1. Shop Drawings are required.
2. 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.
3. Materials:
   a. Steel: Galvanized after fabrication
   c. Support Bracket (Scheme 3) L-shape and Stiffener Plate: ASTM A36
   d. Bottle-guard (Schemes 1 & 3) L-shape: ASTM A36
   e. Pre-cured Silicone Sealant: Specification Section 932
   f. Bearing Pads: Provide 3/8" Plain, Fabric Reinforced or Fabric Laminated bearing pads that meet the requirements of Specification Section 932 for Ancillary Structures.
4. See Structures Plans, Superstructure Sheets for bridge information including concrete type, deck expansion joint locations and orientations, and thermal movement.
5. Railings:
   a. 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 1/2".
   b. For treatment of railings on skewed bridges see Index 521-427.
6. Curbs:
   a. Match open curb joints at Deck Expansion Joint locations to the deck joint dimension.
   b. Construct Concrete Curb (Scheme 2) vertical with the top surface finished level transversely. See Concrete Curb Details Sheet 3.
   c. Provide 3/4" Intermediate open joints in curbs coinciding with the 3/4" joints in the traffic railing.
7. 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.
**ROUND RAILS - TOP RAIL OR HANDRAIL**

* ⅛" Ø x ⅛" 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 ⅛" plug weld may be substituted for the two set screws at expansion joints.

** Increase handrail sleeve embedment to 8" for Expansion Joint openings greater than 2".

*** 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".

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

*DeCK Expansion Joint

** Steel Sleeve:

- 2.50 OD x 0.125 Wall for top rail
- 1" NPS (Sch. 40) for handrails

**Steel Sleeve:

- 1.50 OD x 0.125 Wall for intermediate and bottom rails

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

- Ø x ⅛" 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 ⅛" 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".**

**SCHEME 3 - BOTTLE GUARD DETAIL**

**CURB REINFORCING STEEL NOTES:**

1. All bar dimensions in the bending diagrams are out to out.

2. The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.

3. All reinforcing steel at the open joints shall have a 2" minimum cover.

4. Bars 4S may be continuous or spliced at the construction joints.

**Bar splices for Bars 4S shall be a minimum of 1'-8".**

5. Deformed Welded Wire Reinforcement (WWR) meeting the requirements of Specification Section 931 may be used in lieu of all Bars 4P and 4S.

**CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS**

**BILL OF REINFORCING STEEL**

**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)**

**QUANTITY**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>CY/FT</td>
<td>6,0124</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>LB/FT</td>
<td>4.01</td>
</tr>
</tbody>
</table>

**SCHEME 2 - CONCRETE CURB DETAILS**

**SCHEME 1 - BOTTLE GUARD DETAIL**

**SCHEME 2 - CONCRETE CURB DETAILS**

**SCHEME 3 - BOTTLE GUARD DETAIL**