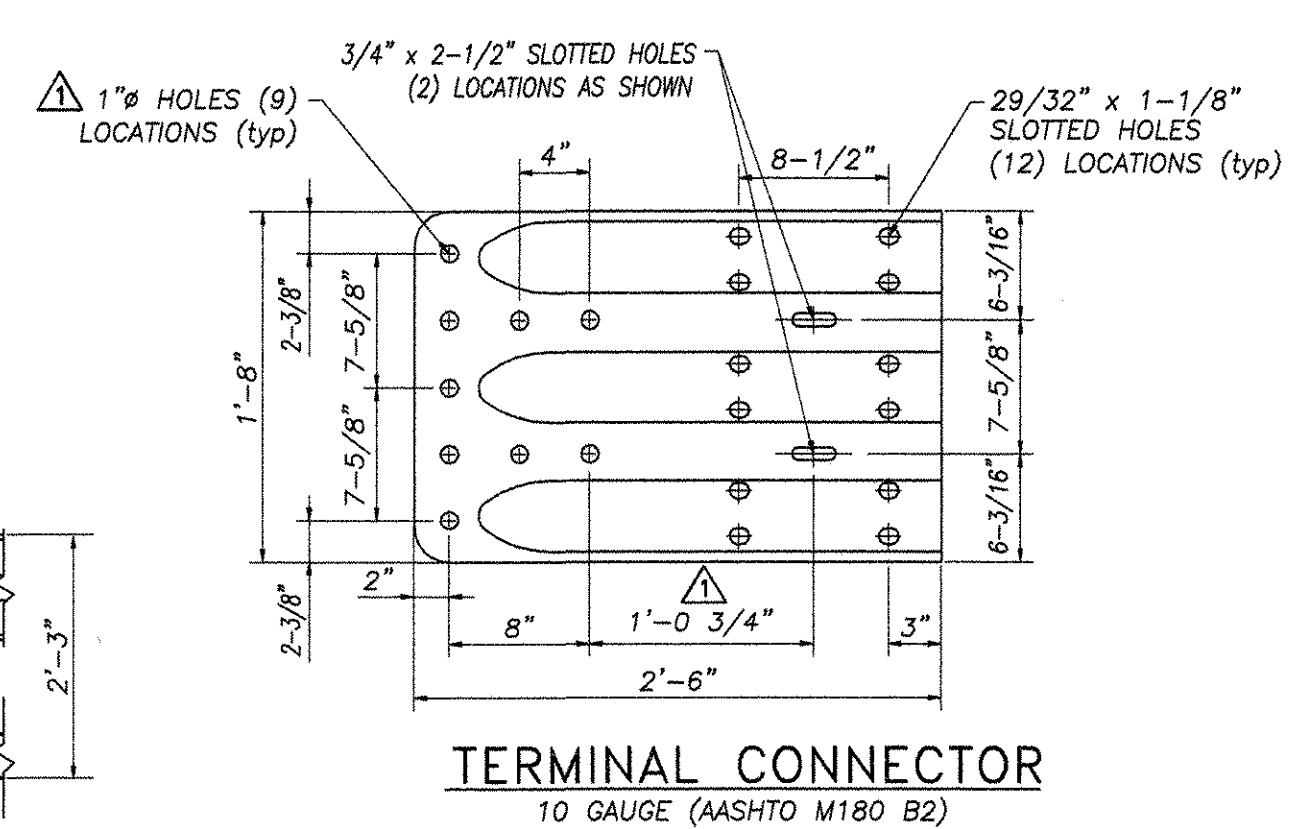
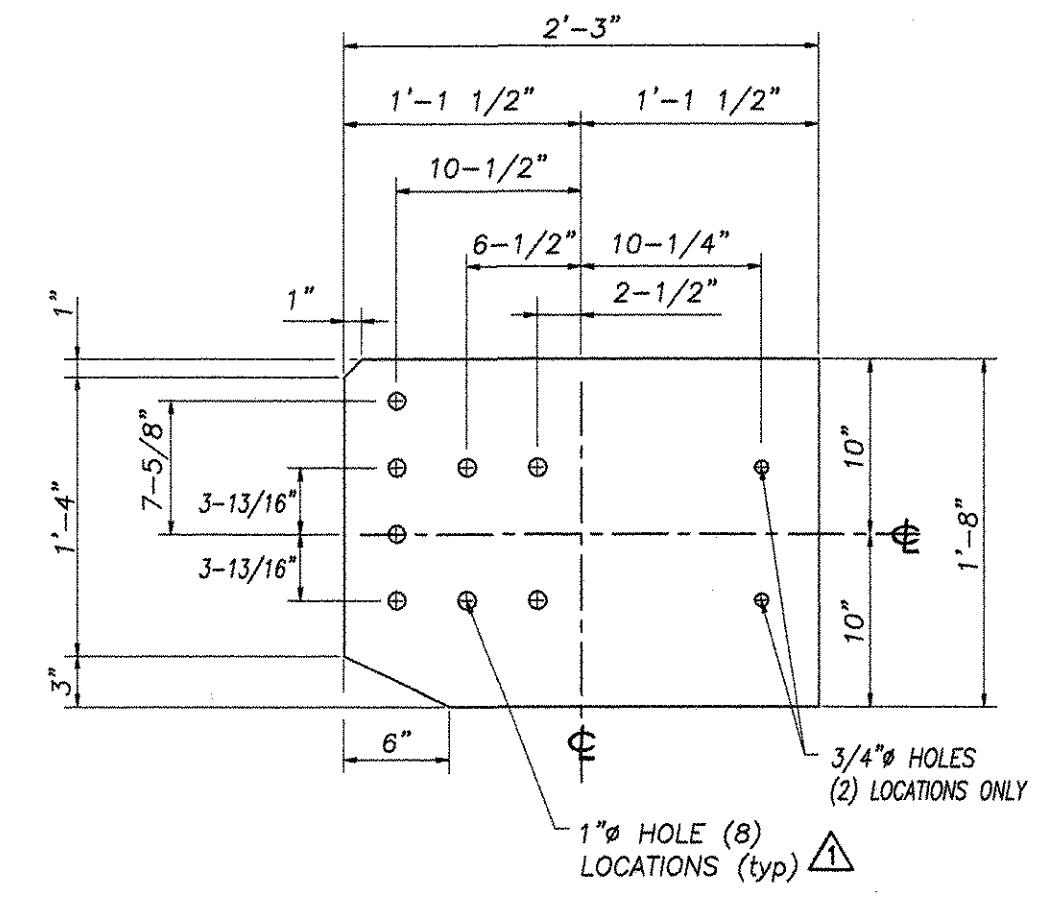


BILL OF MATERIAL			
Mk.	Qty.	Description	Material
	176	STEEL POST W6x25 x 8'-8" OAL	A709 gr 50
	440	WOOD POST 6x8 x 7'-0" OAL	
TU-1	18	RAIL (UPPER) TS 8x4x5/16 x 9'-9 5/8" (FIXED END)	A500 gr B
TU-2	14	RAIL (UPPER) TS 8x4x5/16 x 9'-8 3/4" (2-1/2" EXP END)	A500 gr B
TU-3	12	RAIL (UPPER) TS 8x4x5/16 x 9'-8" (4" EXP END)	A500 gr B
TU-1	18	RAIL (LOWER) TS 4x4x1/4 x 9'-9 5/8" (FIXED END)	A500 gr B
TU-2	14	RAIL (LOWER) TS 4x4x1/4 x 9'-8 3/4" (2-1/2" EXP END)	A500 gr B
TU-3	12	RAIL (LOWER) TS 4x4x1/4 x 9'-8" (4" EXP END)	A500 gr B
	44	THRIE TRANSITION PANEL - 12 GA	M180 A2
	88	THRIE PANEL 12'-6" / 1'-6 3/4" (12 GA)	M180 A2
	44	THRIE FLAT LIP TERMINAL CONNECTOR (10 GA)	M180 B2
	44	END CAP FOR 8 x 4 TUBE RAIL	A709 gr 36
	44	END CAP FOR 4 x 4 TUBE RAIL	A709 gr 36
	44	DEFLECTOR PLATE	A709 gr 36
	44	CONNECTION PLATE 3/8" x 1'-8" x 2'-3"	A709 gr 36
	440	WOOD OFFSET BLOCK 6x8 x 1'-6" LONG	
	836	3/8" x 1'-8" LONG POST BOLT w/ PLATE WASHER, DBL RECESSED NUT & ROUND WASHER	A307
	1056	3/4" x 6" LONG ROUND-SLOTTED HEAD BOLT WITH ROUND WASHER & LOCK NUT	A325
	44	3/4" x 2" LONG ROUND HEAD BOLT WITH HEX NUT	A307
	1408	5/8" x 1-1/4" SPLICE BOLT w/ DOUBLE RECESSED NUT	A307
SP1	32	UPPER RAIL SPLICE TUBE (ANGLED) - TS 7x3x3/8 1'-8" OAL	A500 gr B
SP2	32	UPPER RAIL SPLICE TUBE (STRAIGHT) - TS 3x3x5/16 1'-8" OAL	A500 gr B
SP3	12	LOWER RAIL SPLICE TUBE (STRAIGHT) - TS 3x3x5/16 1'-11 3/4" OAL	A500 gr B
	12	LOWER RAIL SPLICE TUBE (STRAIGHT) - TS 3x3x5/16 1'-11 3/4" OAL	A500 gr B
	352	3/4" x 1-3/4" HEX HEAD BOLT w/ ROUND WASHER	A325
	208	SPACER PIPE 3/4"-in SCH 40 x 1/2" LONG	A53



TERMINAL CONNECTOR
10 GAUGE (AASHTO M180 B2)



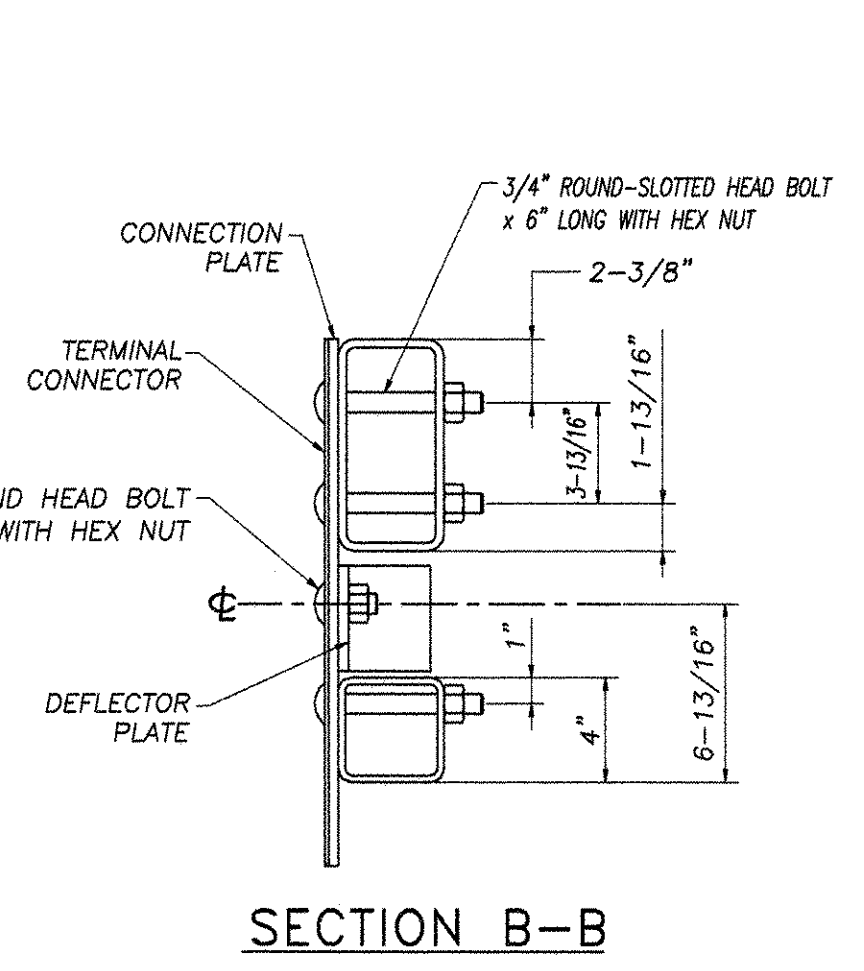
CONNECTION PLATE
3/8" x 1'-8" x 2'-3" (A709 gr 36)

GENERAL ERECTION NOTES

- ALL BRIDGE RAIL APPROACH RAIL MATERIALS, DIMENSION SIZES, AND NOTES SHALL BE THE SAME AS THOSE OF THE BRIDGERAIL UNLESS OTHERWISE NOTED.
- CARRIAGE BOLTS SHALL BE ASTM A307 AND NUTS SHALL BE ASTM A563 GRADE A OR BETTER (GALVANIZED)
- CUT & WELD TOP SPLICE BAR TO FIT BEND. USE COMPLETE PENETRATION WELD B-11A WITH BACKING BAR.
- REFLECTORIZED ALUMINUM DELINEATION IS TO BE ERECTED EVERY 30 ft. (OR CLOSEST POST) WITH 2 NO. 8 x 3/4" SELF TAPPING SCREWS. DELINEATORS SHALL MEET SPECIFICATION REQUIREMENTS FOR ASTM B209 ALLOY 5052-H32.
- REFLECTIVE MATERIAL SHALL MEET THE REQUIREMENTS OF SUBSECTION 750.08 AND SHALL BE ENCAPSULATED LENS SILVER OR AMBER. AMBER IS TO BE INSTALLED ON THE DRIVERS LEFT AND SILVER ON THE RIGHT.
- All work and materials shall conform to the provisions of Section 525 - Railings of the Vermont Standard Specifications for Construction.
- Tubing & posts shall meet the requirements of Section 732 - Railing materials of the Standard Specifications for Construction.
- All exposed cut or sheared edges shall be ground to a 1/16" radius & be free of burrs.
- Rail posts shall be set normal to grade.
- Sections of rail bar shall be attached to a minimum of two (2) posts and preferably to at least four (4) posts.
- Rail bar expansion joints shall be provided in any rail bay spanning a superstructure expansion joint. Expansion joint width shall be "X" at 45° F and will be adjusted in the field by the engineer.
- All parts shall be galvanized after fabrication in accordance with AASHTO M111, except that hardware shall meet the requirements of AASHTO M232.
- Rail bars shall be attached to steel posts using 3/4" full diameter body head bolts AASHTO M164 (Type-1) inserted through the face of the bar. Holes in post shall be 1/16" larger than the bolt size.
- Holes in rails for attachment to posts will be field-drilled. Holes shall be coated with an approved zinc-rich paint prior to erection.
- Radiused rails (if required) will be shop-curved. No field-bending of rail tubes.
- The drop-weight tear test in section 732 shall not apply to the structure tubing on this standard.
- The rail posts & base plates shall be tested for impact properties in accordance with ASTM A370 Charpy Impact Testing, using a type A specimen.

ELEVATION - APPROACH RAIL

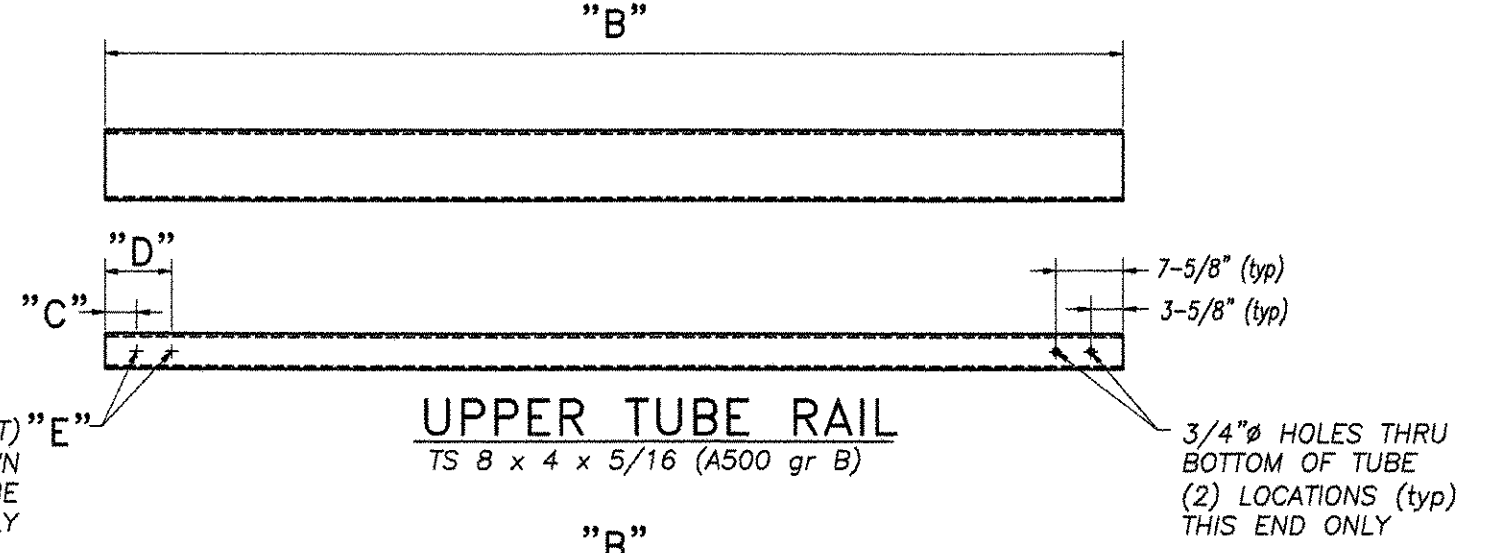
TYPICAL (44) LOCATIONS



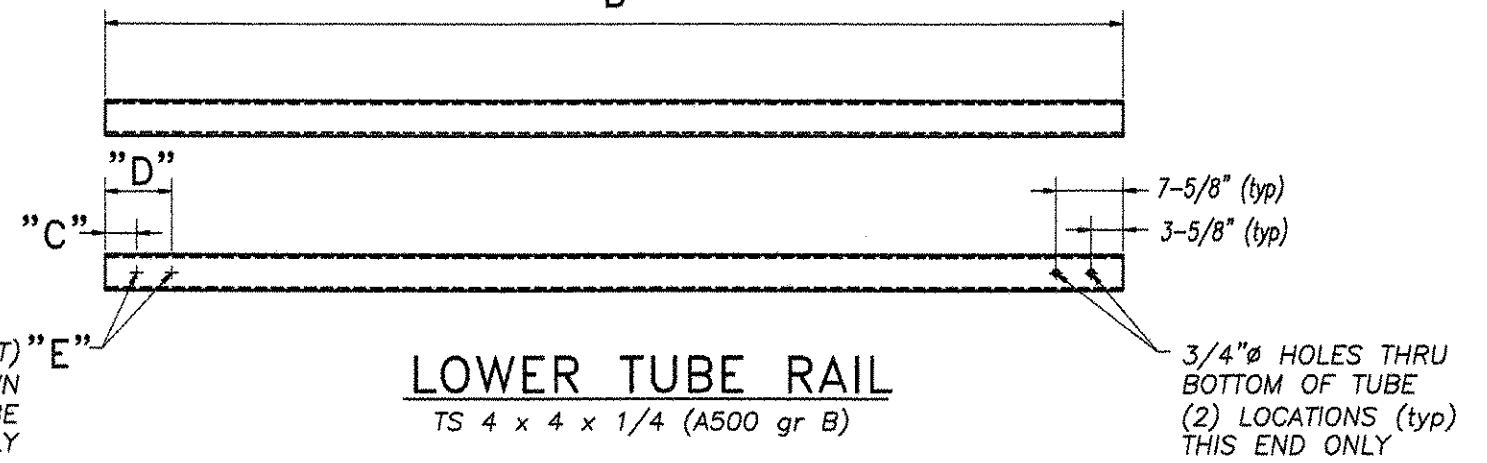
SECTION B-B

END CAP (8x4)
3/16" x 8" x 4" (A709 gr 36)

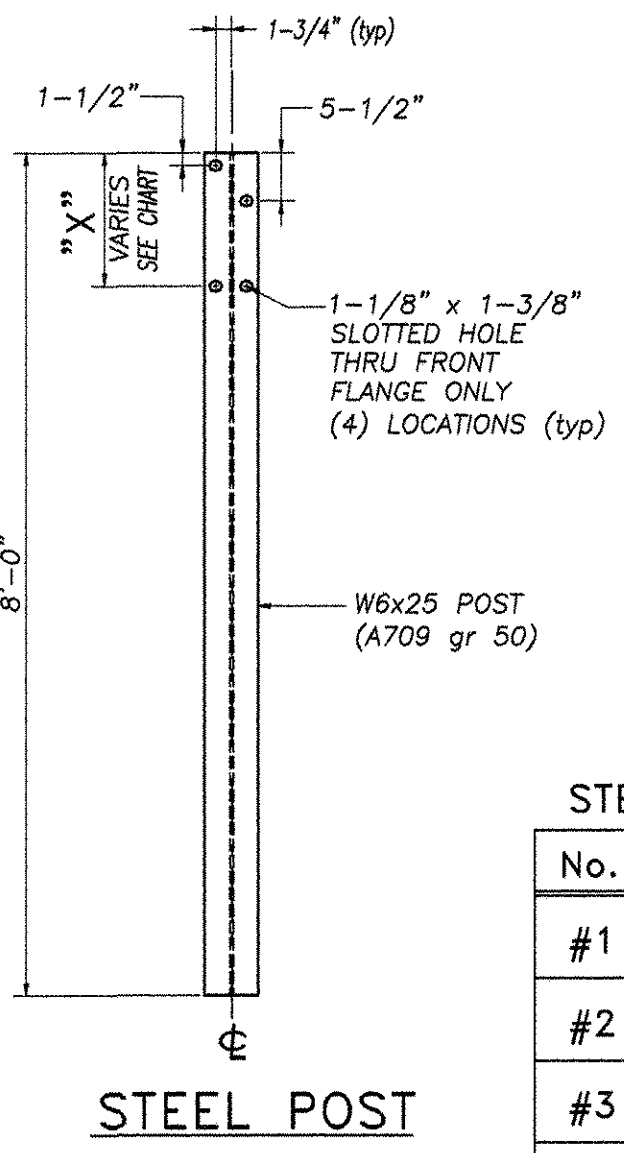
DEFLECTOR PLATE
3/8" x 4" PLATE (A709 gr 36)



UPPER TUBE RAIL
TS 8 x 4 x 5/16 (A500 gr B)



LOWER TUBE RAIL
TS 4 x 4 x 1/4 (A500 gr B)



STEEL POST

STEEL POST CHART

No.	"X"
#1	1'-3 1/4"
#2	1'-3"
#3	1'-2 3/4"
#4	1'-2 1/2"

MATERIALS

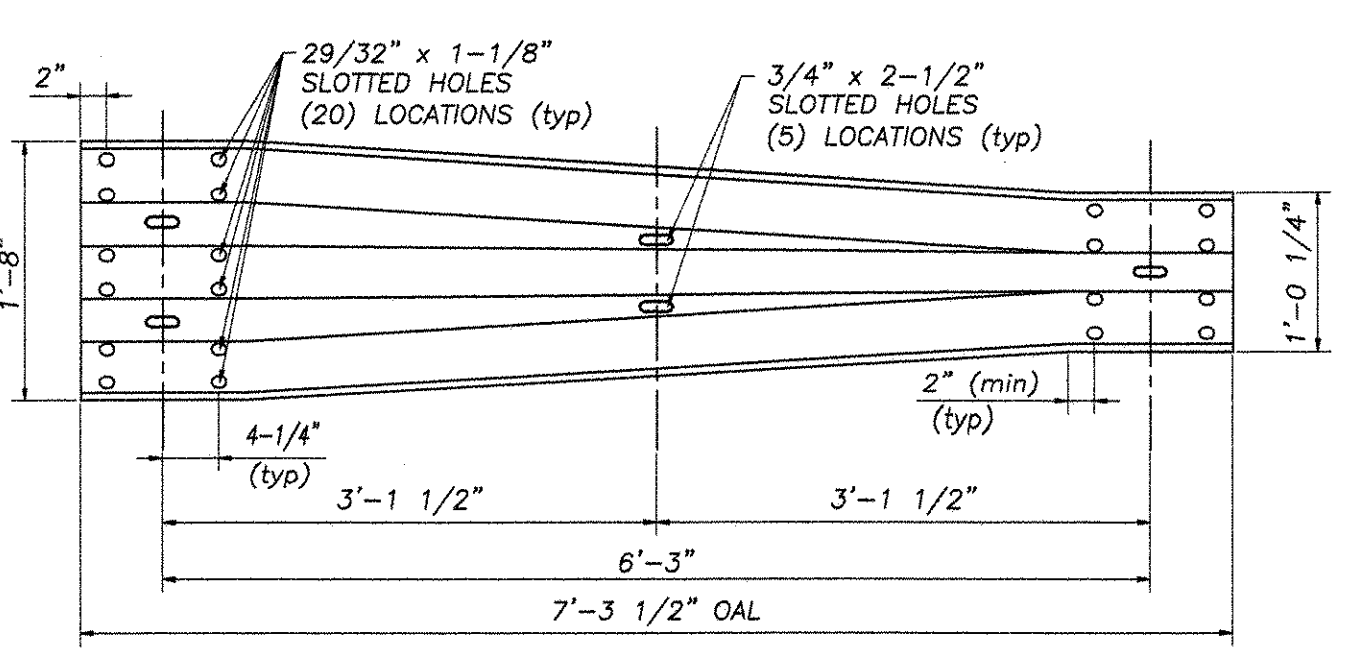
Rail bars.....ASTM A500 GR B or ASTM A501
 Rail posts.....ASTM A709 GR 50
 All other shapes & plates.....ASTM A709 GR 36
 Round-slotted head bolts for Rail-Post connections M164 (type 1)
 Hex head bolts for tube splice joints M164 (type 1)
 All other bolts [unless noted].....ASTM A307
 Nuts for ASTM A307 bolts & AASHTO M164 bolts shall comply with AASHTO M291. Nuts for anchor studs shall comply with ASTM A563.
 washers shall comply with ASTM F436
 1/8" pad shall comply with standard specification subsection 731.01 or 731.02 of Vermont Standard Specifications.

ANGLED SPLICE TUBE DETAIL
UPPER RAIL SPLICE SHOWN

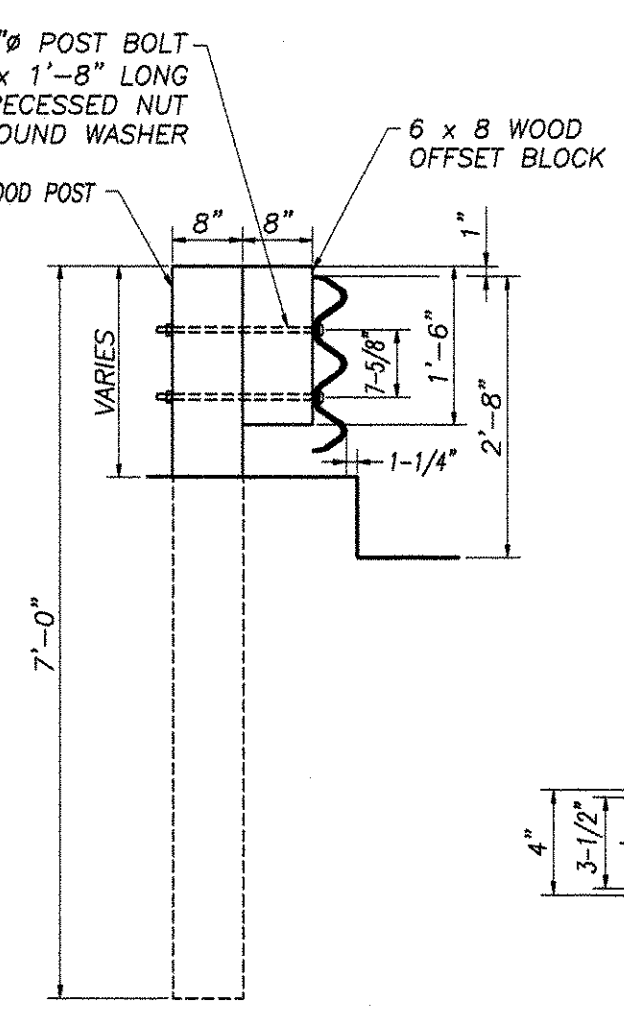
SEE BRIDGE RAIL DETAILS (SHOP DRAWING #1239) FOR ADDITIONAL SPLICE TUBE FABRICATION & ASSEMBLY DETAILS
 LOWER RAIL DOES NOT REQUIRE BENT SPLICE TUBE TO MATCH TUBE ANGLE - USE STRAIGHT SPLICE TUBE

SPLICE TUBE DIMENSIONS

No.	JOINT "A"	"F"	"G"
SP-1	3/4" SPLICE	10"	2"
SP-2	2-1/2" EXPANSION	10"	2"
SP-3	4" EXPANSION	11-7/8"	2-3/8"



THRIE TRANSITION PANEL
12 GAUGE (AASHTO M180 A2)



SECTION A-A

END CAP (4x4)
3/16" x 4" x 4" (A709 gr 36)

STEEL TUBE DIMENSIONS

No.	JOINT "A"	OAL "B"	"C"	"D"	"E"
TU-1	3/4" SPLICE	9'-9 5/8"	3-5/8"	7-5/8"	3/4" DIA HOLES
TU-2	2-1/2" EXPANSION	9'-8 3/4"	2-3/4"	6-3/4"	3/4" x 2-1/2" SLOTTED HOLES
TU-3	4" EXPANSION	9'-8"	3-1/2"	7-1/2"	3/4" x 3-1/2" SLOTTED HOLES

SEE BRIDGE PLANS (SHOP DRAWING #1239) FOR LOCATIONS OF FIXED & EXPANSION JOINTS

REVISIONS		
No.	Remarks	Date
0	Initial submittal	
1	FINAL "AS-BUILT"	11/08/01

HIGHWAY SAFETY CORP.
GLASTONBURY, CT

ITEM 621.72 - GUARDRAIL APPROACH SECTION - NETC 2 RAIL
 IM IR 089-1(B)
 WINDSOR COUNTY
 TOWNS OF HARTFORD, SHARON, ROYALTON
 INTERSTATE ROUTE 89

DRAWN P. Radice
 CHECKED [Signature]
 DATE 1/31/01
 SCALE NONE
 HSC REFERENCE NO. 1246
 GENERAL CONTRACTOR MORRILL CONSTRUCTION INC.
 SUB CONTRACTOR F.R. LAFAYETTE INC.

SIZE D REVISION
 SHEET NO. 1 of 1