DESIGN STANDARDS

FOR DESIGN, CONSTRUCTION, MAINTENANCE AND UTILITY OPERATIONS ON THE STATE HIGHWAY SYSTEM

2010

TOPIC NO. 625-010-003

Approved For Use On Federal Aid Projects

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For Martin Knopp, Division Administrator

State of Florida, Department Of Transportation
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CERTIFICATION STATEMENT

I hereby certify that this Design Standard Book was compiled under my responsible charge from designs prepared, examined, adopted and implemented by the Florida Department of Transportation in accordance with established procedures, and as approved by the Federal Highway Administration.

As To Structures
Design Standards Nos.

199
289-292
302 (Sheets 2-4)
306
403
411
414
420-425
470-490
501,505
521
530
810-880
5100-5301
11200-11860
13417
17502 (Sheets 3-7)
17515
17723,17725
17743,17745
17749
20110-21930

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As To Roadway
Design Standards Nos.

001-106
200-288
293,295
300-301
302 (Sheet 1)
303-305
307-310
400-402
410
412
415,417
430
461
500
506-520
525-527
532-540
546,560
600-670
700
800-803
17302-17501
17502 (Sheets 1,2)
17504, 17505
17600,17721
177727-17736
17748
17764-17890

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As To Planning
Design Standard No.

17900

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As To ITS
Design Standard Nos.

18100-18305

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As To Landscape
Architecture
Design Standard No.

544

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TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

Revisions
Design Standards 2010

Index Number	Sheet Number	Description
001	1 thru 3	Added the following standard abbreviations: ℄ Base Line, Base Line Control ℄ Flow Line GRI Geosynthetic Research Institute HDPE High Density Polyethylene NPS Nominal Pipe Size
		Deleted the following standard abbreviations: Bbl Barrel FRCP Fiber Reinforced Concrete Pipe FRP Fiber Reinforced Pipe FS Far Side
002	2 of 3	Deleted Hand Drafting Symbols
102	2 of 3	NOTES FOR SYNTHETIC BALES OR BALE TYPE BARRIERS, Note 2, deleted the text "trenched 3" to 4" and" from the first sentence.
104	2 of 2	RURAL DIVIDED detail, changed "5' Shoulder Pavement" to "4' Shoulder Pavement".
105	1 of 1	TREATMENT I, Criteria for using Treatment I, replaced text of the last bullet with the following: "resurfacing build-up is less than 3" ".
200	1 of 5	TOP SLAB REINFORCING STEEL DIAGRAM (ALTERNATE B) to the notes "2 Additional Bars A @ 5" O.C." and "2 Additional Bars B @ 5" Max. O.C. Each Side Of Opening", added "(Minimum #4 Bars)".
	2 of 5	Note 9, Delete second sentence and substitute, "Additional bars used to restrain hole formers for precast structures with grouted pipe connections, may be left flush with the hole surface."
	4 of 5	SLAB AND WALL DESIGN TABLE NOTES, added the following to the end of Note 10: "See Index No. 201, Sheet 4 for allowable bar spacing adjustments when larger areas of reinforcing are substituted."
201	4 of 5	"Revised title of notes to ""NOTES FOR PRECAST OPTIONS AND EQUIVALENT REINFORCEMENT SUBSTITUTION"" and added the following to Note 4, ""When an increased area of reinforcing is provided, then the maximum bar spacing may be increased by the squared ratio of increased steel area, but not to exceed 12 inches: Max. Bar Spacing Provided < Max. Bar Spacing Required x (Steel Area Provided/Min. Steel Area Required)² "
205	1 of 6	Changed maximum size of allowed PVC pipe to 36".
	2 of 6	ROUND PIPE DIMENSIONS, deleted the column, "Wall Thickness (In.) Class III" and subcolumn "NRCHP" and heading "SRCP". Also deleted the ** note at the bottom of the table.
	3 of 6	NOTES: deleted note 4; table "PIPE ARCH: SPIRAL RIB: ¾" x¾" x 7½" RIB SPACING..." deleted references to note 4; table "ROUND PIPE - SPIRAL RIB", "Maximum Height of Fill (Ft.)", "Sheet Thickness In Inches (Gage)", "0.138 (10)" added measurements.
210	1 of 1	Delete General Note 4, and substitute the following: "For precast units the rear wall and apron may be precast as a separate piece from the top slab. Provide a minimum of 7 ~ #4 dowels in accordance with Index No. 201 "OPTIONAL CONSTRUCTION JOINTS".
211	1 thru 5	Revised index completely 3 sheets added, Reinforcing configuration and C.I.P. details revised; precast and WWR details added. Changed Note 4 to allow 4'-0" round risers.
213	1 of 1	In PLAN view changed "1/2" Exp. Joint (Typ)" to "1/2" Preformed Joint Filler (Typ)".
218	2 of 2	"STEEL GRATE", "TOP VIEW", for the overall dimension on the left side of the grate, inserted "44¼" ". For the small dimension at the upper left corner of the grate, inserted "3½" ".
219	1 of 2	In PLAN view and Section HH changed "Expansion Joint (Typ)" and "Expansion Material Joint" to "1/2" Preformed Joint Filler (Typ)".
220	1 of 3	"GUTTER INLET TYPE S", "SECTION BB", Changed the vertical dimension between the top of the inlet and the grate elevation from "5½" to "4½" ".
		"SECTION AA", at the top right corner, for precast thickness changed " 6" " to " 3" " (same as left side).
		"SECTION BB", at the top, changed "3'-11" Precast" to " 4'-3" Precast". "PLAN", at the top, changed " 3'-11" Precast to " 4'-3" Precast".
230	1 of 2	In "PLAN" view changed "1/2" Exp. Joint (typ)" to "1/2" Preformed Joint Filler (Typ)". Section E-E, Changed 4Z15.9 shape to built up section (3.5 x 3 x ½L + ½ x 3 Bar) for grating.
231	1 of 3	"DITCH BOTTOM INLET TYPE B", "SECTION BB", upper left side, deleted the dimension "2'-6" (Min.)" and replaced with "1'-10" (Min.)".
232	1 thru 7	Index was expanded due to font size change.
233	1 thru 2	Index was expanded due to font size change.
234	1 thru 2	Index was expanded due to font size change.
	2 of 2	Under Pavement & Sodding detail changed "1/2" Exp. Joint" to "1/2" Preformed Joint Filler".
235	1 of 2	"GENERAL NOTES", Note 3, deleted "Alternate B" replaced with "Index 200", Note 8 changed "Specification Section 962" to "Specification Section 975".
245	1 of 1	"GENERAL NOTES" Note 2, delete and replace with the following: "Concrete shall be Class I (Structural), except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications. Box shall be reinforced with No. 3 bars (Grade 60) on 8" centers both ways, sides and bottom.
250	1 of 2	"GENERAL NOTES" Note 5, deleted and replaced with the following: "Concrete shall be Class I (Structural), except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications."
251	1 of 2	"GENERAL NOTES" Note 4, deleted and replaced with the following: "Concrete shall be Class II, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications."
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260	1 of 1	"GENERAL NOTES" Note 3 changed "Specification Section 962" to "Specification Section 975".
261	1 of 3	"GENERAL NOTES" Note 4 changed "Specification Section 962" to "Specification Section 975".
264	1 thru 2	Index was expanded due to font size change. General note 3 changed.
270	1 of 1	"GENERAL NOTES" Note 2 changed "Specification Section 941-1.5" to "Specification Section 449". Changed Note 3.
272	6 of 6	Reordered "GENERAL NOTES" and changed "Class I concrete" to "Class NS concrete".
273	1 thru 7	Index was expanded due to font size change.
	7 of 7	"GENERAL NOTES", Note 8, deleted "Class I concrete" and substituted "Class NS concrete".
280	1 thru 3	Index was expanded due to font size change.
	1 of 3	"DISSIMILAR TYPES CONCRETE JACKET FOR CONNECTING DISSIMILAR TYPES OF PIPE AND CONCRETE PIPES WITH DISSIMILAR JOINTS" detail, added the note, "Alternate connection must be approved by the State Drainage Engineer."
282	1 thru 3	Index was expanded due to font size change.
	1 of 3	"FRONT ELEVATION" and "SECTION AA" details changed "1/2" Exp. Matl. " to "1/2" Preformed Joint Filler".
	2 of 3	"PLAN" and "SECTION AA" details changed "1/2" Exp. Matl. " to "1/2" Preformed Joint Filler".
284	1 of 1	Deleted note "1" and substituted the following: "1. Spillway to be paid for as Shoulder Gutter, LF." Deleted note "2", and substituted the following: "2. If spillway empties into an unpaved ditch the detail should be modified as necessary."
287	1 thru 4	Sheet 3 is new. Renumbered other sheets.
	1 of 4	Changed all 3 occurrences of "Class I concrete" to "Class NS concrete".
288	1 of 1	New Index added "DEEP WELL INJECTION BOX".
289	6 of 7	Changed "FLARED ENDWALL" to "FLARED WINGWALL" and "STRAIGHT ENDWALL" to "STRAIGHT WINGWALL".
291	1 of 5	Changed "Class I Concrete" to "Class NS".
	5 of 5	Changed "Bond Beam" to "Link Slab", and "Class I Concrete" to "Class NS".
292	2 of 14	"GENERAL NOTES" note 1, changed AASHTO LRFD Bridge Specifications, to "4th Edition"; added note 10.

Revisions
Design Standards 2010

Index Number	Sheet Number	Description
295	1 of 1	"GENERAL NOTES" Note 2 changed "Specification Section 962" to "Specification Section 975".
300	1 thru 2	Index was expanded due to change in font.
304	6 of 6	Added alternate location of detectable warnings on linear ramps. Added note "On curb ramps, landings and flush transitions perpendicular to the curb line: Rows of domes shall be aligned with the centerline of the ramp. (See Pictorial View A)" at top of sheet. Added Rail Road Crossing PLAN view.
305	1 & 4 of 4	Deleted bar spacing table and revised notes (Sheet 1); Changed width of outside lanes (Sheet 4).
307	2 of 3	"UTILITY CONFLICT PIPES THRU STORM SEWER STRUCTURES" changed to "UTILITY CONFLICT PIPES THRU STORM DRAIN STRUCTURES"
310	1 of 2	"SIDEWALK WITH EDGE BEAM FOR SURFACE MOUNTED RAILINGS", "Clear Width", deleted "3' Min." and substituted "4' Min. *".
		"NOTES FOR CONCRETE SIDEWALK ON CURBED ROADWAYS", deleted "Note 1", and substituted the following: "1. Sidewalks shall be constructed in accordance with Section 522 of the FDOT Standard Specifications. Public sidewalk curb ramps shall include detectable warnings and be constructed in accordance with Index No. 304. Detectable warnings are not required where sidewalks intersect urban flared turnouts."
		"Note 3" , deleted.
	2 of 2	"NOTES FOR CONCRETE SIDEWALKS ON UNCURBED ROADWAYS", Changed Note 2 to "Provide detectable warnings that extend the full width of the sidewalk and 24" deep from the edge of pavement where sidewalks adjoin the following vehicular ways: side roads and streets driveways with signalized entrances driveways with entrance volumes greater than 600 vpd driveways with entrance speeds of 25 mph or greater right in – right out composite driveways.
400	1 thru 26	Index expanded by one sheet due to font size change and added new sheet 2, "APPROACH END ANCHORAGE DETAILS", Index renumbered.
	1 of 26	"GENERAL NOTES" Note 17 changed "Specification Section 971" to "Specification Section 975".
	2 of 26	New sheet added showing limits of pay for guardrail, details of shoulder treatment and miscellaneous asphalt for guardrail approach end treatments.
	3 of 26	Corrected spelling of guardrail in last paragraph.
	15 of 26	"LOCATIONS ON FRONT SLOPES", deleted the details for guardrail on slope and rubrail termination and the chart for lateral placement on slopes. (See sheet 26)
	16 of 26	Deleted "REFLECTORS- DETAIL M" (See sheet 17)
	26 of 26	Added "GUARDRAIL ON SLOPES", details for guardrail on slope and rubrail termination and the chart for lateral placement on slopes.
410	1 thru 25	Index completely revised and reorganized.
411	2 of 10	Changed tangent offsets In Detail 'A' to "2.49'-Design Speed ≤45 mph; 1.76' - Design Speed ≥50 mph".
	4 of 10	Changed tangent offsets In Detail 'B' to "2.49'-Design Speed ≤45 mph; 1.76' - Design Speed ≥50 mph".
414	1 of 15	Updated Specification reference Section 971 to 975; Added steel option to ALTERNATE DESIGN note.
	5 of 15	Added PTFE tape option to anchor bolt details.
415	4 of 10	"NOTES FOR WALL END SHIELDING", Note 1, changed the second sentence to: "Except where the plans designate a particular type crash cushion for a specific location, the contractor has the option to construct any of the redirective crash cushions listed on the Qualified Products List, subject to the uses and limitations described on their respective drawings."
		"ANCHOR PLATE BOLTS", upper note, changed "?" to "3/4"".
420	1 of 3	Added the following to the NAME, DATE AND BRIDGE NUMBER note: "The Name shall be as shown in the General Notes in the Structures Plans."; Changed REFLECTIVE RAILING MARKERS note.
		Changed REFLECTIVE RAILING MARKERS note, "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
421	1 of 3	Changed REFLECTIVE RAILING MARKERS note, "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing along the centerline at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
422	1 of 3	Added the following to the NAME, DATE AND BRIDGE NUMBER note: "The Name shall be as shown in the General Notes in the Structures Plans."; Changed REFLECTIVE RAILING MARKERS note.
		Changed REFLECTIVE RAILING MARKERS note, "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
423	1 of 3	Added the following to the NAME, DATE AND BRIDGE NUMBER note: "The Name shall be as shown in the General Notes in the Structures Plans."; Bicycle Railing to "Special Height Bicycle Railing" and Post "B" to Post "B1".
		"TRAFFIC RAILING-(32" VERTICAL SHAPE)", deleted the "REFLECTIVE RAILING MARKERS" note and substituted the following: "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
	2 of 3	Changed Bicycle Railing to "Special Height Bicycle Railing" and Post "B" to Post "B1".
	3 of 3	Changed 83 degrees to 93 degrees in CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM Cross-slope table.
424	1 of 7	Added the following to the NAME, DATE AND BRIDGE NUMBER note: "The Name shall be as shown in the General Notes in the Structures Plans."
		"TRAFFIC RAILING - (CORRAL SHAPE)", deleted the "REFLECTIVE RAILING MARKERS" note and substituted the following: "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
425	1 of 3	Added the following to the NAME, DATE AND BRIDGE NUMBER note: "The Name shall be as shown in the General Notes in the Structures Plans."
		"TRAFFIC RAILING - (42" F SHAPE)", added the following note: "REFLECTIVE RAILING MARKERS: Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
470	1 of 3	Added Field testing proof loads to the ADHESIVE BONDED ANCHORS AND DOWELS note; "TRAFFIC RAILING-(THRIE BEAM RETROFIT) GENERAL NOTES & DETAILS", deleted the "BRIDGE NAME PLATE" note and substituted the following: "If a portion of the existing Traffic Railing is to be removed that carries the bridge name, number and or date, or if the installation of the Traffic Railing (Thrie Beam Retrofit) will obscure the bridge name, number and or date, then replace the information that has been removed or obscured, with 3" tall black lettering on white nonreflective sheeting applied to the top of the adjacent guardrail. The information must be clearly visible from the right side of the approaching travel lane. The sheeting and adhesive backing shall comply with Specification Section 994 and may comprise of individual decals of letters and numbers."
		Added the following note: "NEOPRENE PADS: Neoprene pads must be plain pads with a durometer hardness of 60 or 70 and meet the requirements of Specification Section 932, except that testing of the finished pad will not be required."
	3 of 3	Changed offset of 7/8" dia. anchor bolts to 2 3/4" from back edge of base plate in SECTION B-B.
471	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".
472	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".
473	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".
474	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".
	4 of 4	"SECTION C-C", changed "Resilient Pad" to "Neoprene Pad".

Revisions
Design Standards 2010

Index Number	Sheet Number	Description
475	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".
476	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".
480	1 of 2	"TRAFFIC RAILING-(VERTICAL FACE RETROFIT) GENERAL NOTES & DETAILS", added the following to the "ADHESIVE-BONDED ANCHORS AND DOWELS" note, "The field testing proof loads required by Specification Section 416 shall be 23,800 lbs. for Dowel Bars 6D on the inside face (traffic side) of the railing (1'-0" embedment) and 18,500 lbs for Dowel Bars 6D along the outside face of the traffic railing (5" min. embedment)." Added NEOPRENE PADS note. Also deleted the "REFLECTIVE RAILING MARKERS" note and substituted the following: "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table below. Reflector color (white or yellow) shall match the color of the near edgeline."
	2 of 2	CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM, added Bars 5E, 5F and 4G for Index No. 484
484	1-10 of 10	New Index added TRAFFIC RAILING (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH
500	2 of 2	"HALF SECTION" detail, deleted "Storm Sewer Mains" replaced with "Storm Drain Trunk Lines"
501	3-9 of 9	Changed the REQUIRED TEST METHOD for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor & Joint Overlap to ASTM D 6706.
	4 of 9	Updated values for COMTRAC 70.70; Deleted AMOCO 2006, 2016 & 2044; Added GEOTEX 315ST, 2x2HF, 4x4, 3x3HF, 4x4HF & 4x6 woven geogrids.
	5 of 9	Changed Joint Strength Overlap value to 1.2 for all Marafi products.
	6 of 9	Deleted Application Usage 3 & 4 for SYNTEEN SF 11 & SF 12.
	7 of 9	Added Fornir 20
	8 of 9	Changed Creep Resistance and Creep Reduction Factors for TENSAR BX 1120, BX 1200, BX 1220 & BX 1500
	9 of 9	Updated values for TENAX MS 220 & TENAX MS 330. Added Combigrid 30/30, Secugrid 20/20 & 30/30 extruded geogrids.
505	1-4 of 4	Sheet 3 is new. Renumbered other sheets.
515	5 of 7	In second symbolized note changed "Section 102-6" to "Section 102-8".
	6 of 7	"PAVEMENT STRUCTURE FOR TURNOUTS AND AUXILLIARY LANES TABLE 515-1", "NOTES", Note 5, Deleted "Class I concrete" substituted "Class NS concrete".
518	3 of 3	Revised width of rigid pavement outside travel lane and changed location of rumble strip.
520	1 of 1	"GENERAL NOTES", Note 7, Deleted "Class I Concrete (Retaining Walls)" and substituted "Class NS Concrete"
546	1 of 6	Added detail "PLAN", "PICTORIAL" and ** note. Index sheets reordered.
	5 of 6	Under "NOTES FOR 4-LANE DIVIDED ROADWAY", Note 1, changed reference from "Sheet 6" to "Sheet 2".
600	2 of 13	OVERHEAD WORK, deleted "OPTION 4 - - -" and substituted the following: OPTION 4 (OVERHEAD WORK MAINTAINING TRAFFIC WITH NO ENCROACHMENT BELOW THE OVERHEAD WORK AREA) Traffic shall be detoured, shifted, diverted or paced as to not encroach in the area directly below the overhead work operations in accordance with the appropriate standard index drawing or detailed in the plans. This option applies to, but not limited to, the following construction activities: (a) Beam, girder and segment placement. (b) Deck form placement and removal. (c) Concrete deck placement. (d) Railing construction located at edge of deck. (e) Structure demolition. DEFINITIONS, added the following after definition of TRAVEL WAY: a. Travel Lane: The designated widths of roadway pavement marked to carry through traffic and to separate it from opposing traffic or traffic occupying other lanes. b. Auxiliary Lane: The designated widths of roadway pavement marked to separate speed change, turning, passing and climbing maneuvers from through traffic. CLEAR ZONE WIDTHS FOR WORK ZONES, deleted the text "travel" in the first sentence and substituted "traffic". Replaced chart "CLEAR ZONE WIDTHS FOR WORK ZONES".
600	3 of 13	LANE WIDTHS, in the second sentence, change the word "expected" to "excepted".
	5 of 13	Changed note under "SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING"; added information for the use of the new "PROJECT INFORMATION SIGN".
	6 of 13	GENERAL NOTES, deleted note 1, substituted the following: "1. All signs shall be post mounted when work operations exceed one day except for: a) Road closure signs mounted in accordance with the vendor drawing for the Type III Barricade shown on the QPL. b) Pedestrian advanced warning or regulatory signs mounted on sign supports shown on the QPL." "2 POST SIGN SUPPORT MOUNTING DETAILS", updated text to include a tolerance between sign supports. Insert "+/- 3" " after "1'-6" "and insert "+/- 6" "after "2'-6" ". POST AND FOUNDATION TABLE FOR WORK ZONE SIGNS, expanded Note 2 by adding: "unless otherwise specified in the vendor drawing on the QPL." POST MOUNTED SIGN NOTES, added new notes 1 and 12.
	7 of 13	Added new sheet showing Project Information Sign and renumbered index.
605	1 of 1	"GENERAL NOTES", deleted the text of "Note 8" and substituted the following: "The two channelizing devices directly in front and directly at the end of the work area may be omitted provided vehicles in the work area have high intensity rotating, flashing, oscillating or strobe lights operating." Added new heading "DURATION NOTE" and placed the following note under this heading: 1. ROAD WORK AHEAD sign may be omitted if all of the following conditions are met: a) Work operations are 60 minutes or less. b) Speed is 45 mph or less. c) No sight obstructions to vehicles approaching the work area for a distance of 600 feet. d) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating. e) Volume and complexity of the roadway has been considered.
625	1 of 1	New Index added "TEMPORARY ROAD CLOSURE- 5 MINUTES OR LESS".
655	1-3 of 3	New Index added "TRAFFIC PACING-LIMITED ACCESS".
667	1-6 of 6	New Index added "TOLL PLAZAS".
801	1 of 3	"GENERAL NOTES", Note 15 and 21, deleted "Class I" and substituted "Class NS".
802	1-3 of 3	Added tolerance to ground clearance; revised Notes 7a and 7b; rearranged sheets.
	1 of 3	"GENERAL NOTES", Note 6 and 13, deleted "Class I concrete" and substituted "Class NS concrete" for all occurrences.
803	1 of 1	"GENERAL NOTES", Note 4, deleted both occurrences of "Class I" and substituted "Class NS".
810	2 of 4	Deleted "Section 971" and substituted "Section 975" in ANCHOR RODS, NUTS AND WASHERS note.
811	3 of 3	Deleted "Section 971" and substituted "Section 975" in ANCHOR RODS, NUTS AND WASHERS note.
812	2 of 4	Deleted "Section 971" and substituted "Section 975" in ANCHOR RODS, NUTS AND WASHERS note.
820	1 of 1	Changed Top Rail to "Special Height Bicycle Railing" and added new Post "B2" for 3'-6" height Pedestrian/Bicycle Railing.
821	1 of 1	Changed designation of 4'-6" tall railing to "Special Height Bicycle Railing" and added 3'-6" tall Pedestrian/Bicycle Railing.
822	1 of 2	Changed designation of 4'-6" tall railing to "Special Height Bicycle Railing" and "Post B" to "Post B1"; Added "Post B2" details.
850	1 of 5	Changed "Pedestrian Railing" to "Pedestrian/Bicycle Railing" and "Bicycle Railing" to "Special Height Bicycle Railing"; Added anchor bolt requirements to SHOP DRAWINGS note.
	2 of 5	Added "DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS" detail. Changed Pedestrain and Bicyle Railing designation; maximum ramp length for slopes less than 6.25%; and minimum clear picket opening at post to 3/4".
	3 of 5	Changed Pedestrain and Bicyle Railing designation.
	4 of 5	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAILS "D" & "E", option to notch post in SECTION G-G, and 1/4" joint tolerance in DETAIL "D".
	5 of 5	Added DETAIL "F" and note (*) to ANCHOR BOLT TABLE. Changed Pedestrain and Bicyle Railing designation. Corrected height dimension on steps to top of nosing.

Revisions
Design Standards 2010

Index Number	Sheet Number	Description
851	1 of 2	Changed Pedestrain and Bicyle Railing designation.
	2 of 2	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAIL "B". Changed field splice joint tolerance to ¼" in DETAIL "B".
860	1 of 5	Changed "Pedestrian Railing" to "Pedestrian/Bicycle Railing" and "Bicycle Railing" to "Special Height Bicycle Railing"; Added anchor bolt requirements to SHOP DRAWINGS note. Added filler metal ER4043 to WELDING note.
	2 of 5	Added "DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS" detail. Changed Pedestrain and Bicyle Railing designation; maximum ramp length for slopes less than 6.25%; and minimum clear picket opening at post to ¾".
	3 of 5	Changed Pedestrain and Bicyle Railing designation.
	4 of 5	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAILS "D" & "E"; option to notch post in SECTION G-G; ¼" joint tolerance in DETAIL "D"; Type B (Nonwelded) connection detail in SECTION A-A. Changed Expansion Joint sleeve embedded length to 10" in DETAIL "D" and picket fillet weld size to ⅛", handrail and top rail fillet weld size to ¼", and base plate fillet weld size to ⅜".
	5 of 5	Added DETAIL "F" and note (*) to ANCHOR BOLT TABLE. Changed Pedestrain and Bicyle Railing designation. Corrected height dimension on steps to top of nosing.
861	1 of 2	Changed designation of 54" tall railing to "Special Height Bicycle Railing".
	2 of 2	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAIL "B". Changed field splice joint tolerance to ¼" and "Steel Sleeve" to "Aluminum Sleeve" in DETAIL "B".
870	1 of 5	Deleted Pedestrian and Bicycle designations from DESIGN LIVE LOADS and ALTERNATE DESIGN notes.
	2 of 5	Deleted 4'-6" Bicycle Railing option and "**" note. Changed maximum ramp length for slopes less than 6.25%.
	3 of 5	Deleted 4'-6" Bicycle Railing option.
	4 of 5	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAILS "D" & "E"; and ¼" joint tolerance in DETAIL "D". Deleted Intermediate Rails from DETAILS "B" and "C".
	5 of 5	Added DETAIL "F". Deleted 4'-6" Bicycle Railing option. Corrected height dimension on steps to top of nosing.
880	1 of 5	Deleted Pedestrian and Bicycle designations from DESIGN LIVE LOADS and ALTERNATE DESIGN notes.
	2 of 5	Deleted 4'-6" Bicycle Railing option and "**" note. Changed maximum ramp length for slopes less than 6.25%.
	3 of 5	Deleted 4'-6" Bicycle Railing option.
	4 of 5	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAILS "D" & "E"; and ¼ joint tolerance in DETAIL "D". Deleted Intermediate Rails from DETAILS "B" and "C".
	5 of 5	Added DETAIL "F". Deleted 4'-6" Bicycle Railing option. Corrected height dimension on steps to top of nosing.
5100	2 of 2	Changed to plastic sleeve expansion joint and "Premoulded Expansion Material" to "Preformed Joint Filler". Changed wall and expansion joint key.
5200	1 of 1	Post caps added to note C.1.b; Changed note K.2 to allow 8 ft height panels. Added note K.11; Changed notes H.1, H.2 and O.2; Deleted note H.3.
5201	1 of 1	Texture Type "I" (Cut Coral Block) added.
5202	1 of 4	Added precast post cap; Changed clearance tolerance on stepped panel and Neoprene Pad options.
	3 of 4	Changed #4 Bar Mark to Bars P5 and P6 for Pile/Post Options A, B, & E; changed Texture Thickness to 1¼" Max.
5203	1 of 5	Added precast post cap; Changed clearance tolerance on stepped panel and Neoprene Pad options.
	3 of 5	Changed #4 Bar Mark to Bars P5 & P6 for Pile/Post Options A, B & E, and changed texture thickness dimension to ¼" Max.
	4 of 5	New sheet added for 45 degree corner post.
	5 of 5	Renumbered from Sheet 4 of 4.
5204	1 of 1	Changed "Ribbed" to "Slotted" in PLUG DETAIL.
5205	1, 3, 4 & 6 of 7	Added note in Elevation Views to 'Extend post 2" above high side wall panel when post caps are shown in the plans'.
	2 of 7	Added tolerance between Top of Precast Collar and Auger Cast Pile; Changed "Composite Bearing Pads" to "Fiber Reinforced Bearing Pads".
	5 of 7	Changed "Composite Bearing Pads" to "Fiber Reinforced Bearing Pads".
	7 of 7	Added "Octangonal Precast Collar" details and tolerance between Top of Precast Collar and Auger Cast Pile; Changed "Composite Bearing Pads" to "Fiber Reinforced Bearing Pads".
5206	1 of 1	Added "POST LENGTH WITH CAP" column, BARS D, P5 thru P8 to table and bar bending details for corner posts.
5207	1 of 1	New Index added "PRECAST SOUND BARRIERS-PRECAST POST CAPITAL".
5210	2 of 5	Changed NAME, DATE AND BRIDGE NUMBER note, and "Ribbed" to "Slotted" in NEOPRENE DIAPHRAGM PLUG DETAIL. Added REFLECTIVE RAILING MARKERS note and RELECTIVE RAILING MARKER SPACING table.
5211	3 of 3	Changed "Ribbed" to "Slotted" in NEOPRENE DIAPHRAGM PLUG DETAIL. Corrected Anchor Pin daimeter on FIRE HOSE ACCESS DETAIL.
5212	2 of 2	Added note for "Full Depth Structural Asphalt" above junction slab and changed coping dimension to 6" Min.
5300	3 of 19	Increased max. gap at back of precast coping and added timber blocking.
	6 of 19	Added note for "Full Depth Structural Asphalt" above junction slab and increased max. gap at back of precast coping.
	7 of 19	Added note for "Full Depth Structural Asphalt" above junction slab.
	12 & 15 of 19	Increased max. gap at back of precast coping. Corrected size of Bar 5U1 in BILL OF REINFORCING TABLE
11200	1-2 of 2	Deleted sheet 2
	1 of 2	Revised and rearranged notes, sheet renumbered to 1 of 2.
	2 of 2	Renumbered sheet 3 of 3 to sheet 2 of 2 revised and rearranged notes. Deleted "Class 1 (Special) Concrete" replaced with "Class 1 Concrete".
11300	1 of 1	Hanger table values revised; connection bolt size revised; sign depth for horizontal splice changed to 10'. U-Bolt material spec (A325) added to Typical Detail of Sign & Truss Connection.
11310	1 of 5	Deleted A307 bolts and Palnut (Note 4e). Changed foundation concrete (Note 7). Changed to ½" mesh (Note 9). Deleted grout pad and notes (former Notes 7c & 9). Added CSL tube note (Note 14).
	2 of 5	Changed foundation standoff distance and changed drilled shaft detail. Deleted grout pad and added wire screen. Added CSL tubes. Changed FC & FL reinforcing.
	5 of 5	Changed bolt spacing connection details.
11320	1 of 5	Deleted A307 bolts and Palnut (Note 4e). Changed foundation concrete (Note 7). Changed to ½" mesh (Note 9). Deleted grout pad and notes (former Notes 7c & 9). Added CSL tube note (Note 14).
	2 of 5	Changed foundation standoff distance. Deleted grout pad and added wire screen.
	4 of 5	Changed bolt spacing connection details.
	5 of 5	Changed drilled shaft detail. Added CSL tubes.
11860	1 of 8	Changed SINGLE COLUMN GROUND SIGN NOTES, Note 11, and GUIDE TO USE THIS STANDARD, Note 4 and example. Modified concrete classification. Modified "ALUMINUM COLUMN (POST) SELECTION TABLE".
	2 of 8	Changed maximum limits of sign cluster area and width in NOTE.
	3 of 8	Added Aluminum Soil Plate details and notes. Changed Post and Foundation Table depth values. Modified "ALUMINUM COLUMN (POST) SELECTION TABLE".
	4 of 8	Deleted "Signs at 90°" note. Added "*For" note. Changed number of Z-brackets for STOP and RECTANGULAR sign. Changed '1" Min.' to '0" Min.' and sign panel edge distance in VIEW A-A. Modified U-bolt size. Changed panel overhang length.
	5 of 8	Modified "DRIVEN POST DETAIL IN CONCRETE".
17302	1 of 1	CASE II, and CASE VIII dimensions and notes revised.
17328	1 of 1	Weigh Station and combination Weigh Station and Inspection Station signing details separated.

Revisions
Design Standards 2010

Index Number	Sheet Number	Description
17344	2, 3, 4 & 6 of 6	SCHOOL SIGNS AND MARKINGS, on each sheet, in the Distance table at the bottom of the sheet, deleted the "A" column. Also deleted the "A" dimension from the detail drawings.
17345	2 of 4	NORMAL TAPERED ENTRANCE WITH ADDED LANE, note in lower left corner, arrow now points to the reflective markers on the LEFT side of the ramp.
	4 of 4	Deleted note 2
17346	1-14 of 14	Completely revised and renumbered.
17347	1-4 of 4	New Index BICYCLE MARKINGS added.
17349	1 of 1	Case I and Case II revised; 18" x 18" marker detail revised; notes at bottom right revised.
17355	1 of 11	Revised signs FTP-9A-06 & FTP-9B-06 and notes.
	7 of 11	For all signs with 1-800 phone number, deleted "1-800-998-RIDE" and substituted "1-8XX-XXX-XXXX" and below each sign added note: "Design Project Manager or Transit Administrator will supply correct 1-8XX number".
	8 of 11	Revised sign FTP-68A-06, bolt holes located outside of sign message, notes revised. Sign FTP-69-06 and FTP-68B-06 message and spacing revised.
	9 of 11	Revised sign FTP-82-08 and arrow detail. Added Sign FTP-83-08.
17356	1 of 1	Removed signal head from detail. Single point attachment details deleted from Index. (Deleted sheet 1.)
17359	1 of 2	Changed delineators to object markers; revised reference notes; sign W13-1 made optional. RURAL NARROW BRIDGE TREATMENT, changed the OM3L on the right side of the roadways to an OM3R.
	2 of 2	Notes revised; inserts reorganized
17500	1 of 3	Deleted concrete pole detail, added METAL POLE DETAIL AND WIRING DIAGRAM.
	2 of 3	Note 7, deleted "class I Concrete (Miscellaneous)" replaced with "Concrete and reinforcing for slabs around poles and pull boxes shall be included in the price for pull box or pole."
	3 of 3	Note 7, deleted "class I Concrete (Miscellaneous)" replaced with "Concrete and reinforcing for slabs around poles and pull boxes shall be included in the price for pull box or pole."
17501	1 of 1	Deleted note 28.
17502	3 of 7	Changed Note 9. Added Notes 10 & 11. Changed Notes 11 & 12. Deleted grout pad notes (former Notes 4 & 9). Added CSL tube note (Note 11).
	4 of 7	Added ID plate and changed base plate thickness. Deleted grout pad. Changed drilled shaft reinforcing.
	5 of 7	Changed Weld symbol in SECTION A-A. Added padlock tab to HANDHOLE RING. Added Section E-E detail and bottom baseplate washer to SECTION C-C. Deleted grout pad and added wire screen. Added CSL tubes.
	6 of 7	Grout notes and details removed, new wire screen.
	7 of 7	Note 3, changed "Concrete class" to "concrete NS"
17503	1 of 1	Index deleted.
17504	1 of 1	Dimensions 5'-6" added for height of meter base. Pole type changed from type "N" to type "P".
17505	1 of 2	Mercury Vapor Luminaires changed to Induction Luminaires. Luminaire chart deleted, dimensions revised on spacing detail note and added to structure detail.
17515	1 of 8	Added median barrier mounted light poles. Moved notes to sheet 2.
	2 of 8	New Sheet for Notes. Change Note 7 for QPL Criteria. Modified concrete classification. Added notes for median barrier mounted light pole and foundation.
	3 of 8	Sheet renumberd from 2 to 3. Added double arm configuration to ARM ELEVATION.
	4 of 8	Allowed fusion weld reinforcing cage (*) and changed foundation concrete note. Added 1" dimension to Double Nuts in FOUNDATION. Modified concrete classification. Renumbered sheet from 3 of 3 to 4 of 8.
	5-8 of 8	New Sheets for median barrier mounted light pole.
17600	2 of 3	Added detail for pole foundation to be used only behind guardrail.
	3 of 3	GENERAL NOTES, note 2, changed "Class II Concrete" to "Class I Concrete"; changed note 4.
17723	1 of 3	Changed Note 5i, 6 and 7. Added Note 8. Deleted grout pad and notes (former Notes 4d & 7). Added CSL tube note (Note 9).
	2 of 3	Changed number of bolts in VIEW B-B, number and size of foundation reinforcing bars, and TABLE OF STRAIN POLE VARIABLES. Added foundation standoff distance and washer for base plate. Deleted grout pad and added wire screen. Added CSL tubes. Changed drilled shaft reinforcing.
	3 of 3	Changed note in VIEW E-E; Added 1/4" and 3/8" cable clamps and changed weld criteria. Changed clevis size.
17725	1 of 2	Round pole note revised; pole height dimensions added to Type P-III through P-VIII; Copper Ground note changed.
	2 of 2	Notes revised and rearranged, D(feet) changed to H(feet) in both tables.
17727	1-2 of 2	Schedule 40 aluminum pipe (T6061) added as an alternate to stainless steel pipe in assembly details and signal head notes. Added backplates to signal head details.
17736	1 of 1	Added notes 5 & 6.
17743	1 of 3	Updated assembly dimensions. Changed drilled shaft reinforcing.
	2 of 3	Updated assembly dimensions. Changed drilled shaft reinforcing. Changed T3-BF.
	3 of 3	Updated assembly dimensions. Changed drilled shaft reinforcing.
17745	1 of 5	QPL requirements added in new note 17; added backplates to pole detail; Notes 6 & 14 revised, deleted note 19.
	2 of 5	Revised foundation reinforcing details, Section AA, Section DD and Foundation Plan details.
17748	1 of 1	Option 1 deleted and Options 2 and 3 renumbered; Note 1 revised. Added backplates to signal head displays.
17784	1 of 2	Dimensions revised on Figures A & B. Note 5 and Note to Designers revised.
	2 of 2	Revised details and spacing for signs FTP-68A-06 and FTP-68B-06, also located bolt holes outside of sign message.
17890	2-3 of 3	Added backplates to signal head displays.
17900	7 of 7	Changed pole type call outs, deleted "N-III" and substituted "P-III".
18111	1-2 of 2	Index totally revised.
18113	1-2 of 2	Index totally revised.
20110	1 of 1	Changed Insert Detail for Diaphragm Reinforcing.
20199	1 of 1	Changed BEAM CAMBER AND BUILD-UP NOTES.
20210	2 of 2	Added "Type Q" Epoxy to Note 9.
20299	1 of 1	Changed BEAM CAMBER AND BUILD-UP NOTES.
20500	1 of 1	Added Type C Pads for larger skew ranges. Changed specification of elastomer from "durometer" to "shear modulus".
20501	1 of 1	Changed Note 4.
20502	1 of 1	Changed Note 4.
20602	1 of 1	Changed EDC location to 1D from tip of pile.
20900	2 of 2	Changed coping width and End Bent lug from 6" to 5½" thickness.
20910	2 of 2	Changed coping width and End Bent lug from 6" to 5½" thickness.
21100	1 of 3	Deleted redundant notes from Specification Section 458.
	3 of 3	Changed Sidewalk Cover Plate edge treatment.
21110	1 of 2	Deleted redundant notes from Specification Section 458. Changed last line of title of bottom left detail to "DECK WITH SLOPES 2% OR GREATER".
	2 of 2	Changed Sidewalk Cover Plate edge treatment.
21200	1 of 2	Added "Anchor Plate (dashed lines) (provide Design) to ELEVATION VIEW and TYPICAL SECTION. Added design of anchor bolts and accessories.
	2 of 2	Added design of anchor bolts and accessories.
21600	1 of 7	Clarified INSTRUCTIONS TO DESIGNER for variable end span lengths.
	3 of 7	Added vertical dimensions between deck surface and underside of bearings, including depth of Truss Panel.
21802	1 of 1	Changed "Methyl Methacrylate" to "High Molecular Weight Methacrylate".
21803	1-2 of 3	Revised call-outs for Grout Outlets; Changed "Methyl Methacrylate" to "High Molecular Weight Methacrylate".
	3 of 3	Shrink wrap deleted from Duct Coupler Detail. Revised call-outs for Duct Couplers; Changed "Methyl Methacrylate" to "High Molecular Weight Methacrylate".

A	Area or Amperes
AAA	American Automobile Association
AADT	Annual Average Daily Traffic
AASHO	American Association Of State Highway Officials
AASHTO	American Association Of State Highway And Transportation Officials
ABC	Asphalt Base Course
Abd.	Abandoned
ABS	Acrylonitrite-Butadiene-Styrene Pipe
AC, Ac.	Acre
AC or Asph. Conc.	Asphaltic Concrete
Accel.	Acceleration
ACI	American Concrete Institute
Act.	Actuated
ADA	The Americans With Disabilities Act
Adh.	Adhesive
Adj.	Adjust
ADT	Average Daily Traffic
AFAD	Automatted Flagger Assistance Device
Agg.	Aggregate
Ah.	Ahead
AISC	American Institute Of Steel Construction
Alt.	Alternate
Al.	Aluminum
AM	12:00 Midnight Until 11:59 Noon
ANSI	American National Standards Institute
AOS	Apparent Opening Size
Appl..	Applied, Application
Apprh.	Approach
Approx.	Approximate
ARTBA	American Road & Transportation Builders Association
Artf.	Artificial
Asph.	Asphalt
Assem.	Assembly
Assn.	Association
Assoc.	Associate, Association
ASTM	American Society For Testing And Materials
ATPB	Asphalt Treated Permeable Base
Attn.	Attention
Attnuatr.	Attenuator
Aux. or Auxil.	Auxiliary
Ave.	Avenue
AWG	American Wire Gauge
AWS	American Welding Society
Az	Azimuth
B to B	Back to Back
Basc.	Bascule
Bd. or Bnd.	Bond or Bonded
BC	Bottle Cap or Bolt Circle
B/C, B.C.	Back Of Curb
BCCMP	Bituminous Coated Corrugated Metal Pipe Culvert
BCPA	Bituminous Coated Pipe Arch Culvert
BCPCMP	Bituminous Coated And Paved Corrugated Metal Pipe Culvert
BCPPA	Bituminous Coated And Paved Pipe Arch Culvert
BCT	Breakaway Cable Terminal
BCWE	Base Clearance Water Elevation
BE	Buried Electric
Beg.	Begin
Bit.	Bituminous
Bk.	Back
BL, BLC, or ℄	Base Line, Base Line Control
Bldg.	Building
Blkhd.	Bulkhead
BLON	Begin Length Of Need
Blvd.	Boulevard
BM	Bench Mark
Bndry.	Boundary
Bdr.	Border
Bot.	Bottom
BO	Basin Outlet
BOS	Beginning Of Survey
BP	Borrow Pit
Bq.	Becquerel

Br.	Bridge
Brg.	Bearing
Brkwy.	Breakaway
BT	Buried Telephone Cable or Duct
Btfly.	Butterfly
BW	Barbed Wire, Bottom Width or Both Ways
C	Cantilever Length, Cut, Colorless, Coulomb or Cycle Length
°C	Degree Celsius
C & G	Curb And Gutter
CA	Coarse Aggregate
Cap.	Capacity
CAP	Corrugated Aluminum Pipe
Caps.	Capital Letters
CASP	Corrugated Aluminized Steel Pipe
CATV	Cable Television
CB	Catch Basin
CBC	Concrete Box Culvert
CBS	Concrete Box Structure
CC, C/C, C to C, or C.C.	Center to Center, Crash Cushion
CCEW	Center to Center Each Way
CCTV	Closed-Circuit Television
CD	Cross Drain, Cross Direction (Geotextiles)
cd	Candela
Cem.	Cement or Cemetery
Cem'd.	Cemented
CFS	Cubic Feet Per Second
Ch.	Channel
Chchg.	Channel Change
Chg.	Changeable
CI	Cast Iron
CIP	Cast Iron Pipe
CIPL, C.I.P., C-I-P	Cast In Place
circ.	Circumference
Ckt.	Circuit
Cl. or Clear	Clearance
CL, C/L or ℄	Center Line
CM	Concrete Monument
CMB	Concrete Median Barrier
CMP	Corrugated Metal Pipe
CMPA	Corrugated Metal Pipe Arch
Co.	County or Company
Col.	Column
Com.	Commercial or Common
COMM	Committee or By Committee
Comp.	Composite
Con.	Connect or Connection
Conc.	Concrete
Const.	Construct or Construction
Contrl.	Controller
Cont.	Continuation
Contr.	Contractor
Coord.	Coordinate
Cor.	Corner
Corr.	Corrugated
CP	Concrete Pipe
CPE	Corrugated Polyethylene Pipe
CPT	Cone Penetration Test
CR	Control Radius or County Road
CRA	Clear Recovery Area
Crs. or Cse.	Course
CS	Curve To Spiral
CSP	Corrugated Steel Pipe
CT	Clear Trunk
CTPB	Cement Treated Permeable Base
Ctlvr.	Cantilever
Ctr., Ctrs.	Center
CU or Cu	Copper
Culv.	Culvert
Cwt.	Hundredweight
CY,Cu. Yd., CY, or C.Y.	Cubic Yard
Cyl.	Cylindrical

D	Degree Of Curvature, Depth, Density, Distance, Diameter or Directional Distribution
DA	Drainage Area or Deflection Angle
DBH	Diameter At Breast Height
DBI	Ditch Bottom Inlet
Dbl.	Double
DCS	Degree Of Curvature (Spiral)
DD	Dry Density
DDHV	Directional Design Hour Traffic
Decel.	Deceleration
Deg.	Degree
Delin.	Delineators
Demobl.	Demobilization
Dept.	Department
Det.	Detour, Detection, Detectable
DFE	Design Flood Elevation
DGN or Dgn.	Design
DHV	Design Hourly Volume
DHW	Design High Water
DT	Ditch
DI	Drop Inlet
Dia. or D	Diameter
Dim.	Dimension
Disp.	Disposal
Dist.	Distance
DLS	District Location Surveyor
DMM	Domestic Mail Manual
DOT	Department Of Transportation
DPI or D.P.I.	Ditch Point Intersection
Dr. or DR.	Drain, Drive or Design Review
DR	Design Review
Driv.	Driven
Drwy.	Driveway
DS	Design Speed
DSL	Design Service Life
Dwg.	Drawing
E	East or External Distance
e	Rate Of Superelevation
E to E	End to End
EA or Ea.	Each
EB	Eastbound
EIA	Electronic Industries Alliance
El. or Elev.	Elevation
Elast.	Elastomeric
Elec.	Electric
Ellip.	Elliptical
Embk.	Embankment
Emul.	Emulsified
Encl.	Enclosure
Engr.	Engineer
EOS	End Of Survey or Equivalent Opening Size
E.P. or EOP	Edge Of Pavement
EPDM	Ethylene Propylene Diene Monomer
Eq.	Equation or Equal
Equip.	Equipment
Esmt.	Easement
Est. or Estm.	Estimate
Est.	Establish or Established
Etc. or etc.	Et Cetera (And So Forth)
ETP	Electronic Tough Pitch
EW	Endwall
Ex.	Except, Example
Exc. or Excav.	Excavation
Exist.	Existing
Exp.	Expansion
Ext.	Extension
Exwy.	Expressway

The abbreviations listed are the standard for contract plans production. This list is not all inclusive. Other Department accepted abbreviations may be used when deemed more appropriate. Where special abbreviations are used a descriptive tabulation may be necessary in the plans.

F	Fill, Farad
F or Final	Final Quantity
F & I	Furnish & Install
F to F	Face to Face
FA	Federal Aid or Fine Aggregate
FAC	Florida Administrative Code
FAP	Federal Aid Project
FC	Friction Course
FD	French Drain
Fdn.	Foundation
FDOT	Florida Department Of Transportation
FE	Floor Elevation
Fed.	Federal
Fert.	Fertilizer
FES	Flared End Section
FETS	Flared End Terminal Section
FH	Fire Hydrant
FHWA	Federal Highway Administration
Fig.	Figure
Fin.	Finish
F.L., FL or ℄	Flow Line
FL, Fl. or Fla.	Florida
Flex.	Flexible
FNQ	Fuse (Type Slow Burn)
FOC	Fiber Optics Cable
FPM or fpm	Feet Per Minute
FPS or fps	Feet Per Second
FR or Fr.	Frame
Frang.	Frangible
Freq.	Frequency
F.S.	Florida Statutes
Ft.	Foot or Feet
FTB	Floating Turbidity Barrier
FTBA	Florida Transportation Builder Association
FTP	Florida Traffic Plans
Furn.	Furnish
G	Giga or Gauss
g	Gram or Gravity
Galv.	Galvanized
Ga.	Gauge or Gage
Ga. or Gal.	Gallon
Gar.	Garage
GD	Gutter Drain
GFI	Ground Fault Interrupter
GIP	Galvanized Iron Pipe
GM	Gas Main
GP	Grade Point
Gr.	Grade, Guardrail or Grate
Gr. or Gro.	Gross
GRC	Galvanized Rigid Steel Conduit
Grd.	Ground
GRI	Geosynthetic Research Institute
gross km	Gross Kilometer
Gr. Wt. or gr. wt.	Gross Weight
Gttr.	Gutter
H	Henry
h	Hour or Hecto
ha	Hectare
HAR	Highway Advisory Radio
HB	Hay Bales
HC	Horizontal Clearance
HD	High Density or Heavy Duty
HD or Hd.	Head
HDPE	High Density Polyethylene
Hdwl.	Headwall
HH	Heavy Hex
Hndrl	Handrail
HOA	Hand/Off/Automatic
Horiz. or Hor.	Horizontal
HP	High Pressure or Horsepower
Hr.	Hour
HS	High Strength
HSHV	High Strength Horizontal Vertical
Hse.	House
Ht.	Height
HW or H.W.	High Water or Hot Water
Hwy.	Highway
Hyd.	Hydraulic
Hz	Hertz
I	External Angle (Delta), Interstate
Intchg. or Ichg.	Interchange
IES	Illuminating Engineering Society
ID, I.D.	Inside Diameter or Identification
IMC	Intermediate Metal Conduit
In.	Inch or Inches
Inc.	Incorporated or Including
Incl. or Inc.	Included
Ind.	Industry or Industrial
INV. or Inv.	Invert
IP	Iron Pipe
Install.	Installed
Isect.	Intersection
Isl.	Island
IR	Iron Rod
ITE	Institute Of Transportation Engineers
ITS	Intelligent Transportation Systems
J	Joule
JB	Junction Box
Jct.	Junction
Jt.	Joint
K	Design Hour Factor or Kelvin
k	Kilo (prefix)
kg	Kilogram
kg/m	Kilogram Per Meter
kg/m²	Kilogram Per Square Meter
kg/m³	Kilogram Per Cubic Meter
Kilo	One Thousand
Kip	1000 Pounds
km	Kilometer
km/h	Kilometer Per Hour
kn	Knot
kN	Kilonewton
kPa	Kilopascal
ksi	Kips Per Square Inch
kV	Kilovolt
kVA	Kilovolt Ampere
kWh	Kilowatthour
L	Length, Length Of Curve, Liter, Left
2-L	Two-Lane
2L1W	Two-Lane One-Way
2L2W	Two-Lane Two-Way
LA or L/A	Limited Access
Lat.	Lateral or Latitude
Lb.	Pound
LBS.	Pounds
lb/sy	Pounds Per Square Yard
LBR	Limerock Bearing Ratio
LC	Long Chord
LEO	Law Enforcement With Flashing Lights And Radar
LFD	Load Factor Design
Lgth.	Length
Lin.	Linear
lm	Lumen
Lmrk.	Limerock
LOS	Limit Of Clear Sight
Loc., LO	Location
Long.	Longitude
LRFD	Load Resistance Factor Design
LS	Length Of Spiral
LT	Left Turn
Lt.	Left
Ltd.	Lighted or Limited
Lum.	Luminaire
L/W	Lightweight
lx	Lux
M	Mass, Middle Ordinate Length or Mega
m	Meter or Milli
m²	Square Meter or Meter Square
m³	Cubic Meter or Meter Cubed
m³ /m	Cubic Meter Per Meter
m/s	Meters Per Second
Mach.	Machine
Maint.	Maintenance
Matl.	Material
Max.	Maximum
MB	Median Barrier
MBM	Thousand (Feet) Board Measure
MD	Machine Direction (Geotextiles)
Med.	Median
Mega	One Million
Memb.	Member
MES	Mitered End Section
Mess.	Message
Mfg.	Manufactured or Manufacturer
MG	1000 Gallons
MH, M.H.	Manhole, Mounting Height
MHW	Mean High Water
µ	Micro
Mi.	Mile
Micro	One-Millionth
Mid.	Middle
Mil	One-Thousandth Of An Inch
Mil.	Military
Milli	One-Thousandth
Min.	Minimum or Minute
Misc.	Miscellaneous
mL	Milliliter
MLW	Mean Low Water
mm	Millimeter
Mobl.	Mobilization
Mod.	Modify or Modified
Mol	Mole
Mon.	Monument
MOT	Maintenance Of Traffic
MP	Mile Post
MPa	Megapascal
MPH or mph	Miles Per Hour
MSL	Mean Sea Level
MSTCSD	Minimum Specifications For Traffic Control Signal Devices
Mtd.	Mounted
MUTCD	Manual On Uniform Traffic Control Device
MUTS	Manual On Uniform Traffic Studies
N	North or Newton
N/m	Newtons Per Meter
N/m²	Newtons Per Square Meter
N/m³	Newtons Per Cubic Meter
N/mm²	Newtons Per Square Millimeter
NA or N/A	Not Available or Not Applicable
N & C	Nail & Cap
N & D	Nail & Disk
NAVD	National American Vertical Datum
NB	Northbound
NC	National Coarse or Normal Crown
NCHRP	National Cooperative Research Program
NDCBU	Neighborhood Delivery And Collection Box Unit
NE	Northeast
net km	Net Kilometer
NEMA	National Electrical Manufacturers Association
NGVD	National Geodetic Vertical Datum of 1929
NGS	National Geodetic Survey
NHS	National Highway System
NHW	Normal High Water
NIC	Not In Contract
NJ	New Jersey
N m	Newton Meter
No.	Number
Nom.	Nominal
Norm.	Normal
N.P.	Non Plastic
NPS	Nominal Pipe Size
NPT	National Pipe Thread
NRCP	Non-Reinforced Concrete Pipe
NS	Non Stress, Not Suitable or Near Side
NT, N&T	Non Traffic, Nail & Tin
NTS	Not To Scale
NW	Northwest
Opass	Overpass
O to O, o to o or O.O.	Out to Out
OA	Overall
O.B.G.	Optional Base Group
OC or O.C.	On Center
OD or O.D.	Outside Diameter
OE	Overhead Electric
OH, OHD or Ohd.	Overhead
Opt.	Option, Optional or Optically
OT	Overhead Telephone
Oz.	Ounce
Ω	Ohm
P	Passenger Car & Light Delivery Truck
P or Plan	Plan Quantity
Pa	Pascal
Par.	Parallel
Pa•s	Pascal Second
Part.	Participation or Partition
Pavt.	Pavement
PC	Point Of Curvature
PCBC	Precast Concrete Box Culvert
PCC	Point Of Compound Curvature or Plain Cement Concrete
PCE	Permanent Construction Easement
PE	Professional Engineer
Ped	Pedestrian or Pedestal
Pen.	Penetration
PG	Profile Grade
PGL	Profile Grade Line
Ph.	Phase
pH	Measure Of Acidity or Alkalinity
PI	Point Of Intersection
Pkg.	Parking
Pkwy.	Parkway
PL or ℄	Property Line or Plate
PM	12:00 Noon Until 11:59 Midnight
POC	Point On Curve
POST	Point On Semi-Tangent
POT	Point On Tangent
PP	Power Pole
PPB	Pier Protection Barrier
Pr.	Pair
PRC	Point Of Reverse Curvature
Prcst.	Precast
Prest.	Prestressed
Prob.	Probability
Prod.	Product, Production, Producer or Produced
Prog.	Program or Progression
Proj.	Project or Projection
PRM	Permanent Reference Monument
Prop.	Proposed
Prov.	Provisions
PRS	Portable Regulatory Sign
PS & E	Plans, Specifications And Estimates
PSF or psf	Pounds Per Square Foot
PSI or psi	Pounds Per Square Inch
PT	Point Of Tangency or Pressure Treated
PVC	Polyvinyl Chloride
PW	Pressure Water

The abbreviations listed are the standard for contract plans production. This list is not all inclusive. Other Department accepted abbreviations may be used when deemed more appropriate. Where special abbreviations are used a descriptive tabulation may be necessary in the plans.

Q	Peak Discharge or Flow Volume
QPL	Qualified Products List
R	Right
R or Rad.	Radius
R or Rng.	Range
rad	Radian
rad/s	Radian Per Second
RBAC	Rock Base Asphaltic Concrete
RBST	Rock Base Surface Treatment
RC	Reverse Crown
RCP	Reinforced Concrete Pipe
RCPA	Reinforced Concrete Pipe Arch
Rd.	Road or Round
Rdsd.	Roadside
Rdwy.	Roadway
Rec.	Recovery
Rect.	Reticuline or Rectangular
Ref.	Reference
Refl.	Reflective
Reg.	Region, Regular, Registered or Regulation
Reinf.	Reinforced or Reinforcing
Rejuv.	Rejuvenation
Reloc.	Relocated
Rem.	Removal
Repl.	Replace
Req. or Reqd.	Required
Res.	Residence or Residential
RGS	Rigid Galvanized Steel
RHW	Insulation (Moisture & Heat Resistant Rubber)
RM	Reference Monument
r/min	Revolution Per Minute
RP	Reference Point
rpm	Revolution Per Minute
RPM	Raised Reflective Pavement Markers
r/s	Revolution Per Second
RR	Railroad
RSDU	Radar Speed Display Unit
Rsf.	Resurface
Rt.	Right
RU	Rack Unit
R/W, ROW	Right Of Way
RX	Receive
S or s	Speed, South, Siemens, Or Second
SAHM	Sand-Asphalt Hot Mix
SAN or San.	Sanitary
SB	Southbound
SBAC	Shell Base Asphaltic Concrete
SBRM	Sand Bituminous Road Mix
SBST	Shell Base Surface Treatment
SC	Seal Coat or Spiral To Curve
Sch.	Schedule
SCST	Sand-Clay Surface Treatment
SD	Side Drain, Storm Drain
SE	Southeast
Sec.	Second
Sect.	Section
Sed.	Sediment
Sep.	Separator
Seq.	Sequential
Serv.	Service
SF	Adjustment Factor In Percent, Silt Fence
SG	Subgrade
SG	Specific Gravity
Sh. or Sht.	Sheet
Shldr.	Shoulder
SHW	Seasonal High Water
SIP	Stay In Place
SP	Superpave
Spa.	Space
Spcg. or Sp.	Spacing
Spec.	Specification
SPT	Standard Penetration Test
Sq. Ft., SF, or S.F.	Square Foot
Sq. In.	Square Inch
Sq. Yd., SY or S.Y.	Square Yard
SR or S.R.	State Road
SRAP	Spiral Rib Aluminum Pipe
SRASP	Spiral Rib Aluminized Steel Pipe
SRCP	Steel Reinforced Concrete Pipe
SRD	State Road Department
SRSP	Spiral Rib Steel Pipe
SS	Sanitary Sewer
SSMD	Solid State Modular Design
ST	Surface Treatment or Spiral To Tangent
St. or ST.	Street
Sta.	Station
Stab.	Stability or Stabilization
STB	Staked Turbidity Barrier
Std.	Standard
Stg.	Strong
Stge.	Storage
Stl.	Steel
Str.	Structure
Sty.	Story
SU	Single Unit Trucks
Sub. or Subs.	Subsoil
Sub. or Subst.	Substitute
Subgr.	Subgrade
Suppts.	Supports
SUR or Sur.	Survey
Surf.	Surface
SW	Southwest
SW or Swk.	Sidewalk
Sys. or Syst.	System
Sv	Sievert
Sym.	Symmetrical
T	Tangent, Length Of Curve, Percent Trucks, Tesla,
T, TWP or Twp.	Township
t	Metric Ton
tan.	Tangent
TBM	Temporary Bench Mark
TC	Tangent To Curve
TCB	Temporary Concrete Barrier
TCE	Temporary Construction Easement
TCP	Terra Cotta Pipe
TCZ	Traffic Control Zone
TDLC	Transportation Design For Livable Communities
Tel.	Telephone
Temp.	Temperature or Temporary
Theo.	Theoretical
THRMPLSTC	Thermoplastic
THW or THWN	Insulation (Flame Retardant, Moisture And Heat Resistant Thermoplastic)
Thick.	Thickness
Tk	Thick, Thickness or Truck
Tn.	Ton
Traf.	Traffic
Trans.	Transition, Transverse, Translate or Transportation
Treat.	Treatment
TS	Tangent To Spiral
TSC	Length Of Tangent (Spiral Curve)
TTC	Temporary Traffic Control
TVSS	Transient Voltage Surge Suppression
TX	Transmit
Typ.	Typical
Upass.	Underpass
UG	Underground
UL	Underwriters Laboratories
Ult.	Ultimate
Ultd.	Unlimited
Unddr.	Underdrains
Undrdwy.	Underroadway
UNL or Undl.	Unloaded
Untr.	Untreated
UPS	Uninterruptible Power Supply
USC & GS	US Coast and Geodetic Survey (now National Geodetic Survey)
USGS	US Geological Survey
USPS	United States Postal Service
Util.	Utilities
UV	Ultraviolet
V	Volt, Velocity, Volume or Hourly Volume
Var.	Varies, Variable or Variance
VC	Vertical Curve
VCP	Vitrified Clay Pipe
VECP	Value Engineering Change Proposal
Veh.	Vehicle
Vert.	Vertical
VF	Vertical Foot
Vh	Verified Horizontal Location
VMS	Variable Message Sign
Vol.	Volume
VP	Vertical Panel
VPD or Vpd.	Vehicles Per Day
VPH or Vph.	Vehicles Per Hour
VPHPL or Vphpl.	Vehicles Per Hour Per Lane
VRMS	Volts Root Mean Square
Vv	Verified Vertical Elevation
Vvh	Verified Vertical Elevation And Horizontal Location
VW	Variable Width
W	Width, Wide, West or Watt
W/C	Water-Cement Ratio
WB	Westbound
Wb.	Weber
WB40	Intermediate Semi Trailer
WB50	Large Semi Trailer
WB62	Interstate Semi Trailer
WB67D	Tandem Semi Trailer
WM	Water Main
W.P.I.	Work Program Item
WT	Water Table Or Weight
WWF	Welded Wire Fabric
WWR	Welded Wire Reinforcing
X	Coordinate Value (East-West Direction) or Extra
X Rd.	Cross Road
Xing.	Crossing
Xsec.	Cross Section
Y	Coordinate Value (North-South Direction)
Yd.	Yard
Yr.	Year

The abbreviations listed are the standard for contract plans production. This list is not all inclusive. Other Department accepted abbreviations may be used when deemed more appropriate. Where special abbreviations are used a descriptive tabulation may be necessary in the plans.

UNITS OF MEASURE

US MEASUREMENT

AC	Acre
AS	Assembly
BU	Bushel
CF	Cubic Foot
CO	Cleanout
CY	Cubic Yard
EA	Each
ED	Each Day
GA	Gallon
GM	Gross Mile
LB	Pound
LF	Linear Foot
LM	Lane Mile
LO	Per Location
LS	Lump Sum
LU	Luminaire
MB	Thousand Board Measure
MG	Thousand Gallons
MH	Man Hour
NM	Net Mile
PA	Per Analysis
PB	Per Building
PE	Pile
PI	Per Intersection
PL	Plant
PM	Per Mile
PS	Per Set
PW	Per Well
SI	Square Inch
SF	Square Foot
SY	Square Yard
TN	Ton

METRIC MEASUREMENT

AS	Assembly
CO	Cleanout
DA	Day
EA	Each
ED	Each Day
GK	Gross Kilometer
HA	Hectare
HR	Hour
KG	Kilogram
KL	Kiloliter
KM	Kilometer
LI	Liter
LK	Lane Kilometer
LO	Per Location
LS	Lump Sum
LS/AS	Lump Sum Per Assembly
LS/DA	Lump Sum Per Day
LS/EA	Lump Sum Per Each
LS/HA	Lump Sum Per Hectare
LS/KG	Lump Sum Per Kilogram
LS/LS	Lump Sum Per Lump Sum
LS/MT	Lump Sum Per Metric Ton
LS/MI	Lump Sum Per Linear Meter
LS/M2	Lump Sum Per Square Meter
LU	Luminaire
MH	Man Hour
MO	Month
MT	Metric Ton
MI	Meter
M2	Square Meter
M3	Cubic Meter
NK	Net Kilometer
PA	Per Analysis
PB	Per Building
PI	Per Intersection
PL	Plant
PW	Per Well

STANDARD SYMBOLS FOR KEY MAP

- Highway With Full Control of Access
- Highway With Frontage Roads
- Highway Interchange
- Proposed Controlled Access Highway
- Divided Highway
- Hard Surfaced Road
- Soil, Gravel Or Shell Surfaced Road
- Graded And Drained Road
- Unimproved Road
- Primitive Road
- P — Private Road
- Streets In Inset Or Delimited Areas
- Extension Of Local Roads Within Cities
- FAI — Federal Aid Interstate Highway
- FAU — Federal Aid Urban Highway
- FAP — Federal Aid Primary Highway
- FAS — Federal Aid Secondary Highway
- NFR — National Forest Road
- SFR — State Forest Road
- SPR — State Park Road
- Interstate Highway
- US Numbered Highway
- State Highway
- County Road

- Railroad
- Double Track Railroad
- Abandoned Railroad
- Railroad Station
- Grade Crossing
- Railroad Above
- Railroad Below
- Military Field
- Commercial Or Municipal Airport
- Landing Area Or Strip
- Runways

- FF — Free Ferry
- TF — Toll Ferry
- Canal Or Drainage Ditch
- Intracoastal Waterway
- Narrow Stream
- Wide Stream
- Dam
- Dam Or Spillway With Lock
- Dam With Road
- Flood Control Structure
- Lake, Reservoir Or Pond
- Intermittent Pond
- M — Meandered Lake
- Marsh Or Swamp
- Mangroves
- Levee Or Dike
- Levee Or Dike With Road
- Highway Bridge
- 3 — Small Bridges Closely Spaced
- Drawbridge
- Highway Grade Separation
- Tunnel
- State Boundary Line
- County Boundary Line
- Civil Township Boundary
- Extended Township Line
- Land Grant Line
- Land Section Line
- State Survey Section Line
- Survey By Others
- Location Of Inset Boundary Within Map
- Military Reservation Boundary
- College Or University Boundary
- Corporate Limits
- Delimited Area, Population Est.
- Reservation, Forest Or Park Boundary
  Wildlife Refuge Boundary

- Residential Area Under Development
- Lighthouse
- State Capital
- County Seat
- Other City Or Village
- Seminole Indian Village
- Welcome Station
- WP — Wayside Park Or Small Park
- WP — Park With Boat Ramp
- B — Boat Ramp
- Museum
- Recreational Area Or Historic Site
- Scenic Site
- Post Office
- School
- Church
- Cemetery
- Church And Cemetery
- Hospital, Health Center Or Rest Home
- Toll House, Port Of Entry Or Weight Station
- Fair Grounds, Race Course Or Rodeo Arena
- Mine Or Strip Mine
- Governmental Research Station

- Agricultural Inspection Station
- FM — Farmers Market
- Game Preserve
- Game Checking Station
- Bird Sanctuary
- Fire Control Headquarters
- Lookout Tower
- FS — Fire Station
- Patrol Or Police Station
- Correctional Institution Or Road Camp
- DOT — Department of Transportation Facility
- Coast Guard Station
- A — Armory
- J — Junkyard
- F — Sanitary Fill
- S — Sewage Disposal Plant
- I — Incinerator
- Power Plant
- Power Substation
- Communications Facility
- Locked Gate Or Fence
- WOOD — Triangulation Station

GENERAL NOTE

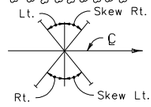
1. Symbols on this Index are intended for use on all Roadway, Signing And Marking, Signalization, and Lighting projects. For work zone traffic control symbols refer to Index 600. When additional or similar symbols are used, legends or notations may be required for clarity.

STANDARD SYMBOLS FOR PLAN SHEETS

GENERAL SYMBOLS

- State Line
- County Line
- Township Line
- Section Line
- City Line
- Base Or Survey Line
- Right-Of-Way
- Easement Line
- Limited Access Line
- Fence Line
- National Or State Park Or Forest
- Grant Line
- Railroad (Drainage Maps)
- Railroad (Detail Plans)
- Fence (Limited Access)
- Box Culvert
- Bridge
- Pipe Culvert-Mitered End Section
- Pipe Culvert-Straight Endwall
- Pipe Culvert-U-Type Endwall
- Pipe Culvert-Median Drain
- Pipe Culvert-Other End Treatments
- 18" SD — Storm Drain (Proposed)
- 18" SD - - - - Storm Drain (Existing)
- Inlet
- Manhole
- Tied Longitudinal Joint
- Keyed Longitudinal Joint
- Doweled Transverse Expansion Joint
- Doweled Transverse Contraction Joint
- Transverse Contraction Joint Without Dowels
- Survey Reference Point
- AL ACHUA — Triangulation Station
- B.M. NO. 112 — Bench Mark
- Point Of Intersection
- North Arrow
- TYP. TYPE PAV'T WALK — Edges Of Existing Pavement And Sidewalk
- Guardrail
- C. C. — Crash Cushion (Attenuator)
- Piling Pier Column
- Concrete Monument
- Base Line
- Centerline
- Flow Line
- Property Line
- Delta Angle
- Approximate
- Round Or Diameter

- Curb
- Curb And Gutter
- Water Well, Spring
- Levee
- MP 327 — Railroad Mile Post
- Railroad Signal With Gate
- Railroad Switch
- 12' — Gate
- Pump Island
- Storage Tank (Surface)
- Storage Tank (Underground)
- Mine Or Quarry
- B P — Borrow Pit
- Church
- S — Store
- RES — Residence
- B — Barn
- School
- Synthetic Bales
- Silt Fence
- Floating Turbidity Barrier
- Staked Turbidity Barrier
- Stream
- Shore Line
- Marsh
- Wetland Boundary (Proposed)
- Wetland Boundary (Existing)
- Hedge
- Trees
- Edge Of Wooded Area
- Shrubbery
- Grove Or Orchard



Definition Of Skew For Cross Drains And Barrels Of Conrete Box Culverts

- Concrete
- Wood
- e — Rate Of Superelevation

UTILITY ADJUSTMENT SYMBOLS

EXISTING	PROPOSED	
		Manhole
		Fire Hydrant
		Meter (Type)
		Valve (Type)
		Valve Box (Type)
		Valve Cover (Type)
		Vent (Type)
		Pump Station
		Sewage Pump Station
		Cleanout
		Cable TV Service Box
		Power Pole
		Telephone Pole
		Combination Pole
		Guy Wire And Anchor Pin
		Guy Pole Deadman
		Tower
		Light Pole
		Transformer

EXISTING	PROPOSED	
W - - - - 6" - - - - W	W W W W W W 6" M M M M M M	Water Main
NPW - - - 6" - - - NPW	NPW NPW 6" NPW NPW	Non Potable Water
S - - - - 8" - - - - S	S S S S S S 8" S S S S S	Sanitary Sewer
G - - - - 6" - - - - G	G G G G G G 6" G G G G G G	Gas
RD - - - - 4" - - - - RD	RD RD RD 4" RD RD	Roof Drain
PET - - - 8" - - - PET	PET PET 8" PET PET	Petroleum
STM - - - 12" - - - STM	STM STM 12" STM STM	Steam
CAS - - - 12" - - - CAS	CAS CAS 12" CAS CAS	Casing
DT - - - 4"x4" - - - DT	DT DT 4"x4" DT DT	Duct
BE - - (7.5 kV) - - BE	BE BE (7.5 kV) BE BE	Buried Electric
OE - - (7.5 kV) - - OE	OE OE (7.5 kV) OE OE	Overhead Electric
BTV - - - 3" - - - BTV	BTV BTV 3" BTV BTV	Buried Cable Television
OTV - - - -2" - - - OTV	OTV OTV 2" OTV OTV	Overhead Cable Television
BT - - - - 2" - - - - BT	BT BT BT 2" BT BT BT	Buried Telephone
OT - - - - 2" - - - - OT	OT OT OT 2" OT OT OT	Overhead Telephone
BFO - - - 2" - - - BFO	BFO BFO 2" BFO BFO	Buried Fiber Optic
OFO - - - -1" - - - - OFO	OFO OFO 1" OFO OFO	Overhead Fiber Optic

See General Note, Sheet 1 of 3

STANDARD SYMBOLS FOR PLAN SHEETS

TRAFFIC SIGNALS SYMBOLS

EXISTING	PROPOSED	
		Traffic Signal Head (Span Wire Mounted)
		Traffic Signal Head (Pedestal Mounted)
		Traffic Signal Head (Mast Arm Mounted)
		Traffic Signal Pole (Concrete, Wood, Metal)
		Vehicle Detector (Loop)
		Signal Cable (On Messenger Wire)
		Conduit
		Vehicle Detector (Points)
		Pedestrian Detector
		Pedestrian Signal Head (Pole Or Pedestal Mounted)
		Controller Cabinet (Base Mounted)
		Controller Cabinet (Pole Mounted)
W - D W		Walk - Dont Walk
FDW		Flashing Dont Walk
5		Signal Face Number
		Signal Lens
P		Programmed Signal Head
		Messenger Wire
3		Pole Tabulation Cross Reference
*3		Pole Tabulation Cross Reference (Joint Use Pole)
		Signal Phase

LIGHTING SYMBOLS

EXISTING	PROPOSED	
		Pole & Luminaire
		Existing Pole & Luminaire To Be Removed
		Final Position Of Relocated Or Adjusted Pole & Luminaire
		High Mast Lighting Tower
		City Or Utility Owned Luminaire & Pole
		PVC (Polyvinyl Chloride) Lighting Conduit And Conductors
		Rigid Galvanized Lighting Conduit And Conductors
		Lighting Pull-Box
		Light Distribution Point
		Joint Use Pole
		Pier Cap Underdeck Luminaire
		Pendant Hung Underdeck Luminaire

SIGNING AND PAVEMENT MARKING SYMBOLS

	Pavement Arrow
	Single Solid Line
	Double Solid Line
	Skip Line
	Stop Bar
	Traffic Sign (Post Mounted)
	Traffic Sign (Overhead)
13	Sign Number
700-83	Sign Item Number
	Traffic Flow Arrow

See General Note, Sheet 1 of 3

GENERAL NOTES

1. The illustrations for guardrail applications are standard configurations; adjustments are to be made as required by site specific conditions to attain optimum design for function, economy and serviceability.

2. The beginning of guardrail need shall be at the greatest of the upstream distances from the hazard, as determined from Figures 1 and 2, and other application details of this Index.

3. One Panel (i.e., panel length) equals 12'-6". Guardrail shall be constructed with rail elements 12'-6" in length except where 25'-0" elements are called for by this and other standards (indexes) or specifically called for in the plans.

   Post spacing shall be 6'-3" except that reduced spacing shall be used for (a) transitions to anchorages at rigid structures such as bridges (See Detail J and Index No. 402) and transitions to redirective crash cushions, (b) the conditions in Note No. 7 below, (c) special post applications, (d) reduced post spacing required for specific end anchorage assemblies, and, (e) specific spacing called for in the plans.

4. Guardrail mounting height for the W-beam without rubrail and for thrie-beam is 1'-9" to the center of beam, and for W-beam with rubrail 2'-0" to center of beam. Modified thrie-beam shall be mounted at a height of 2'-0" to center of beam. The height is critical and shall be attained in all cases; a tolerance of 3" above and 1" below the standard mounting heights is permissible over necessary surface irregularities (e.g., across shoulder gutters, inlets and roadway surface break lines).

5. All guardrail panels, end sections and special end shoes shall be lapped in the direction of adjacent traffic.

6. Flared end anchorage assemblies providing 4' offset are the standard end treatments for single face free standing guardrail approach ends. Parallel end anchorage assemblies for guardrail approach end treatments will be constructed only when restraints prevent construction of flared end anchorages.

   Guardrail end anchorage assemblies shall be of the type called for in the plans. If the plans call for end anchorage assembly "flared" and does not identify the specific system(s) to be used, the contractor has the option to construct any FDOT approved flared assembly provided in this Index or identified on the Qualified Products List (QPL), subject to the conditions identified in the approved Index drawings, or QPL drawings if applicable.

   If the plans call for end anchorage assembly "parallel" and does not identify the specific system(s) to be used, the contractor has the option to construct any FDOT approved parallel assembly provided in this Index or identified on the QPL, subject to the conditions identified in the approved Index drawings, or QPL drawings if applicable.

   If the plans call for a specific end anchorage assembly, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. Approved substitutions will not be eligible for VECP consideration.

   When an end treatment is attached to guardrail with Pedestrian Safety Treatment, only end treatment systems with timber posts are to be used.

   Proprietary end anchorage systems must be identified on the QPL. Manufacturers seeking approval of proprietary end anchorage systems for inclusion on the QPL must submit application along with design documentation showing the end anchorage system is crash tested to NCHRP Report 350 Test Level 3 criteria, is accepted by FHWA for use as a guardrail end anchorage system, and is compatible with FDOT guardrail systems. System approvals will be contingent on FDOT's evaluation of crash test performance results for consistency with FDOT guardrail application and use. If approved, installation drawings signed and sealed by a professional engineer licensed in the State of Florida will be required.

7. At above ground rigid hazards where the face of guardrail is offset from the hazard less than the 4' minimum for standard W-beam, other guardrail configurations may be applicable; see General Note No. 11 and the minimum offset table on Sheet 19. For guardrail with post spacing less than 6'-3" the reduced spacing should extend a minimum of one panel in advance of the hazard. When minimum offset cannot be attained safety shape concrete barrier shall be used unless other shielding is approved by the Engineer of Record. See Index No. 410 for safety shape concrete barriers and typical applications, and the plans for special barrier shapes and applications.

8. In addition to use at roadside hazards or other areas where the Engineer has deemed guardrail necessary, guardrail should be considered on flush shoulder sections where fill slopes are steeper than 1:3 within the clear zone and fill heights are 6' or greater. Curbed sections where fill slopes are steeper than 1:3 and fill heights are 6' or greater within 22' of the traveled way should be evaluated for installation of guardrail. Additional guidance for evaluating the need for guardrail can be found in the Plans Preparation Manual.

9. The guardrail to bridge connections contained in this Index are for bridges with Test Level 4 traffic railing barriers. For guardrail to concrete barrier wall connections see Index No. 410. For existing bridges receiving retrofit traffic railing barriers see Index No. 402.

10. The W-beam guardrail system in this index is the standard system to be used on the State Highway System where a Test Level 3 semi-rigid barrier is required.

11. Thrie-beam guardrail panels shall be used in guardrail transitions to bridge traffic railing barriers, to concrete and certain water filled safety shaped barriers, certain crash cushions and as a continuous barrier when called for in the plans. For additional information on rail attachment, post spacings, nested rails, location of thrie-beam transition panels and offset block configurations see details elsewhere in this Index, and Index Nos. 402, 410 and 414. The use of thrie-beam guardrail with standard offset blocks (Test Level 3 semi-rigid system) may be considered where one or more of the conditions listed below or similar conditions are anticipated or exist:
    a. W-beam deflection is marginal,
    b. W-beam with rubrail considered functionally deficient, continued ...

continued ...
    (c) Vehicle overriding W-beam is probable,
    (d) Drainage will be impeded or blocked by the use of concrete barrier wall (subject to deflection space requirements),
    (e) High frequency of repairs to W-beam,
    (f) Spandrel beam with low deflection needed around unrelocatable structure,
    (g) Accommodating passenger vehicles heavier or larger than the standard passenger car (e.g., passenger vans and small buses).

   The modified thrie-beam guardrail is a Test Level 4 semi-rigid system and may be used where a Test Level 4 guardrail is required.

12. Single face median guardrail for bridges located on divided roadways shall be constructed the same as outer roadway guardrail under the following conditions:
    (a) Wide medians where approach end anchor is located outside of opposing roadway clear zone,
    (b) Medians of uniform width that are occupied by other transportation and joint use facilities,
    (c) Medians of uniform or variable widths with independent vertical alignments not suited to normal median guardrail installations,
    (d) Medians of bifurcated roadways.

13. Straight rail sections may be used to construct radii of 125' or greater. For radii less than 125' the rail must be fabricated (shop-bent) to fit.

14. Crash cushions may be required in lieu of or in conjunction with guardrail at locations where space does not permit development of sufficient guardrail length, offset or crashworthiness at terminals. Crash cushions shall be constructed at or in lieu of Type II assemblies located in the approach clear zones.

15. Corrugated sheet steel beams, end shoes, end sections and back-up plates shall conform to the current requirements of AASHTO M180, Class A, Type II (zinc) coating. All other metallic components, hardware and accessories shall be in conformance with the appropriate current AASHTO requirements.

    Recycled beams: Used Class A guardrail beams that have been refurbished to condition new (AASHTO M180) may be used for both construction of new guardrail and maintenance of existing guardrail. Refurbishing shall include stripping of the existing galvanizing, restoration of the base metal in section and straightness free of warp and deformation, and, regalvanizing to AASHTO Type II specifications. Refurbished beams that retain ruptured holes, gashes or tears will not be accepted.

16. Steel offset blocks other than modified thrie-beam offset blocks are not permitted for new guardrail construction. Existing steel offset blocks may remain throughout the service life of the existing guardrail. Permissible post and offset block combinations are tabulated on Sheet 16.

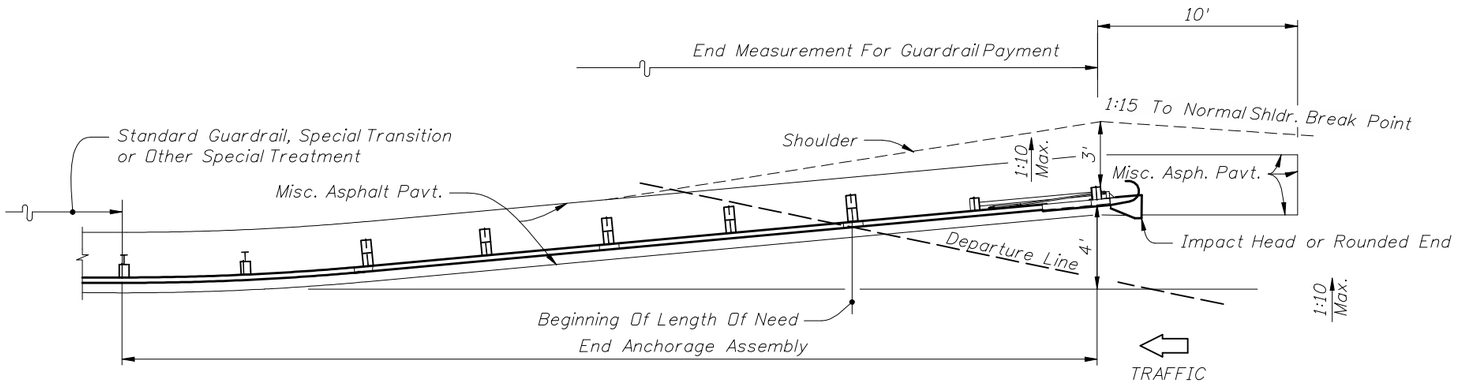
17. Where necessary to enlarge or add holes to galvanized guardrail, the work will be done by drilling or reaming. Damaged galvanized guardrail will be metalized in accordance with Sections 562 and 975 of the Standard Specifications. No burning of holes will be permitted.

18. For guardrail reflector details see Sheet 17.

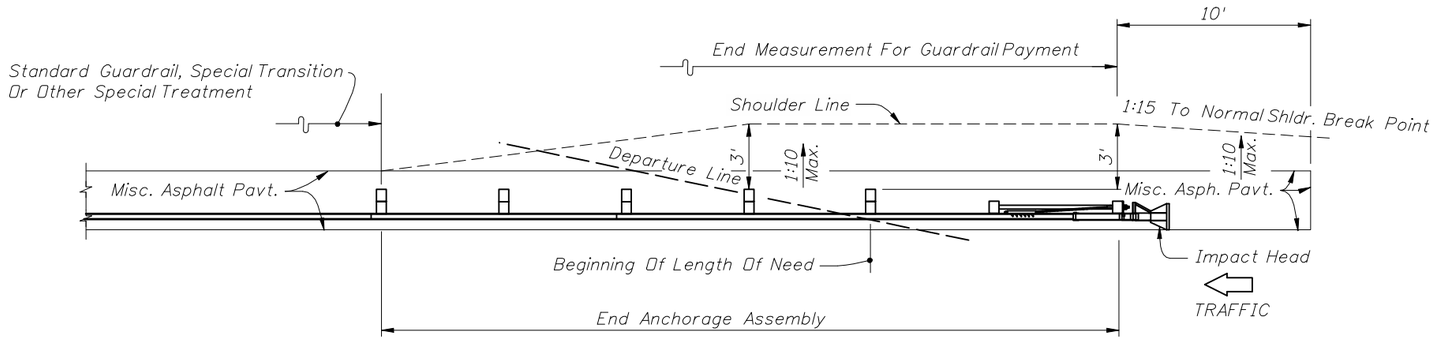
19. Any run of guardrail with existing concrete posts that is being reset under a construction or maintenance contract shall be reset using timber or steel posts. Repair within a run of guardrail with existing concrete posts can be made with either steel, timber, sound salvaged concrete posts; replacement in kind of damaged posts is to be made when like posts are on hand at time of repair.

20. Substitutions between thrie-beam guardrail and concrete barrier wall are not eligible for VECP consideration.

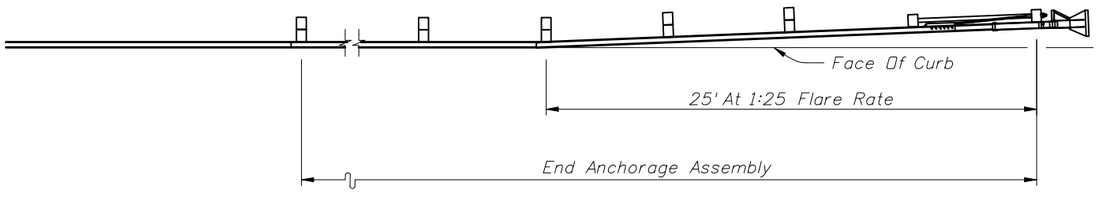
21. On roadways designated for reverse laning, all downstream ends of guardrail that are not shielded or that are not designed as approach end terminals shall be marked with post-mounted Type 3 Object Markers. Trailing bridge ends and trailing shoulder concrete barrier wall ends shall be marked with Type 3 Object Markers except where there is trailing end guardrail. Object markers to be installed facing reverse laning traffic. The cost of the object marker shall be included in the cost of the guardrail.



FLARED OPTION



PARALLEL OPTION



PLACEMENT OF PARALLEL OPTION AT CURBED LOCATIONS

GENERAL NOTES

1. These drawings are representative of the various proprietary guardrail end anchorage assemblies listed on the Department's Qualified Products List (QPL). For specific details and requirements see the vendor drawings on the QPL at www.dot.state.fl.us/specificationsoffice/

2. These drawings present the general graphics to show the limits of payment for guardrail and end anchorage assemblies, modifications to the shoulder and placement of the miscellaneous asphalt mow strips.

3. These drawings, along with the various vendor drawings on the QPL, are intended to show sufficient details for installation of the end anchorage assemblies and their connection to shoulder guardrail. This precludes the requirement for shop drawing submittals unless otherwise called for in the plans. The various end anchorage assemblies shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.

4. The various proprietary end treatments listed on the QPL are intended for use as approach end guardrail anchorages for shoulder guardrail. The effective length of the end treatments vary-refer to the vendor drawings on the QPL for the length and the use of special panels and details. Standard guardrail, guardrail transitions or other special treatments shall not be included within the limits of the end anchorage assembly. See the vendor drawings for the alignment of the end treatment with respect to the normal guardrail alignment.

5. Flared or parallel end anchorage assemblies shall not be used in medians where horizontal clearance requires use of a back rail.

6. Each of the various end anchorage assemblies have unique features. Careful attention should be given to the types and orientation of the posts and other components. Refer to the vendor drawings on the QPL for the specific requirements of each system.

7. For galvanizing requirements of the metallic components see Standard Specifications Section 967.

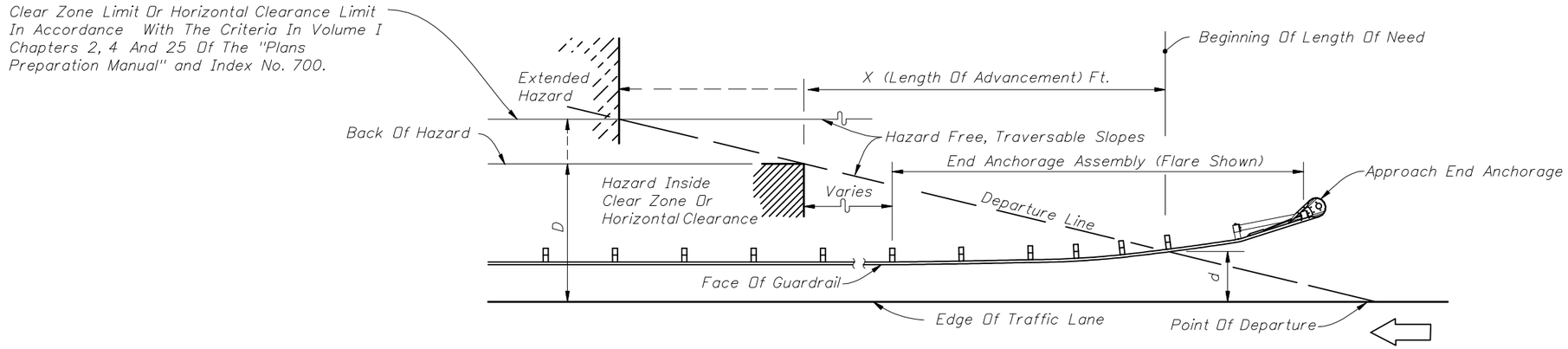
8. The end anchorage assemblies shown on the QPL are suitable for all design speeds.

9. Flared end anchorage assemblies shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Flared), EA.

Parallel end anchorage assemblies shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Parallel), EA.

The unit price for end anchorage assemblies shall be full compensation for furnishing and installing all components in accordance with the plans, the manufacturer's detail drawings, procedures and specifications and these drawings.

APPROACH END ANCHORAGE DETAILS



Design Speed mph	X (Length Of Advancement) Ft. ◪
≤45	= 16 (D-d)
≥50	= 13 (D-d)

◪ Length of advancement determined from the diagram and equations above establishes the location of the upstream beginning length of need for guardrail, however, the length of advancement can be no less than that required by other details of this index.

The flared end anchorage with 4' nose offset is shown in the diagram above, however, the diagram applies to other configurations that may occur at the beginning of length of need, such as, other flare designs; upstream returns; and, other upstream deflected, tangent and curvilinear conditions.

Equation Variables:

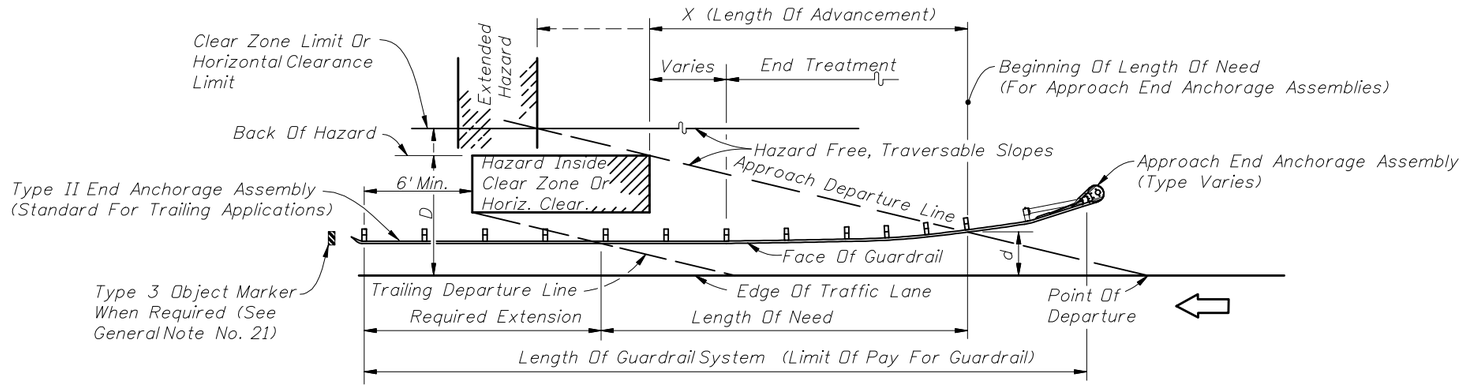
D=Distance in feet from near edge of the near approach traffic lane to either (a) the back of hazard, when the hazard is located inside the clear zone or horizontal clearance or (b) the clear zone or horizontal clearance outer limit, when the hazard extends to or goes beyond the clear zone or horizontal clearance limit. For left side hazards on two-way undivided facilities, D is measured from the inside edge of the near approach traffic lane (see Figure 2).

d=Distance in feet from the near edge of the near approach traffic lane to the face of guardrail at its intersection with the departure line. For left side hazards on two-way undivided facilities, d is measured from the inside edge of the near approach traffic lane (see Figure 2).

For flared and parallel end anchorage assemblies the beginning length of need is to be set at the center of post #3. That is, the departure line must intersect the face of the rail at post #3.

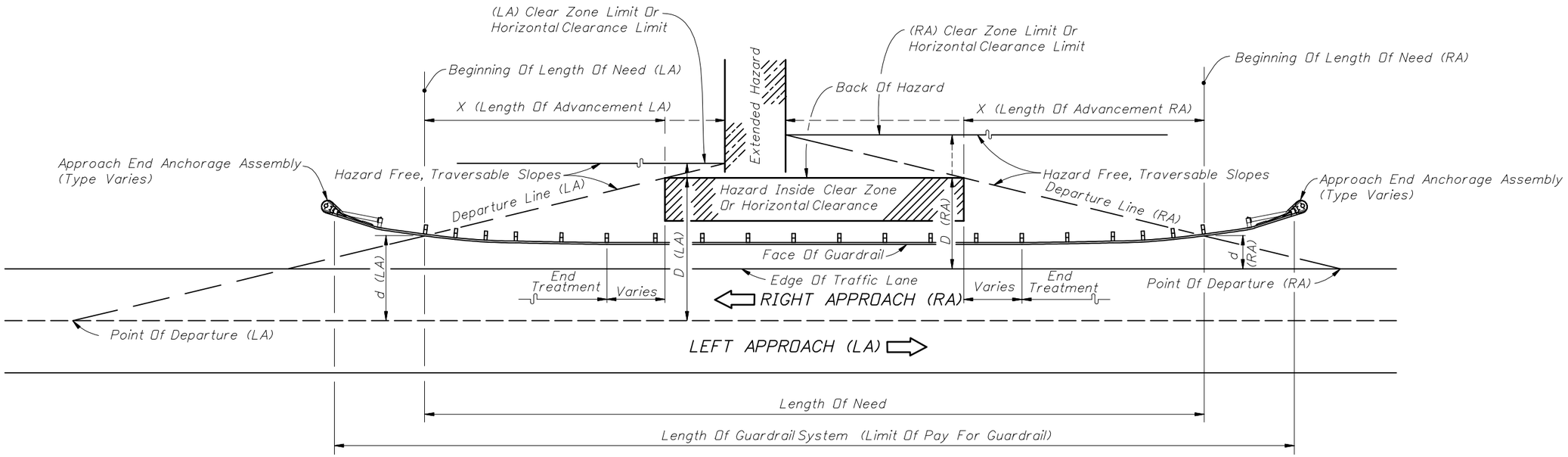
For flared end anchorage assemblies the offset distance "d" will equal the normal guardrail offset measured from the face of the guardrail to the edge of the near approach travel lane plus 1'-2" for 45 mph or less and 1'-9¼" for greater than 45 mph.

LENGTH OF ADVANCEMENT - FIGURE 1



(LEFT SIDE OPPOSITE HAND)

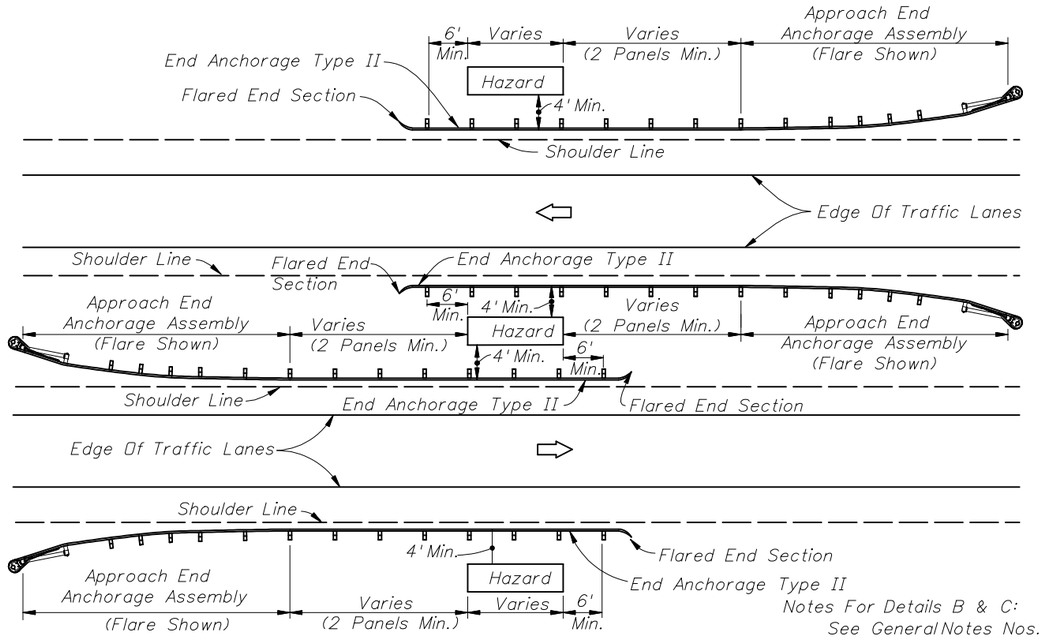
ONE-WAY TRAFFIC



TWO-LANE TWO-WAY TRAFFIC

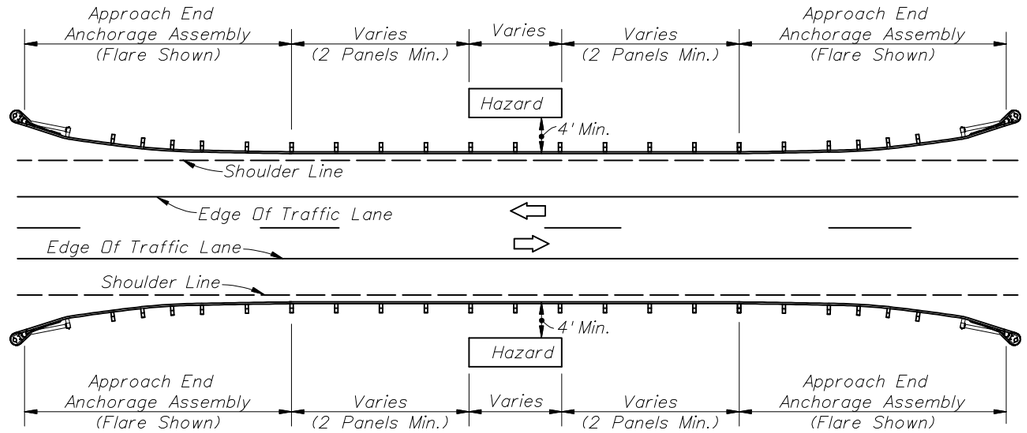
For description of the dimensions D, d and X, see Length of Advancement – Figure 1.
For additional shoulder guardrail information, see Details B and C.

LOCATING TERMINALS ON SHOULDER GUARDRAILS – FIGURE 2



Median Guardrail Applications Shown Are For Locations Where Approach End Anchorage Assemblies Are Outside Of The Opposing Roadway Clear Zone.

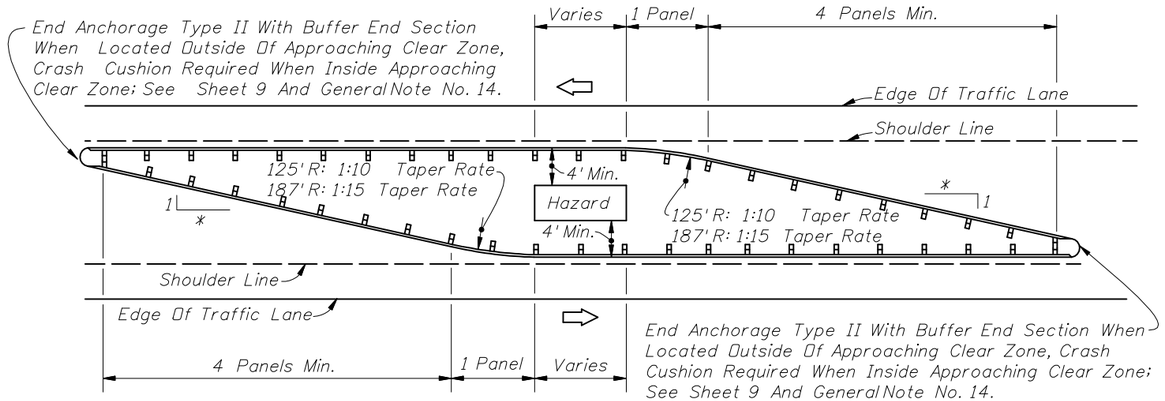
DIVIDED ROADWAY- DETAIL B



UNDIVIDED ROADWAY- DETAIL C

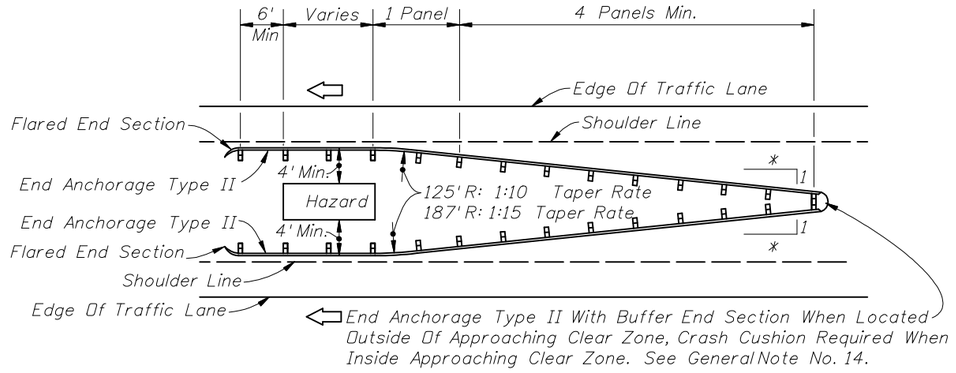
Notes For Details B & C:
See General Notes Nos. 1, 2, 3, 4, 5, 6, 7 and 8.
See Details K and L for guardrail offsets.
For end anchorage assemblies see sheets elsewhere in this Index and the plans.
For hazards that require shielding and are located back of curb see other sheets of this index, and where rigid barrier is required see Index No. 410.

GUARDRAIL APPLICATION FOR ROADSIDE HAZARDS



This Guardrail Configuration Applies Where Approach End Anchorage Assemblies Cannot be Located Outside Of The Opposing Roadway Clear Zone.

OPPOSING TRAFFIC- DETAIL D

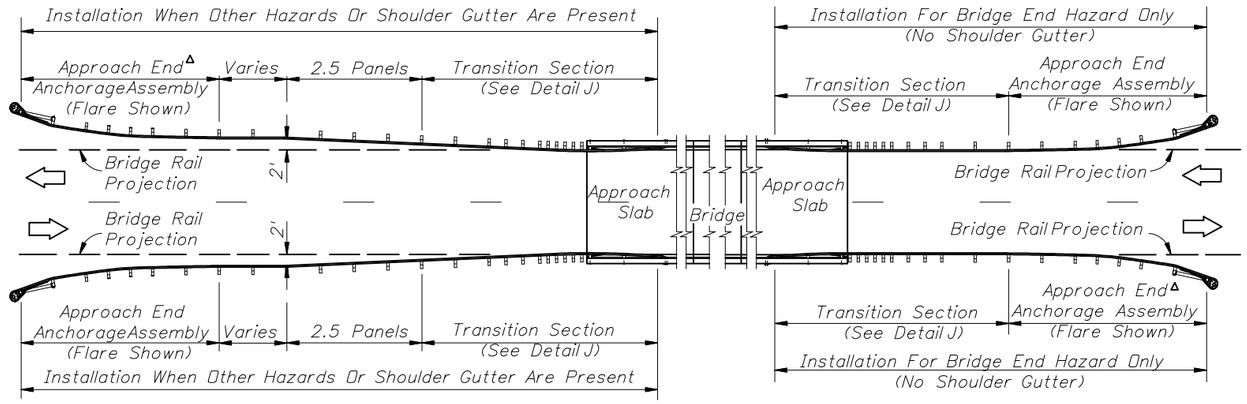


ONE-WAY TRAFFIC- DETAIL G

*1:10 Taper Rate For Design Speeds ≤45 mph
1:15 Taper Rate For Design Speeds ≥50 mph

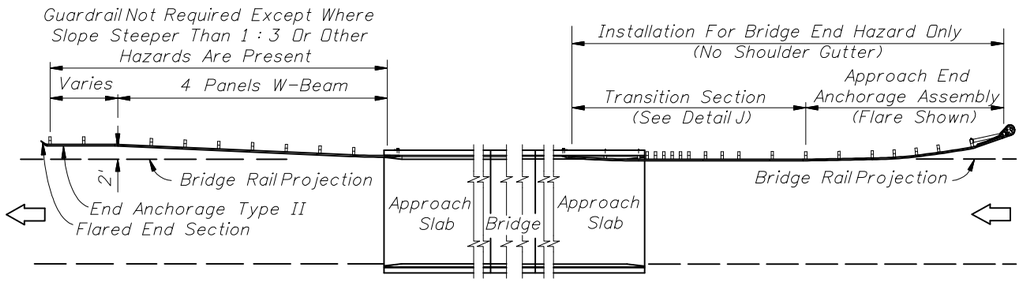
Notes For Details D & G:
See General Notes Nos. 1, 2, 3, 4, 5, 7, and 14.
See Details K and L for guardrail offsets.
For hazards that require shielding and are located back of curb see other sheets of this index, and where rigid barrier is required see Index No. 410.

GUARDRAIL APPLICATION FOR NARROW MEDIAN AND GORE HAZARDS

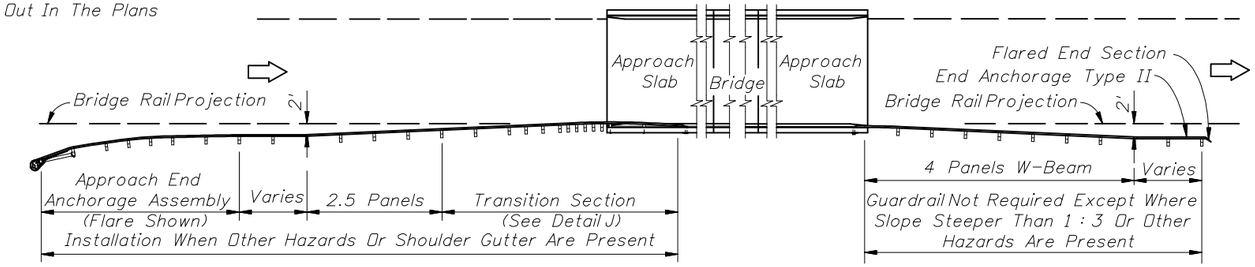


△With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail P Unless Other Anchorage Called Out In The Plans

UNDIVIDED ROADWAY - DETAIL O



For Median Guardrail See Sheets 8 & 9 And General Note 12.

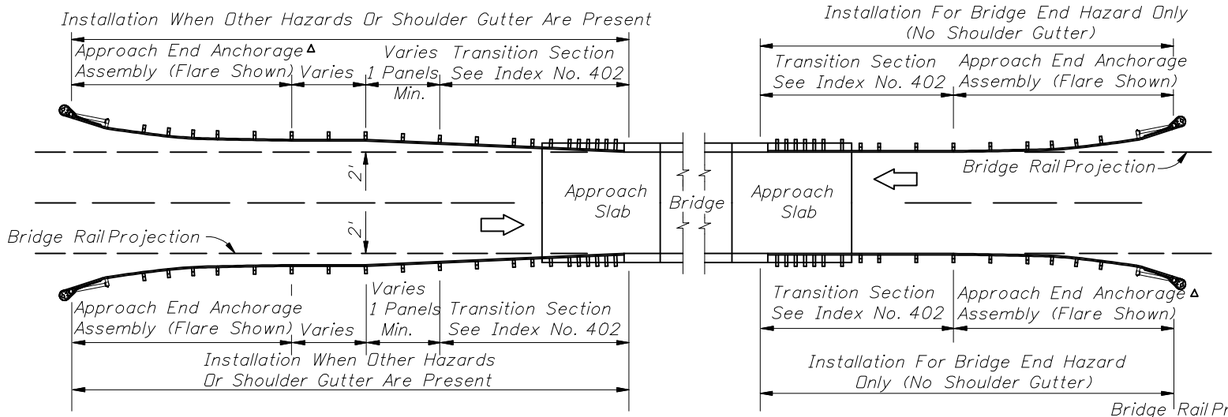


DIVIDED ROADWAY - DETAIL P

Notes For Details O & P:

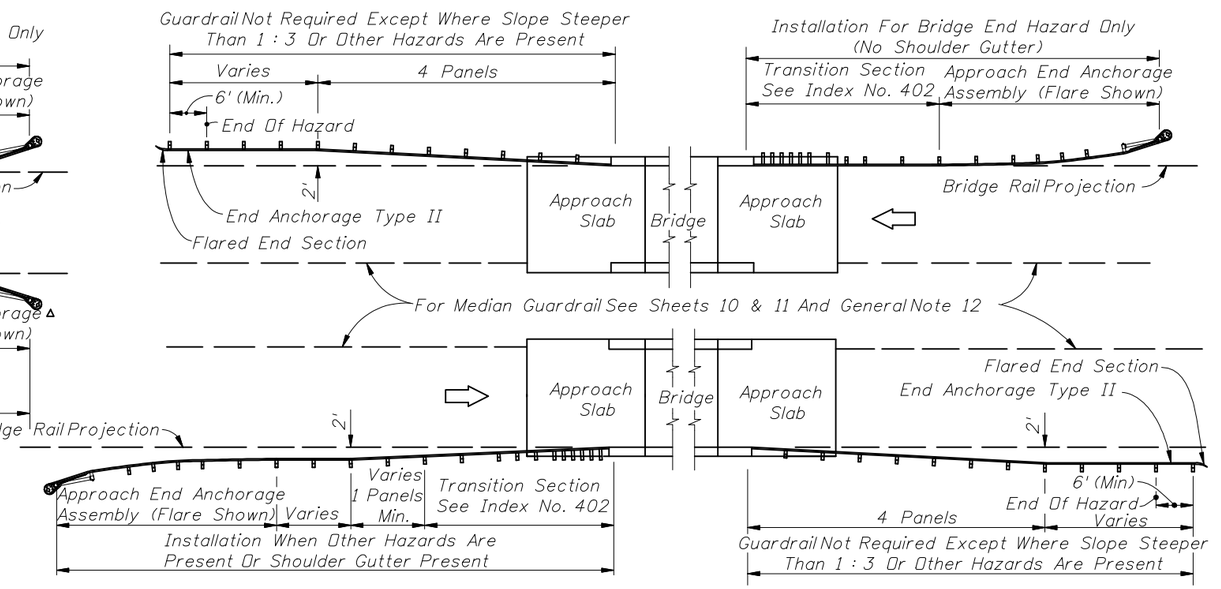
See General Notes Nos. 1, 2, 3, 4, 5, 6, 8 and 9. See Detail J for approach connections to bridges.
For end anchorage assemblies see sheets elsewhere in this Index and the plans.
Shoulder gutter in itself does not require the installation of guardrail.

GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING FULL LENGTH OF APPROACH SLAB



△With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail I Unless Other Anchorage Called Out In The Plans

UNDIVIDED ROADWAY - DETAIL H

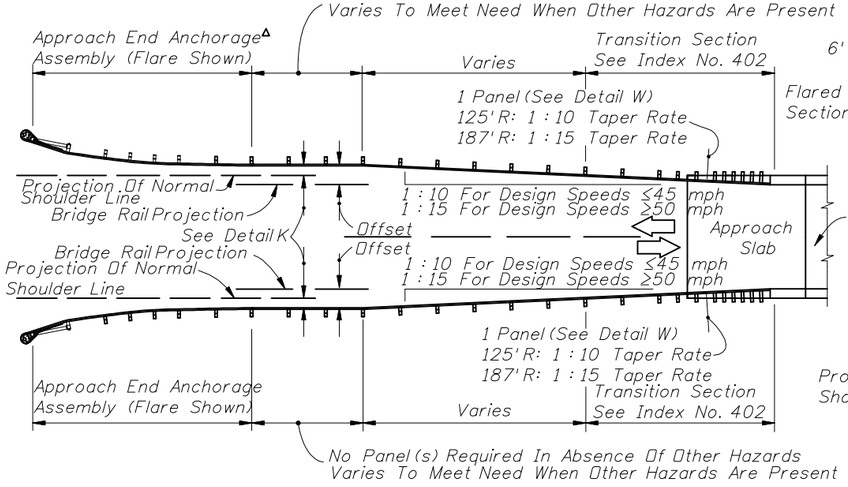


DIVIDED ROADWAY - DETAIL I

Notes For Details H & I:

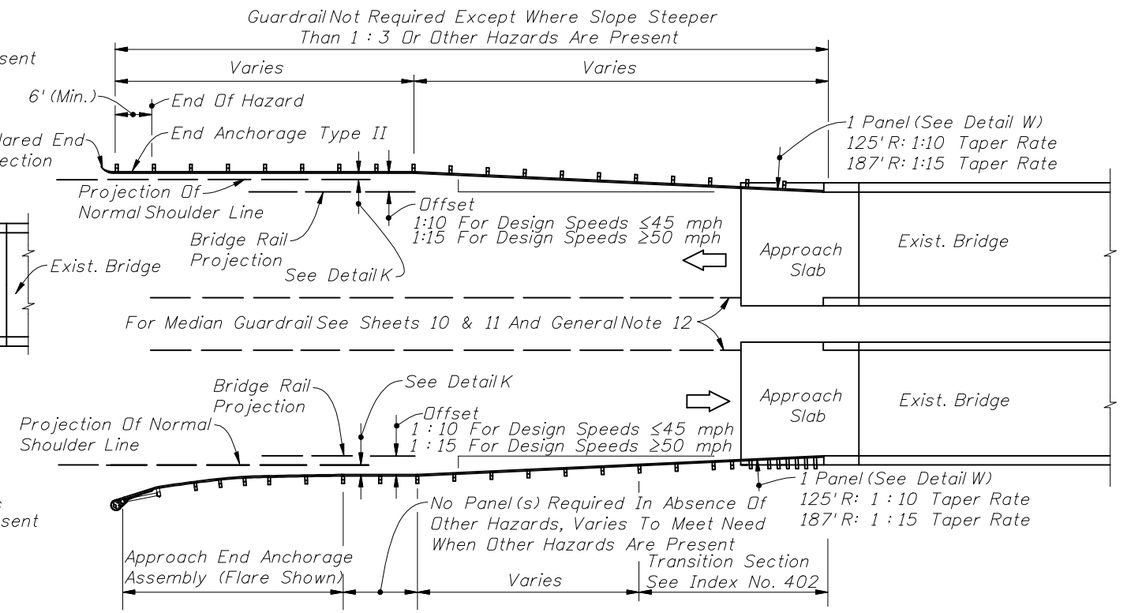
See General Notes Nos. 1, 2, 3, 4, 5, 6, 8, and 9. See Index No. 402 for approach connections to bridges.
For end anchorage assemblies see sheets elsewhere in this Index and in the plans.
Shoulder gutter in itself does not require the installation of guardrail.

GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH



△With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail I Unless Other Anchorage Called Out In The Plans

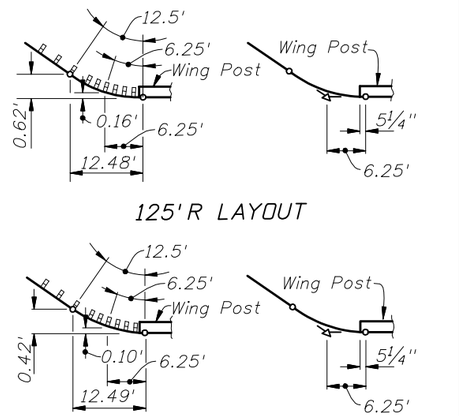
UNDIVIDED ROADWAY - DETAIL S



DIVIDED ROADWAY - DETAIL T

Notes for Details S & T:

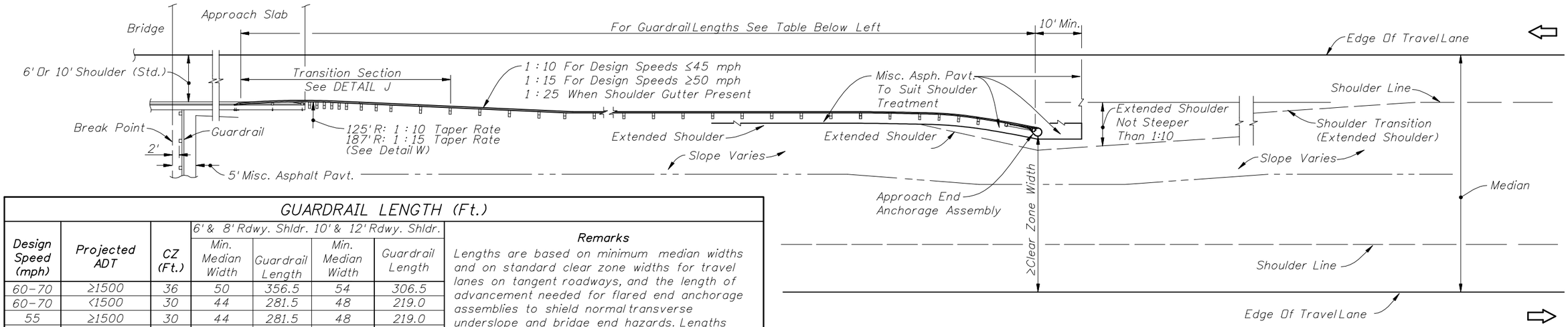
See General Notes Nos. 1, 2, 3, 4, 5, 6, 8 and 9. See Index No. 402 for approach connections to bridges.
For end anchorage assemblies see sheets elsewhere in this Index and the plans.



See General Note No. 13

STANDARD PANELS SET TO RADIALS ADJOINING BRIDGES DETAIL W

GUARDRAIL APPLICATIONS FOR BRIDGES WITH LESS THAN FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH



GUARDRAIL LENGTH (Ft.)

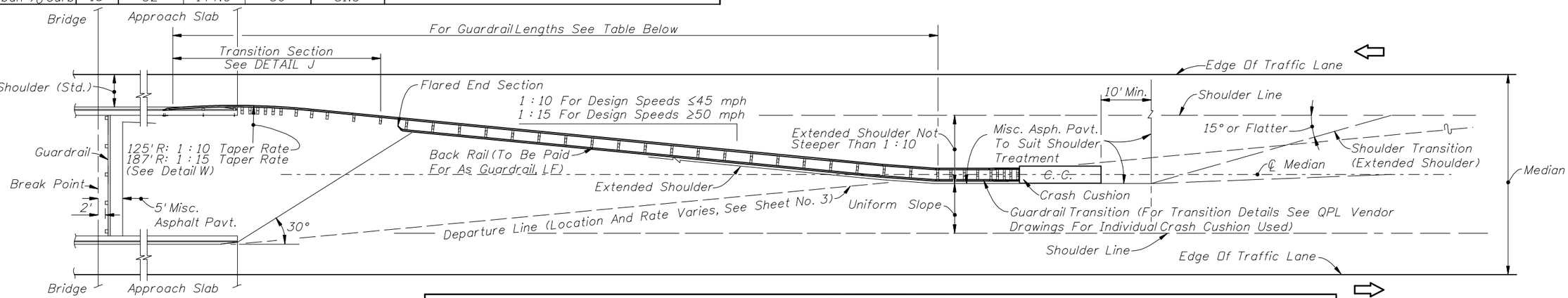
Design Speed (mph)	Projected ADT	CZ (Ft.)	6' & 8' Rdwy. Shldr. Min. Median Width	6' & 8' Rdwy. Shldr. Guardrail Length	10' & 12' Rdwy. Shldr. Min. Median Width	10' & 12' Rdwy. Shldr. Guardrail Length
60-70	≥1500	36	50	356.5	54	306.5
60-70	<1500	30	44	281.5	48	219.0
55	≥1500	30	44	281.5	48	219.0
55	<1500	24	38	194.0	42	144.0
45-50	≥1500	24	38	194.0	42	144.0
45-50	<1500	20	34	144.0	38	94.0
45-50	Urban W/O Curb	24	38	194.0	42	144.0
35-40	Urban W/O Curb	18	32	144.0	36	81.5

Remarks

Lengths are based on minimum median widths and on standard clear zone widths for travel lanes on tangent roadways, and the length of advancement needed for flared end anchorage assemblies to shield normal transverse underslope and bridge end hazards. Lengths may need to be adjusted for auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present.

Note: For approach end anchorage assemblies see sheets elsewhere in this Index and the plans.

WHEN END TERMINAL IS OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE



GUARDRAIL LENGTHS

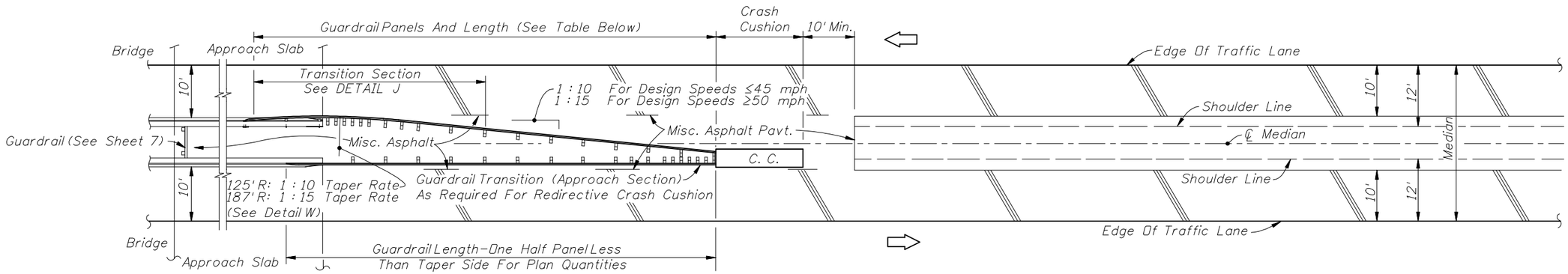
Median Width (Ft.)	1:10 TAPER RATE				1:15 TAPER RATE			
	6' Bridge Shoulder				6' Bridge Shoulder			
	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)
	Front	Back	Total	Total	Front	Back	Total	Total
32	9.5	6	15.5	193.75	13.5	10	23.5	293.75
34	10.5	7	17.5	218.75	14.5	11	25.5	318.75
36	10.5	7	17.5	218.75	15.5	12	27.5	343.75
38	11.5	8	19.5	243.75	16.5	13	29.5	368.75
40	12.5	9	21.5	268.75	17.5	13	30.5	381.25
42	13.5	9	22.5	281.25	19.5	15	34.5	431.25
44	14.5	10	24.5	306.25	20.5	16	36.5	456.25
46	14.5	10	24.5	306.25	21.5	17	38.5	481.25
48	15.5	11	26.5	331.25	22.5	17	39.5	493.75

Median Width (Ft.)	1:10 TAPER RATE				1:15 TAPER RATE			
	10' Bridge Shoulder				10' Bridge Shoulder			
	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)
	Front	Back	Total	Total	Front	Back	Total	Total
32	6.5	4	10.5	131.25	8.5	6	14.5	181.25
34	7.5	5	12.5	156.25	9.5	7	16.5	206.25
36	7.5	5	12.5	156.25	10.5	8	18.5	231.25
38	8.5	6	14.5	181.25	11.5	9	20.5	256.25
40	9.5	6	15.5	193.75	13.5	11	24.5	306.25
42	10.5	7	17.5	218.75	14.5	11	25.5	318.75
44	10.5	7	17.5	218.75	15.5	12	27.5	343.75
46	11.5	8	19.5	243.75	16.5	13	29.5	368.75
48	12.5	9	21.5	268.75	17.5	13	30.5	381.25

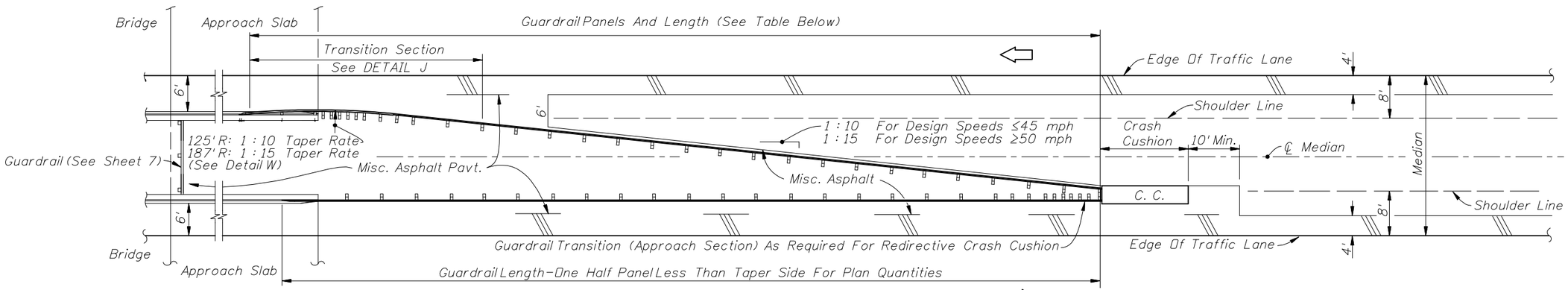
The lengths shown on this table are typical for roadways with standard width shoulders. Length requirements shall be determined on a site specific basis for both standard width and narrow bridge shoulders and end anchorage or end shielding use.

WHEN END TERMINAL CANNOT BE LOCATED OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE

APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING FULL APPROACH SLAB LENGTH IN WIDE MEDIANS WITH FLUSH SHOULDERS

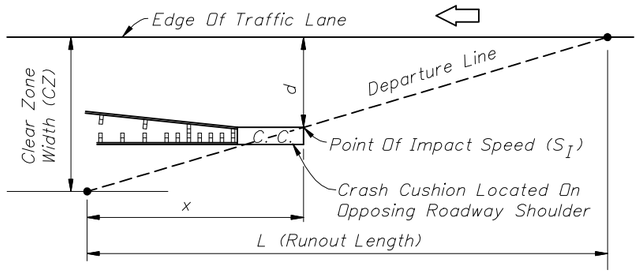


MEDIANS WITH 10' BRIDGE SHOULDERS



MEDIANS WITH 6' BRIDGE SHOULDERS

Note: The guardrail configurations shown apply only to parallel or near parallel bridges with open medians.



Speed (S_I) For Determining Crash Cushion Size:

$$S_I = \frac{x}{L}\,(\text{Design Speed}) = \left[\frac{(CZ-d)}{CZ}\right]\text{Design Speed}$$

SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS

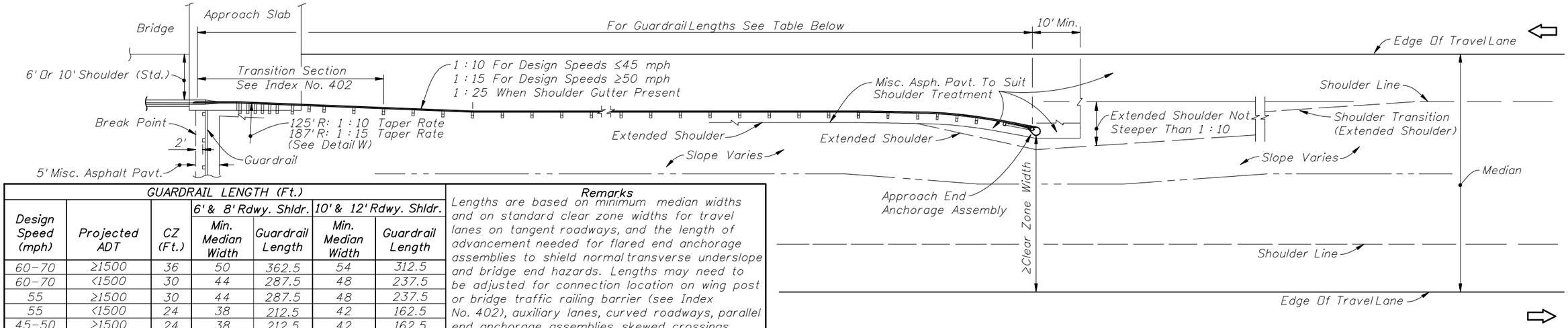
GUARDRAIL LENGTHS

MEDIAN WIDTH (Ft.)	6' BRIDGE SHOULDERS				10' BRIDGE SHOULDERS			
	1:10 TAPER RATE		1:15 TAPER RATE		1:10 TAPER RATE		1:15 TAPER RATE	
	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)
30	14.5	181.25	20.5	256.25	7.5	93.75	10.5	131.25
28	12.5	156.25	18.5	231.25	6.5	81.25	8.5	106.25
26	11.5	143.75	15.5	193.75	5.5*	68.75	6.5	81.25
24	9.5	118.75	13.5	168.75	5.5*	68.75	5.5*	68.75

The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorage or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their sizes may be determined by the residual speeds (S_I's) along the runouts from the approach roadways; however, when calculated speeds (S_I's) are less than 30 mph; crash cushions shall be no less in size than for 30 mph, see speed diagram left. The number of panels may be reduced when installing a crash cushion more than 2.5' in width, see * below.

* Number shown is the minimum number of panels plus a W-Thrie beam transition panel; single faced guardrail must have a length of five (5) or more panels.

APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING FULL APPROACH SLAB LENGTH IN NARROW MEDIANS WITH FLUSH SHOULDERS



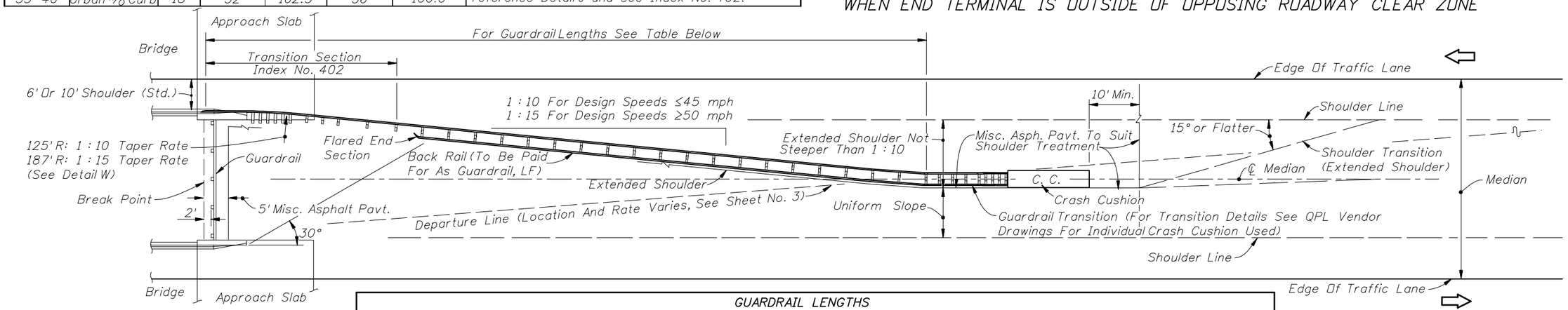
GUARDRAIL LENGTH (Ft.)						
			6' & 8' Rdwy. Shldr.		10' & 12' Rdwy. Shldr.	
Design Speed (mph)	Projected ADT	CZ (Ft.)	Min. Median Width	Guardrail Length	Min. Median Width	Guardrail Length
60-70	≥1500	36	50	362.5	54	312.5
60-70	<1500	30	44	287.5	48	237.5
55	≥1500	30	44	287.5	48	237.5
55	<1500	24	38	212.5	42	162.5
45-50	≥1500	24	38	212.5	42	162.5
45-50	<1500	20	34	162.5	38	112.5
45-50	Urban W/O Curb	24	38	212.5	42	162.5
35-40	Urban W/O Curb	18	32	162.5	36	100.0

Remarks

Lengths are based on minimum median widths and on standard clear zone widths for travel lanes on tangent roadways, and the length of advancement needed for flared end anchorage assemblies to shield normal transverse underslope and bridge end hazards. Lengths may need to be adjusted for connection location on wing post or bridge traffic railing barrier (see Index No. 402), auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present. When the wing post is replaced by bridge traffic railing barrier, reference Detail J and see Index No. 402.

Note: For approach end anchorage assemblies see sheets elsewhere in this Index and the plans.

WHEN END TERMINAL IS OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE

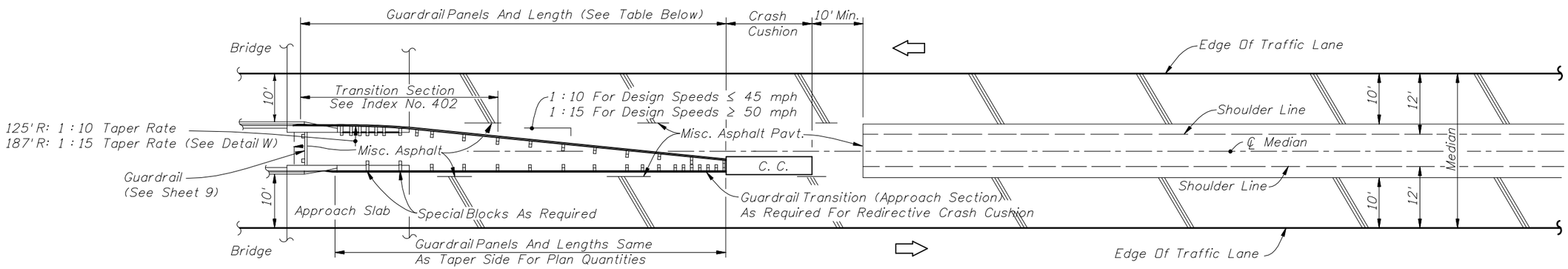


GUARDRAIL LENGTHS																
	1:10 TAPER RATE								1:15 TAPER RATE							
Median Width (ft.)	6' Bridge Shoulder				10' Bridge Shoulder				6' Bridge Shoulder				10' Bridge Shoulder			
	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)
	Front	Back	Total	Total	Front	Back	Total	Total	Front	Back	Total	Total	Front	Back	Total	Total
32	7.5	6	13.5	168.75	4.5	3	7.5	93.75	11.5	9	20.5	256.25	7.5	6	13.5	168.75
34	8.5	6	14.5	181.25	5.5	4	9.5	118.75	12.5	10	22.5	281.25	7.5	6	13.5	168.75
36	9.5	7	16.5	206.25	6.5	5	11.5	143.75	13.5	11	24.5	306.25	8.5	7	15.5	193.75
38	10.5	8	18.5	231.25	7.5	6	13.5	168.75	14.5	12	26.5	331.25	10.5	9	19.5	243.75
40	10.5	8	18.5	231.25	7.5	6	13.5	168.75	16.5	13	29.5	368.75	11.5	9	20.5	256.25
42	11.5	8	19.5	243.75	8.5	6	14.5	181.25	17.5	14	31.5	393.75	12.5	10	22.5	281.25
44	12.5	9	21.5	268.75	9.5	7	16.5	206.25	18.5	15	33.5	418.75	13.5	11	24.5	306.25
46	12.5	9	21.5	268.75	10.5	8	18.5	231.25	19.5	16	35.5	443.75	14.5	12	26.5	331.25
48	14.5	11	25.5	318.75	11.5	9	20.5	256.25	20.5	16	36.5	456.25	16.5	13	29.5	368.75

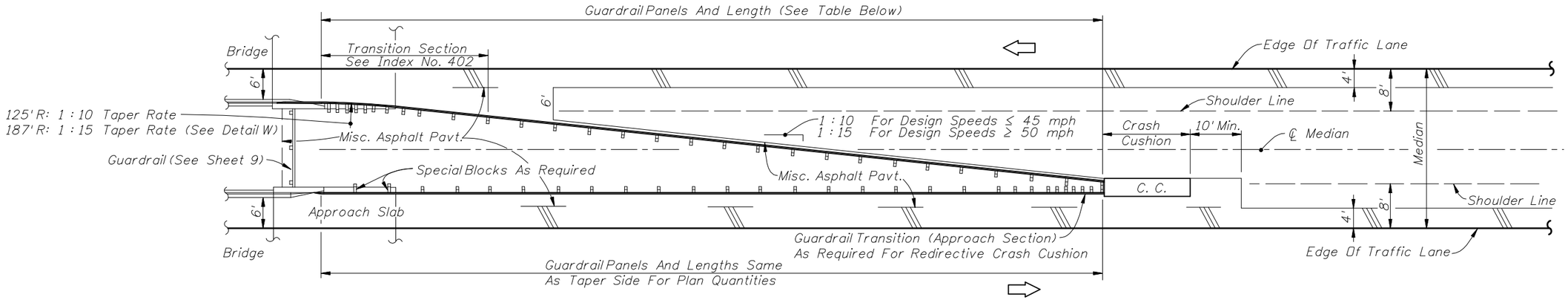
The lengths shown on this table are typical for roadways with standard width shoulders and a relocated connection to the existing wing post. When the wing post is replaced by bridge traffic railing barrier, reference Detail J and see Index No. 402. Length requirements shall be determined on a site specific basis for both standard width and narrow bridge shoulders and for end anchorage or end shielding use.

WHEN END TERMINAL CANNOT BE LOCATED OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE

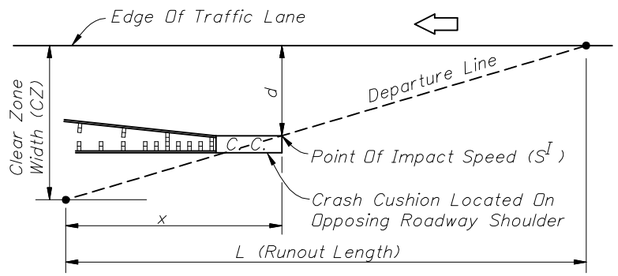
APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN WIDE MEDIANS WITH FLUSH SHOULDERS



MEDIANS WITH 10' BRIDGE SHOULDERS



MEDIANS WITH 6' BRIDGE SHOULDERS



Speed (S_I) For Determining Crash Cushion Size:

$$S_I = \frac{x}{L}(\text{Design Speed}) = \left[\frac{(CZ-d)}{CZ}\right]\text{Design Speed}$$

SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS

Note: The guardrail configurations shown apply only to parallel or near parallel bridges with open medians.

GUARDRAIL LENGTHS

MEDIAN WIDTH (Ft.)	6' BRIDGE SHOULDERS				10' BRIDGE SHOULDERS			
	1 : 10 TAPER RATE		1 : 15 TAPER RATE		1 : 10 TAPER RATE		1 : 15 TAPER RATE	
	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)
30	12.5	156.25	18.5	231.25	6.5	81.25	9.5	118.75
28	11.5	143.75	16.5	206.25	5.5	68.75	7.5	93.75
26	9.5	118.75	14.5	181.25	5.5*	68.75	5.5*	68.75
24	8.5	106.25	11.5	143.75	5.5*	68.75	5.5*	68.75

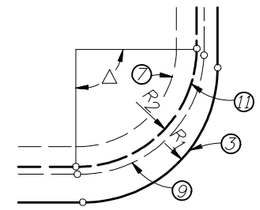
The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorage or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their sizes may be determined by the residual speeds (S_I's) along the runouts from the approach roadways; however, when calculated speeds (S_I's) are less than 30 mph crash cushions shall be no less in size than for 30 mph; see speed diagram left. The number of panels may be reduced when installing a crash cushion more than 2.5' in width; see * below.

*Number shown is the minimum number of panels plus a W-Thrie beam transition panel; single faced guardrail must have a length of five (5) or more panels.

APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN NARROW MEDIANS WITH FLUSH SHOULDERS

LEGEND

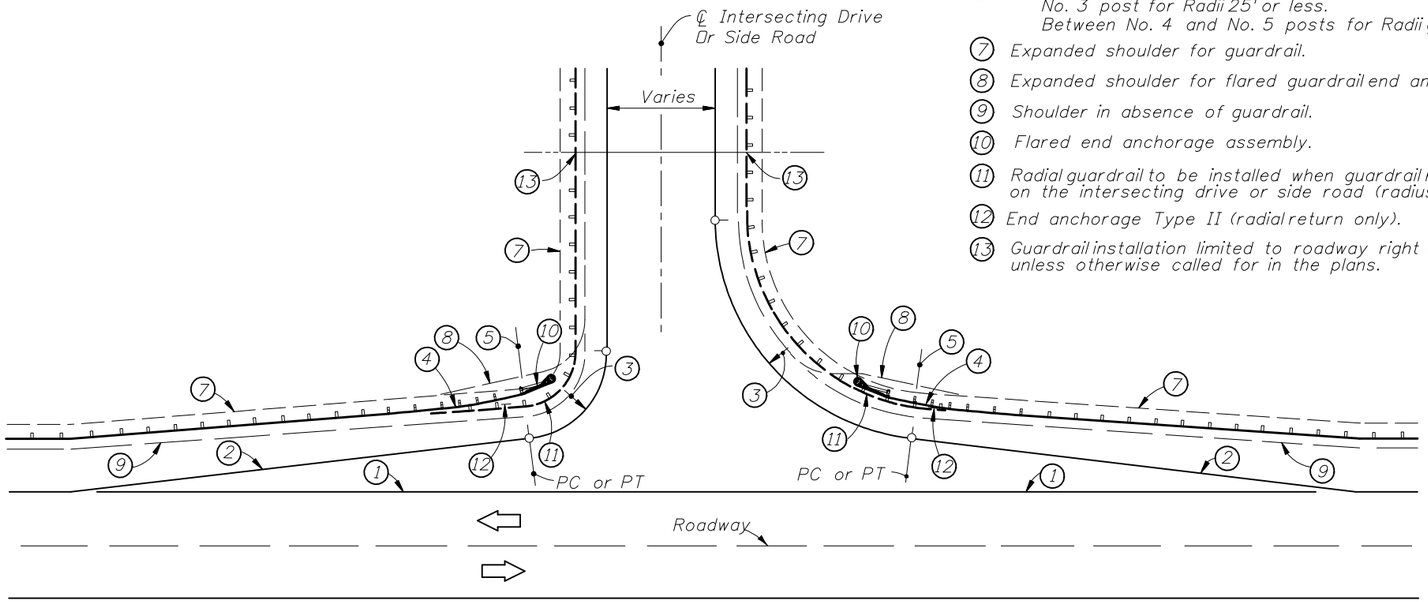
1. Edge of traffic lane for simple curve turnouts. Edge of travel lane for taper turnouts.
2. Taper.
3. Pavement return (radius R_1).
4. Flared end anchorage to be installed except when existing guardrail on intersecting drive or side road adjoins the project.
5. Post for locating flare, proximate to PC or PT:
   No. 2 post for Radii 25' or less.
   No. 3 post for Radii > 25' and < 50'.
   Between No. 4 and No. 5 posts for Radii 50' or greater.
6. Post for locating flare, proximate to PC or PT:
   No. 3 post for Radii 25' or less.
   Between No. 4 and No. 5 posts for Radii greater than 25'.
7. Expanded shoulder for guardrail.
8. Expanded shoulder for flared guardrail end anchorage.
9. Shoulder in absence of guardrail.
10. Flared end anchorage assembly.
11. Radial guardrail to be installed when guardrail required on the intersecting drive or side road (radius R_2).
12. End anchorage Type II (radial return only).
13. Guardrail installation limited to roadway right of way unless otherwise called for in the plans.



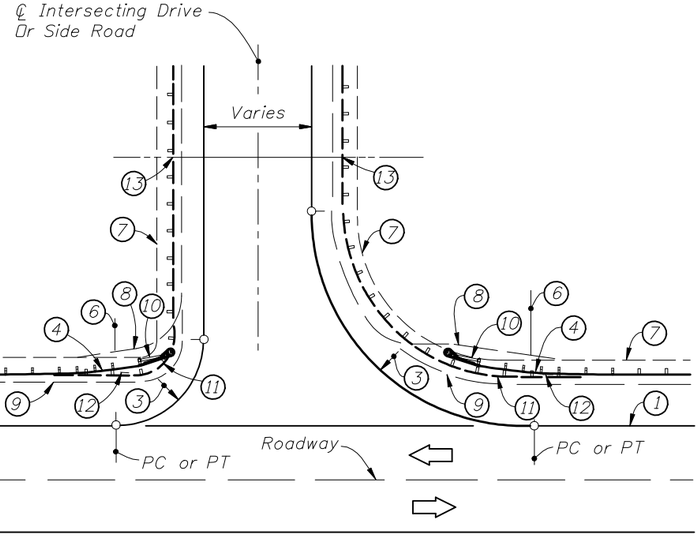
RADIAL GUARDRAIL

RADIAL GUARDRAIL						
	Normal Turnouts					
	Taper			Simple Curve		
R_1	R_2	Panels Required	△	R_2	Panels Required	△
15'	25'	3	85°56'	25'	3	85°56'
20'	25'	3	85°56'	25'	3	85°56'
25'	25'	3	85°56'	25'	3	85°56'
30'	25'	3	85°56'	25'	3	85°56'
35'	25'	3	85°56'	25'	3	85°56'
40'	40'	5	89°31'	40'	5	89°31'
45'	40'	5	89°31'	40'	5	89°31'
50'	40'	5	89°31'	40'	5	89°31'

Note: Only 25' and 40' radius panels are to be used for return guardrail on normal turnouts. On skewed turnouts the number of panels used and their arrangement with straight panels will be as shown in the plans or as directed by the Engineer.



TAPER TURNOUTS

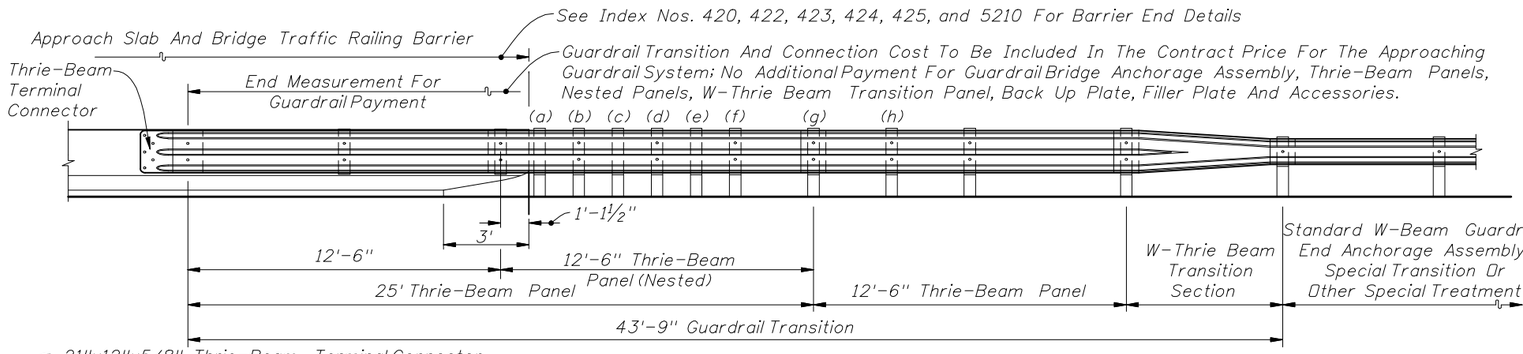


SIMPLE CURVE TURNOUTS

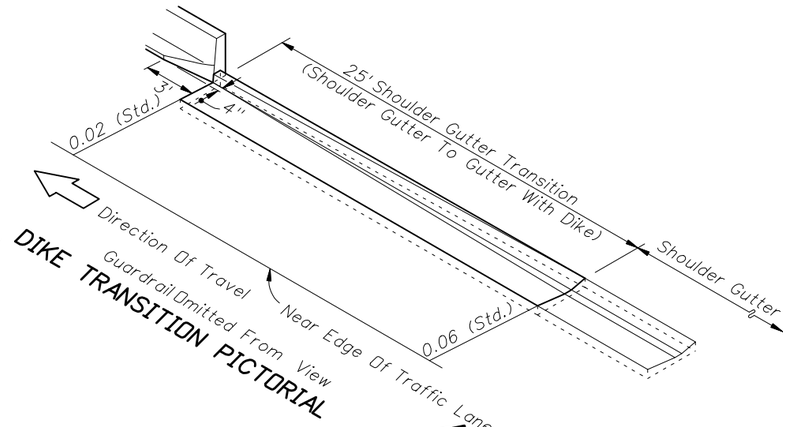
Note: The guardrail application shown on this sheet are for highways with flush shoulders and no restraints for constructing flared end anchorages and minimum lengths of guardrail. For highways with flush shoulders and restraints to constructing flared anchorages, see General Note No. 6.

Where openings in guardrail are required in close proximity to bridge traffic rails or ends of concrete barrier walls, and minimum length guardrail with flared end anchorages can not be applied, either controlled release returns or energy absorbing terminals are to be applied.

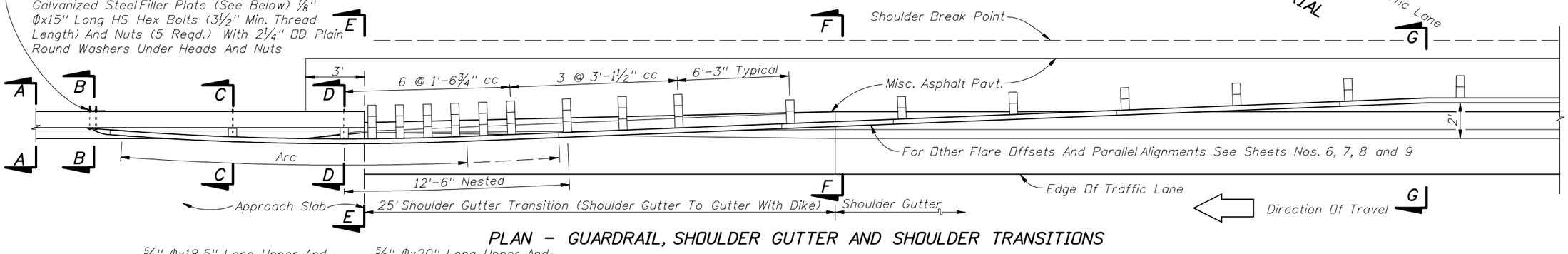
GUARDRAIL APPLICATIONS FOR INTERSECTING DRIVES AND SIDE ROADS ON RURAL FACILITIES



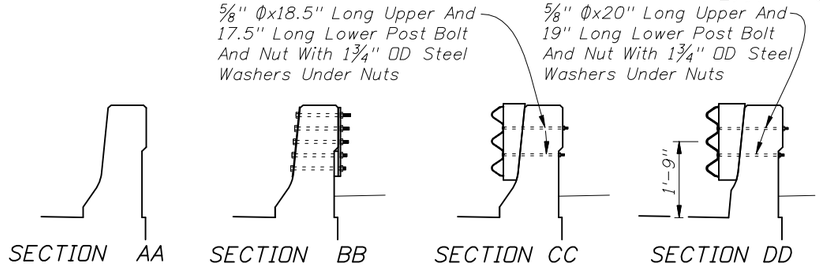
ELEVATION

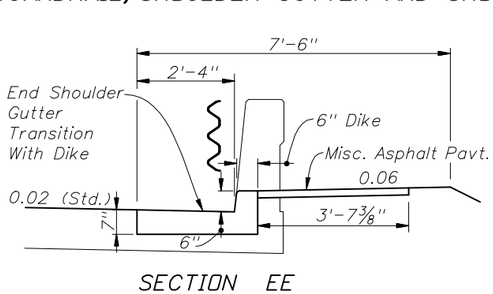


DIKE TRANSITION PICTORIAL

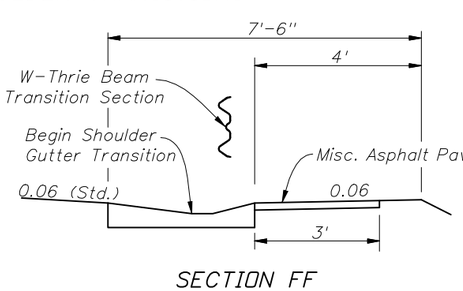


PLAN - GUARDRAIL, SHOULDER GUTTER AND SHOULDER TRANSITIONS

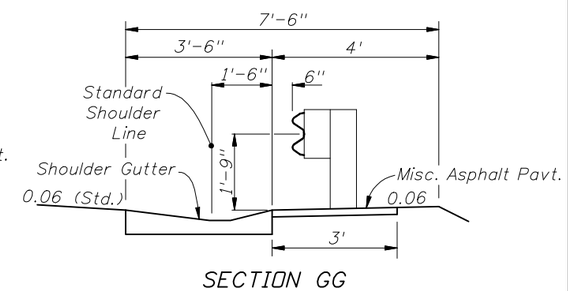




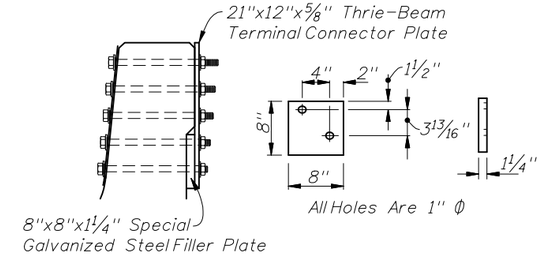
SECTION EE



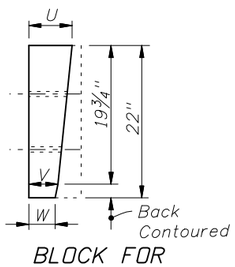
SECTION FF



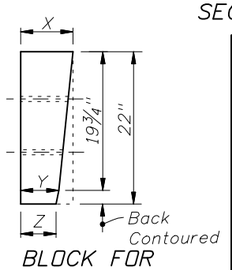
SECTION GG



SPECIAL GALVANIZED STEEL FILLER PLATE FOR USE AT SECTION BB



BLOCK FOR SECTION CC



BLOCK FOR SECTION DD

APPLICATIONS	SECTION CC			SECTION DD		
	U	V	W	X	Y	Z
Single Face Guardrail	6⅛"	4⅛"	3⅝"	7½" nom.	5½" nom.	5" nom.
Double Face Guardrail With Timber Posts	5⅛"	3⅛"	2⅝"	6½" nom.	4½" nom.	4" nom.
Double Face Guardrail With Steel Posts	4⅜"	2⅜"	1⅞"	5¾"	3¾"	3¼"

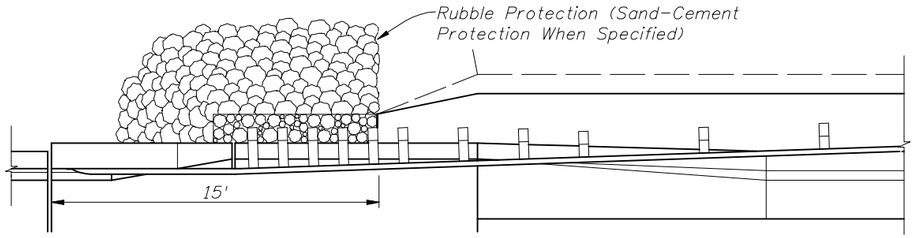
For Double Face Guardrail Connections To Median Bridge Traffic Railing Barrier, See Index No. 410 'Guardrail Connection To Concrete Barrier Wall Approach Ends'.

GUARDRAIL TRANSITION NOTE

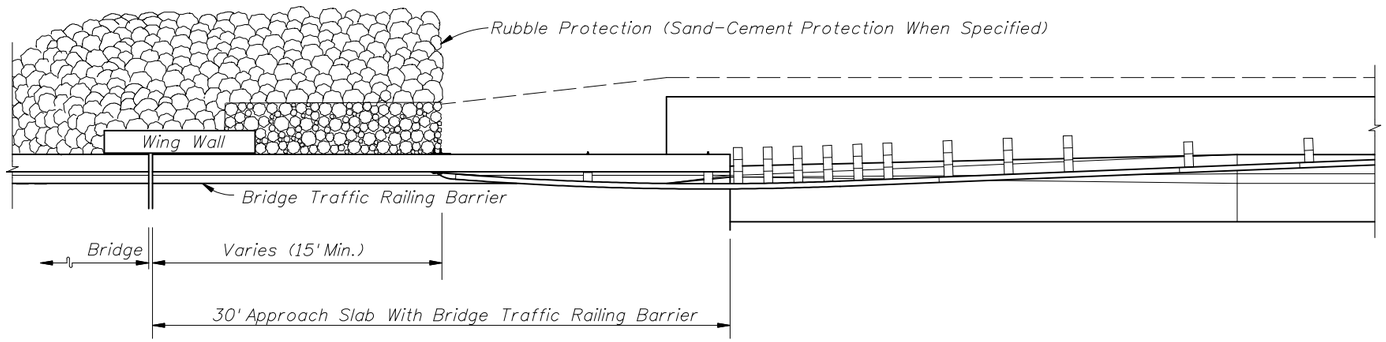
When shoulder gutter is required, the 25' long dike transition, shown in the 'PLAN' and 'PICTORIAL' above, is required. Double offset blocks are shown for guardrail installations adjacent to shoulder gutter/dike transitions; single offset blocks shall be installed in absence of shoulder gutter. Nested rails shall not be bolted to the blocks and posts at posts (a), (c), and (e). One 16d galvanized nail shall be driven between each post and block, and between double blocks, in order to prevent block rotation, see '16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION', this Index.

THRIE-BEAM OFFSET BLOCKS FIELD TRIMMED FOR USE AT SECTIONS CC & DD

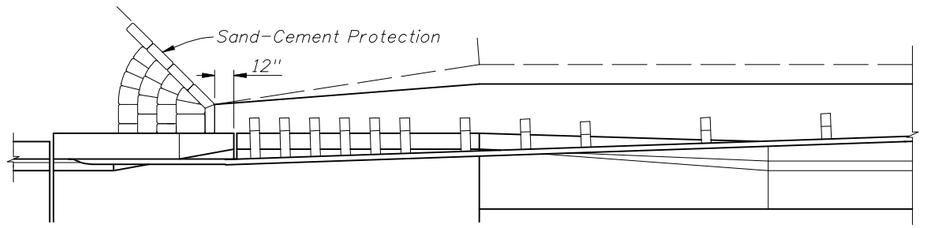
GUARDRAIL APPROACH TRANSITION AND CONNECTION FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIERS EXTENDING FULL LENGTH OF APPROACH SLAB
DETAIL J



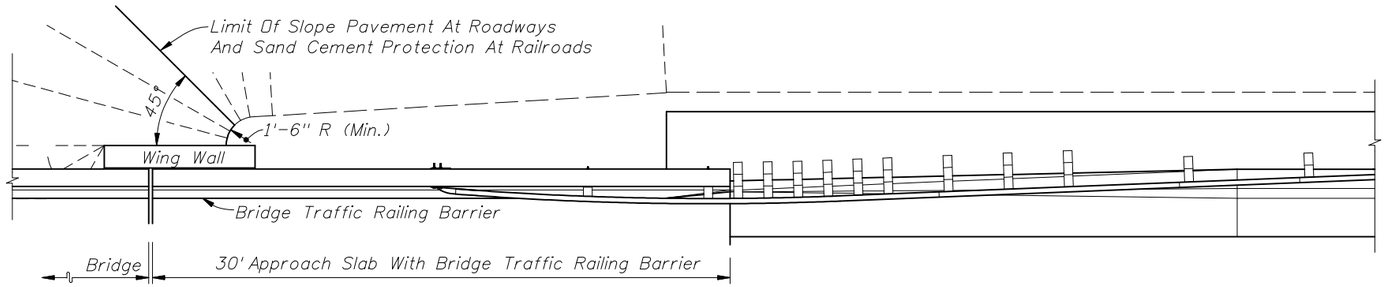
BRIDGES OVER STREAMS



BRIDGES OVER STREAMS



BRIDGES OVER RAILROADS



BRIDGES OVER ROADWAYS OR RAILROADS

For Additional Information See Index No. 402

SKETCHES - BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

For Additional Guardrail Information See Sheet 13

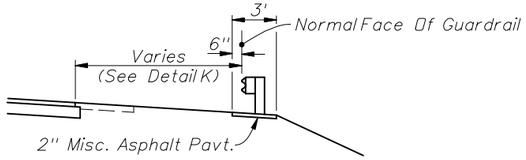
SKETCHES - BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING FULL APPROACH SLAB LENGTH

SKETCH NOTES

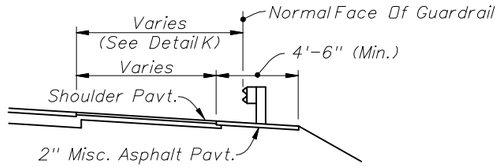
1. These sketches are for showing shoulder interface between roadways and bridges where crossings are normal to other roadways, railroads and streams. For site specific applications and details see the plans and the FDOT Structures Design Office "Detailing Manual" and "Design Guidelines".

2. Shoulder treatments shown in these sketches are for locations with shoulder gutter; shoulder hinge location will vary for facilities without shoulder gutter.

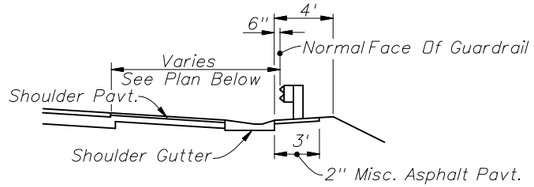
SHOULDER INTERFACE BETWEEN ROADWAYS AND BRIDGES



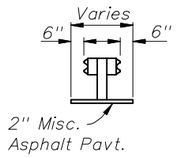
SHOULDER WITH OR WITHOUT 5' PAVEMENT



PAVED SHOULDERS

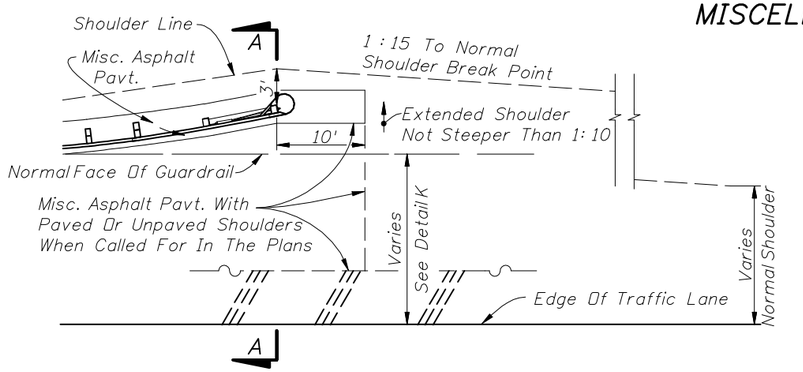


SHOULDER GUTTER

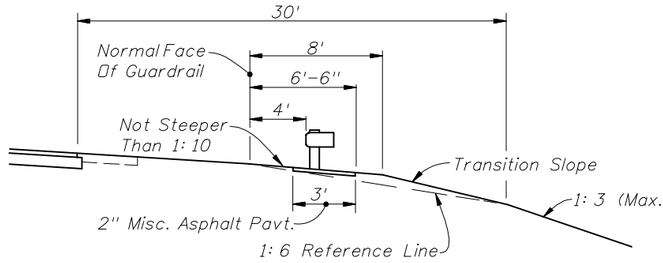


DOUBLE FACE RAIL

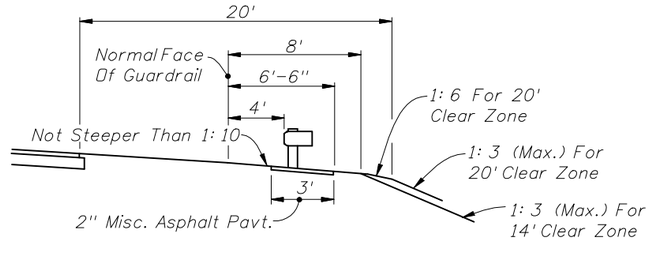
MISCELLANEOUS PAVING FOR STANDARD GUARDRAIL SECTIONS



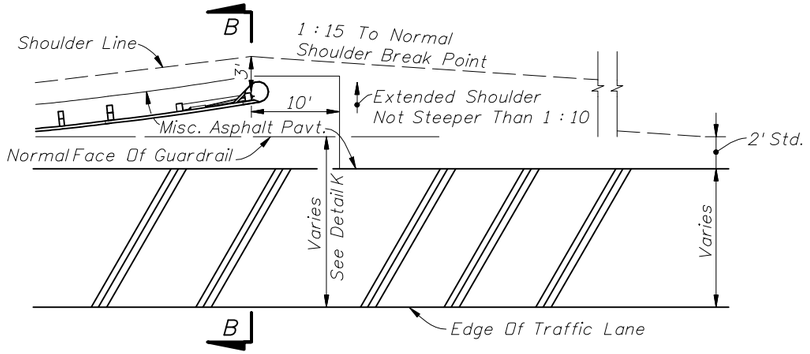
SHOULDER WITH OR WITHOUT 5' PAVEMENT



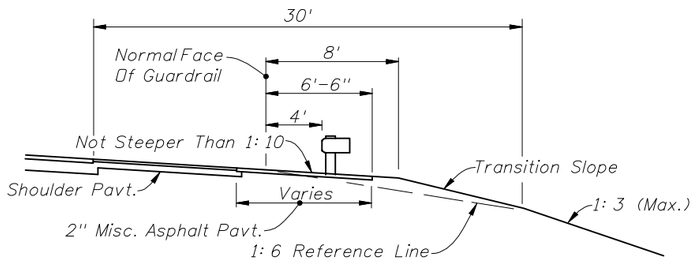
SECTION AA (EXAMPLE FOR 30' CLEAR ZONE)



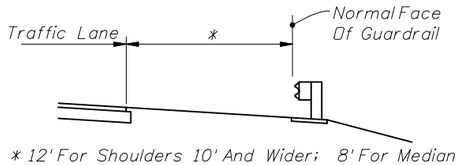
SECTION AA (EXAMPLE FOR 20' CLEAR ZONE)



PAVED SHOULDERS



SECTION BB (EXAMPLE FOR 30' CLEAR ZONE)

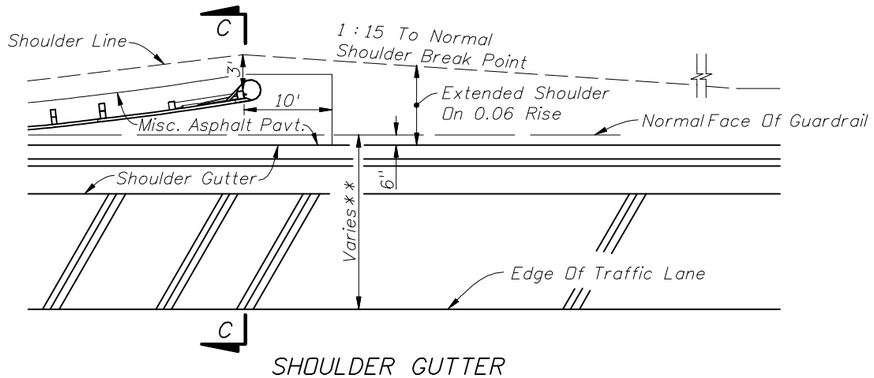


* 12' For Shoulders 10' And Wider; 8' For Median Shoulders 8' Or Less In Width; and, Shoulder Width Plus 2' For All Others Shoulders.

STANDARD LOCATIONS

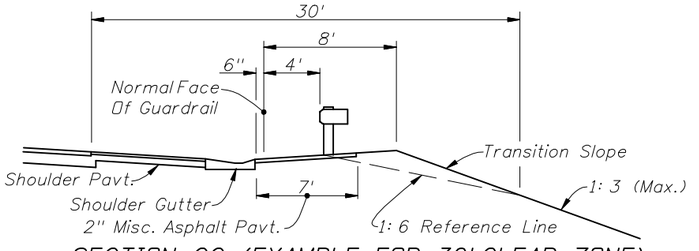
For Guardrail on slopes see Sheet 26.

GUARDRAIL LOCATION–DETAIL K



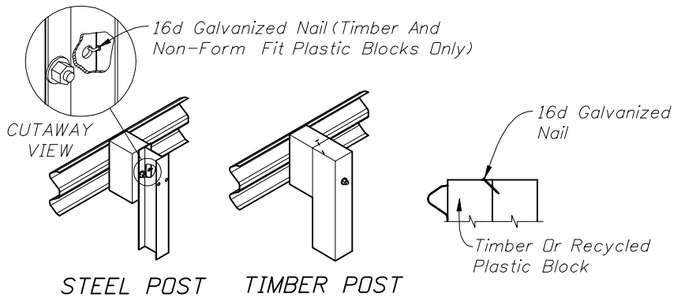
SHOULDER GUTTER

** 8' For 6' Shoulders 10' For 8' Shoulders 12' For 10' And 12' Shoulders Applies To Left And Right Side Shoulders. (See Index No. 525 For Shoulder Widths And Shoulder Gutter Locations On Ramps And Auxiliary Lanes)

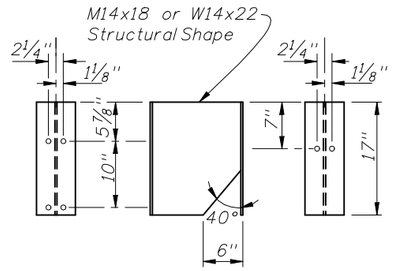


SECTION CC (EXAMPLE FOR 30' CLEAR ZONE)

SHOULDERS, SLOPES AND MISCELLANEOUS PAVING FOR FLARED END ANCHORAGE ASSEMBLIES



16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION



All Holes Are $^{13}/_{16}$"Ø

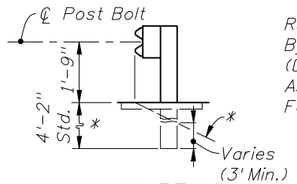
STEEL MODIFIED THRIE-BEAM OFFSET BLOCK

POSTS	OFFSET BLOCKS	REMARKS
Timber	Timber 6"x8"x14" (Nominal) For W-Beam And 6"x8"x22" (Nominal) For Thrie-Beam Recycled Plastic (See Notes)	Post bolt hole in timber and plastic blocks to be centered ± ¼"). All timber offset blocks shall be dressed on all four sides (S4S). One 16d galvanized nail per block is to be used to prevent rotation of block (see detail left).
Steel W6x8.5, W6x9 Or 6" C	Timber 6"x8"x14" (Nominal) For W-Beam And 6"x8"x22" (Nominal) For Thrie-Beam Recycled Plastic (See Notes)	Same as above for timber and plastic blocks except that form fit plastic block holes align with holes in steel posts and do not require nails.
Steel W6x8.5, W6x9 Or 6" C	W14x22x17" (M14x18x17") (Steel Modified Thrie-Beam)	⅝"Øx1½" long hex head bolts with full length thread and nuts (2 Reqd.) and ⅝" plain round washers (4 Reqd.) for mounting steel block to post. Bolts are to be installed in opposite holes, top and bottom.

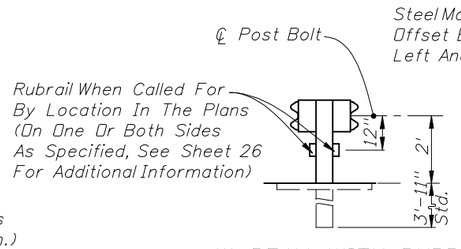
Notes: 1. Timber and recycled plastic offset blocks of identical size and shape can be intermixed within a run of rail.

2. Recycled plastic offset blocks shall meet the passing evaluation criteria for Test Level 3 of NCHRP 350. The blocks shall be tested as a component in a semi-rigid guardrail test article under full scale crash test conditions. The blocks shall be in conformance with Sections 536 and 972 of the Specifications and be included on the Qualified Products List. W-Beam blocks shall be 14" in height and thrie-beam blocks shall be 22" in height. The blocks shall be capable of providing a 7½" (Min.) offset.

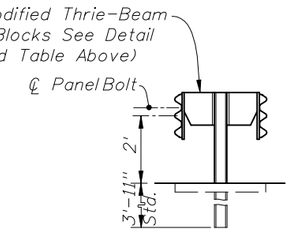
PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS



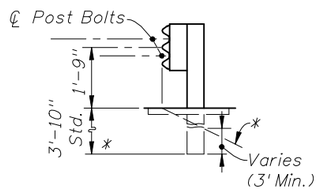
W-BEAM



W-BEAM WITH RUBRAIL



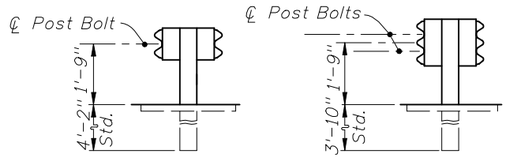
MODIFIED THRIE-BEAM



THRIE-BEAM

*Front Slope When Right Of Way, Environmental Or Other Restrictions Prohibit Normal Shoulder Extension

SINGLE FACED GUARDRAIL

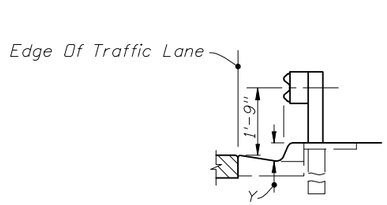


For Narrow Medians With No Median Swale. See Sheet 26 For Median With Swale.

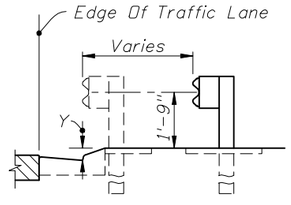
W-BEAM THRIE-BEAM

DOUBLE FACED GUARDRAIL

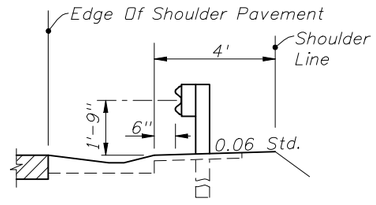
MOUNTING HEIGHTS ON SHOULDERS AND IN MEDIANS



Y=6" Or Greater



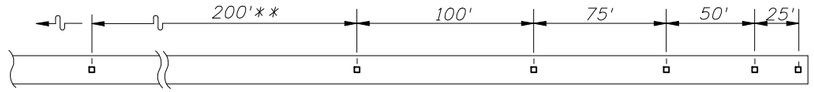
Y=Less Than 6"



Shoulder Gutter

NOTE:
For location of guardrail with offset behind curb and gutter refer to the Plans Preparation Manual, Volume 1, Section 4.3.5.

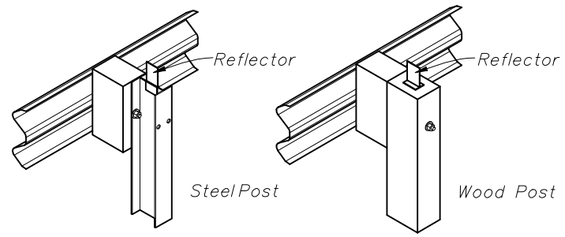
LOCATION AT CURB & GUTTER SECTIONS-DETAIL L



Note: Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer. For minimum installations (length 62.5') provide one reflector at each end and one at the approximate center.

**For curves greater than 2° the spacing shall be reduced to 100' through the curve.

REFLECTOR SPACING

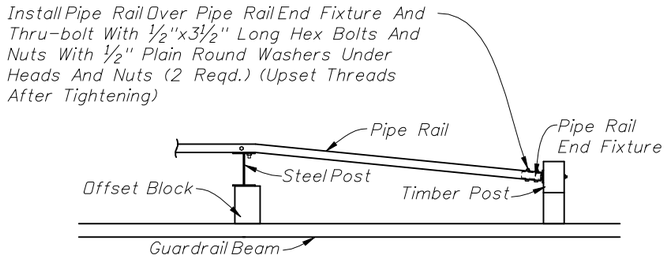


PICTORIAL VIEW REFLECTOR MOUNTING

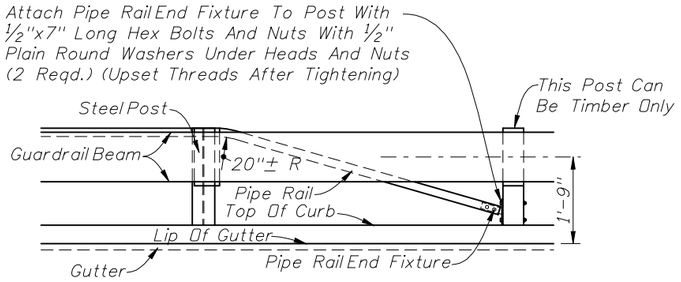
REFLECTOR NOTES

1. Reflectors shall conform to Section 993 of the Standard Specifications.
2. Reflector color (white or yellow) shall conform to the color of the near lane edgeline.
3. Reflectors installed on median guardrail shall have retro-reflective sheeting on both sides of the reflector.
4. The cost for reflectors shall be included in the contract unit price for Guardrail.

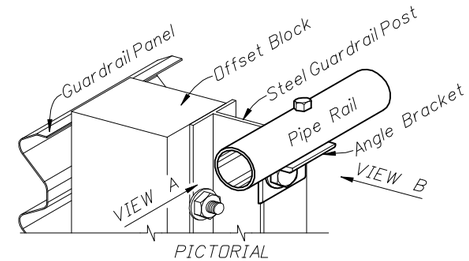
REFLECTORS-DETAIL M



PLAN



ELEVATION



PICTORIAL

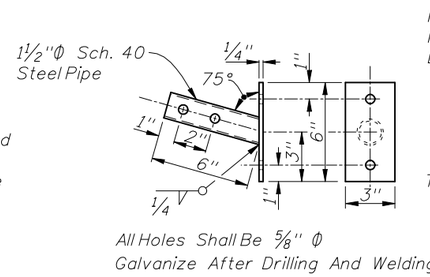
NOTES

1. Pipe Rail required on steel guardrail posts when pedestrian ways and bikeways are located 4' or less from back of the posts. Pipe rail shall not extend beyond the last post of the approach end anchorage assemblies. Begin and end the pipe rail in accordance with the Pipe Rail End detail.

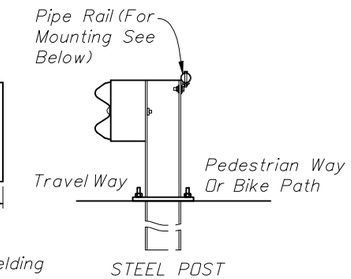
   Refer to Sheet 1, Note 6 for guardrail end treatment requirements.

2. When guardrails with timber posts are located with the back of posts 4' or less from the near edge of the pedestrian way or bikeway, the bolt ends will require one of the following treatments:
   (a) Trimming back flush with the face of nut and metalizing or
   (b) Use of post bolts 15" in length with the washers and nuts counter sunk into sinks 1" to 1½" deep or
   (c) Use of post bolts 15" in length with sleeve nuts and washers.

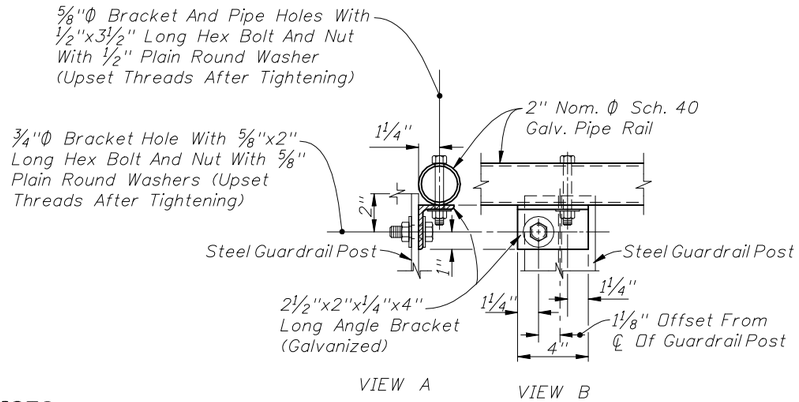
3. The cost for Pipe Rail, mounting components and installation shall be included in the contract unit price for guardrail. Bolt end treatment for timber post shall be included in the contract unit price for guardrail.



PIPE RAIL END FIXTURE



SECTION STEEL POST

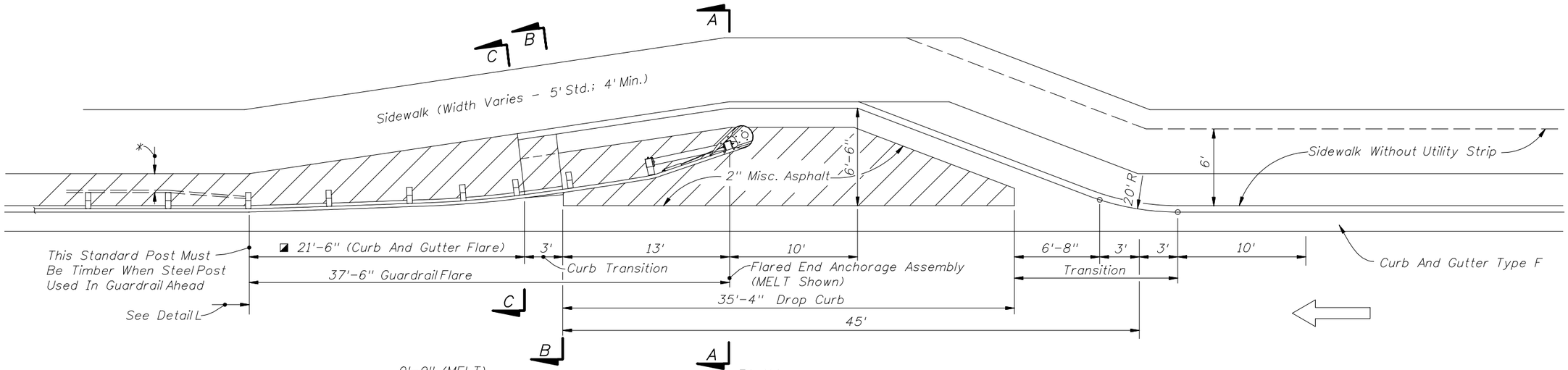


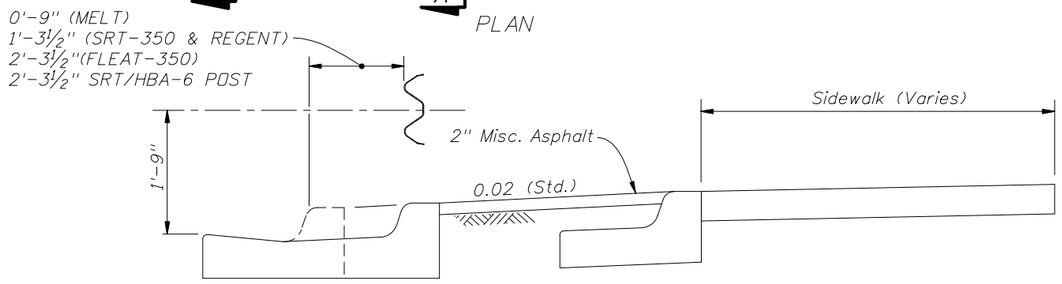
VIEW A VIEW B

PIPE RAIL MOUNTING

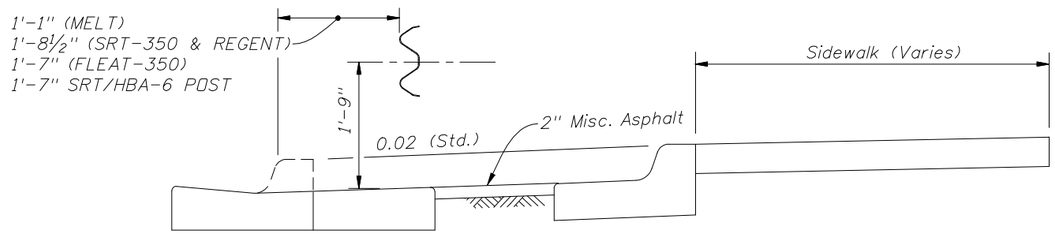
FOR LOCATIONS USED BY PEDESTRIANS OR CYCLISTS

PEDESTRIAN SAFETY TREATMENTS

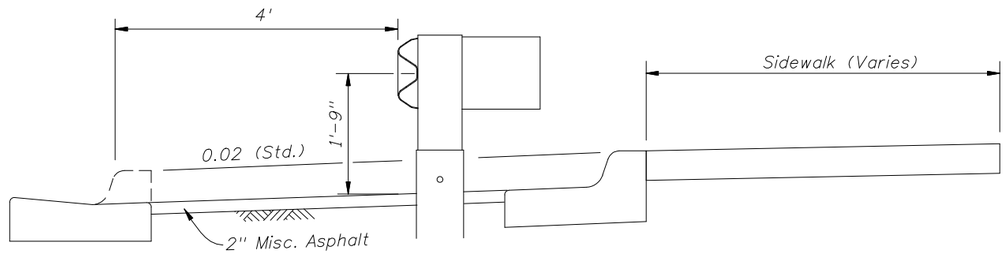




SECTION CC



SECTION BB



SECTION AA

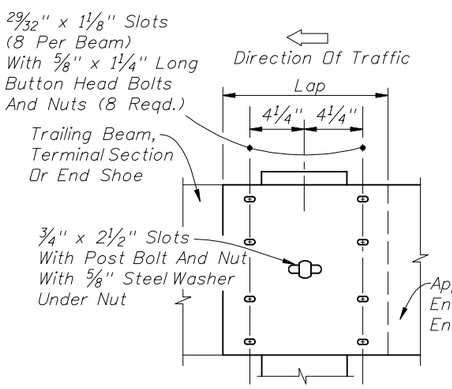
*Safety pipe rail is required when the back of steel guardrail posts are 4' or less from the near edge of a pedestrian way or bikeway and post bolt treatment is required when the back of timber posts are 4' or less from the near edge of a pedestrian way or bikeway; see 'PEDESTRIAN SAFETY TREATMENTS'.

Curb flare shall follow guardrail flare, see elsewhere in this Index for additional guardrail flare information.

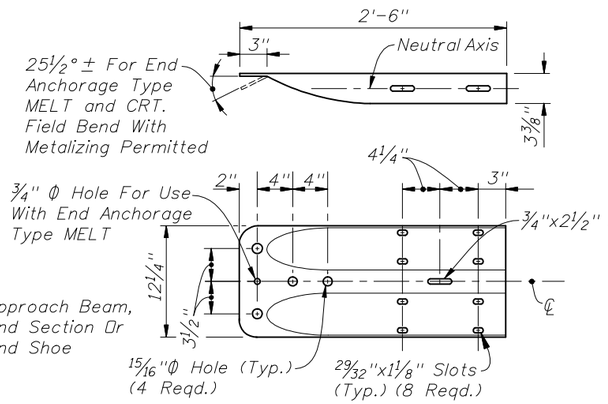
Note: For Proprietary End Treatments See the Qualified Products List.

APPROACH TREATMENT FOR CURB AND GUTTER

DETAIL Q

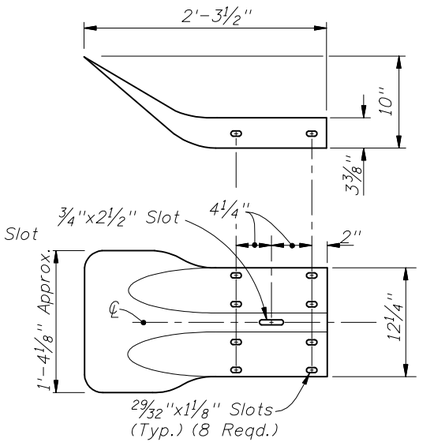


W-BEAM RAIL SPLICE

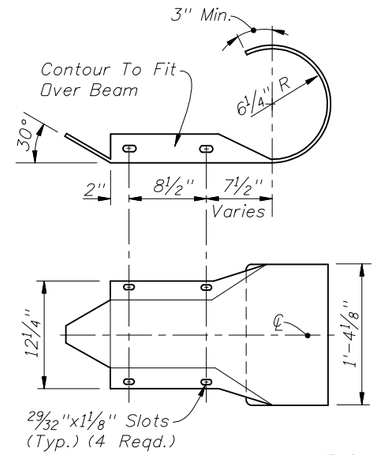


Note: 5/8"Ø Steel washer required with splice bolts

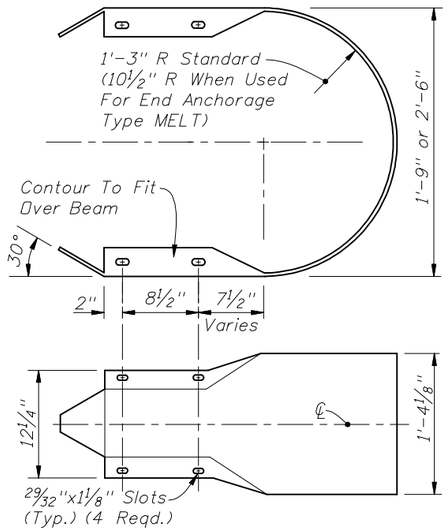
SPECIAL END SHOE



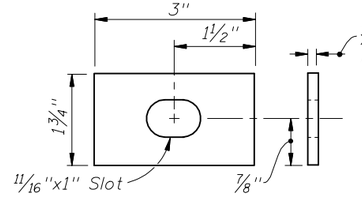
FLARED END SECTION



ROUNDED END SECTION

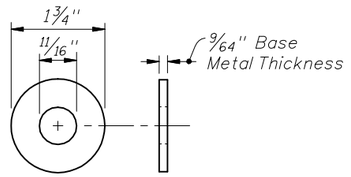


BUFFER END SECTION



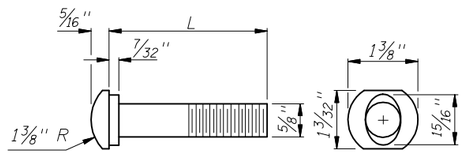
Note:
For beam washer requirements on end terminals, see individual end anchorage assembly details. Washers are to be used where necessary to accomplish alignment or where the posts bolt head shows tendency to pull through the rail slot. Washers installed on guardrail, between end anchorages, prior to July 1, 1990 may remain in place until the guardrail is relocated or until repairs require removal and reinstallment of a post bolt.

(RECTANGULAR PLATE WASHER) BEAM WASHER



Note:
The round washer is not intended for use under the recess nut for the beam to beam rail splice. The washer is required under the recess nut for connecting the beam to the special end shoe; under the post bolt nut for connecting the beam to the timber post and offset blocks; for connecting the beam to steel posts with timber offset blocks; under the hex bolt head for securing the beam anchor plate to the beam; and, for general guardrail connections by 5/8" Ø hex bolts and nuts and under hex nut for connecting rubrail to wood and steel posts. For supplemental information see BEAM ANCHOR PLATE, PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS, individual end anchorage assembly details, SPECIAL STEEL GUARDRAIL POSTS, SPECIAL END SHOE, W-BEAM RAIL SPLICE, THRIE-BEAM RAIL SPLICE, and THRIE-BEAM TERMINAL CONNECTOR details.

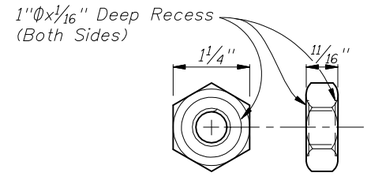
5/8" STEEL WASHER



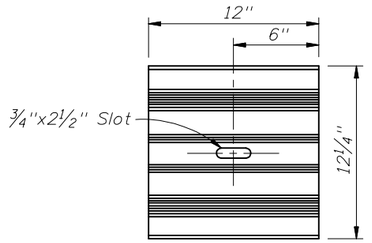
L (In.)	THREAD LENGTH (Min.) (In.)	APPLICATION
1 1/4"	Full Length	Rail Splice Bolt
10"	4"	Post Bolt – Single Or Double Faced Guardrail Timber Or Recycled Plastic Offset Block(s) On Steel Post As An Option, A Single 25"* Long Post Bolt May Be Used
18"	4"	Post Bolt – Single Faced Guardrail Timber Posts
25"*	4"	Post Bolt – Double Faced Guardrail Timber Posts Double Faced Guardrail Steel Posts

Special bolts having lengths of 10" or greater shall have a thread length of not less than 4". For applications where special bolts having lengths greater than 25" are required, the Contractor may use a 5/8"Ø threaded rod (field cut to length). A hex nut and beam washer shall be used at the guardrail face with no more than 3/4" of the threaded rod projecting beyond the top of the nut. The projecting thread on both ends shall be distorted to secure the nuts, and both ends of the threaded rod metalized with organic zinc-rich coating. *Use of the 25" AASHTO-AGC-ARTBA standard length post bolt on double faced guardrail that results in the bolt projecting more than 3/4" beyond the face of the nut after pull-up shall be trimmed to 3/4" reveal and metalized with organic zinc-rich coating.

5/8" OVAL SHOULDER BUTTON HEAD BOLT



5/8" MODIFIED HEAVY HEX NUT (RECESSED NUT)



Note: For application information see individual end anchorage assembly details.

W-BEAM BACK-UP PLATE

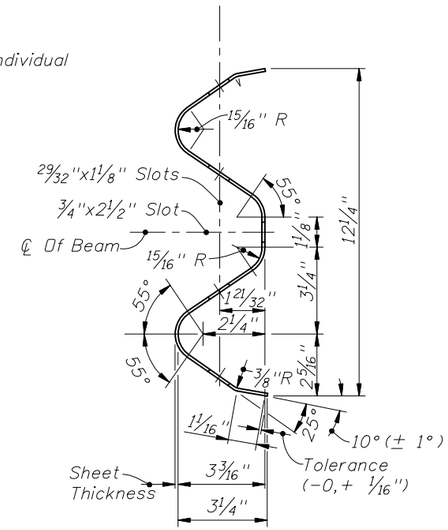
OFFSETS (Ft.) Measured From Face Of Guardrail To Front Of Above Ground Rigid Hazard				
POST SPACING (Ft.)	SINGLE BEAM		NESTED BEAMS	
	W-Beam	Thrie-Beam	W-Beam	Thrie-Beam
6'-3"	4'	3'-3"	N/A	N/A
3'-1 1/2"	3'	2'-8"	2'-8"	2'-4"
1'-6 3/4"	N/A	N/A	2'-4"	2'

Note:
The values shown should be utilized unless changes are supported by imperical validation. Those desiring to develop offset values from the simulated deflection values shown in Table 5.4 of the AASHTO Roadside Design Guide are cautioned to proceed only if back-ground in the table development is understood.

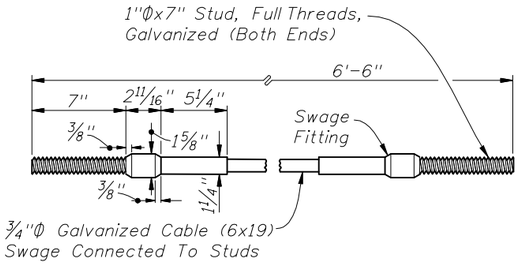
MINIMUM OFFSET FOR SINGLE FACED GUARDRAIL (Ft.)

HS Hex bolts for THRIE-BEAM TERMINAL CONNECTORS shall conform to the requirements of ASTM A449 (Type 1) with heavy hex nuts and washers. All other hex bolts shall conform to the requirements of ASTM A563. Bolts, nuts and washers shall be hot dip galvanized. Heavy hex nut may be used in lieu of hex nuts and hex nuts used for jam nuts.

HEX BOLTS AND NUTS

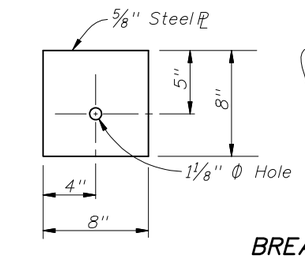


W-BEAM

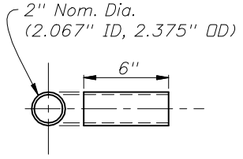


Note:
Cable assemblies shall be in accordance with the specifications of AASHTO-AGC-ARTBA 'A Guide To Standardized Highway Barrier Hardware' Cable Anchor Assembly FCA01. An additional cable assembly 9' in length with a swaged fitting on one (1) end is required for each end anchorage assembly Type CRT.

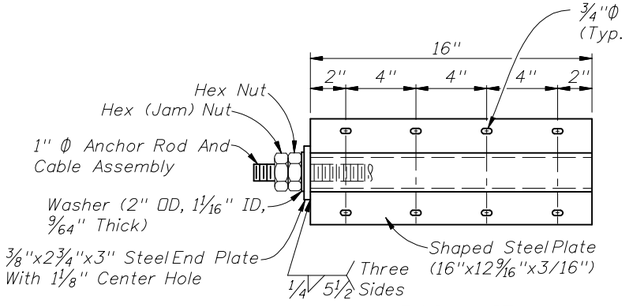
CABLE ASSEMBLY



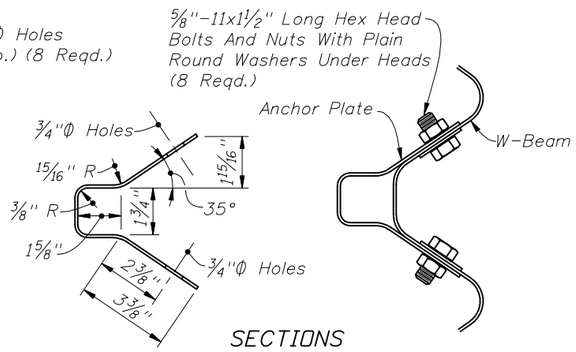
BEARING PLATE



BREAKAWAY TERMINAL POST SLEEVE

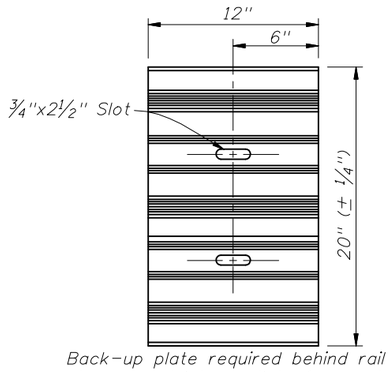


BACK VIEW



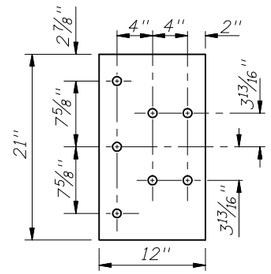
SECTIONS

BEAM ANCHOR PLATE



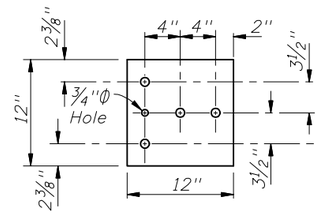
Back-up plate required behind rail elements at intermediate (non-splice) posts when steel offset block used.

THRIE-BEAM BACK-UP PLATE



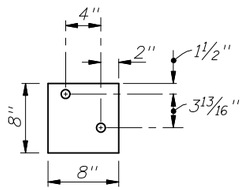
5/8" Plate For Bridge Traffic Railing Barrier
1/4" Plate For Barrier Walls

THRIE-BEAM TERMINAL CONNECTOR



1/4" Plate For All Applications

SPECIAL END SHOE

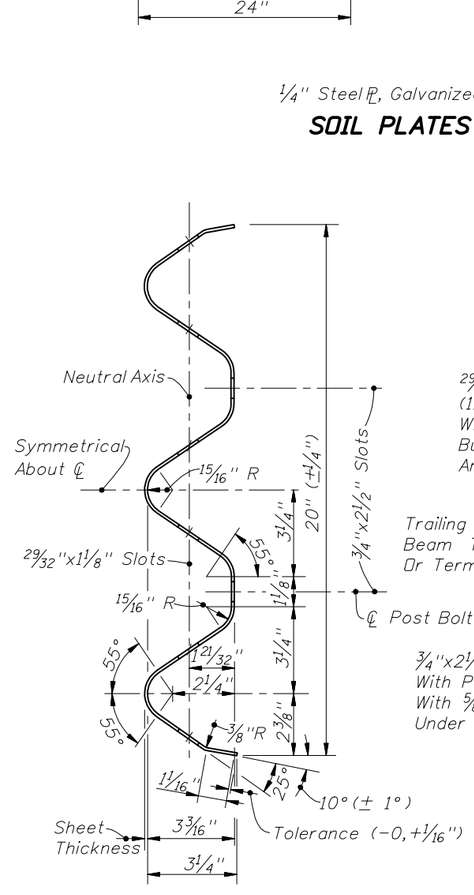


1 1/4" Plate
See Detail J For Application

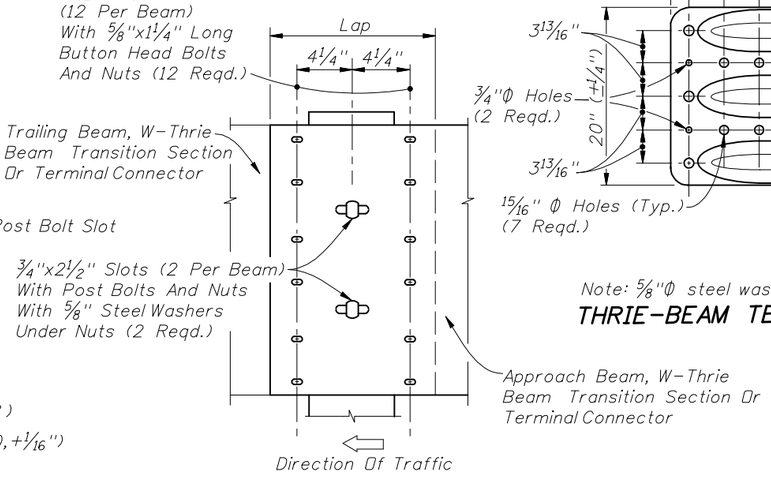
FILLER PLATE

All Holes 1" Ø Except As Shown

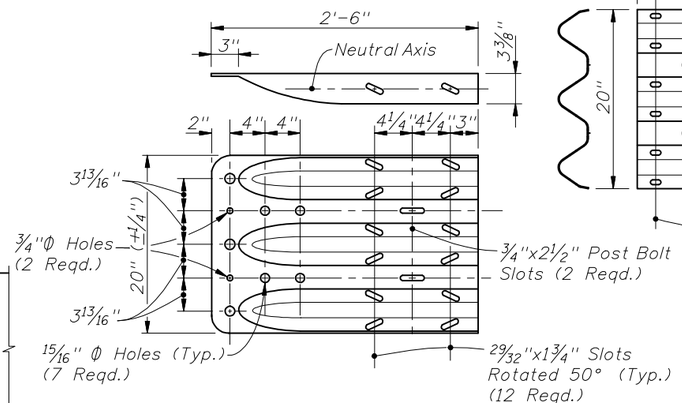
GALVANIZED STEEL BACK-UP PLATES FOR CONNECTING SPECIAL END SHOES AND TERMINAL CONNECTORS TO CONCRETE BRIDGE TRAFFIC RAILING BARRIERS AND CONCRETE BARRIER WALLS



THRIE-BEAM

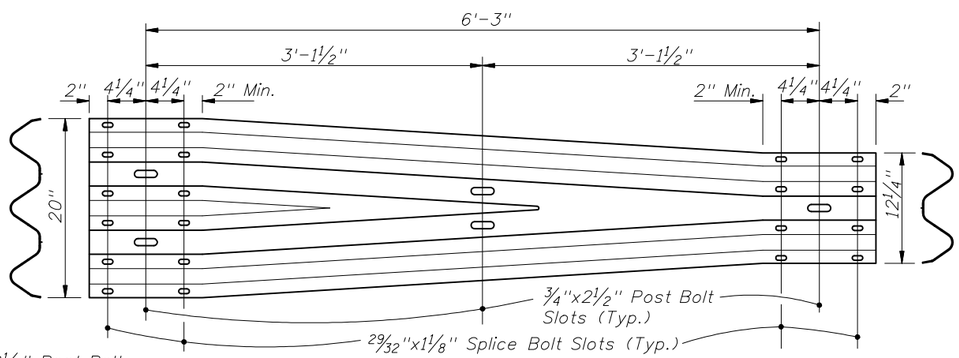


THRIE-BEAM RAIL SPLICE

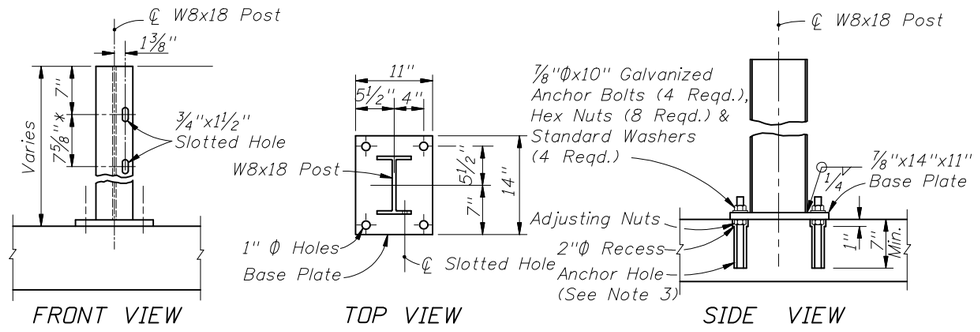


Note: 5/8"Ø steel washer required with splice bolts

THRIE-BEAM TERMINAL CONNECTOR



W-THRIE BEAM TRANSITION SECTION



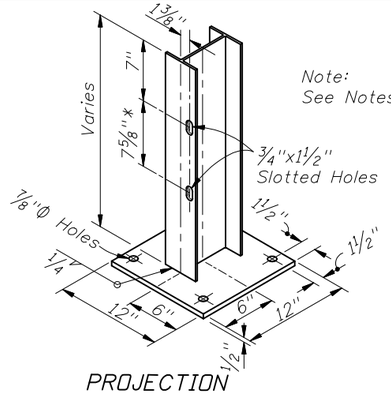
FOR REPLACEMENT OF EXISTING W8x18 GUARDRAIL POSTS ON APPROACH SLABS AND BRIDGES

* Additional slotted hole required when mounting thrie-beam guardrail

NOTES: (SPECIAL STEEL POST)

1. See Index No. 402 for special steel posts required for construction and repair of guardrail transitions to bridge traffic railing barrier retrofits on existing bridges. See Structures Index Nos. 470 through 476 for steel posts required to construct traffic railing barrier retrofits on existing bridges.

2. Either anchor bolts, concrete wedge anchors or approved Adhesive-Bonded Anchors for Structural Applications may be used. Anchor bolts, wedge anchors and adhesive anchors shall have a minimum tensile strength of 60,000 psi and galvanized in accordance with ASTM A153 (stainless steel components may be substituted but components plated in accordance with ASTM B-633 are not acceptable). Adhesive anchor rods shall be equal in diameter to that detailed for anchor bolts. Wedge anchors are to be installed in accordance with the manufacturer's recommendations, assuming 3,000 psi compressive strength for concrete. Wedge anchors shall also meet the following requirements:
(a) tensile load each anchor: approach slabs 14,000 lbs.; other structures 8,000 lbs.
(b) shear load each anchor: approach slabs 15,000 lbs.; other structurers 7,800 lbs.



FOR CONSTRUCTION OF GUARDRAIL WHERE CULVERT, PIER FOOTING OR OTHER STRUCTURE PRECLUDES DRIVEN POST INSTALLATION

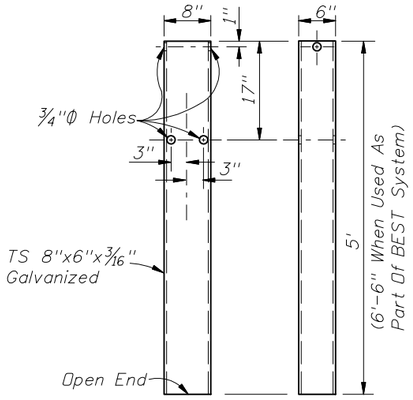
3. Posts are to be plumbed by adjusting nuts or mortar seating. Posts installed using anchor bolts and adhesive anchors are to be set with adjusting nuts as detailed, unless the Engineer approves the use of mortar seating in lieu of adjusting nuts. Posts installed using wedge anchors are to be set with mortar seating. Base plates shall be grouted with neat finish.

4. Adhesive-Bonded Anchors for Structural Applications shall comply with Section 937 and be installed in accordance with Section 416. Drilled hole diameter shall be in accordance with the manufacturer's instructions.

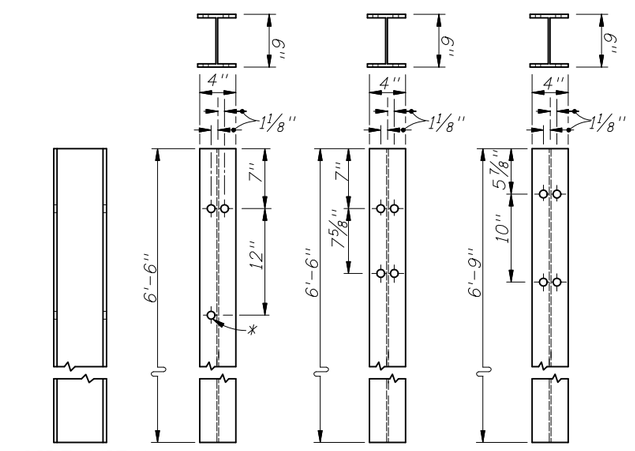
5. Anchor holes and recesses shall be drilled; wedge anchor holes are to be drilled in accordance with the manufacturer's specifications. Encountered reinforcing steel shall be drilled through. Holes shall be thoroughly cleaned when setting bolts and anchors and dry when setting wedge anchors.

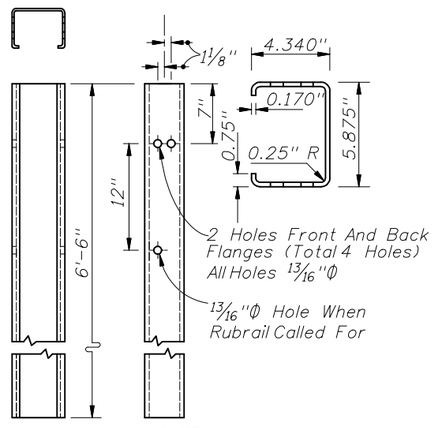
6. Steel post and base units shall be galvanized in accordance with ASTM A123. Any damaged galvanized areas are to be metalized in accordance with Section 562 of the Standard Specifications.

7. Special steel posts are not to be substituted for any post in a guardrail approach end treatment system.

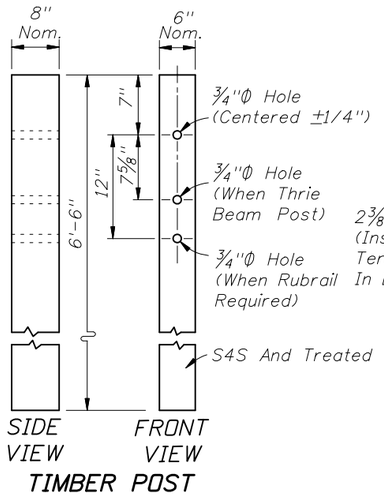


SPECIAL STEEL GUARDRAIL POSTS



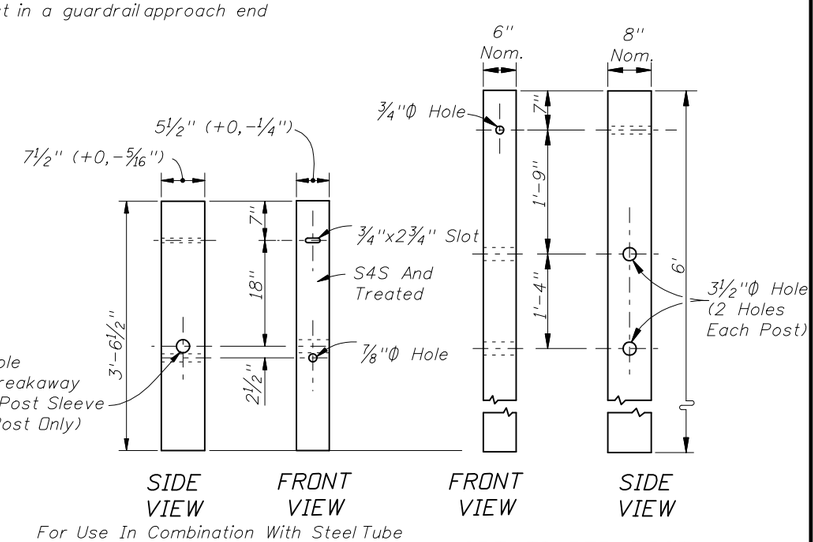


Note: 6"-C steel posts are to face the same direction in any continuous run of guardrail. Posts to be galvanized in accordance with ASTM A123.



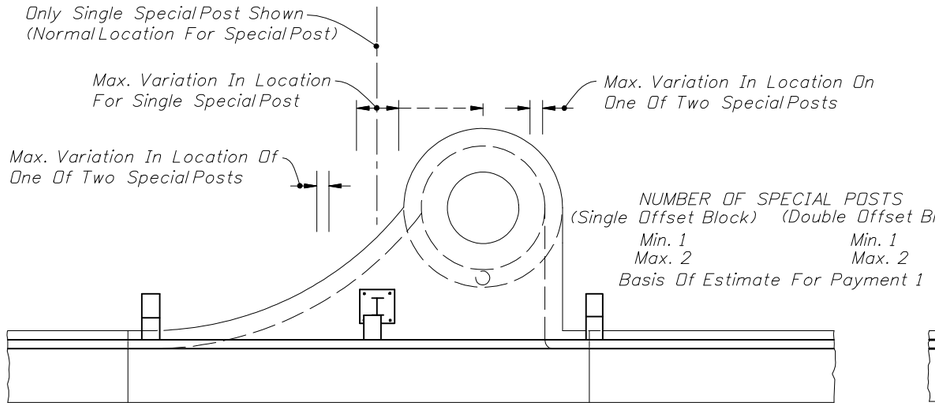
Note: W6x8.5 or W6x9 steel posts may be either rolled or welded structural shapes conforming to or exceeding the design properties of ASTM A6/A6M. Welding shall be in accordance with the requirements of ASTM A769/A769M. Posts shall be cut to length and the ends seal welded between web and flange before galvanizing. Posts to be galvanized in accordance with ASTM A123.

W6x8.5 OR W6x9 STEEL POST

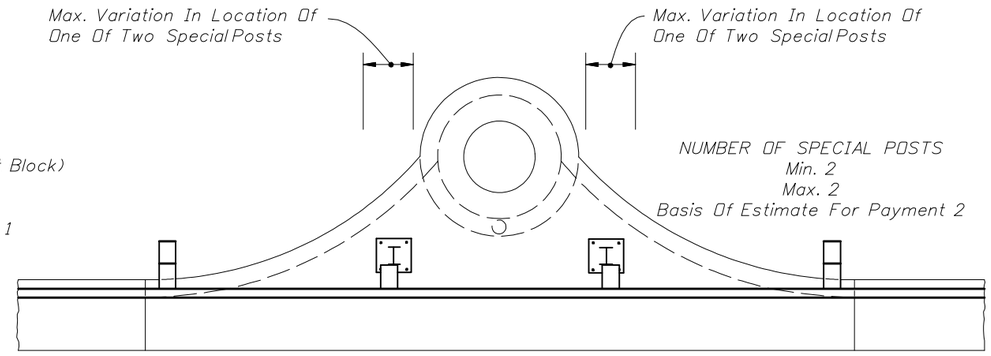


STANDARD TIMBER AND STEEL GUARDRAIL POSTS

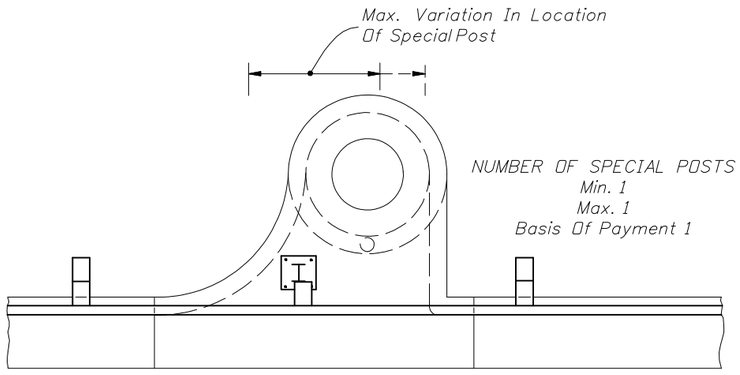
SPECIAL TIMBER GUARDRAIL POSTS



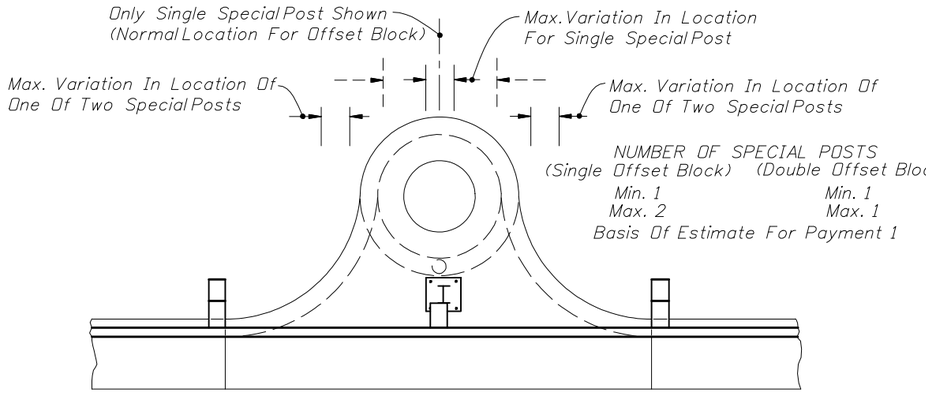
CURB INLET TYPE 1



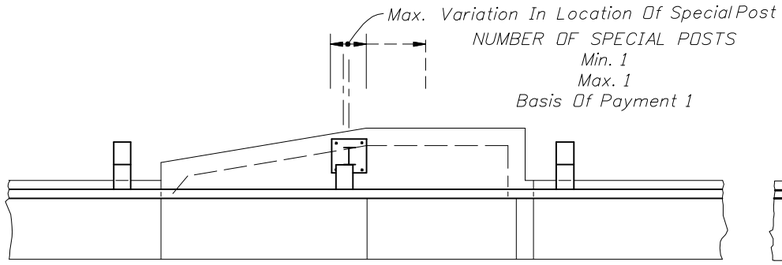
CURB INLET TYPE 2



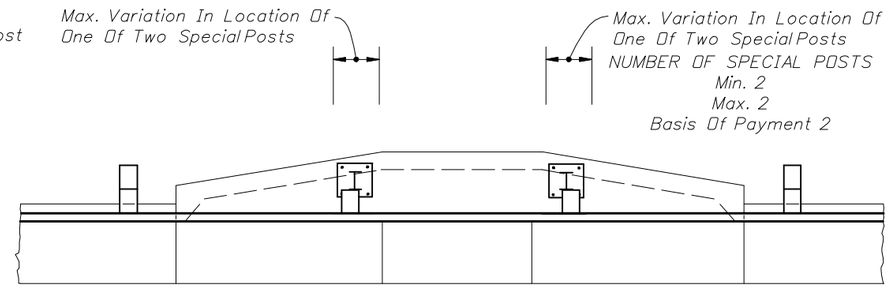
CURB INLET TYPE 3



CURB INLET TYPE 4



CURB INLET TYPE 5



CURB INLET TYPE 6

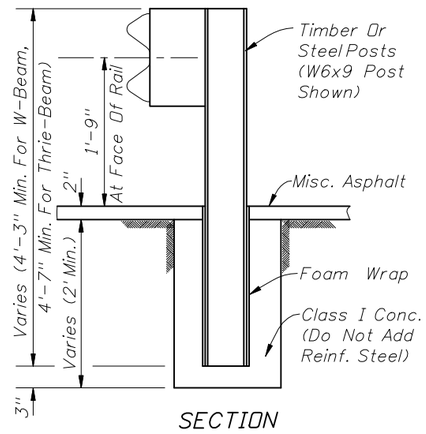
Notes:

1. The locations shown for special posts mounted on inlets are to be used as guidelines for positioning the posts and for estimating the number of required posts.

2. Special posts and their anchorages mounted on curb inlets shall be in accordance with special steel guardrail posts Sheet 23, and paid for under the contract unit price for Special Guardrail Post, EA.

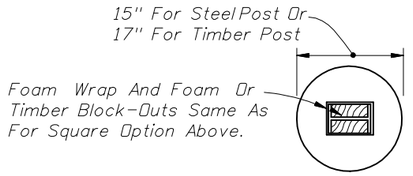
3. Variations shown for the locations of special posts mounted on inlets are established from standard post spacing (6'-3"); clearance of standard posts from inlets (4" min.); use of single and double offset blocks on standard posts adjacent to the inlets; optional flange mountings; and, concrete anchor edge distances (2" for grouted and 3¾" for expansion anchors). The number of posts and their locations may vary by reducing post spacing and adjusting the length of rail panel (s).

4. Encased guardrail posts shall conform in section to standard timber and steel posts, and be paid for under the contract unit price for Special Guardrail Post, EA. Payment shall include cost of foam wrap and concrete encasement.



SECTION

PLAN
(SQUARE OPTION)



PLAN
(ROUND OPTION)

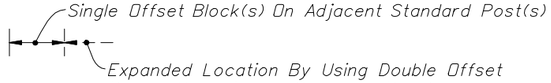
Note: For line post applications only, i.e., not to be used with breakaway post applications nor be used to modify End Anchorage Assemblies Type II.

TO BE USED PRINCIPALLY OVER SHALLOW UTILITIES

ENCASED GUARDRAIL POST

LEGEND

Variation In Location Of Special Post:



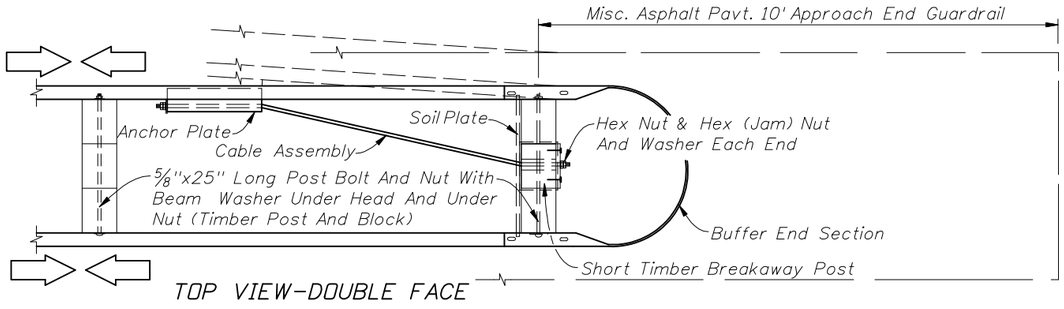
SPECIAL POST LOCATIONS ON CURB INLETS

2010 FDOT Design Standards

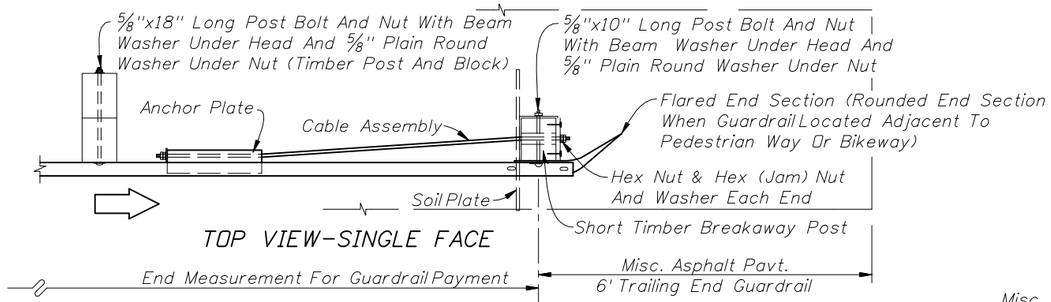
GUARDRAIL

Last Revision 00 | Sheet No. 22 of 26

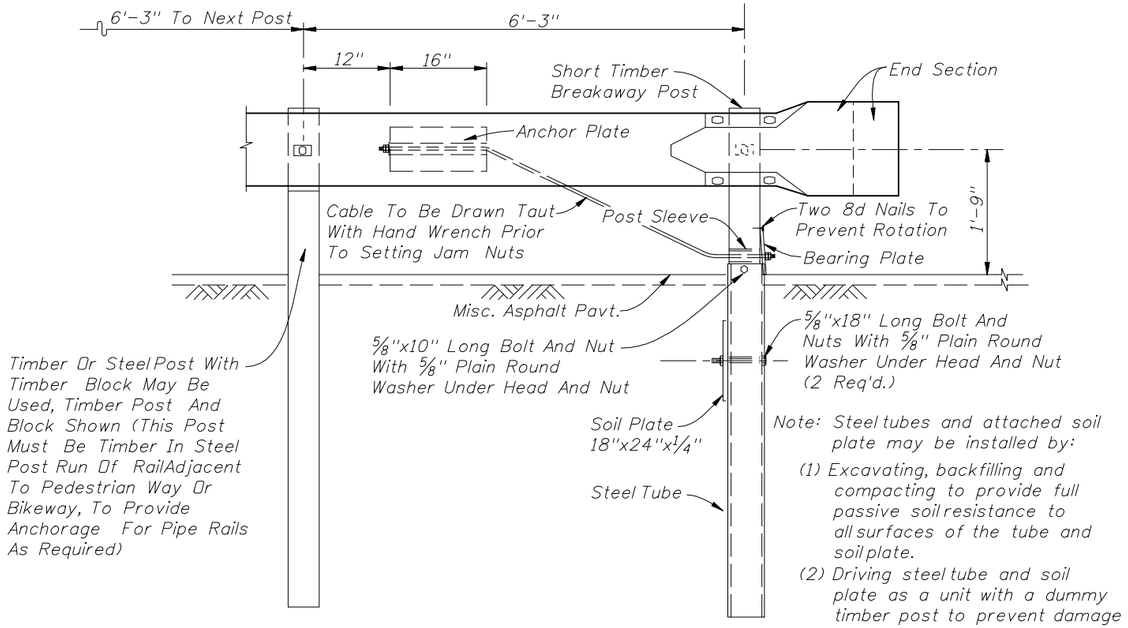
Index No. 400



TOP VIEW-DOUBLE FACE



TOP VIEW-SINGLE FACE



Note: Steel tubes and attached soil plate may be installed by:

(1) Excavating, backfilling and compacting to provide full passive soil resistance to all surfaces of the tube and soil plate.

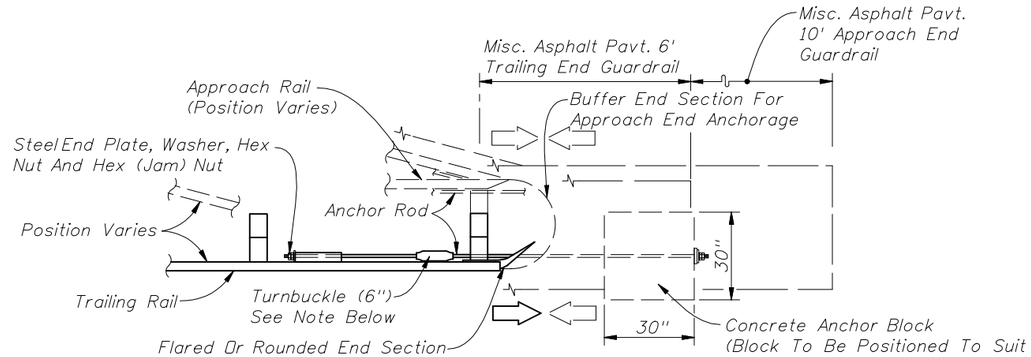
(2) Driving steel tube and soil plate as a unit with a dummy timber post to prevent damage to breakaway post.

FRONT VIEW

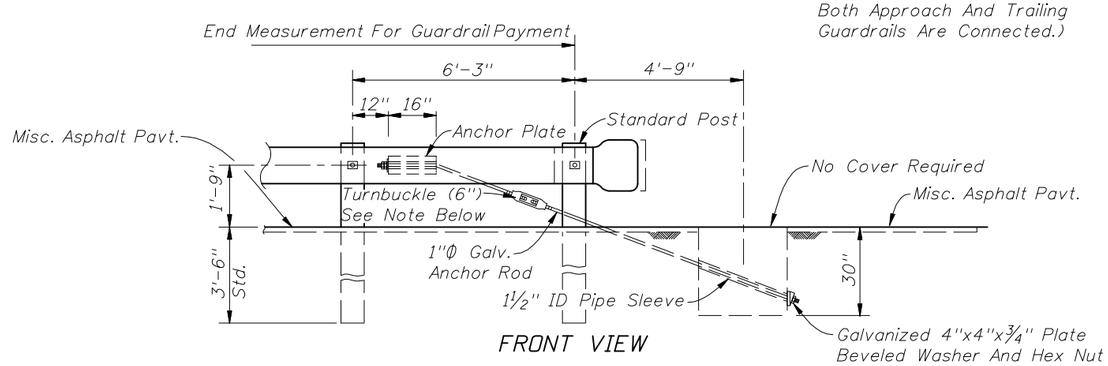
The payment for the items of End Anchorage Assembly Type II shall be full compensation for furnishing and installing either the Round or the Buffer End Section, the Beam Anchor Plate, Cable Assembly, Pipe Sleeve, Soil Plate, Steel Tube, Bearing Plate, Short Timber Breakaway Post, Offset Blocks and the necessary hardware.

CABLE ANCHOR OPTION

END ANCHORAGE ASSEMBLY TYPE II



TOP VIEW



FRONT VIEW

Turnbuckle to be used only for guardrail that is reset vertically. The existing anchor rod (1" or 1¼" Dia.) shall be field cut, threaded 4" on each end, and, metalized in accordance with Sections 562 and 975 of the Standard Specifications. The cost for cutting, threading, metalizing and the turnbuckle shall be included in the contract unit price for Reset Guardrail, LF.

The payment for the items of End Anchorage Assembly Type II shall be full compensation for furnishing and installing the Beam Anchor Plate, Anchor Rod, Pipe Sleeve, Anchor Block, either Flared, Rounded or Buffer End Section, and the necessary hardware.

CONCRETE ANCHOR BLOCK OPTION

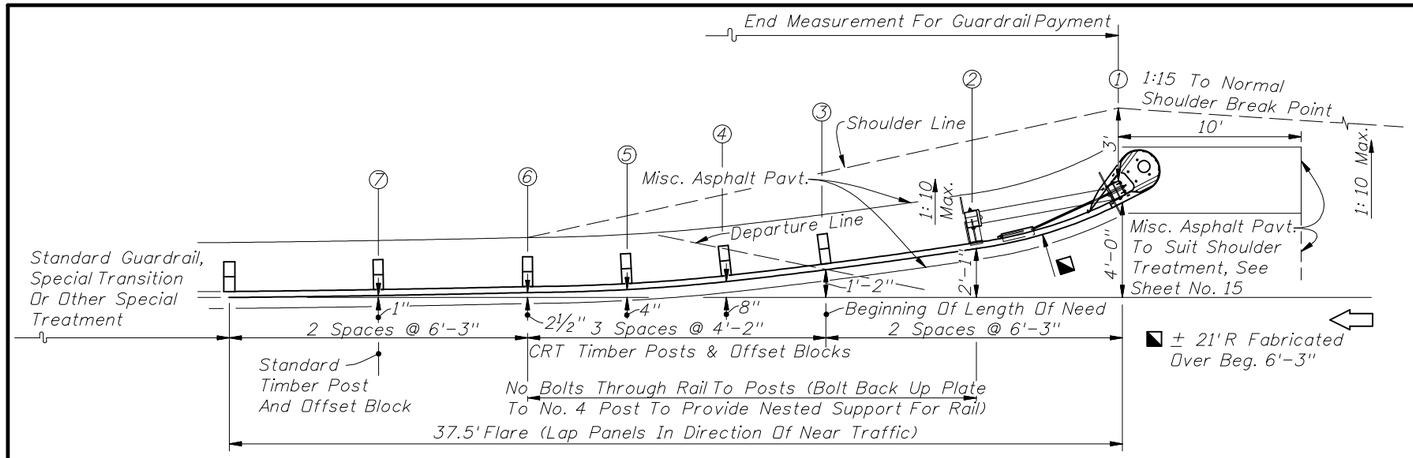
TYPE II NOTES

1. *Unless specified in the plans, the contractor can supply either the cable anchor option or the concrete anchor block option.*

2. *Type II end anchorage assemblies are approved for all speeds and are intended for use as:*
   (a) trailing end anchorages for single face free standing guardrail systems;
   (b) approach end anchorages for single face free standing guardrail systems when end anchorage is located outside of the clear zone; and,
   (c) both approach and trailing ends of double face guardrail systems.
   Crash cushions shall be constructed at or in lieu of approach Type II end anchorages located inside the clear zone.

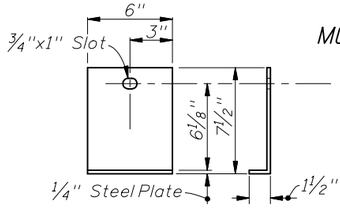
   End anchorage for thrie beam guardrail shall be constructed the same as detailed for W-beam, except use thrie beam rail and end section; and the Anchor Plate is to be attached to the bottom corrugation of the thrie beam.

3. *These end anchors are to be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Type II), EA as called for in the plans or by permit.*

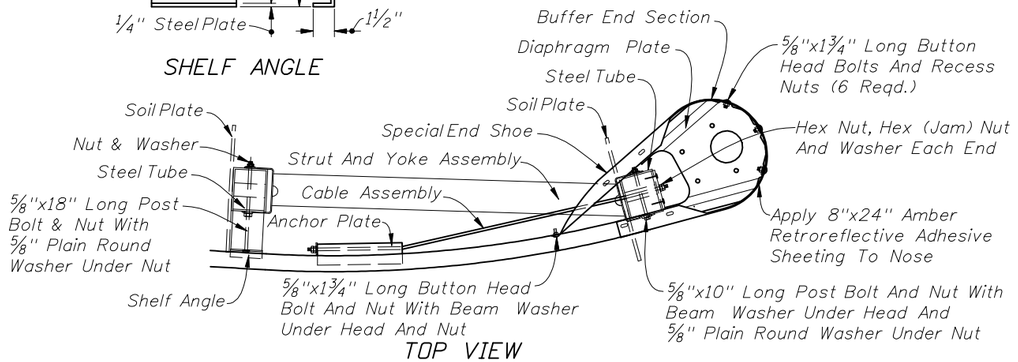


PLAN

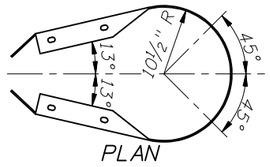
MODIFIED ECCENTRIC LOADER TERMINAL (MELT)



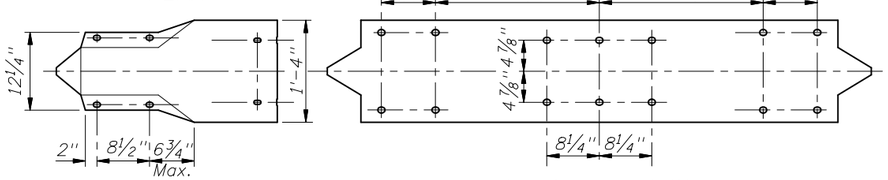
SHELF ANGLE



TOP VIEW



PLAN

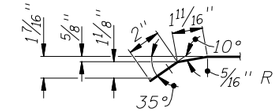


FLAT PLATE LAYOUT

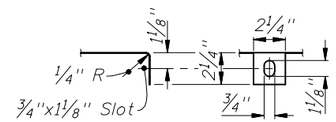
All Slots Shall Be 29/32"x1⅛"

ELEVATION

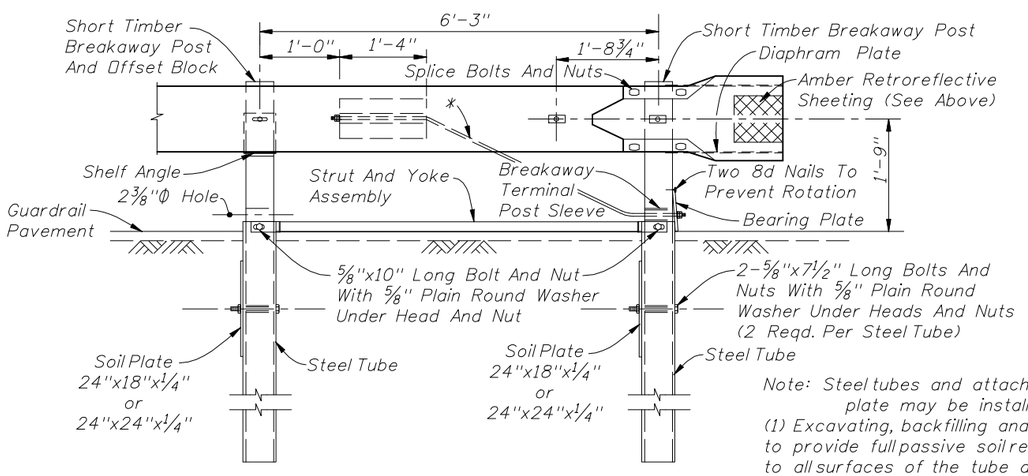
BUFFERED END SECTION



SECTION AA

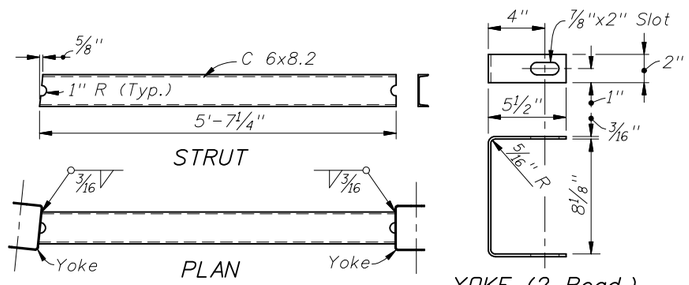


SECTION BB



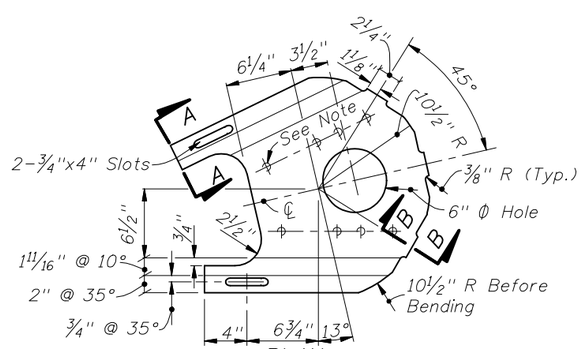
* Cable To Be Drawn Taut With Hand Wrench Prior To Setting Jam Nuts

FRONT VIEW



Note: Assembly installed with channel turned down for right side guardrail and turned up for left side guardrail.

STEEL STRUT AND YOKE ASSEMBLY



PLAN

Note: Bolt holes are not required, but, diaphragms with either manufacturer produced two or three hole in line patterns are acceptable.

DIAPHRAGM PLATE (2 Reqd.)

Note: Steel tubes and attached soil plate may be installed by:
(1) Excavating, backfilling and compacting to provide full passive soil resistance to all surfaces of the tube and soil plate.

(2) Driving steel tube and soil plate as a unit with a dummy timber post to prevent damage to breakaway post.

END ANCHORAGE ASSEMBLY TYPE MELT

MODIFIED ECCENTRIC LOADER TERMINAL NOTES

1. The MELT is applicable for design speeds up to 45 mph. The MELT is intended for use as an approach end guardrail anchorage for shoulder guardrail. Its alignment is a flare from the normal guardrail alignment with an effective length of 37.5' including three standard W-beam panel outside of any standard guardrail, guardrail transitions or other special treatments.

2. This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the MELT and their incorporation into a whole system.

3. This standard drawing is sufficient for plan details for the MELT when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. The MELT shall be assembled in accordance with the distributor's detailed drawings, procedures and specifications.

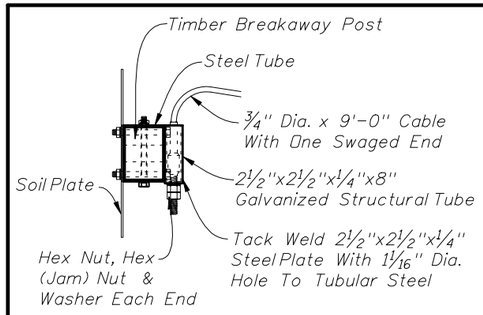
4. The first two post must be short timber breakaway posts with steel foundation tubes and soil plates, post Nos. 3 thru 6 must be CRT timber posts and post No. 7 must be a standard timber post.

5. The MELT can not be used in medians where horizontal clearance requires the use of a backrail.

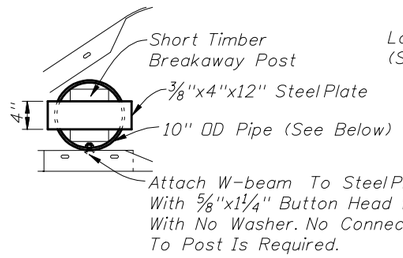
6. See the General Notes for galvanizing requirements of metallic components.

7. If the plans call for the MELT at a specific location, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'flared' at a specific location, the contractor has the option to construct any FDOT approved flared assembly that meet the applications for that location. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchorage will not be eligible for VECP consideration.

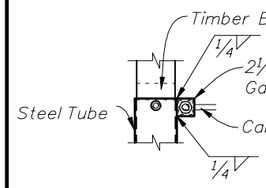
8. The MELT shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Flared), EA and shall be full compensation for furnishing and installing all components in accordance with the plans; the distributor's detailed drawings, procedures and specifications and this Index.



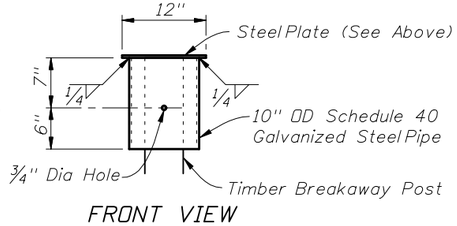
TOP VIEW



TOP VIEW

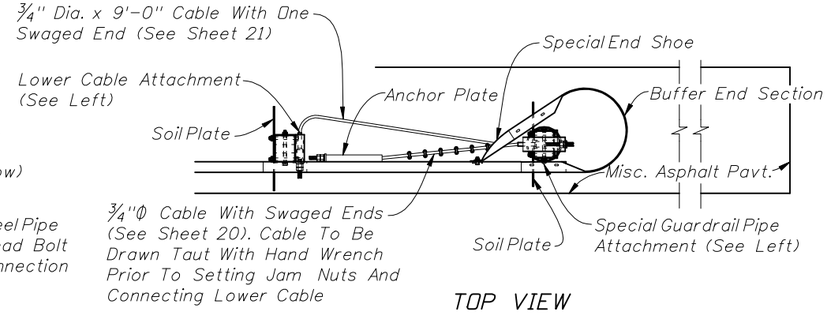


FRONT VIEW

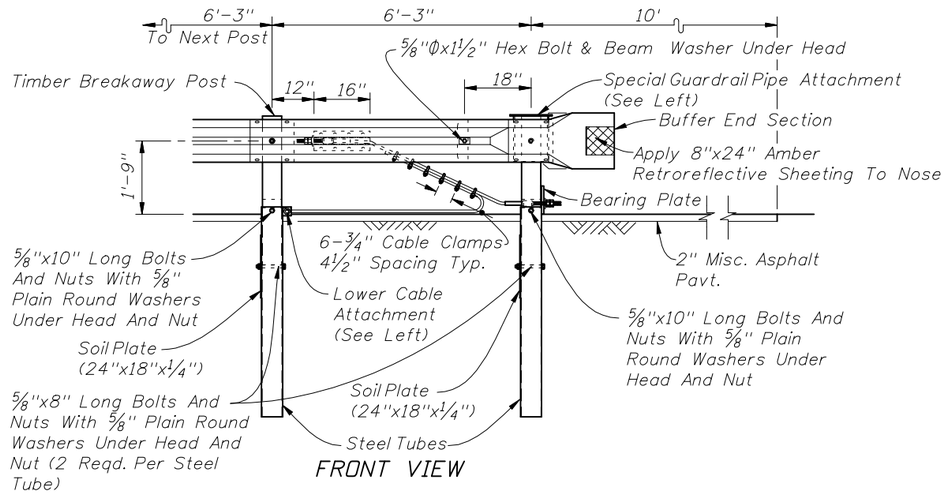


FRONT VIEW

LOWER CABLE ATTACHMENT SPECIAL GUARDRAIL PIPE ATTACHMENT

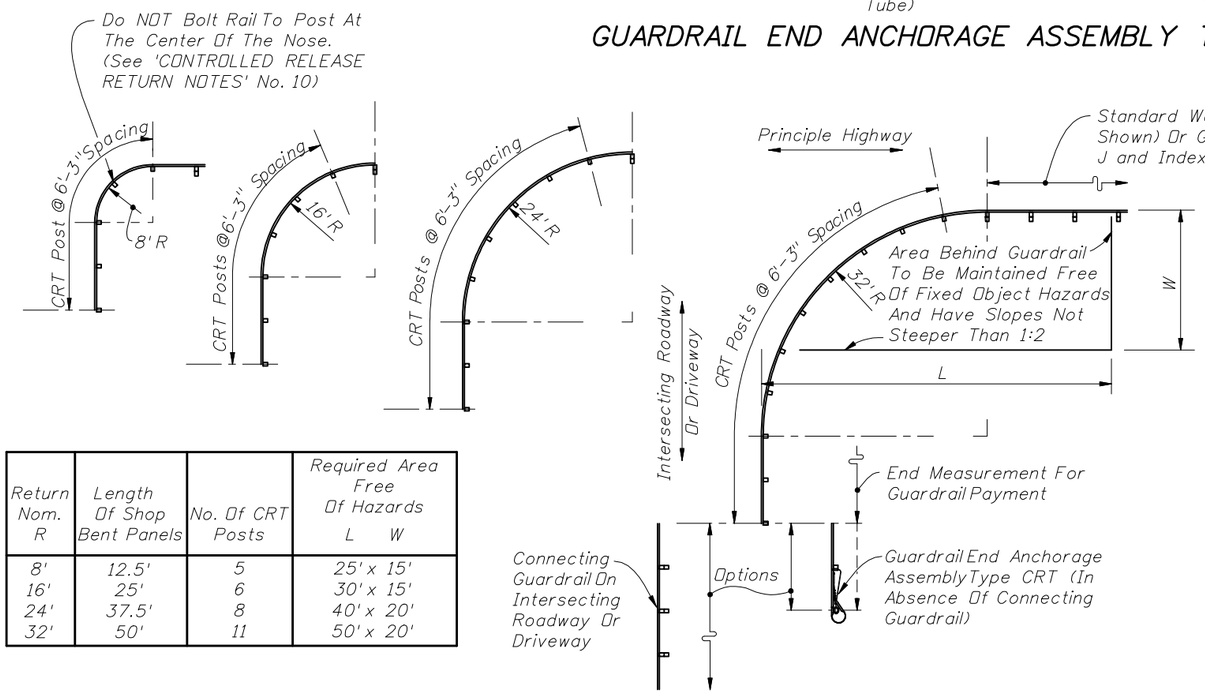


TOP VIEW

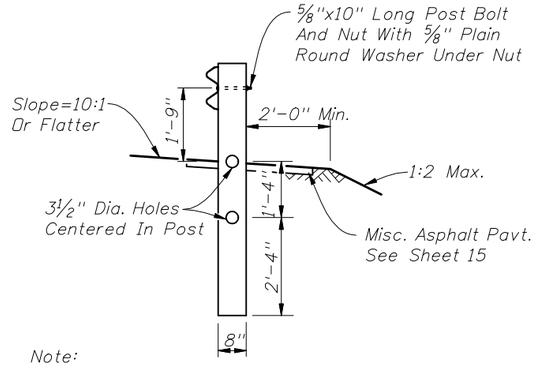


FRONT VIEW

GUARDRAIL END ANCHORAGE ASSEMBLY TYPE CRT



Return Nom. R	Length Of Shop Bent Panels	No. Of CRT Posts	Required Area Free Of Hazards L	W
8'	12.5'	5	25'	x 15'
16'	25'	6	30'	x 15'
24'	37.5'	8	40'	x 20'
32'	50'	11	50'	x 20'



Note:
To be constructed when flares and transitions or standard radial returns can not be applied. See Sheet 12.

CRT TIMBER POST

CONTROLLED RELEASE RETURN FOR SIDE ROAD AND DRIVEWAY ACCESS

CONTROLLED RELEASE RETURN NOTES

1. Controlled release returns are intended for use (a) in openings in continuous guardrail for driveway and side road access when flares and transitions or standard radial returns can not be applied (Sheet 12); and, (b) for shielding the ends of bridge traffic rails and barrier walls where the driveway and side road access is in close proximity to the structure and space does not permit the proper use of approved flared and parallel types of Guardrail End Anchorage Assemblies.

2. Controlled release returns are not intended as a substitute or replacement for the appropriate use of approved vehicle impact attenuators.

3. Controlled release returns with either 8', 16' or 24' radii are designed for highway speeds of 60 mph or less; the 32' radius return is to be used only highway speeds of 60 mph or less; the 32' radius return is to be used only for highway speeds of 45 mph or less.

4. The controlled release returns shown are designed as full returns based on an intersection angle of 90°. The return can be terminated with the Guardrail End Anchorage Assembly Type CRT or connected to standard guardrail as shown or as otherwise detailed in the plans.

5. The Guardrail End Anchorage Assembly Type CRT is to be used only for the controlled release returns with 8', 16', 24' and 32' radii as shown; the assembly is not to be used in any tangent rail or flared rail applications. Other types of end anchorage assemblies are not to be used in the controlled release returns.

6. The area immediately behind the control release return shall have slopes not steeper than 1:2 and be maintained free of fixed objects in accordance with the area limits tabulated in the plan below.

7. The surface approaching the controlled release return shall have a transverse slope not exceeding 1:10. The effective width of the transverse surface is to be based on standard vehicle departure, return radii and preceding shielding; the width (beyond shoulder) shall be not greater than the corresponding 15' and 20', 'W' values tabulated below.

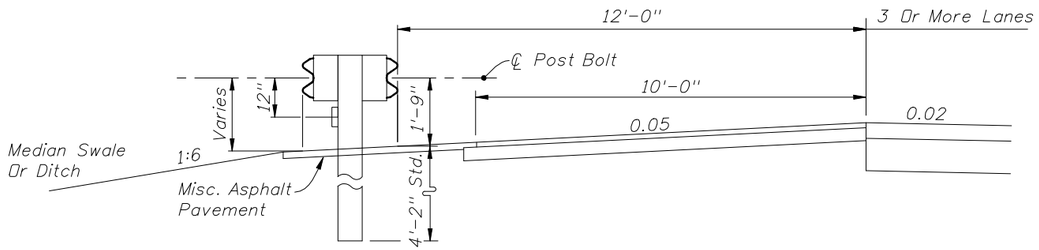
8. The curved guardrail portion of the controlled release return shall be full section shop bent panels (12.5' or 25' panels).

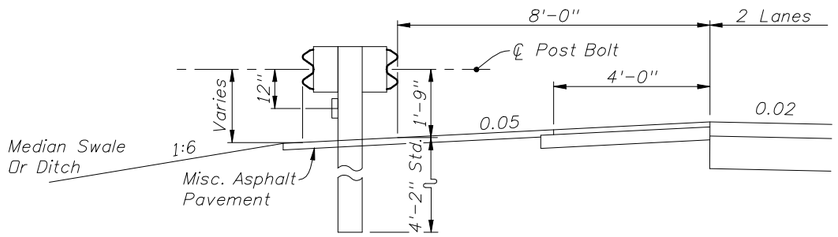
9. Washers are not to be used between the guardrail beam and the head of the button head post bolts at any controlled release terminal (CRT) post or at any Guardrail End Anchorage Assembly Type CRT breakaway timber post.

10. The guardrail beam of the 8' radius return is not bolted to the center control release post.

11. See the General Notes for galvanizing requirements of metallic components.

12. Controlled release return systems shall be paid for under the contract unit prices for Guardrail (Roadway), LF, Guardrail (Shop-bent Panels), LF, and Guardrail, End Anchorage Assembly (Type CRT), EA as called for in the plans or by permit and shall be full compensation for furnishing and installing all components in accordance with the plans and with this index. CRT posts are included in the cost for guardrail.





LATERAL PLACEMENT ON SLOPES (FROM EDGE OF NEAR TRAFFIC LANE) (1)

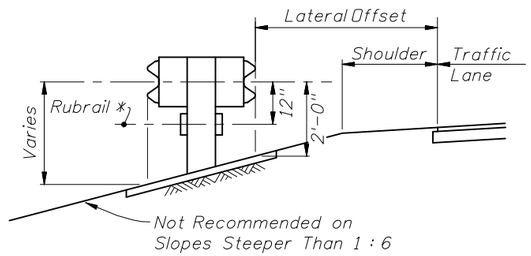
Slope	Standard Guardrail (2)	Guardrail Not Recommended	Guardrail With Rubrail (3)
1:4	to 13'	14' to 27'	28' to 45'
1:5	to 14'	15' to 25'	26' to 45'
1:6	to 16'	17' to 22'	23' to 45'
1:7	to 20'	21' to 24'	25' to 45'
1:8	to 25'		26' to 45'
1:9	to 26'		27' to 45'
1:10	to 27'		28' to 45'

Notes:

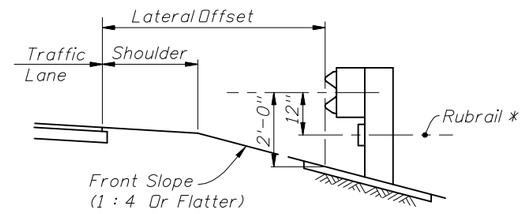
(1) For shoulders less than 12' in width the tabulated values will be reduced by the difference between 12' and the shoulder width. Placement of guardrail on frontslopes steeper than 1:4 not recommended. Cost of rubrail to be included in the contract unit price for guardrail.

(2) Standard guardrail; 1'-9" to ℄ post bolt. Rubrail required on median side when double face guardrail is used.

(3) Guardrail with rubrail; 2'-0" to ℄ post bolt.



GUARDRAIL ON MEDIAN SLOPES



GUARDRAIL ON OUTSIDE SLOPES

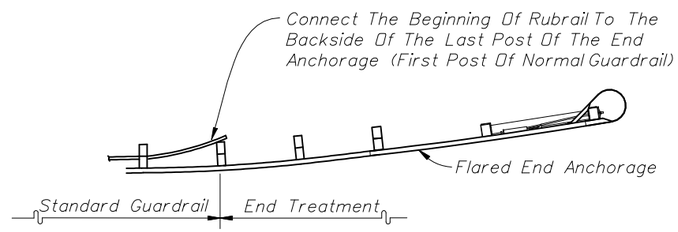
* C6x8.2, Plates And Fastners or Bent Plate And Fastners In Accordance With Standards RLR01 And RER01 Of AASHTO-AGC-ARTBA "A Guide To Standardized Highway Barrier Hardware")

GUARDRAIL ON SLOPES

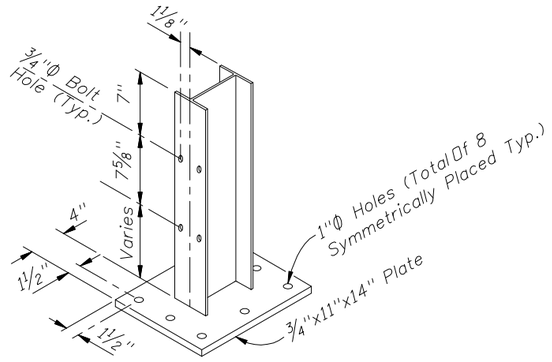
Notes:

1. Typical placement shown. May be constructed at other locations as called for in the plans.
2. Rubrail required on median side or ditch side of barrier.

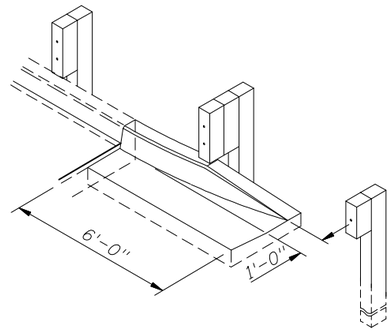
MOUNTING HEIGHT FOR DOUBLE FACED GUARDRAIL ON MEDIAN SHOULDERS (FREEWAYS)



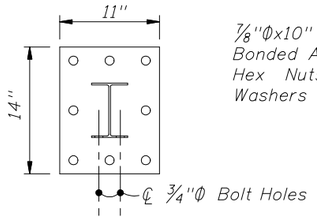
RUBRAIL TERMINATION



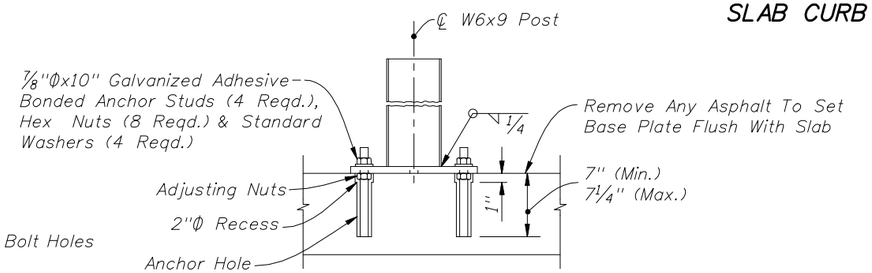
PICTORIAL



CURB TYPE F FLARE WHEN END OF EXISTING APPROACH SLAB CURB EXPOSED

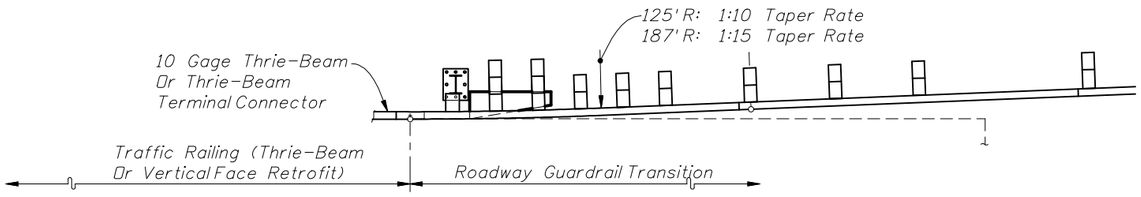


TOP VIEW

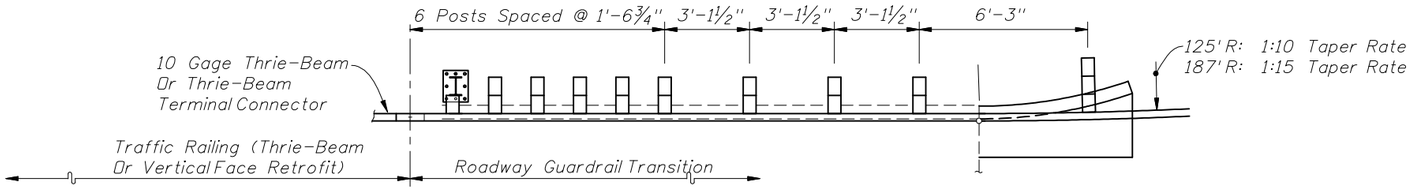


SIDE VIEW

SPECIAL STEEL POST FOR ROADWAY THRIE-BEAM TRANSITIONS TO BRIDGE TRAFFIC RAILING RETROFITS



APPROACH SLAB WITHOUT CURB



APPROACH SLAB WITH CURB

Longitudinal Location Of Transition Blocks And Curb End Flares Will Vary With Scheme Type

PARTIAL PLAN VIEWS

GENERAL NOTES

1. This index provides thrie-beam transition and connection details for approach end guardrail on existing bridges, and anchorage details for trailing end traffic railing retrofits and safety shapes on existing bridges. Sheets 1 through 23 apply to bridges with retrofitted traffic railings, (Sheet 23 shows the trailing end guardrail connections). Sheet 24 applies to bridges with safety shaped traffic railing.

2. The schemes identified by Arabic numerals in this index are complementary to the bridge traffic railing barrier retrofit schemes with like numeral identification in Index Nos. 470, 471 through 476, 480 through 483. The schemes in this index identified by Roman numerals are complementary to bridge safety shaped traffic railing barrier where determined to be in accordance with applications of criteria specified in the Structures Manual.

3. For guardrail applications and details of related hardware and accessories that are not provided on this index, refer to Index No. 400.

NOTES FOR GUARDRAIL TRANSITIONS CONNECTING TO TRAFFIC RAILING RETROFITS ON EXISTING BRIDGES

1. The transition detail shown on this sheet shows (a) the standard post spacings within the typical thrie-beam approach transitions connecting to existing bridges with retrofit traffic railings, and (b) depict the typical alignments of the approach transitions.

2. The curb and gutter flare shown on this sheet is typical of flares that are to be constructed when approach slab curbs extend to the beginning of the slab, and where other treatment to curb blunt ends are not in place.

3. The special steel post for roadway thrie-beam transitions detailed on this sheet is specific to all transition applications on this index that require one or more steel posts.

The special steel post and base plate assembly shall be fabricated using ASTM A36 or ASTM A709 Grade 36 steel. Welding shall conform to ANSI/AASHTO/AWS D1.5. The assembly shall be hot-dip zinc coated in accordance with Section 536 of the Specifications.

Anchor studs shall be fully threaded rods in accordance with ASTM F1554 Grade 36 or ASTM A193 Grade B7. All nuts shall be heavy hex in accordance with ASTM A563 or ASTM A194. Anchor studs and nuts shall be hot-dip zinc coated in accordance with the Specifications. After the nuts have been snug tightened, the anchor stud threads shall be single punch distorted immediately above the top nuts to prevent loosening of the nuts. Distorted threads shall be coated with a galvanizing compound in accordance with the Specifications.

Adhesive bonding material systems for anchors shall comply with Specification Section 937 and be installed in accordance with Specification Section 416.4. Nested beam extensions and points for terminal connector attachments will vary for traffic railing barrier vertical face retrofits. The plan views for the vertical face retrofit barriers show the primary configurations for each particular scheme. The associated pictorial views show the variations.

5. For installing thrie-beam terminal connector to traffic railing vertical face retrofits, see notations on Sheets 12 through 15 and the flag notation on Sheet 23.

6. Payment for connections to traffic railing vertical face retrofits are to be made under the contract unit price for Bridge Anchorage Assembly, EA., and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate and bolts, nuts and washers.

DESIGN NOTES FOR GUARDRAIL TRANSITIONS CONNECTING TO TRAFFIC RAILING RETROFITS ON EXISTING BRIDGES

1. For selection of an appropriate transition scheme, see the Structures Manual for instructions to the Structures and Roadway engineers.

GUARDRAIL TRANSITION ALIGNMENTS FOR BRIDGE THRIE-BEAM AND VERTICAL FACE TRAFFIC RAILING RETROFIT

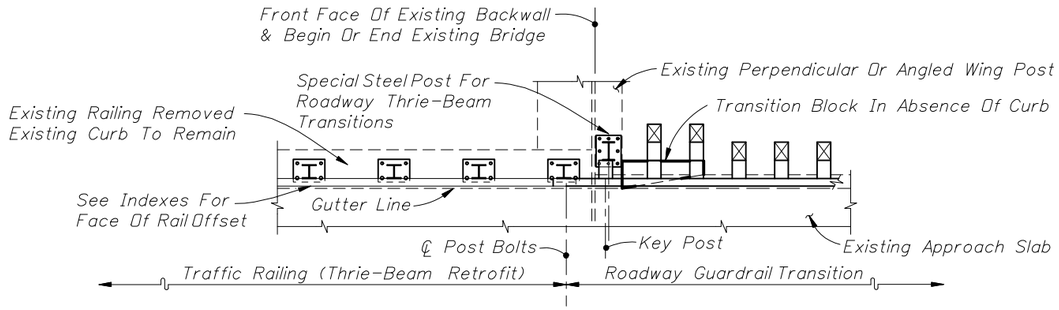
2010 FDOT Design Standards

GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

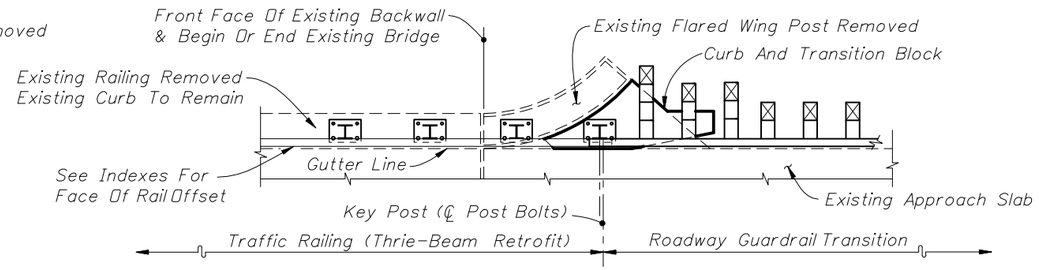
Last Revision 07/01/07

Sheet No. 1 of 24

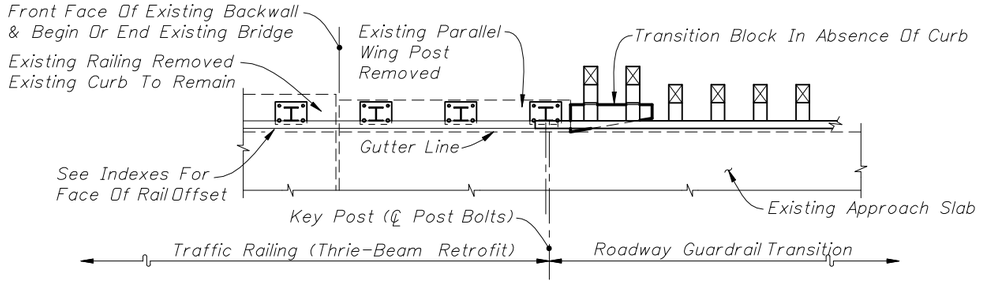
Index No. 402



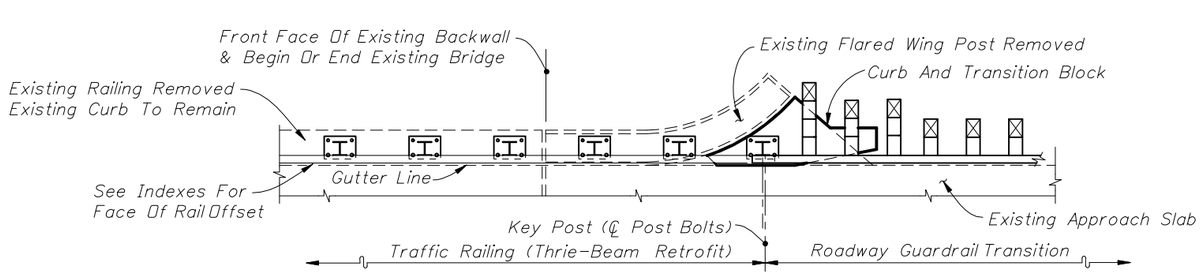
SEE INDEX NO. 471 - SCHEME 1



SEE INDEX NO. 471 - SCHEME 3



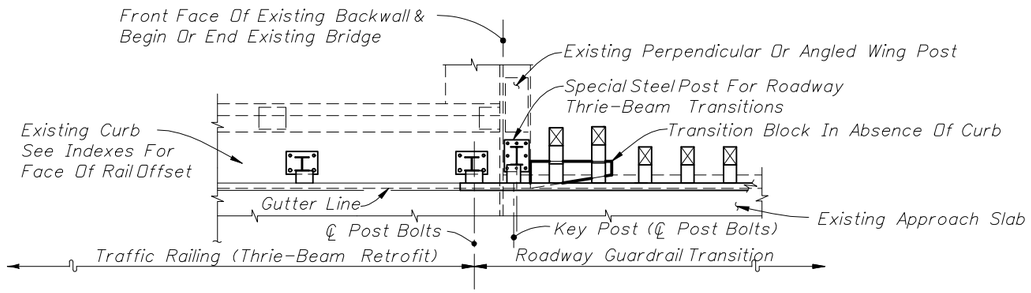
SEE INDEX NO. 471 - SCHEME 2



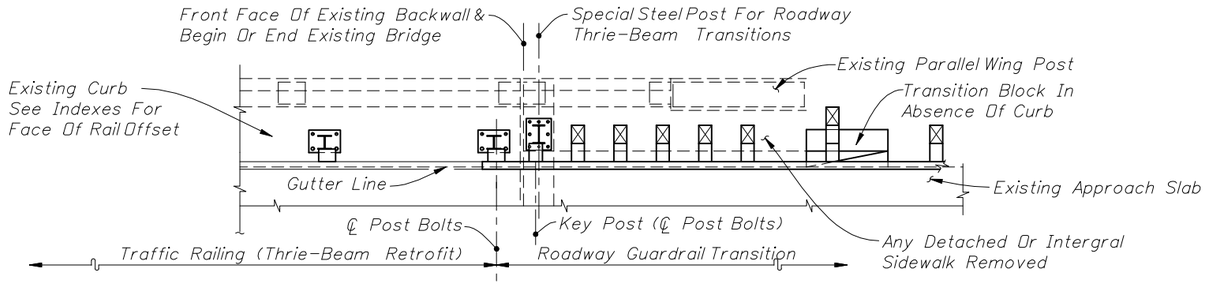
SEE INDEX NO. 471 - SCHEME 3

PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	Last Revision 07/01/07	Sheet No. 2 of 24
		Index No. 402	



SEE INDEX NOS. 472 & 475 - SCHEME 1



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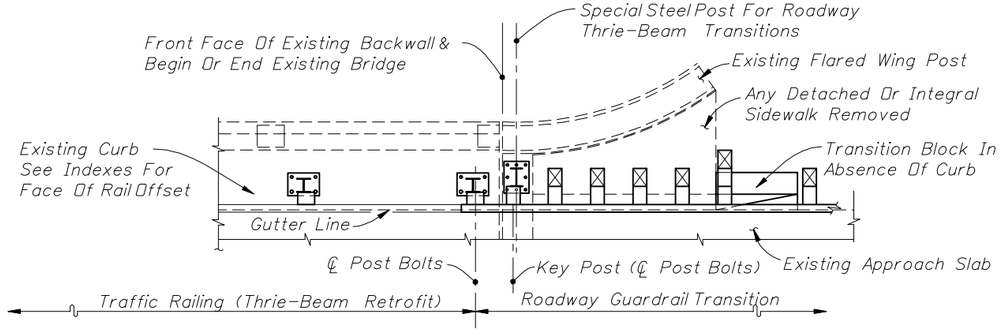
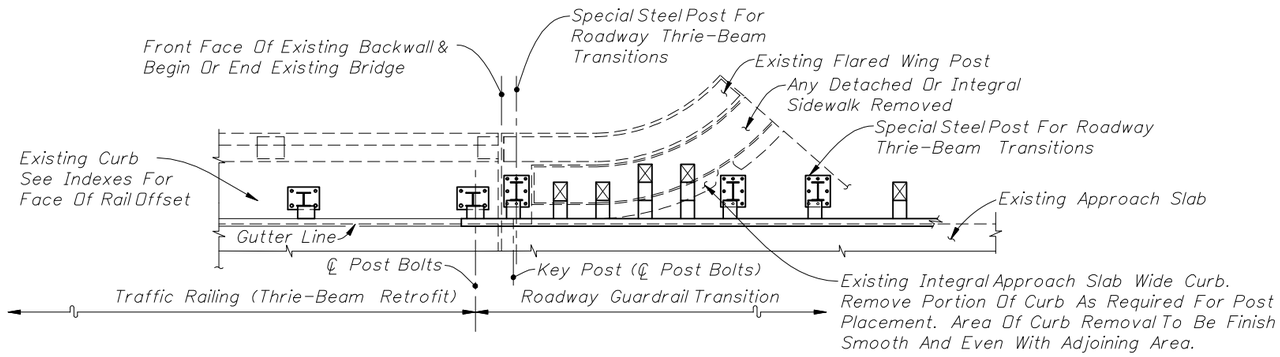
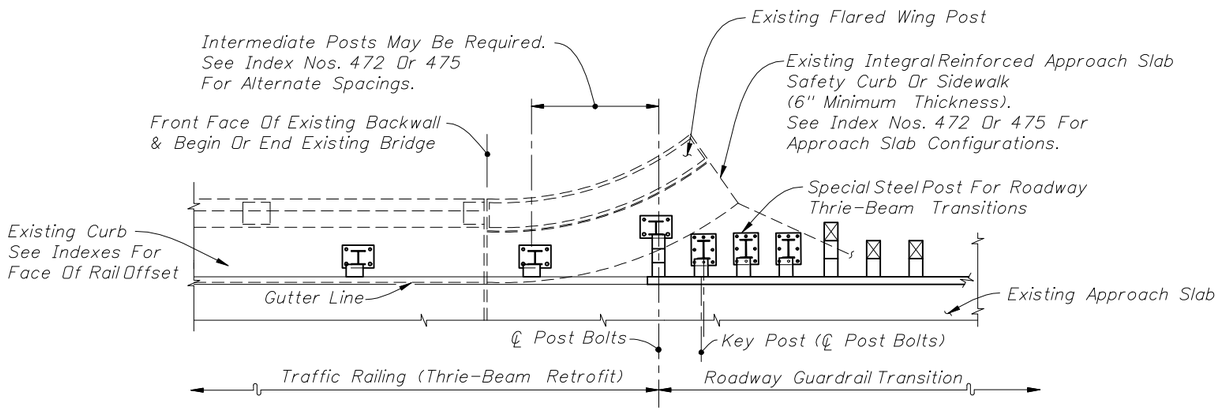


SEE INDEX NOS. 472 & 475 - SCHEME 2

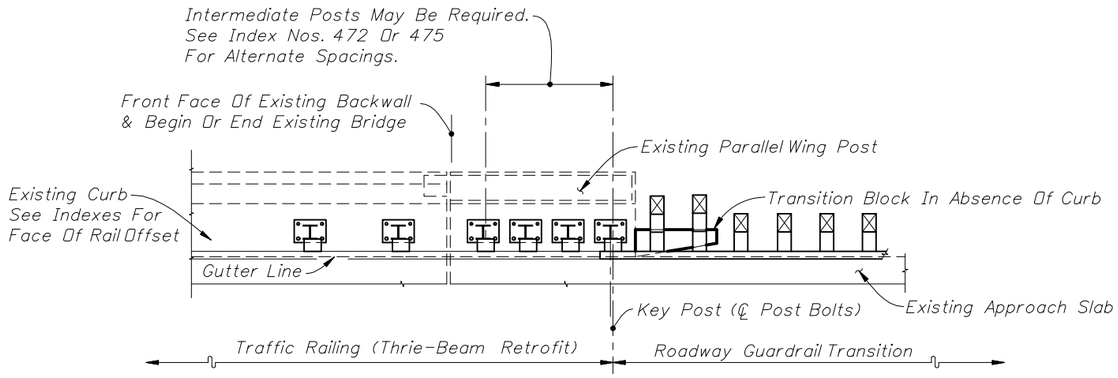


SEE INDEX NOS. 472 & 475 - SCHEME 2

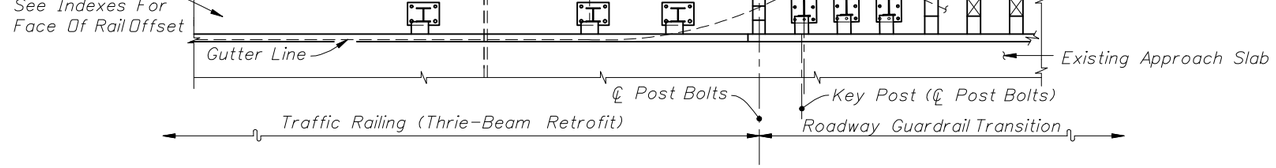
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



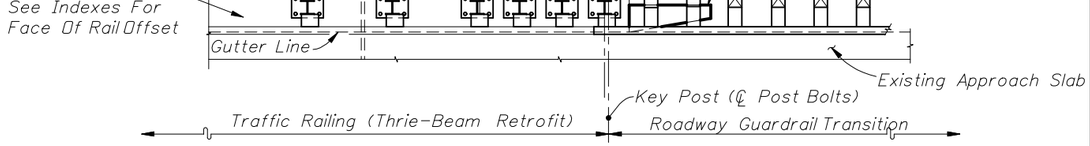
SEE INDEX NOS. 472 & 475 - SCHEMES 3 & 4



SEE INDEX NOS. 472 & 475 - SCHEMES 5 & 6

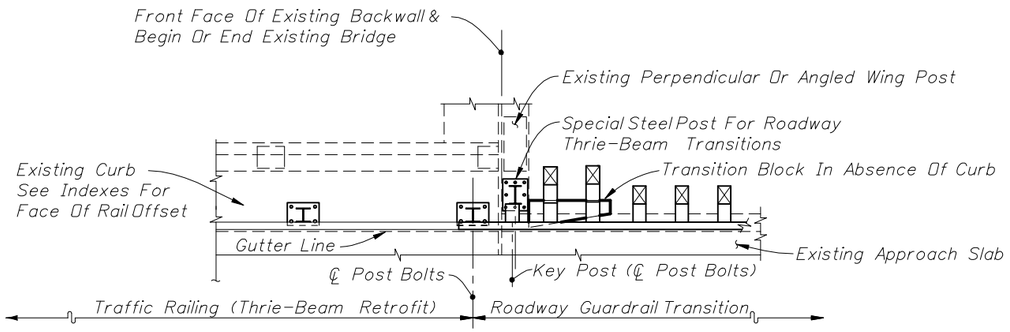


SEE INDEX NOS. 472 & 475 - SCHEMES 3 & 4



SEE INDEX NOS. 472 & 475 - SCHEMES 5 & 6

PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



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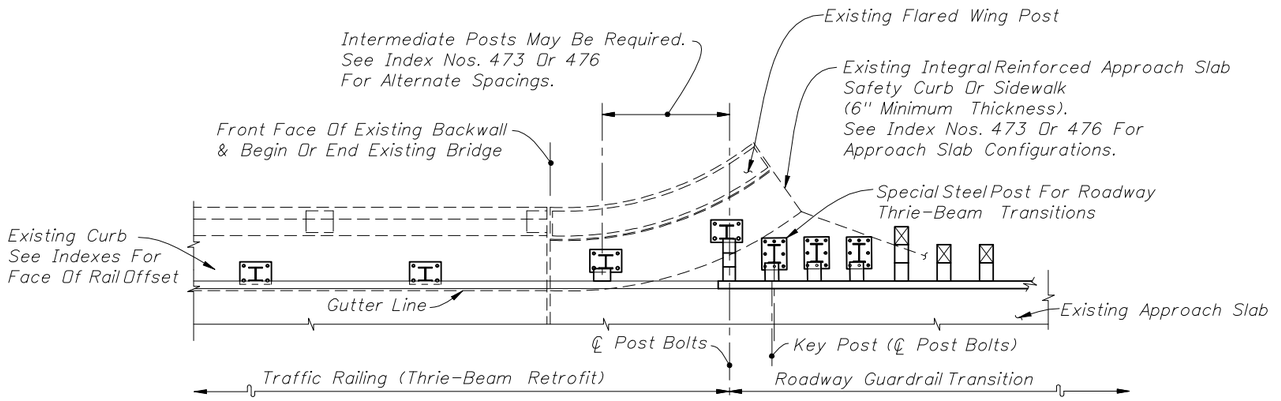
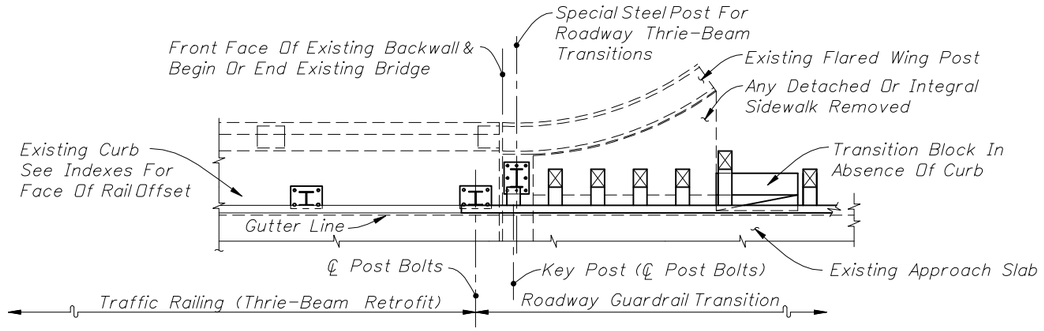
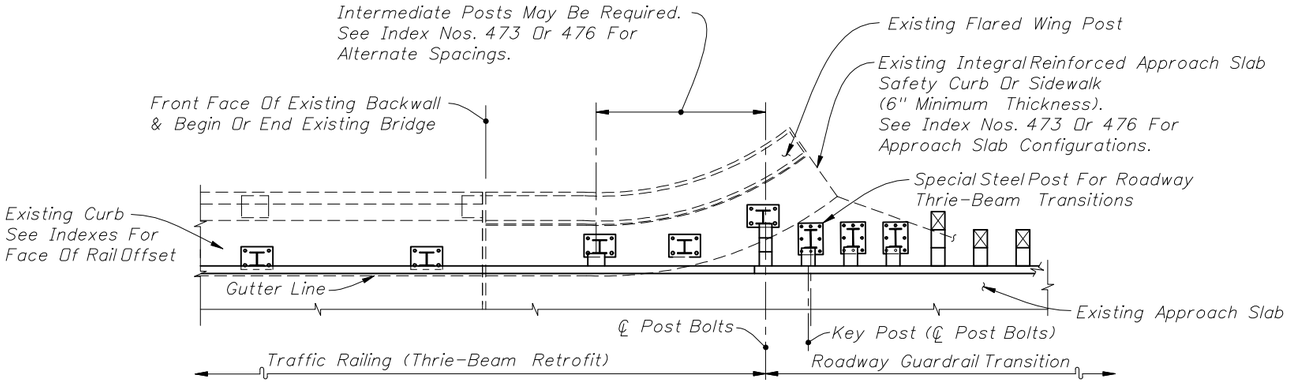


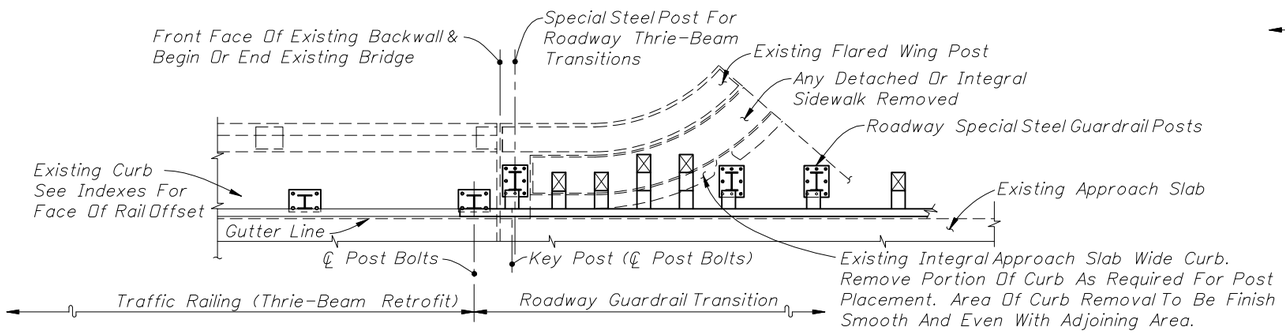
SEE INDEX NOS. 473 & 476 - SCHEMES 3 & 4



SEE INDEX NOS. 473 & 476 - SCHEME 2



SEE INDEX NOS. 473 & 476 - SCHEMES 3 & 4



SEE INDEX NOS. 473 & 476 - SCHEME 2

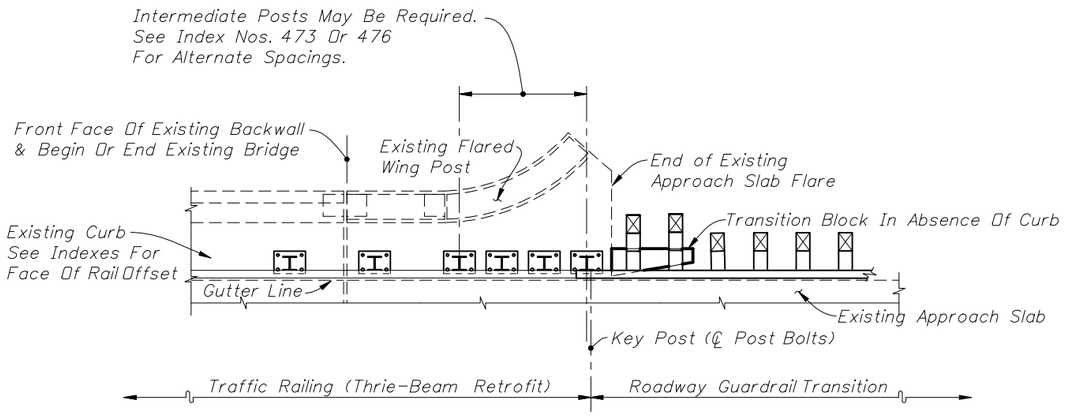
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

2010 FDOT Design Standards

GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

Last Revision	Sheet No.
07/01/07	5 of 24

Index No. 402



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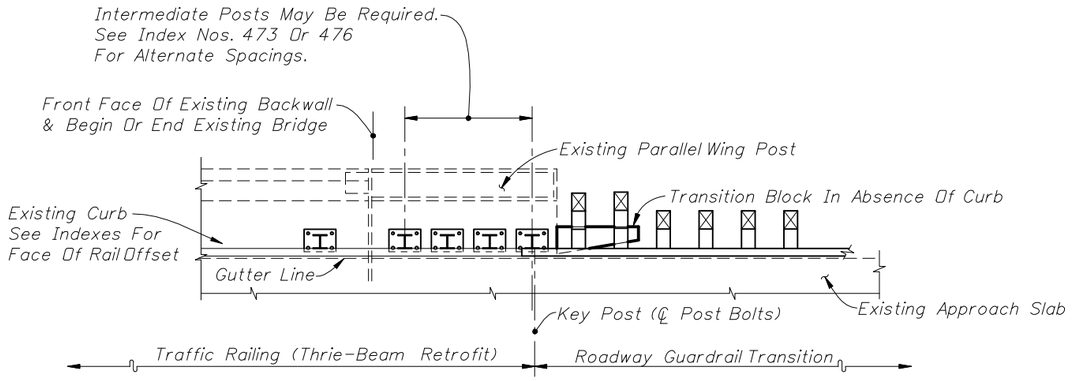
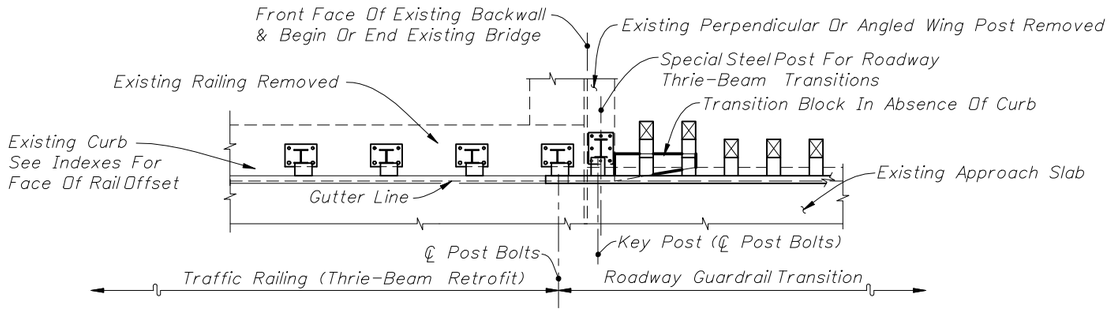
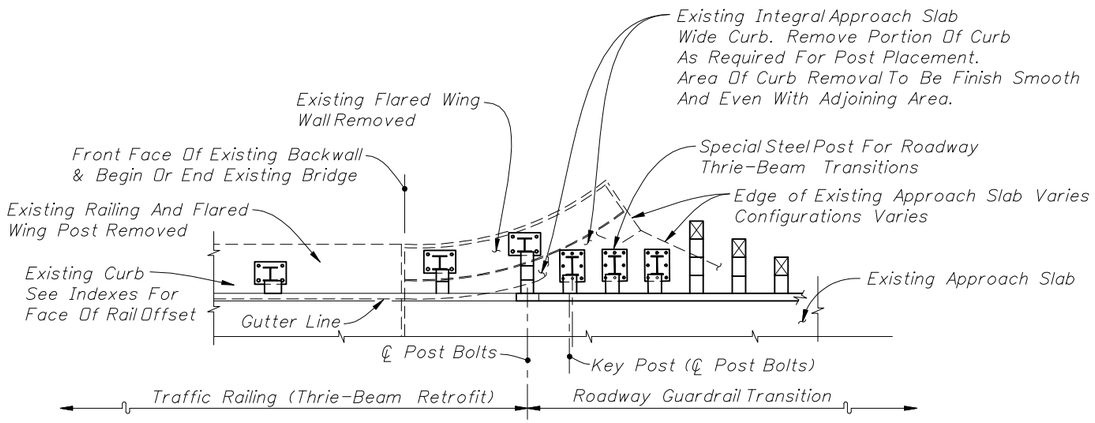


SEE INDEX NOS. 473 & 476 - SCHEMES 5 & 6

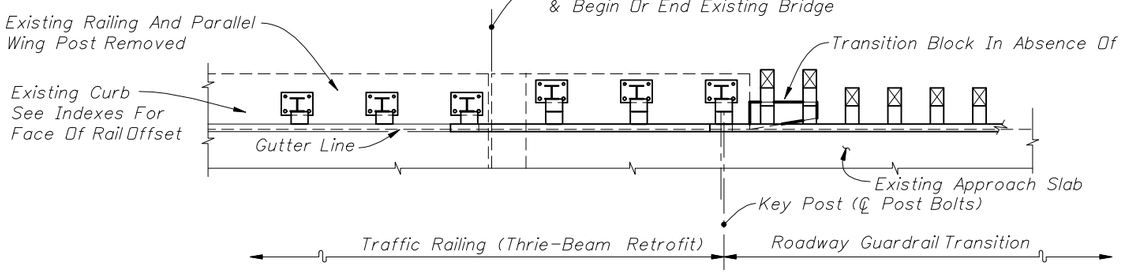
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



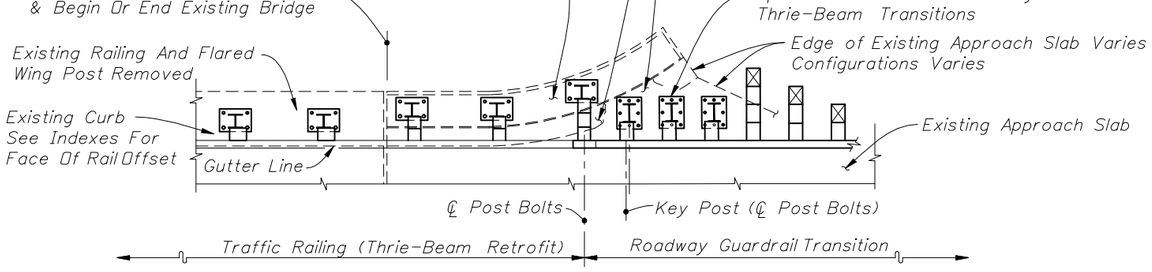
SEE INDEX NO. 474 - SCHEME 1



SEE INDEX NO. 474 - SCHEME 3

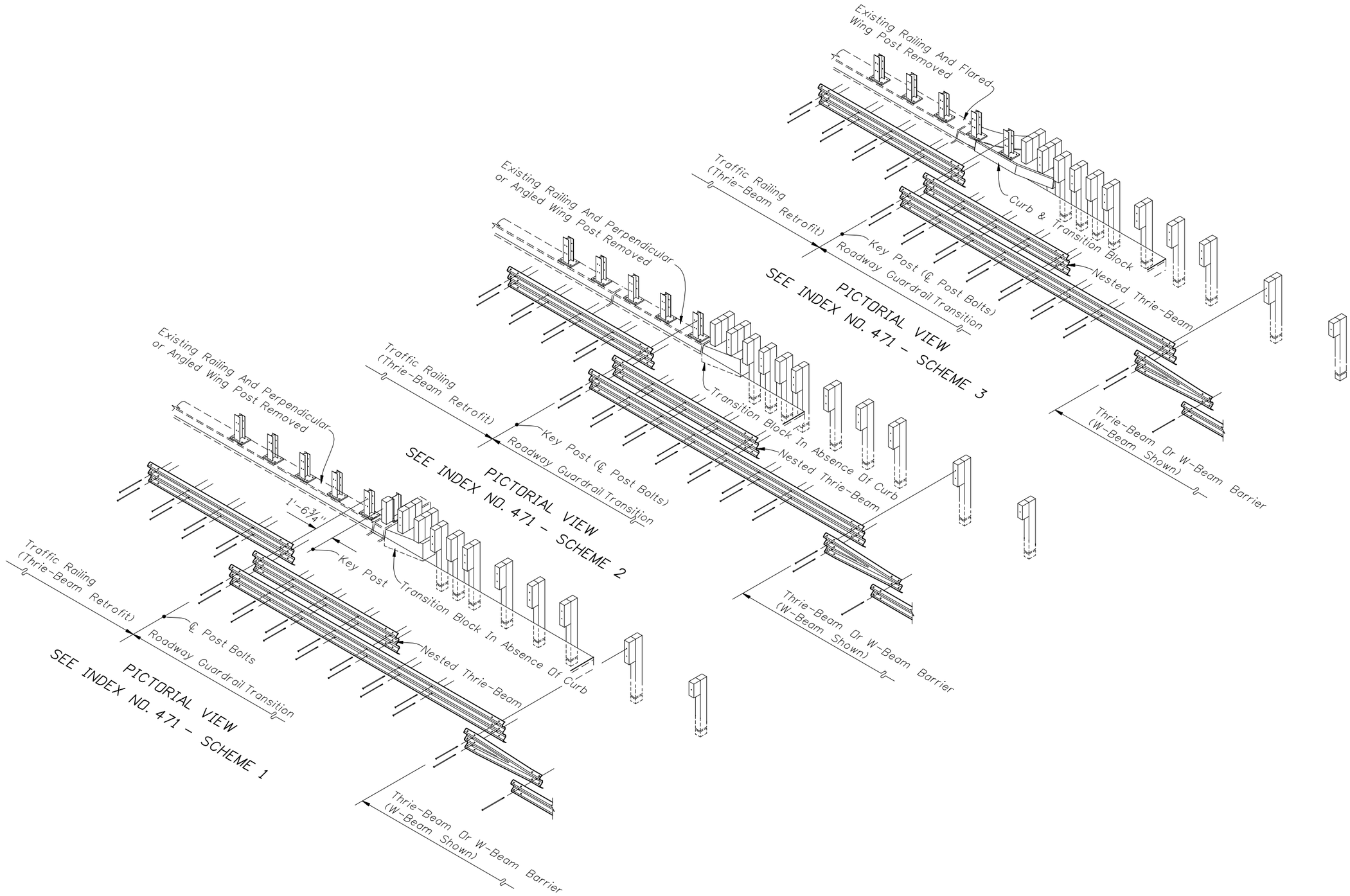


SEE INDEX NO. 474 - SCHEME 2

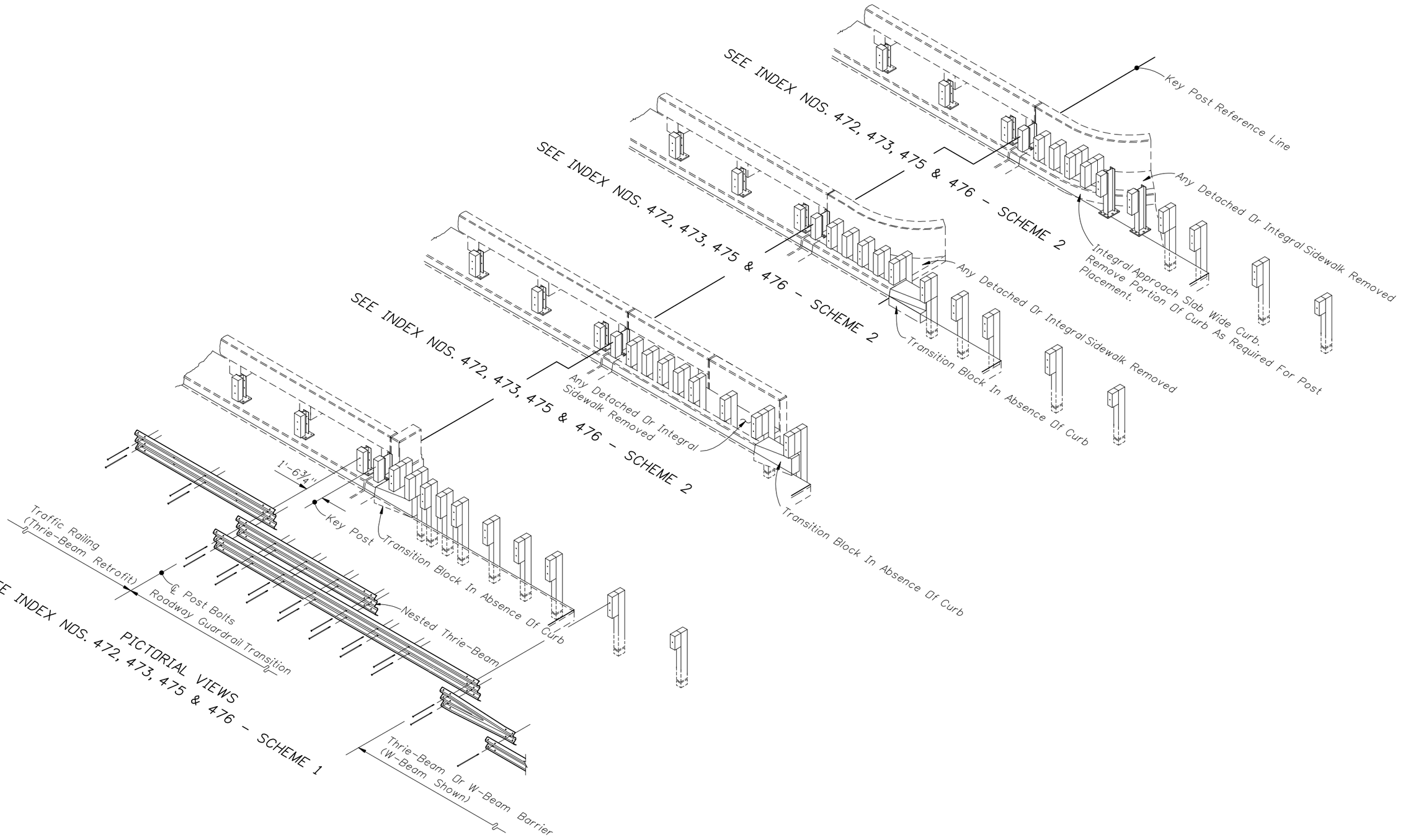


SEE INDEX NO. 474 - SCHEME 3

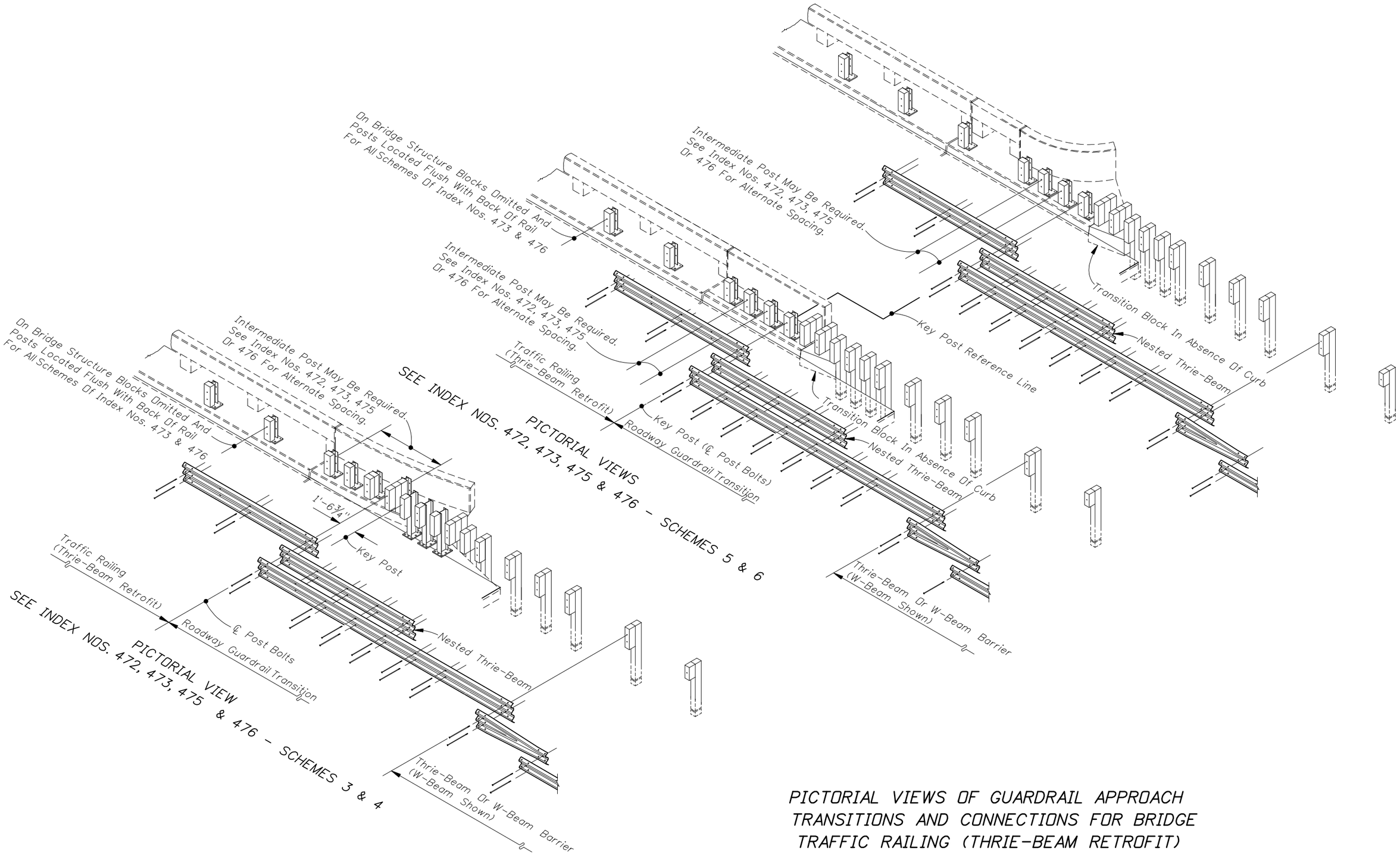
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



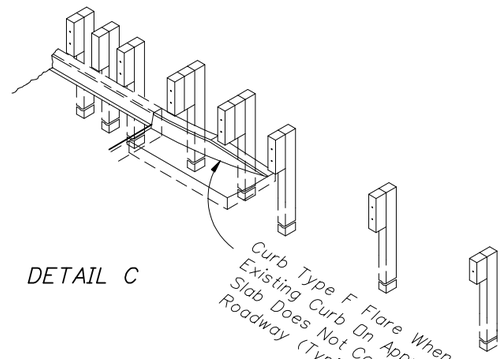
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



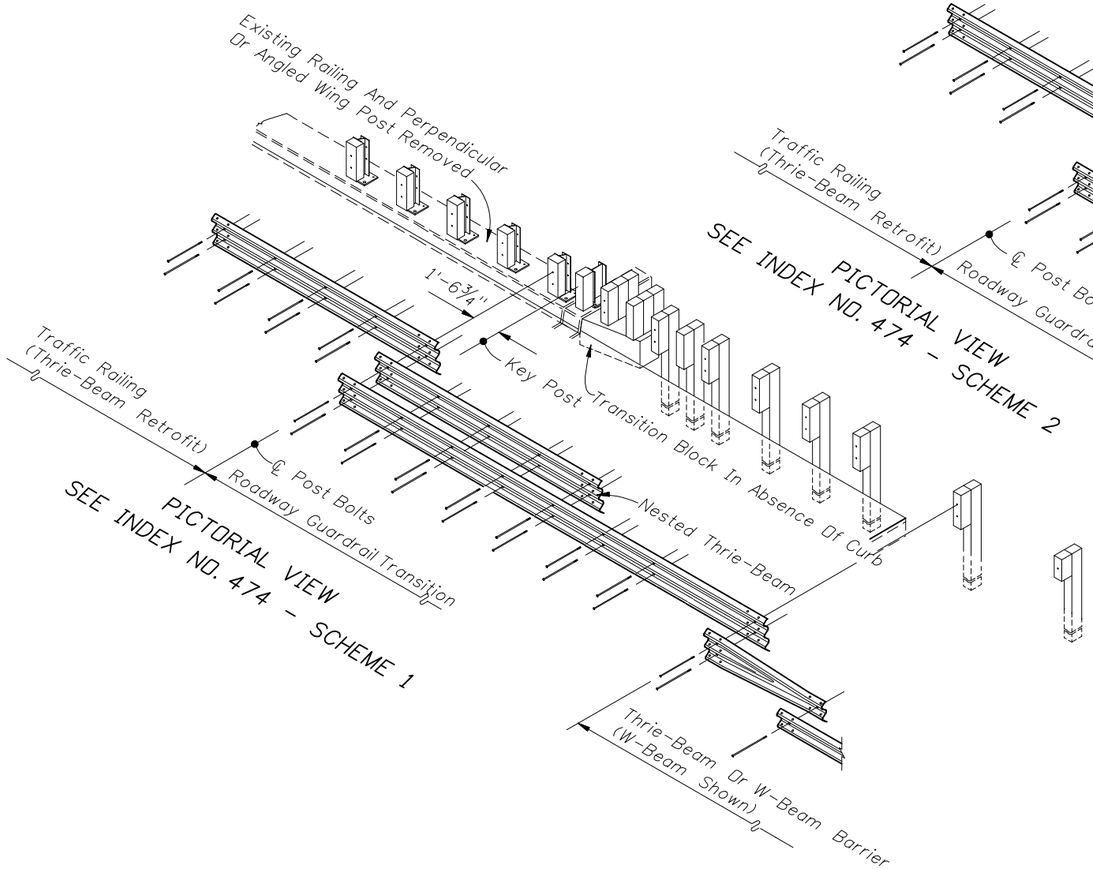
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



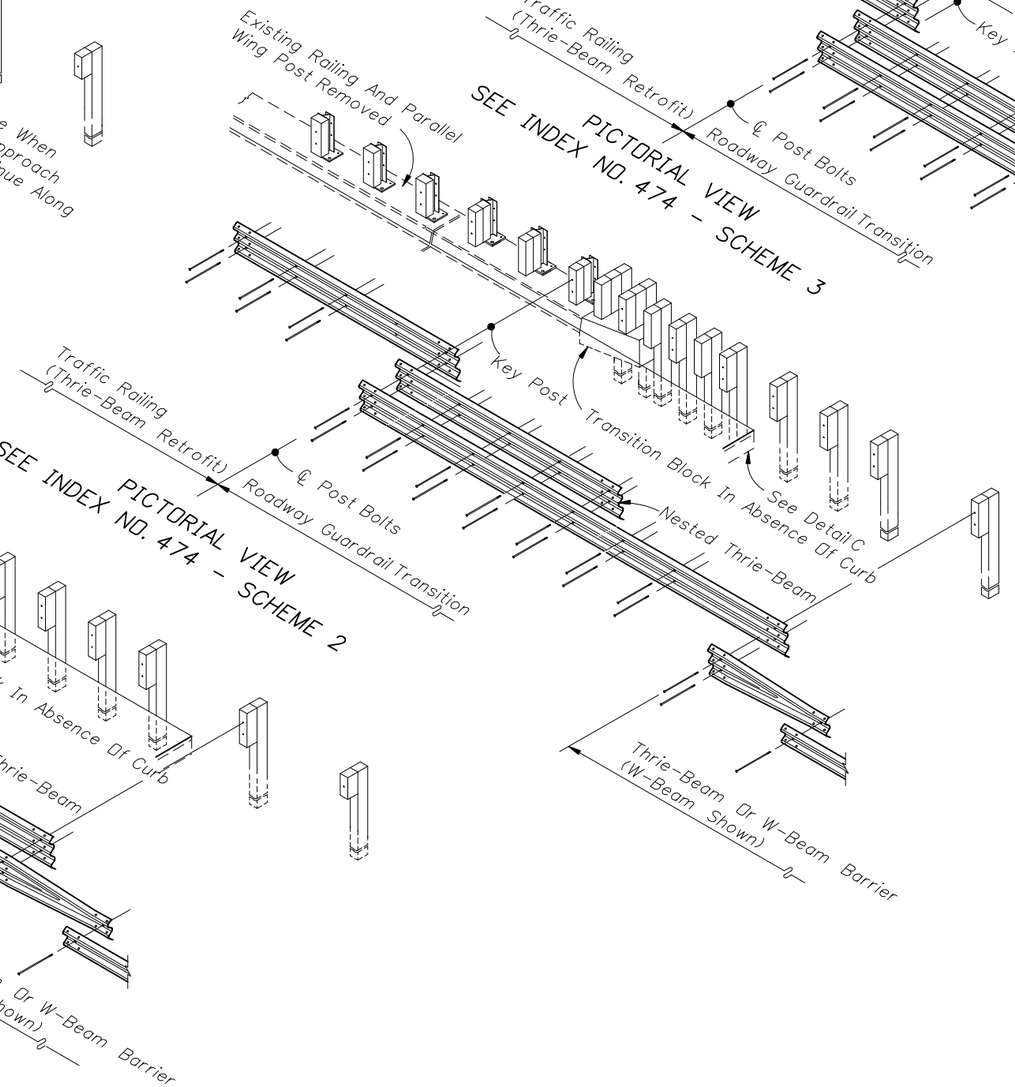
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



DETAIL C



PICTORIAL VIEW
SEE INDEX NO. 474 - SCHEME 1

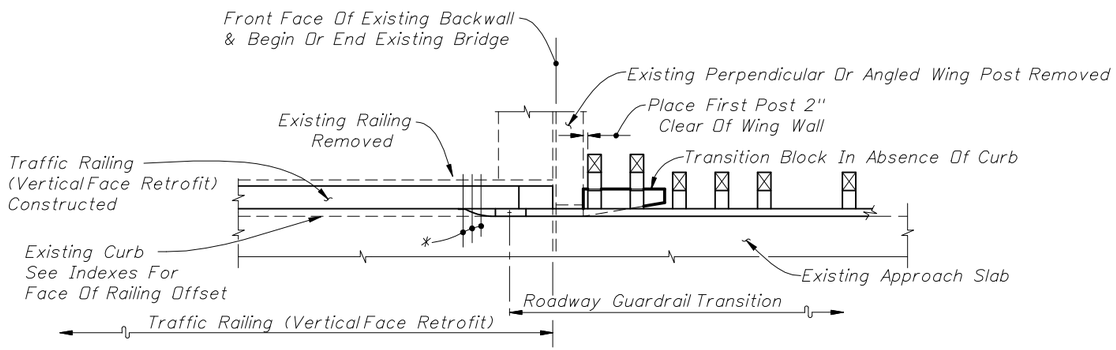


PICTORIAL VIEW
SEE INDEX NO. 474 - SCHEME 2

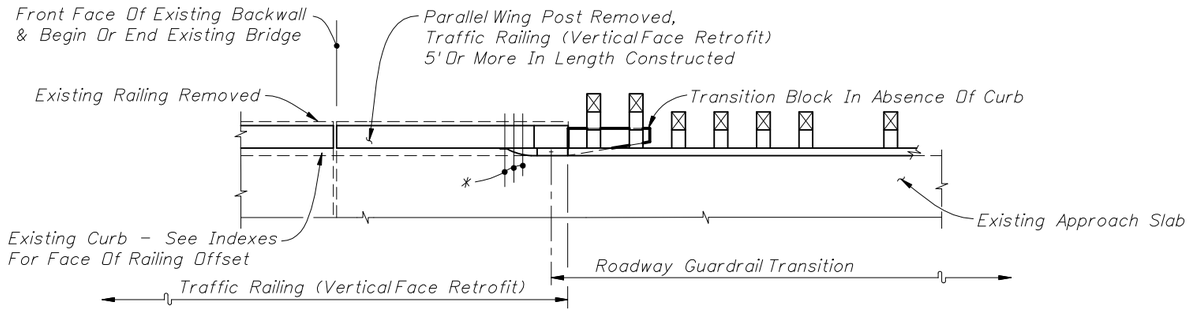
PICTORIAL VIEW
SEE INDEX NO. 474 - SCHEME 3

PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

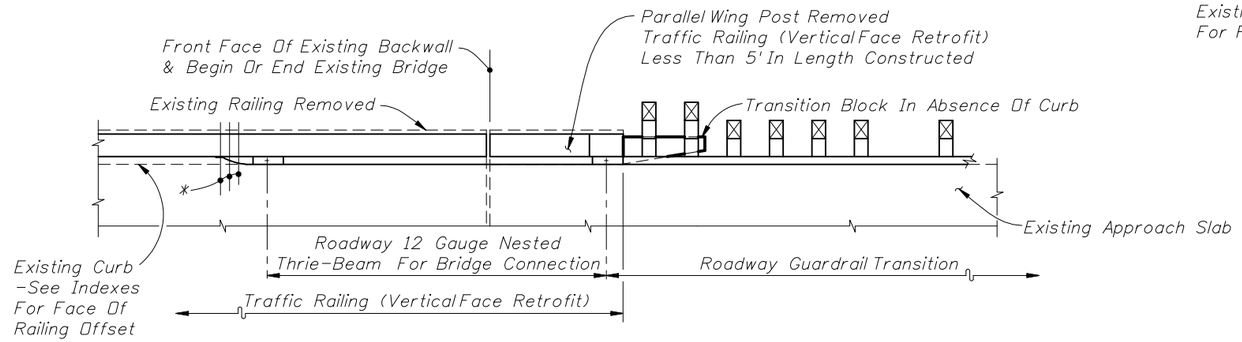
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/07	Sheet No. 11 of 24
	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	Index No. 402	



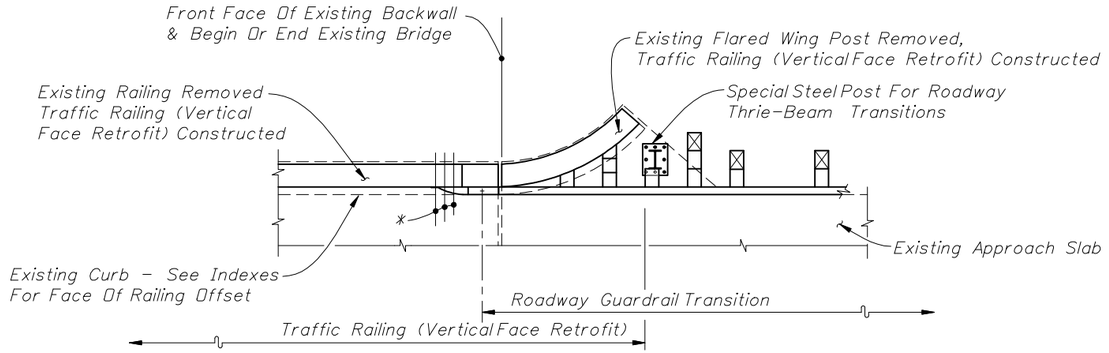
SEE INDEX NO. 481 - SCHEME 1



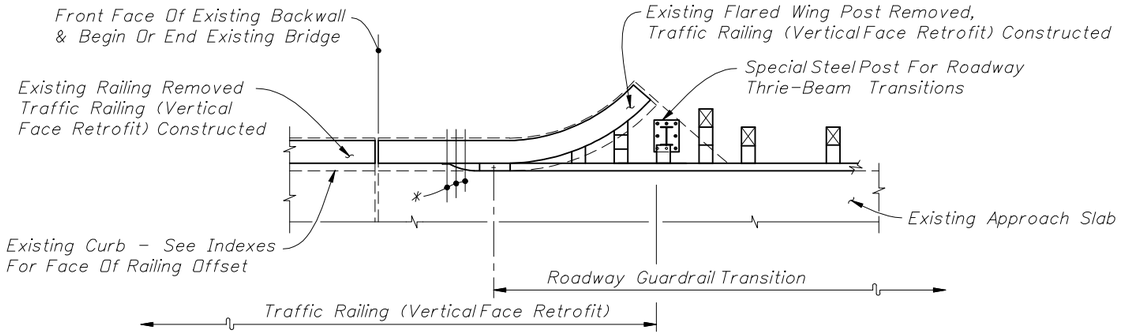
SEE INDEX NO. 481 - SCHEME 2



SEE INDEX NO. 481 - SCHEME 2



SEE INDEX NO. 481 - SCHEME 3

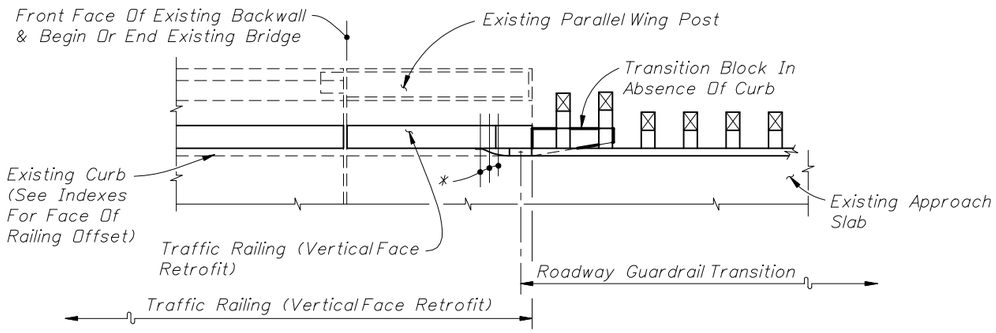


SEE INDEX NO. 481 - SCHEME 3

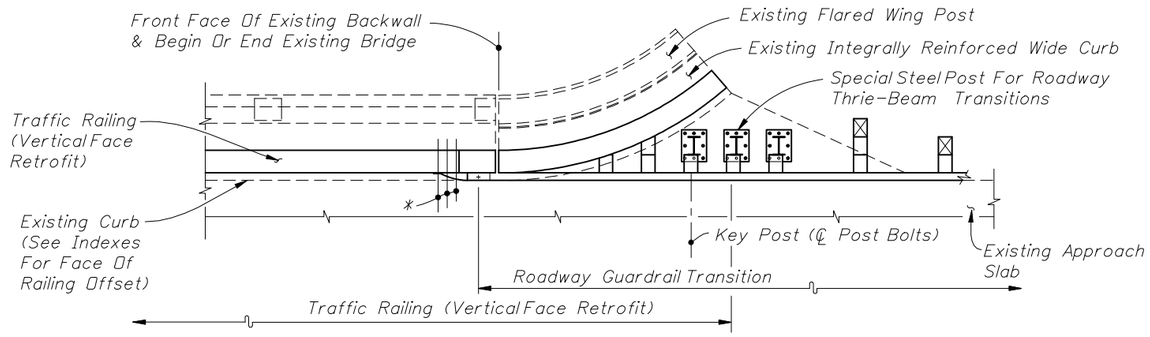
Note:

*21"x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8" Ø x 12" Long HS Hex Bolts And Nuts (5 Reqd.) With 2¼" OD Plain Round Washers Under Heads And Nuts

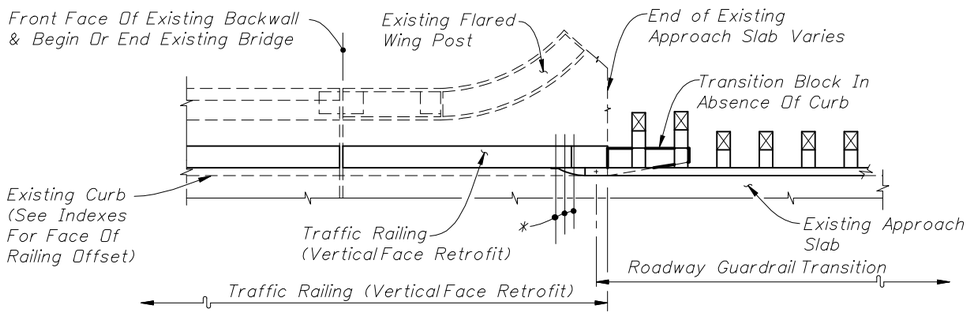
PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)



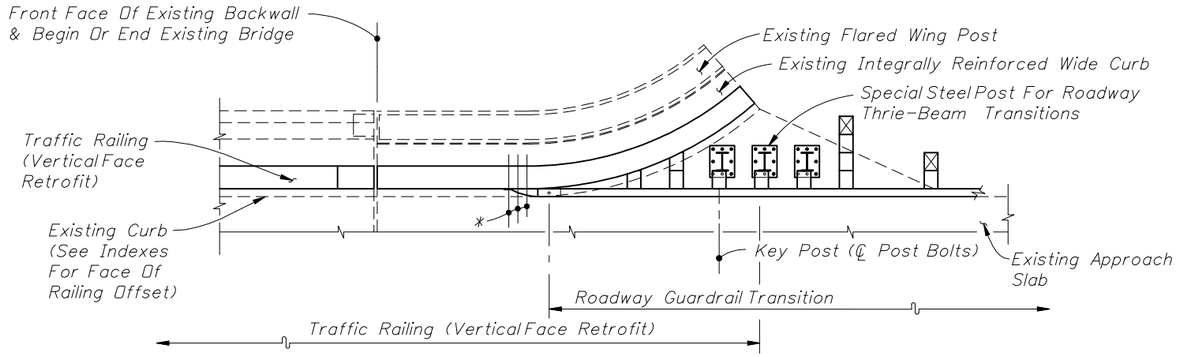
SEE INDEX NO. 482 - SCHEME 2



SEE INDEX NO. 482- SCHEME 3



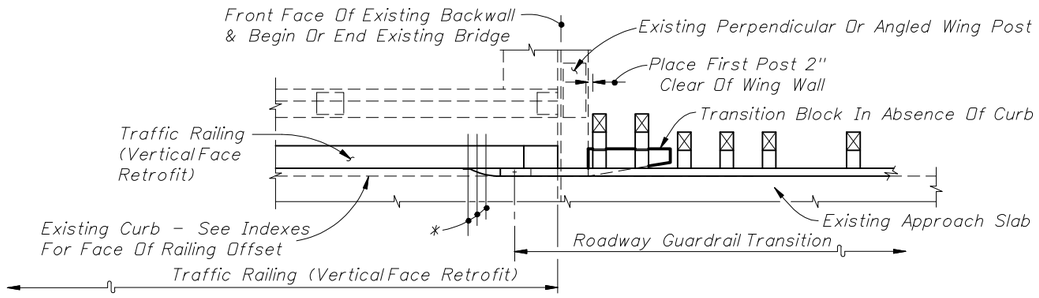
SEE INDEX NO. 482 - SCHEME 2



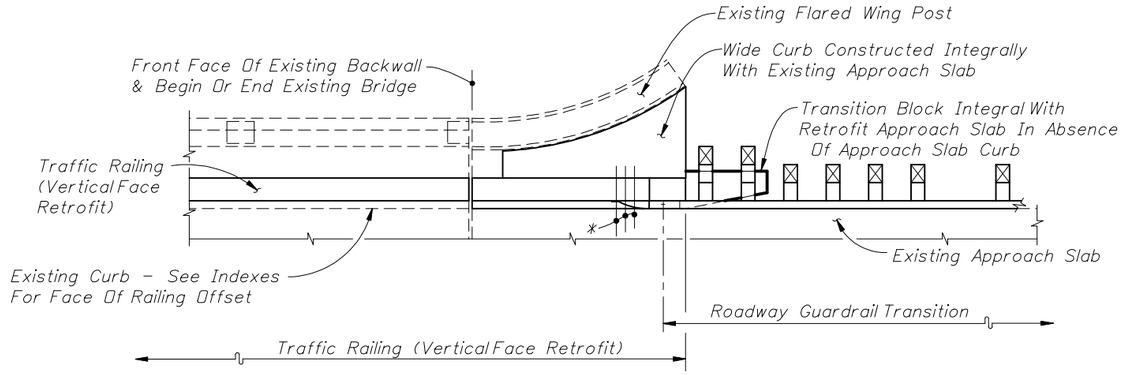
SEE INDEX NO. 482- SCHEME 3

Note:
*21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8" ℗ x 12" Long
HS Hex Bolts And Nuts (5 Reqd.) With 2¼" OD Plain Round Washers Under Heads And Nuts

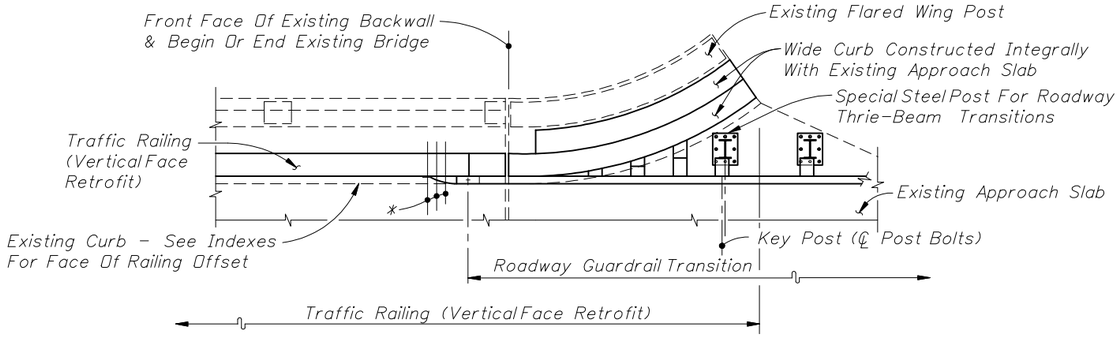
PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)



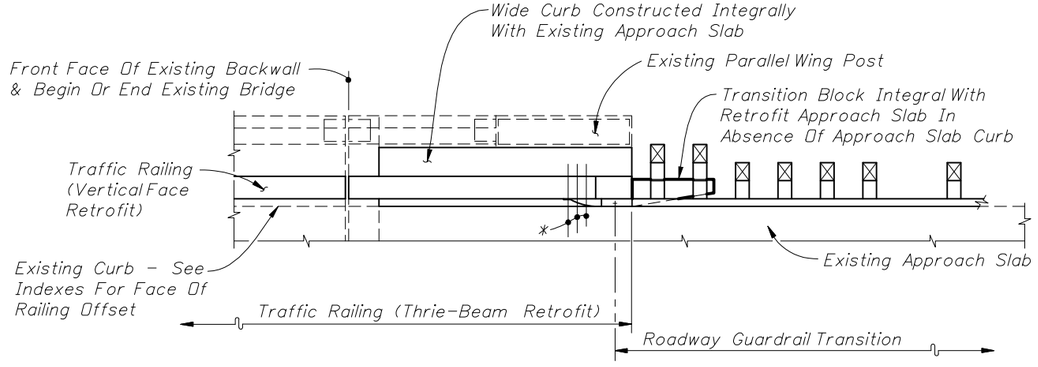
SEE INDEX NO. 482 - SCHEME 1



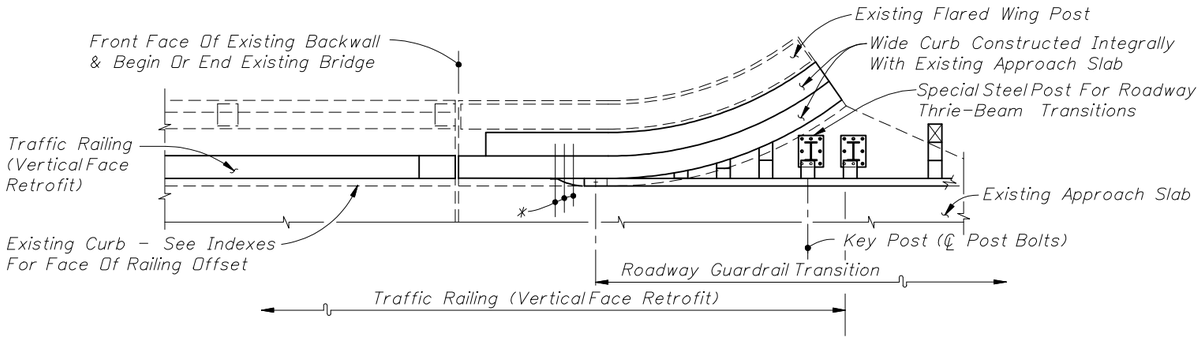
SEE INDEX NO. 482 - SCHEME 5



SEE INDEX NO. 482 - SCHEME 4



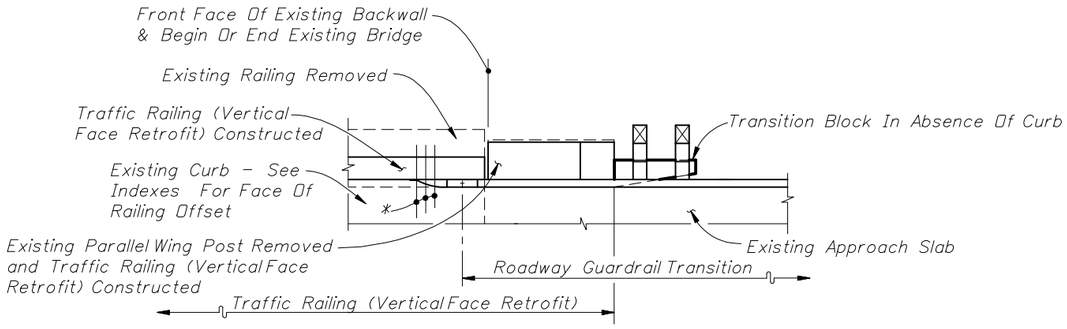
SEE INDEX NO. 482 - SCHEME 5



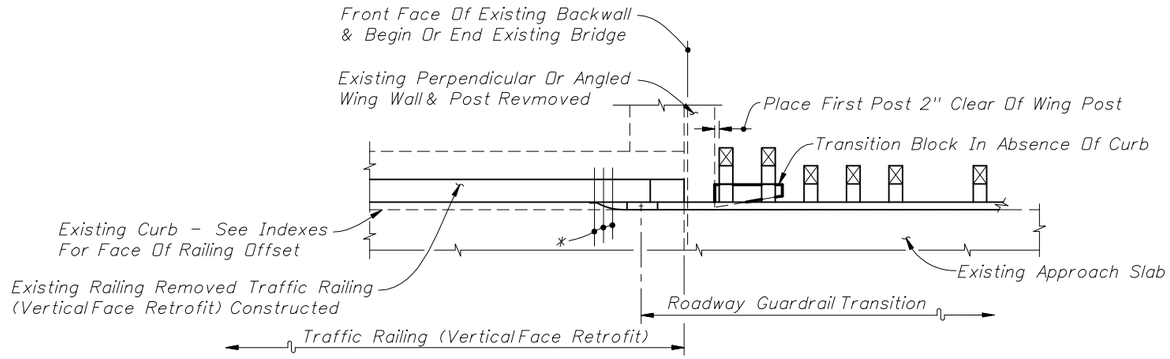
SEE INDEX NO. 482 - SCHEME 4

Note:
*21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8" Ø x 12" Long HS Hex Bolts And Nuts (5 Reqd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

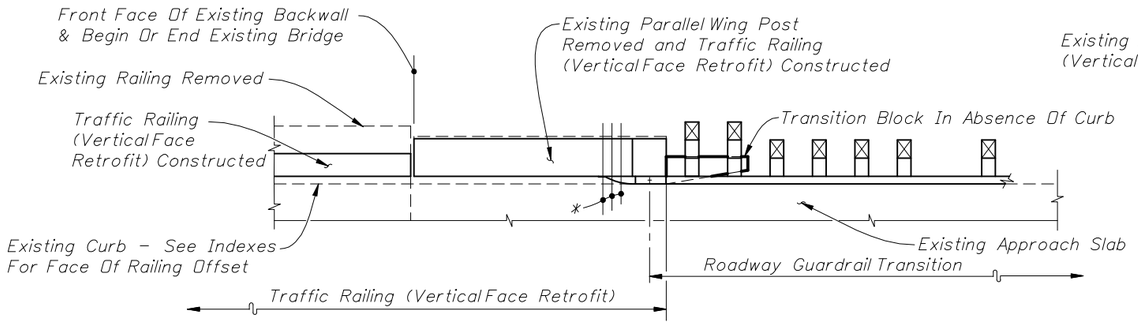
PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)



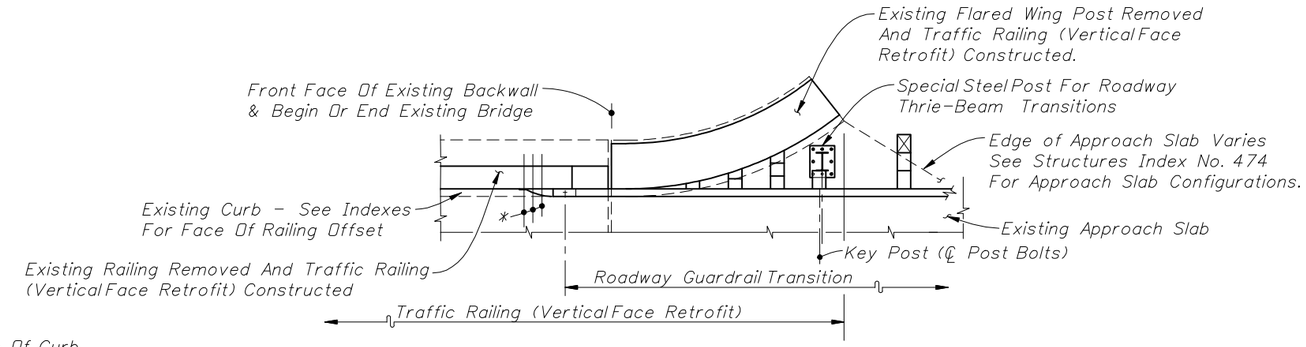
SEE INDEX NO. 483 - SCHEME 2



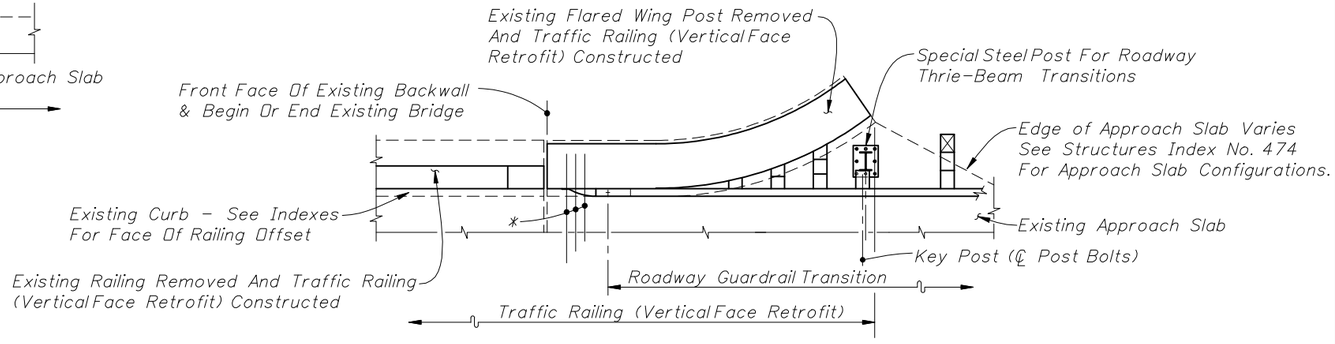
SEE INDEX NO. 483 - SCHEME 1



SEE INDEX NO. 483 - SCHEME 2



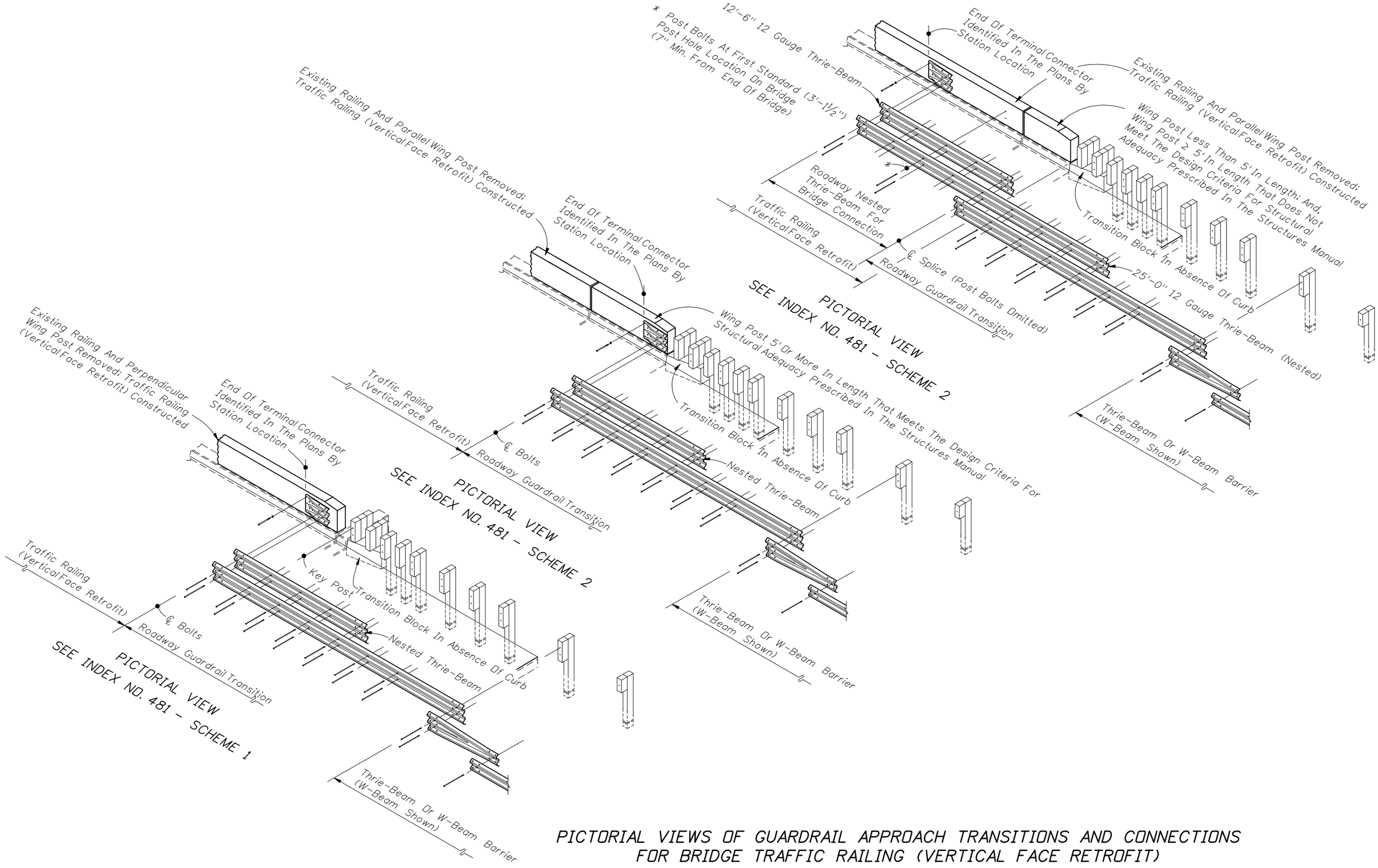
SEE INDEX NO. 483 - SCHEME 3



SEE INDEX NO. 483 - SCHEME 3

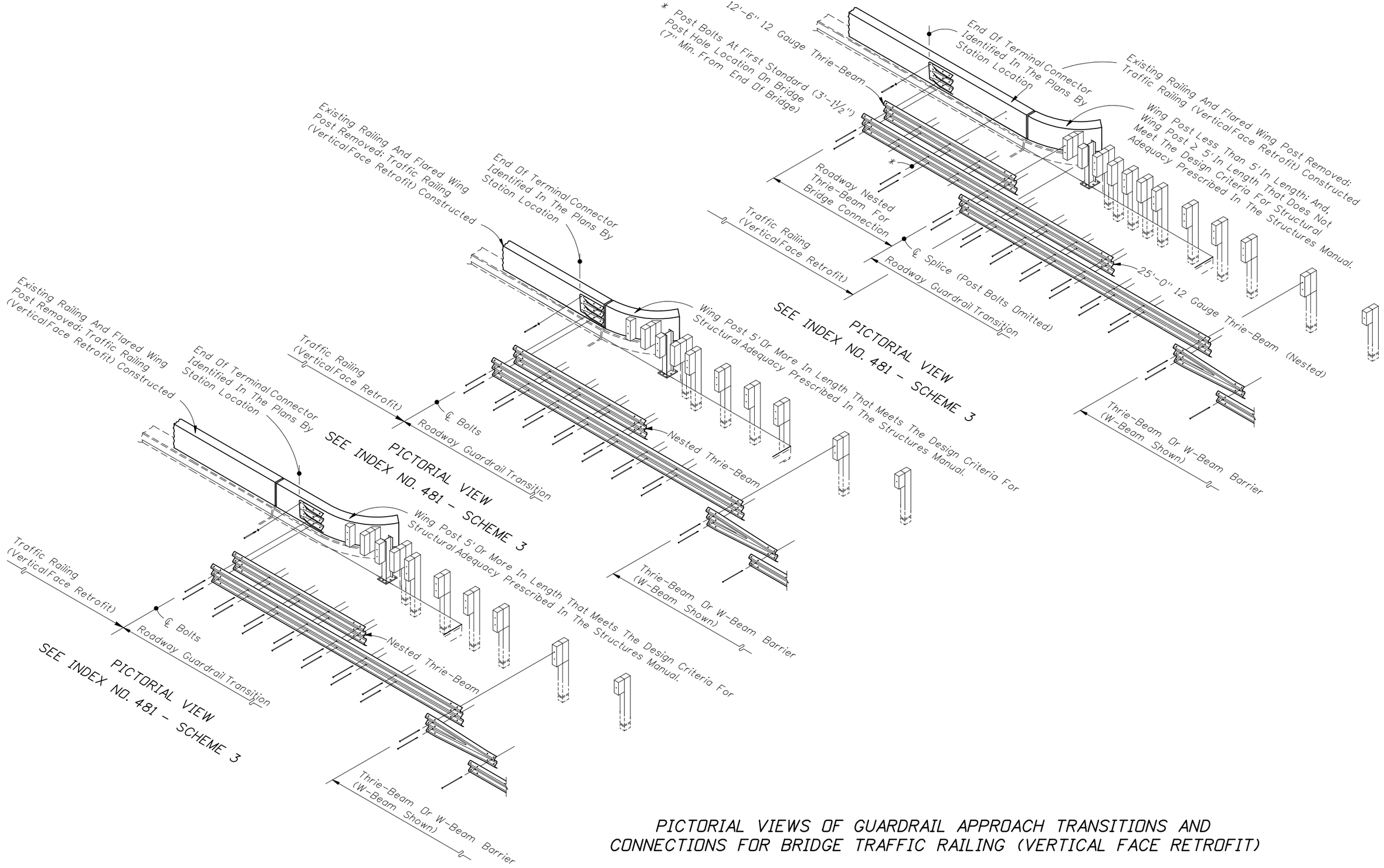
Note:
*21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8" Ø HS Hex Bolts And Nuts (12" Long For Scheme 1 And Length To Fit For Schemes 2 And 3) (5 Reqd.) With 2¼" OD Plain Round Washers Under Heads And Nuts

PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)

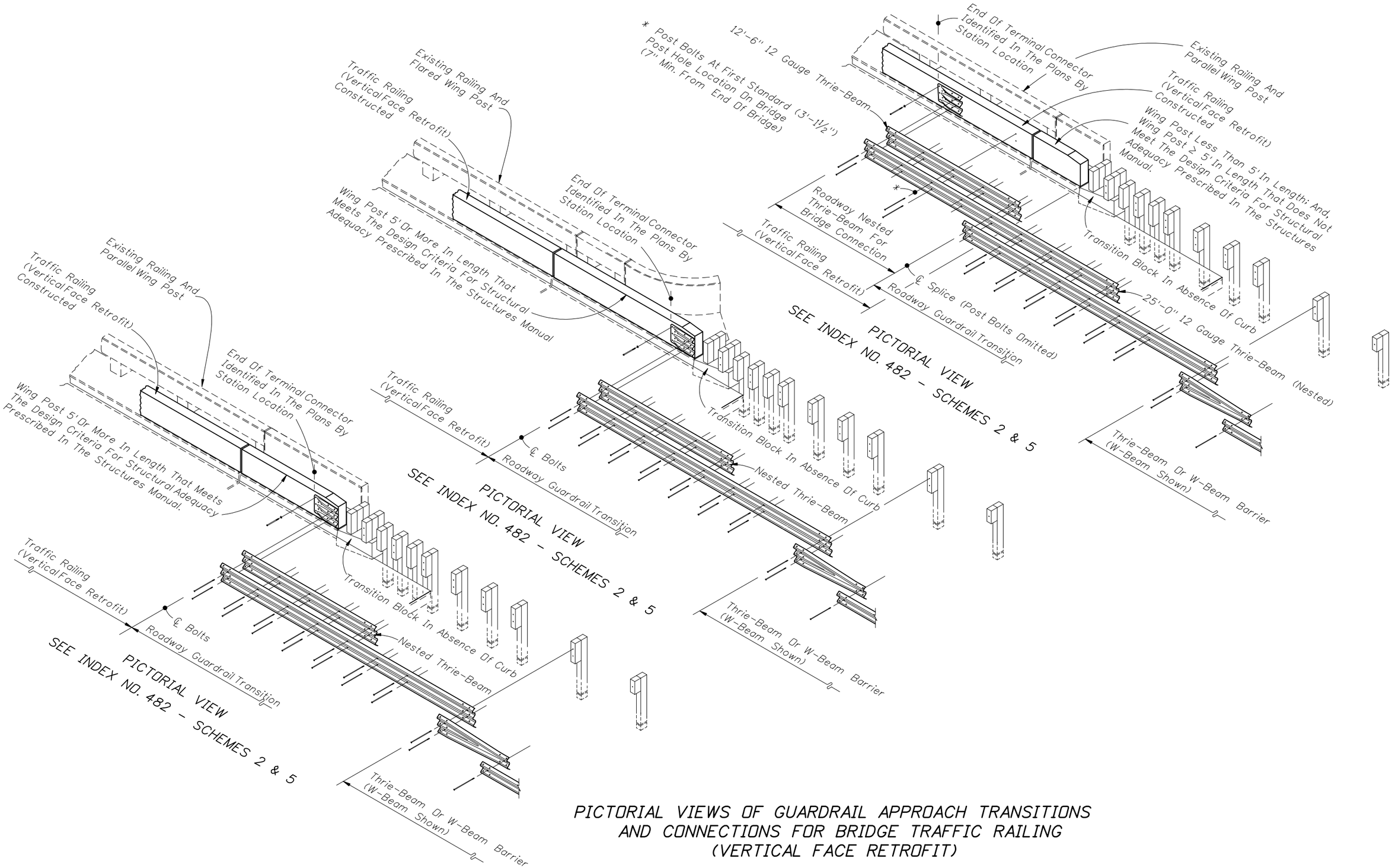


PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

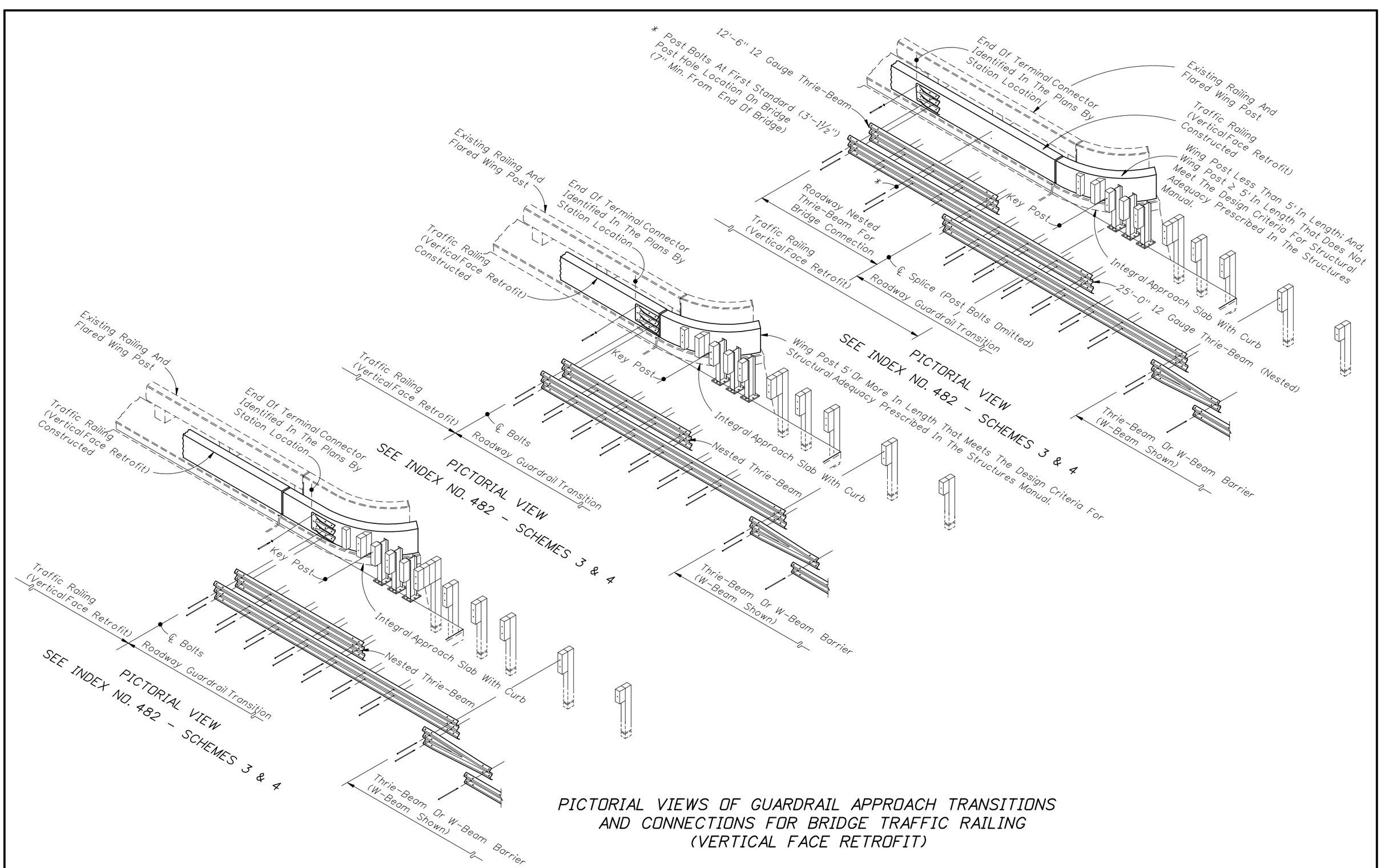
	2010 FDOT Design Standards	Last Revision 07/01/07	Sheet No. 16 of 24
	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	Index No. 402	



PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

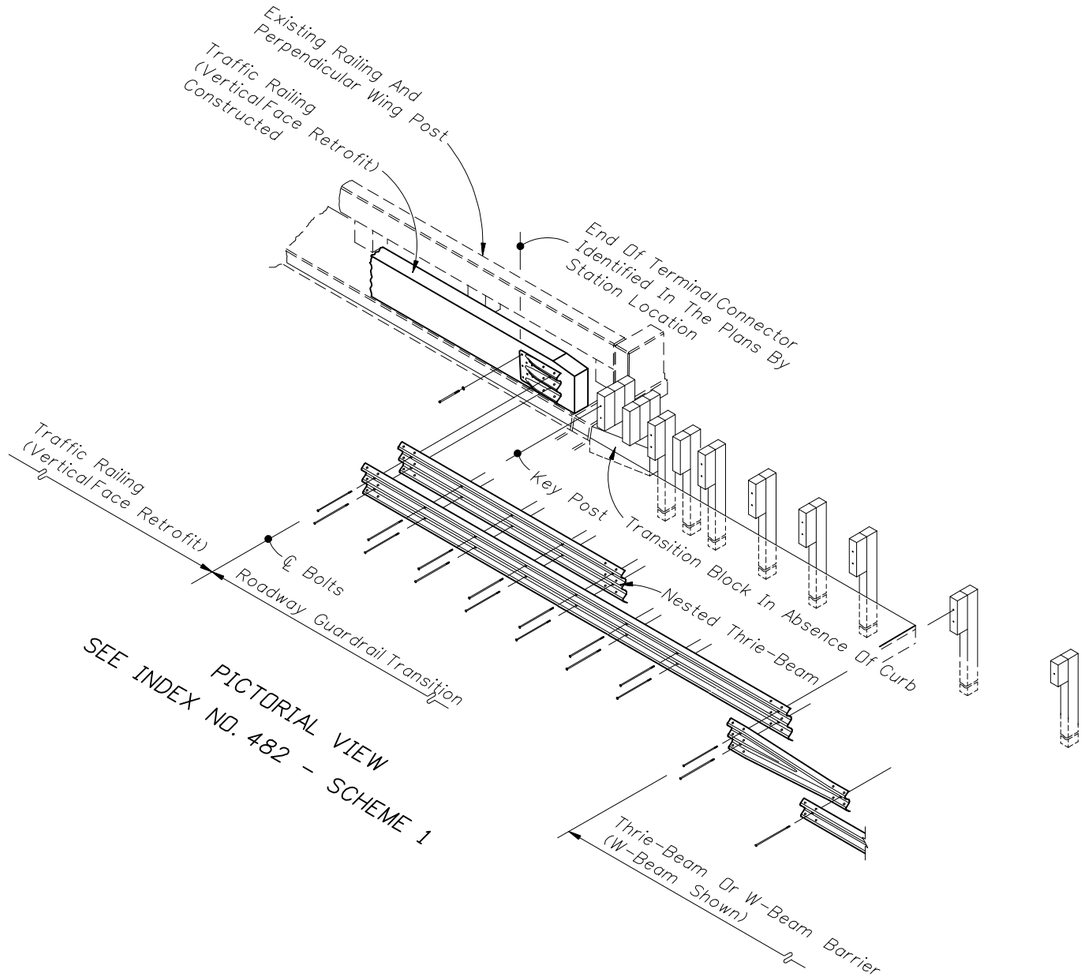


PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)



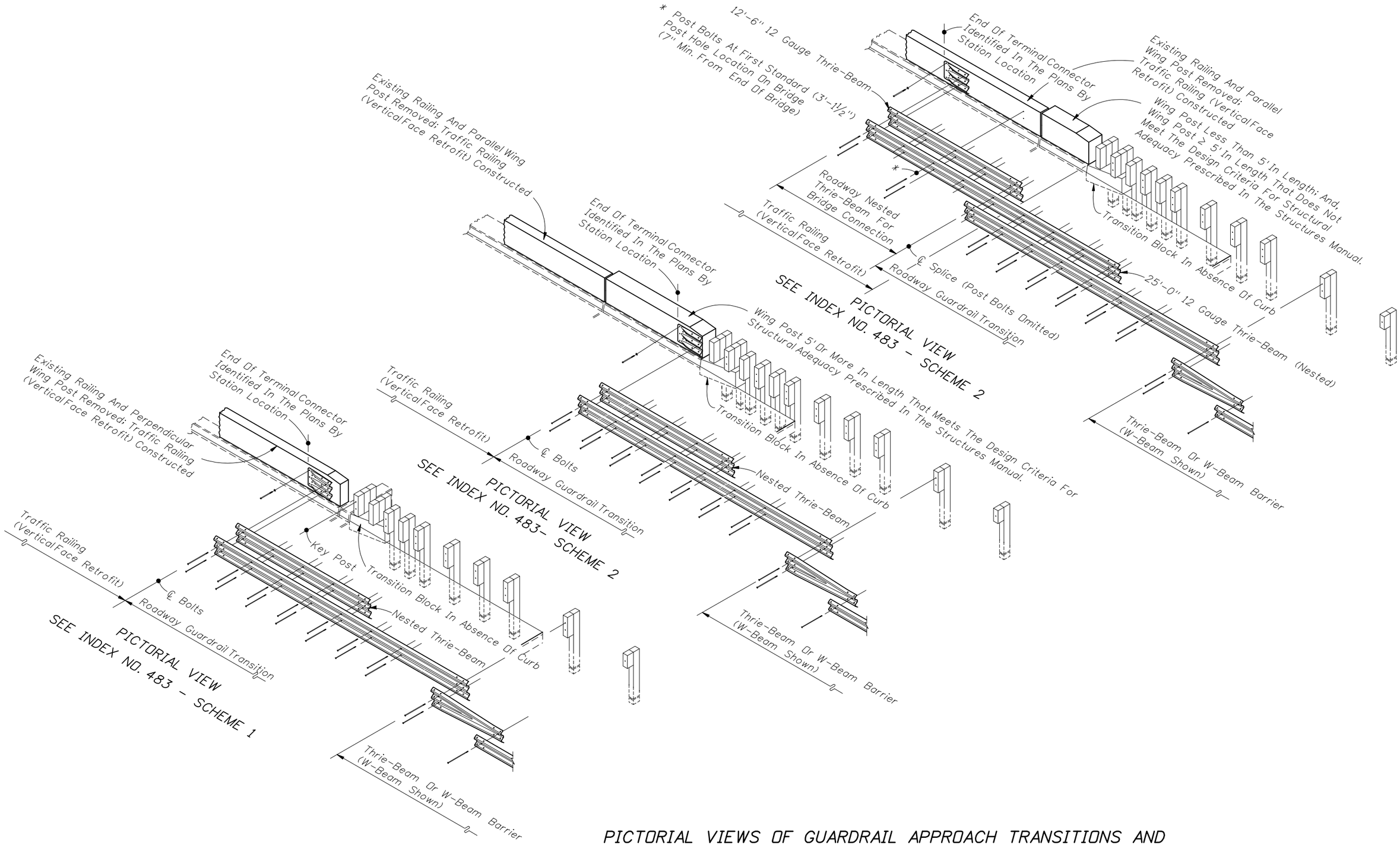
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

	2010 FDOT Design Standards	Last Revision 07/01/07	Sheet No. 19 of 24
	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	Index No. 402	

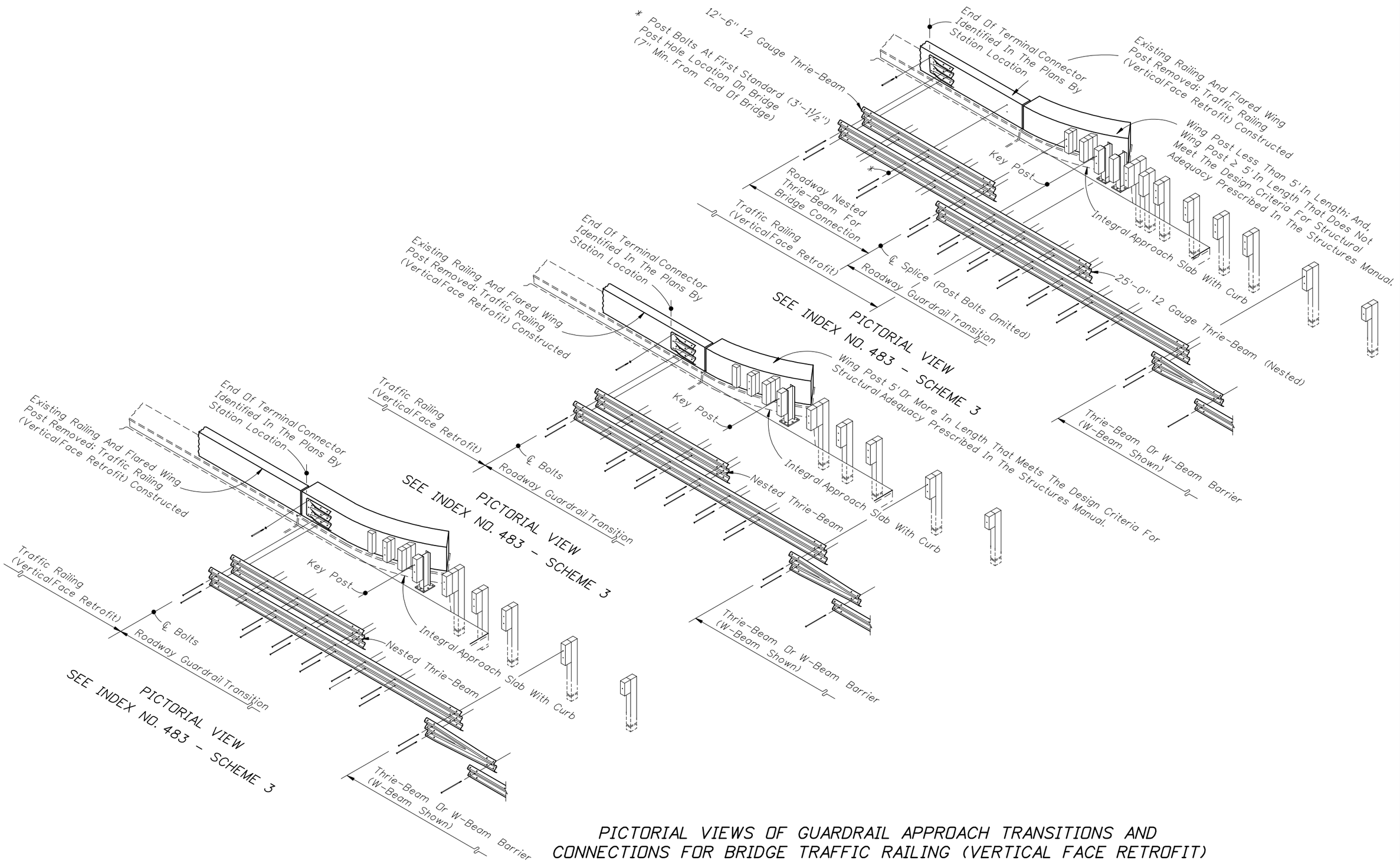


PICTORIAL VIEW
SEE INDEX NO. 482 - SCHEME 1

PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)



PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

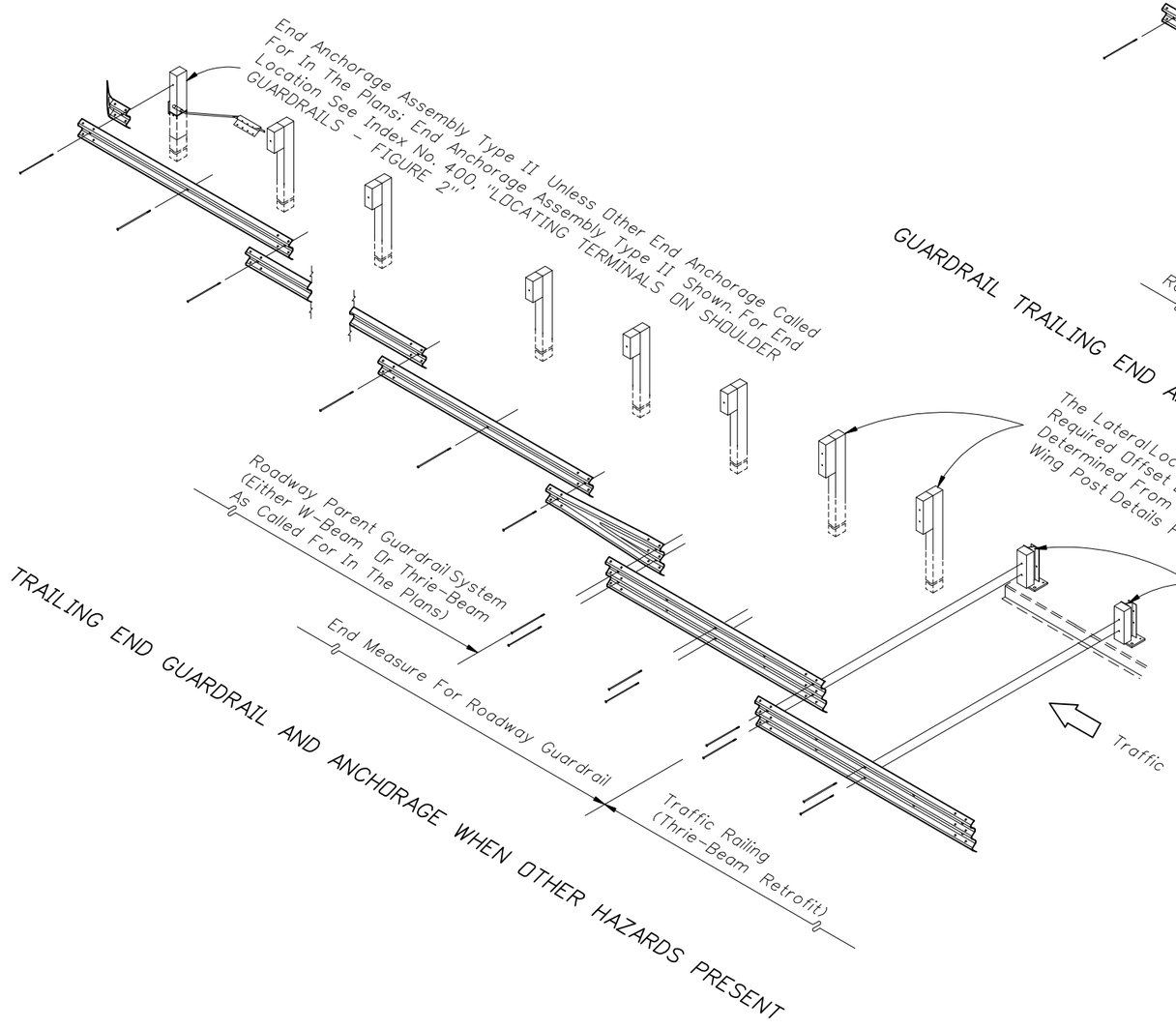


PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

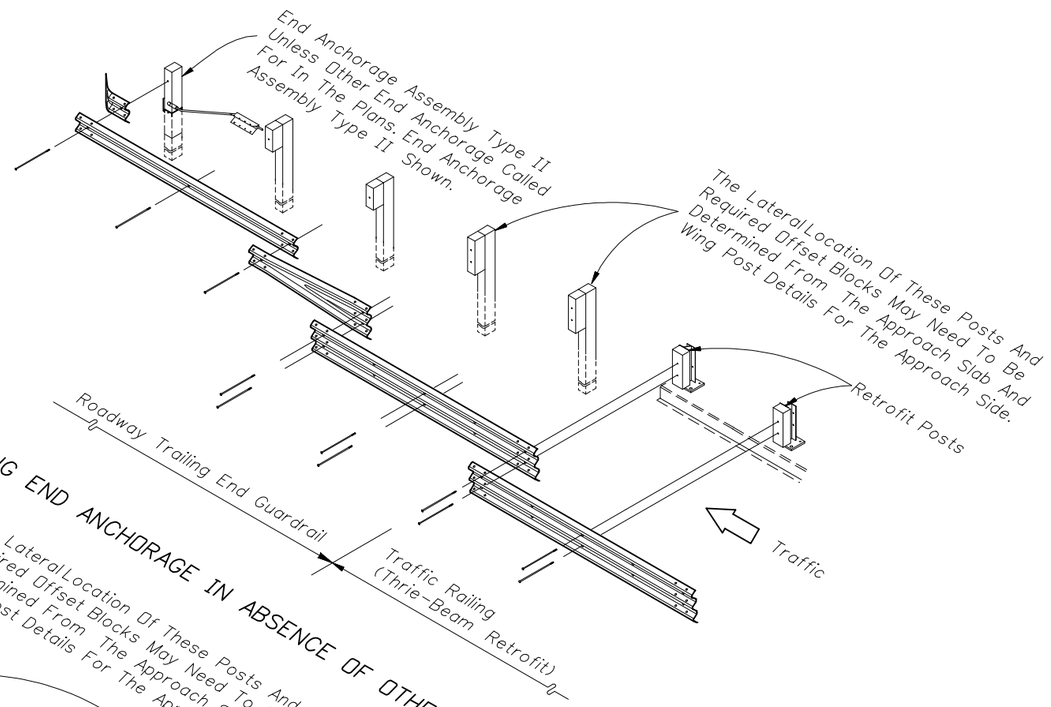
2010 FDOT Design Standards

GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

Last Revision	Sheet No.
07/01/07	22 of 24
Index No.	
402	



TRAILING END GUARDRAIL AND ANCHORAGE WHEN OTHER HAZARDS PRESENT



GUARDRAIL TRAILING END ANCHORAGE IN ABSENCE OF OTHER HAZARDS

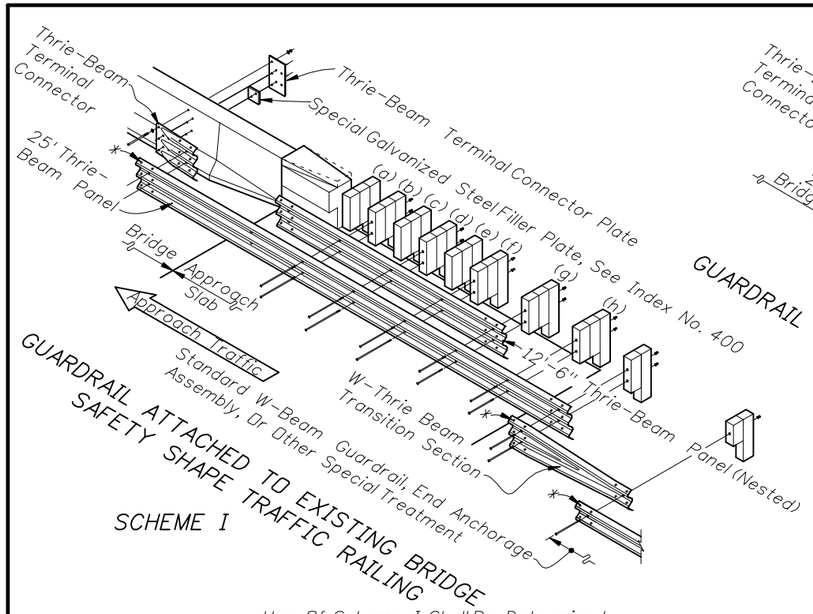
THRIE-BEAM RETROFIT NOTES

1. See indexes for bridge thrie-beam traffic railing retrofits.
2. Trailing end guardrail to be paid for under the contract unit price for the parent roadway guardrail; end measure includes length of end anchorage assembly; additional payment made for end anchorage assembly. No additional payment for connecting roadway thrie-beam to bridge thrie-beam retrofit.

NOTES FOR TRAILING END TRAFFIC RAILING VERTICAL FACE RETROFITS

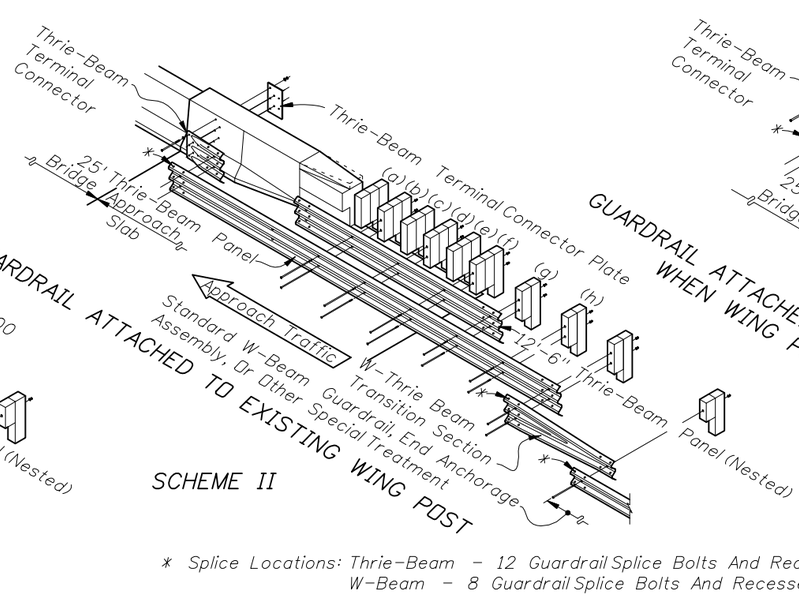
1. Where Guardrail Extensions Are Required Beyond The Trailing End Of Bridges With Traffic Railing Vertical Face Retrofits, Guardrail Connections To The Bridge Railing Will Be By SPECIAL END SHOE For W-Beam Guardrail Extensions And By THRIE-BEAM TERMINAL CONNECTOR For Thrie-Beam Guardrail Extensions.
2. Install W-Beam Special End Shoes and Thrie-Beam Terminal Connectors With Back-Up Plates, And 7/8" Ø HS Hex Bolts And Nuts (12" Long) With 2 1/4" OD Plain Round Washers Under Heads And Nuts (4 Required For Special End Shoes And 5 Required For Thrie-Beam Terminal Connectors). Back-Up Plates For Special End Shoes Are 12"x12"x5/8" And For Terminal Connector 21"x12"x5/8".
3. Payment For Connecting Trailing End Special End Shoes And Thrie-Beam Terminal Connectors To Traffic Railing Vertical Face Retrofits Will Be Made Under The Contract Unit Price For Guardrail Bridge Anchorage Assembly, EA..

TRAILING END GUARDRAIL AND ANCHORAGE FOR BRIDGE TRAFFIC RAILING (THRIE BEAM RETROFITS)



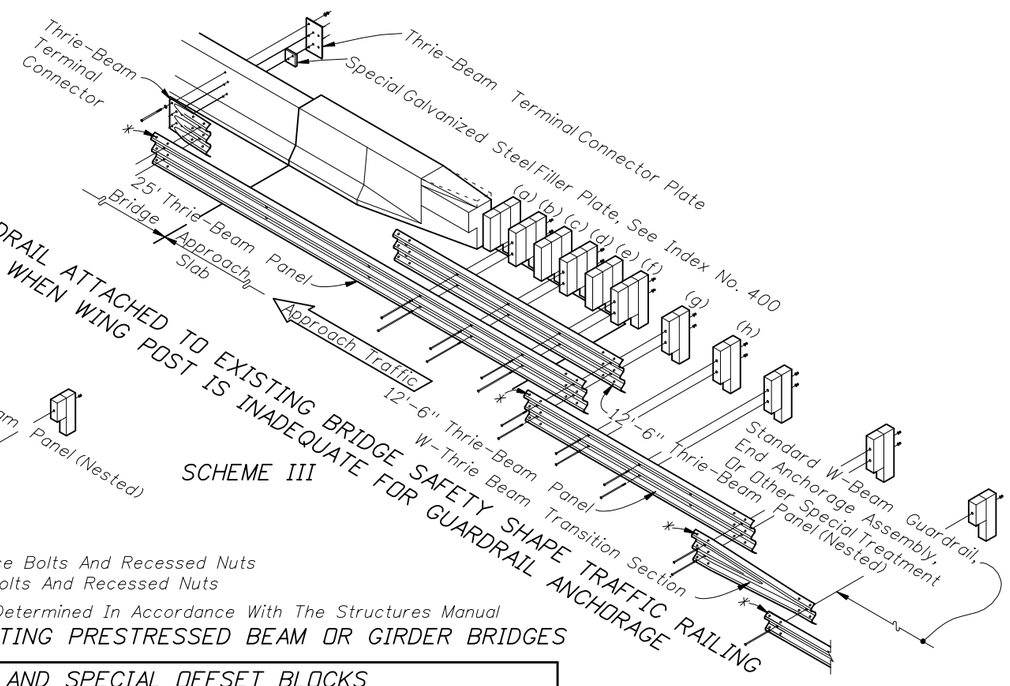
SCHEME I

GUARDRAIL ATTACHED TO EXISTING BRIDGE SAFETY SHAPE TRAFFIC RAILING



SCHEME II

GUARDRAIL ATTACHED TO EXISTING WING POST



SCHEME III

GUARDRAIL ATTACHED TO EXISTING BRIDGE SAFETY SHAPE TRAFFIC RAILING WHEN WING POST IS INADEQUATE FOR GUARDRAIL ANCHORAGE

* Splice Locations: Thrie-Beam – 12 Guardrail Splice Bolts And Recessed Nuts
W-Beam – 8 Guardrail Splice Bolts And Recessed Nuts

Use Of Schemes II And III Shall Be Determined In Accordance With The Structures Manual

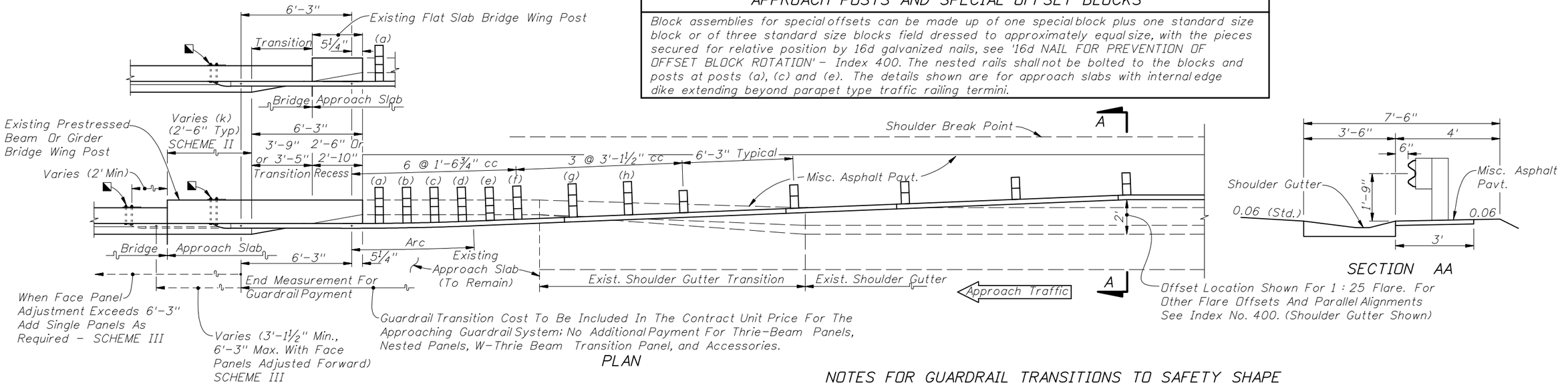
GUARDRAIL TRANSITIONS TO EXISTING PRESTRESSED BEAM OR GIRDER BRIDGES

Use Of Scheme I Shall Be Determined In Accordance With The Structures Manual

GUARDRAIL TRANSITION TO EXISTING FLAT SLAB BRIDGES

APPROACH POSTS AND SPECIAL OFFSET BLOCKS

Block assemblies for special offsets can be made up of one special block plus one standard size block or of three standard size blocks field dressed to approximately equal size, with the pieces secured for relative position by 16d galvanized nails, see '16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION' – Index 400. The nested rails shall not be bolted to the blocks and posts at posts (a), (c) and (e). The details shown are for approach slabs with internal edge dike extending beyond parapet type traffic railing termini.



PLAN

SECTION AA

Offset Location Shown For 1 : 25 Flare. For Other Flare Offsets And Parallel Alignments See Index No. 400. (Shoulder Gutter Shown)

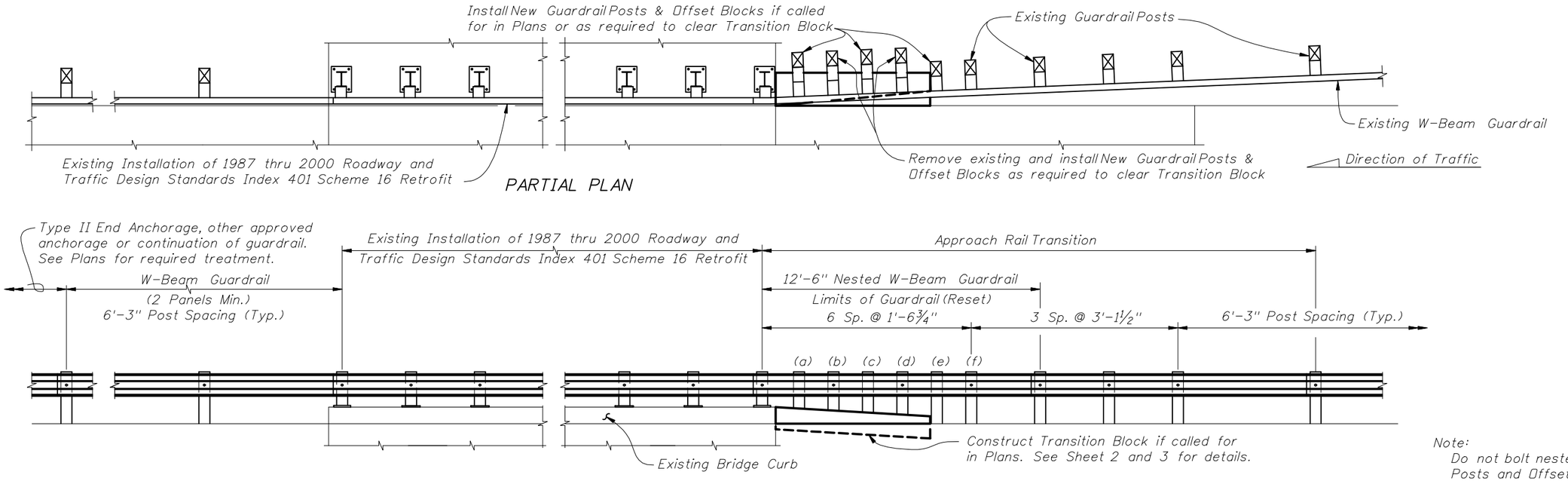
◥ 21"x12"x⅝" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And ⅞" Ø x 18" Long [15" Long With 3½" Min. Thread Length For Bridge Safety Shape Railing] HS Hex Bolts And Nuts (5 Reqd.) With 2¼" OD Plain Round Washers Under Heads And Nuts. [When Attaching Guardrail To Existing Wing Posts Or Bridge Rails, Care Should Be Exercised To Avoid Damaging Conduits And Their Utilities That May Be Routed Through Wing Posts Or Bridge Rails. When Conduits And Their Utilities Are Encountered, At Least Five ⅞" HS Hex Bolts Shall Be Installed In Any Of The Seven Holes Provided In The Thrie-Beam Terminal Connector.]

NOTES FOR GUARDRAIL TRANSITIONS TO SAFETY SHAPE TRAFFIC RAILINGS ON EXISTING BRDIGES

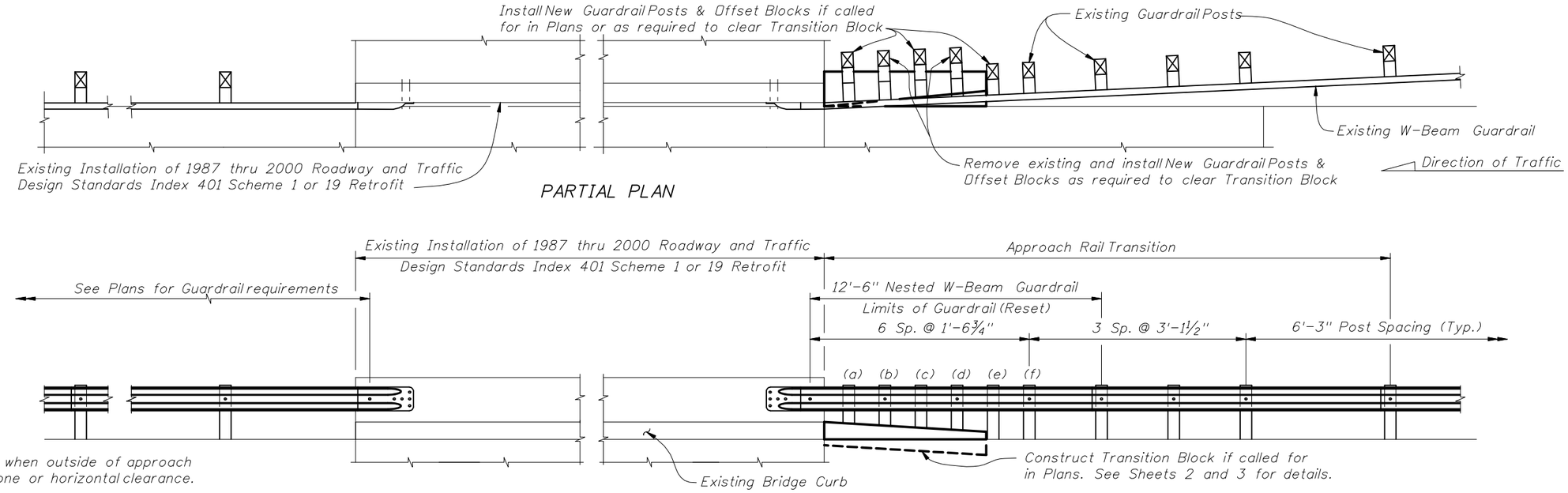
1. When the existing wing post is to be replaced with a bridge traffic railing in accordance with the Structures Manual, the thrie-beam guardrail connection shall be in accordance with Detail J of Index No. 400.
2. When retrofitting thrie-beam guardrail to existing wing posts or existing bridge safety shape traffic railing, attachment construction to be paid for under the contract unit price for Guardrail Bridge Anchorage Assembly, EA., and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate(s) and bolts, nuts and washers.

GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR EXISTING FLAT SLAB, PRESTRESSED BEAM AND GIRDER BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/07	Sheet No. 24 of 24
	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES		Index No. 402



Note:
Do not bolt nested W-Beam to Posts and Offset Blocks at Posts (a), (c) & (e), (Typ.)

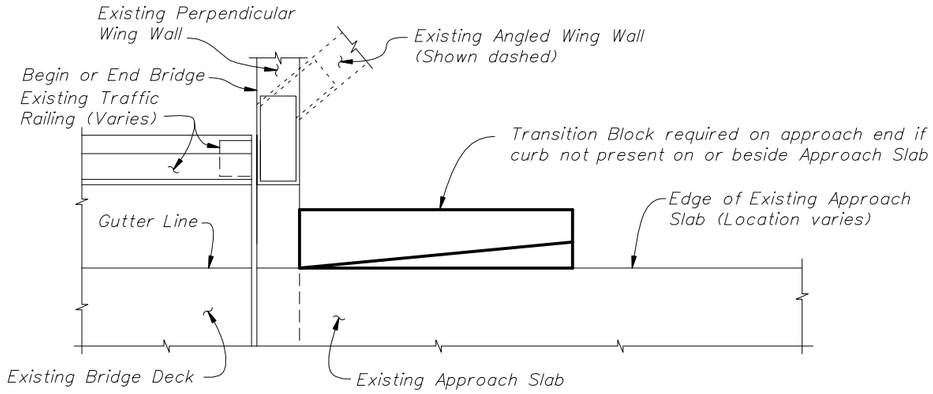


2010 FDOT Design Standards

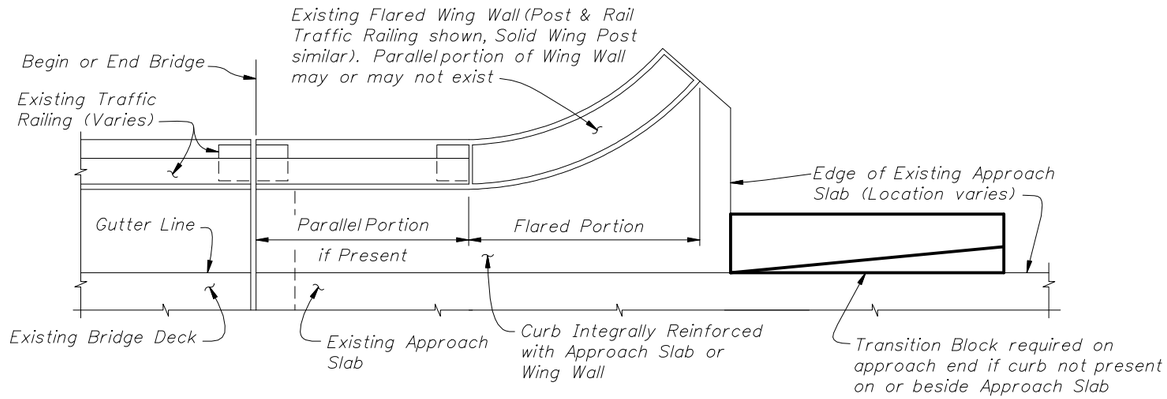
GUARDRAIL TRANSITIONS FOR EXISTING BRIDGE TRAFFIC RAILING RETROFITS

Last Revision	Sheet No.
07/01/05	1 of 3

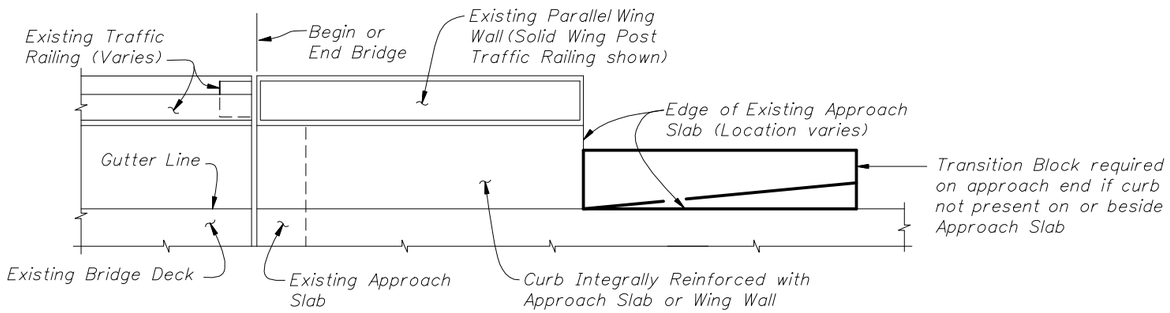
Index No. 403



PARTIAL PLAN VIEW OF EXISTING BRIDGE WITH PERPENDICULAR OR ANGLED WING WALLS

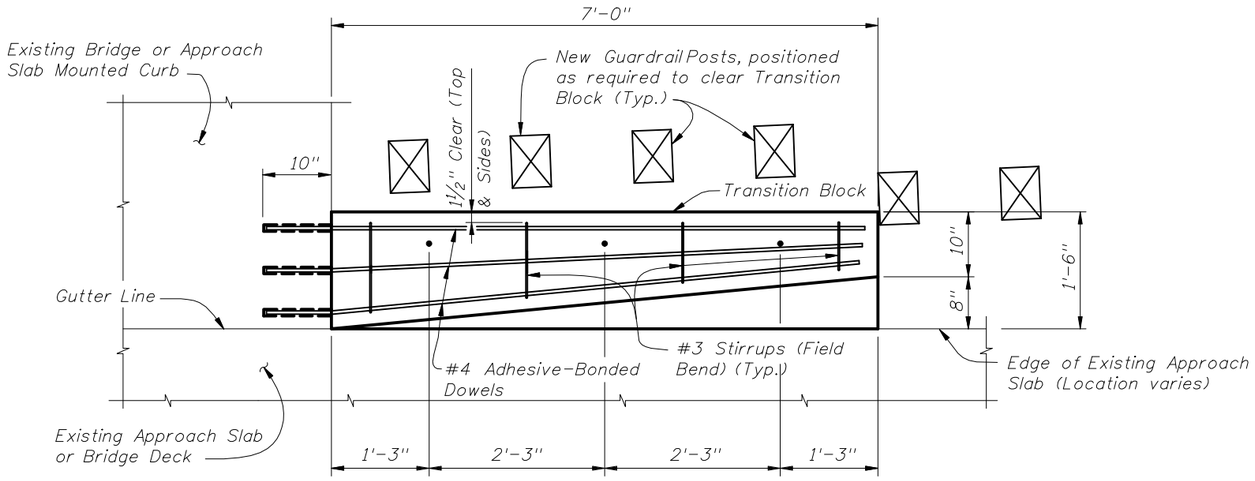


PARTIAL PLAN VIEW OF EXISTING BRIDGE WITH FLARED WING WALLS AND PARALLEL INTEGRALLY REINFORCED APPROACH SLAB CURBS (APPROACH SLAB WITH DETACHED CURBS OR SIDEWALK SIMILAR)

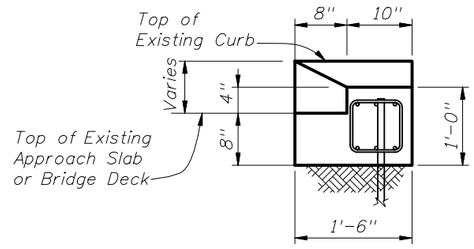


PARTIAL PLAN VIEW OF EXISTING BRIDGE WITH PARALLEL WING WALLS AND INTEGRALLY REINFORCED APPROACH SLAB CURBS (APPROACH SLAB WITH DETACHED CURBS OR SIDEWALK SIMILAR)

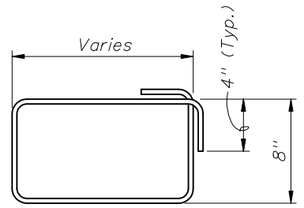
CROSS REFERENCE:
For Trainsition Block Details, Quantities and reinforcement see Sheet 3.



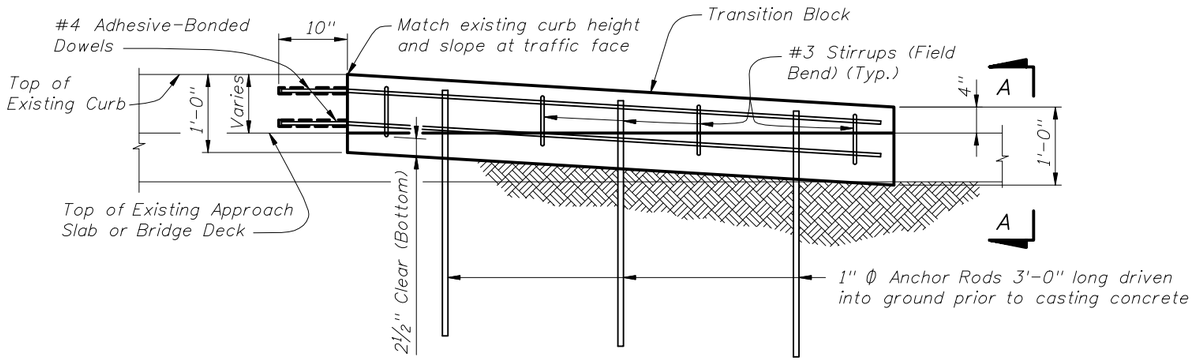
PLAN VIEW OF TRANSITION BLOCK
(GUARDRAIL NOT SHOWN FOR CLARITY)



END VIEW A-A



#3 STIRRUP (FIELD BEND)



ELEVATION OF TRANSITION BLOCK
(GUARDRAIL AND POSTS NOT
SHOWN FOR CLARITY)

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete Class II (Miscellaneous)	CY	0.4
Reinforcing Steel (Roadway)	LB	61
Guardrail (Reset)	LF	12.5

NOTES:

CONCRETE: Concrete for Transition Blocks shall be Class II (Miscellaneous).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60.

ANCHOR RODS: Steel Anchor Rods shall be ASTM A36, ASTM A709 Grade 36 or ASTM A615 Grade 60 hot-dip galvanized in accordance with Specification Section 962.

W BEAM GUARDRAIL: Guardrail components and installation shall be in accordance with Design Standards Index 400.

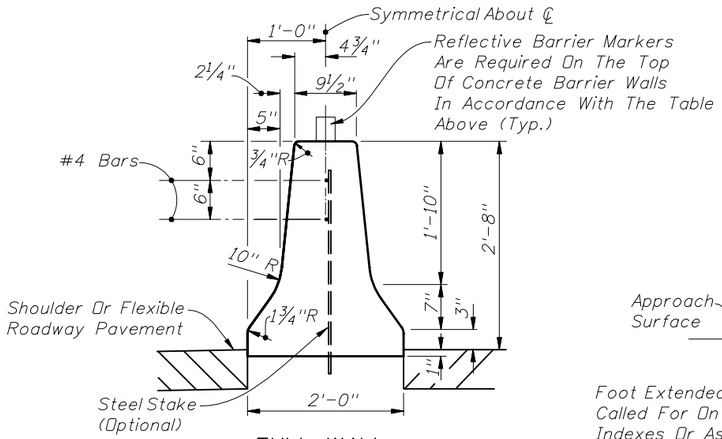
ADHESIVE-BONDED DOWELS: Adhesive Bonding Material Systems for Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416.

Adhesive Bonded Dowels are shown installed in an existing curb or sidewalk integrally reinforced with Approach Slab, Wingwall or Bridge Deck. For installations in existing detached curbs or sidewalks, install dowels in available sound concrete.

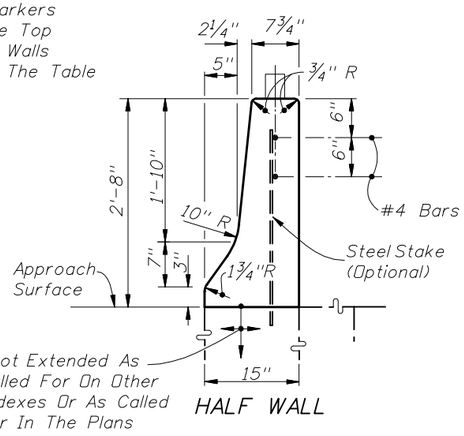
PAYMENT: Payment for Guardrail work will be made under Pay Item Guardrail (Reset) (LF). Payment for Transition Block will be made under Pay Items Concrete Class II (Miscellaneous) (CY) and Reinforcing Steel (Roadway) (LB).

REFLECTIVE BARRIER MARKER SPACING ON WALL

Distance–Edge of Travel Lane to Barrier Wall (ft)	Spacing (Ft.)	REMARKS
< 4'	40'	1. Reflectors shall conform to Section 993 of the Standard Specifications. 2. Reflector color (white or yellow) shall conform to the color of the near edgeline. 3. The cost for reflectors shall be included in the contract unit price for barrier wall.
4' to 8'	80'	
> than 8'	none required	



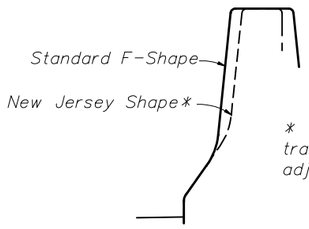
FULL WALL



HALF WALL

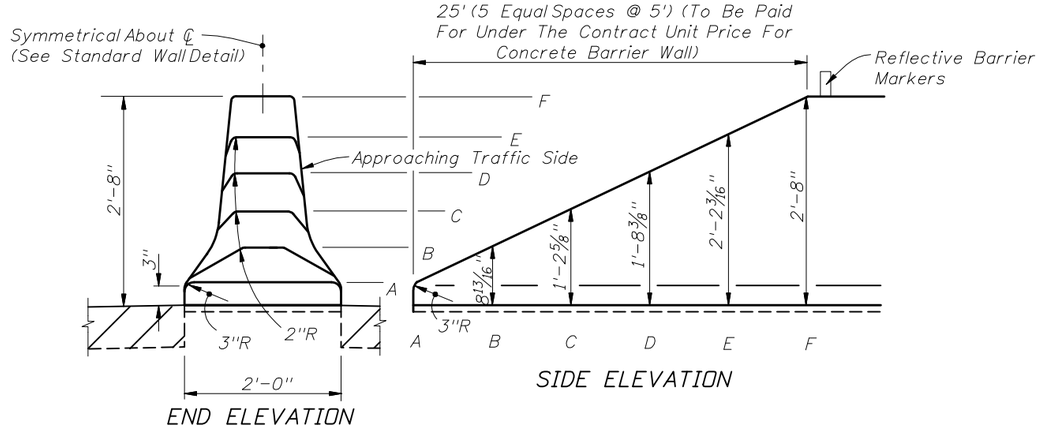
For concrete barrier wall details at piers, highway lighting and guardrail connections, see other sheets of this Index.
Standard barrier to be paid for under the contract unit price for Median Concrete Barrier Wall, LF.

STANDARD BARRIER WALL SECTIONS



* Where standard F-Shape walls abut existing NJ Shape walls, face transitions of not less than 5' in length shall be constructed at the adjoining end of the F-Shape wall.

WALL FACE SAFETY SHAPES

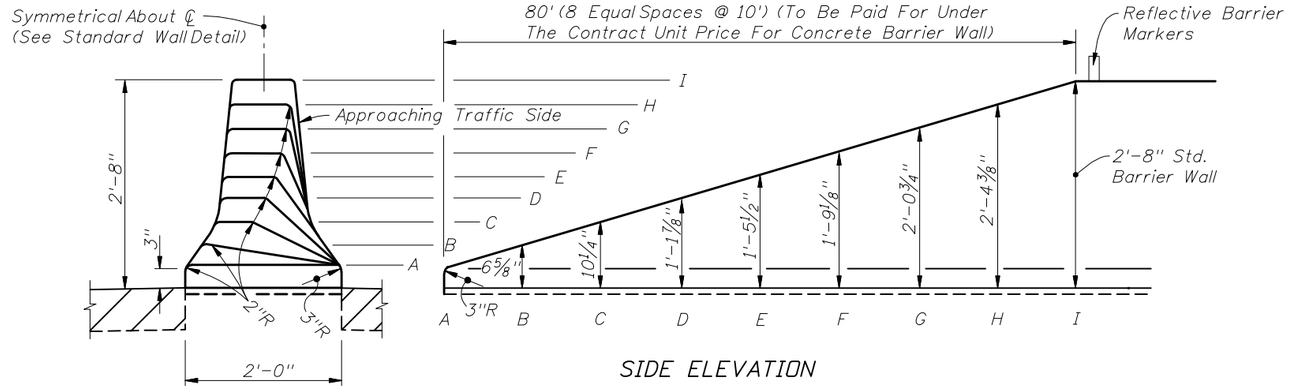


END ELEVATION

SIDE ELEVATION

TO BE USED ONLY WHERE TERMINAL LOCATED CLEAR ZONE WIDTH FROM EDGE OF THE NEAR APPROACH TRAFFIC LANE.

CONCRETE BARRIER WALL TERMINAL DETAIL II



END ELEVATION

SIDE ELEVATION

DESIGN SPEED 45 MPH OR LESS CONCRETE BARRIER WALL TERMINAL FOR NARROW MEDIAN DETAIL III

GENERAL NOTES

1. Class II concrete shall be used for all reinforced and plain (nonreinforced) concrete barrier walls; except, in moderately and extremely aggressive environments, Class IV concrete shall be used. All reinforcing steel with undesignated size shall be #4 bars. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Standard Specifications, unless other finish called for in plans. The surfaces shall have a Class 5 Applied Finished Coating in accordance with Section 400 only when called for in the plans.

2. Concrete barrier wall terminal notes for design speeds ≥50 mph.
   a. Terminated outside clear zone of the approach traffic with 'Detail II' end treatment.
   b. Terminated within a shielded location.
   c. Terminal protection by the use of a crash cushion system.
   d. Terminated in conjunction with a suitably designed transition to another barrier.

3. Expansion joints in wall required only at bridge ends and/or at locations where wall is an integral part of existing or proposed concrete slab; wall joints are to match an existing or proposed expansion joint.

4. When the barrier is installed adjacent to the pavement the top 12" of the subgrade shall be compacted to at least 100% of the density as defined in the AASHTO T-99 specifications.

5. Cast-in place barrier wall normally will be a continuous pour without transverse contraction joints. Cast-in-place segments with a length <40' shall be joined to adjacent sections by doweling. See Detail B on Sheet 2.

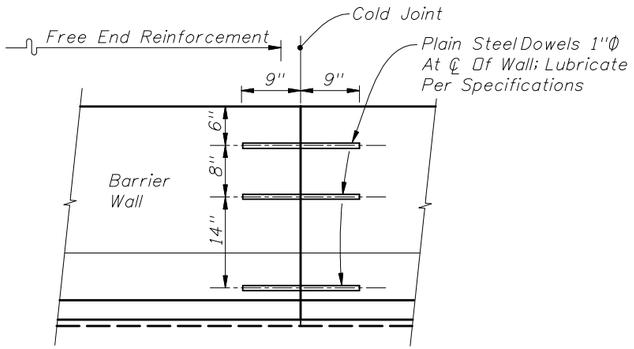
6. Precast construction is allowed as an alternate to cast-in-place construction.
   a. Wall segments <40' in length shall be joined by a transverse joint in accordance with Details C & D on Sheet 2. The minimum segment length is 20'.
   b. Bedding of the precast sections shall be facilitated by the use of sand-cement grout or equal method to assure uniform bearing.
   c. Reinforcement may be required for handling stresses.

7. On roadways designated for reverse laning all downstream, ends that are not shielded or outside the clear zone shall be marked by Type 3 Object Markers.

8. Cost of reinforcing steel and reflective barrier markers shall be included in the contract unit price for concrete barrier wall. See individual details for pay item information.

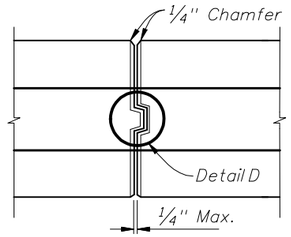
9. For barrier wall inlet details see Indexes Nos. 217, 218 and 219.

10. Concrete barrier wall with New Jersey Safety Shape may not be substituted for the Standard F Shape Barrier.



DOWELED TRANSVERSE CONSTRUCTION JOINT WHEN ABUTTING SEGMENT(S) LESS THAN 40' IN LENGTH

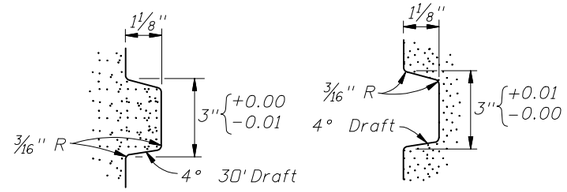
DETAIL B



TOP VIEW

PRECAST BARRIER TRANSVERSE JOINTS

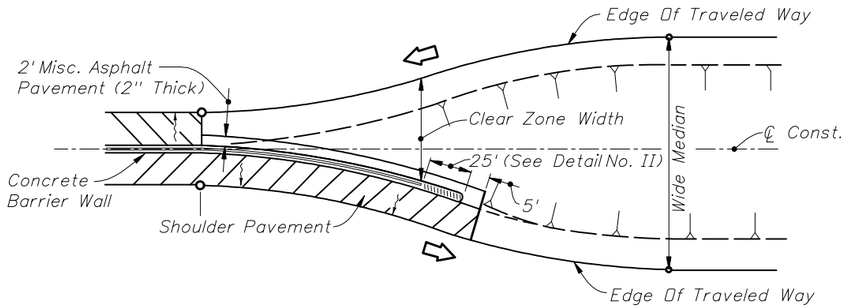
DETAIL C



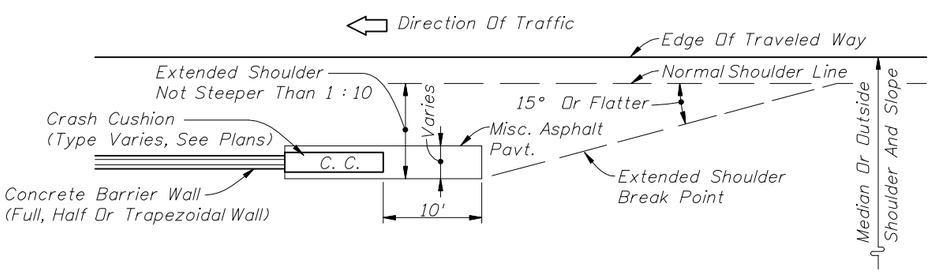
TOP VIEW

STRAIGHT TONGUE AND GROOVE

DETAIL D

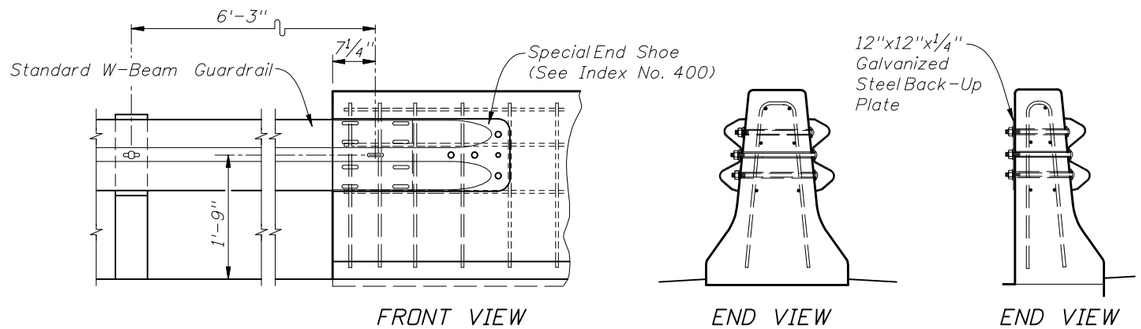


CONCRETE BARRIER WALL TRANSITION BETWEEN WIDE AND NARROW MEDIANS WHEN BARRIER WALL END LOCATED OUTSIDE APPROACH CLEAR ZONE OR HORIZONTAL CLEARANCE



SHOULDER TREATMENT WHEN CRASH CUSHIONS SHIELDING CONCRETE BARRIER WALL END LOCATED INSIDE APPROACH CLEAR ZONE OR HORIZONTAL CLEARANCE

DETAIL A



FRONT VIEW

END VIEW

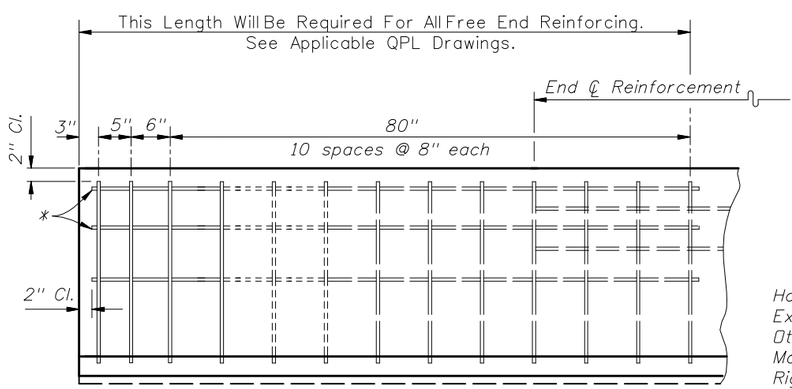
END VIEW

NOTES

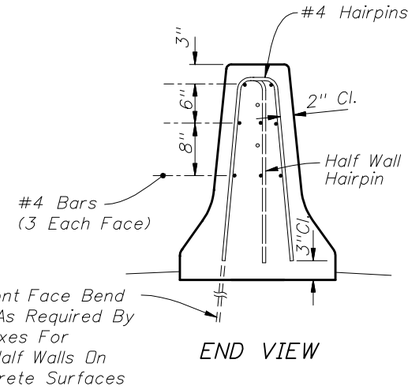
1. End of wall flush mounted connections are not applicable to two-lane two-way facilities. See Sheets 20, 24, and 25 for trailing end connections on two-lane two-way facilities and for approach guardrail connections.

2. Trailing guardrail connections to double face safety shaped walls will be under one of the following traffic conditions and mounting methods:
   (a) One-way traffic trailing condition one side only - flush mount with flat steel back-up plate on back side.
   (b) One-way traffic trailing condition both sides - flush mount both sides.
   (c) For trailing condition one side and approach traffic condition opposite side - see "Median Barrier Wall" mounting, Sheet 25.

W-BEAM GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL TRAILING ENDS



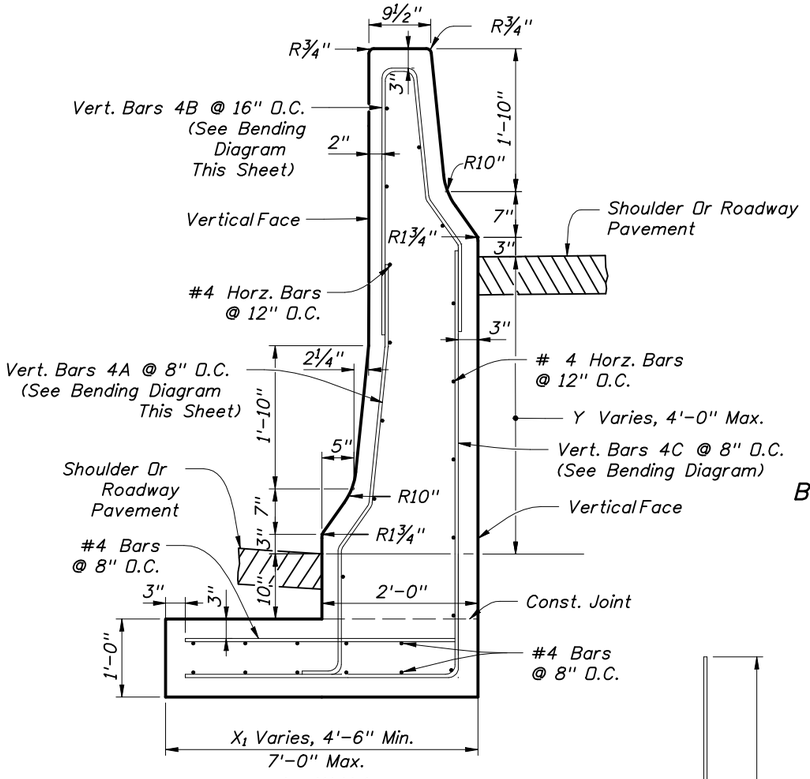
SIDE VIEW



END VIEW

* Note: Free end reinforcement required for nonreinforced walls at the following locations: All exposed ends; abutting ends of true joints; ends with guardrail connections; ends with redirective crash cushion connections; and, ends connecting to bridge traffic rails or other rigid barrier walls.

FREE END REINFORCEMENT



L-WALL
SUPERELEVATED SECTION

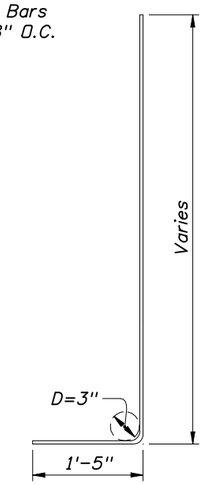
Design Criteria:

NCHRP report 350 Test Level (TL-4) Vehicle: 8000S, 50 mph, 25°, Avg. Lat. Impact.

Vehicle force: 54 kips Horiz.; 18 kips Vert. at 32" above pavement.

Unless the plans stipulate a specific wall type, either the cantilever wall or the "L" wall may be constructed at the Contractor's option.

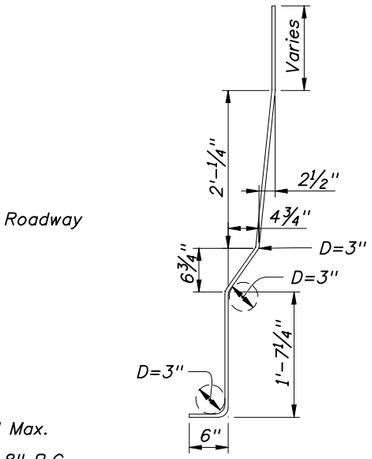
Cost of the footing to be included in the contract unit price for Median Concrete Barrier Wall, LF.



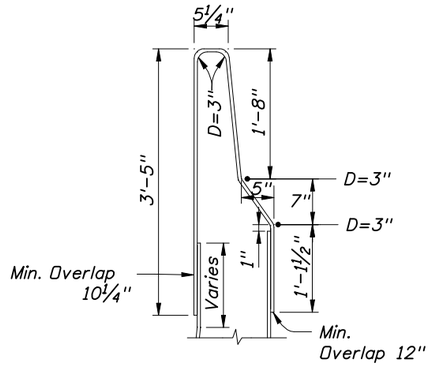
CANTILEVER WALL
BAR 4E BENDING DIAGRAM

"L" Wall	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width X_1	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-6"	7'-0"
Min. Segment Wall Length		46'	44'	42'	41'	39'	36'	33'

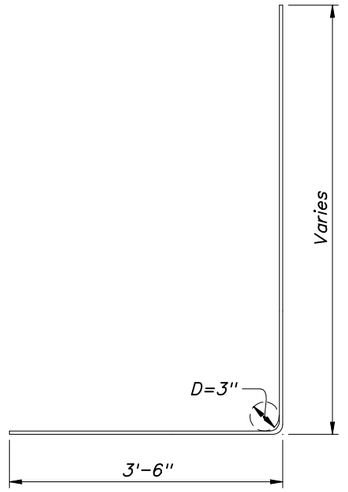
Cantilever Wall	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width X	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-3"	6'-6"
Min. Segment Wall Length		39'	35'	32'	29'	26'	24'	22'



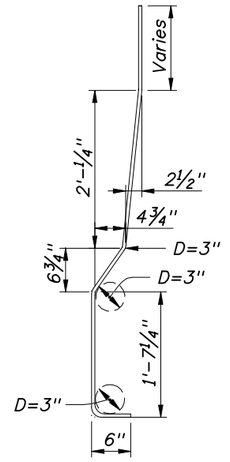
L-WALL
BAR 4A BENDING DIAGRAM



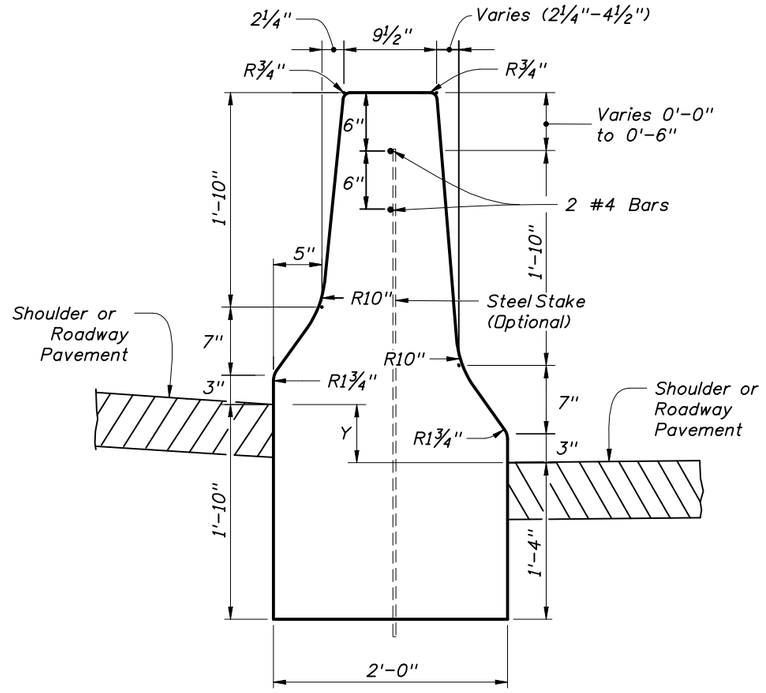
L-WALL & CANTILEVER WALL
BAR 4B BENDING DIAGRAM



L-WALL
BAR 4C BENDING DIAGRAM

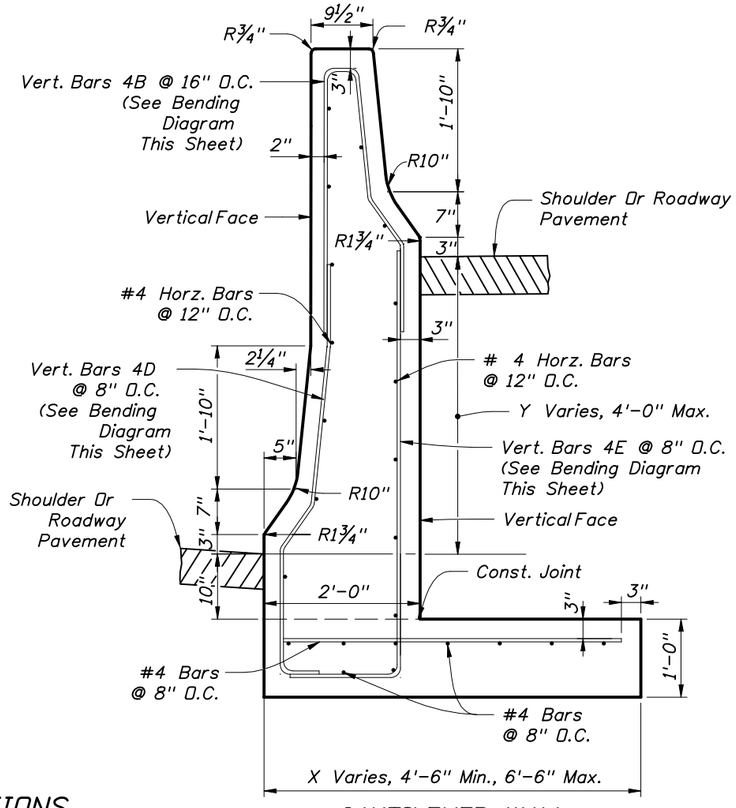


CANTILEVER WALL
BAR 4D BENDING DIAGRAM



F-SHAPE MEDIAN BARRIER
WHEN Y IS LESS THAN OR EQUAL TO 6 INCHES

MEDIAN BARRIER WALL FOR SUPERELEVATED SECTIONS
OR FOR VARIABLE ROADWAY PROFILE GRADES



CANTILEVER WALL
SUPERELEVATED SECTION

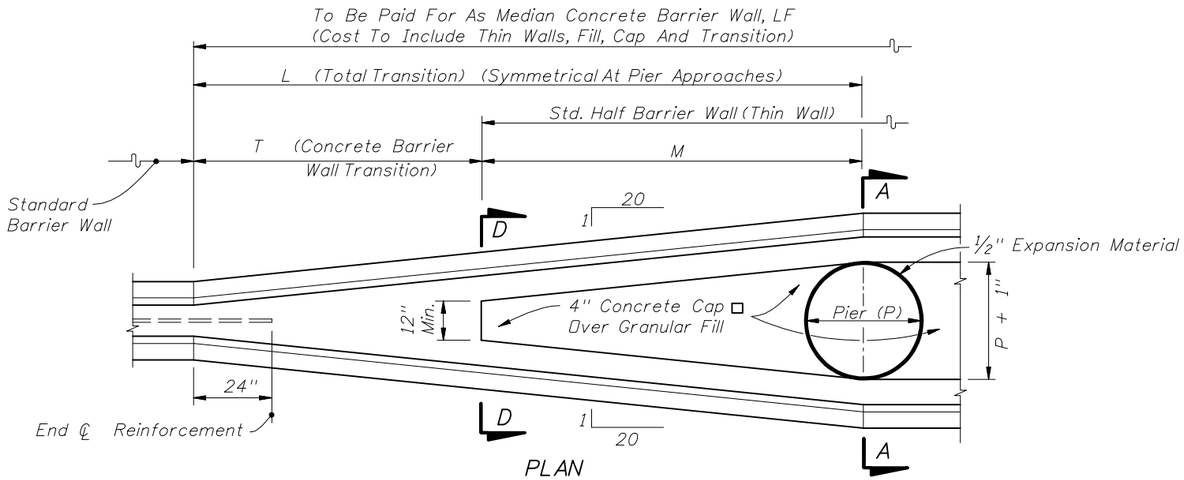
2010 FDOT Design Standards

CONCRETE BARRIER WALL

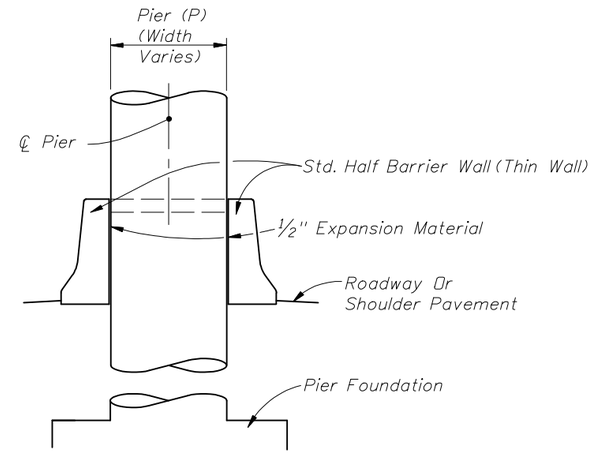
Last Revision 07/01/09

Sheet No. 3 of 25

Index No. 410

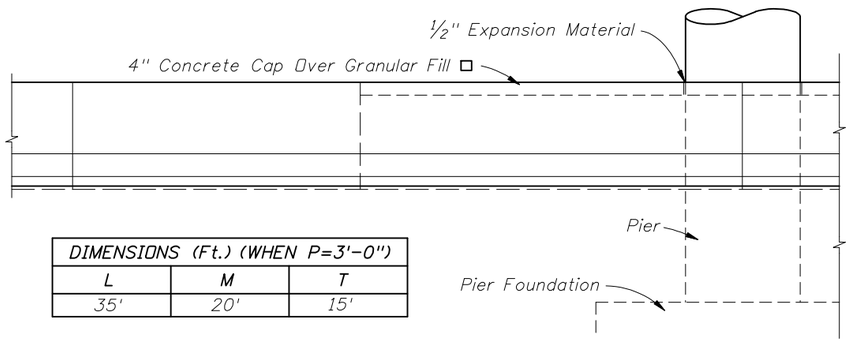


PLAN



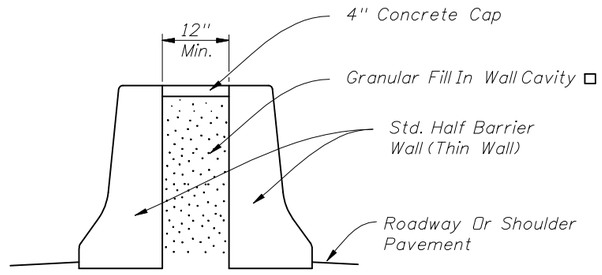
SECTION AA

BRIDGE PIERS



DIMENSIONS (Ft.) (WHEN P=3'-0")		
L	M	T
35'	20'	15'

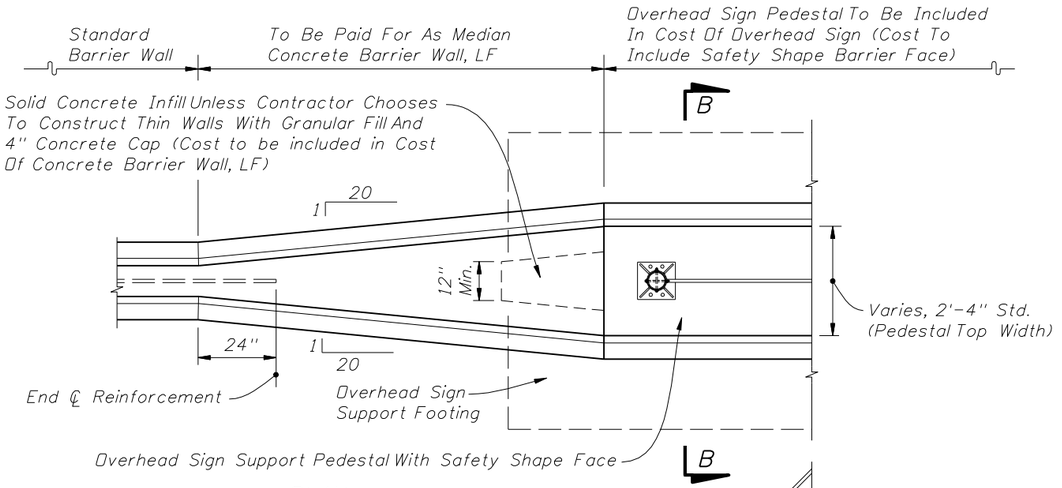
ELEVATION



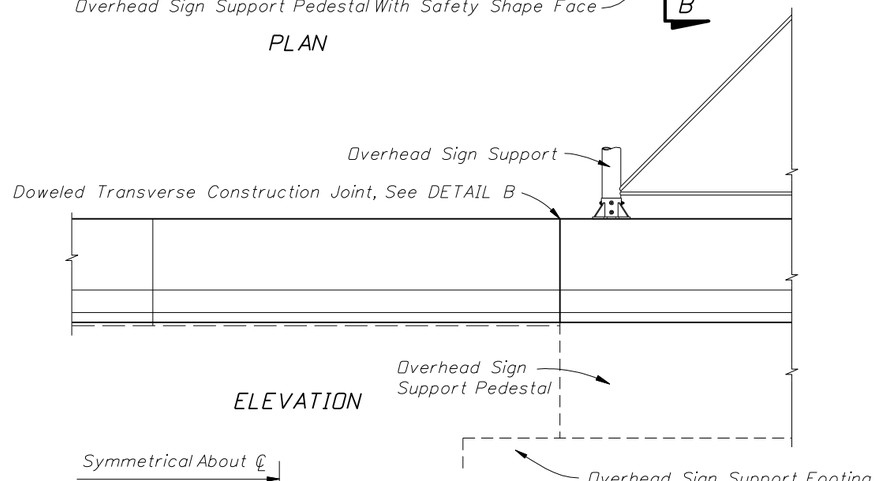
SECTION DD

□ Fill To Be Free Of Deleterious And Cementitious Material

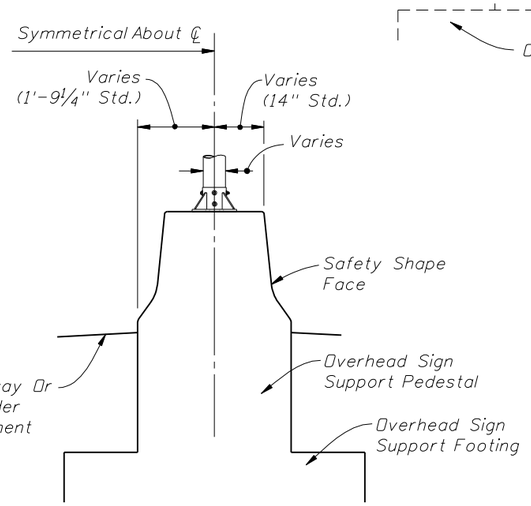
CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT BRIDGE PIERS



PLAN

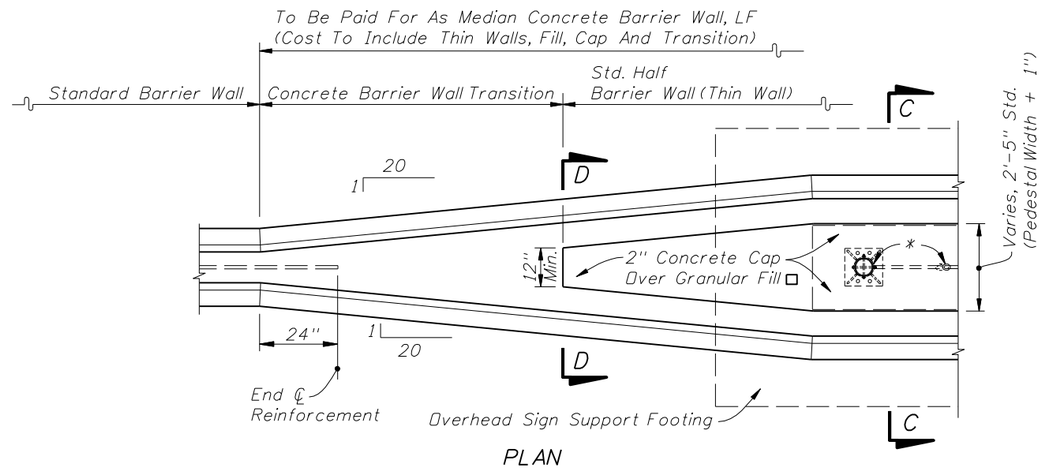


ELEVATION

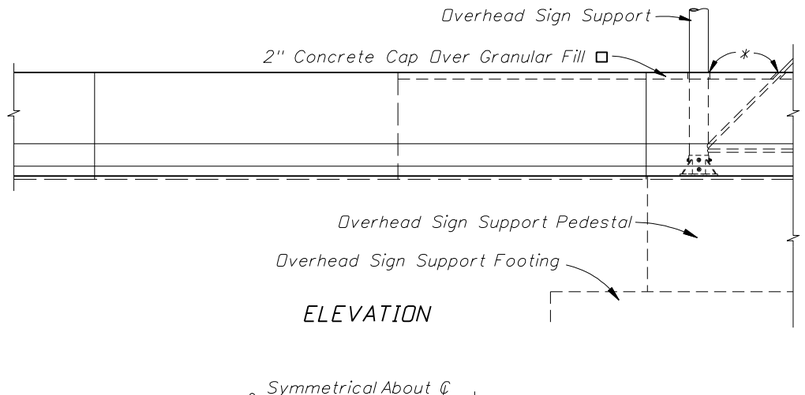


SECTION BB

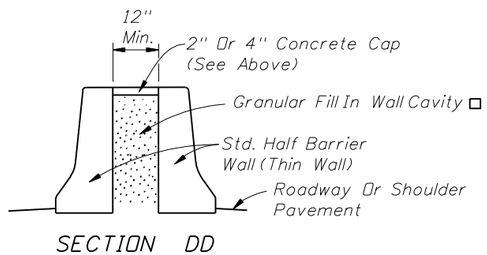
COMBINATION BARRIER AND SIGN PEDESTAL



PLAN



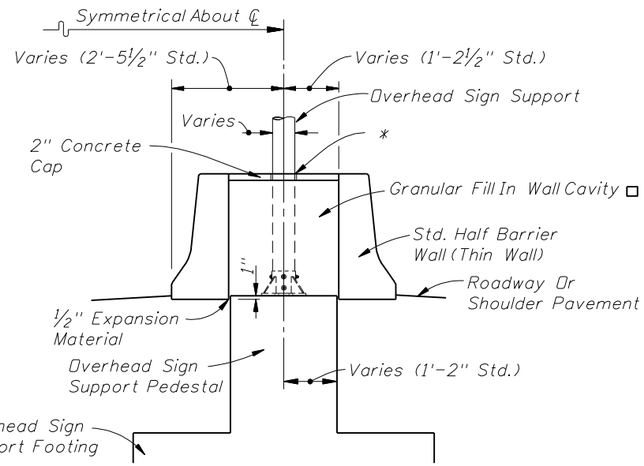
ELEVATION



SECTION DD

□ Fill To Be Free Of Deleterious And Cementitious Materials

* ½" Expansion Material Wrap Around Column(s) And Strut(s) At Concrete Cap



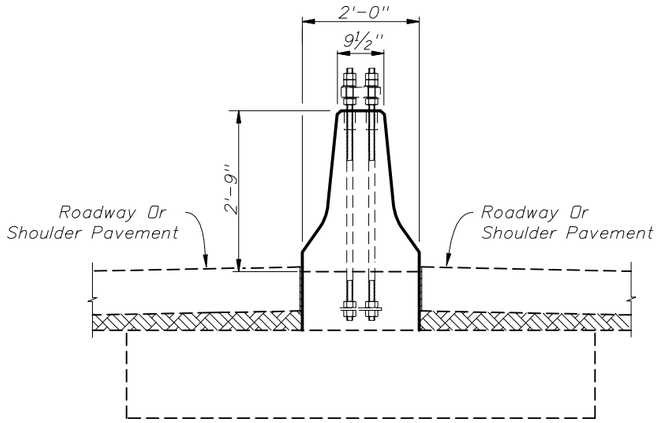
Note: This detail to be used only when installing barriers around existing sign supports that are to remain. It shall not be used for new sign support installations. For new installations use combination barrier and sign pedestal (Section BB).

SECTION CC

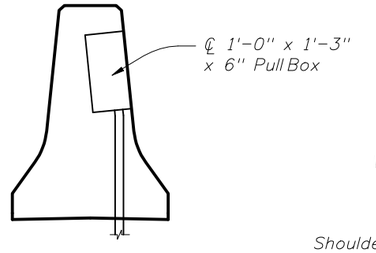
INDEPENDENT BARRIER AND SIGN PEDESTAL

CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT OVERHEAD SIGN SUPPORTS

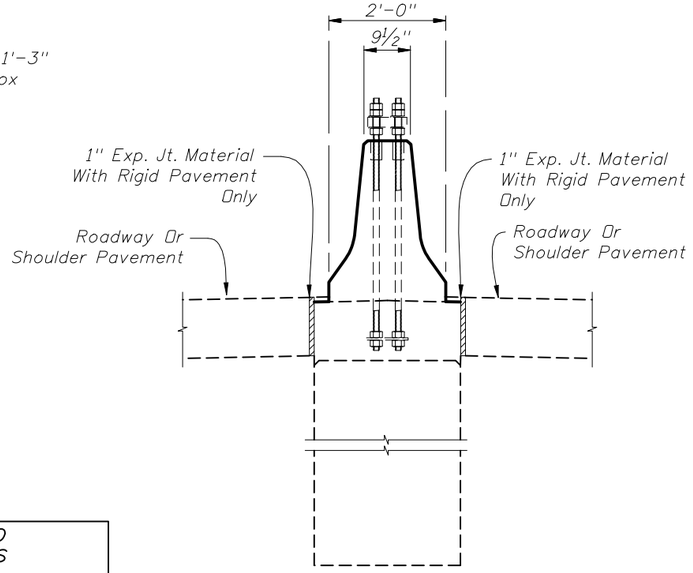
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/09	Sheet No. 5 of 25
	CONCRETE BARRIER WALL		Index No. 410



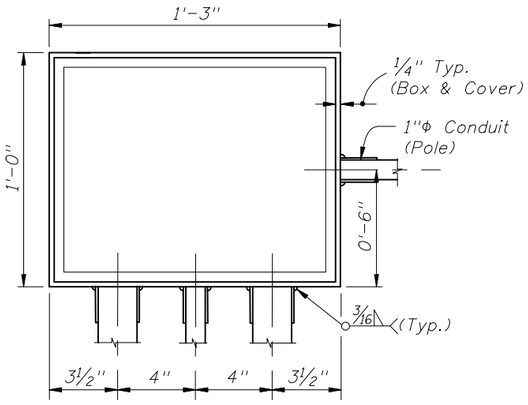
END VIEW
SPREAD FOOTING OPTION



TRANSVERSE SECTION
INSTALLATION



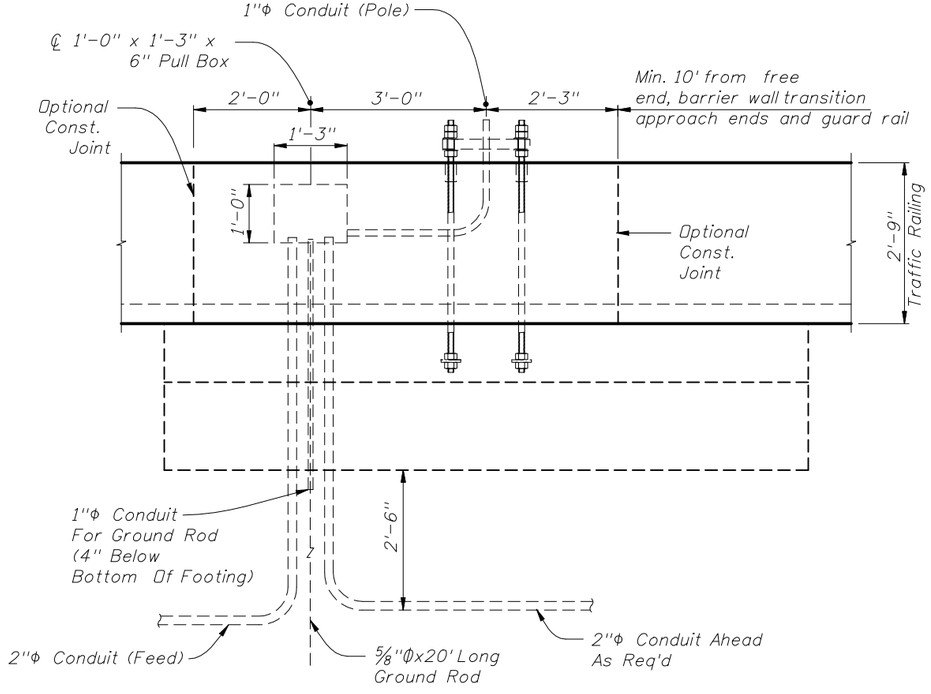
END VIEW
CYLINDRICAL OPTION



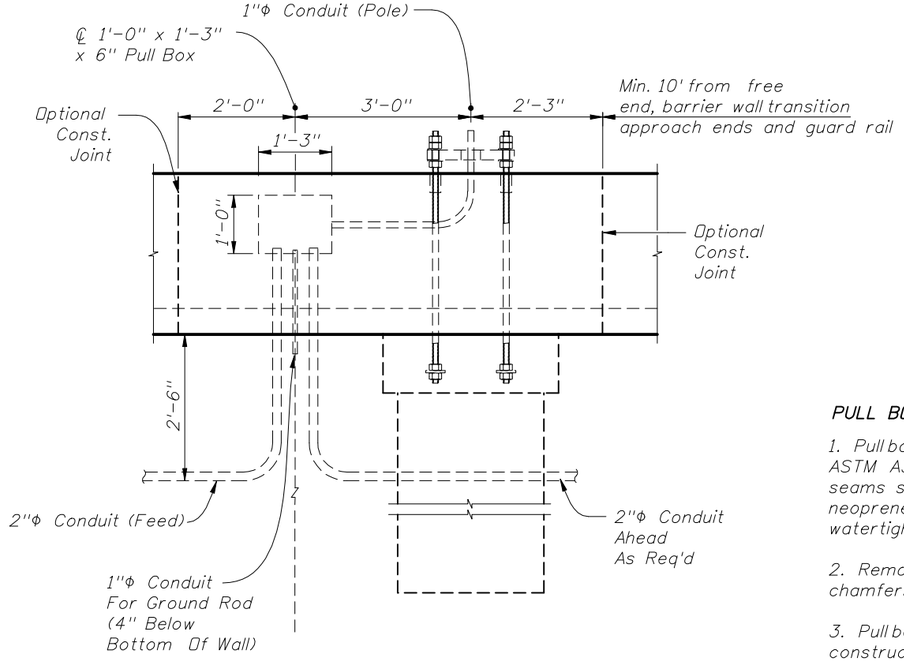
FRONT VIEW
PULL BOX

SPREAD FOOTING AND CYLINDRICAL NOTES

The Reinforcement Details And Dimensions For Both The Spread Footing And Cylindrical Foundations Can Be Found In Index 17515.

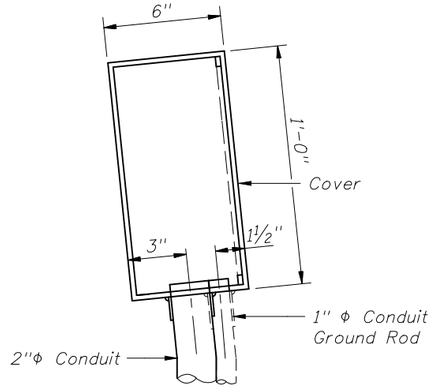


ELEVATION
SPREAD FOOTING OPTION



ELEVATION
CYLINDRICAL OPTION

LIGHT POLE MOUNTING IN MEDIAN BARRIER WALL



SIDE VIEW
PULL BOX

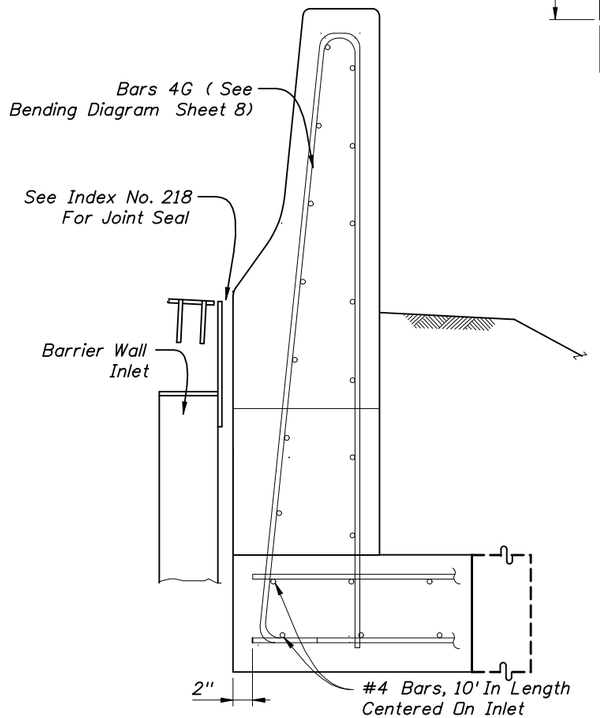
PULL BOX NOTES

1. Pull boxes are to be fabricated from steel conforming to ASTM A36 and be hot-dip galvanized after fabrication. All seams shall be continuously welded and ground smooth. A neoprene gasket shall be attached to the box to provide a watertight cover. The cover screws shall be fully galvanized.

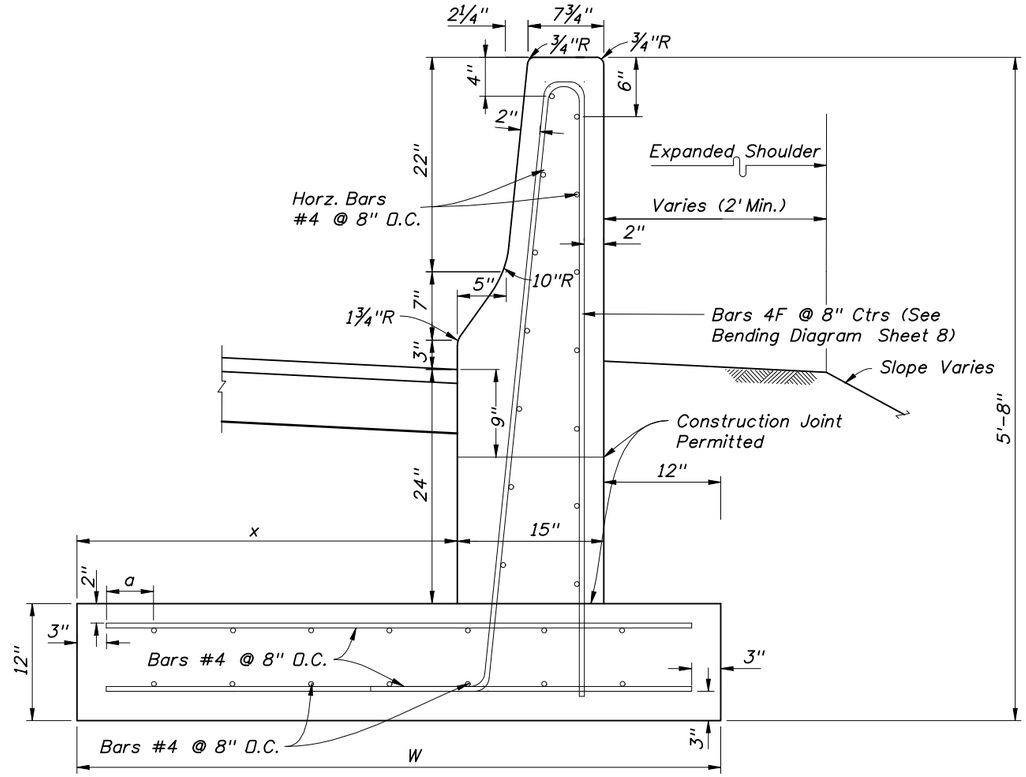
2. Remove excess concrete while green and hand form chamfers.

3. Pull box complete and conduit risers are incidental to the construction and cost of the barrier wall; there is to be no separate compensation for the box, risers or installation unless specifically called for in the plans.

PULL BOX - ELECTRICAL

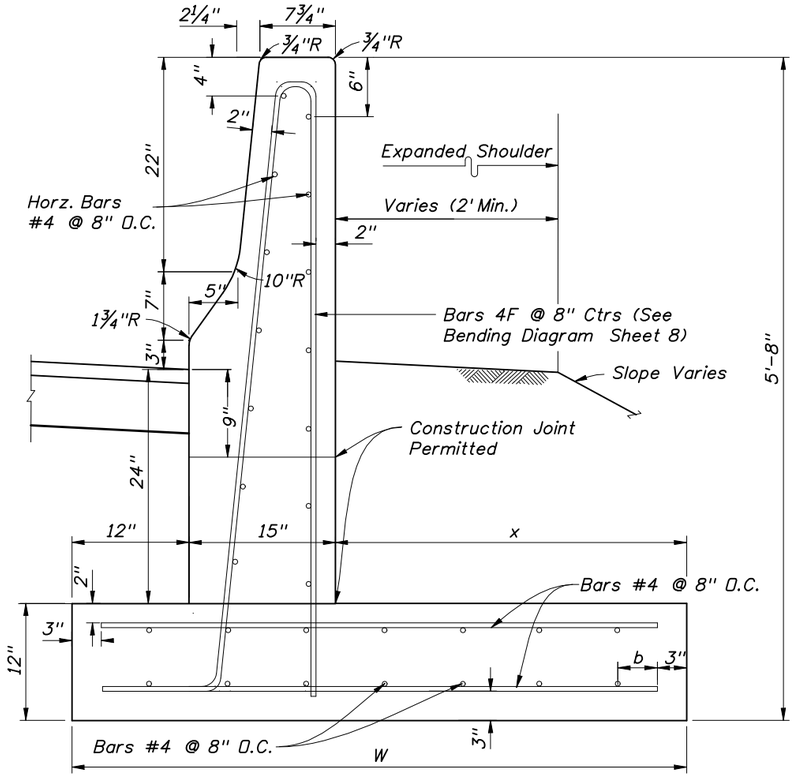


REINFORCING STEEL MODIFICATIONS AT BARRIER WALL INLETS (INDEX NO. 218)



NOTE: All longitudinal reinforcement #4 bars.

CANTILEVER WALL



NOTE: All longitudinal reinforcement #4 bars.

L-WALL

DIMENSIONS AND QUANTITIES											
CANTILEVER WALL						L-WALL					
Length* Of Barrier Wall	W	x	a	Class II Conc. CY Per Lin. Ft.	Rein. Steel Lbs. Per Lin. Ft.	Length* Of Barrier Wall	W	x	b	Class II Conc. CY Per Lin. Ft.	Rein. Steel Lbs. Per Lin. Ft.
≥ 65'	3'-3"	1'-0"	5"	0.30	31	≥ 60'	3'-6"	1'-3"	7"	0.31	32
57' to 64'	3'-9"	1'-6"	3"	0.32	34	50' to 59'	4'-0"	1'-9"	5"	0.33	34
50' to 56'	4'-3"	2'-0"	3"	0.33	36	40' to 49'	4'-9"	2'-6"	6"	0.35	37
41' to 49'	5'-0"	2'-9"	7"	0.36	38	35' to 39'	5'-3"	3'-0"	4"	0.37	39
36' to 40'	5'-6"	3'-3"	5"	0.38	40	30' to 34'	5'-9"	3'-6"	2"	0.39	42
28' to 35'	6'-6"	4'-3"	3"	0.42	45	25' to 29'	6'-6"	4'-3"	3"	0.42	45
25' to 27'	7'-0"	4'-9"	7"	0.44	46	20' to 24'	7'-6"	5'-3"	2"	0.45	49

Quantities shown are for information only. For method of payment see payment note. Barrier wall inlets (Index 218) shall be isolated from the barrier wall stem and footing by 1" expansion material. * All walls may be made up of segments of 20' or more in length provided the segments are joined by a transverse joint in accordance with Detail B, Sheet 2. Segments shall have dimensions same as walls above.

REINFORCED CONCRETE BARRIER WALL (SHOULDER)

PAYMENT:

Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Shoulder), LF.

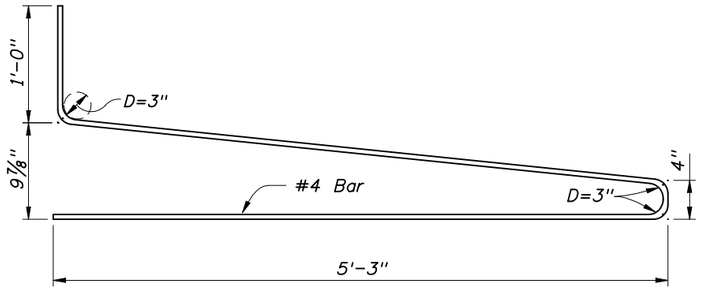
DESIGN NOTES:

Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side of all cold joints.

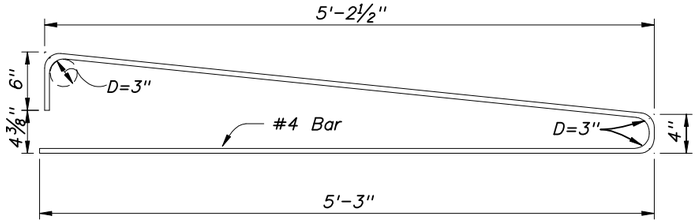
Use of this barrier wall should be limited to special applications such as hazard encroachment into the clear zone where barrier wall deflection, rotation or translation cannot be tolerated; example hazards to consider are as follows:

(a) Structure supporting piers, bents and pylons (b) Pumping, metering, control or other similar critical stations (c) Quarries (d) Intolerable vertical drops (e) Historic structures or monuments (f) Rail transit travel way or passenger station (g) Other similar occupancies

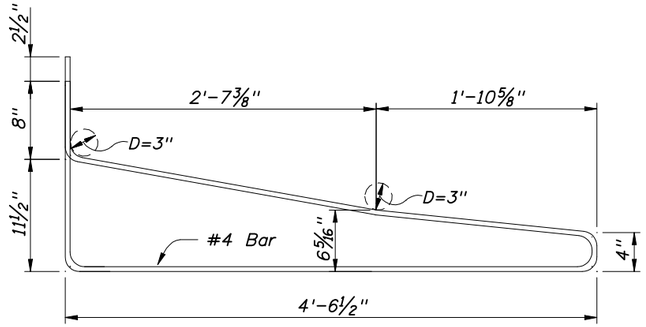
NCHRP report 350 Test Level (TL-4) Vehicle: 8000S, 50 mph, 25°. Vehicle force applications: 18 kips Vert. at top of railing; 54 kips Horiz. at 32" above pavement.



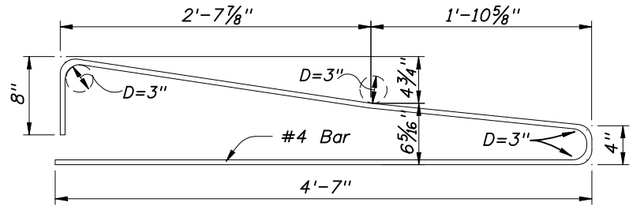
BAR 4F



BAR 4G

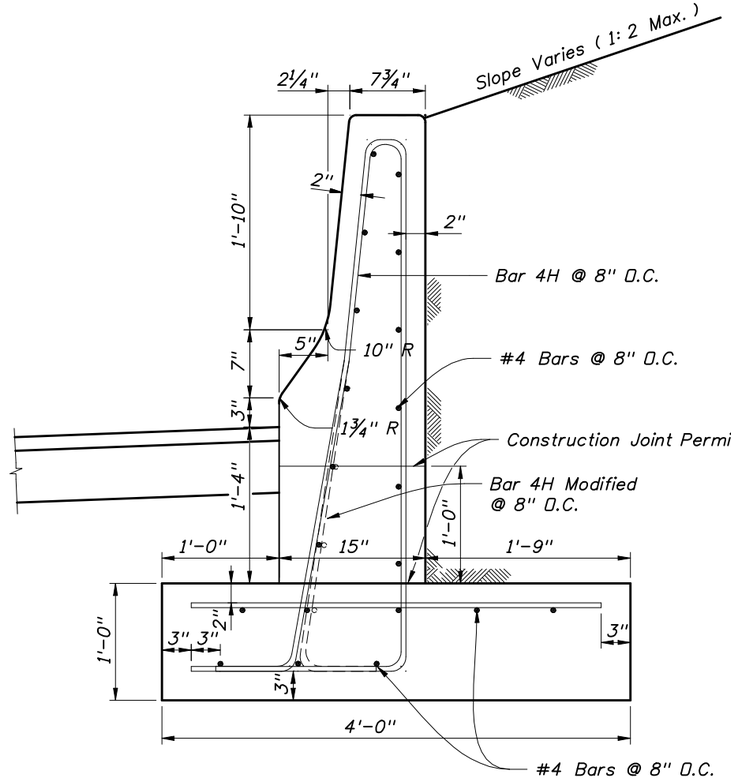


BAR 4H



For Use In Areas Where Obstructions Require Localized Omission Of Toe

BAR 4H MODIFIED

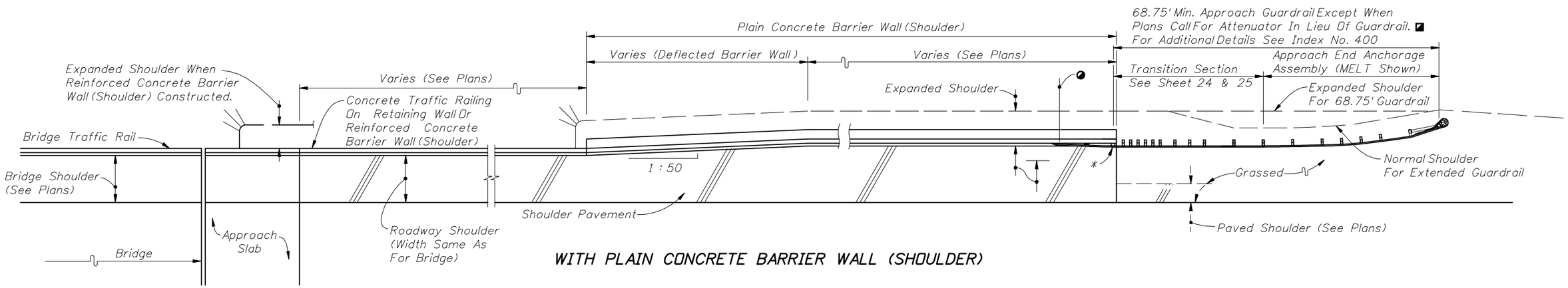


Note: All longitudinal reinforcement #4 bars.
Minimum segment length for this wall is 20 feet.
Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Retaining), LF.

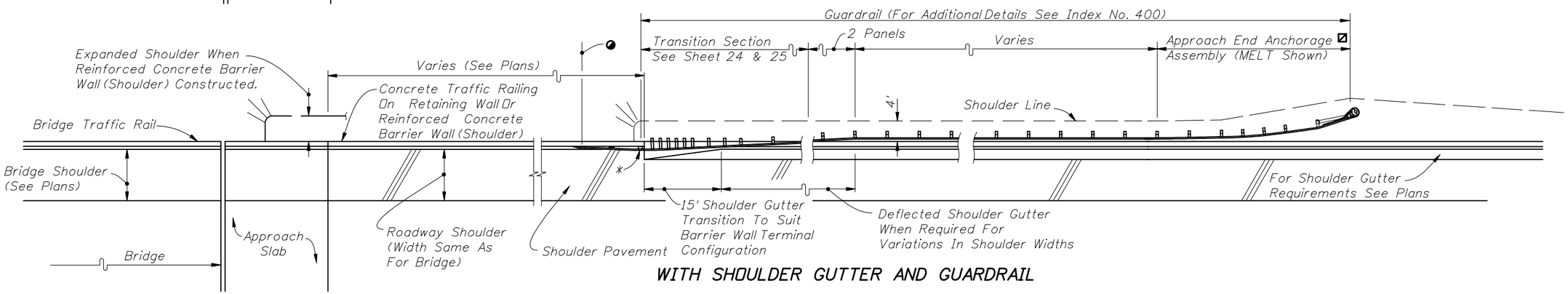
QUANTITIES: Class II Concrete 0.29 CY/LF
Reinforcing Steel 28.6 LBS/LF

BENDING DIAGRAMS

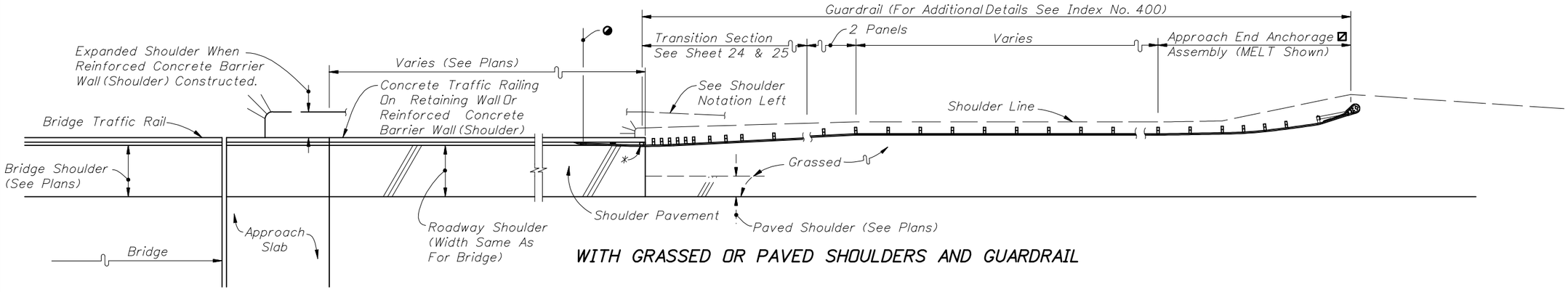
REINFORCED CONCRETE BARRIER WALL (RETAINING)



WITH PLAIN CONCRETE BARRIER WALL (SHOULDER)



WITH SHOULDER GUTTER AND GUARDRAIL



WITH GRASSED OR PAVED SHOULDERS AND GUARDRAIL

◪ To be deleted on trailing ends except for 2-lane 2-way facilities. The tangent guardrail shall be anchored by End Anchorage Type II, Index No. 400.

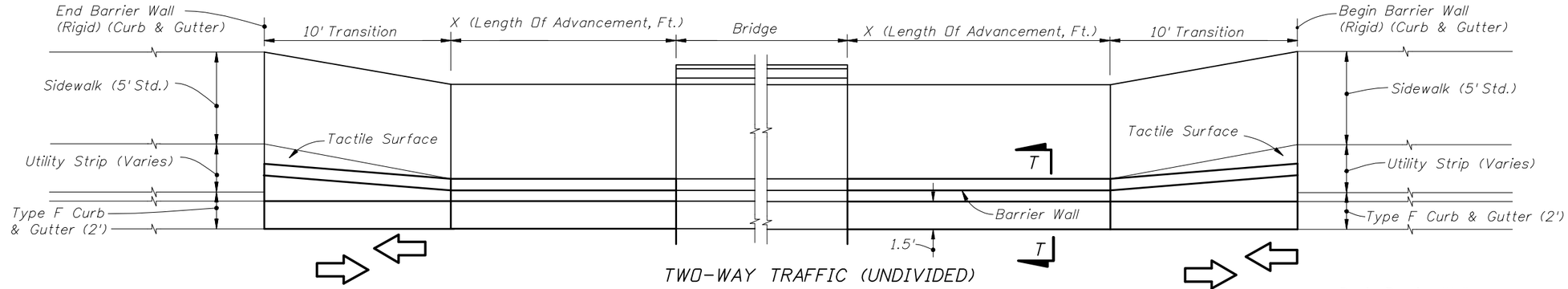
◪ To be deleted on trailing ends except for 2-lane 2-way facilities.

◕ End measurement for guardrail payment when guardrail connected to shoulder barrier walls. See Index No. 400, Detail J for end measurement when guardrail connected to concrete traffic rails constructed with approach slab or on retaining walls.

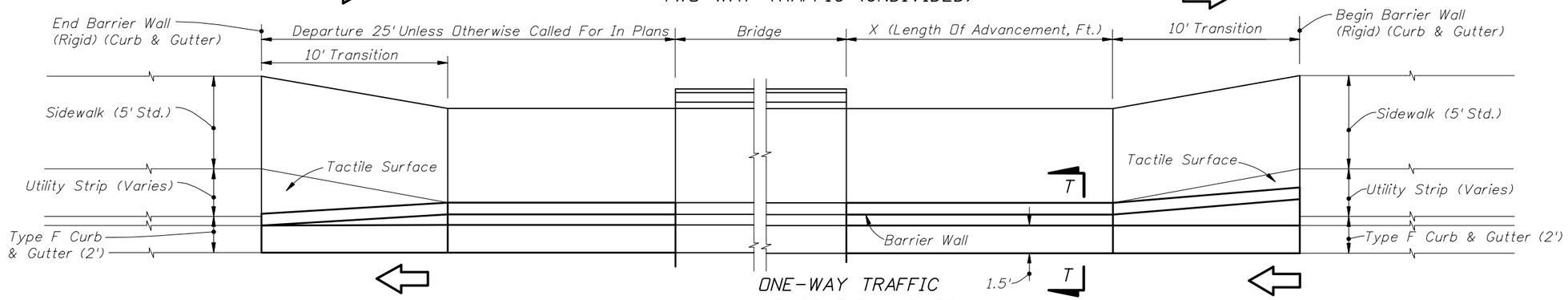
△ Views show approach roadside barriers when length of need exceeds the length of either retaining walls with concrete traffic railings* or Reinforced Concrete Barrier Wall (Shoulder) on shoulders. When either of these rigid barriers alone satisfies the approach length of need, the wall ends shall be shielded by crash cushions, or, by guardrail the same as for bridge traffic rails, as detailed in Index No. 400. See other flagged notes for trailing end treatments. Miscellaneous asphalt paving under guardrail not shown.

* Guardrail connection to concrete traffic railings on retaining walls shall be in accordance with the Structures Design Office Standard Drawings and the plans. Approach guardrail connections to shoulder concrete barrier walls shall be in accordance with the details shown on Sheets 2, 24 and 25 of this Index and Index No. 400, Detail J.

EITHER REINFORCED CONCRETE BARRIER WALL (SHOULDER) OR RETAINING WALL WITH CONCRETE TRAFFIC RAILING △
CONCRETE BARRIER WALLS ON APPROACHES TO BRIDGES



TWO-WAY TRAFFIC (UNDIVIDED)



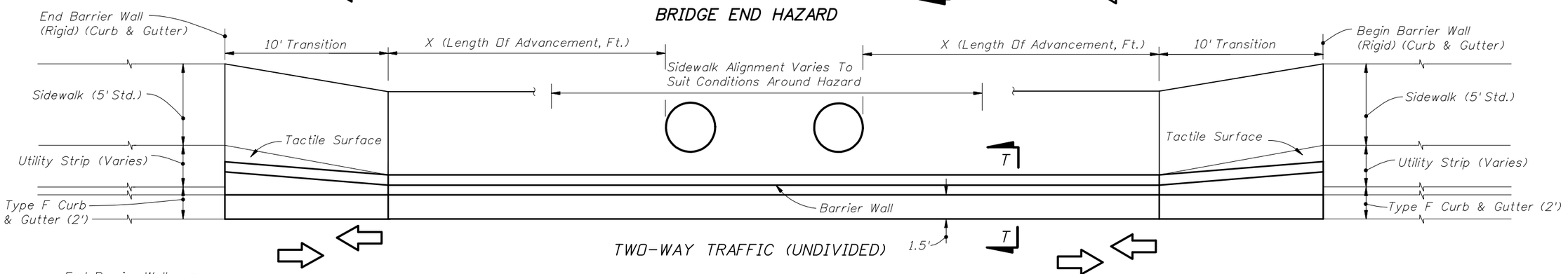
ONE-WAY TRAFFIC
BRIDGE END HAZARD

NOTE:

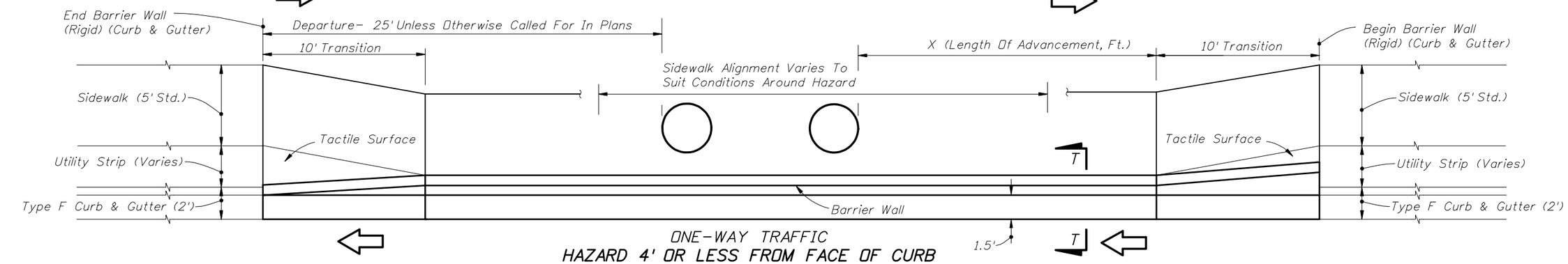
X=Length of advancement in feet for near and opposing approach lanes. See Sheet 14.

For locations without utility strips see Sheet 11.
For transition and sidewalk details see Sheets 12 & 13 and for sectional details see Sheet 14.

The 1.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the details on Sheets 22 & 23.

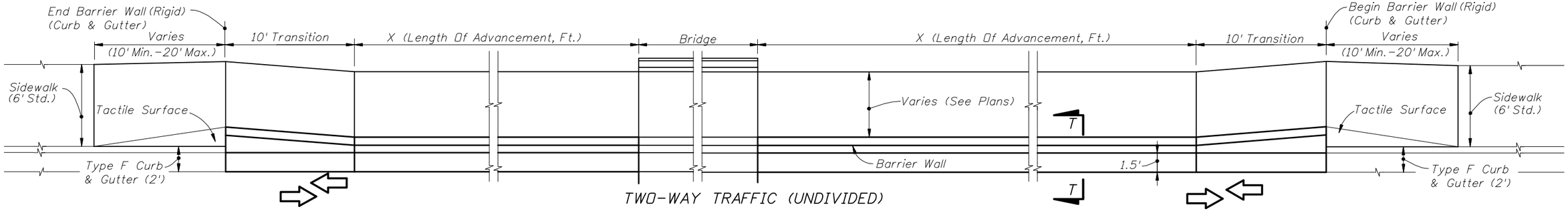


TWO-WAY TRAFFIC (UNDIVIDED)

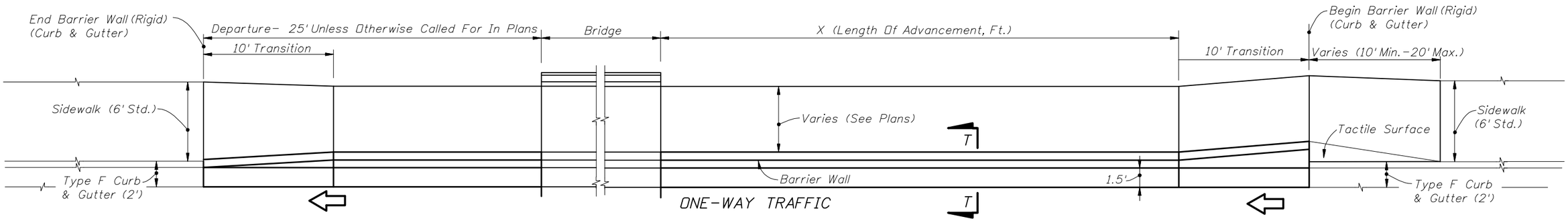


ONE-WAY TRAFFIC
HAZARD 4' OR LESS FROM FACE OF CURB

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) ● CURB AND GUTTER WITH UTILITY STRIP AND WITH ADJACENT BICYCLE LANE

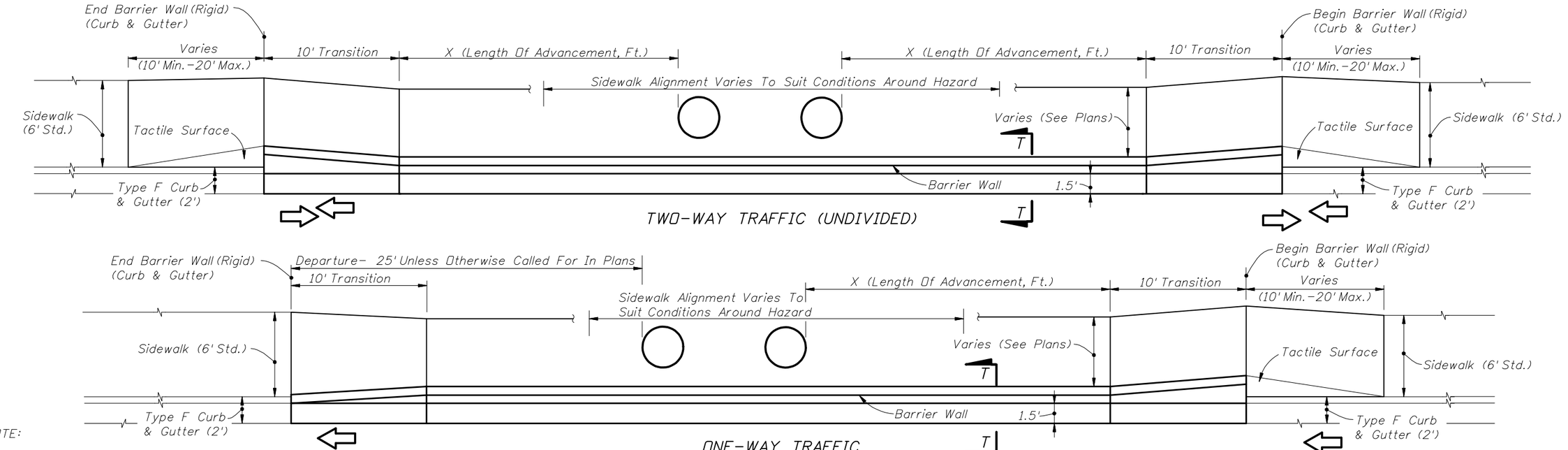


TWO-WAY TRAFFIC (UNDIVIDED)



ONE-WAY TRAFFIC

BRIDGE END HAZARD



TWO-WAY TRAFFIC (UNDIVIDED)

ONE-WAY TRAFFIC

HAZARD 4' OR LESS FROM FACE OF CURB

NOTE:

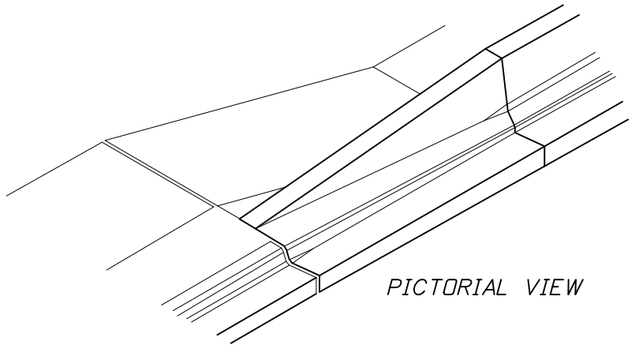
X=Length of advancement in feet for near and opposing approach lanes. See Sheet 14.

For locations with utility strips see Sheet 10. For transition and sidewalk see Sheets 12 & 13, for sectional details see Sheet 14.

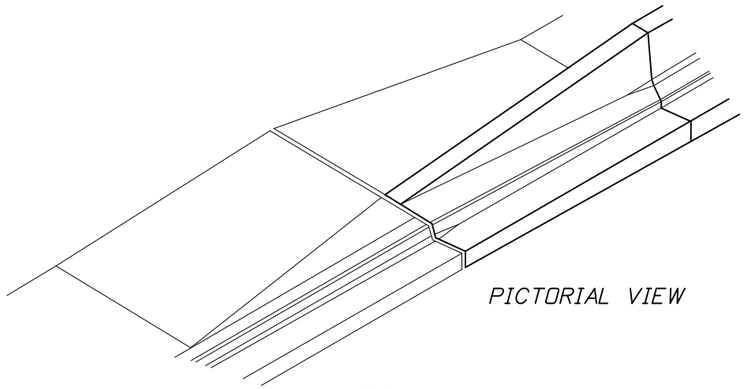
The 1.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the detail on Sheets 22 & 23.

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)
CURB AND GUTTER WITHOUT UTILITY STRIP AND WITH ADJACENT BICYCLE LANE

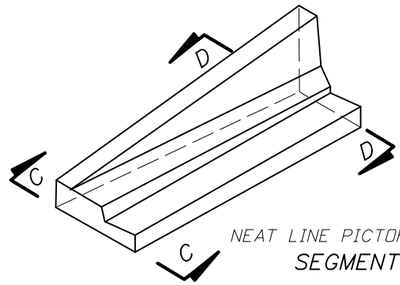
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/07	Sheet No. 11 of 25
	CONCRETE BARRIER WALL		Index No. 410



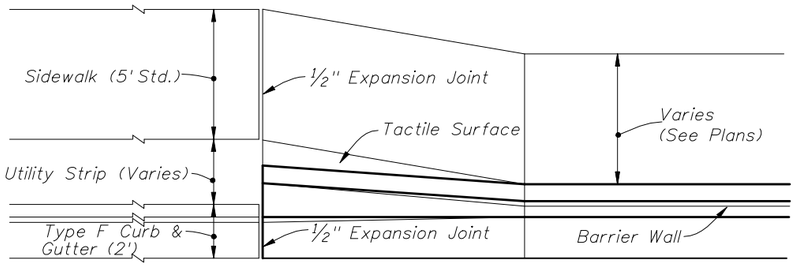
PICTORIAL VIEW



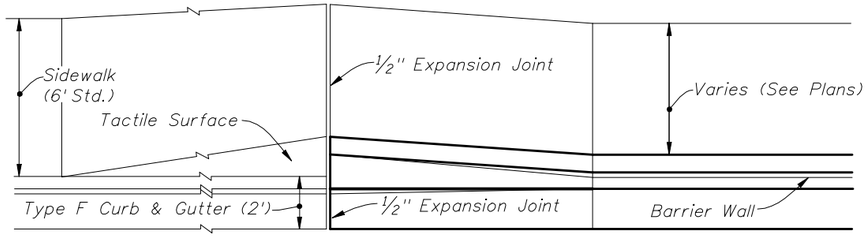
PICTORIAL VIEW



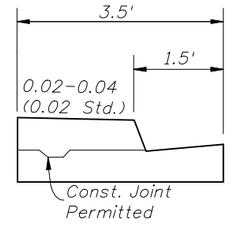
NEAT LINE PICTORIAL VIEW
SEGMENT



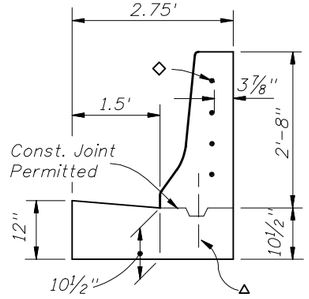
PLAN
WITH UTILITY STRIP



PLAN
WITHOUT UTILITY STRIP

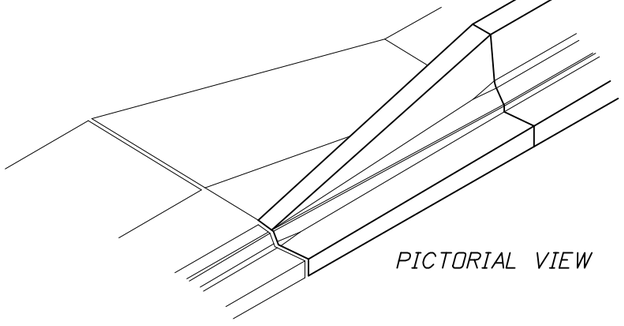


SECTION CC

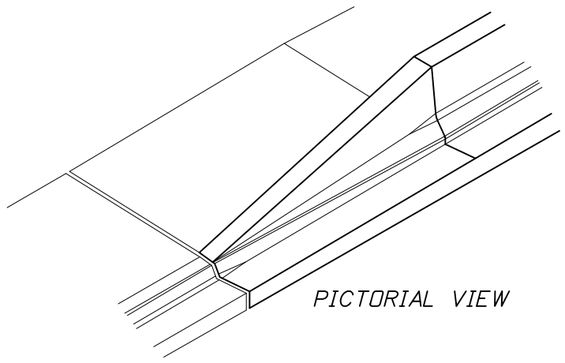


SECTION DD

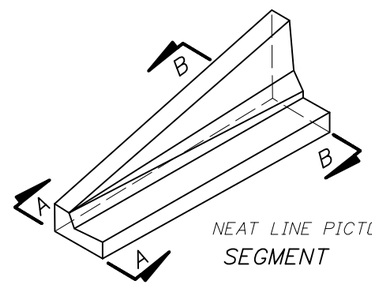
TWO-WAY TRAFFIC (OPPOSING LANE APPROACH)



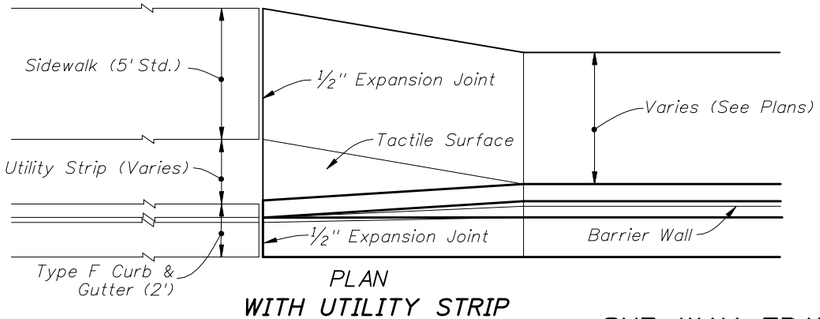
PICTORIAL VIEW



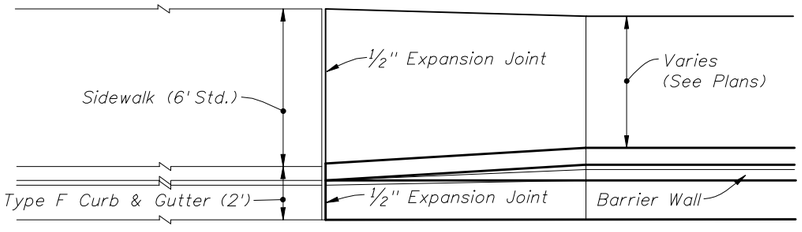
PICTORIAL VIEW



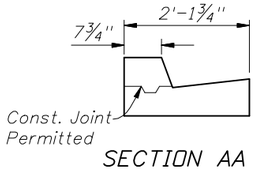
NEAT LINE PICTORIAL VIEW
SEGMENT



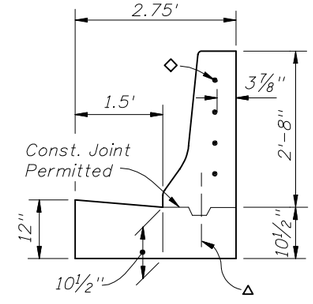
PLAN
WITH UTILITY STRIP



PLAN
WITH UTILITY STRIP



SECTION AA



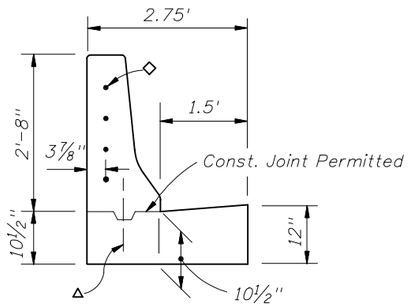
SECTION BB

ONE-WAY TRAFFIC (TRAILING END)

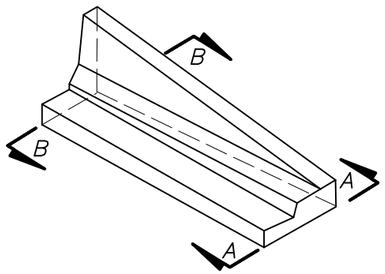
CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) ● TRANSITION SEGMENTS ● WITH ADJACENT BICYCLE LANE

◇ See Notes Sheet 13
△ See Notes Sheet 13

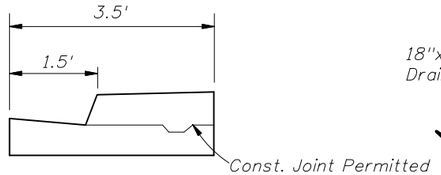
	2010 FDOT Design Standards	Last Revision 07/01/07	Sheet No. 12 of 25
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	CONCRETE BARRIER WALL		Index No. 410



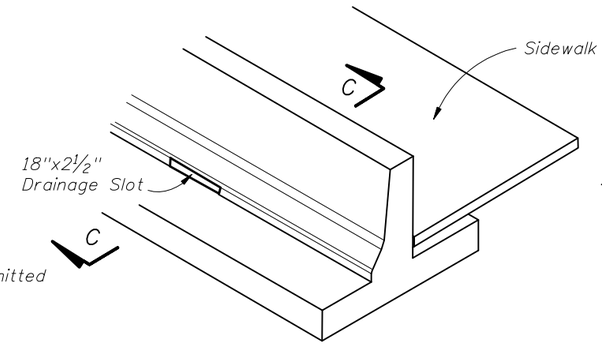
SECTION BB



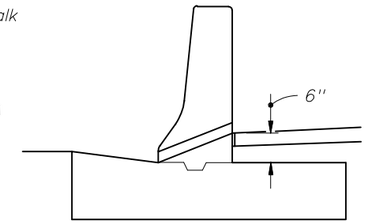
WITH OR WITHOUT UTILITY STRIP
NEAT LINE PICTORIAL VIEW



SECTION AA



NEAT LINE PICTORIAL VIEW



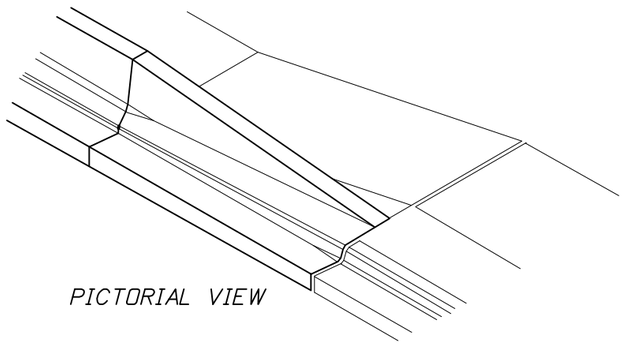
SECTION CC

NOTE: Drainage slots shall be located at all low points along the sidewalk, and, unless otherwise shown in the plans, slots shall be spaced at intervals not exceeding 50' in fill sections and 20' in cut sections. Slots shall be located such that only one bar is cut away or deleted in front and back lines of vertical reinforcement.

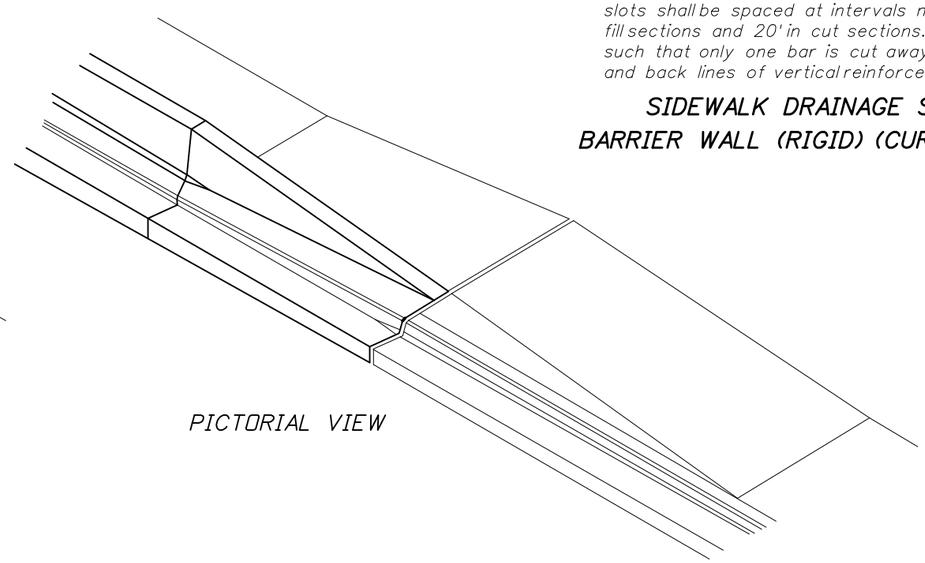
SIDEWALK DRAINAGE SLOT FOR BARRIER WALL (RIGID) (CURB & GUTTER)

◇ *Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner:*
Four 1" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and #6 bars 15" long set in an Adhesive Bonded Material System. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 15 lb. Type I asphalt-saturated roofing felt with the ends crimped.

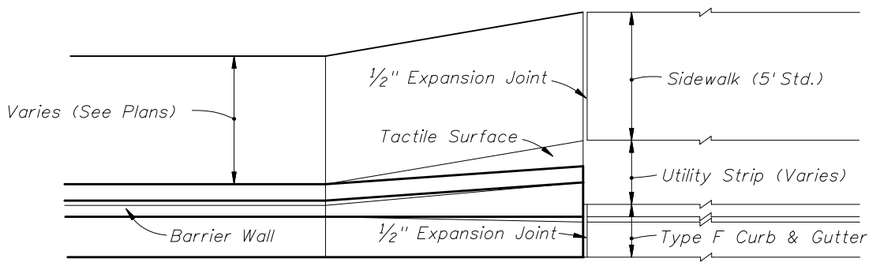
△ *When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Doweled To The Footing In The Following Manner:*
Five #5 bars 15" long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 12" from the barrier wall. Dowels may be placed within or adjacent to the keyway.



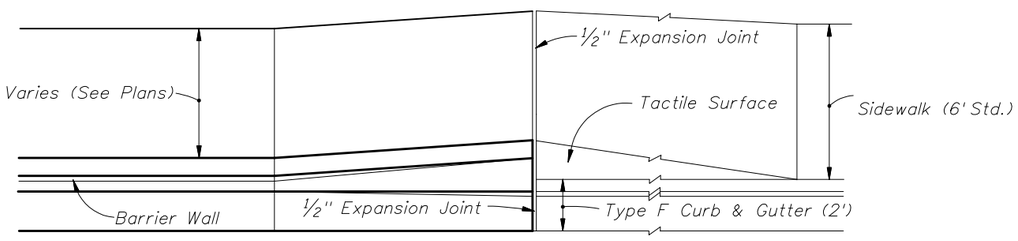
PICTORIAL VIEW



PICTORIAL VIEW



PLAN
WITH UTILITY STRIP

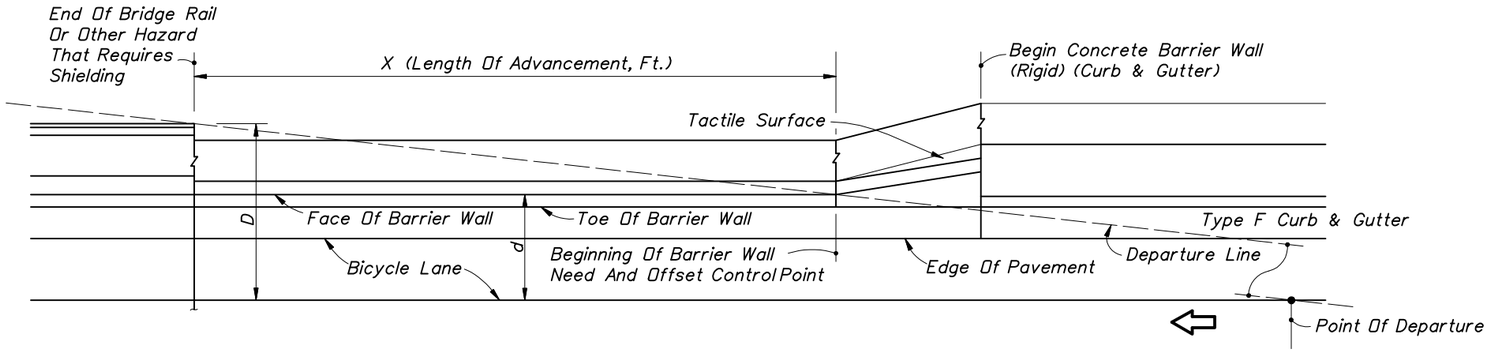


PLAN
WITHOUT UTILITY STRIP

RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE HAND

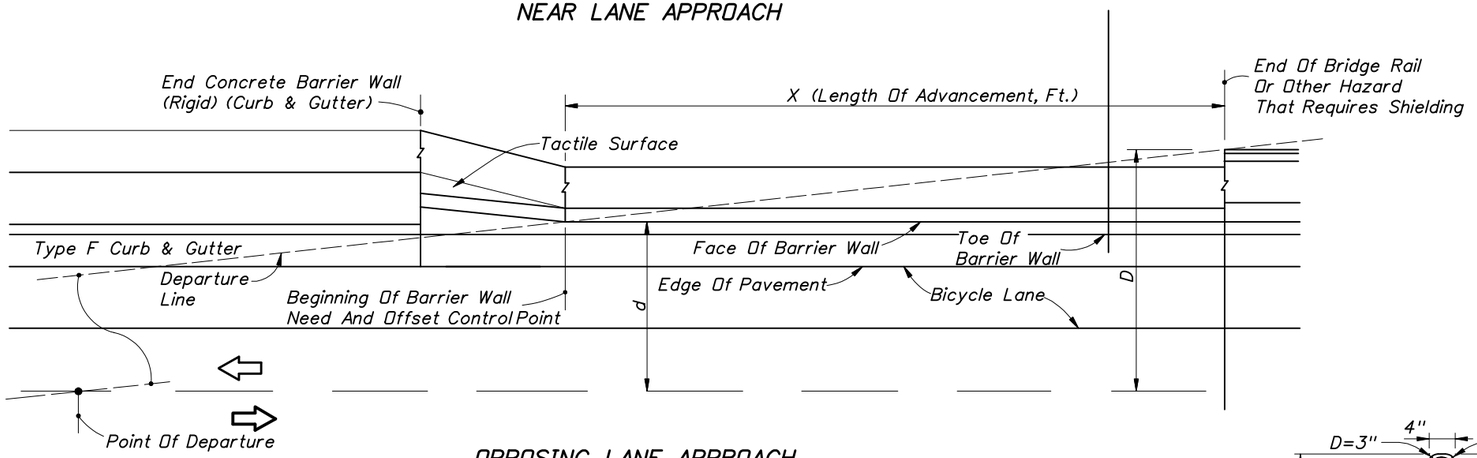
ONE-WAY AND TWO-WAY TRAFFIC (NEAR LANE APPROACH)

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) ● TRANSITION SEGMENT ● WITH ADJACENT BICYCLE LANE



RIGHT SIDE APPROACH SHOWN - LEFT SIDE OPPOSITE HAND

NEAR LANE APPROACH



OPPOSING LANE APPROACH

WITH OR WITHOUT UTILITY STRIP - UTILITY STRIP SHOWN
- SEE SHEET 10 & 11 FOR APPLICATIONS

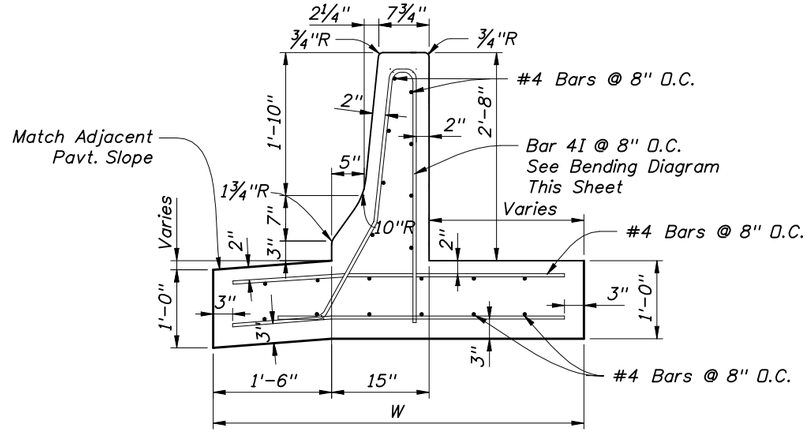
Design Speed mph	Length Of Advancement, Ft. (X)
≤45	=16 (D-d)
Note: The minimum length of advancement for both near and opposing lane approaches is 40'.	

Equation Variables:

D= Distance in feet from near edge of the near approach traffic lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities D is measured from the inside edge of the near approach traffic lane.

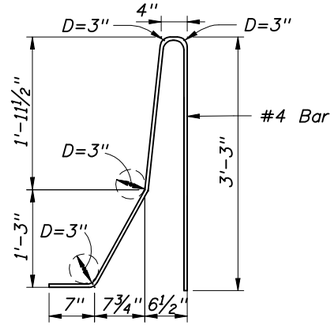
d= Distance in feet from near edge of the near approach traffic lane to the face of barrier (at offset control point). For left side hazards on two-way undivided facilities d is measured from the inside edge of the nearest opposing traffic lane.

LENGTH OF ADVANCEMENT

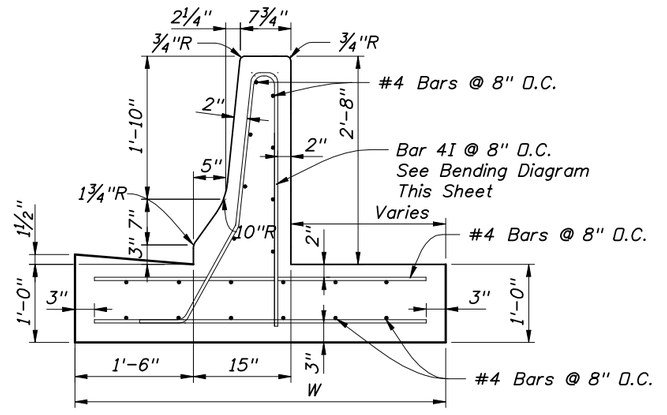


FOR HIGH SIDE SECTION TT

QUANTITIES			
Length* Of Barrier Wall	W	Class II Conc. CY Per Lin. Ft.	Rein. Steel Lbs. Per Lin. Ft.
>73'	4'-9"	0.26	29
56' to 73'	5'-6"	0.29	32
48' to 55'	6'-0"	0.31	34
41' to 47'	6'-6"	0.33	37
36' to 41'	7'-0"	0.35	39
29' to 35'	8'-0"	0.38	42



BAR 4I BENDING DIAGRAM



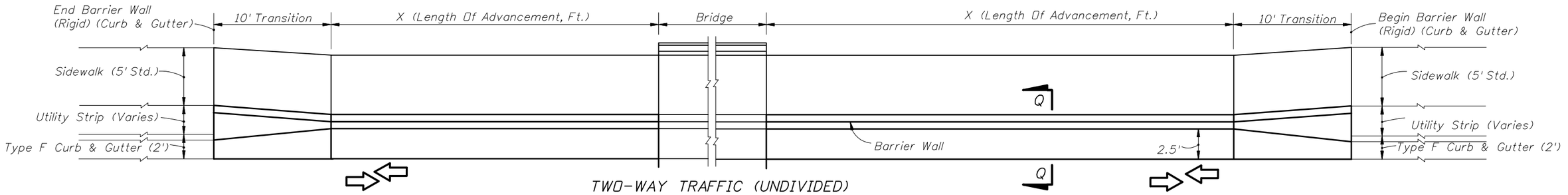
FOR LOW SIDE SECTION TT

Note: All longitudinal reinforcement #4 bars. Shorter segments due to construction or expansion joint shall be doweled in the manner described for 'Transition Segments' on Sheet 13.

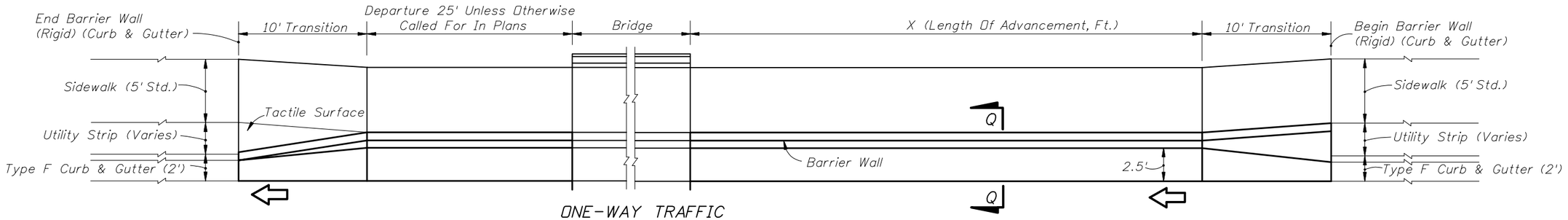
Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'.

For barrier wall inlet details see Index No. 219. Inlet extends into bicycle lane 12". Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Curb & Gutter), LF.

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) WITH ADJACENT BICYCLE LANE

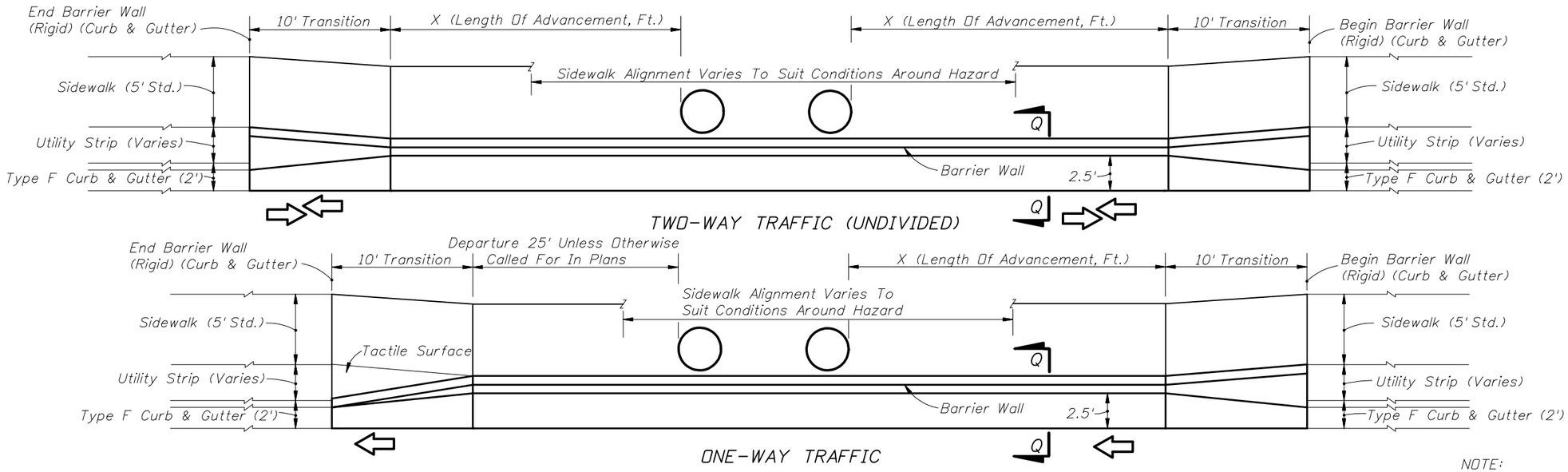


TWO-WAY TRAFFIC (UNDIVIDED)



ONE-WAY TRAFFIC

BRIDGE END HAZARD



TWO-WAY TRAFFIC (UNDIVIDED)

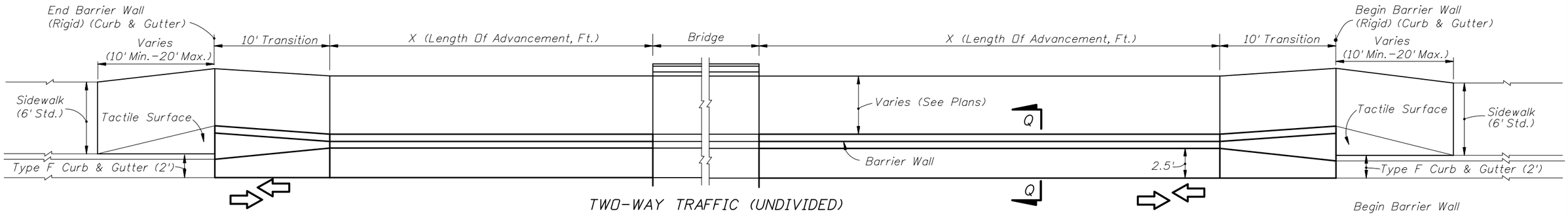
ONE-WAY TRAFFIC

HAZARD 4' OR LESS FROM FACE OF CURB

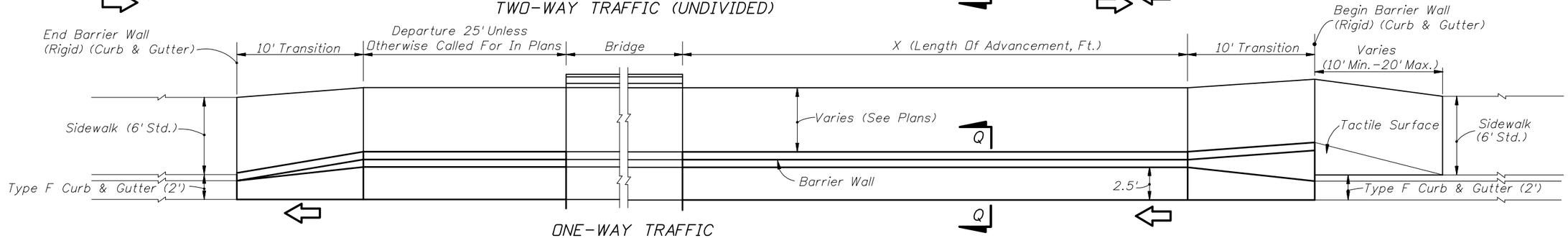
CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)

CURB AND GUTTER WITH UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE

NOTE:
X=Length of advancement in feet for near and opposing approach lanes. See Sheet 19.
For locations without utility strips see Sheet 16.
For transition and sidewalk see Sheets 17 & 18 and for sectional details see Sheet 19.
The 2.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the details on Sheets 22 & 23.

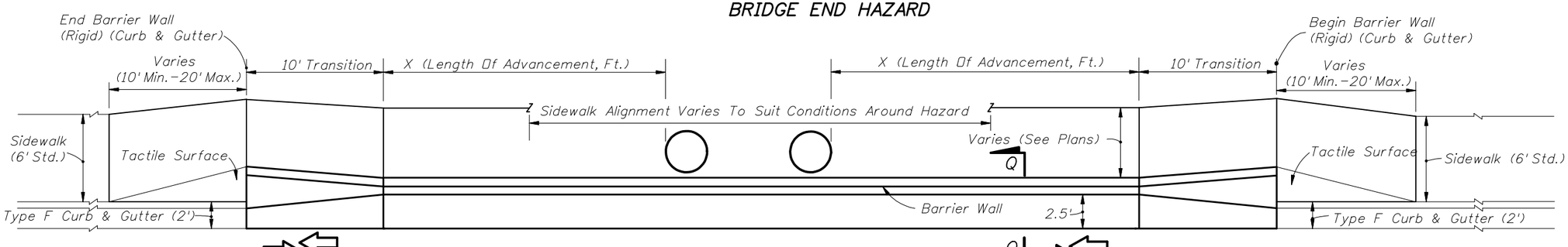


TWO-WAY TRAFFIC (UNDIVIDED)

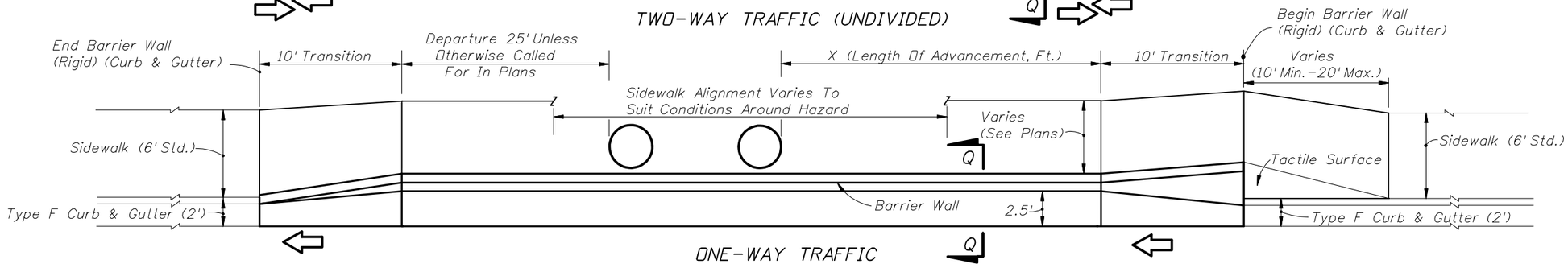


ONE-WAY TRAFFIC

BRIDGE END HAZARD



TWO-WAY TRAFFIC (UNDIVIDED)



ONE-WAY TRAFFIC

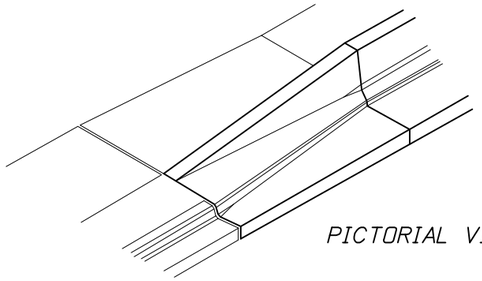
HAZARD 4' OR LESS FROM FACE OF CURB

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)
CURB AND GUTTER WITHOUT UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE

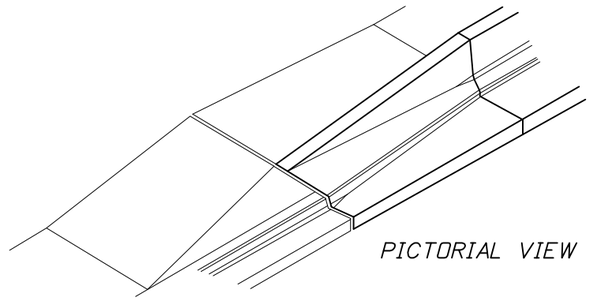
NOTE:
X=Length of advancement in feet for near and opposing approach lanes. See Sheet 19.

For locations with utility strips see Sheet 15. For transition and sidewalk see Sheets 17 & 18 and for sectional details see Sheet 19.

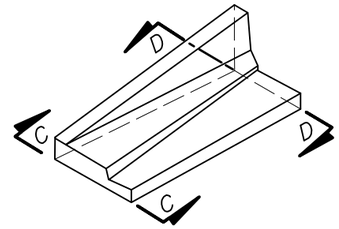
The 2.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the detail on Sheets 22 & 23.



PICTORIAL VIEW

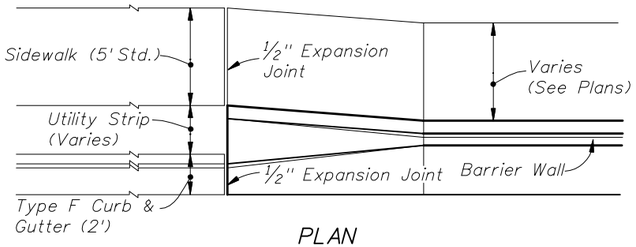


PICTORIAL VIEW



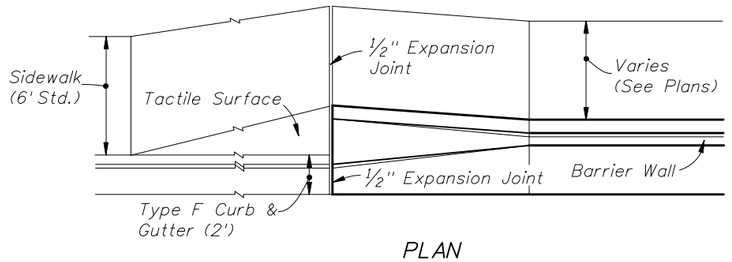
NEAT LINE PICTORIAL VIEW

SEGMENT



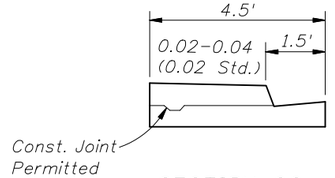
PLAN

WITH UTILITY STRIP

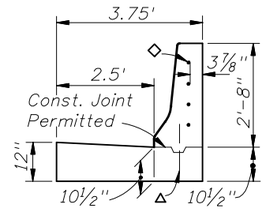


PLAN

WITHOUT UTILITY STRIP

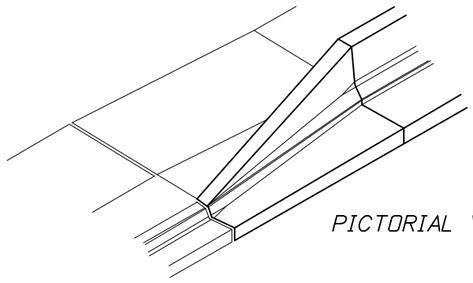


SECTION CC

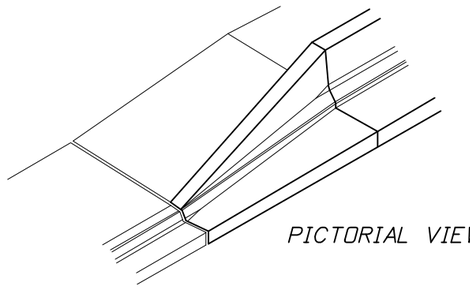


SECTION DD

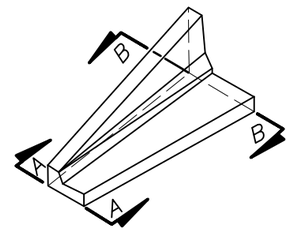
TWO-WAY TRAFFIC (OPPOSING LANE APPROACH)



PICTORIAL VIEW

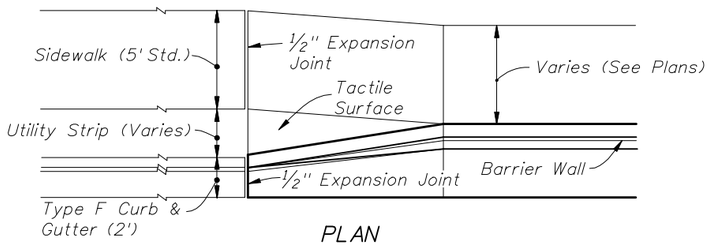


PICTORIAL VIEW



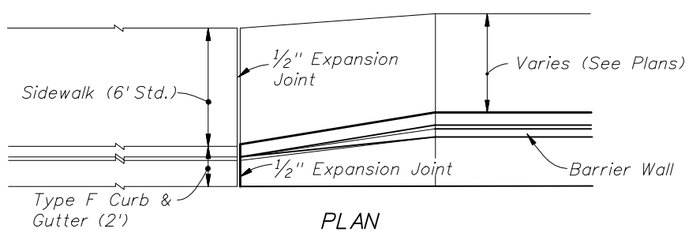
NEAT LINE PICTORIAL VIEW

SEGMENT



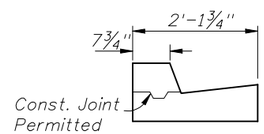
PLAN

WITH UTILITY STRIP

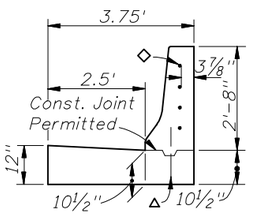


PLAN

WITH UTILITY STRIP



SECTION AA



SECTION BB

ONE-WAY TRAFFIC (TRAILING END)

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENTS • WITHOUT ADJACENT BICYCLE LANE

◇ See Sheet 19

△ See Sheet 19

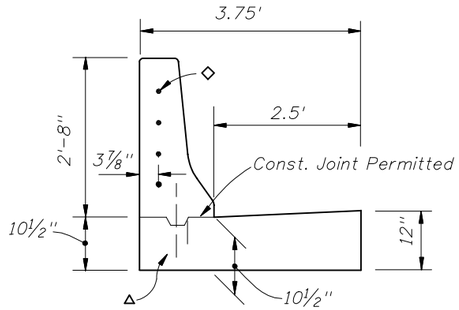
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

CONCRETE BARRIER WALL

Last Revision	Sheet No.
07/01/07	17 of 25

Index No. 410



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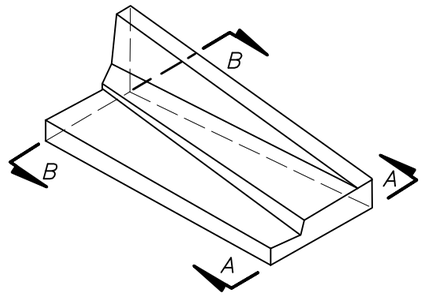
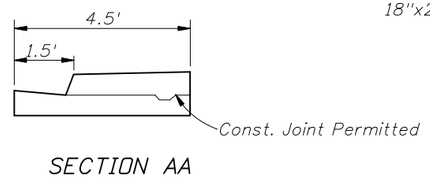
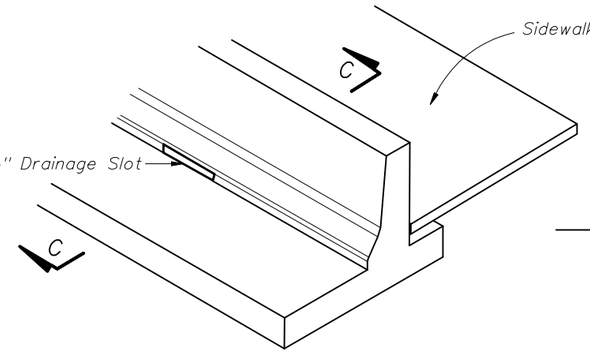


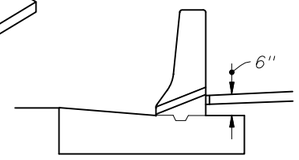
WITH OR WITHOUT UTILITY STRIP
NEAT LINE PICTORIAL VIEW



SECTION AA



NEAT LINE PICTORIAL VIEW



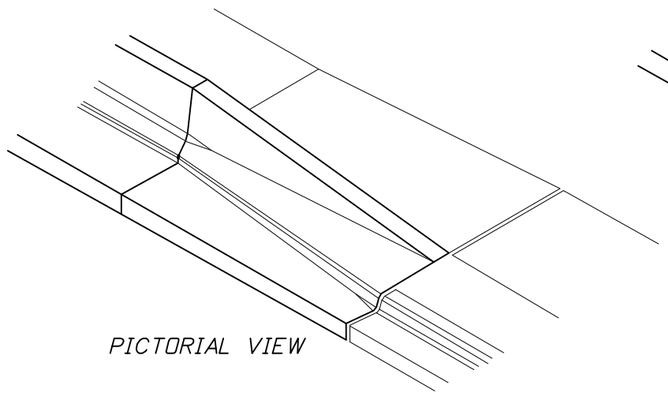
SECTION CC

NOTE: Drainage slots shall be located at all low points along the sidewalk, and, unless otherwise shown in the plans, slots shall be spaced at intervals not exceeding 50' in fill sections and 20' in cut sections. Slots shall be located such that only one bar is cut away or deleted in front and back lines of vertical reinforcement.

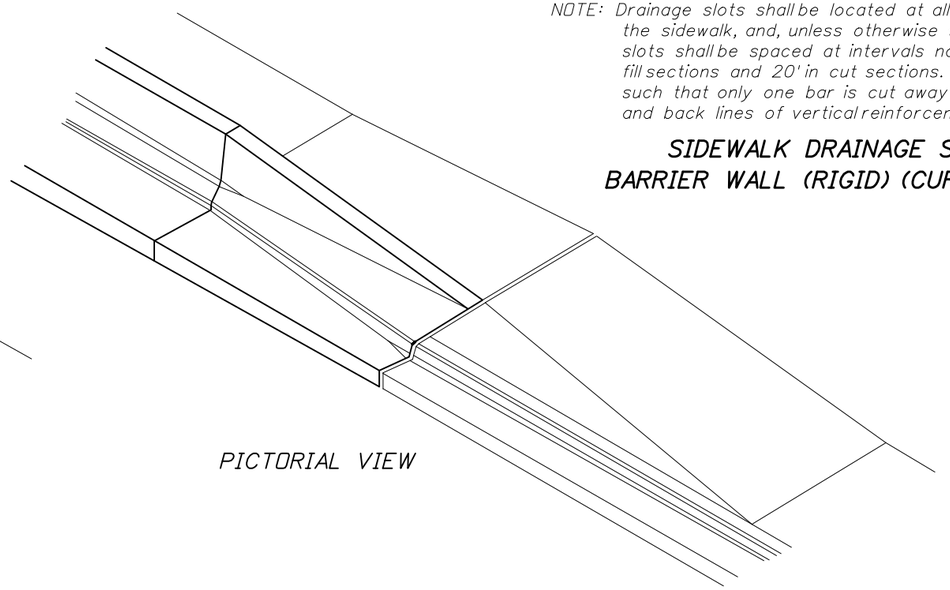
SIDEWALK DRAINAGE SLOT FOR BARRIER WALL (RIGID) (CURB & GUTTER)

◇ Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner: Four 1" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and #6 bars 15" long set in an Adhesive Bonded Material System. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 15 lb. Type I asphalt-saturated roofing felt with the ends crimped.

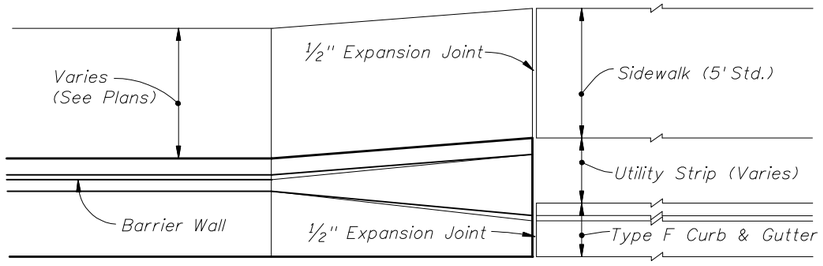
△ When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Doweled To The Footing In The Following Manner: Five #5 bars 15" long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 12" from the barrier wall. Dowels may be placed within or adjacent to the keyway.



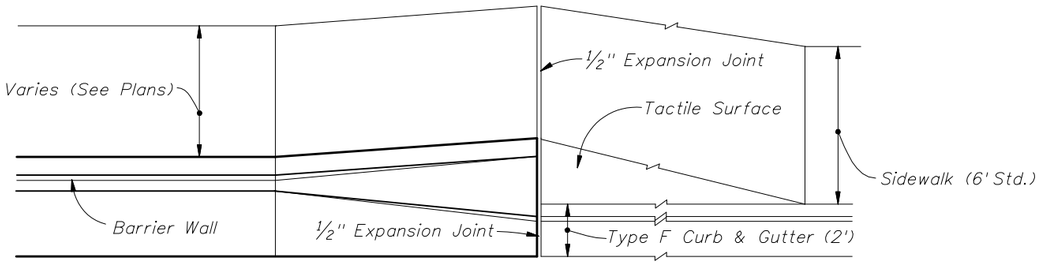
PICTORIAL VIEW



PICTORIAL VIEW



PLAN
WITH UTILITY STRIP

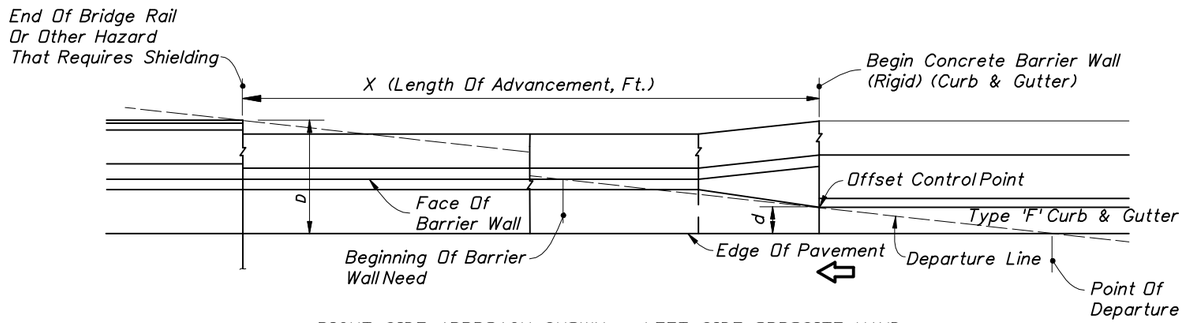


PLAN
WITHOUT UTILITY STRIP

RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE HAND

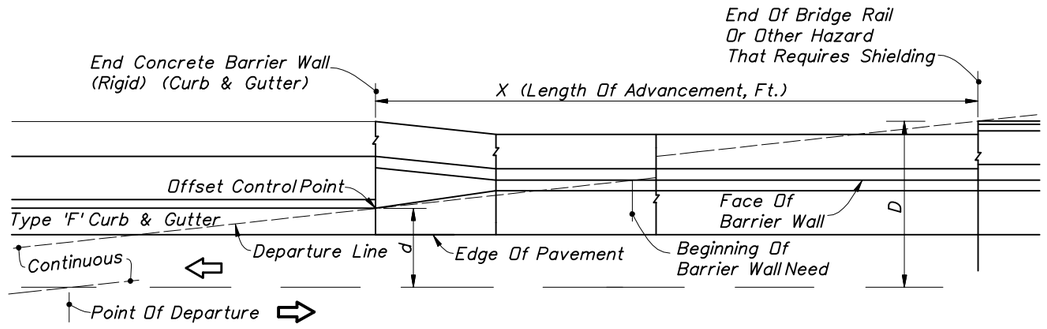
ONE-WAY AND TWO-WAY TRAFFIC (NEAR LANE APPROACH)

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) ● TRANSITION SEGMENT ● WITHOUT ADJACENT BICYCLE LANE



RIGHT SIDE APPROACH SHOWN - LEFT SIDE OPPOSITE HAND

NEAR LANE APPROACH



OPPOSING LANE APPROACH

WITH OR WITHOUT UTILITY STRIP - UTILITY STRIP SHOWN
SEE SHEET 15 & 16 FOR APPLICATIONS

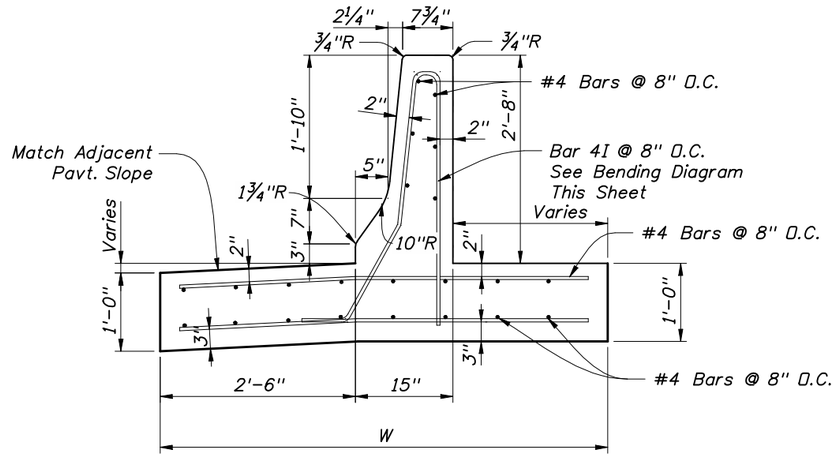
Design Speed mph	Length Of Advancement, Ft.(X)
≤45	16 (D-d)
Note: The minimum length of advancement for both near and opposing lane approaches is 40'.	

Equation Variables:

D= Distance in feet from near edge of the near approach traffic lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities D is measured from the inside edge of the near approach traffic lane.

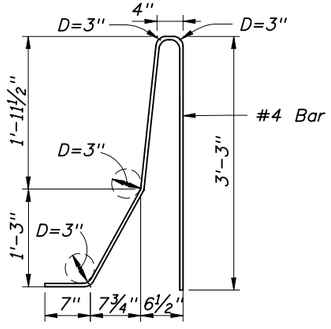
d= Distance in feet from near edge of the near approach traffic lane to the face of curb (at offset control point). For left side hazards on two-way undivided facilities d is measured from the inside edge of the nearest opposing traffic lane.

LENGTH OF ADVANCEMENT

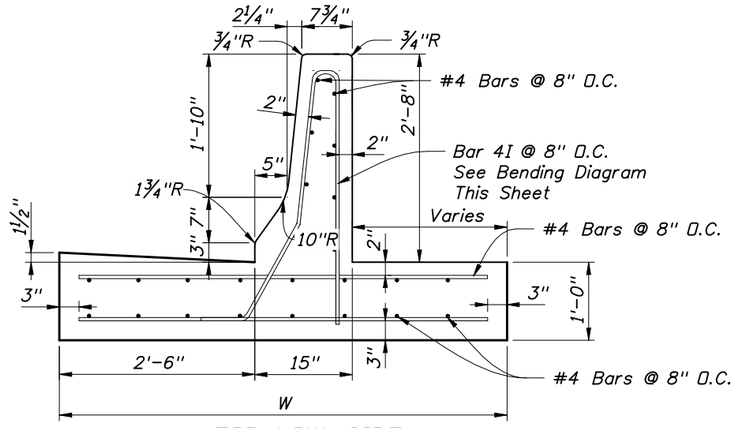


FOR HIGH SIDE
SECTION QQ

QUANTITIES			
Length* Of Barrier Wall	W	Class II Conc. CY Per Lin. Ft.	Rein. Steel Lbs. Per Lin. Ft.
>73'	4'-9"	0.26	29
56' to 73'	5'-6"	0.29	32
48' to 55'	6'-0"	0.31	34
41' to 47'	6'-6"	0.33	37
36' to 41'	7'-0"	0.35	39
29' to 35'	8'-0"	0.38	42



BAR 4I
BENDING DIAGRAM



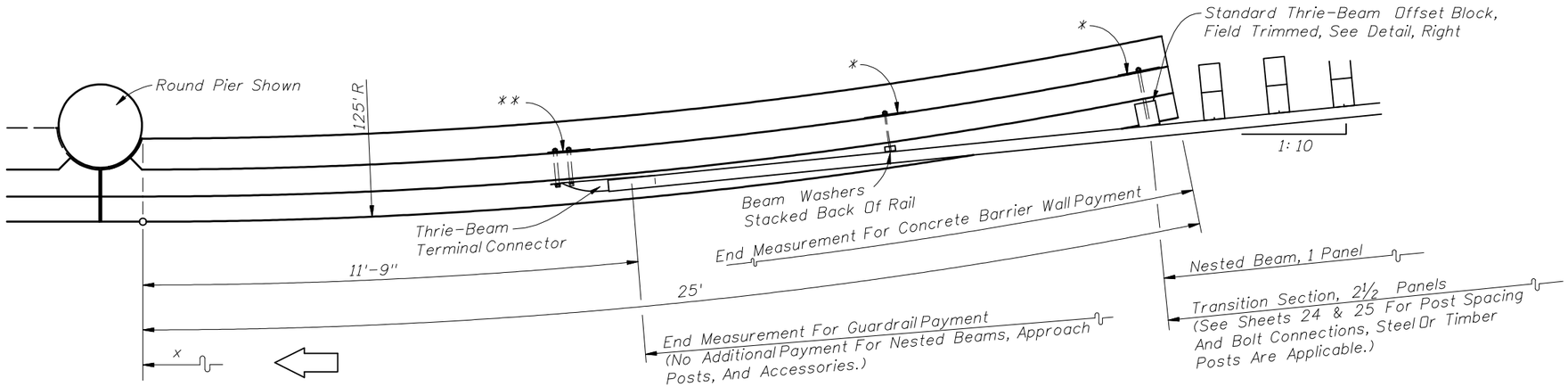
FOR LOW SIDE
SECTION QQ

Note: All longitudinal reinforcement #4 bars. Shorter segments due to construction or expansion joint shall be dowled in the manner described for 'Transition Segments' on Sheet 18.

Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'.

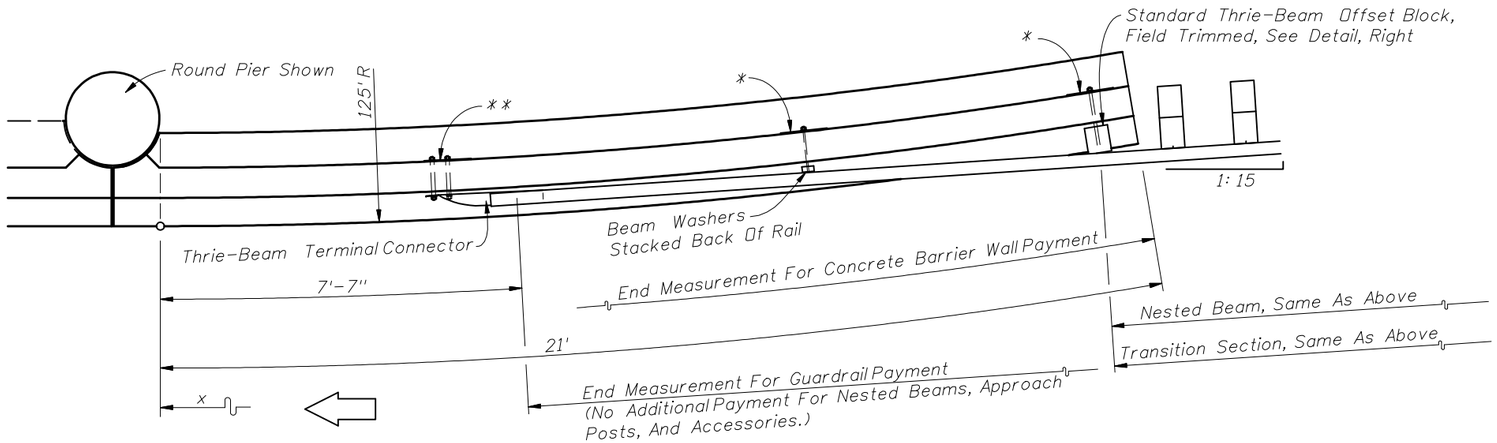
For barrier wall inlet details see Index No. 219. Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Curb & Gutter), LF.

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) ● WITHOUT ADJACENT BICYCLE LANE



PLAN FOR DESIGN SPEED ≤ 45 MPH

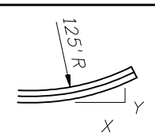
NOTE:
For details at Rigid Hazard see Sheet 21.



PLAN FOR DESIGN SPEED ≥ 50 MPH

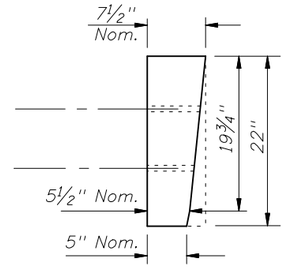
Note: For continuous barrier between independent bents or single pier columns see Sheets 21-23.

ARC LENGTH (FT)	DISTANCE "x" (FT)	OFFSETS "y" (FT)
4	4.00	0.06
8	7.99	0.26
12	11.98	0.58
16	15.96	1.02
20	19.91	1.60
21	20.91	1.76
24	23.85	2.30
25	24.83	2.49



Note:
Wall may be constructed in chords having lengths ≤ 4 feet.

SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS WHEN GUARDRAIL OFFSET FROM HAZARD LESS THAN 3'



FOR USE WITH EITHER 1:10 OR 1:15 GUARDRAIL TRANSITIONS

STANDARD THRIE-BEAM OFFSET BLOCK (FIELD TRIMMED)

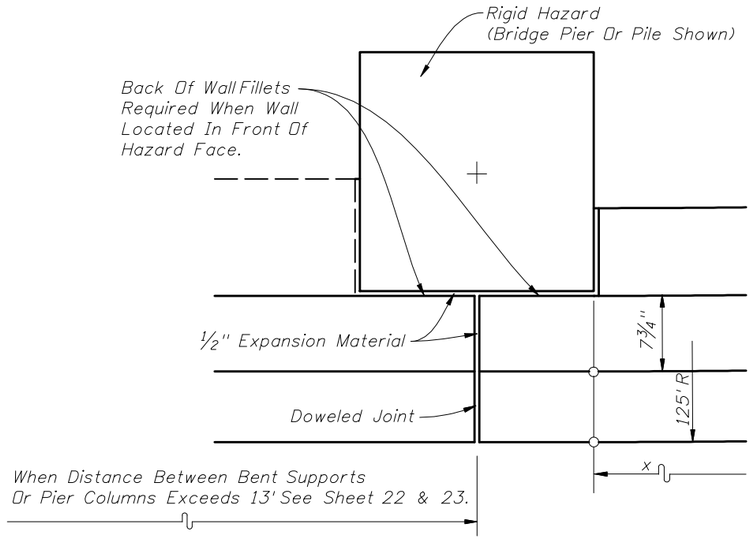
NOTES

1. This wall is intended for use where the wall has bearing against the hazard; when the length between bent supports or pier columns exceeds 13', the affected segments shall be constructed in accordance with the detail for 'Reinforced Concrete Barrier Wall (Shoulder)', 'Section TT' or 'Section QQ', this index.
   In cases where the barrier wall and slope pavement or other structure would occupy the same location, the wall and structure are to be modified as detailed in the plans.
2. The barrier wall radial segments are intended for use on approach and trailing ends of both one-way and two-way facilities. The guardrail connections shown on this sheet apply to one-way approaches and to the approaching and trailing ends of two-lane two-way facilities. On trailing ends of two-way multilane and one-way facilities the end connection on Sheet 1 may be used.

   For walls with normal offsets from hazards and their guardrail connections, see Sheet 24 & 25.
3. Refer to Index No. 400 for additional guardrail information.
4. Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Shoulder), LF.

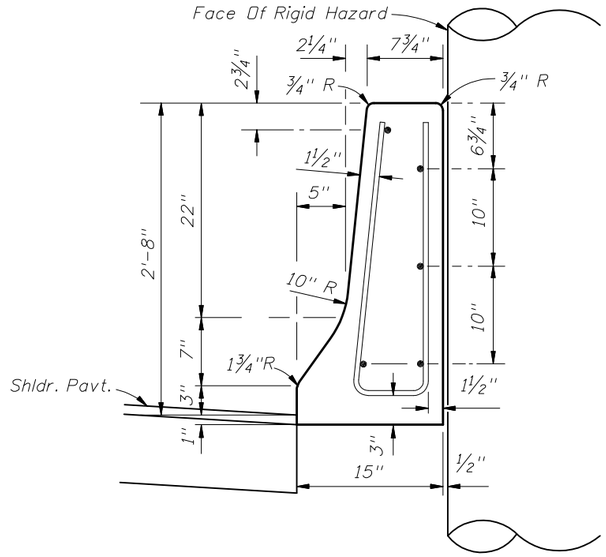
* 12"x12"x¼" galvanized steel back-up plate with ⅝" post bolts (either 14" or 18" long) and nuts with ⅝" plain round washers under nuts.

** Attach thrie-beam terminal connector to shoulder barrier wall with a 21"x12"x⅝" thrie beam terminal connector plate and 5-⅞"x12" long HS hex bolts and nuts with ⅞" plain round washers under heads and nuts.

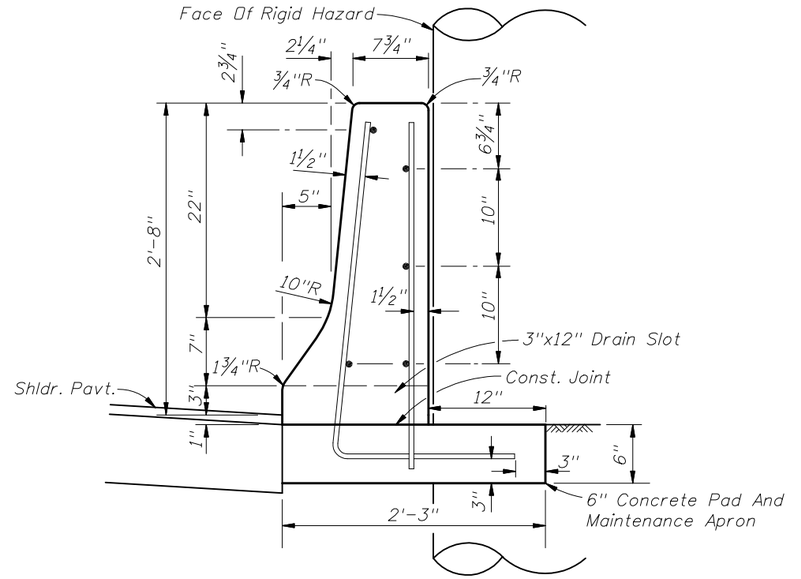


BARRIER WALL AT SQUARE OR RECTANGULAR SHAPED HAZARD

PARTIAL PLAN

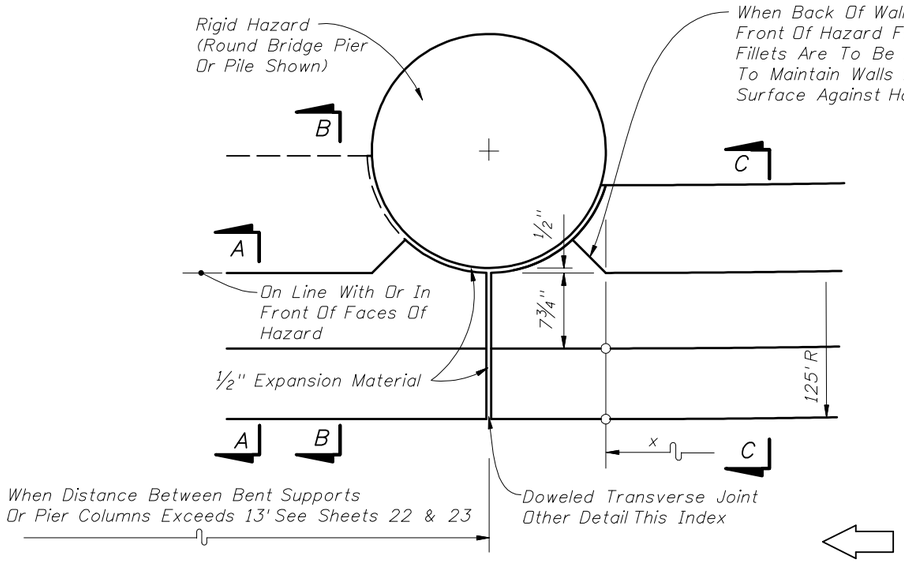


SECTION AA



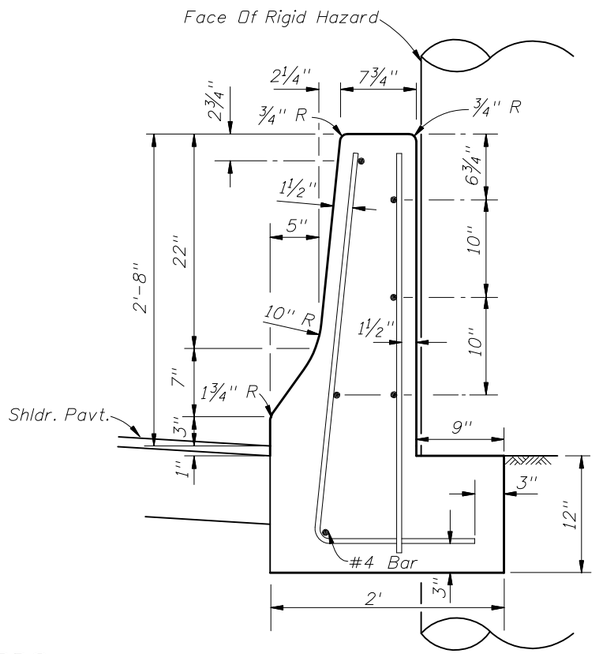
TO BE CONST. IN LIEU OF SECTION AA WHEN THRU DRAINAGE REQUIRED

SECTION BB



BARRIER WALL AT ROUND HAZARD

PARTIAL PLAN

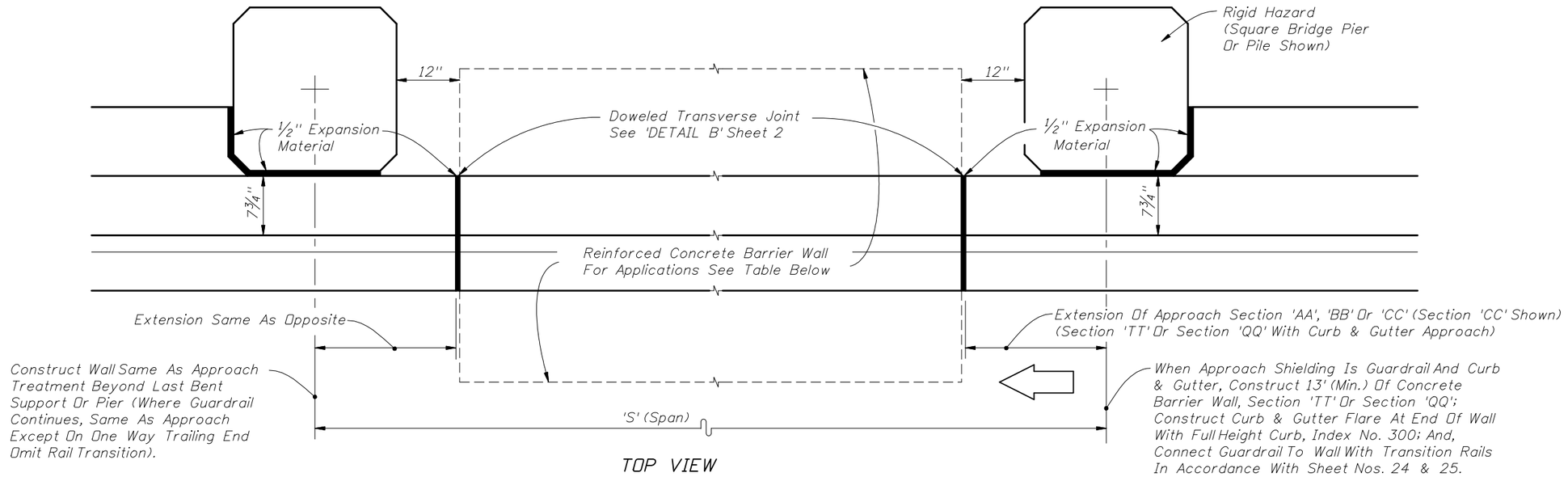


SECTION CC

SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS WHEN GUARDRAIL OFFSET FROM HAZARD LESS THAN 3'

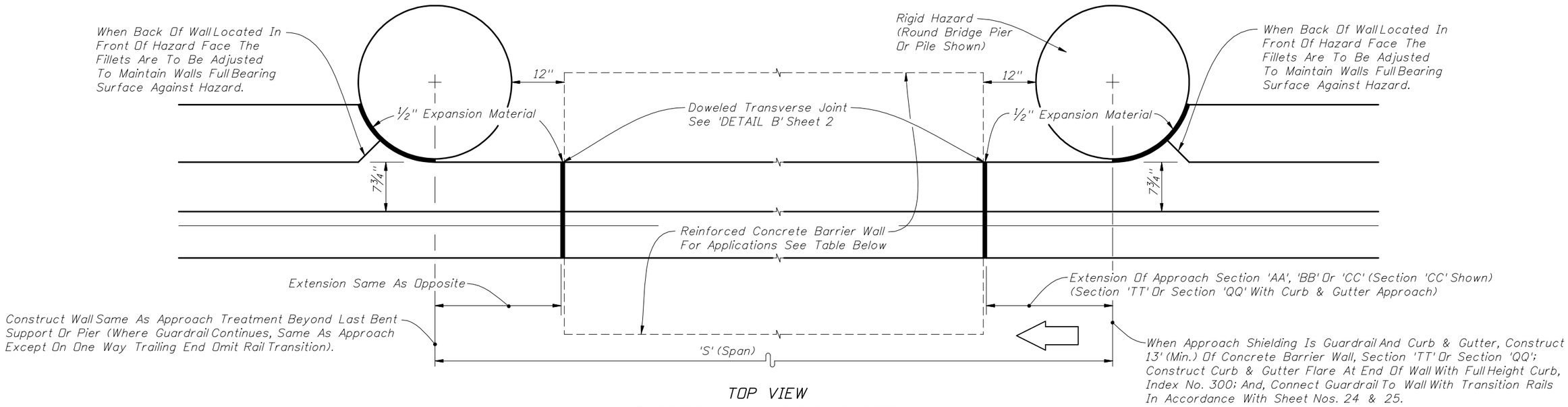
NOTE:
All vertical reinforcement #4 bars at 12" centers.
All horizontal reinforcement #5 bars.

	2010 FDOT Design Standards	Last Revision	Sheet No.
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	**CONCRETE BARRIER WALL**	07/01/05	21 of 25
		Index No.	410



TOP VIEW

BARRIER WALL AT SQUARE PIER



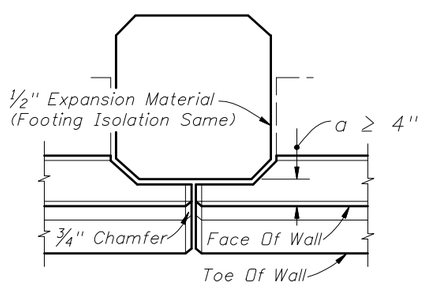
TOP VIEW

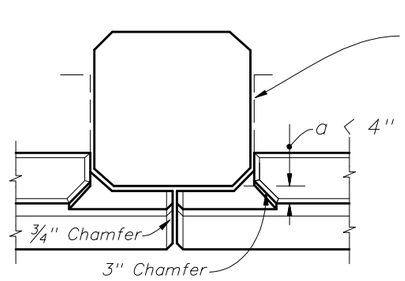
BARRIER WALL AT ROUND PIER

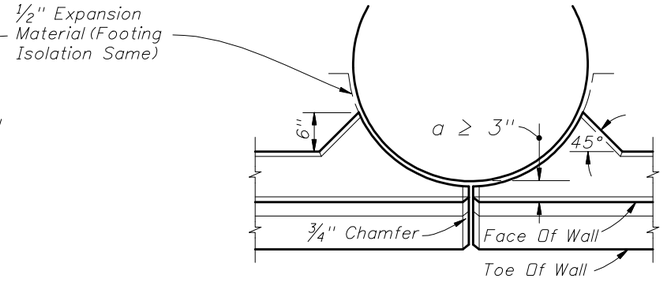
CONCRETE BARRIER WALL WHEN SPAN BETWEEN BENT SUPPORTS OR PIER COLUMNS EXCEEDS 13'

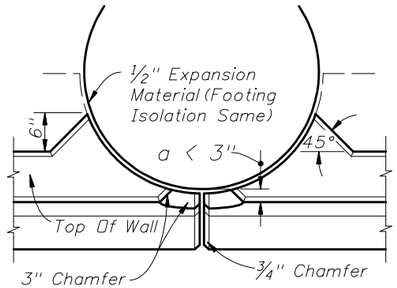
'S' Feet	REINFORCED CONCRETE BARRIER WALL APPLICATIONS
>13'	'Reinforced Concrete Barrier Wall (Shoulder)' With Flush Shoulders; Or, Section 'TT' Or Section 'QQ' With Curb & Gutter
Barrier wall footings that conflict with bent or pier foundations shall be modified as described in the plans.	

CONCRETE BARRIER WALL WHEN GUARDRAIL OFFSET FROM BENT OR PIER LESS THAN 3 FEET OR WHERE WALL STEM ABUTS SUPPORTS OR PIER COLUMN







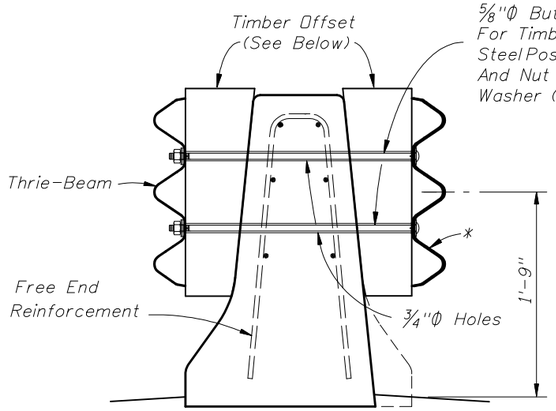


TOP VIEWS

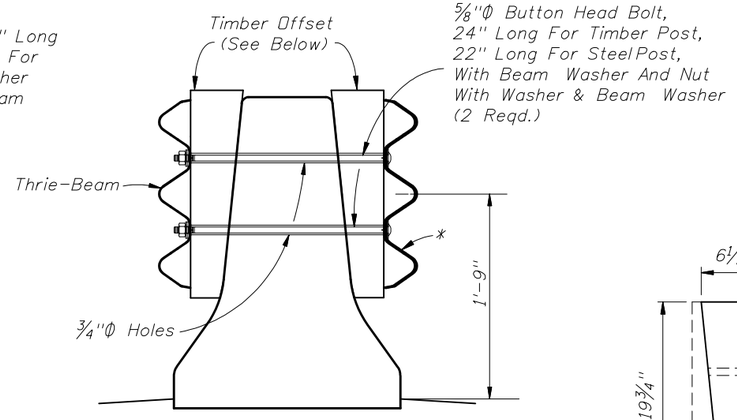
'a' Varies (Circular Or Octagonal Hazard Not More Than 2" In Front Of Face Of Wall).
Applicable To Sections 'AA' And 'BB' With Spans Of ≤ 13', And To Section 'CC', Sheet No. 21.
Applicable To Other Rigid Walls Of This Index For Spans > 13' Unless Otherwise Shown In The Plans.

HAZARD PENETRATING STEM OF RIGID CONCRETE BARRIER WALLS

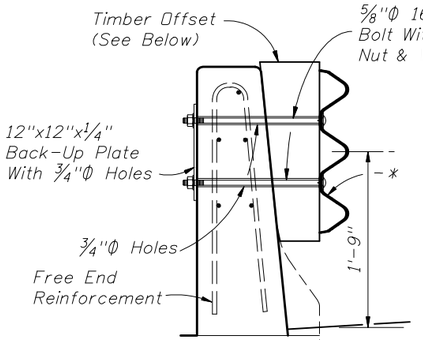
The details on sheets 22 & 23 are treatments to the F-shape concrete barrier walls depicted on Sheet Nos. 9 through 19, where site conditions impose reduced clearances between above ground hazards and the walls. Bridge bent supports and piers are shown. These treatments are not applicable to hazards that cannot provide lateral support for the walls. See the plans for limits of wall sections applied and other associated wall treatments.



SECTION AA

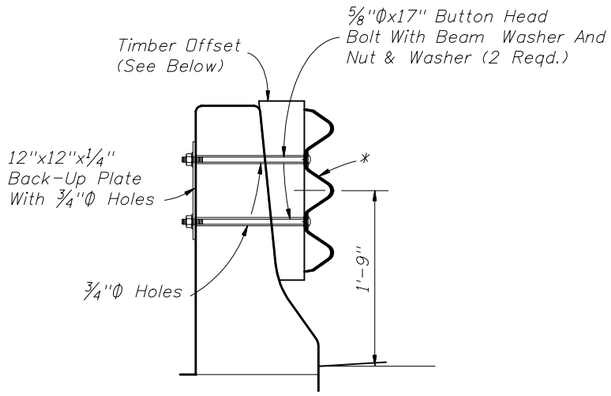


SECTION BB



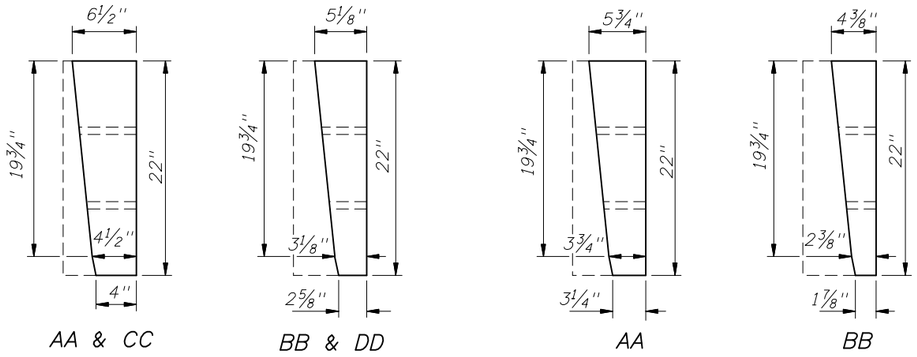
* Single Thrie-Beam On Trailing Ends Of Barrier Wall; Nested Thrie-Beams On Approaches To Barrier Wall.

SECTION CC



SECTION DD

NOTE: See Sheet 25 For Locations Of Sections.



AA & CC

BB & DD

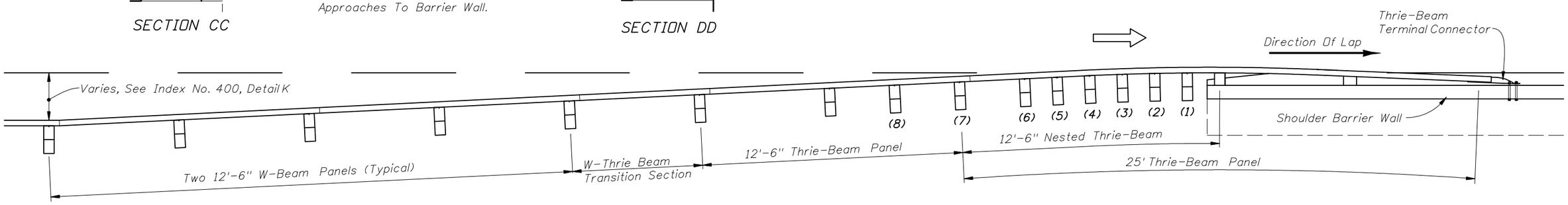
AA

BB

FOR DOUBLE FACED GUARDRAIL USING TIMBER POSTS AND FOR SINGLE FACED GUARDRAIL USING EITHER TIMBER OR STEEL POSTS

FOR DOUBLE FACED GUARDRAIL USING STEEL POSTS

STANDARD TIMBER OR PLASTIC OFFSET BLOCKS ● FIELD TRIMMED FOR USE AT SECTIONS AA, BB, CC & DD

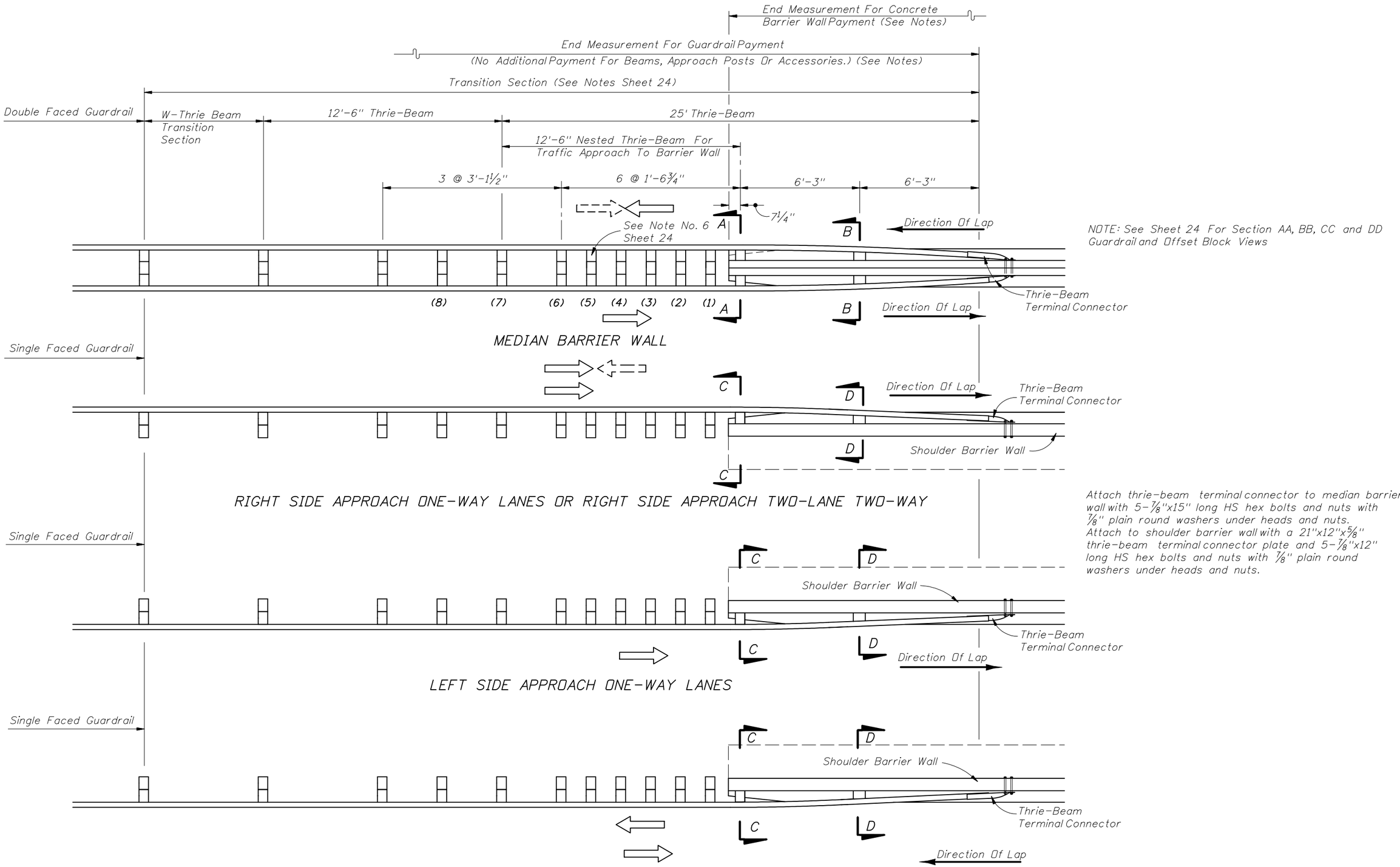


STANDARD GUARDRAIL APPROACH TO SHOULDER BARRIER

NOTES

1. The longitudinal dimensions and payment limits shown for median concrete barrier wall also apply to shoulder concrete barrier walls.
2. W-beam elements do not apply to these transition schemes. For barrier wall trailing end guardrail connections for one-way lanes, see Sheet 2.
3. Where reaming is necessary to fit nested beams the reamed surfaces shall be metalized in accordance with Index No. 400.
4. Either steel or timber guardrail post may be used, timber posts shown.
5. The nested beams shall not be bolted to blocks and posts at posts numbers (1), (3) and (5).
6. On the trailing side of MEDIAN BARRIER WALL, offset blocks may be omitted at posts numbers (1), (2), (3), (5), (6) and (8). (See Sheet 25)
7. For additional guardrail information refer to Index No. 400.

GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS



NOTE: See Sheet 24 For Section AA, BB, CC and DD Guardrail and Offset Block Views

Attach thrie-beam terminal connector to median barrier wall with 5-⅞"x15" long HS hex bolts and nuts with ⅞" plain round washers under heads and nuts. Attach to shoulder barrier wall with a 21"x12"x⅝" thrie-beam terminal connector plate and 5-⅞"x12" long HS hex bolts and nuts with ⅞" plain round washers under heads and nuts.

GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS

	2010 FDOT Design Standards	Last Revision 00	Sheet No. 25 of 25
	CONCRETE BARRIER WALL	Index No. 410	

This Pier Protection Barrier has been structurally evaluated to be equivalent or greater in strength to other safety shape traffic barriers which have been crash tested to NCHRP Report 350 TL-5 criteria. This barrier meets the requirements of the AASHTO LRFD Bridge Design Specifications for a barrier used for bridge pier protection.

GENERAL NOTES:

1. Concrete shall be Class III or IV unless otherwise called for in the plans. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Specifications, unless another finish is called for in the plans. The surfaces shall have a Class 5 Applied Finished Coating in accordance with Section 400 only when called for in the plans.

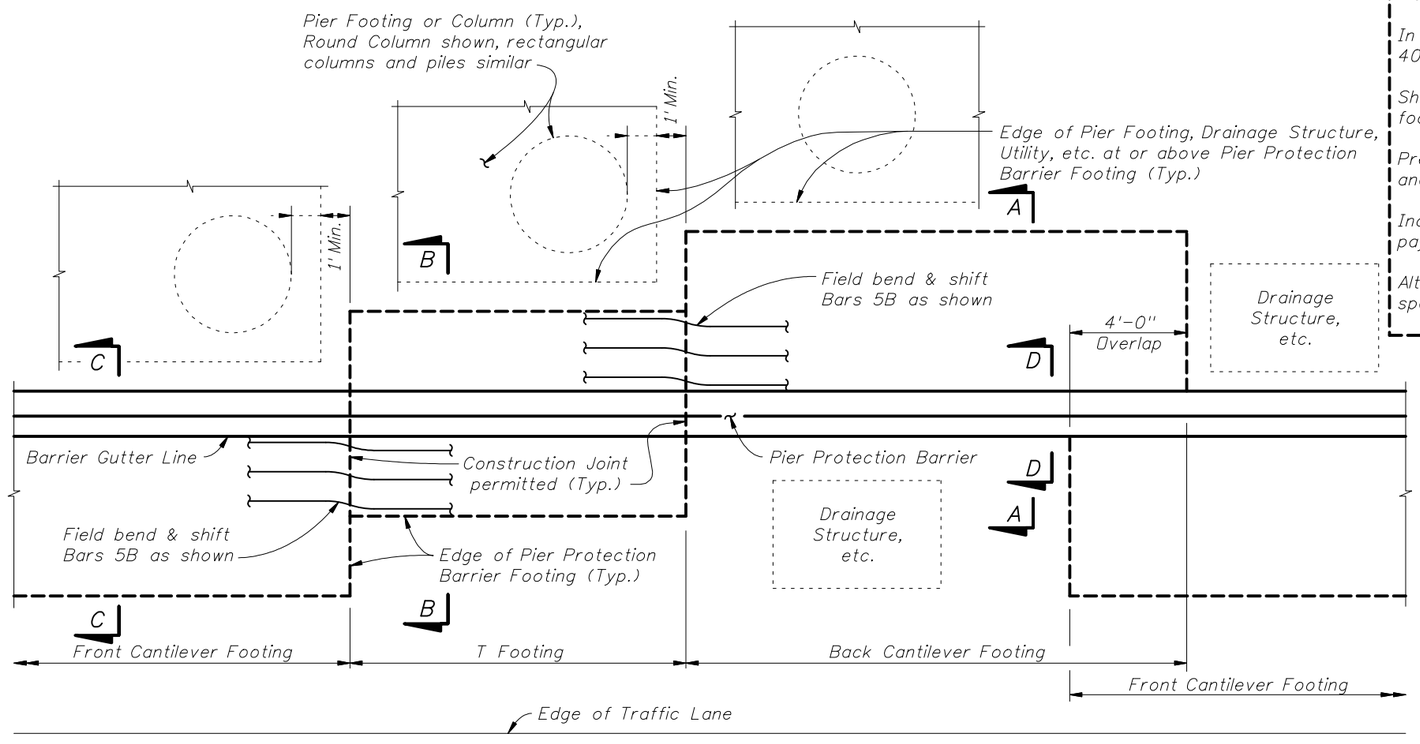
2. Construct Pier Protection Barrier continuous without transverse contraction or expansion joints. Transverse construction joints may be used at a spacing greater than or equal to 40'. Provide longitudinal reinforcing steel continuous across construction joints.

3. When the Pier Protection Barrier is installed adjacent to Roadway or Shouler pavement, compact the top 12" of the subgrade to at least 100% of the density as defined in the AASHTO T-99 specifications.

4. Isolate Barrier Wall Inlets, Index 218, from Pier Protection Barriers and Footings with 1" expansion material.

5. On roadways designated for reverse laning, mark all downstream barrier ends that are not shielded or outside the clear zone with Type 3 Object Markers. Include the cost of the Object Marker in the cost of the Pier Protection Barrier.

6. Payment: Pier Protection Barrier and Crash Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Shoulder 42"), LF, or Shoulder Concrete Barrier Wall (Rigid-Shoulder 54"), LF.



PLAN VIEW

INSTRUCTIONS TO DESIGNER:

As used in this standard, setback distance is as defined by LRFD. See PPM and Index 700 for minimum recoverable terrain and horizontal clearance requirements.

Establish the offset from the Pier Protection Barrier to the bridge pier, column or pile bent based on project constraints.

Determine the required Pier Protection Barrier height, i.e. 42" or 54", in accordance with the requirements of the LRFD Bridge Design Specifications and the Structures Design Guidelines.

Determine the appropriate limiting stations of the Pier Protection Barrier and its end treatment(s) using the Pier Protection Barrier Length of Advancement diagrams provided.

Select Pier Protection Barrier terminal treatment for design speeds greater than or equal to 50 mph:

a. Terminated outside of the clear zone of any approach traffic;
b. Terminated within a shielded location;
c. Terminal protection by the use of a crash cushion system; or,
d. Terminated in conjunction with a suitably designed transition to another barrier.

Determine the appropriate footing configuration(s) (T, Front Cantilever or Back Cantilever) for a continuous run of Pier Protection Barrier using the Pier Protection Barrier Footing Layout Schematics. Select the footing configuration(s) based on traffic control needs and locations of piers, pier footings, utilities, drainage structures, etc. as shown. Footing configurations along a continuous run of Pier Protection Barrier may be intermixed as shown.

Designate the Pier Protection Barrier height, footing configuration(s) and limiting stations on the Plan-Profile sheets, e.g.:

Begin 42" Pier Protection Barrier with Front Cantilever Footing, Sta. 100+00.00

Indicate Crash Wall locations (when required) and lengths on the Plan-Profile sheets. Designate Crash Wall height to match height of adjacent Pier Protection Barrier.

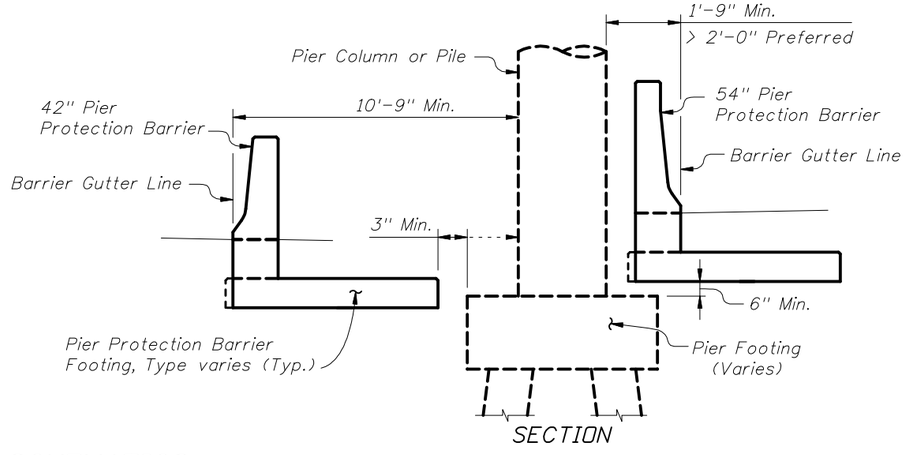
In absence of continuous concrete barrier, determine guardrail requirements in accordance with Indexes 400 and 410.

Show Cross Sections as required to locate Pier Protection Barrier, Crash Wall (when required) and footings adjacent to bridge piers, columns or footings, drainage structures, utilities, etc.

Prepare Traffic Control Plans to accommodate Pier Protection Barrier, Crash Wall (when required) and footing construction.

Include length(s) of Crash Walls (measured along front face) in length of Pier Protection Barrier for payment.

Although intended for shielding bridge piers, the Pier Protection Barrier can be used on a project specific basis to shield other critical roadside objects when deemed necessary or appropriate.



SECTION

PIER PROTECTION BARRIER FOOTING LAYOUT SCHEMATICS

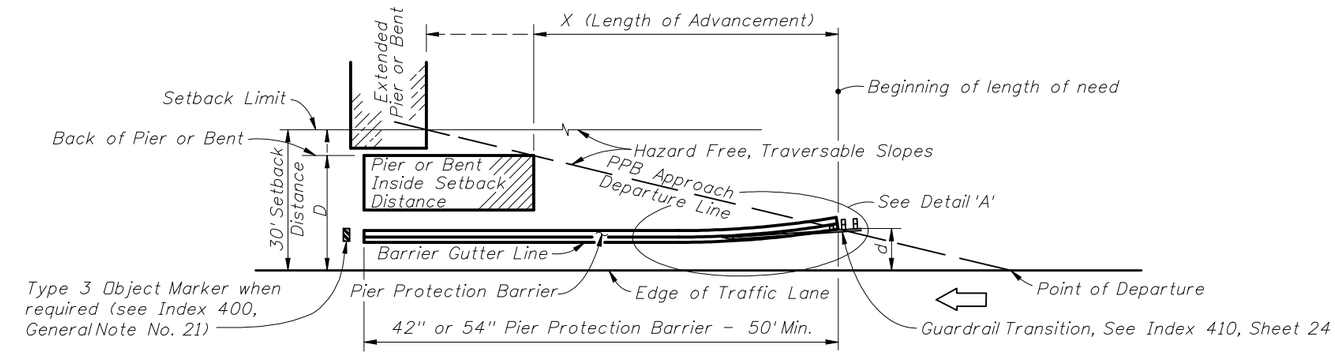
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

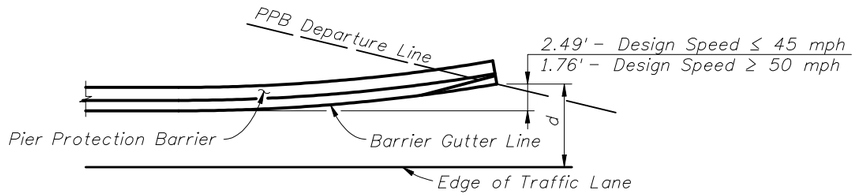
PIER PROTECTION BARRIER

Last Revision	Sheet No.
07/01/06	1 of 10

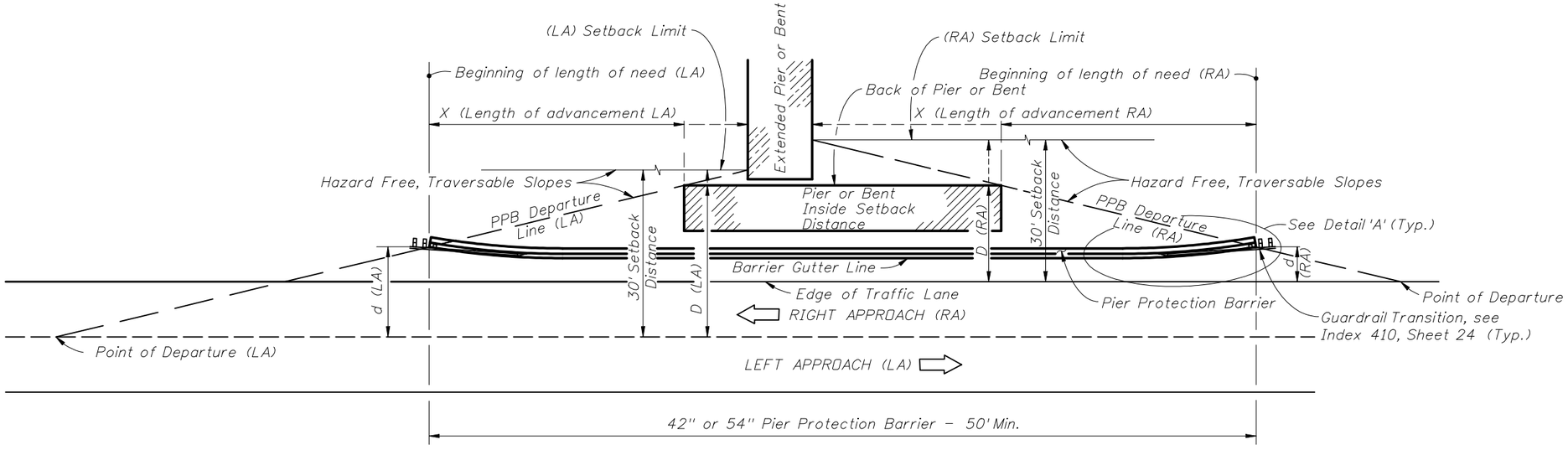
Index No. 411



(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC



DETAIL 'A'
(Guardrail not shown for clarity)



TWO-LANE TWO-WAY TRAFFIC

Design Speed mph	X (Length of Advancement) Ft.
≤45	= 16 (D-d)
≥50	= 13 (D-d)

NOTE:

Length of Advancement determined from the diagrams and equations shown establishes the location of the upstream beginning length of need for a Pier Protection Barrier, however, the Length of Advancement for the combination of Pier Protection Barrier and required guardrail can be no less than that required by other details of Index 400.

Equation Variables:

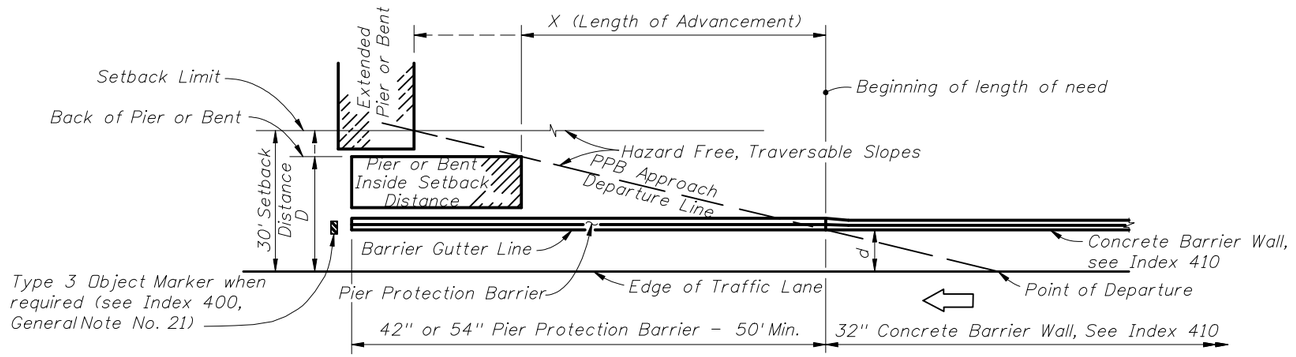
D = Distance in feet from the near edge of the near approach traffic lane to either (a) the back of pier, when the pier is located inside the Setback Distance or (b) the Setback Distance, when the pier extends to or goes beyond the Setback Distance. For left side piers on two-way undivided facilities, D is measured from the inside edge of the near approach traffic lane.

d = Distance in feet from the near edge of the near approach traffic lane to the Pier Protection Barrier gutter line at its intersection with the departure line or the face of guardrail at its intersection with the departure line. For left side hazards on two-way undivided facilities, d is measured from the inside edge of the near approach traffic lane.

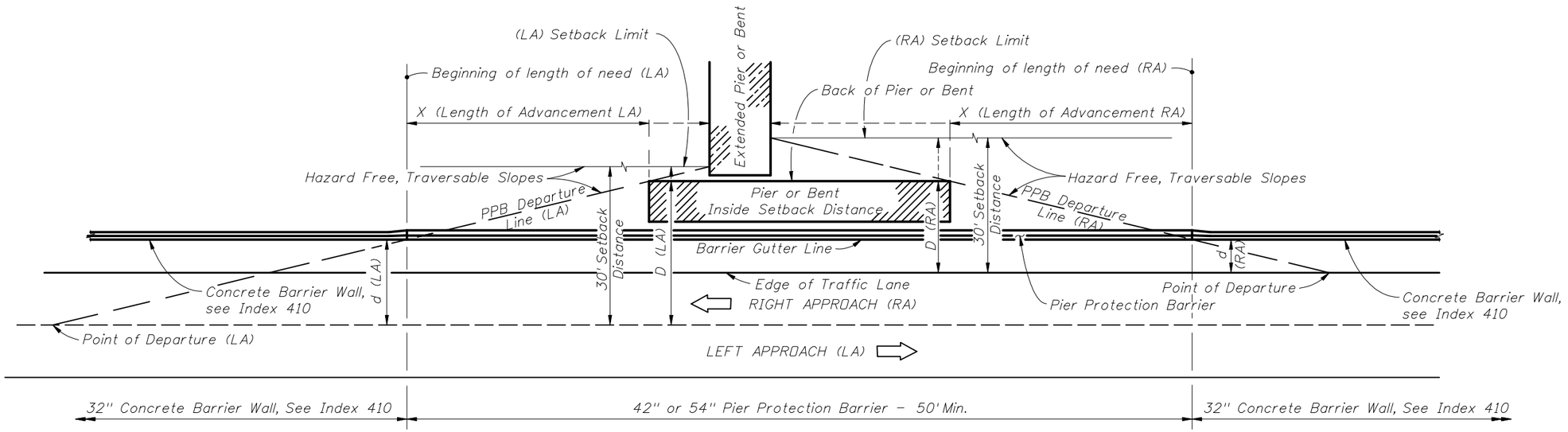
NOTE:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.

PPB = Pier Protection Barrier

LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH GUARDRAIL CONTINUATION



(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC

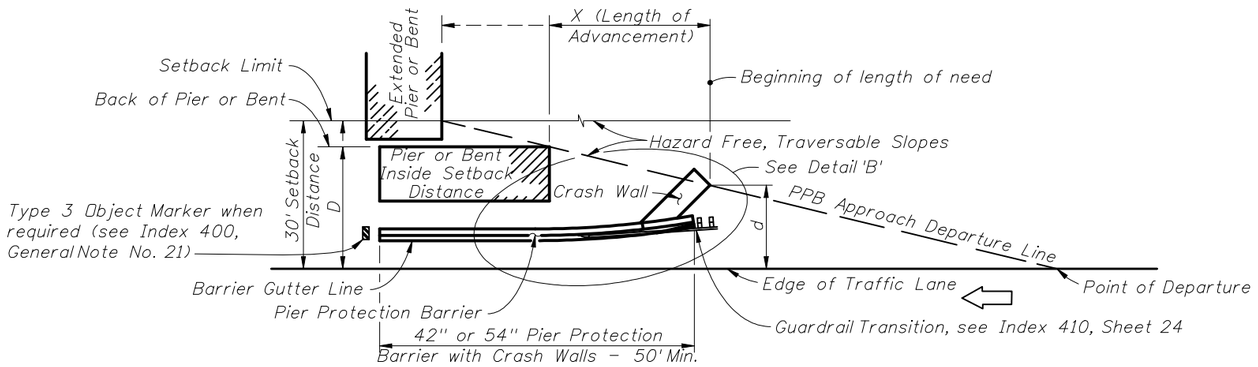


TWO-LANE TWO-WAY TRAFFIC

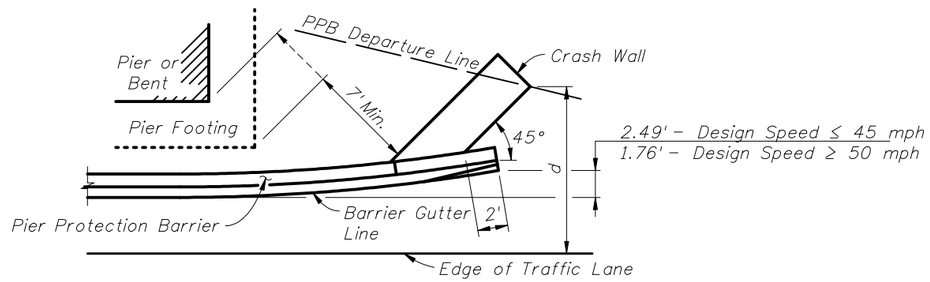
NOTES:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.
PPB = Pier Protection Barrier

See Notes on Sheet 2.

LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH CONCRETE BARRIER WALL CONTINUATION



(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC



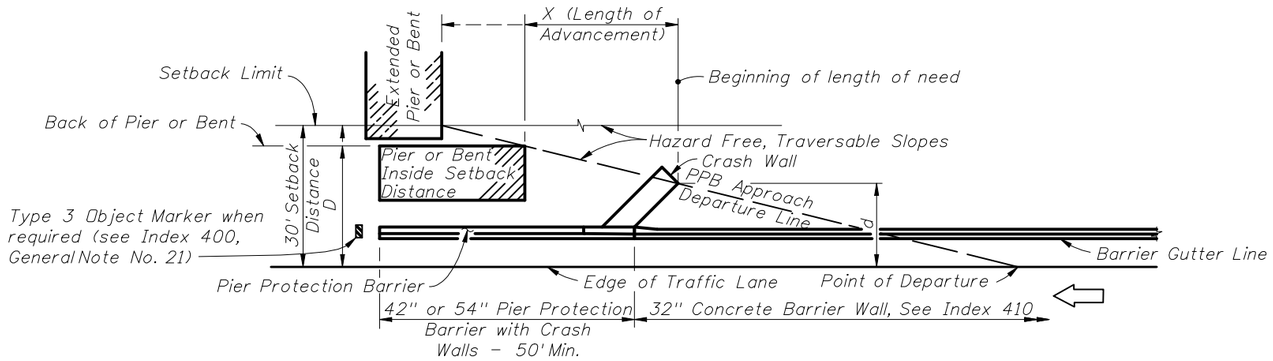
DETAIL 'B'
(Guardrail not shown for clarity)

TWO-LANE TWO-WAY TRAFFIC

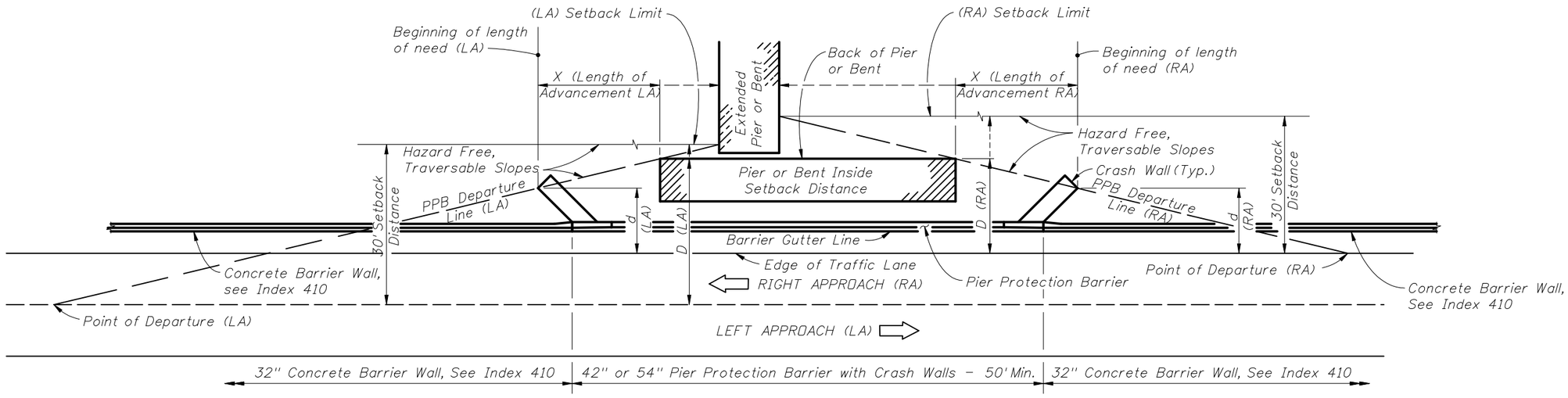
NOTES:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.
PPB = Pier Protection Barrier

See Notes on Sheet 2.

LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH CRASH WALL AND GUARDRAIL CONTINUATION



(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC



TWO-LANE TWO-WAY TRAFFIC

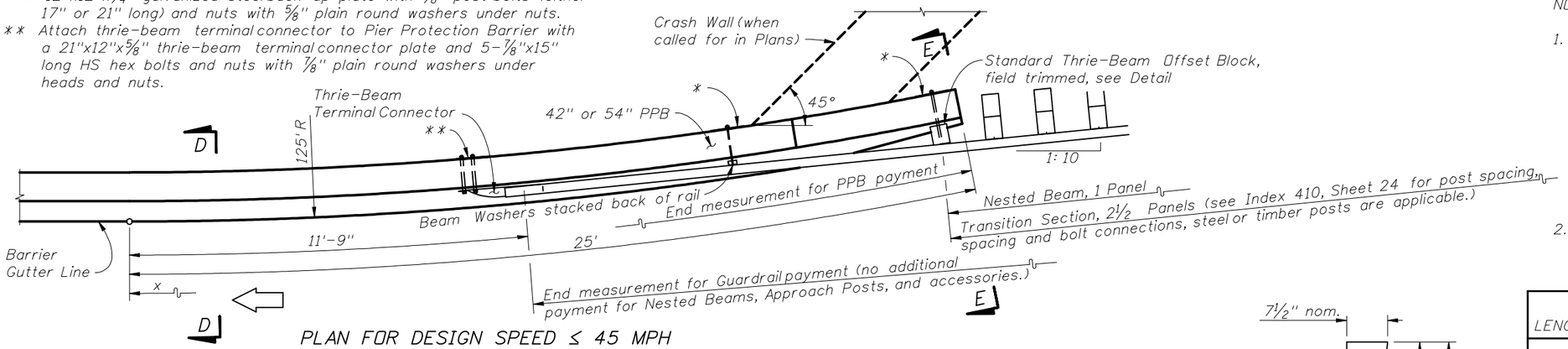
NOTES:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.
PPB = Pier Protection Barrier

See Notes on Sheet 2.

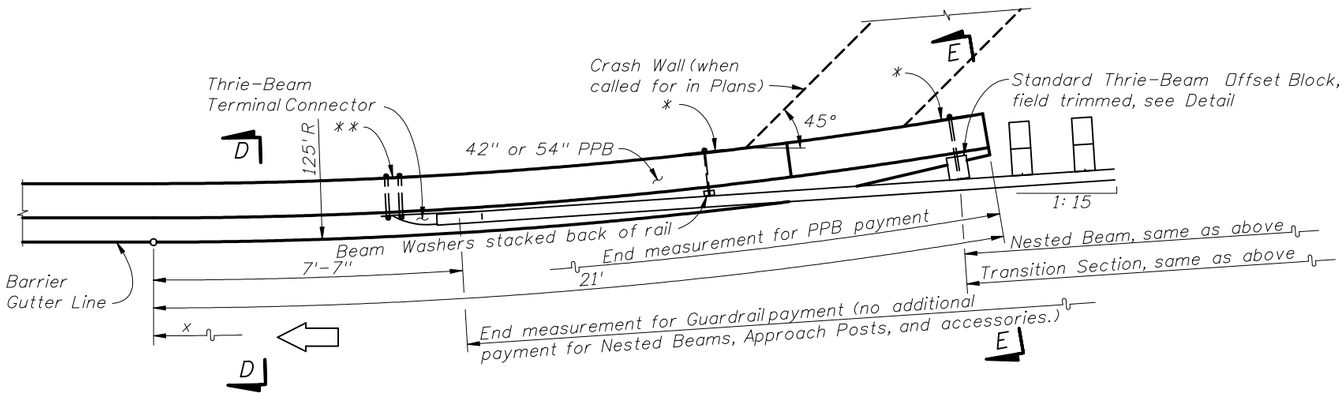
LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH CRASH WALL AND CONCRETE BARRIER WALL CONTINUATION

* 12"x12"x¼" galvanized steel back-up plate with ⅝" post bolts (either 17" or 21" long) and nuts with ⅝" plain round washers under nuts.

** Attach thrie-beam terminal connector to Pier Protection Barrier with a 21"x12"x⅝" thrie-beam terminal connector plate and 5-⅞"x15" long HS hex bolts and nuts with ⅞" plain round washers under heads and nuts.



PLAN FOR DESIGN SPEED ≤ 45 MPH



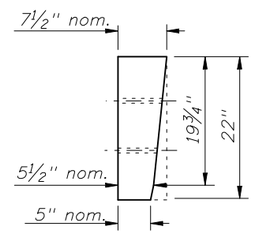
PLAN FOR DESIGN SPEED ≤ 50 MPH

NOTES

1. The Pier Protection Barrier radial segments are intended for use on approach and trailing ends of both one-way and two-way facilities. The guardrail connections shown on this sheet apply to one-way approaches and to the approaching and trailing ends of two-lane two-way facilities. On trailing ends of two-way multilane and one-way facilities the end connection on Index 410, Sheet 2 may be used.

   For guardrail connections, see Index 410, Sheet 24.

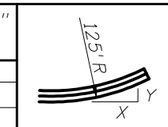
2. Refer to Index No. 400 Detail J for additional guardrail information.



FOR USE WITH EITHER 1:10 OR 1:15 GUARDRAIL TRANSITIONS

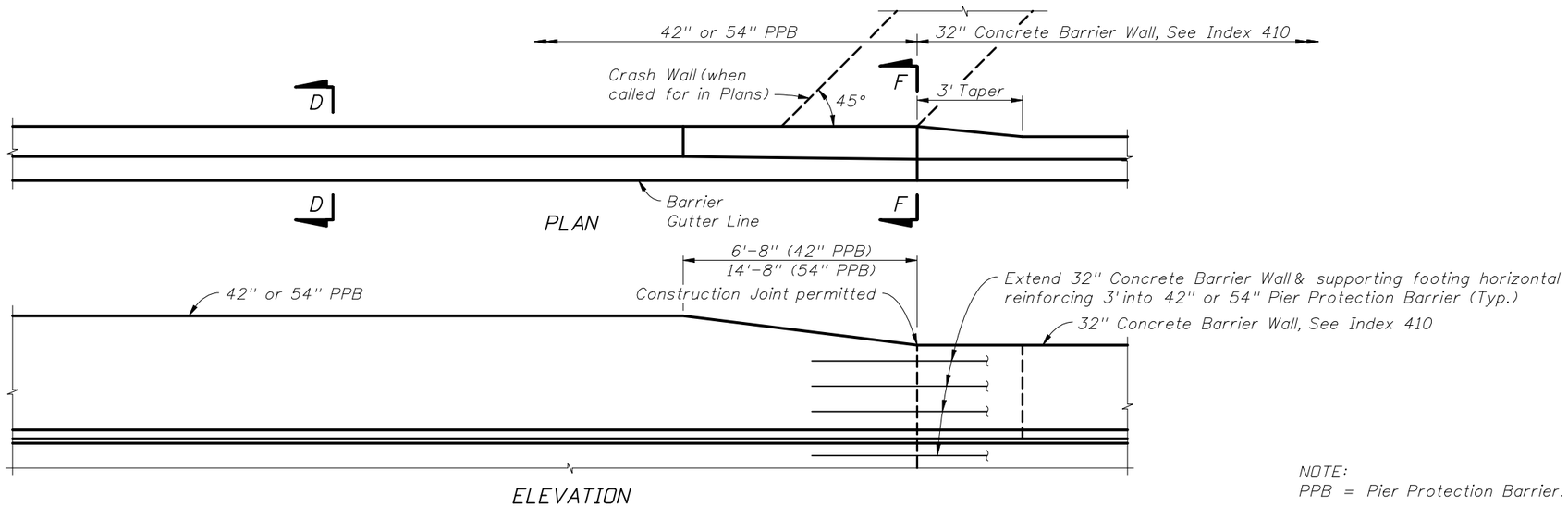
STANDARD THRIE-BEAM OFFSET BLOCK (FIELD TRIMMED)

ARC LENGTH (Ft.)	DISTANCE "x" (Ft.)	OFFSETS "y" "y" (Ft.)
4	4.00	0.06
8	7.99	0.26
12	11.98	0.58
16	15.96	1.02
20	19.91	1.60
21	20.91	1.76
24	23.85	2.30
25	24.83	2.49



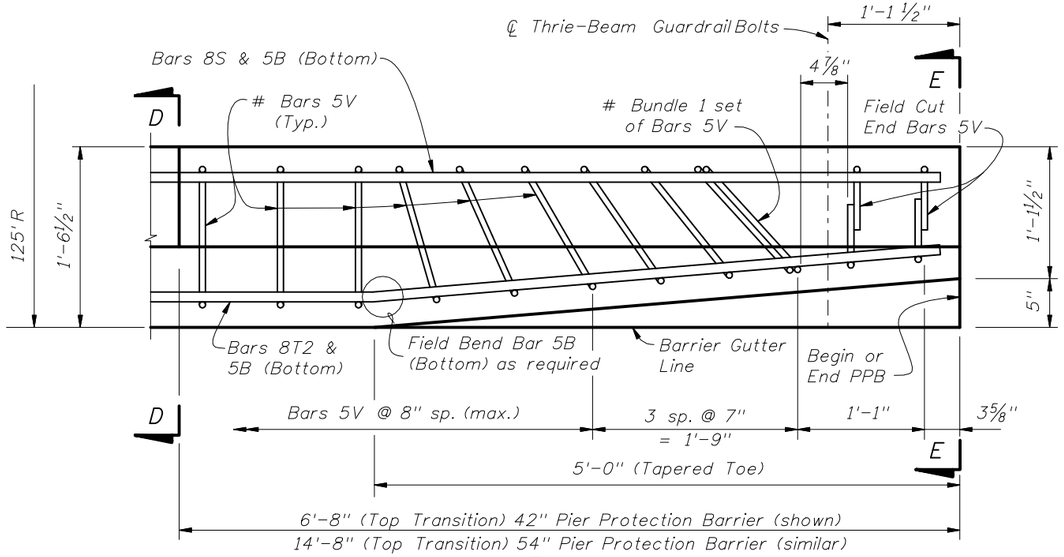
Note: Barrier may be constructed in chords having lengths ≤4 feet.

FLARED END TREATMENT - PIER PROTECTION BARRIER WITH GUARDRAIL CONTINUATION



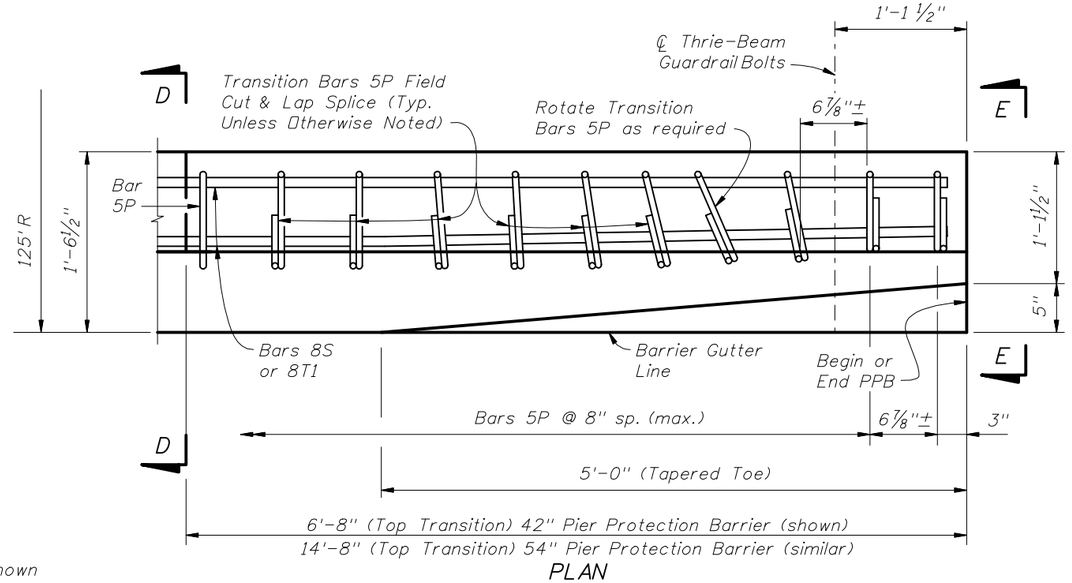
NOTE:
PPB = Pier Protection Barrier.

END TREATMENT - PIER PROTECTION BARRIER WITH CONCRETE BARRIER WALL CONTINUATION



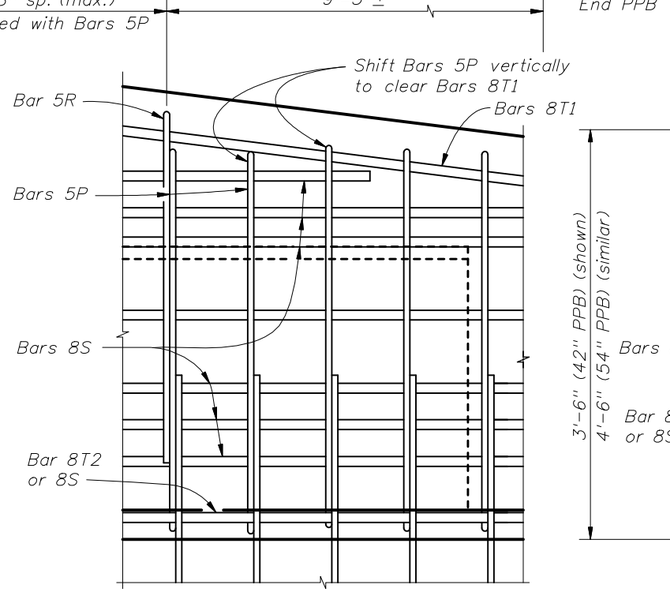
PLAN
(Showing Bars 5V, 8S, 5B & 8T2)

Rotate Bars 5V as shown to maintain clearance.

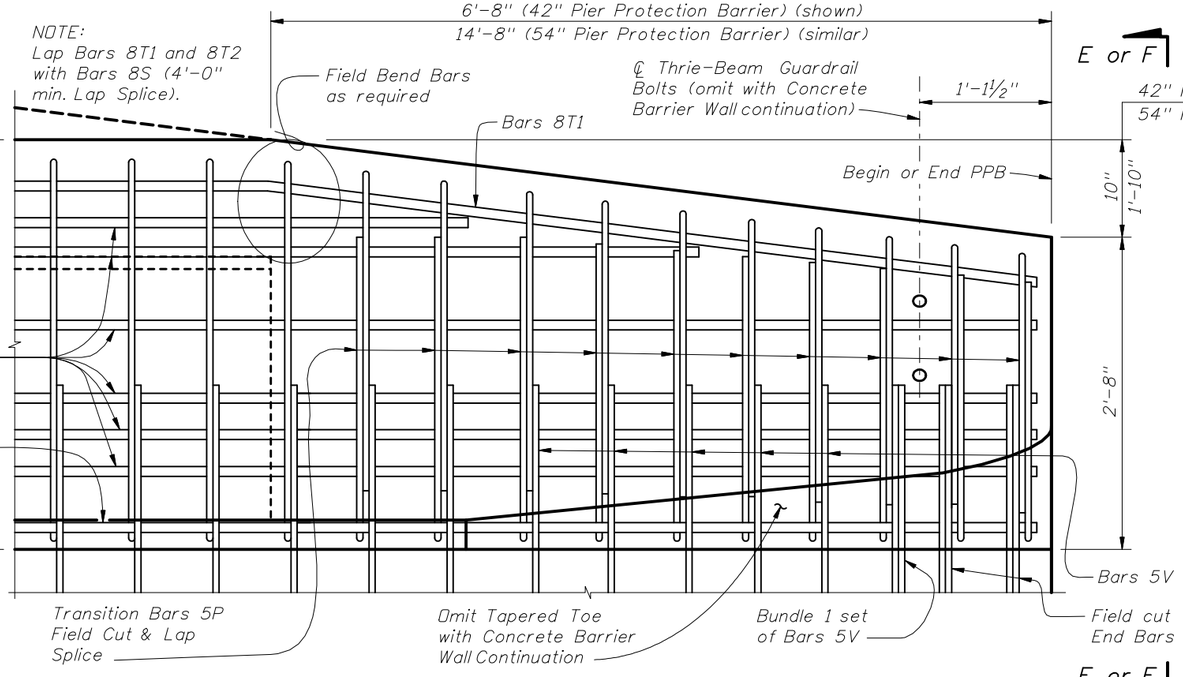


PLAN
(Showing Transition Bars 5P and Bars 8S & 8T1)

END TRANSITION AND TAPERED TOE DETAILS - PIER PROTECTION BARRIER WITH GUARDRAIL CONTINUATION



PARTIAL ELEVATION - 54" PPB DETAIL



ELEVATION - BARRIER END TRANSITION - 42" PPB (shown); 54" PPB (similar)
(Guardrail and back leg of Stirrups not shown for clarity)

NOTES:
1. See Sheet 9 for Footing Details.
2. See Sheet 8 for Cross Sections.

ESTIMATED 42" PPB QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.141
Reinforcing Steel (w/out Bars 5V)	LB/LF	33.10

ESTIMATED 54" PPB QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.172
Reinforcing Steel (w/out Bars 5V)	LB/LF	48.74

NOTE:
PPB = Pier Protection Barrier.

END TRANSITION DETAILS - PIER PROTECTION BARRIER WITH GUARDRAIL OR CONCRETE BARRIER WALL CONTINUATION

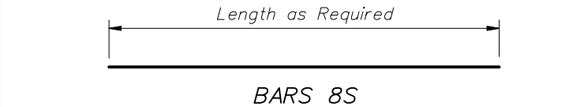
BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
P	5	7'-6"
R	5	6'-7"
S	8	As Reqd.
42" PPB T1 & T2	8	13'-0"
54" PPB T1 & T2	8	21'-0"
V	5	9'-2"

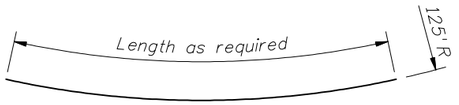
REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. Bars 8S may be continuous or spliced at the construction joints. Lap splices for Bars 8S shall be a minimum of 4'-0".
3. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.

NOTE: PPB = Pier Protection Barrier

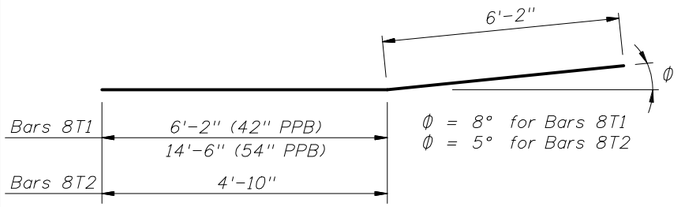
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS



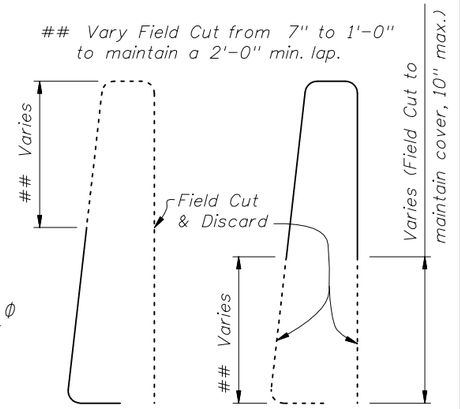
BARS 8S



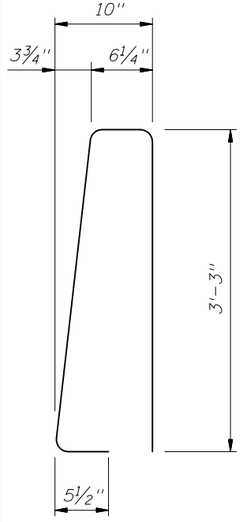
BARS 8S
(within Flared End Treatments)



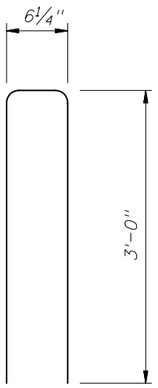
TRANSITION BARS 8T1 & 8T2



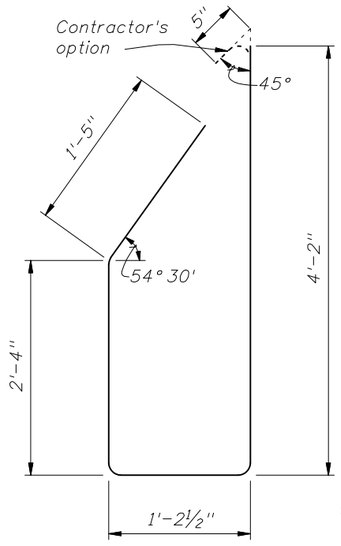
TRANSITION STIRRUP BARS 5P
To Be Field Cut (10 of each required per Railing End Transition)



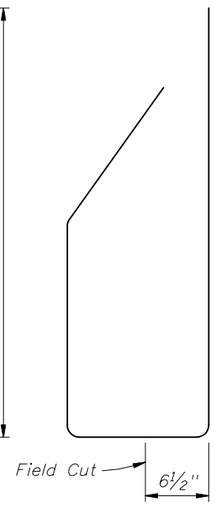
STIRRUP BAR 5P



STIRRUP
BAR 5R

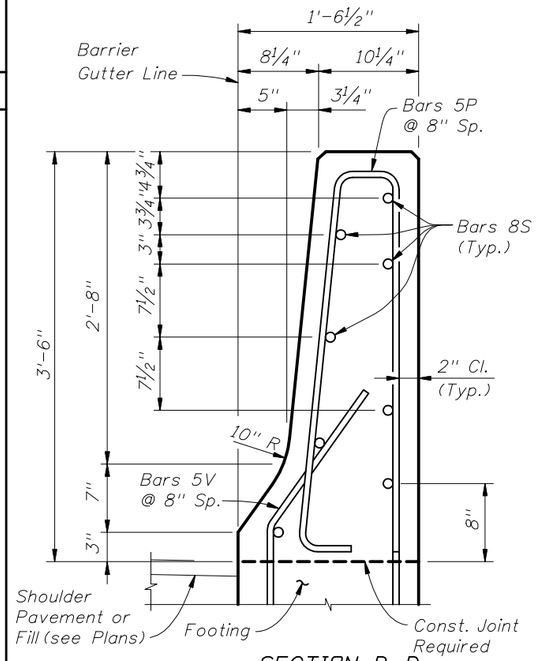


STIRRUP BAR 5V

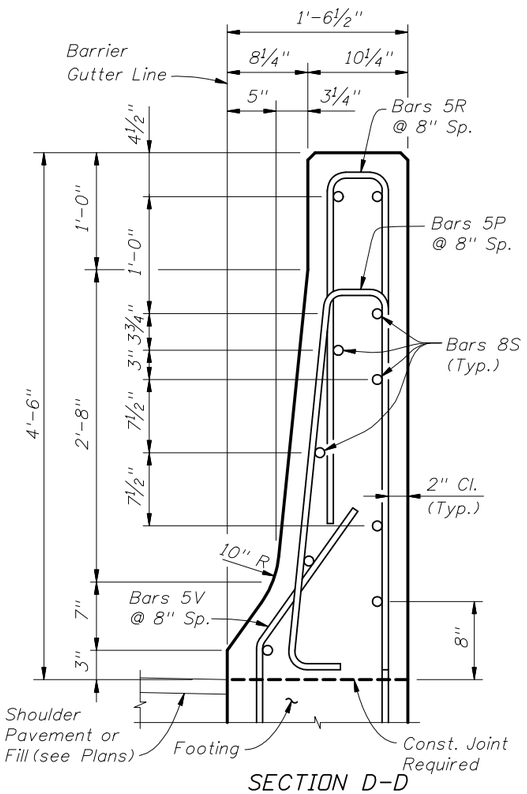


END STIRRUP BAR 5V
To Be Field Cut
(Two required per
Barrier End Transition
w/ Tapered Toe)

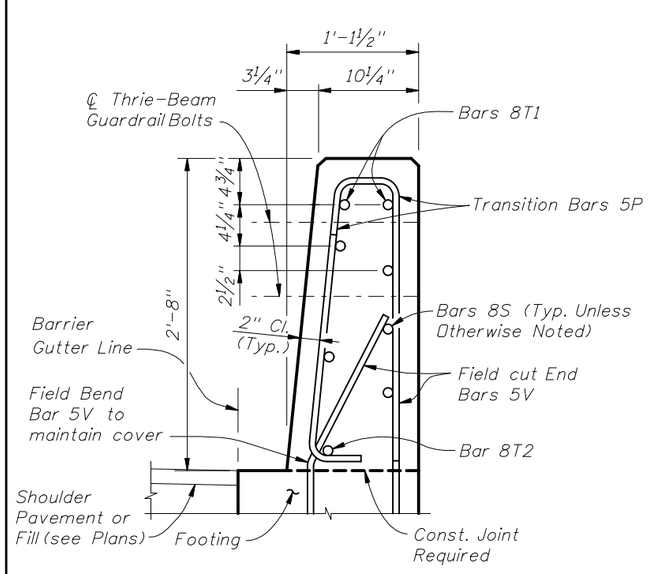
NOTES:
1. See Sheet 9 for Footing Details.
2. See Sheet 7 for bar spacings and details within End Transitions.



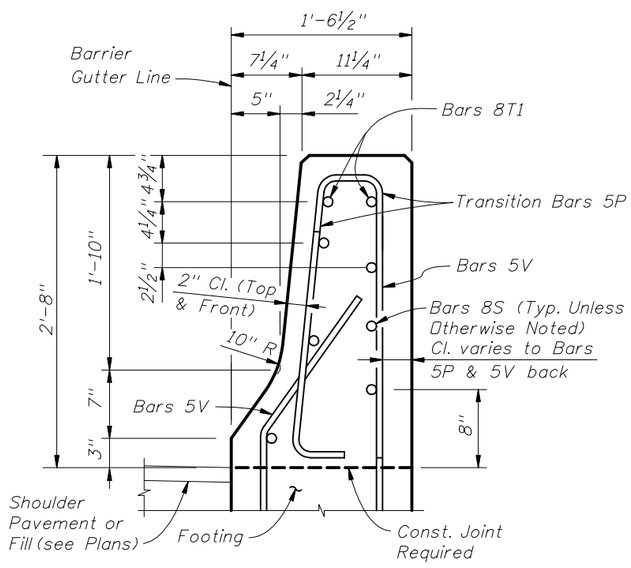
SECTION D-D
TYPICAL SECTION THRU
42" PIER PROTECTION BARRIER



SECTION D-D
TYPICAL SECTION THRU
54" PIER PROTECTION BARRIER



END VIEW E-E
(with Tapered Toe)



END VIEW F-F
(without Tapered Toe)

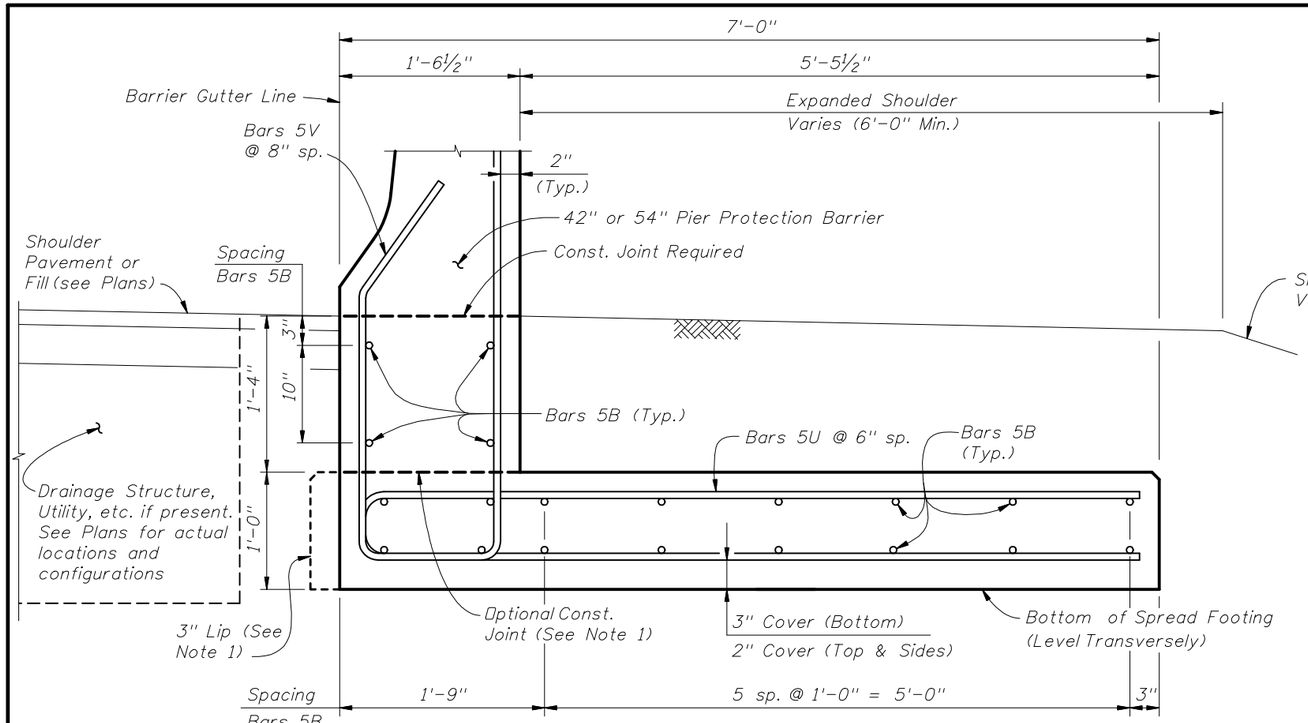
BARRIER DETAILS

2010 FDOT Design Standards

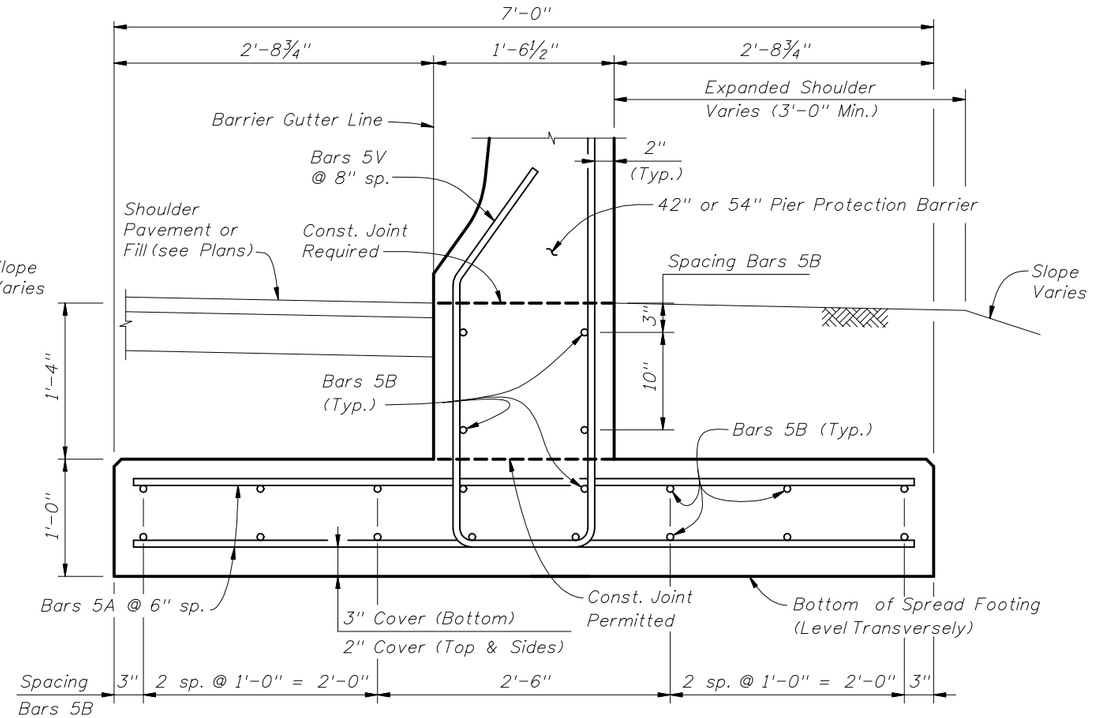
PIER PROTECTION BARRIER

Last Revision	Sheet No.
07/01/07	8 of 10

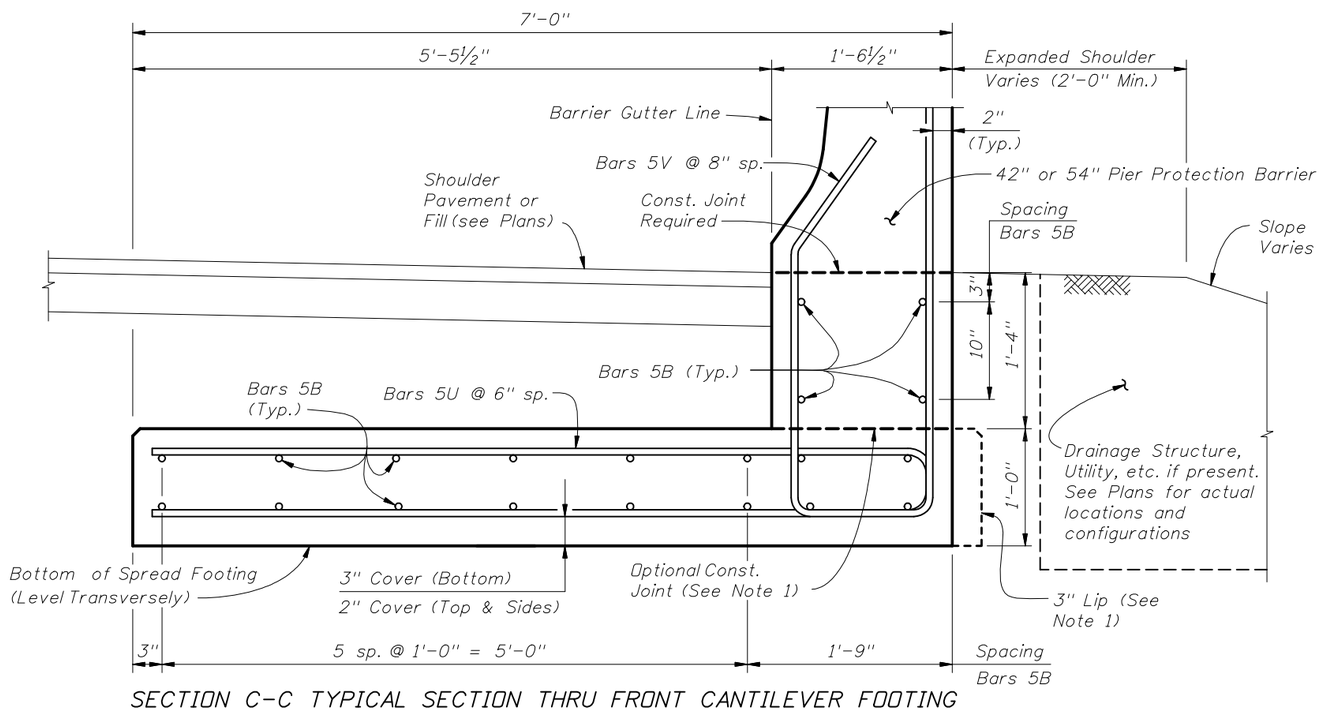
Index No. 411



SECTION A-A TYPICAL SECTION THRU BACK CANTILEVER FOOTING



SECTION B-B TYPICAL SECTION THRU T FOOTING

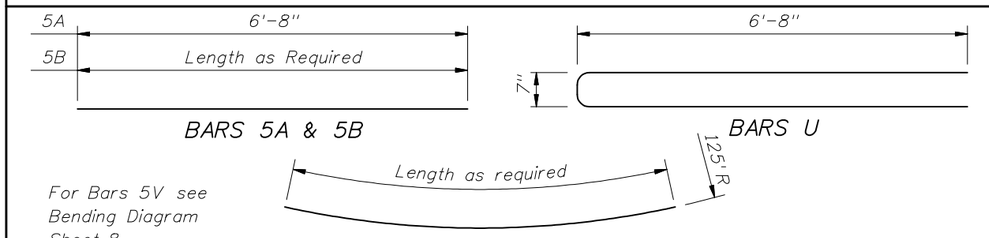


SECTION C-C TYPICAL SECTION THRU FRONT CANTILEVER FOOTING

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
A	5	6'-8"
B	5	As Reqd.
U	5	14'-0"

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. Lap splices for Bars 5B shall be a minimum of 2'-2".
3. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A 497.

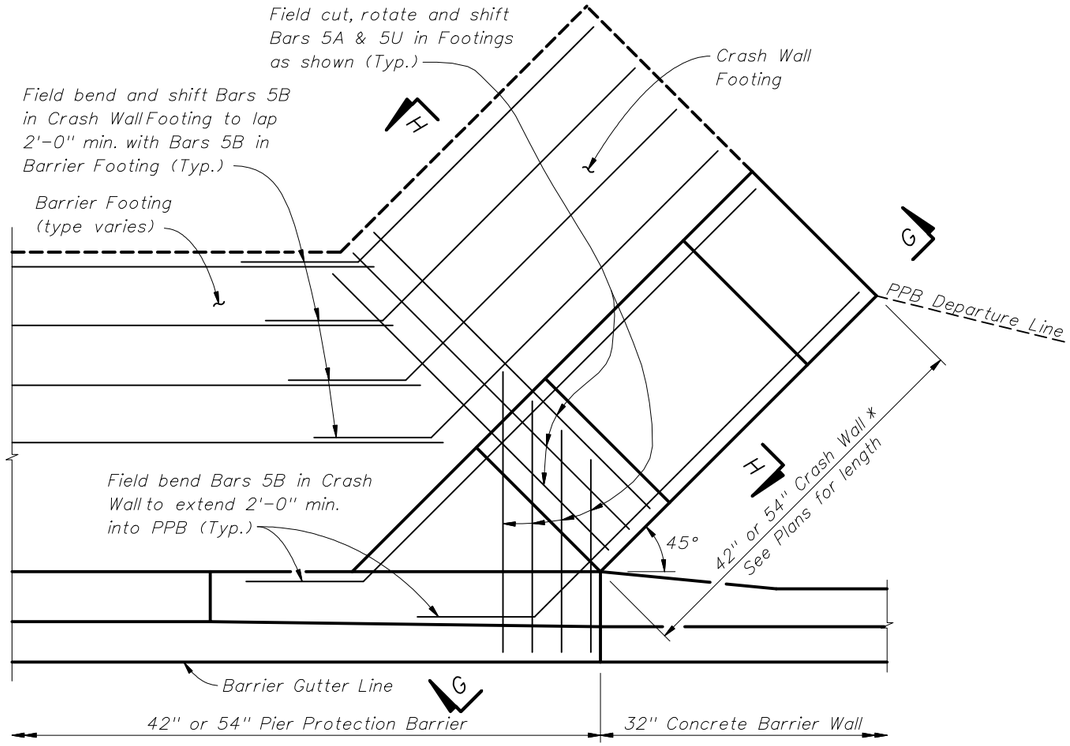
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS



ESTIMATED BARRIER FOOTING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.335
Reinforcing Steel (w/ Bars 5V) Cantilever Footing	LB/LF	64.32
Reinforcing Steel (w/ Bars 5V) T Footing	LB/LF	63.01

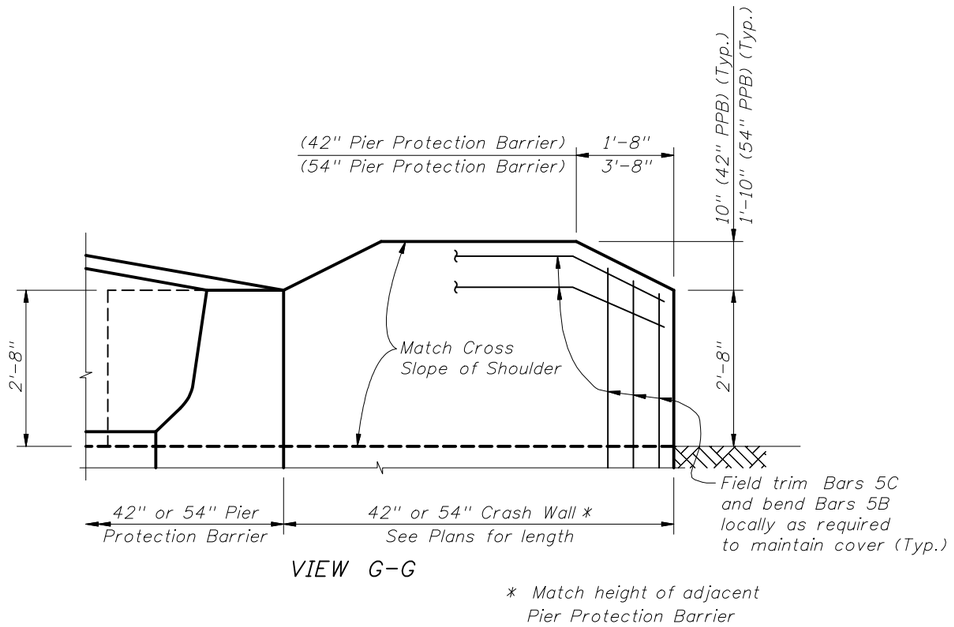
NOTES:
1. Provide 3" lip when optional construction joint is used. Omit 3" lip adjacent to Barrier Wall Inlets and as required to provide 2" min. clear between Cantilever Footing and adjacent Pier Footing or Column.
2. See Sheets 7 & 8 for Barrier Details.

BARRIER FOOTING DETAILS



PLAN VIEW

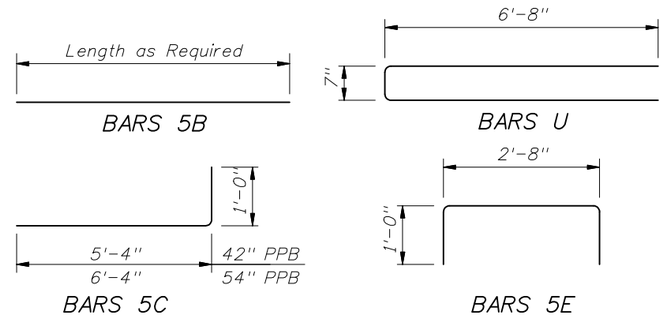
(Concrete Barrier Wall Continuation shown, Guardrail Continuation similar)



VIEW G-G

* Match height of adjacent Pier Protection Barrier

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS



BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
B	5	As Reqd.
C	5	6'-4" / 7'-4"
E	5	4'-8"
U	5	11'-0"

REINFORCING STEEL NOTES:

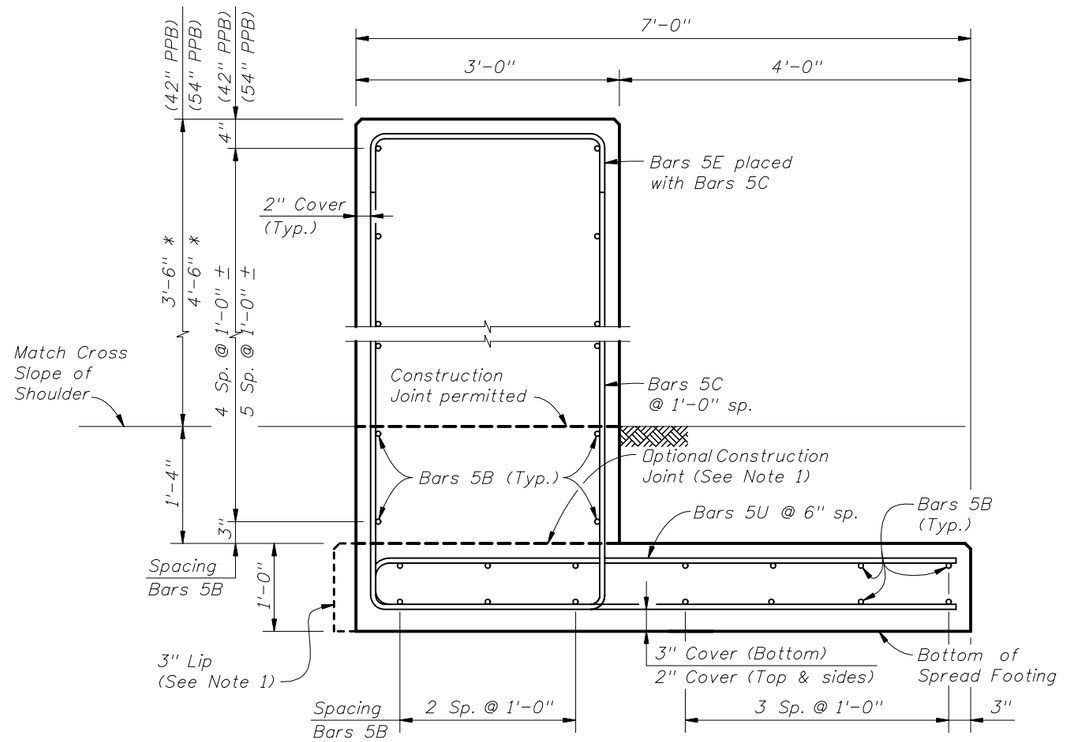
1. All bar dimensions in the bending diagrams are out to out.
2. Lap splices for Bars 5B shall be a minimum of 2'-2".
3. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A 497.

ESTIMATED CRASH WALL & FOOTING QUANTITIES

ITEM	UNIT	QUANTITY
Concrete (Footing)	CY/LF	0.260
Concrete (42" Crash Wall)	CY/LF	0.389
Concrete (54" Crash Wall)	CY/LF	0.500
Reinforcing Steel (42" Crash Wall)	LB/LF	66.06
Reinforcing Steel (54" Crash Wall)	LB/LF	70.23

NOTES:

1. Provide 3" lip when optional construction joint is used.
2. See Sheet 8 for Barrier Details and Sheet 9 for Barrier Footing details.



SECTION H-H

NOTE:

PPB = Pier Protection Barrier

CRASH WALL & FOOTING DETAILS

2010 FDOT Design Standards

PIER PROTECTION BARRIER

Last Revision	Sheet No.
07/01/07	10 of 10

Index No. 411

GENERAL NOTES

1. The 'Portable Temporary Low Profile Barrier For Roadside Safety' is a licensed design by the University Of Florida. Any infringement on the rights of the designer shall be the sole responsibility of the user.

2. This standard drawing (Index No. 412) is provided by the Florida Department Of Transportation solely for use by the Department and its assignees. The purpose for this standard drawing is to indicate the approval of use of the barrier on the State Highway System; to provide sufficient pictorials for identifying the barrier unit; and, to provide general installation geometry for the barrier.

3. Only those barrier units cast by producers licensed by the University Of Florida will be allowed for installation on the State Highway System in Florida.

   Barrier wall units shall conform to Section 521 of the Standard Specification and shall be produced in Department approved plants with quality control plans for precasting concrete barrier walls. Each barrier wall unit shall be permanently marked with an identification that is traceable to the manufacturer, the producing precast concrete plant and the date of production. This permanent identification mark will serve as certification that the unit has been manufactured in accordance with University of Florida drawings and specifications, and the approved quality control program.

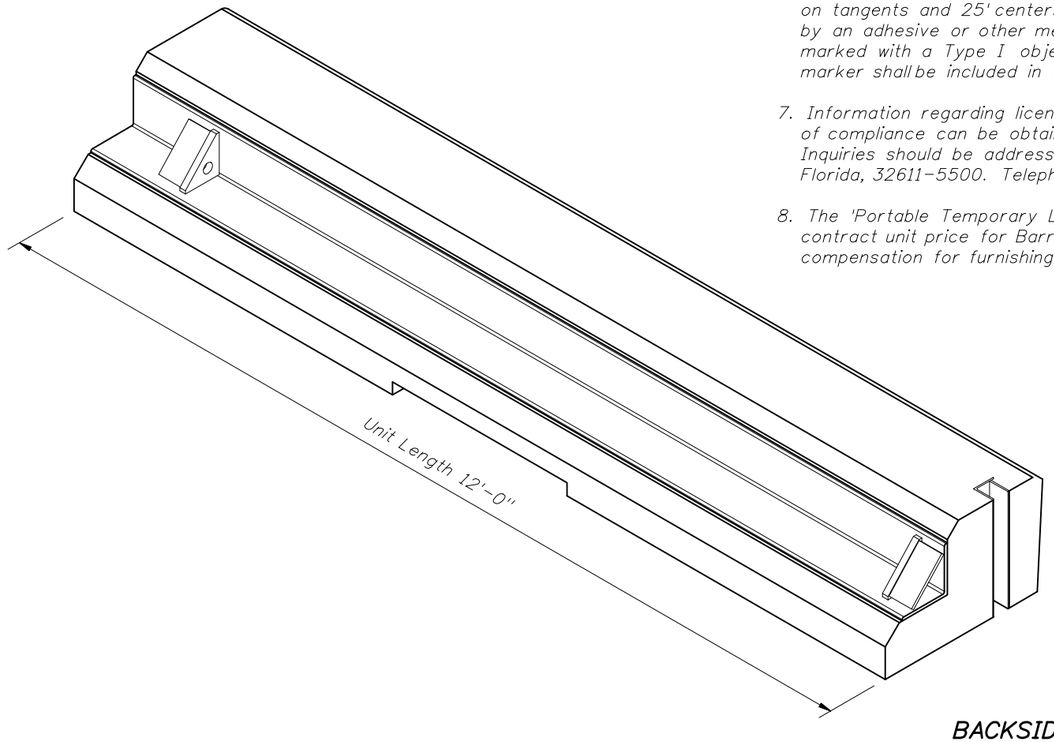
4. The low profile barrier is to be installed only with hardware and accessories furnished by the licensed barrier producer. Units shall be used for no purpose other than as interconnected segments in a run of barrier.
   Low profile barrier wall units shall be installed so as to be in firm contact with adjoining units. Nuts on tensioning rods shall be installed snug tight.

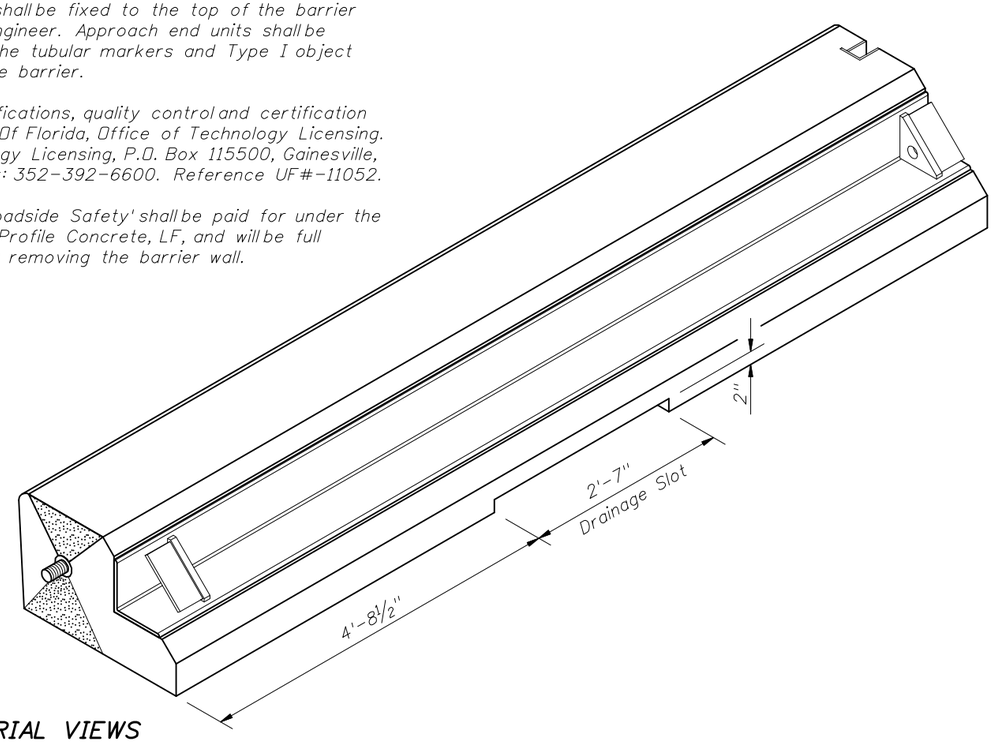
5. The low profile barrier is applicable for design speeds of 45 mph or less.

6. Tubular markers shall be installed along the run of barrier at the ends and at 50' centers on tangents and 25' centers on radii. The markers shall be fixed to the top of the barrier by an adhesive or other method approved by the engineer. Approach end units shall be marked with a Type I object marker. The cost of the tubular markers and Type I object marker shall be included in the cost of the low profile barrier.

7. Information regarding licensing, shop drawings, specifications, quality control and certification of compliance can be obtained from the University Of Florida, Office of Technology Licensing. Inquiries should be addressed to: Office of Technology Licensing, P.O. Box 115500, Gainesville, Florida, 32611-5500. Telephone: 352-392-8929, Fax: 352-392-6600. Reference UF#-11052.

8. The 'Portable Temporary Low Profile Barrier For Roadside Safety' shall be paid for under the contract unit price for Barrier Wall (Temporary) Low Profile Concrete, LF, and will be full compensation for furnishing, installing, maintaining and removing the barrier wall.

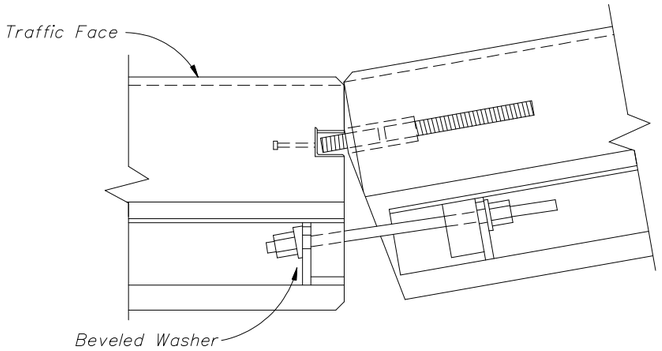




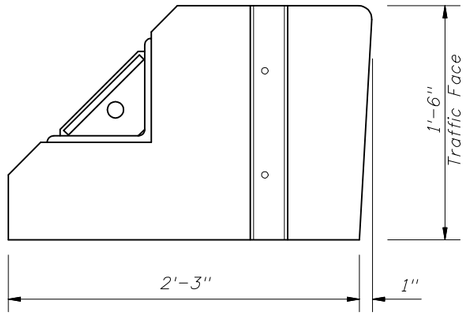
BACKSIDE AND END PICTORIAL VIEWS

PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

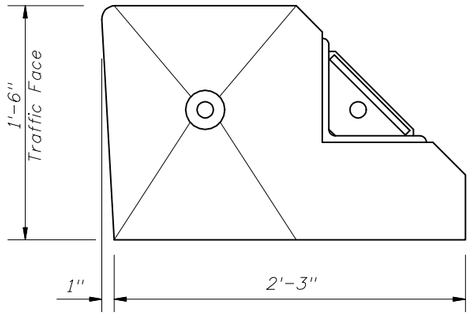
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/05	Sheet No. 1 of 5
	LOW PROFILE BARRIER		Index No. 412



CONCAVE CONNECTION

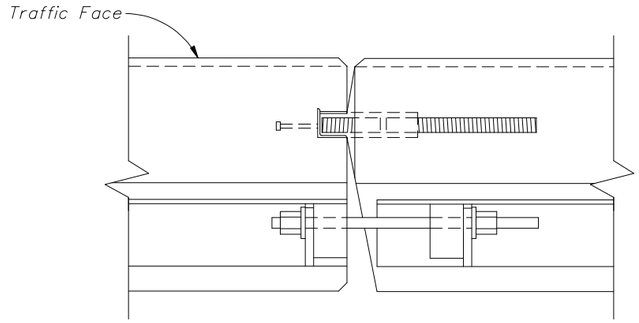


FLAT FACE FEMALE END

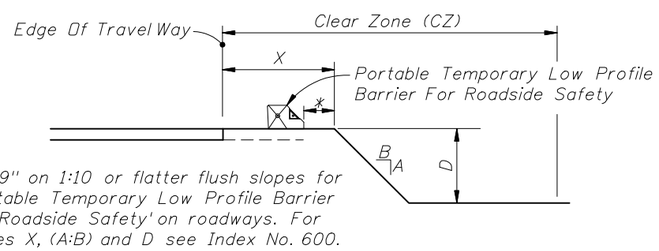


BEVELED FACE MALE END

END VIEWS

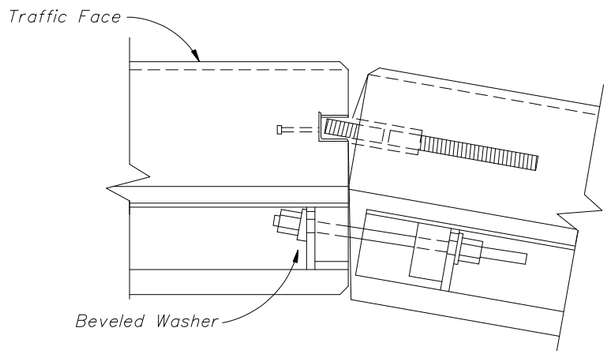


PARALLEL CONNECTION



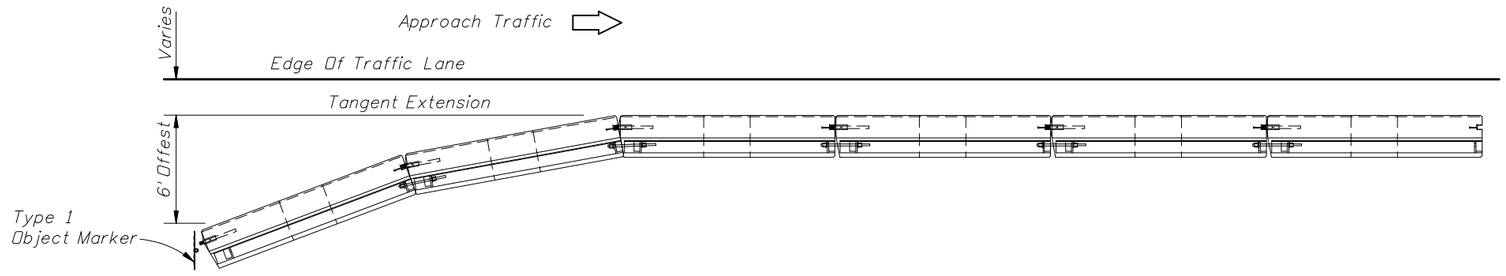
* Min. 9" on 1:10 or flatter flush slopes for 'Portable Temporary Low Profile Barrier For Roadside Safety' on roadways. For values X, (A:B) and D see Index No. 600.

DEFLECTION SPACE AT DROPOFFS



CONVEX CONNECTION

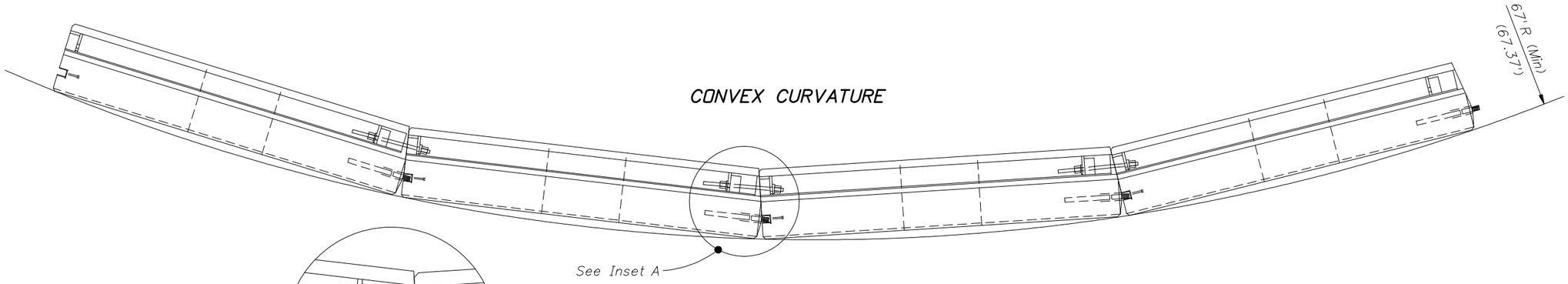
PLAN VIEWS OF CONNECTIONS

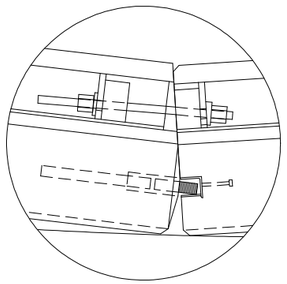


PLAN VIEW OF APPROACH END OFFSET

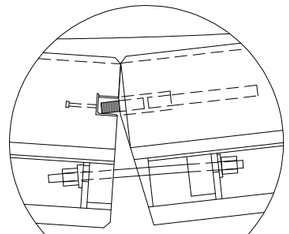
PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

	2010 FDOT Design Standards	Last Revision 07/01/05	Sheet No. 2 of 5
	LOW PROFILE BARRIER	Index No. 412	





Inset A



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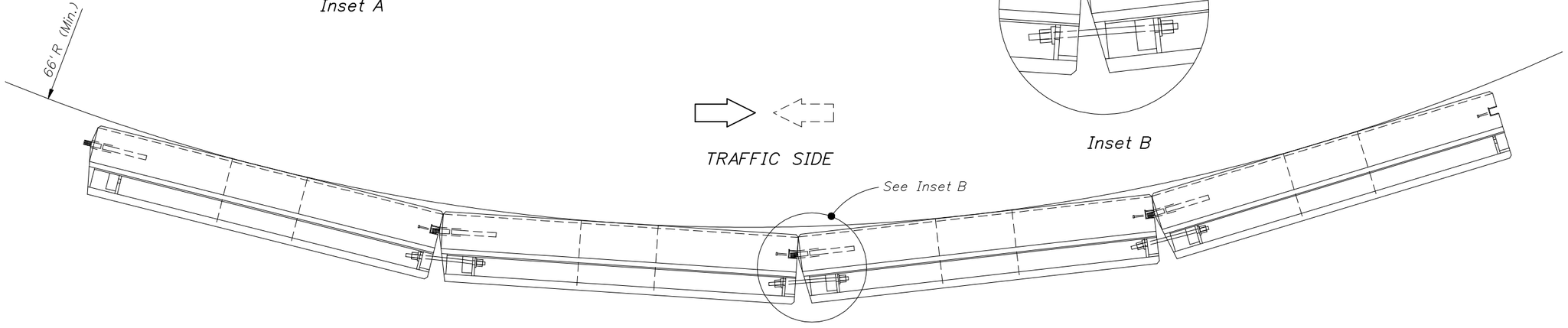
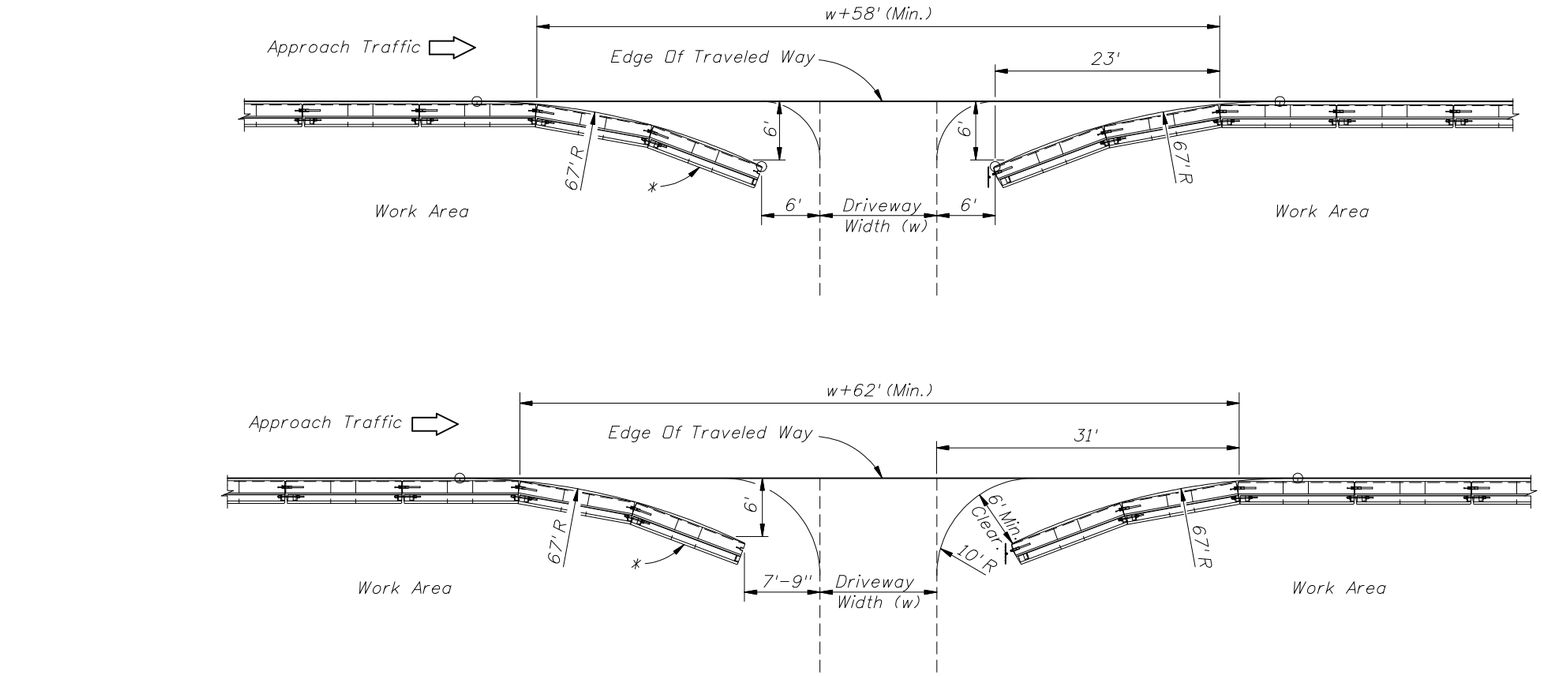


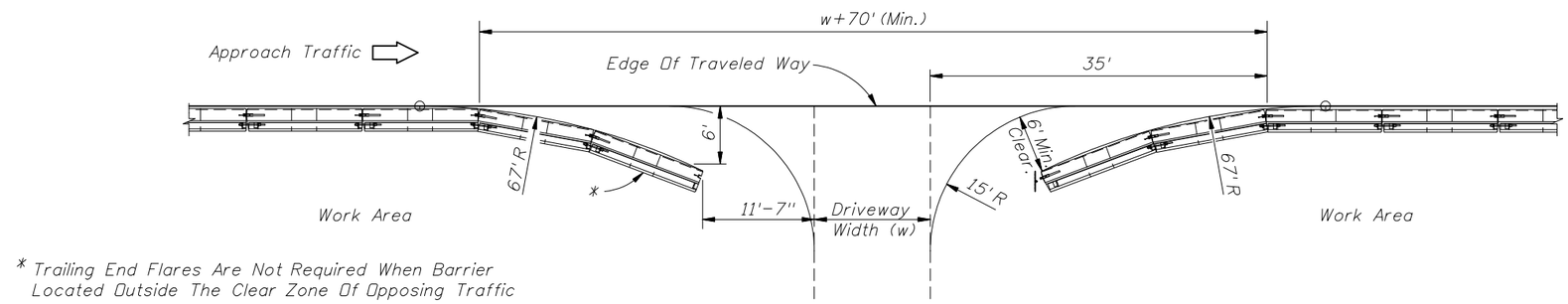
CONCAVE CURVATURE

MAXIMUM CURVATURE ● MINIMUM RADIUS

PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/05	Sheet No. 3 of 5
	LOW PROFILE BARRIER	Index No. 412	





* Trailing End Flares Are Not Required When Barrier Located Outside The Clear Zone Of Opposing Traffic

Type I Object Marker To Be Installed When Trailing End Flare Falls Within The Clear Zone Of Opposing Traffic

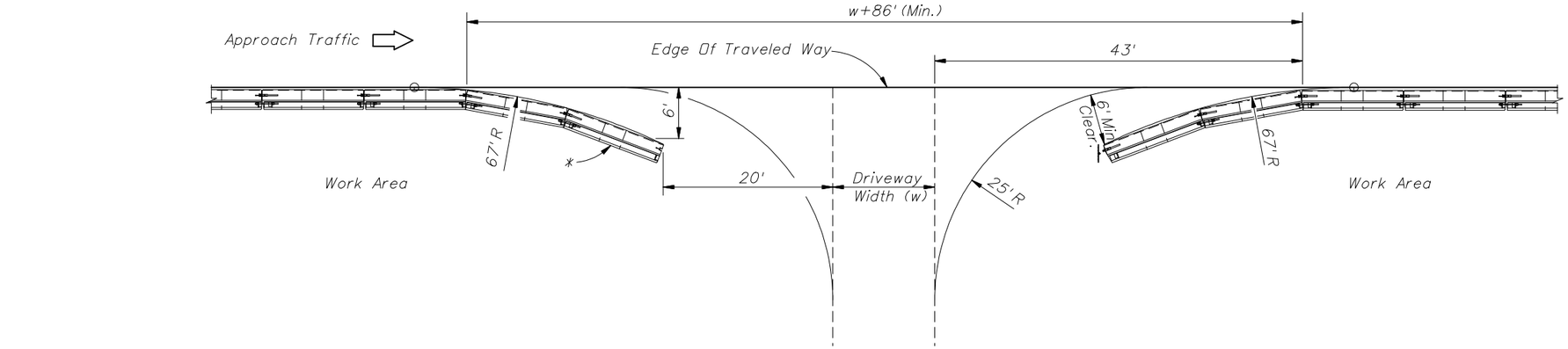
LEGEND

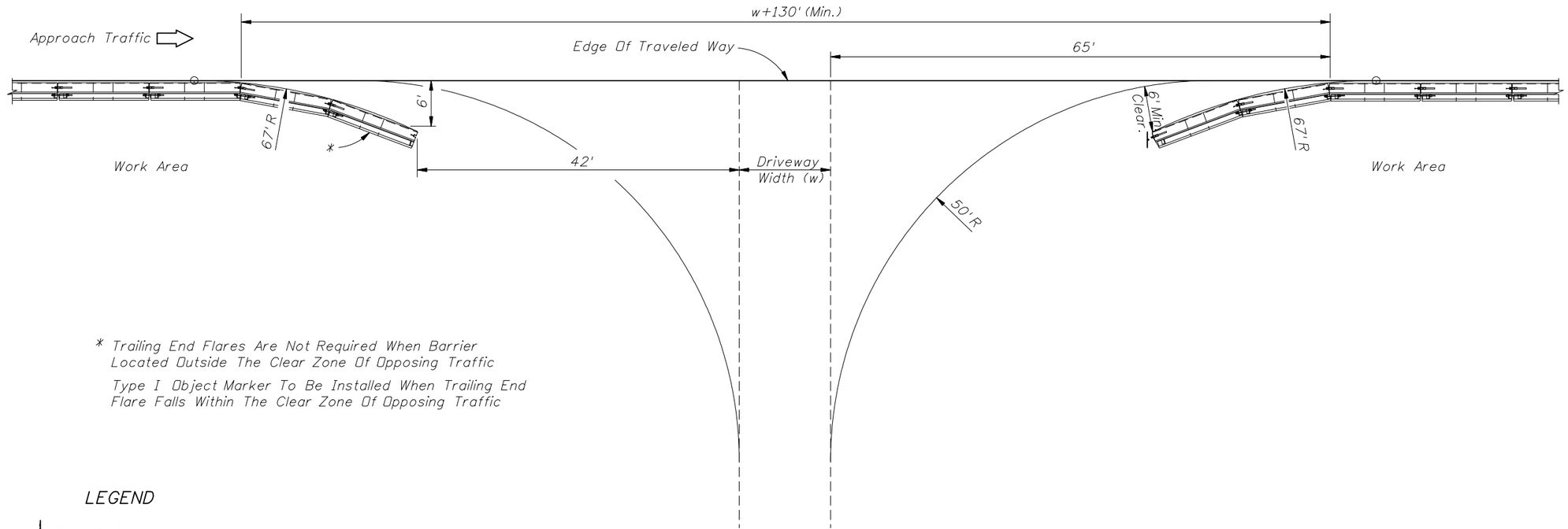
Type I Object Marker

BARRIER OPENINGS AT DRIVEWAYS

PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/05	Sheet No. 4 of 5
	LOW PROFILE BARRIER	Index No. 412	





* Trailing End Flares Are Not Required When Barrier Located Outside The Clear Zone Of Opposing Traffic

Type I Object Marker To Be Installed When Trailing End Flare Falls Within The Clear Zone Of Opposing Traffic

LEGEND

Type I Object Marker

BARRIER OPENINGS AT DRIVEWAYS

PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

The Type K Temporary Concrete Barrier System has been crash tested to NCHRP Report 350 TL-3 criteria or structurally evaluated to meet the requirements of NCHRP Report 350 TL-3 criteria for the installation configurations as shown utilizing the types, sizes, lengths, shapes, strengths and grades of the fabrication and installation materials as shown.

In order to maintain crashworthiness of the system, do not substitute different grades, sizes, shapes or types of reinforcing steel for those shown for constructing Type K Barrier Units. Also, do not substitute different type, size, length or material grade anchor bolts, nuts, washers, adhesives, connector pins, stakes, keeper pins, or guardrail components for installing Type K Barrier Units.

FABRICATION NOTES:

FABRICATOR PREQUALIFICATION: The Barrier Units shall be made in a prestressed concrete plant that meets the requirements of Specification Section 450 or in a precast plant meeting the requirements of Specification Section 6-8.

CONCRETE: Concrete shall be Class IV in accordance with Specification Section 346. Specification Sections 346-10.2 through 346-10.4 are not applicable. Barrier Units represented by concrete acceptance strength tests which fall below 5000 psi will be rejected.

REINFORCING STEEL: All reinforcing steel shall be ASTM A 615, Grade 60 except for Bars 6D1, 6D2 and 6D3. Bars 6D1, 6D2 and 6D3 shall be ASTM A 706 except that a 2¾" diameter pin must be used for the 180 degree bend test. After fabrication, all or part of Bars 6D shall be hot dip galvanized in accordance with Specification Section 962 or coated with a cold galvanizing compound in accordance with Specification Section 975. The minimum limit of galvanizing or coating is shown in the Bending Diagrams. At the Fabricator's option, the entire length of Bars 6D may be galvanized or coated. Install Bars 6D within ⅛" of the plan dimensions. Correct placement of Bars 6D is critical for proper fit up and performance of individual Barrier Units.

At the option of the Fabricator, Deformed Welded Wire Fabric in accordance with ASTM A 497 and the details shown on Sheet 2 may be utilized in lieu of Bars 4A and 5B.

All dimensions in the Bending Diagrams are out to out. All reinforcing steel shall have a 2" minimum cover except as noted.

LIFTING SLEEVE ASSEMBLY: Inclusion of the Lifting Sleeve Assemblies is optional. Steel for Pipe Sleeve shall be in accordance with ASTM A 53. Hot-dip galvanize the Lifting Sleeve Assemblies after their fabrication in accordance with the Specifications.

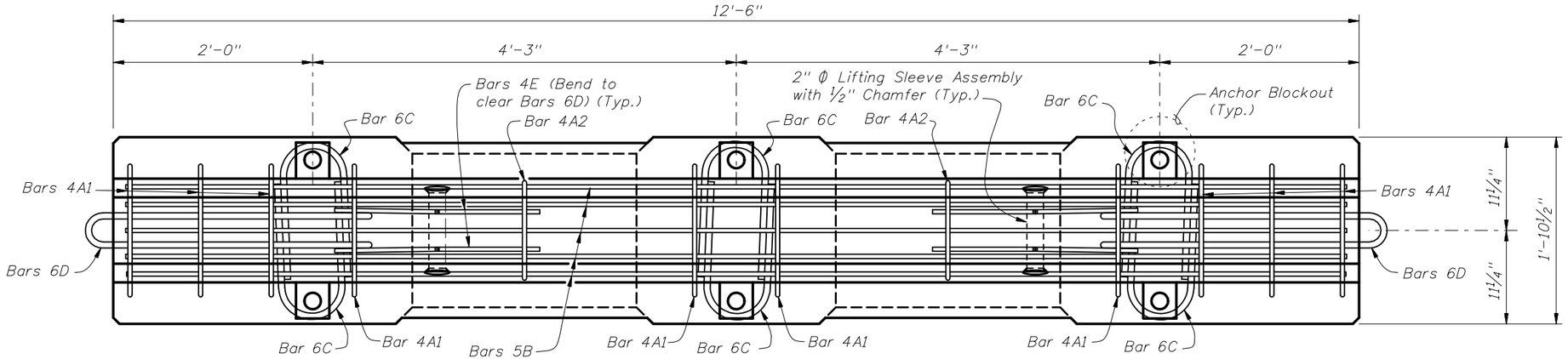
SURFACE FINISH: Construct Barrier Units in accordance with Specification Sections 400 and 521. Finish the top and sides of the Barrier Units with a General Surface Finish. Finish the bottom of the Barrier Units to a dense uniform surface by floating in lieu of the General Surface Finish. Use stationary metal forms or stationary timber forms with a form liner.

MARKING: Permanently mark the top left end of each Barrier Unit by the use of an embedded and anchored metallic plate with letters and figures a minimum of 0.5" tall. Ink stamps are not allowed. Permanently mark with the following information:

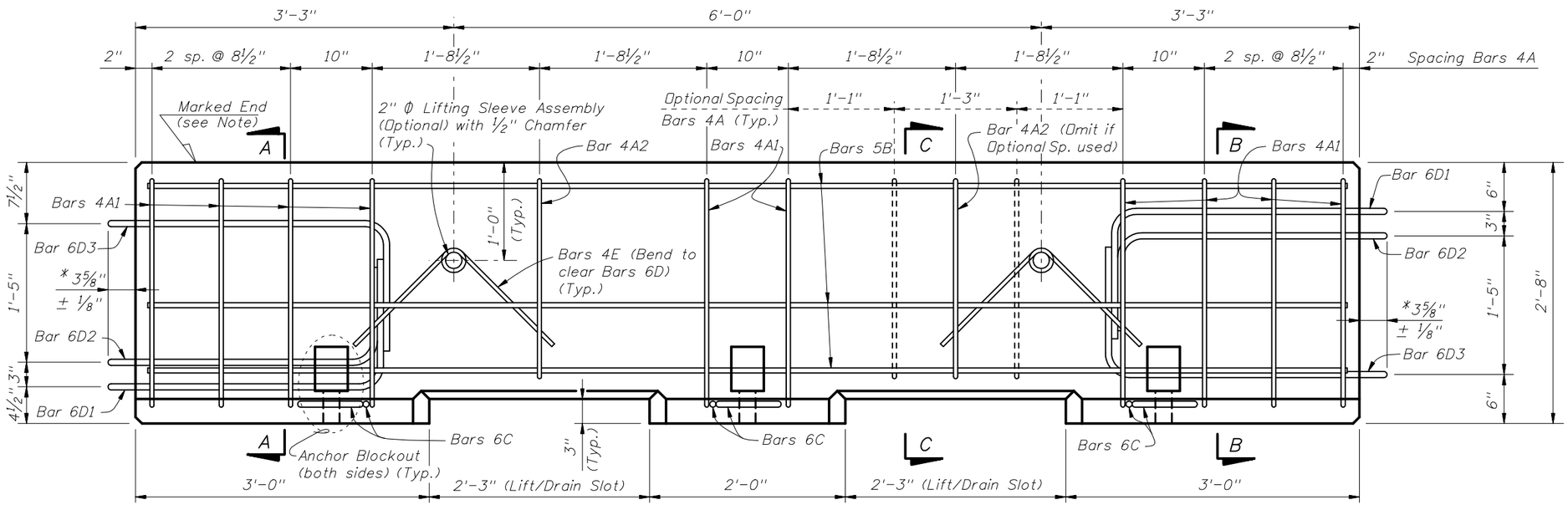
- Type K1
- Fabricator's name or symbol
- Date of manufacture (day, month and year)

HANDLING: At no time shall the Barrier Units be lifted or moved by use of Bars 6D that extend from the ends of the units. Approximate weight of one unit equals 2.7 tons.

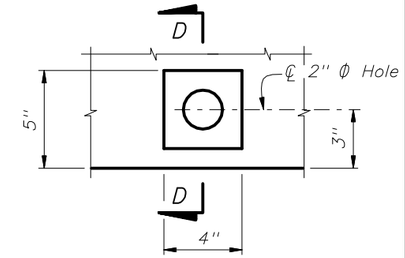
ALTERNATE DESIGN: Manufacturers seeking approval of proprietary concrete or steel barrier systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the barrier system is crash tested to NCHRP Report 350 Test Level 3 criteria, is accepted by FHWA for use as a temporary concrete or steel barrier in the configurations shown herein, is a minimum of 2'-8" tall, has transitions and connections comparable to the standard design and has permanent deflections due to TL-3 crash test impacts not to exceed 3'-9" in freestanding configuration, 3.5" in bolted down configuration and 1'-0" in staked down configuration.



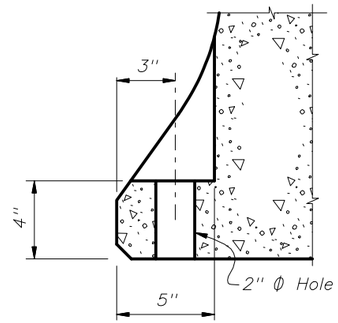
PLAN VIEW



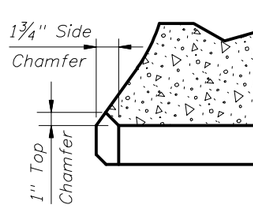
ELEVATION VIEW



ANCHOR BLOCKOUT DETAIL



SECTION D-D
(Reinforcement not shown for clarity)



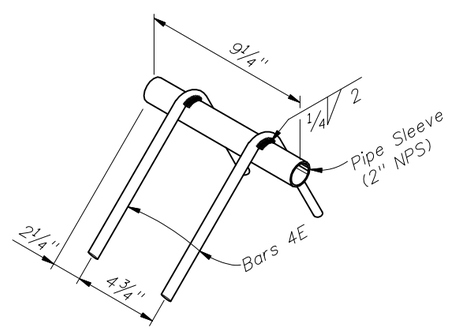
SECTION THRU LIFT/DRAIN SLOT

ESTIMATED TEMPORARY CONCRETE BARRIER QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY	1.29
Reinforcing Steel	LB	218

The above quantities are for one Barrier Unit.

Cross References:
For Section A-A, Section B-B and Section C-C see Sheet 3.

* Measured from end of Barrier Unit to outside edge of Bars 6D.



LIFTING SLEEVE ASSEMBLY DETAIL (OPTIONAL)

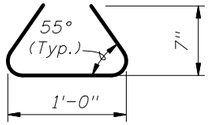
2010 FDOT Design Standards

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

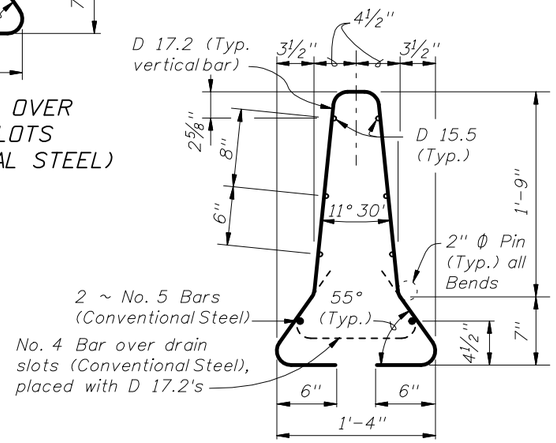
Last Revision	Sheet No.
07/01/07	2 of 15

Index No. 414

ALTERNATE REINFORCING STEEL DETAIL
WELDED WIRE REINFORCEMENT

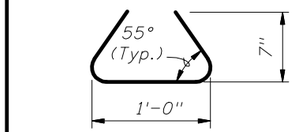


NO. 4 BAR OVER
DRAIN SLOTS
(CONVENTIONAL STEEL)

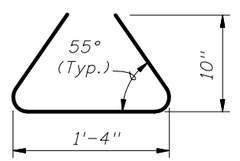


NOTES:
Place 2 ~ No. 5 Bars (12'-3" long) in bottom of Welded Wire Reinforcement cage as shown.
D 17.2 spacing shall match spacings for Bars 4A shown in Elevation View, Sheet 2. Field trim D 17.2's to clear drain slots by 2".

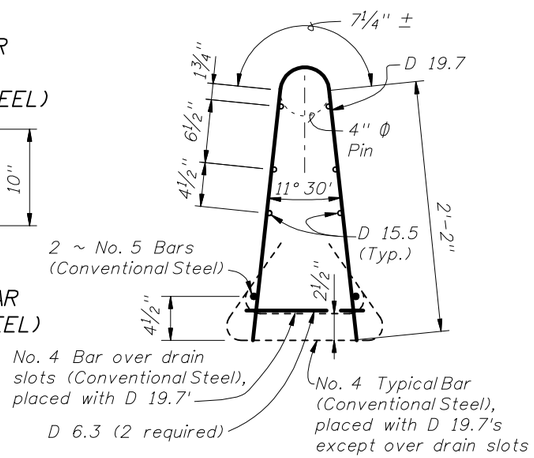
CONFIGURATION ONE



NO. 4 BAR OVER
DRAIN SLOTS
(CONVENTIONAL STEEL)



NO. 4 TYPICAL BAR
(CONVENTIONAL STEEL)



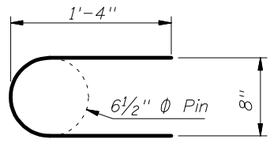
NOTES:
Place 2 ~ No. 5 Bars (12'-3" long) in bottom of Welded Wire Reinforcement cage as shown.
D 19.7 spacing shall match spacings for Bars 4A shown in Elevation View, Sheet 2. Field trim D 19.7's to clear drain slots by 2".

CONFIGURATION TWO

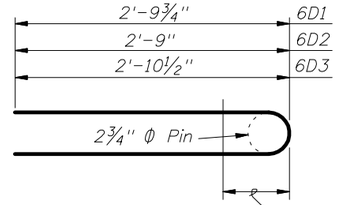
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

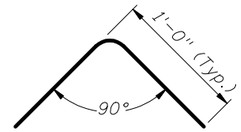
MARK	SIZE	NUMBER	LENGTH
A1	4	10	6'-1"
A2	4	2	5'-5"
B	5	5	12'-3" (Straight)
C	6	6	3'-1"
D1	6	2	8'-4"
D2	6	2	7'-6"
D3	6	2	8'-6"
E	4	4	2'-0"



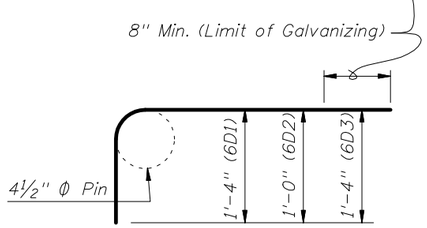
BAR 6C



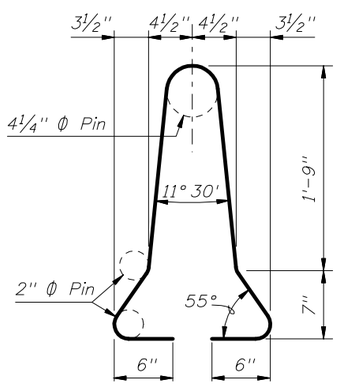
TOP VIEW
BARS 6D1, 6D2 & 6D3



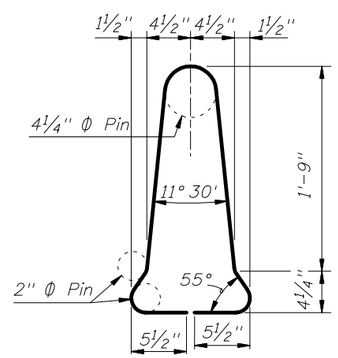
BAR 4E



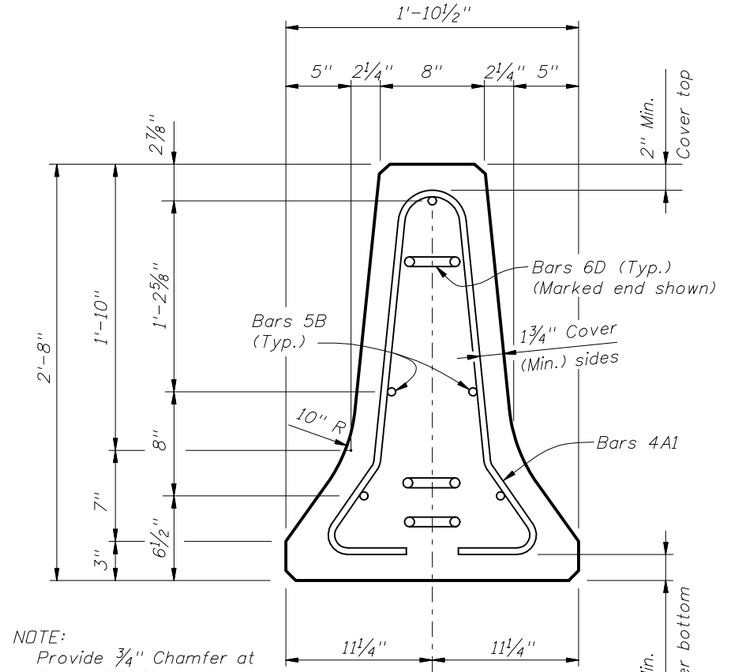
SIDE VIEW
BARS 6D1, 6D2 & 6D3



STIRRUP BAR 4A1

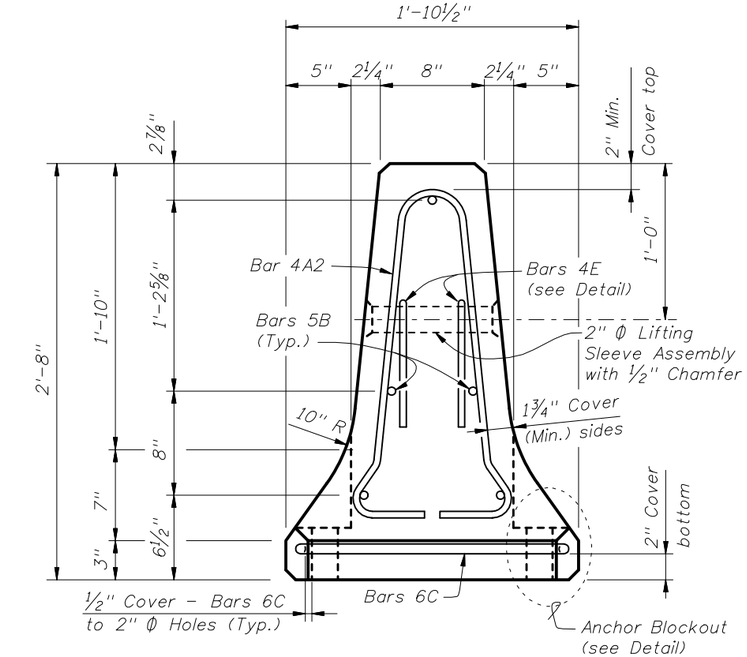


STIRRUP BAR 4A2

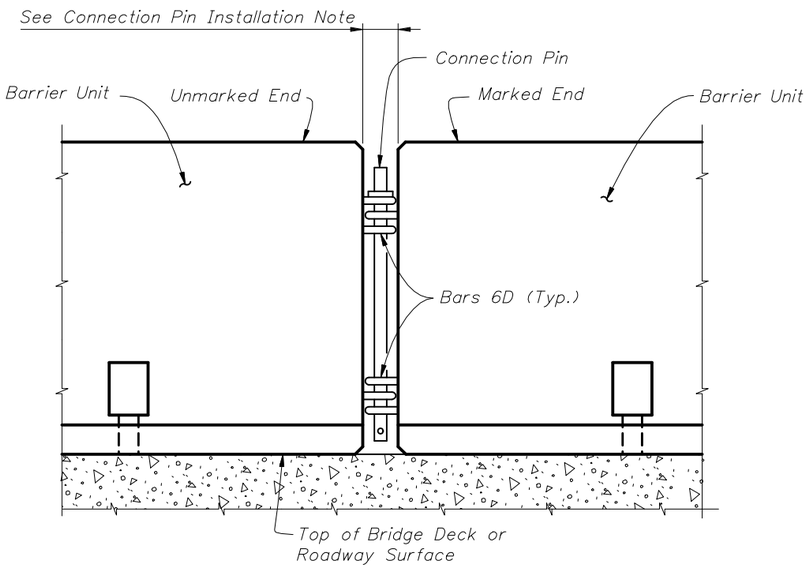


NOTE:
Provide ¾" Chamfer at top and bottom corners of Barrier.

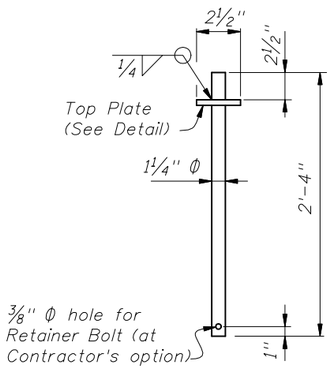
SECTION A-A (SHOWN)
(SECTION B-B SIMILAR)



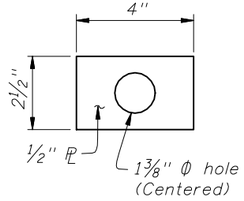
SECTION C-C
(Bars 6D not shown for clarity)



DETAIL OF CONNECTION BETWEEN BARRIER UNITS



CONNECTION PIN DETAIL



TOP PLATE DETAIL

NOTES FOR ALL INSTALLATIONS:

LIMITATION OF USE: This Temporary Concrete Barrier System is intended for work zone traffic control and other temporary applications. It shall not be used for permanent traffic railing construction unless specifically permitted by the Plans. Except as shown for the Back Filled Roadway Installations, the Barrier Units must be installed on a flexible pavement (asphalt) or rigid pavement (concrete) surface as shown with a cross slope of 1:10 or flatter. Except as shown for transition installations, Type K Barrier Units are not intended to be bolted down or staked down in locations where they can be impacted from the back side.

HANDLING: At no time shall the Barrier Units be lifted or moved by use of Bars 6D that extend from the ends of the units. Approximate weight of one unit equals 2.7 tons.

SURFACE PREPARATION: Except as shown for the Back Filled Roadway Installations, remove all debris, loose dirt and sand from the pavement, bridge deck or Asphalt Pad surface within the barrier footprint just prior to placement of the Barrier Units.

CONNECTION PIN ASSEMBLY: Steel for Connection Pin and Top Plate assemblies shall be in accordance with ASTM A36 or ASTM A709 Grade 36. Nondestructive testing of welds shall not be required. At the Contractor's option, a ⅜" diameter hole may be provided at the bottom of the Connection Pin, as shown, for the installation of a vandal resistance bolt.

CONNECTION PIN INSTALLATION: Initially set Barrier Units by using a 3⅝" wooden block between ends of adjacent units. Install Connection Pin between adjacent Barrier Units as shown, then pull newly placed Barrier Unit away from adjacent Barrier Unit to remove slack between Connection Pin and Bars 6D (except as shown on Sheet 5). Barrier Units shall not be used unconnected.

DELINEATION: Mount Type C Steady-Burn Lights on top of Barrier Units that are used as traffic barriers along travel ways in work zones. Space the lights at 50' centers in transitions, 100' centers on curves and 200' centers on tangent alignments. Refer to "Warning Lights" on Index No. 600 for additional information.

REUSE OF UNITS: Barrier Units may be reused provided they have the structural integrity and surface qualities of new units. Do not use Barrier Units without Marking Plates.

REUSE OF CONNECTION PINS: Connection pins may be reused if they have the structural integrity of new pins.

INSTALLATIONS ON CURVED ALIGNMENTS: The details presented in these Standards are shown for installations on tangent alignments. Details for horizontally curved alignments are similar.

TRANSITIONS: Transitions are required between freestanding, bolted down, staked down and back filled Type K Barrier installations, see Sheet 8 for transition requirements and details. Transitions are also required between installations of Type K Barrier and other types of temporary barrier, see Index No. 415 for transition requirements and details. Splices and transitions are required between installations of Type K Barrier and permanent Bridge or Roadway Traffic Railings, see Sheets 9 through 13 for transition requirements and details.

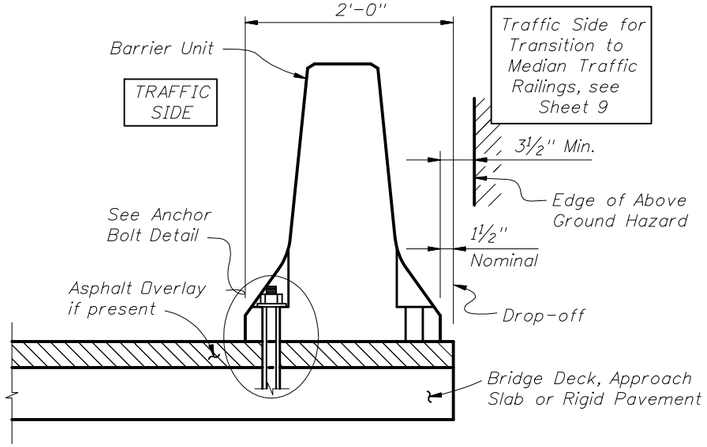
PAYMENT: Barrier Units for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Barrier Wall (Temporary) (F&I) (Type K), LF. Any relocation of the Barrier Units required for the project shall be paid for under the contract unit price for Barrier Wall (Temporary) (Relocate) (Type K), LF. Type C Steady-Burn Lights shall be paid for under the contract unit price for Lights (Temp. Barrier Wall Mount) (Type C, Steady Burn), ED. The Contractor shall furnish Barrier Units except when the Plans stipulate the availability of Department owned units. Regardless of unit source the Contractor shall furnish all hardware and shall be responsible for all handling including loading, transport, unloading, stockpiling, installation, removal and return. Unless otherwise noted on the Plans, the Barrier Units shall become the property of the Contractor and shall be removed from the site prior to acceptance of the completed project.

NOTES FOR THRIE BEAM GUARDRAIL SPLICE INSTALLATIONS:

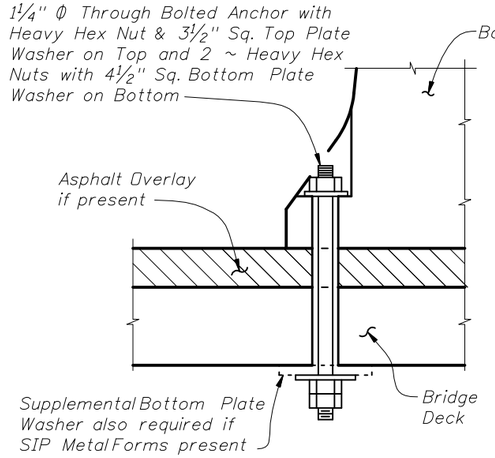
THRIE-BEAM GUARDRAIL: Provide Thrie-Beam Guardrail for splices in accordance with AASHTO M 180, Type II (Zinc coated) and as follows:
Two panels per splice (One panel per side) of Class B (10 Gauge), or
Four panels per splice (Two nested panels per side) of Class A (12 Gauge).
Guardrail panel length shall be 12'-6". Provide and install all other associated metallic guardrail components (Terminal Connectors, Shoulder Bolts, Hex Bolts and Nuts, Filler Plates, etc.) in accordance with Index No. 400.
Install five Guardrail Anchor Bolts at each end of each splice in any of the standard seven anchor bolt holes in the Thrie-Beam Terminal Connector. If reinforcing steel is encountered when drilling holes for Guardrail Anchor Bolts in Type K Barrier Units, shift Thrie-Beam Terminal Connector so as to clear reinforcing steel within the given tolerances or select a different bolt hole to use. Do not drill or cut through reinforcing steel within Type K Barrier Units. Drilling or cutting through reinforcing steel within permanent concrete traffic railings is permitted. Do not drill or cut through utilities or conduits within permanent concrete traffic railings.

GUARDRAIL OFFSET BLOCKS: Provide and install timber Offset Blocks meeting the material requirements of Index No. 400. Field trim Offset Blocks as required for proper fit. Utilize Offset Blocks as shown and required in order to prevent bending or kinking of Thrie-Beam Guardrail panels.

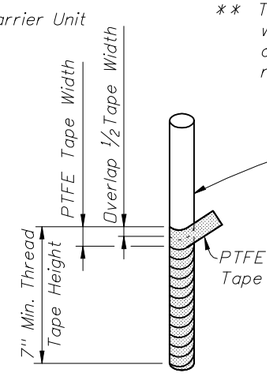
CONCRETE FOR FILLING TAPERED TRAFFIC RAILING TOES: Provide concrete for filling tapered toes of Traffic Railings as shown meeting the material requirements of Specification Section 346, any Class, or a commercially available prebagged concrete mix (3000 psi minimum compressive strength). Sampling, testing, evaluation and certification of the concrete in accordance with Specification Section 346 is not required. Saturate with water the surfaces upon and against which the concrete fill will be placed prior to placing concrete. Place and finish concrete fill using forms or by hand methods to the general configurations shown so as to provide a smooth shape transition between the Type K Barrier and the adjacent traffic railing. A low slump is desirable if placing and finishing concrete by hand methods. Cure the concrete fill by application of a curing compound, or by covering with a wet tarp or burlap for a minimum of 24 hours. Completely remove the concrete fill upon relocation or removal of the Type K Temporary Concrete Barrier.



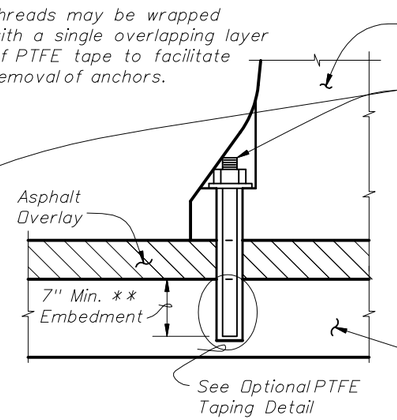
TYPICAL SECTION (BRIDGE DECK SHOWN, APPROACH SLAB OR RIGID PAVEMENT SIMILAR; INSTALLATION ADJACENT TO DROP-OFF SHOWN, MEDIAN TRANSITION INSTALLATION SIMILAR)



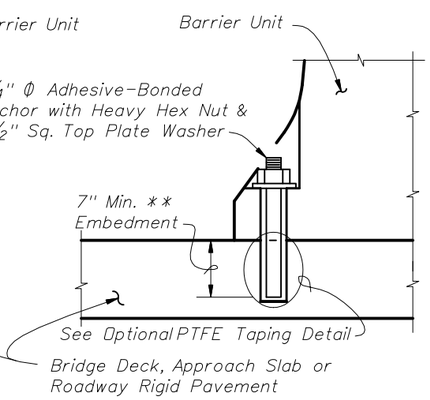
THROUGH BOLTED ANCHOR INSTALLATION ON BRIDGE DECK



OPTIONAL PTFE TAPING DETAIL



WITH ASPHALT OVERLAY



WITHOUT ASPHALT OVERLAY

ADHESIVE BONDED ANCHOR INSTALLATION ON BRIDGE DECK, APPROACH SLAB OR RIGID PAVEMENT

NOTES FOR BOLTED DOWN BRIDGE, APPROACH SLAB, ROADWAY AND TRANSITION INSTALLATIONS:

LIMITATION OF USE: This installation technique can only be used on rigid pavement and concrete bridge decks as shown. Barrier Units shall not be bolted down on bridge superstructures that contain post-tensioned tendons within the concrete deck (top flange of concrete box girders) or on bridge superstructures consisting of longitudinally prestressed, transversely post-tensioned, solid or voided concrete slab units. Anchor Bolts must not be installed on both sides of the Barrier Units. Do not bolt down Barrier Units across bridge finger or modular expansion joints.

ANCHOR BOLTS, NUTS AND WASHERS: Adhesive-Bonded Anchor Bolts shall be fully threaded rods in accordance with ASTM F 1554 Grade 36. Anchor Bolts for through bolting shall be in accordance with ASTM A 307 or ASTM F 1554 Grade 36. Nuts shall be in accordance with ASTM A 563 or ASTM A 194. Flat Washers shall be in accordance with ASTM F 436 and Plate Washers shall be in accordance with ASTM A 36 or ASTM A 709 Grade 36.

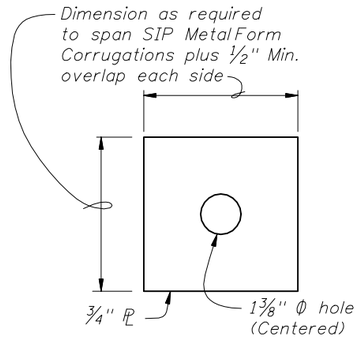
Install three (3) Anchor Bolts per Barrier Unit on the traffic side of the Barrier Units as shown, except for Transition Installations. For the number and positions of Anchor Bolts required in Transition Installations see Sheets 8 and 9 and Index No. 415. Drilling through deck reinforcing steel to install Anchor Bolts is permitted. Unless otherwise shown in the Plans, at the Contractor's option Barrier Units may be installed by through bolting (where geometrically possible) or by the use of Adhesive-Bonded Anchor Bolts. Do not drill into or otherwise damage the tops of supporting beams or girders, bridge deck expansion joints or drains. Install Anchor Bolts and Nuts so that the maximum extension beyond the face of the Barrier Units is ½". Snug tighten the Nuts on the Anchor Bolts. For through bolted installations, snug tighten the double Nuts on the underside of the deck against each other to minimize the potential for loosening.

Omit one (1) Anchor Bolt within a single Barrier Unit if a conflict exists between the Anchor Bolt location and a bridge deck expansion joint or drain. The adjacent Barrier Units must each be installed with the standard three (3) Anchor Bolts.

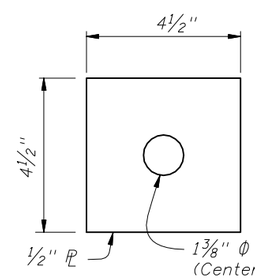
Omit one (1) Anchor Bolt within a single Barrier Unit as shown in the Treatment at Bridge Deck Expansion Joint Schematic if the Barrier Unit straddles a bridge deck expansion joint. The adjacent Barrier Units must each be installed with the standard three (3) Anchor Bolts.

ADHESIVE-BONDING MATERIAL SYSTEMS: Adhesive Bonding Material Systems for Anchor Bolts shall be Type HSHV in accordance with Specification Section 937 and shall be installed in accordance with Specification Section 416. Prior to installation of the Barrier Units in the Plan location(s), install a demonstration Barrier Unit using the proposed production installation method, at a location approved by the Engineer. In lieu of the production test requirements of Specification Section 416-6, install six (6) Adhesive-Bonded Anchor Bolts in the demonstration Barrier Unit and test each Anchor Bolt with a 29,800 pound tensile proof load. Install and test additional demonstration Barrier Units when requested by the Engineer. Remove the demonstration Barrier Unit prior to testing the Anchor Bolts. Remove the test Anchor Bolts after testing as directed by the Engineer.

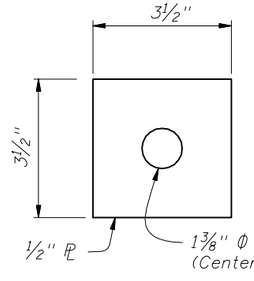
REMOVAL OF ANCHOR BOLTS: Upon removal or relocation of Barrier Units, remove all Anchor Bolts and completely fill the remaining holes in bridge decks, approach slabs and roadway rigid pavements that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.



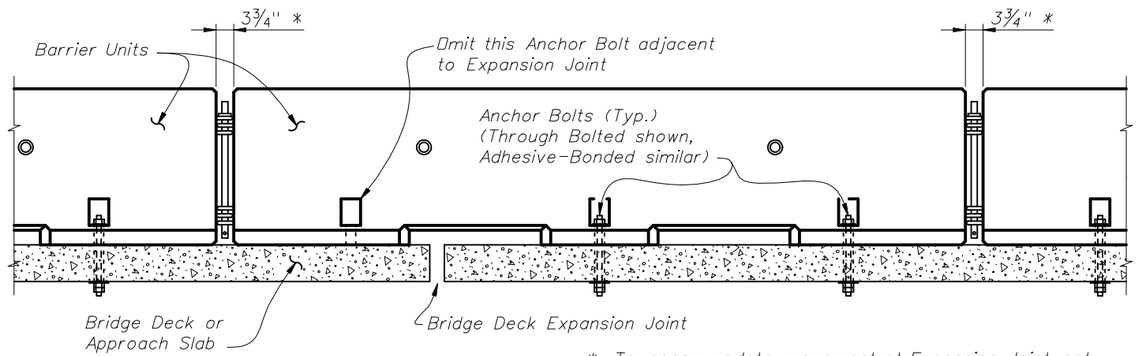
SUPPLEMENTAL BOTTOM PLATE WASHER DETAIL



BOTTOM PLATE WASHER DETAIL



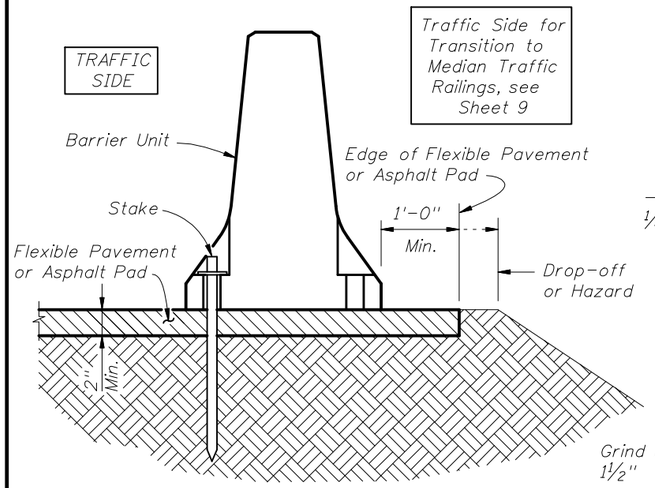
TOP PLATE WASHER DETAIL



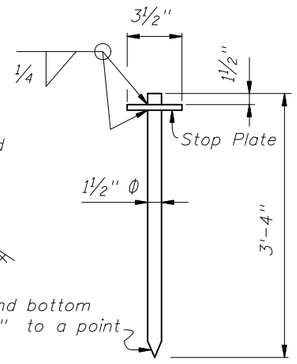
* To accommodate movement at Expansion Joint, set Barrier Units with 3¾" gap at locations shown.

TREATMENT AT BRIDGE DECK EXPANSION JOINT SCHEMATIC

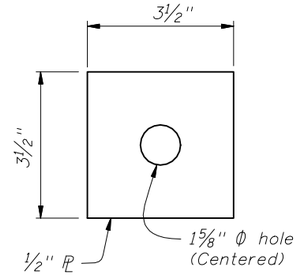
BOLTED DOWN BRIDGE, APPROACH SLAB, ROADWAY AND TRANSITION INSTALLATIONS



TYPICAL SECTION
(INSTALLATION ADJACENT TO DROP-OFF SHOWN, MEDIAN TRANSITION INSTALLATION SIMILAR)



STAKE DETAIL



STOP PLATE DETAIL

NOTES FOR STAKED DOWN ROADWAY AND TRANSITION INSTALLATIONS:

LIMITATION OF USE: This installation technique can only be used on flexible pavement or an Asphalt Pad as shown. Stakes must not be installed on both sides of the Barrier Units.

ASPHALT PAD: Where existing flexible pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

STAKES: Provide steel for Stake assemblies in accordance with ASTM A 36 or ASTM A 709 Grade 36. All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required.

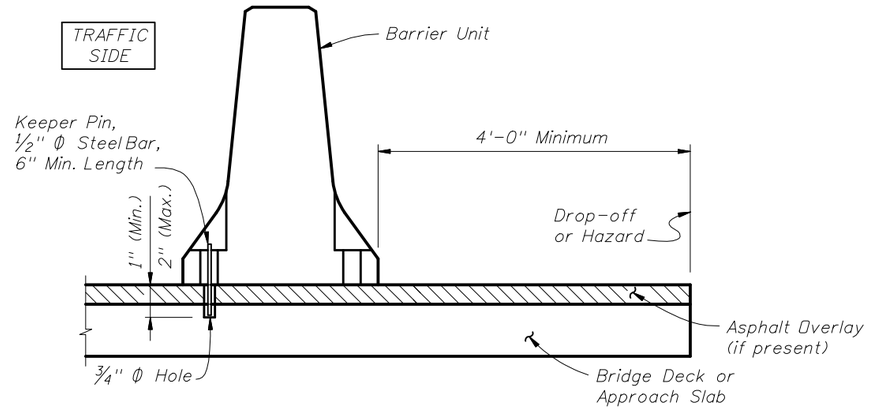
Install three (3) Stakes on the traffic side of the Barrier Units as shown, except for Transition Installations. For the number and positions of stakes required in Transition Installations see Sheets 8 and 9 and Index No. 415. Install Stakes so that the Stop Plate is snug against the bottom of the Anchor Blockout.

BURIED UTILITIES: Prior to installation of Stakes verify locations of all adjacent buried utilities, drainage structures, pipes, etc. If conflicts between Stake locations and buried elements exist, a maximum of two (2) Stakes within a single Barrier Unit may be omitted if the adjacent Barrier Units are installed with the standard three (3) Stakes.

REMOVAL OF STAKES: Upon removal or relocation of Barrier Units, completely remove all Stakes and completely fill the remaining holes in flexible pavement that is to remain with hot or cold patch asphalt material.

REUSE OF STAKES: Stakes may be reused if they have the structural integrity of new stakes.

STAKED DOWN ROADWAY AND TRANSITION INSTALLATIONS



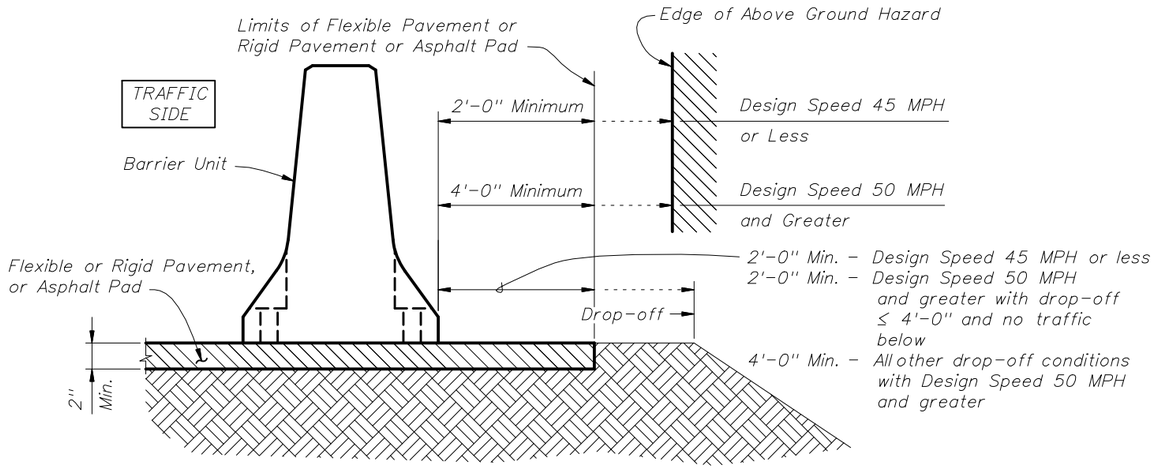
TYPICAL SECTION (BRIDGE DECK SHOWN, APPROACH SLAB SIMILAR)

NOTES FOR FREE STANDING BRIDGE OR APPROACH SLAB INSTALLATIONS:

KEEPER PINS: Keeper Pins shall be ½" diameter, smooth steel bar in accordance with ASTM A 36 or ASTM A 709 Grade 36. As directed by the Engineer in order to limit vibration induced translation of the Barrier Units, install one (1) Keeper Pin per Barrier Unit on the traffic side of the Barrier Units as shown. Do not drill into or otherwise damage bridge deck expansion joints or drains.

REMOVAL OF KEEPER PINS: Upon removal or relocation of Barrier Units, remove all Keeper Pins and completely fill the remaining holes in bridge decks and approach slabs that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.

FREESTANDING BRIDGE OR APPROACH SLAB INSTALLATIONS



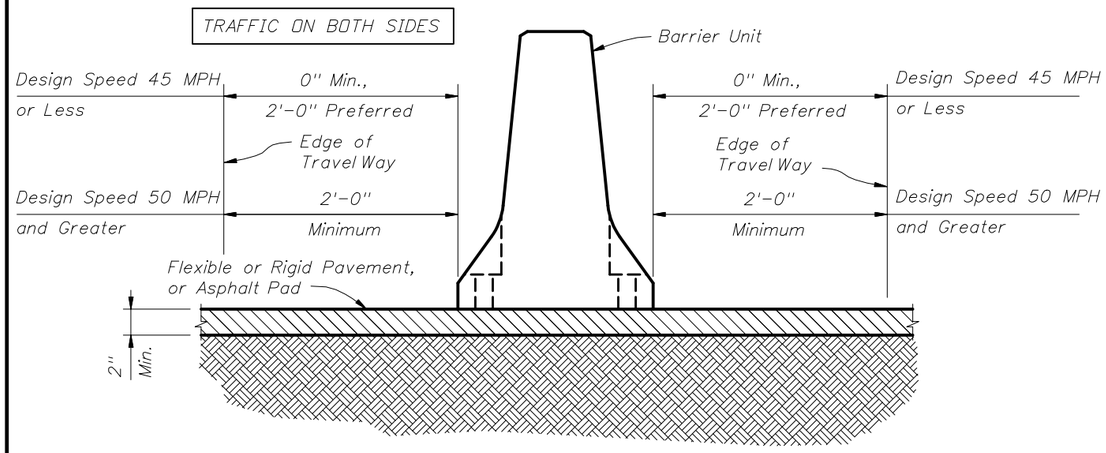
TYPICAL SECTION

NOTES FOR FREE STANDING ROADWAY INSTALLATION:

LIMITATION OF USE: This installation technique can only be used on flexible or rigid pavement or on an Asphalt Pad as shown.

ASPHALT PAD: Where existing pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

FREESTANDING ROADWAY INSTALLATION



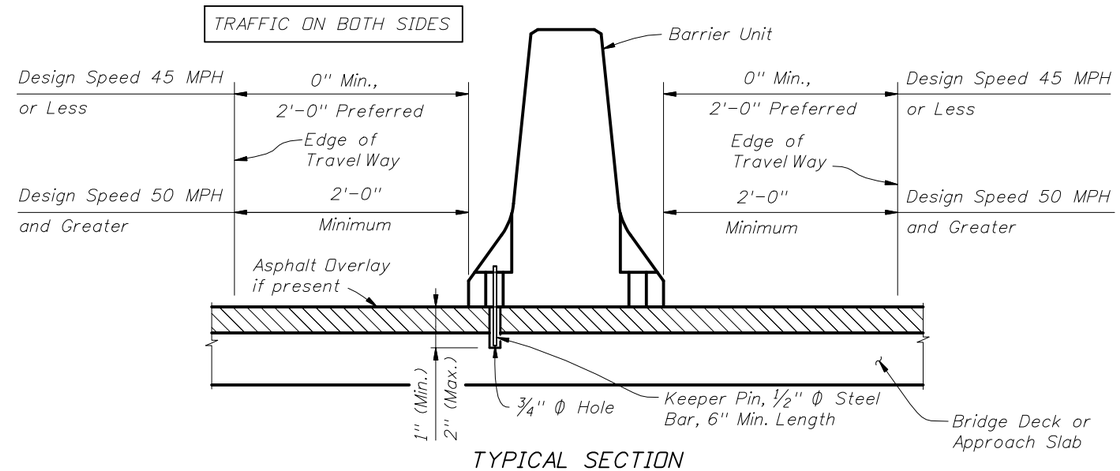
TYPICAL SECTION

NOTES FOR FREE STANDING ROADWAY MEDIAN INSTALLATION:

LIMITATION OF USE: This installation technique can only be used on flexible or rigid pavement or on an Asphalt Pad as shown.

ASPHALT PAD: Where existing pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

FREESTANDING ROADWAY MEDIAN INSTALLATION



TYPICAL SECTION

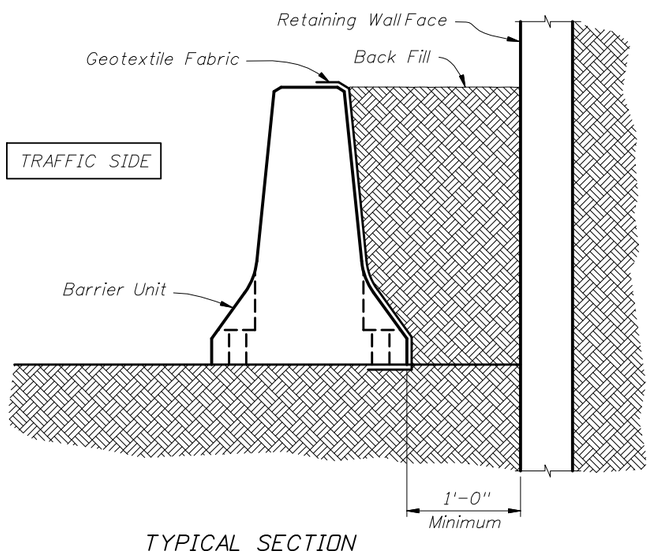
NOTES FOR FREE STANDING BRIDGE OR APPROACH SLAB MEDIAN INSTALLATION:

KEEPER PINS: Keeper Pins shall be ½" diameter, smooth steel bar in accordance with ASTM A 36 or ASTM A 709 Grade 36.

As directed by the Engineer in order to limit vibration induced translation of the Barrier Units, install one (1) Keeper Pin per Barrier Unit as shown. Alternate Keeper Pin locations from side to side of Barrier Units along the length of the installation. Do not drill into or otherwise damage bridge deck expansion joints or drains.

REMOVAL OF KEEPER PINS: Upon removal or relocation of Barrier Units, remove all Keeper Pins and completely fill the remaining holes in bridge decks and approach slabs that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.

FREESTANDING BRIDGE OR APPROACH SLAB MEDIAN INSTALLATION

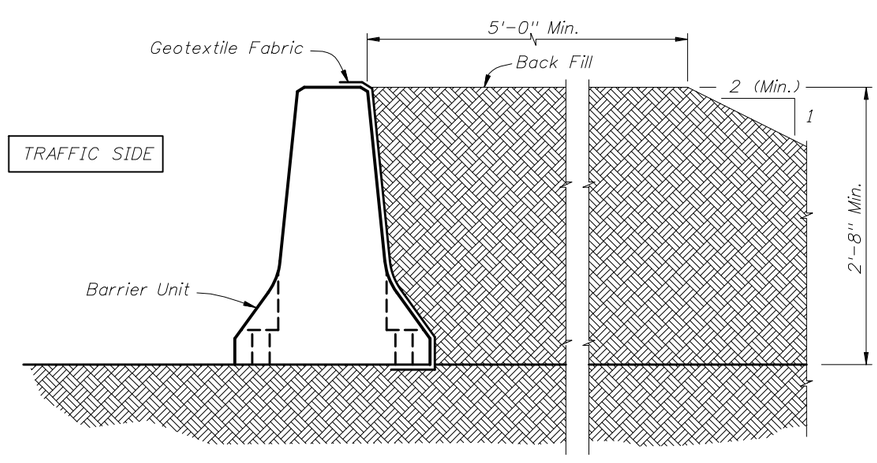


TYPICAL SECTION
ADJACENT TO RETAINING WALL

NOTES FOR BACK FILLED ROADWAY INSTALLATIONS:

BACK FILL MATERIAL: Provide Back Fill Material consisting of any available clean soil. Compact Back Fill Material until the soil mass is firm and unyielding. Provide erosion control as specified in the Plans. If none is specified in the Plans, provide erosion control as required to maintain the integrity of the Back Fill embankment.

GEOTEXTILE FABRIC: Provide Type D-5 Geotextile Fabric in accordance with Index No. 199 to contain Back Fill Material behind Barrier Units. Geotextile Fabric may be continuous over the length and height of the installation or may be individual pieces as required to cover the Lift / Drain Slots and open vertical joints between Barrier Units.



TYPICAL SECTION

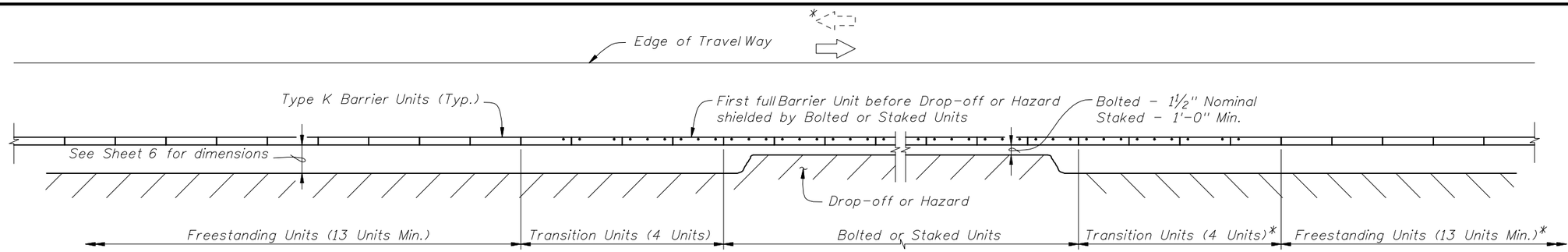
BACK FILLED ROADWAY INSTALLATIONS

2010 FDOT Design Standards

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

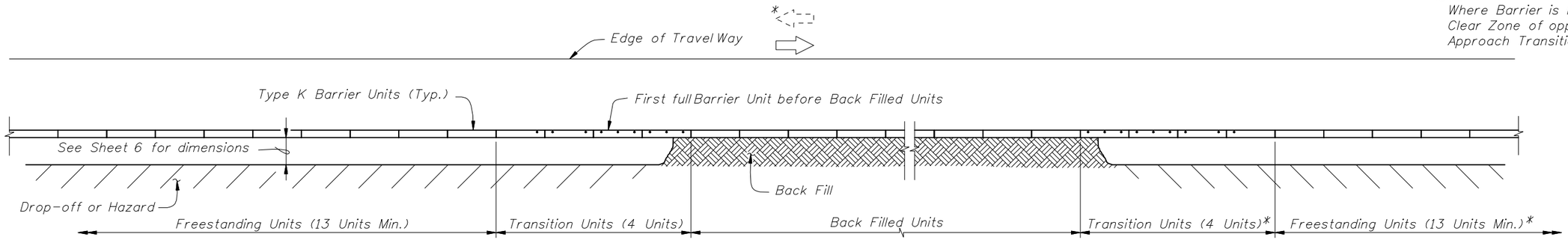
Last Revision 07/01/07

Index No. 414

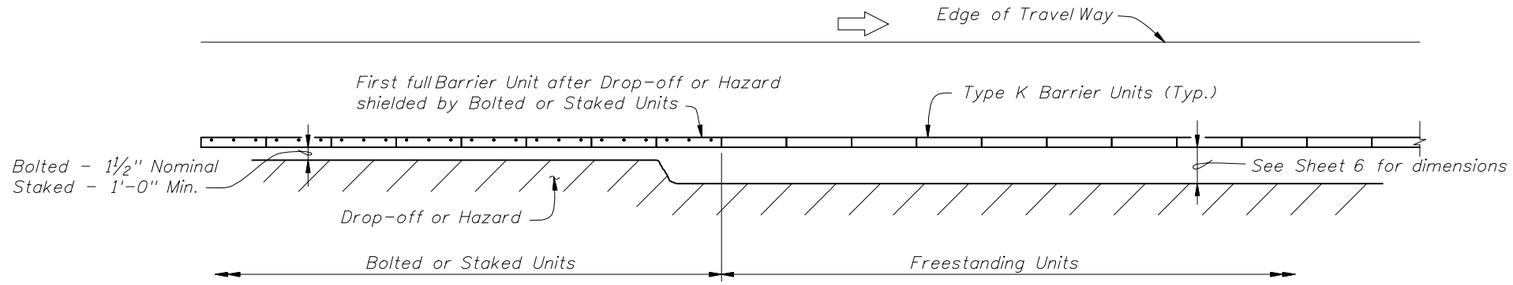


APPROACH TRANSITION FROM FREESTANDING TO BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS

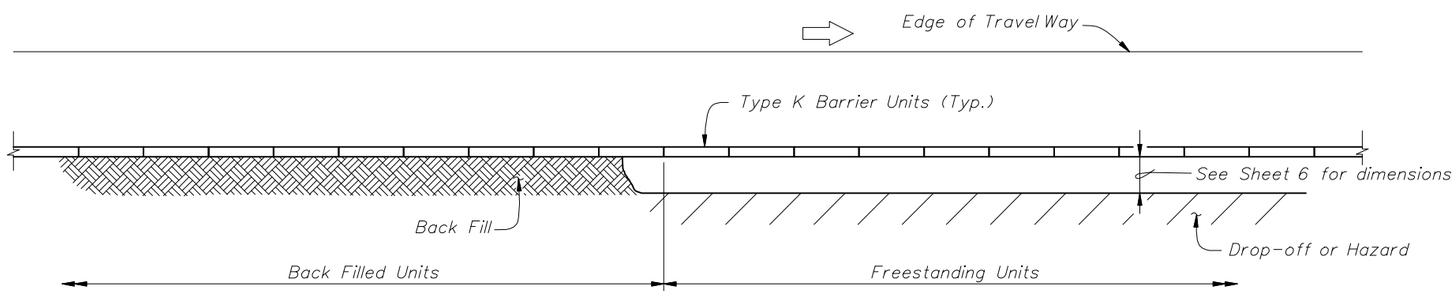
* NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.



APPROACH TRANSITION FROM FREESTANDING TO BACK FILLED TYPE K TEMPORARY CONCRETE BARRIERS



TRAILING END TRANSITION FROM BOLTED OR STAKED DOWN TO FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS

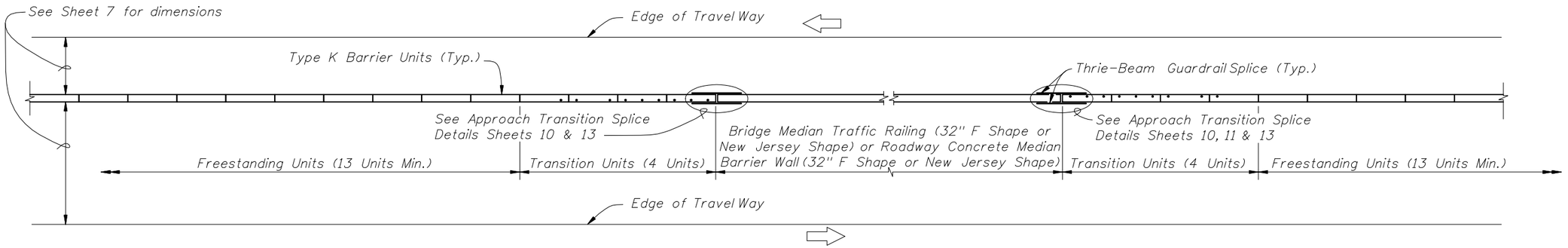


TRAILING END TRANSITION FROM BACK FILLED TO FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS

LEGEND:

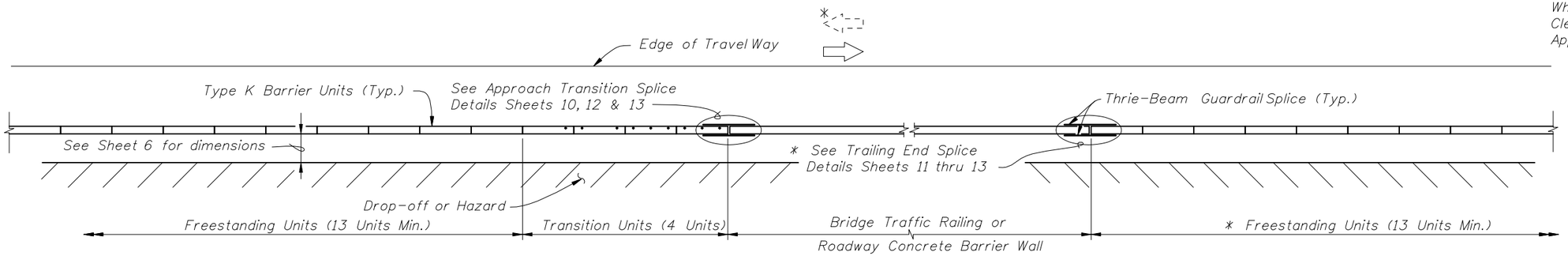
Dot indicates number and position of Bolts or Stakes

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/07	Sheet No. 8 of 15
	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM		Index No. 414

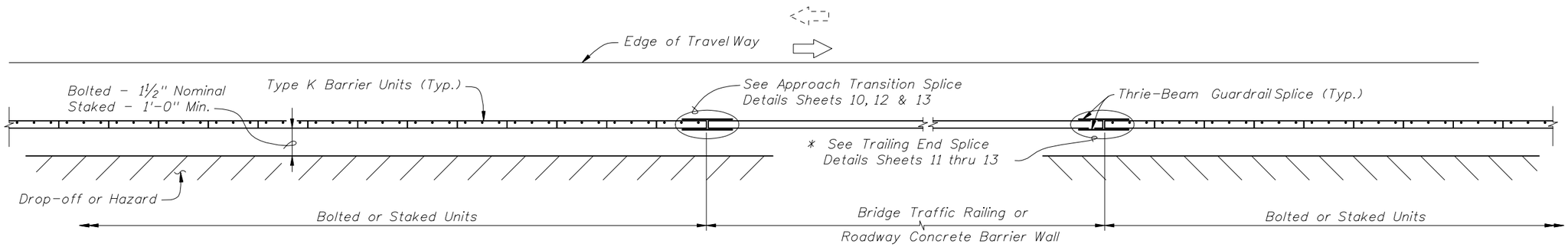


TRANSITION FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE MEDIAN TRAFFIC RAILING OR ROADWAY MEDIAN CONCRETE BARRIER WALL

* NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.

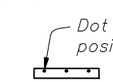


TRANSITION FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE TRAFFIC RAILING OR ROADWAY CONCRETE BARRIER WALL



TRANSITION FROM BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE TRAFFIC RAILING OR ROADWAY CONCRETE BARRIER WALL

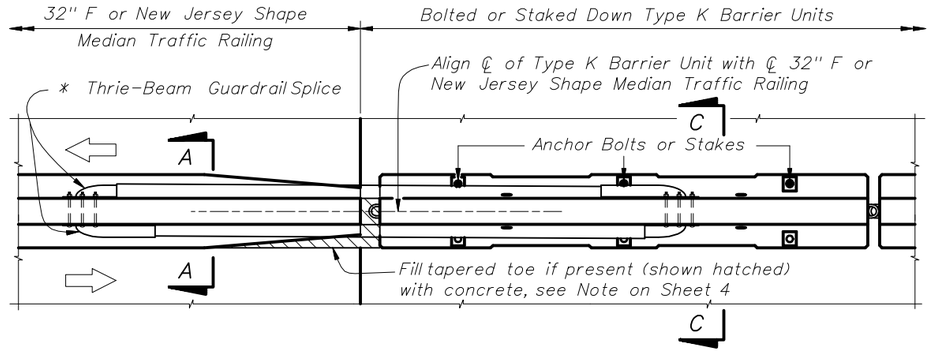
LEGEND:



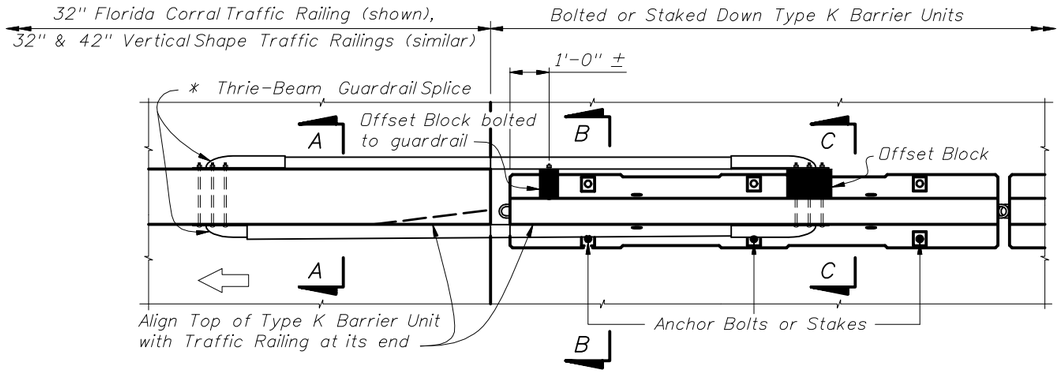
2010 FDOT Design Standards

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

Last Revision	Sheet No.
07/01/07	9 of 15
Index No.	
414	



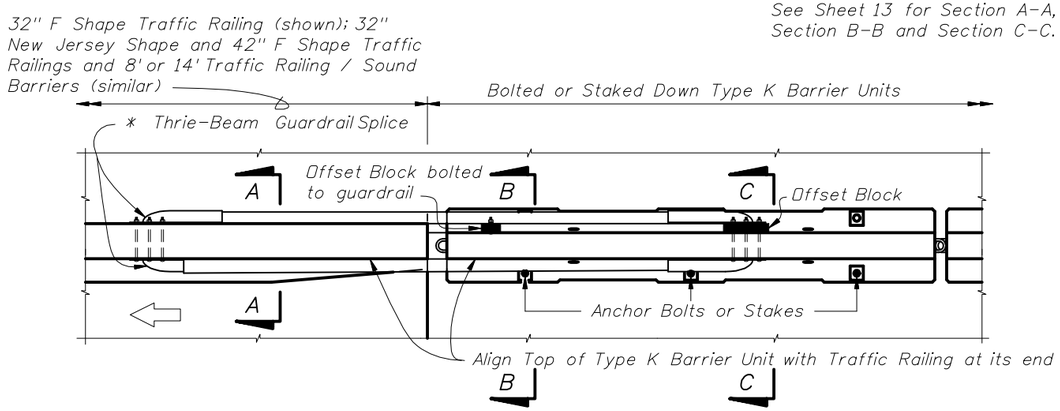
PARTIAL PLAN VIEW AT MEDIAN TRAFFIC RAILING



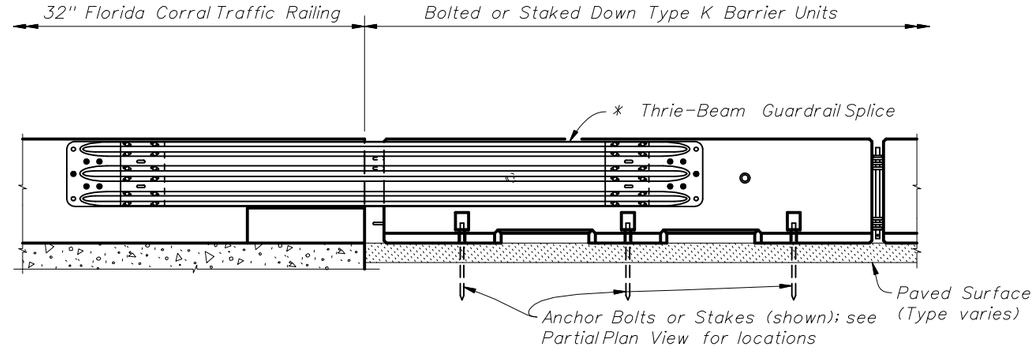
PARTIAL PLAN VIEW

Cross References:
See Sheet 13 for Section A-A, Section B-B and Section C-C.

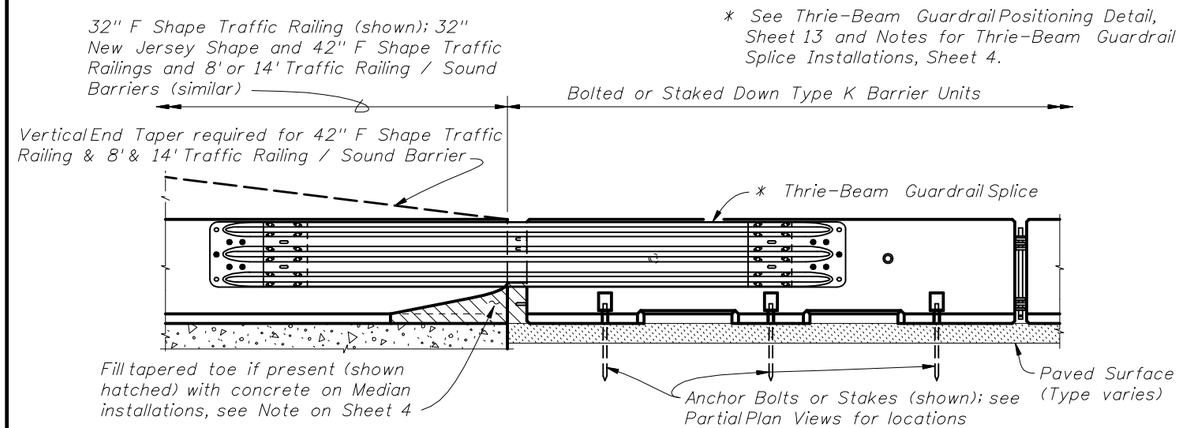
Cross References:
See Sheet 13 for Section A-A, Section B-B and Section C-C.



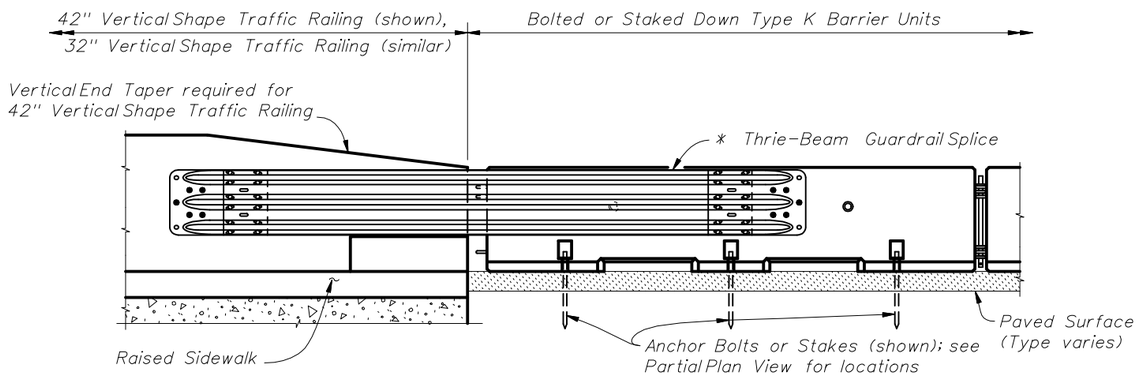
PARTIAL PLAN VIEW AT SHOULDER TRAFFIC RAILING



PARTIAL ELEVATION VIEW - FLORIDA CORRAL TRAFFIC RAILING



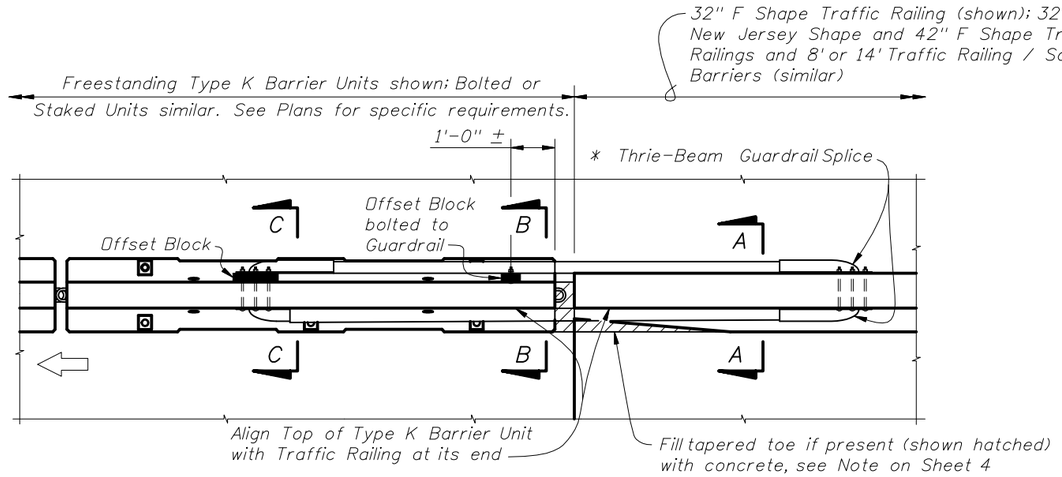
PARTIAL ELEVATION VIEW



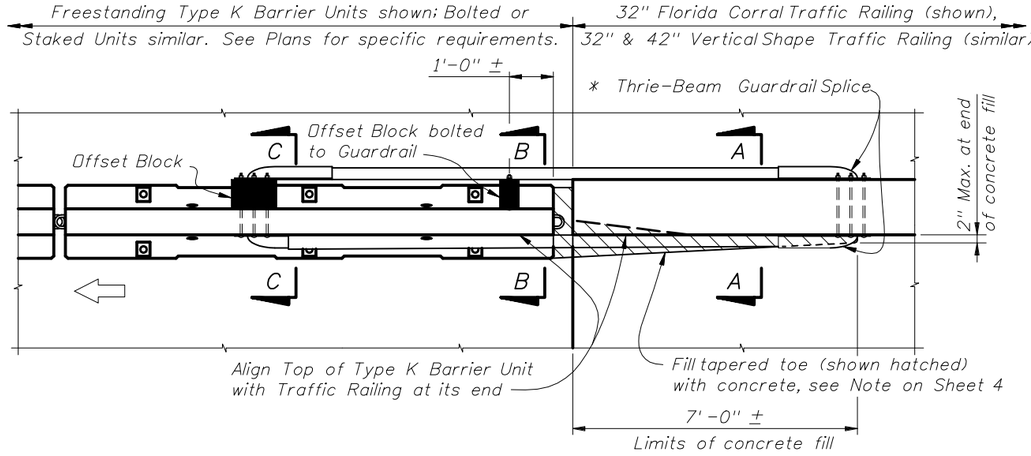
PARTIAL ELEVATION VIEW - VERTICAL SHAPE TRAFFIC RAILINGS

APPROACH TRANSITION SPLICE DETAIL FOR F AND NEW JERSEY SHAPE TRAFFIC RAILINGS AND 8'& 14' TRAFFIC RAILING / SOUND BARRIERS (CONCRETE BARRIER WALL SIMILAR)

APPROACH TRANSITION SPLICE DETAIL FOR FLORIDA CORRAL AND VERTICAL SHAPE TRAFFIC RAILINGS

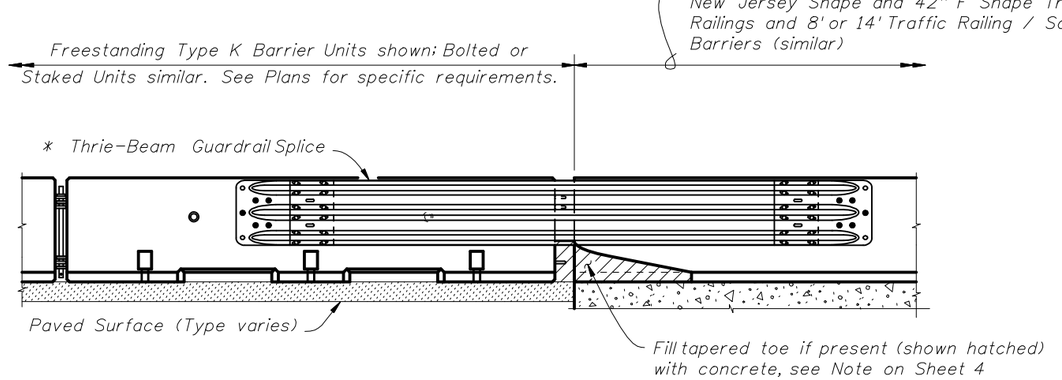


PARTIAL PLAN VIEW



PARTIAL PLAN VIEW

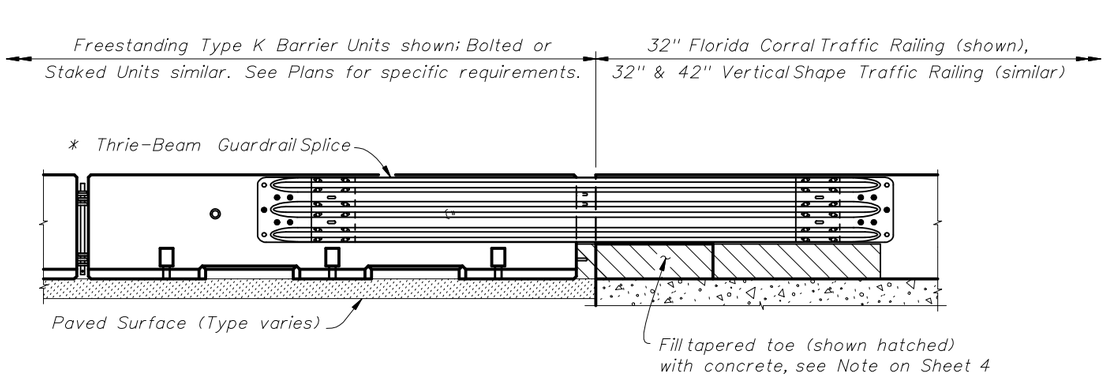
* See Thrie-Beam Guardrail Positioning Detail, Sheet 13 and Notes for Thrie-Beam Guardrail Splice Installations, Sheet 4.



PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section A-A, Section B-B and Section C-C.

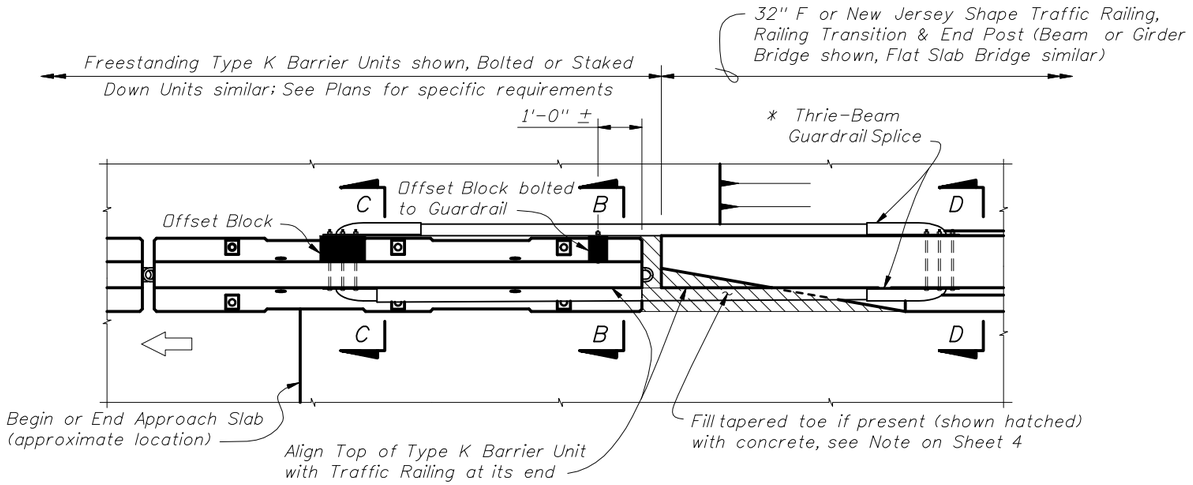
TRAILING END SPLICE DETAIL FOR F AND NEW JERSEY SHAPE TRAFFIC RAILINGS AND 8' & 14' TRAFFIC RAILING / SOUND BARRIERS



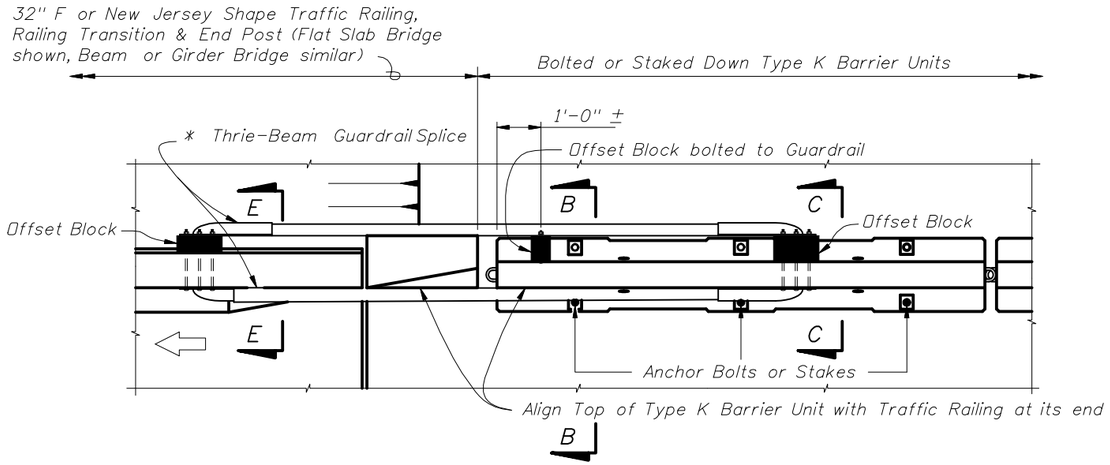
PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section A-A, Section B-B and Section C-C.

TRAILING END SPLICE DETAIL FOR FLORIDA CORRAL AND VERTICAL SHAPE TRAFFIC RAILINGS

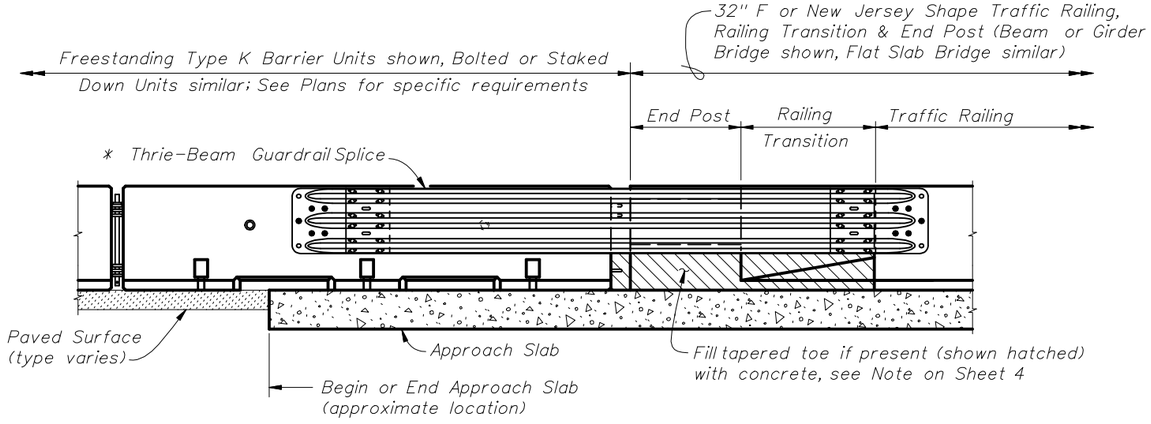


PARTIAL PLAN VIEW



PARTIAL PLAN VIEW

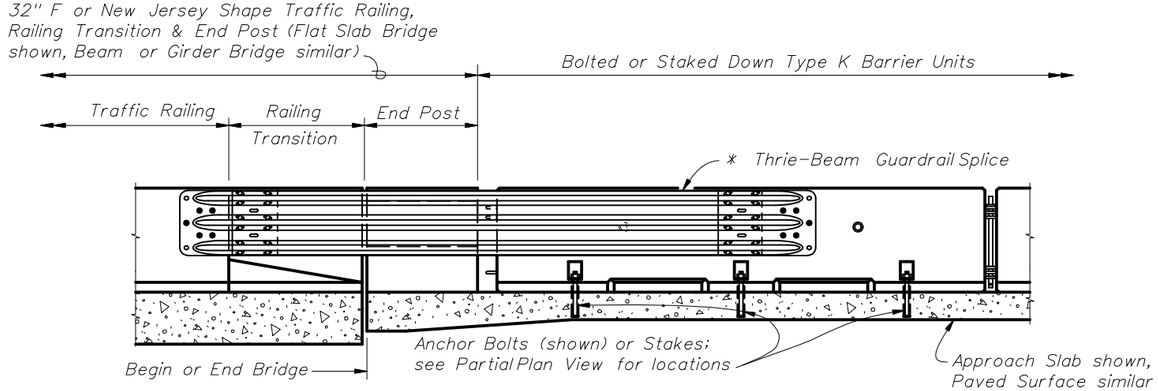
* See Thrie-Beam Guardrail Positioning Detail, Sheet 13 and Notes for Thrie-Beam Guardrail Splice Installations, Sheet 4.



PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section B-B, Section C-C and Section D-D.

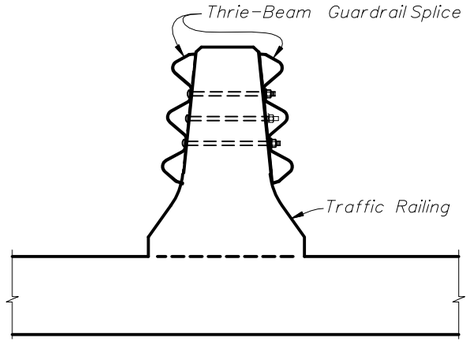
TRAILING END SPLICE DETAIL
FOR 32" F AND NEW JERSEY SHAPE TRAFFIC RAILINGS WITH RAILING TRANSITION AND END POST



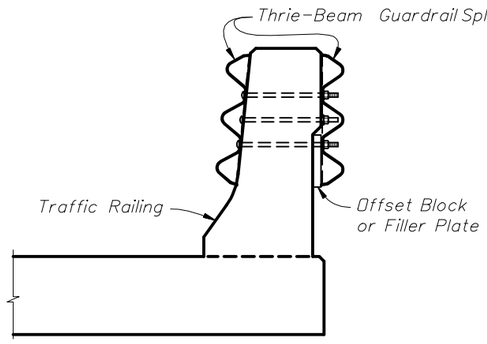
PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section B-B, Section C-C and Section E-E.

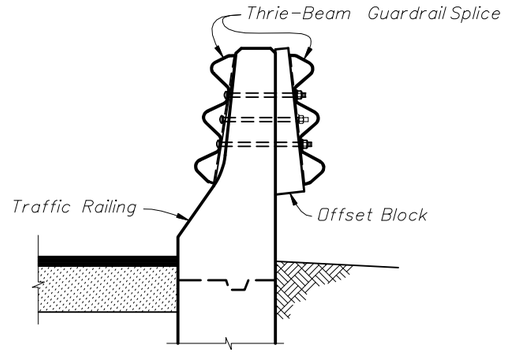
APPROACH TRANSITION SPLICE DETAIL
FOR 32" F AND NEW JERSEY SHAPE TRAFFIC RAILINGS WITH RAILING TRANSITION AND END POST



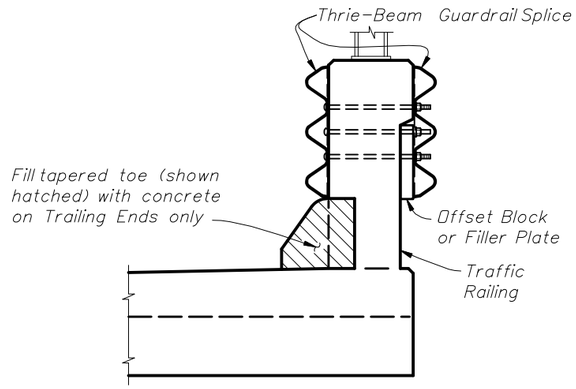
SECTION A-A
32" F Shape Median Traffic Railing (shown),
Median Concrete Barrier Wall (similar)



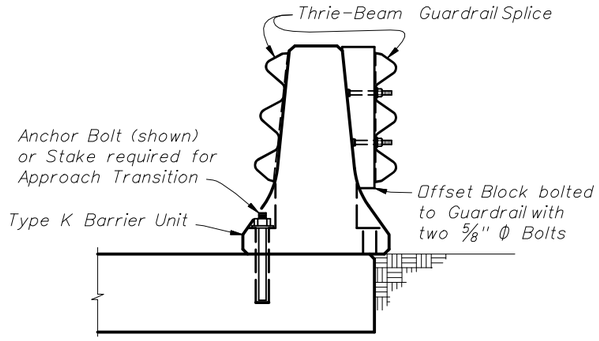
SECTION A-A
32" F Shape Traffic Railing (shown),
42" Traffic Railing and 8' & 14' Traffic
Railing / Sound Barriers (similar)



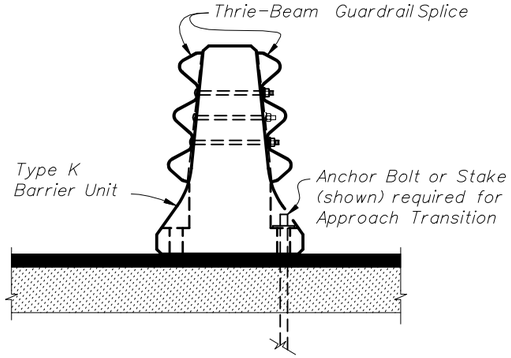
SECTION A-A
32" New Jersey Shape Concrete Barrier
Wall (shown), 32" New Jersey Shape Traffic
Railing & other Narrow Traffic Railings (similar)



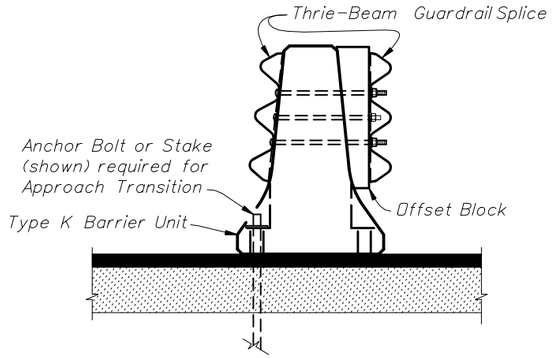
SECTION A-A
32" & 42" Vertical Shape Traffic
Railing (shown), Florida Corral
Traffic Railing (similar)



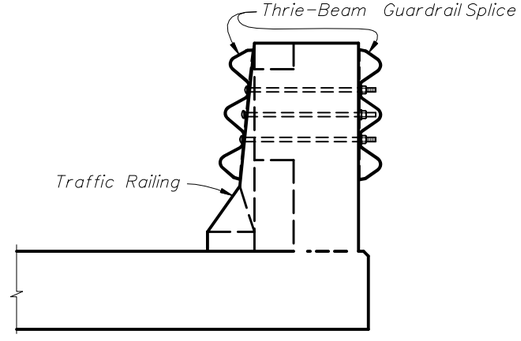
SECTION B-B
Adjacent to Shoulder Traffic Railings



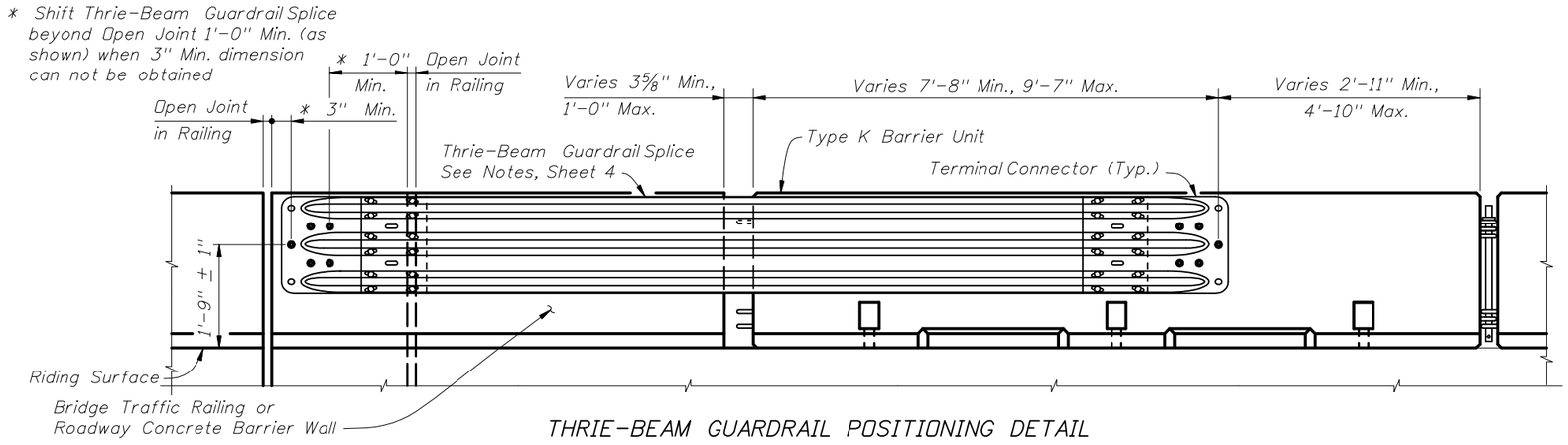
SECTION C-C
Adjacent to 32" F or New Jersey Shape
Median Traffic Railing or
Median Concrete Barrier Wall



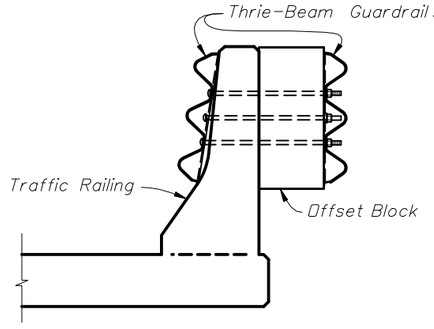
SECTION C-C
Adjacent to Shoulder Traffic Railings



SECTION D-D
32" F or New Jersey Shape Traffic
Railing, Railing Transition & End Post



THRIE-BEAM GUARDRAIL POSITIONING DETAIL



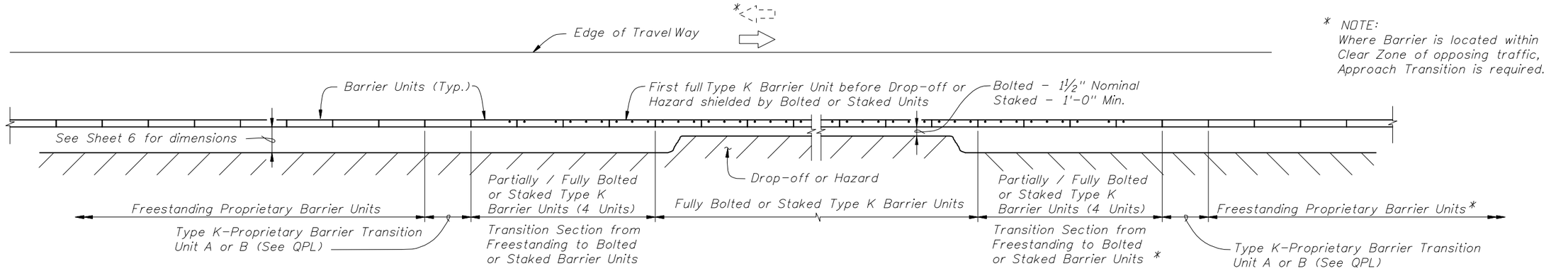
SECTION E-E
32" New Jersey Shape Traffic Railing
(shown), 32" F Shape Traffic
Railing (similar)

2010 FDOT Design Standards

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

Last Revision	Sheet No.
07/01/07	13 of 15

Index No. 414

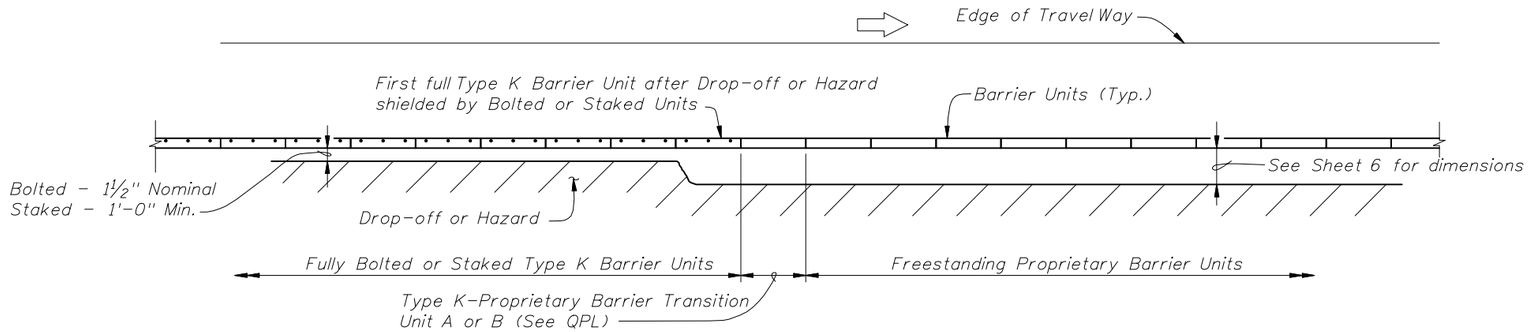


* NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.

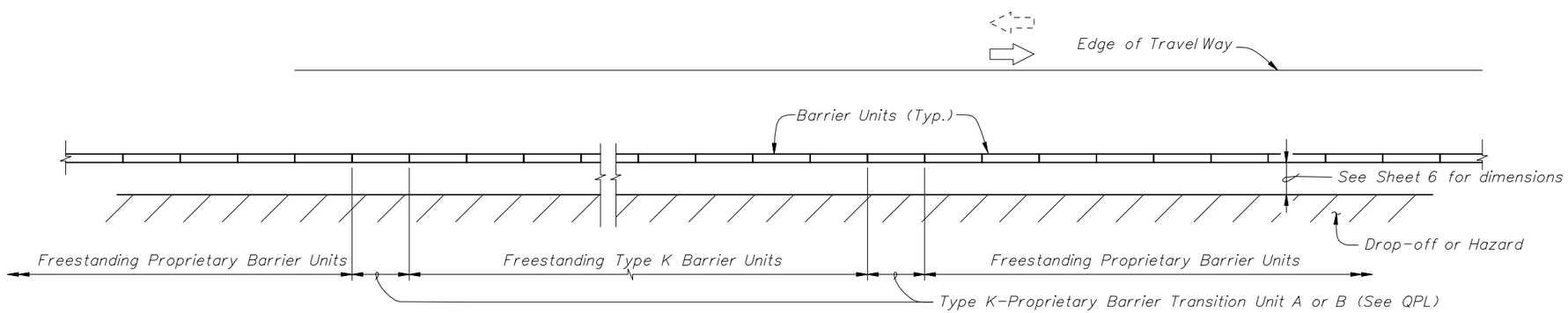
APPROACH TRANSITION FROM FREESTANDING PROPRIETARY TEMPORARY BARRIERS TO BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS

LEGEND:

Dot indicates number and position of Bolts or Stakes



TRAILING END TRANSITION FROM BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY TEMPORARY BARRIERS



APPROACH AND TRAILING END TRANSITIONS FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY TEMPORARY BARRIERS

TYPE K-PROPRIETARY TEMPORARY CONCRETE BARRIER TRANSITIONS

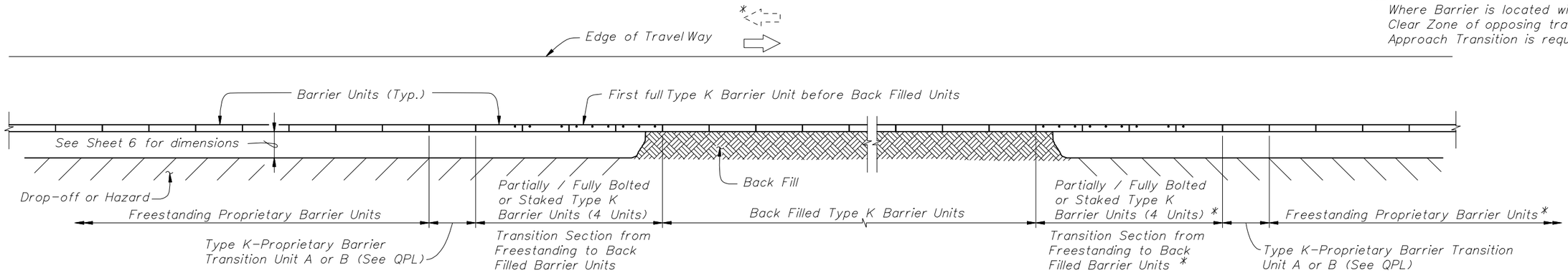
2010 FDOT Design Standards

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

Last Revision	Sheet No.
07/01/07	14 of 15

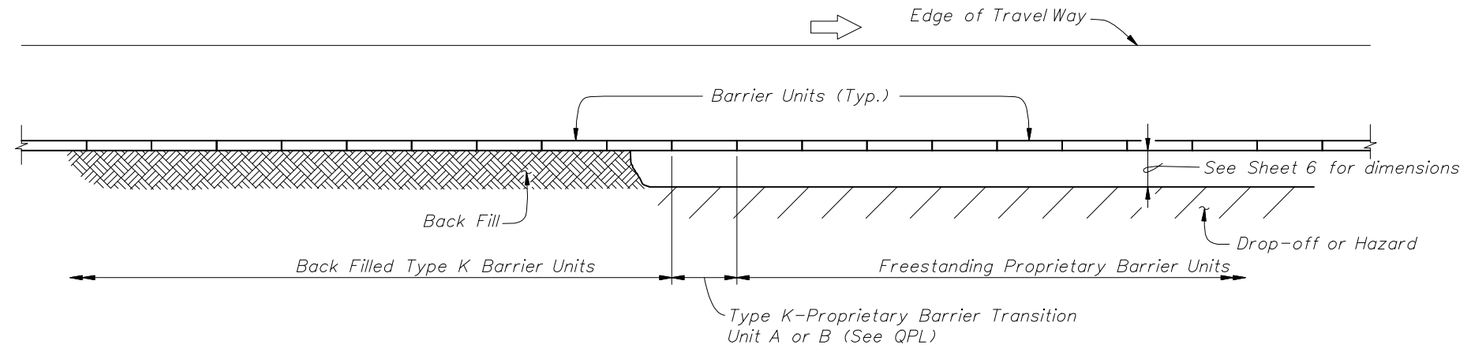
Index No. 414

* NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.

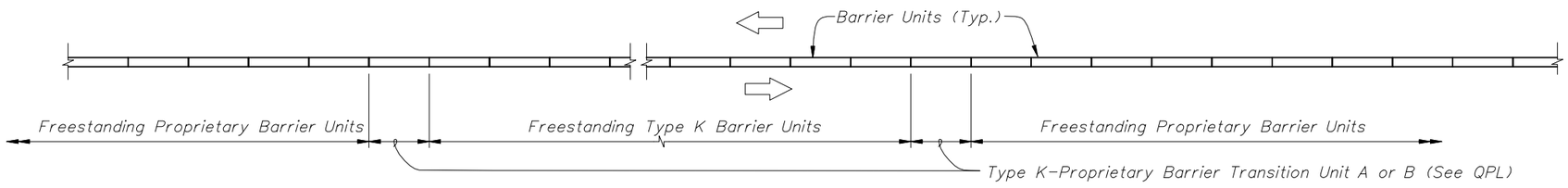


APPROACH TRANSITION FROM FREESTANDING PROPRIETARY TEMPORARY BARRIERS TO BACK FILLED TYPE K TEMPORARY CONCRETE BARRIERS

LEGEND:



TRAILING END TRANSITION FROM BACK FILLED TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY BARRIERS



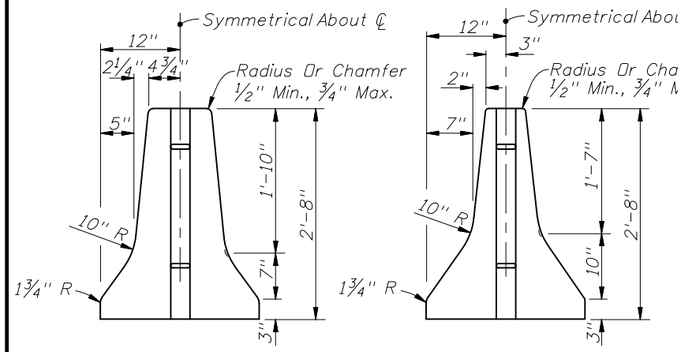
MEDIAN APPROACH AND TRAILING END TRANSITIONS FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY TEMPORARY BARRIERS

TYPE K-PROPRIETARY TEMPORARY CONCRETE BARRIER TRANSITIONS

2010 FDOT Design Standards

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

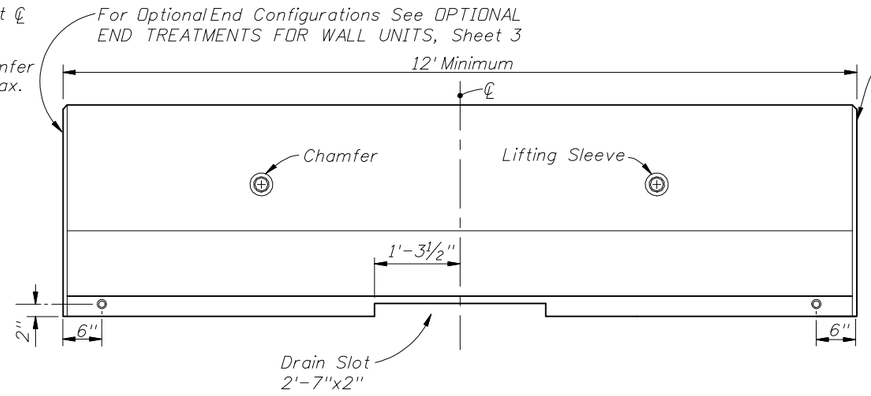
Last Revision	Sheet No.
07/01/07	15 of 15
Index No.	
414	



F-SHAPE

N.J. SHAPE

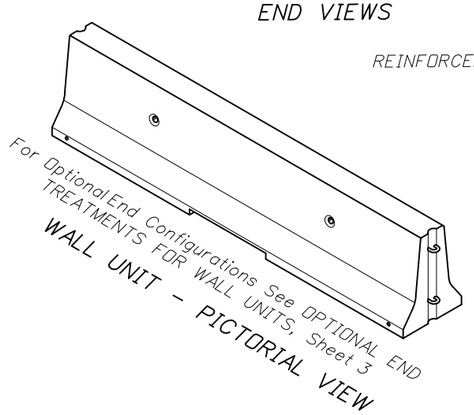
END VIEWS



SIDE VIEW

REINFORCEMENT AND OTHER UNIT FABRICATION DETAILS NOT SHOWN. SEE 'NOTICE' BELOW.

WALL UNIT



WALL UNIT - PICTORIAL VIEW

NOTICE

THE TEMPORARY CONCRETE BARRIER WALL UNIT SHOWN ON THIS INDEX THAT WAS PRODUCED PRIOR TO OCTOBER 1, 2002, AND THAT IS IN GOOD CONDITION, CAN BE USED ON STATE HIGHWAY PROJECTS THROUGH SEPTEMBER 30, 2012. TEMPORARY CONCRETE BARRIER UNITS PRODUCED ON AND AFTER OCTOBER 1, 2002 FOR USE ON STATE HIGHWAY PROJECTS MUST MEET NCHRP 350 CRITERIA, AND MUST BE INCLUDED ON THE QUALIFIED PRODUCTS LIST. IF AND WHEN A GENERIC TEMPORARY CONCRETE BARRIER WALL UNIT IS APPROVED FOR USE ON STATE HIGHWAY PROJECTS, THE UNIT DESIGN WILL BE POSTED ON THE ROADWAY DESIGN WEB SITE.

GENERAL NOTES

1. Temporary Concrete Barrier walls on roadways may be any of the following:
   a. The FDOT Type K Temporary Concrete Barrier Wall (Design Standard Index 414). F-Shape Units only.
   b. The FDOT 415 Temporary Concrete Barrier wall unit shown on Sheets 1 and 3 of this index, if manufactured prior to October 1, 2002, in good condition, and installed in accordance with this Index. Units may be either F-Shape or New Jersey Shape. The FDOT 415 unit shown in this Index is the design provided in Index No. 415 in prior editions of the Design Standards. See "NOTICE" below. Since units produced after October 1, 2002 cannot be used, complete fabrication details are omitted in this edition of the Design Standards.
   c. Temporary concrete barrier wall systems meeting NCHRP 350 Test Level 3 criteria and included on the Qualified Products List. Units may be either F-Shape or New Jersey Shape unless otherwise noted in the plans. For temporary concrete barrier walls on bridges see Design Standard Index No. 414.
2. The FDOT 415 units with the optional end connections shown in this index may be interconnected within a run of wall. However, intermixing units with different shapes (F-Shape, New Jersey Shape) and units with dissimilar end connections (415, Type K, or other) within a continuous run of wall is not permitted. See Sheets 6 through 8 for required treatment for continuation of runs of barrier with different shapes or dissimilar connectors.
3. Alignment, length of need, anchorage and end treatment shall be in accordance with this index.
4. Wall units shall not be used for permanent barrier wall construction regardless of unit length, unless specifically permitted by the plans.
5. If the plans specify Barrier Wall (Temporary) (Type K), substitution with other barrier types is not permitted.
6. If the plans specify temporary concrete barrier wall, substitution with water filled barriers is not permitted.
7. Type C Steady-Burn Lights are to be mounted on top of temporary concrete barrier walls that are used as barriers along traveled ways in work zones. The lights are to be spaced at 50' centers in transitions, 100' centers on curves and 200' centers on tangent roadways. For additional information refer to Index 600.
8. Wall units used for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Barrier Wall (Temporary), LF. Type C Steady-Burn Lights shall be paid for under the contract unit price for Lights, Temporary, Barrier Wall Mount (Steady-Burn), ED.

FDOT 415 TEMPORARY CONCRETE BARRIER WALL UNIT AND GENERAL NOTES

When Shielding Above Ground Hazards:

Design Speed	Deflection Space
45 mph or Less	2'
50 mph and Greater	4'

When Shielding Dropoffs:

Design Speed	Deflection Space
45 mph or Less	2'
50 mph and Greater a. Dropoffs 4' or Less and No Traffic Below b. All dropoff conditions other than 'a'.	 2' 4'

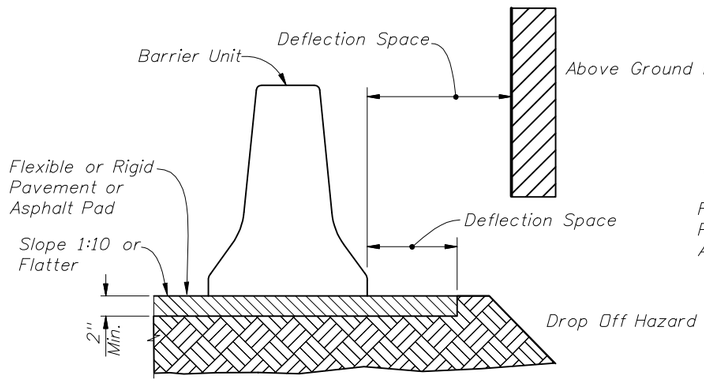
When used as a Temporary Median Barrier separating opposing traffic lanes:

Design Speed	Offset To Travelway
45 mph or Less	0' min., 2' preferred
50 mph and Greater	2'

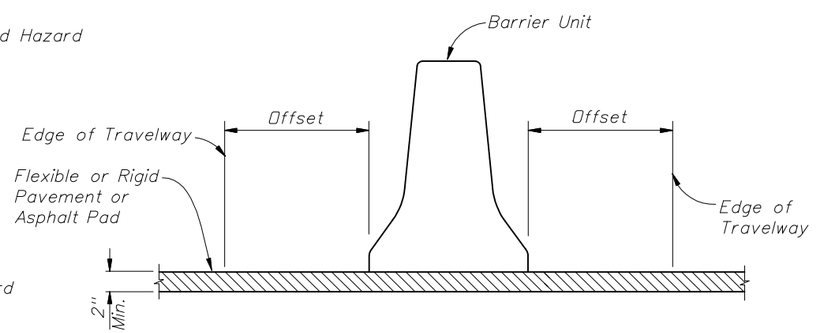
Note: These deflection space requirements also apply to approved options identified in General Note 1.

DEFLECTION SPACE REQUIREMENTS

Note: Where existing pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement. Cost of the Asphalt Pad to be included in the cost of the Barrier.



ROADSIDE INSTALLATION



MEDIAN INSTALLATION

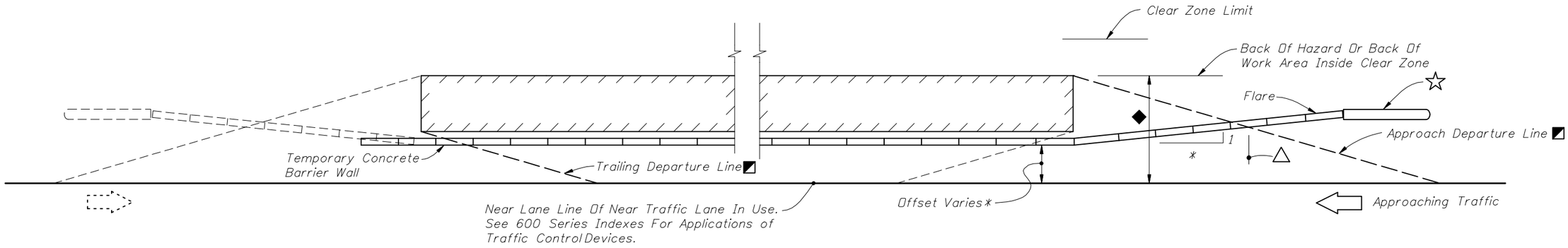
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

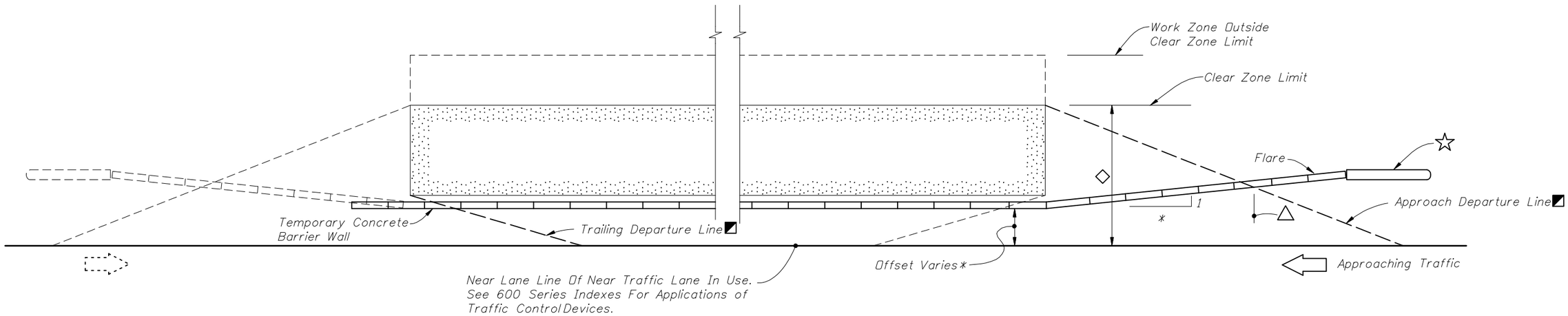
2010 FDOT Design Standards

TEMPORARY CONCRETE BARRIER

Last Revision	Sheet No.
07/01/07	1 of 10

Index No. 415





△ The approach departure line location is determined by the line intersect with the back of the hazard or the area to be shielded, however the intersect offset distance is not to be beyond the clear zone limit. The trailing departure line is determined by the line intersect with the front of the downstream end of the hazard or the area to be shielded.

The length of barrier wall need is the distance from the approach departure line intersect with the upstream toe of the temporary concrete barrier wall to the trailing departure line intersect with the downstream toe of the temporary concrete barrier wall.

Where temporary concrete barrier wall end units are not anchored, two and one-half ($2\frac{1}{2}$) wall units (min.) are required beyond the length of barrier need for wall end anchorage. Temporary concrete barrier wall end units shall be located at or outside the clear zone or shielded by other structure, earth embedment or a crash cushion.

Proprietary redirective crash cushions designed for use with temporary concrete barriers have the beginning length of need and departure line intersect point indicated on the respective QPL drawing for each proprietary crash cushion. Where redirective crash cushions are located on the departure line by their length of need reference point, the wall upstream end unit must be aligned with the crash cushion, and the wall's end unit secured with the anchor plates shown on Sheet 4 of this index. See Sheets 5 through 8 for configurations requiring end unit anchorage.

* The wall offset from the near traffic lane, wall flare rate and wall flare length are to be in conformance with the alignment called for in the plans and the alignments called for by Department Design Standards specified in the plans; in absence of either plan requirement, the offset shall be as determined by the Engineer, and, unless other flare rates are approved by the Engineer the flare rates to be applied are 1 : 10 or flatter for speeds ≤ 45 mph and 1 : 15 or flatter for speeds ≥ 50 mph; see Index No. 642 for other flare rates on freeway facilities.

The surface cross slope approaching the barrier wall and continuing across the required deflection space shall not exceed a rate of 1 vertical: 10 horizontal.

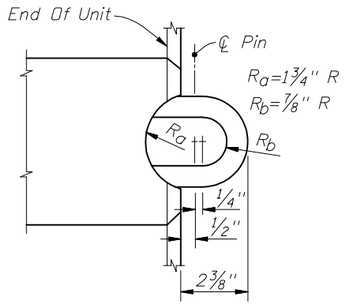
◪ Departure Rates
1 : 16 For Speeds ≤ 45 mph
1 : 13 For Speeds ≥ 50 mph

◆ Area Shielded When Work Zone Hazards Or The Work Area Occupy Space Less Than Clear Zone Width

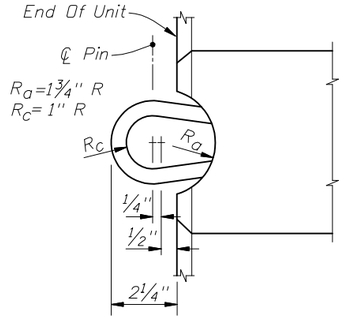
◇ Area Shielded When Work Zone Hazards Or The Work Area Extend To Or Beyond Clear Zone Limit

☆ Crash Cushion In Absence Of Other Wall End Shielding. See △ Notations And Sheet 5 Through 8 For Varied Locations For Wall End Units And Crash Cushions.

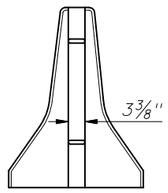
ALIGNMENT AND LENGTH OF NEED



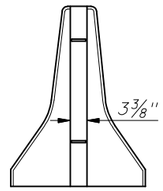
TOP VIEW



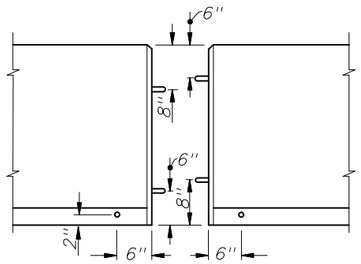
TOP VIEW



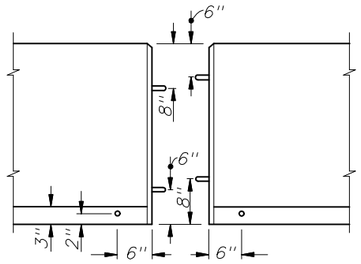
END VIEW



END VIEW

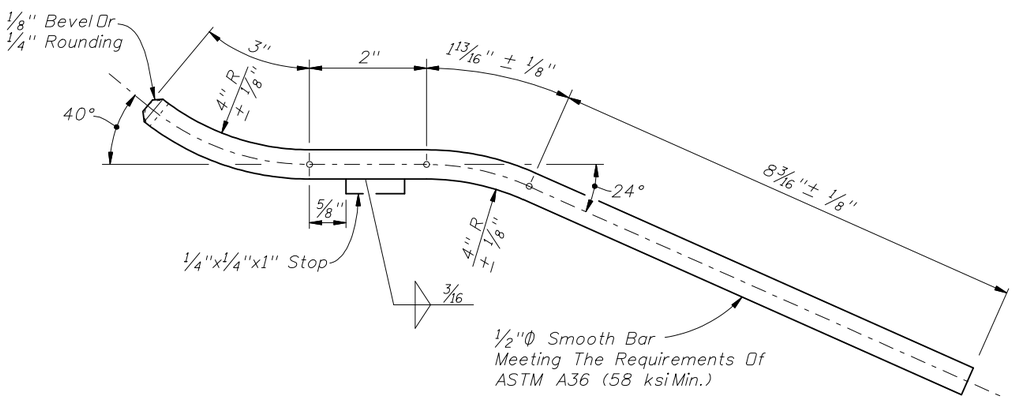


SIDE VIEW
ROUND BAR CONNECTOR

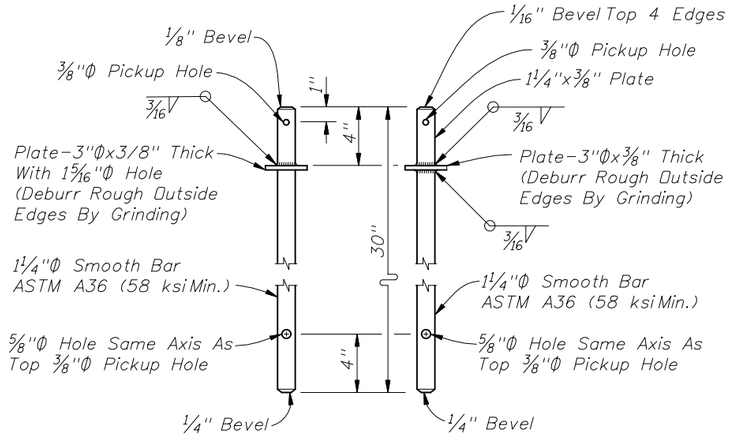


SIDE VIEW
WIRE ROPE CONNECTOR

OPTIONAL END TREATMENTS FOR WALL UNITS

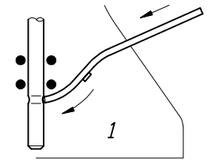


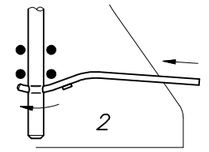
FDOT SNAKE PIN

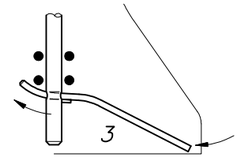


OPTIONAL PINS

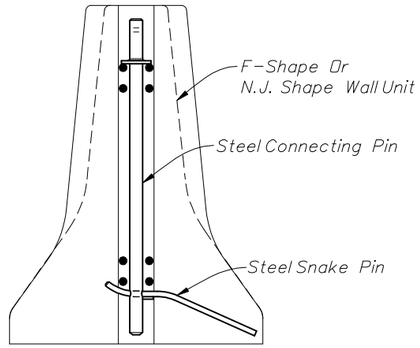
STEEL CONNECTING PIN



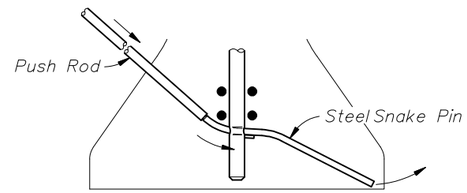




INSERTING FDOT SNAKE PIN

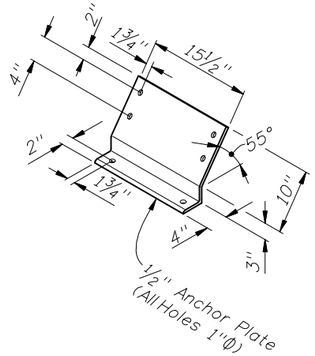


ASSEMBLED UNIT

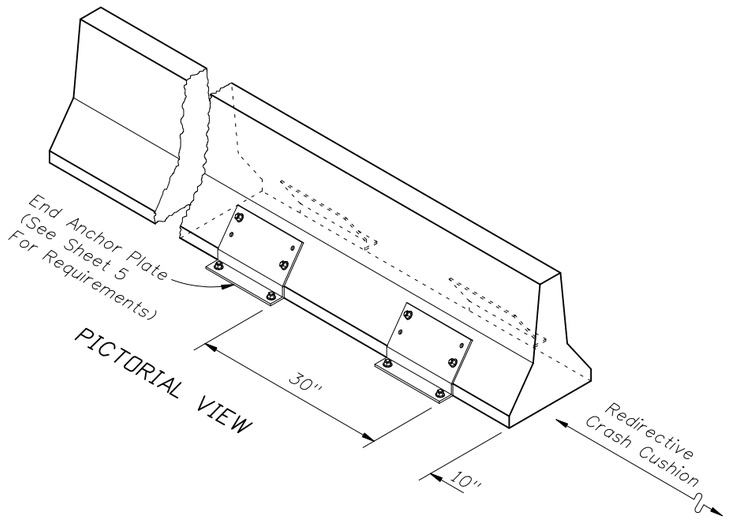


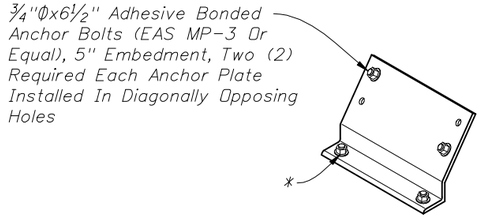
REMOVING FDOT SNAKE PIN

CONNECTING PIN ASSEMBLY



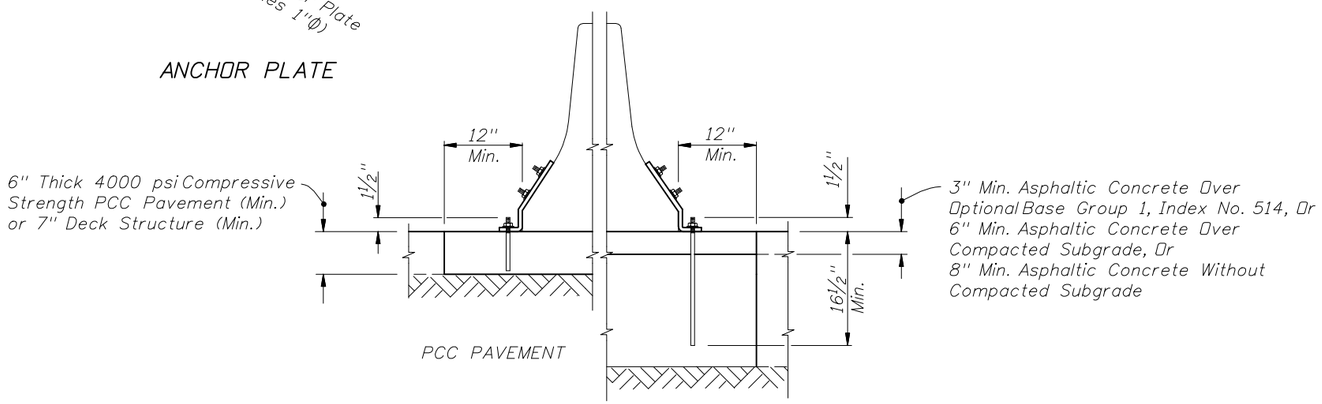
ANCHOR PLATE





* ¾"Øx6½" Adhesive Bonded Anchor Bolts (EAS MP-3 Or Equal), 5" Embedment Where Installed On Concrete Pavement Or Decking, Two (2) Required Each Anchor Plate. ¾"Øx18" MP-3 Threaded Rod Longbolt System Or Other Approved ¾"Øx18" Threaded Rod With Chemical Anchorage Full Embedment Depth Where Installed On Asphaltic Concrete Pavement Prescribed Below, Two (2) Required Each Anchor Plate.

ANCHOR PLATE BOLTS



FLEXIBLE PAVEMENT

SURFACE ANCHORAGE REQUIREMENTS

ANCHOR PLATE NOTES

1. For temporary barrier wall end units requiring anchor plates, see sheets 5 through 8.

2. The temporary concrete barrier wall anchor plate depicted above is a proprietary design by Energy Absorption Systems, Inc. Other temporary anchorage methods can be substituted when wall rigidity is assured by any of the following:
   (a) proven by associated crash test of redirective crash cushions, or
   (b) meet anchorage prescribed in 'A Guide To Standardized Highway Barrier Hardware', or
   (c) crash cushion manufacturer's engineered design, or
   (d) approved shop drawings on a case by case basis.

3. The cost for anchoring the wall segment will be included in the cost for the adjoining redirective crash cushion.

NOTES FOR WALL END SHIELDING

1. Redirective crash cushions are the principal (standard) device to be used for shielding approach ends of temporary concrete barrier walls. Except where the plans designate a particular type crash cushion for a specific location, the contractor has the option to construct any of the redirective crash cushions listed on the Qualified Products List, subject to the uses and limitations described on their respective drawings. The barrier wall end unit must be anchored to a paved surface using anchor plates in accordance with "Anchor Plate Notes" and the details on this sheet.

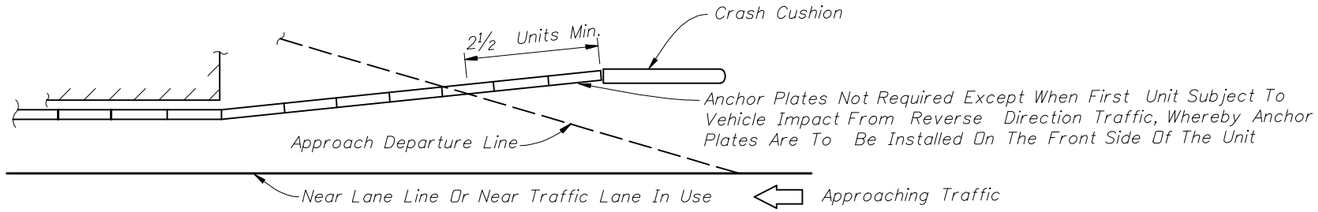
2. Temporary redirective crash cushions shall be installed in accordance with the manufacturer's specifications and recommendations. Temporary crash cushions can be either new or functionally sound used devices. Performance of intended function is the only condition for acceptance, whether the crash cushion is new, used, refurbished, purchased, leased, rented, on loan, shared between projects, or made up of mixed new and used components.

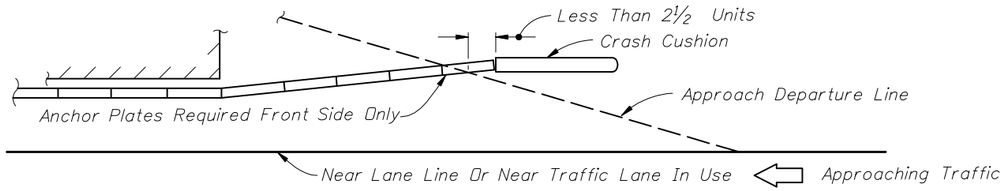
3. Inertial crash cushions are not optional systems for locations designated for redirective crash cushions by the plans; can not be substituted for redirective crash cushions, and are not eligible for VECP consideration.

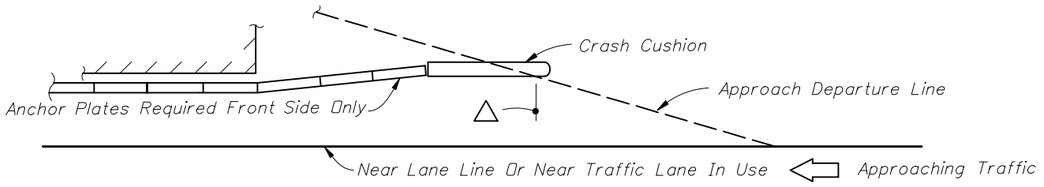
4. A yellow post mounted Type 1 Object Marker shall be centered 3' in front of the nose of all temporary crash cushions. Mounting hardware shall be in accordance with Index Nos. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the crash cushion.

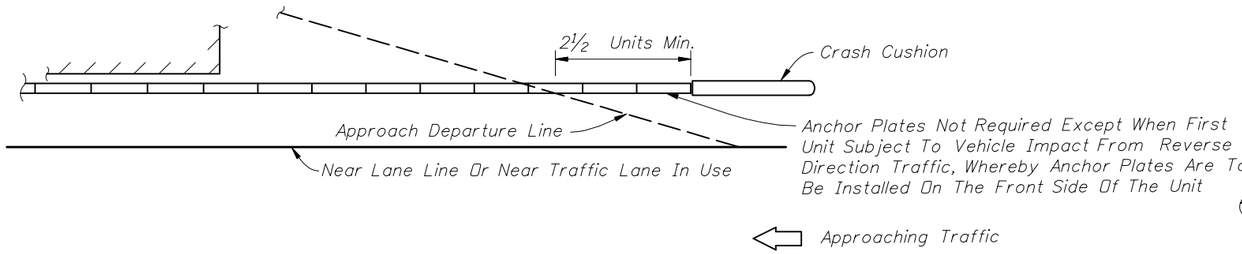
5. Optional temporary redirective crash cushions are to be paid for per location under the contract unit price for Vehicular Impact Attenuator (Temporary) (Redirective Option), LO.

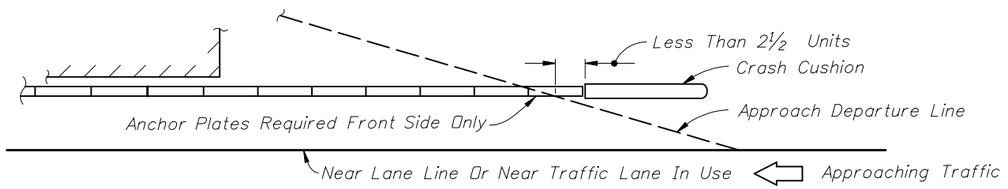
ANCHOR PLATE REQUIREMENTS FOR BARRIER WALL END UNITS ABUTTING CRASH CUSHIONS

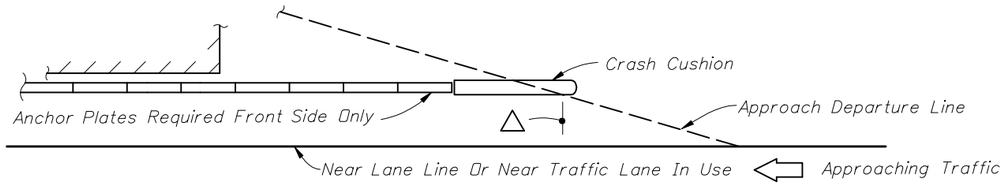




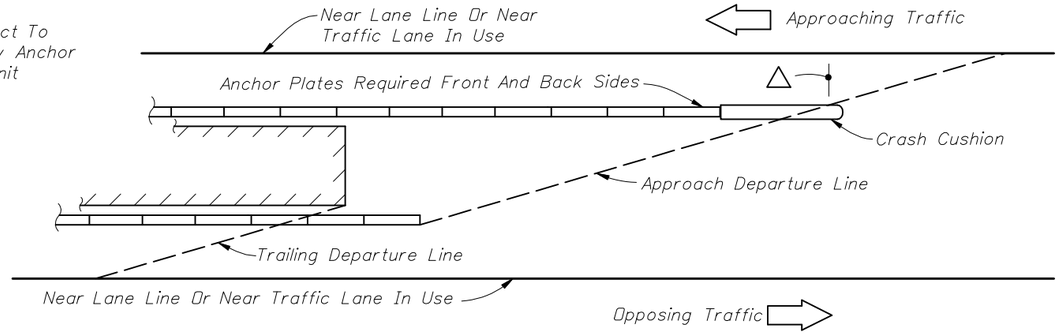




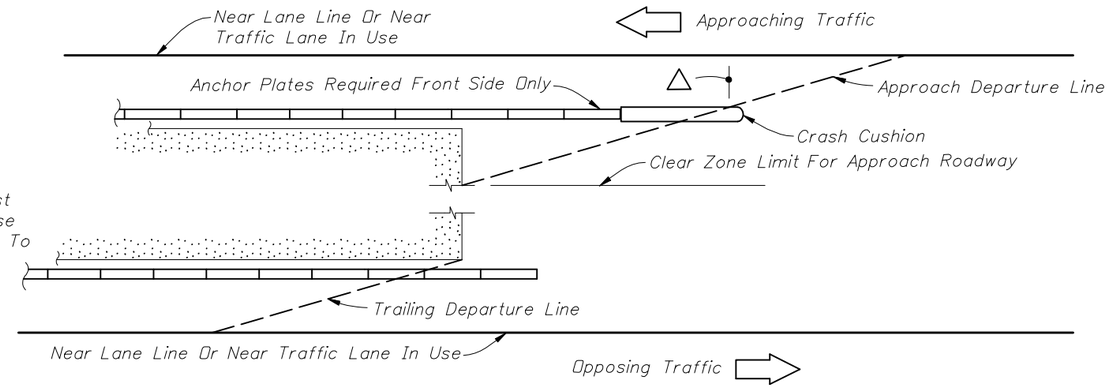




BARRIER WALL END UNIT ANCHORAGE



MEDIAN HAZARDS WITHIN CLEAR ZONES BOTH ROADWAYS

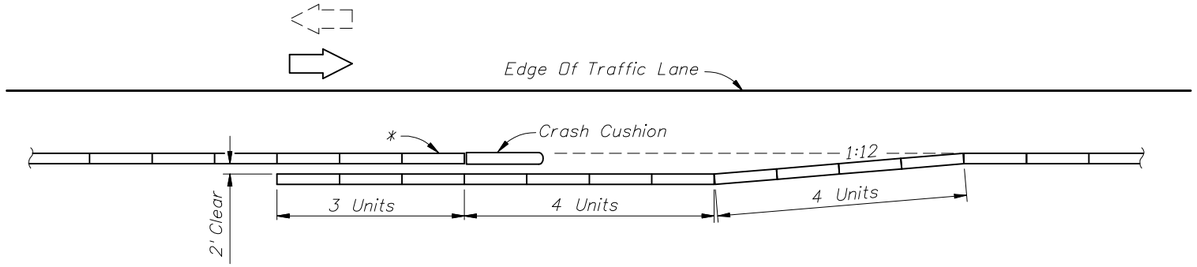


MEDIAN HAZARDS EXTENDS TO OR BEYOND CLEAR ZONES BOTH ROADWAYS

△ See Sheet 2

Note: Anchor Plates Required Only On End Units Abutting Crash Cushions. Schemes on this sheet based on 12' units.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/05	Sheet No. 5 of 10
	TEMPORARY CONCRETE BARRIER	Index No. 415	



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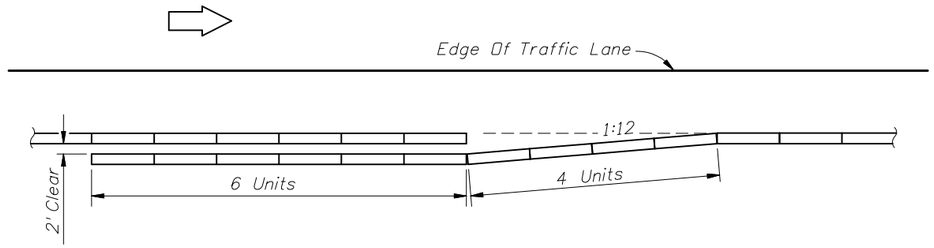

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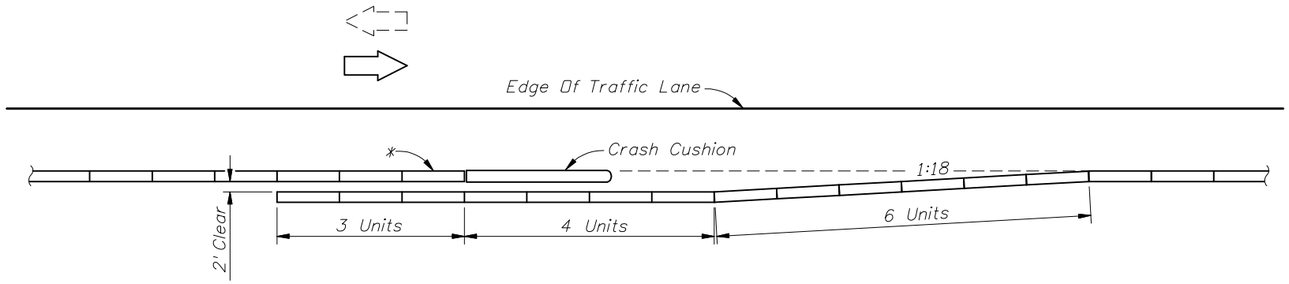
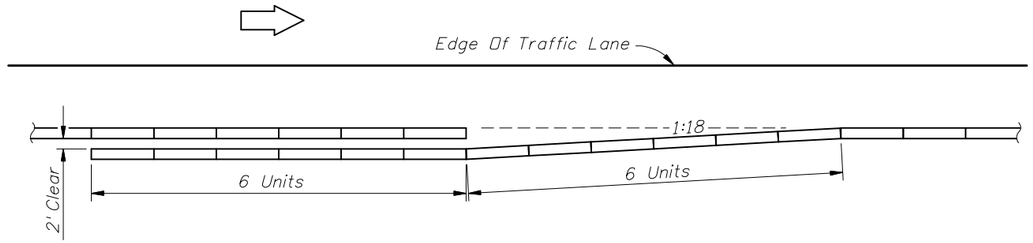


50 MPH OR GREATER

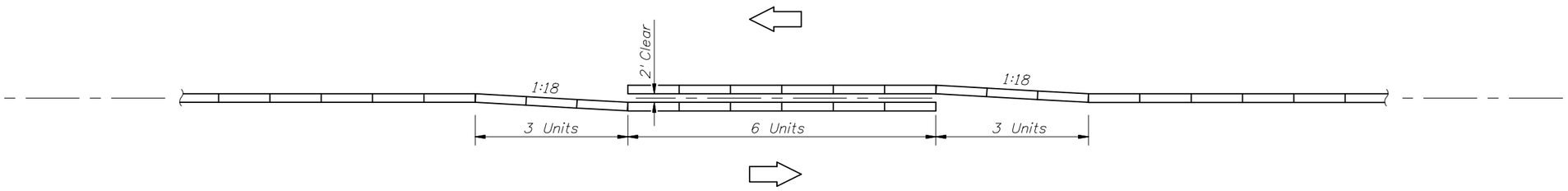
* Anchor Plates Required Front Side Only On Unit Abutting Crash Cushion (See Sheet 4).

SHOULDER BARRIER ON UNDIVIDED FACILITIES



50 MPH OR GREATER

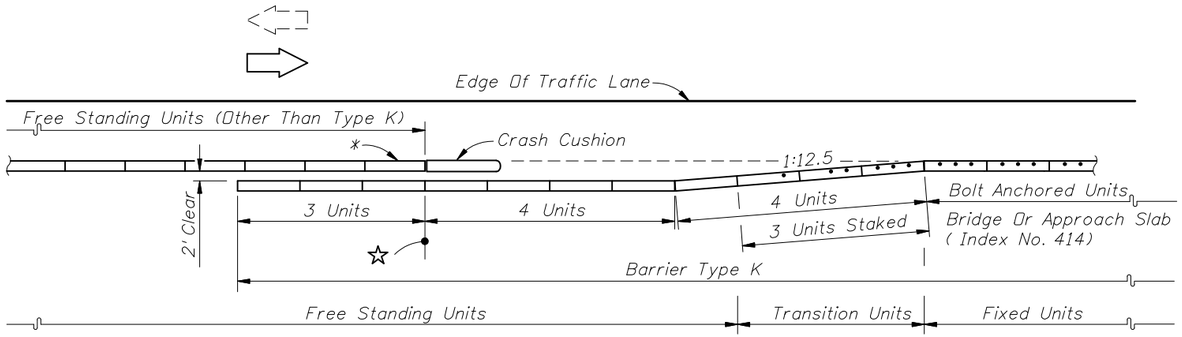
SHOULDER BARRIER ON DIVIDED FACILITIES



INTERIOR MEDIAN BARRIER

Note:
Schemes On This Sheet Based On 12' Units.
See Sheet Nos. 7 & 8 For Bridge Applications With Barrier Type K.

CONTINUATION OF RUNS OF BARRIER WITH DISSIMILAR CONNECTORS



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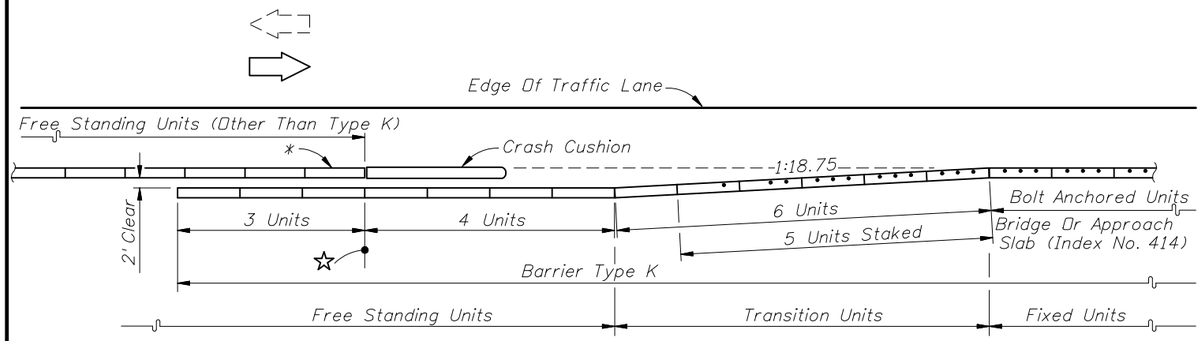
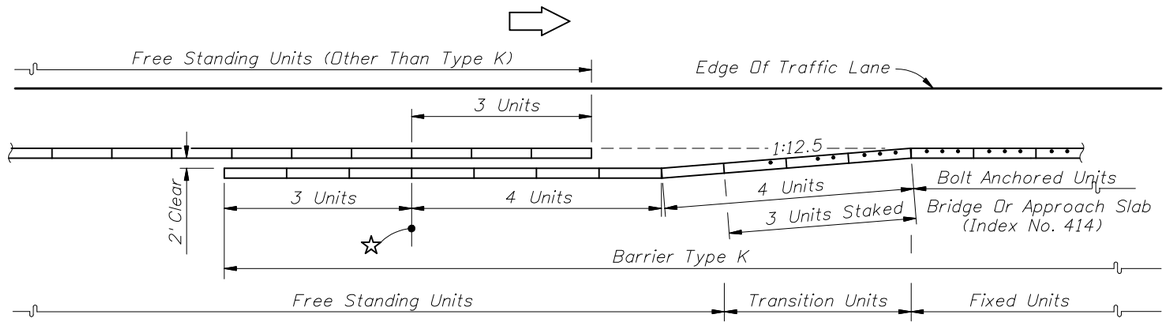


50 MPH OR GREATER

* Anchor Plates Required Front Side Only On Unit Abutting Crash Cushion (See Sheet 4).
☆ Overlap Reference Line

APPROACH SHOULDER BARRIER ON UNDIVIDED FACILITIES



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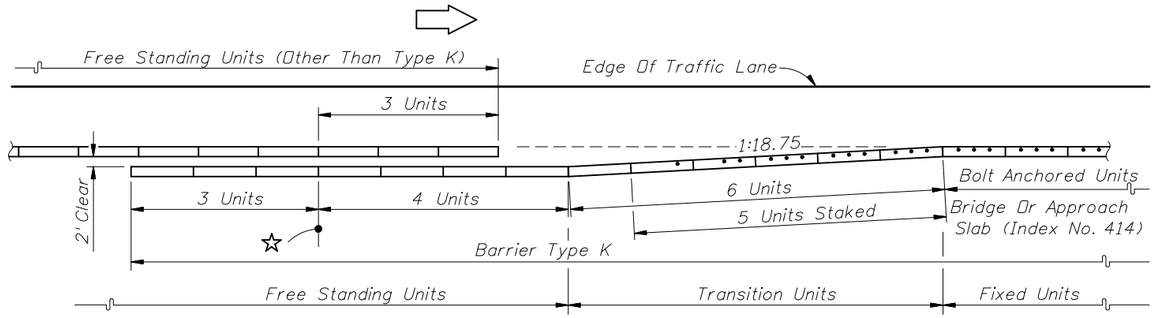
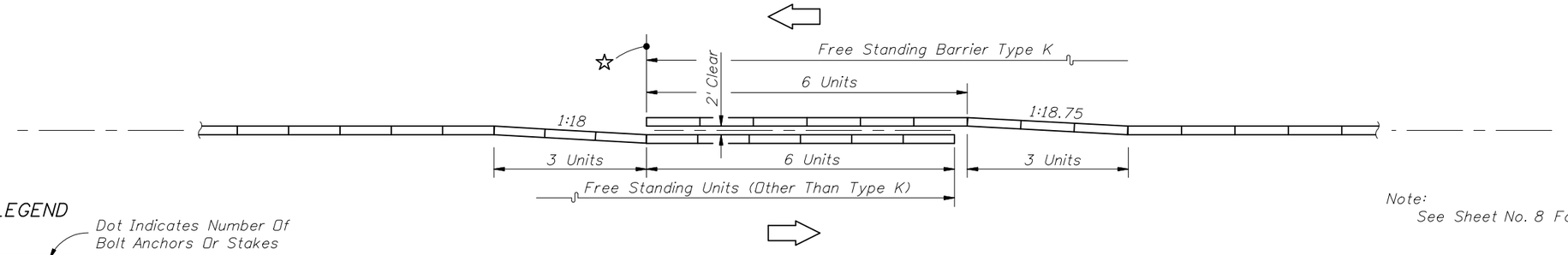


50 MPH OR GREATER

APPROACH SHOULDER BARRIER ON DIVIDED FACILITIES



LEGEND

Dot Indicates Number Of Bolt Anchors Or Stakes

Note:
See Sheet No. 8 For Departure Shoulder Applications.

INTERIOR MEDIAN BARRIER

CONTINUATION OF BARRIER ● FROM OTHER TYPE BARRIERS TO BARRIER TYPE K

BARRIER TYPE K ON BRIDGES AND APPROACH SLABS

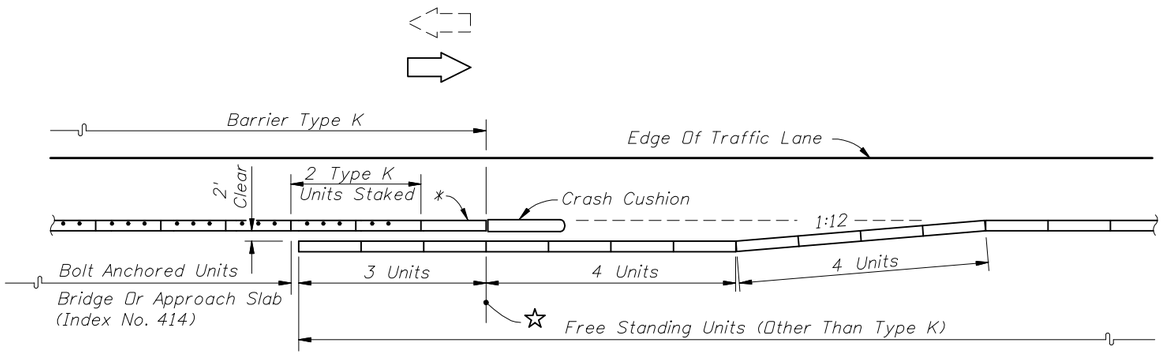
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

TEMPORARY CONCRETE BARRIER

Last Revision	Sheet No.
07/01/05	7 of 10

Index No. 415



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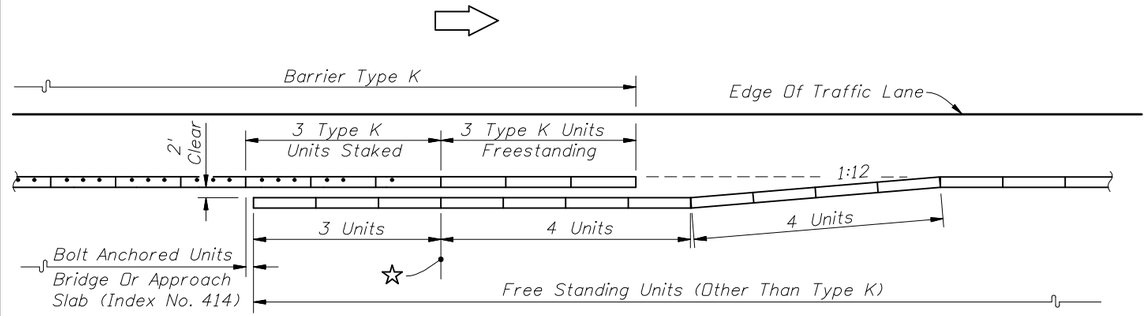

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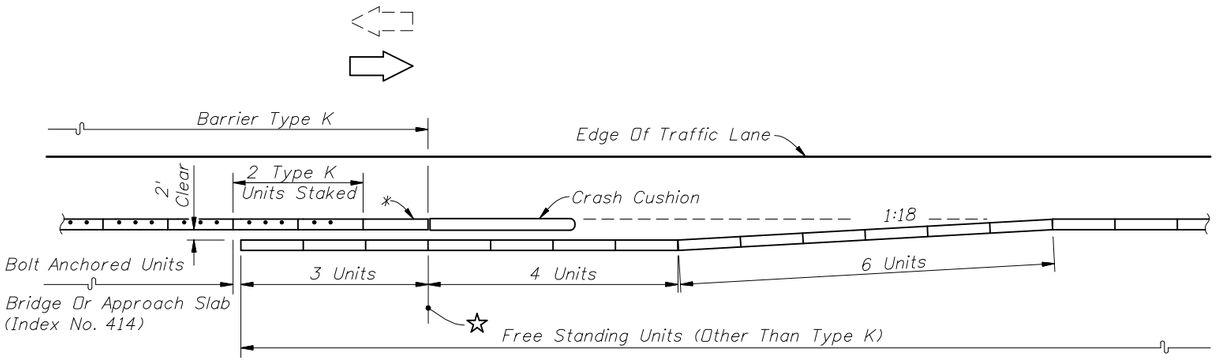
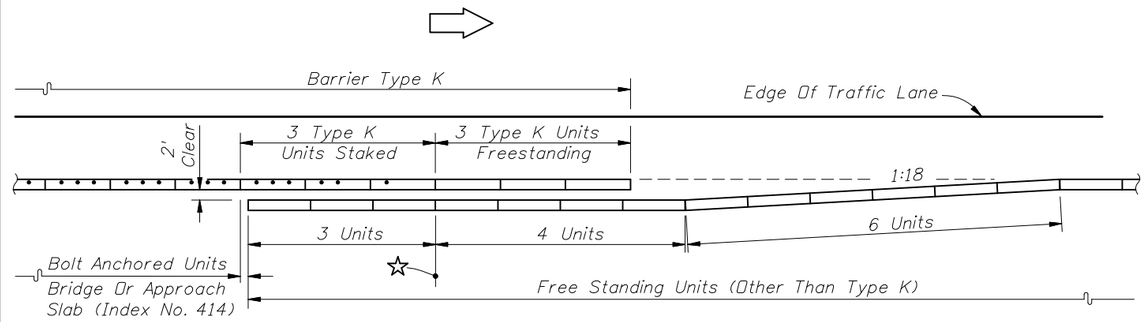


50 MPH OR GREATER

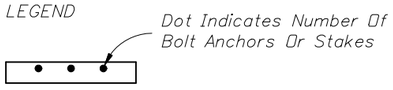
* Anchor Plates Required Front Side Only On Unit Abutting Crash Cushion (See Sheet 4).
☆ Overlap Reference Line

DEPARTURE (TRAILING) SHOULDER BARRIER ON UNDIVIDED FACILITIES



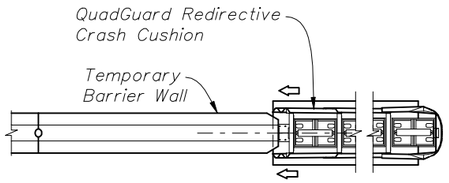
50 MPH OR GREATER

DEPARTURE (TRAILING) SHOULDER BARRIER ON DIVIDED FACILITIES

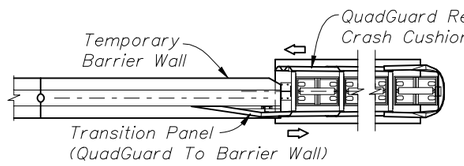


Note:
See Sheet No. 7 For Approach Shoulder Applications.
See Sheet No. 7 For Interior Median Applications.

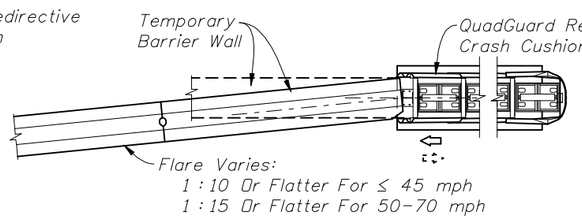
CONTINUATION OF BARRIER ● FROM BARRIER TYPE K TO OTHER TYPE BARRIERS
BARRIER TYPE K ON BRIDGES AND APPROACH SLABS



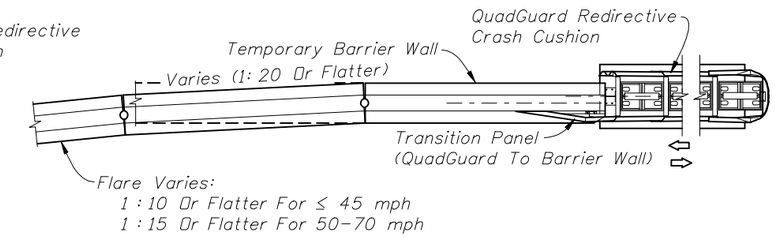
UNIDIRECTIONAL - SEPARATED TRAFFIC



BIDIRECTIONAL - SEPARATED TRAFFIC



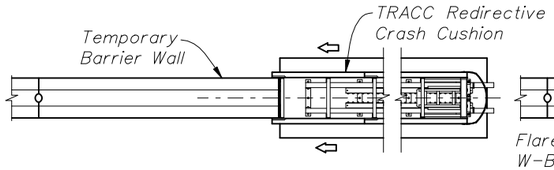
TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED OUTSIDE OPPOSING LANE CLEAR ZONE OR ONE-WAY TRAFFIC



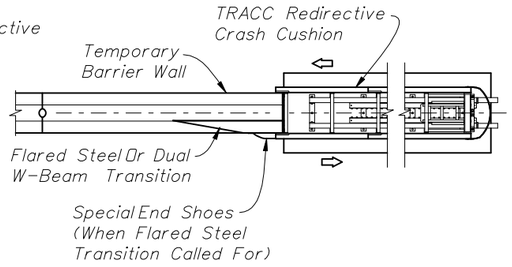
TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED WITHIN OPPOSING LANE CLEAR ZONE

SHOULDER - RIGHT OR LEFT (RIGHT SIDE SHOWN)

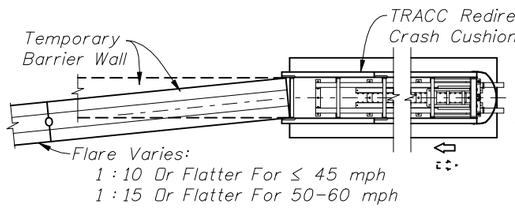
WALL END TREATMENT WHEN SHIELDED BY A QuadGuard CRASH CUSHION



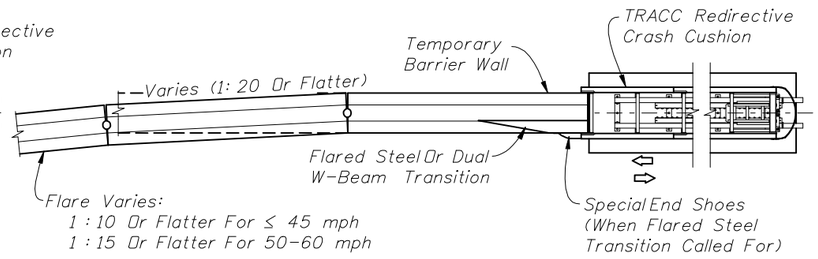
UNIDIRECTIONAL - SEPARATED TRAFFIC



BIDIRECTIONAL - SEPARATED TRAFFIC



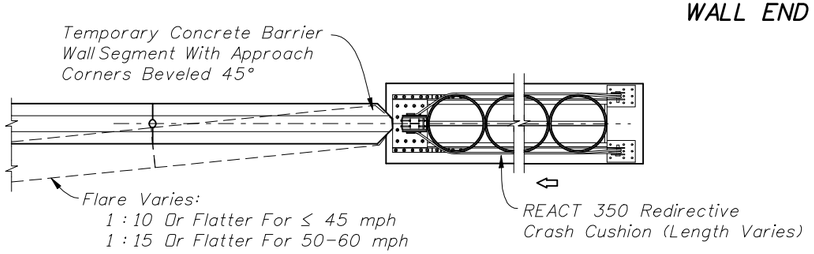
TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED OUTSIDE OPPOSING LANE CLEAR ZONE OR ONE-WAY TRAFFIC



TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED WITHIN OPPOSING LANE CLEAR ZONE

SHOULDER - RIGHT OR LEFT (RIGHT SIDE SHOWN)

WALL END TREATMENT WHEN SHIELDED BY A TRACC CRASH CUSHION



FOR ANY APPROACH CONDITION IT SHALL BE IN ACCORDANCE WITH THE DRAWINGS POSTED ON THE QUALIFIED PRODUCTS LIST

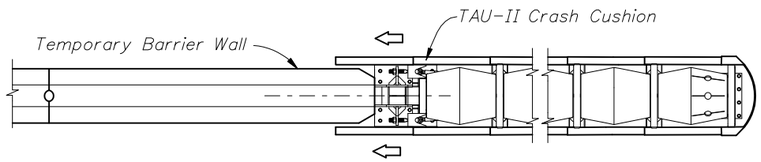
WALL END TREATMENT WHEN SHIELDED BY A REACT 350 CRASH CUSHION

NOTES

1. For alignment and length of need see Sheets 2 and 5 through 8.
2. Anchor plates required only on units abutting crash cushions.
3. For crash cushion details see drawings posted on the Qualified Products List at "544 Vehicle Impact Attenuators".

SHIELDING WALL ENDS WITH REDIRECTIVE CRASH CUSHIONS (REDIRECTIVE OPTION)

(CONTINUATION ON SHEET 10)



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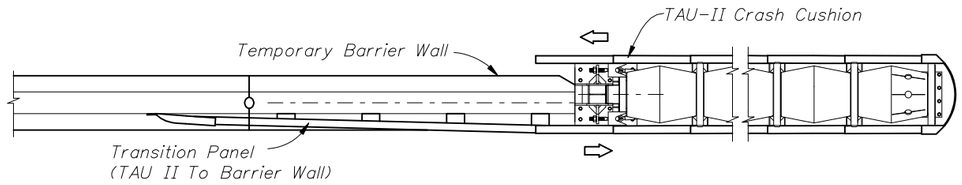

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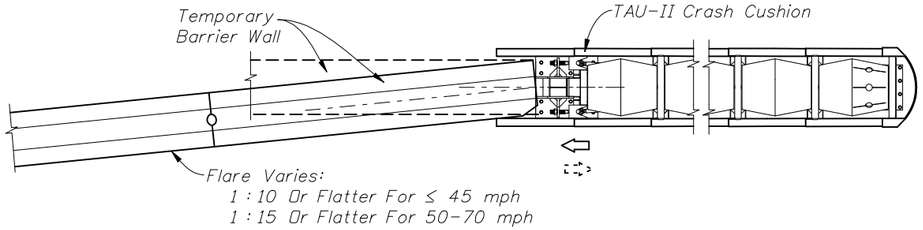
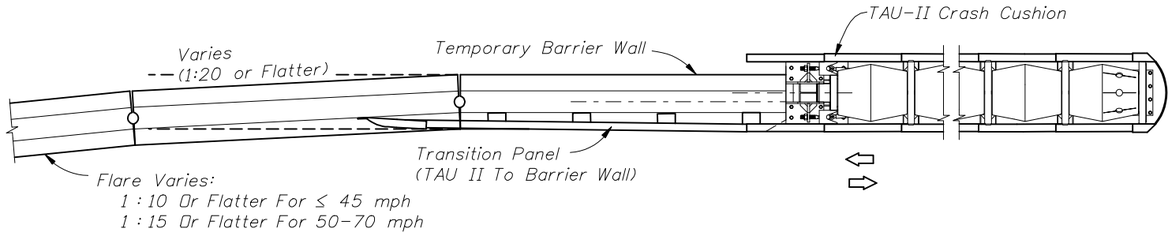


TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED OUTSIDE OPPOSING LANE CLEAR ZONE OR ONE-WAY TRAFFIC

SHOULDER - RIGHT OR LEFT (RIGHT SIDE SHOWN)



TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED WITHIN OPPOSING LANE CLEAR ZONE

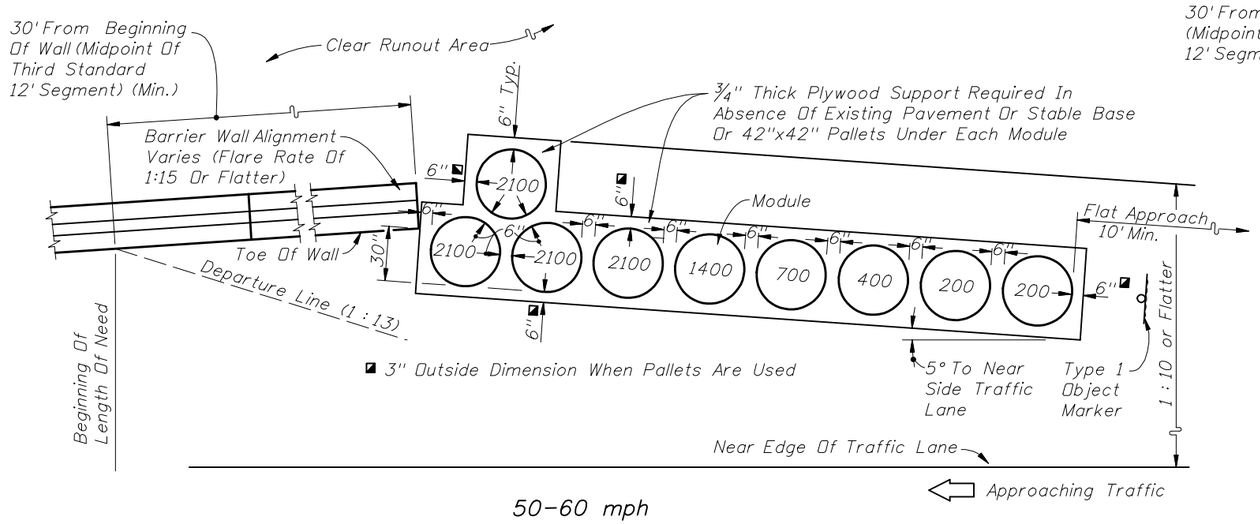
SHOULDER - RIGHT OR LEFT (RIGHT SIDE SHOWN)

WALL END TREATMENT WHEN SHIELDED BY TAU II CRASH CUSHION

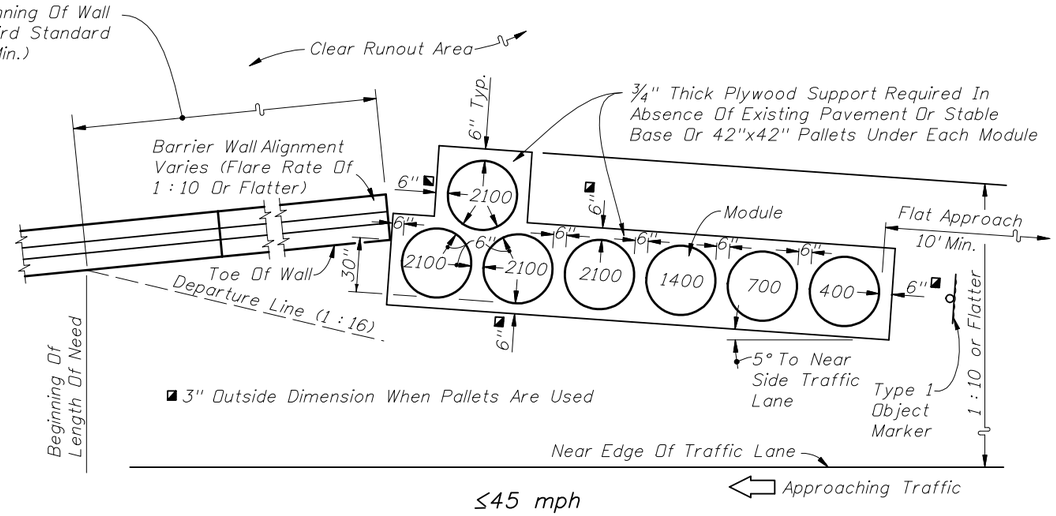
NOTES

1. For alignment and length of need see Sheets 2 and 5 through 8.
2. Anchor plates required only on units abutting crash cushions.
3. For crash cushion details see drawings posted on the Qualified Products List.

SHIELDING WALL ENDS WITH REDIRECTIVE CRASH CUSHIONS (REDIRECTIVE OPTION)



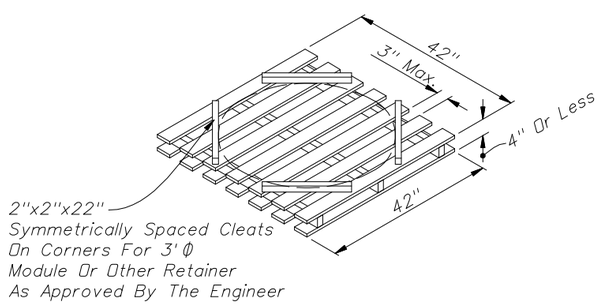
50-60 mph
PLAN



≤45 mph
PLAN

Note: Numbers shown inside modules indicate mass in pounds of sand. All modules are approximately 3' in diameter with heights ranging from 3' to 3'-9".

INERTIAL CRASH CUSHION ARRAYS



Pallet Shall Be Constructed Of Wood Or Other Frangible Or Resilient Materials Other Than Metals, And, Shall Be Sufficiently Durable To Support Modules For Their Expected Period Of Use; Wood Pallet Detail Shown.

INERTIAL MODULE PALLET

NOTES FOR TEMPORARY GATING CRASH CUSHIONS

1. The crash cushion arrays shown on this Index can be used on the State Highway System only when all of the following conditions are met:
   (a) Use is limited to shielding temporary concrete barrier wall approach ends.
   (b) Used only when a temporary gating crash cushion or inertial crash cushion is specifically called for in the plans.
   (c) Use is limited to installations that will not exceed 30 calendar days in duration, unless otherwise called for in the plans.

   When the plans do not specifically call for a temporary gating crash cushion, and/or when the installation will exceed 30 days in duration, a redirective crash cushion system in accordance with Index No. 415 is required.

2. Inertial crash cushions are gating type crash cushions, and a clear runout area back of the array must be provided. The arrays shown can be used for outer roadway applications, exclusive of gore areas, and for median applications where the median width is sufficient to provide clear zone width between the back side module and the near lane of the opposing traffic.

3. Inertial crash cushion modules shall be installed in accordance with the manufacturer's specifications and recommendations, and can be constructed of either new or functionally sound used modules.

4. Anchorage of barrier wall end segment is not required.

5. A yellow post mounted Type I Object Marker shall be centered 3' in front of the nose of all crash cushion arrays. Mounting hardware shall be in accordance with Index Nos. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the crash cushion.

6. Temporary gating crash cushion systems listed on the Department's Qualified Products List (QPL) may be substituted for the crash cushion arrays shown in this Index, provided a configuration using the system for this substitution has been detailed in the approved QPL drawings. Manufacturers seeking approval of temporary gating crash cushions for inclusion on the QPL must submit application along with design documentation showing the crash cushion system is crash tested to NCHRP Report 350 Test Level 3 criteria, is accepted by FHWA and is compatible with FDOT temporary barrier wall systems. System approvals will be contingent on FDOT's evaluation of crash test performance results for consistency with FDOT temporary barrier wall end shielding applications and uses. If approved, installation drawings signed and sealed by a professional engineer licensed in the State of Florida will be required.

7. Temporary crash cushions (gating) are to be paid for, per array, under the contract unit price for Vehicular Impact Attenuator/Crash Cushion (Gating) (Temporary), LO.

TEMPORARY INERTIAL CRASH CUSHIONS FOR SHIELDING ENDS OF TEMPORARY CONCRETE BARRIER WALL

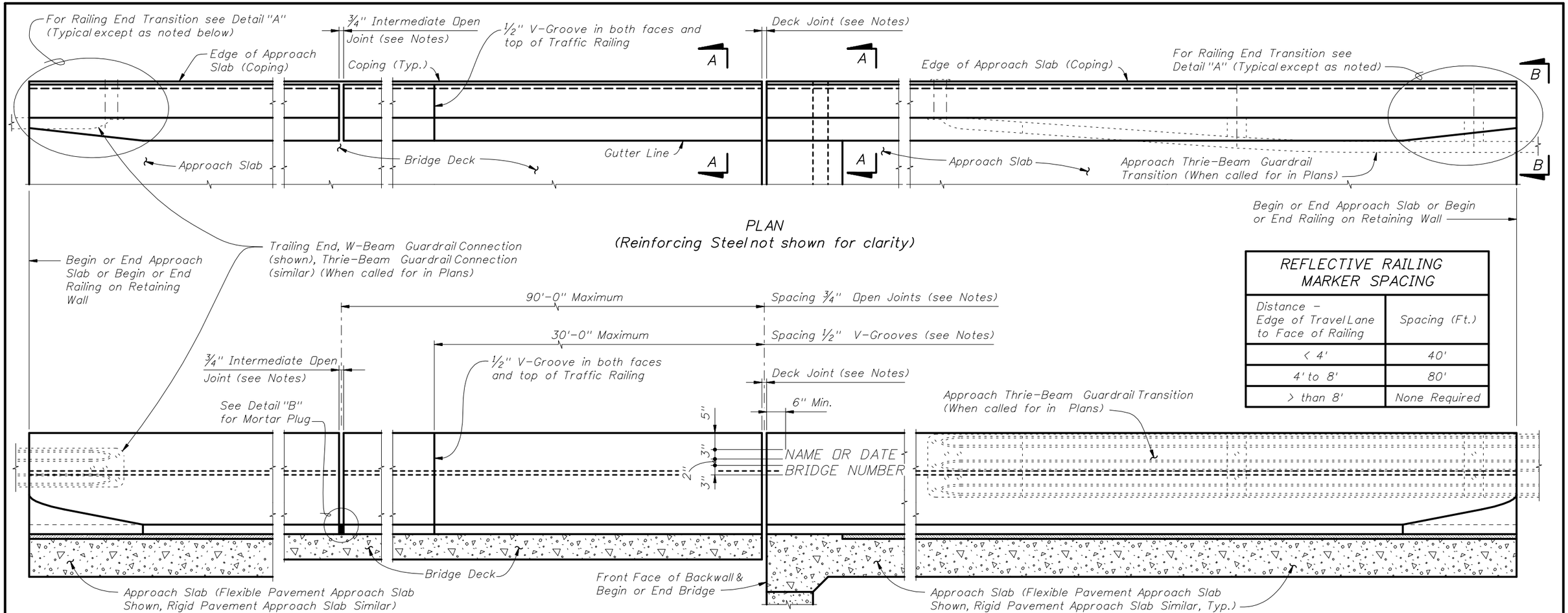
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

INERTIAL CRASH CUSHION

Last Revision	Sheet No.
07/01/05	1 of 1

Index No. 417



PLAN
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)
(Railing on Bridge Deck and Approach Slab shown, Railing on Retaining Wall similar)

CROSS REFERENCE:
For Section A-A, View B-B and Detail "A", see Sheet 2.
For Detail "B", see Sheet 3.

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing.

GUARDRAIL : For Guardrail connection details see Index Nos. 400 and 410.

SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. If an adjoining railing is constructed plumb, transition the end of the Traffic Railing from perpendicular to plumb over a minimum distance of 20'-0". The cost of all modifications will be at the Contractor's expense.

PEDESTRIAN AND BICYCLE RAILING : See Index Nos. 821 and 822 for Notes, Details and post spacings for Traffic Railings with Aluminum Pedestrian /Bicycle Bullet Railings.

V-GROOVES : Construct ½" V-Grooves plumb. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

NAME, DATE AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at ℄ Pier or Intermediate Bent similar. Provide ¾" Intermediate Open Joints at :

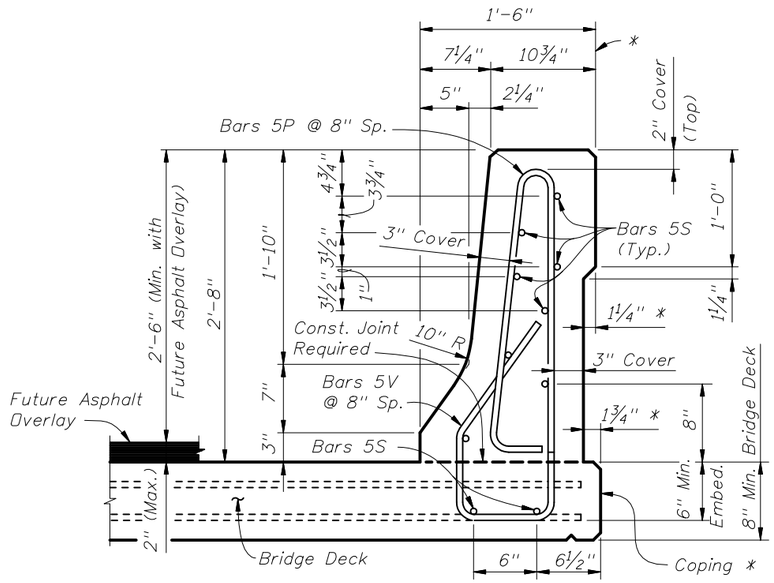
(1) – Substructure supports where superstructure slab is continuous.
(2) – Midspan where span length exceeds 90 ft.
(3) – Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.
(4) – At ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

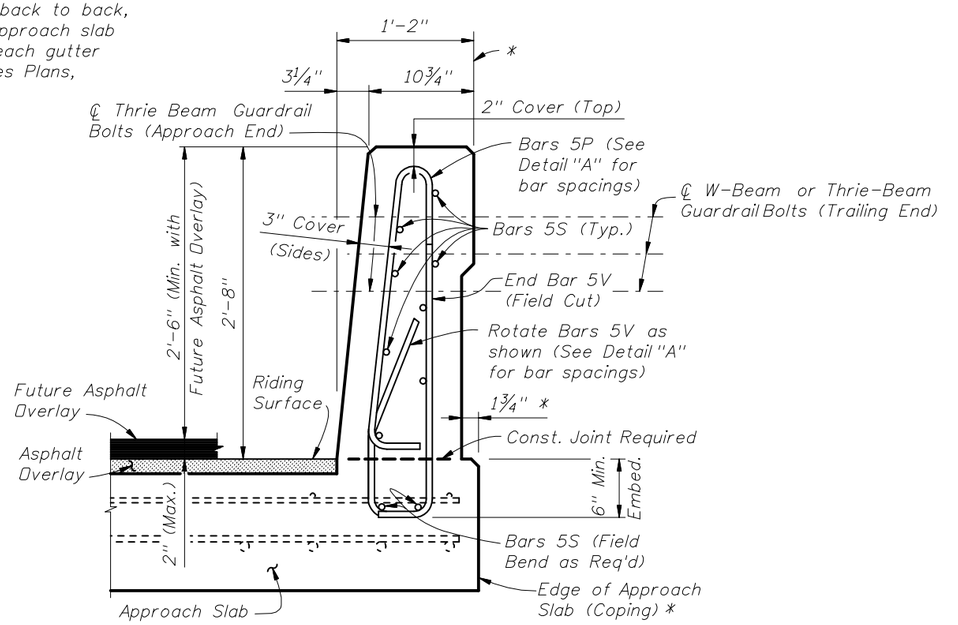
TRAFFIC RAILING - (32" F SHAPE)

Last Revision	Sheet No.
07/01/08	1 of 3
Index No.	
420	

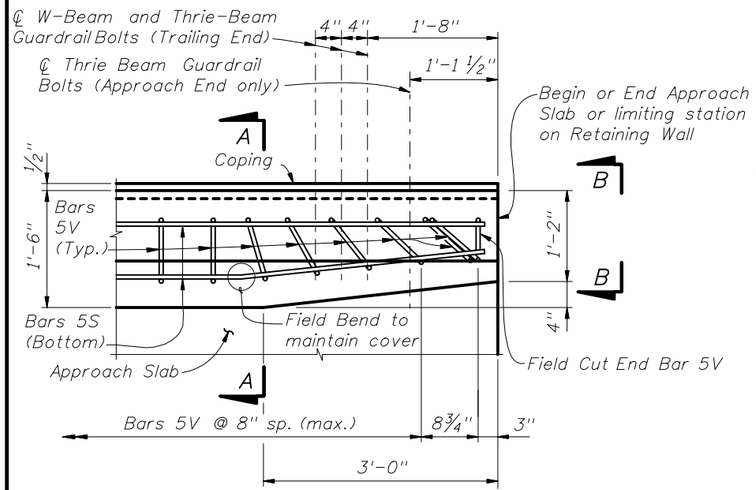


* *Where railings of adjacent bridges are to be built back to back, the outside vertical plane of the railing and deck/approach slab may coincide along a plane centered 1'-6" from each gutter line. A bond breaker will be required. See Structures Plans, Superstructure Sheets for Details.*

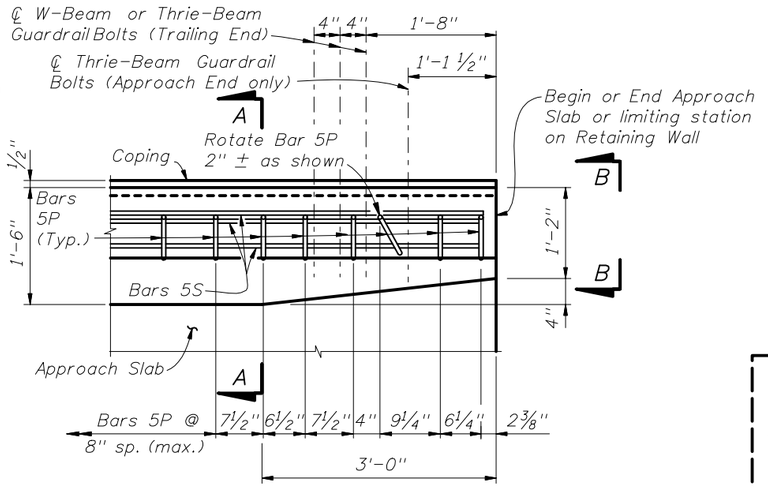
SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(Section thru Bridge Deck shown, Section thru Approach Slab and Retaining Walls similar)



VIEW B-B
(Section thru Approach Slab shown, Section thru Retaining Walls similar)



PLAN – Railing End Transition
(Showing Bars 5V and 5S)



PLAN – Railing End Transition
(Showing Bars 5P and 5S)

DETAIL "A"
(Railing on Approach Slab shown, Railing on Retaining Wall similar)

NOTE: Omit Railing End Transition and Guardrail if Index 410 Concrete Barrier Wall is used beyond the Approach Slab or Retaining Wall. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Transition is omitted, extend Typical Section to end of the Approach Slab or limiting station on Retaining Wall, and space Bars 5P and 5V at 8" (Typ.)

NOTES:
Rotate Bars 5V in Railing End Transition to maintain cover. Begin placing Railing Bars 5P and 5V on Approach Slab at the barrier end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge.

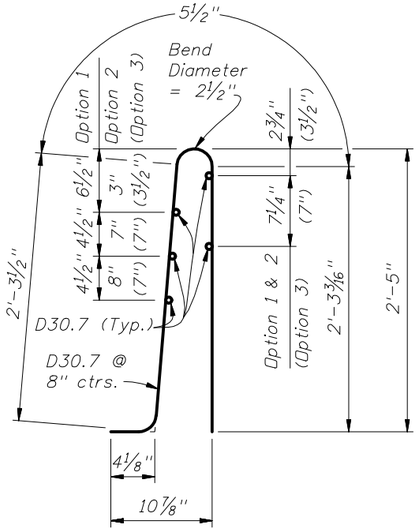
CROSS REFERENCE:
For locations of Section A-A and View B-B see Sheet 1.

INSTRUCTIONS TO DESIGNER:

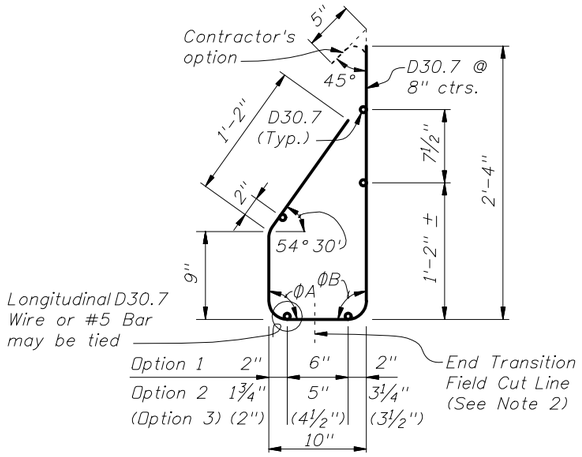
For Bridge Decks up to a maximum thickness of 9", the two Bars 5S placed in the Bridge Deck may substitute for the longitudinal deck steel located within the limits of Bars 5V, provided that the total area of longitudinal deck steel beneath the railing, as required by calculation, is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.

All Bars 5P, 5S and 5V as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5P, 5S and 5V in the reinforcing bar lists and estimated quantities for supporting bridge decks, approach slabs or retaining walls.

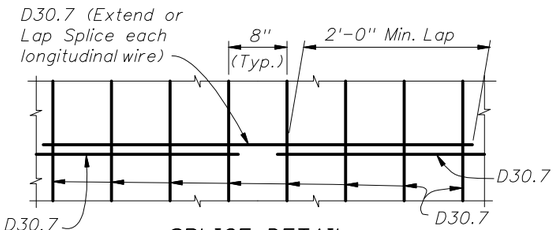
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



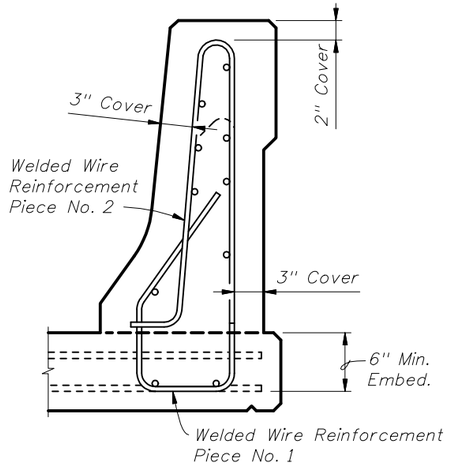
Welded Wire Reinforcement (WWR) Piece No. 2



Welded Wire Reinforcement (WWR) Piece No. 1



SPLICE DETAIL
(Between WWR Sections)



WELDED WIRE REINFORCEMENT NOTES:

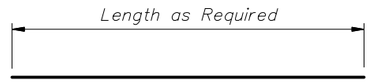
1. At the option of the Contractor Welded Wire Reinforcement (WWR) may be utilized in lieu of all Bars 5P, 5S and 5V. Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded Wire Reinforcement at Railing End Transition shall be field bent inward as required (Pieces 1 & 2) to maintain cover. The vertical wires (D30.7) in Piece 1 shall be cut as shown and the gutter side portion bent inward as required to allow placement.

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

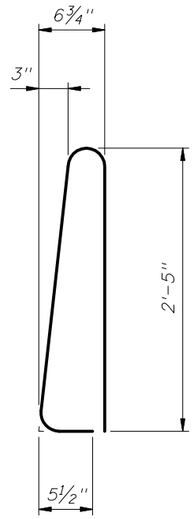
ROADWAY CROSS-SLOPE	LOW GUTTER		HIGH GUTTER	
	ΦA	ΦB	ΦA	ΦB
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	87°	93°
6% to 10%	96°	84°	84°	96°

ΦA and ΦB shall be 90° if Contractor elects to place railing perpendicular to the deck and approach slabs.

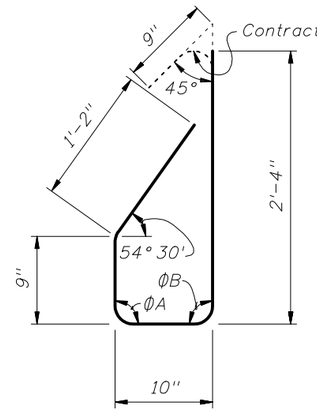
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	5'-7"
S	5	As Reqd.
V	5	5'-1"



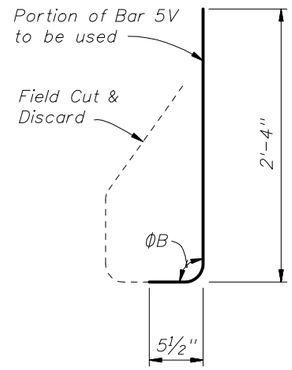
BAR 5S



STIRRUP BAR 5P



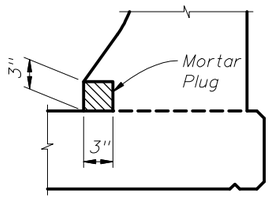
STIRRUP BAR 5V



END STIRRUP BAR 5V
To Be Field Cut
(One Required per Railing End Transition)

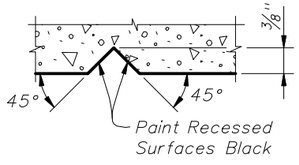
REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. The 9" and the 2'-4" vertical dimensions shown for Bar 5V are based on a bridge deck without a raised sidewalk. If a raised sidewalk is to be provided, increase these dimensions to achieve a 6" minimum embedment into the bridge deck. See Structures Plans, Superstructure and Approach Slab Sheets.
3. The reinforcement for the railing on a retaining wall shall be the same as detailed above for a 8" deck with ΦA = ΦB = 90°
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".



DETAIL "B" – SECTION
AT INTERMEDIATE OPEN JOINT

NOTE:
At Intermediate Open Joints, plug the lower 3" portion of the open joint by filling it with mortar in accordance with Section 400 of the Specifications.



SECTION THRU RECESSED
"V" GROOVE TO FORM INSCRIBED
LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.104
Reinforcing Steel	LB/LF	27.12

(The above quantities are based on a 2% deck cross slope; railing on low side of deck.)

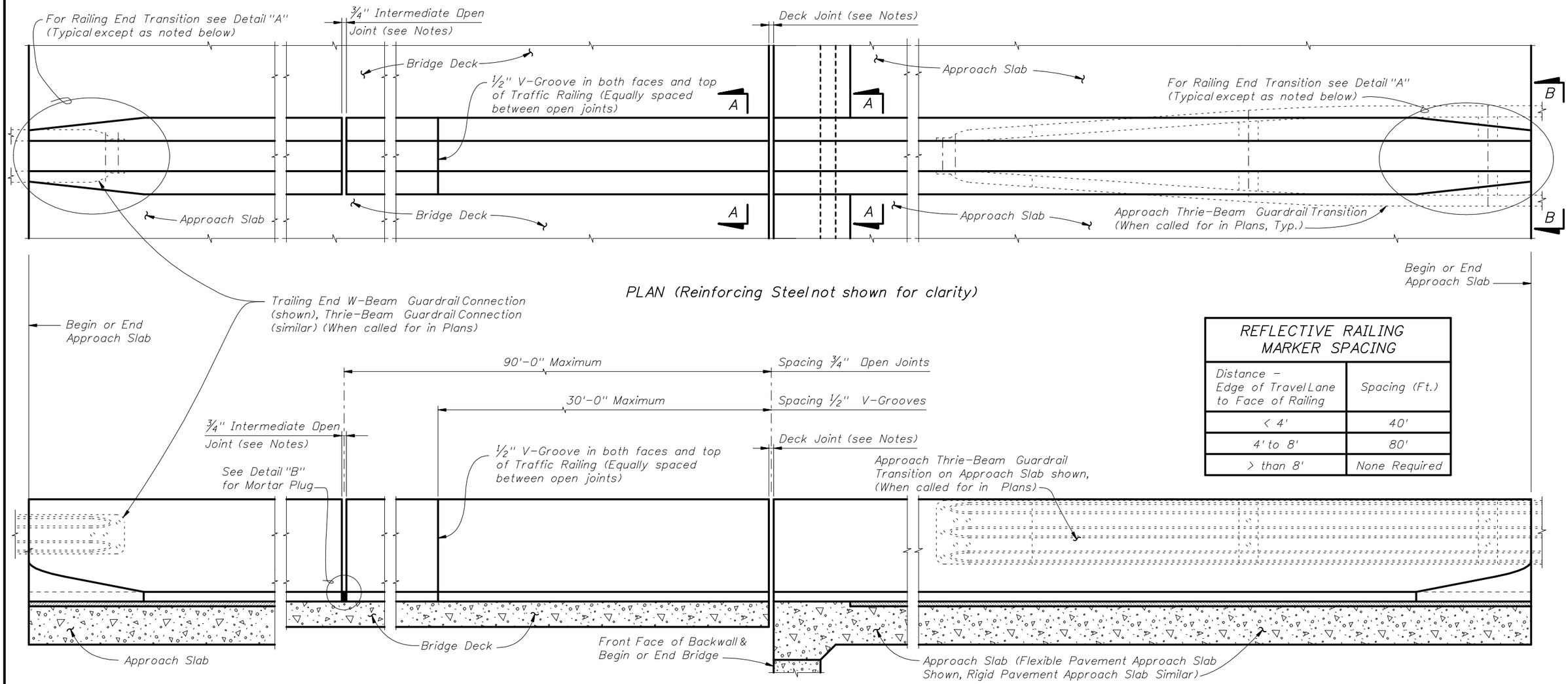
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

TRAFFIC RAILING - (32" F SHAPE)

Last Revision	Sheet No.
07/01/07	3 of 3

Index No. 420



PLAN (Reinforcing Steel not shown for clarity)

ELEVATION
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

CROSS REFERENCE:
For Section A–A, View B–B and Detail "A" see Sheet 2.

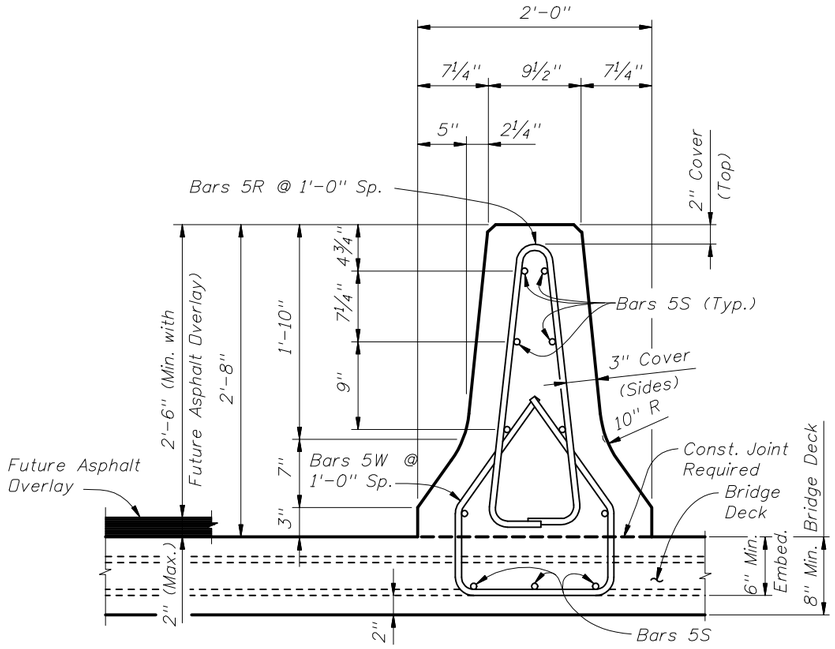
For Detail "B" see Sheet 3.

TRAFFIC RAILING NOTES

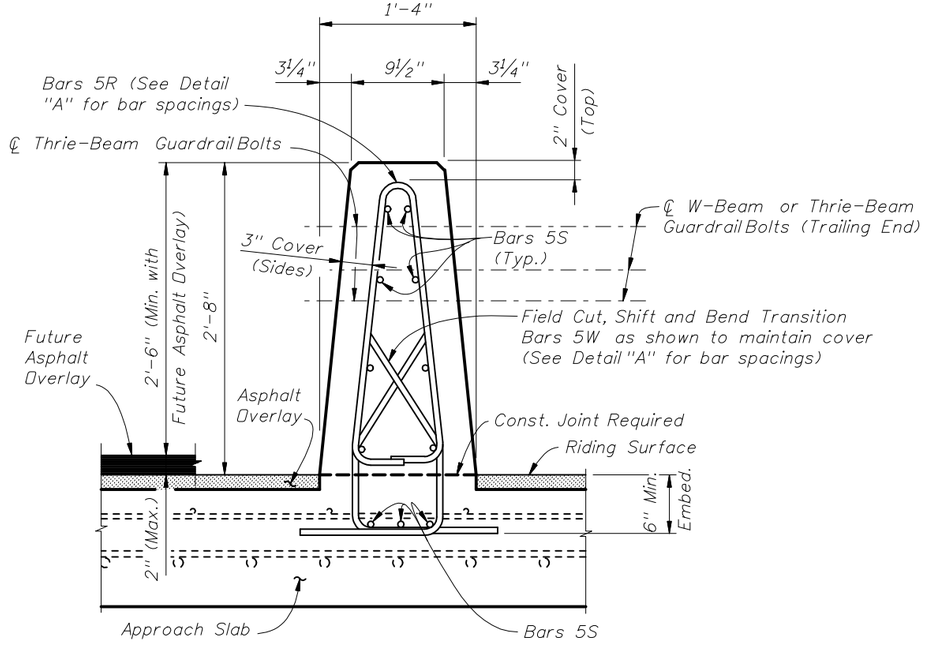
This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL–4 criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.
GUARDRAIL : For Guardrail connection details see Index No. 400.
SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.
REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing along the centerline at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

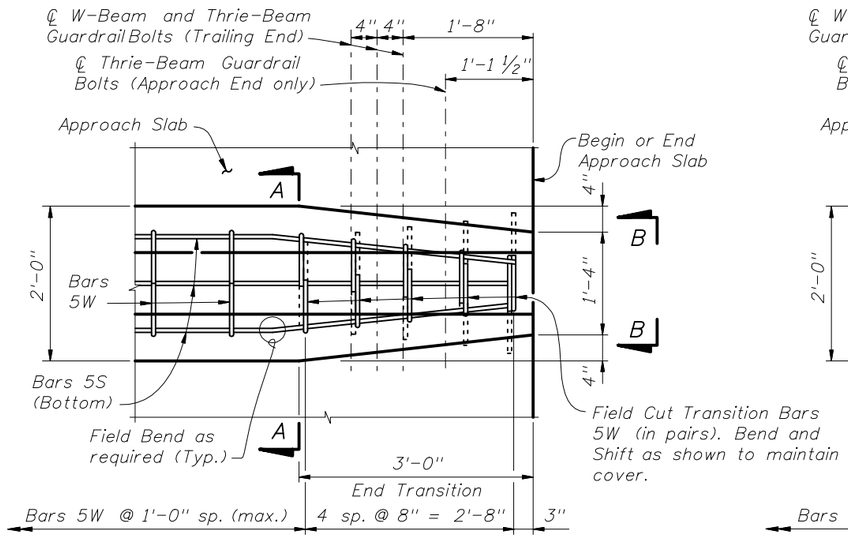
JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at ℄ Pier or Intermediate Bent similar. Provide ¾" Intermediate Open Joints at :
(1) – Substructure supports where superstructure slab is continuous.
(2) – Midspan where span length exceeds 90 ft.
(3) – Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.



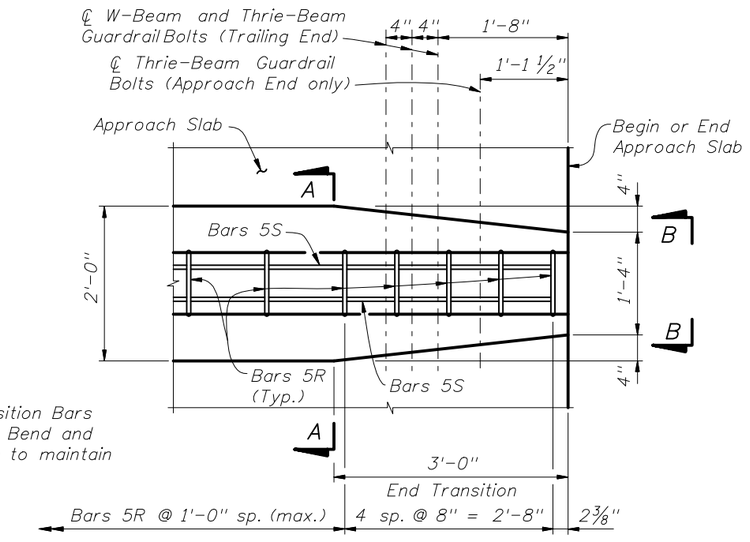
SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(SECTION THRU BRIDGE DECK SHOWN -
SECTION THRU APPROACH SLAB SIMILAR)



VIEW B-B



PLAN - Railing End Transition
(Showing Bars 5W and 5S)



PLAN - Railing End Transition
(Showing Bars 5R and 5S)

DETAIL "A"

NOTE:
Begin placing Railing Bars 5R and 5W on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5R and 5W shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5R and 5W as required to maintain cover in Railing End Transition.

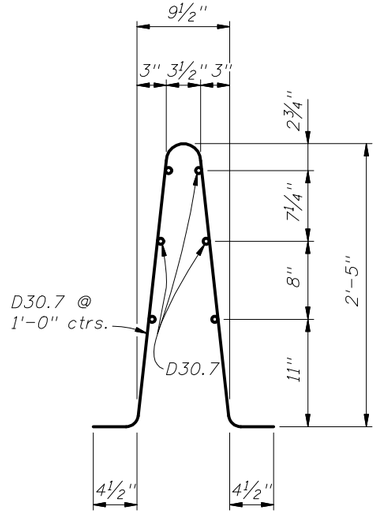
Omit Railing End Transition and Guardrail if Index 410 Concrete Barrier Wall is used beyond the Approach Slab. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Transition is omitted, extend Typical Section to the end of Approach Slab and space Bars 5R and 5W at 1'-0" (Typ.)

INSTRUCTIONS TO DESIGNER:

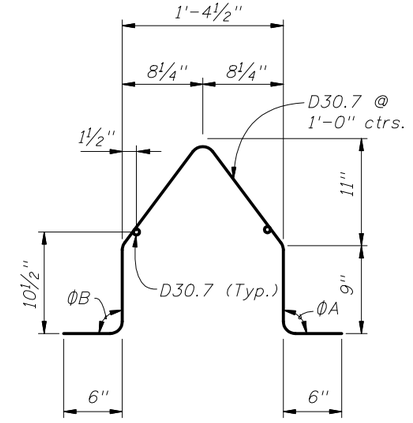
For Bridge Decks up to a maximum thickness of 9", the three Bars 5S placed in the deck may substitute for the longitudinal deck steel located within the limits of Bars 5W, provided that the total area of longitudinal deck steel beneath the railing, as required by calculation, is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.

All Bars 5R, 5S and 5W as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5R, 5S and 5W in the reinforcing bar lists and estimated quantities for supporting bridge decks or approach slabs.

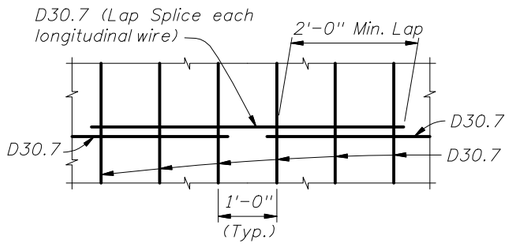
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



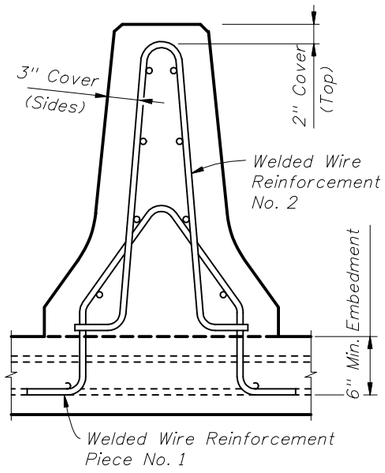
Welded Wire Reinforcement (WWR)
Piece No. 2



Welded Wire Reinforcement (WWR)
Piece No. 1



SPLICE DETAIL
(Between WWR Sections)



WELDED WIRE REINFORCEMENT NOTES:

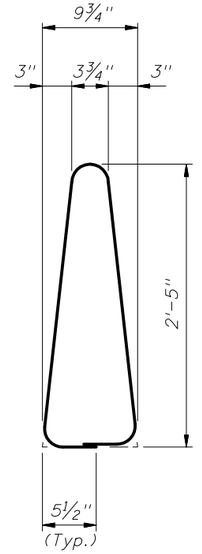
1. At the option of the Contractor Welded Wire Reinforcement may be utilized in lieu of all Bars 5R, 5S and 5W. Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded Wire Reinforcement at Railing End Transition shall be field bent inward as required (Pieces 1 & 2) to maintain cover. The top of Piece 1 shall be cut to allow overlap.
3. Place WWR panels so as to minimize the end overhang of longitudinal wires at Railing Ends and Open Joints. Overhangs greater than 6" are not permitted.

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

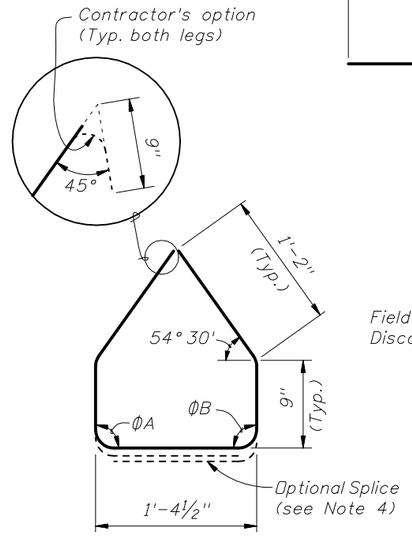
ROADWAY CROSS-SLOPE	ON SLOPE		AT CROWN	
	ΦA	ΦB	ΦA	ΦB
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	90°	90°
6% to 10%	96°	84°	90°	90°

ΦA and ΦB shall be 90° if Contractor elects to place railing perpendicular to the deck, and approach slabs.

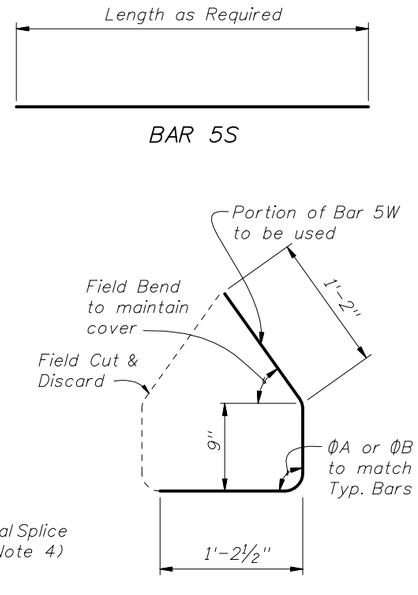
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
R	5	6'-1"
S	5	As Reqd.
W	5	5'-3"



STIRRUP BAR 5R



STIRRUP BAR 5W

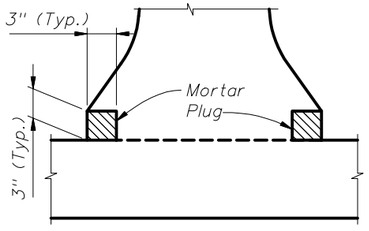


BAR 5S

TRANSITION STIRRUP BAR 5W
To Be Field Cut and Bent
(10 required per Railing
End Transition)

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints shall have a 2" minimum cover.
3. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".
4. At the Contractor's option, Bars 5W may be fabricated as a two piece bar with a 1'-2" lap splice of the bottom legs.



DETAIL "B" - SECTION
AT INTERMEDIATE OPEN JOINT

NOTE: At Intermediate Open Joints, plug the lower 3" portion of the open joint by filling it with mortar in accordance with Section 400 of the Specifications.

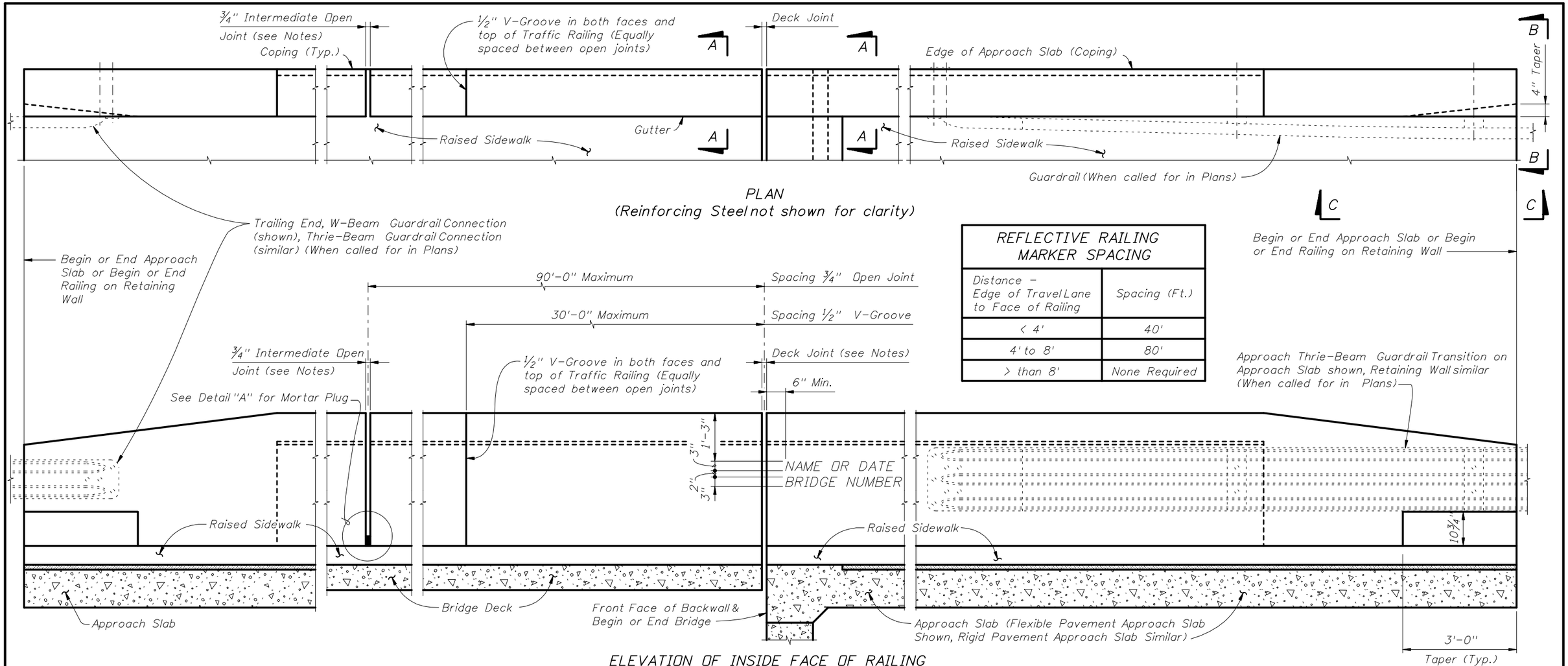
ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.120
Reinforcing Steel	LB/LF	23.29

(The above quantities are based on a crowned roadway, with a 2% cross slope)

2010 FDOT Design Standards

TRAFFIC RAILING - (MEDIAN 32" F SHAPE)

Last Revision	Sheet No.
07/01/07	3 of 3
Index No.	
421	



PLAN
(Reinforcing Steel not shown for clarity)

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

CROSS REFERENCE:
For Section A–A, Detail "A", View B–B and View C–C, see Sheet 2.

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL–4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Index No. 422, Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the ¾" open joints and ½" V-Groove shall apply.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

V-GROOVES : Construct ½" V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

NAME, DATE, AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at ℄ Pier or Intermediate Bent similar.

Provide ¾" Intermediate Open Joints at :

(1) – Substructure supports where superstructure slab is continuous.
(2) – Midspan where span length exceeds 90 ft.
(3) – Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.
(4) – At ends of approach slabs when adjacent to Retaining Walls and at expansion joints on Retaining Wall junction slabs.

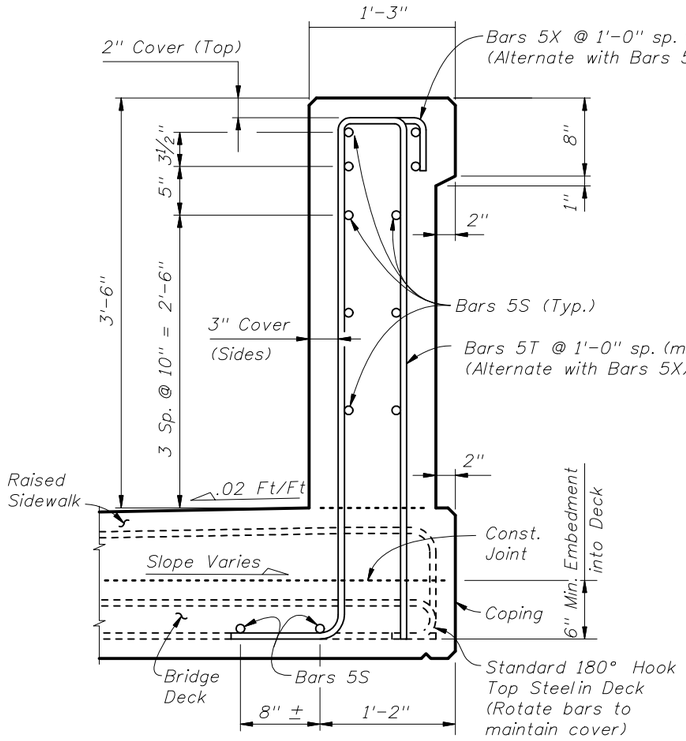
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

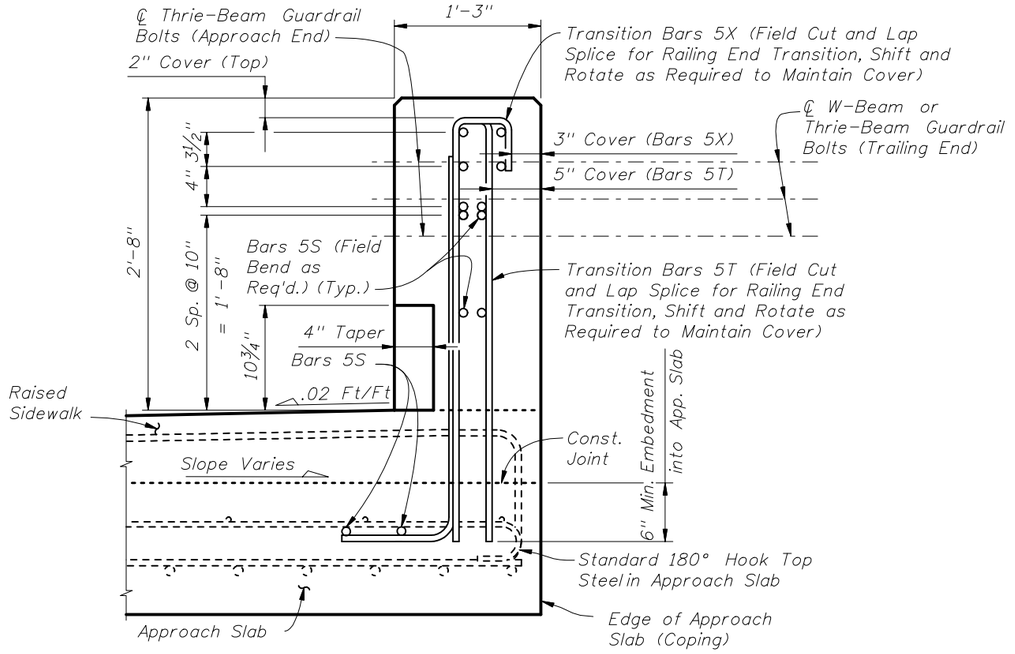
TRAFFIC RAILING - (42" VERTICAL SHAPE)

Last Revision	Sheet No.
07/01/08	1 of 3

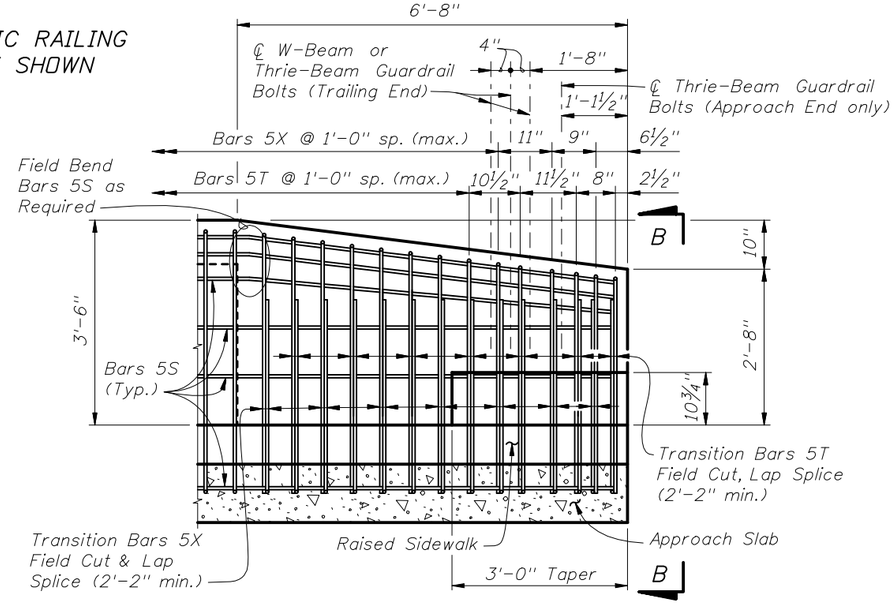
Index No. 422



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
SECTION THRU BRIDGE DECK SHOWN



VIEW B-B
(End View of Traffic Railing, Approach Slab shown,
Retaining Wall Junction Slab similar)



VIEW C-C
RAILING END TRANSITION
(Guardrail Not Shown For Clarity)

NOTES:

Begin placing Railing Bars 5T and 5X on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5T and 5X shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5T and 5X as required to maintain cover in Railing End Transition.

Omit Railing Taper, End Transition and Guardrail if Concrete Barrier Wall is used beyond the Approach Slab or Retaining Wall. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Taper and Railing End Transition is omitted, extend Typical Section to end of the Approach Slab or limiting station on Retaining Wall, and space Bars 5T and 5X at 1'-0" (Typ.)

CROSS REFERENCE:
For location of Section A-A, Detail "A" and View B-B, see Sheet 1.

INSTRUCTIONS TO DESIGNER:

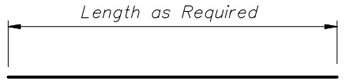
For Bridge Decks up to a maximum thickness of 9", the two Bars 5S placed in the Bridge Deck may substitute for the longitudinal deck steel located within the limits of Bars 5T, provided that the total area of longitudinal steel beneath the railing as required by calculation is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.

All Bars 5S, 5T and 5X as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5S, 5T and 5X in the reinforcing bar lists and estimated quantities for supporting bridge decks, approach slabs or retaining walls.

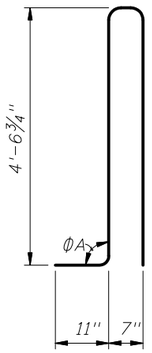
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
S	5	As Reqd.
T	5	10'-8"
X	5	6'-9"

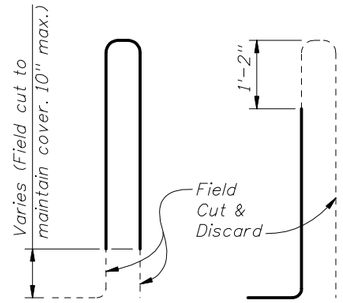
ROADWAY CROSS-SLOPE	ØA	
	LOW GUTTER	HIGH GUTTER
0% to 2%	90°	90°
2% to 6%	87°	83°
6% to 10%	84°	96°



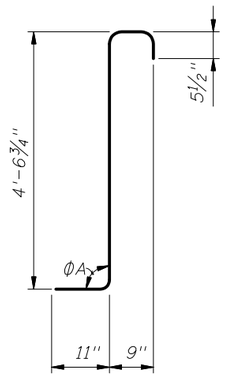
BAR 5S



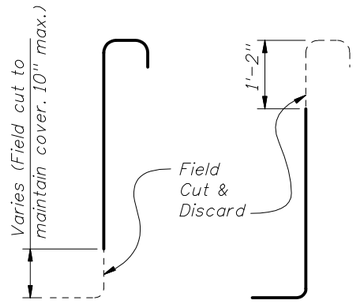
STIRRUP BAR 5T



TRANSITION STIRRUP BARS 5T
To Be Field Cut (7 of each required per Railing End Transition)



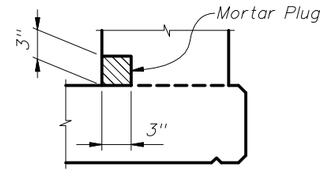
STIRRUP BAR 5X



TRANSITION STIRRUP BARS 5X
To Be Field Cut (7 of each required per Railing End Transition)

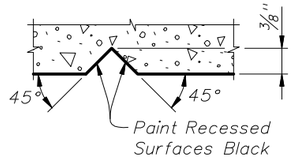
REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. The 4'-6¾" vertical dimension shown for Bars 5T and 5X is based on a bridge deck with a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and a counter 2% raised sidewalk cross slope. If the raised sidewalk thickness, width or cross slope vary from the above amounts, adjust this dimension accordingly to achieve a 6" minimum embedment into the bridge deck. See Structures Plans, Superstructure and Approach Slab Sheets.
3. The reinforcement for the railing on a retaining wall shall be the same as detailed above with ØA = 90°.
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".
6. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT

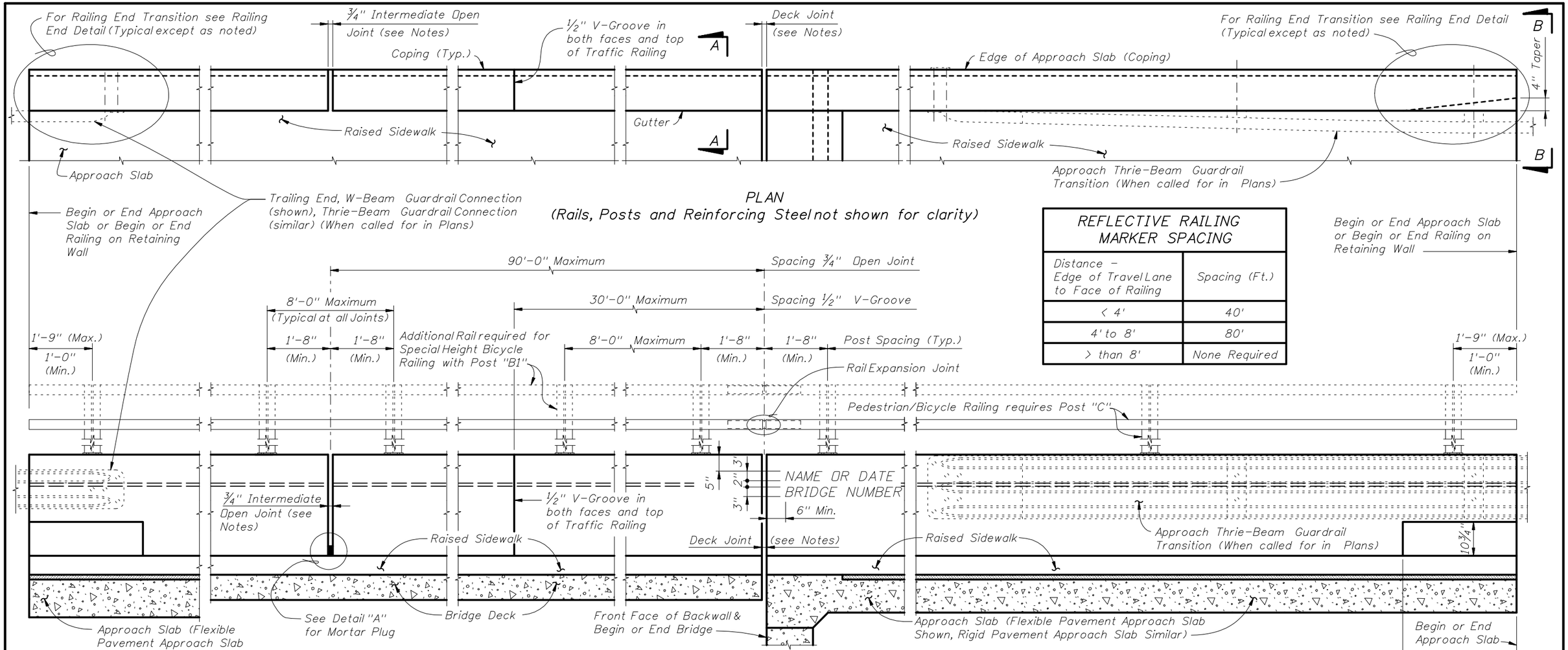
NOTE:
At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.



SECTION THRU RECESSED "V" GROOVE
TO FORM INSCRIBED LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.145
Reinforcing Steel	LB/LF	30.68

(The above quantities are based on a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and counter 2% sidewalk cross slope)



REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

PEDESTRIAN/BICYCLE RAILING AND SPECIAL HEIGHT BICYCLE RAILING DETAILS : See Index No. 822 for Post, Rail and Rail Expansion Joint fabrication and installation Details and Notes.

V-GROOVES : Construct ½" V-Grooves plumb. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the ¾" open joints and ½" V-Groove shall apply.

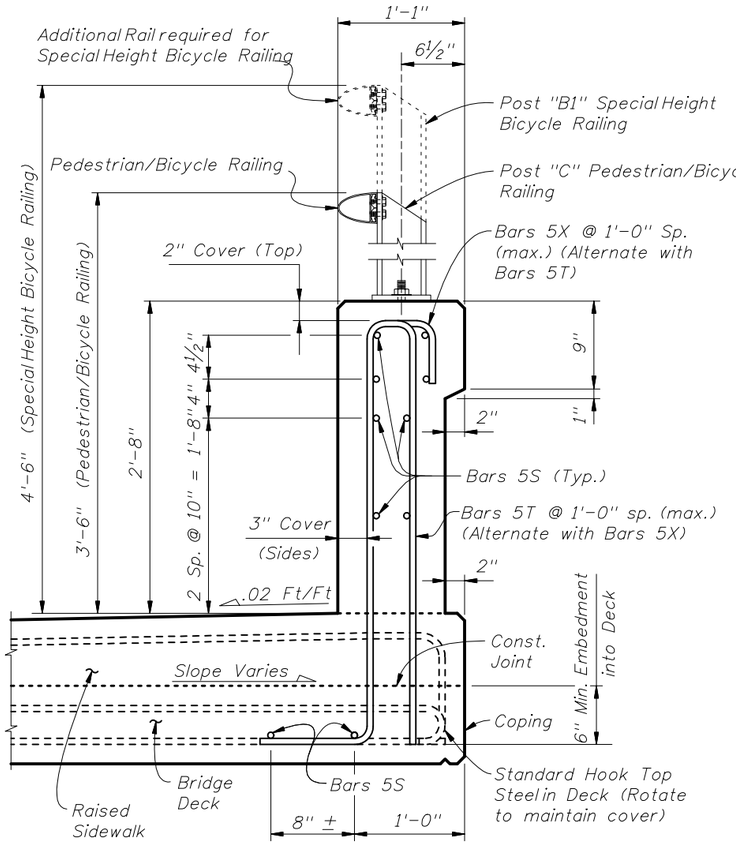
NAME, DATE, AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes of the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

OPEN JOINTS : See Structures Plans, Superstructure, Approach Slab Sheets and Retaining Walls for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin or End Bridge Shown. Deck Joint at ℄ Pier or Intermediate Bent Similar.

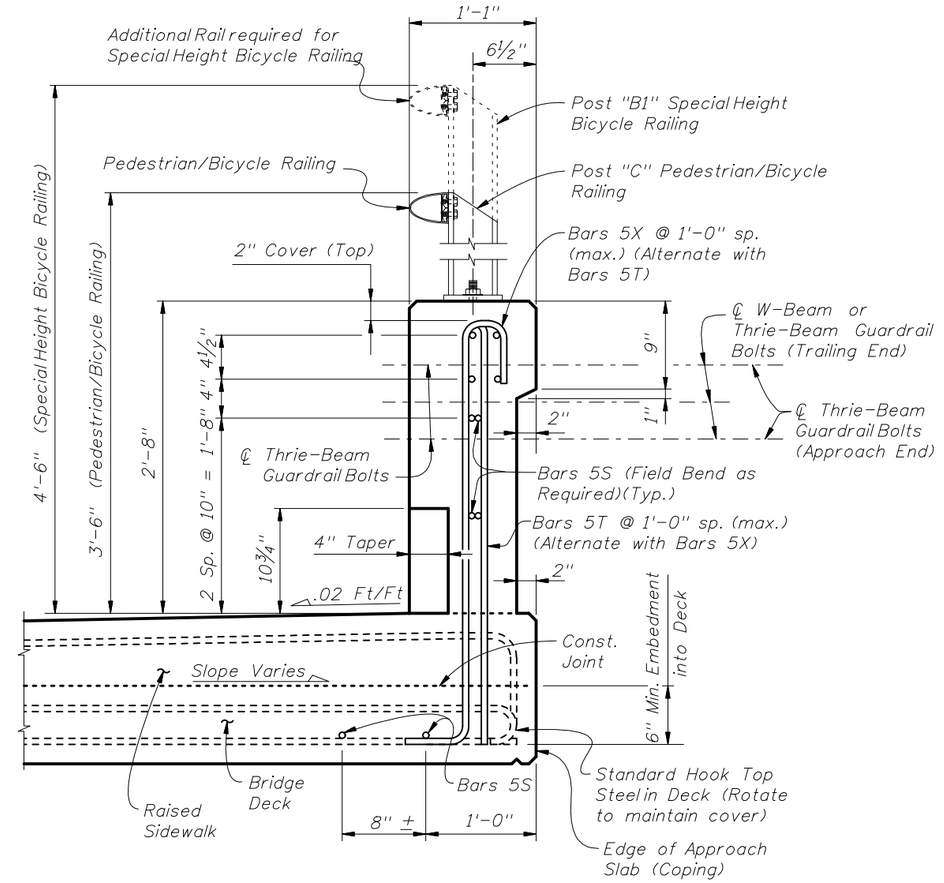
Provide ¾" Intermediate Open Joints at :

(1) – Substructure supports where superstructure slab is continuous.
(2) – Midspan where span length exceeds 90 ft.
(3) – Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.
(4) – At ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

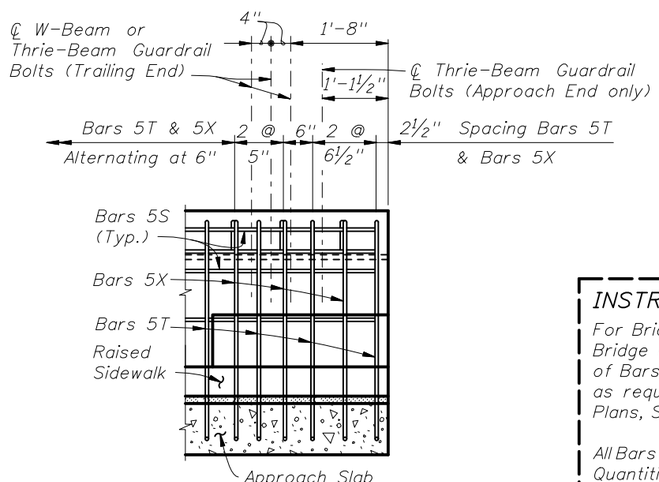
CROSS REFERENCE:
For Section A-A and View B-B, see Sheet 2.



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
SECTION THRU BRIDGE DECK SHOWN



VIEW B-B
APPROACH SLAB END VIEW
OF TRAFFIC RAILING



RAILING END DETAIL

CROSS REFERENCE:
For location of Section A-A and View B-B see Sheet 1.

NOTE: For Post "B1", Post "C" and Rail Details, see Index No. 822.

NOTES:
Omit Railing End Taper and Guardrail if Concrete Barrier Wall is used beyond the Approach Slab. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Taper is omitted, extend Typical Section to the end of the Approach Slab. Begin placing Railing Bars 5T and 5X on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5T and 5X shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5T and 5X on Approach Slab in end taper section as required to maintain cover.

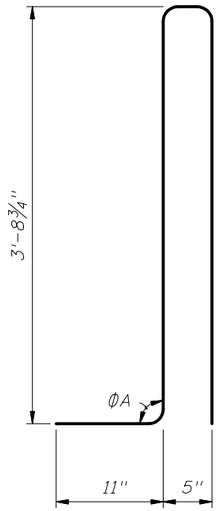
INSTRUCTIONS TO DESIGNER:
For Bridge Decks up to a maximum thickness of 9", the two Bars 5S placed in the Bridge Deck may substitute for the longitudinal deck steel located within the limits of Bars 5T, provided that the total area of longitudinal steel beneath the railing, as required by calculation, is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.

All Bars 5S, 5T and 5X as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5S, 5T and 5X in the reinforcing bar lists and estimated quantities for supporting bridge decks, approach slabs or retaining walls.

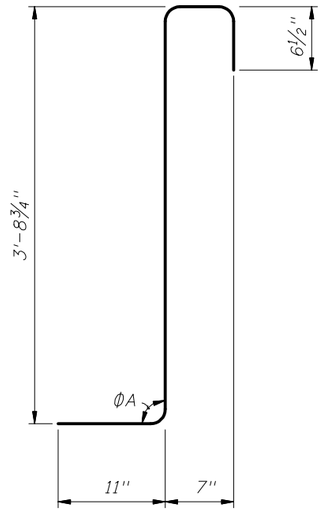
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
S	5	As Reqd.
T	5	9'-0"
X	5	5'-10"

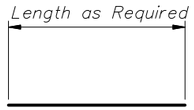
ROADWAY CROSS-SLOPE	ØA	
	LOW GUTTER	HIGH GUTTER
0% to 2%	90°	90°
2% to 6%	87°	93°
6% to 10%	84°	96°



STIRRUP BAR 5T



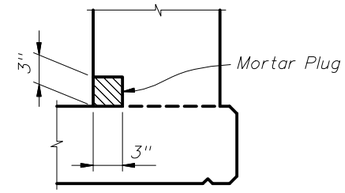
STIRRUP BAR 5X



BAR 5S

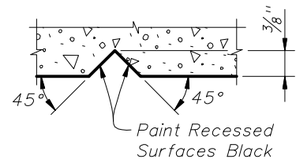
REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. The 3'-8¾" vertical dimensions shown for Bars 5T and 5X are based on a bridge deck with a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and a counter 2% raised sidewalk cross slope. If the raised sidewalk thickness, width or cross slopes vary from the above amounts, adjust these vertical dimensions accordingly to achieve a 6" minimum embedment into the bridge deck.
3. The reinforcement for the railing on a Retaining Wall shall be the same as detailed with ØA = 90°.
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".
6. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT

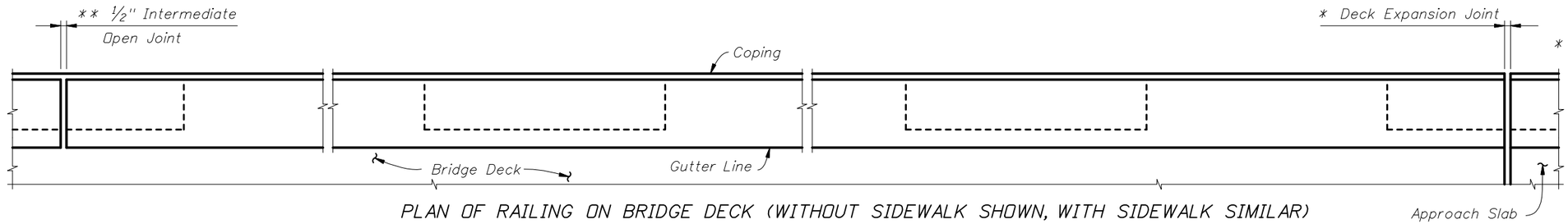
NOTE:
At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.



SECTION THRU RECESSED "V" GROOVE
TO FORM INSCRIBED LETTERS AND FIGURES

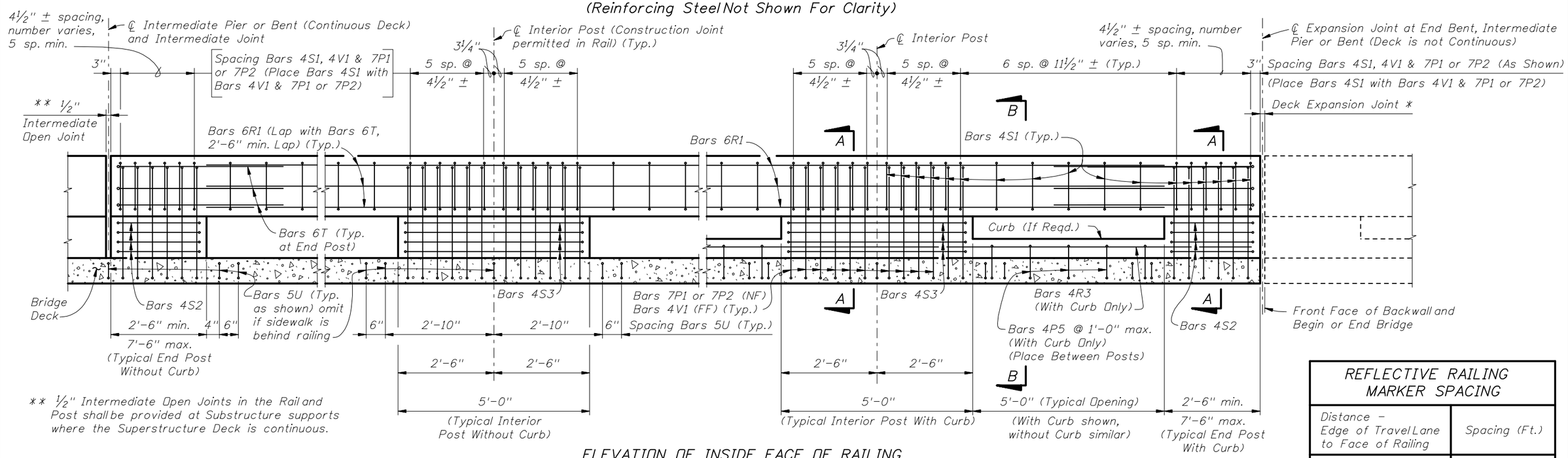
ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.095
Reinforcing Steel	LB/LF	25.90

(The above quantities are based on a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and counter 2% sidewalk cross slope.)



* See Structures Plans Superstructure and Approach Slab Sheets for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at ℄ Pier or Intermediate Bent similar. See Sheets 6 and 7 for details at Skewed Deck Joints.

PLAN OF RAILING ON BRIDGE DECK (WITHOUT SIDEWALK SHOWN, WITH SIDEWALK SIMILAR)
(APPROACH SLAB WITHOUT GUARDRAIL WITH OR WITHOUT SIDEWALK SIMILAR)
(Reinforcing Steel Not Shown For Clarity)



** ½" Intermediate Open Joints in the Rail and Post shall be provided at Substructure supports where the Superstructure Deck is continuous.

NOTE:
End Post dimensions for a given span shall match.

ELEVATION OF INSIDE FACE OF RAILING
(BRIDGE DECK SHOWN,
APPROACH SLAB WITHOUT GUARDRAIL OR ADJACENT TO ROADWAY BARRIER SIMILAR)

REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans General Notes.
AGGREGATE LIMITATION: The aggregate used in the concrete mix shall be a #67 aggregate.
MARKERS : Elevation markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing.
GUARDRAIL : For Guardrail connection details see Index No. 400.
SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.

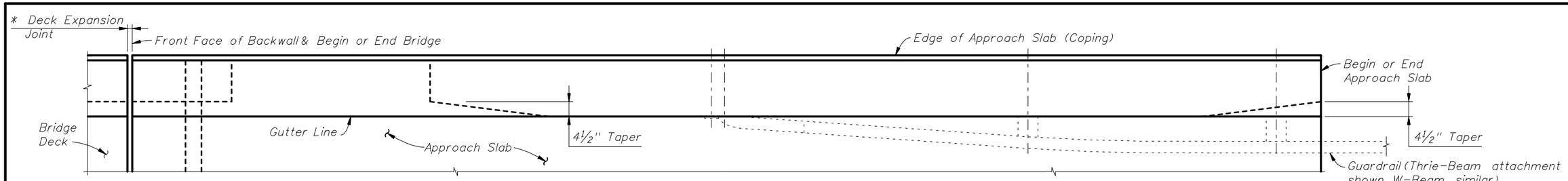
RETAINING WALL : If the Traffic Railing Barrier is to be provided on a retaining wall, the railing sections will be the same as on Sheets 3 and 4. See Retaining Wall Plans for payment.
NAME, DATE AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be placed on the driver's left side when approaching the bridge. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.
REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

NOTES:
(NF) means Near Face, (FF) means Far Face.

CROSS REFERENCES:
For Sections see Sheets 3 and 4.
For Quantities and Quantity Breakdown see Sheet 5.

INSTRUCTION TO DESIGNER

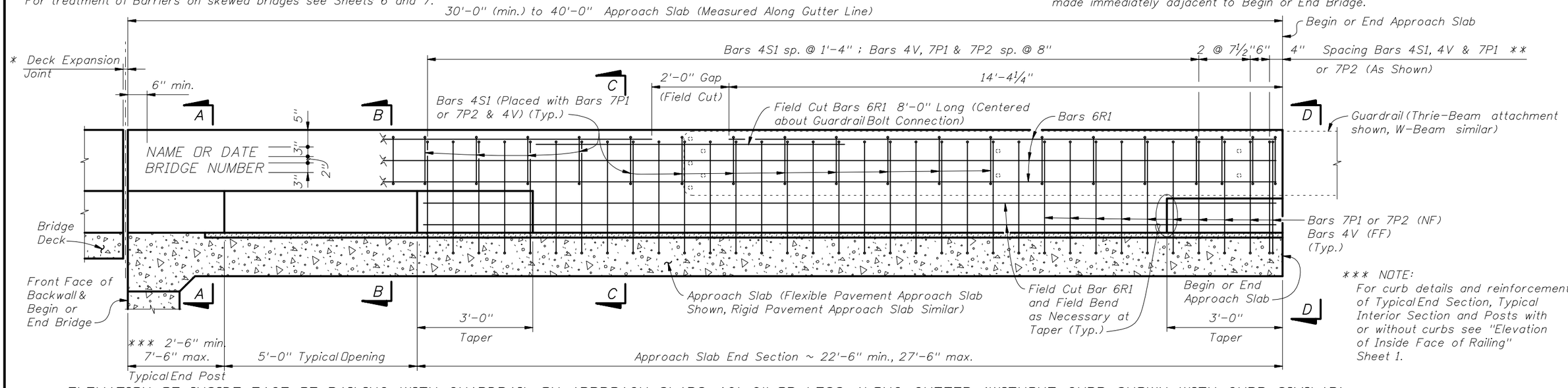
1. Indicate use of Curb beneath railing on low side of deck without sidewalks and other locations where required to contain bridge deck runoff. Define Curb location in Structures Plans Superstructure Sheets by Stationing limits or other appropriate methods.
2. Define lengths of End Posts in Structures Plans Superstructure Sheets.



PLAN OF RAILING WITH GUARDRAIL ON APPROACH SLAB WITHOUT SIDEWALK (APPROACH SLAB WITH ADJACENT SIDEWALK SIMILAR) (Reinforcing Steel Not Shown For Clarity)

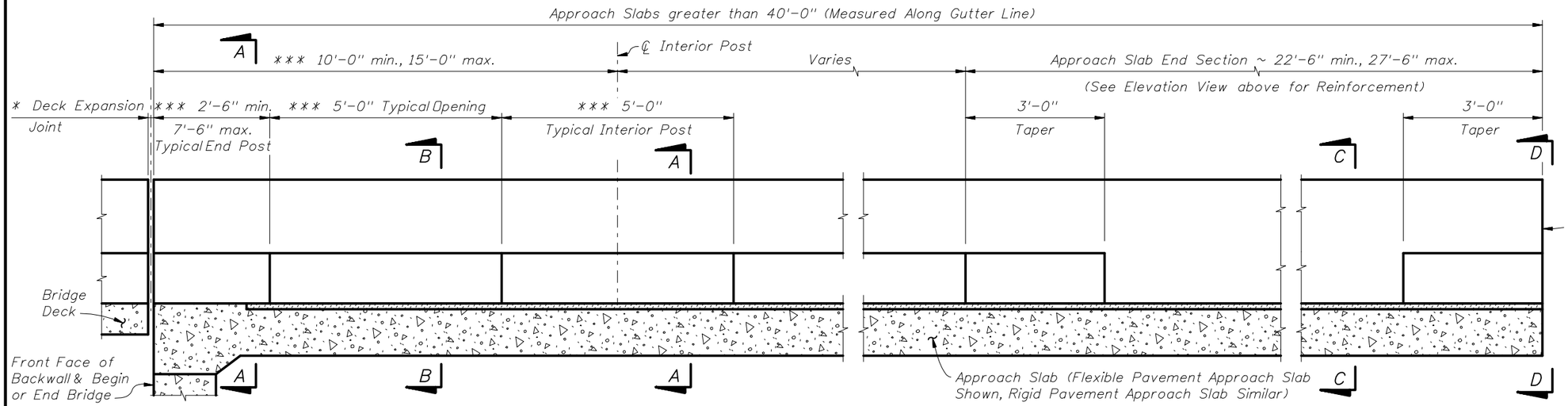
* See Structures Plans, Superstructure and Approach Slab Sheets for actual dimensions and joint orientation. Open railing Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Barriers on skewed bridges see Sheets 6 and 7.

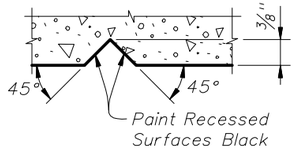
** Begin placing Railing Bars 7P1 or 7P2 and 4V on Approach Slab at the barrier end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes If required, adjustments to the bar spacing for Bars 7P1 or 7P2 and 4V shall be made immediately adjacent to Begin or End Bridge.



*** NOTE:
For curb details and reinforcement of Typical End Section, Typical Interior Section and Posts with or without curbs see "Elevation of Inside Face of Railing" Sheet 1.

ELEVATION OF INSIDE FACE OF RAILING WITH GUARDRAIL ON APPROACH SLABS 40'-0" OR LESS ALONG GUTTER (WITHOUT CURB SHOWN, WITH CURB SIMILAR)





SECTION THRU RECESSED "V" GROOVE TO FORM INSCRIBED LETTERS AND FIGURES

NOTES:
(NF) means Near Face.
(FF) means Far Face.

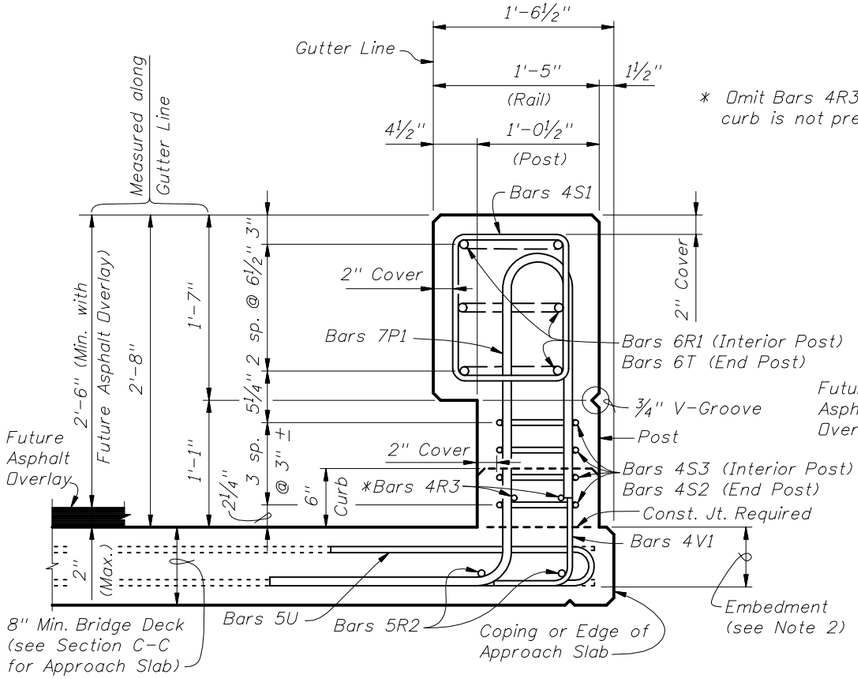
CROSS REFERENCES:
For Sections see Sheets 3 and 4.
For Quantities and Quantity Breakdown see Sheet 5.

ELEVATION OF INSIDE FACE OF RAILING WITH GUARDRAIL ON APPROACH SLABS GREATER THAN 40'-0" ALONG GUTTER (WITHOUT CURB SHOWN, WITH CURB SIMILAR)

2010 FDOT Design Standards

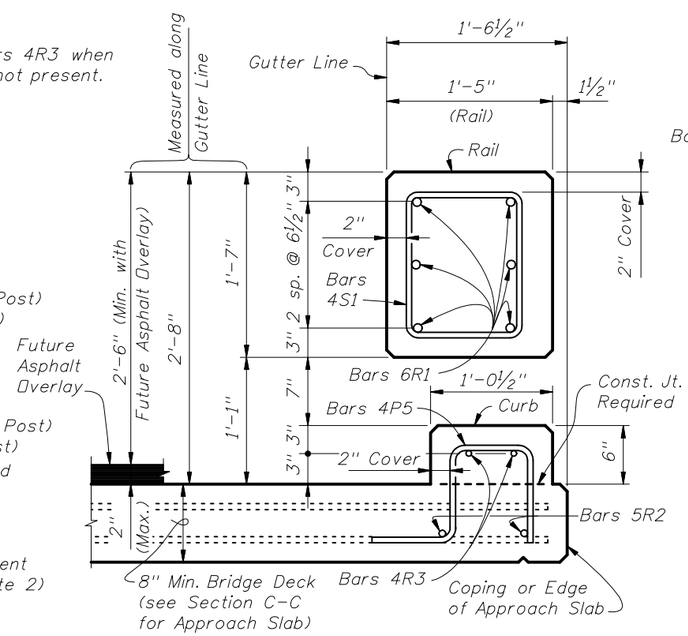
TRAFFIC RAILING - (CORRAL SHAPE)

Last Revision	Sheet No.
07/01/05	2 of 7
Index No.	
424	

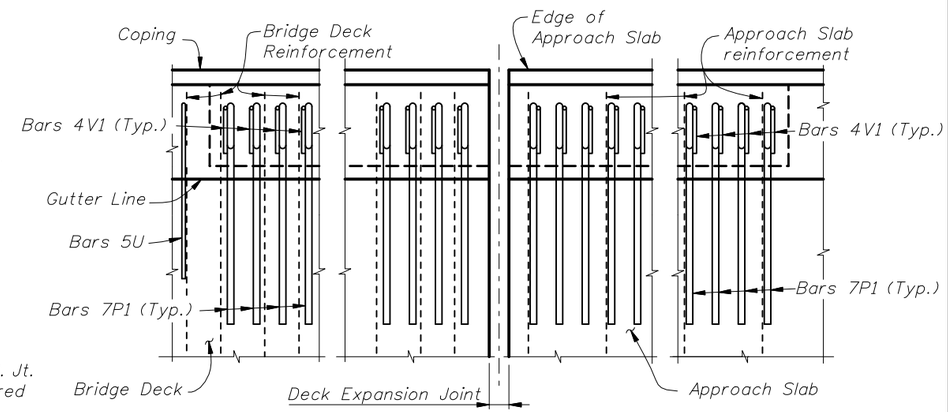


* Omit Bars 4R3 when curb is not present.

SECTION A-A (WITH CURB SHOWN, WITHOUT CURB SIMILAR)



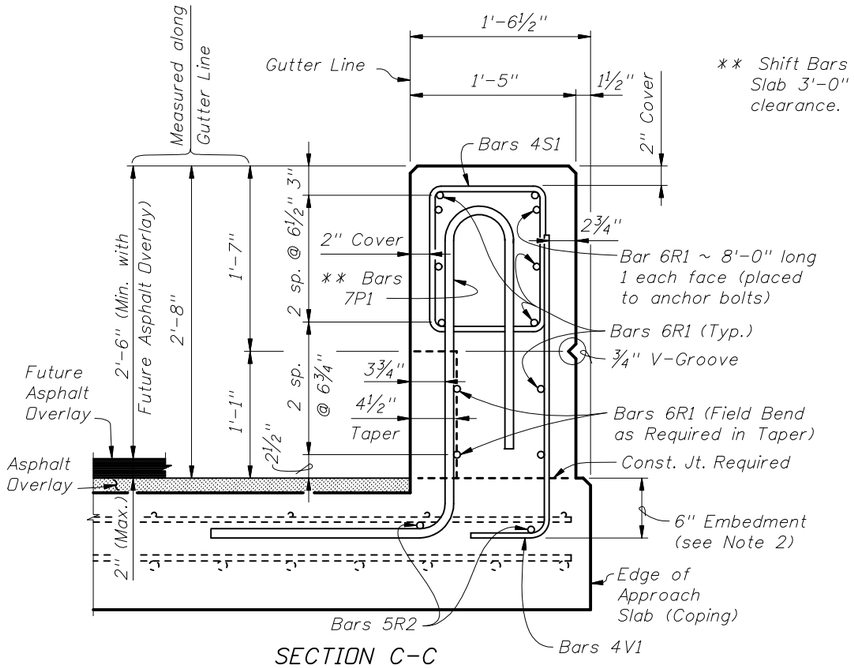
SECTION B-B (WITH CURB SHOWN, WITHOUT CURB SIMILAR)



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB
(END POST SHOWN, INTERIOR POST SIMILAR)
(Bars R, S and T not shown for clarity)

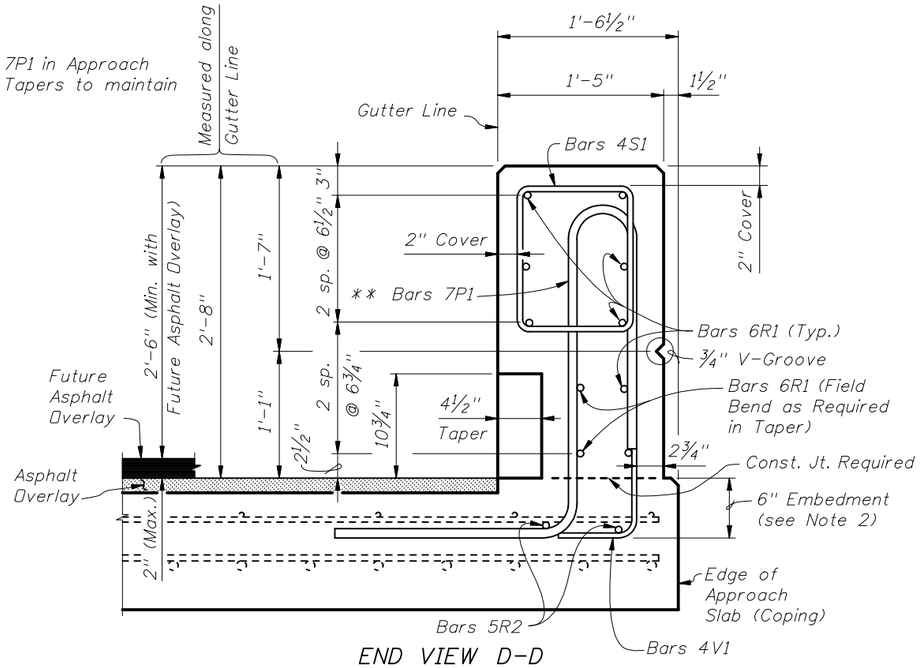
NOTES:
1) Shift deck and approach slab transverse reinforcement minimally to allow placement of Bars 7P & 4V.
2) For decks to 8½" place Bars 7P1 & 4V with the bottom mat of reinforcement as shown in Section A-A. For decks and slabs thicker than 8½" place Bars 7P1 and 4V with 6" embedment. At skewed joints, place Bars 7P3 and 4V with 5" embedment.

TYPICAL SECTIONS THRU RAILING (BRIDGE DECK SHOWN, APPROACH SLAB SIMILAR)



** Shift Bars 7P1 in Approach Slab 3'-0" Tapers to maintain clearance.

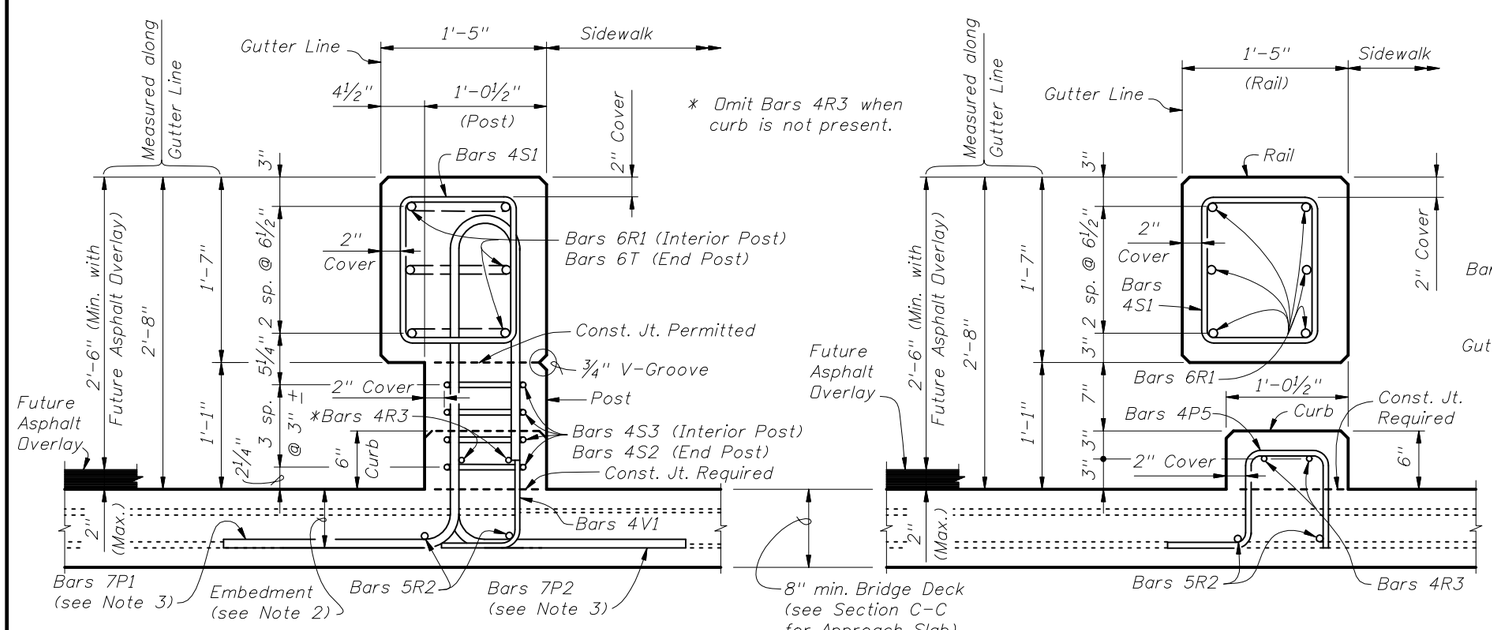
SECTION C-C



END VIEW D-D

TYPICAL SECTIONS THRU RAILING END SECTIONS ON APPROACH SLAB WITH GUARDRAIL
(APPROACH SLAB (FLEXIBLE PAVEMENT APPROACHES) SHOWN, APPROACH SLAB (RIGID PAVEMENT APPROACHES) SIMILAR)

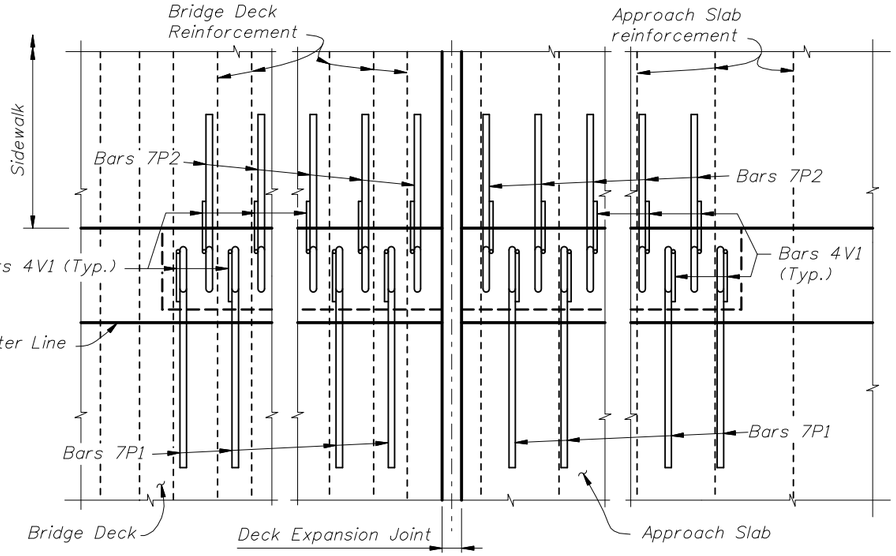
CROSS REFERENCES:
For Locations of Sections see Sheets 1 and 2.
For Quantities and Rebar Details see Sheet 5.



SECTION A-A (WITH CURB SHOWN, WITHOUT CURB SIMILAR)

SECTION B-B

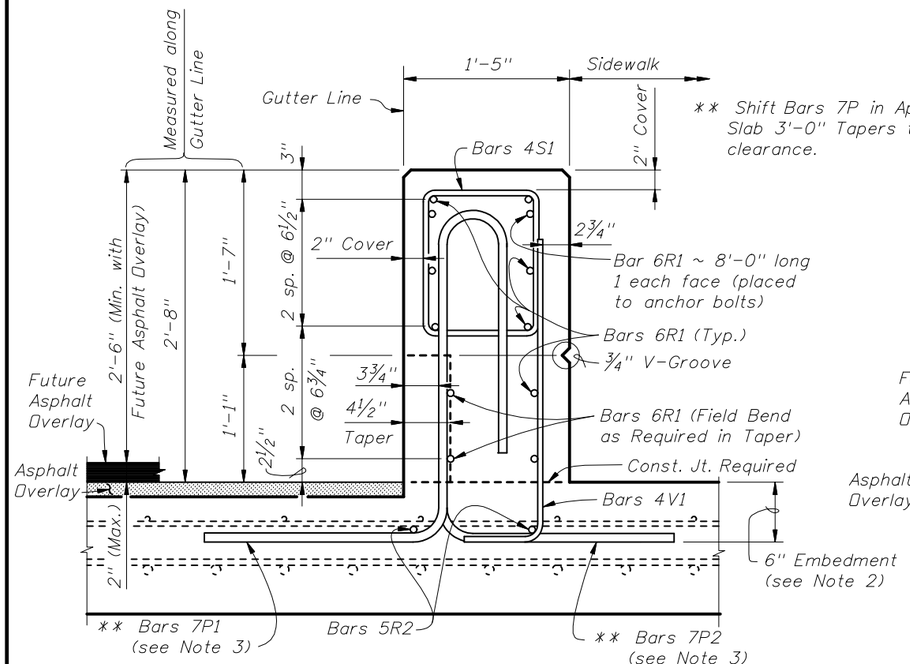
TYPICAL SECTIONS THRU RAILING ON BRIDGE DECK WITH SIDEWALK (SHOWN)
(RAILING ON APPROACH SLAB SIMILAR)



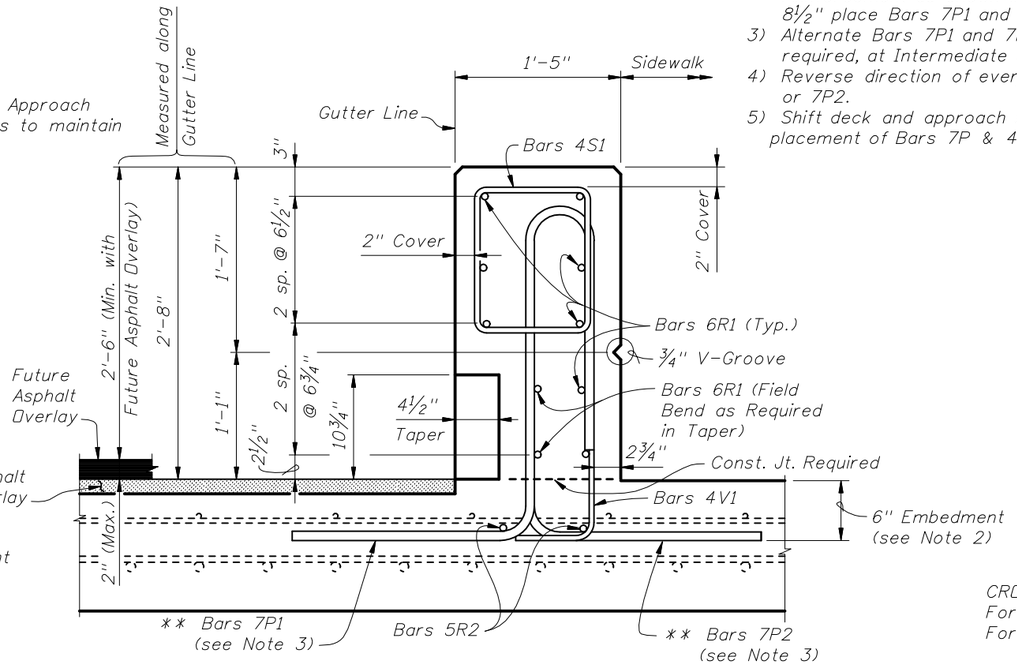
PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK
(Bars R, S and T not shown for clarity)

RAILING ADJACENT TO SIDEWALK NOTES:

1) End Post detailed above, Interior Post and Approach Slab End Section similar.
2) For decks to 8½" place Bars 7P1 and 7P2 and 4V with the bottom mat of reinforcement as shown in Section A-A. For decks and slabs thicker than 8½" place Bars 7P1 and 7P2 and 4V with 6" embedment.
3) Alternate Bars 7P1 and 7P2 at each post. At End Posts 3 each (min.) required, at Intermediate Post 6 each required.
4) Reverse direction of every other Bar 4V1 to match direction of Bars 7P1 or 7P2.
5) Shift deck and approach slab transverse reinforcement minimally to allow placement of Bars 7P & 4V.



SECTION C-C



END VIEW D-D

TYPICAL SECTIONS THRU RAILING END SECTION ON APPROACH SLAB WITH SIDEWALK AND GUARDRAIL
(APPROACH SLAB (FLEXIBLE PAVEMENT APPROACHES) SHOWN, APPROACH SLAB (RIGID PAVEMENT APPROACHES) SIMILAR)

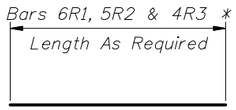
CROSS REFERENCES:
For Locations of Sections see Sheets 1 and 2.
For Quantities and Rebar Details see Sheet 5.

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

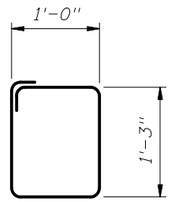
BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH	LB/BAR
P1	7	7'-4"	15.00
P2	7	7'-3"	14.82
P3	7	7'-2"	14.65
*** P4	7	7'-3"	14.82
* P5	4	2'-11"	1.94
R1	6	As Reqd.	1.5 (LB/LF)
R2	5	As Reqd.	1.04 (LB/LF)
* R3	4	As Reqd.	0.67 (LB/LF)
** S1	4	5'-0"	3.34
** S2	4	Varies 6'-3" min. 16'-3" max.	Varies 4.18 min. 10.86 max.
** S3	4	11'-3"	7.52
T	6	11'-4"	17.02
U	5	4'-8"	4.87
V1	4	3'-2"	2.12
*** V2	4	3'-6"	2.34

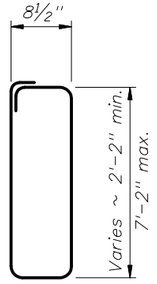
* Bars 4P5 and 4R3 are to be used with a curb only.
** Bend Bars 4S1, 4S2 & 4S3 around a #3 Stirrup Pin.
*** Bars 7P4 & 4V2 are to be used on CIP Concrete Retaining Walls.



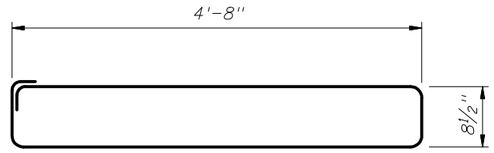
Bars 6R1, 5R2 & 4R3



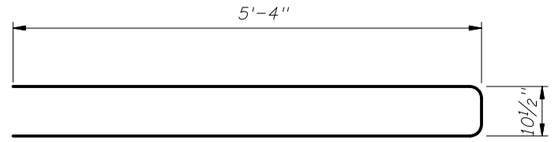
Stirrup Bar 4S1



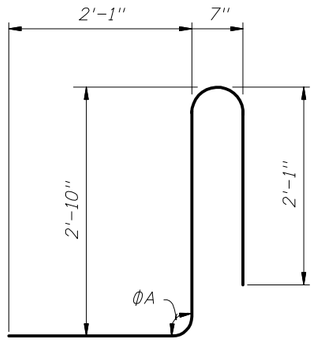
Stirrup Bar 4S2



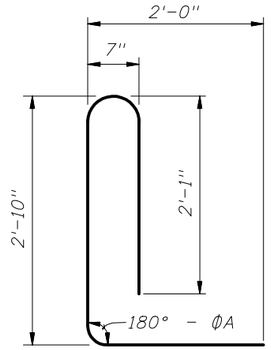
Stirrup Bar 4S3



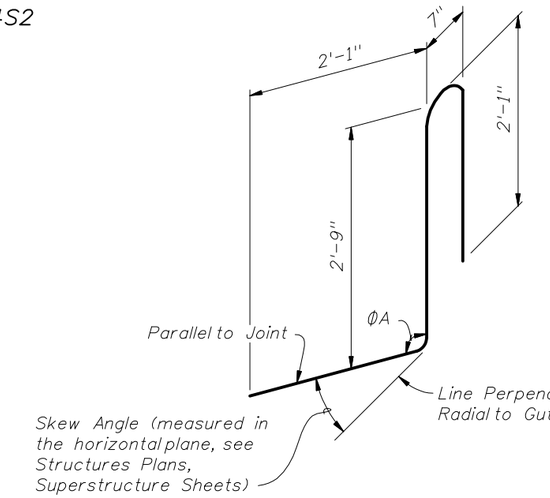
Stirrup Bar 6T



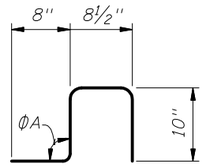
Bar 7P1



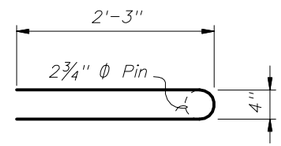
Bar 7P2



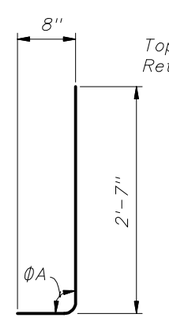
Bar 7P3 (Requires 3 Dimensional Bend)



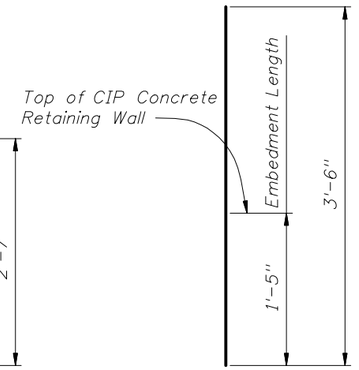
Bar 4P5 *



Stirrup Bar 5U



Bar 4V1

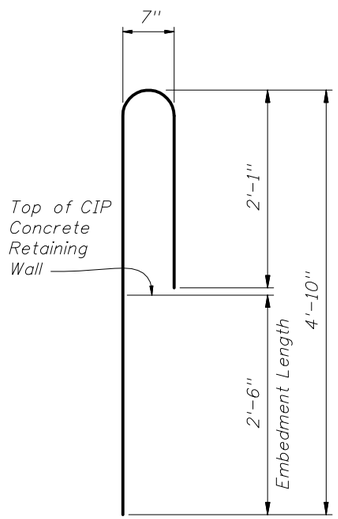


Bar 4V2 ***

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the railing on a CIP Concrete Retaining Wall shall be the same as detailed above for a 8" deck with ΦA = 90°, where applicable. If bottom horizontal legs of Bars 7P1, 7P3 and 4V1 prohibit placement, Bars 7P4 and 4V2 may be substituted for Bars 7P1, 7P3 and 4V1 as shown.
3. All reinforcing steel at the open joints shall have a 2" minimum cover unless otherwise noted.
4. At Construction Joints Bars 6R1, 5R2 and 4R3 may be continuous or spliced. Where bars are spliced provide a 2'-6" min. lap length for Bar 6R1, a 2'-0" min. lap length for Bars 5R2 and a 1'-3" min. lap length for Bars 4R3.
5. The skew angle for Bars 7P3 may vary from joint to joint and side to side, see Structures Plans, Superstructure Sheets for details.

ROADWAY OR SIDEWALK CROSS-SLOPE	HIGH SIDE ΦA	LOW SIDE ΦA
0% to 2%	90°	90°
2% to 6%	93°	87°
6% to 10%	96°	84°

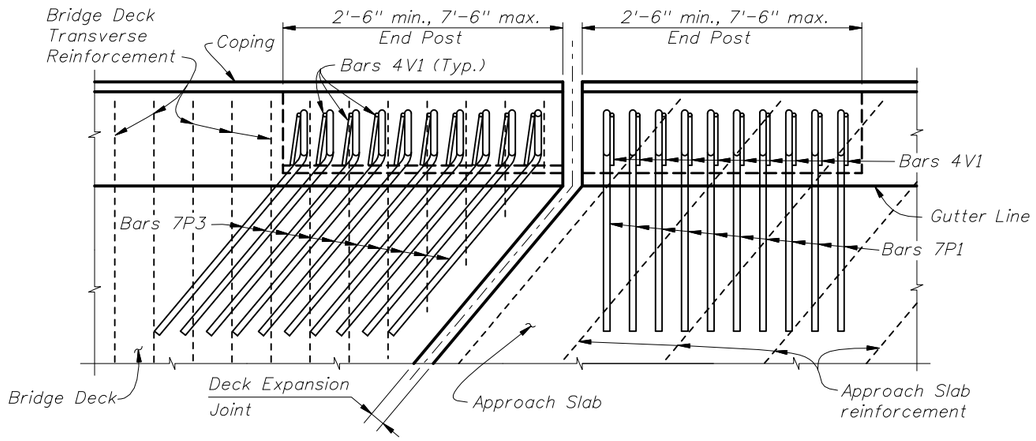
ΦA shall be 90° if Contractor elects to place Railing Perpendicular to the Deck.



Bar 7P4 ***

ESTIMATED TRAFFIC RAILING QUANTITIES

ITEM	CONCRETE QUANTITY (CY)	REBAR QUANTITY (LB)
Typical 10'-0" Section w/Curb	1.13	451
Typical 10'-0" Section w/o Curb	1.03	428
Approach Slab with Guardrail End Section	0.14 (per LF)	44 (per LF)



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB
- SKEW ANGLE GREATER THAN 15 DEGREES

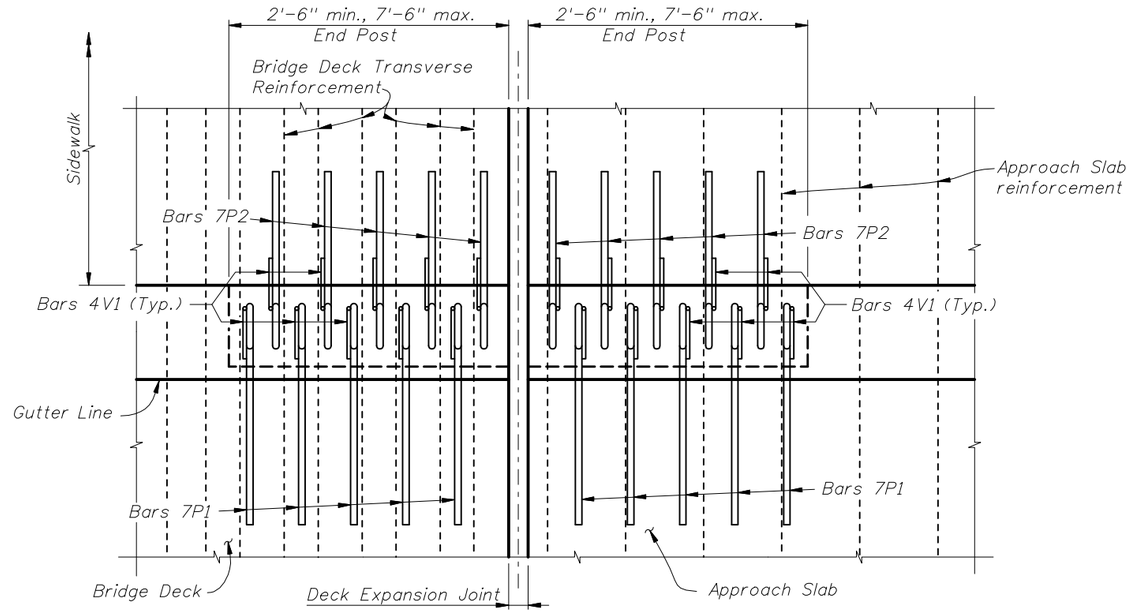
NOTES:
1) Railing expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.

BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (SHOWN):

3) End Post & Approach Slab End Section - Place Bars 7P1 & 4V1 in obtuse corners of intersection of deck joint and gutter line. Place Bars 7P3 & 4V1 in acute corners of intersection of deck joint and gutter line as required. Interior Post - use Bars 7P1 and 4V1 placed with bottom mat of reinforcement. Shift deck or slab reinforcement minimally to allow proper placement of Bars 7P and 4V and to facilitate placement of concrete.

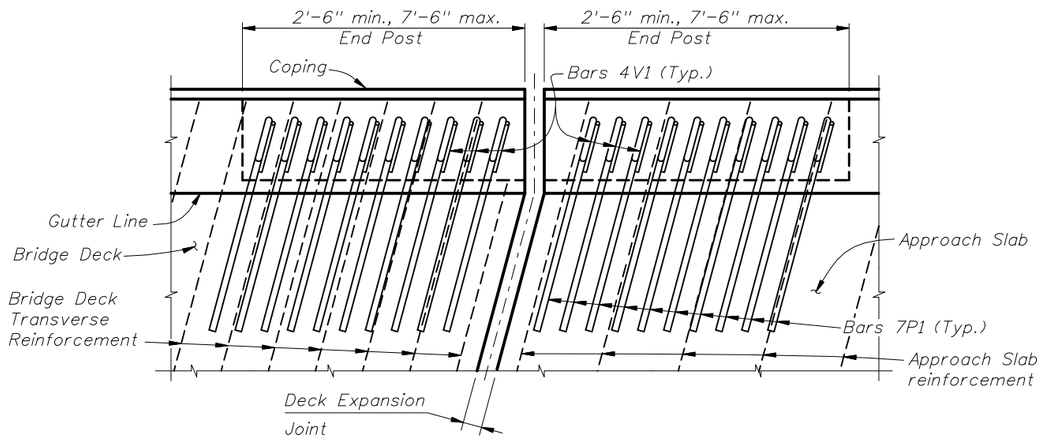
APPROACH SLAB WITH GUARDRAIL ATTACHED (NOT SHOWN):

4) Place Bars 7P1 & 4V1 in obtuse corners of intersection of deck joint and gutter line and Bars 7P3 & 4V1 in acute corners of intersection of deck joint and gutter line as required. Shift deck or slab reinforcement minimally to allow proper placement of Bars 7P & 4V and to facilitate placement of concrete.
5) Begin placing Railing Bars 7P & 4V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 7P & 4V shall be made immediately adjacent to Begin or End Bridge.



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK
- 0 DEGREE SKEW ANGLE

NOTES:
1) Alternate Bars 7P1 with Bars 7P2 and reverse direction of every other Bar 4V1 as detailed above to facilitate placement of concrete.
2) Shift deck transverse reinforcement minimally to allow placement of Bars 7P & 4V.



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB
- SKEW ANGLE 15 DEGREES OR LESS

NOTES:
1) Railing expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.
3) Bars 7P & 4V in the Approach Slab may be rotated to match Approach Slab reinforcement or placed perpendicular or radial to the gutter line.

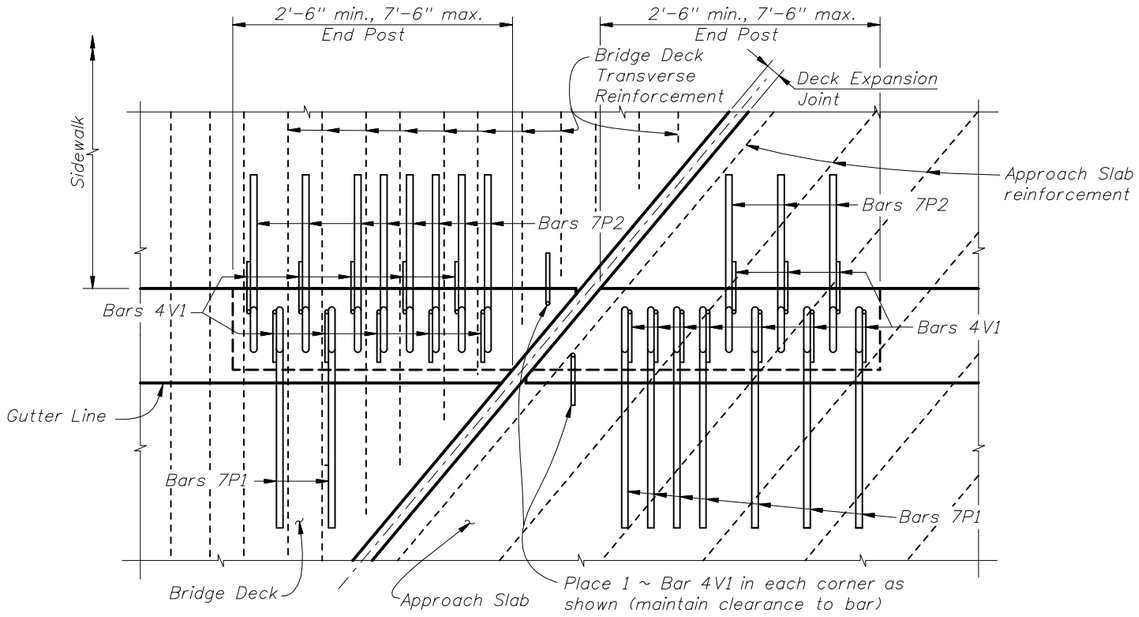
BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (SHOWN):

4) Rotate vertical Bars 7P & 4V to match bridge deck reinforcement. Shift deck & slab transverse reinforcement to allow proper placement of Bars 7P & 4V and to facilitate placement of concrete.

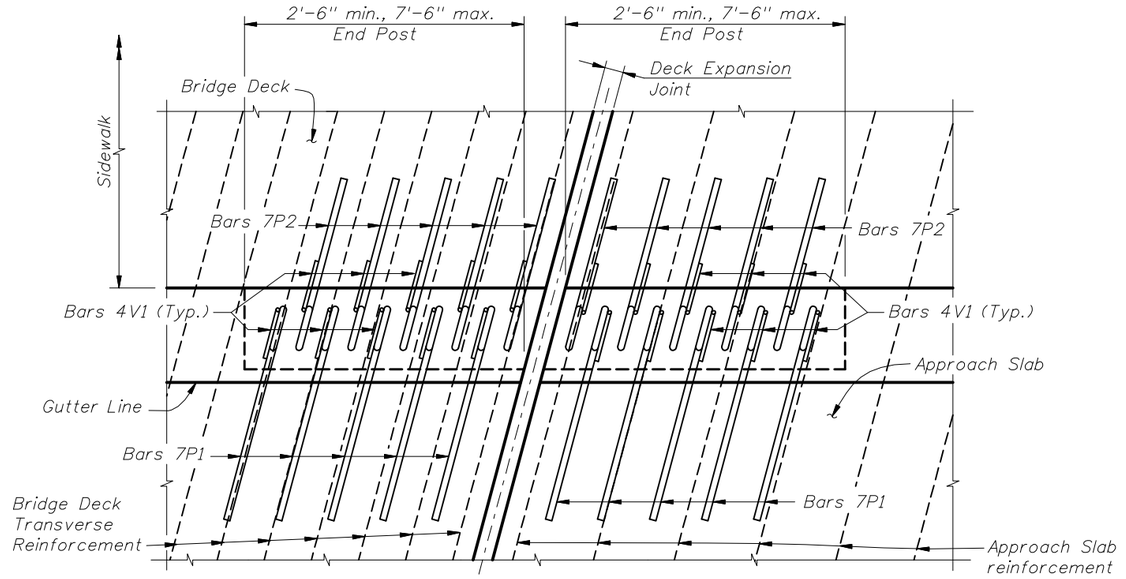
APPROACH SLAB WITH GUARDRAIL ATTACHED (NOT SHOWN):

5) Begin placing Railing Bars 7P & 4V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 7P & 4V shall be made immediately adjacent to Begin or End Bridge.
6) Bars 7P at end of the railing shall be field cut and shifted to maintain clearance, see Railing End Taper Detail Sheet 2 for similar details.

GENERAL NOTES:
1) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at ℄ Pier or Intermediate Bents are similar.
2) Partial Plan Views shown are intended as guides only. See Structures Plans, Superstructure and Approach Slab Sheets for skew angles, joint orientation, dimensions and details.



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK
– SKEW ANGLE GREATER THAN 15 DEGREES

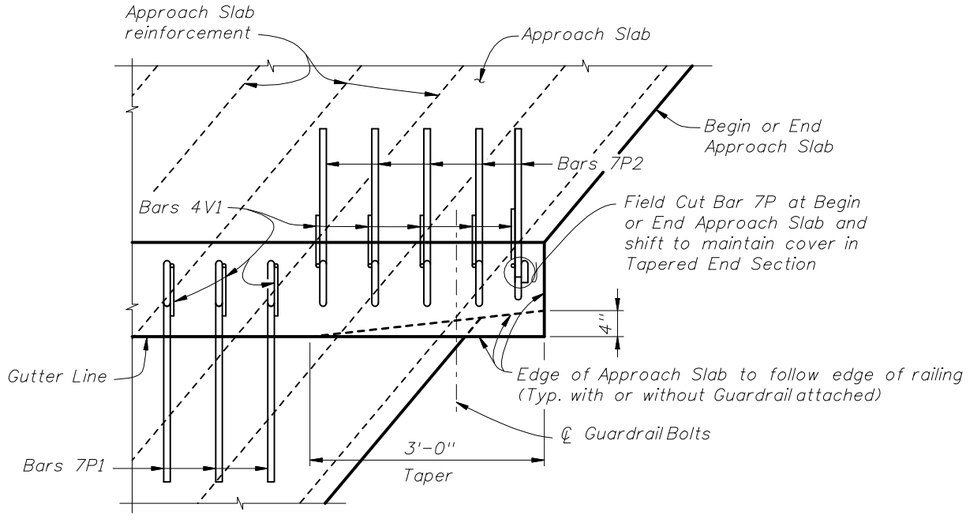


PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK
– SKEW ANGLE 15 DEGREES OR LESS

NOTES:
1) Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. Expansion joint at the inside face of parapet shall be turned perpendicular or radial to this line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.
3) Edge of Approach Slab adjacent to the roadway shall follow end of railing, Bars 7P at end of the railing shall be field cut and shifted to maintain clearance, see detail bottom left this sheet for similar details.

BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (SHOWN):
4) Alternate Bars 7P1 with Bars 7P2 and reverse direction of every other Bar 4V1 to facilitate placement of concrete.
5) Bars 7P & 4V shall be rotated to match bridge deck reinforcement. Shift deck transverse reinforcement minimally to allow placement of Bars 7P & 4V.
6) Railing End Post and reinforcement detailed above. Railing Interior Post reinforcement similar.

APPROACH SLAB WITH GUARDRAIL ATTACHED (NOT SHOWN):
7) Begin placing Railing Bars 7P & 4V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 7P & 4V shall be made immediately adjacent to Begin or End Bridge.

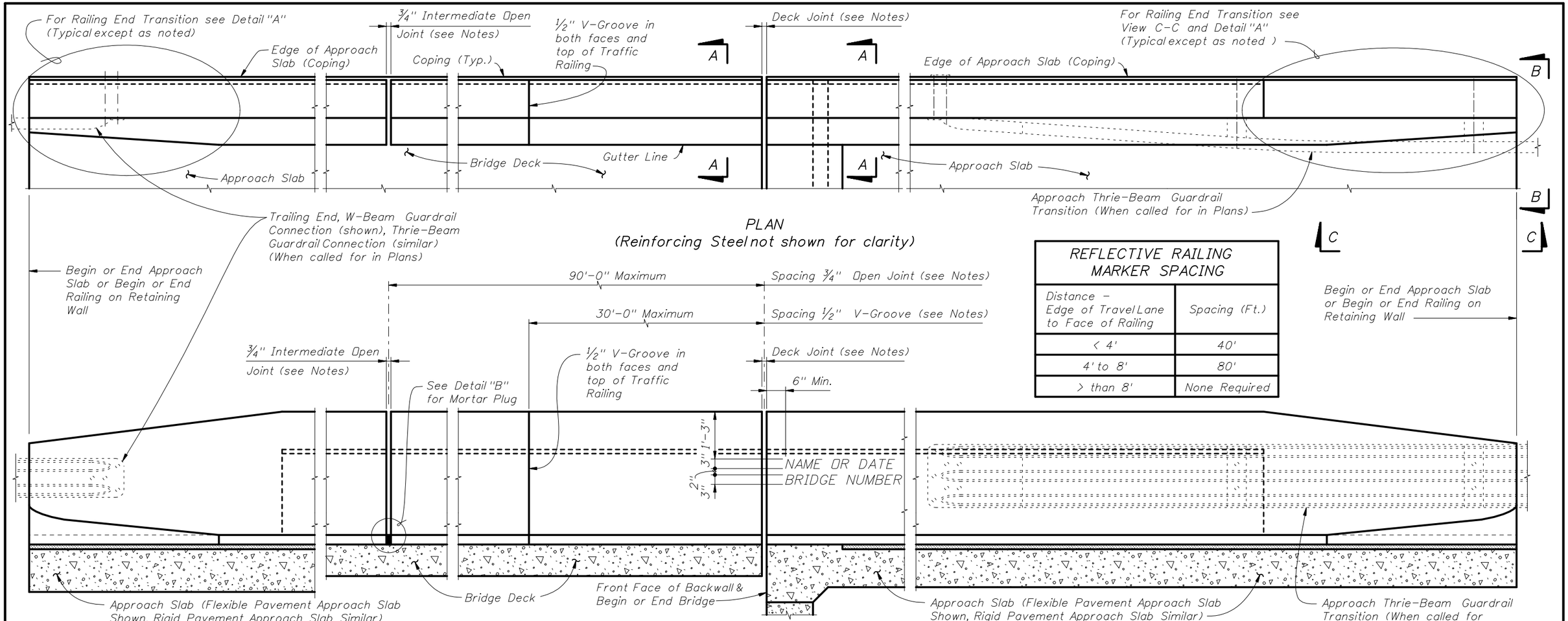


PARTIAL PLAN VIEW AT BEGIN OR END APPROACH SLAB WITH
SIDEWALK AND RAILING WITH GUARDRAIL ATTACHED
– SKEW ANGLE GREATER THAN 15 DEGREES SHOWN, 15 DEGREES OR LESS SIMILAR

NOTES:
1) Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. Expansion joint at the inside face of parapet shall be turned perpendicular or radial to this line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.

BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (NOT SHOWN):
3) Deck transverse reinforcement may be shifted minimally as required to allow proper placement of Bars 7P & 4V and to facilitate placement of concrete. Bars 7P1 & 4V1 or 7P2 & 4V1 shall be used on opposing sides of the joint depending on the direction of the skew, see Detail above. Approach Slab reinforcement may be shifted if conflicts occur.
4) Interior Post – alternate Bars 7P1 with Bars 7P2 and reverse direction of every other Bar 4V1 to facilitate placement of concrete.
5) End Post – alternate Bars 7P1 with Bars 7P2 and reverse direction of Bars 4V1 (as detailed) where possible.

APPROACH SLAB WITH GUARDRAIL ATTACHED (SHOWN):
6) Use Bars 7P2 and reverse direction of Bars 4V1 where skew restricts use of Bars 7P1 & 4P1.
7) Begin placing Railing Bars 7P & 4V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 7P & 4V shall be made immediately adjacent to Begin or End Bridge.



REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)
(Railing on Bridge Deck and Approach Slab shown, Railing on Retaining Wall Similar)

CROSS REFERENCE:
For Section A-A, End View B-B and Detail "A" see Sheet 2.
For Detail "B" see Sheet 3.

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-5 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing.

SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. If an adjoining railing is constructed plumb, transition the end of the Traffic Railing from perpendicular to plumb over a minimum distance of 20'-0". The cost of all modifications will be at the Contractor's expense.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the 3/4" open joints and 1/2" V-groove shall apply.

V-GROOVES : Construct 1/2" V-Grooves plumb,. Space V-Grooves equally between 3/4" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

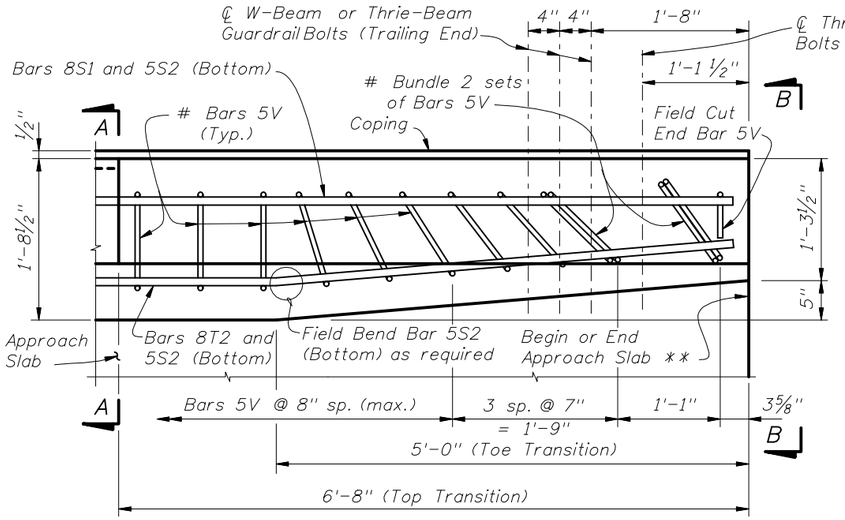
NAME, DATE, AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by 3/16" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

JOINTS : See Structures Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin or End Bridge Shown. Deck Joint at ℄ Pier or Intermediate Bent Similar.

Provide 3/4" Intermediate Open Joints shall be provided at :

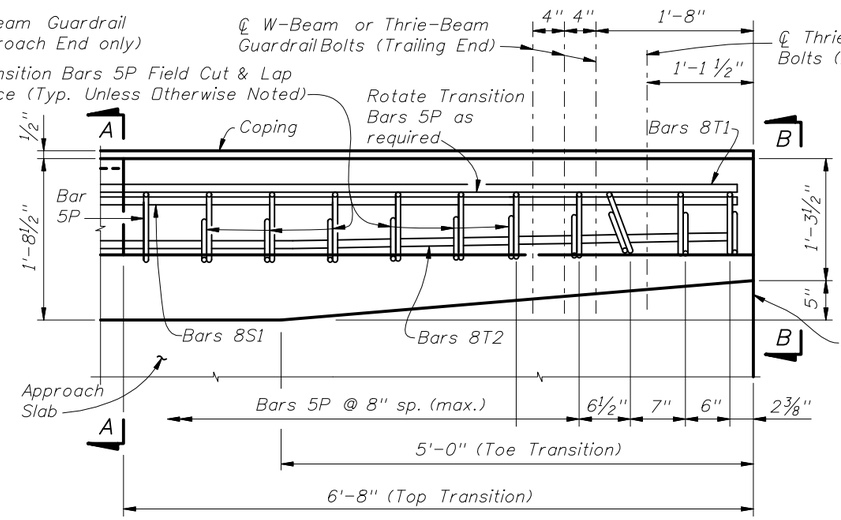
(1) - Substructure supports where superstructure slab is continuous.
(2) - Midspan where span length exceeds 90 ft.
(3) - Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.
(4) - At ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing



PLAN - Railing End Transition
(Showing Bars 5V, 8S1, 5S2 and 8T2)

Rotate Bars 5V as shown to maintain clearance.



PLAN - Railing End Transition
(Showing Transition Bars 5P and Bars 8S1, 8T1 & 8T2)

NOTE:
Begin placing Railing Bars 5P and 5V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5P and 5V (see Detail "A") as required to maintain cover in Railing End Transition.

** See joint orientation note on Sheet 1.

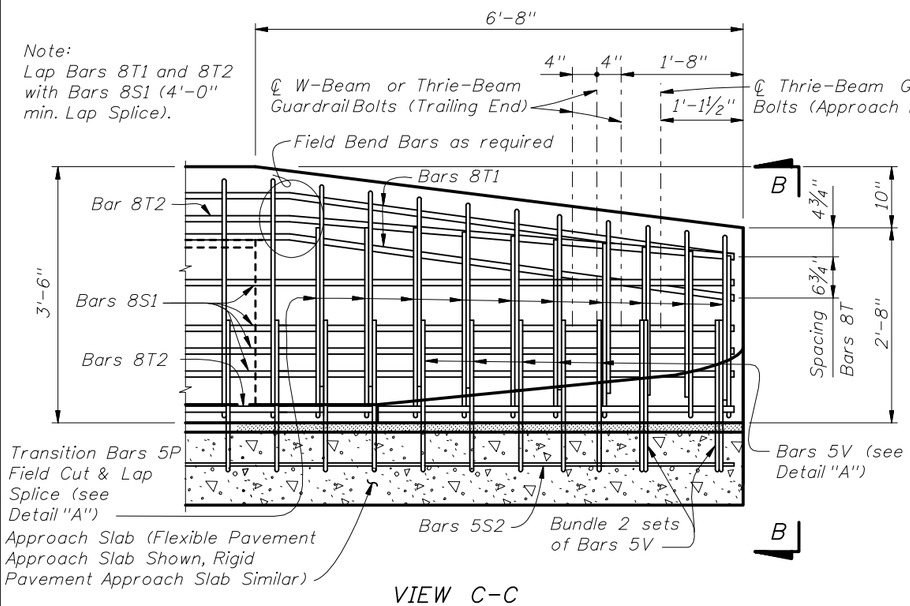
INSTRUCTION TO DESIGNER:

For Bridge Decks up to a maximum thickness of 11", the two Bars 5S2 placed in the Bridge Deck may substitute for the longitudinal deck steel located within the limits of Bars 5V, provided that the total area of longitudinal deck steel beneath the railing, as required by calculation, is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.

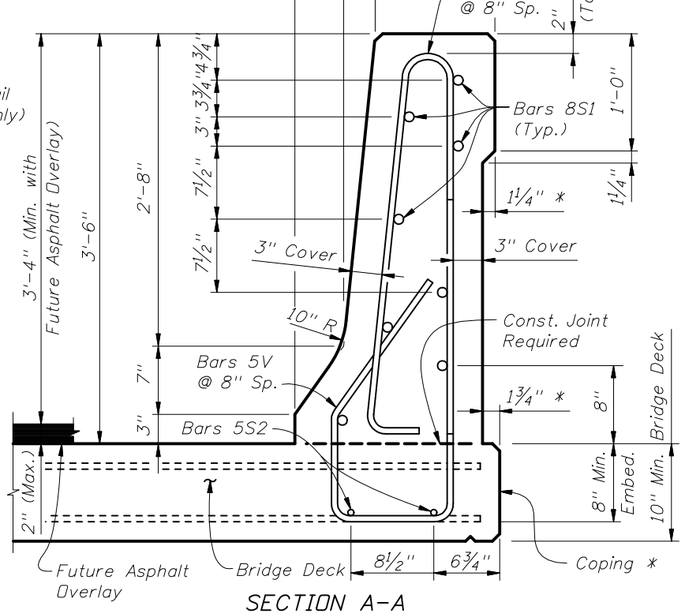
All Bars 5P, 5S and 5V as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5P, 5S and 5V in the reinforcing bar lists and estimated quantities for supporting bridge decks, approach slabs or retaining walls.

DETAIL "A"

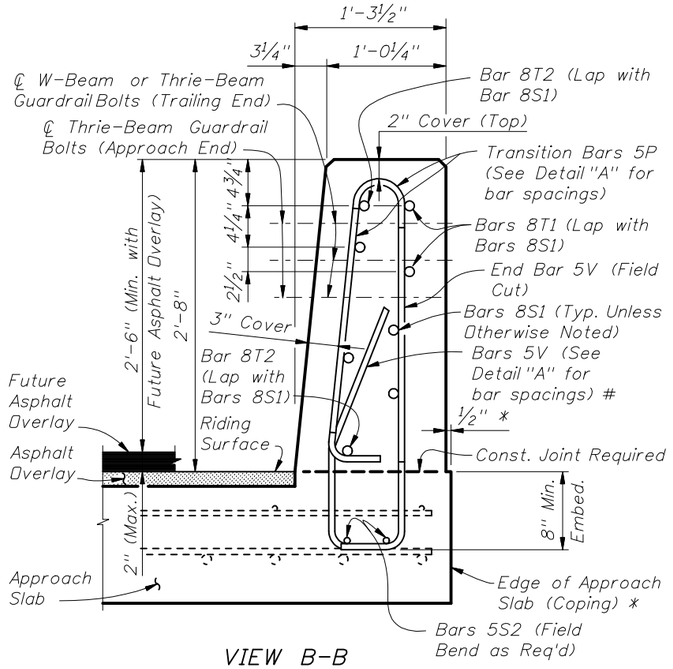
* Where railings of adjacent bridges are to be built back to back, the outside vertical plane of the railing and deck may coincide along a plane centered 1'-8½" from each gutter line. A bond breaker will be required. See Structures Plans, Superstructure Sheets for Details.



VIEW C-C
ELEVATION - RAILING END TRANSITION
(Guardrail and back leg of Stirrups not shown for clarity)



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(SECTION THRU BRIDGE DECK SHOWN -
SECTION THRU APPROACH SLAB SIMILAR)



VIEW B-B
(Section thru Approach Slab shown,
Section thru Retaining Walls similar)

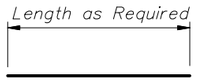
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/07	Sheet No. 2 of 3
	TRAFFIC RAILING - (42" F SHAPE)		Index No. 425

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

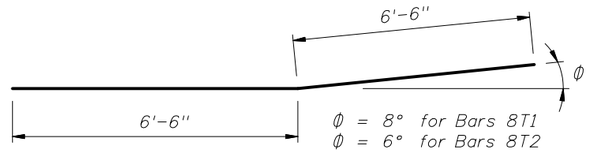
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	7'-5"
S1	8	As Reqd.
S2	5	As Reqd.
T1 & T2	8	13'-0"
V	5	6'-2"

ROADWAY CROSS-SLOPE	LOW GUTTER		HIGH GUTTER	
	ϕA	ϕB	ϕA	ϕB
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	87°	93°
6% to 10%	96°	84°	84°	96°

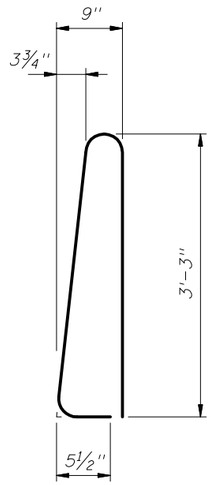
ϕA and ϕB shall be 90° if Contractor elects to place Railing perpendicular to the Deck.



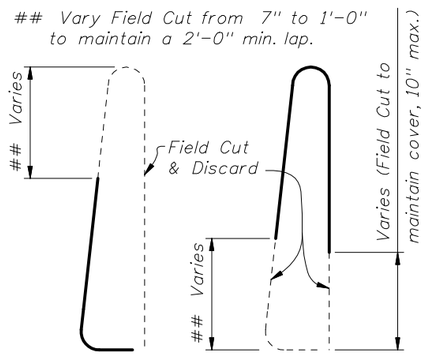
BARS 8S1 & 5S2



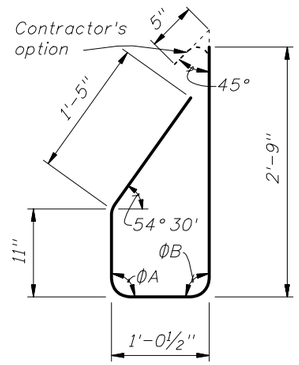
TRANSITION BARS 8T1 & 8T2
(2 of each required per Railing End Transition)



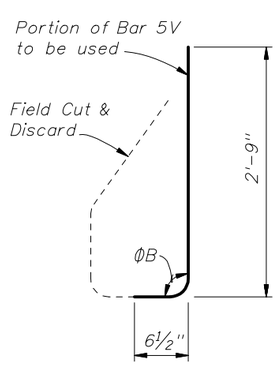
STIRRUP BAR 5P



TRANSITION STIRRUP BARS 5P
To Be Field Cut (10 of each required per Railing End Transition)

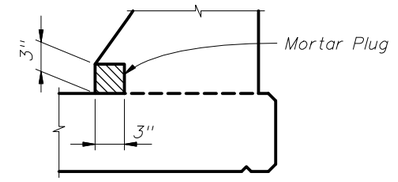


STIRRUP BAR 5V



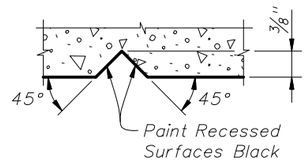
END STIRRUP BAR 5V
To Be Field Cut
(One required per Railing End Transition)

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the railing on a retaining wall shall be the same as detailed above for a 10" deck with ϕA = ϕB = 90°.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 8S1 may be continuous or spliced at the construction joints. Lap splices for Bars 8S1 and 5S2 shall be a minimum of 4'-0" and 2'-0", respectively.
5. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "B" – SECTION
AT INTERMEDIATE OPEN JOINT

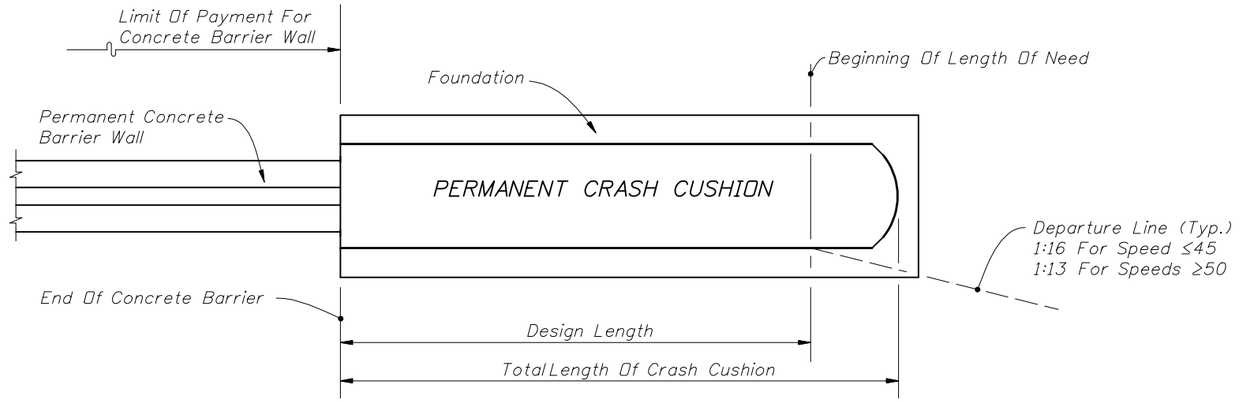
NOTE:
At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.



SECTION THRU RECESSED
"V" GROOVE TO FORM INSCRIBED
LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.154
Reinforcing Steel	LB/LF	44.71

Note:
The estimated railing quantities are based on a 2% deck cross slope; railing on low side of deck.



DESIGN NOTES - CONCRETE BARRIER WALL APPLICATION

1. Design length is the length from the beginning of length of need to the end of the crash cushion.
2. Determine length of need for barrier as detailed on Index 400.
3. Establish the end of barrier based on design length of shortest Crash Cushion option for given design speed.
4. Determine that adequate space is available for construction of all options for given design speed. If adequate space is not available, options must be limited to those that will fit. Tabulate selected options in the plans by location and design speed.

GENERAL NOTES FOR OPTIONAL CRASH CUSHIONS

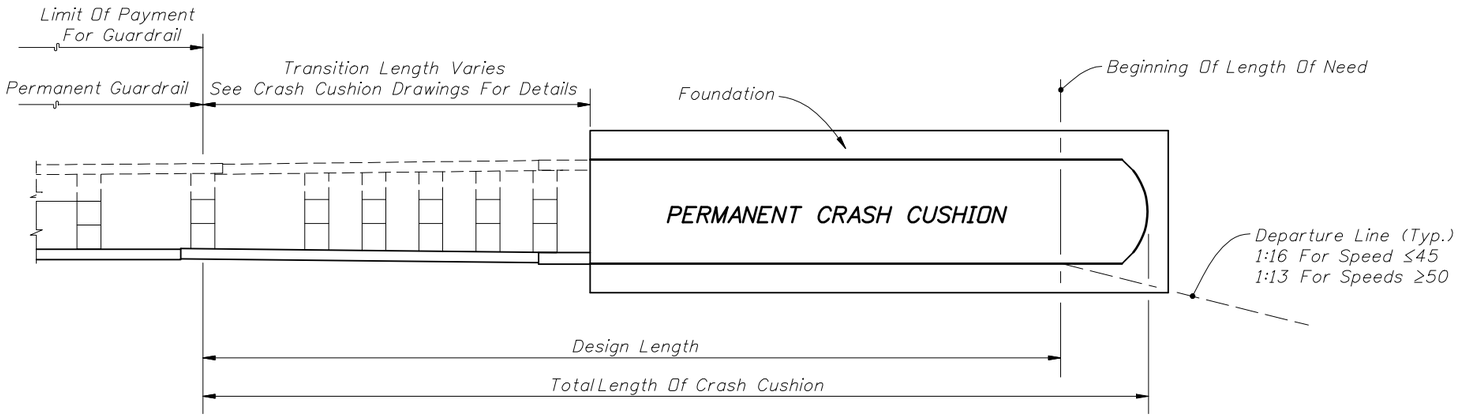
1. Crash Cushions for which the optional item may be used are limited to the systems identified on this index. The Contractor may only use the options identified in the plans.
2. This Index is applicable for permanent installations that shield the ends of Concrete Barrier Walls or Guardrails only.
3. For Crash Cushion details, see drawings posted on Qualified Products List (QPL) web page.
4. For other Crash Cushion applications, see the approved QPL drawings.
5. Crash Cushions shall be assembled and installed in accordance with the manufacturer's specifications and any limiting conditions noted on the approved QPL drawings.
6. Transition Panels may be required from Concrete Barriers to Crash Cushions subject to reverse direction hits; see the Crash Cushion drawings posted on the QPL for details. Transitions are required between the Crash Cushion and guardrail and vary in length depending on the Crash Cushion used; see the Crash Cushion drawings for details.

   The cost of the transition(s) is to be included in the cost of the Crash Cushion.
7. Optional Crash Cushions will be paid for under the contract unit price for Vehicular Impact Attenuator/Crash Cushion (optional) EA, and shall be full compensation for furnishing and installing all components in accordance with the plans; the manufacturer's detail drawings, procedures and specifications; the drawings posted on the QPL and this Index.

CONCRETE BARRIER WALL APPLICATION

Design Speed	System	Design Length (Ft.)	Total Length Of Crash Cushion (Ft.)
30	QuadGuard	6.71	9.98
	TAU 11	4.61	8.35
	SHORTRACC	14.11	15.06
35	QuadGuard	6.71	9.98
	TAU 11	7.45	11.19
	SHORTRACC	14.11	15.06
40	QuadGuard	6.71	9.98
	TAU 11	10.30	14.04
	SHORTRACC	14.11	15.06
45	QuadGuard	9.55	12.83
	TAU 11	10.30	14.04
	SHORTRACC	14.11	15.06
50	QuadGuard	12.55	15.83
	TAU 11	13.14	16.88
	TRACC	21.00	21.98
55	QuadGuard	15.65	18.93
	TAU 11	18.82	22.56
	TRACC	21.00	21.98
60	QuadGuard	18.62	21.90
	TAU 11	21.67	25.41
	TRACC	21.00	21.98
65	QuadGuard	21.60	24.87
	QuadGuard HS	24.58	29.16
	TAU 11	24.52	28.26
	FASTRACC	26.00	26.98
70	QuadGuard	27.55	30.83
	QuadGuard HS	24.58	29.16
	TAU 11	27.36	31.10
	FASTRACC	26.00	26.98

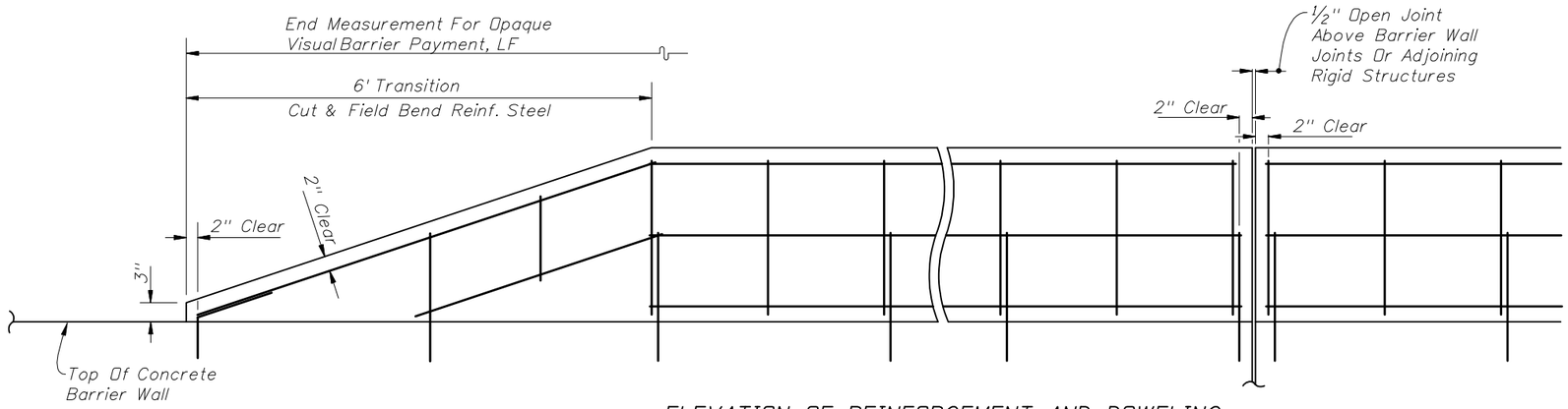
NOTE:
Total length of Crash Cushion for the TAU II units is based on use of the Compact Backstop. When the PCB Backstop is used, these lengths are reduced by 1.67 ft.



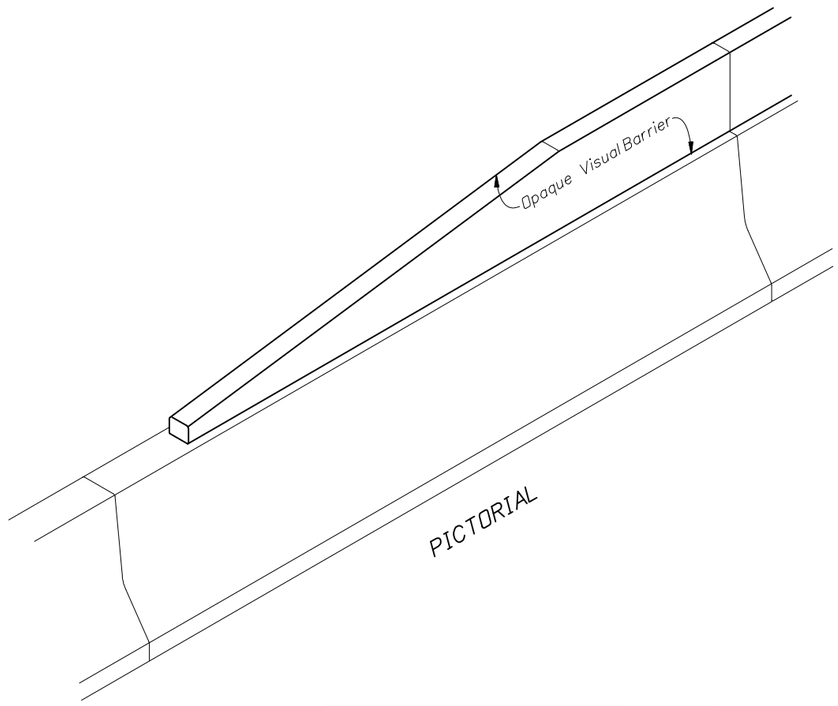
GUARDRAIL APPLICATION			
Design Speed	System	Design Length (Ft.)	Total Length Of Crash Cushion (Ft.)
30	QuadGuard	26.29	29.56
	TAU II	18.36	22.10
	SHORTRACC	26.70	27.65
35	QuadGuard	26.29	29.56
	TAU II	21.20	24.94
	SHORTRACC	26.70	27.65
40	QuadGuard	26.29	29.56
	TAU II	24.05	27.79
	SHORTRACC	26.70	27.65
45	QuadGuard	29.13	32.41
	TAU II	24.05	27.79
	SHORTRACC	26.70	27.65
50	QuadGuard	32.13	35.41
	TAU II	26.89	30.63
	TRACC	33.59	34.57
55	QuadGuard	35.23	38.51
	TAU II	32.57	36.31
	TRACC	33.59	34.57
60	QuadGuard	38.20	41.48
	TAU II	35.42	39.16
	TRACC	33.59	34.57
65	QuadGuard	41.18	44.45
	QuadGuard HS	44.16	48.74
	TAU II	38.27	42.01
	FASTRACC	38.59	39.57
70	QuadGuard	47.13	50.41
	QuadGuard HS	44.16	48.74
	TAU II	41.11	44.85
	FASTRACC	38.59	39.57

DESIGN NOTES - GUARDRAIL APPLICATION

1. Design length is the length from the beginning of length of need to the end of the transition section.
2. Determine length of need for barrier as detailed on Index 400.
3. Establish the end of the guardrail based on design length of shortest Crash Cushion option for given design speed.
4. Determine that adequate space is available for construction of all options for given design speed. If adequate space is not available, options must be limited to those that will fit. Tabulate selected options in the plans by location and design speed.

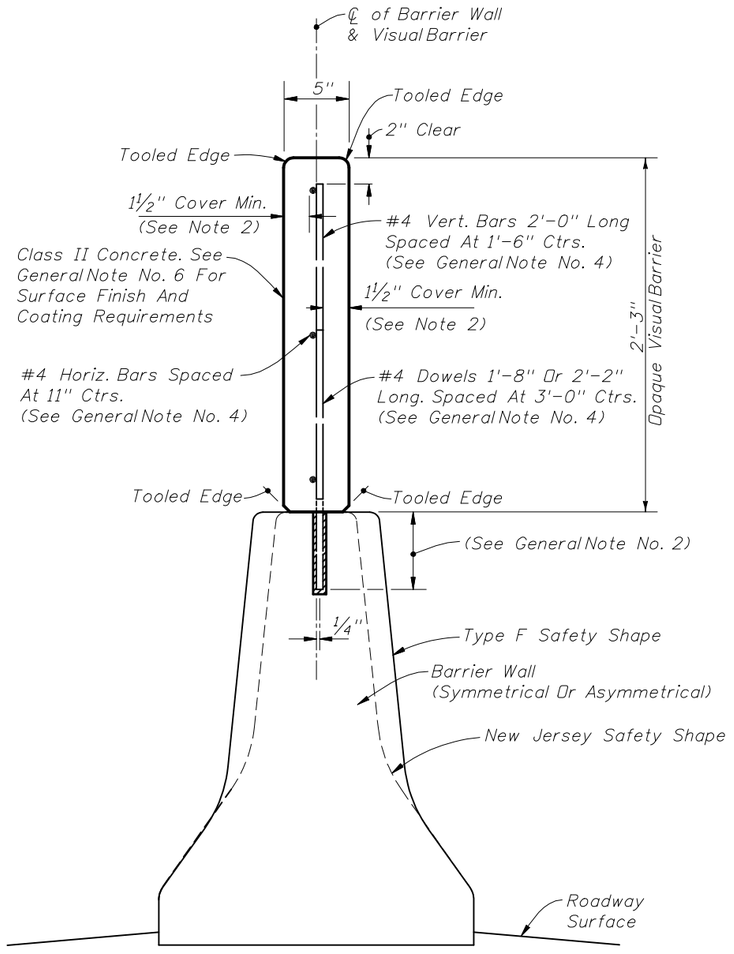


ELEVATION OF REINFORCEMENT AND DOWELING



PICTORIAL

ESTIMATED QUANTITIES, LF	
Concrete	0.042 CY
Reinforcing Steel	3.27 Lbs.*
*3.38 Lbs. With 2'-2" Dowels	



END VIEW

GENERAL NOTES

1. The opaque visual barrier is intended to function as a visual screen, and is not intended to resist vehicle impact loads nor to restrain, contain or restrict vehicles or cargo. The barrier is designed to withstand zone wind loading and strikes by light debris; and, designed to yield to exceptional strikes by vehicles or cargo, and to contain ruptured segments of the screen when yielding to such strikes.

2. When the opaque visual barrier is constructed on an existing barrier wall, dowels shall be 1'-8" in length, embedded 6" into the barrier wall and set with an approved chemical grout. Embedment holes shall be ⅝" diameter, drilled to a depth ¼" below the tip of the dowel unless greater depth is required to accept manufactured grout capsules.

   When the opaque visual barrier is constructed in conjunction with project concrete barrier walls, dowels may be set as described above, in either the drilled or preformed holes; or, placed when the barrier wall is cast. For dowels that are placed when the wall is cast, the dowel shall be 2'-2" in length and embedded to a depth of 12".

   When longitudinal reinforcing bars are encountered in the stem of existing barrier, shift the dowels to clear, maintaining the 1½" Cover Minimum to the face of the Opaque Visual Barrier.

3. For both double and single faced concrete barrier walls the opaque visual barrier is to be located in the center of the top of the wall.

   For single faced barrier walls that are constructed around other vertical structures, the opaque visual barrier shall follow the alignments of only one of the walls and be centered atop that wall.

   For dual median barrier walls that follow differential profiles, the opaque visual barrier shall be constructed atop the wall with the higher elevation, unless conditions dictate otherwise. Lateral transitions or end overlaps for opaque visual barriers that alternate between dual walls shall be detailed in the plans.

   For median barrier walls that are divided when connecting to separated bridges, the opaque visual barrier shall be constructed atop the approach side barrier wall, unless differential profiles dictate locating the opaque visual barrier on the departure side barrier wall.

   Opaque visual barriers to be located on capped fills between dual barrier walls shall be detailed in the plans.

4. In lieu of the reinforcement shown, the Contractor may substitute welded wire fabric equal to or better than that shown, when approved by the Engineer. Details shall be submitted with requests for substitution.

5. The Contractor may construct contiguous precast concrete panels in lieu of the cast-in-place opaque screen when approved by the Engineer. Panel design and method for anchorage to the barrier wall shall be detailed by shop drawings when requesting the Engineer's approval.

   The Contractor may construct the opaque screen monolithically with the barrier wall; however, the screen design shall not be modified so as to cause the wall to be dynamically active from strikes on the screen; see design considerations in Note No. 1 above.

6. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Standard Specification, unless another finish is called for in the plans. The surfaces shall have a Class 5 Applied Finish Coating in accordance with Section 400 only when called for in the plans.

7. Payment for opaque visual barrier shall be full compensation for concrete, reinforcement, dowels, casting, placement, drilling, grouting, tooling, finishing and work incidental thereto, and shall be paid for under the contract unit price for Opaque Visual Barrier (Concrete) (2'-3" Height), LF.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

OPAQUE VISUAL BARRIER

Last Revision	Sheet No.
07/01/07	1 of 1

Index No. 461

TRAFFIC RAILING NOTES

This Traffic Railing Retrofit has been structurally evaluated to be equivalent or greater in strength to a design which has been successfully crash tested in accordance with NCHRP Report 350 TL-4 criteria.

CONCRETE: Concrete for Transition Blocks and Curbs shall be Class II (Bridge Deck).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60.

THRIE-BEAM GUARDRAIL: Steel Thrie-Beam Elements shall meet the requirements for Class B (10 Gauge) Guardrail of AASHTO M 180, Type II (Zinc coated). The minimum panel length for Thrie-Beam Elements shall be 12'-6". Field drilled holes for Post connections shall be ¾" by 2½" slotted holes.

GUARDRAIL BOLTS: Guardrail bolts, nuts and washers shall be in accordance with AASHTO M180.

GUARDRAIL POSTS AND BASE PLATES: Posts and Base Plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

ANCHOR BOLTS, NUTS AND WASHERS: Adhesive-Bonded Anchors and Anchor Bolts shall be fully threaded rods in accordance with ASTM F1554 Grade 105 or ASTM A193 Grade B7. At the Contractor's option, Anchor Bolts for through bolting may be in accordance with ASTM 449. All Nuts shall be single self-locking hex nuts and in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM F436 and Plate Washers (for long slotted holes only) shall be in accordance with ASTM A36 or ASTM A709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and the exposed trimmed ends of anchors shall be coated with a galvanizing compound in accordance with the Specifications.

COATINGS: All Nuts, Bolts, Anchors, Washers, Guardrail Posts, Anchor Plates and Base Plates shall be hot-dip galvanized in accordance with the Specifications. Guardrail Post Assemblies shall be hot-dip galvanized after fabrication.

ADHESIVE-BONDED ANCHORS AND DOWELS: Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416. The field testing proof loads required by Specification Section 416 shall be 15,000 lbs. for ⅞" Ø anchor bolts; 55,000 lbs. for the 1¼" anchor bolts with 13" embedment; and 30,500 lbs. for the 1¼" Ø anchor bolts with 5" embedment.

BRIDGES ON CURVED ALIGNMENTS: The details presented in these Standards are shown for bridges on tangent alignments. Details for bridges on horizontally curved alignments are similar.

POST SPACING: Posts shall be located along the length of the bridge at typical 6'-3" or 3'-1 ½" spaces. Utilize the Modified Post Spacing at Intermediate Deck Joints Details as required to clear deck joints. Establish post spacing along the bridge and Roadway Guardrail Transition beginning with the Key Post. The variable post spacings located near begin and end bridge may be utilized to optimize the typical post spacing. Variable lengths of guardrail overlap are also permitted to optimize the typical post spacing. Symmetry of post spacing is not necessary.

THRIE-BEAM EXPANSION SECTION: Thrie-Beam Expansion Sections shall be installed at locations shown in the Plans. Install nuts for splice bolts finger-tight at 2½" slots in thrie beam expansion sections. Nuts shall fully engage bolts with a minimum of one bolt thread extending beyond the nuts. Distort the first thread on the outside of the nut to prevent loosening. Tighten guardrail bolts in 3¾" slots at guardrail post(s) that lie between the slotted expansion splice and bridge deck joint so that the bolt heads are in full contact with thrie-beam elements, but not so tight as to impede movement due to expansion.

NEOPRENE PADS: Neoprene pads must be plain pads with a durometer hardness of 60 or 70 and meet the requirements of Specification Section 932, except that testing of the finished pad will not be required.

ELEVATION MARKERS: Elevation Markers shall be placed on the top surface of the end bents as directed by the Engineer when portions of the existing traffic railing carrying existing elevation markers are removed. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor.

REFLECTIVE RAILING MARKERS: Reflective Railing Markers shall conform to Section 993 of the Specifications. Install markers in the upper groove of the Thrie Beam Guardrail at the spacings shown in the table below. Reflector color (white or yellow) shall conform to the color of the near edgeline.

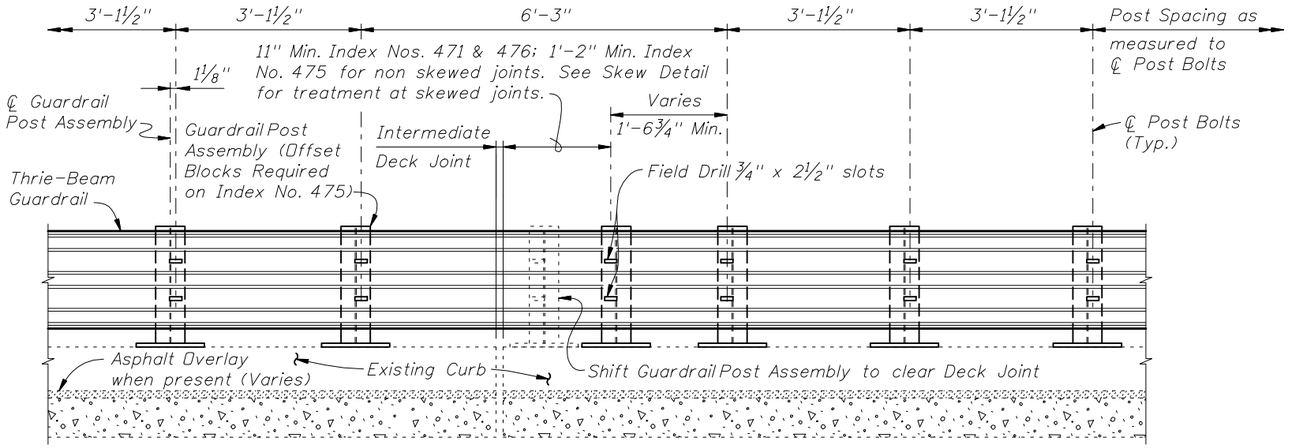
PEDESTRIAN SAFETY PIPE RAIL: Pedestrian Safety Pipe Rail is required when called for in the Plans. See Index No. 400 for details.

BRIDGE NAME PLATE: If a portion of the existing Traffic Railing is to be removed that carries the bridge name, number and or date, or if the installation of the Traffic Railing (Thrie Beam Retrofit) will obscure the bridge name, number and or date, then replace the information that has been removed or obscured, with 3" tall black lettering on white nonreflective sheeting applied to the top of the adjacent guardrail. The information must be clearly visible from the right side of the approaching travel lane. The sheeting and adhesive backing shall comply with Specification Section 994 and may comprise of individual decals of letters and numbers.

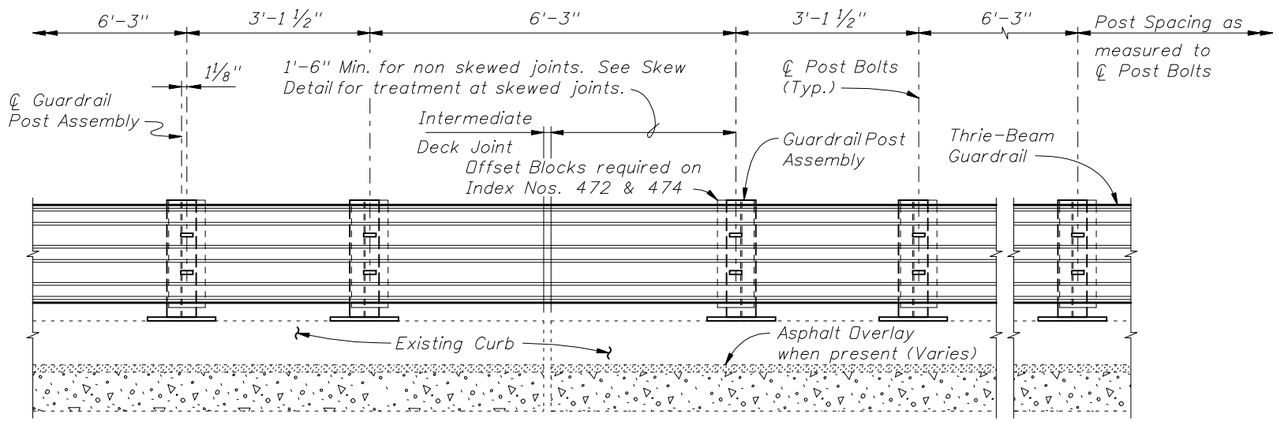
PAYMENT: Payment will be made under Metal Traffic Railing (Thrie-Beam Retrofit) which shall include all materials and labor required to fabricate and install the barrier and lapped guardrail where necessary to maintain post spacing. The Pedestrian Safety Pipe Rail, Transition Blocks and Curbs, Bridge Name Plate, Reflective Railing Markers and installation of Elevation Markers, where required, will not be paid for directly but shall be considered as incidental work.

REFLECTIVE RAILING MARKER SPACING

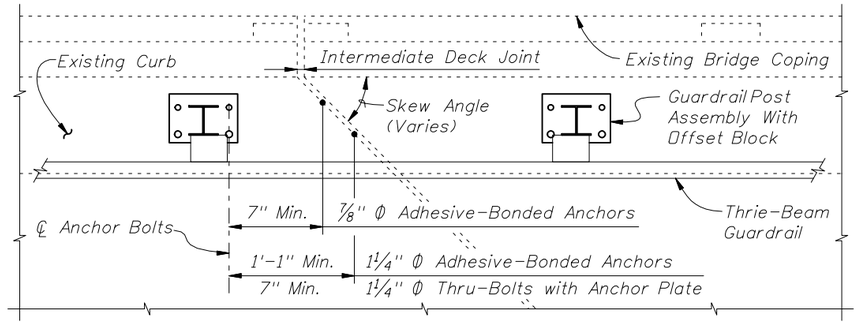
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required



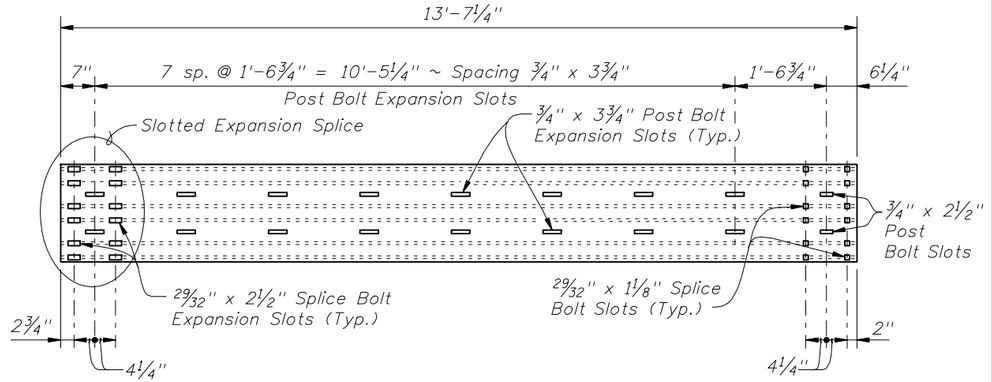
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
MODIFIED POST SPACING AT INTERMEDIATE DECK JOINTS DETAIL FOR INDEX NOS. 471, 475 & 476



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
MODIFIED POST SPACING AT INTERMEDIATE DECK JOINTS DETAIL FOR INDEX NOS. 472, 473 & 474



PARTIAL PLAN
INTERMEDIATE JOINT SKEW DETAIL

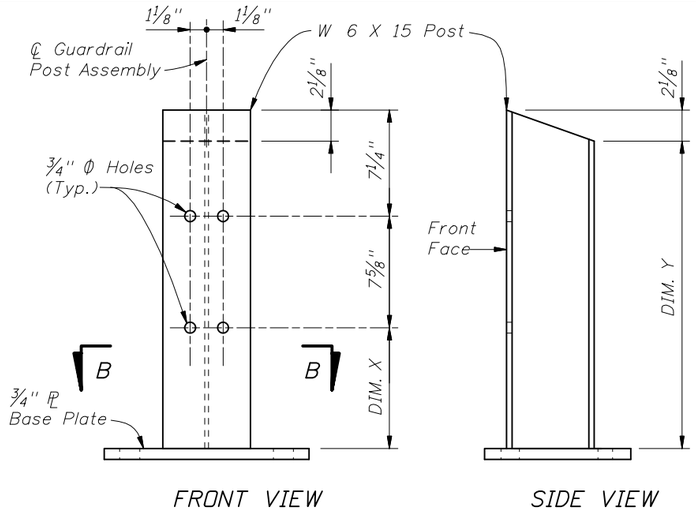


THRIE-BEAM EXPANSION SECTION

2010 FDOT Design Standards

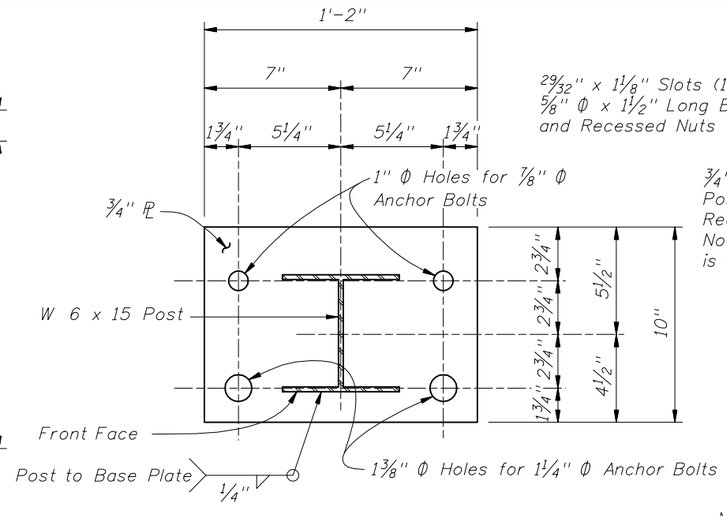
TRAFFIC RAILING - (THRIE-BEAM RETROFIT) GENERAL NOTES & DETAILS

Last Revision	Sheet No.
01/01/08	2 of 3
Index No.	
470	



FRONT VIEW

SIDE VIEW

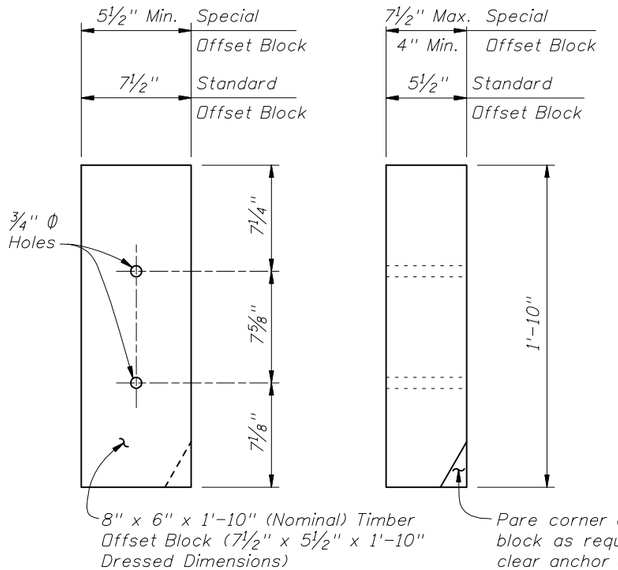


SECTION B-B

POST DIMENSION TABLE			
POST	CURB HEIGHT (DIM. A)	DIM. X	DIM. Y
Post "A"	5" to 7"	11¼"	2'-0"
Post "B"	> 7" to 10"	9¼"	1'-10"
Post "C"	> 10" to 1'-0"	7¼"	1'-8"

Note: DIM. A is equal to the exposed curb height. For location of DIM. A see Index Nos. 471 thru 476, Sheet 1.

GUARDRAIL POST ASSEMBLY DETAIL



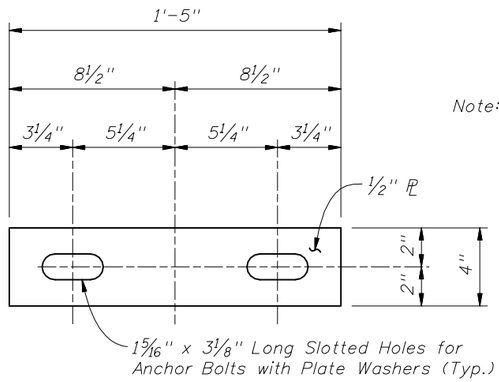
FRONT VIEW

SIDE VIEW

OFFSET BLOCK NOTES:

1. Offset blocks shall be timber or Approved Alternate. Uniformity of block size and alignment of guardrail shall be maintained along length of retrofit.
2. Post bolt holes in offset blocks to be centered (± ¼").
3. Timber offset blocks shall be dressed on all four sides (S4S).
4. Block assemblies for Special Offset Blocks can be made up of 2 or 3 Special or Standard Offset Blocks, field dressed as required.

OFFSET BLOCK DETAIL



ANCHOR PLATE DETAIL

Note: The Anchor Plate and Plate Washer are applicable only to 1¼" Ø Anchor Bolts that are to be thru-bolted for Index Nos. 471 & 476.

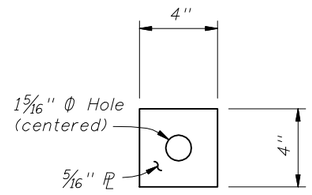
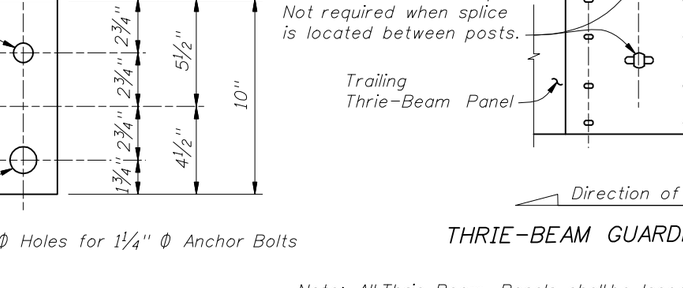
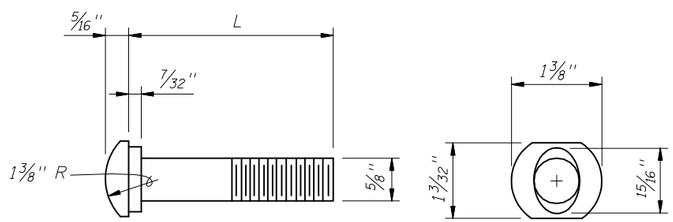


PLATE WASHER DETAIL



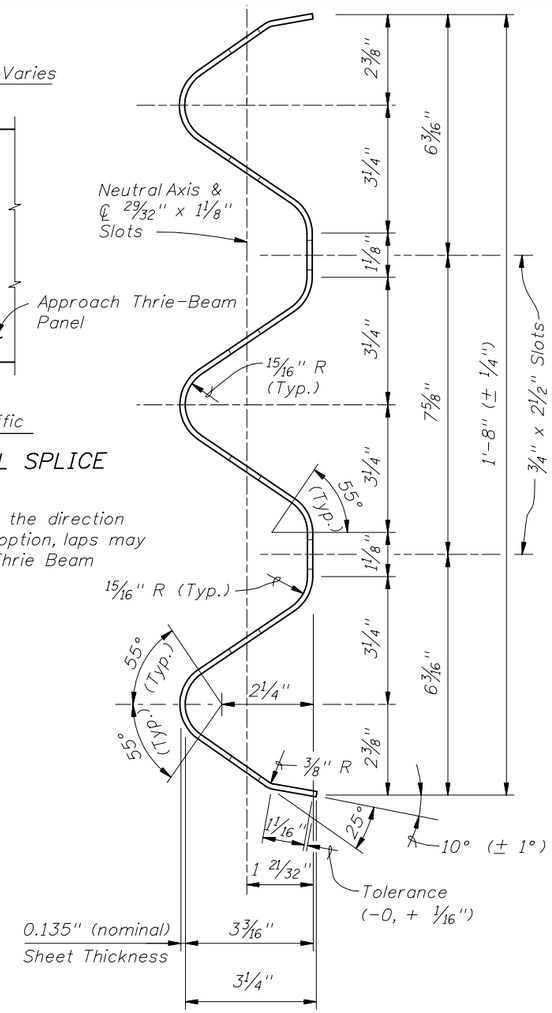
THRIE-BEAM GUARDRAIL SPLICE

Note: All Thrie Beam Panels shall be lapped in the direction of adjacent traffic. At the Contractor's option, laps may be extended. Field drill holes in Trailing Thrie Beam Guardrail Panel as required.

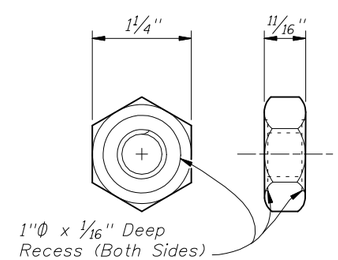


⅝" OVAL SHOULDER BUTTON HEAD BOLT

L	THREAD LENGTH	APPLICATION
1½"	Full Length	Rail Splice Bolt, Post Bolt for Index Nos. 471, 473 & 476
Varies (8" Min.)	4" Min.	Post Bolt for Index Nos. 472, 473, 474, 475 & 476



TYPICAL SECTION THRU THRIE-BEAM GUARDRAIL (EXPANSION SECTION SIMILAR)



⅝" MODIFIED HEAVY HEX NUT (RECESSED NUT)

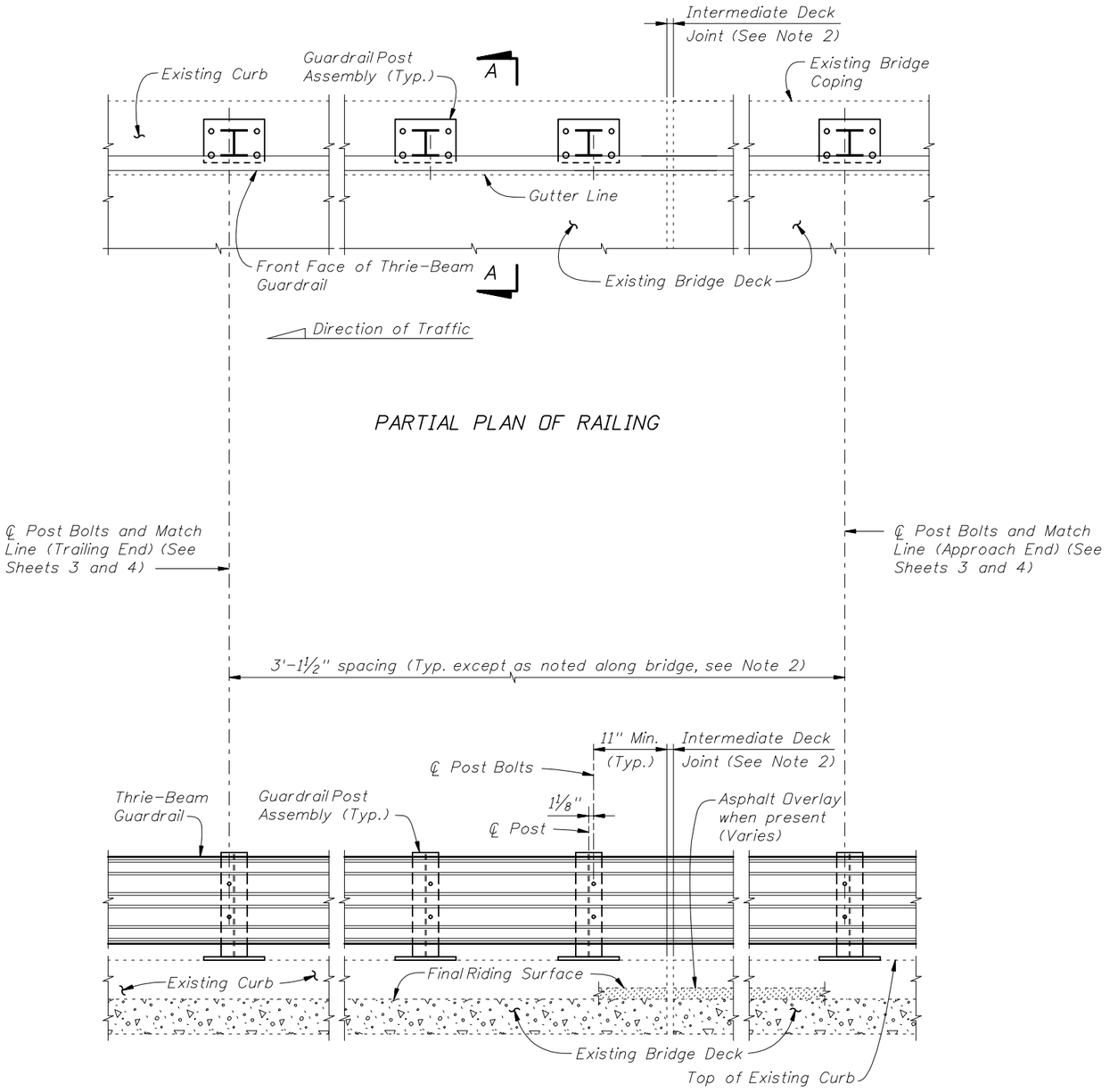
2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) GENERAL NOTES & DETAILS

Last Revision 01/01/08

Sheet No. 3 of 3

Index No. 470



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

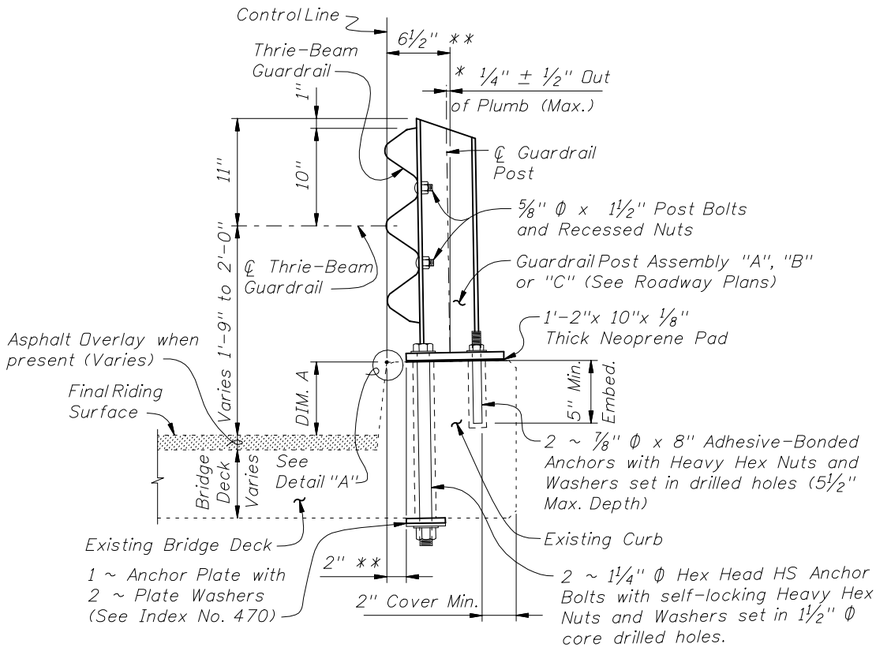
1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be removed off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.

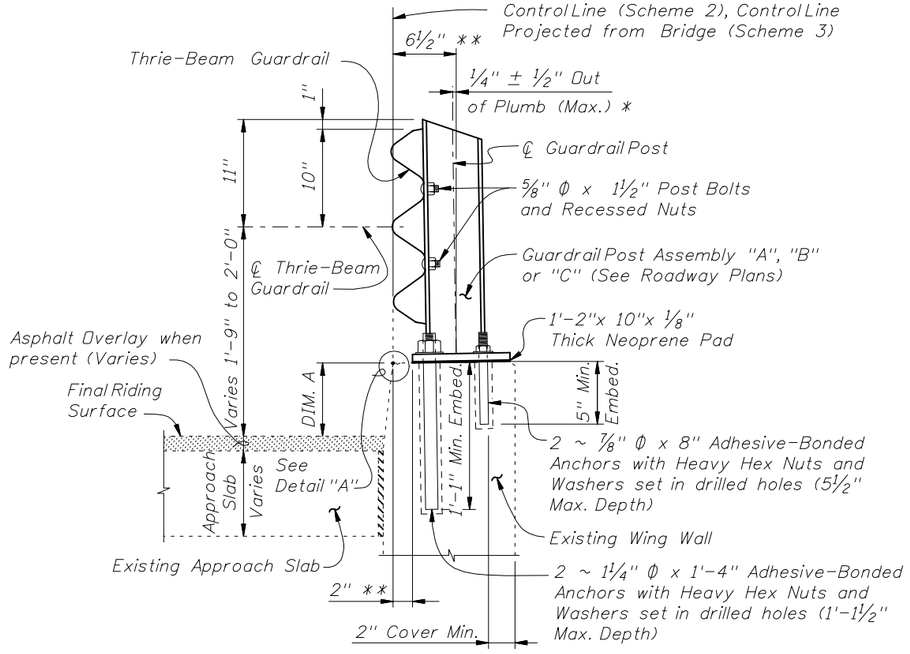
2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) NARROW CURB

Last Revision	Sheet No.
01/01/08	1 of 4
Index No.	
471	

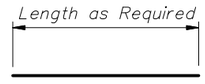


SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



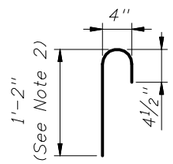
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEME 2 SHOWN, SCHEME 3 SIMILAR)

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
A	4	AS REQUIRED
D	4	1'-11"
L	4	4'-1"

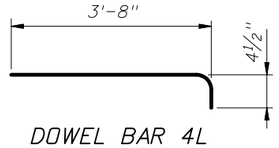


BAR 4A

BAR BENDING DIAGRAMS



Dowel Bar 4D
(Standard 180° Hook)

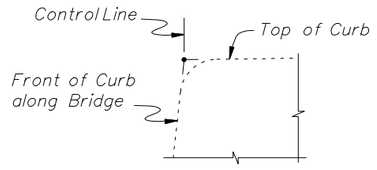


DOWEL BAR 4L

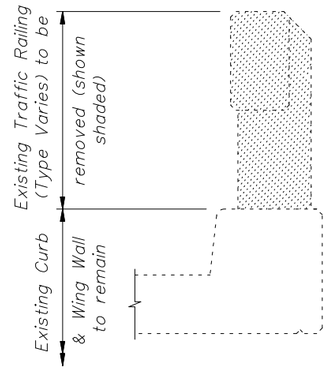
NOTES:
1. All bar dimensions are out to out.
2. The 1'-2" vertical dimension shown for Bar 4D is based on a curb height of 9". If curb height is less or more than 9", decrease or increase this dimension by an amount equal to the difference in curb height.

*Shim with washers around Anchors as required to maintain tolerance.

**Offset may vary ± 1" for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

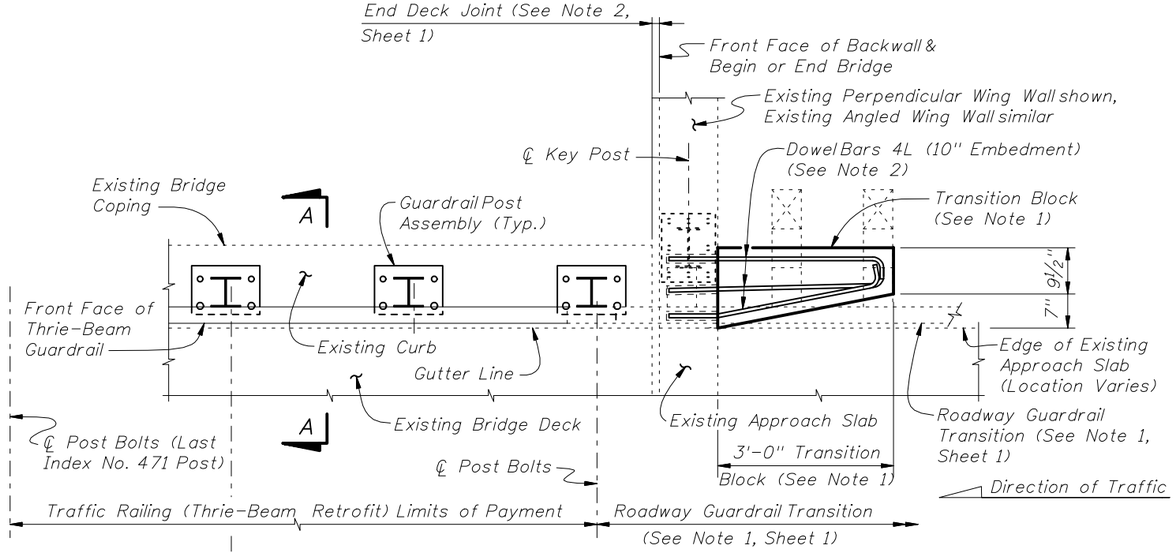


DETAIL "A"

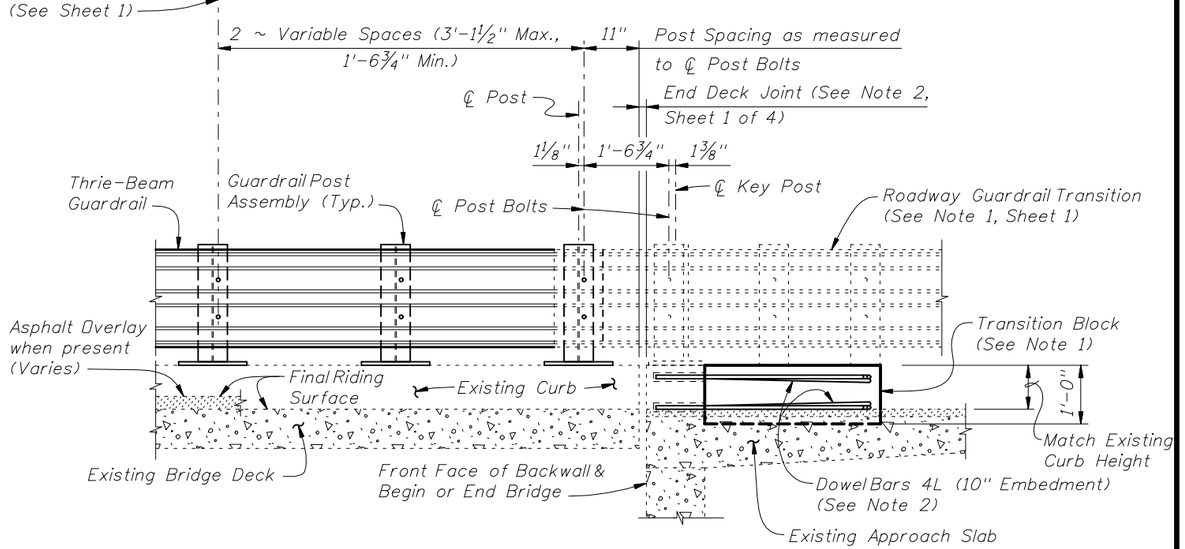


TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL
(BRIDGE DECK SHOWN, WING WALL SIMILAR)

CROSS REFERENCES:
For location of Section A-A see Sheets 1, 3 & 4.
For location of Section B-B see Sheets 3 & 4.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



PARTIAL PLAN OF RAILING



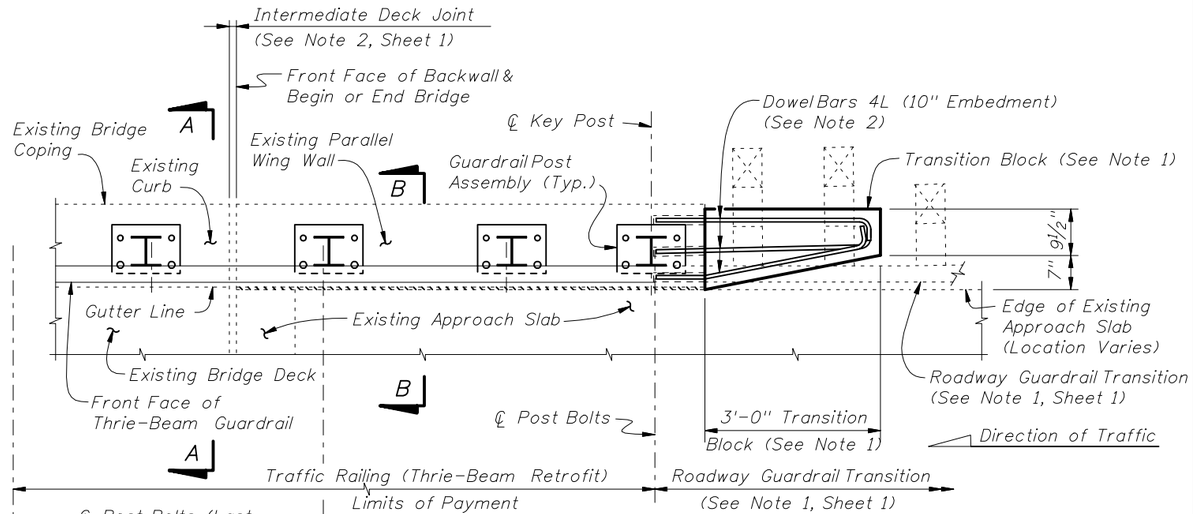
PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

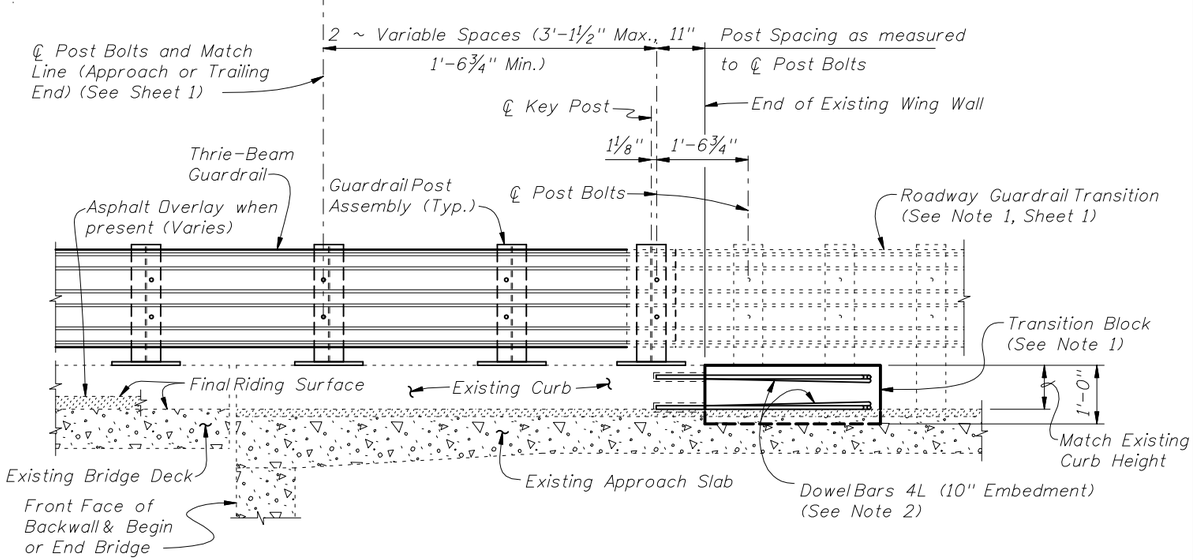
SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING



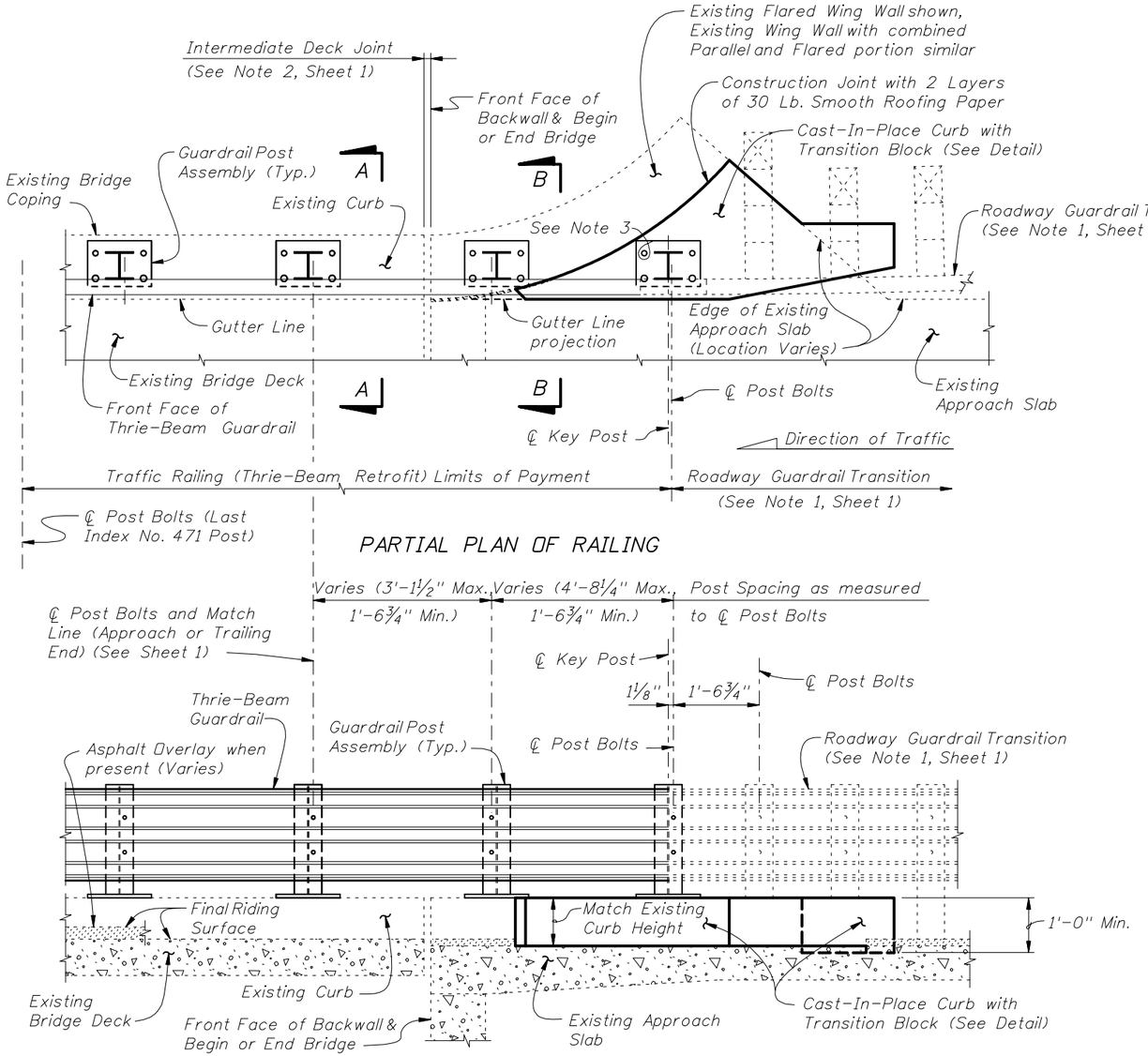
PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS

SCHEME 2 NOTES:

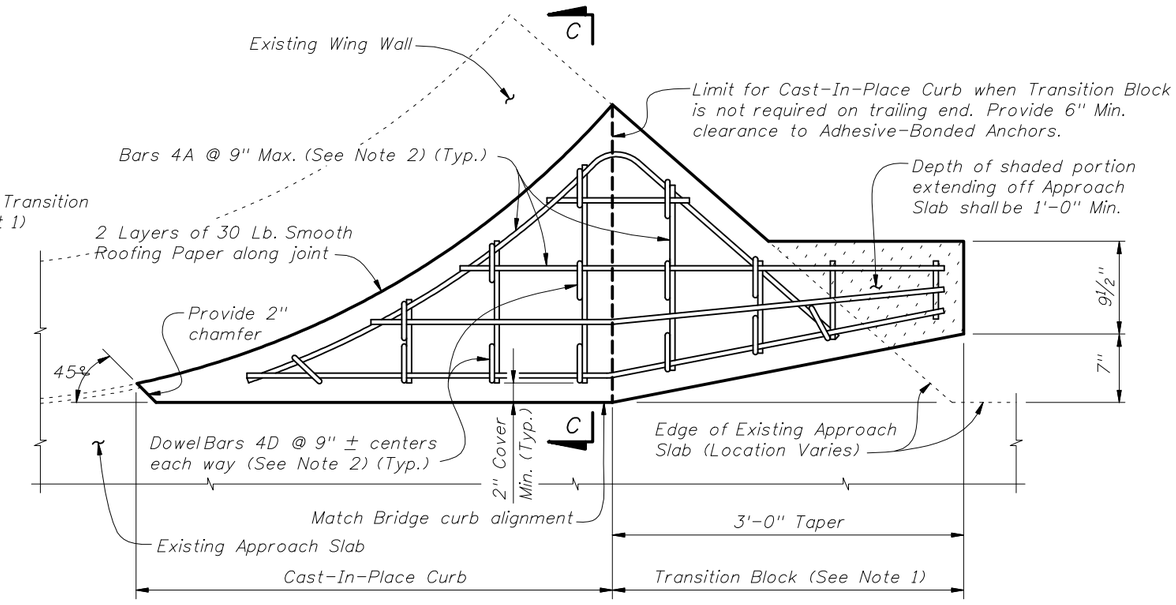
1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

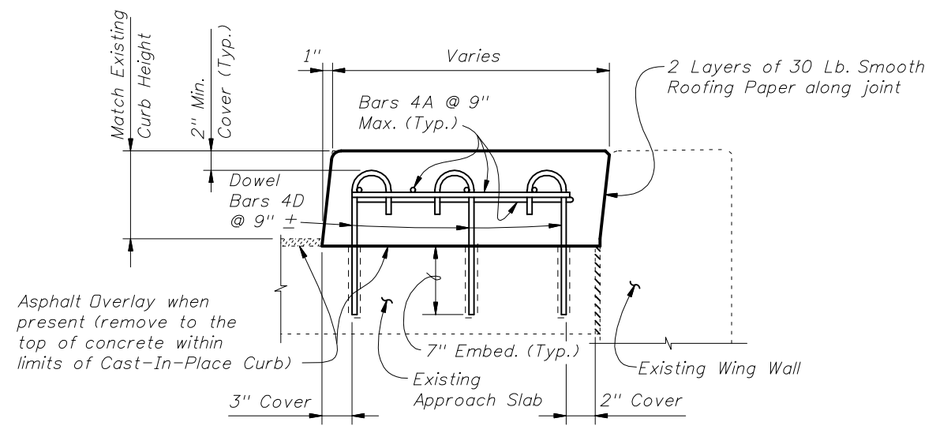


PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING



PLAN OF CAST-IN-PLACE CURB & TRANSITION BLOCK DETAIL
(Approach End with Transition Block Shown, Trailing End without Transition Block Similar)



SECTION C-C

SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS

SCHEME 3 NOTES:

1. Provide Cast-In-Place Curb as shown. Shape and height of Transition Block and Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field cut and bend Bars 4A and rotate Dowel Bars 4B within Curb and Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.
3. A single ⅞" Ø x 8" Adhesive-Bonded Anchor may be omitted as shown when 2" clear cover cannot be provided.

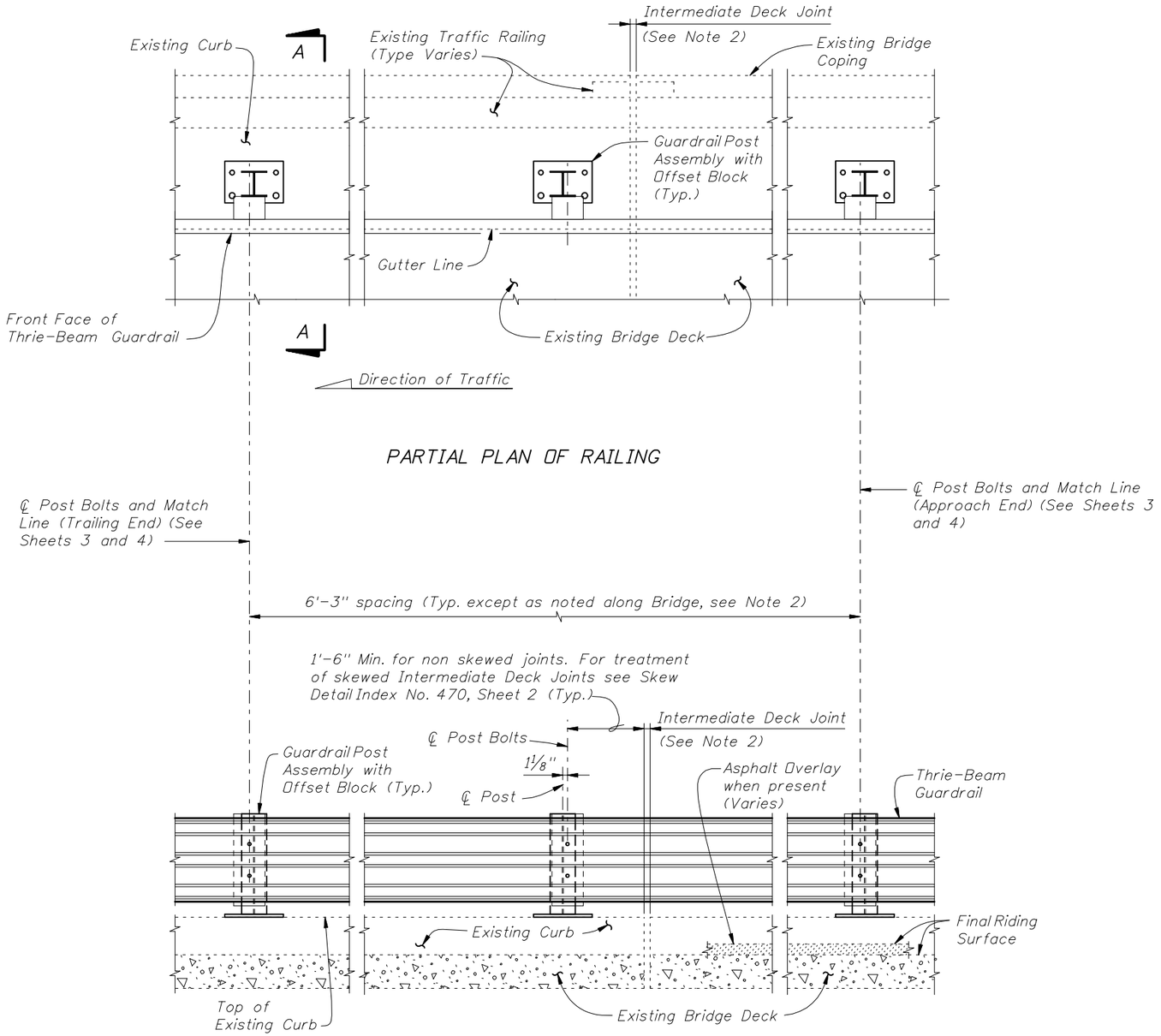
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) NARROW CURB

Last Revision	Sheet No.
01/01/08	4 of 4

Index No. 471



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

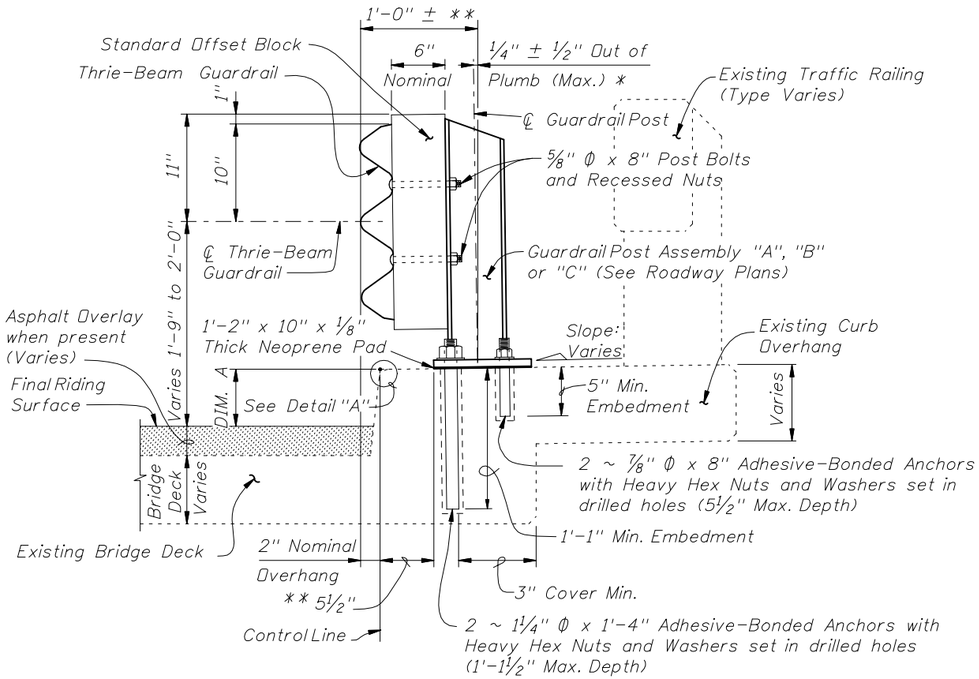
TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

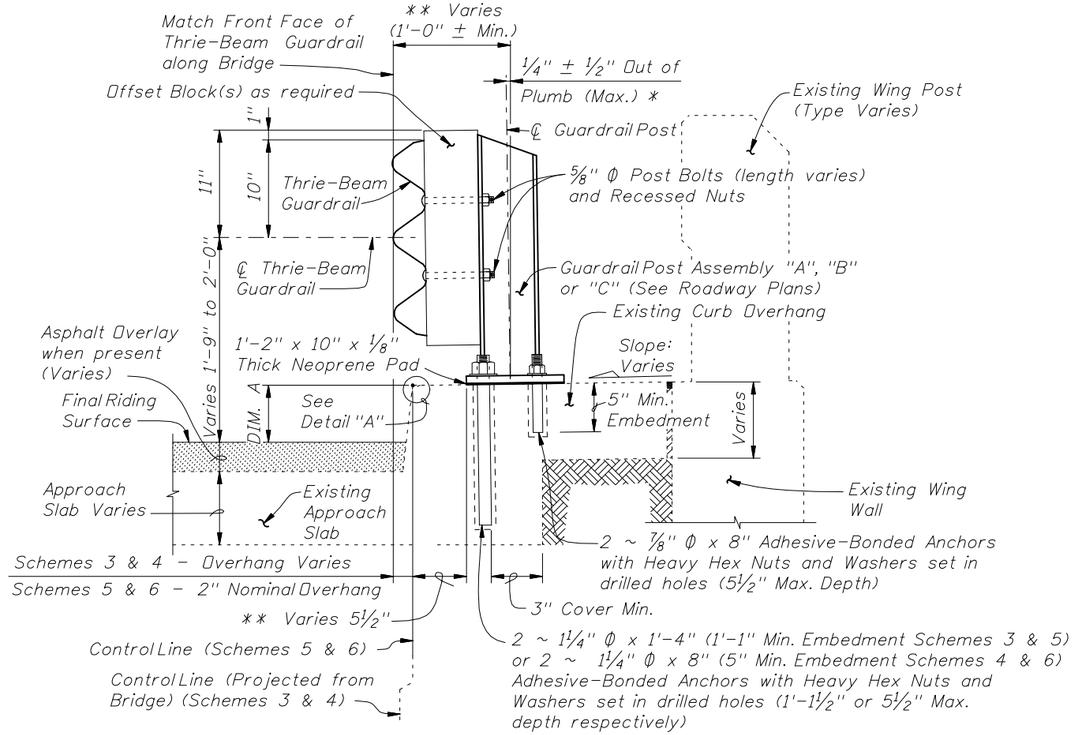
1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 1	Last Revision 01/01/08 · Sheet No. 1 of 4 Index No. 472



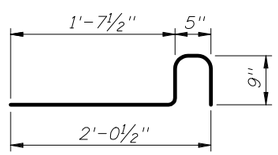
SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



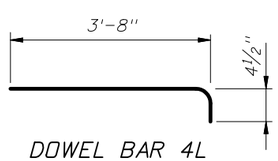
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
D	4	3'-7"
L	4	4'-1"
M	4	2'-8"

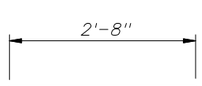
BAR BENDING DIAGRAMS



DOWEL BAR 4D



DOWEL BAR 4L

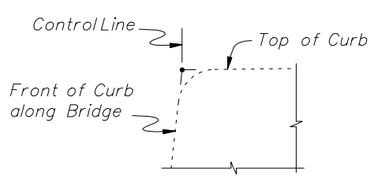


BAR 4M

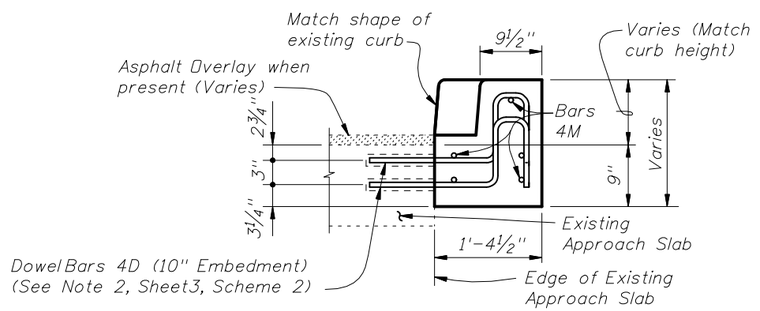
NOTE: All bar dimensions are out to out.

* Shim with washers around Anchors as required to maintain tolerance.

** Offset may vary ± 1" for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

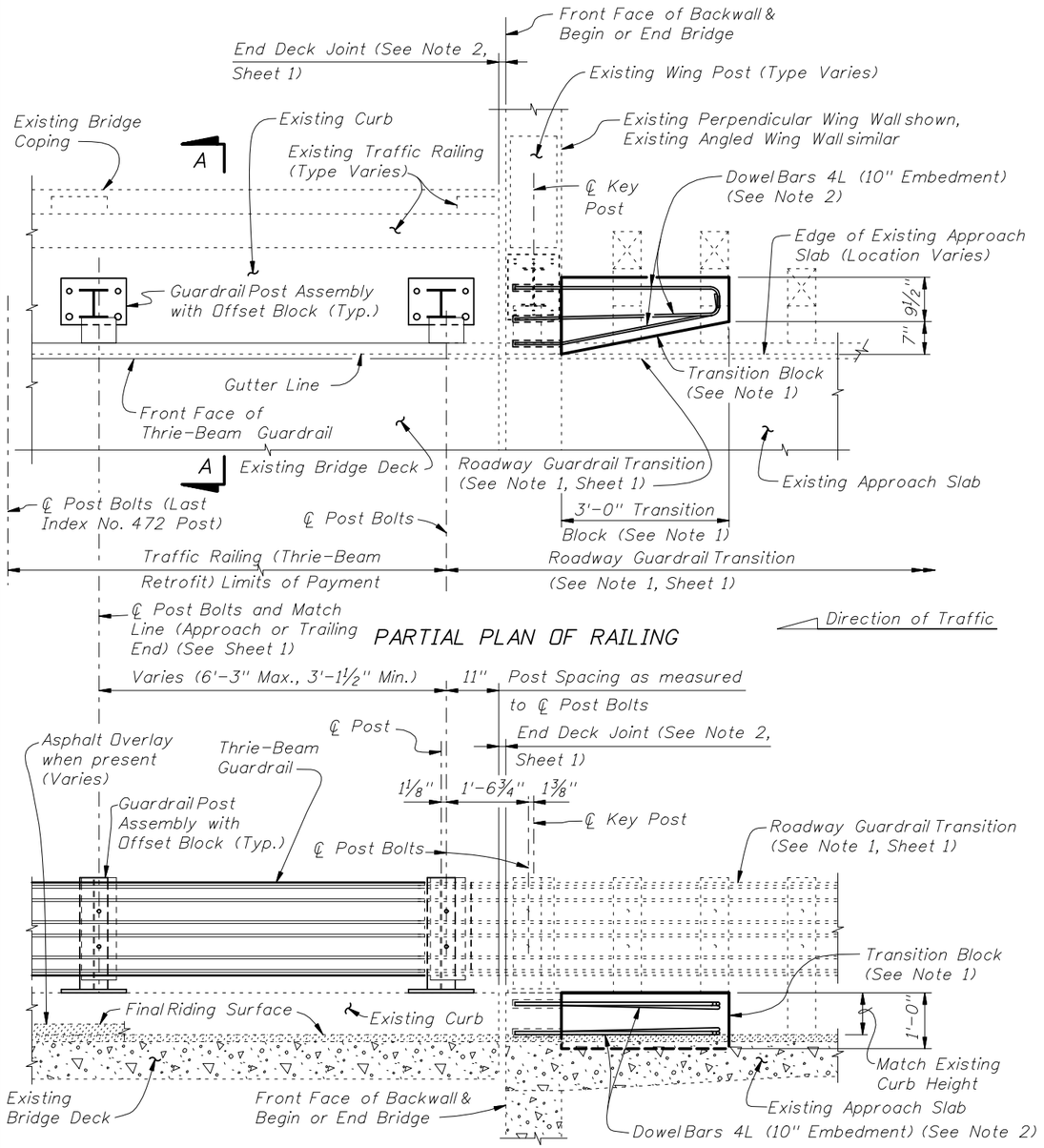


DETAIL "A"



VIEW C-C

CROSS REFERENCES:
For location of Section A-A see Sheets 1, 3 & 4.
For location of Section B-B see Sheet 4.
For location of View C-C see Sheet 3.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



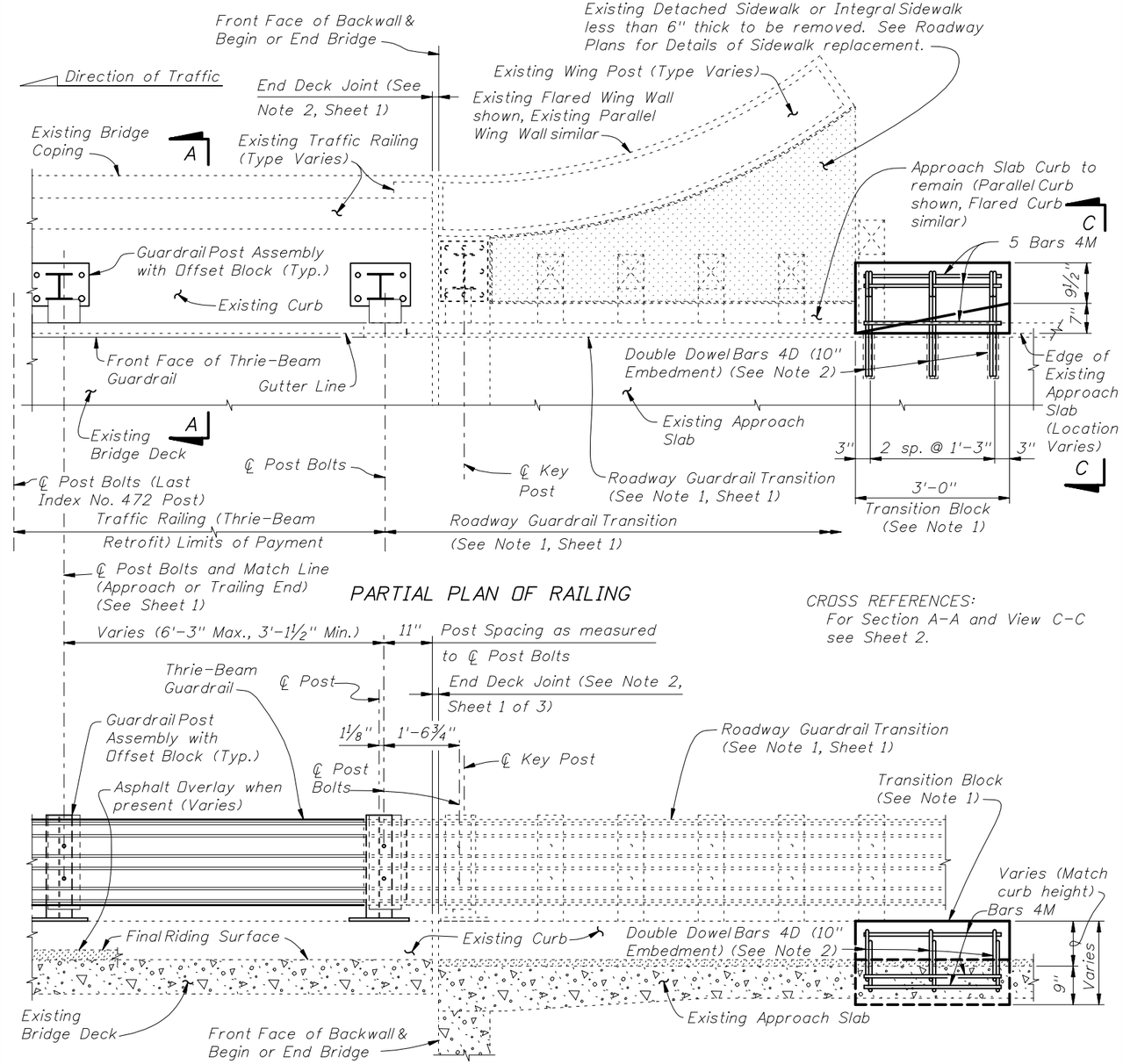
SCHEME 1

RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



CROSS REFERENCES:
For Section A-A and View C-C see Sheet 2.

SCHEME 2

RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALKS LESS THAN 6" THICK

SCHEME 2 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.

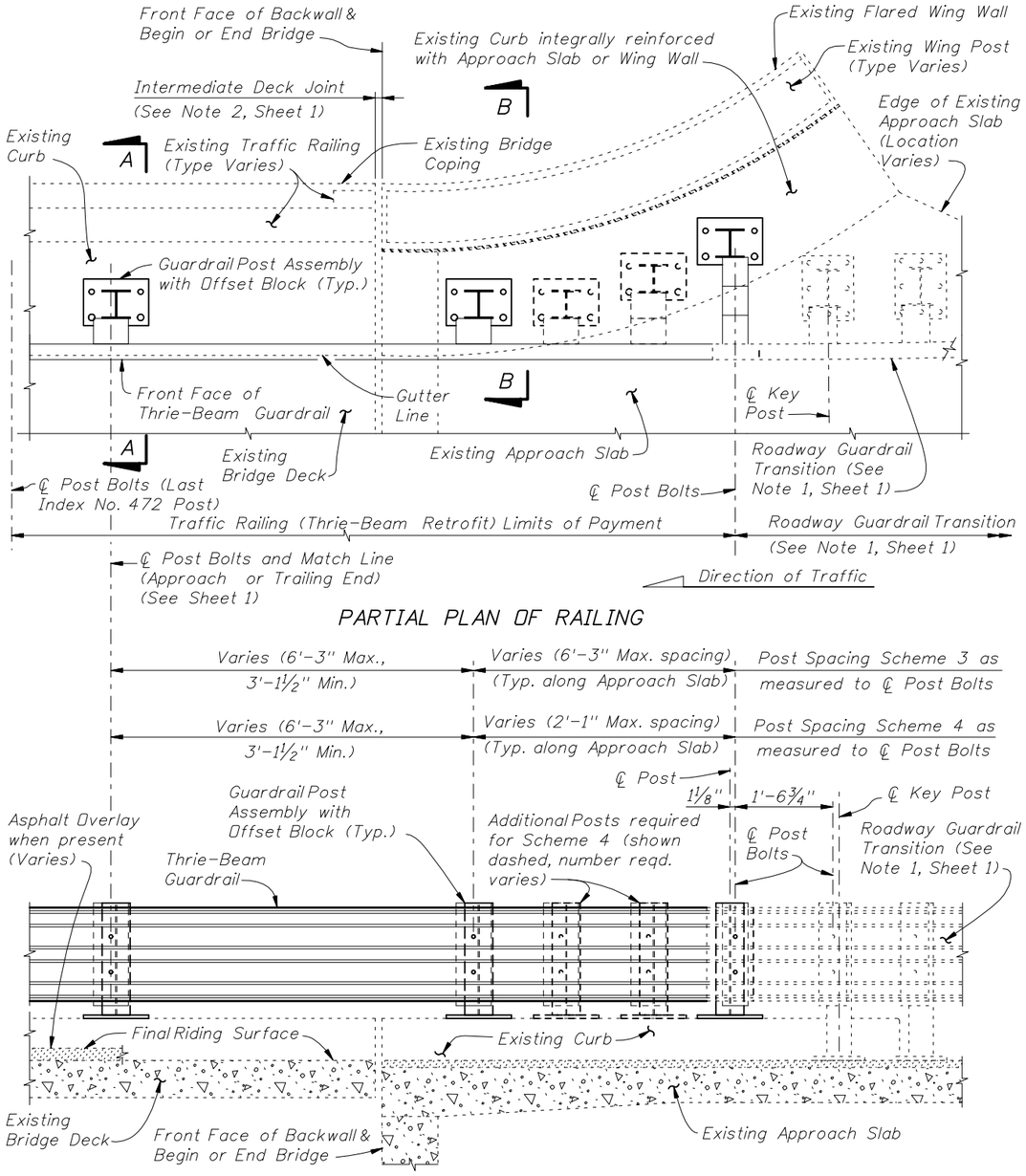
2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 1

Last Revision	Sheet No.
01/01/08	3 of 4

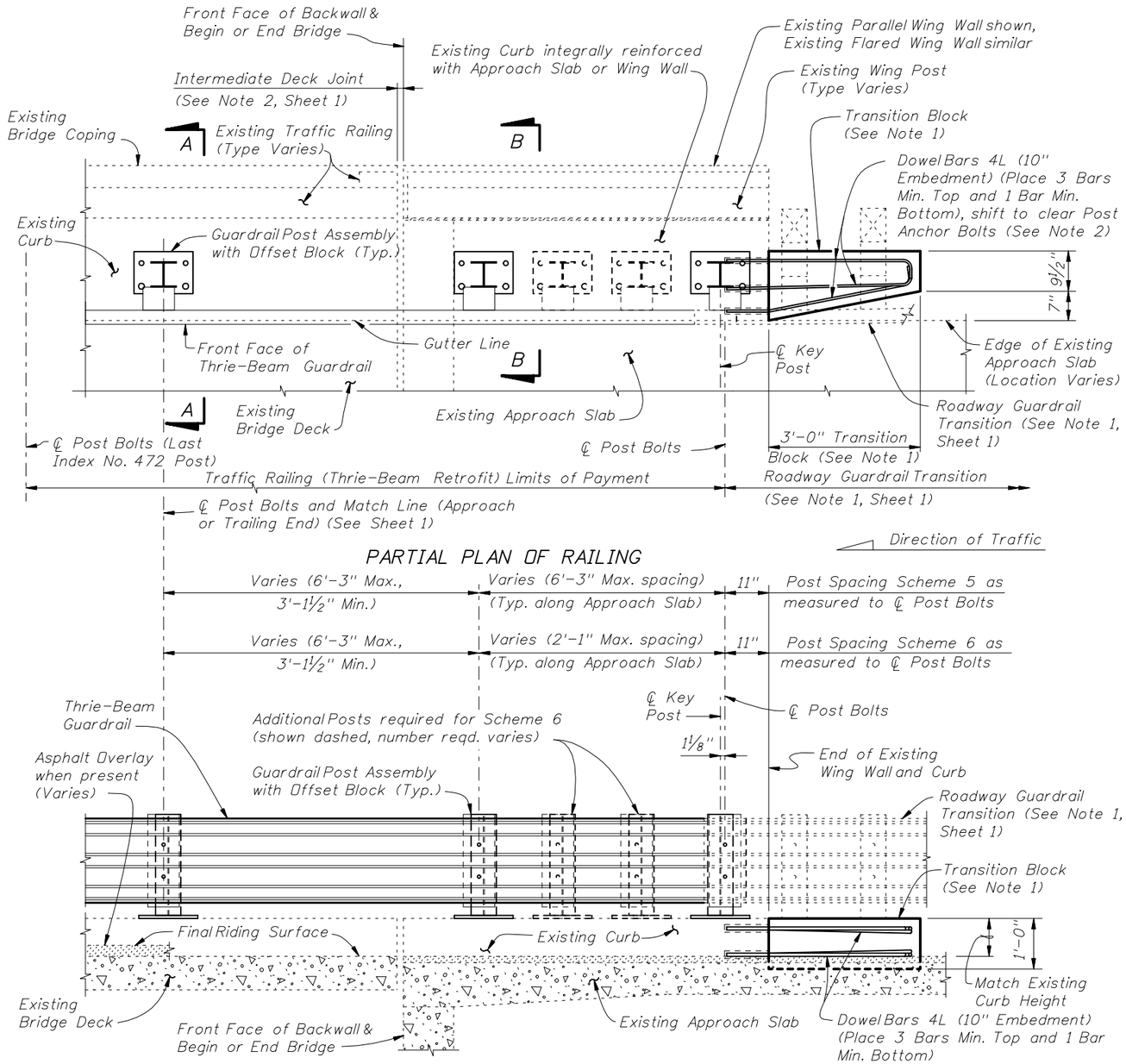
Index No. 472



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

SCHEMES 5 AND 6 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

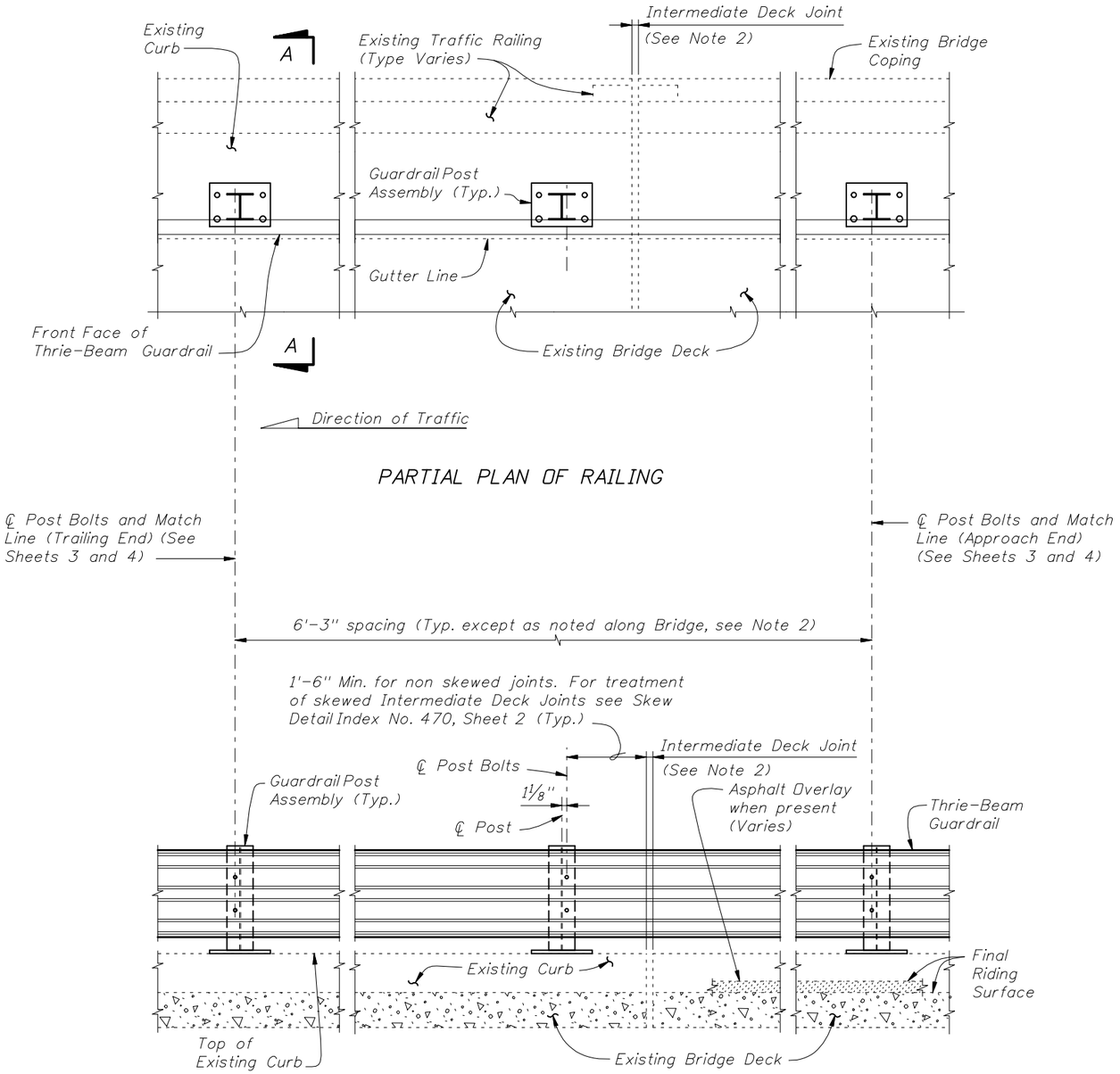
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 1

Last Revision	Sheet No.
01/01/08	4 of 4

Index No. **472**



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

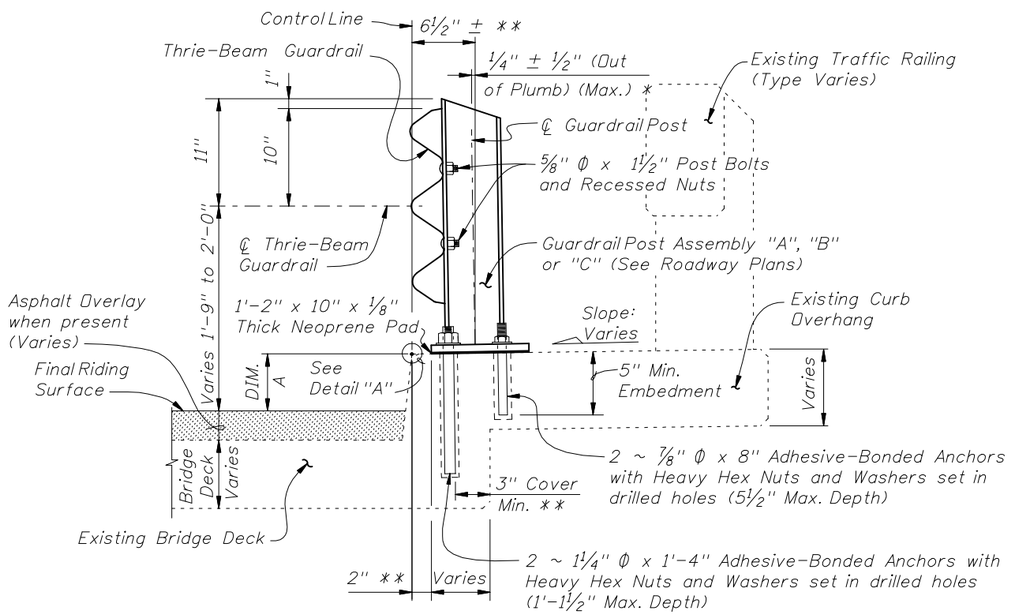
TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

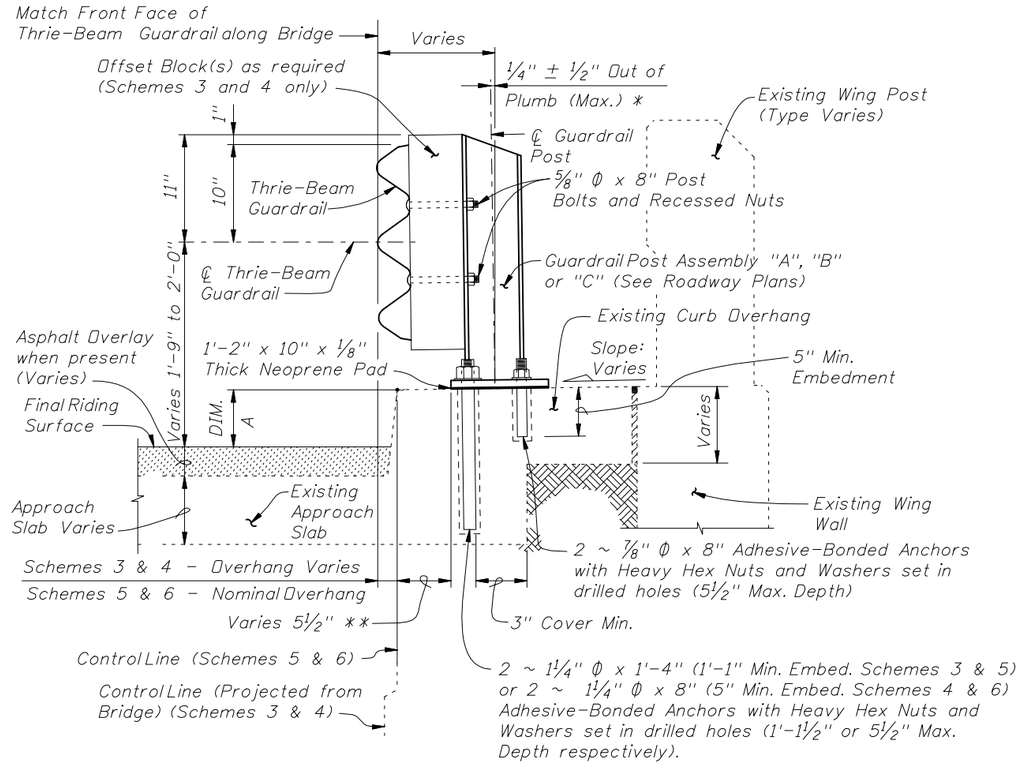
1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 01/01/08	Sheet No. 1 of 4
	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 2		Index No. 473



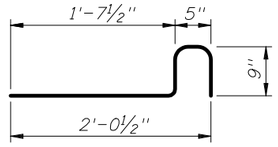
SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



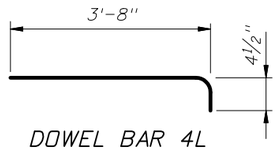
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
D	4	3'-7"
L	4	4'-1"
M	4	2'-8"

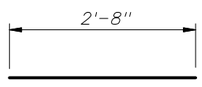
BAR BENDING DIAGRAMS



DOWEL BAR 4D



DOWEL BAR 4L

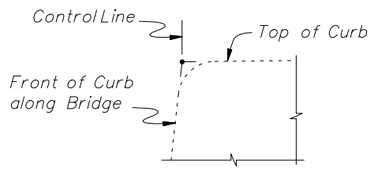


BAR 4M

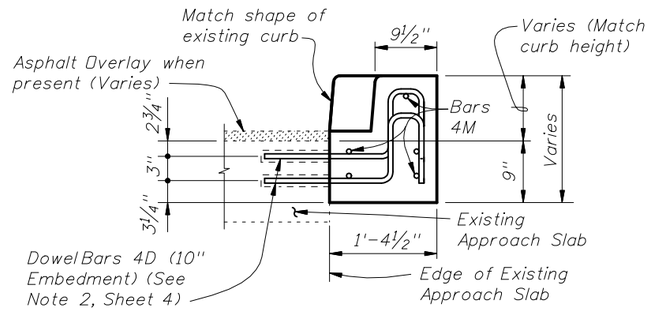
NOTE: All bar dimensions are out to out.

* Shim with washers around Anchor Bolts and Anchors as required to maintain tolerance.

** Offset may vary ± 1" for Adhesive-Bonded Anchors and Anchor Bolts to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

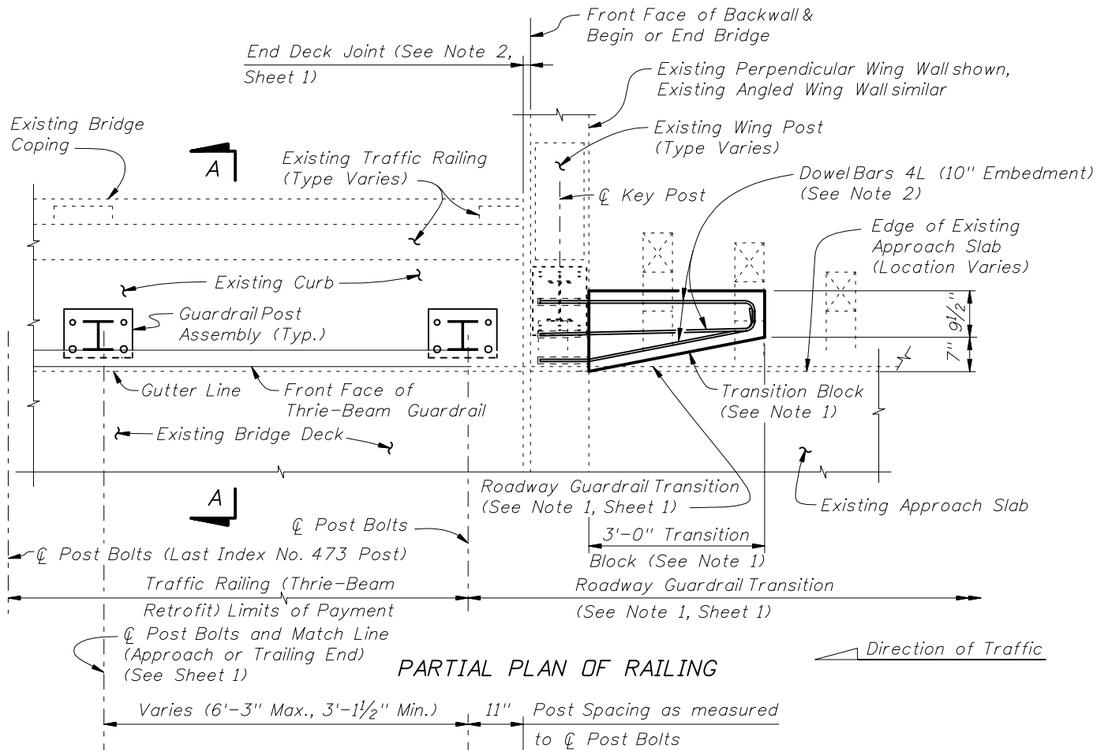


DETAIL "A"

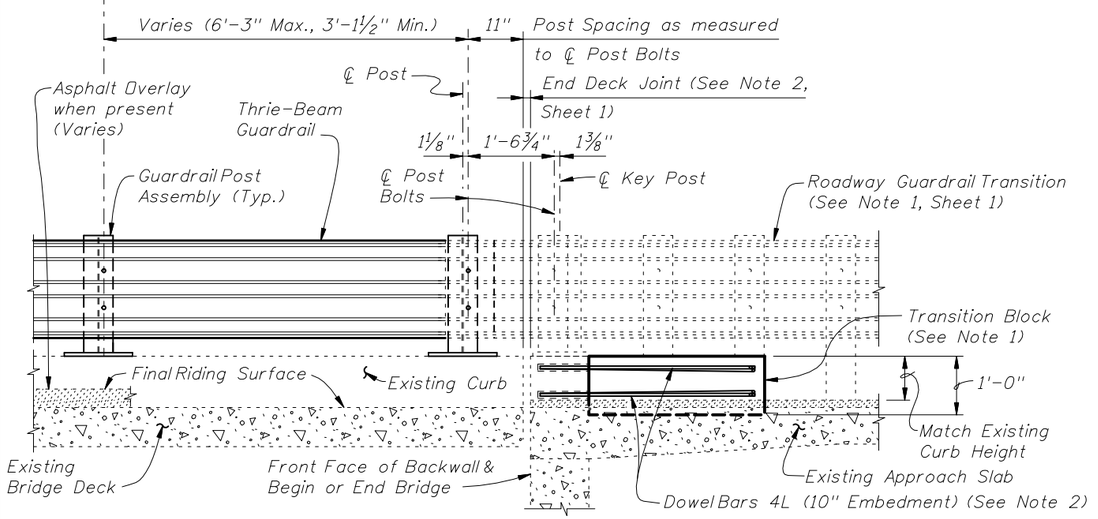


VIEW C-C

CROSS REFERENCES:
For location of Section A-A see Sheet 1, 3 and 4.
For location of Section B-B see Sheet 4.
For location of View C-C see Sheet 3.
For Traffic Railing Notes and Details see Index No. 470.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



PARTIAL PLAN OF RAILING



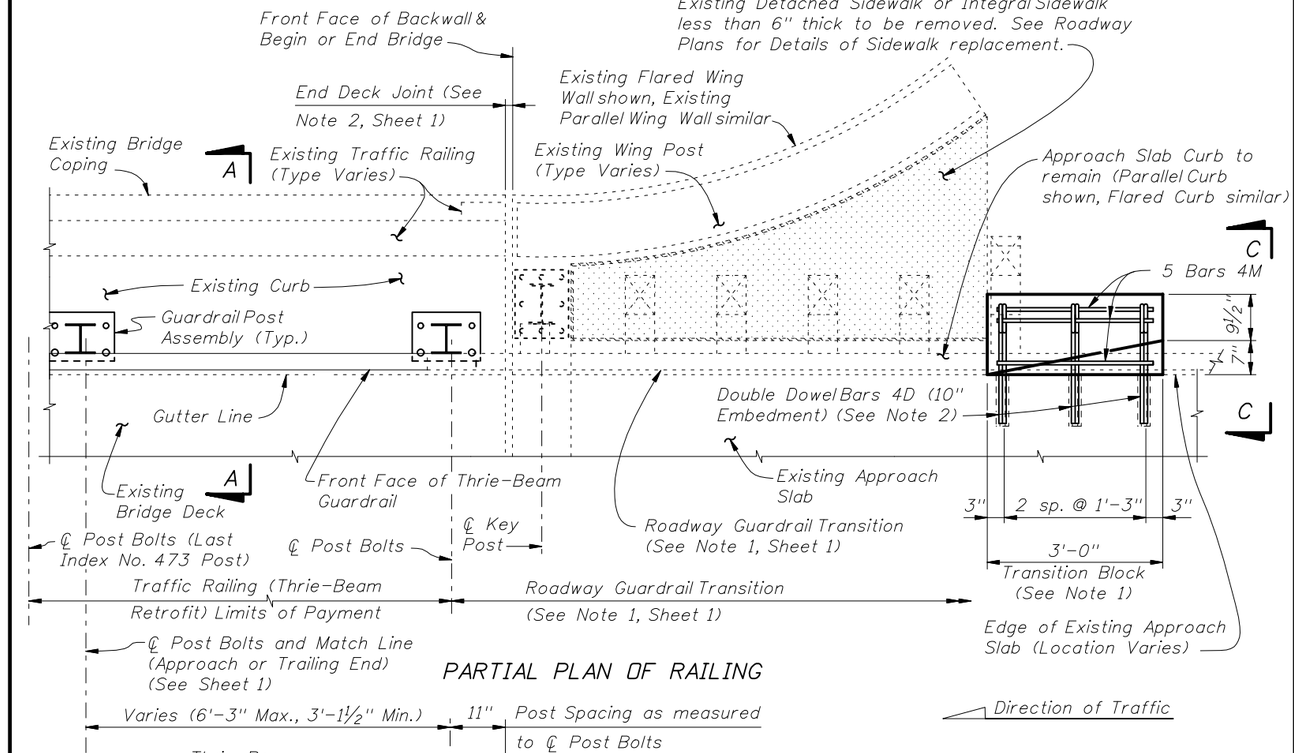
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

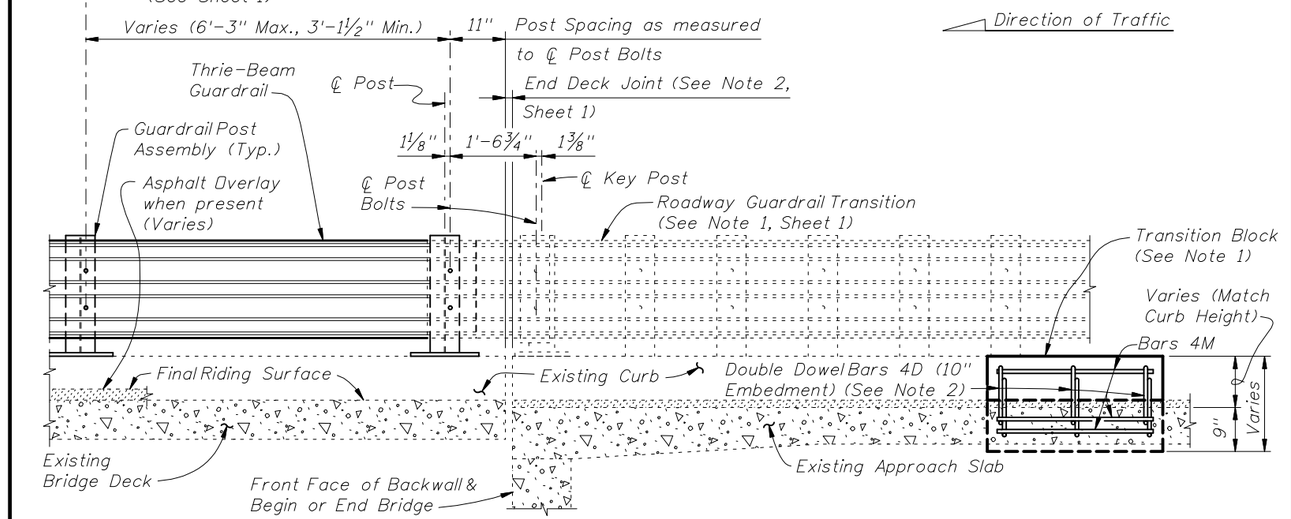
SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING



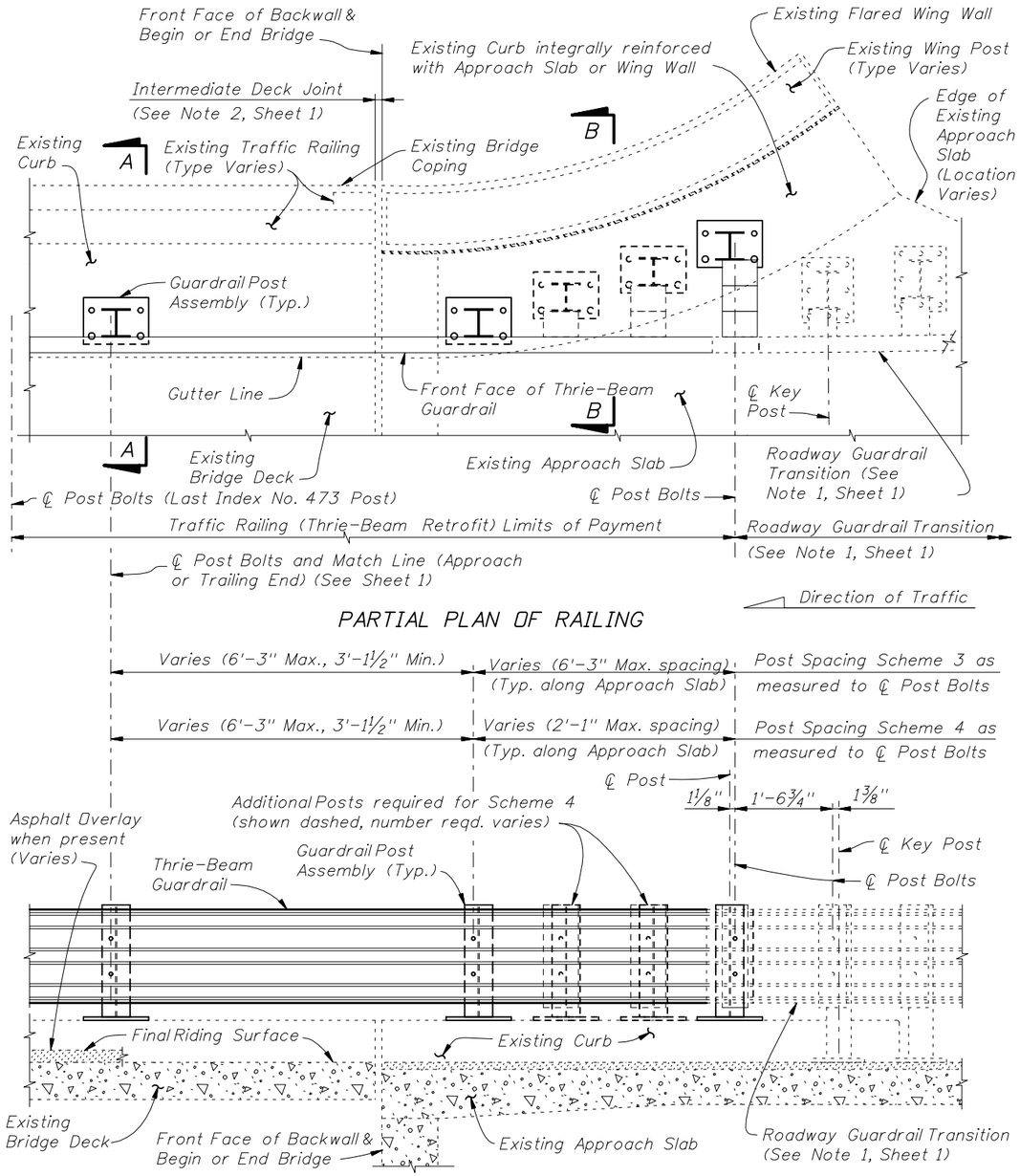
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEME 2
RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALK LESS THAN 6" THICK

SCHEME 2 NOTES:

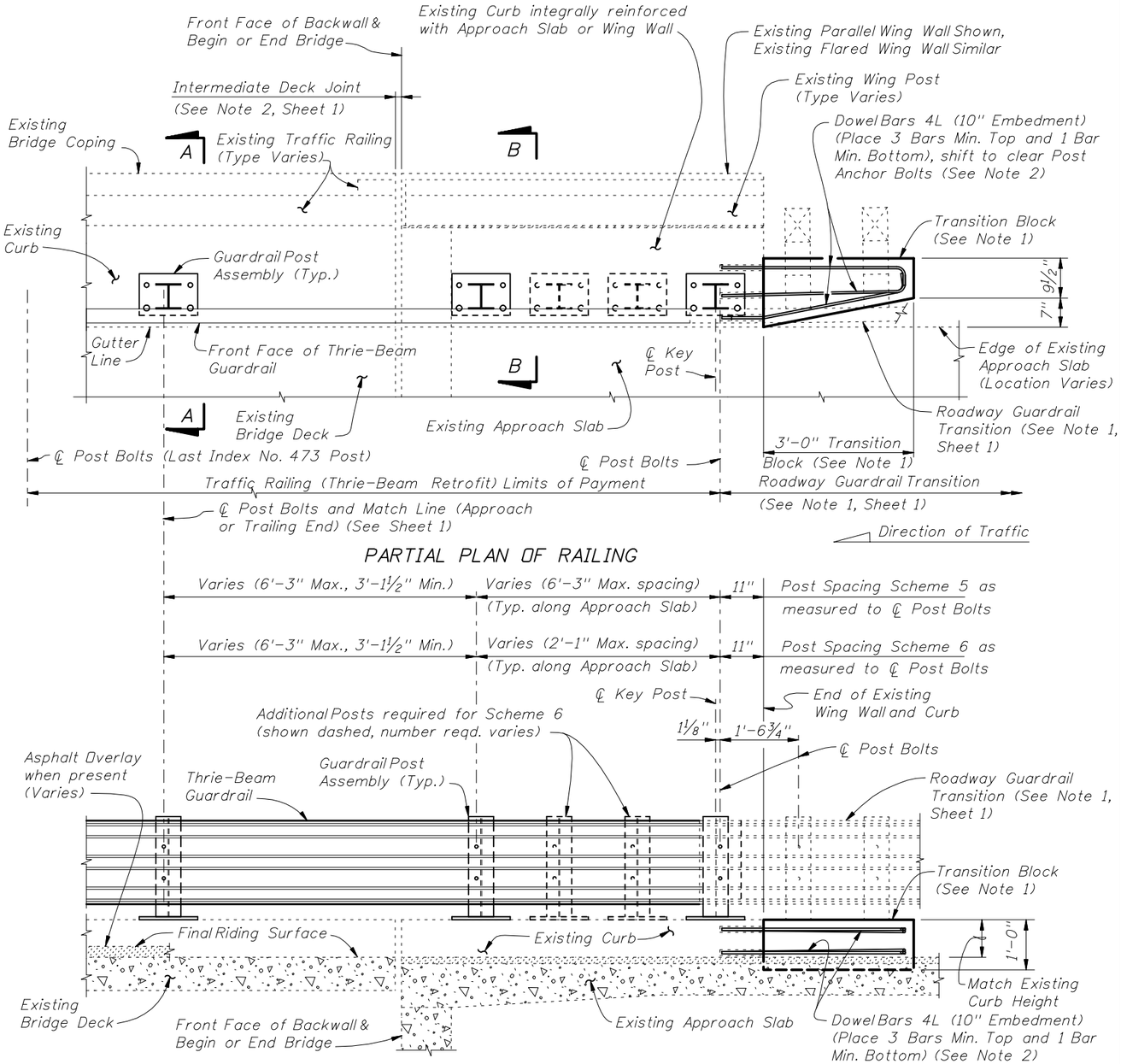
1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.

2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

SCHEMES 5 AND 6 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

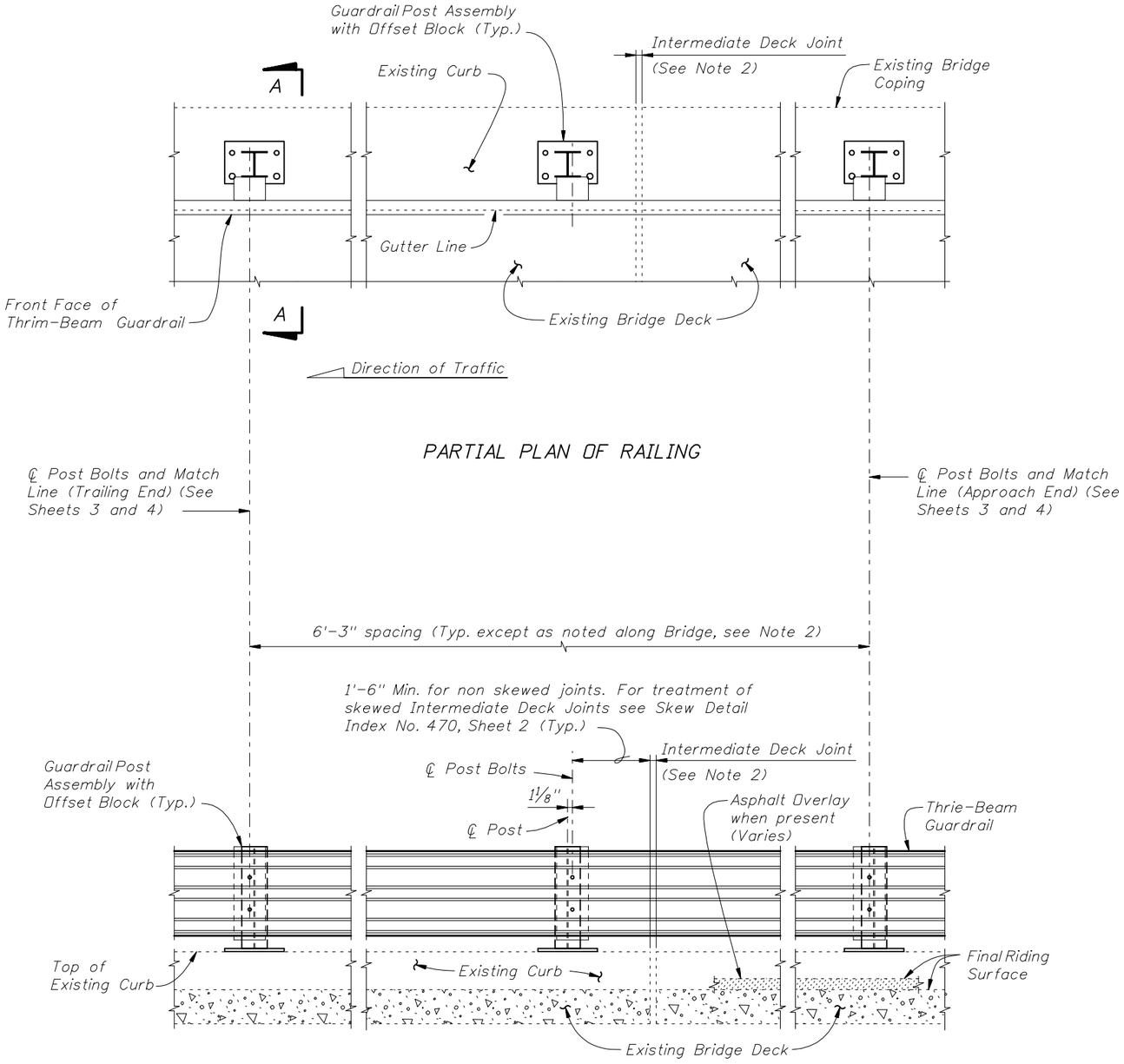
2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 2

Last Revision	Sheet No.
01/01/08	4 of 4

Index No. 473



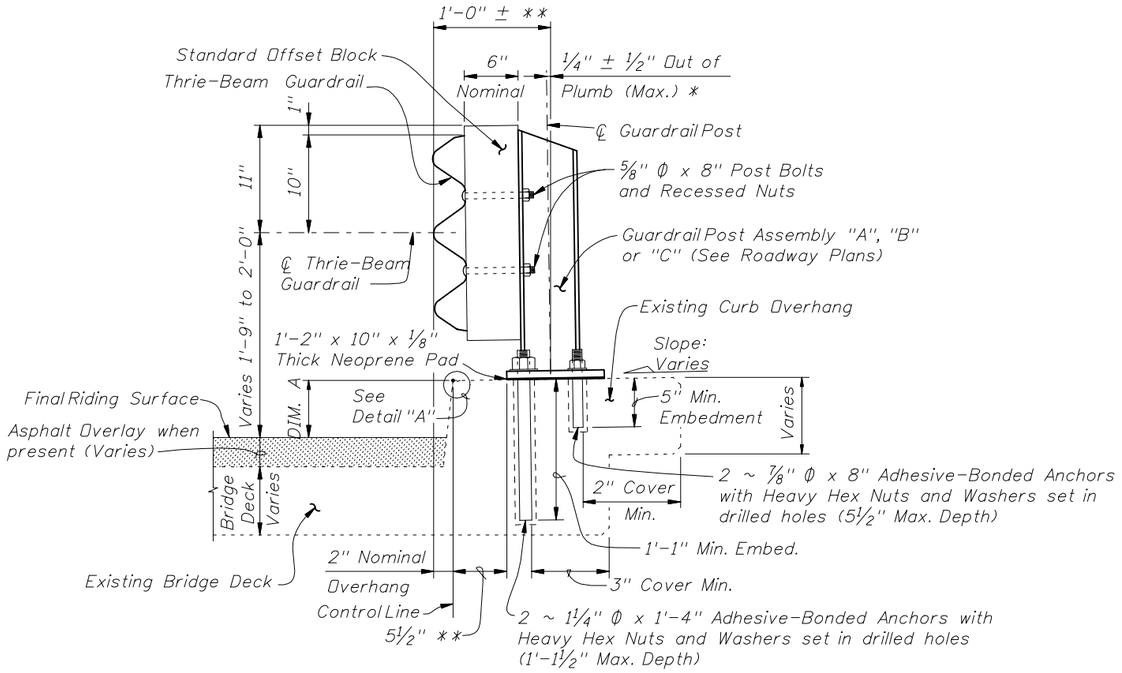
PARTIAL ELEVATION OF INSIDE FACE OF RAILING

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

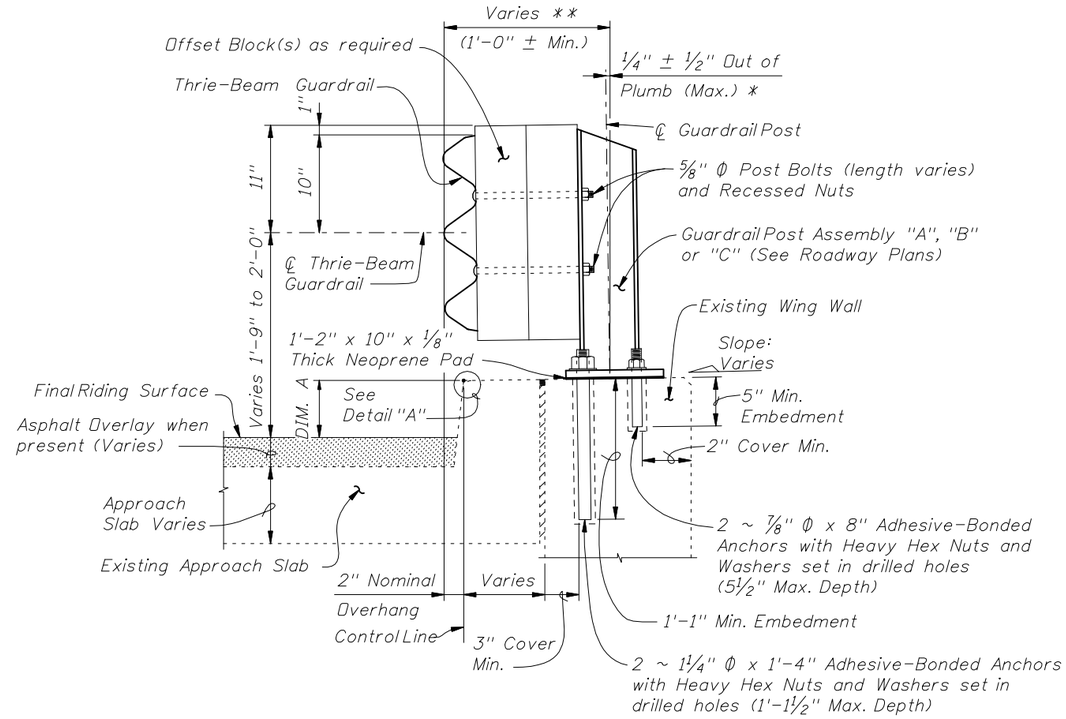
NOTES:

1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Match Line see Sheets 3 & 4.
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.



SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK

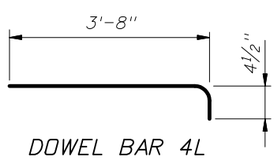


SECTION B-B (SCHEME 2)
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB

*Shim with washers around Anchor Bolts and Anchors as required to maintain tolerance.

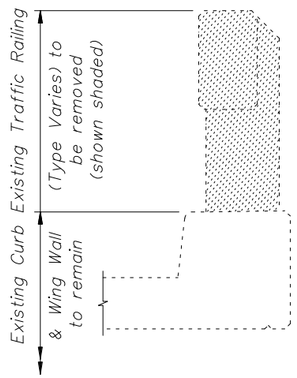
**Offset may vary ± 1" for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
L	4	4'-1"
BAR BENDING DIAGRAM		

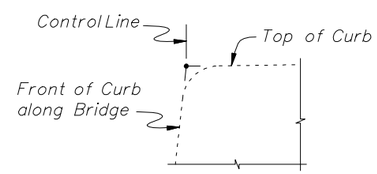


DOWEL BAR 4L

NOTE: All bar dimensions are out to out.



TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL (BRIDGE DECK SHOWN, WING WALL SIMILAR)



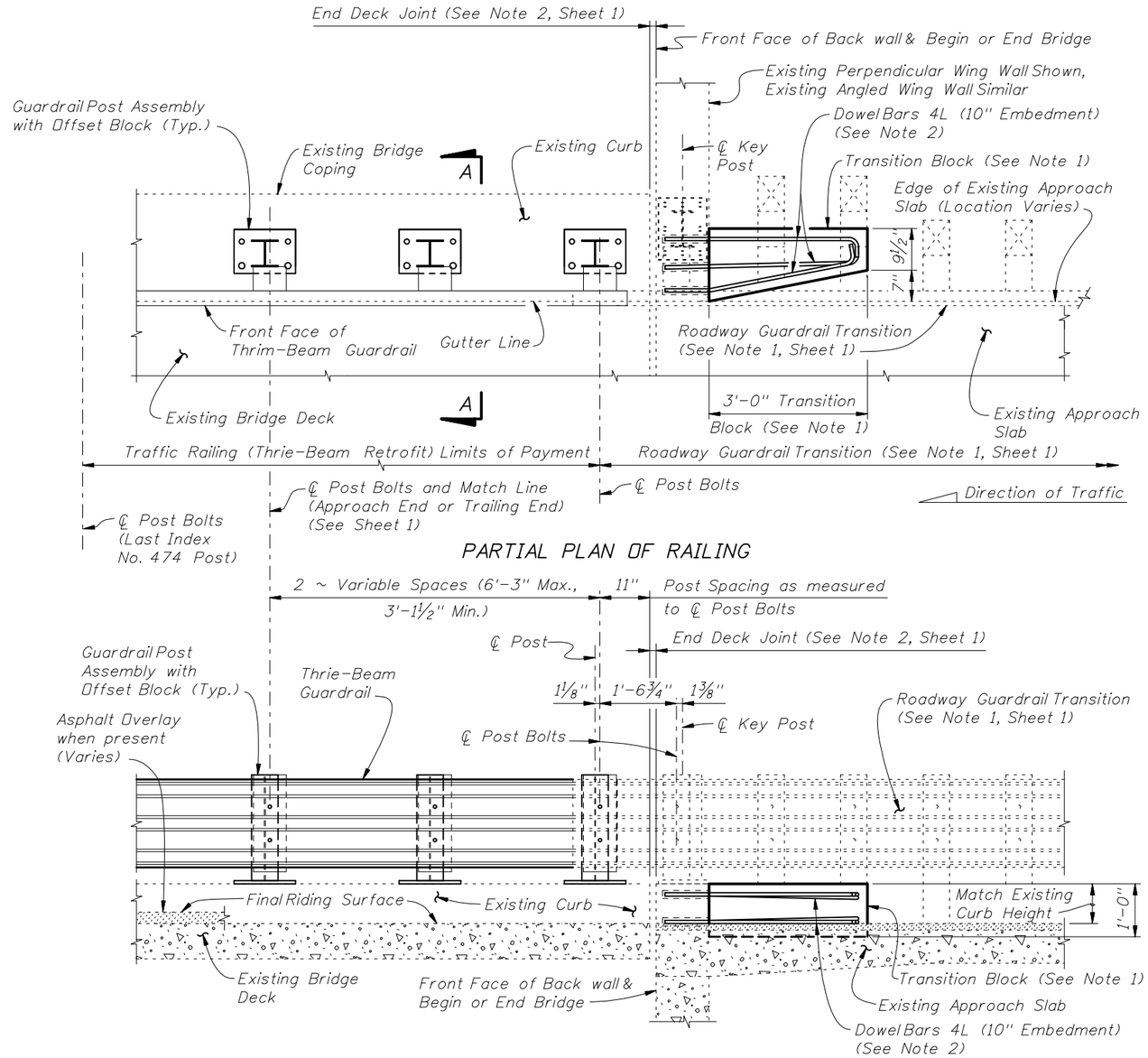
DETAIL "A"

CROSS REFERENCES:
For location of Section A-A see Sheet 1 and 3.
For location of Section B-B see Sheet 3
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.

2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) INTERMEDIATE CURB

Last Revision	Sheet No.
07/01/08	2 of 4
Index No.	
474	



PARTIAL PLAN OF RAILING

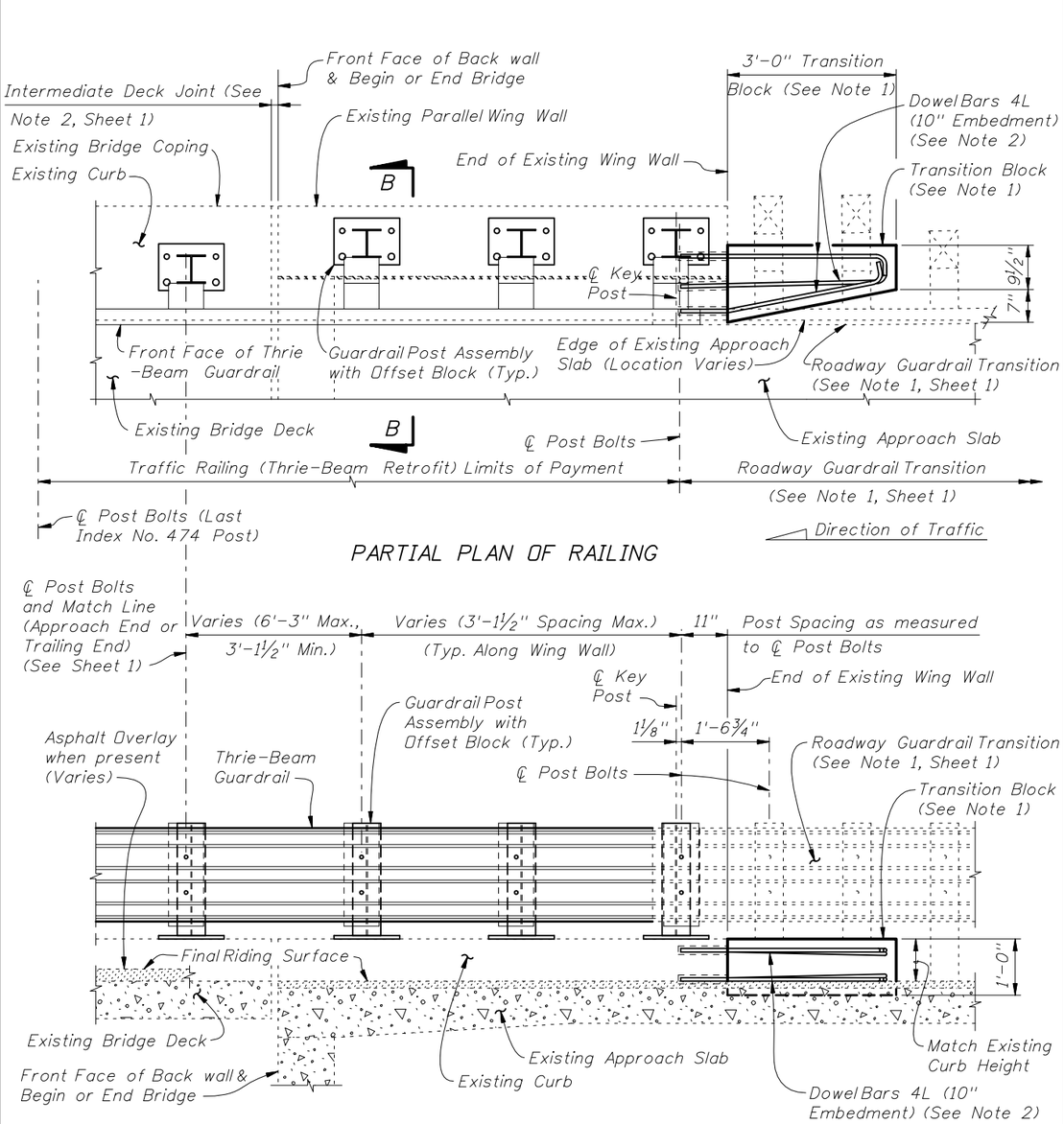
PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

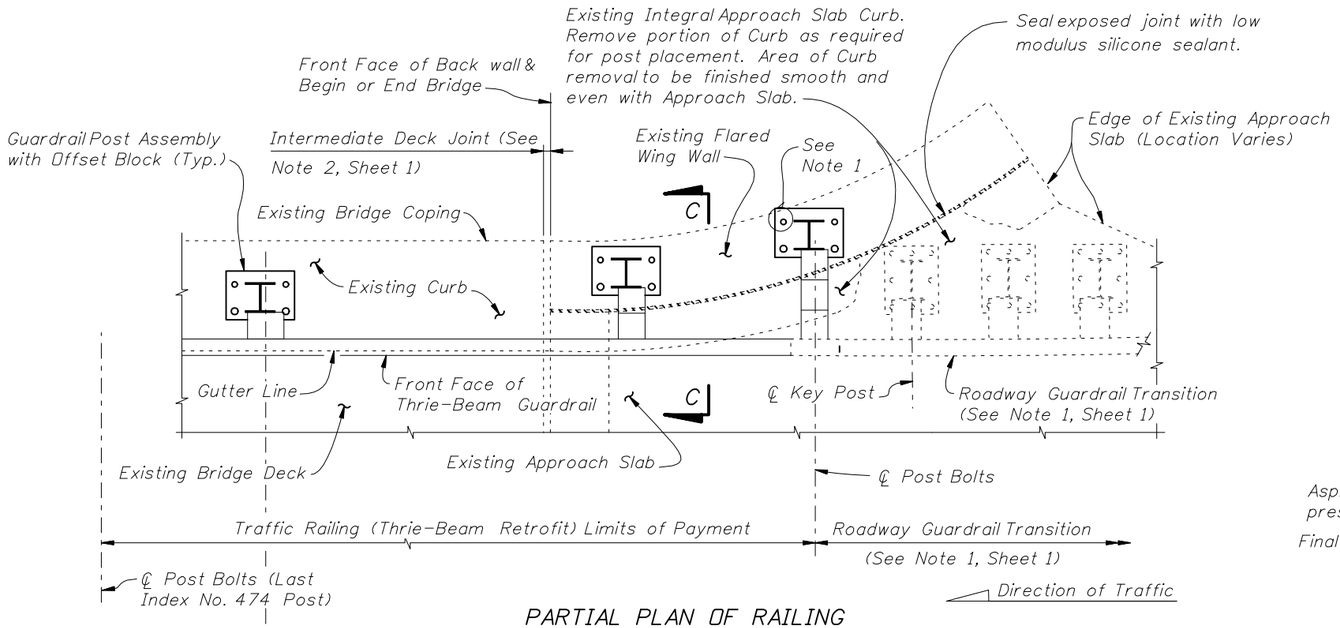
PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS

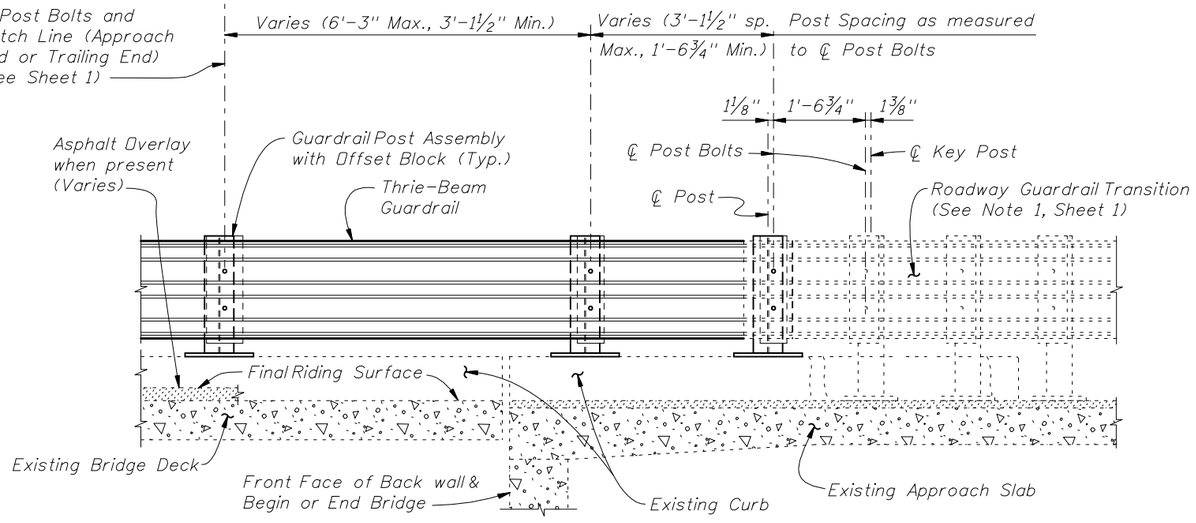
SCHEME 2 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

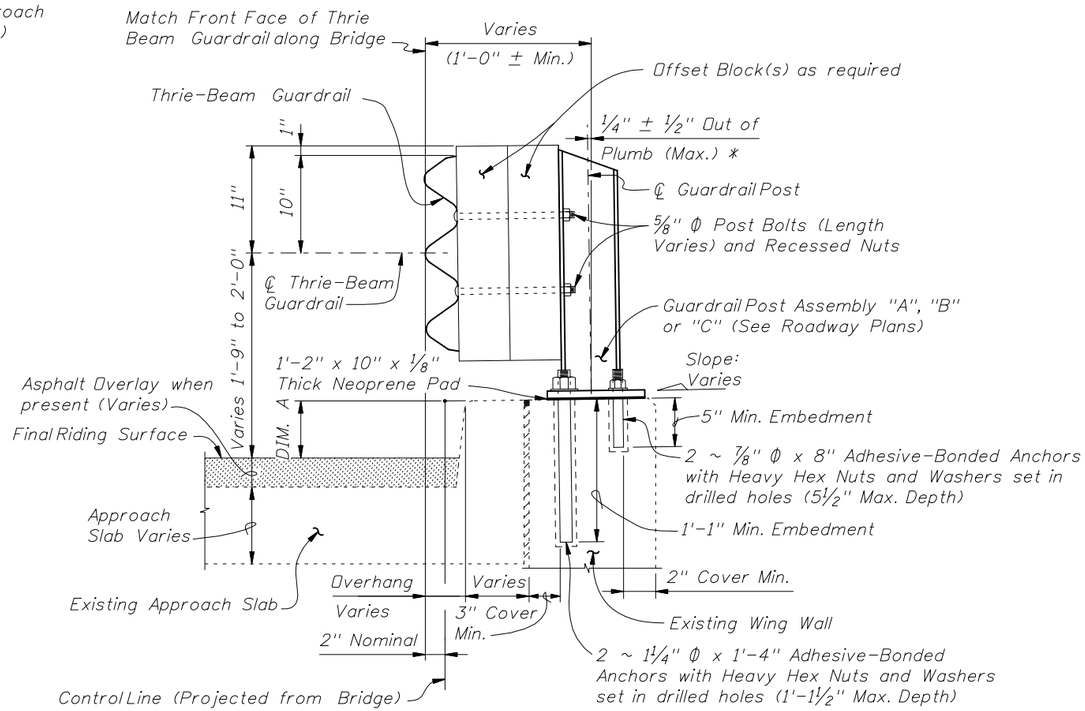


PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS

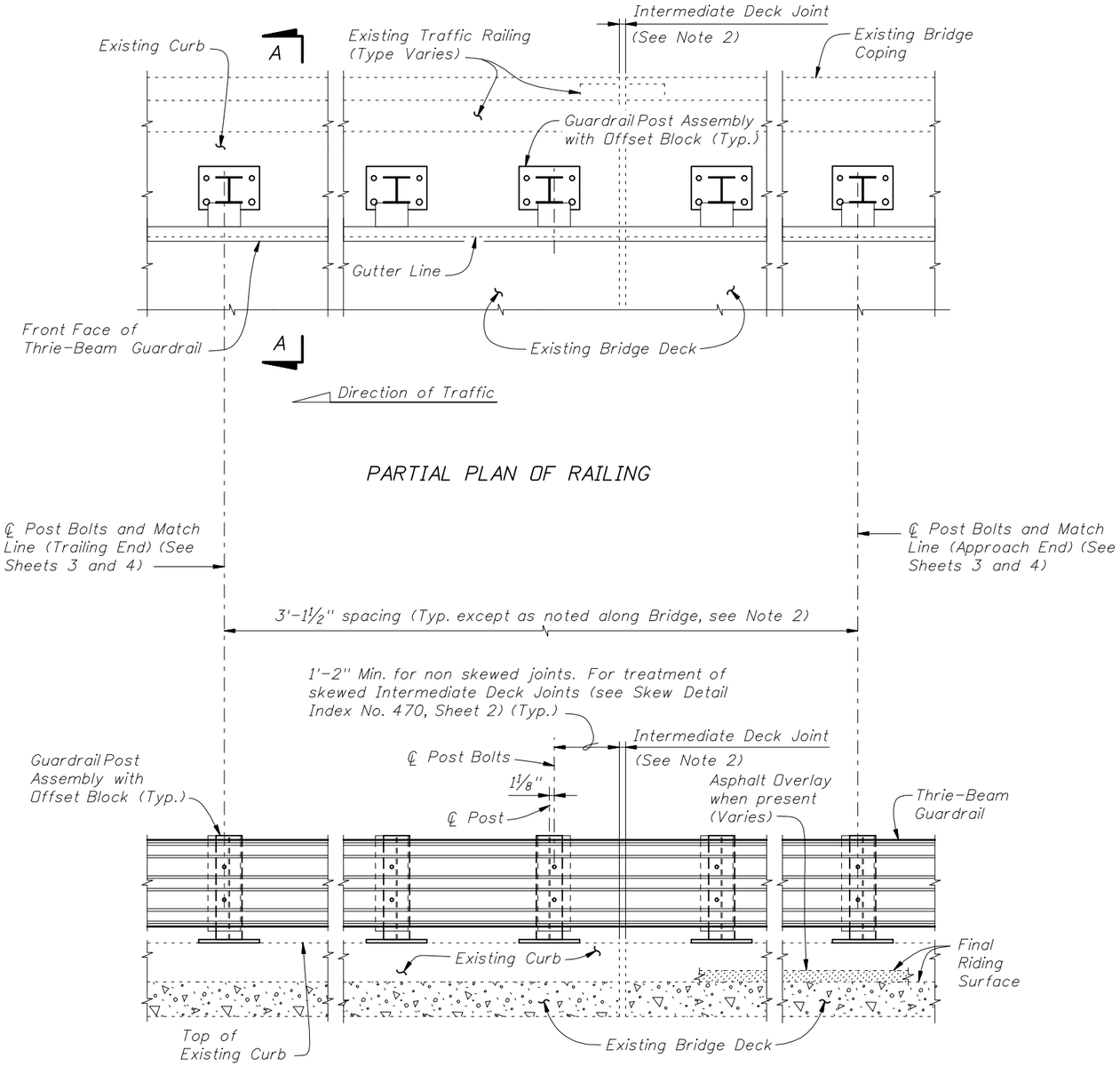


SECTION C-C (SCHEME 3)
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB

SCHEME 3 NOTE:

1. A single ⅞" Ø x 8" Adhesive-Bonded Anchor may be omitted as shown when 2" clear cover cannot be provided (see Section C-C).

CROSS REFERENCE:
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

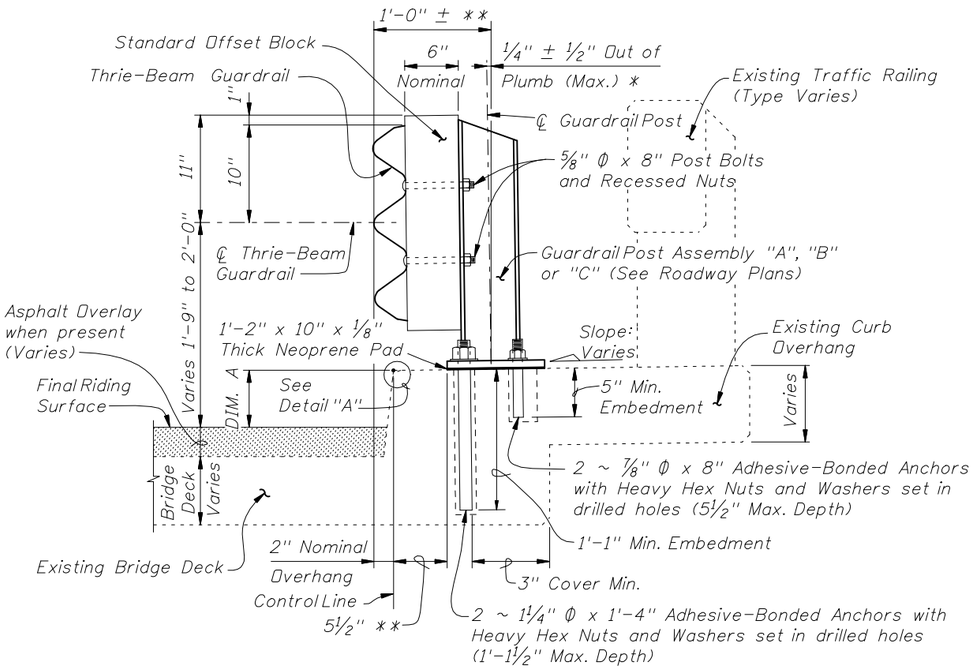
TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

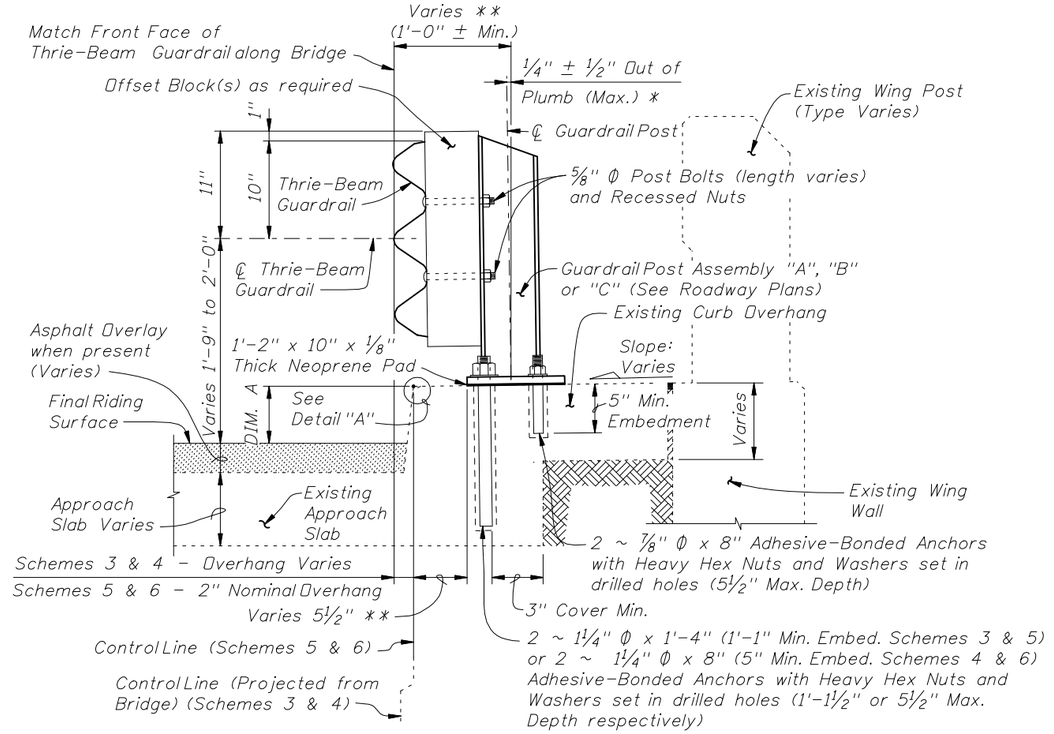
1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 01/01/08	Sheet No. 1 of 4
	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE CURB TYPE 1	Index No. 475	



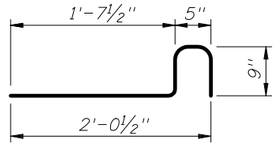
SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



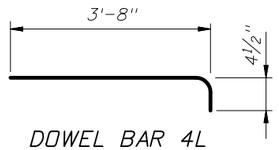
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
D	4	3'-7"
L	4	4'-1"
M	4	2'-8"

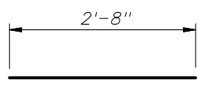
BAR BENDING DIAGRAMS



DOWEL BAR 4D



DOWEL BAR 4L

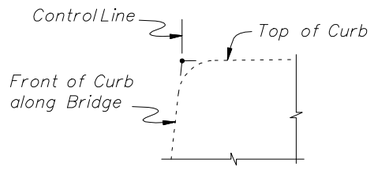


BAR 4M

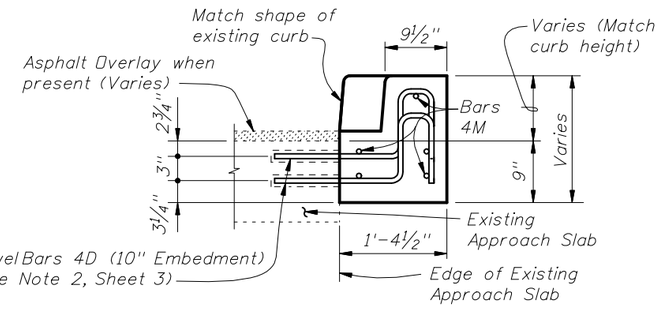
NOTE: All bar dimensions are out to out.

* Shim with washers around Anchors as required to maintain tolerance.

** Offset may vary ± 1" for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

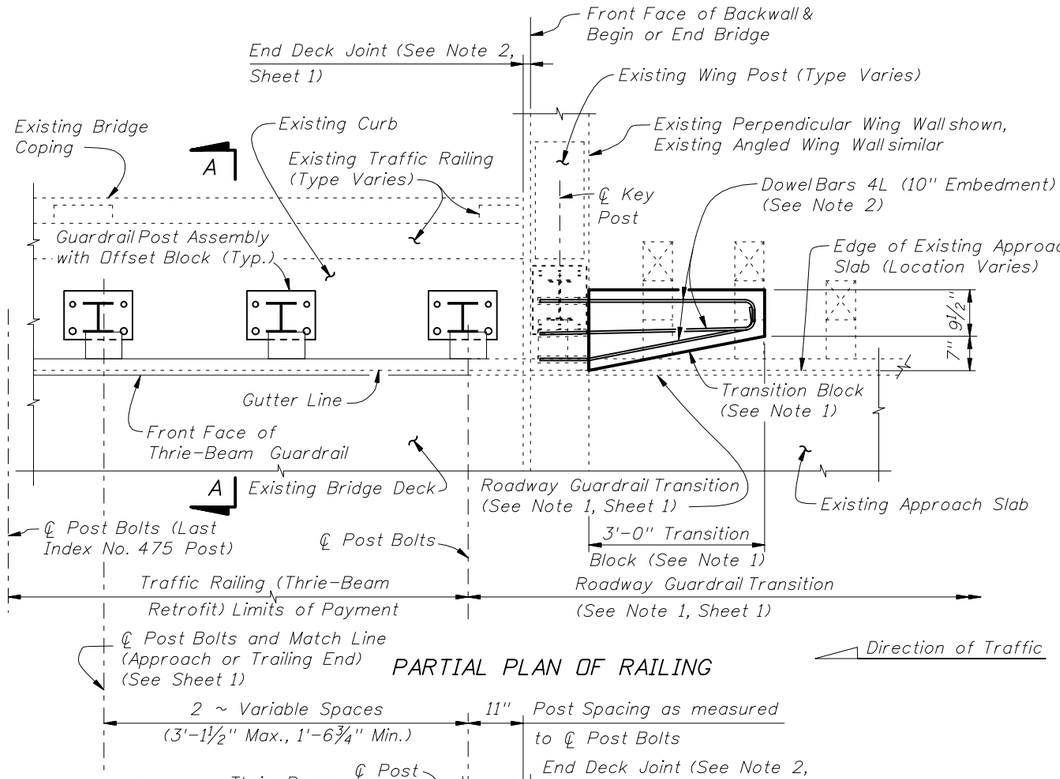


DETAIL "A"

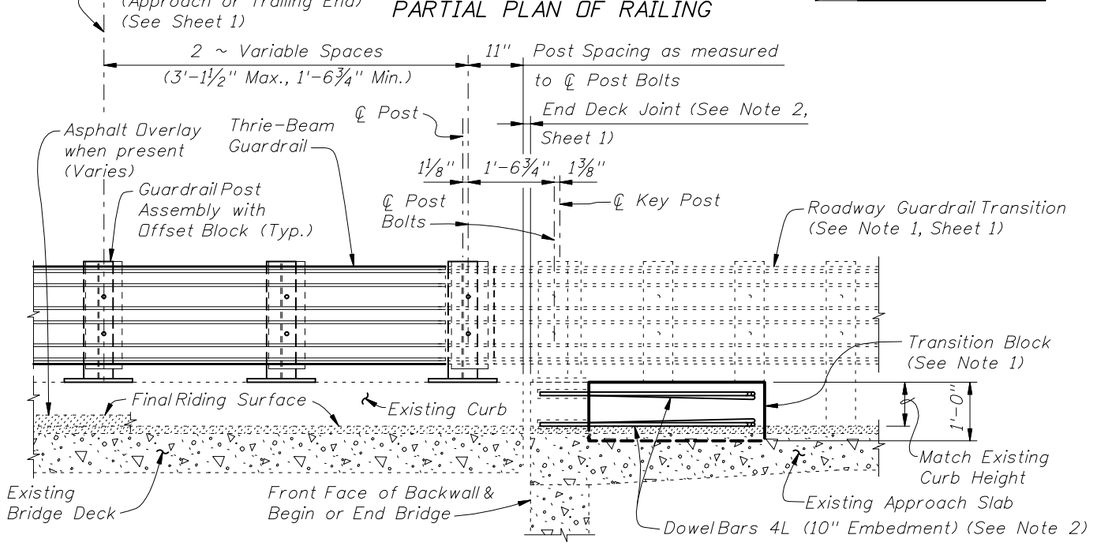


VIEW C-C

CROSS REFERENCES:
For location of Section A-A see Sheet 1, 3 & 4.
For location of Section B-B see Sheet 4.
For location of View C-C see Sheet 3.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

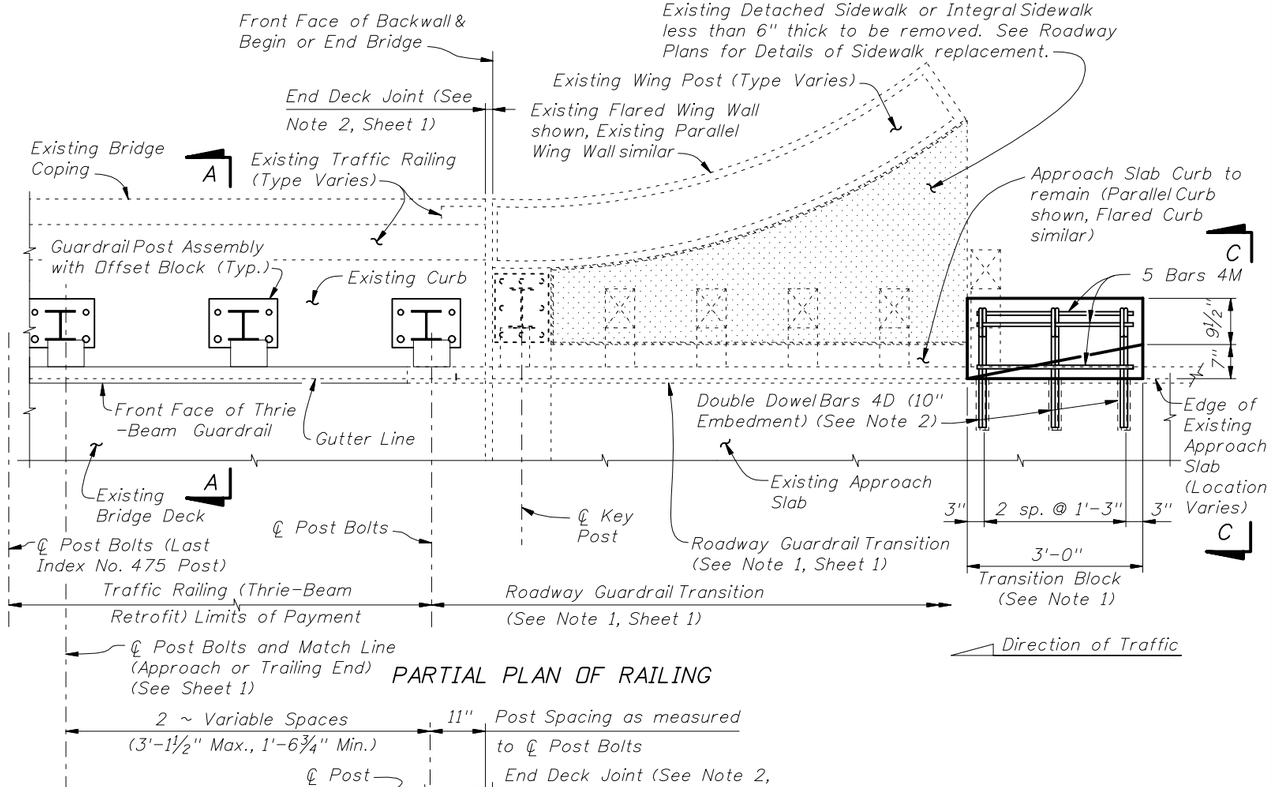
SCHEME 1

RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

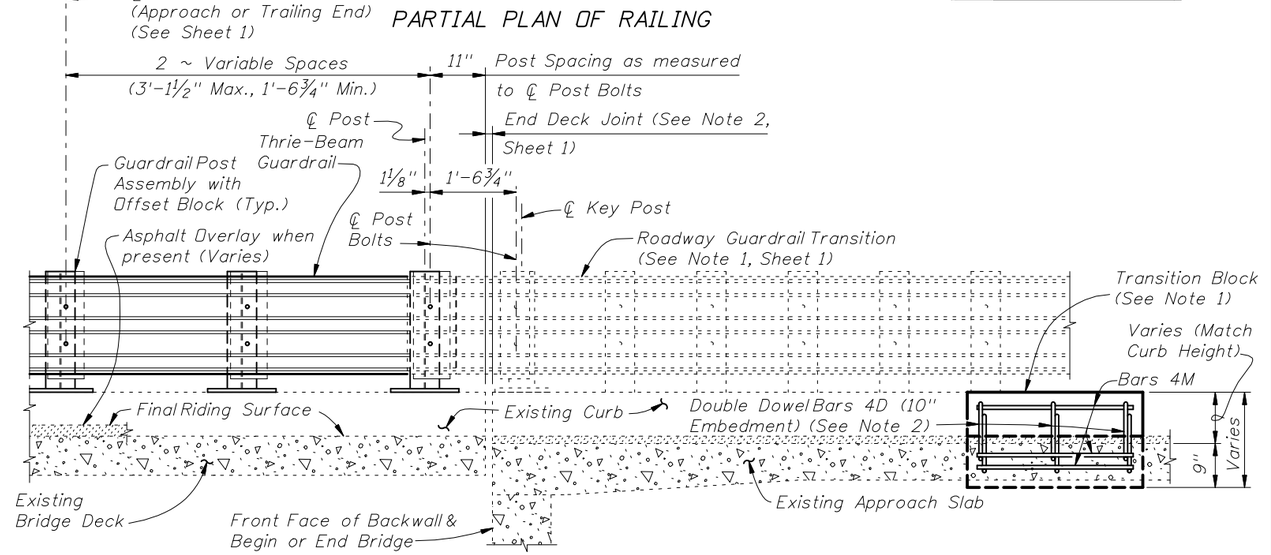
SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

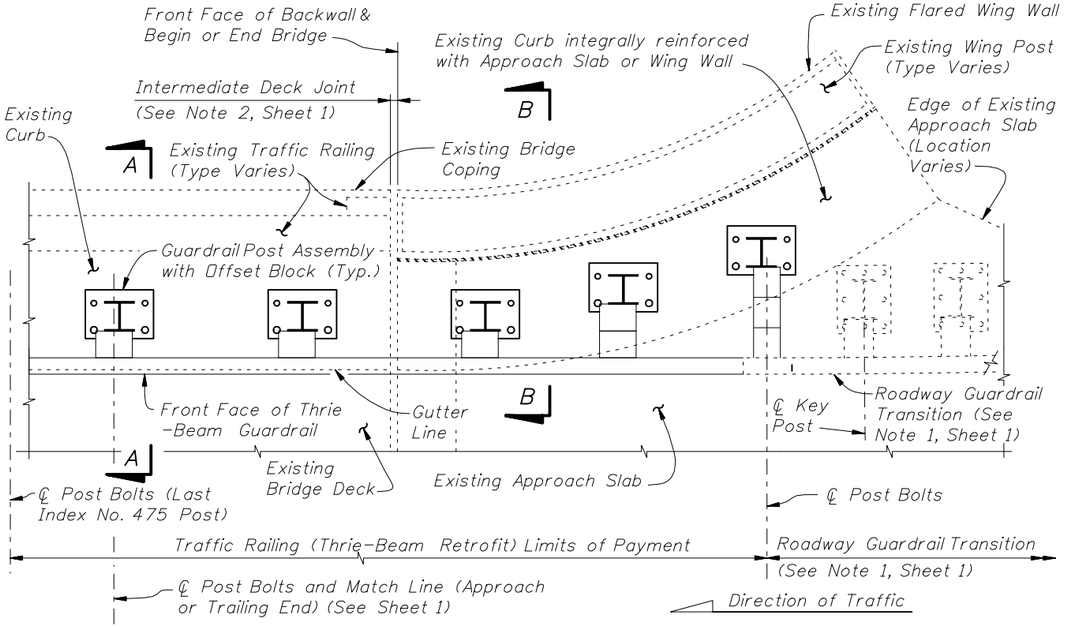
SCHEME 2

RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALKS LESS THAN 6" THICK

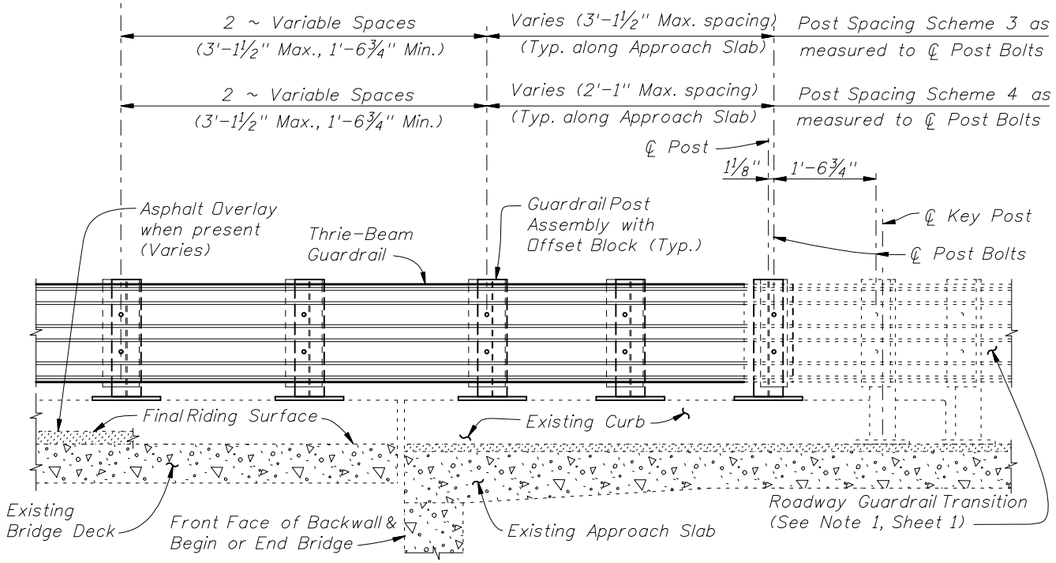
SCHEME 2 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.

2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

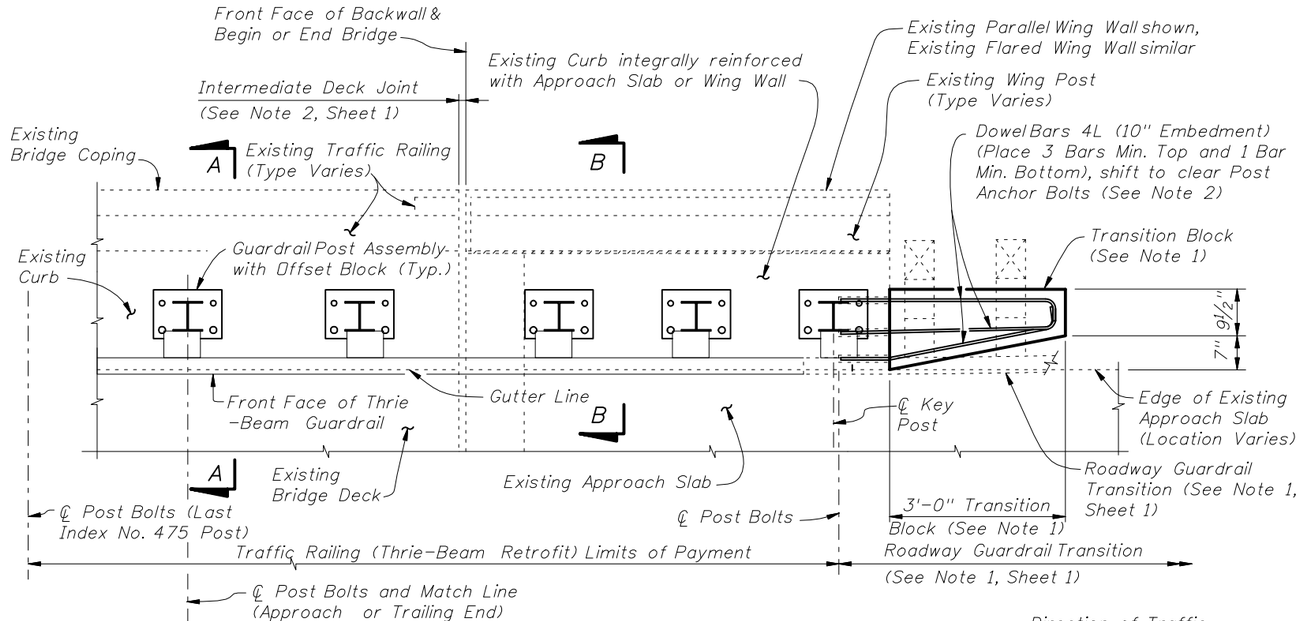


PARTIAL PLAN OF RAILING

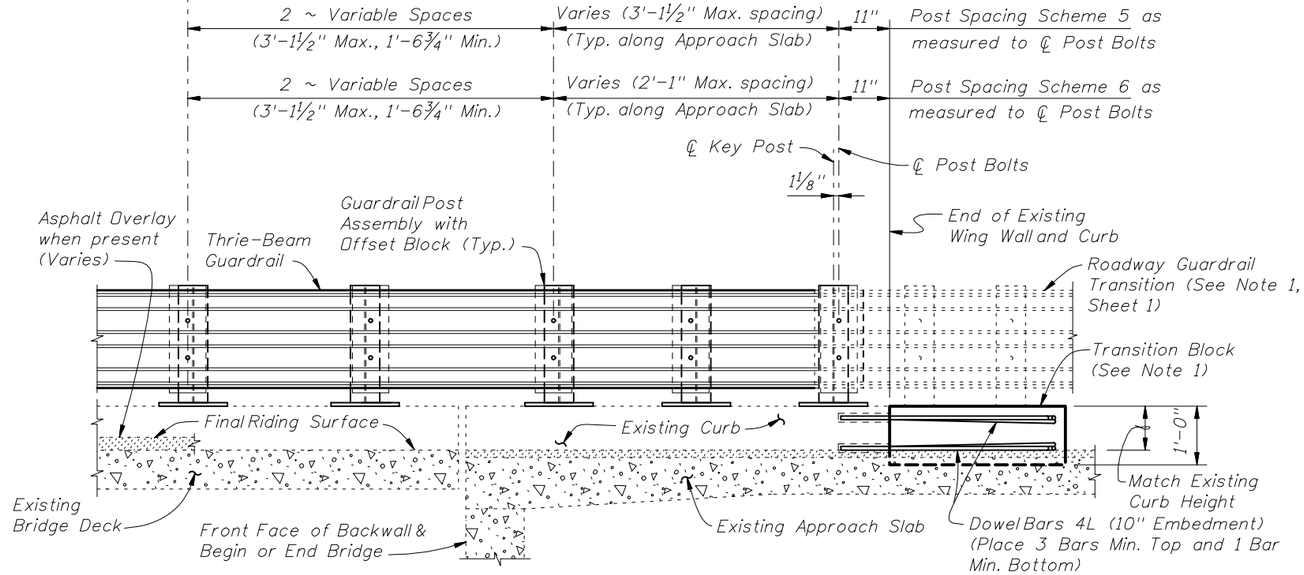


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

SCHEMES 5 AND 6 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

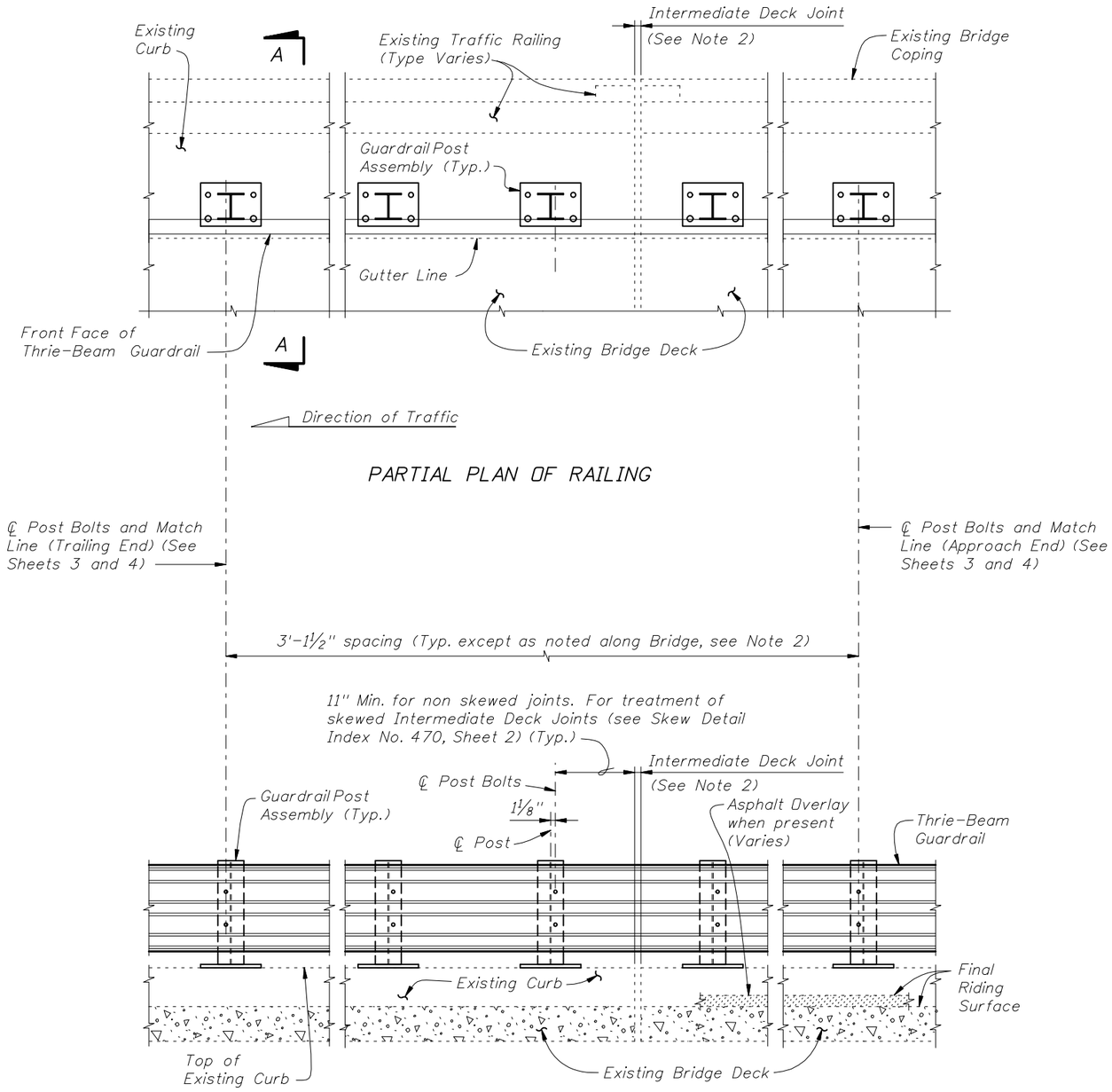
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE CURB TYPE 1

Last Revision	Sheet No.
01/01/08	4 of 4

Index No. 475



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

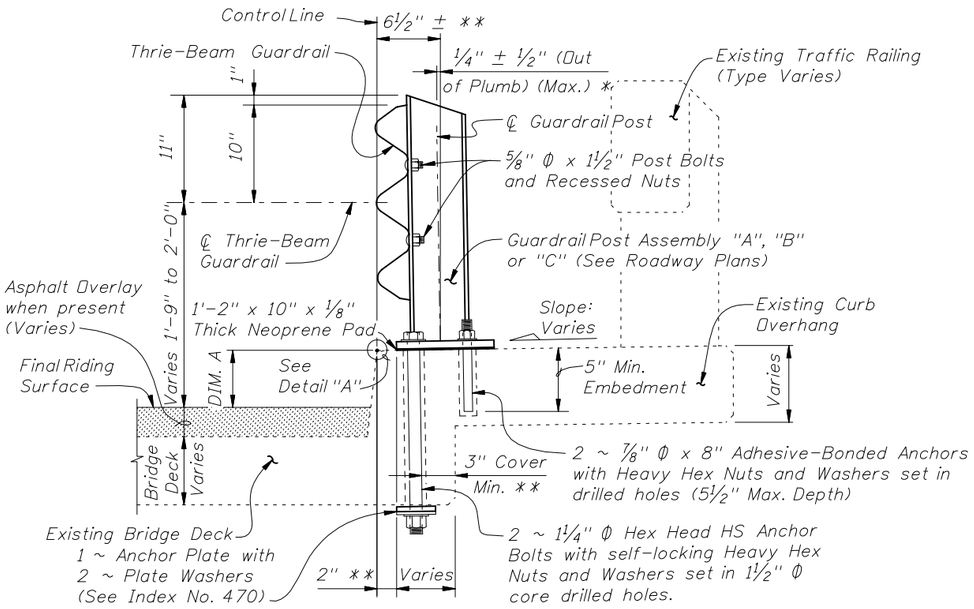
TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

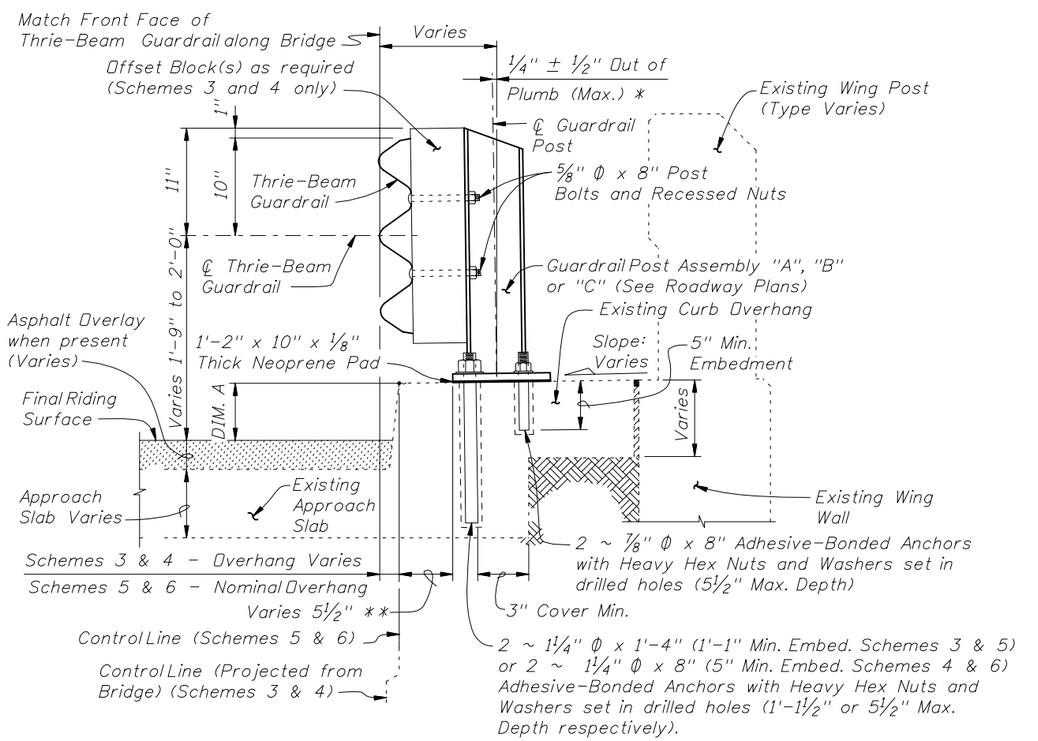
1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 01/01/08	Sheet No. 1 of 4
	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE CURB TYPE 2		Index No. 476



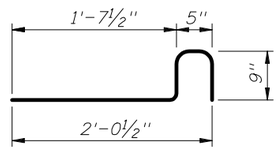
SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



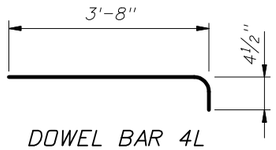
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
D	4	3'-7"
L	4	4'-1"
M	4	2'-8"

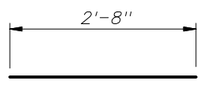
BAR BENDING DIAGRAMS



DOWEL BAR 4D



DOWEL BAR 4L

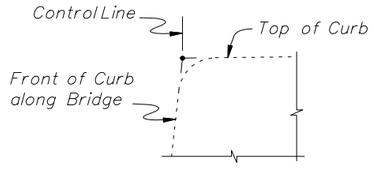


BAR 4M

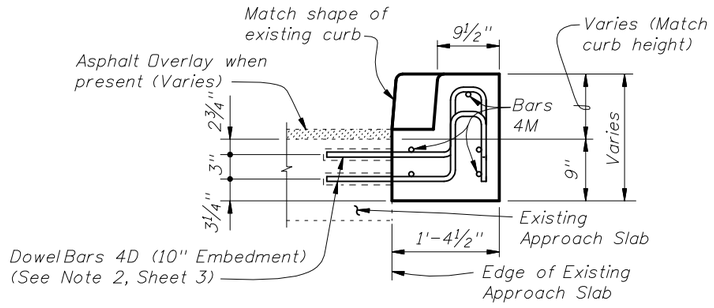
NOTE: All bar dimensions are out to out.

* Shim with washers around Anchors as required to maintain tolerance.

** Offset may vary ± 1" for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

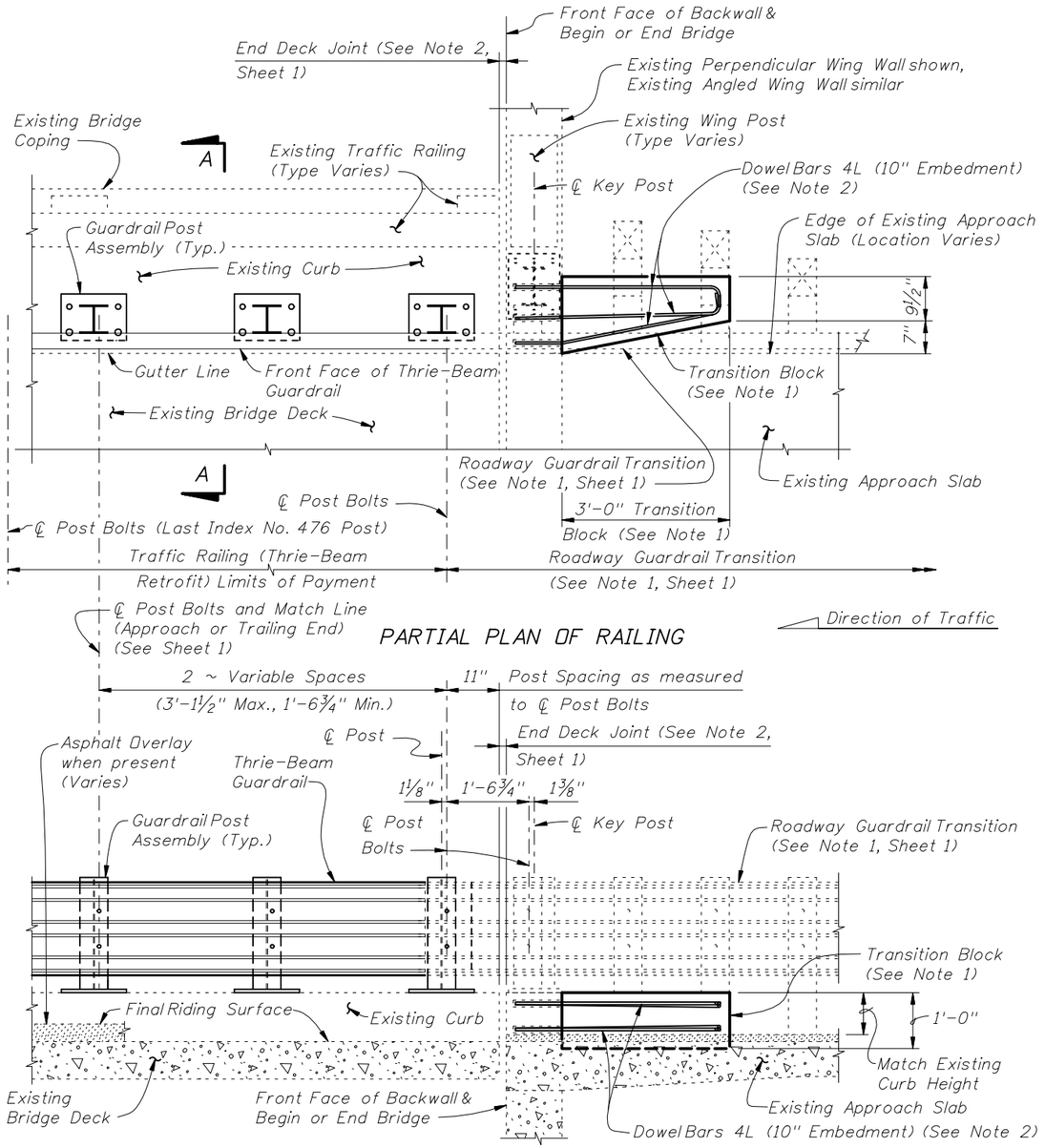


DETAIL "A"



VIEW C-C

CROSS REFERENCES:
For location of Section A-A see Sheet 1, 3 & 4.
For location of Section B-B see Sheet 4.
For location of Section C-C see Sheet 3.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

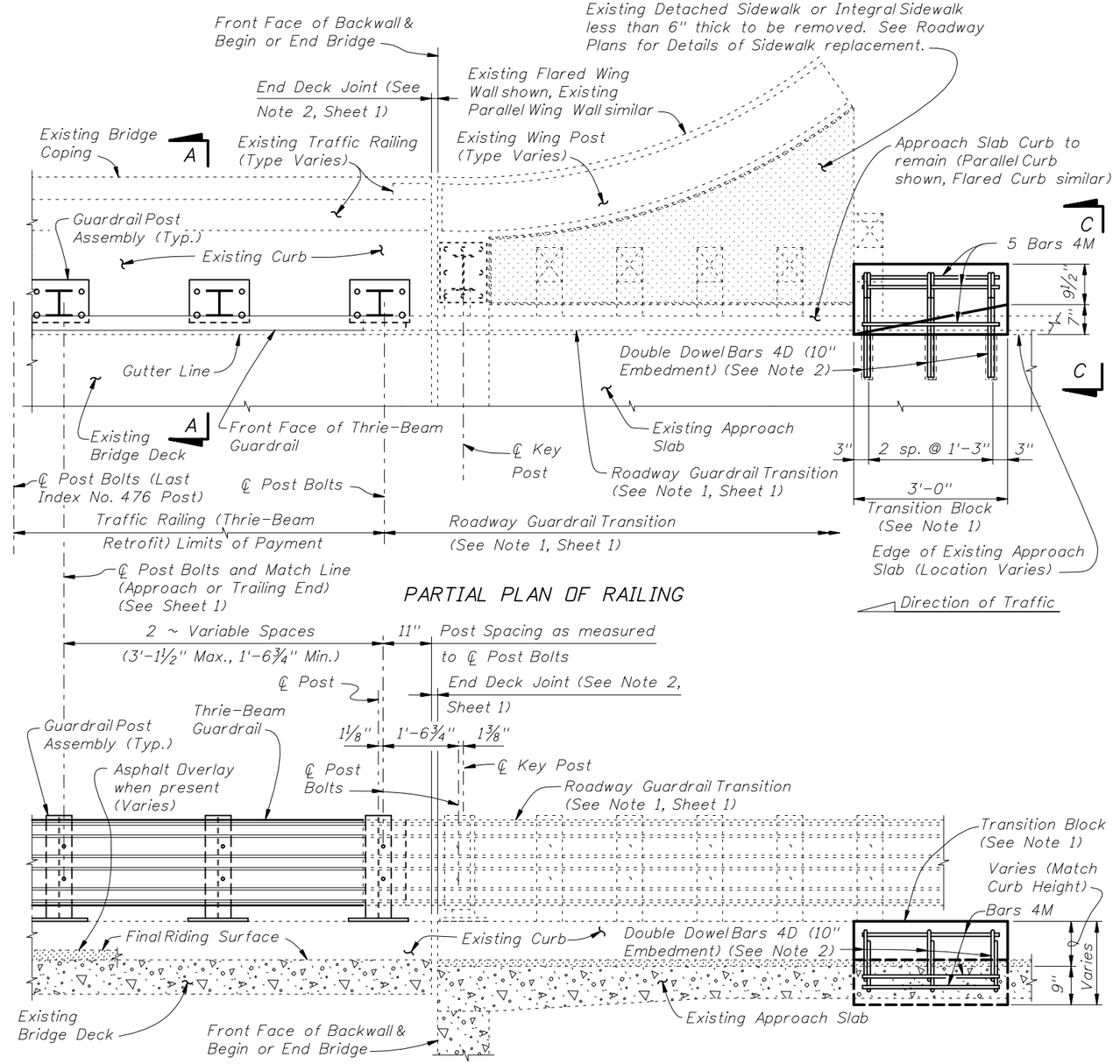
SCHEME 1

RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

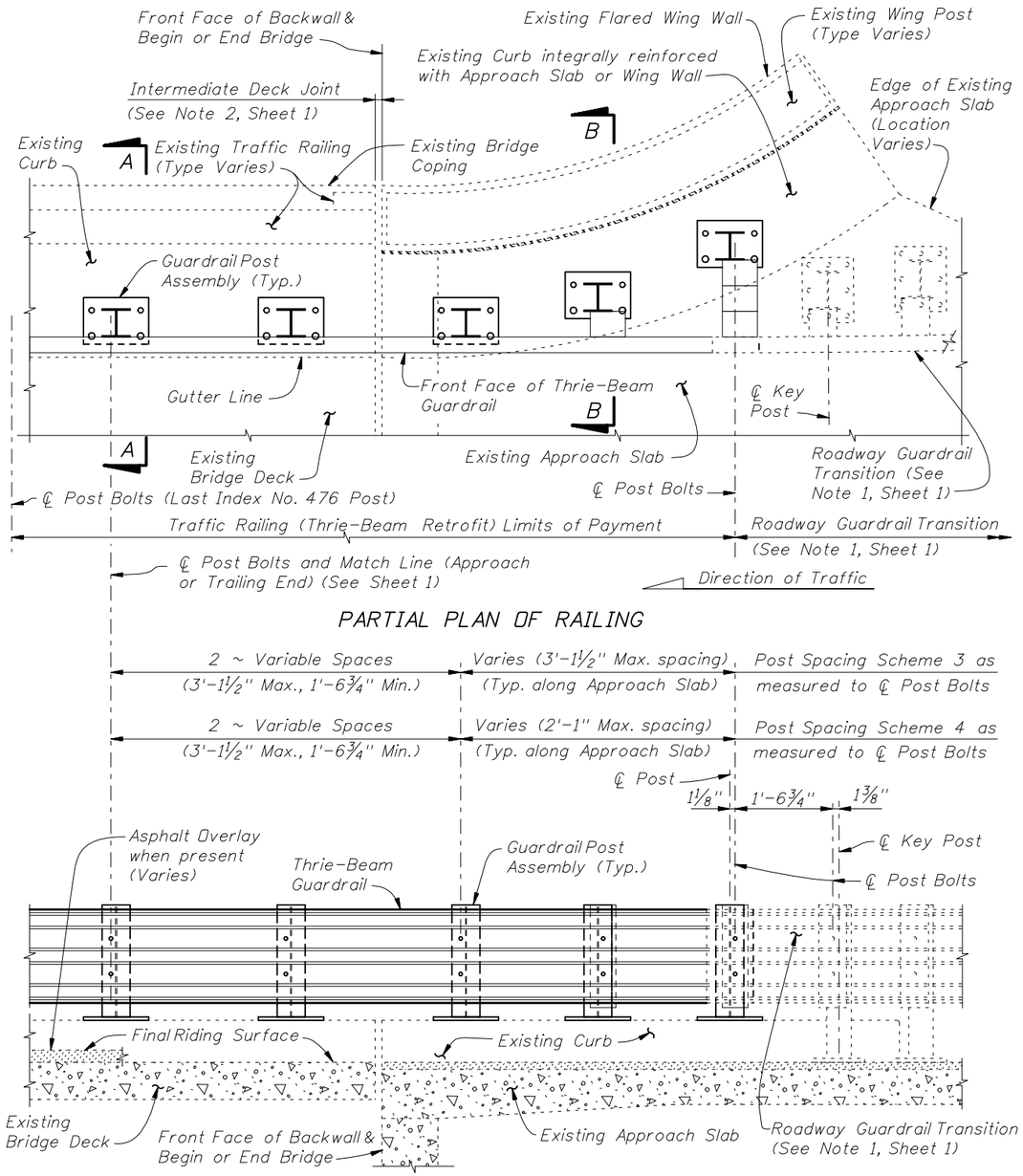
SCHEME 2

RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALK LESS THAN 6" THICK

SCHEME 2 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.

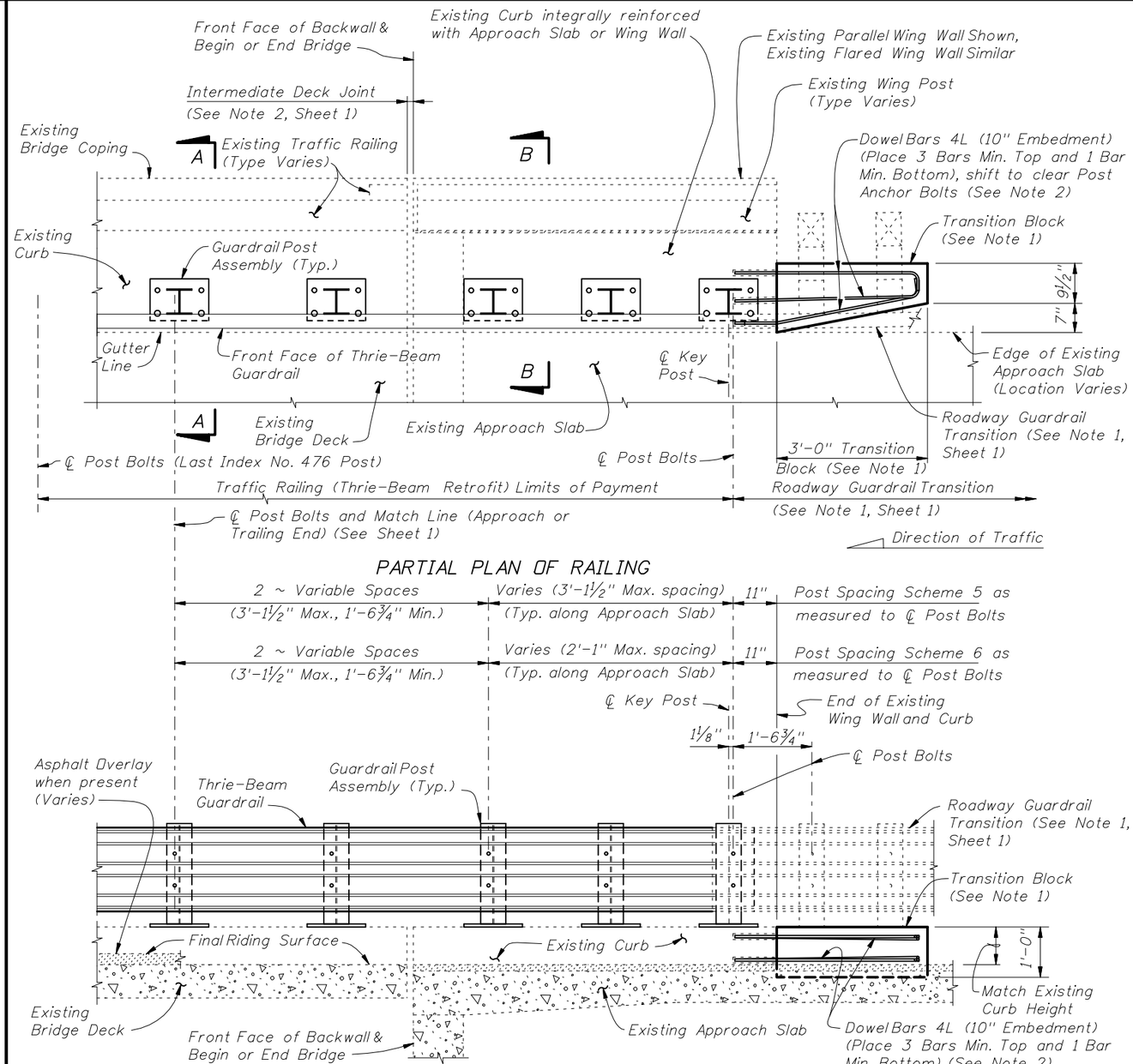
2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

SCHEMES 5 AND 6 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE CURB TYPE 2

Last Revision	Sheet No.
01/01/08	4 of 4

Index No. 476

TRAFFIC RAILING NOTES

This Traffic Railing Retrofit has been structurally evaluated to be equivalent or greater in strength to a design which has been successfully crash tested previously and approved for a NCHRP Report 350 Test Level 4 rating, except for the Tapered End Transition on Index No. 484.

CONCRETE: Concrete for the Traffic Railing (Vertical Face Retrofit), Spread Footing Approaches and replacement curb sections shall be Class IV. Concrete for Curb Transition Blocks shall be Class II (Bridge Deck).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60, except Expansion Dowel Bar B which shall be ASTM A36 smooth round bar hot-dip galvanized in accordance with the Specifications.

EXPANSION SLEEVE ASSEMBLY: Pipe sleeve shall be ASTM D2241 PVC pipe, SDR13.5. End Cap shall be ASTM D2466 PVC socket fitting, Schedule 40. End of Sleeve assembly at railing open joint shall be sealed with silicone to prevent concrete intrusion during railing casting. A compressible expanded polystyrene plug is required in the opposite end of the assembly for correct dowel positioning during railing casting. Correct dowel positioning is required in order to provide for thermal movement of the deck.

ADHESIVE-BONDED ANCHORS AND DOWELS: Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416. The field testing proof loads required by Specification Section 416 shall be 23,800 lbs. for Dowel Bars 6D on the inside face (traffic side) of the railing (1'-0" embedment) and 18,500 lbs for Dowel Bars 6D along the outside face of the traffic railing (5" min. embedment).

BRIDGES ON CURVED ALIGNMENTS: The details presented in these Standards are shown for bridges on tangent alignments. Details for bridges on horizontally curved alignments are similar.

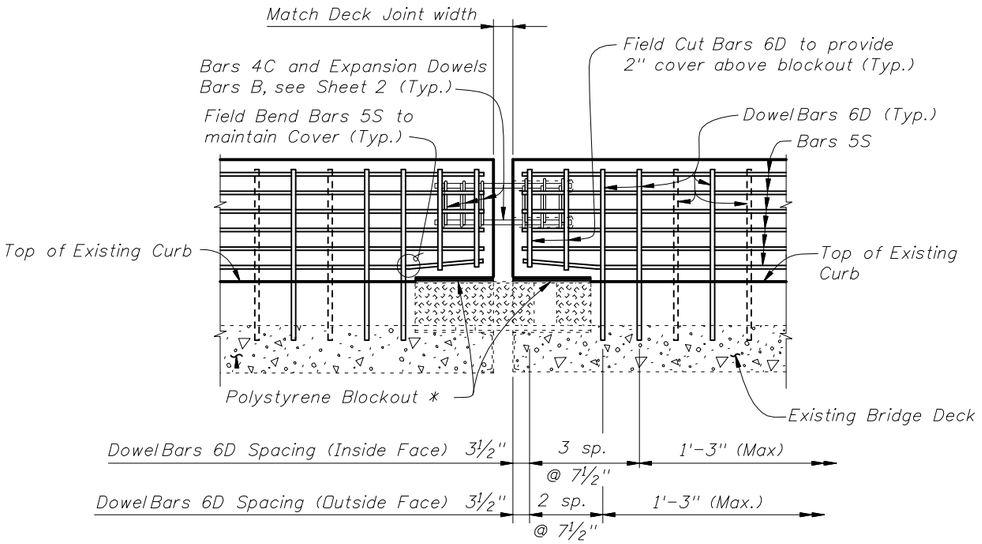
NAME, DATE AND BRIDGE NUMBER: The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Date shall be the year the bridge was constructed. Letters and figures may be 3" tall black plastic as approved by the Engineer or ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

ELEVATION MARKERS: Elevation Markers shall be placed on the top surface of the end bents as directed by the Engineer when portions of the existing traffic railing carrying existing elevation markers are removed. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor.

SURFACE FINISH: Unless otherwise shown in the Plans, place a Class 5 Applied Finish Coating on the top and sides of the Traffic Railing (Vertical Face Retrofit).

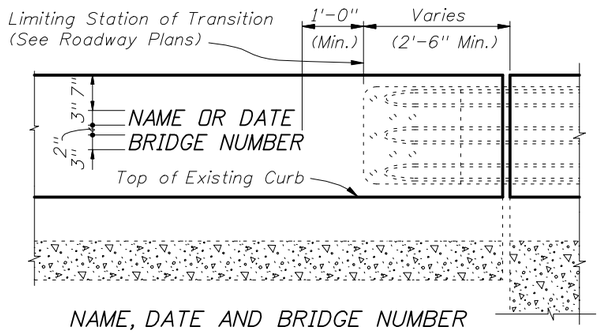
REFLECTIVE RAILING MARKERS: Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table below. Reflector color (white or yellow) shall match the color of the near edgeline.

PAYMENT: Payment under Traffic Railing (Vertical Face Retrofit) include all materials and labor required to construct the railing. Incidental work as required for transition blocks, curbs, spread footings approaches, reflective railing markers (including installation) shall also be included under Traffic Railing (Vertical Face Retofit).



PARTIAL ELEVATION OF RAILING SHOWING INTERIOR FINGER/SLIDING PLATE JOINT
(Beam/Girder, Intermediate Bent or Pier not shown for clairty)

* Place 1" thick polystyrene blockout over limits of bridge deck expansion joint full width to the end of the Traffic Railing to allow for thermal movement. Seal Forms to prevent mortar leakage into the expansion joint.

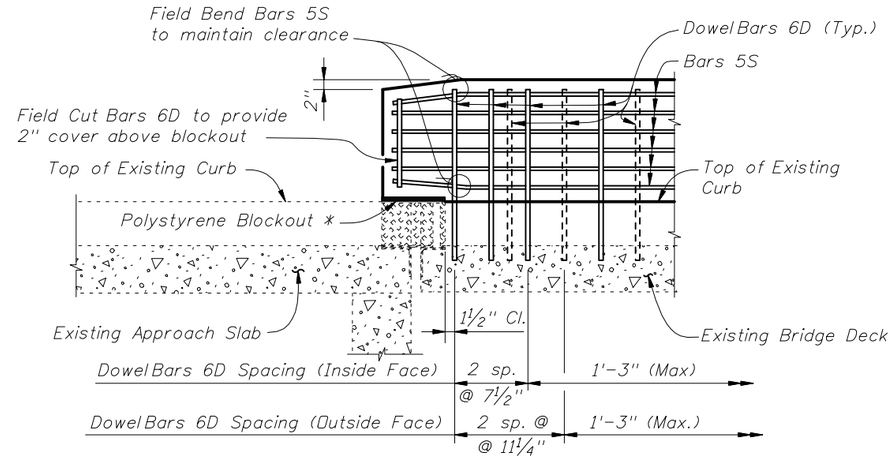


NAME, DATE AND BRIDGE NUMBER LETTERING DETAIL

REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ESTIMATED TRAFFIC RAILING QUANTITIES			
ITEM	UNIT	QUANTITY	
		9" Curb	Increment
Concrete	CY/Ft.	0.064	0.003 per in. height
Reinforcing Steel	Lb./Ft.	13.27	0.10 per in. length

(Quantities are based on a 9" curb, no curb cross slope and 1'-0" embedment length of Bars 6D. If the curb height or embedment length differs from that shown, increase or decrease quantity by the given per inch increment.) See Index No. 484, Sheet 4 for Spread Footing Approach Quantities.



PARTIAL ELEVATION OF RAILING SHOWING SLIDING PLATE JOINT AT BEGIN OR END BRIDGE
(Scheme 1 shown, Schemes 2, 3 and 4 similar)
(Guardrail Transition or continuation of Traffic Railing not show for clarity)

2010 FDOT Design Standards

TRAFFIC RAILING - (VERTICAL FACE RETROFIT) GENERAL NOTES & DETAILS

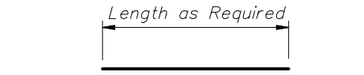
Last Revision 07/01/09

Index No. 480

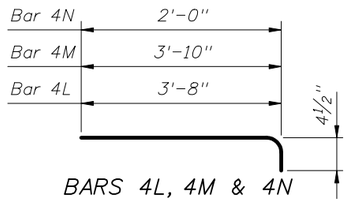
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM

BILL OF REINFORCING STEEL

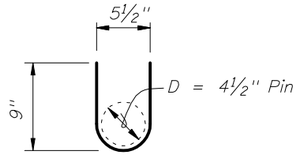
MARK	SIZE	LENGTH	INDEX NO.	NOTE NOS.
A	4	AS REQD.	482 ONLY	3
B	1" Ø	2'-0"	481 THRU 483	2 & 5
C	4	2'-0"	481 THRU 484	1, 2 & 3
D	6	AS REQD.	481 THRU 484	2 & 3
E	5	7'-4"	484 ONLY	1 & 3
F	5	4'-3"	484 ONLY	3
G	4	AS REQD.	484 ONLY	3
L	4	4'-1"	481 THRU 483	1 & 3
M	4	4'-3"	482 ONLY	1 & 3
N	4	2'-5"	482 ONLY	1 & 3
S	5	AS REQD.	481 THRU 484	2, 3 & 4



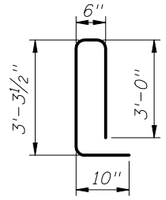
BARS 4A, B, 6D, 5F, 4G & 5S



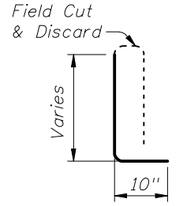
BARS 4L, 4M & 4N



BARS 4C
(12 required per open joint)

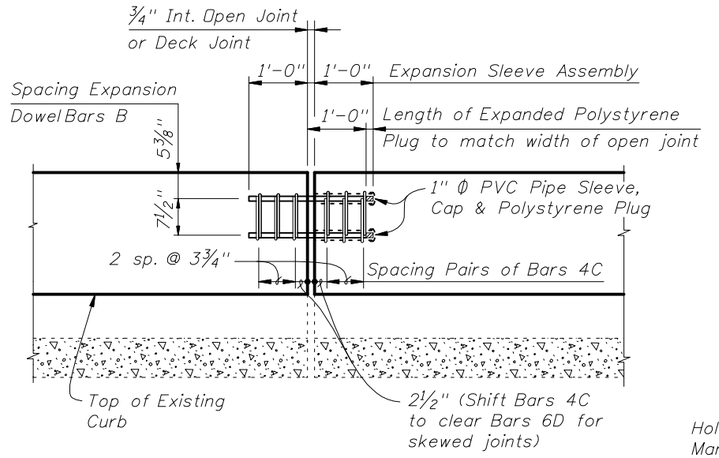


BARS 5E
(Typical Section)

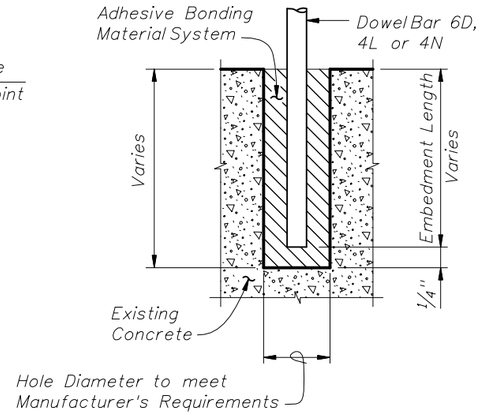


BARS 5E
(Tapered End Transition)

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the railing on a retaining wall shall be the same as detailed for a bridge deck.
3. All reinforcing steel in the Vertical Face Retrofit Railing shall have a 2" minimum cover.
4. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".
5. Expansion Dowel Bars B shall be ASTM A36 smooth round bar and hot-dip galvanized in accordance with the Specifications.



OPEN JOINT EXPANSION DOWEL DETAIL
(Railing Reinforcing Not Shown For Clarity)

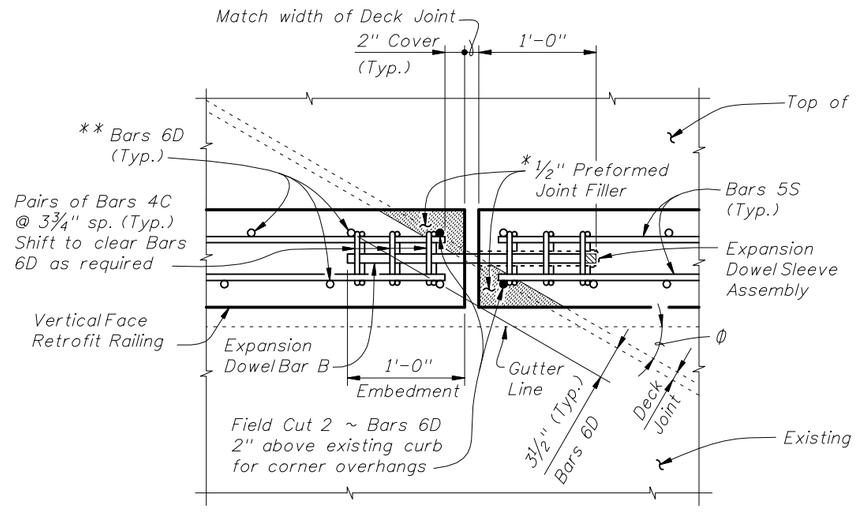


DOWEL DETAIL

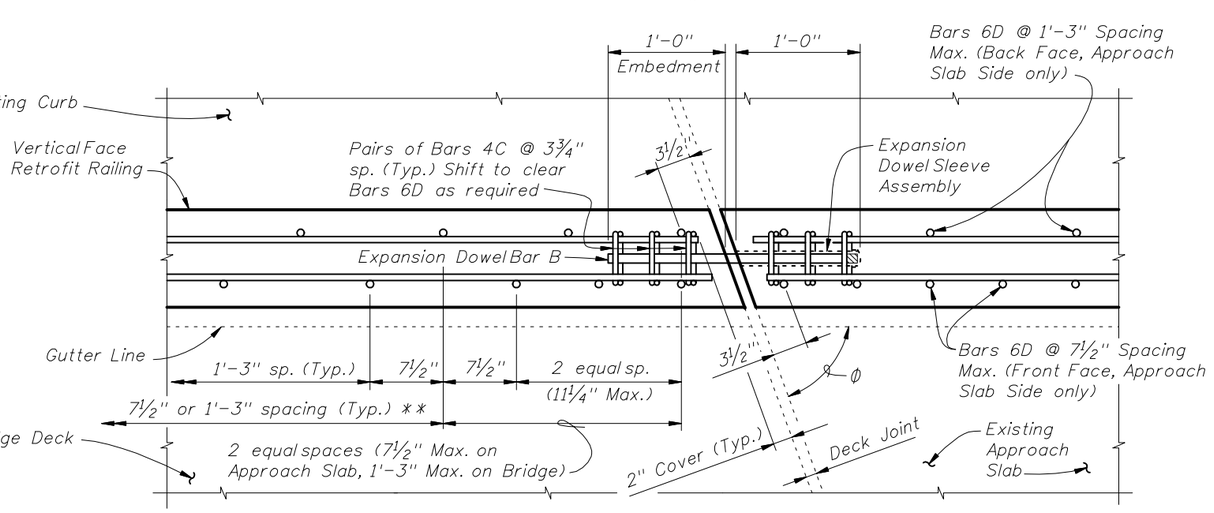
Dowel Installation Notes:
1. Shift dowel holes to clear if the existing reinforcement is encountered.
2. See individual Standards Index Nos. 481 thru 484 for required embedment length of Bars 6D, 4L or 4N.

* ½" Preformed Joint Filler at top of Existing Curb shall extend beyond the joint material (Silicone, poured rubber, armored neoprene seal or sliding plates) as shown to prevent concrete intrusion during railing casting and shall be placed so as not to restrict in any way normal joint movement.

** See individual Standard Index Nos. 481 thru 484 for spacing of Bars 6D.



PARTIAL PLAN OF RAILING (SKEW ANGLE Ø LESS THAN 70°)
(Skewed Deck Joint at Begin or End Bridge Shown, Skewed Deck Joint at Intermediate Pier or Bent Similar)



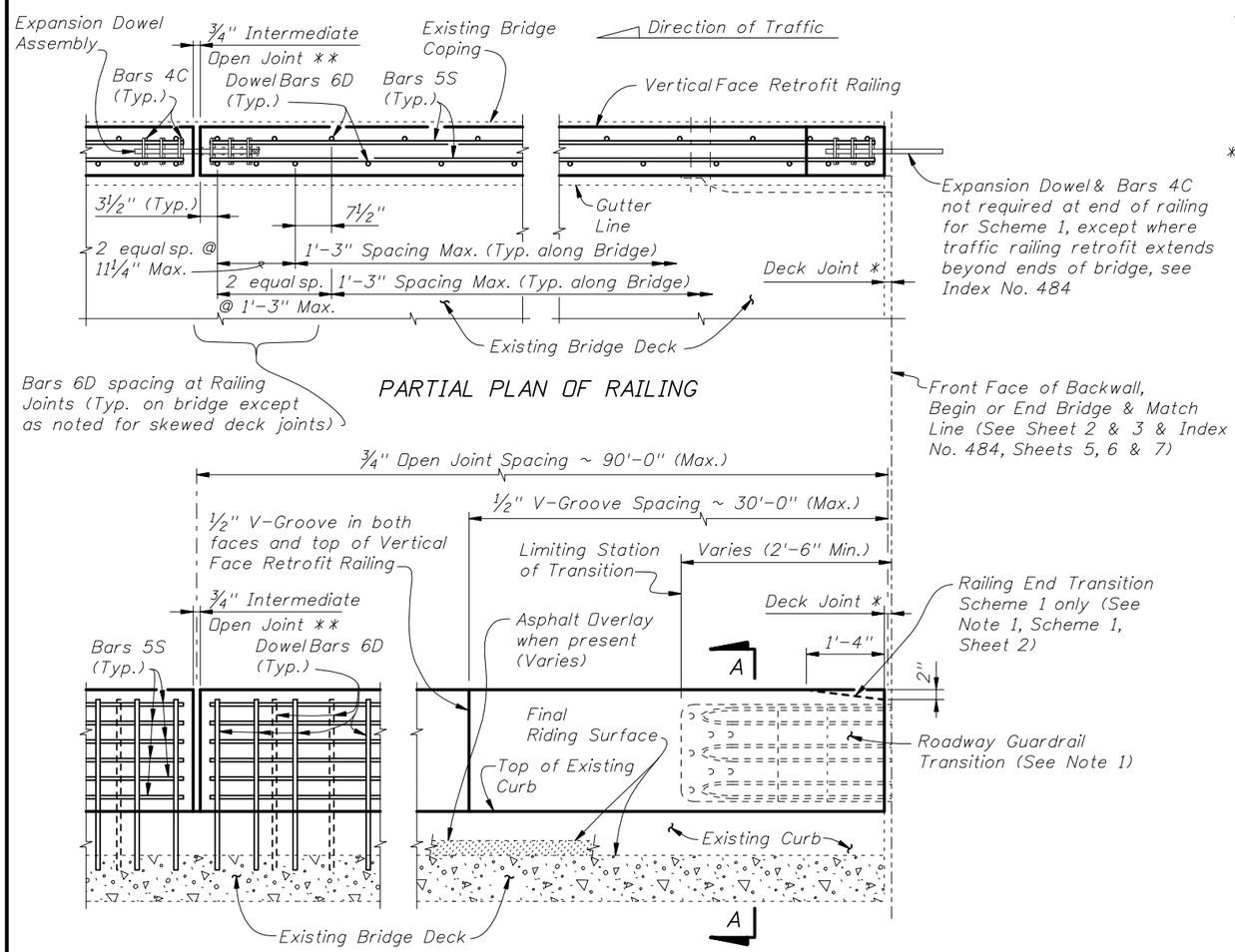
PARTIAL PLAN OF RAILING (SKEW ANGLE Ø = 70° OR GREATER)
(Skewed Deck Joint at Begin or End Bridge Shown, Skewed Deck Joint at Intermediate Pier or Bent Similar)

SKEW DETAIL

2010 FDOT Design Standards

TRAFFIC RAILING - (VERTICAL FACE RETROFIT) GENERAL NOTES & DETAILS

Last Revision	Sheet No.
07/01/09	2 of 2
Index No.	
480	



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies & Bars 4C not shown for clarity)

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

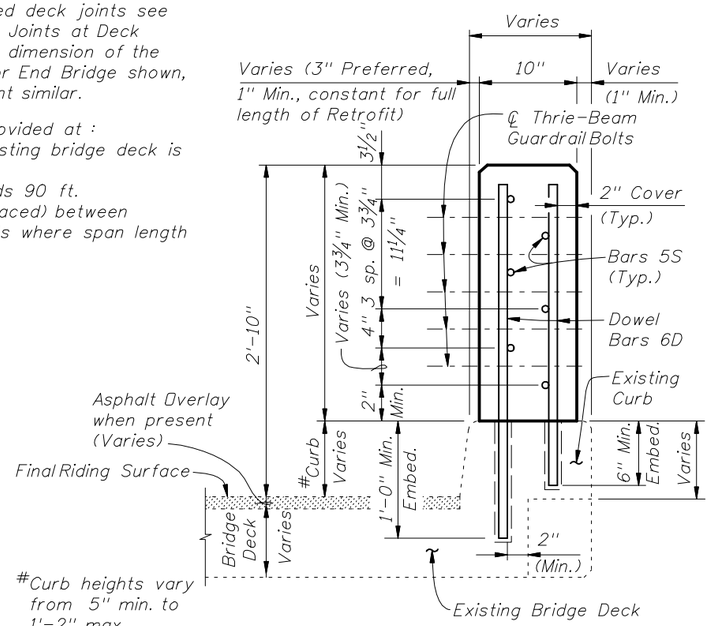
1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2 or 3, Index No. 481, Sheet 2 and 3. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.

2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.

3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.

* Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Open Railing Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at ℄ Pier or Intermediate Bent similar.

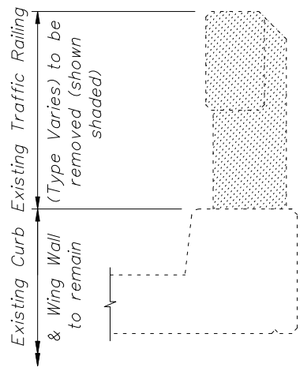
** ¾" Intermediate Open Joints shall be provided at :
(1) – Substructure supports where existing bridge deck is continuous.
(2) – Midspan where span length exceeds 90 ft.
(3) – Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.



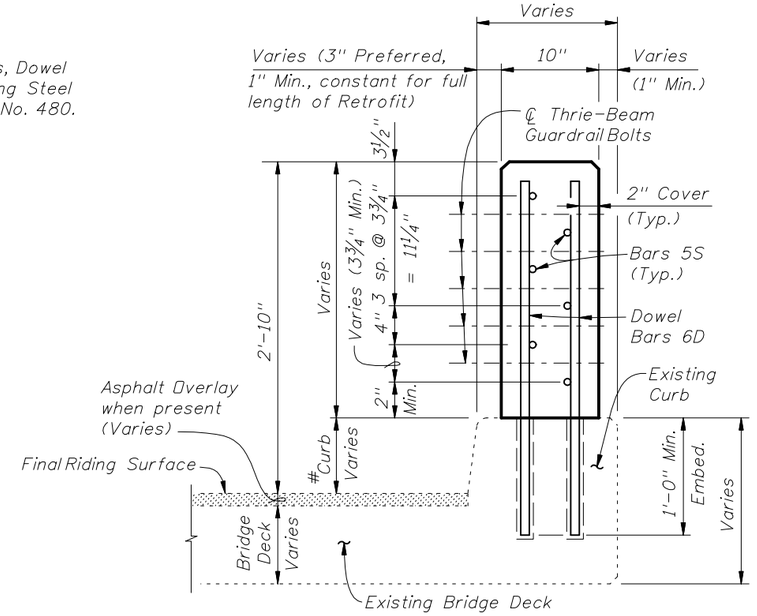
SECTION A-A
TYPICAL SECTION THRU RAILING ON CURB WITH CORBELS

CROSS REFERENCE:

For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagrams see Index No. 480.



TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL
(BRIDGE DECK SHOWN, WING WALL SIMILAR)



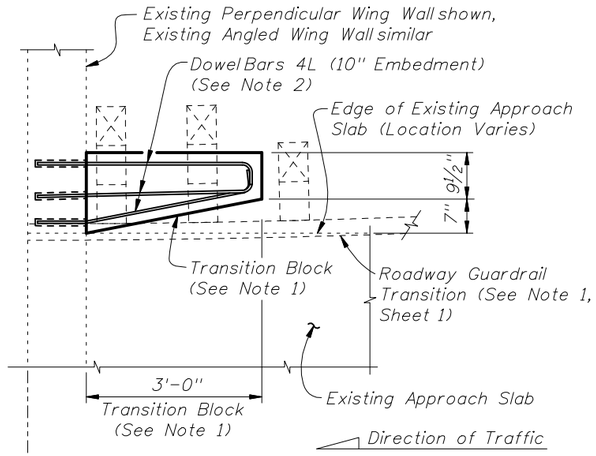
SECTION A-A
TYPICAL SECTION THRU RAILING ON FULL DEPTH CURB (BRIDGE SHOWN, WING WALL SIMILAR)

2010 FDOT Design Standards

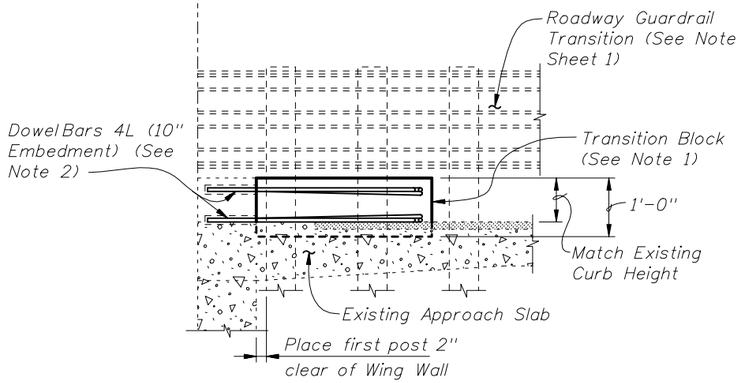
TRAFFIC RAILING - (VERTICAL FACE RETROFIT) NARROW CURB

Last Revision	Sheet No.
07/01/09	1 of 3

Index No. 481



PARTIAL PLAN OF GUARDRAIL



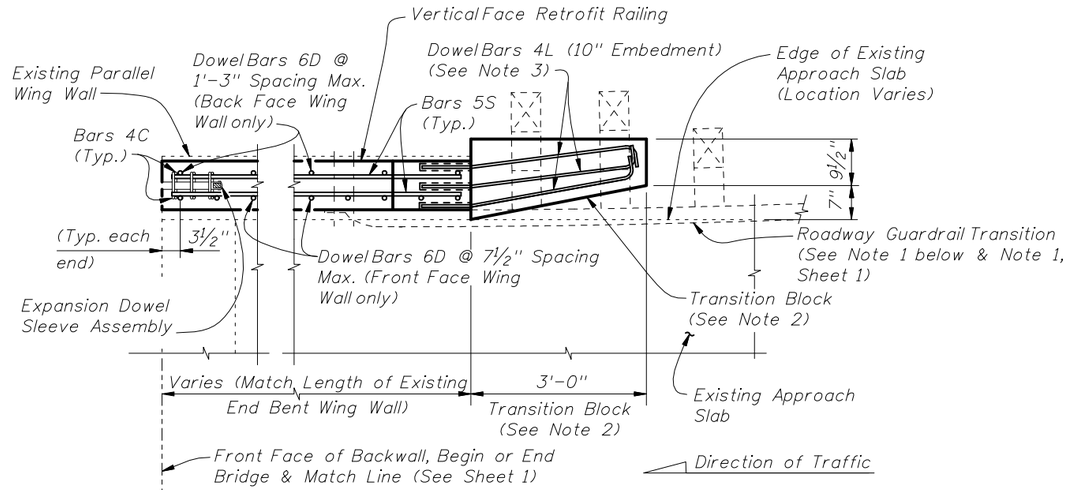
PARTIAL ELEVATION OF INSIDE FACE OF GUARDRAIL

SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

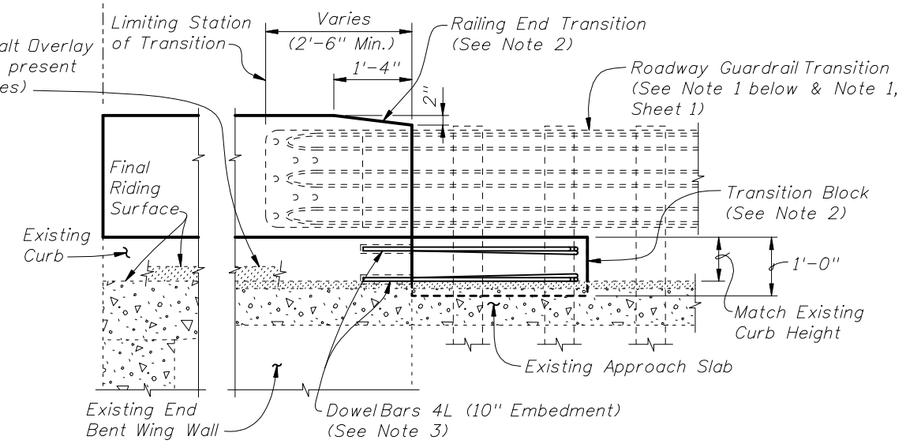
SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

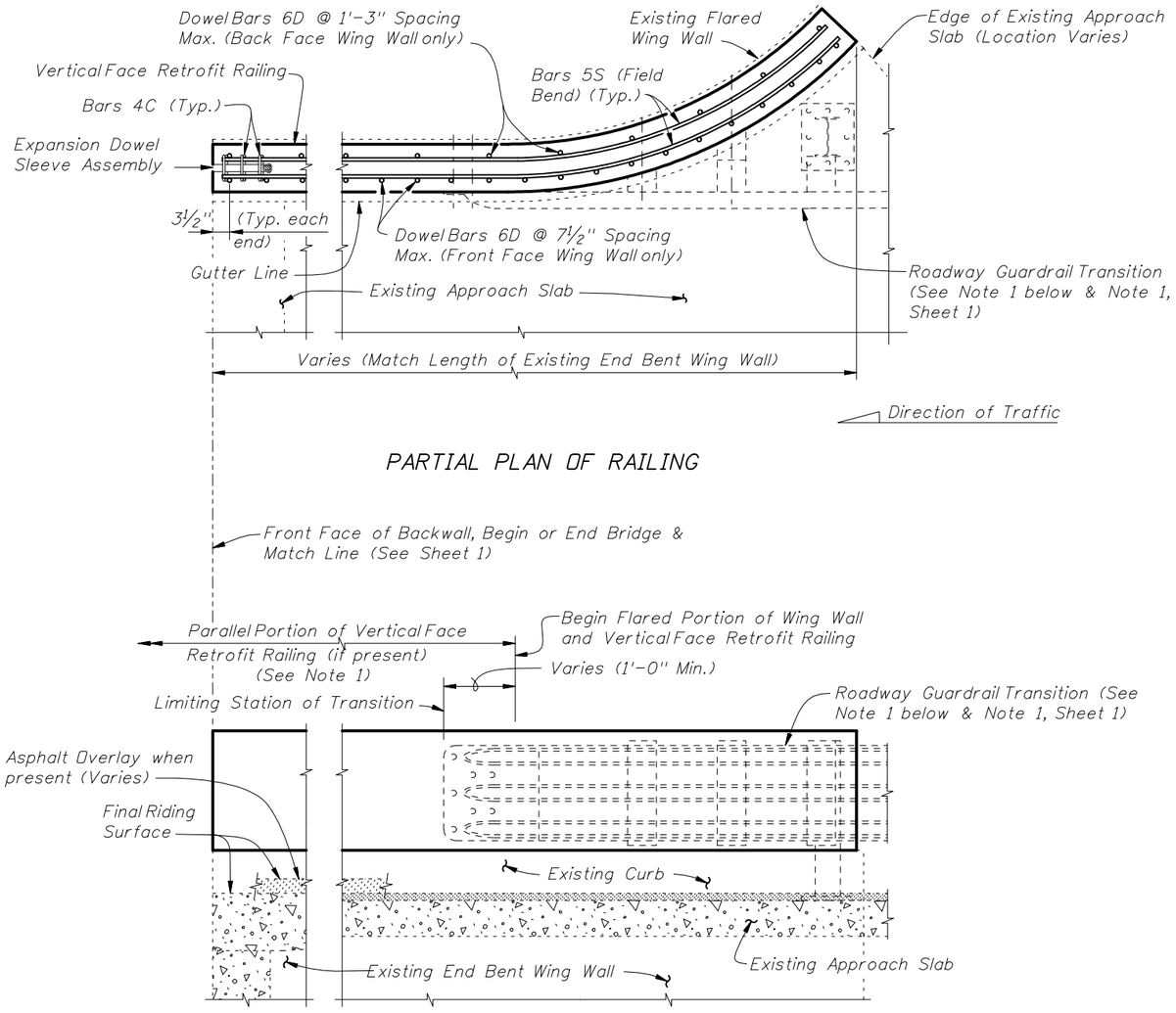
SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS

SCHEME 2 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Index No. 481, Sheet 1. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing.

2. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

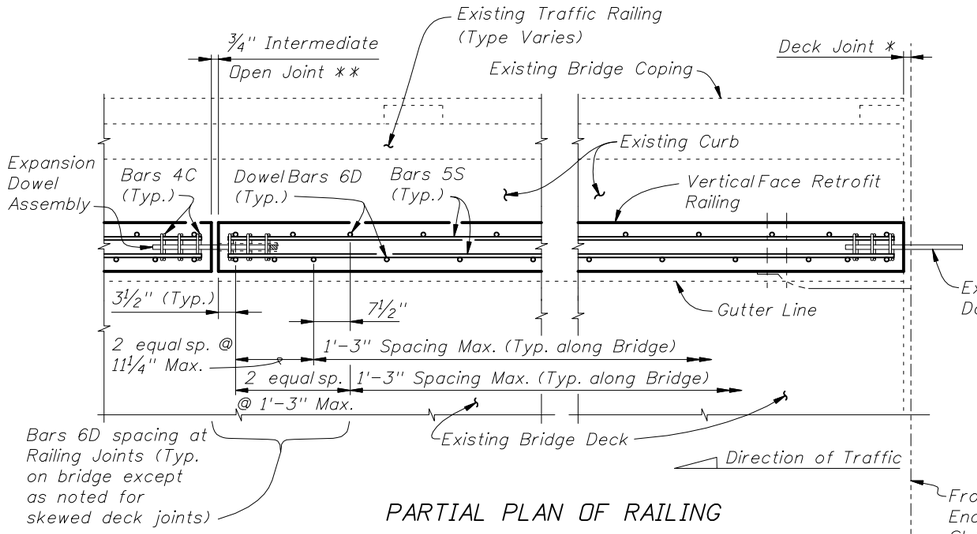
3. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



SCHEME 3 NOTE:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.

SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS



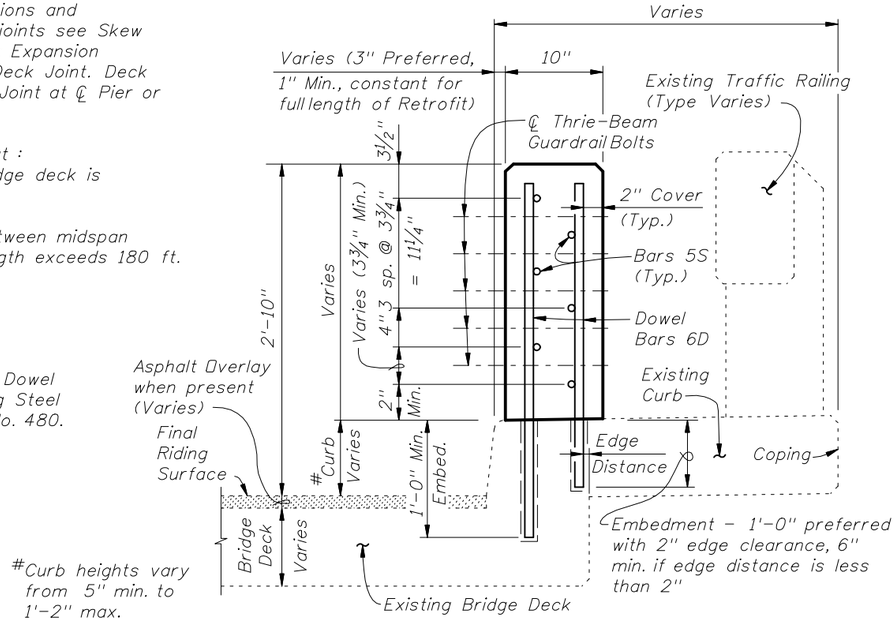
PARTIAL PLAN OF RAILING

* Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Open Railing Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at ℄ Pier or Intermediate Bent similar.

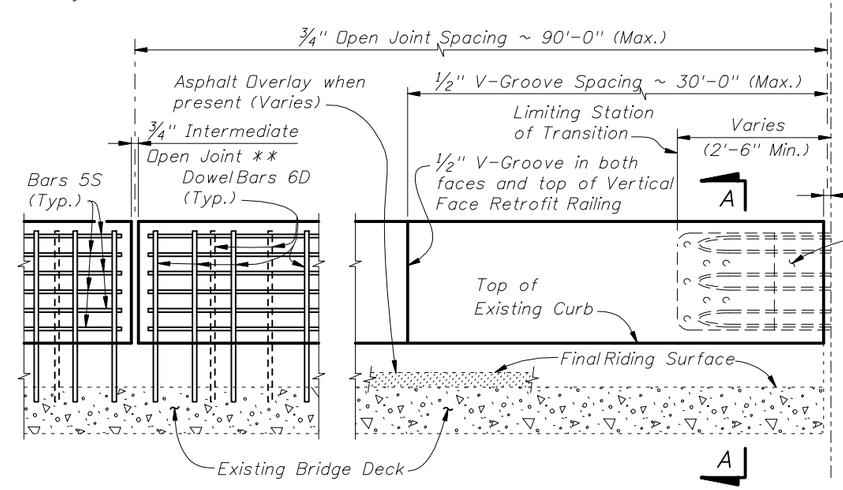
** ¾" Intermediate Open Joints shall be provided at :
(1) – Substructure supports where existing bridge deck is continuous.
(2) – Midspan where span length exceeds 90 ft.
(3) – Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.

CROSS REFERENCE:

For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagrams see Index No. 480.



SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing, Expansion Dowel Assemblies & Bars 4C not shown for clarity)

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2, 3, 4 or 5, Sheets 3 and 4. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.

2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.

3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.

TYPICAL SECTION THRU EXISTING APPROACH SLAB AND END BENT WING WALL SHOWING LIMITS OF REMOVAL (SCHEMES 4 AND 5 ONLY)

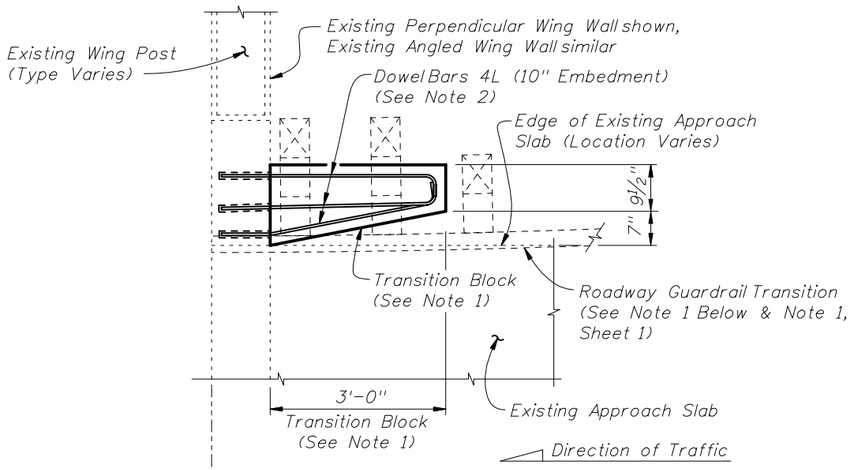
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 2 AND 3 ONLY)

2010 FDOT Design Standards

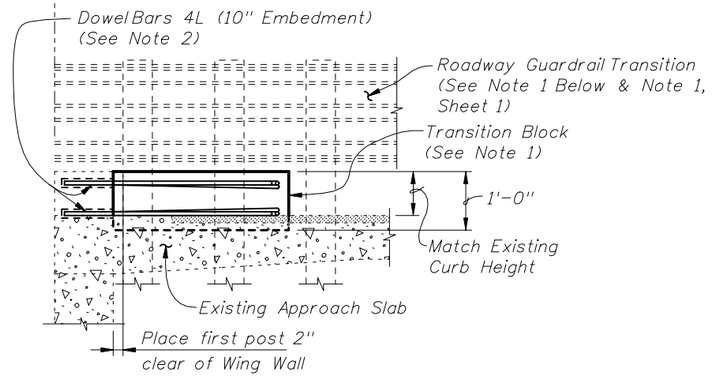
TRAFFIC RAILING - (VERTICAL FACE RETROFIT) WIDE CURB

Last Revision	Sheet No.
07/01/09	1 of 4

Index No. 482



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF GUARDRAIL
(Existing Wing Post not shown for clarity)

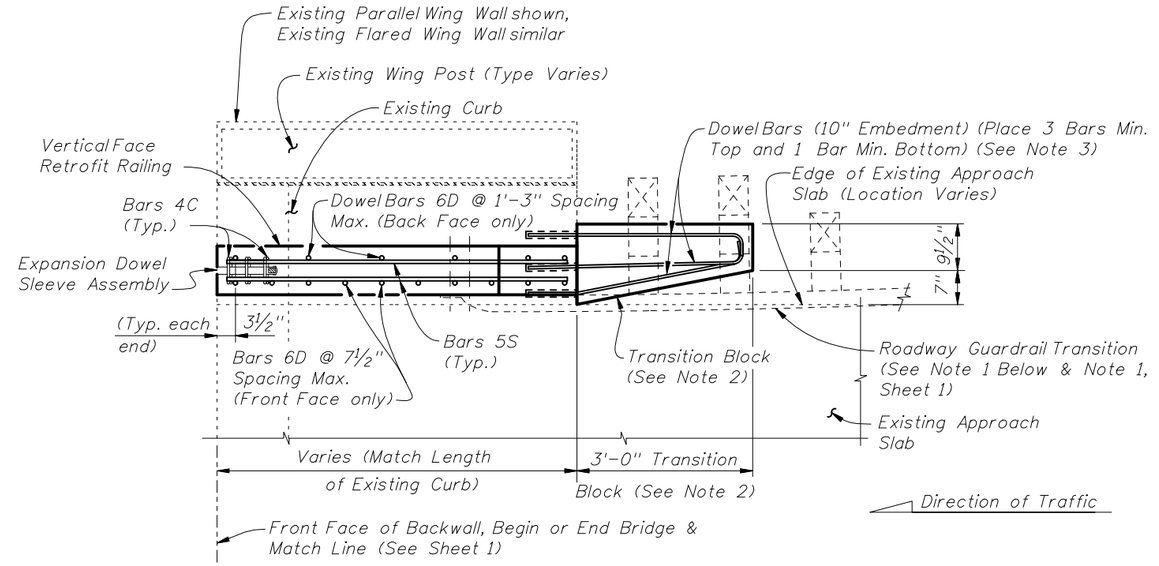
SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

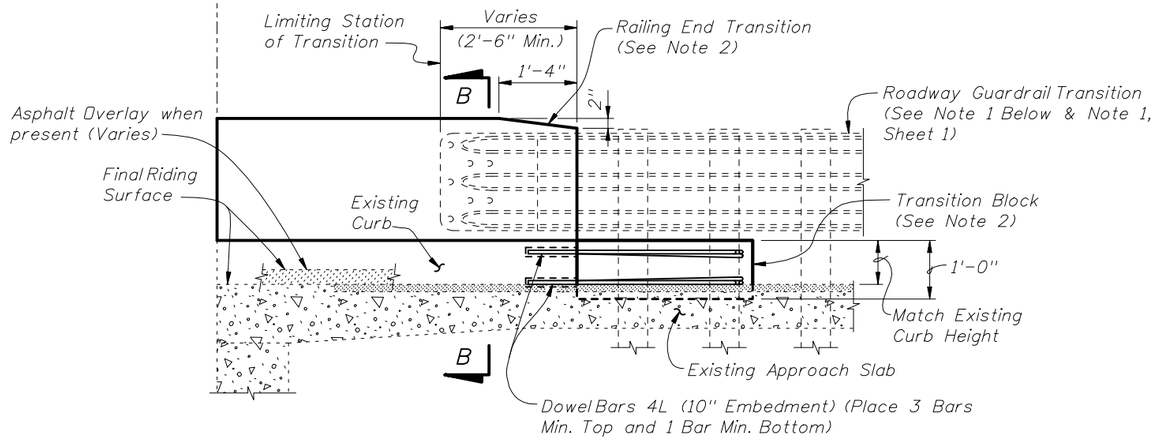
1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

3. If a Special Steel Guardrail Post is required for attachment to the top of a sloping Wing Wall, saw cut and remove a wedge shaped portion of the sloping Wing Wall as required to provide a level surface for post installation.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

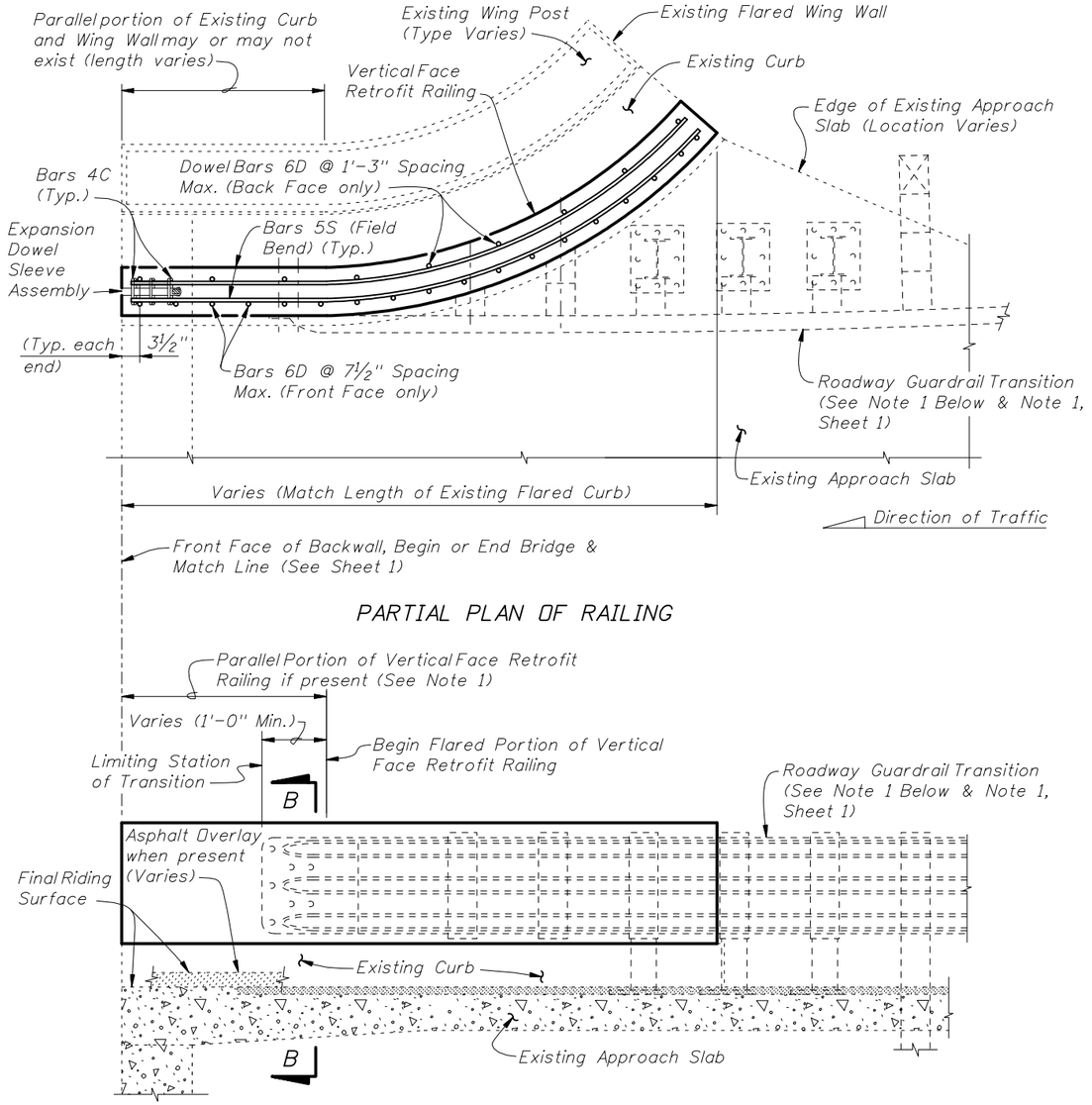
SCHEME 2
RAILING END TREATMENT FOR PARALLEL CURBS

SCHEME 2 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing.

2. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

3. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



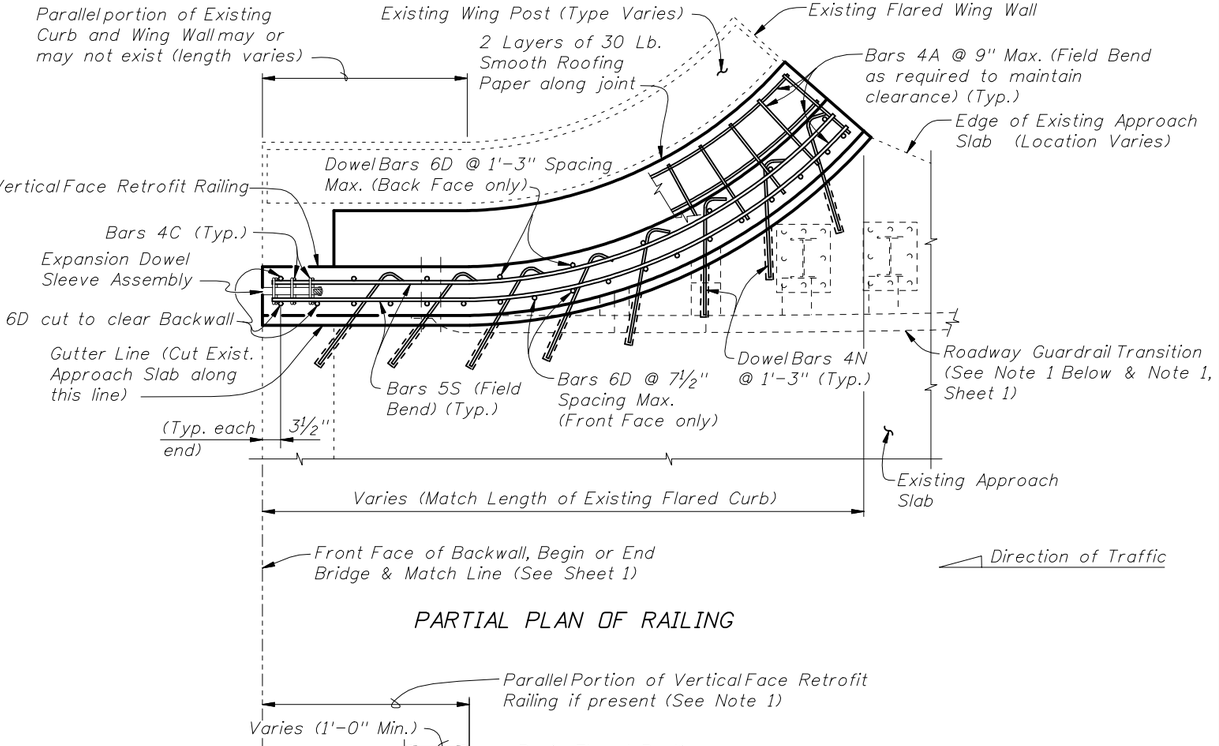
PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 3
RAILING END TREATMENT FOR FLARED CURBS

SCHEME 3 NOTE:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.



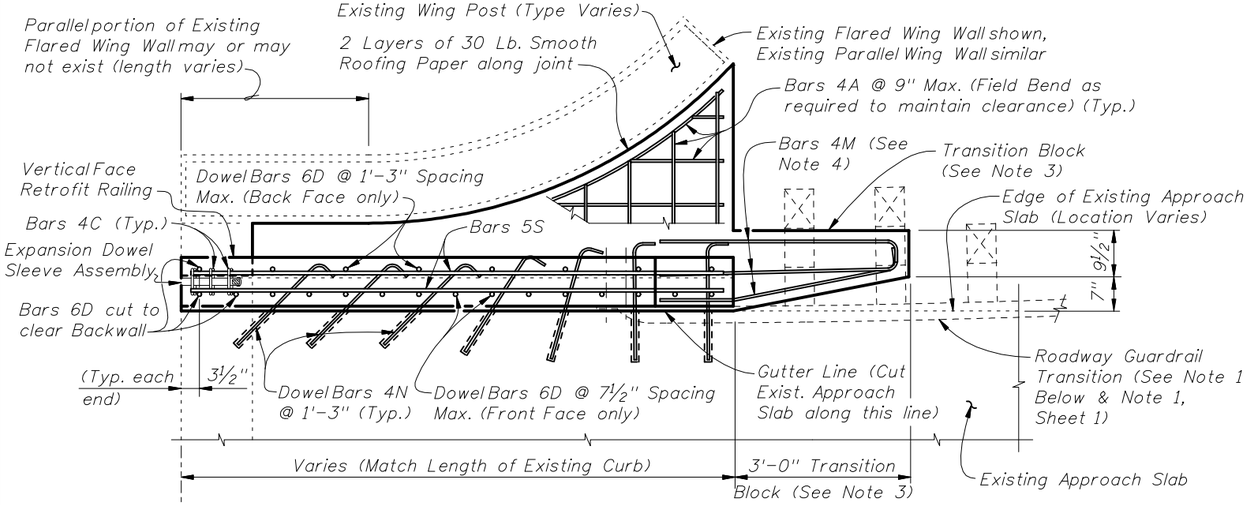
PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

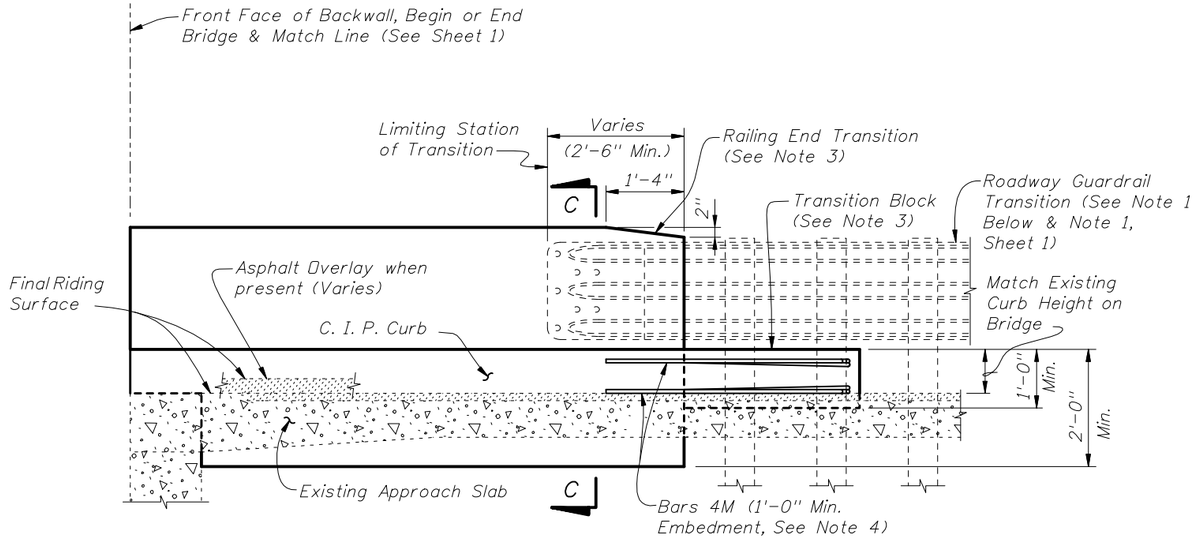
SCHEME 4
RAILING END TREATMENT FOR FLARED CURBS

SCHEME 4 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see , Sheet 1.
2. Dowel Bars 4N may be installed on a maximum angle of 45° to the cut edge of the Approach Slab as shown to facilitate drilling of holes and installation of bars.
3. At the Contractor's option, along the length of the Approach Slab curb that is to be replaced, Dowel Bars 6D may be cast in with the new section of curb as shown or they may be installed in drilled holes in the new section of curb using an Adhesive Bonding Material System with a 1'-0" minimum embedment.

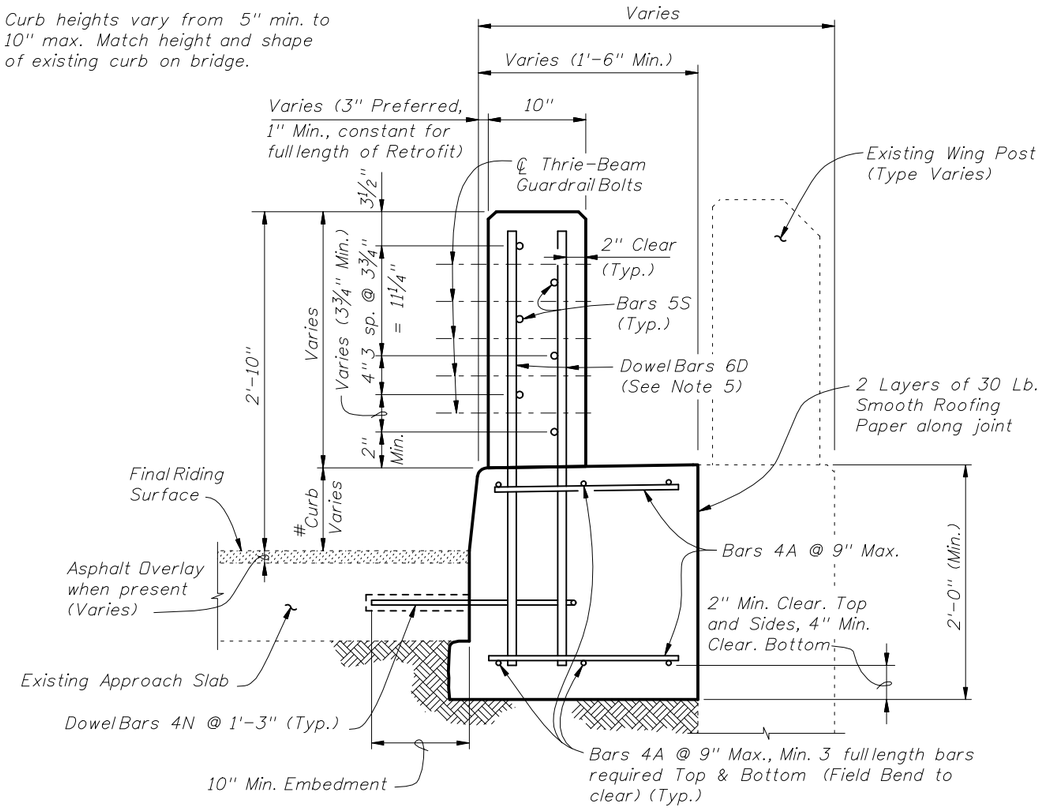


PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 5
RAILING END TREATMENT FOR PARALLEL CURBS



SECTION C-C
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEME 4 SHOWN, SCHEME 5 SIMILAR)

SCHEME 5 NOTES:

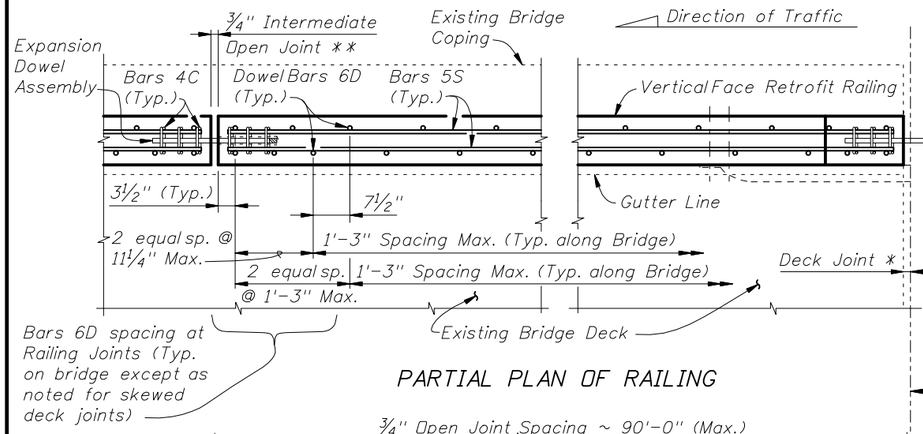
1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.
2. Dowel Bars 4N may be installed on a maximum angle of 45° to the cut edge of the Approach Slab as shown to facilitate drilling of holes and installation of bars.
3. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.
4. Field bend Dowel Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.
5. At the Contractor's option, along the length of the Approach Slab curb that is to be replaced, Dowel Bars 6D may be cast in with the new section of curb as shown or they may be installed in drilled holes in the new section of curb using an Adhesive Bonding Material System with a 1'-0" minimum embedment.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

TRAFFIC RAILING - (VERTICAL FACE RETROFIT) WIDE CURB

Last Revision	Sheet No.
07/01/05	4 of 4
Index No.	
482	



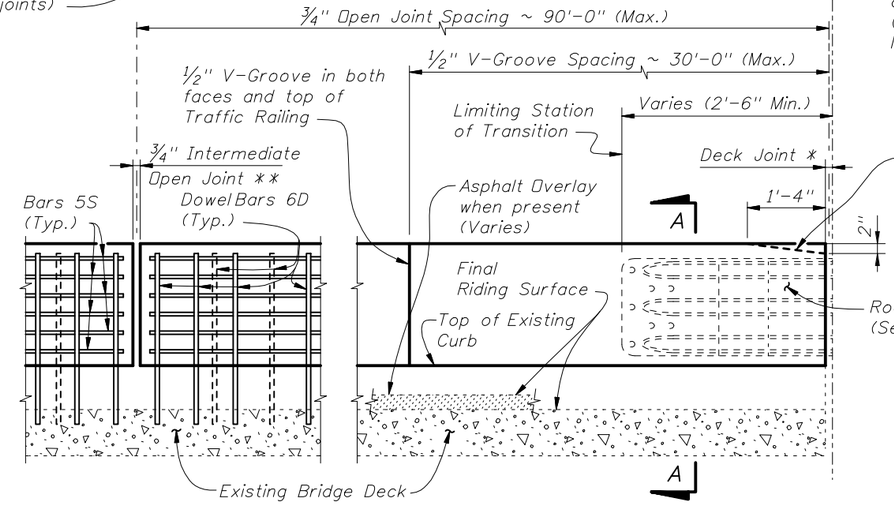
PARTIAL PLAN OF RAILING

* Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Open Railing Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at ℄ Pier or Intermediate Bent similar.

** ¾" Intermediate Open Joints shall be provided at :
(1) – Substructure supports where existing bridge deck is continuous.
(2) – Midspan where span length exceeds 90 ft.
(3) – Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.

Expansion Dowel & Bars 4C not required at end of railing for Scheme 1, except where traffic railing retrofit extends beyond ends of bridge, see Index No. 484

Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 2 and 3 and Index No. 484, Sheets 5, 9 & 10.)

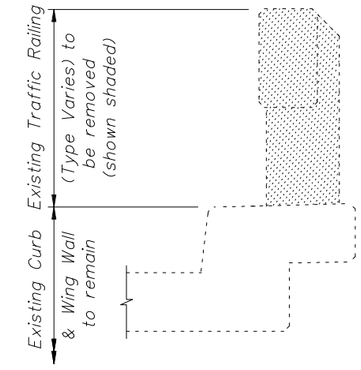


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

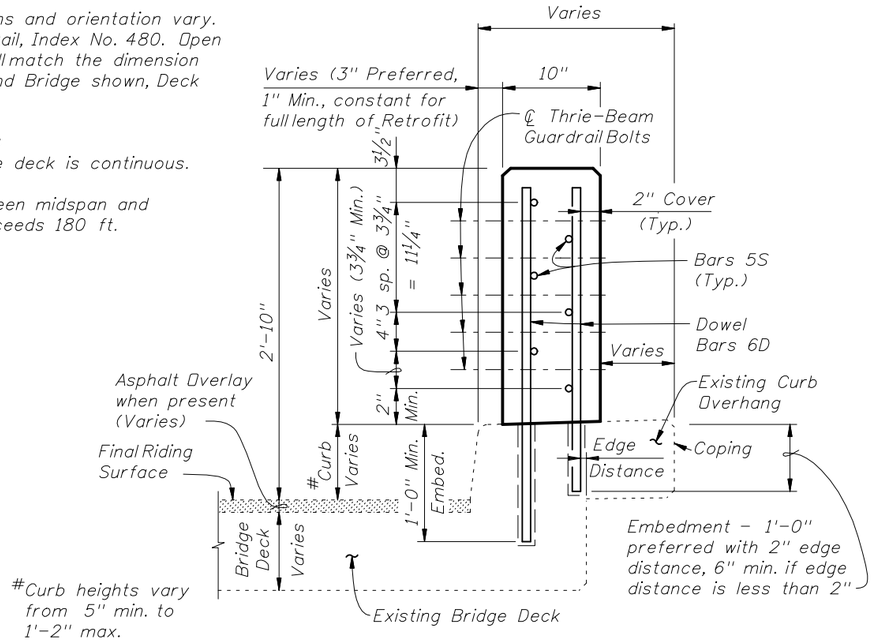
1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2 or 3, Sheets 2 & 3. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.
2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.
3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.



TYPICAL SECTION THRU EXISTING TRAFFIC RAILING
SHOWING LIMITS OF REMOVAL
(BRIDGE DECK SHOWN, WING WALL SIMILAR)

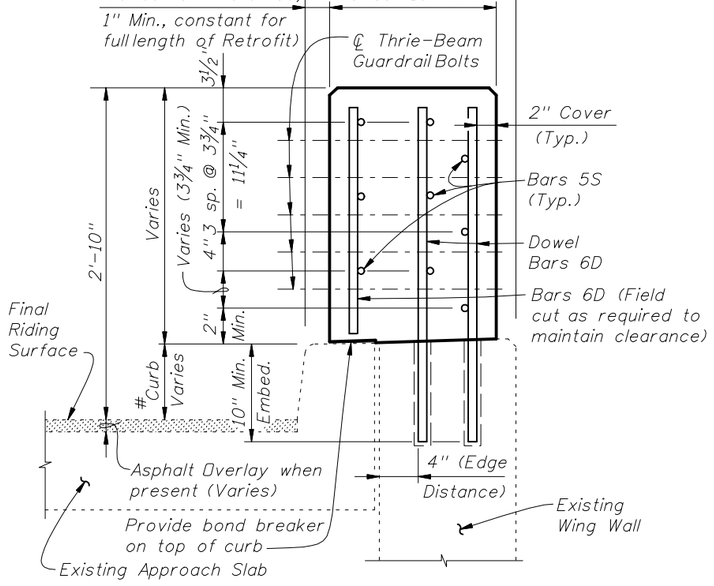
CROSS REFERENCE:

For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagram see Index No. 480.



#Curb heights vary from 5" min. to 1'-2" max.

SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK

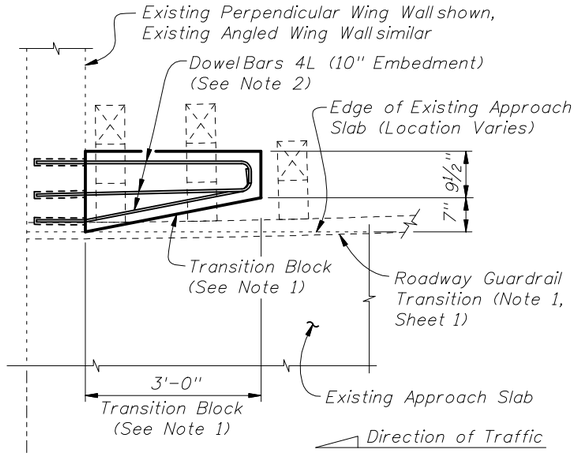


SECTION B-B
TYPICAL SECTION THRU RAILING ON WING WALL

2010 FDOT Design Standards

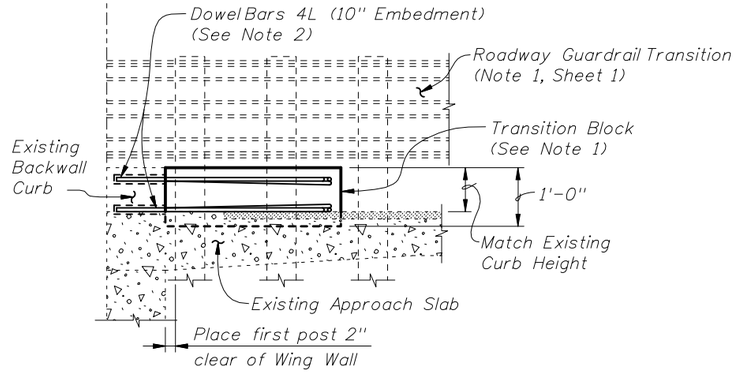
TRAFFIC RAILING - (VERTICAL FACE RETROFIT) INTERMEDIATE CURB

Last Revision	Sheet No.
07/01/09	1 of 3
Index No.	
483	



Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 1)

PARTIAL PLAN OF GUARDRAIL



PARTIAL ELEVATION OF INSIDE FACE OF GUARDRAIL

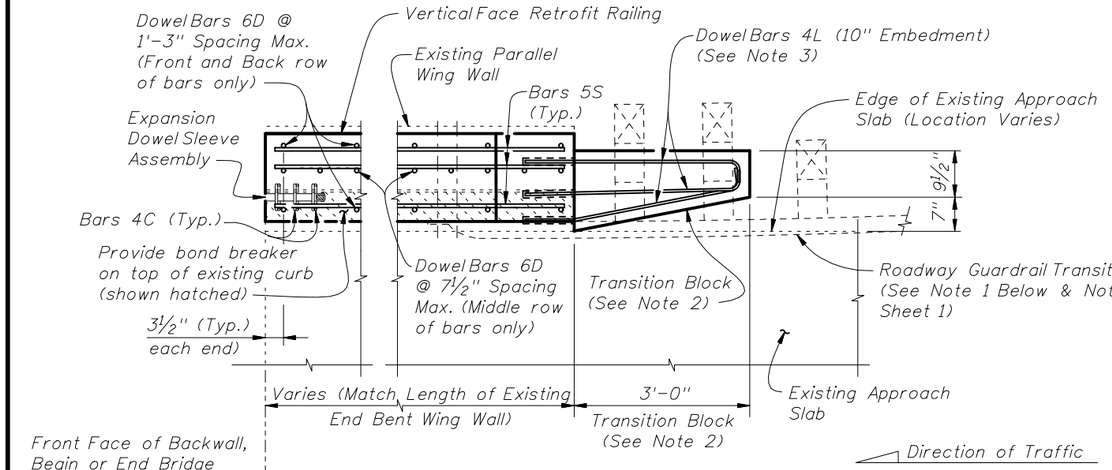
SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

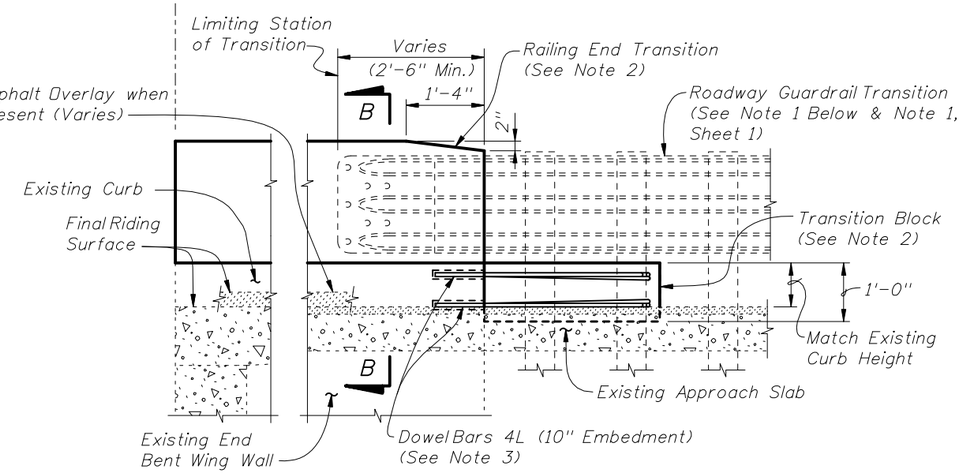
2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

3. If a Special Steel Guardrail Post is required for attachment to the top of a sloping Wing Wall, saw cut and remove a wedge shaped portion of the sloping Wing Wall as required to provide a level surface for post installation.



Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 1)

PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

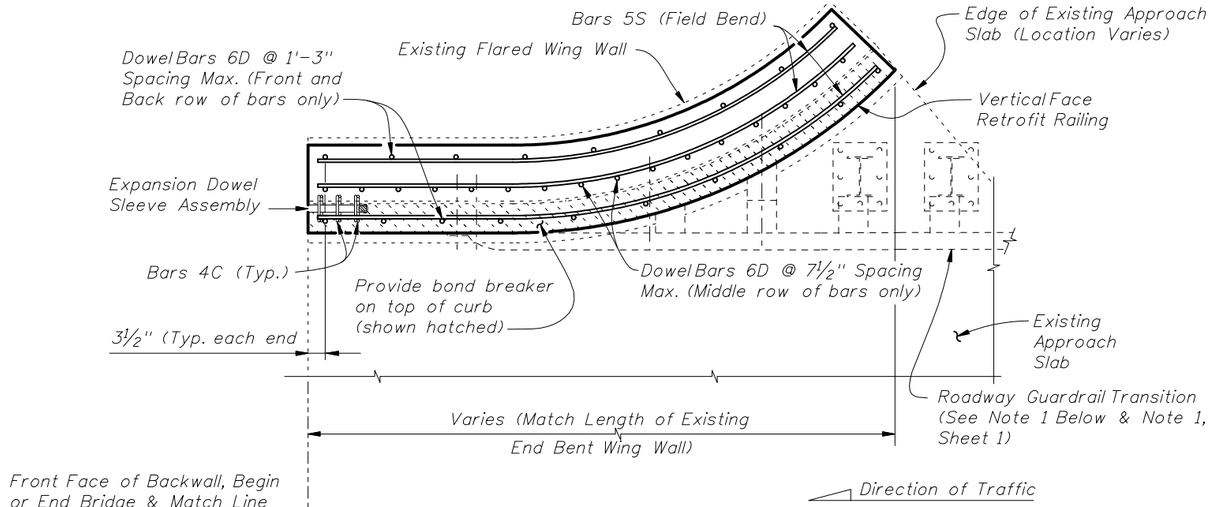
SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS

SCHEME 2 NOTES:

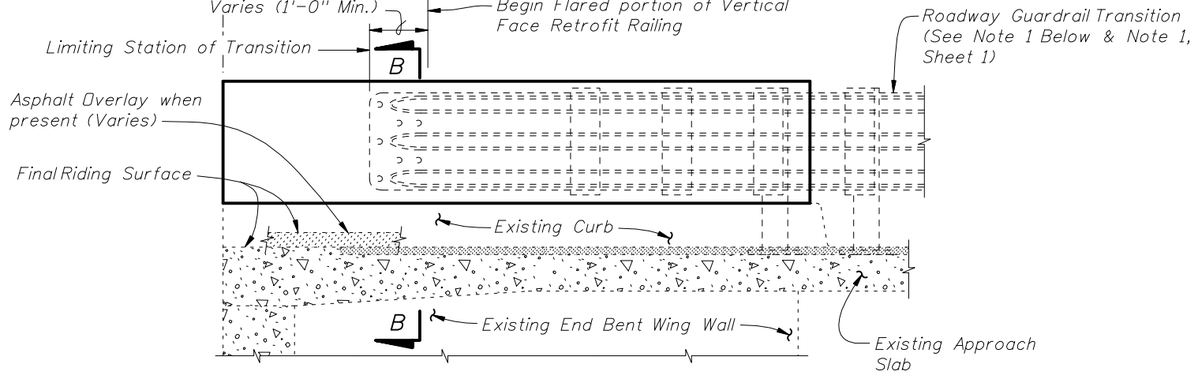
1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" mminimum dimension shall apply to both the front and back face of the railing.

2. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

3. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

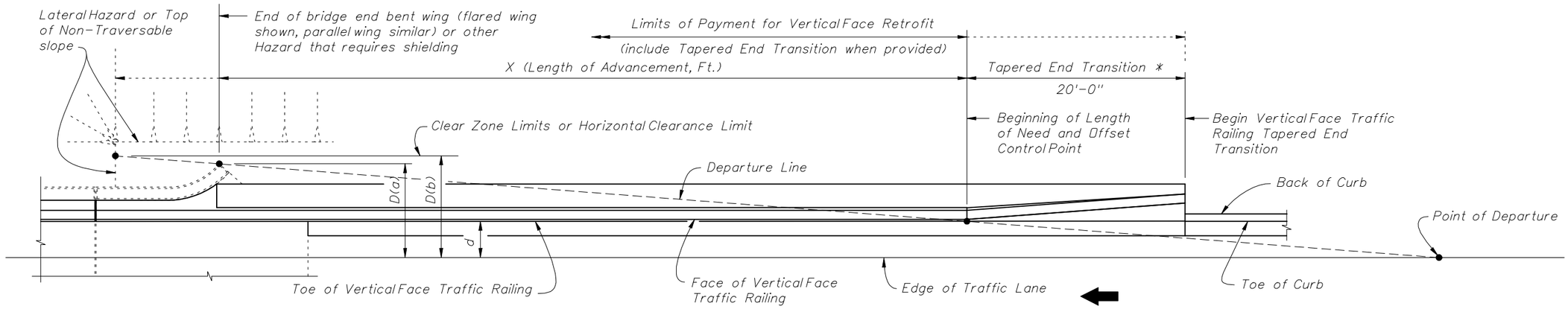


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 3 NOTE:

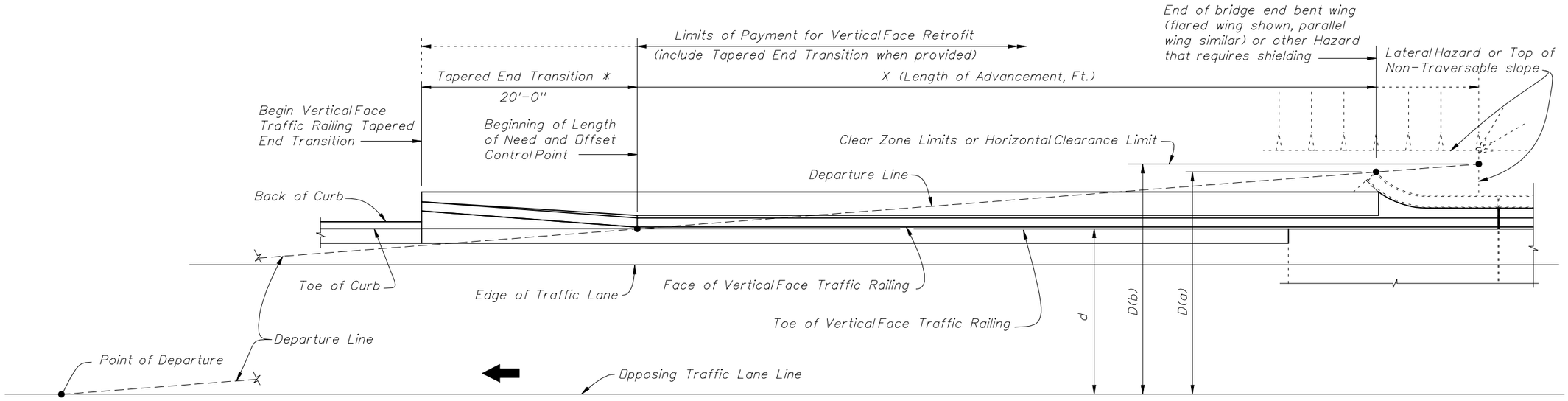
1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.

SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS



* Guardrail or Crash Cushion may also be shown in the Contract Plans, in lieu of the Tapered End Transition.

SCHEMATIC PLAN VIEW - NEAR LANE APPROACH



SCHEMATIC PLAN VIEW - OPPOSING LANE APPROACH

Design Speed (mph)	Length of Advancement, Ft. (X)
≤ 40	= 16 (D-d)

Notes:
1. The minimum length of advancement for both near lane and opposing lane approaches is 20'.
2. For Design Speeds greater than 40 mph the Tapered End Transition is not permitted. See Index No. 400 for length of Advancement of guardrail or other project specific end treatments.

LENGTH OF ADVANCEMENT - TAPERED END TRANSITION (40 MPH OR LESS)

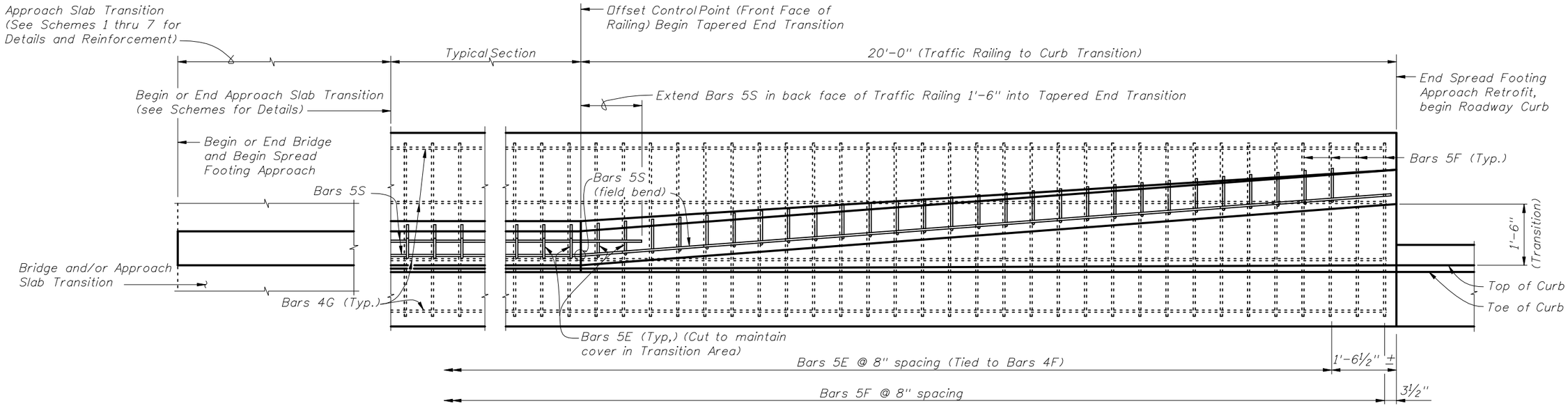
DESIGN NOTES:

The Tapered End Transition should only be used when space is limited which precludes the use of a guardrail end treatment or crash cushion.

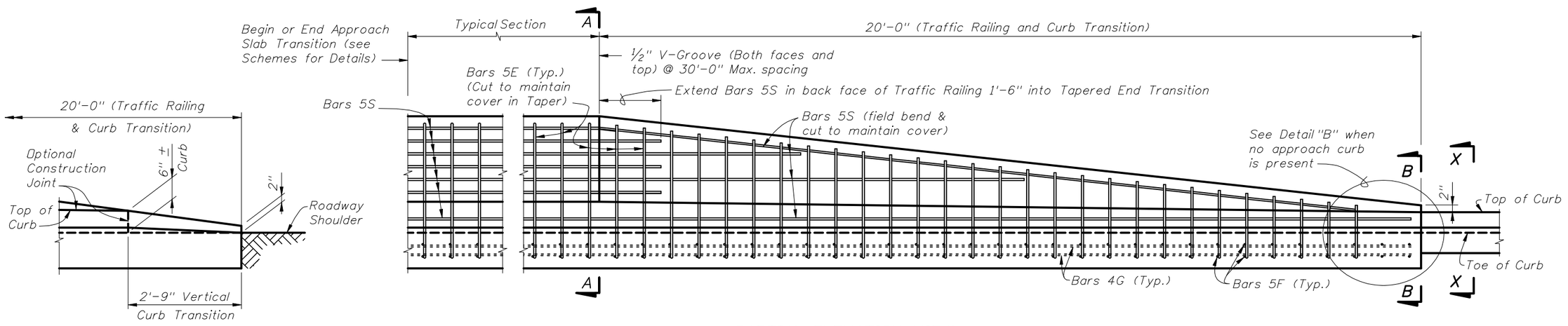
D = Distance in feet from near edge of near approach traffic lane to either:
(a) the back of hazard, when the hazard is located inside the clear zone or horizontal clearance;
(b) the clear zone or horizontal clearance outer limits, when hazard extends to, or goes beyond the clear zone or horizontal clearance limits.
For left side hazards on two way undivided facilities, "D" is measured from the inside edge of the near approach traffic lane as shown above.

d = Distance in feet from near edge of near approach traffic lane to face of traffic railing (at offset control point). For left side hazards on two-way undivided facilities "d" is measured from the inside edge of the nearest opposing traffic lane as shown above.

CROSS REFERENCES:
For General Notes, Dowel Details, Expansion Dowel Details, Reinforcing Steel Notes and Reinforcing Steel Bending Diagram see Index No. 480.



PARTIAL PLAN VIEW

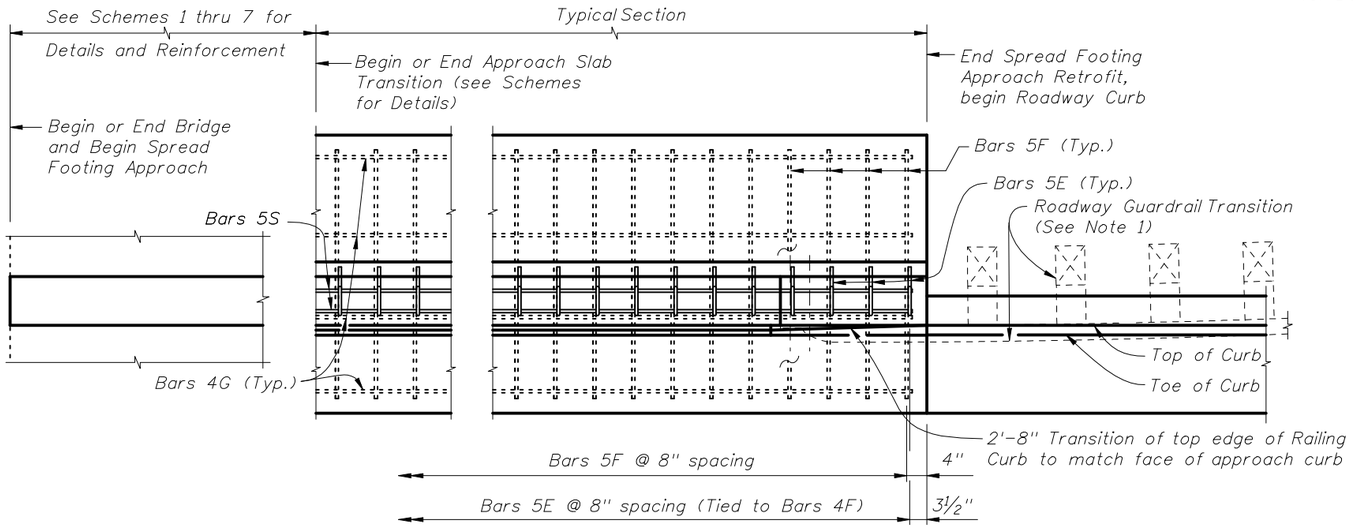


PARTIAL ELEVATION VIEW

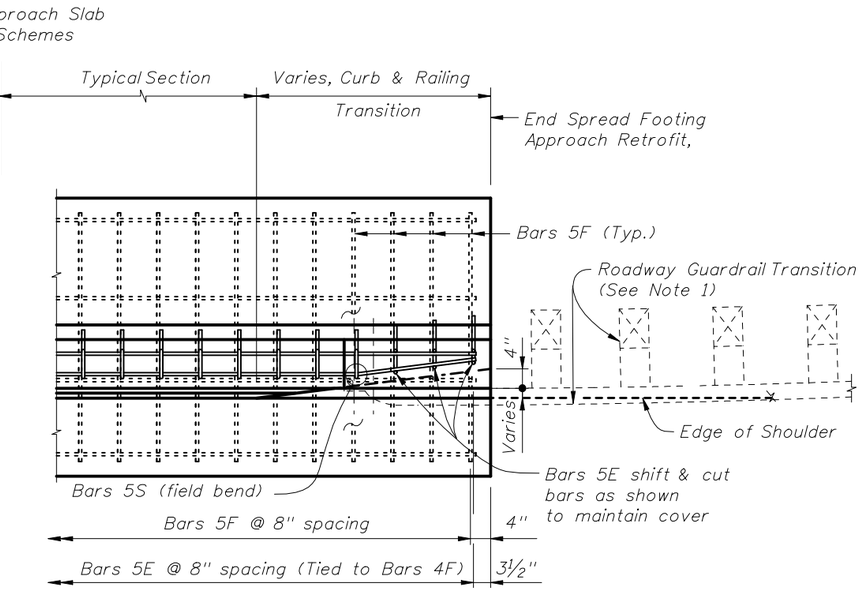
DETAIL "B"
TRANSITION TO NON-CURB APPROACH
(Reinforcing Not Shown For Clarity)

TAPERED END TRANSITION

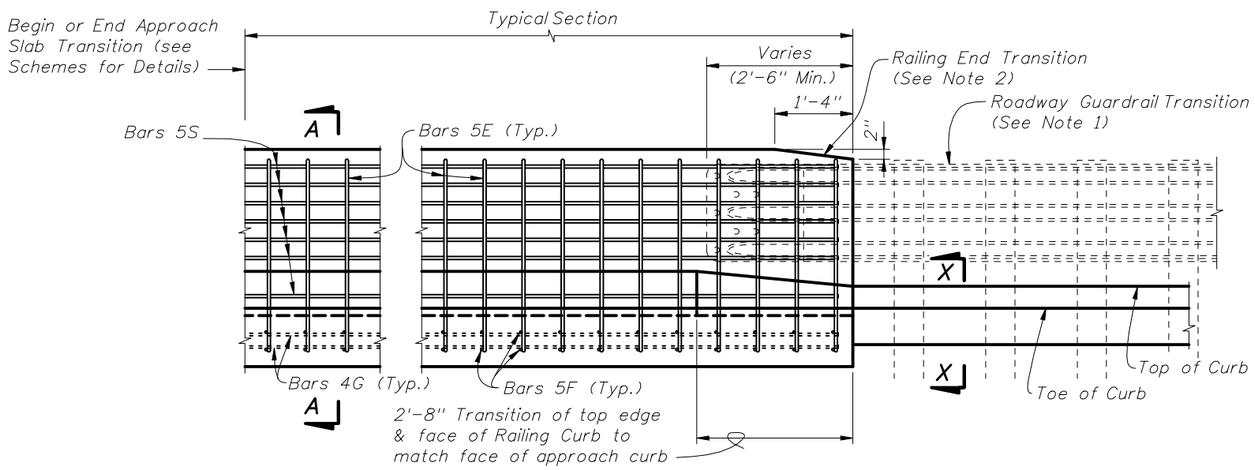
CROSS REFERENCES:
For Section A-A, B-B and X-X see Sheet 4.



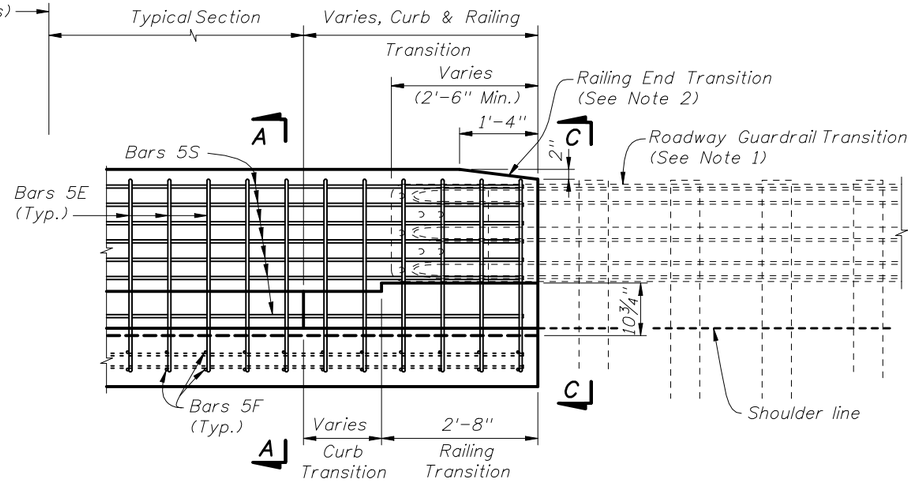
PARTIAL PLAN VIEW
(With Curb Approach)



PARTIAL PLAN VIEW
(Without Curb Approach)



PARTIAL ELEVATION VIEW
(With Curb Approach)



PARTIAL ELEVATION VIEW
(Without Curb Approach)

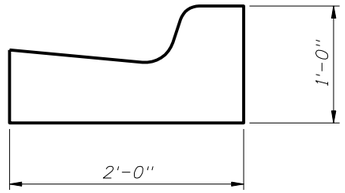
GUARDRAIL END TRANSITION

NOTES:
1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (Sheet 16 - Scheme 1) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment.
2. Provide Railing & Curb Base Transitions (as shown) if curb does not extend beyond end of Spread Footing Approach, see Roadway Plans. Railing End Transition & Railing & Curb Base Transitions may be omitted on trailing ends with no opposing traffic.

CROSS REFERENCES:
For Section A-A, C-C and X-X see Sheet 4.

ESTIMATED TRAFFIC RAILING RETROFIT SPREAD FOOTING APPROACH QUANTITIES		
ITEM	UNIT	QUANTITY
		9" Curb
Concrete - Typical Section	CY/Ft.	0.25
Reinforcing Steel - Typical Section	Lb./Ft.	38
Concrete - 20'-0" Tappered End Transition plus Footing	CY	4.57 Total
Reinforcing Steel - 20'-0" Tapered End Transition plus Footing	Lb.	776 Total

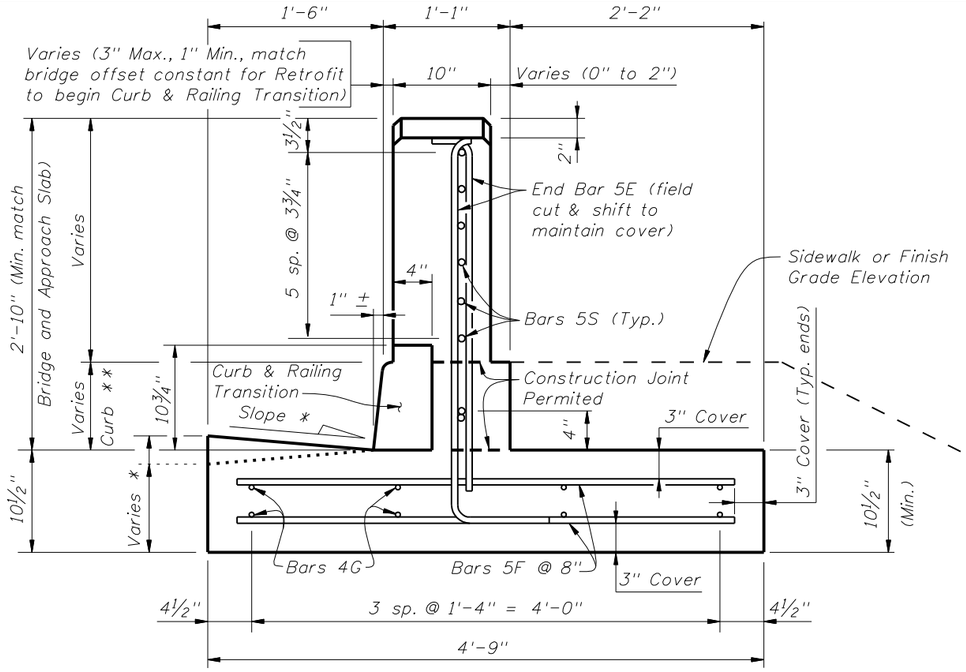
NOTE: Quantities are based on a 9" curb, no curb cross slope.



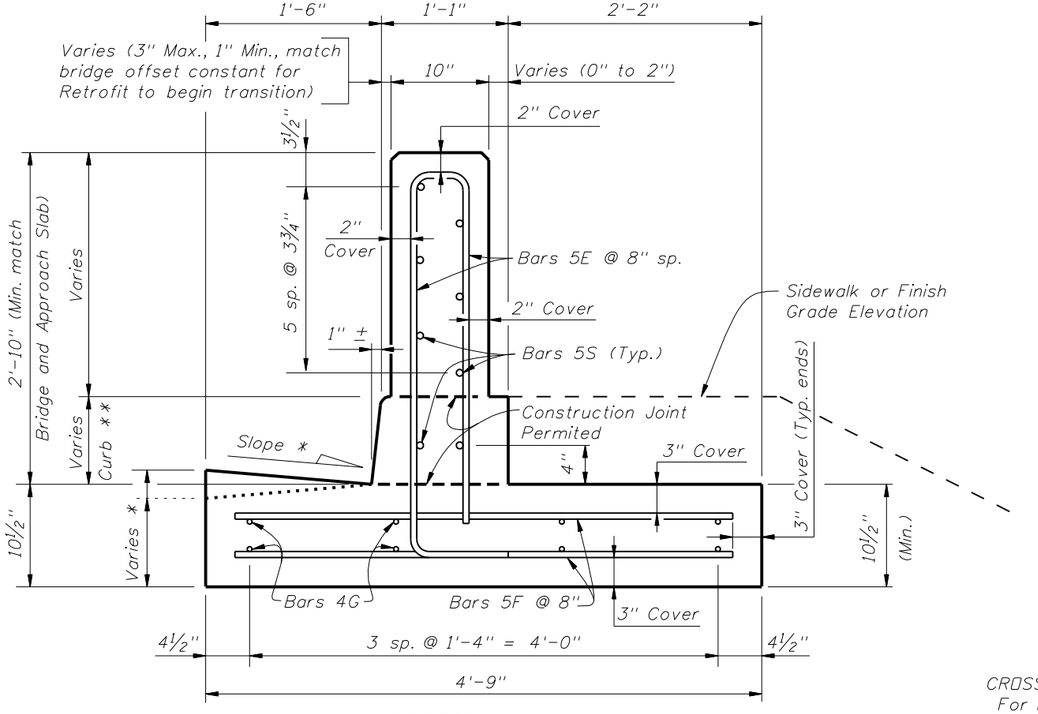
SECTION X-X (TYPICAL CURB, TYPE VARIES, TYPE F SHOWN)
(See Index No. 300 and Plans for Details)

* Match Cross Slope of high side and low side at begin or end bridge or approach slab.

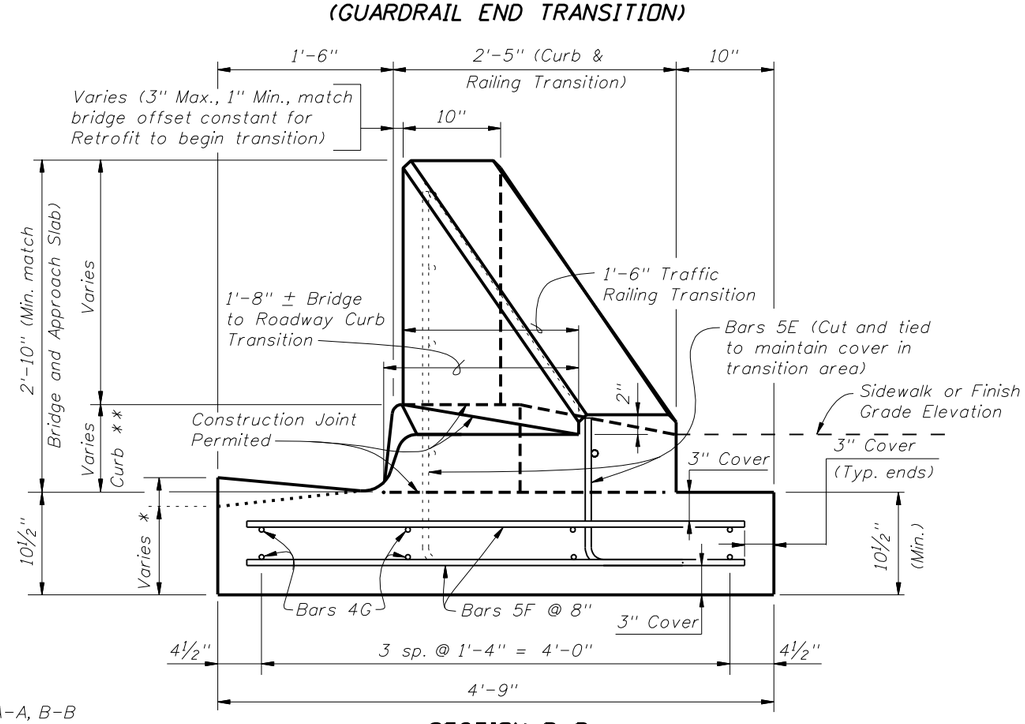
** Match curb height of adjacent bridge and approach slab. Adjust height in Transition area to match adjoining Roadway curb.



SECTION C-C
(GUARDRAIL END TRANSITION)

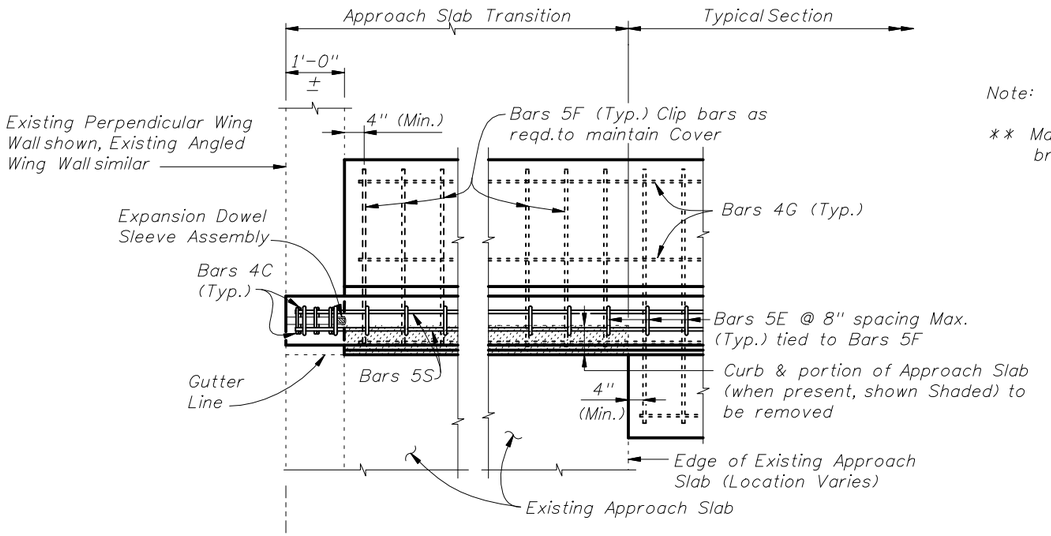


SECTION A-A
TYPICAL SECTION
(9" Curb shown, 6" Curb similar)



SECTION B-B
TAPERED END TRANSITION
(Bars 5S not shown for clarity)

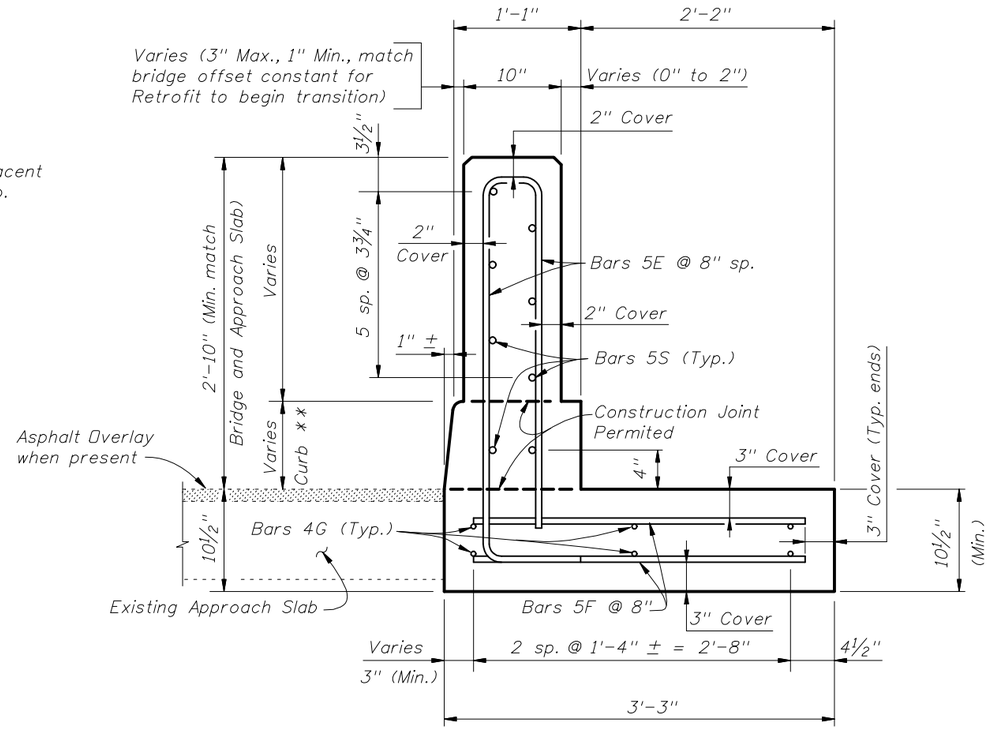
CROSS REFERENCES:
For location of Sections A-A, B-B and X-X see Sheet 2.
For location of Section C-C see Sheet 3.



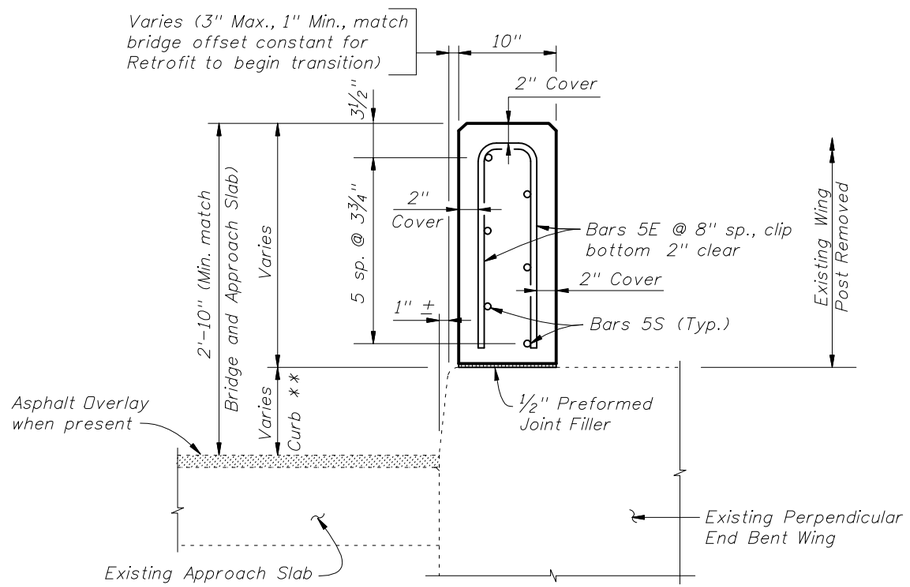
PARTIAL PLAN

Note:

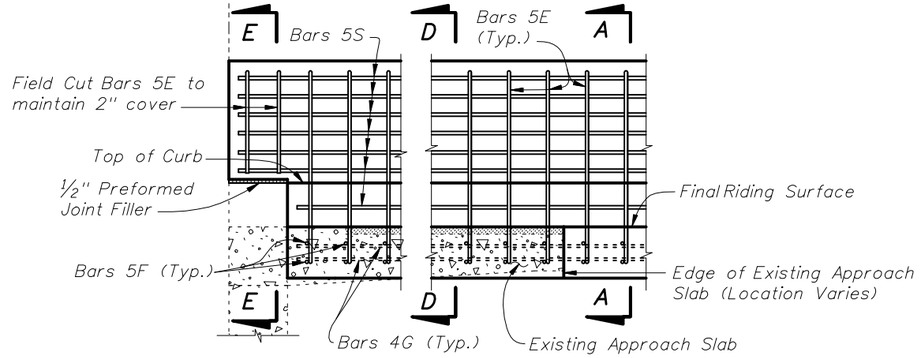
** Match curb height of adjacent bridge and approach slab.



SECTION D-D



SECTION E-E (NARROW CURB SHOWN, WIDE AND INTERMEDIATE CURBS SIMILAR)



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)

SCHEME 1 ~ MODIFICATION FOR INDEX NO. 481, 482 AND 483 - SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS WITH NARROW CURBS (SHOWN), WIDE CURBS AND INTERMEDIATE CURBS (SIMILAR)

CROSS REFERENCE:
For Section A-A see Sheet 4.
For Expansion Dowel Assembly and placement of Dowel Bars 6D Details see Index 480.

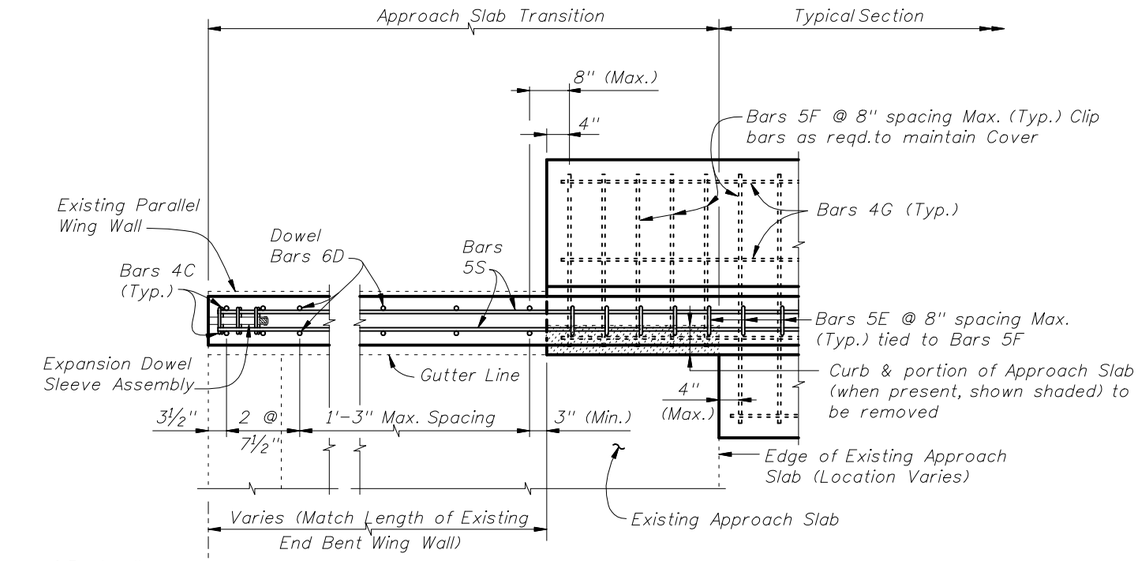
2010 FDOT Design Standards

TRAFFIC RAILING - (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH

Last Revision 07/01/09

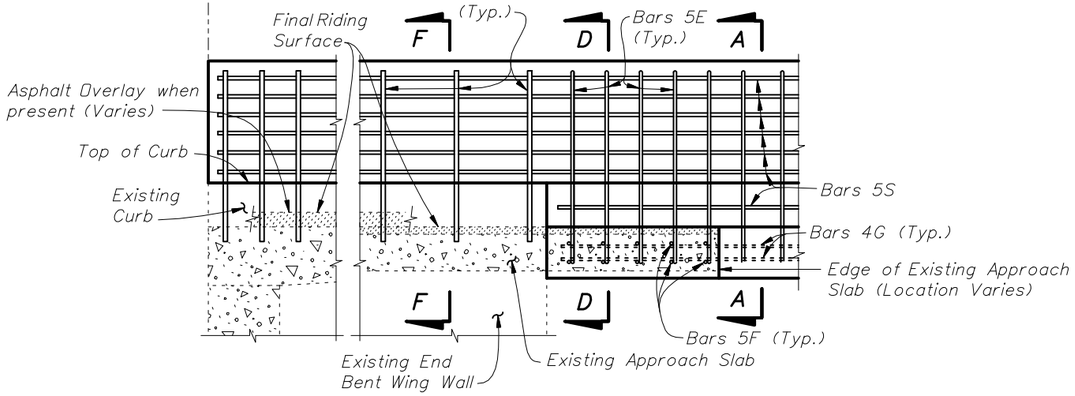
Sheet No. 5 of 10

Index No. 484



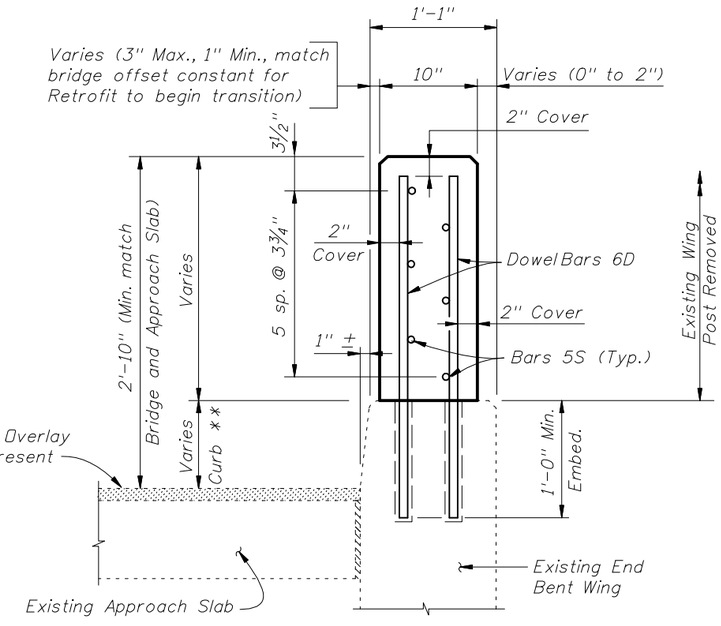
PARTIAL PLAN

Front Face of Backwall, Begin or End Bridge & Match Line (See Index No. 481, Sheet 2)

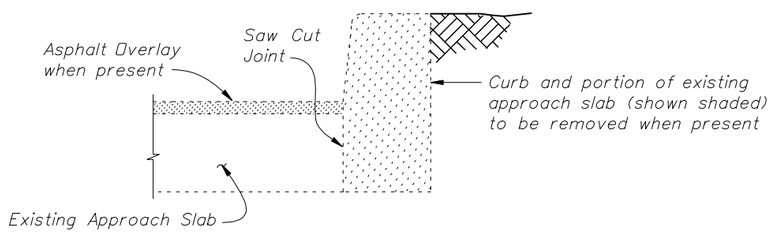


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)

Note:
** Match curb height at adjoining existing end bent wing.



SECTION F-F

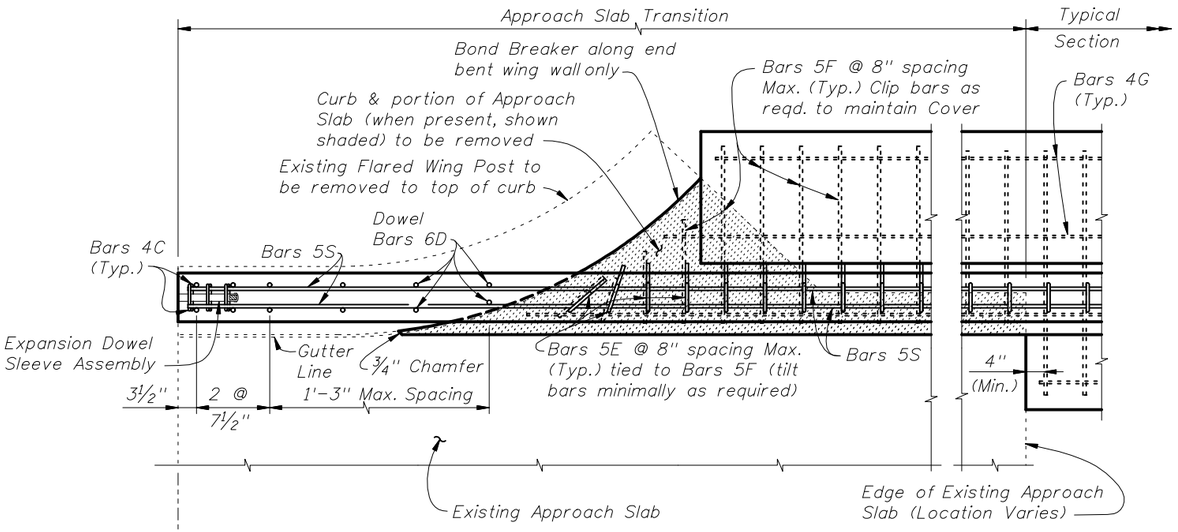


SECTION THRU EXISTING CURB AND APPROACH SLAB TO BE REMOVED
(Free Standing Curb Similar)

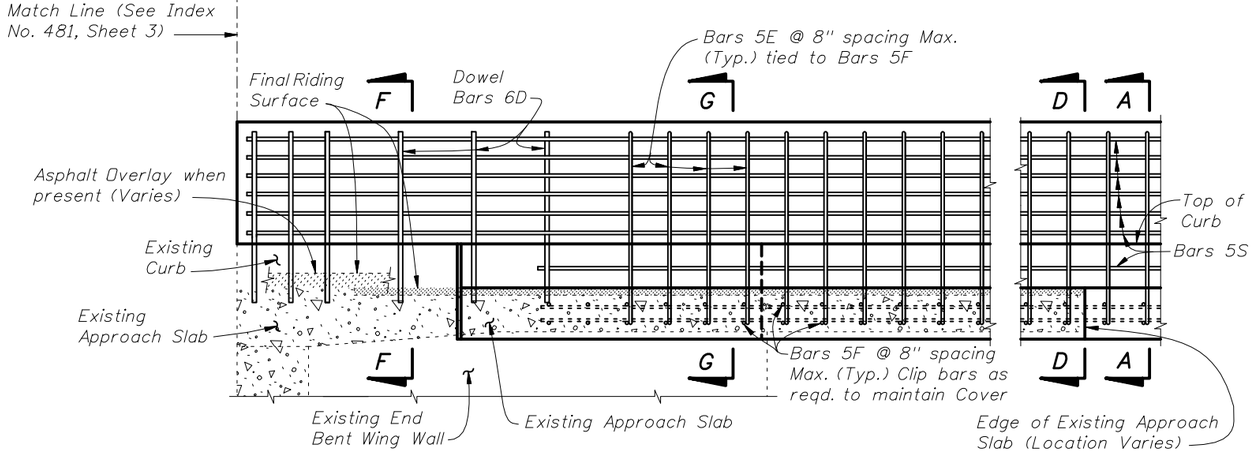
SCHEME 2 ~ MODIFICATION FOR INDEX NO. 481 - SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS WITH NARROW CURBS

NOTES:
1. Remove existing concrete along saw cut joints. Existing reinforcing steel may be cut at joint or extended into new concrete. Exposed existing reinforcing not encased in new concrete shall be removed 1" below existing concrete surface and grouted over.

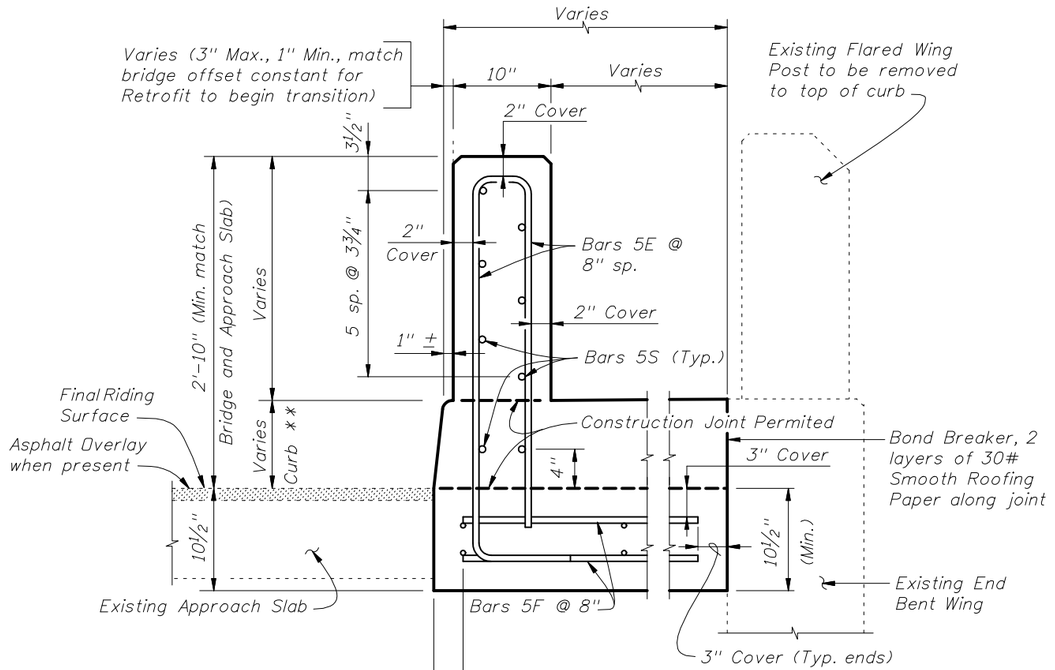
CROSS REFERENCES:
For Section A-A see Sheet 4.
For Section D-D see Sheet 5.
For Expansion Dowel Assembly and placement of Dowel Bars 6D Details see Index 480.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)



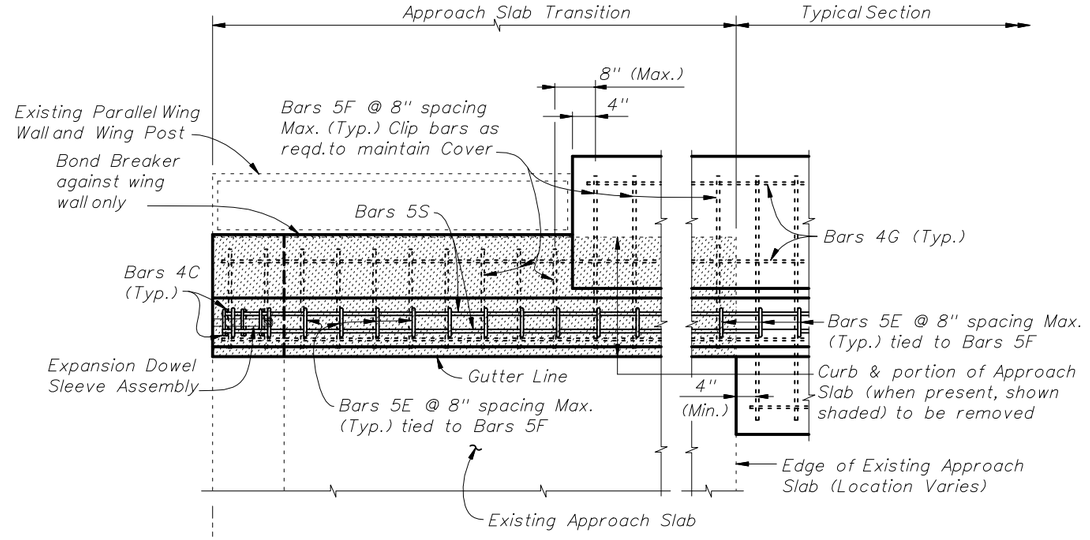
SECTION G-G

Note:
** Match curb height at adjoining existing end bent wing.

CROSS REFERENCES:
For Section A-A see Sheet 4.
For Section D-D see Sheet 5.
For Section F-F see Sheet 6.
For Expansion Dowel Assemblies Details and placement of Dowel Bars 6D see Index 480.

SCHEME 3 ~ MODIFICATION FOR INDEX NO. 481 SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS
WITH NARROW CURBS

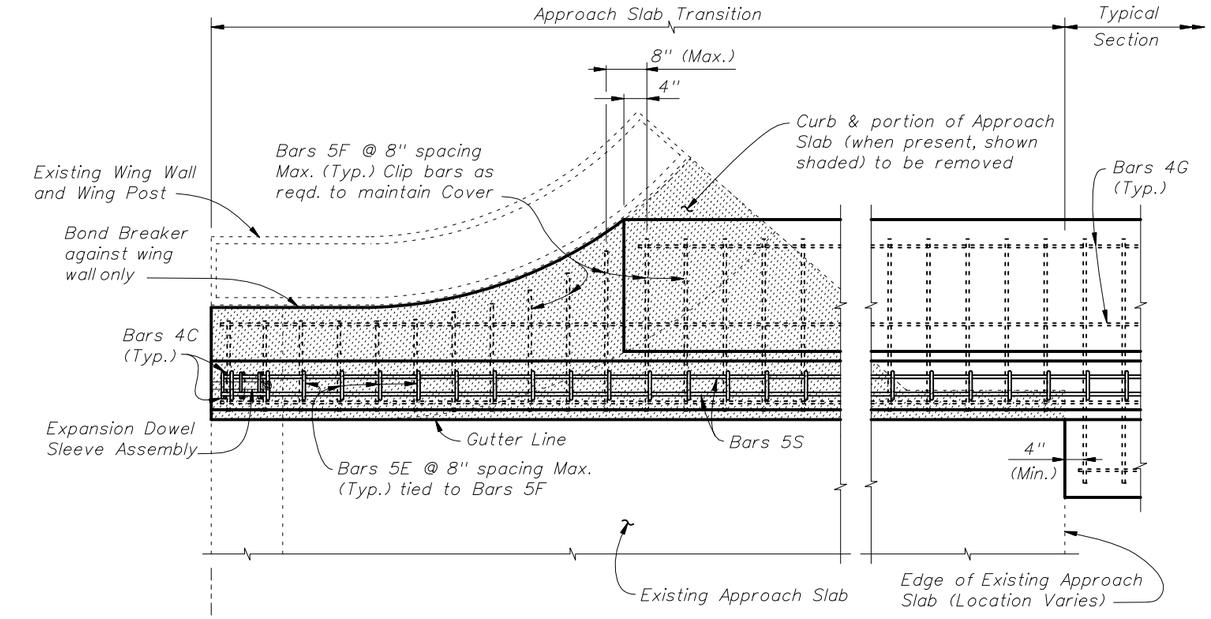
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2010 FDOT Design Standards	Last Revision 07/01/09	Sheet No. 7 of 10
	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH	Index No. 484	



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Expansion Dowel Assemblies and Bars 4C not shown for clarity)

SCHEME 4 ~ MODIFICATION FOR INDEX NO. 482 SCHEME 2
RAILING END TREATMENT FOR PARALLEL CURBS AND WING WALLS WITH WIDE CURBS

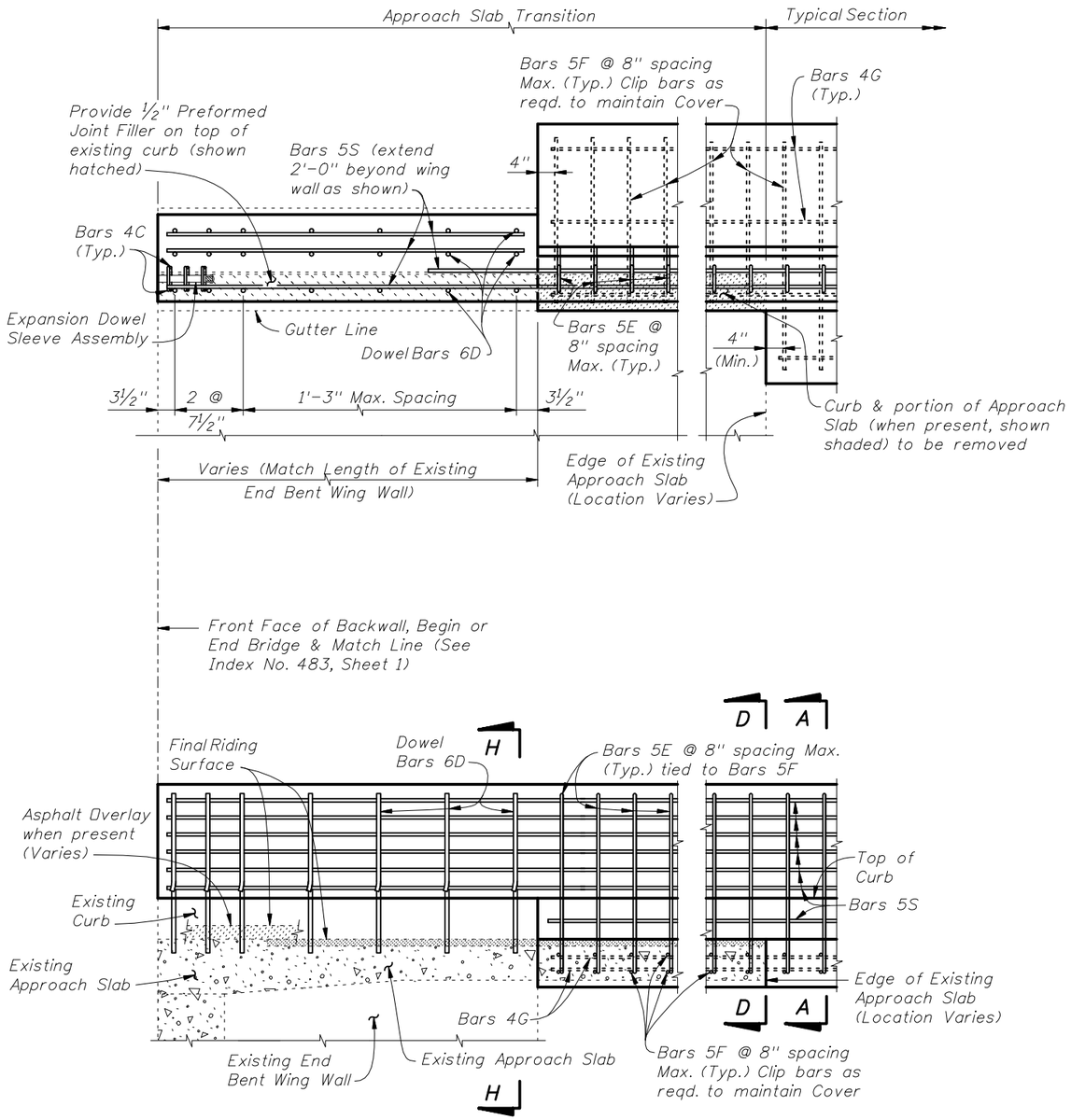


PARTIAL PLAN OF RAILING

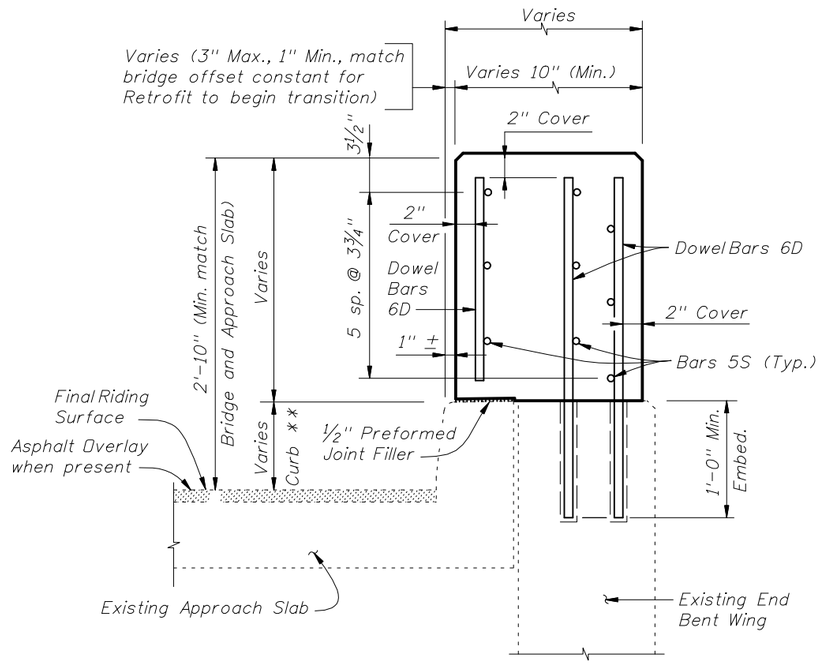
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Expansion Dowel Assemblies and Bars 4C not shown for clarity)

SCHEME 5 ~ MODIFICATION FOR INDEX NO. 482 SCHEME 3 AND 4
RAILING END TREATMENT FOR PARALLEL CURBS AND FLARED WING WALLS WITH WIDE CURBS

CROSS REFERENCES:
For Section A-A see Sheet 4
For Section D-D see Sheet 5.
For Section G-G & H-H see Sheet 7.
For Expansion Dowel Assemblies Details see Index 480.



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)

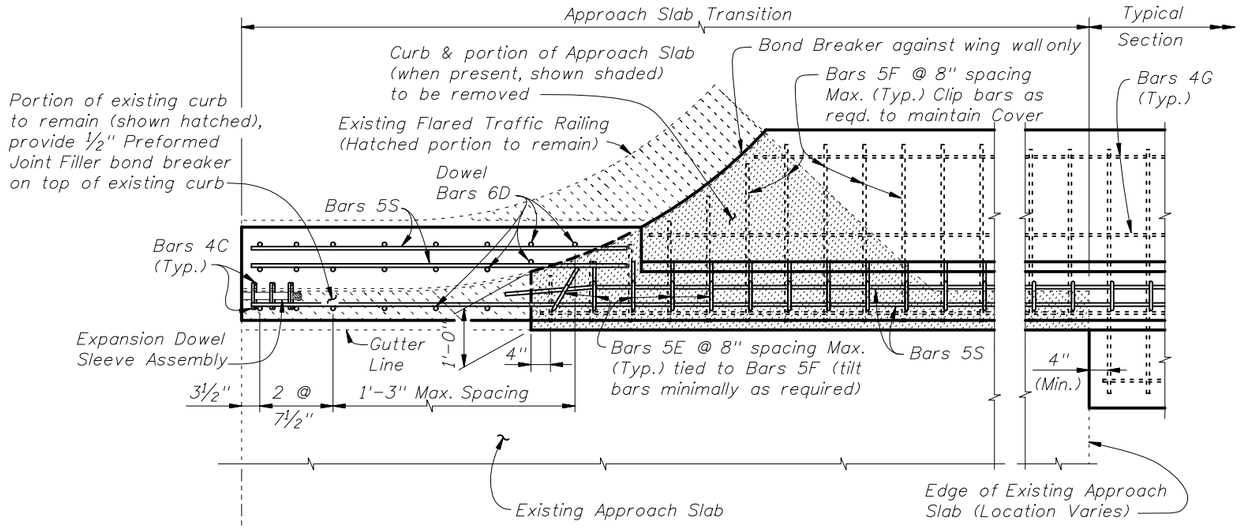


SECTION H-H

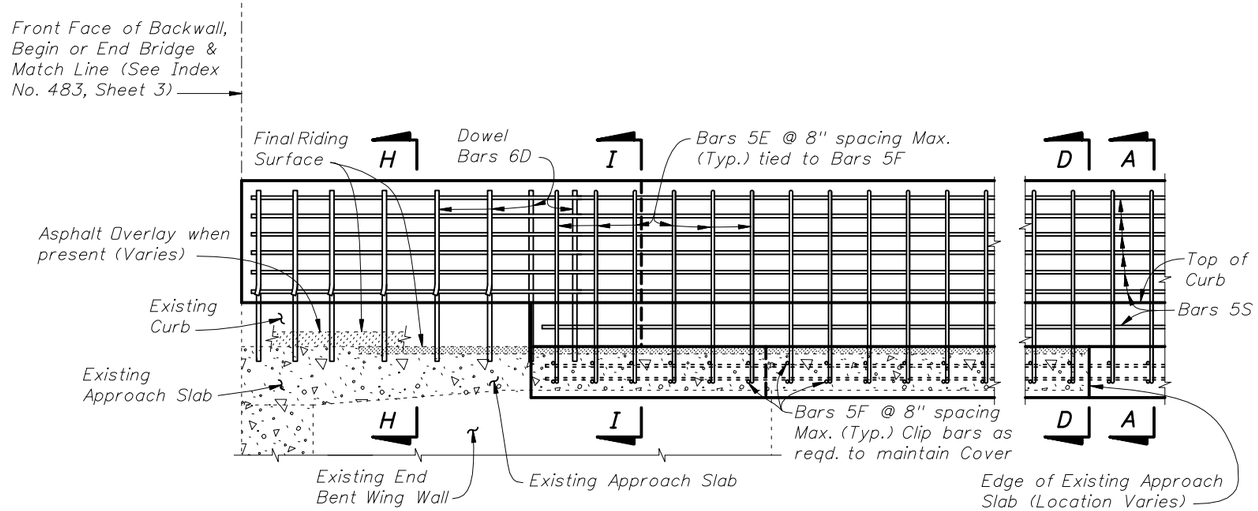
Note:
** Match curb height at adjoining existing end bent wing.

CROSS REFERENCES:
For Section A-A see Sheet 4.
For Section D-D see Sheet 5.
For Expansion Dowel Assembly and placement of Dowel Bars 6D Details see Index 480.

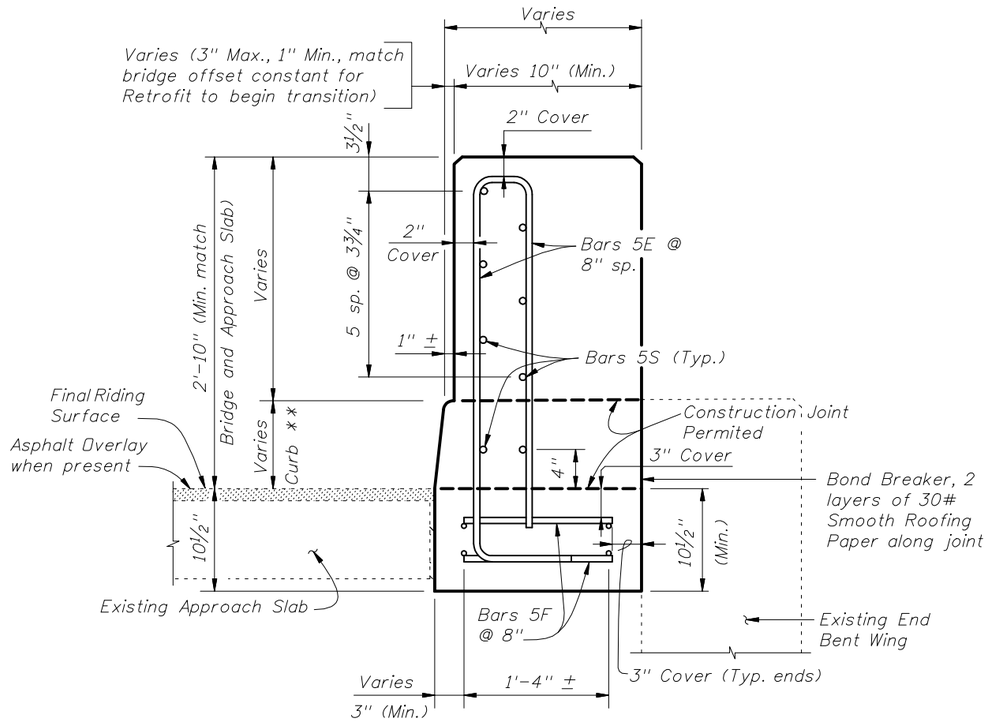
SCHEME 6 ~ MODIFICATION FOR INDEX NO. 483 SCHEME 2
RAILING END TREATMENT FOR PARALLEL CURBS AND WING WALLS WITH INTERMEDIATE CURBS



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)

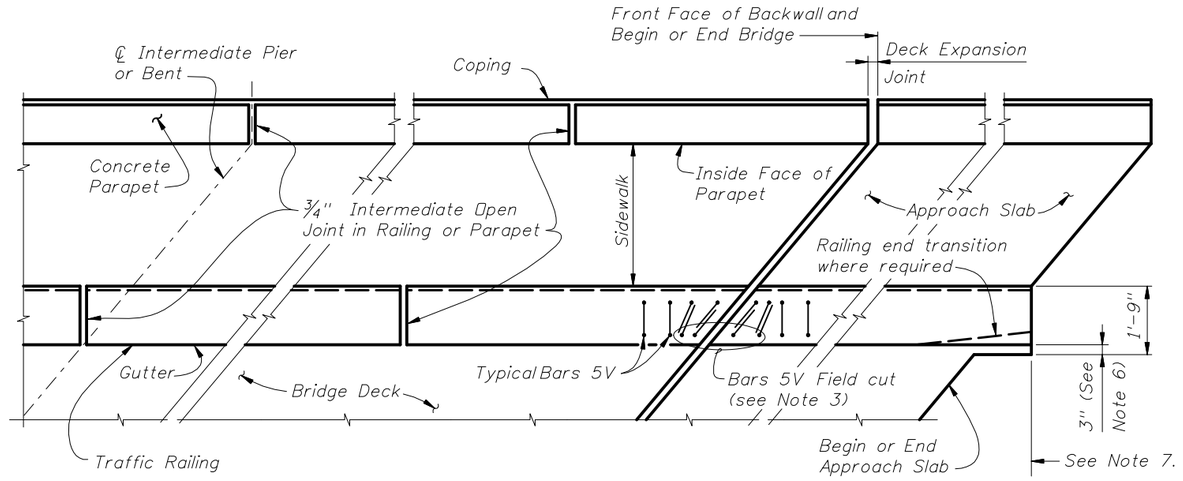


SECTION I-I

Note:
** Match curb height at adjoining existing end bent wing.

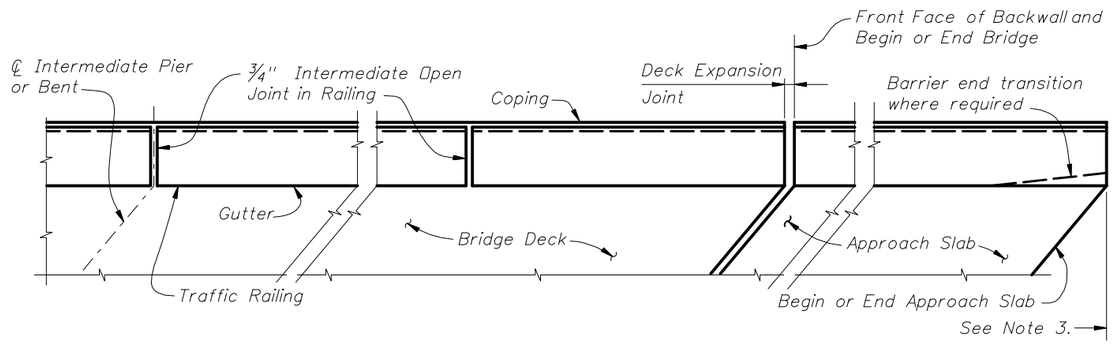
CROSS REFERENCES:
For Section A-A see Sheet 4.
For Section D-D see Sheet 5.
For Section H-H see Sheet 9.
For Expansion Dowel Assemblies and placement of Dowel Bars 6D Details see Index 480.

SCHEME 7 ~ MODIFICATION FOR INDEX NO. 483 SCHEME 3
RAILING END TREATMENT FOR PARALLEL CURBS AND FLARED WING WALLS WITH INTERMEDIATE CURBS



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK, TRAFFIC RAILING INDEX NO. 420 AND PEDESTRIAN/BICYCLE RAILING INDEX NO. 820, OTHER TRAFFIC RAILINGS SIMILAR

NOTES:
1) Concrete Parapet reinforcement is not effected by skew angle, see Index No. 820 for details.
2) Parapet expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure Sheets for details.
3) Traffic Railing reinforcement vertical Bars 5V & 5P may be shifted up to 1" (Max.) and rotated up to 10 degrees as required to allow proper placement. Bars 5V adjacent to expansion joints shall be field adjusted to maintain clearance and spacing, extra Bars 5V will be required. Bars 5V bottom horizontal portion shall be cut so as to maintain maximum bottom horizontal length of bar to each vertical leg being placed, the remainder of bar shall be discarded. Cut Bars 5V may be rotated to maintain clearance.
4) Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. Expansion joint at the inside face of parapet shall be turned perpendicular or radial to this line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
5) ¾" Intermediate Open Joints and V-Grooves in railing and parapet shall be placed perpendicular or radial to the gutter line or inside face of parapet line. See Structures Plans, Superstructure Sheets for locations.
6) At begin or end approach slab extend slab at the railing ends 3" (gutter side or back face of railing as required) as shown to provide a base for casting of the railing.
7) Begin placing Railing Bars 5P and 5V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge.



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH TRAFFIC RAILING INDEX NO. 420 SHOWN, OTHER TRAFFIC RAILINGS SIMILAR

NOTES:
1) Railing expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure Sheets for details.
2) ¾" Intermediate Open Joints and ½" V-Grooves in railing shall be placed perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for locations.
3) Begin placing Railing Bars 5P and 5V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge.

GENERAL NOTES:
1) Work this Sheet with Traffic Railing, Pedestrian/Bicycle Railing, and Approach Slab Indexes as applicable.
2) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at ℄ Pier or Intermediate Bents are similar.
3) Partial Plan Views shown are intended as guides only. See Structures Plans, Superstructure and Approach Slab Sheets for skew angles, joint orientation, dimensions and details.
4) Railings on Raised Sidewalks shall be treated similar to the Partial Plan View of Bridge Deck with Traffic Railing Index No. 420 Detail shown in the upper right corner of this sheet.
5) If Welded Wire Fabric is used in lieu of conventional reinforcement placement of the WWF vertical elements shall be similar to those shown above. Clipping of horizontal elements to facilitate placement shall be minimized where possible.

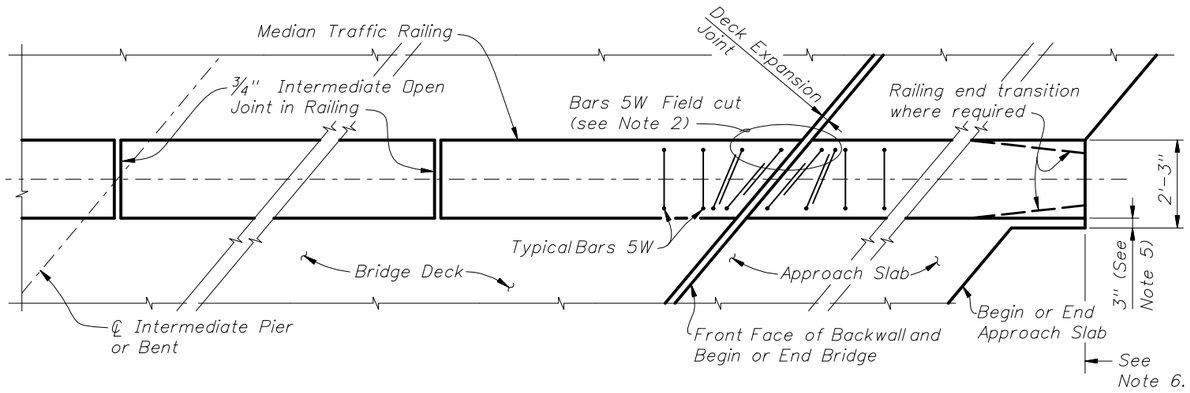
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

SKEW DETAILS FOR TRAFFIC RAILINGS, PARAPETS AND TRAFFIC SEPARATORS

Last Revision	Sheet No.
07/01/07	1 of 2

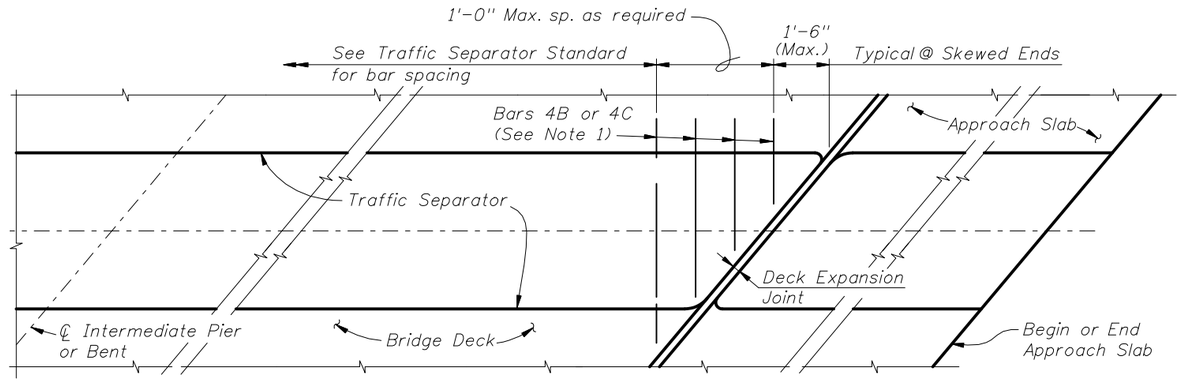
Index No. 490



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH MEDIAN TRAFFIC RAILING INDEX NO. 421

NOTES:

1) Median Traffic Railing reinforcement vertical Bars 5W may be shifted up to 1" (Max.) and rotated up to 10 degrees as required to allow proper placement.
2) Transition Stirrup Bars 5W shall be used as required at railing ends adjacent to expansion joints to facilitate placement of bars in acute corners. Place Transition Bars 5W in a fan pattern to maintain spacing. Rotate bars in 10° (Max.) increments as required.
3) Median Traffic Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. See Structures Plans, Superstructure and Approach Slab Sheets for Details.
4) ¾" Intermediate Open Joints and ½" V-Grooves in railing shall be placed perpendicular or radial to the ℄ of the median railing. See Structures Plans, Superstructure and Approach Slab Sheets for locations.
5) At begin or end approach slab extend slab at the median railing ends 3" (open side) as shown to provide a base for casting of the railing.
6) Begin placing Railing Bars 5R and 5W on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5R and 5W shall be made immediately adjacent to Begin or End Bridge.



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH TRAFFIC SEPARATOR INDEX NO. 302

NOTES:

1) Traffic Separator transverse reinforcement adjacent to deck expansion joints shall be field adjusted to maintain clearance and spacing. Bars shall be field cut as shown, bars may be rotated to maintain clearance.
2) Traffic Separator ends at deck expansion joints shall follow the deck joint limits. Drainage joints and ½" V-Grooves shall be placed perpendicular or radial to the ℄ of the Traffic Separator. See Structures Plans, Superstructure and Approach Slab Sheets for details.

GENERAL NOTES:

1) Work this Sheet with Median Traffic Railing and Traffic Separator and Approach Slab Indexes as applicable.

2) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at ℄ Pier or Intermediate Bents are similar.

3) Partial Plan Views shown are intended as guides only. See Structures Plans, Superstructure and Approach Slab Sheets for skew angles, joint orientation, dimensions and details.

4) If Welded Wire Fabric is used in lieu of conventional reinforcement placement of the WWF vertical elements shall be similar to those shown above. Clipping of horizontal elements to facilitate placement shall be minimized where possible.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 FDOT Design Standards

SKEW DETAILS FOR TRAFFIC RAILINGS, PARAPETS AND TRAFFIC SEPARATORS

Last Revision	Sheet No.
07/01/07	2 of 2
Index No.	
490	