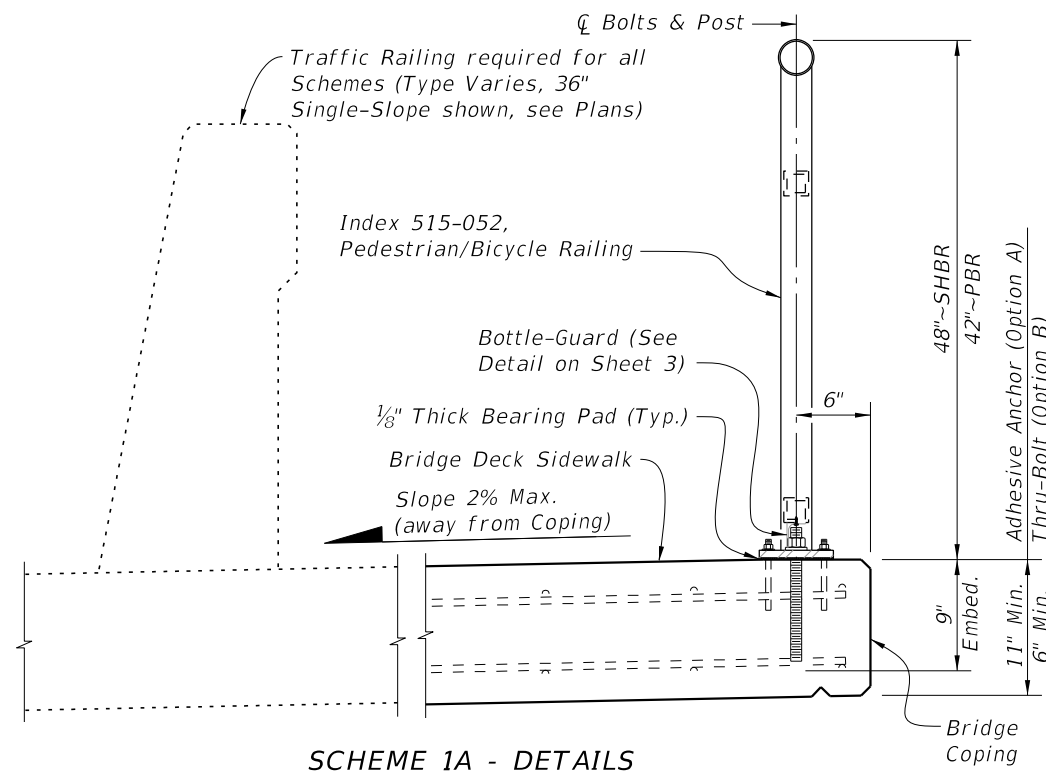


\* Deck Joint at Begin Bridge or End Bridge shown; Deck Joint at  $\phi$  Pier or Intermediate Bent similar.  
 \*\* SHBR-Special Height Bicycle Rail  
 PBR-Pedestrian/Bicycle Rail

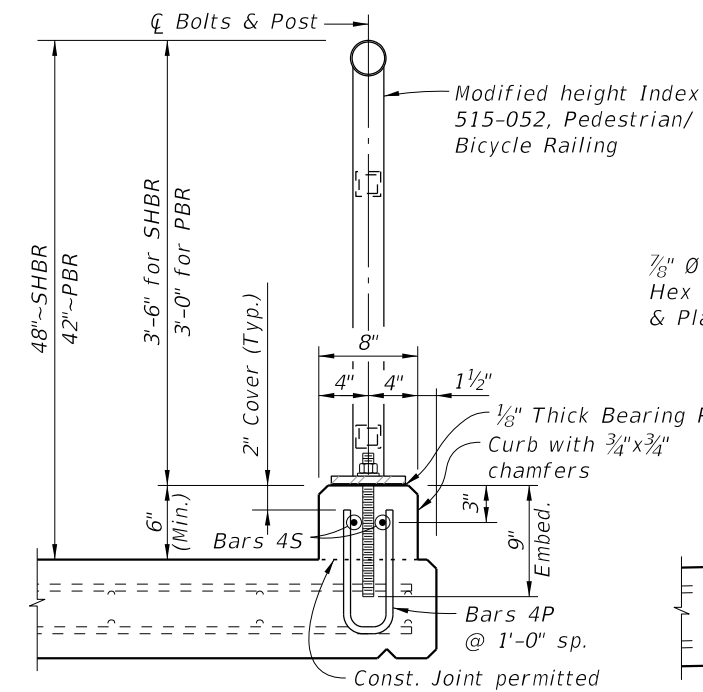
- NOTES:
- Shop Drawings are required.
  - Work this Index with Index 515-052 Bicycle/Pedestrian Railing Details (Steel) and Specification Section 515. Refer to the SPI for Design Criteria and Limits of Use.
  - Materials:
    - Steel: Galvanized after fabrication
      - Fasteners: Hex Head Bolt ASTM A307, Hex Nuts ASTM A563, Washers ASTM F436
      - Support Bracket (Scheme 3) L-shape and Stiffener Plate: ASTM A36
      - Bottle-guard (Schemes 1 & 3) L-shape: ASTM A36
    - Concrete: Same as bridge deck
    - Pre-cured Silicone Sealant: Specification Section 932
    - Bearing Pads: Provide  $\frac{1}{8}$ " Plain, Fabric Reinforced or Fabric Laminated bearing pads that meet the requirements of Specification Section 932 for Ancillary Structures.
  - See Structures Plans, Superstructure Sheets for bridge information including concrete type, deck expansion joint locations and orientations, and thermal movement.
  - Railings:
    - For thermal movement greater than 4" (up to a maximum of 5"), clear opening between adjacent pickets, or panels at Rail Expansion Joints above Deck Joints must be reduced to  $3\frac{1}{2}$ ".
    - For treatment of railings on skewed bridges see Index 521-427.
  - Curbs:
    - Match open curb joints at Deck Expansion Joint locations to the deck joint dimension.
    - Construct Concrete Curb (Scheme 2) vertical with the top surface finished level transversely. See Concrete Curb Details Sheet 3.
    - Provide  $\frac{3}{4}$ " Intermediate open joints in curbs coinciding with the  $\frac{3}{4}$ " joints in the traffic railing.
  - Payment: Support bracket (Scheme 3) is incidental to the cost of railing. Curb concrete and reinforcing steel (Scheme 2) are included in the bridge deck quantities.

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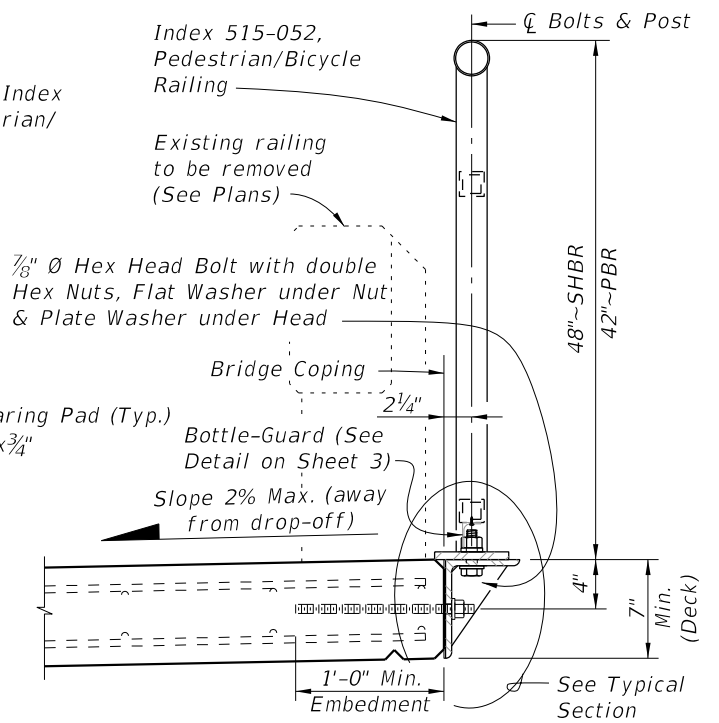
LAST REVISION 11/01/17	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	BRIDGE PEDESTRIAN/BICYCLE RAILING (STEEL)	INDEX 515-051	SHEET 1 of 3
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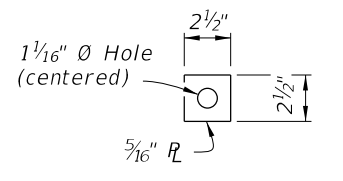
**SCHEME 1A - DETAILS**  
(Adhesive Anchor Option shown)



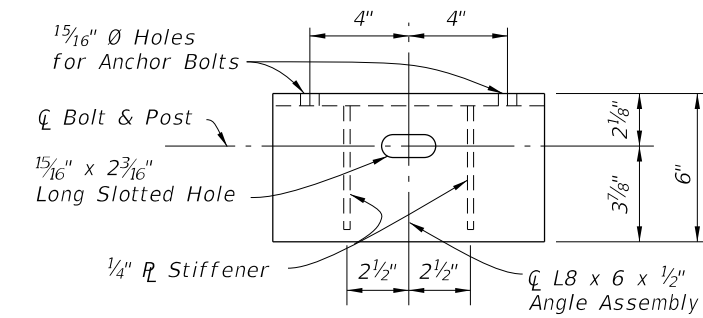
**SCHEME 2 - TYPICAL SECTION THROUGH CURB MOUNTED RAILING**



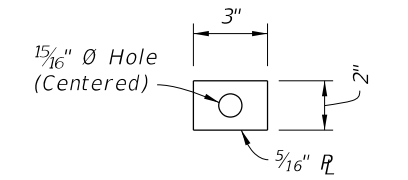
**SCHEME 3 - TYPICAL SECTION THROUGH SIDE MOUNTED RAILING (RETROFIT)**



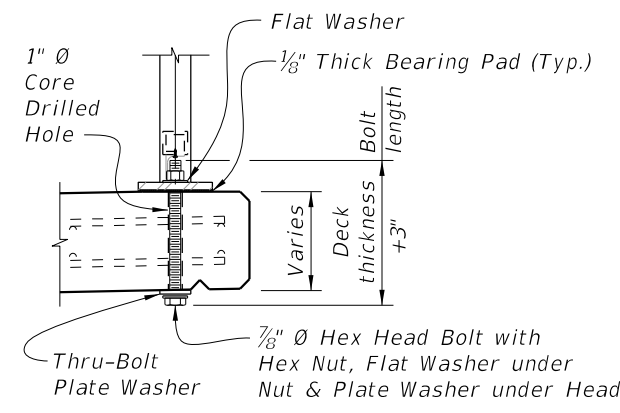
**THRU-BOLT PLATE WASHER DETAIL**



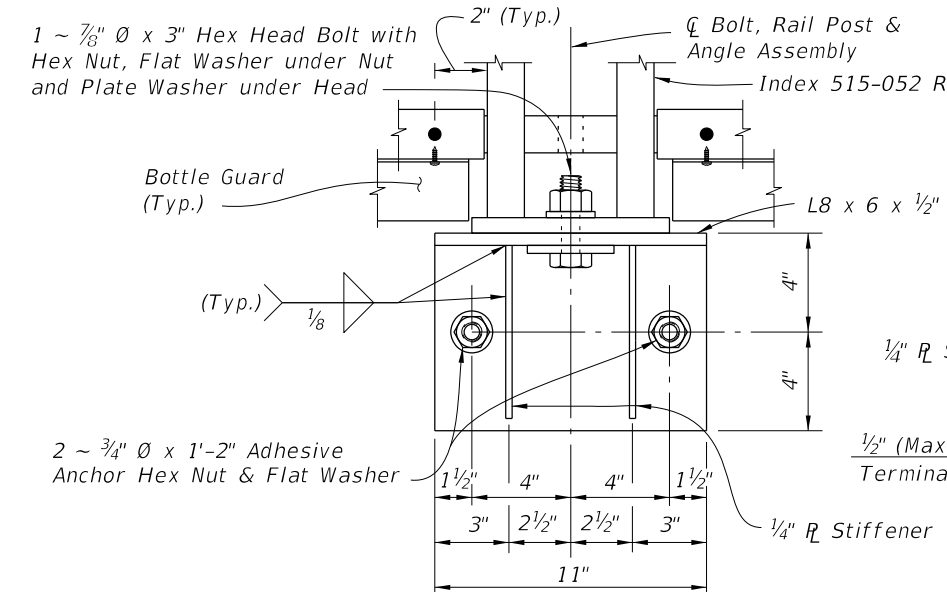
**PLAN VIEW**



**PLATE WASHER DETAIL**



**SCHEME 1B - DETAILS**  
(Thru-Bolt Option)




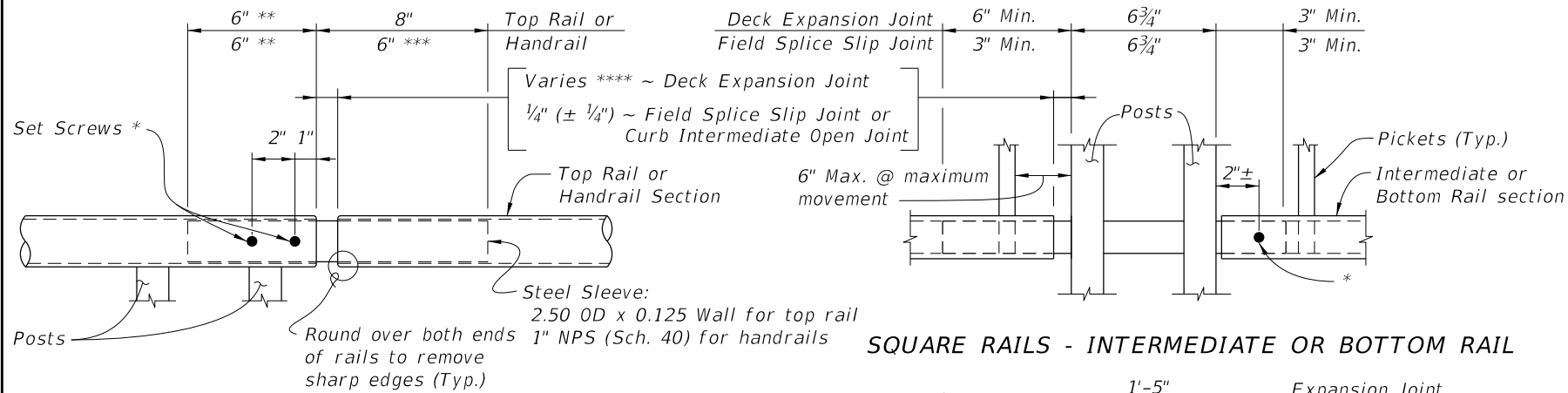
**SCHEME 3 - SIDE-MOUNTED SUPPORT BRACKET DETAILS**

**SCHEME 1 - TYPICAL SECTION THROUGH DECK MOUNTED RAILING**

**SCHEME 3 - SIDE-MOUNTED SUPPORT BRACKET DETAILS**

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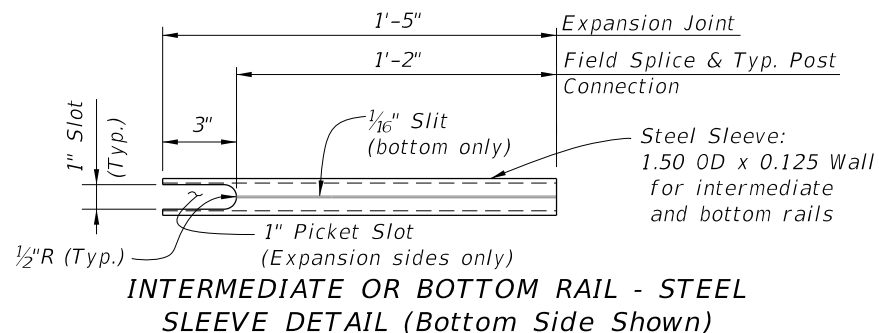
LAST REVISION 11/01/17	REVISION	DESCRIPTION:		FY 2023-24 STANDARD PLANS	BRIDGE PEDESTRIAN/BICYCLE RAILING (STEEL)	INDEX 515-051	SHEET 2 of 3
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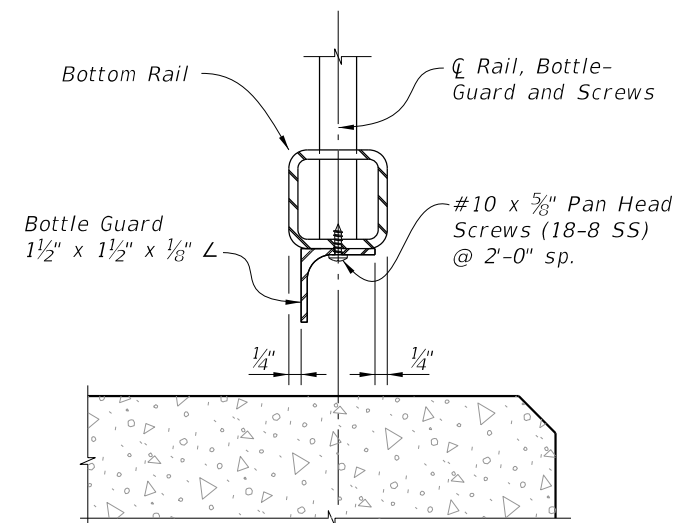
**ROUND RAILS - TOP RAIL OR HANDRAIL**

- \* 1/4" Ø x 3/4" Pan Head Stainless Steel (Type 316 or 18-8 Alloy) Set Screws along outside face of railing. Set screws must be set flush against the rail surface. A 3/4" Ø plug weld may be substituted for the two set screws at expansion joints.
- \*\* Embedded length may be 4" for plug welded connection.
- \*\*\* Increase handrail sleeve embedment to 8" for Expansion Joint openings greater than 2".
- \*\*\*\* Expansion Joint opening shall match the clear opening in the deck joint but not greater than 3".

**SQUARE RAILS - INTERMEDIATE OR BOTTOM RAIL**



**INTERMEDIATE OR BOTTOM RAIL - STEEL SLEEVE DETAIL (Bottom Side Shown)**



**TYPICAL SECTION THROUGH BOTTOM RAIL (Post Not Shown for Clarity)**

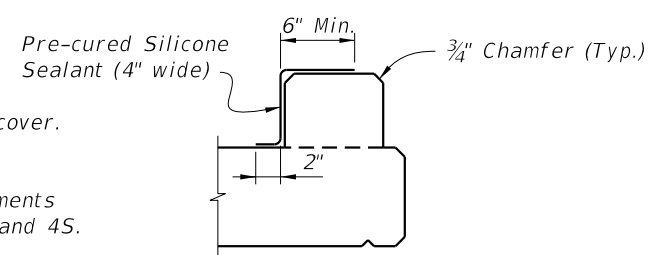
**SCHEME 1 - BOTTLE GUARD DETAIL**

**DETAIL "B" EXPANSION JOINT (FIELD SPLICE SIMILAR)**

ALTERNATE REINFORCING (WWR) DETAILS		CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS	
NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4 3/4" are not permitted.		<b>BILL OF REINFORCING STEEL</b>	
<p><b>SPLICE DETAIL (Between WWR Sections)</b></p> <p><b>WWR SECTION DETAIL</b></p>		MARK	SIZE
		LENGTH	
<p>D19.7 (Horizontal)</p> <p>D19.7 (Vertical) (Typ.)</p> <p>1'-9" Min. Lap</p> <p>1'-0" (Typ.)</p> <p>4" D19.7 (Typ.)</p> <p>9" 10"</p>		P	4
		S	4
<p>10/10/2022 8:22:57 AM</p>		<p><b>BAR 4P</b> <b>BAR 4S</b></p>	
		As Reqd.	As Reqd.

**CROSS REFERENCE:**  
See Sheet 1 for Bridge Railing Notes.

- CURB REINFORCING STEEL NOTES:**
- All bar dimensions in the bending diagrams are out to out.
  - The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.
  - All reinforcing steel at the open joints shall have a 2" minimum cover.
  - Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-8".
  - Deformed Welded Wire Reinforcement (WWR) meeting the requirements of Specification Section 931 may be used in lieu of all Bars 4P and 4S.

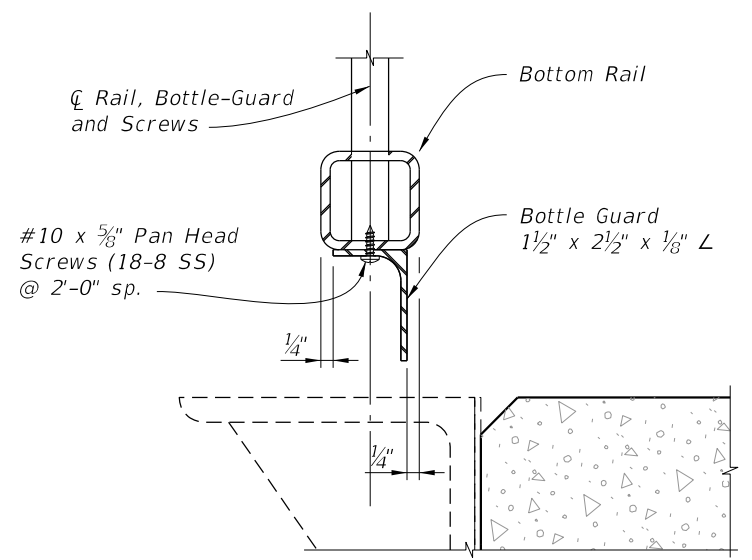


**DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT**

**INTERMEDIATE JOINT SEAL NOTE:**  
At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.

ESTIMATED CONCRETE CURB QUANTITIES (SCHEME 2)		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.0124
Reinforcing Steel	LB/LF	4.01

**SCHEME 2 - CONCRETE CURB DETAILS**



**TYPICAL SECTION THROUGH BOTTOM RAIL (Post Not Shown for Clarity)**

**SCHEME 3 - BOTTLE GUARD DETAIL**