

# MILLER CONSTRUCTION, INC.

P.O. BOX 86 ASCUTNEY BLVD WINDSOR, VERMONT 05089-0086  
 TELEPHONE (802) 674-5525 / FAX (802) 674-5245

## TRANSMITTAL

TO: Kristin M. Higgins, PE Project Manager Vermont Agency of Transportation	DATE	PROJECT NO.
	1/2/2014	Barnard ER BRF 0241 (39)

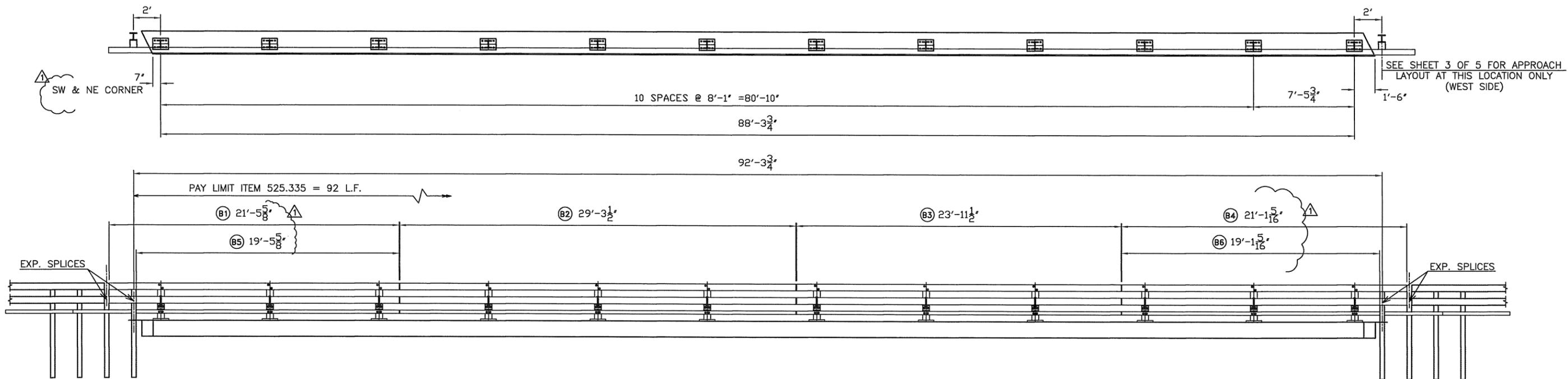
XX WE ENCLOSE THE FOLLOWING: \_\_\_\_\_ UNDER SEPARATE COVER WE ARE SENDING THE FOLLOWING

COPIES	NUMBER	DESCRIPTION	CODE
1		Rail Box Beam Shop Drawings 1 - 5 Rev 1	H
1		AASHTO Guide to Standardized Barriers Detail PSE03	H
1		AASHTO Guide to Standardized Barriers Detail PWE01-04	H

- CODE:
- |   |                            |
|---|----------------------------|
| A FOR INITIAL APPROVAL                        | H FOR APPROVAL             |
| B FOR FINAL APPROVAL                          | I AS REQUESTED OR REQUIRED |
| C APPROVED AS NOTED-RESUBMISSION REQUIRED     | J FOR USE IN ERECTION      |
| D APPROVED AS NOTED-RESUBMISSION NOT REQUIRED | K LETTER FOLLOWS           |
| E DISAPPROVED-RESUBMIT                        | L FOR FIELD CHECK          |
| F QUOTATION REQUESTED                         | M FOR YOUR USE             |
| G APPROVED                                    |                            |

Please Note:  
 S3 X 5.7 posts are not manufactured in Gr. 50 material and can only be supplied in Gr. 36. Please see Detail PSE03 for this exception.  
 W6 X 8.5 is an acceptable substitution for W6 X 9 in Highway Applications. Please see Detail PWE01-04 for this exception.

BY: 



**BRIDGE NO. 25**  
**WEST RAIL ELEVATION**  
 LOOKING AT FACE OF RAIL FROM CENTER OF ROAD  
 EAST RAIL ELEVATION SIMILAR LOOKING FROM CENTER OF ROAD  
 ALL APPROACHES TYPICAL EXCEPT AT NW CORNER (SEE SHEET 3 OF 5)

**BILL OF MATERIAL – BRIDGE NO. 25 (EAST & WEST SIDE)**

Qty	mk	Description	Spec.
24		PED POST W6x25 2'-9.000" OAH (GALV) w/ 1.250" x 10" x 14" B.P	A572 gr 50
12		FIXED SPLICE TUBE (6x6) GALV TS 5x5x5/16 x 2'-3" OAL w/ (3) 1/4" fill plates	A500 gr B
8		EXP SPLICE TUBE (6x6) GALV TS 5x5x5/16 x 3'-0" OAL w/ (3) 1/4" fill plates	A500 gr B
6		FIXED SPLICE BAR (5x3) GALV 2.125 x 4.25 x 27.00"	A500 gr B
4		EXPANSION SPLICE BAR (5x3) GALV 2.25 x 4.25 x 36.00	A500 gr B
24		BRIDGE RAIL SHELF ANGLE (GALV) L 5 x 5 x 5/8 x 6" LONG	A572 gr 50
4	B1	TUBE 6 x 6 x 3/16 x 21 ft - 5.625 in LG (GALV) fixed splice 1 end, exp splice 1 end	A500 gr B
4	B2	TUBE 6 x 6 x 3/16 x 29 ft - 3.500 in LG (GALV) fixed splice both ends	A500 gr B
4	B3	TUBE 6 x 6 x 3/16 x 23 ft - 11.500 in LG (GALV) fixed splice both ends	A500 gr B
4	B4	TUBE 6 x 6 x 3/16 x 21 ft - 1.313 in LG (GALV) fixed splice 1 end, exp splice 1 end	A500 gr B
2	B5	TUBE 5 x 3 x 1/4 x 19 ft - 5.625 in LG (GALV) fixed splice 1 end, exp splice 1 end	A500 gr B
2	B2	TUBE 5 x 3 x 1/4 x 29 ft - 3.500 in LG (GALV) fixed splice both ends	A500 gr B
2	B3	TUBE 5 x 3 x 1/4 x 23 ft - 11.500 in LG (GALV) fixed splice both ends	A500 gr B
2	B6	TUBE 5 x 3 x 1/4 x 19 ft - 1.313 in LG (GALV) fixed splice 1 end, exp splice 1 end	A500 gr B
3		LOWER FLAREBACK TUBE 5 x 3 x 1/4 x 9'-4" oal w/welded cap (GALV) mitered w/exp. slots 1 end	A500 gr B
1		LOWER FLAREBACK TUBE 5 x 3 x 1/4 x 9'-4" oal w/welded cap (GALV) c&w + mitered w/exp. slots 1 end	A500 gr B
24		ANCHOR PLATE (GALV) PL 3/8" x 10.000" x 14.000"	A36
24		BEARING PAD 1/8" x 10.000" x 14.000"	DURO 80
96		THREADED STUD (2 1/4" THREAD EACH SIDE) 1.000-08 x 13.000 HDG A449	A449
192		NUT HEX HEAVY (2) HI-STRENGTH 1.000-08 GALV	A563 DH
192		WASHER ROUND SMALL (2) F436 1.000 SAE GALV	F436
96		JAM NUT (1) 1.000-08 GALV	A563 DH
112		7/8 x 8 slotted head bolt w/ HN & LW SQW	A449
24		3/4 x 8 hex bolt w/ HN & LW (A325)	A325
48		3/4 x 2.5 hex bolt w/ HN & LW (A325)	A325
40		3/4 x 4.5 hex bolt w/ HN & 2 FW (A325)	A325
80		3/4 x 7.5 hex bolt w/ HN & 2 FW (A325)	A325

ITEM 525.335 3 RAIL BOX BEAM BRIDGE RAILING(EAST & WEST) = 184 L.F.

No.	Remarks	Date
1	revised per approver	12/23/13
0	Initial submittal	12/5/13

**REVISIONS**

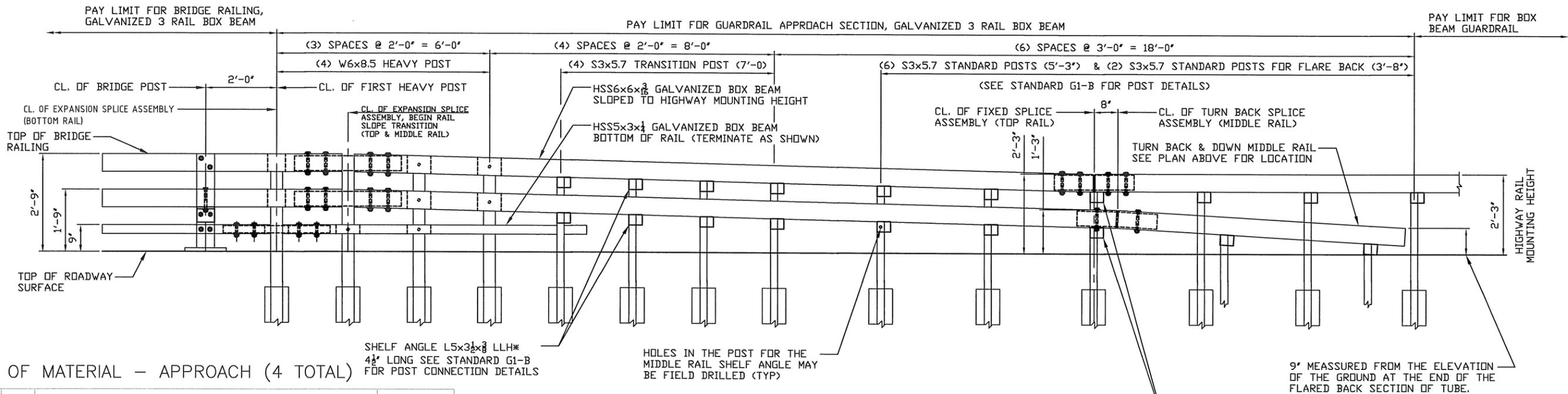
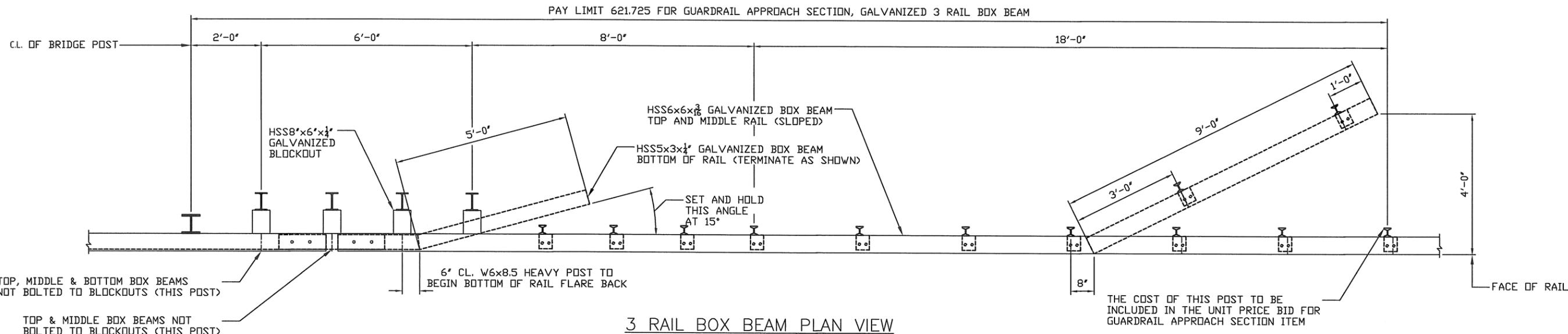
**HIGHWAY SAFETY CORP**  
 GLASTONBURY, CT  
 860-633-9445

ITEM 525.335 3-RAIL BOX BEAM  
 TOWN OF BARNARD  
 COUNTY OF WINDSOR  
 VT ROUTE 12 – MAJOR COLLECTOR  
 BRIDGE NO. 25  
 PROJECT NO. ER BRF 0241(39)

HSD JOB NO. **1966**  
 SHEET NO. **1 of 5**

GENERAL CONTRACTOR  
 SUB CONTRACTOR **LAFAYETTE**

DRAWN **RWL** CHECKED *[Signature]* DATE **11-19-13** SCALE **NONE** SIZE **D**



BILL OF MATERIAL - APPROACH (4 TOTAL)

Qty	mk	Description	Spec.
3		6 X 6 BXBM TOP @ 20'-9.5" EXP	A500 gr B
3		6 X 6 BXBM BOTT @ 21'-5" EXP	A500 gr B
1		6 X 6 BXBM TOP @ 20'-9.5" EXP C&W	A500 gr B
1		6 X 6 BXBM BOTT @ 21'-5" EXP C&W	A500 gr B
16		W6 X 8.5 POST @ 7'-0" W/SPADE	A992/A709 GR.50
16		3" I POST @ 7'-0" W/2'-8" SPADE	A36
24		3" I POST @ 5'-3" W/SPADE STD	A36
8		3" I POST @ 3'-11" W/SPADE	A36
32		TUBE BLOCKOUT 6" X 8" X 6" LONG	A500 gr B
12		TUBE BLOCKOUT 6" X 8" X 3" LONG	A500 gr B
3		9' BXBM TRANS FLAREBACK END	A500 gr B
1		9' BXBM TRANS FLAREBACK END (C&W)	A500 gr B
4		5 X 5 DOUBLE BEND SPLICE TUBE	A500 gr B
4		5 X 5 FIXED TUBE SPLICE 27"	A500 gr B
68		BOXBEAM CLIP ANGLE STD	A36
4		BOXBEAM END ANGLE STD	A36
32		3/4 X 8 CARR BOLT - N FW LW (2 per heavy post)	A307
4		3/4 X 8 HEXBOLT - N 2FW (1 per 9'-0" flareback)	A307
72		1/2 X 1 1/2 HEX BOLT - N FW (1 per shelf / end angle)	A307
80		1/2 X 1 1/2 HEX BOLT - N 2FW LW (2 per tube block)	A307
72		3/8 X 7 1/2 HEX BOLT - N 2FW (1 per shelf angle)	A307
48		3/4 x 7 1/2 HEX BOLT W/ HN & 2 FW (A325) (4 per 6x6 splice)	A325
8		3/4 x 7 1/2 HEX BOLT W/ HN & 2 FW & LW (A325) (2 per angled turnback splice)	A325

ITEM 621.725 GUARDRAIL APPR. SECTION 3 RAIL = 4 EA.

**HIGHWAY SAFETY CORP**  
 GLASTONBURY, CT  
 860-633-9445

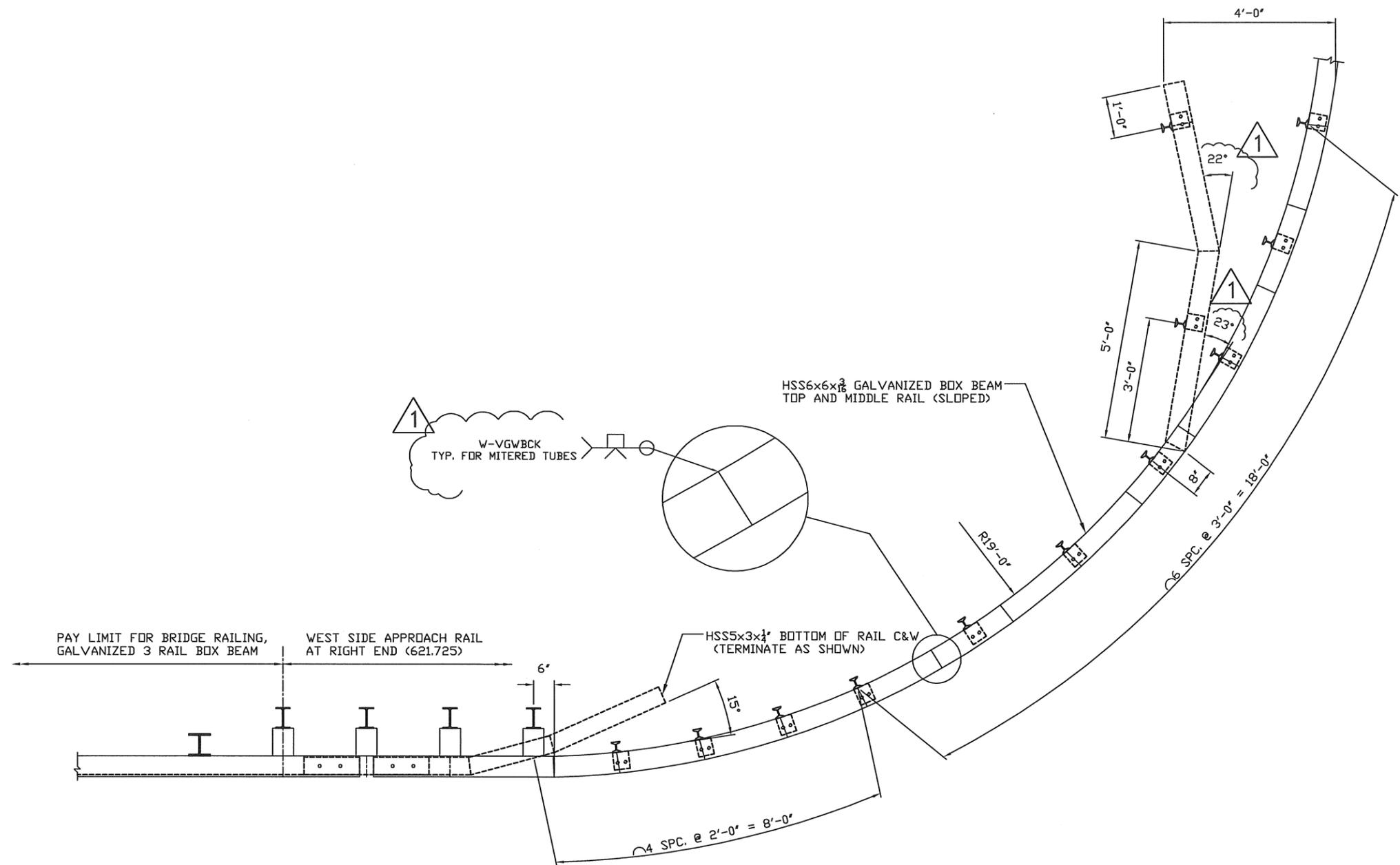
ITEM 621.725 APPROACH SECTION  
 TOWN OF BARNARD  
 COUNTY OF WINDSOR  
 VT ROUTE 12 - MAJOR COLLECTOR  
 BRIDGE NO. 25  
 PROJECT NO. ER BRF 0241(39)

GENERAL CONTRACTOR  
 SUB CONTRACTOR  
 LAFAYETTE

DATE 11-20-13 SCALE NONE SIZE D

CERTIFIED FABRICATOR

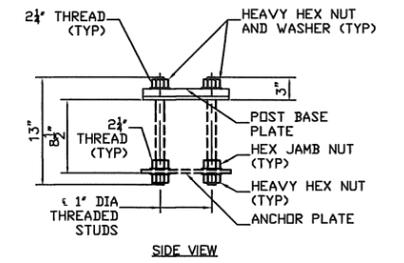
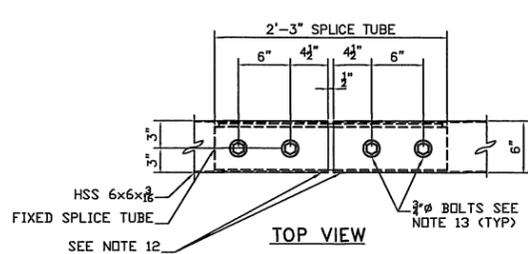
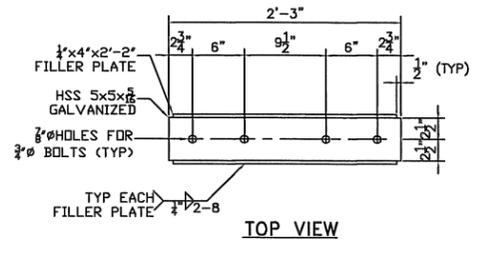
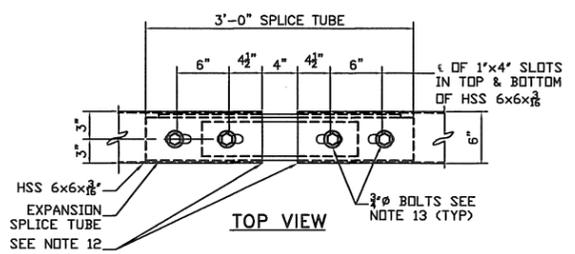
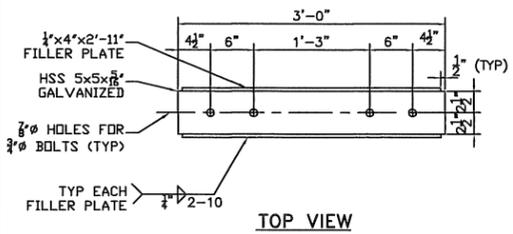
HSC JOB NO. 1966  
 SHEET NO. 2 of 5



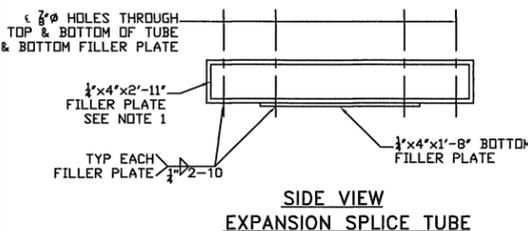
3 RAIL BOX BEAM PLAN  
 WEST SIDE APPROACH ONLY (1 LOCATION- NW CORNER)  
 SEE SHEET 2 OF 4 FOR ADDITIONAL INFORMATION

**HIGHWAY SAFETY CORP**  
 GLASTONBURY, CT  
 860-633-9445

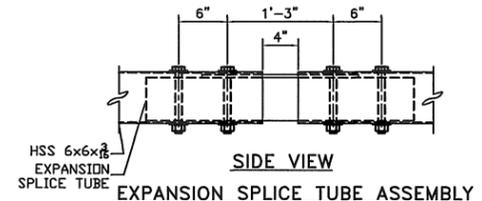
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TOWN OF BARNARD		
COUNTY OF WINDSOR		HSC JOB NO. <b>1966</b>
VT ROUTE 12 - MAJOR COLLECTOR		SHEET NO. <b>3 of 5</b>
BRIDGE NO. 25		
PROJECT NO. ER BRF 0241(39)		
GENERAL CONTRACTOR		
SUB CONTRACTOR <b>LAFAYETTE</b>		
DRAWN <b>RWL</b>	CHECKED	DATE <b>11-20-13</b>
SCALE <b>NONE</b>	SIZE <b>D</b>	



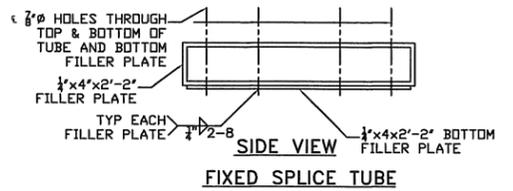
RAILING POST ANCHORAGE



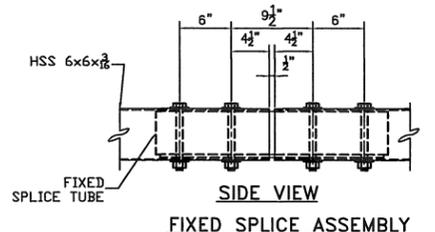
EXPANSION SPLICE TUBE



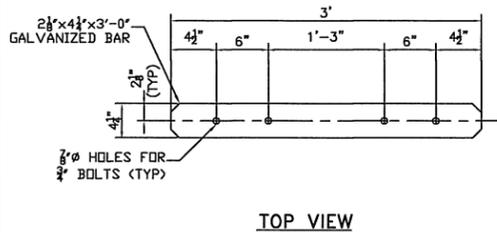
EXPANSION SPLICE TUBE ASSEMBLY



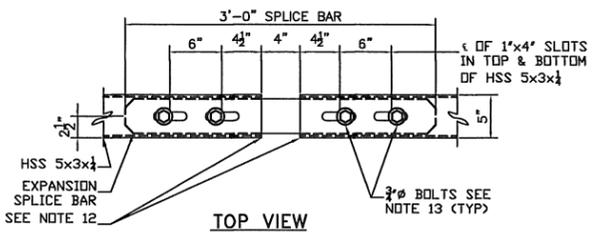
FIXED SPLICE TUBE



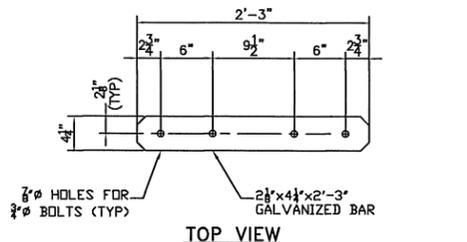
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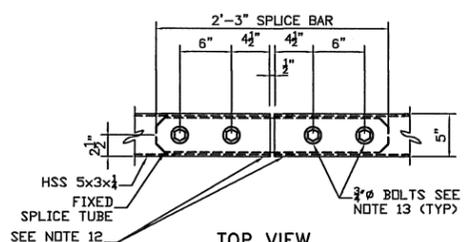
EXPANSION SPLICE BAR



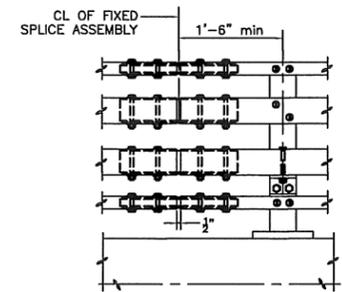
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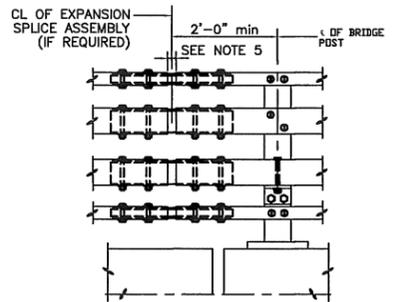
FIXED SPLICE BAR



FIXED SPLICE ASSEMBLY



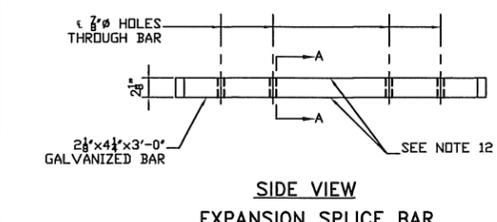
FIXED SPLICE



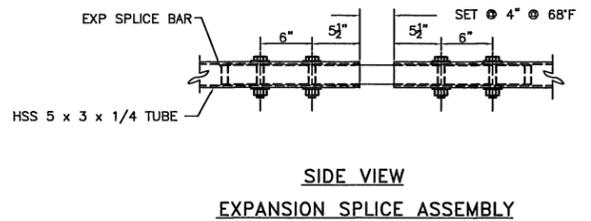
EXPANSION SPLICE

RAILING SPLICE DETAIL ELEVATION

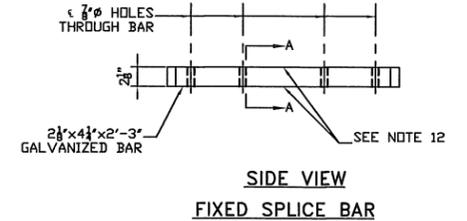
A RAILING EXPANSION SPLICE IS REQUIRED IN ANY POST SPACING THAT CONTAINS A SUPERSTRUCTURE EXPANSION JOINT.



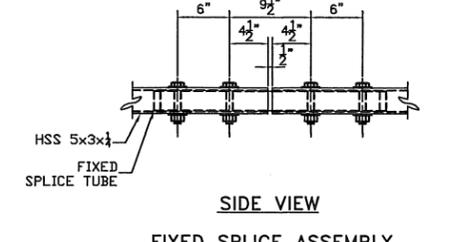
EXPANSION SPLICE BAR



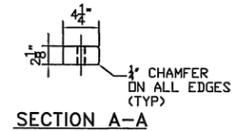
EXPANSION SPLICE ASSEMBLY



FIXED SPLICE BAR



FIXED SPLICE ASSEMBLY



SECTION A-A

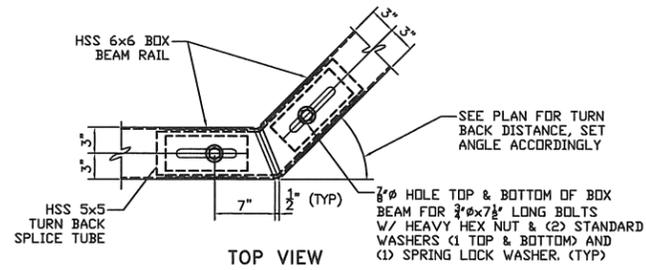
NOTES:

- ALL WORK AND MATERIALS SHALL CONFORM TO SECTION 525.
- PRIOR TO GALVANIZING THE ASSEMBLED POST, GRIND ALL EDGES TO A MINIMUM RADIUS OF 1/16".
- ALL POSTS SHALL BE SET NORMAL TO GRADE. THE MAXIMUM CENTER TO CENTER SPACING OF BRIDGE RAIL POSTS IS 8'-3".
- SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO BRIDGE POST AND PREFERABLY TO AT LEAST 4 POSTS.
- RAIL TUBE EXPANSION JOINTS SHALL BE PROVIDED IN ANY RAIL BAY SPANNING THE END OF AN INTEGRAL ABUTMENT BRIDGE AND AT ALL SUPERSTRUCTURE EXPANSION JOINTS. EXPANSION JOINT WIDTH SHALL BE 4" @ 68'F AND WILL BE ADJUSTED IN THE FIELD BY THE ENGINEER FOR OTHER TEMPERATURES.
- HOLES IN RAILS FOR TUBE ATTACHMENT MAY BE FIELD-DRILLED. HOLES SHALL BE COATED WITH AN APPROVED ZINC-RICH PAINT PRIOR TO INSTALLATION.
- BOLTS SHALL BE TORQUED SNUG TIGHT (APPROXIMATELY 100 FT-LB).
- SEE STANDARD DRAWING G-1B FOR DETAILS OF DELINEATORS. A DELINEATOR SHALL BE INSTALLED AT 30 FOOT SPACING FOR THE NEAREST POST. WHITE IS TO BE INSTALLED ON THE DRIVER'S RIGHT. FOR ONE WAY BRIDGES, YELLOW IS TO BE INSTALLED ON THE DRIVER'S LEFT. PAYMENT SHALL BE INCIDENTAL TO OTHER ITEMS.
- ANY BENDING OF RAIL SHALL BE DONE AT THE FABRICATION PLANT ACCORDING TO A PROCEDURE PROVIDED BY THE FABRICATOR.
- THE MINIMUM DISTANCE FROM THE POST TO AN EXPANSION JOINT SHALL BE DETERMINED BY THE MINIMUM EDGE DISTANCE OF 5" FROM ANY ANCHORS STUD TO THE END OF THE SLAB, OR TO THE EXPANSION JOINT RECESS POUR, IF ONE IS USED.
- THIS RAILING MEETS THE REQUIREMENTS FOR A TL-4 SERVICE LEVEL.

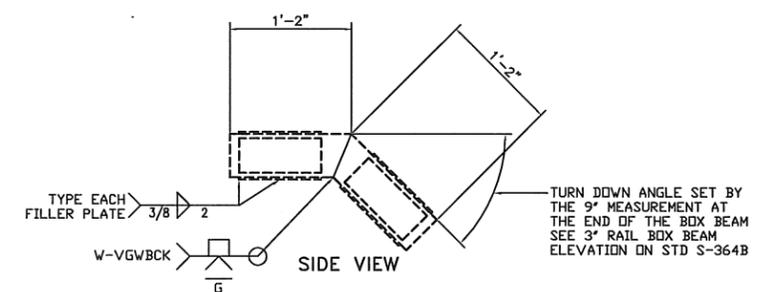
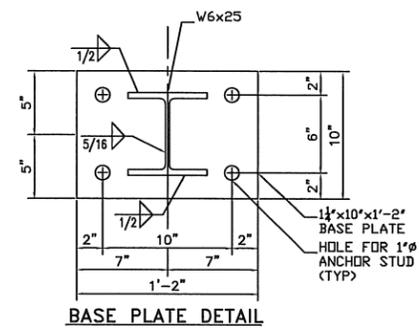
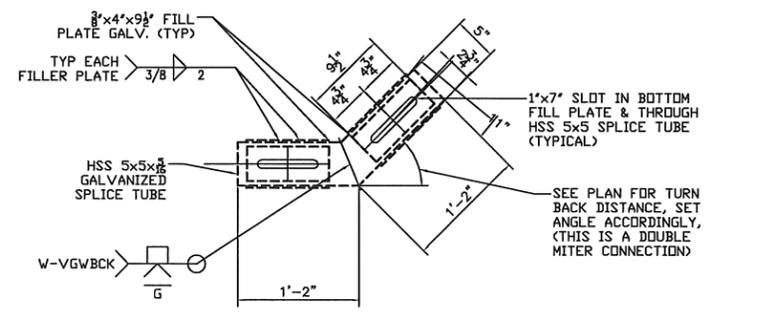
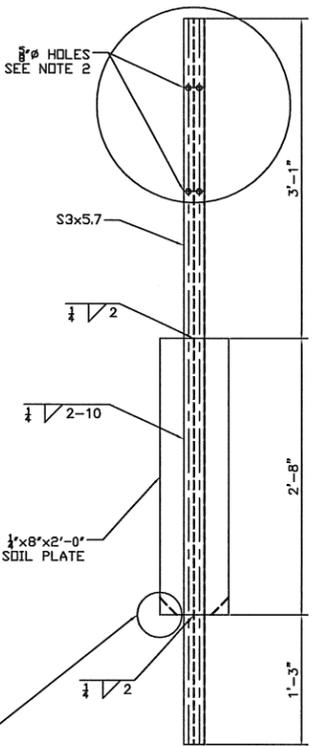
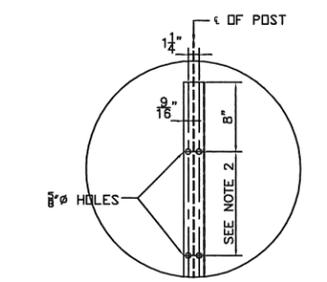
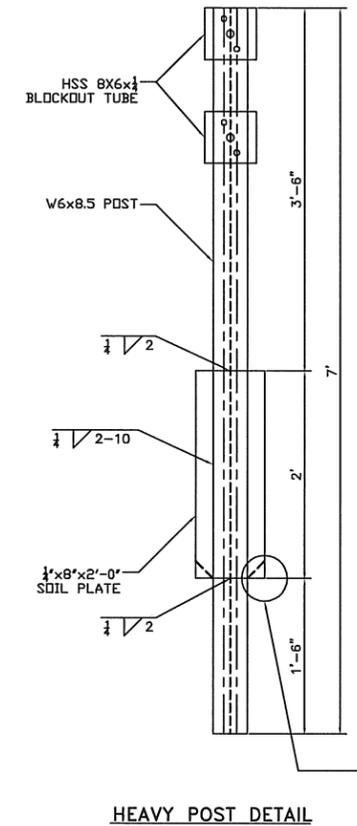
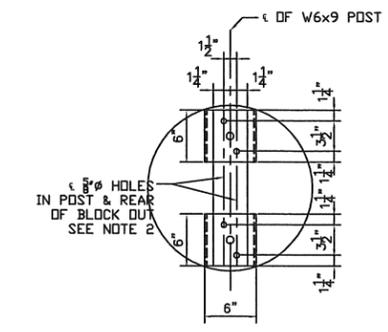
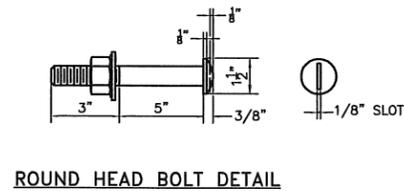
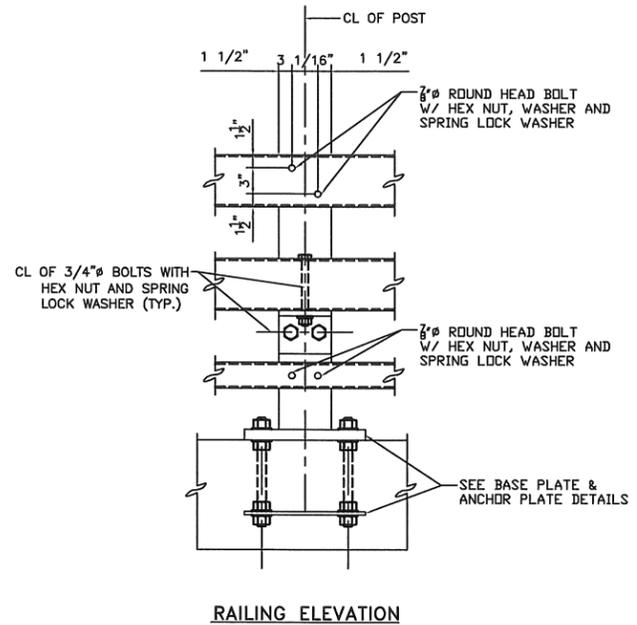
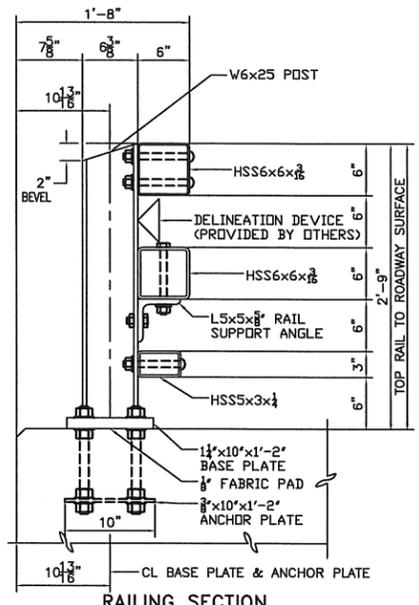
NOTES:

- PROTRUSIONS CAUSED BY WELDING OR GALVANIZING ARE NOT PERMITTED ON THE ADJOINING SURFACES OF THE BOX BEAM RAILS, SPLICE TUBES AND FILL PLATES.
- FOUR (4) 3/8" DIAMETER BOLTS, 7 1/2" LONG WITH TWO (2) WASHERS AND HEAVY HEX NUT ON EACH BOLT. NUT TO BE FINGER TIGHT AND THE FIRST THREAD BELOW THE NUT TO BE BURRED TO PREVENT DISLODGING. FOUR (4) BOLTS AT EACH SPLICE.

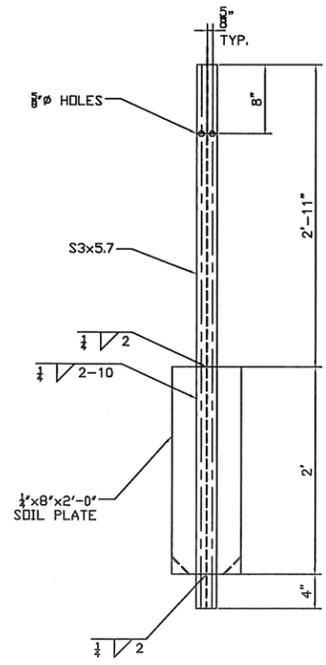
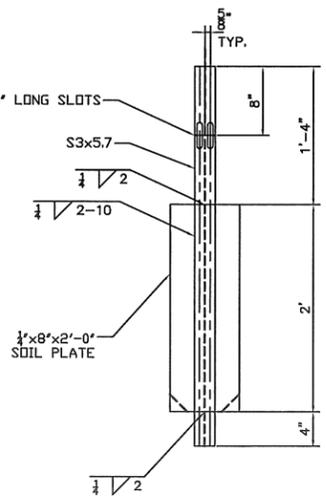
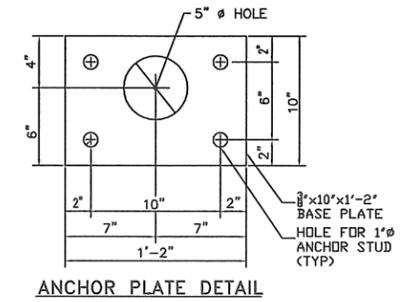
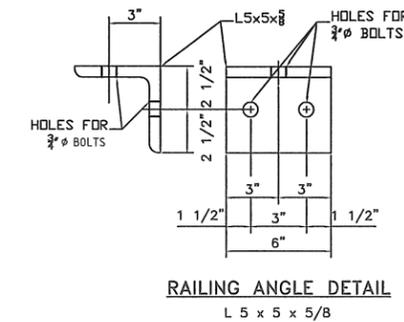
<b>HIGHWAY SAFETY CORP</b>		GLASTONBURY, CT 860-633-9445	
BRIDGE RAIL DETAILS 525.335 & 621.725		TOWN OF BARNARD, COUNTY OF WINDSOR VT ROUTE 12 - MAJOR COLLECTOR BRIDGE NO. 25 PROJECT NO. ER BRF 0241(39)	
GENERAL CONTRACTOR	LAFAYETTE	CERTIFIED FABRICATOR	HSC JOB NO. 1966
SUB CONTRACTOR	LAFAYETTE	SHEET NO.	4 of 5
DRAWN	RWL	CHECKED	DATE 11/20/13 SCALE NONE SIZE D



TURN BACK SPLICE TUBE ASSEMBLY



TURN BACK SPLICE TUBE DETAIL



SEE ALL NOTES ON SHEET 4 OF 5 FOR ADDITIONAL INFORMATION

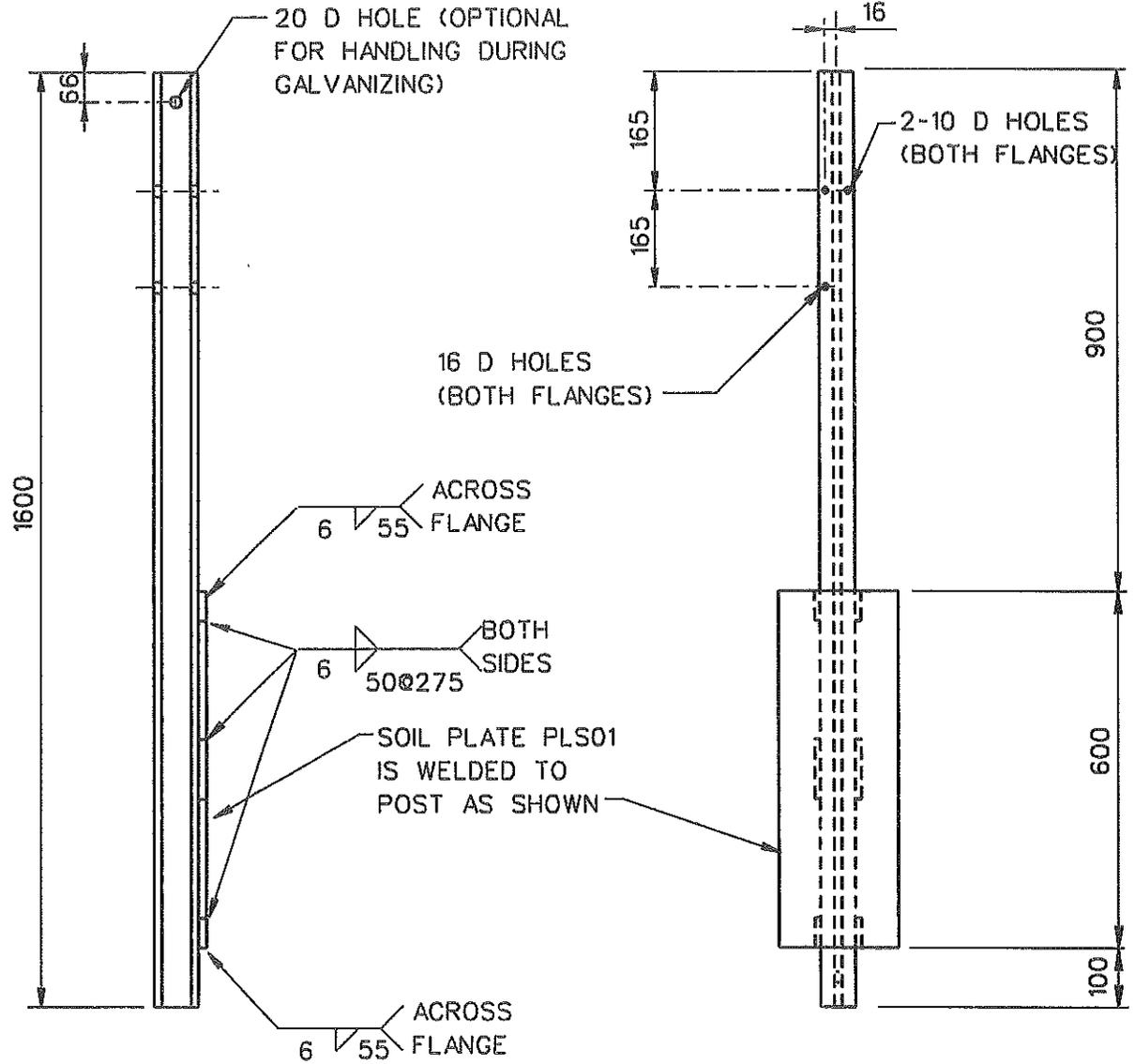
<b>HIGHWAY SAFETY CORP</b>		<b>CERTIFIED FABRICATOR</b>
GLASTONBURY, CT 860-633-9445		
BRIDGE RAIL DETAILS 525.335 & 621.725		
TOWN OF BARNARD, COUNTY OF WINDSOR		
VT ROUTE 12 - MAJOR COLLECTOR		
BRIDGE NO. 25		
PROJECT NO. ER BRF 0241(39)		
GENERAL CONTRACTOR	1966	
SUB CONTRACTOR	5 of 5	
DRAWN	CHECKED	DATE
RWL		11/20/13
SCALE	NONE	SIZE
		D

**S3x5.7**

S75x8.5  
STRUCTURAL  
STEEL SHAPE



PLAN



SIDE

FRONT

1994

**WEAK POST GUARDRAIL POST & WELDED SOIL PLATE**



**PSE03**

SHEET NO. 1 of 2	REF. NO. P-3-76
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### SPECIFICATIONS

**GR 36 KSI**

This post shall be manufactured using AASHTO M270M (ASTM A709M) Grade 250 steel. The section shall be manufactured such that it conforms to the geometry and tolerances of AASHTO M160M (ASTM A6M) for a S75x8.5 S-section. After all punching, drilling, stamping and welding is complete, the section shall be zinc-coated according to AASHTO M111 (ASTM A123). If corrosion resistant hardware is required AASHTO M270M (ASTM A709M) Grade 50W steel shall be used and the embedded portion of the post shall be zinc-coated according to AASHTO M111 (ASTM A123). All holes shall be punched through both flanges (in-line). All welding shall conform to ANSI/AASHTO/AWS D1.5.

Designator	Area (10 <sup>3</sup> mm <sup>2</sup> )	I <sub>x</sub> (10 <sup>6</sup> mm <sup>4</sup> )	I <sub>y</sub> (10 <sup>6</sup> mm <sup>4</sup> )	S <sub>x</sub> (10 <sup>3</sup> mm <sup>4</sup> )	S <sub>y</sub> (10 <sup>3</sup> mm <sup>4</sup> )
PSE03	1.1	1.1	0.2	28	6

Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance and accepted manufacturing practices.

### INTENDED USE

This post is used with the standard SGR02 weak-post guardrail system and the SGM02 weak-post median barrier system. The RWM02a W-beam guardrail is bolted to this post using a 40-mm long FBX08a bolt and nut with a FWR01 square washer and a FBX14a support bolt and nut with an additional FNX14a support nut.

## WEAK POST GUARDRAIL POST & WELDED SOIL PLATE

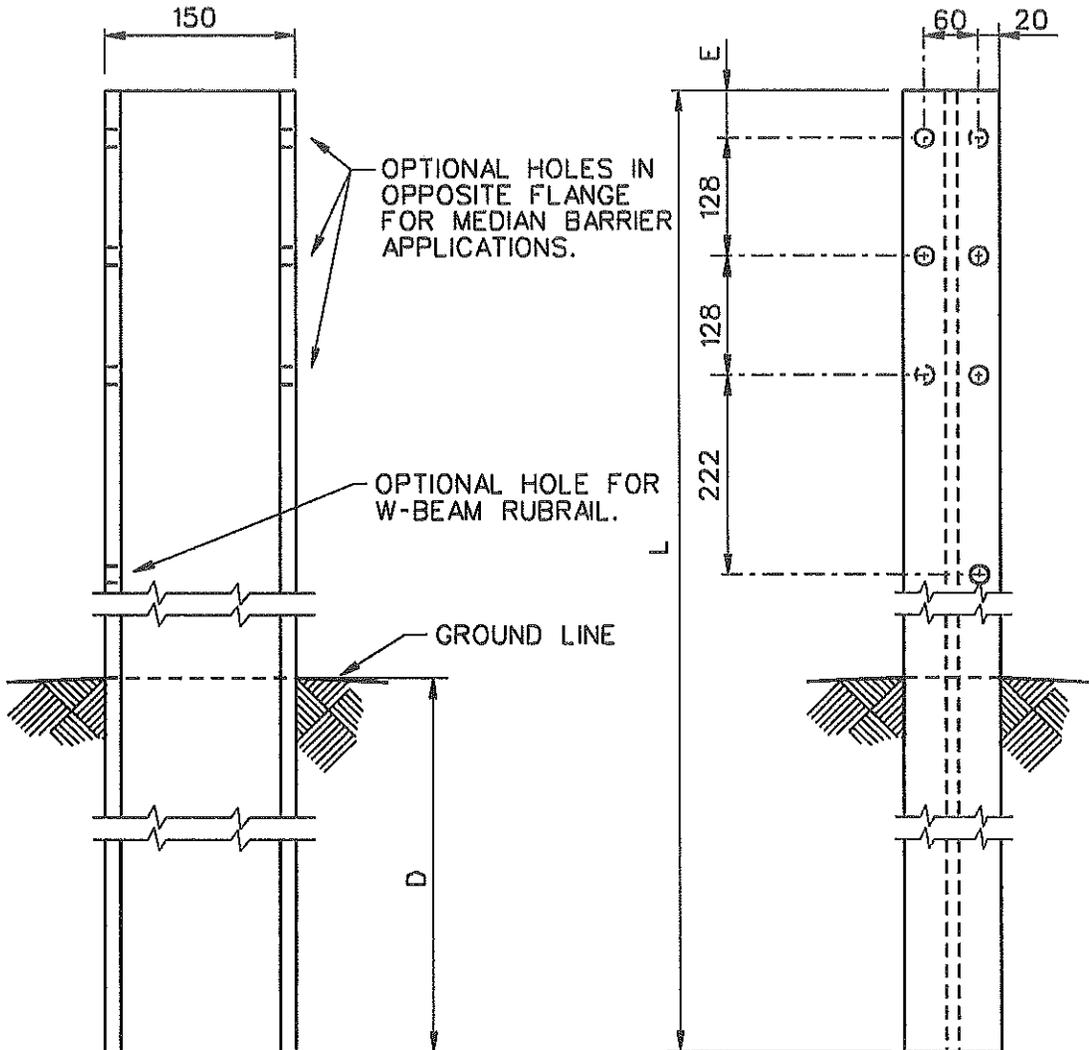
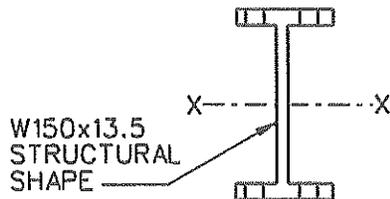
PSE03

SHEET NO.	DATE
2 of 2	04-01-95



**NOTE:** ALL HOLES ARE 20 D.

DESIGNATOR	L	D	E
PWE01	1830	1100	52
PWE02	1980	1250	52
PWE03	1980	1153	149
PWE04	2060	1173	149



1994

WIDE-FLANGE GUARDRAIL POST

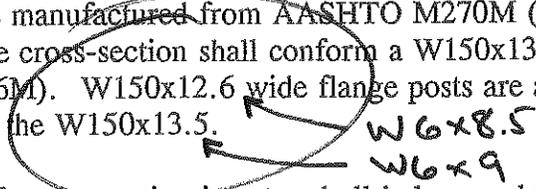


PWE01-04

SHEET NO. 1 of 2	REF. NO. P-10-79
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### SPECIFICATIONS

W-beam and thrie-beam guardrail posts shall be manufactured using AASHTO M270M (ASTM A709M) Grade 250 steel unless corrosion resistant steel is required in which case the post shall be manufactured from AASHTO M270M (ASTM A709M) Grade 50W steel. The dimensions of the cross-section shall conform a W150x13.5 section as defined in AASHTO M160M (ASTM A6M). W150x12.6 wide flange posts are an acceptable alternative that is considered equivalent to the W150x13.5.



After the section is cut and all holes are drilled or punched the component should be zinc-coated according to AASHTO M111 (ASTM A123) unless corrosion resistant steel is used. When corrosion resistant steel is used the portion of the post to be embedded in soil shall be zinc-coated according to AASHTO M111 (ASTM A123) and the portion above the soil shall not be zinc-coated, painted or otherwise treated.

Designator	Area (10 <sup>3</sup> mm <sup>2</sup> )	I <sub>x</sub> (10 <sup>6</sup> mm <sup>4</sup> )	I <sub>y</sub> (10 <sup>6</sup> mm <sup>4</sup> )	S <sub>x</sub> (10 <sup>3</sup> mm <sup>4</sup> )	S <sub>y</sub> (10 <sup>3</sup> mm <sup>4</sup> )
PWE01-04	1.7	6.84	0.91	91.2	18.2

Dimensional tolerances not shown or implied are intended to be those consistent with the proper functioning of the part, including its appearance and accepted manufacturing practices.

### INTENDED USE

Posts PWE01 and PWE02 are used with the SGR04a guardrail and SGM04a median barrier. PWB01 blockouts are attached to the post using at least 2 40-mm long FBX16a bolts and nuts. The PWE03 and PWE04 posts are used with the SGR09a-b guardrail and the SGM09a-b median barriers. PWB01, PWB02 or PWB03 blockouts are attached using at least 2 40-mm long bolts for each blockout. Posts PWE01 and PWE02 are also used in the STB02, STB03, and STB04 w-beam guardrail to bridge rail transitions. Posts PWE03 and PWE04 are also used in the STB05 and STB06 thrie-beam guardrail to bridge rail transitions.

## WIDE-FLANGE GUARDRAIL POST

<b>PWE01-04</b>		  
SHEET NO.	DATE	
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