This railing has been structurally evaluated to be equivalent or greater in strength to other safety type railings which have been crash tested to NCHRP Report 350 TL-4 criteria.

**CONCRETE AND REINFORCING STEEL** - See Structures Plans, General Notes, Guardrail. For Guardrail connection details see Index No. 400.

**SUPERELEVATED BRIDGES** - At the option of the Contractor the Traffic Railing on super-elevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.

**REFLECTIVE RAILING MARKERS** - Reflective Railing Markers shall be Specification Section 993. Install markers on top of the Traffic Railing along the centerline at the spacing shown in the table below. Reflector color (white or yellow) shall match the color of the near roadway. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

**J O I N T S** - See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Open Railing joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at Piers or Intermediate Bents similar. Provide (1) Intermediate Open Joint(s).

1. **Supports where superstructure slab is continuous.
2. **Mudjacking where span length exceeds 90 ft.
3. **Intermediate locations (equally spaced) between mudjacking and substructure supports where span length exceeds 180 ft.
SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(SECTION THRU BRIDGE DECK SHOWN –
SECTION THRU APPROACH SLAB SIMILAR)

NOTE:
Begin placing Railing Bars SR and SW an Approach Slab at the
rolling end and proceed toward Begin or End Bridge to ensure
placement of guardrail bolt holes. If required, adjustments to the
bar spacing for Bars 5W and 5S shall be made immediately
adjacent to Begin or End Bridge. Shift and rotate Bars 5W and 5S
as required to maintain cover in Rolling End Transition.

Unit Rolling End Transition and Guardrail H Index 410 Concrete Barrier
Walls used beyond the Approach Slab. See Structures Plans, Plan
and Elevation Sheet and Roadway Plans. If Rolling End Transition is
omitted, extend Typical Section to the end of Approach Slab and
space Bars 5R and 5S at 1'-0" (Typ.)

INSTRUCTIONS TO DESIGNER:
For Bridge Decks up to a maximum thickness of 9", the three Bars 5S placed
in the deck may substitute for the longitudinal deck steel located within the
limits of Bars 5W, provided that the total area of longitudinal deck steel
beneath the railing, as required by calculation, is not reduced. Show these
bars on the Structures Plans, Superstructure Sheets with the deck steel.

Al Bars 5R, 5S, and 5W as shown are included in the Estimated Traffic Railing
Quantities. Do not include Bars 5R, 5S, and 5W in the reinforcing bar lists
and estimated quantities for supporting bridge decks or approach slabs.

PLAN - Railing End Transition
(Showing Bars 5W and 5S)

DETAIL "A"

PLAN - Railing End Transition
(Showing Bars 5R and 5S)
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

<table>
<thead>
<tr>
<th>MARK</th>
<th>SIZE</th>
<th>LENGTH</th>
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</thead>
<tbody>
<tr>
<td>R</td>
<td>5</td>
<td>6'-3&quot;</td>
</tr>
<tr>
<td>S</td>
<td>5</td>
<td>As Reqd.</td>
</tr>
<tr>
<td>W</td>
<td>5</td>
<td>5'-3&quot;</td>
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</tbody>
</table>

ROADWAY CROSS-SLOPE
<table>
<thead>
<tr>
<th>SLOPE</th>
<th>84</th>
<th>90</th>
<th>94</th>
<th>98</th>
</tr>
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<tbody>
<tr>
<td>0% to 2%</td>
<td>90°</td>
<td>90°</td>
<td>90°</td>
<td>90°</td>
</tr>
<tr>
<td>2% to 6%</td>
<td>94°</td>
<td>94°</td>
<td>94°</td>
<td>94°</td>
</tr>
<tr>
<td>6% to 10%</td>
<td>98°</td>
<td>98°</td>
<td>98°</td>
<td>98°</td>
</tr>
</tbody>
</table>

$84$ and $88$ shall be $90^\circ$ if Contractor elects to place railing perpendicular to the deck, and approach slabs.

BAR 5S

Transition Stirrup Bar 5W
To Be Field Cut and Bent
(10 required per Rolling End Transition)

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are cut to cut.
2. All reinforcing steel at the open joints shall have a 2" minimum cover.
3. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".
4. At the Contractor’s option, Bars 5W may be fabricated as a two piece bar with a 1'-0" lap splice at the bottom legs.

DETAIL “B” - SECTION AT INTERMEDIATE OPEN JOINT

NOTE: At Intermediate Open Joints, plug the lower 3" portion of the open joint by filling it with mortar in accordance with Section 400 of the Specifications.

ESTIMATED TRAFFIC RAILING QUANTITIES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
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<tbody>
<tr>
<td>Concrete</td>
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<tr>
<td>Reinforcing Steel</td>
<td>B/Y/F</td>
<td>23.29</td>
</tr>
</tbody>
</table>

(The above quantities are based on a crowned roadway, with a 2% cross slope.)