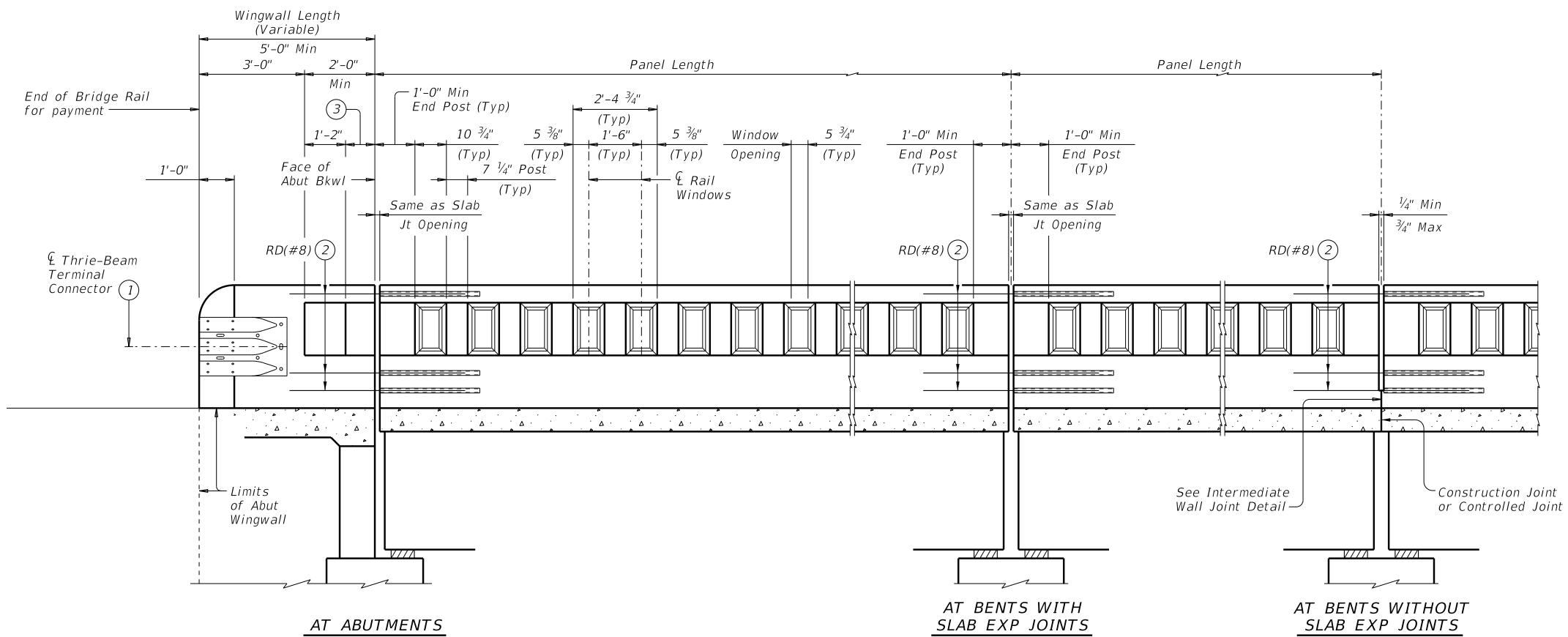
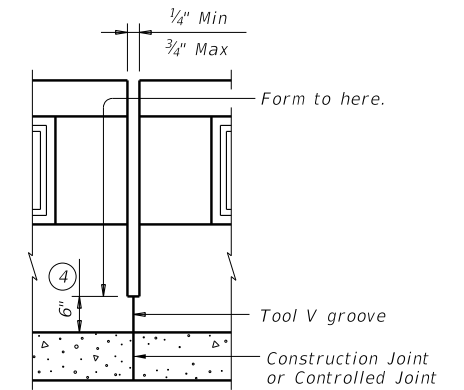


DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



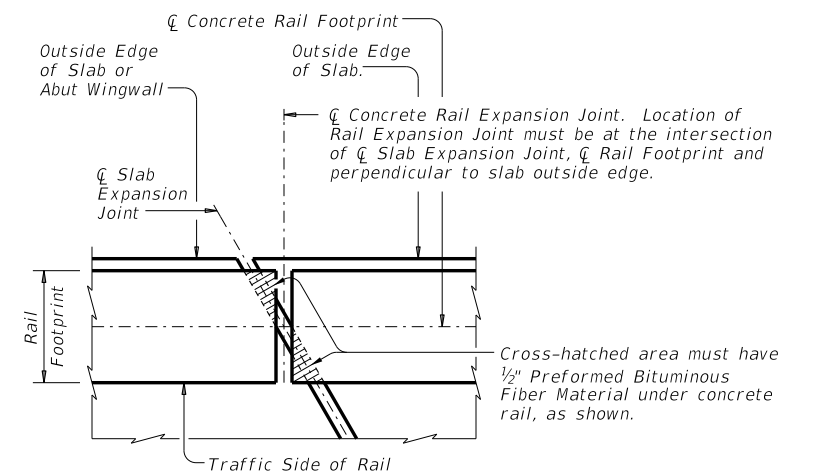
ROADWAY ELEVATION OF RAIL

(Showing without raised sidewalk)



INTERMEDIATE WALL JOINT DETAIL (5)

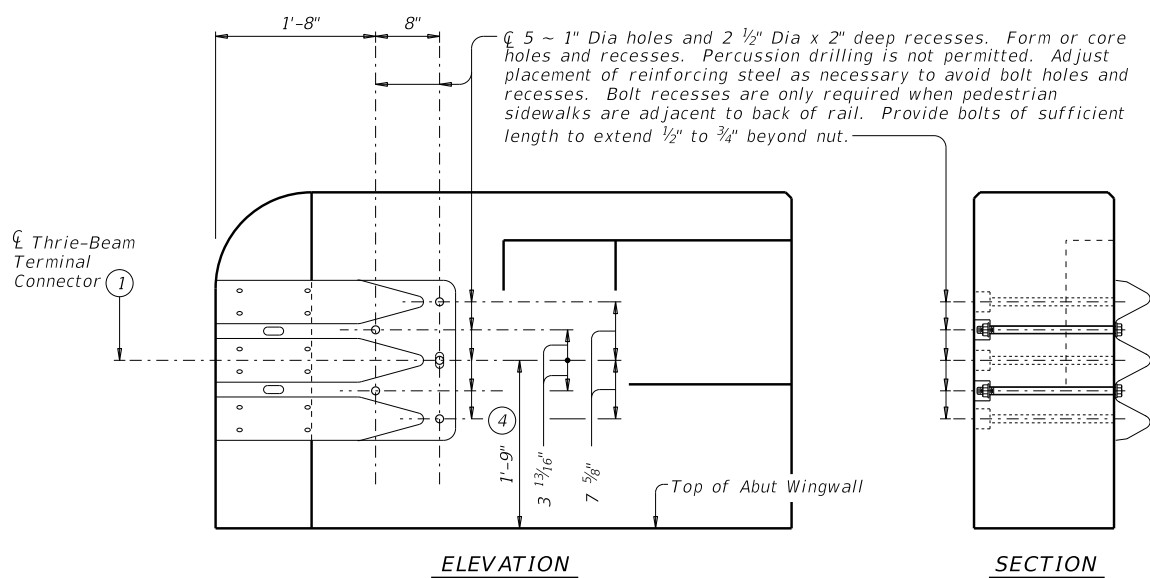
(Shown without raised sidewalk)
Provide at all interior bents without slab expansion joints.



PLAN OF RAIL AT EXPANSION JOINTS

Example showing Slab Expansion Joints without breakbacks.

- 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 Located at rail joints. For placement and assembly of RD(#8) bar, see "Sections Thru Rail Without or With Raised Sidewalk Section F-F On Abutment Wingwalls Or CIP Retaining Walls", "Sections Thru Rail Without or With Raised Sidewalk On Bridge Slab At Post" and "Bar RD(#8) Assembly Detail."
- ③ Wingwall length minus 4'-2" (Variable) 10" Min.
- ④ Increase 2" for structures with overlay.
- ⑤ RD(#8) bars located at rail joints are not shown for clarity.



TERMINAL CONNECTION DETAILS

(Reveals not shown for clarity. See "Typical Reveal Location Detail.")

SHEET 1 OF 4



COMBINATION RAIL

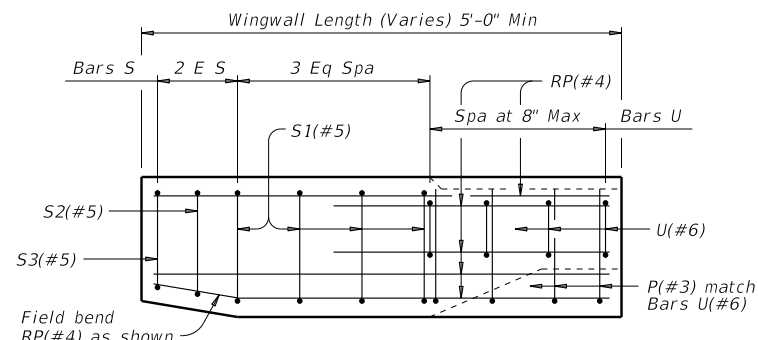
TYPE C412

FILE: RL-C412-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.

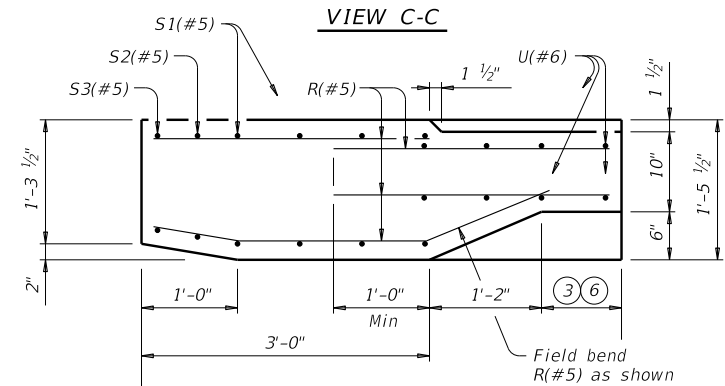
DATE:
FILE:

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

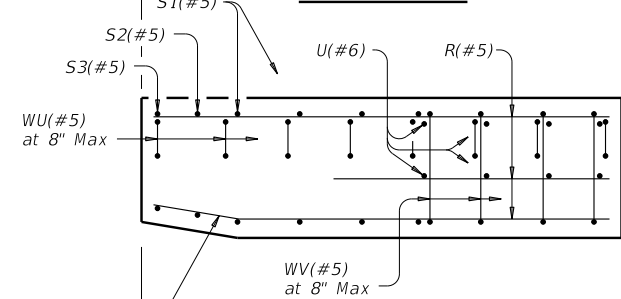
DATE: FILE:



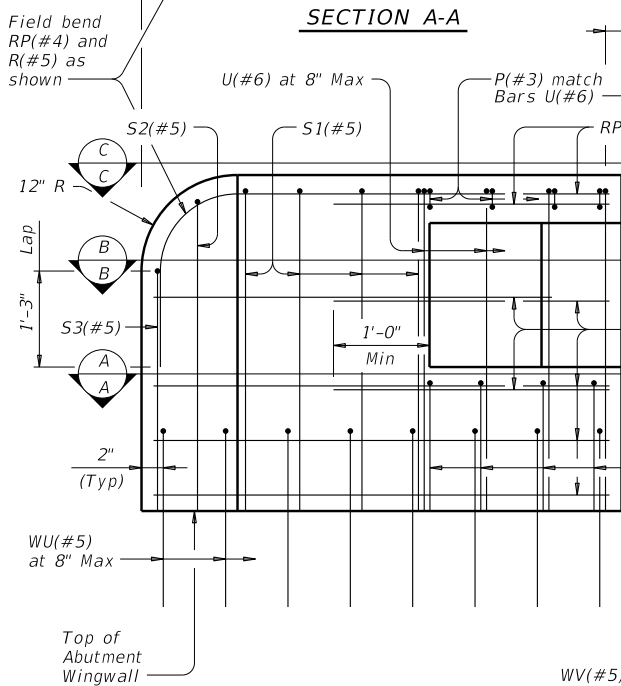
VIEW C-C



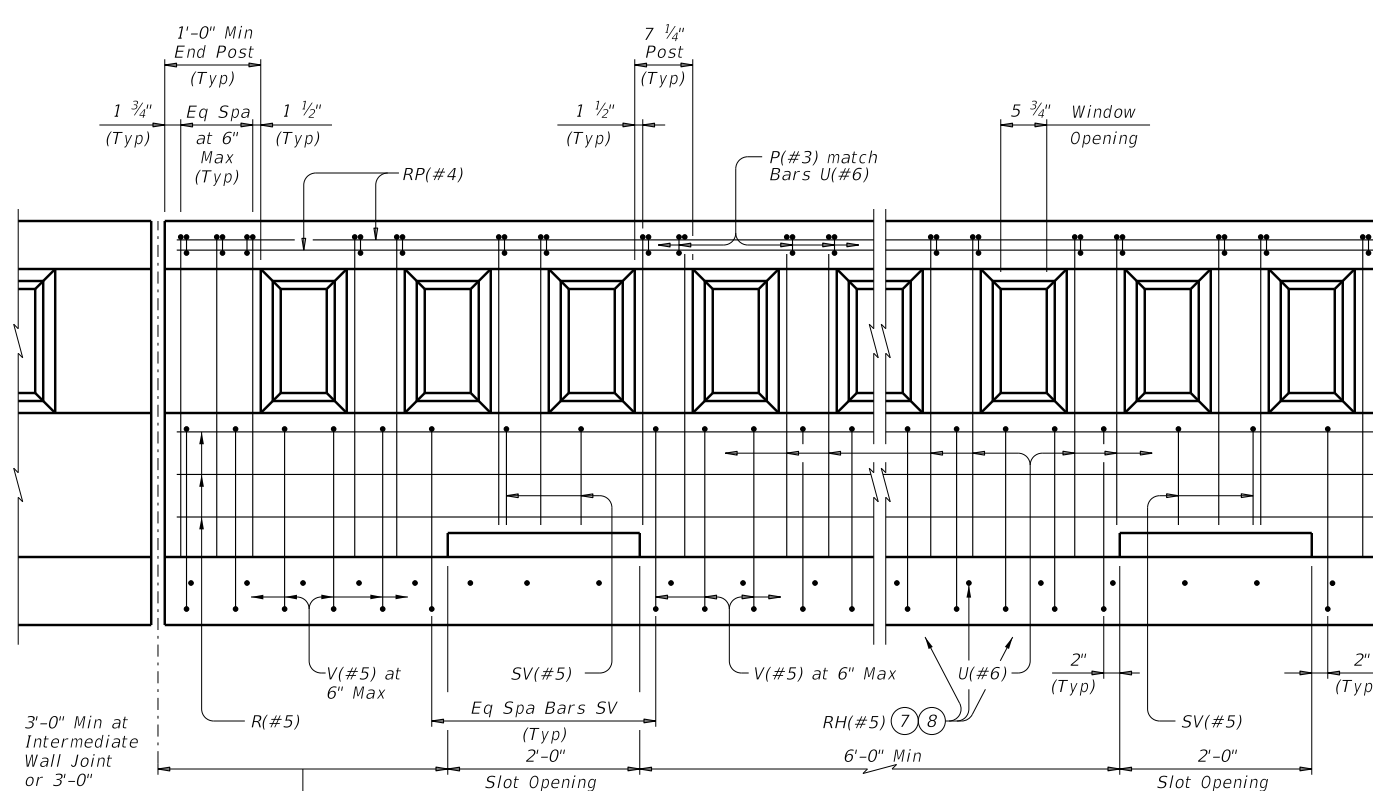
SECTION B-B



SECTION A-A

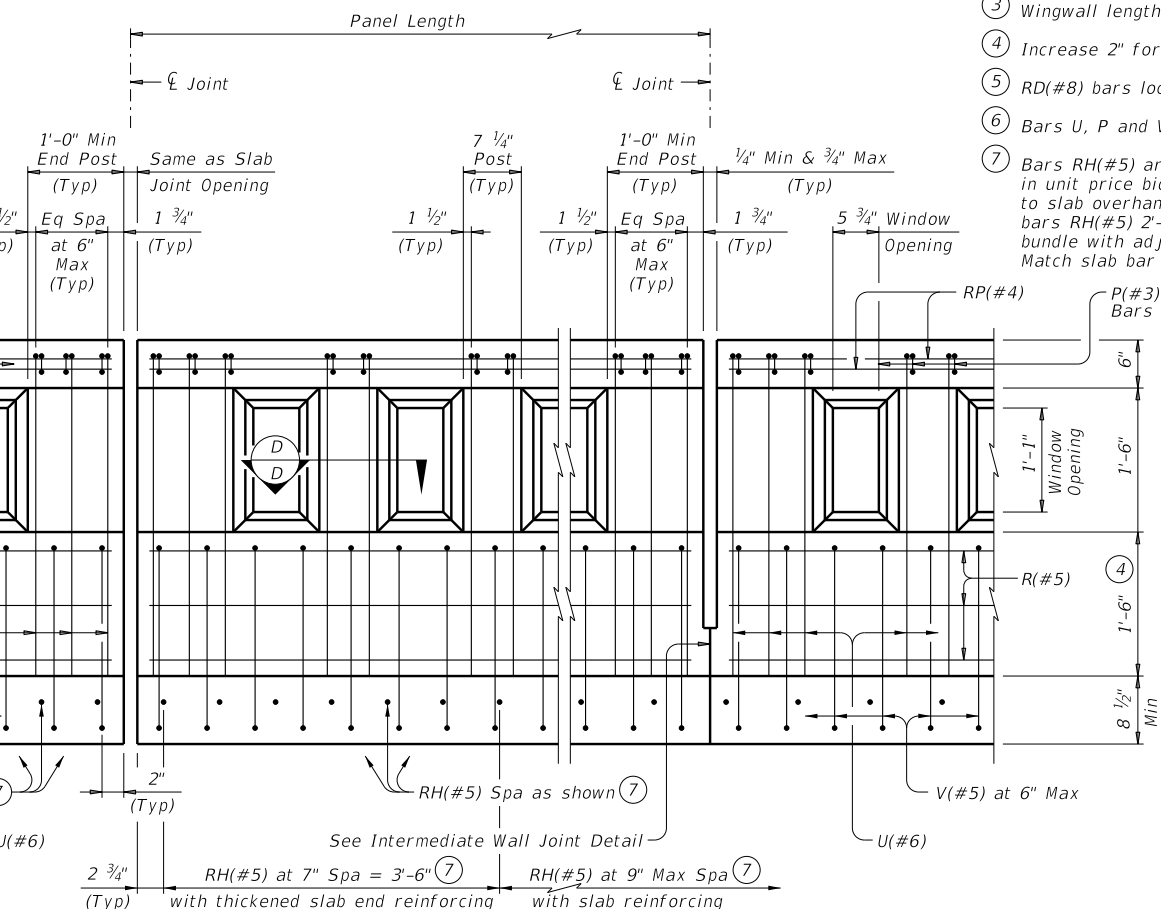


AT ABUTMENT WINGWALL



OPTIONAL SIDE SLOT DRAIN DETAIL ⑧

Note: Side Slot Drains may be used where shown elsewhere on the plans or as directed by the Engineer. Do not place drains over railroad tracks, lower roadways, or sidewalks. When this rail is used as a separator between a roadway surface and a sidewalk surface, side drain slots are not permitted.

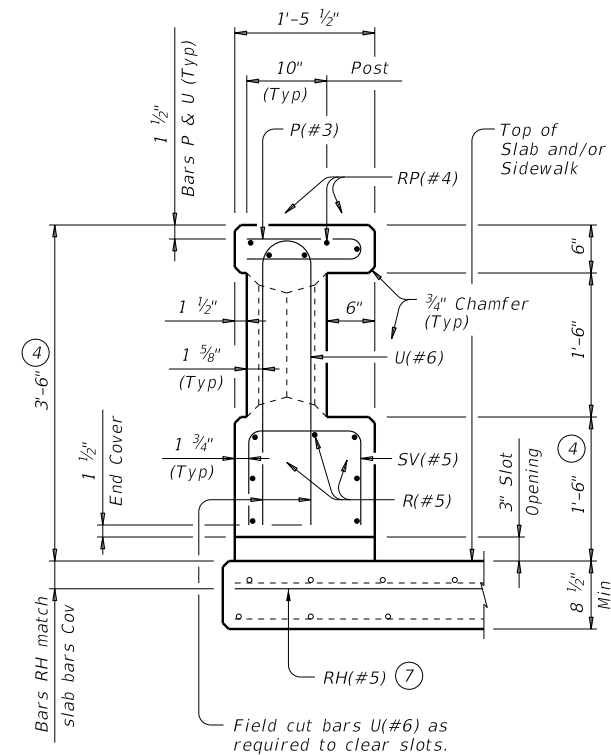


AT BENTS WITH SLAB EXP JOINTS

AT BENTS WITHOUT SLAB EXP JOINTS

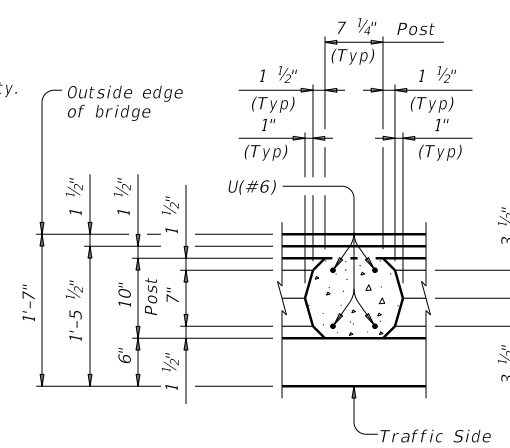
ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT ⑤

(Shown without raised sidewalk.)



SECTION THRU OPTIONAL SIDE SLOT DRAIN

- ③ Wingwall length minus 4'-2" (Variable) 10" Min.
- ④ Increase 2" for structures with overlay.
- ⑤ RD(#8) bars located at rail joints are not shown for clarity.
- ⑥ Bars U, P and WV are spaced at 8" Max.
- ⑦ Bars RH(#5) are part of rail reinforcing and are included in unit price bid for railing. Bars RH(#5) are in addition to slab overhang reinforcement shown elsewhere. Extend bars RH(#5) 2'-0" Min past ϕ of beam/girder. Space and bundle with adjacent slab bars G(#4) and bars A(#4). Match slab bar cover. (Typ)
- ⑧ See "Elevation Showing Typical Reinforcing Placement" for spacing RH(#5) bars.

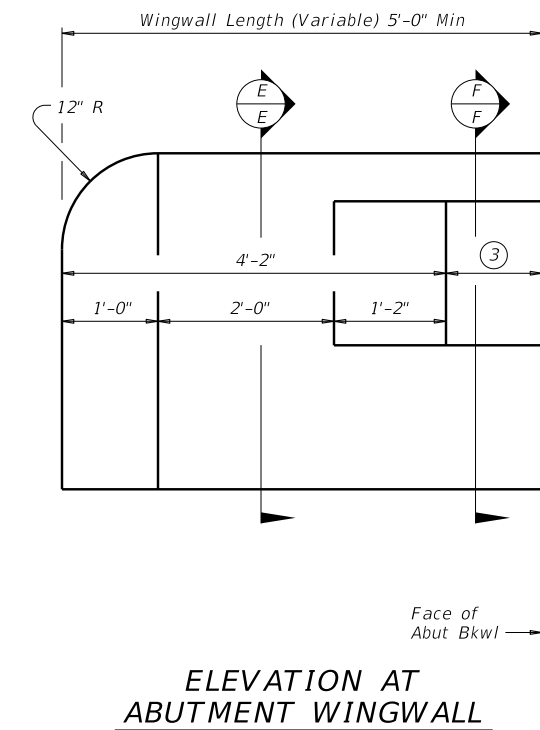
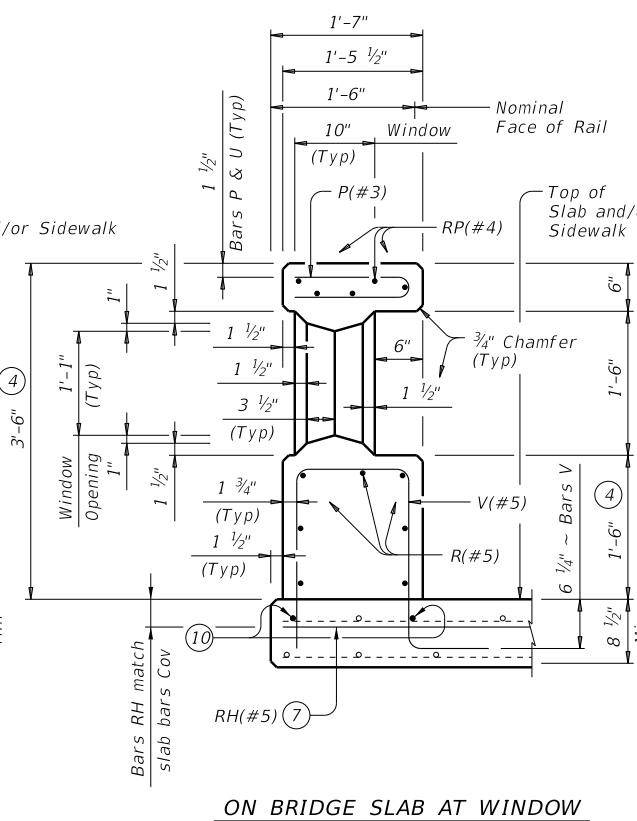
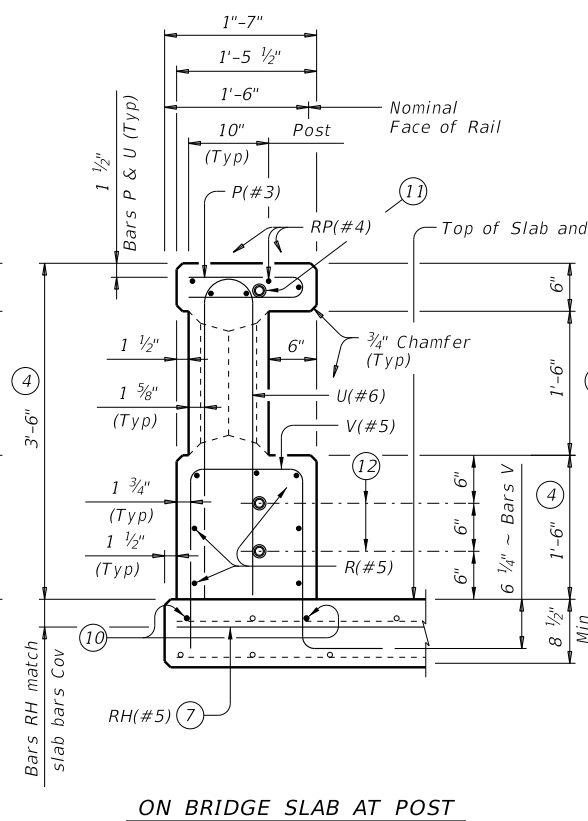
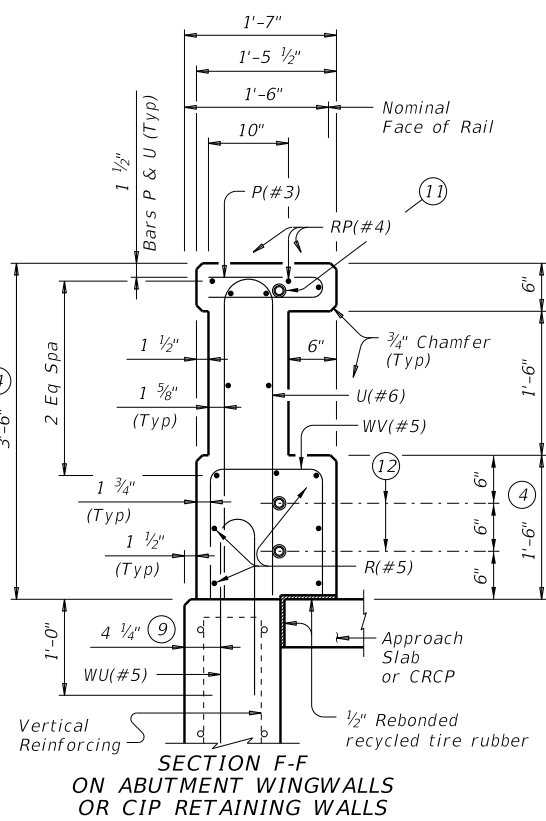
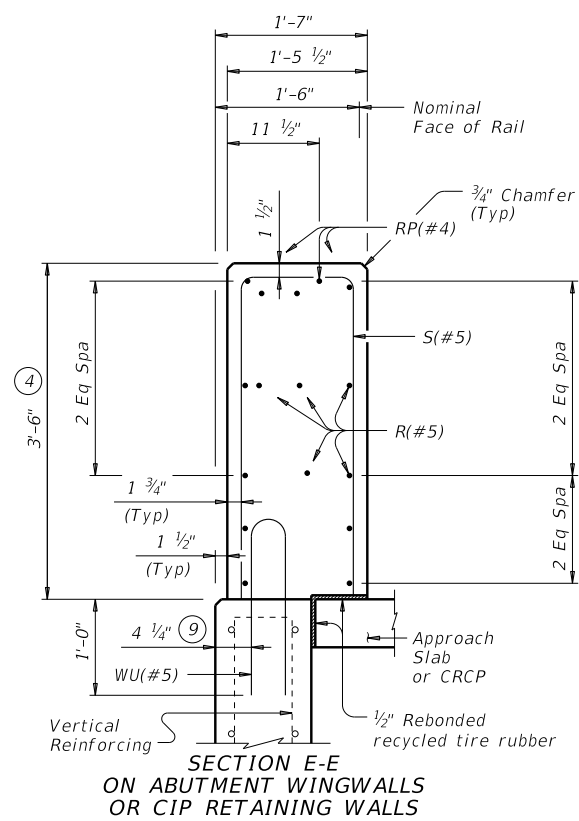


SECTION D-D

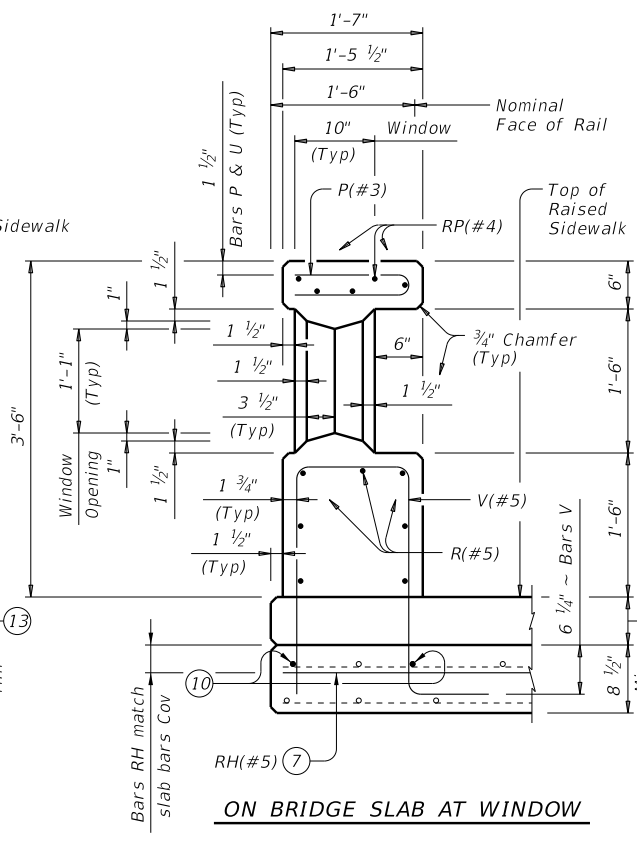
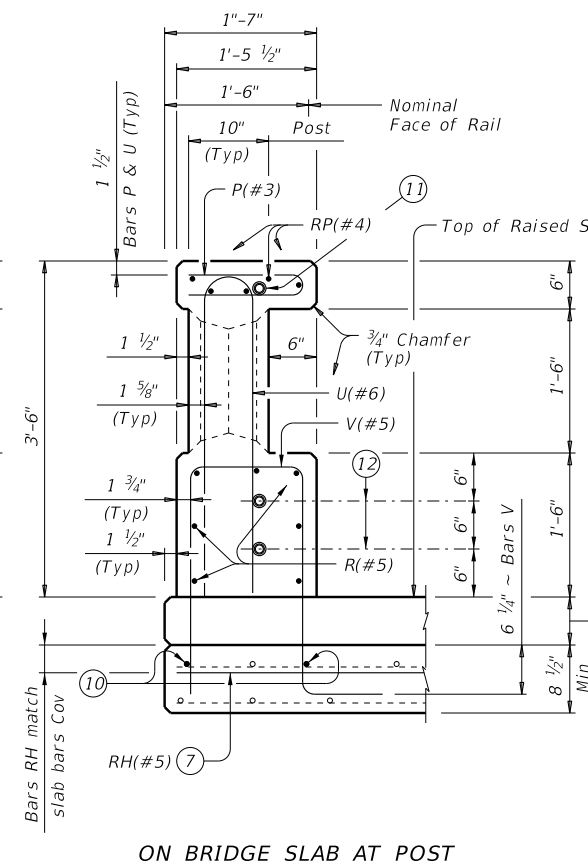
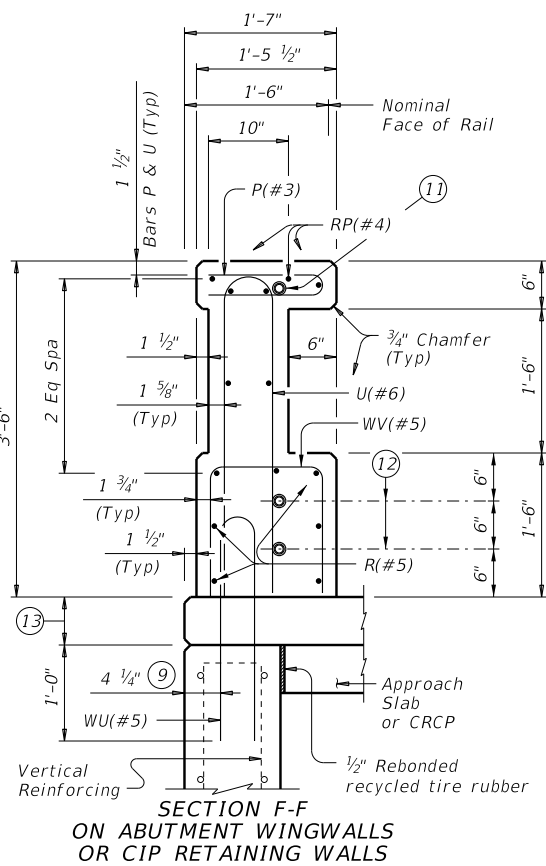
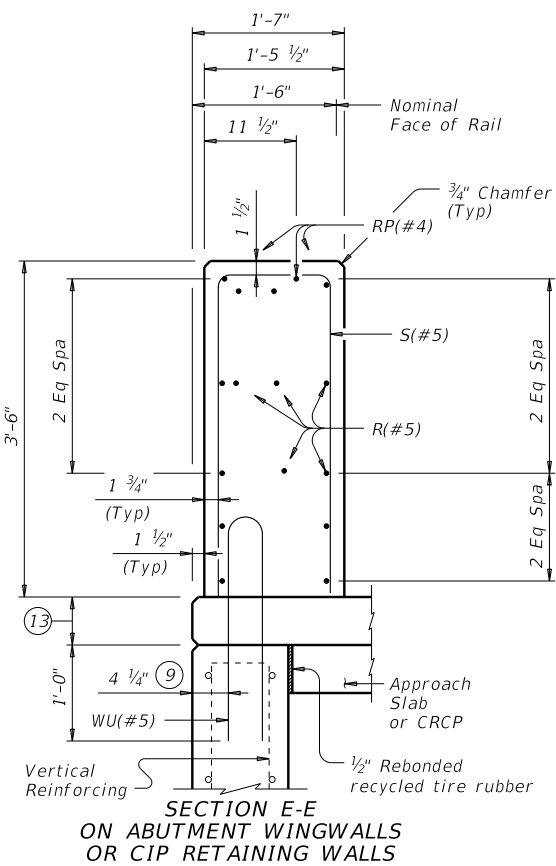
SHEET 2 OF 4

		Bridge Division Standard	
<h2>COMBINATION RAIL</h2>			
<h3>TYPE C412</h3>			
FILE: RL-C412-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST	COUNTY	SHEET NO.	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK



SECTIONS THRU RAIL WITH RAISED SIDEWALK

- ③ Wingwall length minus 4'-2" (Variable) 10" Min.
- ④ Increase 2" for structures with overlay.
- ⑦ Bars RH(#5) are part of rail reinforcing and are included in unit price bid for railing. Bars RH(#5) are in addition to slab overhang reinforcement shown elsewhere. Extend bars RH(#5) 2'-0" Min past C of beam/girder. Space and bundle with adjacent slab bars G(#4) and bars A(#4). Match slab bar cover. (Typ)
- ⑨ 5 1/4" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment wingwalls or retaining walls on traffic side of wall.
- ⑩ Top longitudinal slab bar may be adjusted laterally 3" plus or minus to tie reinforcing.
- ⑪ Place 1 RD(#8) bar as shown at each joint. Center RD(#8) bar at joint locations with 1 1/4" PVC pipe Sch 80 sleeve on one side of joint. See "Bar RD(#8) Assembly Detail."
- ⑫ 2 bars RD(#8) placed as shown at each joint. Center RD(#8) bar at joint locations with 1 1/4" PVC pipe Sch 80 sleeve on one side of joint. See "Bar RD(#8) Assembly Detail."
- ⑬ Raised Sidewalk.

SHEET 3 OF 4



COMBINATION RAIL

TYPE C412

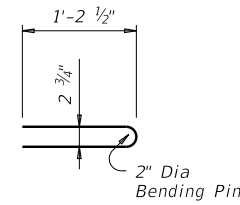
FILE: RL-C412-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR	CK: JMH
©TxDOT September 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				
DIST	COUNTY			SHEET NO.

DATE:
FILE:

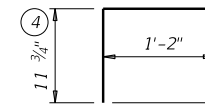
DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act." No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

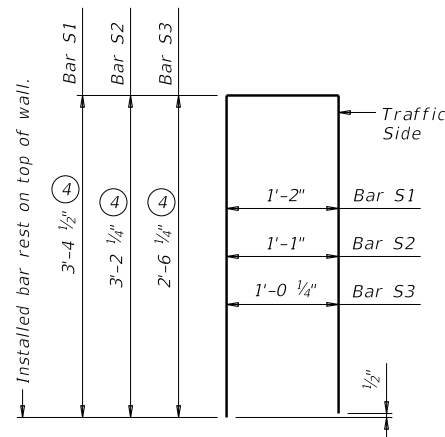
- ④ Increase 2" for structures with overlay.
- ⑭ For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.
- ⑮ Tape ends of 1 1/4" PVC Sch 80 to prevent concrete or mortar from seeping in.



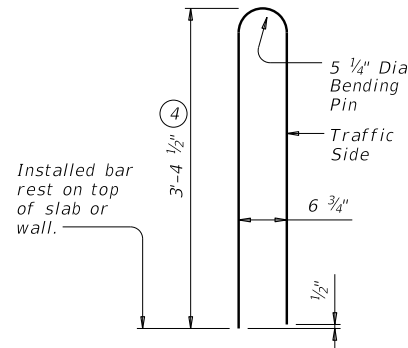
BARS P (#3)



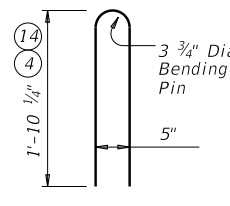
BARS SV (#5)



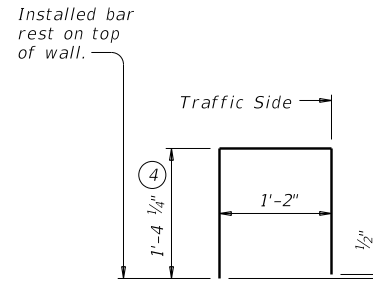
BARS S (#5)



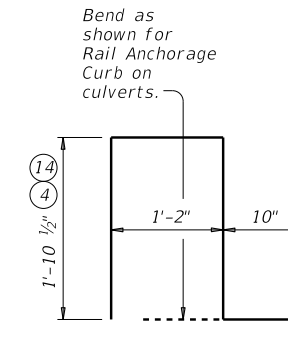
BARS U (#6)



BARS WU (#5)



BARS WV (#5)



BARS V (#5)

CONSTRUCTION NOTES:

The back of railing must be vertical unless otherwise shown on the plans or approved.

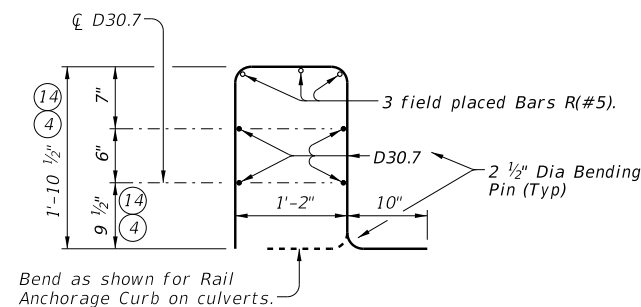
MATERIAL NOTES:

Galvanize RD(#8) bar as shown.
Provide Class "S" concrete. Provide Class "S" (HPC) if required elsewhere.
Provide Grade 60 reinforcing steel.
Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.
Do not epoxy coat RD(#8) bars.
Deformed Welded Wire Reinforcement (WWR) (ASTM A1064) of equal size and spacing may be substituted for Bars WU unless noted otherwise. Deformed WWR (A1064) may be substituted for Bars V, and 4 Bars R(#5) with 3 field placed Bars R(#5), as shown. Provide the same laps as required for reinforcing bars.
Provide bar laps, where required, as follows: Uncoated or galvanized ~ #4 = 1'-7"
Uncoated or galvanized ~ #5 = 2'-0"
Epoxy coated ~ #4 = 2'-5"
Epoxy coated ~ #5 = 3'-0"

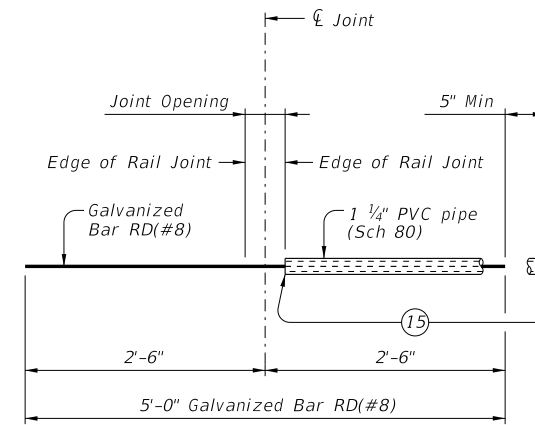
GENERAL NOTES:

This rail has been successfully evaluated by full-scale crash test to meet MASH TL-5 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 may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.
Shop drawings are not required for this rail.
Average weight of railing with no overlay is 560 pcf.

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



OPTIONAL WELDED WIRE REINFORCING (WWR) FOR BARS V



BAR RD(#8) ASSEMBLY DETAIL

		Bridge Division Standard	
<h2>COMBINATION RAIL</h2>			
<h3>TYPE C412</h3>			
FILE: RL-C412-19.dgn	DN: TxDOT	CK: TxDOT	DW: JTR
©TxDOT September 2019	CONT	SECT	JOB
REVISIONS		HIGHWAY	
DIST		COUNTY	
		SHEET NO.	