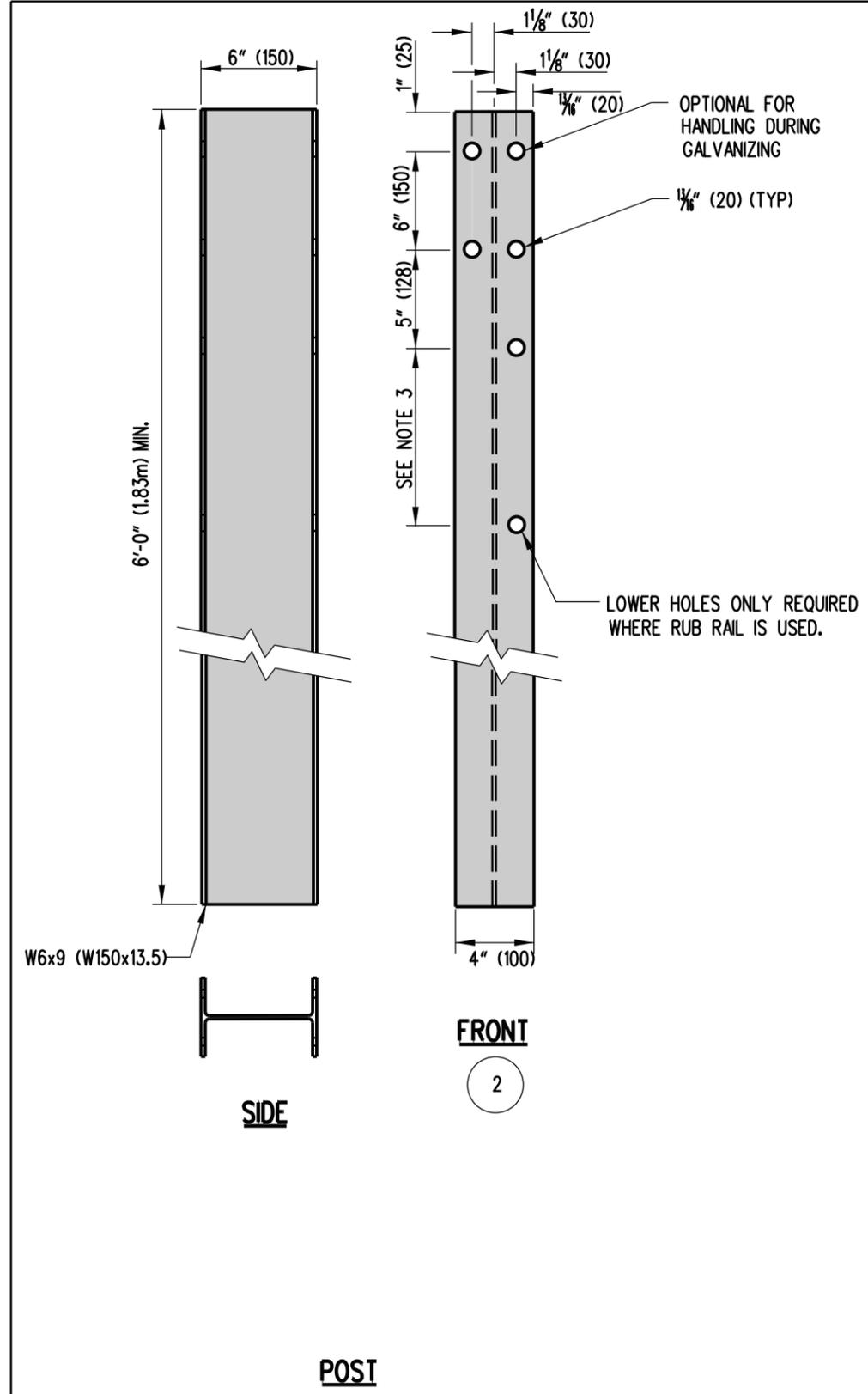
W-BEAM SECTION

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.

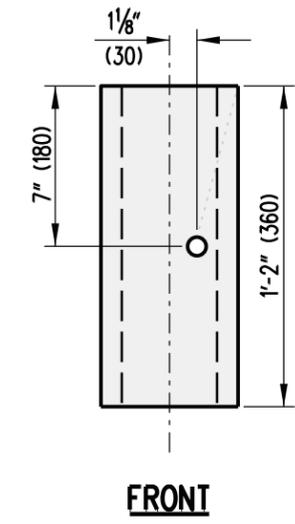
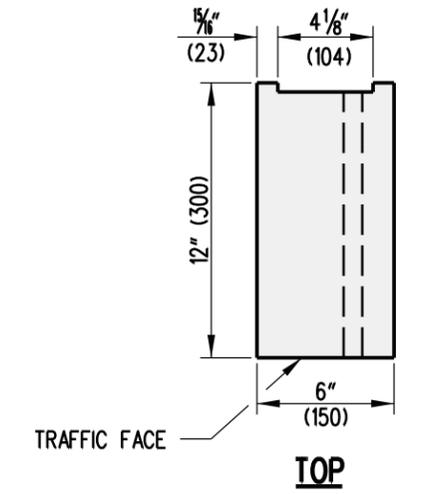


HARDWARE			
STANDARD NO.	B-13 (2010)	SHT.	1 OF 10

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



OFFSET BLOCK, TYPE 27 3B

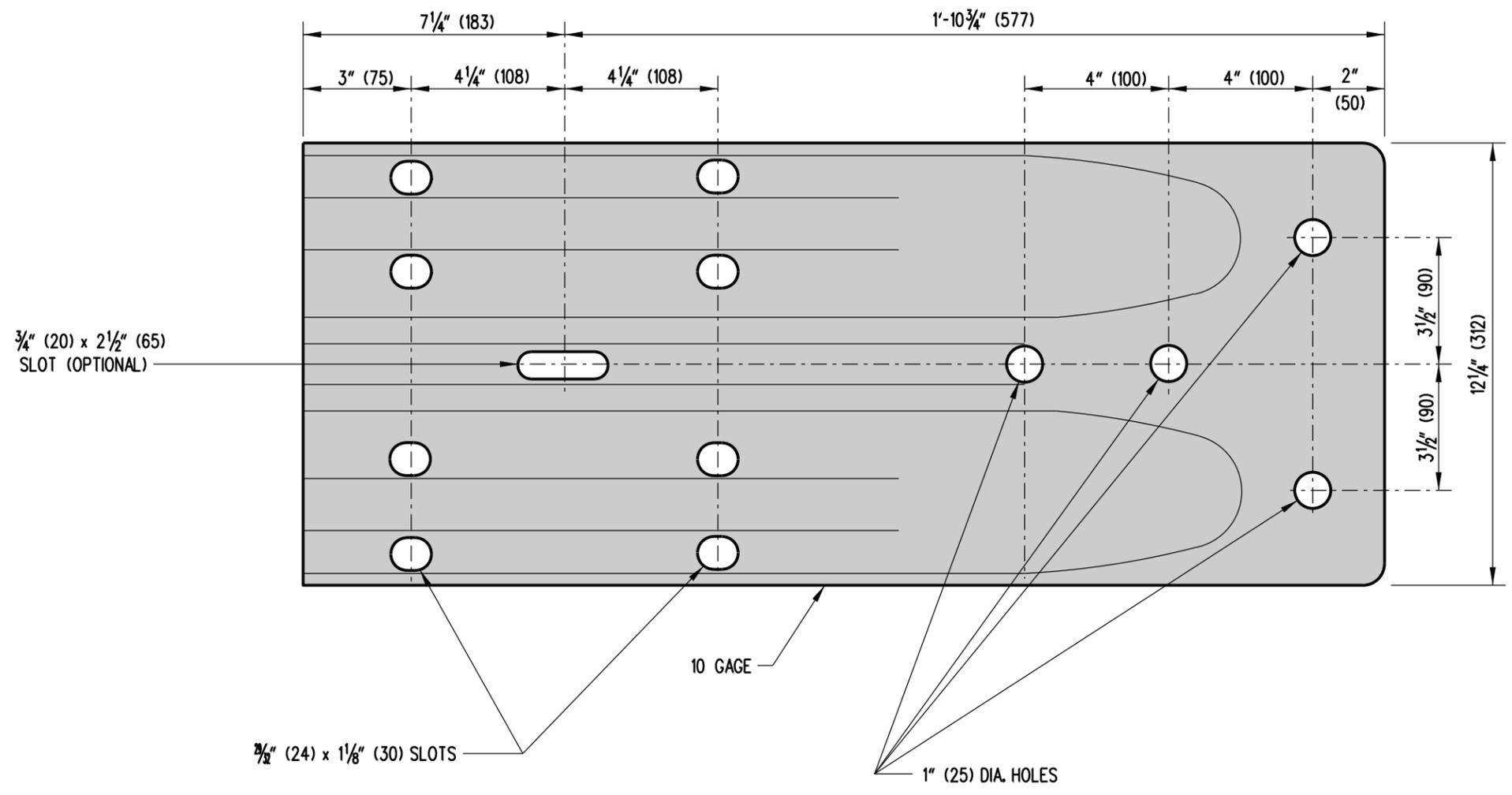


OFFSET BLOCK, TYPE 31 3A

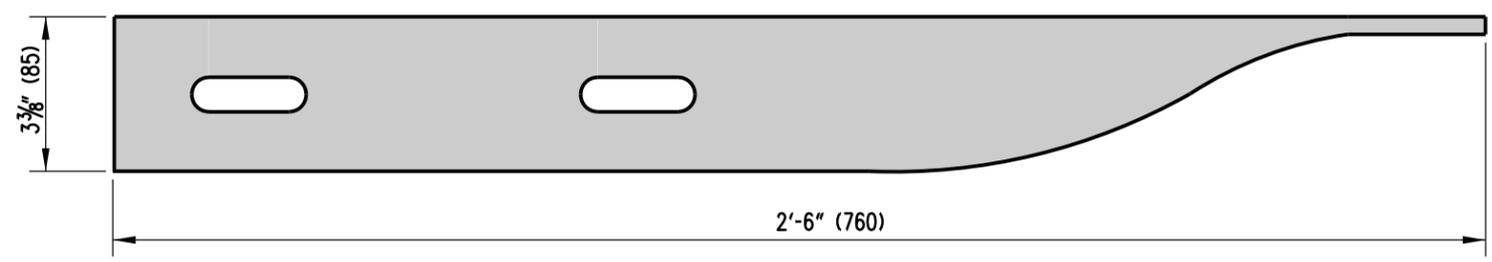
- NOTE:**
- 1). ALL HOLES SHALL BE 1/8" (20) DIA. BOLT HOLE PATTERN IS SYMMETRICAL WITH RESPECT TO THE VERTICAL AXIS OF THE POST.
 - 2). WHERE CONDITIONS REQUIRE, ALTERNATE POST LENGTHS IN INCREMENTS OF 6" (150) MAY BE USED.
 - 3). THE RUB RAIL HOLE OFFSET DISTANCE IS 12" (300) FOR GUARDRAIL TO BARRIER 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.

W-BEAM STEEL POST AND OFFSET BLOCK

<p>DELAWARE DEPARTMENT OF TRANSPORTATION</p>	HARDWARE			APPROVED	SIGNATURE ON FILE CHIEF ENGINEER	12/28/2010 DATE
	STANDARD NO. B-13 (2010)	SHT. 2	OF 10	RECOMMENDED	SIGNATURE ON FILE DESIGN ENGINEER	12/27/2010 DATE



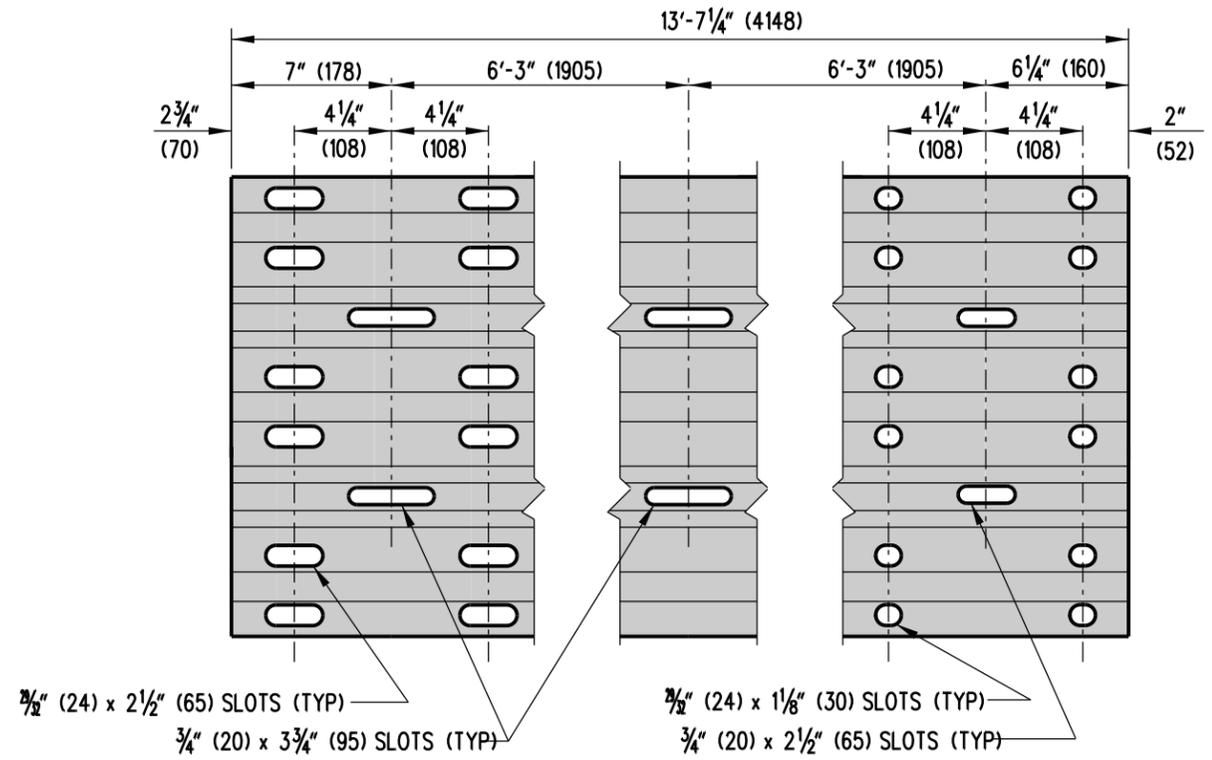
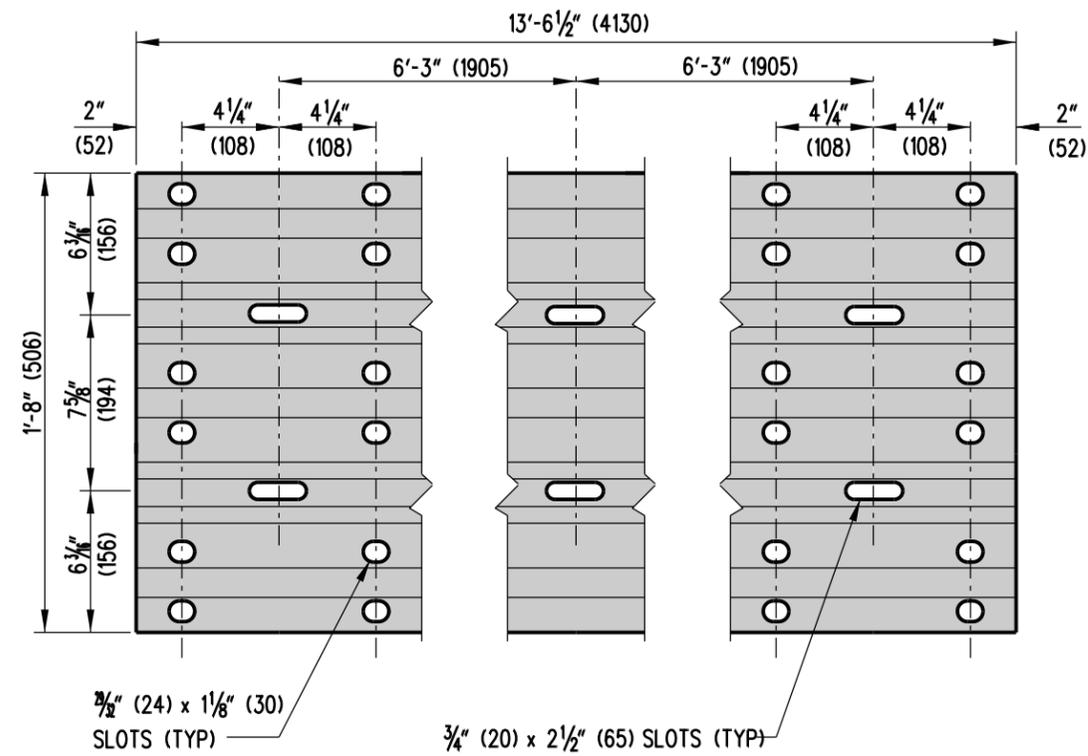
ELEVATION



PLAN

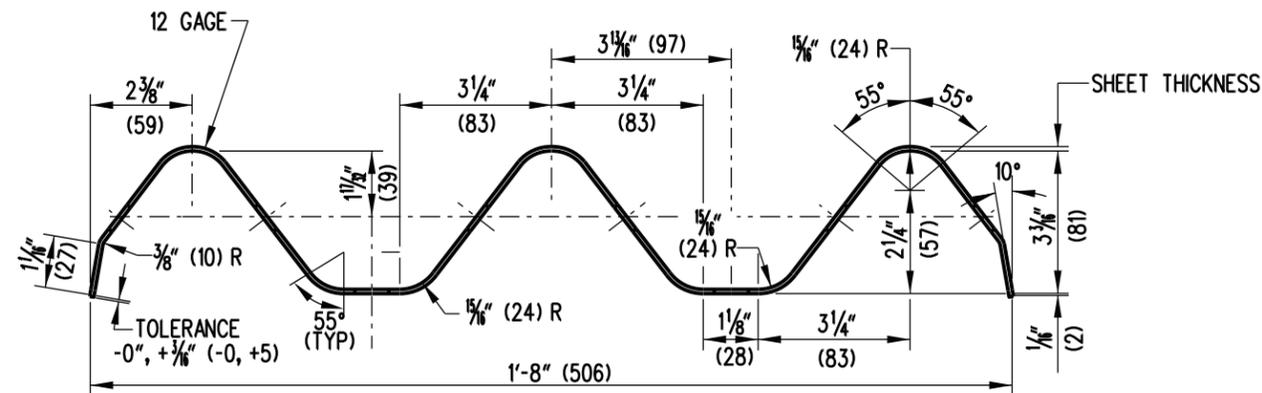
W-BEAM TERMINAL CONNECTOR (5)

 DELAWARE DEPARTMENT OF TRANSPORTATION	HARDWARE			APPROVED	SIGNATURE ON FILE CHIEF ENGINEER	12/28/2010 DATE
	STANDARD NO. B-13 (2010)	SHT. 3	OF 10	RECOMMENDED	SIGNATURE ON FILE DESIGN ENGINEER	12/27/2010 DATE



THRIE BEAM ELEVATION

THRIE BEAM EXPANSION ELEMENT



THRIE BEAM SECTION



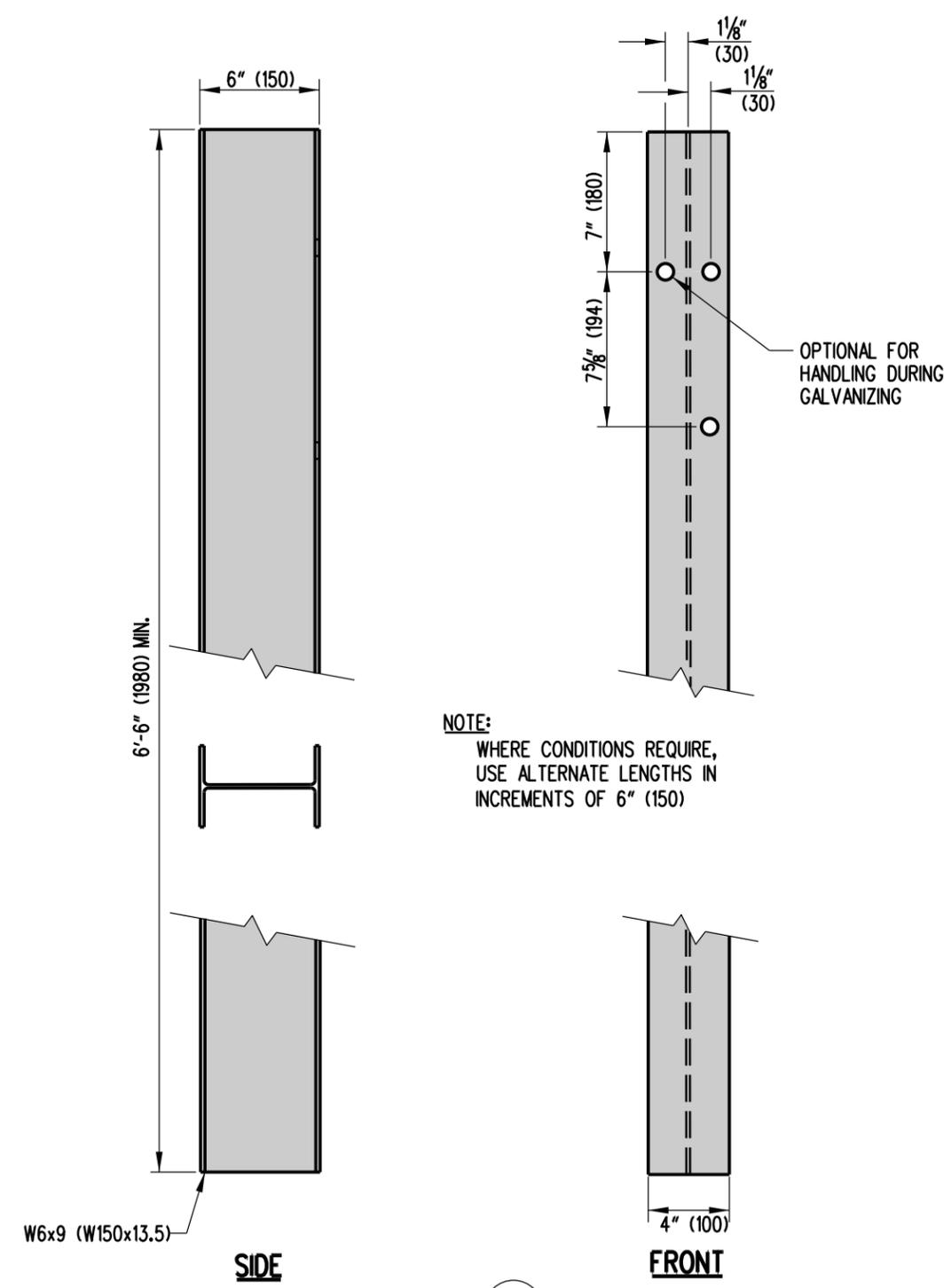
DELAWARE
DEPARTMENT OF TRANSPORTATION

HARDWARE
STANDARD NO. **B-13 (2010)**

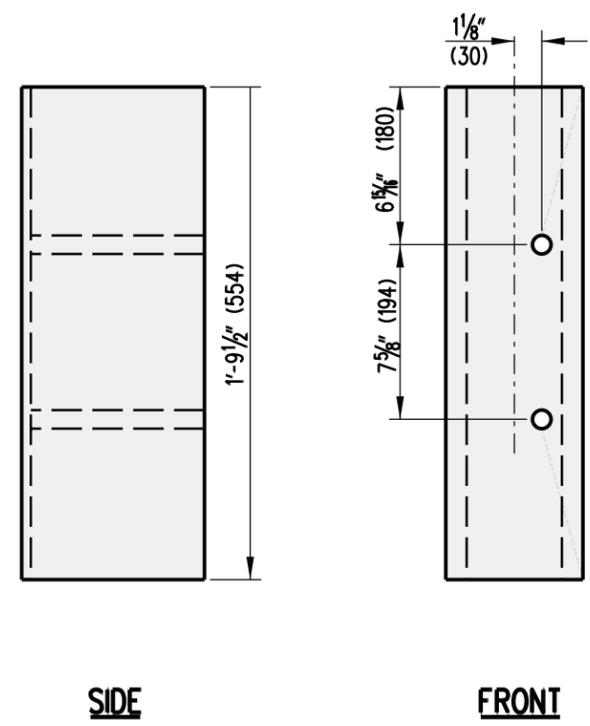
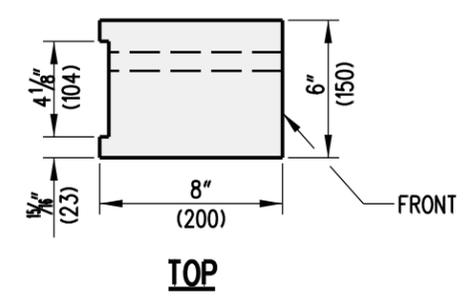
SHT. **4** OF **10**

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

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



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

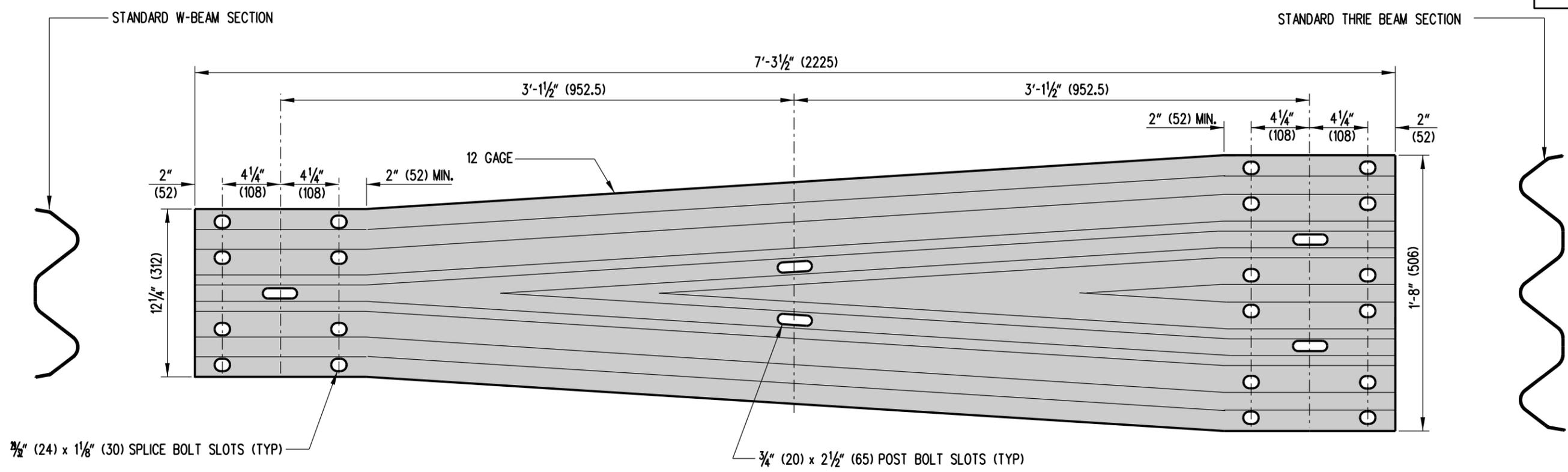


OFFSET BLOCK

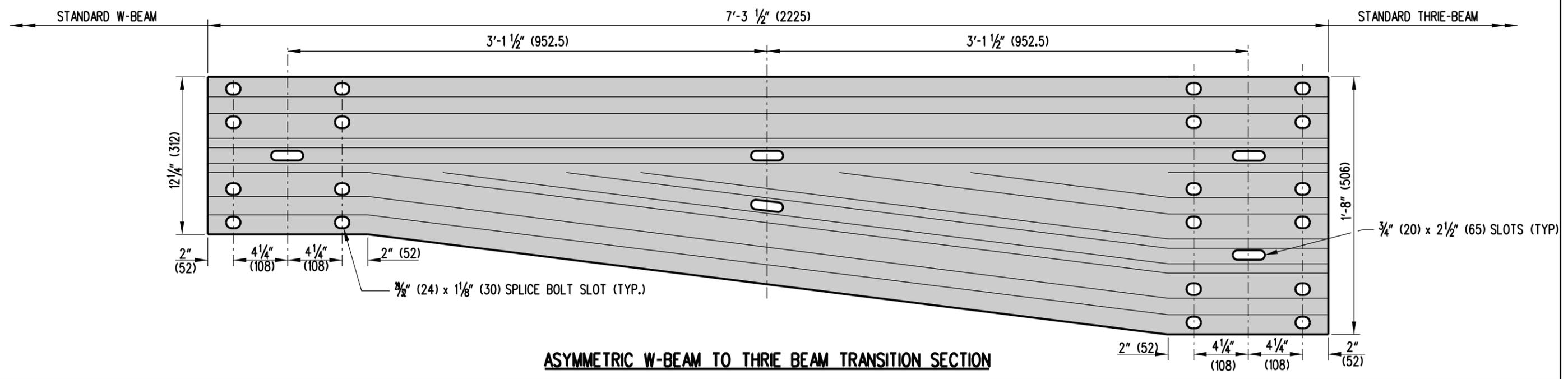
NOTE:
ALL HOLES SHALL BE 1/4" (20) DIA. BOLT HOLE
PATTERN IS SYMMETRICAL WITH RESPECT TO THE
VERTICAL AXIS OF THE POST.

POST 2

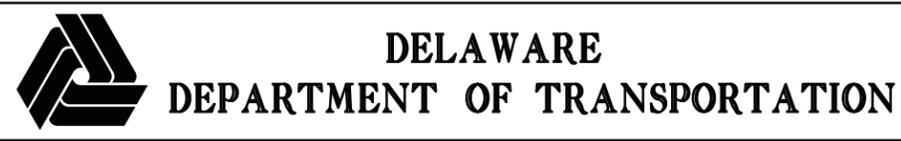
THRIE BEAM STEEL POST AND OFFSET BLOCK



SYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION



ASYMMETRIC W-BEAM TO THRIE BEAM TRANSITION SECTION



HARDWARE	
STANDARD NO. B-13 (2010)	SHT. 6 OF 10

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