

Appendix B

Detailed Drawings for the Modified Illinois Two-Tube
Bridge Rail System

Bolt Chart

Part No.	Description	BOLTS				NUTS	FLAT WASHERS	
		Diameter	Length	Class	Bolts / connection	Type	Type	QTY / bolt
B0	Slotted round head bolts for tube rail	3/4"	6"		4	ASTM A563-DH Lock Nut	ASTM F436-1	1
B1	Top bolts for PL2 to PL3 and PL5 to PL6	1"	3-1/4"	ASTM A325-1	2	ASTM A563-DH	ASTM F436-1	2
B2	Bottom bolts for PL2 to PL3 and PL5 to PL6	5/8"	3-1/4"	ASTM A325-1	2	ASTM A563-DH	ASTM F436-1	2
B3	Bolts for PL4 to fascia beam and PL7 to fascia beam	7/8"	2-11/16"	ASTM A325-1	6	ASTM A563-DH	ASTM F436-1	2
B4	Bolts for BSS2 (structural Tee) to BSS3 (diaphragm) and BSS5 (structural Tee) to BSS3 (diaphragm)	7/8"	2-11/16"	ASTM A325-1	3	ASTM A563-DH	ASTM F436-1	2
TC-B0	Bolts for terminal connector to connection plate (TC-5)	7/8"	6"	ASTM A325-1	8	ASTM A563-DH	ASTM F436-1	1
TC-B1	Bolts for thrie beam to connection angle (TC-4)	5/8"	7"	ASTM A325-1	2	ASTM A563-DH	ASTM F436-1	2
TC-B2	Bolts for terminal connector to thrie beam	5/8"		ASTM A325-1	12	ASTM A563-DH	ASTM F436-1	2

- All hardware is to be hot dip galvanize per ASTM A153 or ASTM F2329.
- All bolts shall be tightened in accordance with ODOT C&MS 513. Lock washers are not required for bolts tightened per C&M 513
- All bolts are UNC threads unless otherwise noted.
- All bolts in standard holes shall have a standard galvanised ASTM F-436 hardened washer under the element (nut / bolt head) turned in tightening.

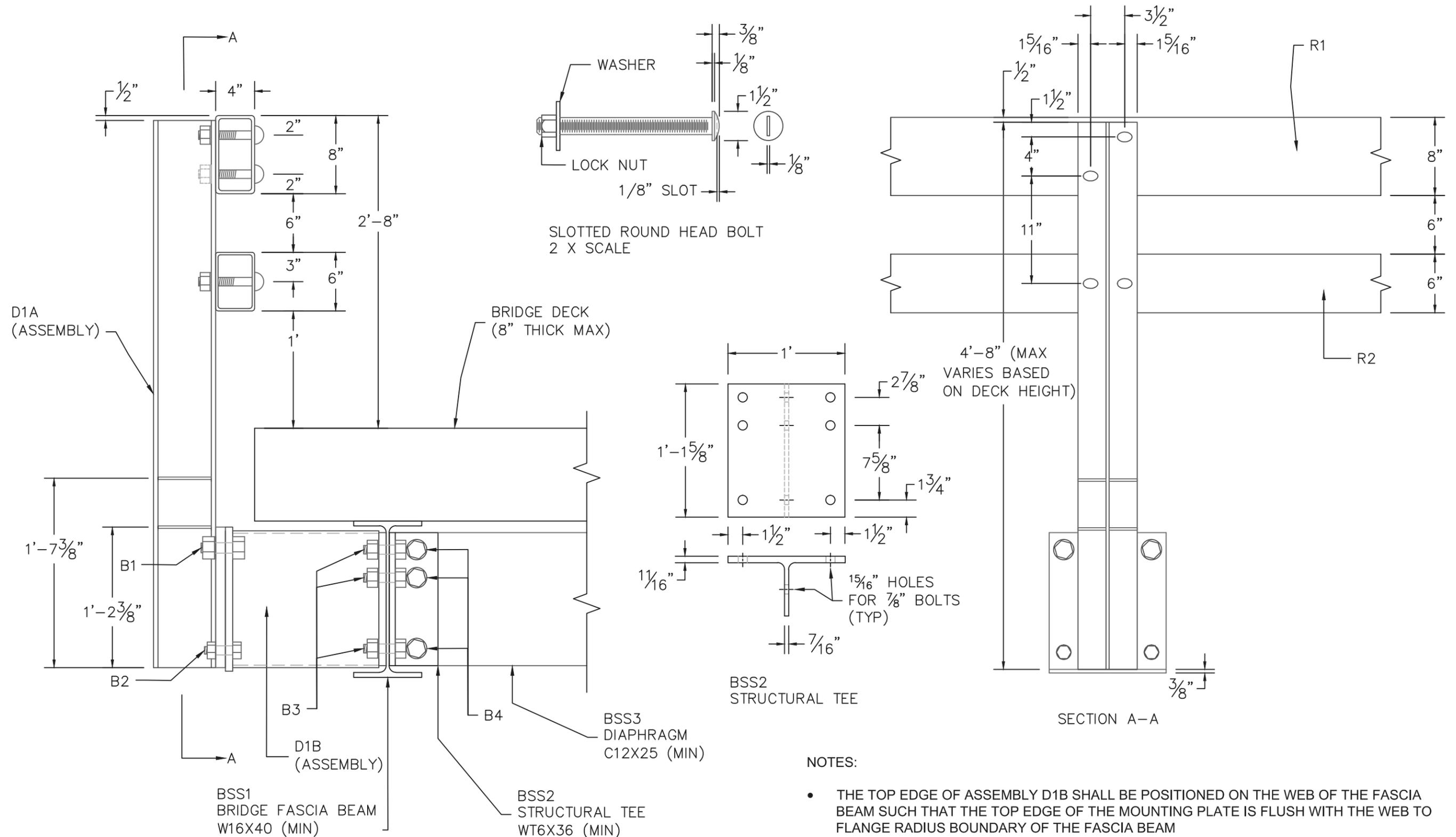
Materials Chart

Part No.	Description	Section	Length	Grade	Min. Yield
P1	Post	W6x25	56" (max)	ASTM A992	50 ksi
P2	Post	W6x25	54" (max)	ASTM A992	50 ksi
R1	Top Tubular Rail	HSS 8 x 4 x 5/16	varies	ASTM A500-B	46 ksi
R2	Lower Tubular Rail	HSS 6 x 4 x 1/4	varies	ASTM A500-B	46 ksi
PL1	Post Stiffener Plate	1/4" x 2-7/8"	5-1/2"	ASTM A709 GR 50	50 ksi
PL2	Post Support Plate	1" x 1'	14-3/8"	ASTM A709 GR 50	50 ksi
PL3	Front Tube Support Plate	3/4" x 1'	14-3/4"	ASTM A709 GR 50	50 ksi
PL4	Back Tube Support Plate	3/4" x 1'	13-5/8"	ASTM A709 GR 50	50 ksi
PL5	Post Support Plate	1" x 1'	12-3/8"	ASTM A709 GR 50	50 ksi
PL6	Front Tube Support Plate	3/4" x 1'	12-3/4"	ASTM A709 GR 50	50 ksi
PL7	Back Tube Support Plate	3/4" x 1'	12"	ASTM A709 GR 50	50 ksi
PS1	Tubular mount for W16X40 and larger fascia beams	HSS 14 x 6 x 1/4	15"	ASTM A500-B	46 ksi
PS2	Tubular mount for W14X30 and larger fascia beams	HSS 12 x 6 x 1/4	15"	ASTM A500-B	46 ksi
BSS1	W16X40 or larger bridge fascia beam	W16X40 (min)	varies	ASTM A709 GR 50	50 ksi
BSS2	Structural Tee for connecting BSS3 to BSS1	WT6X36 (min)	13-5/8"	ASTM A709 GR 50	50 ksi
BSS3	Diaphragm between fascia beam and 1'st interior stringer	C12X25 (min)	varies	ASTM A709 GR 50	50 ksi
BSS4	W14X30 and larger bridge fascia beam	W14X30 (min)	varies	ASTM A709 GR 50	50 ksi
BSS5	Structural tee for connecting BSS3 to BSS4	WT6X36 (min)	12"	ASTM A709 GR 50	50 ksi
TC-1	Upper tubular rail end cap	3/16" x 3-3/4"	7-3/4"	ASTM A709 GR 50	50 ksi
TC-2	Lower tubular rail end cap	3/16" x 3-3/4"	5-3/4"	ASTM A709 GR 50	50 ksi
TC-3	Bearing plate at transition connection	1/2" x 3"	3"	ASTM A709 GR 50	50 ksi
TC-4	Connection angle at transition connection	1/4" x L3 x 4	22-1/4"	ASTM A709 GR 50	50 ksi
TC-P1	Horizontal angled piece of connection plate (TC-5)	1/2" x 3-1/2"	24"	ASTM A709 GR 50	50 ksi
TC-P2	Vertical angled piece of connection plate (TC-5)	1/2" x 12"	4"	ASTM A709 GR 50	50 ksi
TC-P3	Vertical flat piece of connection plate (TC-5)	1/2" x 12"	22"	ASTM A709 GR 50	50 ksi

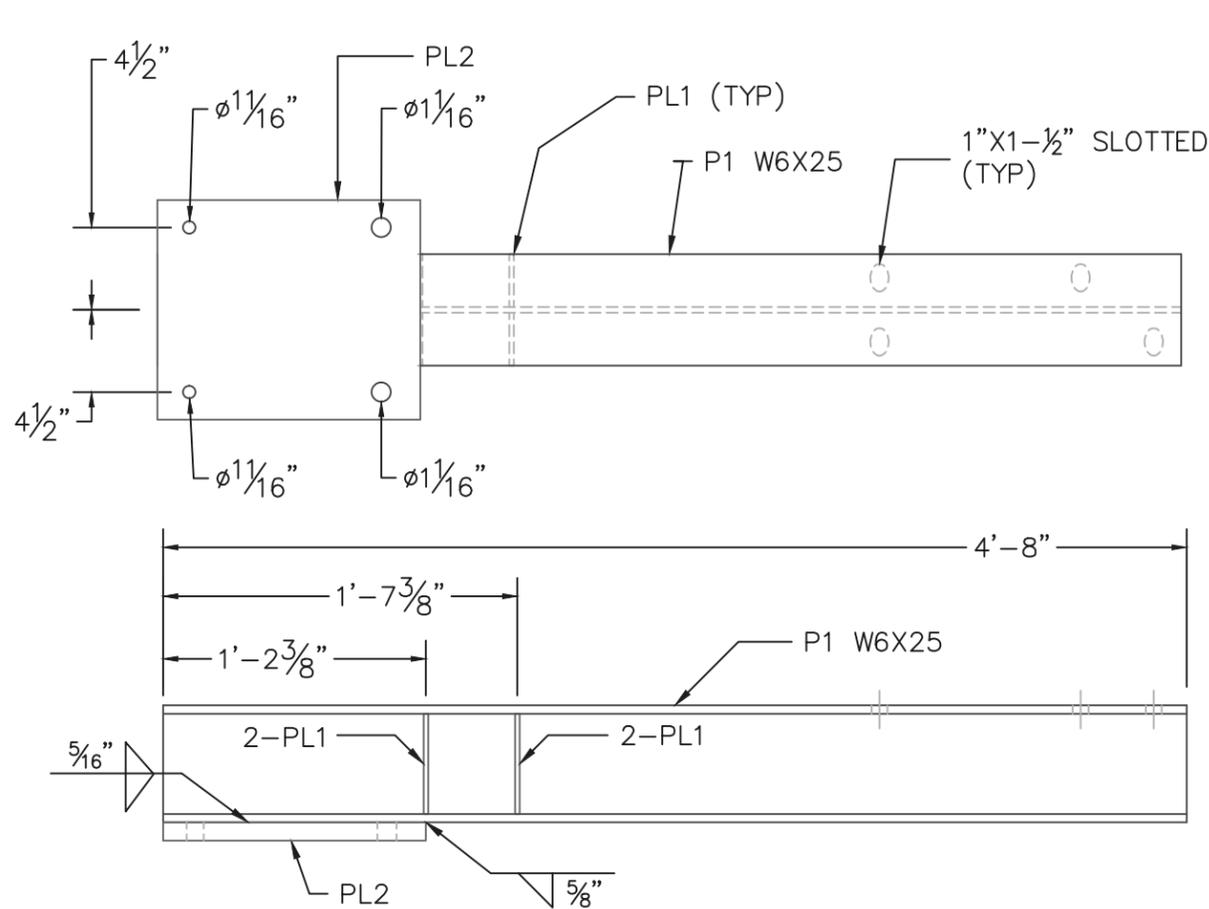
- All steel components shall be galvanized according to ODOT C&MS 711.02.
- All tubular steel materials shall be ASTM A500-B in accordance with ODOT C&MS 707.10.
- All bolts in slotted holes shall have an ASTM A-709 Grade 36 or 50 galvanized 5/16" thick plate washer with standard hole under both the nut and the bolt head.
- Galvanize all steel components according to ODOT C&MS 711.02.

Notes

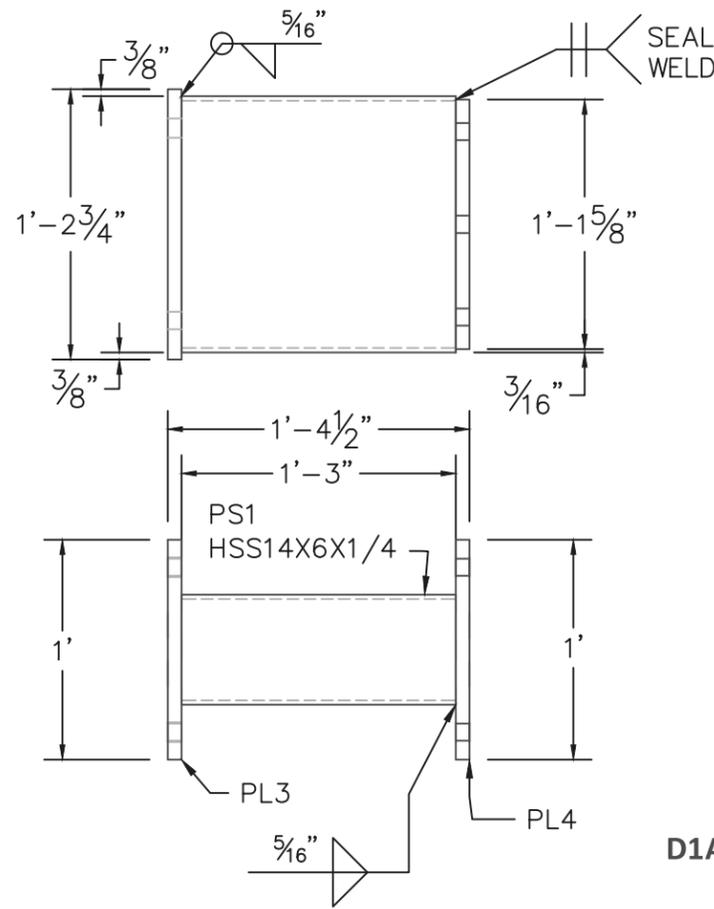
- Method of measurement
- Basis of payment
- Application (NCHRP Report 350 TL3)



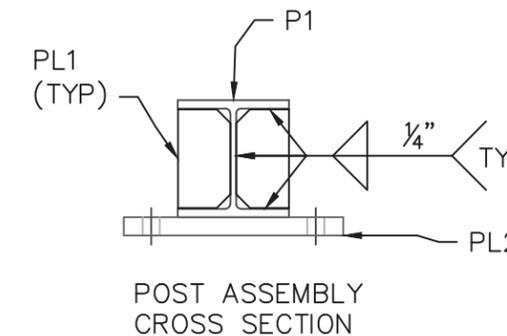
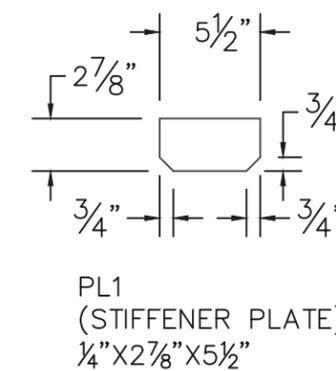
- NOTES:
- THE TOP EDGE OF ASSEMBLY D1B SHALL BE POSITIONED ON THE WEB OF THE FASCIA BEAM SUCH THAT THE TOP EDGE OF THE MOUNTING PLATE IS FLUSH WITH THE WEB TO FLANGE RADIUS BOUNDARY OF THE FASCIA BEAM
 - THE TOP EDGE OF THE STRUCTURAL TEE BSS2 SHALL BE POSITIONED ON THE WEB OF THE FASCIA BEAM, OPPOSITE D1B AND SUCH THAT THE TOP EDGE OF THE MOUNTING PLATE IS FLUSH WITH THE WEB TO FLANGE RADIUS BOUNDARY OF THE FASCIA BEAM



D1A (POST ASSEMBLY)



D1B (POST SUPPORT ASSEMBLY)



D1A ASSEMBLY CHART

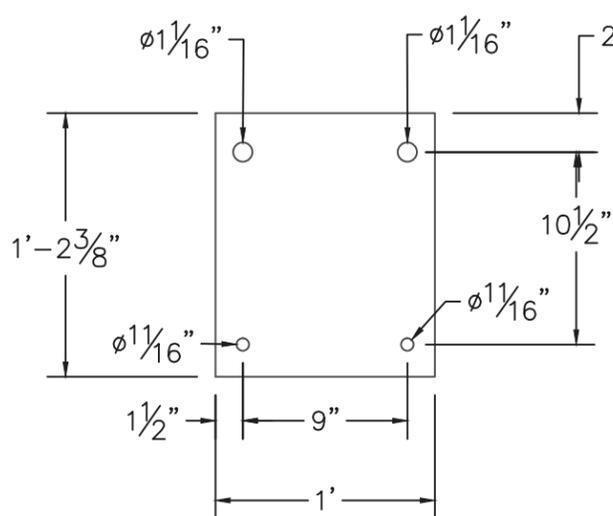
PART #	DESCRIPTION	QUANTITY
P1	POST	01
PL1	POST STIFFENER PLATE	04
PL2	POST SUPPORT PLATE	01
B1	TOP MOUNTING BOLTS FOR PL2 TO PL3	SEE BOLT CHART
B2	BOTTOM MOUNTING BOLTS FOR PL2 TO PL3	SEE BOLT CHART

D1B ASSEMBLY CHART

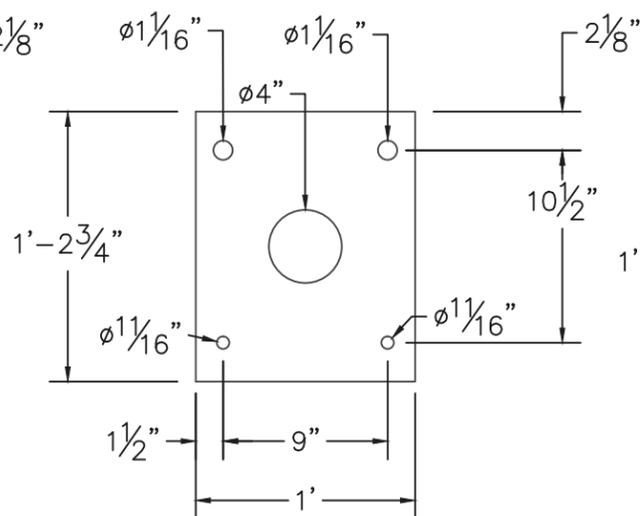
PART #	DESCRIPTION	QUANTITY
PS1	TUBULAR MOUNT	01
PL3	FRONT TUBE SUPPORT PLATE	01
PL4	BACK TUBE SUPPORT PLATE	01
B1	TOP MOUNTING BOLTS FOR PL2 TO PL3	SEE BOLT CHART
B2	BOTTOM MOUNTING BOLTS FOR PL2 TO PL3	SEE BOLT CHART
B3	MOUNTING BOLTS FOR PL4 TO FASCIA BEAM	SEE BOLT CHART

NOTES:

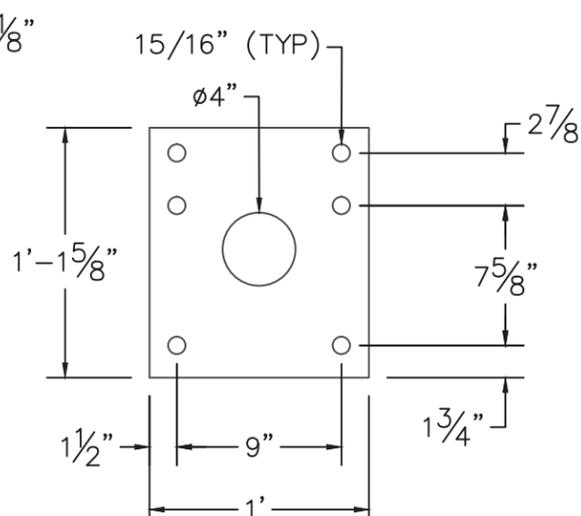
- THE 4" HOLE IN CENTER OF POST SUPPORT PLATES FOR VENTING PURPOSES DURING GALVANIZING.
- ALL WELDS SHALL BEGIN AND END 1/4" ± 1/8" FROM JOINT ENDS.



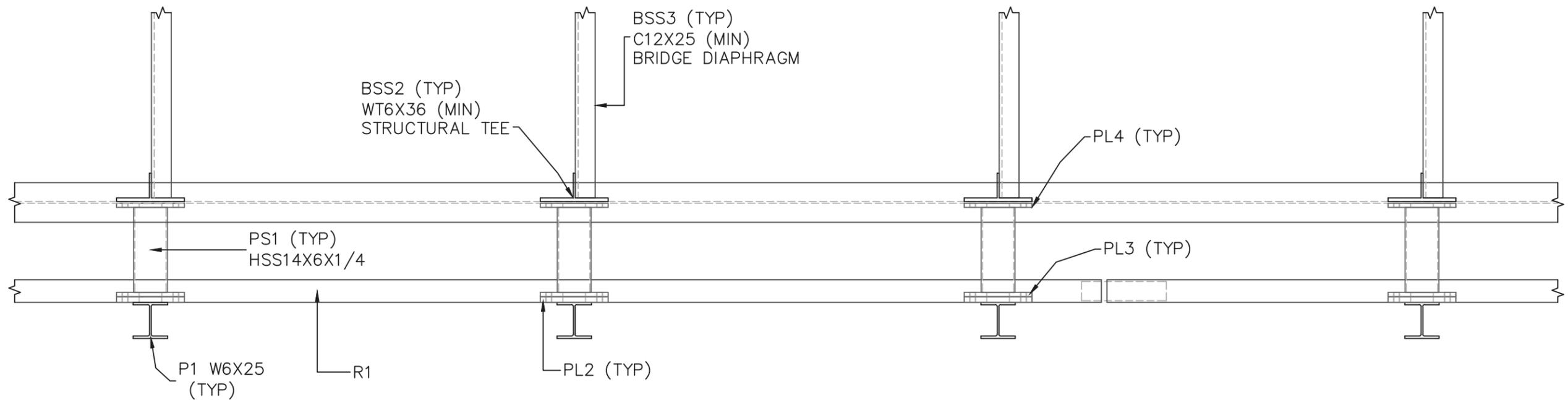
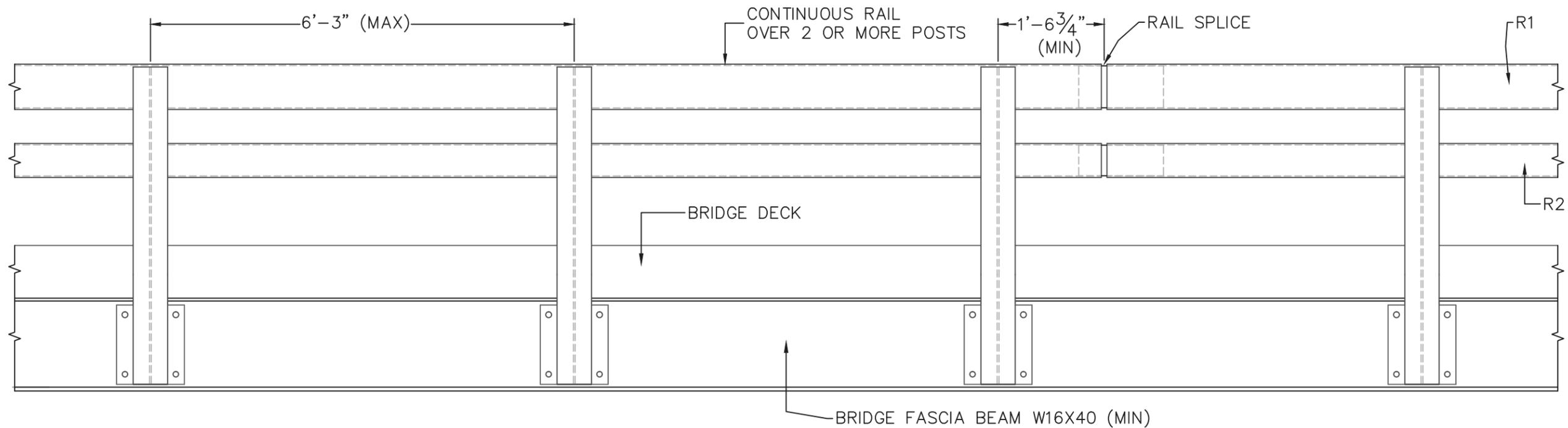
PL2 (POST SUPPORT PLATE 1)
1" THICK X 14-3/8" X 12"



PL3 (FRONT TUBE SUPPORT PLATE 2)
3/4" THICK X 14-3/4" X 12"

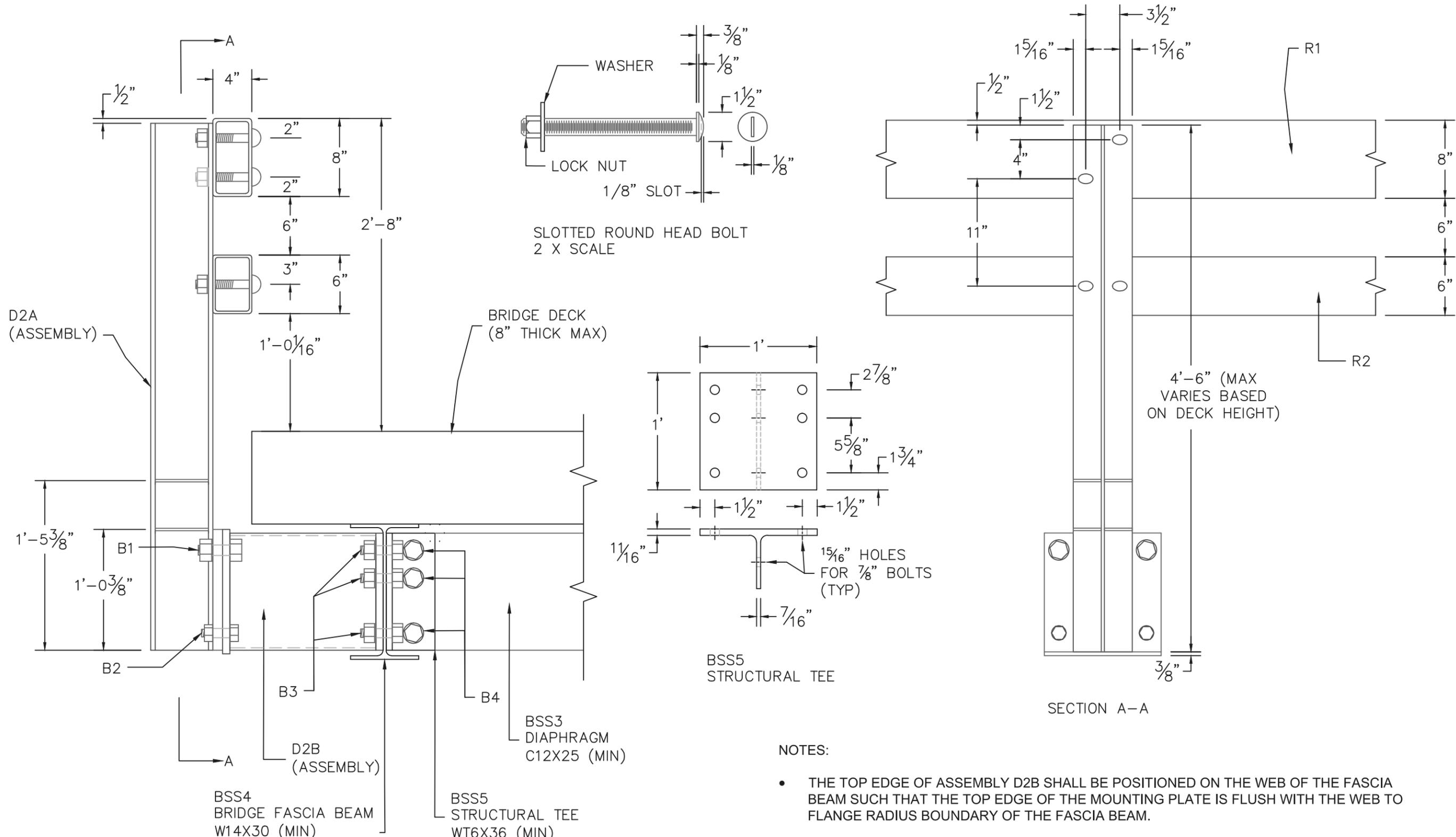


PL4 (BACK TUBE SUPPORT PLATE 3)
3/4" THICK X 13-5/8" X 12"

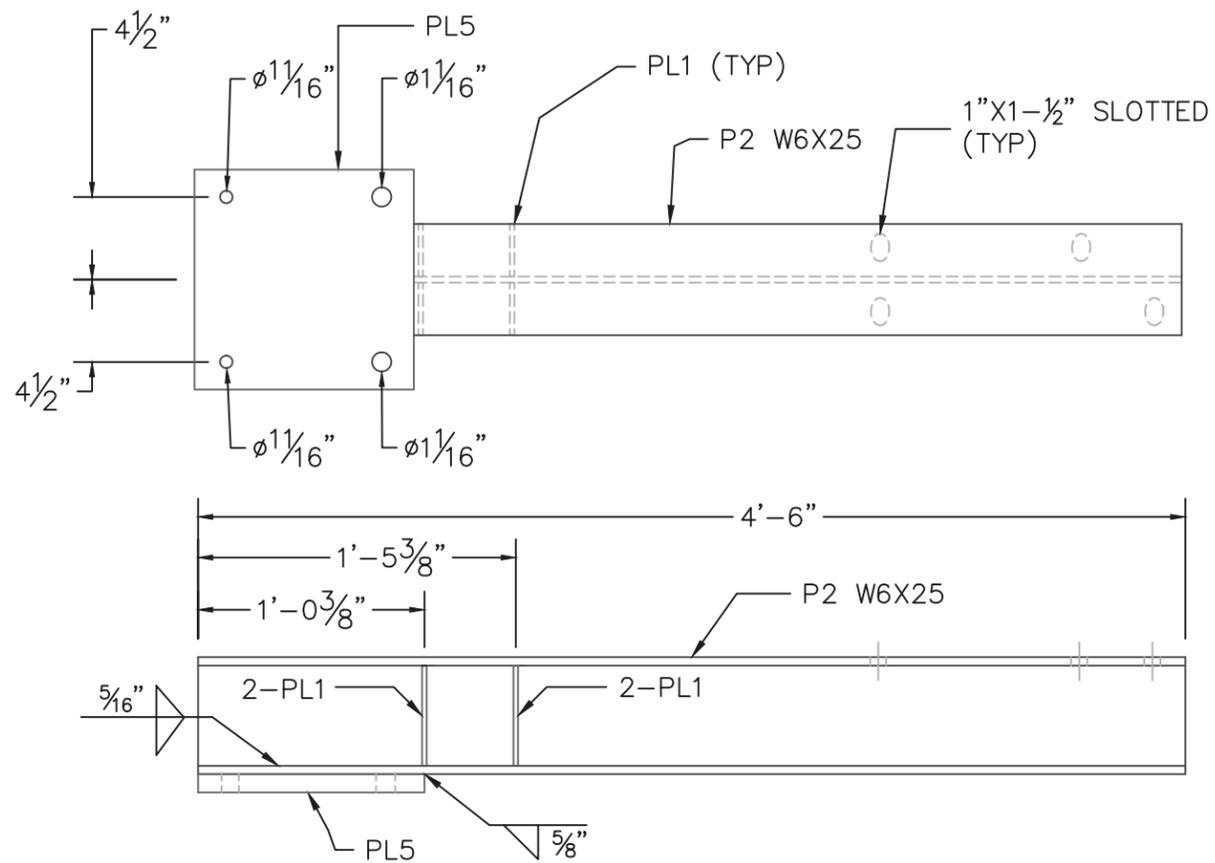


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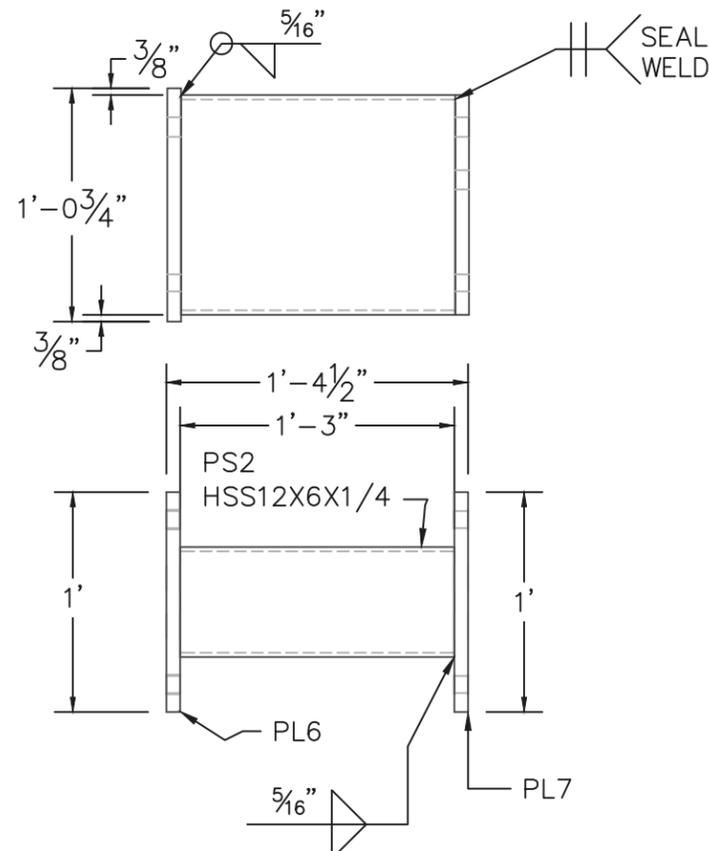
- BRIDGE DIAPHRAGM AND STRUCTURAL TEE ELEMENTS SHALL BE INSTALLED AT EACH POST-MOUNT LOCATION.
- THE BRIDGE COMPONENT SPECIFICATIONS DETAILED HERE CORRESPOND ONLY TO THE BRIDGE FASCIA BEAM AND THE STRUCTURAL COMPONENTS LOCATED BETWEEN THE FASCIA BEAM AND THE FIRST INTERIOR STRINGER BEAM.
- ½" DRAIN HOLE AT LOWEST POINT OF TUBE RAIL WHEN SAG VERTICAL CURVES OCCUR. SPECIFY THIS LOCATION IN PROJECT PLANS.



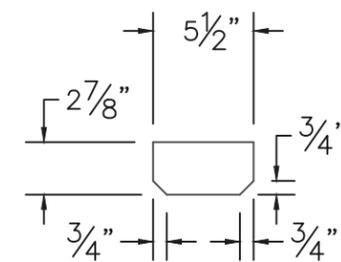
- NOTES:
- THE TOP EDGE OF ASSEMBLY D2B SHALL BE POSITIONED ON THE WEB OF THE FASCIA BEAM SUCH THAT THE TOP EDGE OF THE MOUNTING PLATE IS FLUSH WITH THE WEB TO FLANGE RADIUS BOUNDARY OF THE FASCIA BEAM.
 - THE TOP EDGE OF THE STRUCTURAL TEE BSS2 SHALL BE POSITIONED ON THE WEB OF THE FASCIA BEAM, OPPOSITE D2B AND SUCH THAT THE TOP EDGE OF THE MOUNTING PLATE IS FLUSH WITH THE WEB TO FLANGE RADIUS BOUNDARY OF THE FASCIA BEAM.



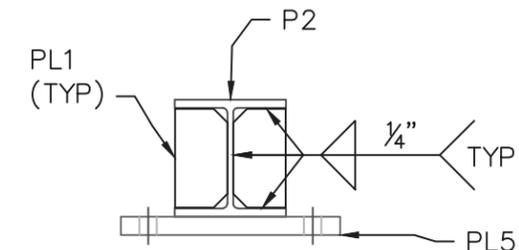
D2A (POST ASSEMBLY)



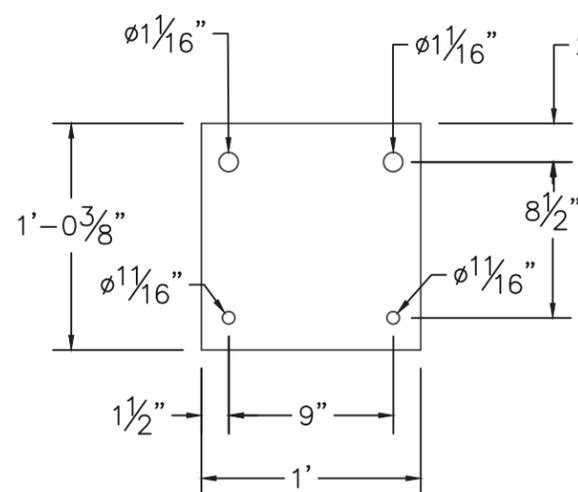
D2B (POST SUPPORT ASSEMBLY)



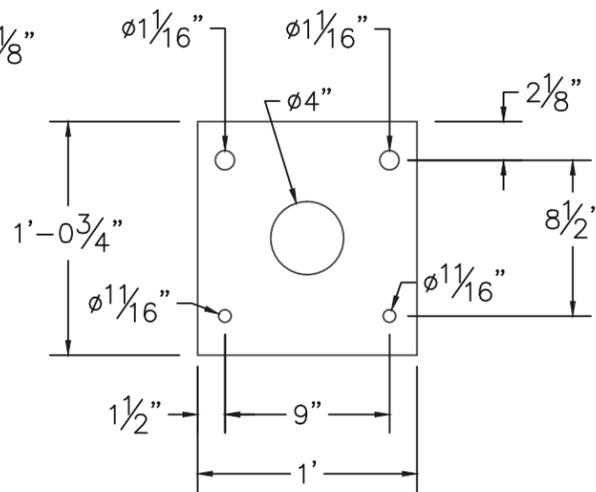
PL1 (STIFFENER PLATE)
1/4" X 2 7/8" X 5 1/2"



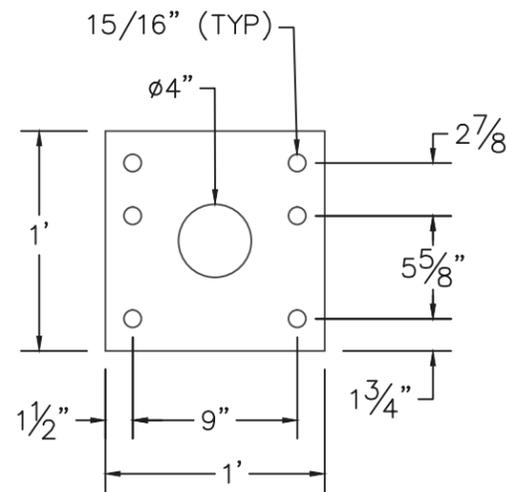
POST ASSEMBLY
CROSS SECTION



PL5 (POST SUPPORT PLATE 1)
1" THICK X 12-3/8" X 12"



PL6 (FRONT TUBE SUPPORT PLATE 2)
3/4" THICK X 12-3/4" X 12"



PL7 (BACK TUBE SUPPORT PLATE 3)
3/4" THICK X 12" X 12"

D2A ASSEMBLY CHART

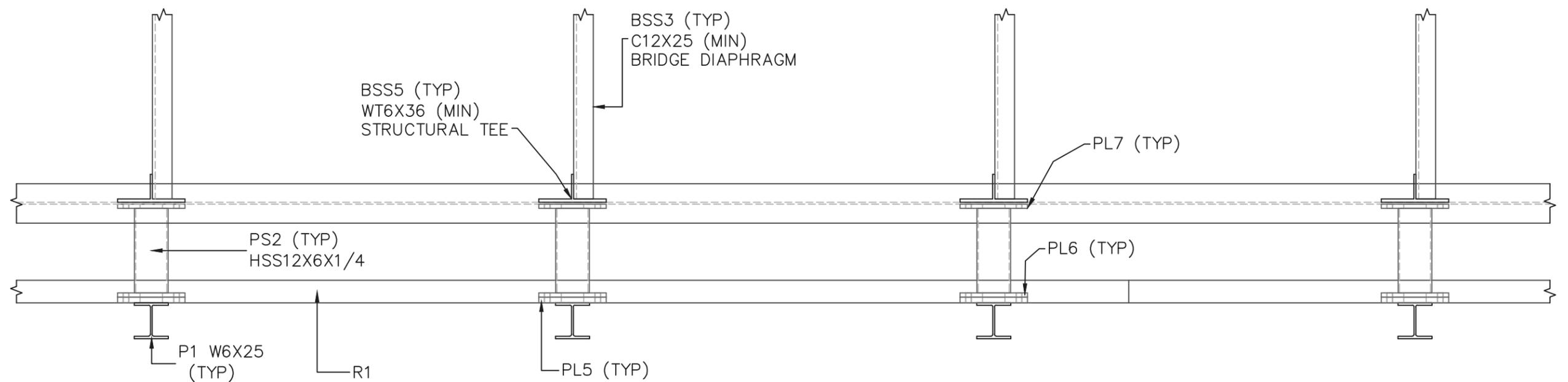
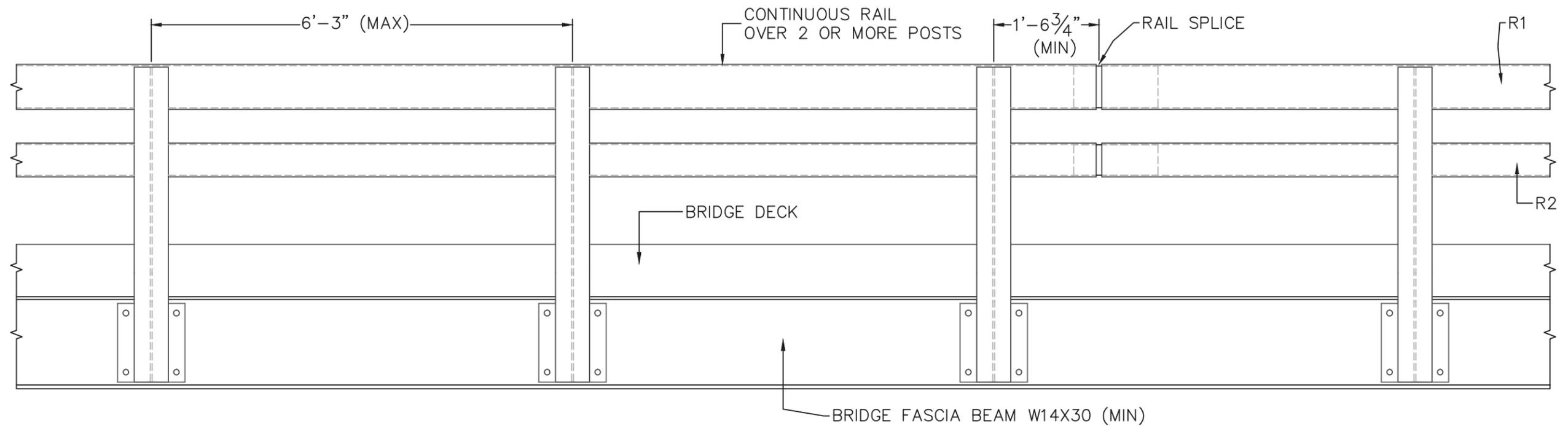
PART #	DESCRIPTION	QUANTITY
P1	POST	01
PL1	POST STIFFENER PLATE	04
PL5	POST SUPPORT PLATE	01
B1	TOP MOUNTING BOLTS FOR PL5 TO PL6	SEE BOLT CHART
B2	BOTTOM MOUNTING BOLTS FOR PL5 TO PL6	SEE BOLT CHART

D2B ASSEMBLY CHART

PART #	DESCRIPTION	QUANTITY
PS2	TUBULAR MOUNT	01
PL6	FRONT TUBE SUPPORT PLATE	01
PL7	BACK TUBE SUPPORT PLATE	01
B1	TOP MOUNTING BOLTS FOR PL5 TO PL6	SEE BOLT CHART
B2	BOTTOM MOUNTING BOLTS FOR PL5 TO PL6	SEE BOLT CHART
B3	MOUNTING BOLTS FOR PL7 TO FASCIA BEAM	SEE BOLT CHART

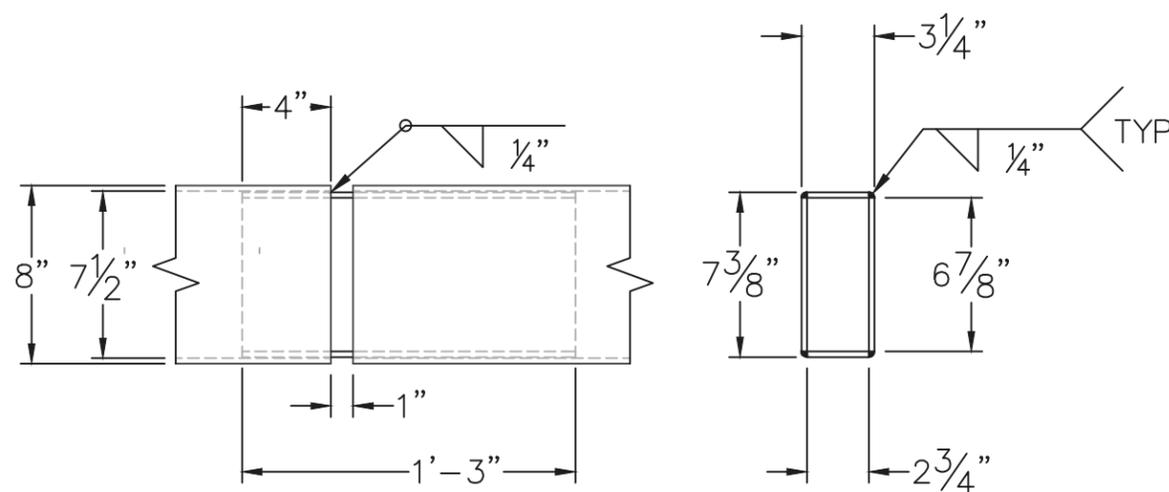
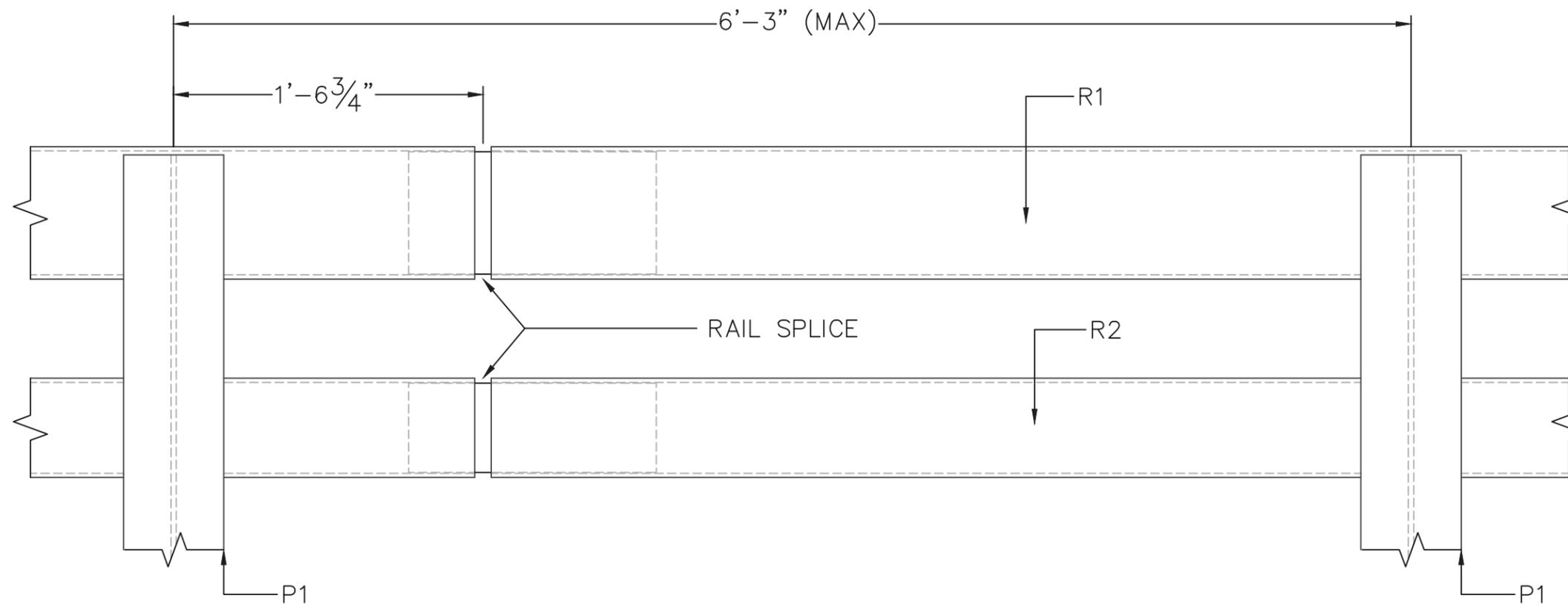
NOTES:

- THE 4" HOLE IN CENTER OF POST SUPPORT PLATES IS FOR VENTING PURPOSES DURING GALVANIZING
- ALL WELDS SHALL BEGIN AND END 1/4" ± 1/8" FROM JOINT ENDS.

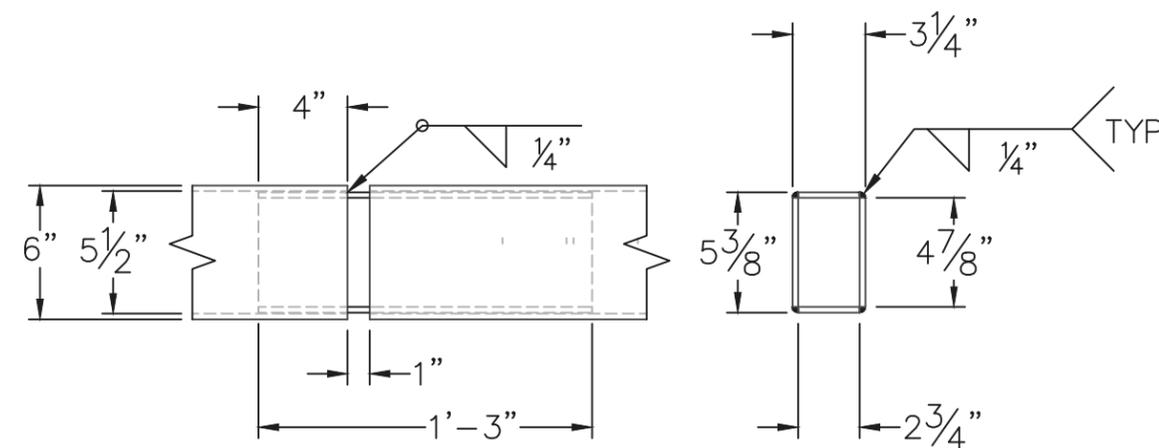


NOTES:

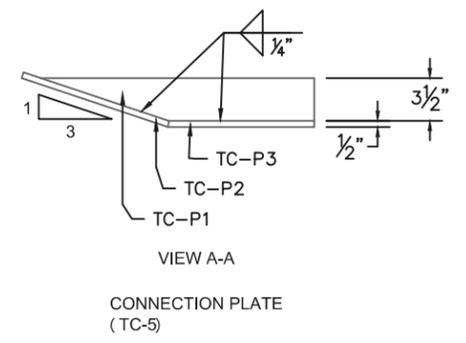
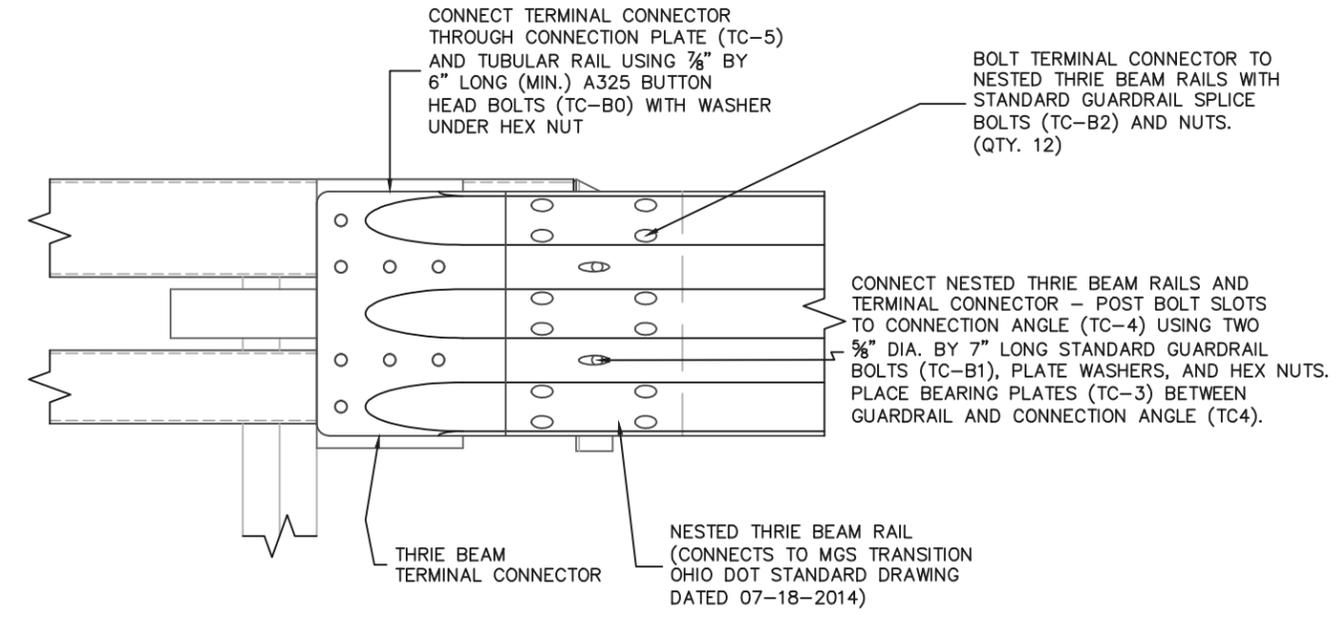
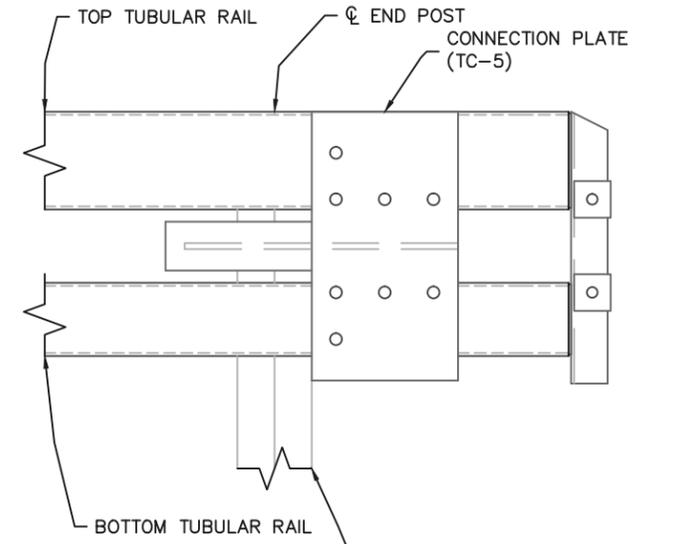
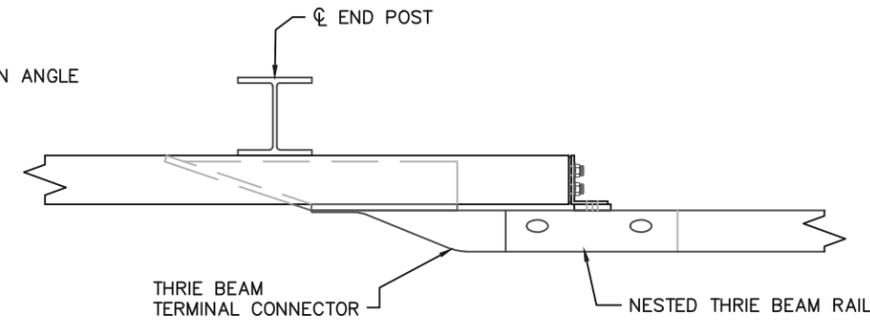
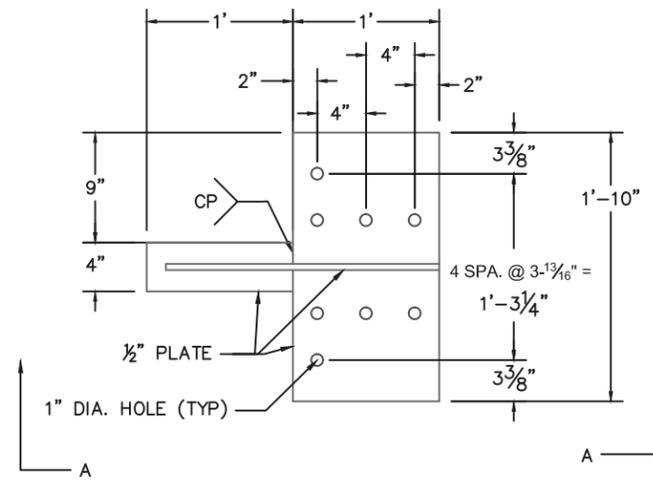
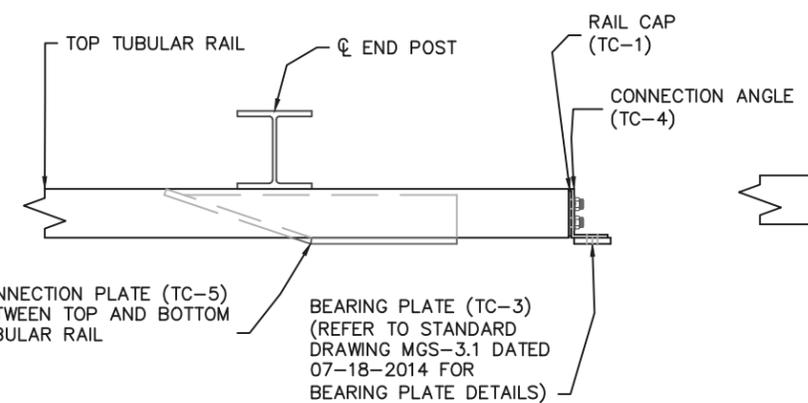
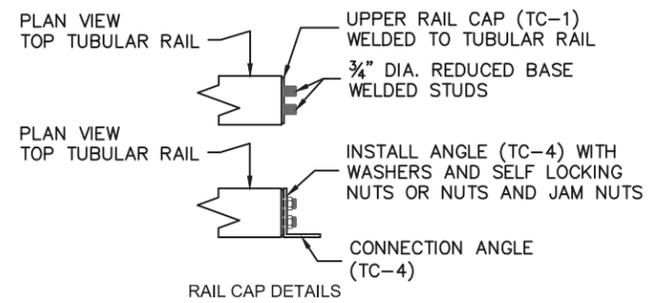
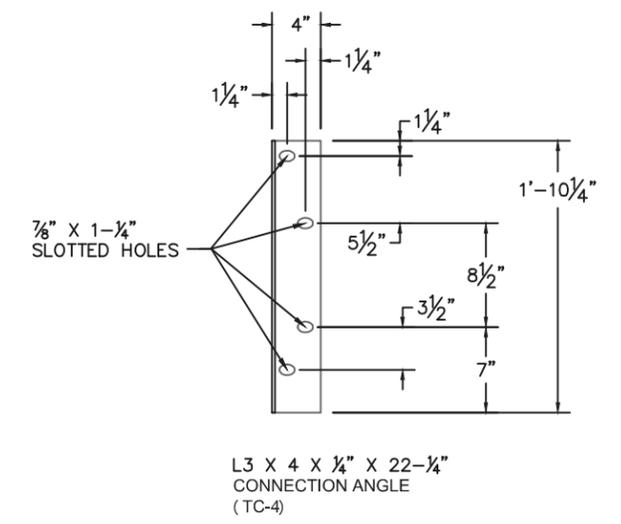
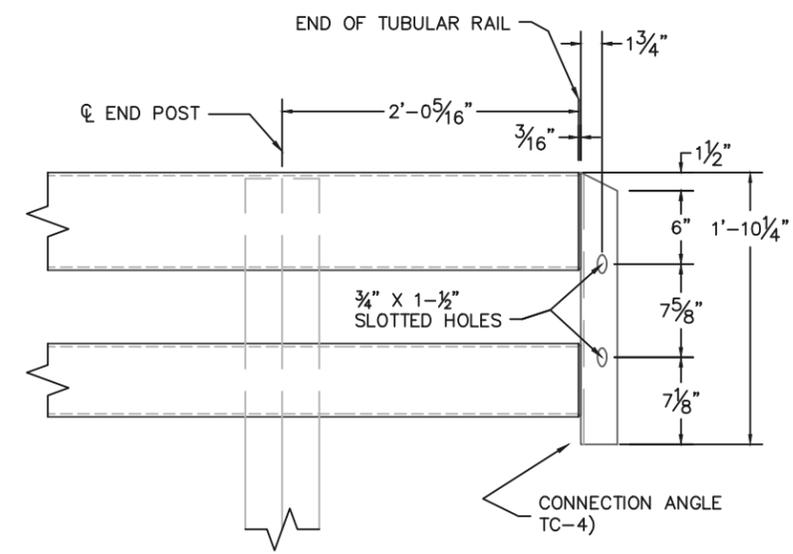
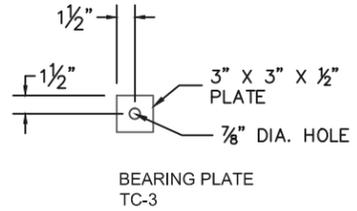
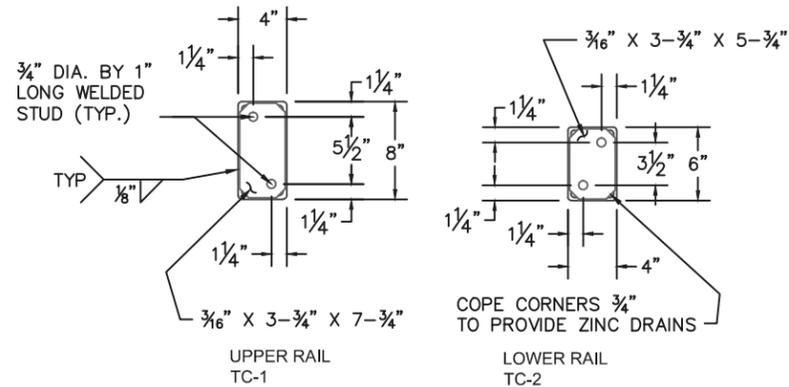
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R1 SPLICE DETAIL



R2 SPLICE DETAIL



REFER TO STANDARD DRAWING TST-1-99 REVISED 7-15-2016 FOR FINAL POST OPTIONS