

CONSTRUCTION NOTES:
Test adhesive anchors in accordance with Oregon Standard Specification 00535.45. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

Erect mounting plates square to the top of parapet. Place grout under mounting plate for gaps greater than 1/16". Provide grout according to Oregon Standard Specification 2080.30.

Panel lengths of rail section members must be attached continuously to a minimum of three mounting plates. 2

One shop splice per panel is permitted with minimum 85% penetration. The weld may be square groove, double vee groove, or single groove. Grind smooth.

Round or chamfer all exposed edges of steel components 1/16" by grinding prior to galvanizing.

Cap all open ends of tubular steel sections.

Field verify rail heights prior to fabrication.

MATERIAL NOTES:
Provide structural tubing according to Oregon Standard Specification 02810.20.

Provide steel mounting plates conforming to ASTM A572 Gr 50 unless otherwise noted.

Anchor rods must be 3/4" dia. ASTM F1554 Grade 105 threaded rods with heavy hex nuts, one hardened steel washer, and one (2" O.D.) steel washer each.

Anchor installation, include hole size, drilling, and clean out, must be in accordance with Oregon Standard Specification 00535. Anchor adhesive chosen must be able to achieve a minimum pullout force of 30kips. Use Hilti HIT-HY200-A, or Hilti HIT-RE 500v3, or Red Head C6+ or Ultrabond HS-1CC epoxy adhesive from the QPL. Minimum adhesive anchor embedment depth is 10 1/2".

Hot-dip galvanized structural steel including fasteners after fabrication, except as noted. Provide Galvanize-Control Silicon according to Oregon Standard Specification 02530.70.

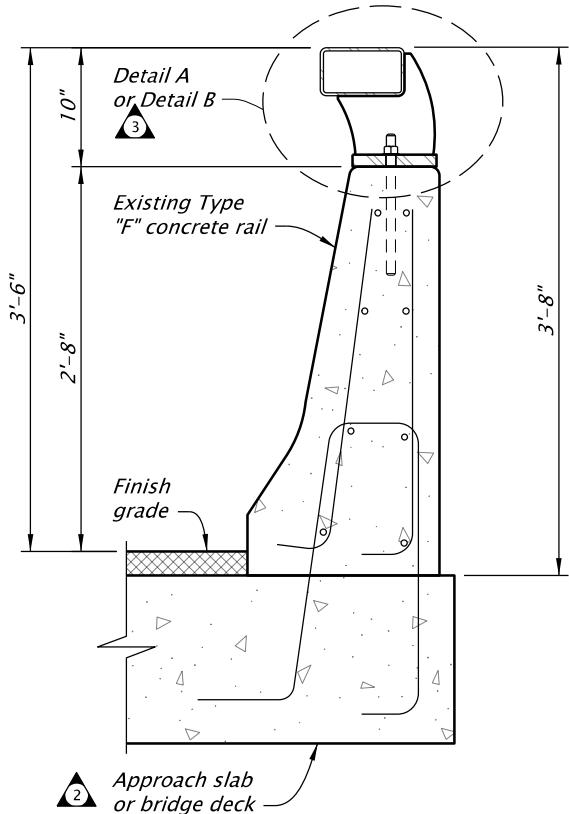
GENERAL NOTES:
Rail evaluated to meet MASH TL-4 requirements. This rail retrofit can be used for speeds of 45 mph and greater when a TL-3 rated guardrail transition is used.

Do not use this railing on bridges with expansion joints providing more than 5" movement.

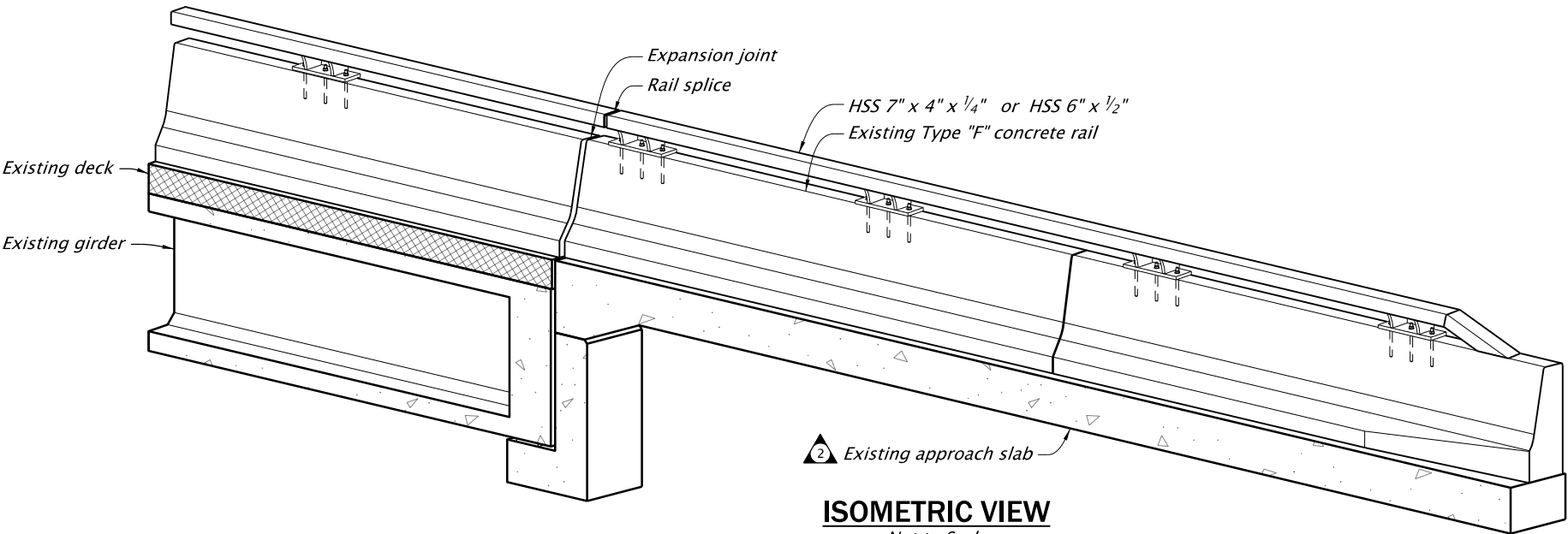
Submit erection drawings showing panel lengths, mounting plate spacing, and anchor rod setting to the Engineer for approval.

NOTE TO DESIGNER:
Check structural capacity of the existing bridge deck overhang and strengthen as required.

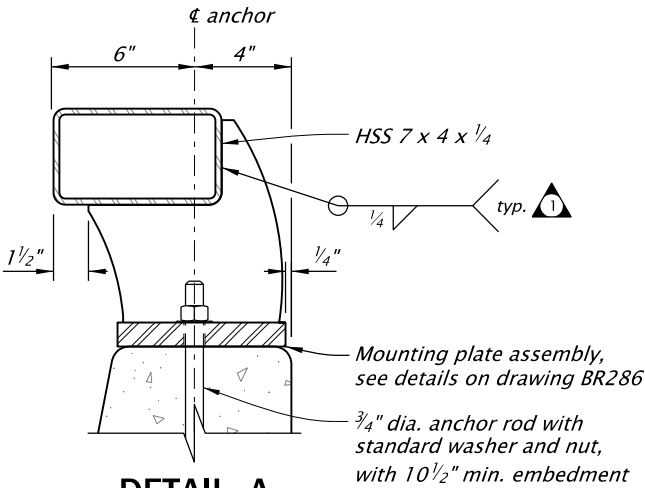
RAIL DATA FOR HORIZONTAL CURVES			
	RADIUS TO FACE OF RAIL	MAX. CHORD LENGTH	CONSTRUCT OR FABRICATE
Rail Members	Over 2800'	29'-0"	Straight rail sections
	Over 1400' through 2800'	14'-6"	To required radius
	Over 700' through 1400'	7'-3"	or to chords shown
	Through 700'	Zero	To required radius



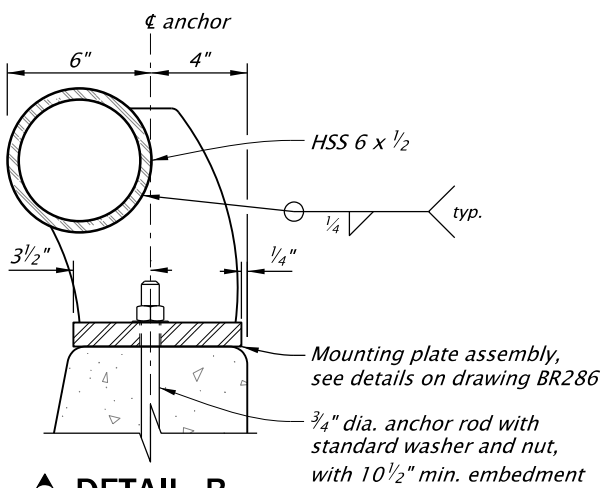
TYPICAL SECTION
Scale: 3/4"=1'-0"



ISOMETRIC VIEW
Not to Scale



DETAIL A
Scale: 1 1/2"=1'-0"



DETAIL B
Scale: 1 1/2"=1'-0"

Accompanied by drawings BR200, BR203, BR236

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.		
OREGON STANDARD DRAWINGS		
TYPE "F" CONCRETE RAIL TUBE RETROFIT SHEET 1 OF 3 3		
2024		
DATE	REVISION	DESCRIPTION
07-2020		Update section number for adhesive anchor test.
07-2021		Modify mounting plate to tube weld size, Detail A.
07-2025		Note Changes/CAD edits.
07-2025		Title updated to reflect round HSS alternative; Detail B added.
CALC. BOOK NO.	N/A	SDR DATE 11-JULY-2025
		BR285