**NOTES:***

1. For the entire length of single slope concrete bridge railings, project plans shall show the locations of deflection joints.

2. Deflection joint spacing shall not exceed 4'-0" on centers. For continuous structures, the deflection joints within the dead load contract area in the middle of any single span shall be spaced not less than 5'-0" nor more than 10'-0" on centers.

3. Payment for 3/4" dia. glass fiber reinforced polymer (GFPR) stiffening reinforcement shall be included with contract price for item 509 - epoxy coated reinforcing steel.

4. (Notes of Sawcut is shown in detail A, Sheet 4/5 - 1/4" sawcut depth shown in detail A is the minimum required. However, the contractor has an option to perform full depth sawcut.

**DESIGN CRITERIA:***

4" single slope concrete bridge railings meet the requirements of NCHRP 550 test level. 5 and AASHTO LRD bridge design specifications, 2001.

**DESIGN DATA:***

- Concrete - compressive strength = 4,500 psi
- Reinforcing steel - minimum yield strength = 60,000 psi
- Area of standard 4" SBR-1 cross section = 0.660 sq. in.
- Volume of 4" SBR-1 + 4" transition section = 1,188 cu. ft.
- Deflection joints for concrete parapets:
  - Sawcut 1/4" inch deep deflection joints along the perimeter of the parapet when the concrete is still green or as soon as the saw can be operated without damaging the concrete.
  - After the concrete curing period specified in CMS 501.4, sawn joints shall be covered with a protective rubber or plastic strip.
  - The contractor has an option to perform full depth sawcut, however, the sawcut shall not be less than 1/4" from the top of the concrete deck slab.

**SECTION A-A***

GRP fiber stiffening detail at deflection joints for single slope concrete bridge railing

**SECTION B-B***

Reinforced concrete deck on steel or prestressed concrete I-beams shown

**MAXIMUM SPACING OF VERTICAL REINFORCING BARS FOR STANDARD 47" SBR-1 CONCRETE PARAPETS:***

The maximum spacing of vertical reinforcing bars for the standard 47" SBR-1 concrete parapet shall be 1'-0" unless noted otherwise.

**MAXIMUM SPACING OF VERTICAL REINFORCING BARS FOR 47" SBR-1 TRANSITIONS:***

The maximum spacing of vertical reinforcing bars for the 47" SBR-1 transition section shall be as shown on Sheets R89, R89B, and R89C.

**MINIMUM EMBEDMENT OF VERTICAL REINFORCING BARS:***

If the minimum embedment shown for the vertical reinforcing bars into the bridge deck, approach slab, or parapet is not met, then the designer shall calculate the required embedment according to section 13 of the "AASHTO LRD bridge design specifications" adopted by the American Association of State Highway and Transportation Officials.