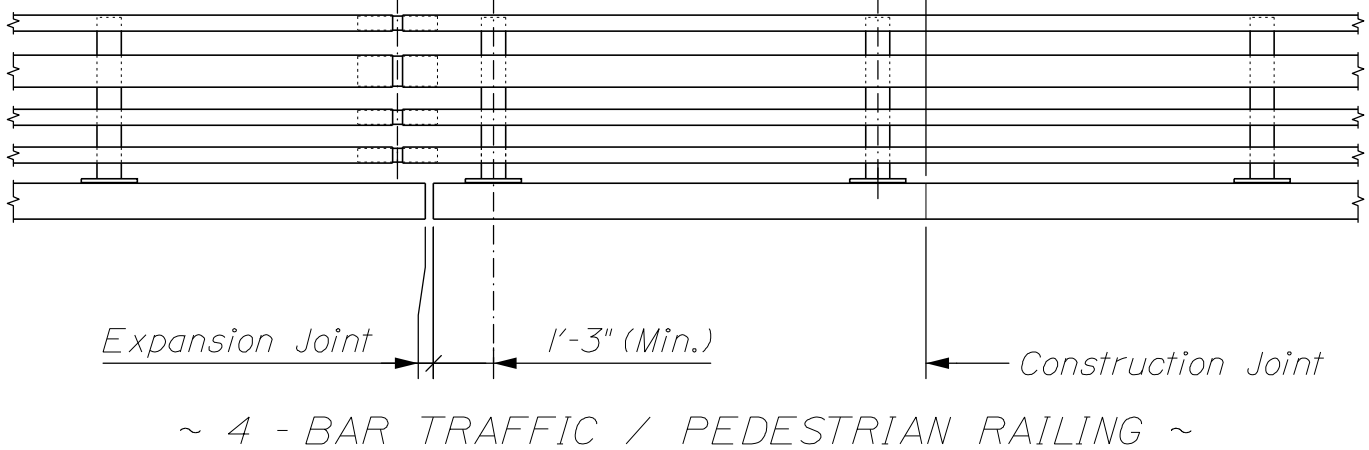
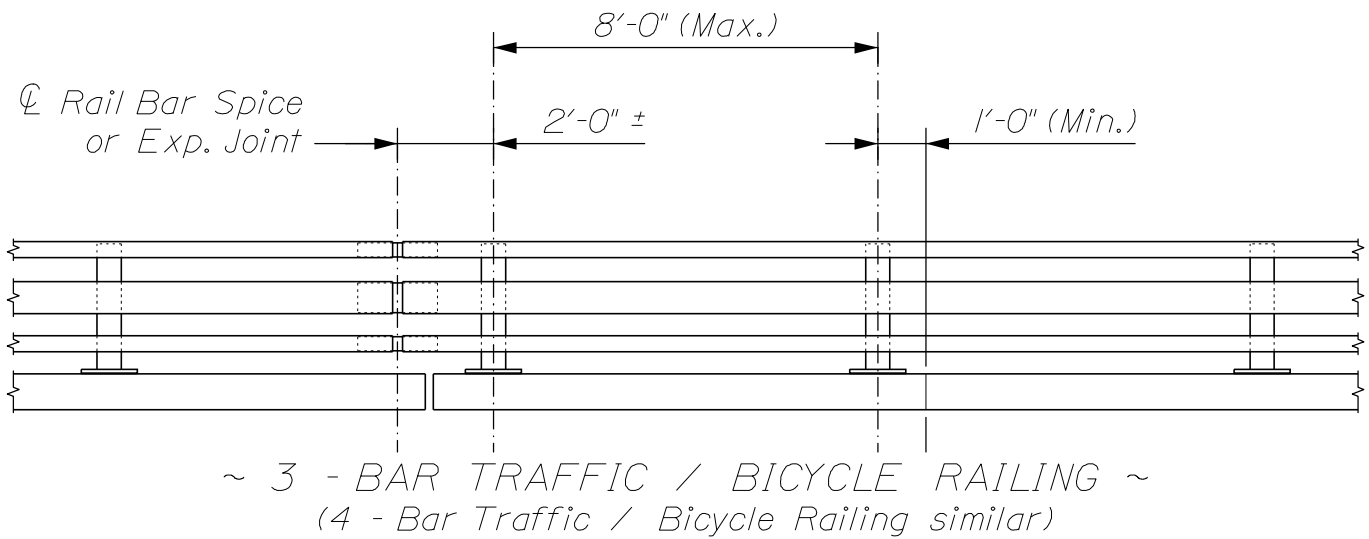
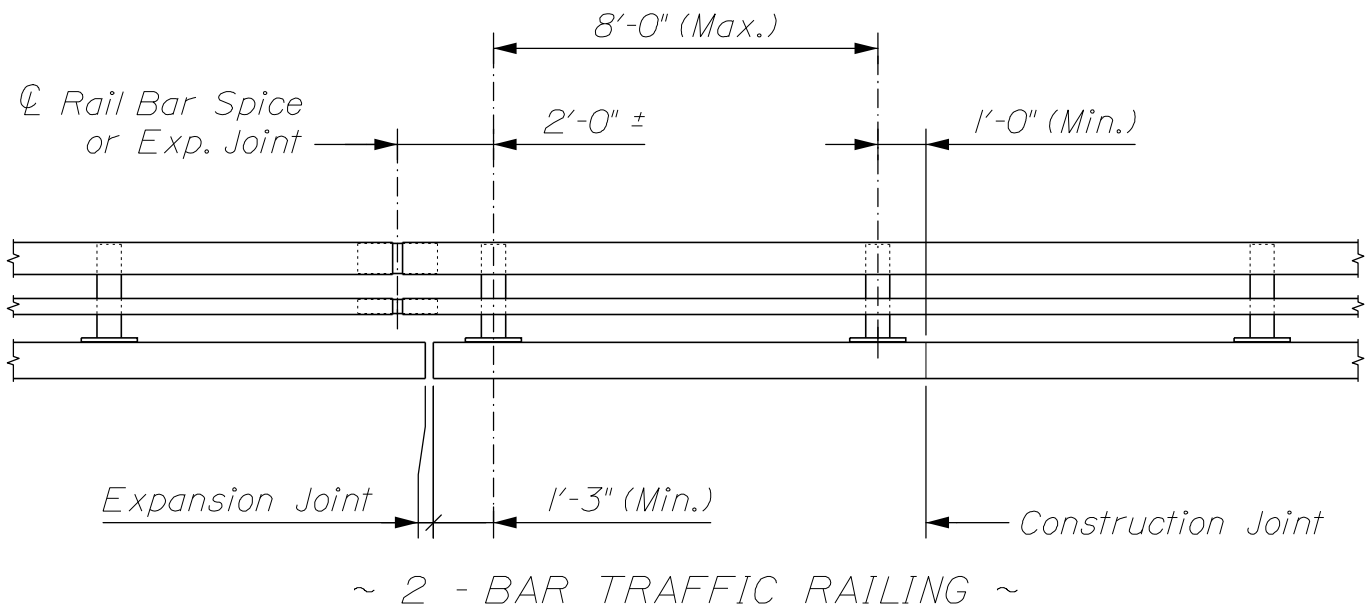
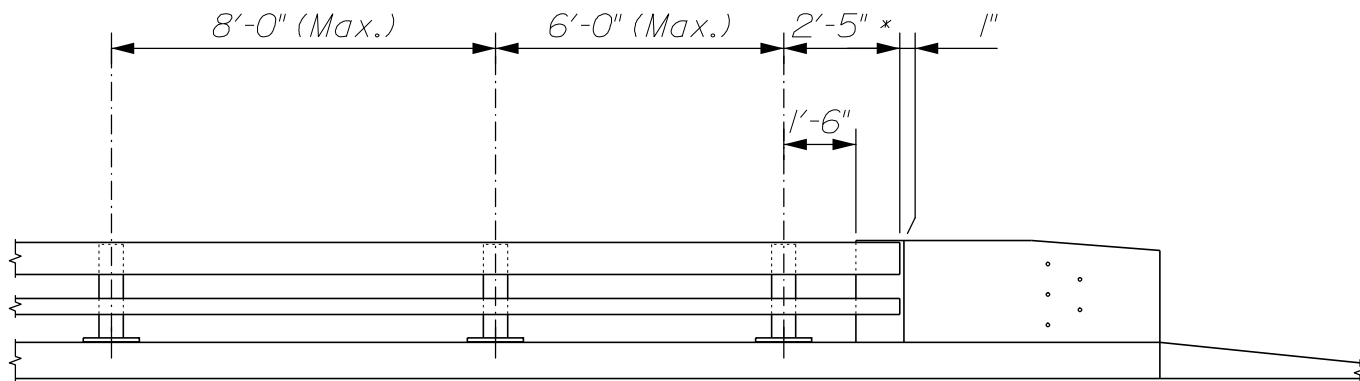
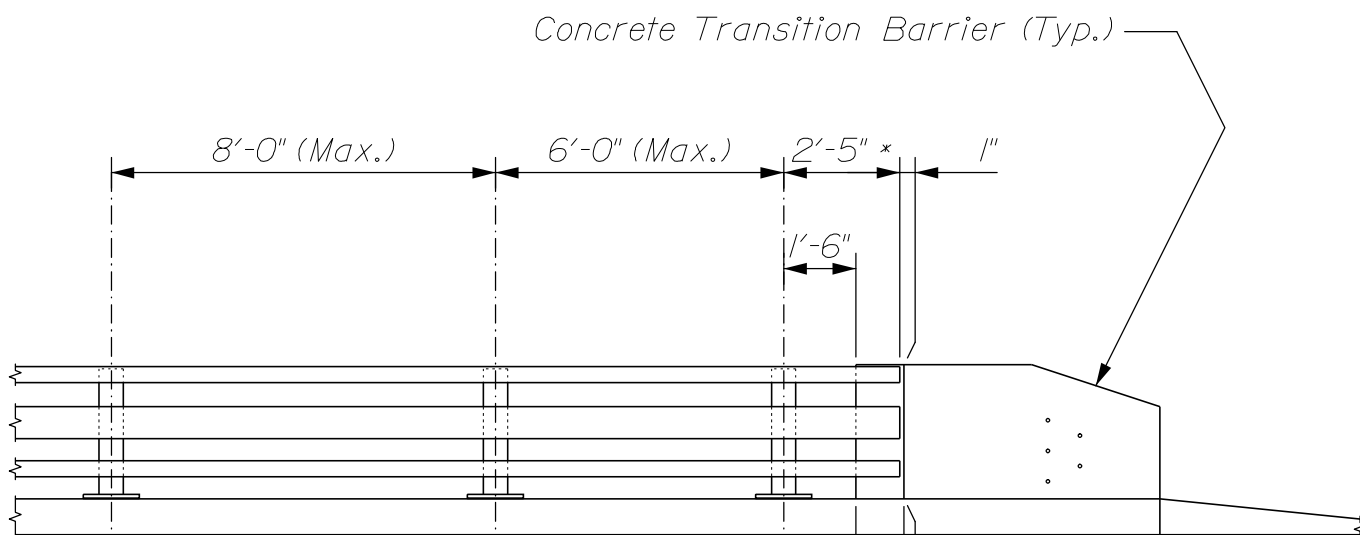




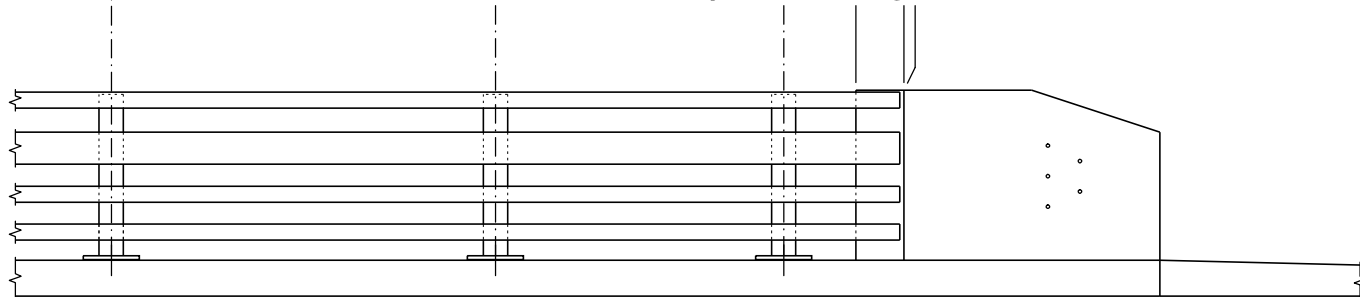
STEEL BRIDGE RAILING
 507(01)



~ 2 - BAR TRAFFIC RAILING ~



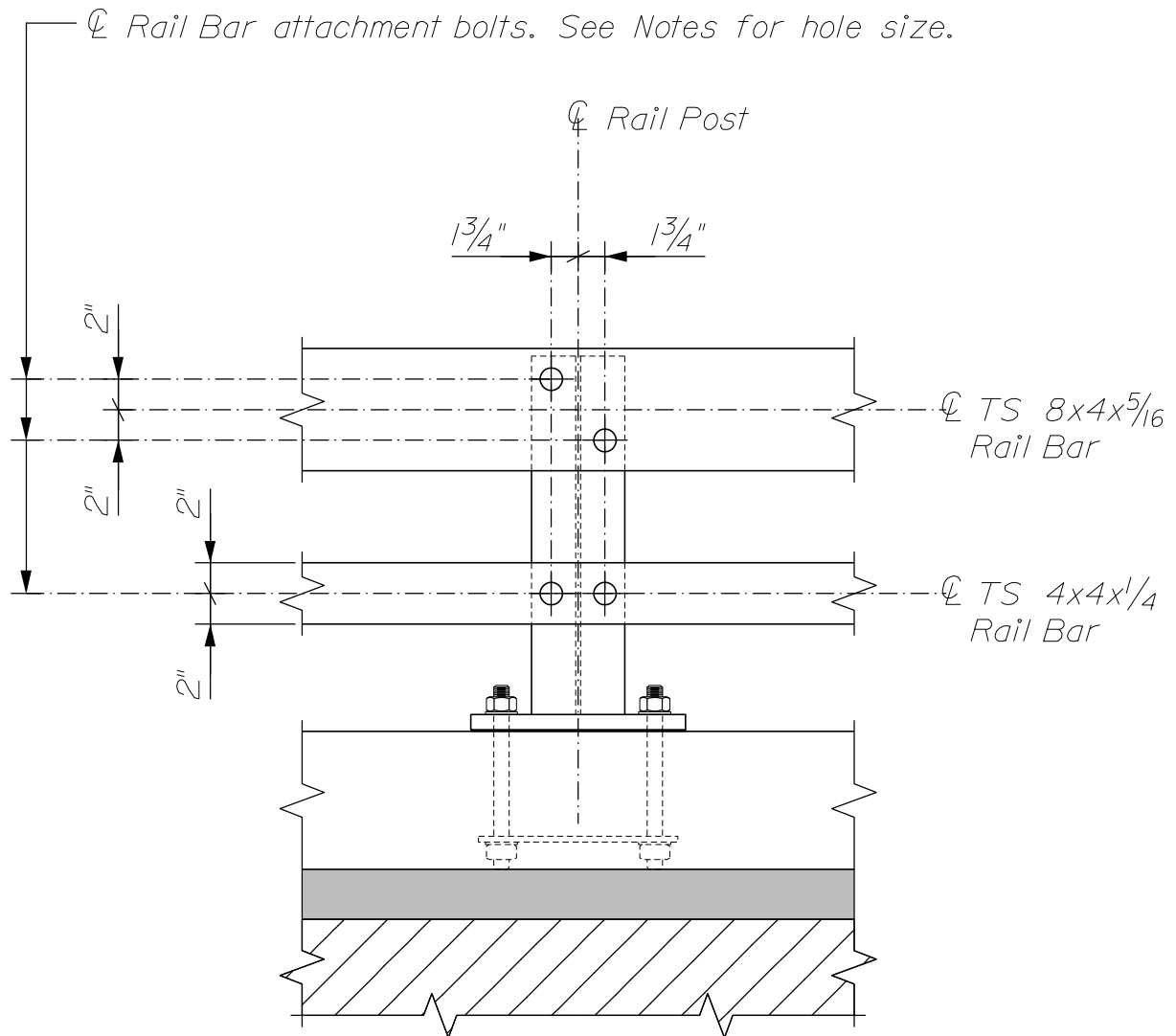
~ 3 - BAR TRAFFIC / BICYCLE RAILING ~
(4 - Bar Traffic / Bicycle Railing similar)



~ 4 - BAR TRAFFIC / PEDESTRIAN RAILING ~

* Including Rail Bar Cap (Typ.)

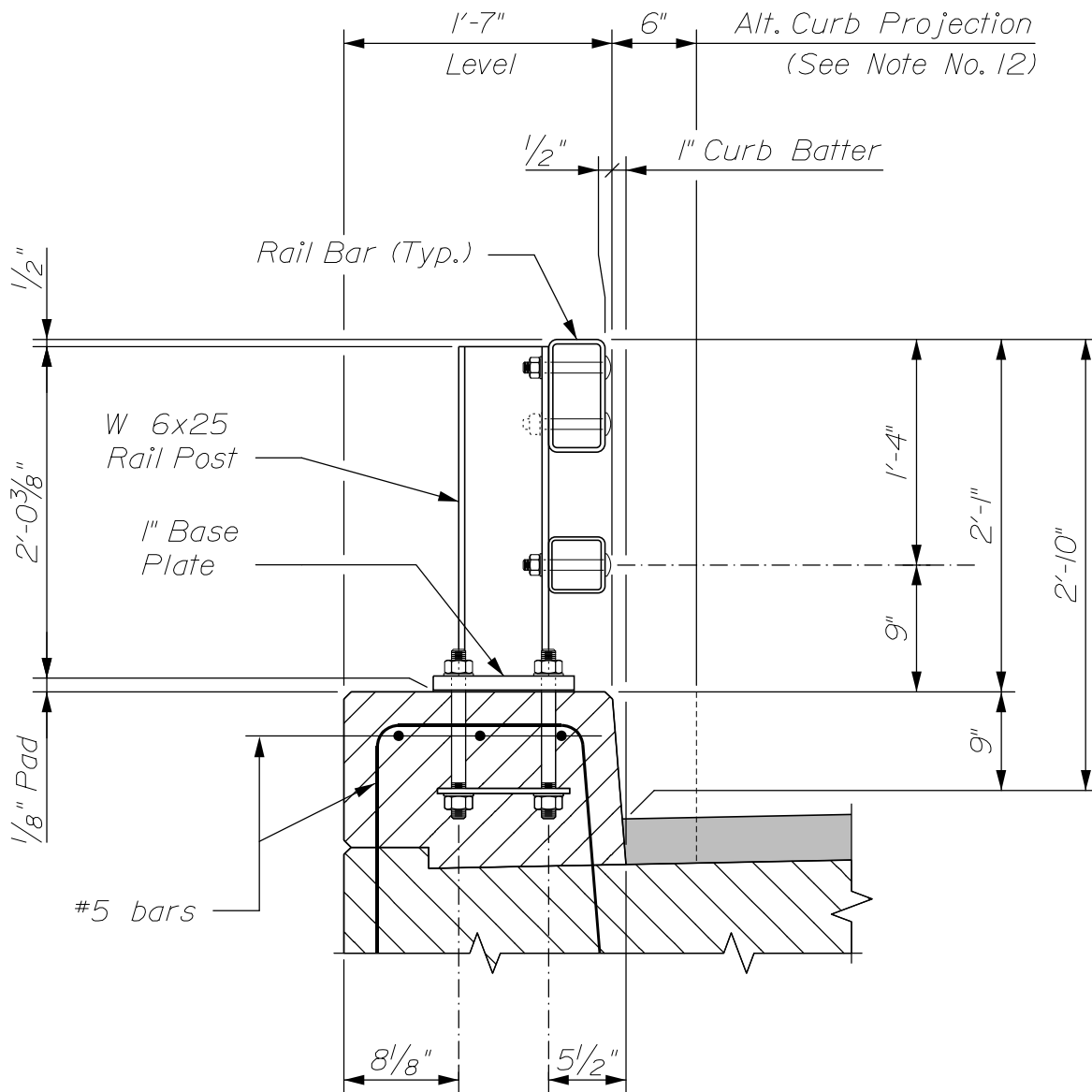
STEEL BRIDGE RAILING
507(02)



~ TYPICAL RAILING ELEVATION ~
 2 - Bar Traffic Railing is shown.
 Other railing configurations are similar.

STEEL BRIDGE RAILING
 507(03)

Rail Bars:
HSS 8x4x $\frac{5}{16}$ (1)
HSS 4x4x $\frac{1}{4}$ (1)



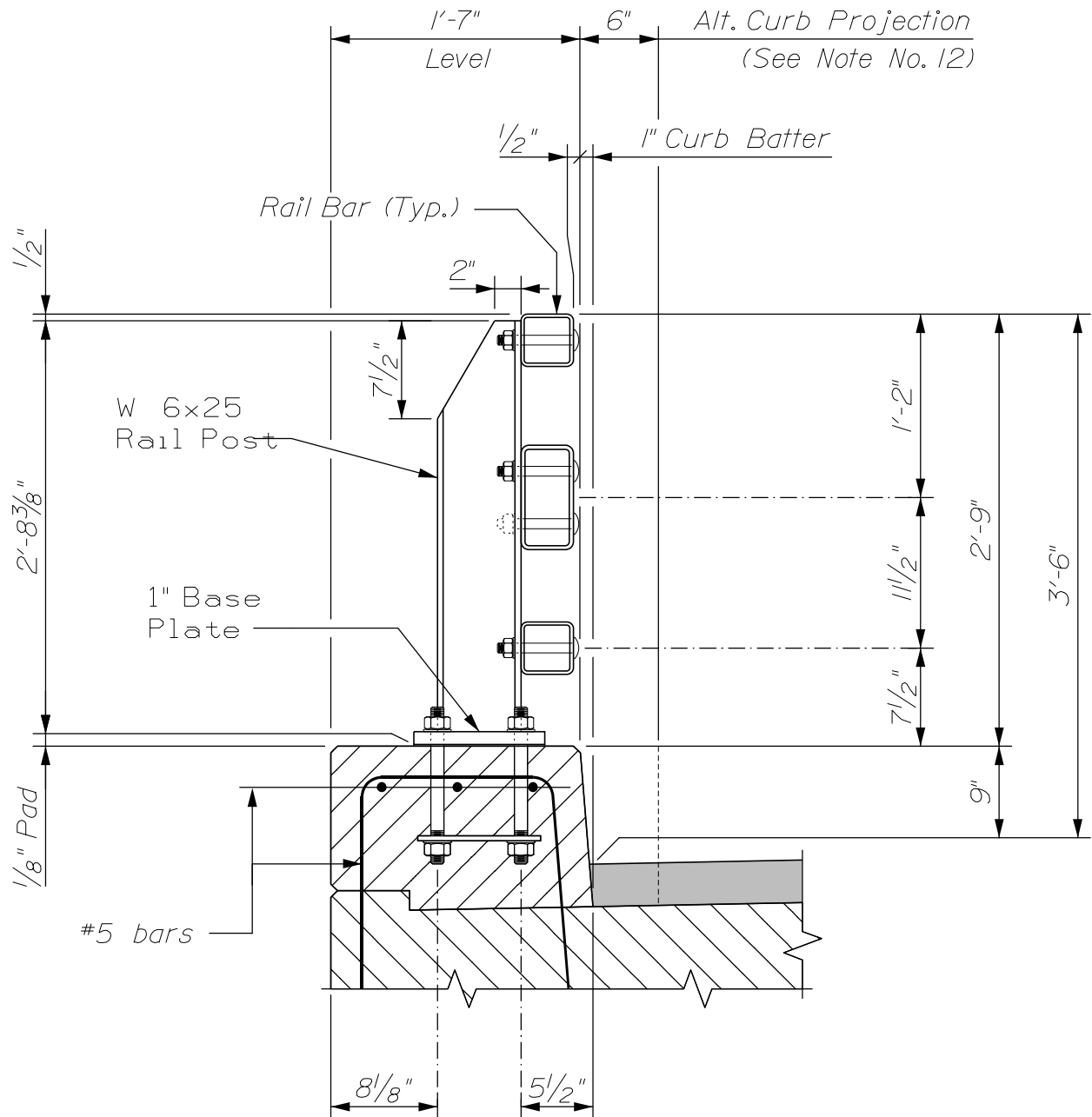
~ TYPICAL RAILING SECTION ~
(2 - Bar Traffic Railing)

STEEL BRIDGE RAILING
507(04)

Rail Bars:

HSS 8x4x $\frac{5}{16}$ (1)

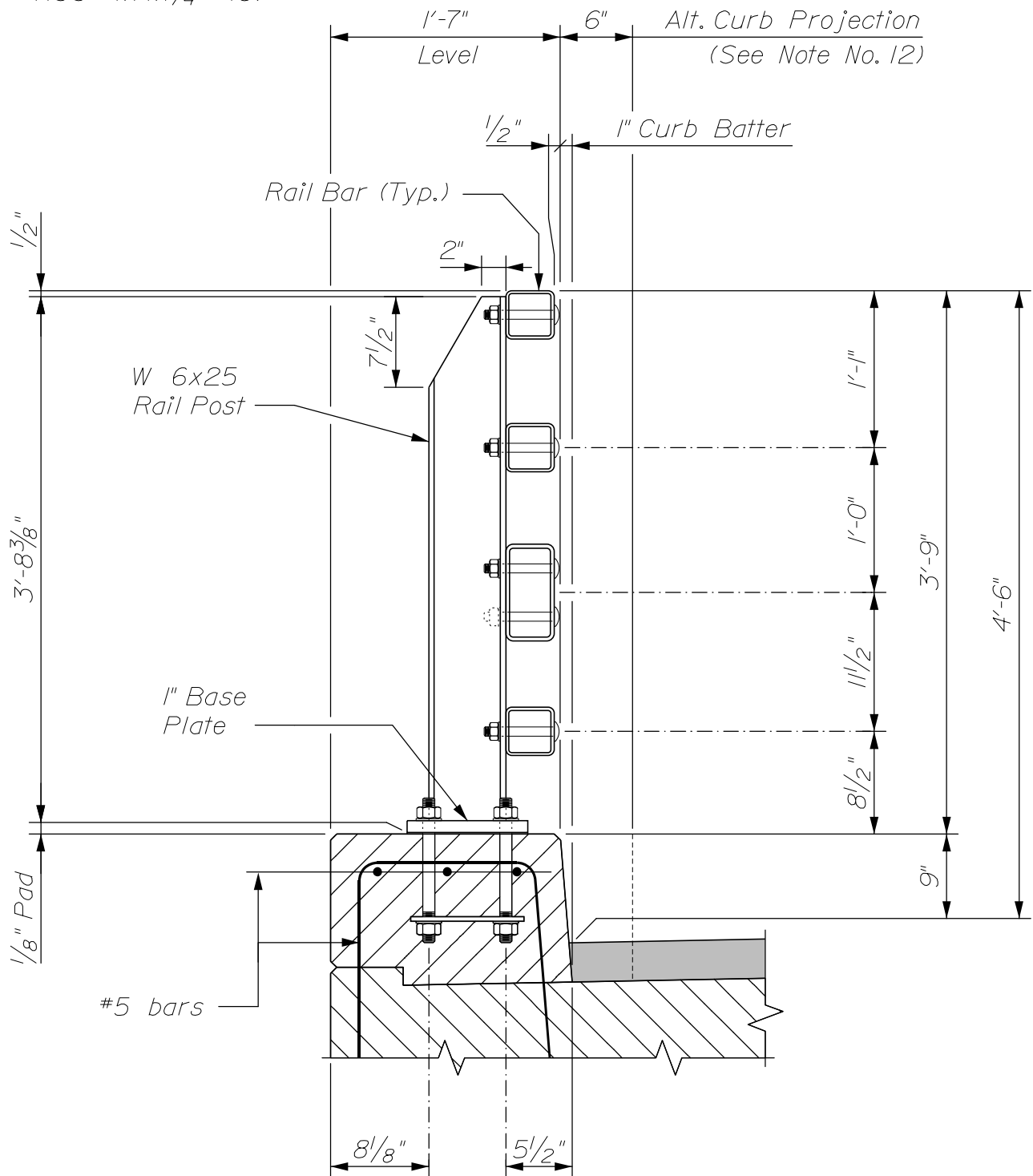
HSS 4x4x $\frac{1}{4}$ (2)



*~ TYPICAL RAILING SECTION ~
(3 - Bar Traffic / Bicycle Railing)*

*STEEL BRIDGE RAILING
507(05)*

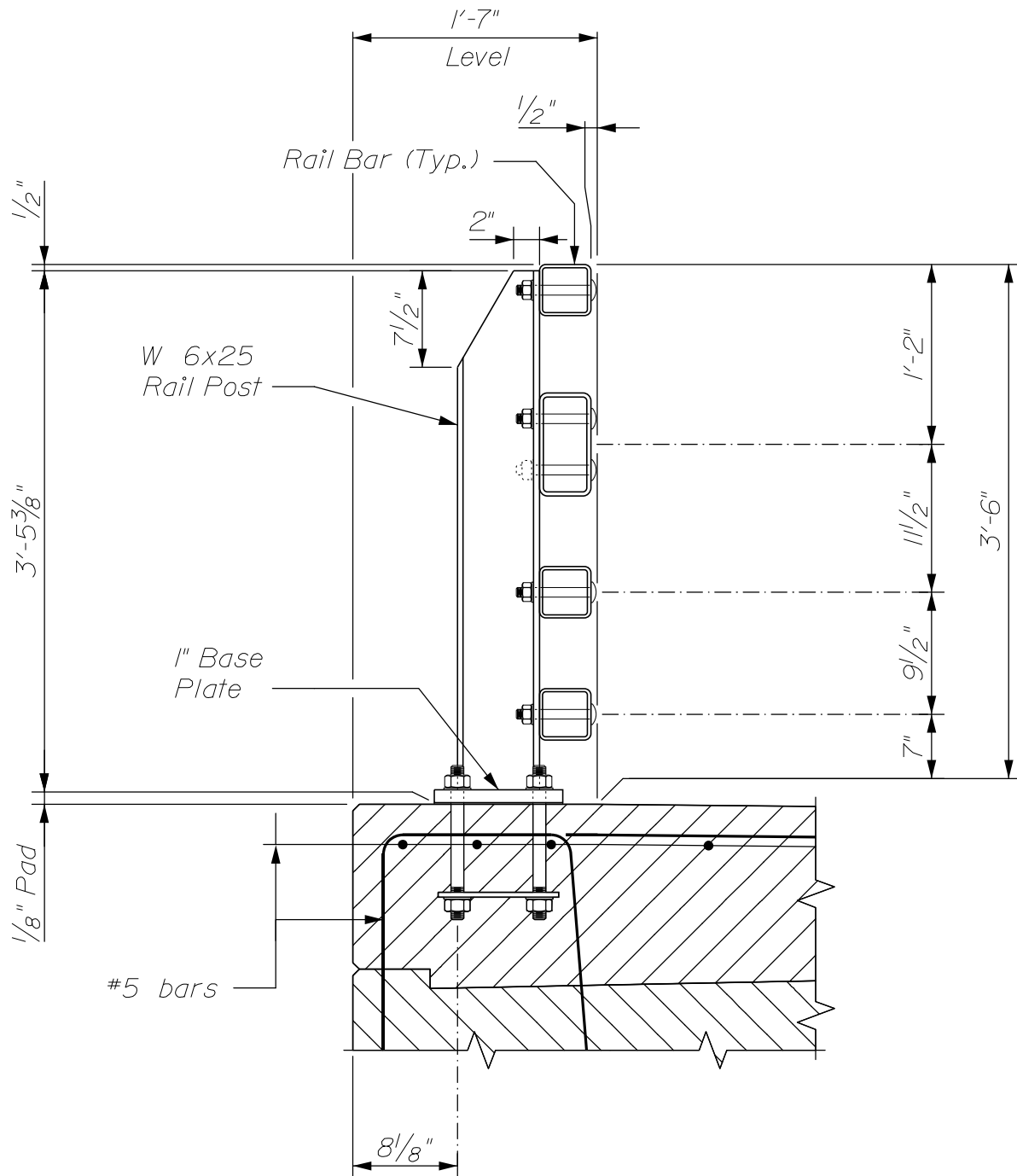
Rail Bars:
HSS 8x4x $\frac{5}{16}$ (1)
HSS 4x4x $\frac{1}{4}$ (3)



~ TYPICAL RAILING SECTION ~
(4 - Bar Traffic / Bicycle Railing)

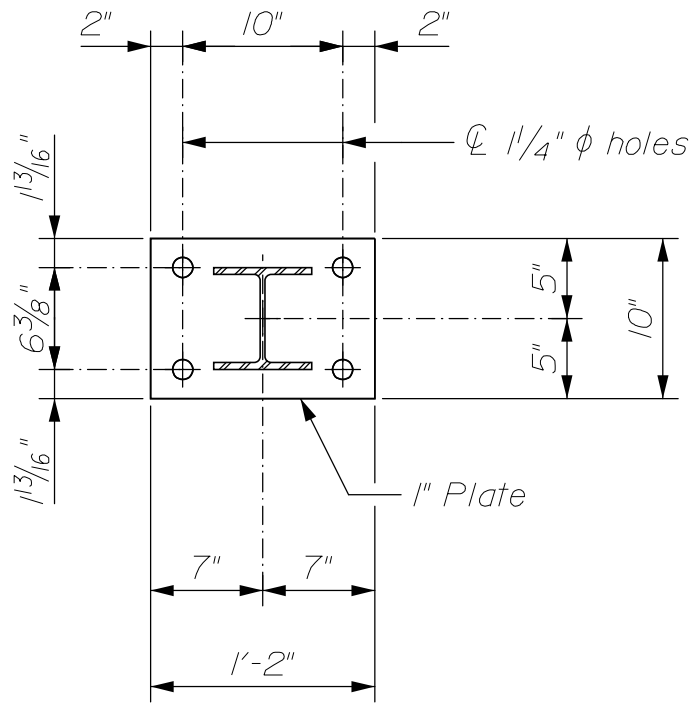
STEEL BRIDGE RAILING
507(06)

Rail Bars:
HSS 8x4x $\frac{5}{16}$ (1)
HSS 4x4x $\frac{1}{4}$ (3)

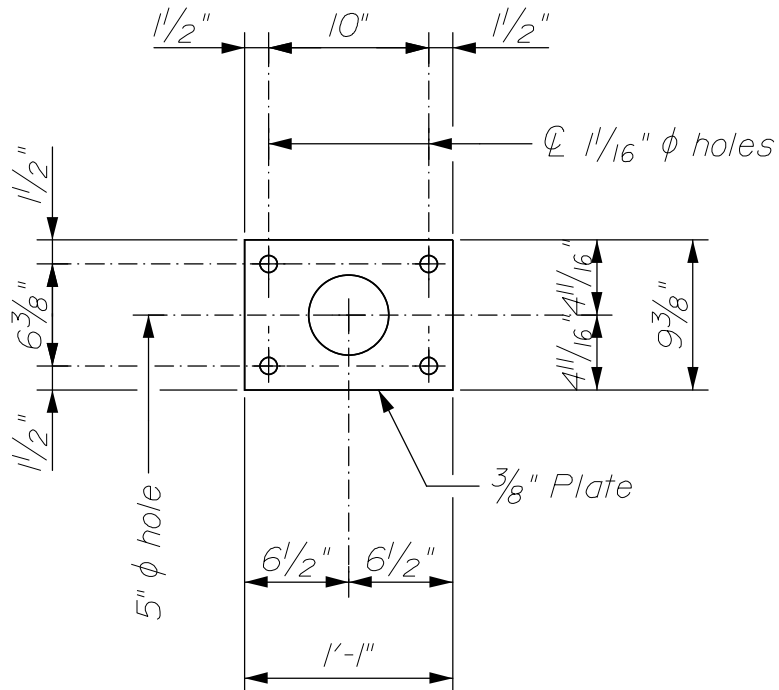


~ TYPICAL RAILING SECTION ~
(4 - Bar Traffic / Pedestrian Railing)

STEEL BRIDGE RAILING
507(07)

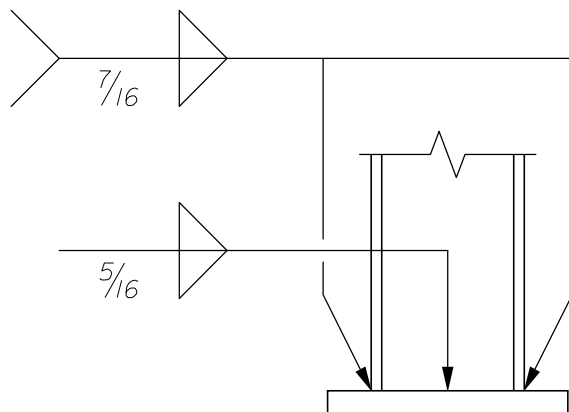


~ POST & BASE PLATE PLAN ~

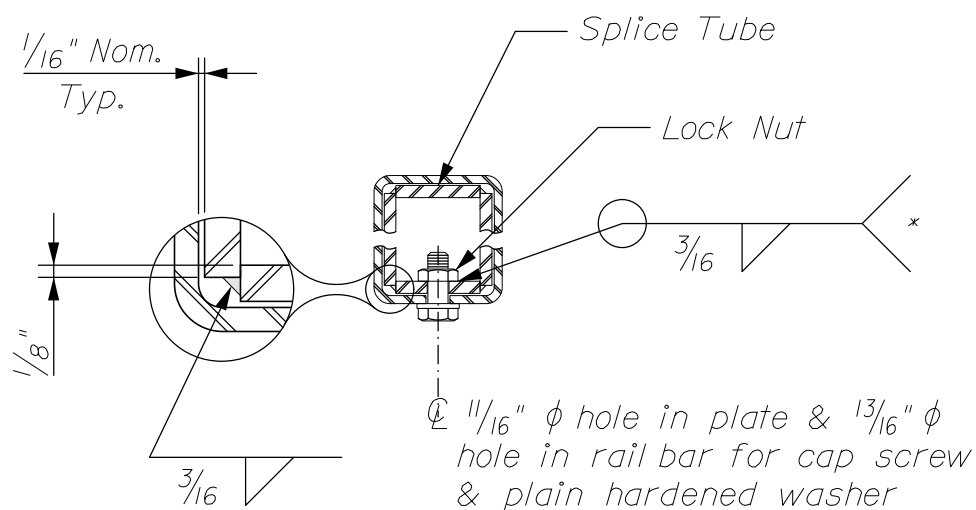


~ ANCHOR PLATE PLAN ~

Seal Weld
flange edges

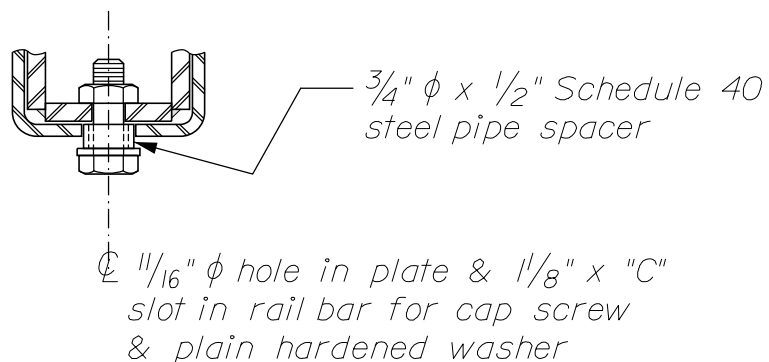


~ POST - TO - BASE WELD DETAIL ~



~ RAIL BAR SPLICE SECTION ~

* Weld nuts to plate before assembling splice tube

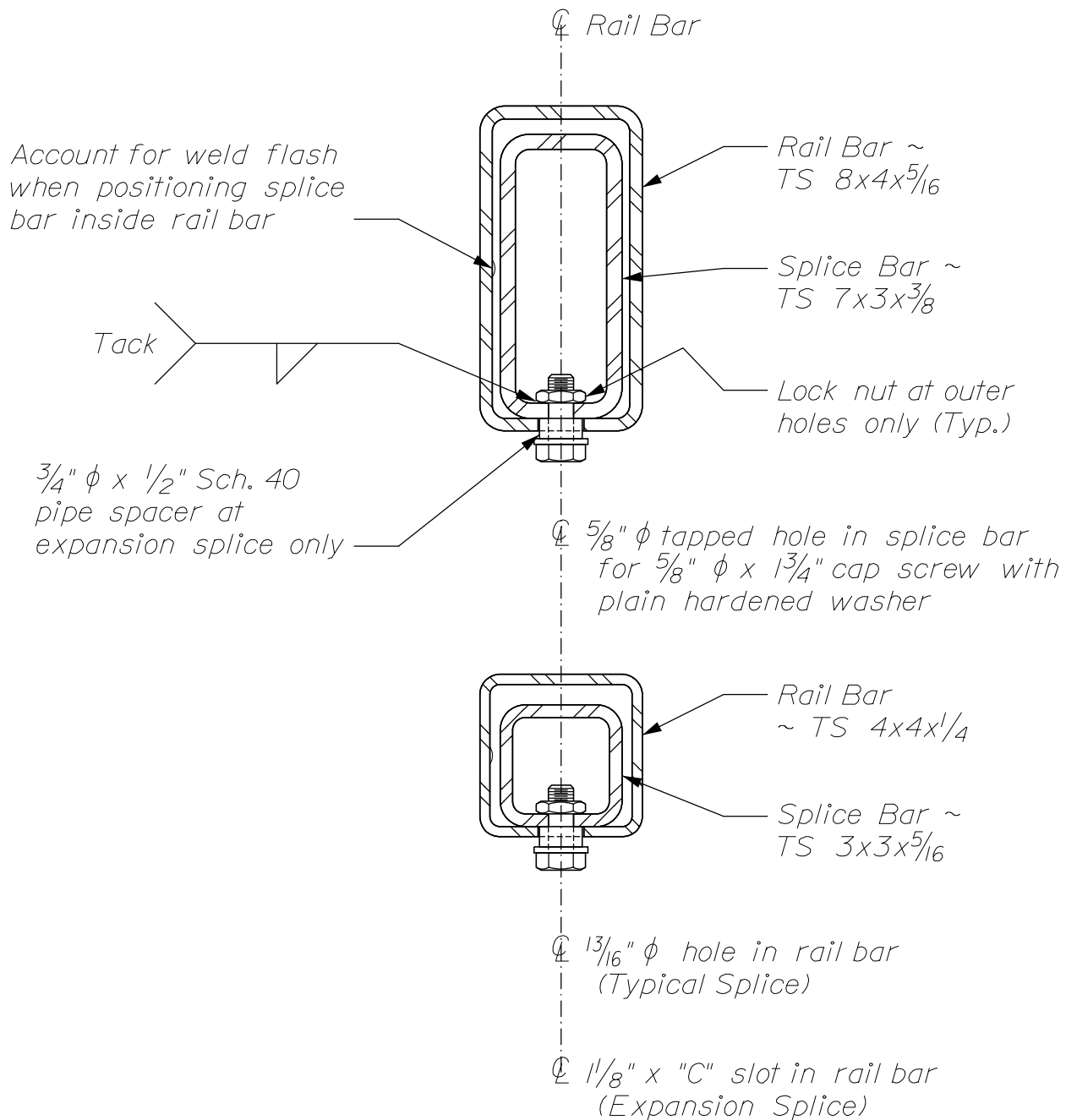


~ RAIL BAR EXPANSION JOINT SECTION ~

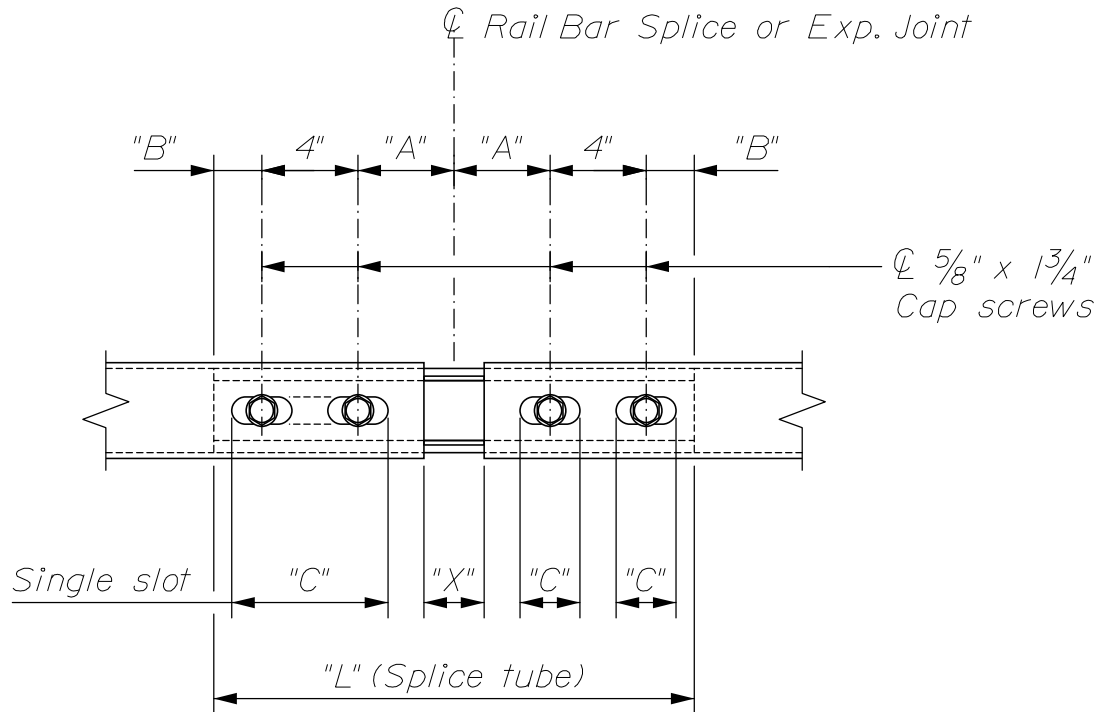
For details not shown, see "Rail Bar Splice Section"

STEEL BRIDGE RAILING

507(10)



-- OPTIONAL RAIL BAR SPLICE SECTION --
 (Details Typical for both rail bars)



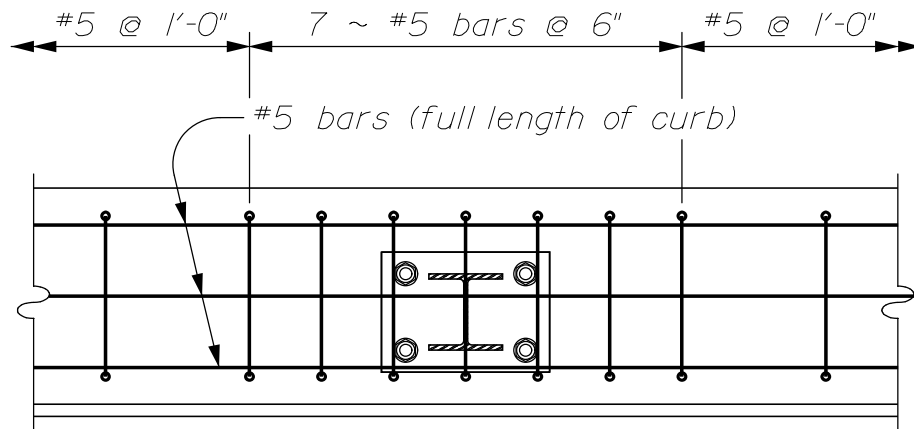
~ RAIL BAR SPLICE & EXPANSION JOINT DETAIL ~
(Bottom View)

SPLICE TUBE DIMENSIONS		
	TS 8x4	TS 4x4
Top & Bot. Plates	$2\frac{1}{2} \times \frac{3}{8} \times "L"$	$2\frac{5}{8} \times \frac{3}{8} \times "L"$
Side Plates	$6\frac{3}{4} \times \frac{3}{8} \times "L"$	$2\frac{7}{8} \times \frac{3}{8} \times "L"$

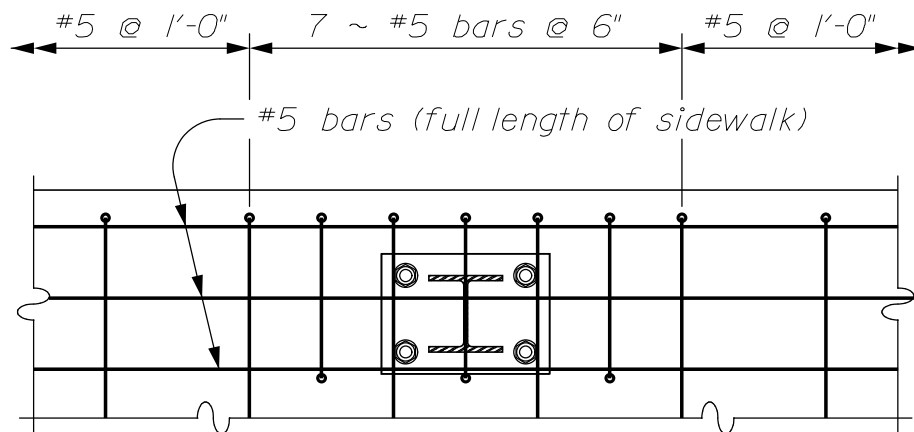
SPLICE & EXPANSION JOINT TABLE					
"T"	"A"	"B"	"C"	"L"	"X"
Splice	4"	2"	--	1'-8"	$\frac{3}{4}"$
$\leq 4"$	4"	2"	$2\frac{1}{2}"$	1'-8"	$2\frac{1}{2}"$
$> 4" \leq 6\frac{1}{2}"$	$5\frac{1}{2}"$	$2\frac{1}{2}"$	$3\frac{1}{2}"$	2'-0"	$3\frac{3}{4}"$
$> 6\frac{1}{2}" \leq 9"$	$6\frac{1}{2}"$	$3\frac{1}{2}"$	9" *	2'-4"	5"
$> 9" \leq 13"$	$8\frac{1}{2}"$	$4\frac{1}{2}"$	11" *	2'-10"	7"

T = Total Movement

* = Single Slot



~ CURB REINFORCING PLAN ~



~ SIDEWALK REINFORCING PLAN ~

NOTES:

1. All work and materials shall conform to the provisions of Section 507 - Railings of the Standard Specifications.

2. Tubing shall meet the longitudinal CVN minimum requirements of 15 ft-lb at 0° F or proportional values of sub - size specimens. Testing shall be done in accordance with ASTM A673. The H frequency shall be used and the material shall be as - rolled.

3. All exposed cut or sheared edges shall be broken and free of burrs. The inside weld flash of tubing shall be removed at splices and expansion joints.

4. Rail posts shall be set normal to grade unless otherwise shown.

5. Lengths of rail bar shall be attached to a minimum of 2 rail posts and to at least 4 posts whenever possible.

6. 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 as directed by the Resident. Refer to detail and table on page 507(12) for dimension "X".

7. All parts shall be galvanized after fabrication in accordance with except that hardware shall meet the requirements of either ASTM F2329 or ASTM B695, Class 50, Type I. Parts except hardware shall be blast - cleaned prior to galvanizing in accordance with SSPC - SP6.

8. Anchor bolts shall be set with a template. Nuts securing the post base plate shall be tightened to a snug fit and given an additional $\frac{1}{8}$ turn.

9. Bolts for attaching rail bars to posts shall be $\frac{3}{4}$ " Diameter round or dome head and may be rib neck, slotted, wrench head or tension control (TC or twist - off). Holes in posts shall be $\frac{1}{16}$ inch larger than the diameter of the bolt. Holes in rail bars shall be drilled to size as follows:

Slotted, wrench head or TC bolts: $\frac{1}{16}$ " larger than bolt diameter

Rib neck bolts: Size appropriate to accomodate an interference fit

Bolts shall be 6 inches in length and shall include a flat washer under the nut.

(Continued)

NOTES (Continued):

10. Holes in rail bars shall be field - drilled and shall be coated with an approved zinc - rich paint prior to erection.

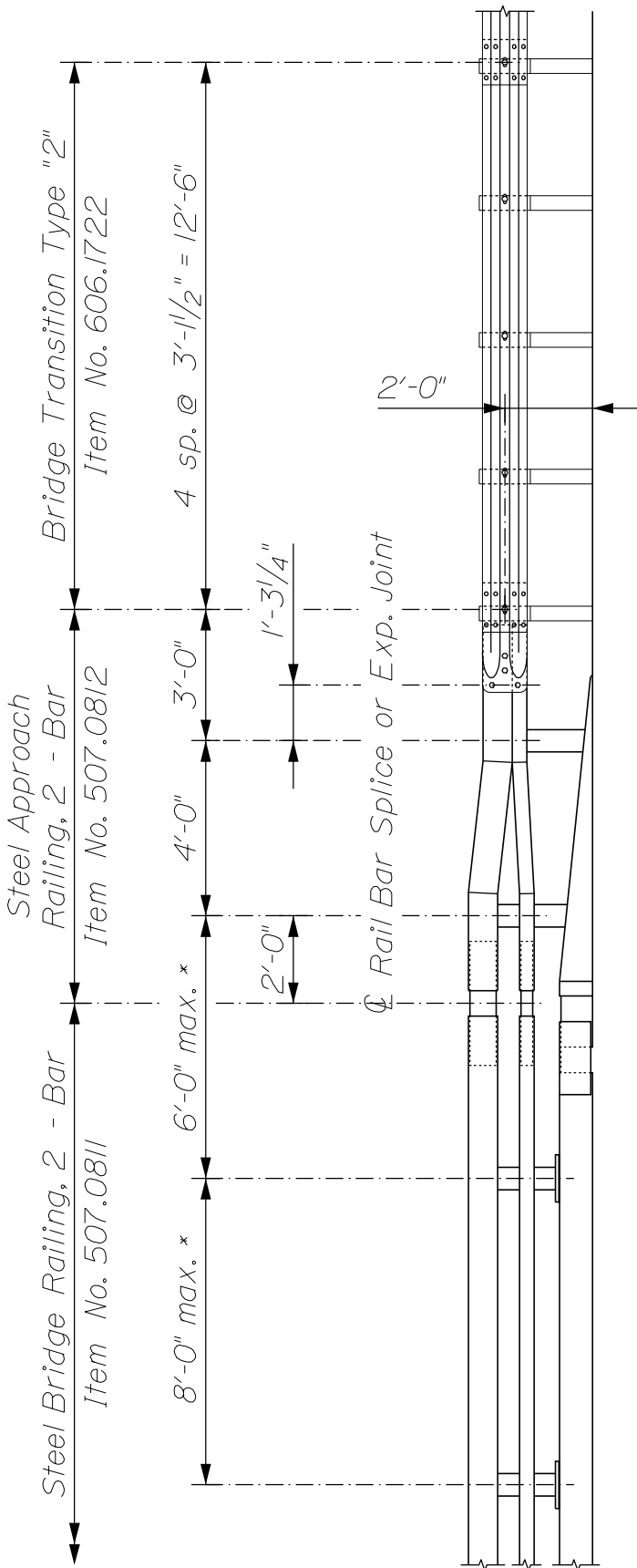
11. Bolts in expansion joints shall be tightened only to a point that will allow rail movement.

12. The alternate curb projection shown for the curb - mounted railings is intended for use with granite bridge curb.

13. If there is a conflict between these Standard Details and the Design Drawings, the Contractor shall notify the Resident immediately.

MATERIALS:

Rail bars & rail splice bars ASTM A500, Grade C
Rail posts, base plates
& fabricated splice bars AASHTO M 270M/M 270, Grade 50
All other shapes & plates ASTM A36/A36M
Anchor bolts, washers & heavy hex nuts AASHTO M 314, Grade 105
Rail attachment bolts ASTM A449
All other bolts & nuts (unless noted) ASTM A307 & ASTM A563,
Grade D or DH



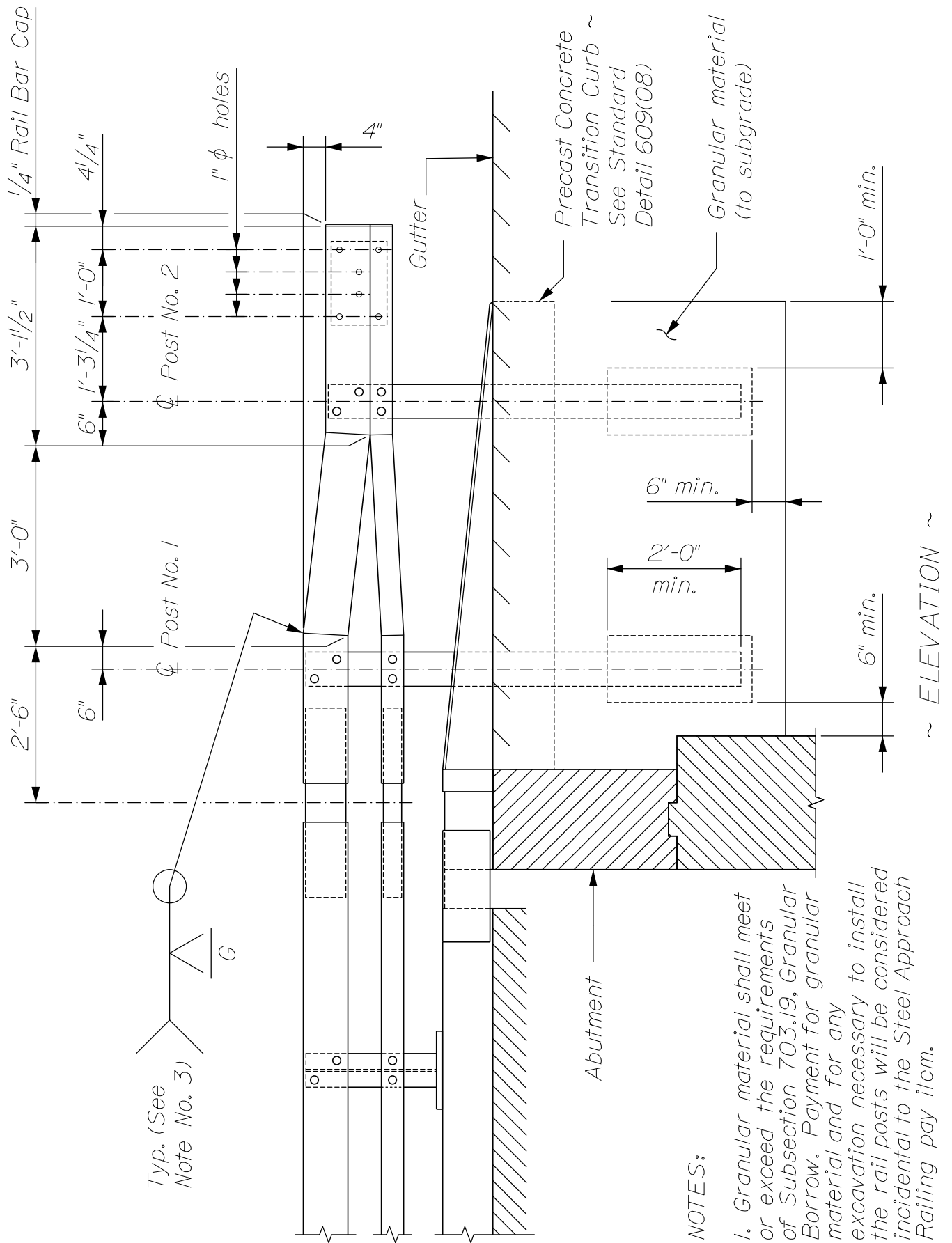
~ ELEVATION ~

* See Design Drawings for dimensions

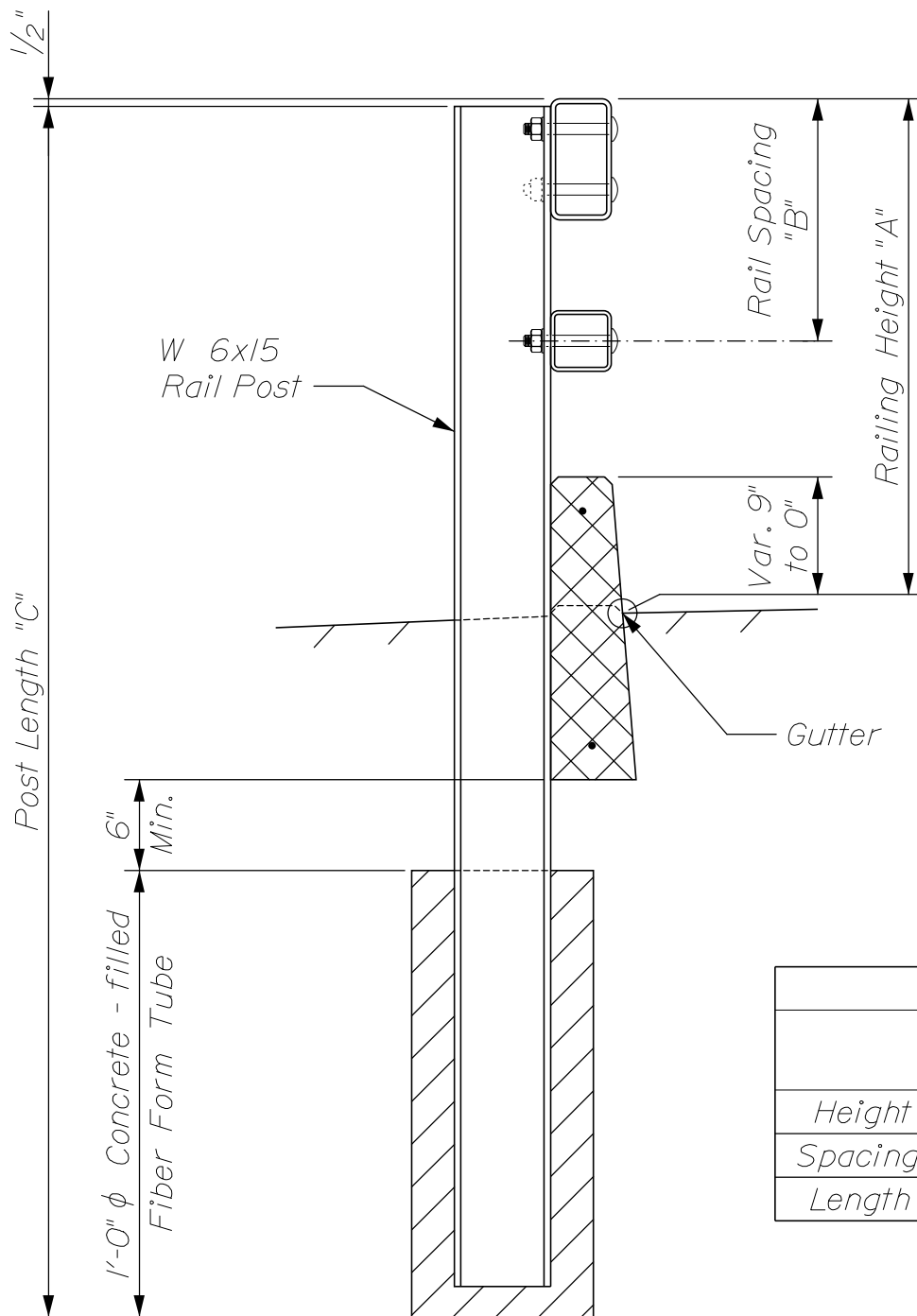
NOTES:

1. The bottom rail bar may be bent to shape from one continuous length of stock provided that the fabricator can achieve the required geometry without deforming the tube.
2. To facilitate field fit - up of the approach railing, posts shall be set loosely into fiber form tubes while parts are being assembled. Post holes shall be backfilled with Class "S" or other concrete mix approved by the Resident. Payment will be considered incidental to the Steel Approach Railing pay item.

STEEL APPROACH RAILING, 2-BAR
507(16)



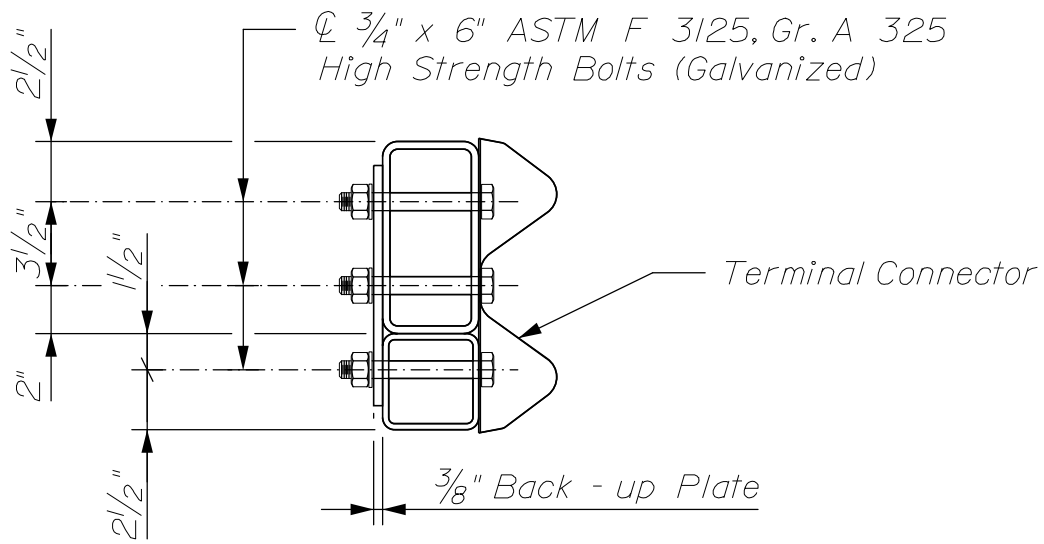
STEEL APPROACH RAILING, 2-BAR
507(17)



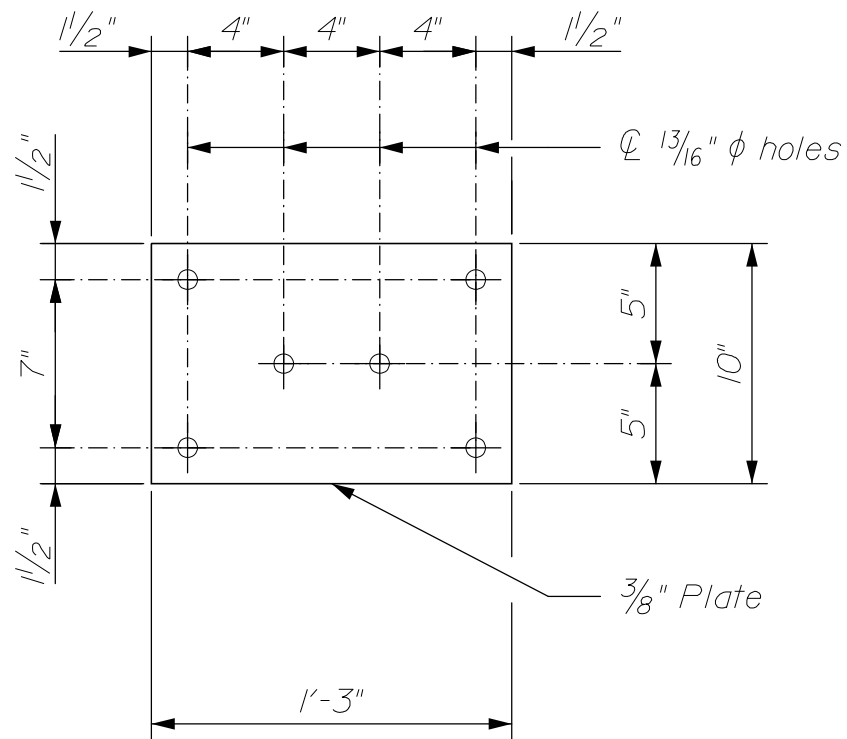
DIMENSIONS		
	Post No. 1	Post No. 2
Height "A"	2'-10"	2'-6"
Spacing "B"	1'-4"	10"
Length "C"	6'-6"	6'-2"

~ TYPICAL SECTION ~

STEEL APPROACH RAILING, 2-BAR 507(18)



~ SECTION THROUGH
 TERMINAL CONNECTOR ~



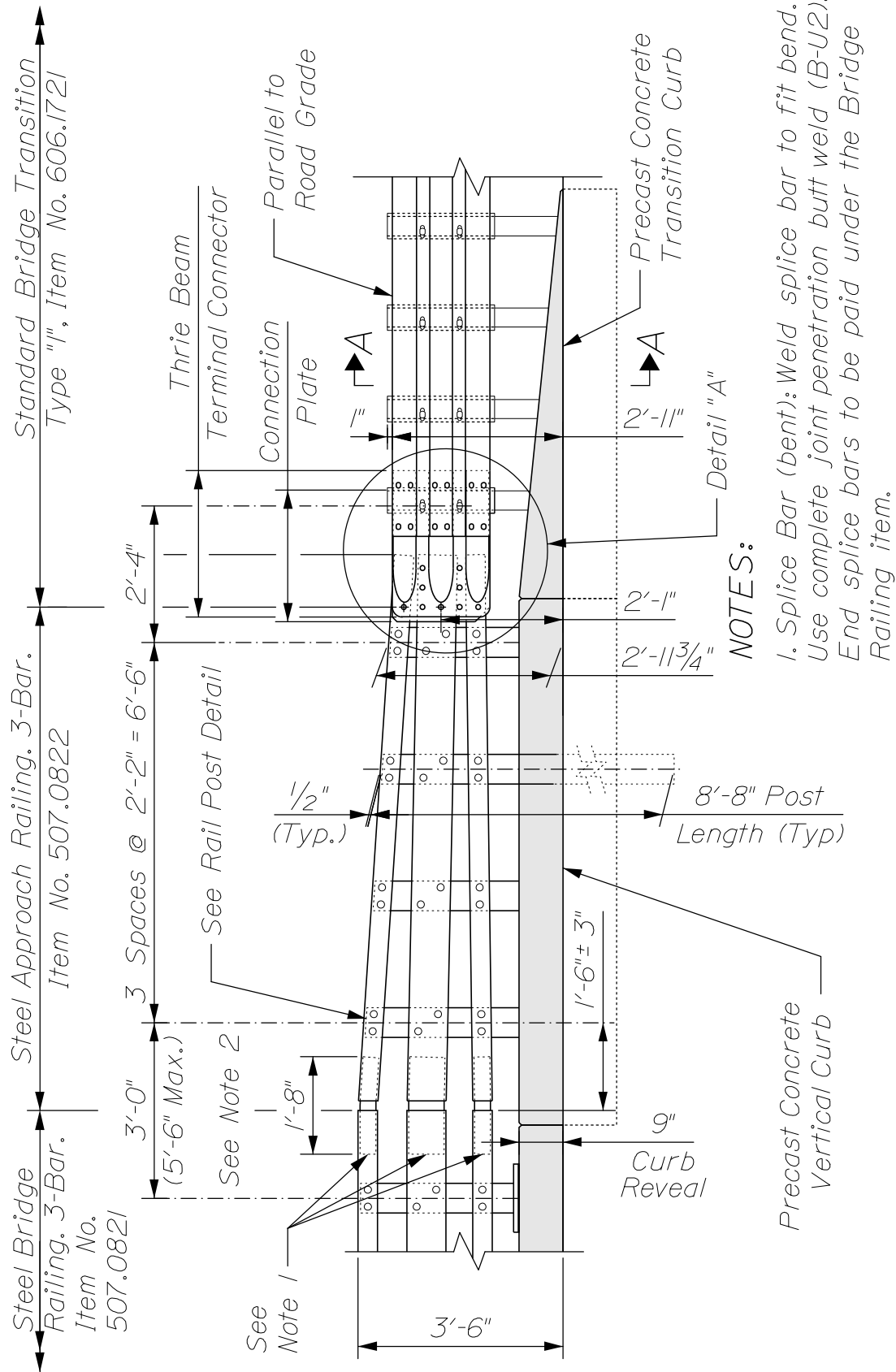
~ BACK - UP PLATE ~

NOTES:

1. The Bridge Transition Type "2" as shown is a slight modification of the standard Type "2" detail shown in Section 606. The $\frac{3}{4}" \phi$ bolts and back - up plate will be considered as part of the Steel Approach Railing pay item.

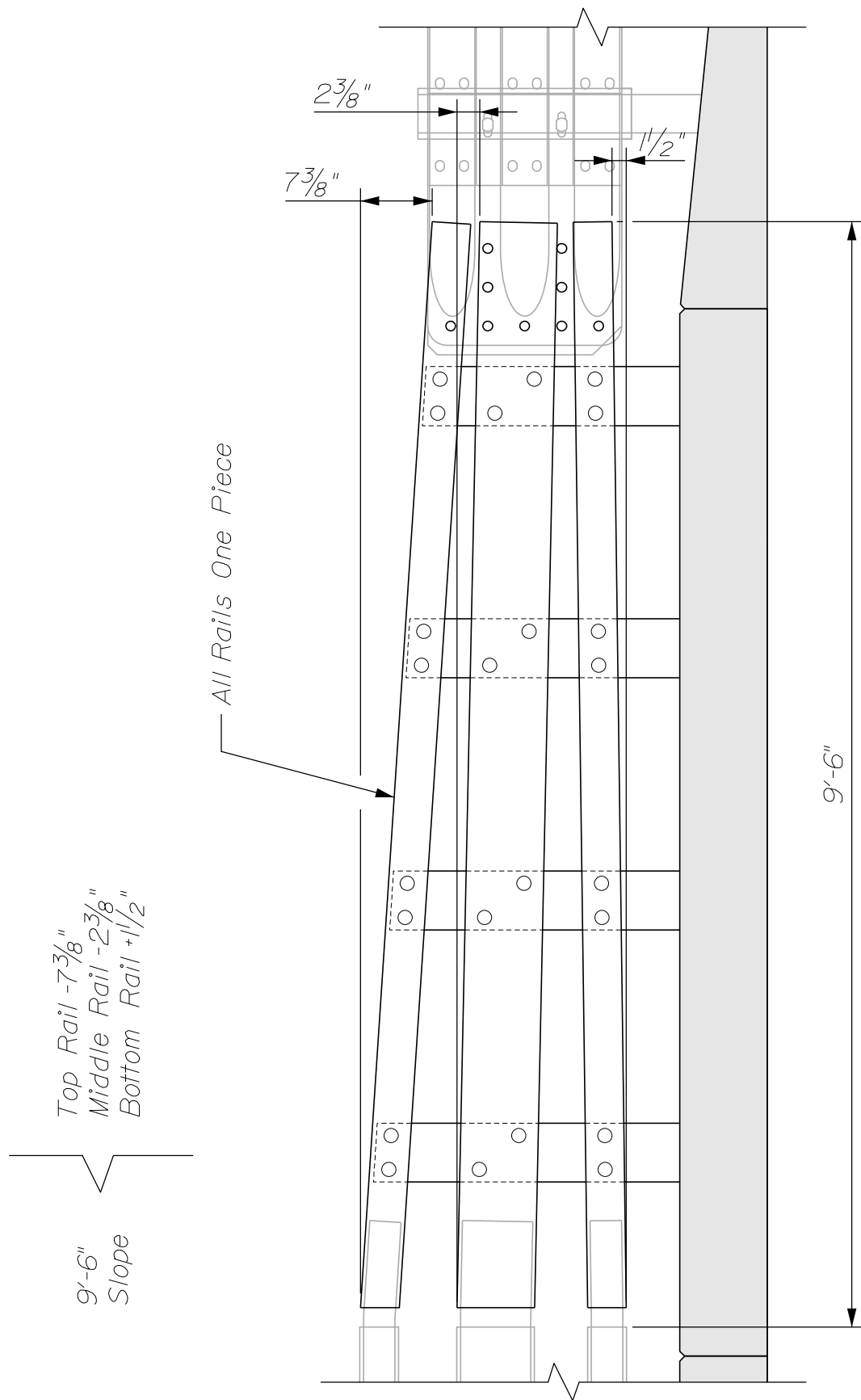
STEEL APPROACH RAILING, 2-BAR

507(19)



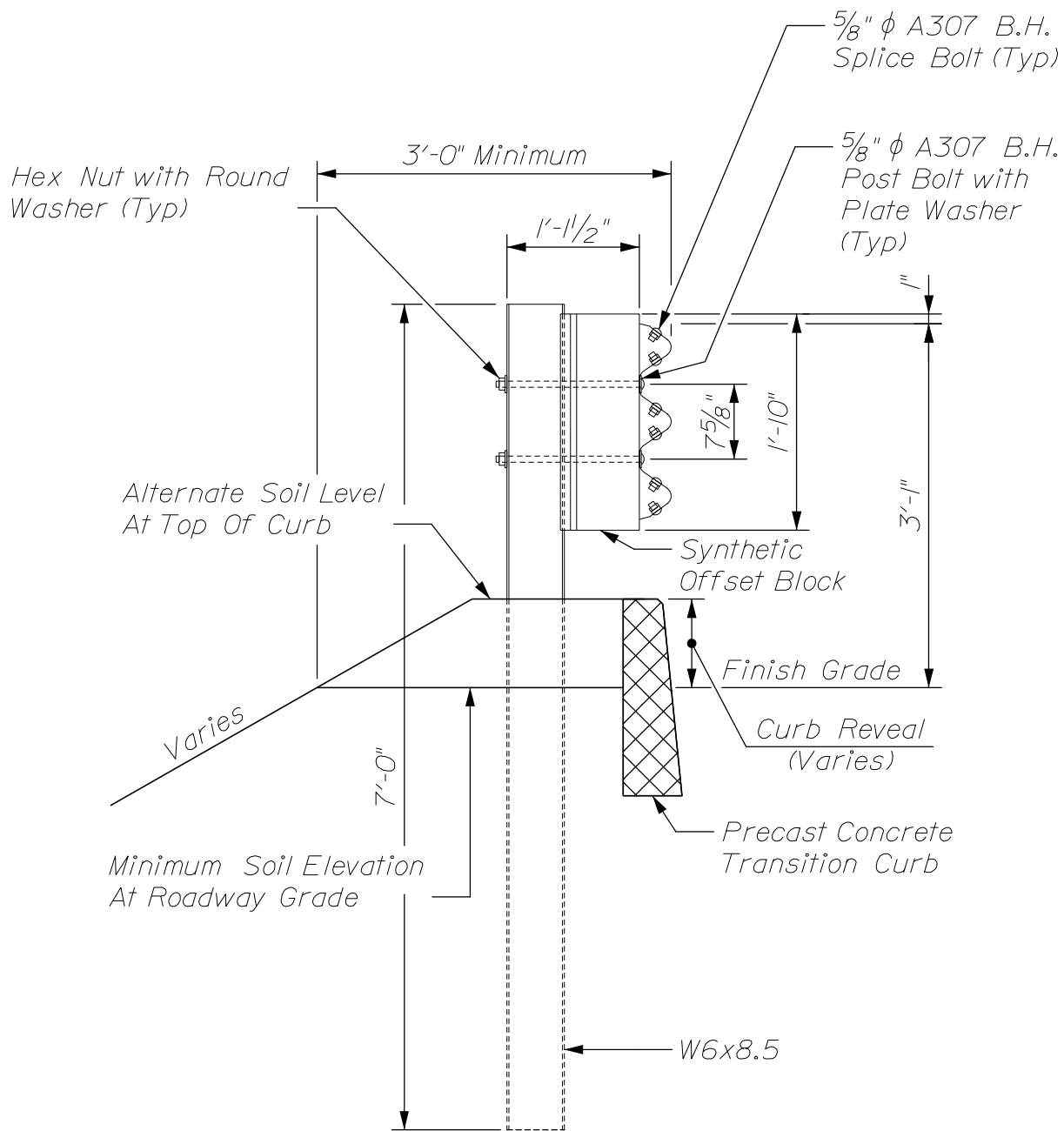
STEEL APPROACH RAILING, 3-BAR
507(20)

~ ELEVATION ~



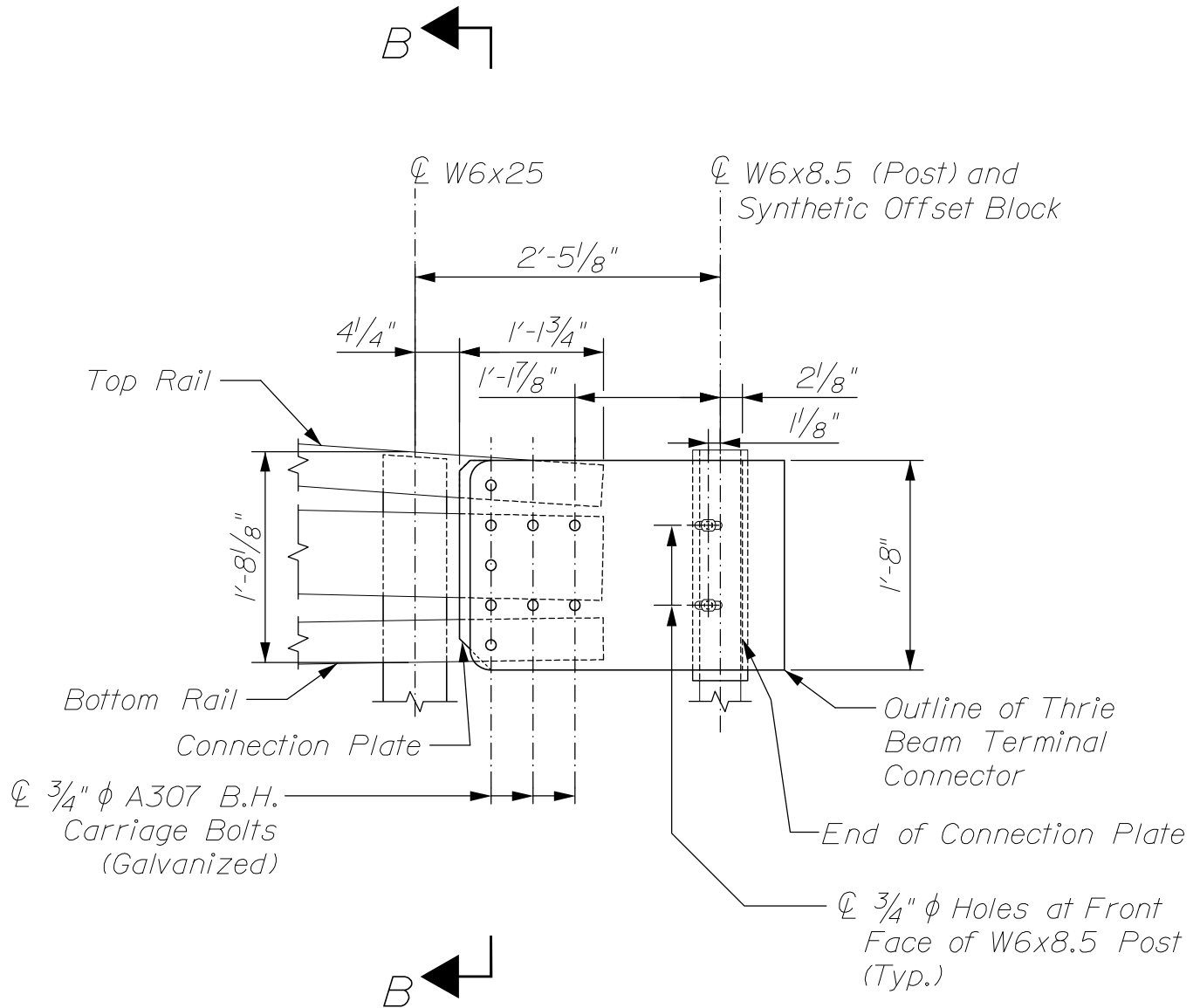
~ DETAIL - RAIL SLOPE ~

STEEL APPROACH RAILING, 3-BAR
507(21)



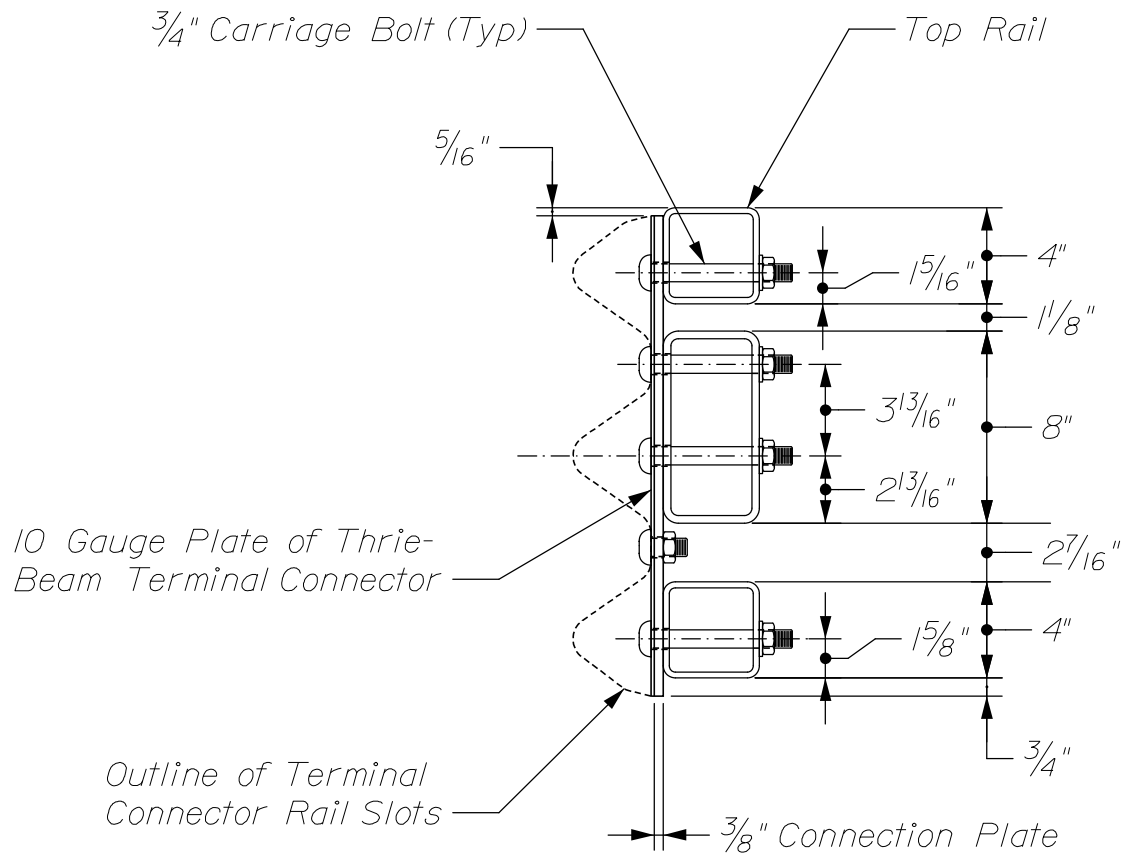
~ SECTION A-A ~
(POST RAIL ASSEMBLY)

STEEL APPROACH RAILING, 3-BAR 507(22)



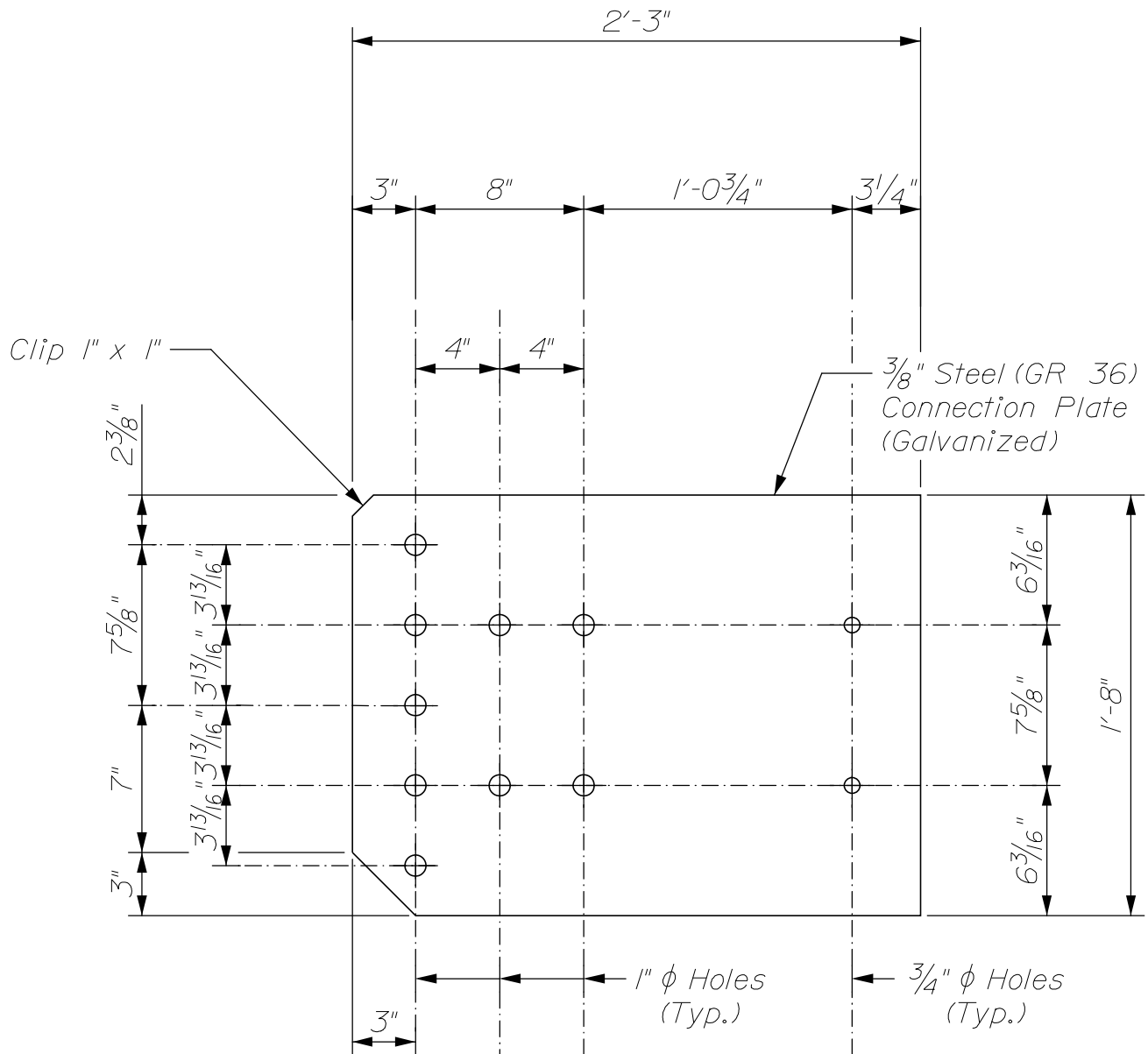
~ DETAIL "A" ~
 (Overlapping of Double Nested Thrie-Beam not Shown for Clarity)

STEEL APPROACH RAILING, 3-BAR
 507(23)



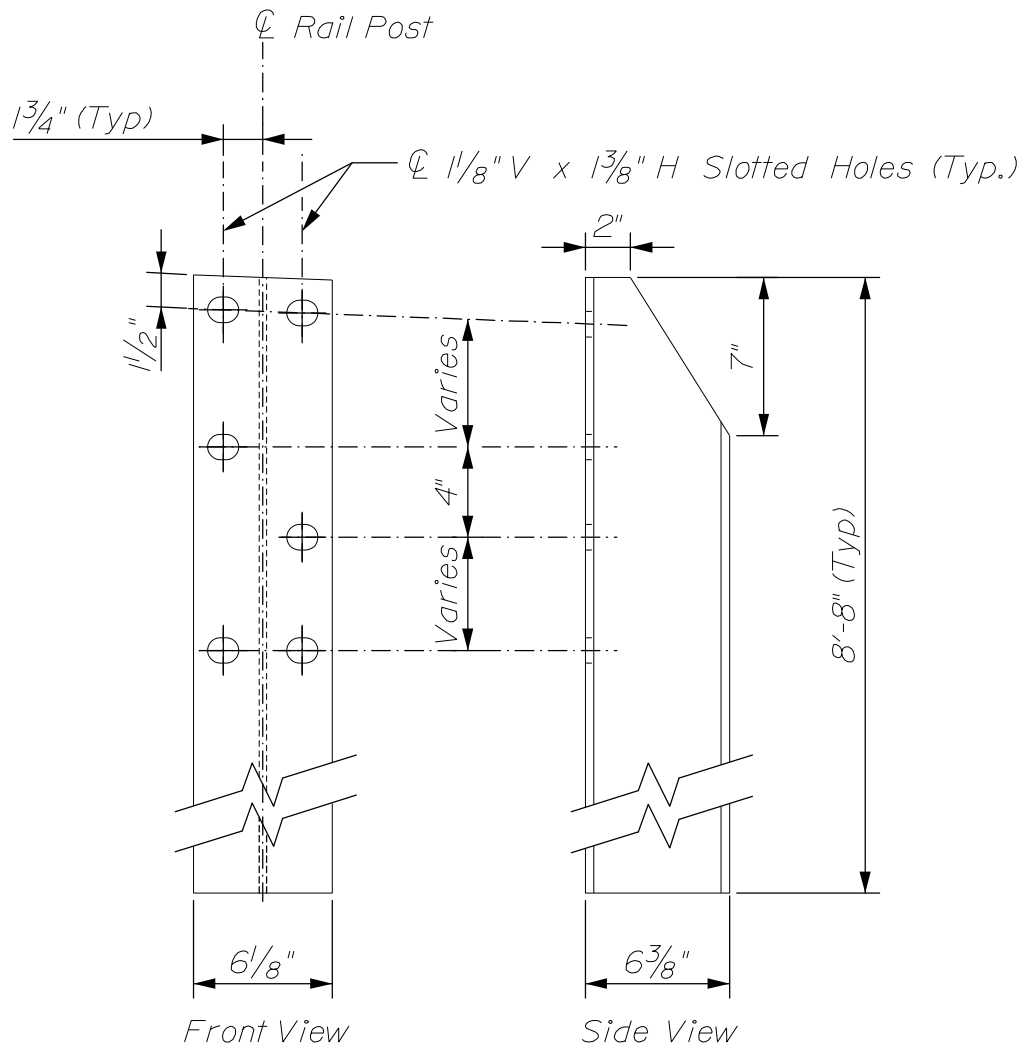
~ SECTION B-B (CONNECTION PLATE) ~

STEEL APPROACH RAILING, 3-BAR
507(24)



~ DETAIL - CONNECTION PLATE ~

STEEL APPROACH RAILING, 3-BAR
507(25)



~ DETAIL - RAIL POST (W6x25) ~

STEEL APPROACH RAILING, 3-BAR
507(26)

NOTES:

- 1. Refer to Steel Bridge Railing pages for additional details, notes and materials specifications.*
- 2. Rail bar welds shall have a minimum penetration of 80% as demonstrated by a test weld performed by the fabricator.*
- 3. The precast concrete vertical or transition curb shall meet the provisions of Section 609 - Curbing of the Standard Specifications. The bridge end of the curb shall be saw - cut in the field to fit flush against the backwall, as dictated by the bridge skew angle and the profile grade. Where curbing is specified on the adjacent highway, the transition shall be modified accordingly.*