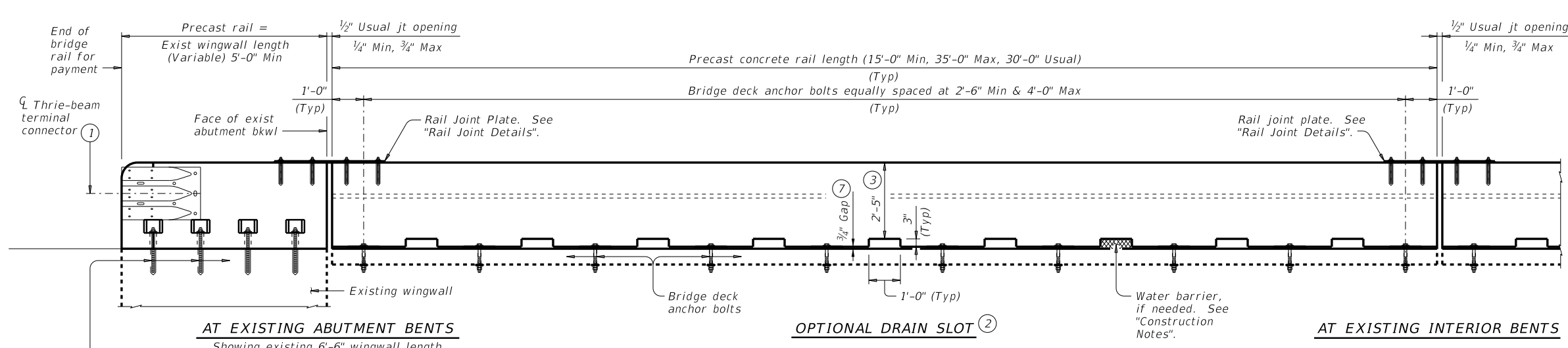
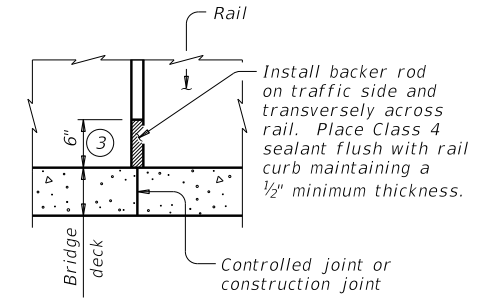


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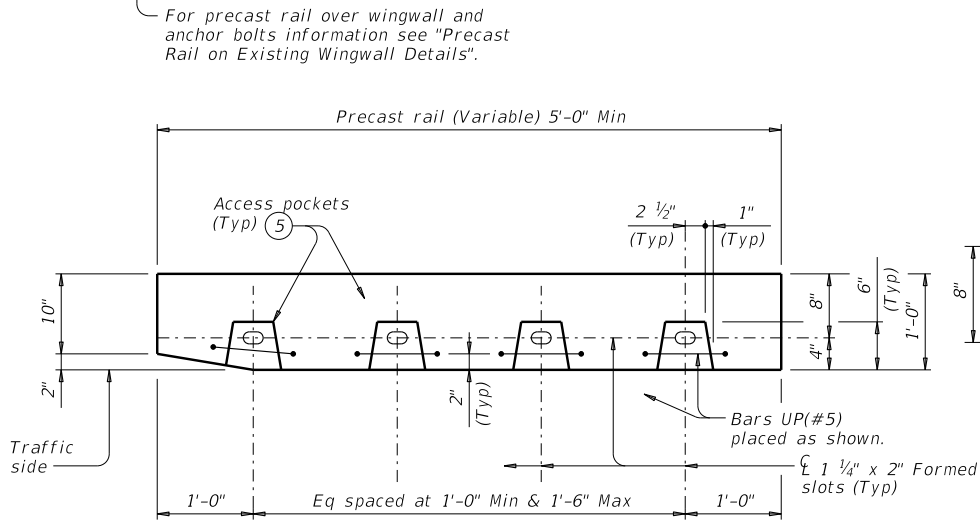
**ROADWAY ELEVATION OF RAIL RETROFIT**



**SEALED JOINT DETAIL**

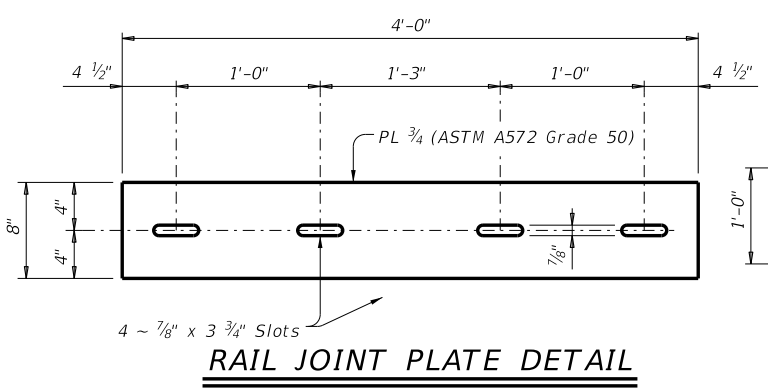
Provide at all interior bents without slab expansion joints.

- 1 Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- 2 Center optional drain slots between bridge deck anchor bolts. Drains should not be placed over railroad tracks, lower roadways, or sidewalks.
- 3 Increase 2" for structures with overlay.
- 4 Anchor bolts must be 1" Dia ASTM A449 or A193 Grade B7 fully threaded rods, each with one heavy hex nut that conforms to ASTM A563 requirements, and one 3/8 x 3 x 3 plate washer (ASTM A36) with a centered 1/8" Dia hole. Embed fully threaded rods into concrete wingwall using a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, 50 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean-out, must be in accordance Item 450, "Railing".
- 5 Fill access pockets with Type A-4, vertical or overhead repair material in accordance with DMS-4655, "Concrete Repair Materials". Perform work in accordance with Item 429, "Concrete Structure Repair".
- 6 3/4" Dia fully threaded rods (ASTM A449 or A193 Grade B7), each with one 1/4 x 2 x 2 plate washer (ASTM A36) with a centered 7/8" Dia hole and one heavy lock washer placed under heavy hex nut that conforms to ASTM A563 requirements. Embed threaded rods into concrete parapet with a Type III Class C, D, E, or F anchor adhesive. Minimum adhesive anchorage embedment depth is 6". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 30 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing".
- 7 See "Gap Seal Detail".

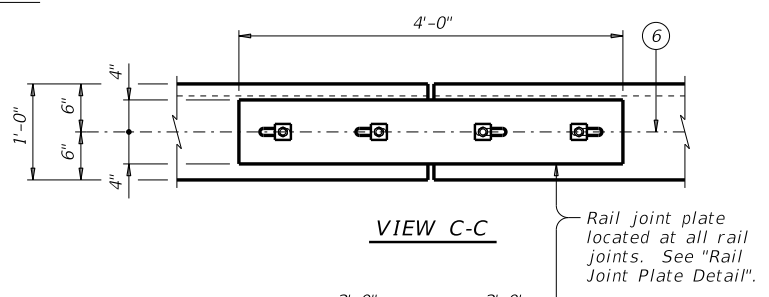


**SECTION A-A**

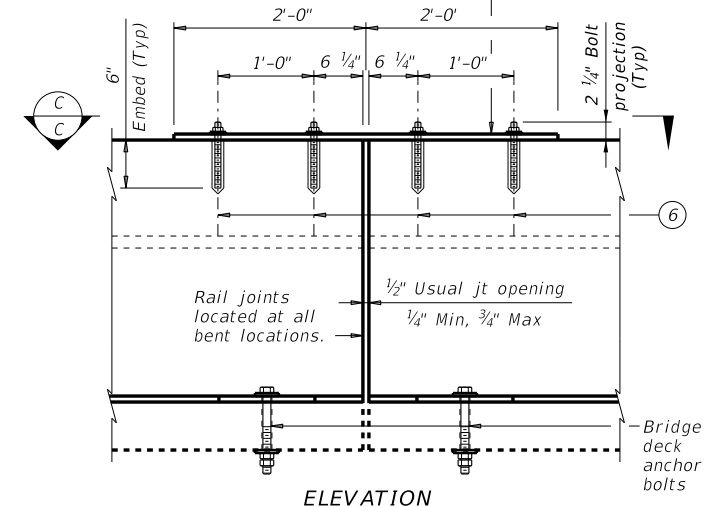
Anchor bolts not shown for clarity.



**RAIL JOINT PLATE DETAIL**

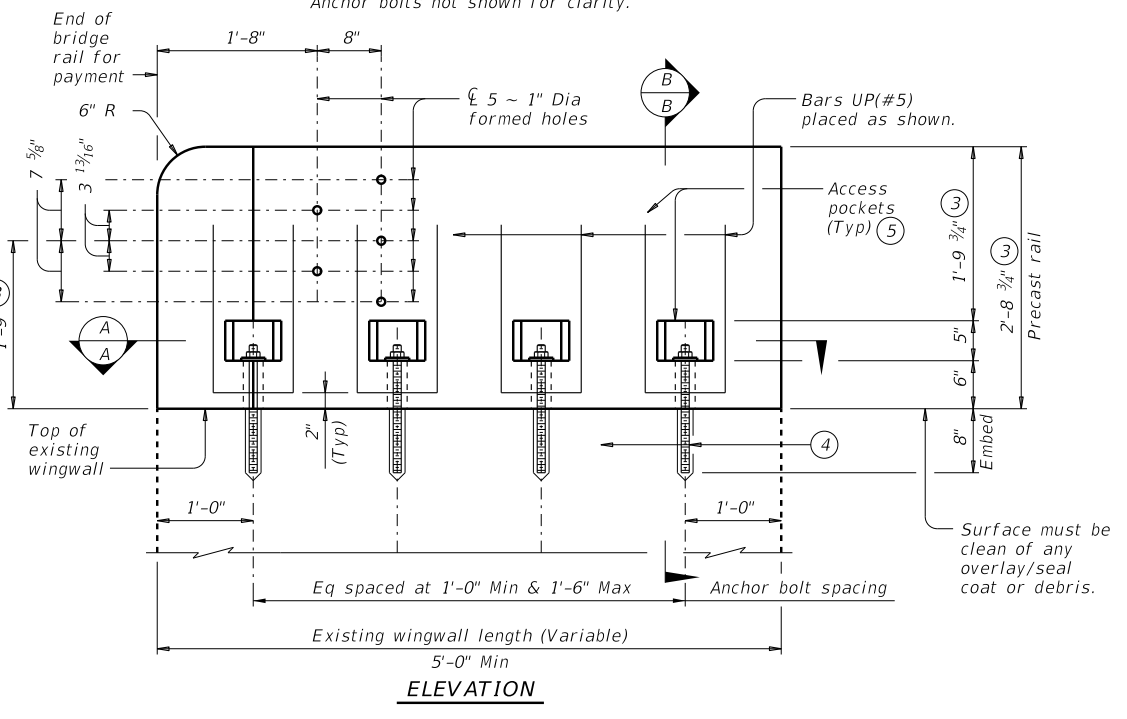


**VIEW C-C**



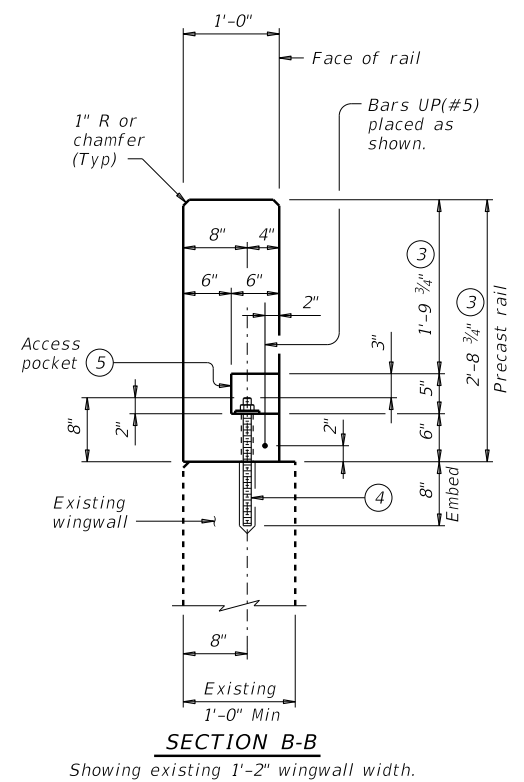
**ELEVATION RAIL JOINT DETAILS**

Rail joints can occur on spans between centerline of bents.



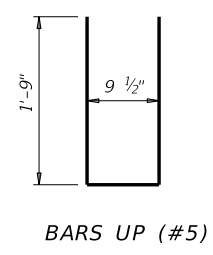
**PRECAST RAIL ON EXISTING WINGWALL DETAILS**

Precast rail shown is detailed for one side only, other side similar. For other side precast rail must be built for opposite hand. Normal rail reinforcing not shown on details for clarity.



**SECTION B-B**

Showing existing 1'-2" wingwall width.



**BARS UP (#5)**



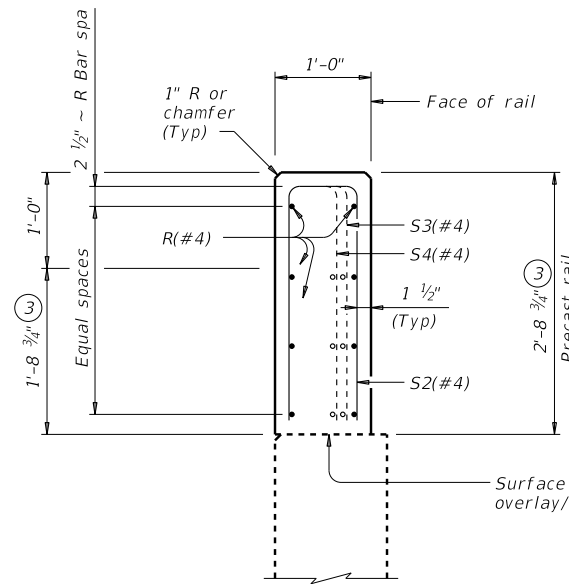
**GUIDE FOR PRECAST TRAFFIC RAIL**

(Not to be used as a standard)  
**TYPE T221P**

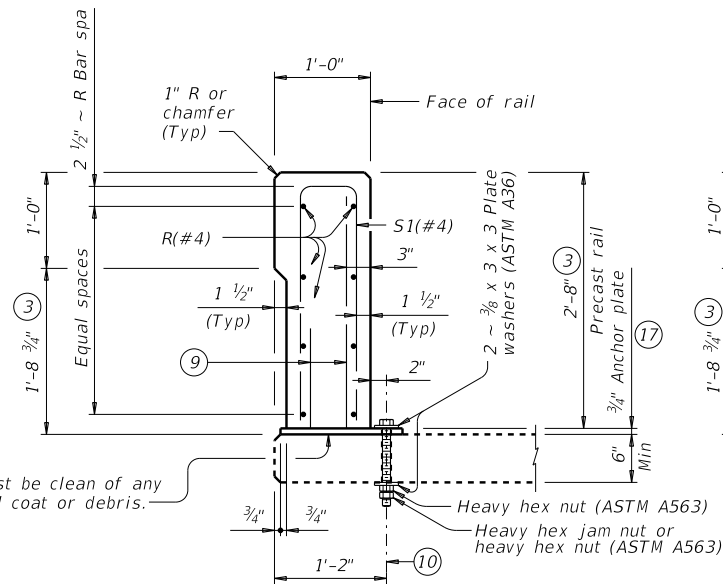
FILE: RL-T221P-19.dgn	DN: TxDOT	CK: AES	DW: JTR	CK: AES
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.

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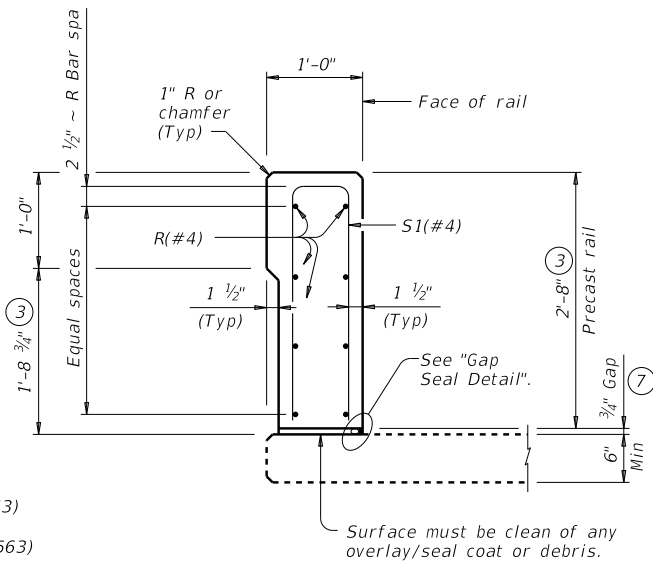
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**ON EXISTING ABUTMENT WINGWALLS** ⑧

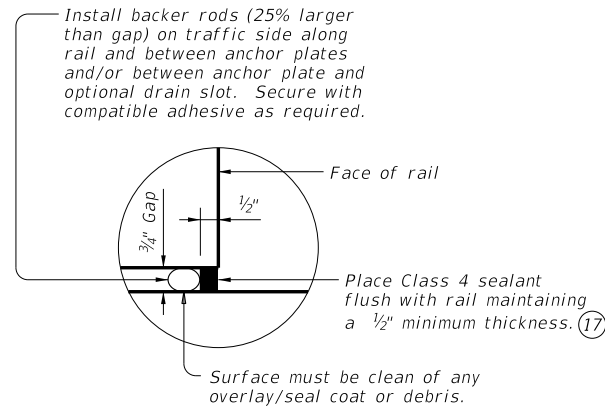


**ON EXISTING BRIDGE SLAB AT ANCHOR PLATE** ⑪

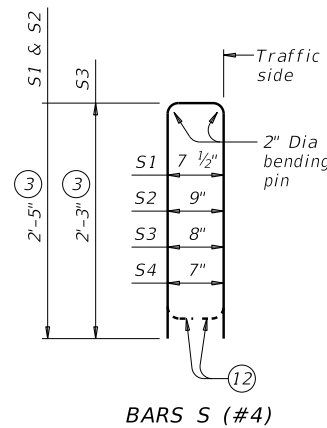


**ON EXISTING BRIDGE SLAB BETWEEN ANCHOR PLATES** ⑪

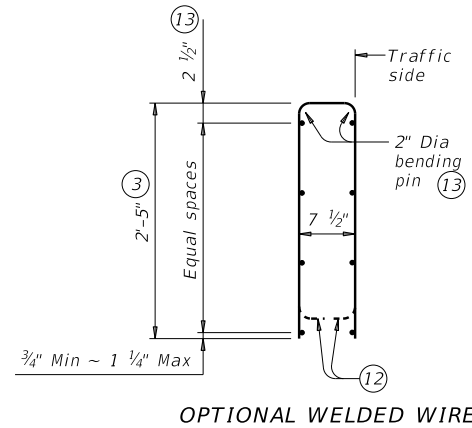
**SECTIONS THRU PRECAST RAIL RETROFIT**



**GAP SEAL DETAIL**

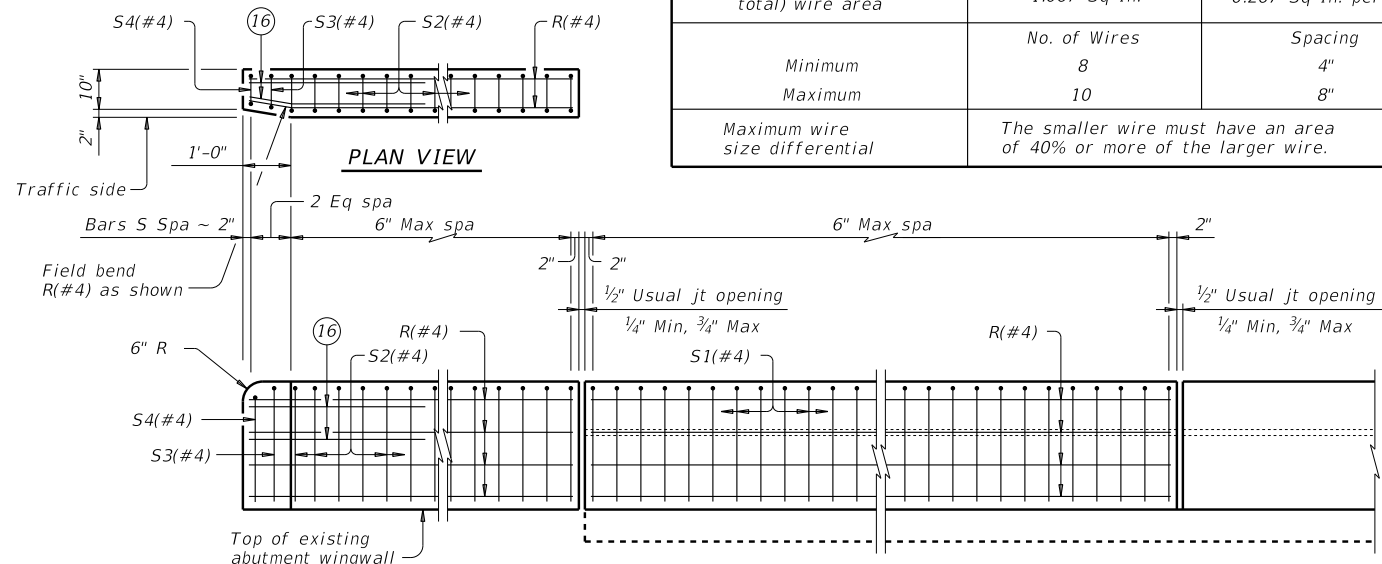


**BAR S (#4)** ⑫



**OPTIONAL WELDED WIRE REINFORCEMENT (WWR)** ⑬

DESCRIPTION	LONGITUDINAL WIRES	VERTICAL WIRES
Minimum (cumulative total) wire area	1.067 Sq In.	0.267 Sq In. per Ft
Minimum	No. of Wires	Spacing
Maximum	8	4"
	10	8"
Maximum wire size differential	The smaller wire must have an area of 40% or more of the larger wire.	



**AT EXISTING WINGWALLS** ⑧

**AT EXISTING SPANS** ⑪

**ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT** ⑮

- ③ Increase 2" for structures with overlay.
- ⑦ See "Gap Seal Detail".
- ⑧ Access pockets and formed holes not shown for clarity. Reinforcing must be moved, bent or cut as necessary to maintain a 1" cover around access pockets. For formed holes, access pockets and Bars UP(#5), see "Precast Rail On Existing Wingwall Details".

- ⑨ 3/8" deformed bar anchors. See "Anchor Plate Details".
- ⑩ 1 1/16" to 1 1/4" Dia holes through existing deck (percussion drilling not permitted). Patch concrete spalls in bottom of deck exceeding 1/2" from edge of holes in accordance with Item 429, "Concrete Structure Repair" at the Contractor's expense. Bridge deck anchor bolts must be 1" Dia (ASTM F3125 Gr A325 or A449), each with 1 heavy hex nut (ASTM A563), 1 heavy hex jam nut (ASTM A563), 2 ~ 3/8 x 3 x 3 plate washers (ASTM A36) with a centered 1 1/16" Dia hole. For spacing of bridge deck anchor bolts and anchor plate see "Roadway Elevation of Rail Retrofit".
- ⑪ Optional drain slot not shown for clarity. Reinforcing must be bent or cut as necessary to maintain a 1" cover around drain slots. For spacing of drain slots see "Roadway Elevation of Rail Retrofit".
- ⑫ Bend or cut as required to clear drain slots.
- ⑬ No longitudinal wires may be in top center of cage.
- ⑭ 3/8" deformed bar anchors (DBA), electric arc end-welded to plate with complete fusion. After DBAs are attached to anchor plate, galvanize anchor plate and DBAs. DBAs must not be epoxy coated.
- ⑮ Rail Joint Plates not shown for clarity. See "Rail Joint Details". Bridge deck anchor bolts with anchor plates not shown for clarity.
- ⑯ Place 4 additional Bars R(#4) 3'-8" in length inside Bars S(#4) and centered 2'-0" from end of rail when terminal connections are required.
- ⑰ Provide Class 4 sealant around anchor plate protruding out from bottom of bridge rail to the bridge deck.

**CONSTRUCTION NOTES:**

Rail can be installed on cross-slope up to 2% without any modification to anchor plate. Contractor may provide lifting devices (lugs, loops, etc.) in the rail at their option. Lifting devices must be located in rail so as to not exceed tensile strength of the concrete during lifting. Permanent steel components must be galvanized. Use shims to fill gaps beneath anchor plates larger than 1/4", up to 1". Shims must match dimensions of anchor plate and include hole. Chamfer all exposed corners. Water barriers must be provided at openings draining onto railroads tracks, undercrossing roadways and sidewalks. They may be cast in precast in convenient length and bonded to the bridge deck with an approved epoxy cement.

**MATERIAL NOTES:**

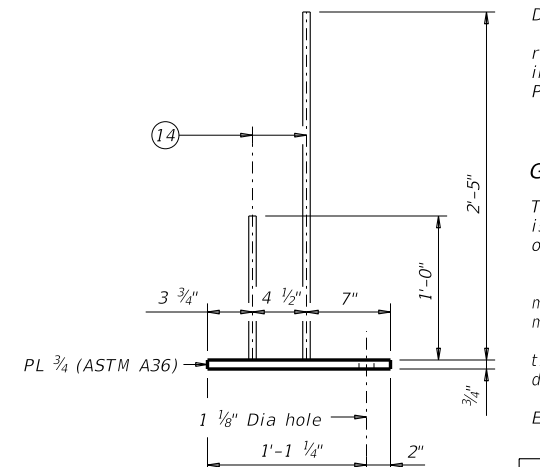
Galvanize all metal components of steel rail system. Provide Class "C" concrete. Provide Class "C" (HPC) if required elsewhere. Provide Grade 60 reinforcing steel. Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized. Deformed bar anchors (DBA) must not be epoxy coated. Deformed WWR (ASTM 1064) may be substituted for Bars R and S, as shown. Combinations of reinforcing steel and WWR or configurations of WWR other than that shown are permitted if conditions in the table are satisfied. Provide the same laps as required for reinforcing bars. Provide bar laps, where required, as follows: Uncoated or galvanized ~ #4 = 1'-7" Epoxy coated ~ #4 = 2'-5"

**GENERAL NOTES:**

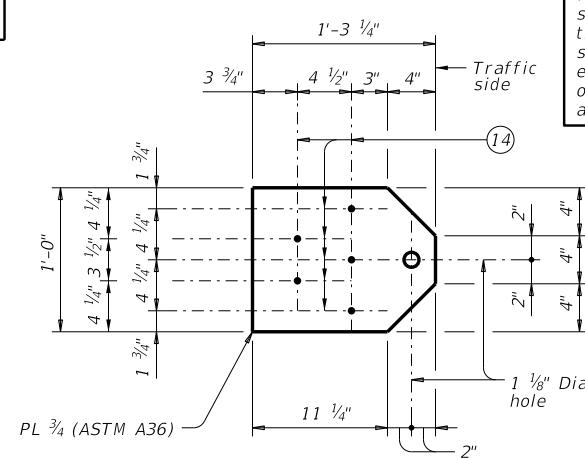
This rail has been successfully evaluated by full-scale crash test to meet MASH TL-3 criteria. This rail can be used for speeds of 50 mph and greater when a TL-3 rated guard fence transition is used. When a TL-2 rated guard fence transition is used, this rail can only be used for speeds of 45 mph and less. Do not use this railing on bridges with expansion joints providing more than 5" movement. Rail anchorage details shown on this standard for precast rail on existing wingwalls may require modification for select structure types. See appropriate details elsewhere in plans for these modifications. Consideration should be given for application of this rail to structures with vertical curve, as the rail anchors will not bear uniformly on the structure. This rail should not be used if gap due to vertical curve exceeds 1". Shop drawings are not required for this rail, but erection drawings must be submitted to the Engineer showing rail lengths, anchor bolt spacing and optional drain slots if chosen. Average weight of railing with no overlay is 376 plf.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing bar dimensions shown are out-to-out of bar.

This sheet is to be used as a guide for preparing project-specific details for retrofit to existing structures or rapid construction. Furnish slab thickness, span lengths, wingwall lengths, wingwall thickness, etc. Particular care should be taken with the bridge abutment wingwall conditions. This sheet may not be used without modification. Details shown may need to be amended if the exact existing condition is not covered. In all cases, details and notes not required must be crossed out or eliminated, "(MOD)" added, this note and the phrase "(Not to be used as a standard)" removed, and the sheets must be sealed and signed.



**ELEVATION**



**PLAN**

**ANCHOR PLATE DETAILS**



**GUIDE FOR PRECAST TRAFFIC RAIL**

(Not to be used as a standard)  
**TYPE T221P**

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