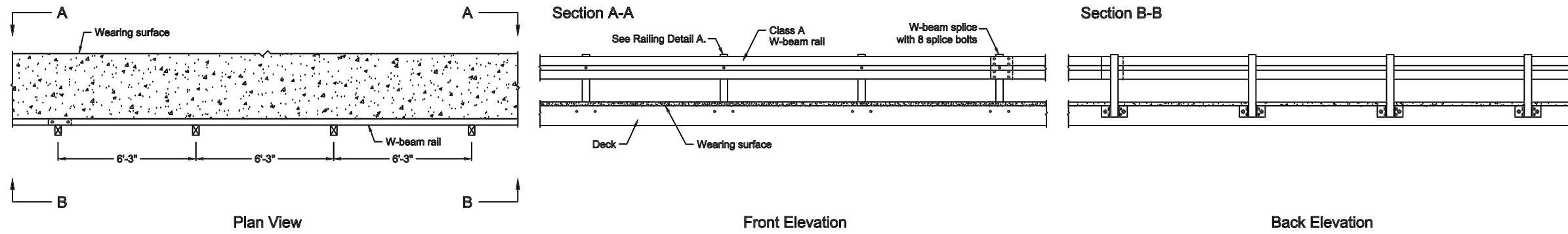


## General Configuration



## Design

1. This bridge rail was successfully crash tested to the requirements for Test Level 1 (TL-1), as outlined in NCHRP Report 350 (Ross and others 1993). This rail is adaptable to longitudinal stress-laminated, spike-laminated, nail-laminated, and glued-laminated (glulam) timber decks that are 6 in. or greater in actual thickness and are less than 100 ft in length. For additional information, refer to Development of a Flexible Bridge Railing for Longitudinal Timber Decks (Faller and Rosson 1997).

2. This railing is a breakaway system where the wood posts are designed to separate from the deck attachment at vehicle impact. Vehicle containment is by tension developed in the steel bridge railing and approach railing systems.

3. Bridge railing shall be provided with a strong-post W-beam approach guardrail (SGR04a-b) and an appropriate end terminal as outlined in the AASHTO-AGC-ARTBA Guide to Standardized Highway Barrier Hardware.

4. Actual height of the bridge rail shall be 27-3/4 in. above the traveled way (top of wearing surface or top of bridge deck if a wearing surface is omitted), but not greater than 29-3/4 in. above the bridge deck.

## Materials

5. Sawn lumber posts shall comply with the requirements of AASHTO M168 and shall be pressure treated with wood preservative in accordance with AASHTO M133. Post dimensions shall be 3-1/2 by 5-1/2 in., which are the actual dimensions for a nominal 4-by-6-in. post that is surfaced on four sides (S4S).

6. Posts shall be visually graded No. 2 or better with a maximum tabulated bending stress ( $F_b$ ) of 1,250 lb/in<sup>2</sup> and a maximum tabulated modulus of elasticity ( $E$ ) of 1,600,000 lb/in<sup>2</sup>.

7. W-beam rail and rail splice bolts shall comply with the requirements of AASHTO M180. Railing shall be Class A (0.105-in. nominal base metal thickness).

8. Steel plates and shapes shall comply with the requirements of ASTM A36.

9. Unless otherwise noted, bolts and lag screws shall comply with the requirements of ASTM A307.

10. All steel components and fasteners shall be galvanized in accordance with AASHTO M111 or M232 or shall otherwise be provided with adequate corrosion protection.

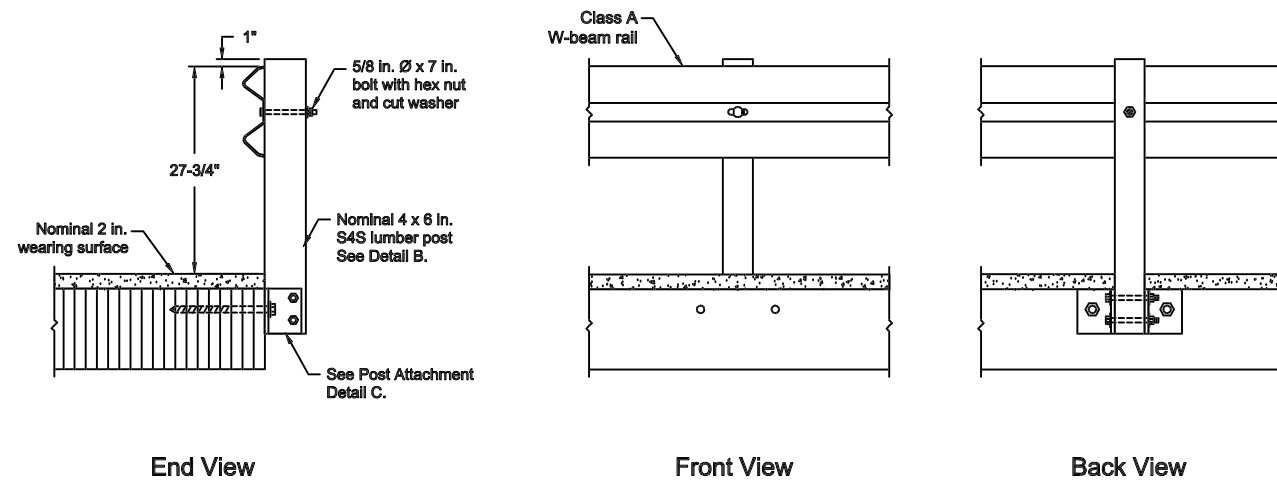
## Fabrication and Construction

11. To the extent possible, all wood shall be cut, drilled, and completely fabricated prior to pressure treatment with preservatives. When field fabrication of wood is required or if wood is damaged, all cuts, bore holes, and damage shall be immediately treated with wood preservative in accordance with AASHTO M133.

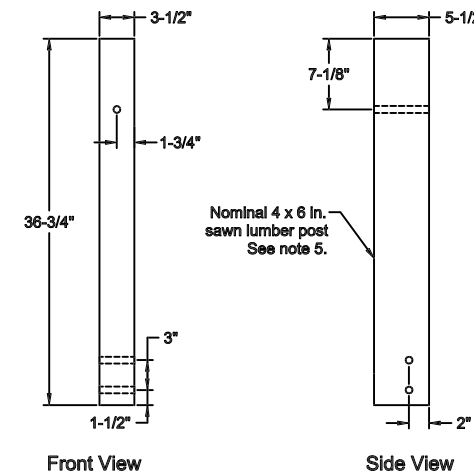
12. Unless noted, malleable iron washers shall be provided under bolt heads and under nuts that are in contact with wood. When the size and strength of the head are sufficient to develop connection strength without wood crushing, washers may be omitted under heads of dome-head timber bolts.

13. Top of rail posts shall be sealed with roofing cement or otherwise protected from direct exposure to weather.

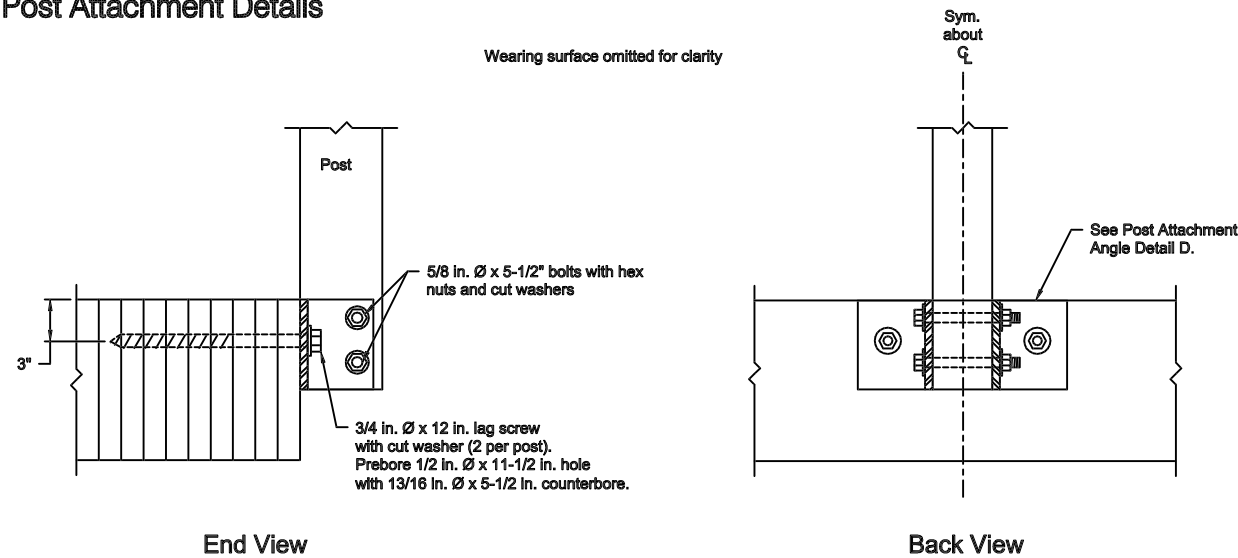
## A Railing Details



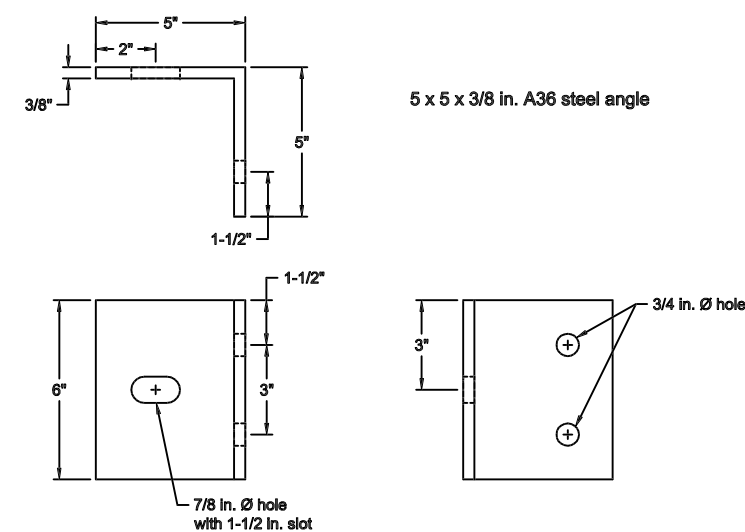
## B Post Detail



## C Post Attachment Details



## D Post Attachment Angle



The bridge railings depicted on these drawings were developed and crash tested under a cooperative research agreement between the Midwest Roadside Safety Facility of the University of Nebraska-Lincoln and the USDA Forest Service, Forest Products Laboratory.



# Crash-Tested Bridge Rails for Longitudinal Wood Decks on Low-Volume Roads

Side Mounted Breakaway Railing  
NCHRP 350 Test Level 1 (TL-1)

August 1998

Sheet 1 of 1