


# 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

  
For Martin Knopp, Division Administrator

State of Florida, Department Of Transportation  
Roadway Design Office  
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*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.*

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**Revisions  
Design Standards 2010**

Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
001	1 thru 3	Added the following standard abbreviations: B Base Line, Base Line Control F 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	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.
002	2 of 3	Deleted Hand Drafting Symbols	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."
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.	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."
104	2 of 2	RURAL DIVIDED detail, changed "5' Shoulder Pavement" to "4' Shoulder Pavement".	252	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."
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" "	253	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."
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)".	255	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."
	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."	260	1 of 1	"GENERAL NOTES" Note 3 changed "Specification Section 962" to "Specification Section 975".
	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."	261	1 of 3	"GENERAL NOTES" Note 4 changed "Specification Section 962" to "Specification Section 975".
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) <sup>2</sup> "	264	1 thru 2	Index was expanded due to font size change. General note 3 changed.
205	1 of 6	Changed maximum size of allowed PVC pipe to 36".	270	1 of 1	"GENERAL NOTES" Note 2 changed "Specification Section 941-1.5" to "Specification Section 449". Changed Note 3.
	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.	272	6 of 6	Reordered "GENERAL NOTES" and changed "Class I concrete" to "Class NS concrete".
	3 of 6	NOTES: deleted note 4; table "PIPE ARCH: SPIRAL RIB: 3/4" x 3/4" x 7 1/2" 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.	273	1 thru 7	Index was expanded due to font size change.
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".		7 of 7	"GENERAL NOTES", Note 8, deleted "Class I concrete" and substituted "Class NS concrete".
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.	280	1 thru 3	Index was expanded due to font size change.
213	1 of 1	In PLAN view changed "1/2" Exp. Joint (Typ)" to "1/2" Preformed Joint Filler (Typ)".		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."
218	2 of 2	"STEEL GRATE", "TOP VIEW", for the overall dimension on the left side of the grate, inserted "44 1/4" ". For the small dimension at the upper left corner of the grate, inserted "3 1/2" ".	282	1 thru 3	Index was expanded due to font size change.
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)".		1 of 3	"FRONT ELEVATION" and "SECTION AA" details changed "1/2" Exp. Matl. " to "1/2" Preformed Joint Filler".
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 "5 1/2" to "4 1/2" ".  "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".	284	2 of 3	"PLAN" and "SECTION AA" details changed "1/2" Exp. Matl. " to "1/2" Preformed Joint Filler".
			287	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.
			288	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 BDX".
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 1/2L + 1/2 x 3 Bar) for grating.	289	6 of 7	Changed "FLARED ENDWALL" to "FLARED WINGWALL" and "STRAIGHT ENDWALL" to "STRAIGHT WINGWALL".
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.)".	291	1 of 5	Changed "Class I Concrete" to "Class NS".
232	1 thru 7	Index was expanded due to font size change.		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.

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Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
295	1 of 1	"GENERAL NOTES" Note 2 changed "Specification Section 962" to "Specification Section 975".	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."
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.	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.
305	1 & 4 of 4	Deleted bar spacing table and revised notes (Sheet 1); Changed width of outside lanes (Sheet 4).			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."
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. *".	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".
		"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."			"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."
		"Note 3" , deleted.		2 of 3	Changed Bicycle Railing to "Special Height Bicycle Railing" and Post "B" to Post "B1".
	2 of 2	"NOTES FOR CONCRETE SIDEWALKS ON UNCURBED ROADWAYS", Changed Note 2 to "Provide detectable warnings that extend the fullwidth 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.		3 of 3	Changed 83 degrees to 93 degrees in CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM Cross-slope table.
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.	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."
	1 of 26	"GENERAL NOTES" Note 17 changed "Specification Section 971" to "Specification Section 975".	425	1 of 3	"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."
	2 of 26	New sheet added showing limits of pay for guardrail, details of shoulder treatment and miscellaneous asphalt for guardrail approach end treatments.			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."
	3 of 26	Corrected spelling of guardrail in last paragraph.			"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."
	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.	470	1 of 3	Added Field testing proof loads to the ADHESIVE BONDED ANCHORS AND DWELS 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."
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."		3 of 3	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."
		"ANCHOR PLATE BDLTS", upper note, changed "?" to "3/4"."	471	2 of 4	Changed offset of 7/8" dia. anchor bolts to 2 3/4" from back edge of base plate in SECTION B-B.
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.	472	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".
		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."	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".

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Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
475	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".	600	3 of 13	LANE WIDTHS, in the second sentence, change the word "expected" to "excepted".
476	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".		5 of 13	Changed note under "SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING"; added information for the use of the new "PROJECT INFORMATION SIGN".
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."		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" ".
	2 of 2	CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM, added Bars 5E, 5F and 4G for Index No. 484			POST AND FOUNDATION TABLE FOR WORK ZONE SIGNS, expanded Note 2 by adding: "unless otherwise specified in the vendor drawing on the QPL."
484	1-10 of 10	New Index added TRAFFIC RAILING (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH			POST MOUNTED SIGN NOTES, added new notes 1 and 12.
500	2 of 2	"HALF SECTION" detail, deleted "Storm Sewer Mains" replaced with "Storm Drain Trunk Lines"		7 of 13	Added new sheet showing Project Information Sign and renumbered index.
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.	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."
	4 of 9	Updated values for COMTRAC 70.70; Deleted AMOCD 2006, 2016 & 2044; Added GEOTEX 315ST, 2x2HF, 4x4, 3x3HF, 4x4HF & 4x6 woven geogrids.			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.
	5 of 9	Changed Joint Strength Overlap value to 1.2 for all Marafi products.			
	6 of 9	Deleted Application Usage 3 & 4 for SYNTEN 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.	625	1 of 1	New Index added "TEMPORARY ROAD CLOSURE- 5 MINUTES OR LESS".
505	1-4 of 4	Sheet 3 is new. Renumbered other sheets.	655	1-3 of 3	New Index added "TRAFFIC PACING-LIMITED ACCESS".
515	5 of 7	In second symbolized note changed "Section 102-6" to "Section 102-8".	667	1-6 of 6	New Index added "TOLL PLAZAS".
	6 of 7	"PAVEMENT STRUCTURE FOR TURNOUTS AND AUXILIARY LANES TABLE 515-1", "NOTES", Note 5, Deleted "Class I concrete" substituted "Class NS concrete".	801	1 of 3	"GENERAL NOTES", Note 15 and 21, deleted "Class I" and substituted "Class NS".
518	3 of 3	Revised width of rigid pavement outside travellane and changed location of rumble strip.	802	1-3 of 3	Added tolerance to ground clearance; revised Notes 7a and 7b; rearranged sheets.
520	1 of 1	"GENERAL NOTES", Note 7, Deleted "Class I Concrete (Retaining Walls)" and substituted "Class NS Concrete"		1 of 3	"GENERAL NOTES", Note 6 and 13, deleted "Class I concrete" and substituted "Class NS concrete" for all occurrences.
546	1 of 6	Added detail "PLAN", "PICTORIAL" and ** note. Index sheets reordered.	803	1 of 1	"GENERAL NOTES", Note 4, deleted both occurrences of "Class I" and substituted "Class NS".
	5 of 6	Under "NOTES FOR 4-LANE DIVIDED ROADWAY", Note 1, changed reference from "Sheet 6" to "Sheet 2".	810	2 of 4	Deleted "Section 971" and substituted "Section 975" in ANCHOR RODS, NUTS AND WASHERS note.
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".	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 Pedestrian and Bicycle 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 Pedestrian and Bicycle 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 Pedestrian and Bicycle Railing designation. Corrected height dimension on steps to top of nosing.



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Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
851	1 of 2	Changed Pedestrian and Bicycle Railing designation.	5204	1 of 1	Changed "Ribbed" to "Slotted" in PLUG DETAIL.
	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 1/4" in DETAIL "B".	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'.
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 7	Added tolerance between Top of Precast Collar and Auger Cast Pile; Changed "Composite Bearing Pads" to "Fiber Reinforced Bearing Pads".
	2 of 5	Added "DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS" detail. Changed Pedestrian and Bicycle Railing designation; maximum ramp length for slopes less than 6.25%; and minimum clear picket opening at post to 3/4".		5 of 7	Changed "Composite Bearing Pads" to "Fiber Reinforced Bearing Pads".
	3 of 5	Changed Pedestrian and Bicycle Railing designation.	5206	7 of 7	Added "Octagonal Precast Collar" details and tolerance between Top of Precast Collar and Auger Cast Pile; Changed "Composite Bearing Pads" to "Fiber Reinforced Bearing Pads".
	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; 1/4" 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 1/8", handrail and top rail fillet weld size to 1/4", and base plate fillet weld size to 3/8".	5207	1 of 1	Added "POST LENGTH WITH CAP" column, BARS D, P5 thru P8 to table and bar bending details for corner posts.
	5 of 5	Added DETAIL "F" and note (*) to ANCHOR BOLT TABLE. Changed Pedestrian and Bicycle Railing designation. Corrected height dimension on steps to top of nosing.	5210	1 of 1	New Index added "PRECAST SOUND BARRIERS-PRECAST POST CAPITAL".
861	1 of 2	Changed designation of 54" tall railing to "Special Height Bicycle Railing".	5211	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 SELECTIVE RAILING MARKER SPACING table.
	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 1/4" and "Steel Sleeve" to "Aluminum Sleeve" in DETAIL "B".	5212	3 of 3	Changed "Ribbed" to "Slotted" in NEOPRENE DIAPHRAGM PLUG DETAIL. Corrected Anchor Pin diameter on FIRE HOSE ACCESS DETAIL.
870	1 of 5	Deleted Pedestrian and Bicycle designations from DESIGN LIVE LOADS and ALTERNATE DESIGN notes.	5300	2 of 2	Added note for "Full Depth Structural Asphalt" above junction slab and changed coping dimension to 6" Min.
	2 of 5	Deleted 4'-6" Bicycle Railing option and "*" note. Changed maximum ramp length for slopes less than 6.25%.		3 of 19	Increased max. gap at back of precast coping and added timber blocking.
	3 of 5	Deleted 4'-6" Bicycle Railing option.		6 of 19	Added note for "Full Depth Structural Asphalt" above junction slab and increased max. gap at back of precast coping.
	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 1/4" joint tolerance in DETAIL "D". Deleted Intermediate Rails from DETAILS "B" and "C".	11200	7 of 19	Added note for "Full Depth Structural Asphalt" above junction slab.
	5 of 5	Added DETAIL "F". Deleted 4'-6" Bicycle Railing option. Corrected height dimension on steps to top of nosing.		12 & 15 of 19	Increased max. gap at back of precast coping. Corrected size of Bar 5U1 in BILL OF REINFORCING TABLE
880	1 of 5	Deleted Pedestrian and Bicycle designations from DESIGN LIVE LOADS and ALTERNATE DESIGN notes.		1-2 of 2	Deleted sheet 2
	2 of 5	Deleted 4'-6" Bicycle Railing option and "*" note. Changed maximum ramp length for slopes less than 6.25%.	11300	1 of 2	Revised and rearranged notes, sheet renumbered to 1 of 2.
	3 of 5	Deleted 4'-6" Bicycle Railing option.	11310	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".
	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 1/4" joint tolerance in DETAIL "D". Deleted Intermediate Rails from DETAILS "B" and "C".		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.
	5 of 5	Added DETAIL "F". Deleted 4'-6" Bicycle Railing option. Corrected height dimension on steps to top of nosing.	11320	1 of 5	Deleted A307 bolts and Palnut (Note 4e). Changed foundation concrete (Note 7). Changed to 1/2" mesh (Note 9). Deleted grout pad and notes (former Notes 7c & 9). Added CSL tube note (Note 14).
5100	2 of 2	Changed to plastic sleeve expansion joint and "Premoulded Expansion Material" to "Preformed Joint Filler". Changed wall and expansion joint key.		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.
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 D.2; Deleted note H.3.		5 of 5	Changed bolt spacing connection details.
5201	1 of 1	Texture Type "I" (Cut Coral Block) added.		1 of 5	Deleted A307 bolts and Palnut (Note 4e). Changed foundation concrete (Note 7). Changed to 1/2" mesh (Note 9). Deleted grout pad and notes (former Notes 7c & 9). Added CSL tube note (Note 14).
5202	1 of 4	Added precast post cap; Changed clearance tolerance on stepped panel and Neoprene Pad options.		2 of 5	Changed foundation standoff distance. Deleted grout pad and added wire screen.
	3 of 4	Changed #4 Bar Mark to Bars P5 and P6 for Pile/Post Options A, B, & E; changed Texture Thickness to 1 1/4" Max.		4 of 5	Changed bolt spacing connection details.
5203	1 of 5	Added precast post cap; Changed clearance tolerance on stepped panel and Neoprene Pad options.		5 of 5	Changed drilled shaft detail. Added CSL tubes.
	3 of 5	Changed #4 Bar Mark to Bars P5 & P6 for Pile/Post Options A, B & E, and changed texture thickness dimension to 1/4" Max.	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".
	4 of 5	New sheet added for 45 degree corner post.		2 of 8	Changed maximum limits of sign cluster area and width in NOTE.
	5 of 5	Renumbered from Sheet 4 of 4.		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.
			17302	5 of 8	Modified "DRIVEN POST DETAIL IN CONCRETE".
				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	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.	17725	1 of 2	Round pole note revised; pole height dimensions added to Type P-III through P-VIII; Copper Ground note changed.
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.		2 of 2	Notes revised and rearranged, D(feet) changed to H(feet) in both tables.
	4 of 4	Deleted note 2	17727	1-2 of 2	Schedule 40 aluminum pipe (T6061) added as an alternate to stainless steel pipe in assembly details and signalhead notes. Added backplates to signalhead details.
17346	1-14 of 14	Completely revised and renumbered.	17736	1 of 1	Added notes 5 & 6.
17347	1-4 of 4	New Index BICYCLE MARKINGS added.	17743	1 of 3	Updated assembly dimensions. Changed drilled shaft reinforcing.
17349	1 of 1	Case I and Case II revised; 18" x 18" marker detail revised; notes at bottom right revised.		2 of 3	Updated assembly dimensions. Changed drilled shaft reinforcing. Changed T3-BF.
17355	1 of 11	Revised signs FTP-9A-06 & FTP-9B-06 and notes.		3 of 3	Updated assembly dimensions. Changed drilled shaft reinforcing.
	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".	17745	1 of 5	QPL requirements added in new note 17; added backplates to pole detail; Notes 6 & 14 revised, deleted note 19.
	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.	17748	2 of 5	Revised foundation reinforcing details, Section AA, Section DD and Foundation Plan details.
	9 of 11	Revised sign FTP-82-08 and arrow detail. Added Sign FTP-83-08.		1 of 1	Option 1 deleted and Options 2 and 3 renumbered; Note 1 revised. Added backplates to signalhead displays.
17356	1 of 1	Removed signalhead from detail. Single point attachment details deleted from Index. (Deleted sheet 1.)	17784	1 of 2	Dimensions revised on Figures A & B. Note 5 and Note to Designers revised.
17359	1 of 2	Changed delineators to object markers; revised reference notes; sign W13-1 made optional. RURAL NARROW BRIDGE TREATMENT, changed the DM3L on the right side of the roadways to an DM3R.	17890	2-3 of 3	Added backplates to signalhead displays.
	2 of 2	Notes revised; inserts reorganized	17900	7 of 7	Changed pole type callouts, deleted "N-III" and substituted "P-III".
17500	1 of 3	Deleted concrete pole detail, added METAL POLE DETAIL AND WIRING DIAGRAM.	18111	1-2 of 2	Index totally revised.
	2 of 3	Note 7, deleted "class I Concrete (Miscellaneous)" replaced with "Concrete and reinforcing for slabs around poles and pullboxes shall be included in the price for pullbox or pole."	18113	1-2 of 2	Index totally revised.
	3 of 3	Note 7, deleted "class I Concrete (Miscellaneous)" replaced with "Concrete and reinforcing for slabs around poles and pullboxes shall be included in the price for pullbox or pole."	20110	1 of 1	Changed Insert Detail for Diaphragm Reinforcing.
17501	1 of 1	Deleted note 28.	20199	1 of 1	Changed BEAM CAMBER AND BUILD-UP NOTES.
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).	20210	2 of 2	Added "Type Q" Epoxy to Note 9.
	4 of 7	Added ID plate and changed base plate thickness. Deleted grout pad. Changed drilled shaft reinforcing.	20299	1 of 1	Changed BEAM CAMBER AND BUILD-UP NOTES.
	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.	20500	1 of 1	Added Type C Pads for larger skew ranges. Changed specification of elastomer from "durometer" to "shear modulus".
	6 of 7	Grout notes and details removed, new wire screen.	20501	1 of 1	Changed Note 4.
	7 of 7	Note 3, changed "Concrete class" to "concrete NS"	20502	1 of 1	Changed Note 4.
17503	1 of 1	Index deleted.	20602	1 of 1	Changed EDC location to 1D from tip of pile.
17504	1 of 1	Dimensions 5'-6" added for height of meter base. Pole type changed from type "N" to type "P".	20900	2 of 2	Changed coping width and End Bent lug from 6" to 5½" thickness.
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.	20910	2 of 2	Changed coping width and End Bent lug from 6" to 5½" thickness.
17515	1 of 8	Added median barrier mounted light poles. Moved notes to sheet 2.	21100	1 of 3	Deleted redundant notes from Specification Section 458.
	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 3	Changed Sidewalk Cover Plate edge treatment.
	3 of 8	Sheet renumbered from 2 to 3. Added double arm configuration to ARM ELEVATION.	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".
	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.		2 of 2	Changed Sidewalk Cover Plate edge treatment.
	5-8 of 8	New Sheets for median barrier mounted light pole.	21200	1 of 2	Added "Anchor Plate (dashed lines) (provide Design) to ELEVATION VIEW and TYPICAL SECTION. Added design of anchor bolts and accessories.
17600	2 of 3	Added detail for pole foundation to be used only behind guardrail.		2 of 2	Added design of anchor bolts and accessories.
	3 of 3	GENERAL NOTES, note 2, changed "Class II Concrete" to "Class I Concrete"; changed note 4.	21600	1 of 7	Clarified INSTRUCTIONS TO DESIGNER for variable end span lengths.
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).		3 of 7	Added vertical dimensions between deck surface and underside of bearings, including depth of Truss Panel.
	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.	21802	1 of 1	Changed "Methyl Methacrylate" to "High Molecular Weight Methacrylate".
	3 of 3	Changed note in VIEW E-E; Added ¼" and ⅜" cable clamps and changed weld criteria. Changed clevis size.	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  
 AASHTO American Association Of State Highway Officials  
 AASHTO American Association Of State Highway And Transportation Officials  
 ABC Asphalt Base Course  
 Abd. Abandoned  
 ABS Acrylonitrile-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  
 ADS 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 B 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 C 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  
 CDMM Committee or By Committee  
 Comp. Composite  
 Con. Connect or Connection  
 Conc. Concrete  
 Const. Construct or Construction  
 Contr. 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

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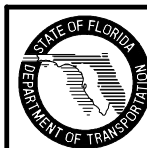
2010 FDOT Design Standards

**STANDARD ABBREVIATIONS**

Last Revision	Sheet No.
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001	

F	Fill, Farad	HW or H.W.	High Water or Hot Water	M	Mass, Middle Ordinate Length or Mega	N m	Newton Meter
F or Final	Final Quantity	Hwy.	Highway	m	Meter or Milli	No.	Number
F & I	Furnish & Install	Hyd.	Hydraulic	m <sup>2</sup>	Square Meter or Meter Square	Nom.	Nominal
F to F	Face to Face	Hz	Hertz	m <sup>3</sup>	Cubic Meter or Meter Cubed	Norm.	Normal
FA	Federal Aid or Fine Aggregate			m <sup>3</sup> /m	Cubic Meter Per Meter	N.P.	Non Plastic
FAC	Florida Administrative Code	I	External Angle (Delta), Interstate	m/s	Meters Per Second	NPS	Nominal Pipe Size
FAP	Federal Aid Project	Intchg. or Ichg.	Interchange	Mach.	Machine	NPT	National Pipe Thread
FC	Friction Course	IES	Illuminating Engineering Society	Maint.	Maintenance	NRCP	Non-Reinforced Concrete Pipe
FD	French Drain	ID, I.D.	Inside Diameter or Identification	Matl.	Material	NS	Non Stress, Not Suitable or Near Side
Fdn.	Foundation	IMC	Intermediate Metal Conduit	Max.	Maximum	NT, N&T	Non Traffic, Nail & Tin
FDDT	Florida Department Of Transportation	In.	Inch or Inches	MB	Median Barrier	NTS	Not To Scale
FE	Floor Elevation	Inc.	Incorporated or Including	MBM	Thousand (Feet) Board Measure	NW	Northwest
Fed.	Federal	Incl. or Inc.	Included	MD	Machine Direction (Geotextiles)		
Fert.	Fertilizer	Ind.	Industry or Industrial	Med.	Median	Opass	Overpass
FES	Flared End Section	INV. or Inv.	Invert	Mega	One Million	Q to Q, o to o or O.D.	Out to Out
FETS	Flared End Terminal Section	IP	Iron Pipe	Memb.	Member	QA	Overall
FH	Fire Hydrant	Install.	Installed	MES	Mitered End Section	Q.B.G.	Optional Base Group
FHWA	Federal Highway Administration	Isect.	Intersection	Mess.	Message	QC or Q.C.	On Center
Fig.	Figure	Isl.	Island	Mfg.	Manufactured or Manufacturer	OD or O.D.	Outside Diameter
Fin.	Finish	IR	Iron Rod	MG	1000 Gallons	OE	Overhead Electric
F.L., FL or $\bar{F}$	Flow Line	ITE	Institute Of Transportation Engineers	MH, M.H.	Manhole, Mounting Height	OH, OHD or Ohd.	Overhead
FL, Fl. or Fla.	Florida	ITS	Intelligent Transportation Systems	MHW	Mean High Water	Opt.	Option, Optional or Optically
Flex.	Flexible			$\mu$	Micro	OT	Overhead Telephone
FNQ	Fuse (Type Slow Burn)	J	Joule	Mi.	Mile	Oz.	Ounce
FDC	Fiber Optics Cable	JB	Junction Box	Micro	One-Millionth	$\Omega$	Ohm
FPM or fpm	Feet Per Minute	Jct.	Junction	Mid.	Middle	P	Passenger Car & Light Delivery Truck
FPS or fps	Feet Per Second	Jt.	Joint	Mil	One-Thousandth Of An Inch	P or Plan	Plan Quantity
FR or Fr.	Frame			Mil.	Military	Pa	Pascal
Frang.	Frangible	K	Design Hour Factor or Kelvin	Milli	One-Thousandth	Par.	Parallel
Freq.	Frequency	k	Kilo (prefix)	Min.	Minimum or Minute	Pa.s	Pascal Second
F.S.	Florida Statutes	kg	Kilogram	Misc.	Miscellaneous	Part.	Participation or Partition
Ft.	Foot or Feet	kg/m	Kilogram Per Meter	mL	Milliliter	Pavt.	Pavement
FTB	Floating Turbidity Barrier	kg/m <sup>2</sup>	Kilogram Per Square Meter	MLW	Mean Low Water	PC	Point Of Curvature
FTBA	Florida Transportation Builder Association	kg/m <sup>3</sup>	Kilogram Per Cubic Meter	mm	Millimeter	PCBC	Precast Concrete Box Culvert
FTP	Florida Traffic Plans	Kilo	One Thousand	mobl.	Mobilization	PCC	Point Of Compound Curvature or Plain Cement Concrete
Furn.	Furnish	Kip	1000 Pounds	Mod.	Modify or Modified	PCE	Permanent Construction Easement
		km	Kilometer	Mol	Mole	PE	Professional Engineer
		km/h	Kilometer Per Hour	Mon.	Monument	Ped	Pedestrian or Pedestal
G	Giga or Gauss	kn	Knot	MOT	Maintenance Of Traffic	Pen.	Penetration
g	Gram or Gravity	kN	Kilonewton	MP	Mile Post	PG	Profile Grade
Galv.	Galvanized	kPa	Kilopascal	MPa	Megapascal	PGL	Profile Grade Line
Ga.	Gauge or Gage	ksi	Kips Per Square Inch	MPH or mph	Miles Per Hour	Ph.	Phase
Ga. or Gal.	Gallon	kV	Kilovolt	MSL	Mean Sea Level	pH	Measure Of Acidity or Alkalinity
Gar.	Garage	kVA	Kilovolt Ampere	MSTCSD	Minimum Specifications For Traffic Control Signal Devices	PI	Point Of Intersection
GD	Gutter Drain	kWh	Kilowatthour			Pkg.	Parking
GFI	Ground Fault Interrupter			Mtd.	Mounted	Pkwy.	Parkway
GIP	Galvanized Iron Pipe	L	Length, Length Of Curve, Liter, Left	MUTCD	Manual On Uniform Traffic Control Device	PL or $\bar{P}$	Property Line or Plate
GM	Gas Main	2-L	Two-Lane	MUTS	Manual On Uniform Traffic Studies	PM	12:00 Noon Until 11:59 Midnight
GP	Grade Point	2L1W	Two-Lane One-Way			POC	Point On Curve
Gr.	Grade, Guardrail or Grate	2L2W	Two-Lane Two-Way	N	North or Newton	PDST	Point On Semi-Tangent
Gr. or Gro.	Gross	LA or L/A	Limited Access	N/m	Newtons Per Meter	POT	Point On Tangent
GRC	Galvanized Rigid Steel Conduit	Lat.	Lateral or Latitude	N/m <sup>2</sup>	Newtons Per Square Meter	PP	Power Pole
Grd.	Ground	Lb.	Pound	N/m <sup>3</sup>	Newtons Per Cubic Meter	PPB	Pier Protection Barrier
GRI	Geosynthetic Research Institute	LBS.	Pounds	N/mm <sup>2</sup>	Newtons Per Square Millimeter	Pr.	Pair
gross km	Gross Kilometer	lb/sy	Pounds Per Square Yard	NA or N/A	Not Available or Not Applicable	PRC	Point Of Reverse Curvature
Gr. Wt. or gr. wt.	Gross Weight	LBR	Limerock Bearing Ratio	N & C	Nail & Cap	Prct.	Precast
Gttr.	Gutter	LC	Long Chord	N & D	Nail & Disk	Prest.	Prestressed
		LED	Law Enforcement With Flashing Lights And Radar	NAVD	National American Vertical Datum	Prob.	Probability
H	Henry	LFD	Load Factor Design	NB	Northbound	Prod.	Product, Production, Producer or Produced
h	Hour or Hecto	Lgth.	Length	NC	National Coarse or Normal Crown	Prog.	Program or Progression
ha	Hectare	Lin.	Linear	NCHRP	National Cooperative Research Program	Proj.	Project or Projection
HAR	Highway Advisory Radio	lm	Lumen	NDCBU	Neighborhood Delivery And Collection Box Unit	PRM	Permanent Reference Monument
HB	Hay Bales	Lmrk.	Limerock	NE	Northeast	Prop.	Proposed
HC	Horizontal Clearance	LDS	Limit Of Clear Sight	net km	Net Kilometer	Prov.	Provisions
HD	High Density or Heavy Duty	Loc., LD	Location	NEMA	National Electrical Manufacturers Association	PRS	Portable Regulatory Sign
HD or Hd.	Head	Long.	Longitude	NGVD	National Geodetic Vertical Datum of 1929	PS & E	Plans, Specifications And Estimates
HDPE	High Density Polyethylene	LRFD	Load Resistance Factor Design	NGS	National Geodetic Survey	PSF or psf	Pounds Per Square Foot
Hdl.	Headwall	LS	Length Of Spiral	NHS	National Highway System	PSI or psi	Pounds Per Square Inch
HH	Heavy Hex	LT	Left Turn	NHW	Normal High Water	PT	Point Of Tangency or Pressure Treated
Hndrl	Handrail	Lt.	Left	NIC	Not In Contract	PVC	Polyvinyl Chloride
HDA	Hand/Off/Automatic	Ltd.	Lighted or Limited	NJ	New Jersey	PW	Pressure Water
Horiz. or Hor.	Horizontal	Lum.	Luminaire				
HP	High Pressure or Horsepower	L/W	Lightweight				
Hr.	Hour	lx	Lux				
HS	High Strength						
HSHV	High Strength Horizontal Vertical						
Hse.	House						
Ht.	Height						

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**STANDARD ABBREVIATIONS**

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, RDW 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 ShellBase Asphaltic Concrete  
 SBRM Sand Bituminous Road Mix  
 SBST ShellBase 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  
 Unltd. 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

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

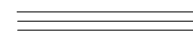





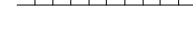
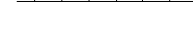


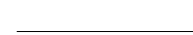

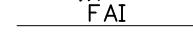


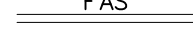
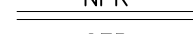
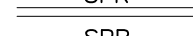
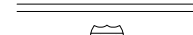
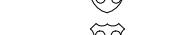


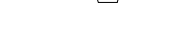
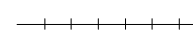


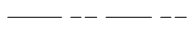
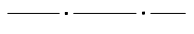

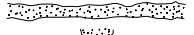






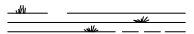



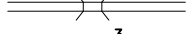
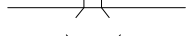
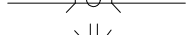




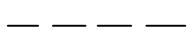
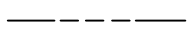



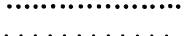
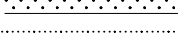
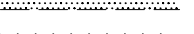
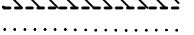
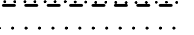
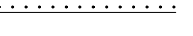
















































METRIC MEASUREMENT

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  
 M1 Meter  
 M2 Square Meter  
 M3 Cubic Meter  
 NK Net Kilometer  
 PA Per Analysis  
 PB Per Building  
 PI Per Intersection  
 PL Plant  
 PW Per Well

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.



## 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  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	 Free Ferry  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  Meandered Lake  Marsh Or Swamp  Mangroves  Levee Or Dike  Levee Or Dike With Road  Highway Bridge  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  Wayside Park Or Small Park  Park With Boat Ramp  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  Farmers Market  Game Preserve  Game Checking Station  Bird Sanctuary  Fire Control Headquarters  Lookout Tower  Fire Station  Patrol Or Police Station  Correctional Institution Or Road Camp  DOT Department of Transportation Facility  Coast Guard Station  Armory  Junkyard  Sanitary Fill  Sewage Disposal Plant  Incinerator  Power Plant  Power Substation  Communications Facility  Locked Gate Or Fence  WOOD Triangulation Station
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### 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
	ALACHUA Triangulation Station
	B.M. NO. 112 Bench Mark
	Point Of Intersection
	North Arrow
	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
	Railroad Mile Post
	Railroad Signal With Gate
	Railroad Switch
	Gate
	Pump Island
	Storage Tank (Surface)
	Storage Tank (Underground)
	Mine Or Quarry
	Borrow Pit
	Church
	Store
	Residence
	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
	Lt. Skew Rt. Definition Of Skew For Cross Drains And Barrels Of Concrete Box Culverts
	Rt. Skew Lt.
	Concrete
	Wood
	e Rate Of Superelevation

## UTILITY ADJUSTMENT SYMBOLS

EXISTING	PROPOSED	EXISTING	PROPOSED

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)
		Walk - Dont Walk
		Flashing Dont Walk
		Signal Face Number
		Signal Lens
		Programmed Signal Head
		Messenger Wire
		Pole Tabulation Cross Reference
		Pole Tabulation Cross Reference (Joint Use Pole)
		Signal Phase

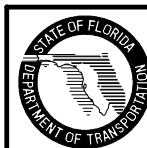
## LIGHTING SYMBOLS

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)
	Sign Number
	Sign Item Number
	Traffic Flow Arrow

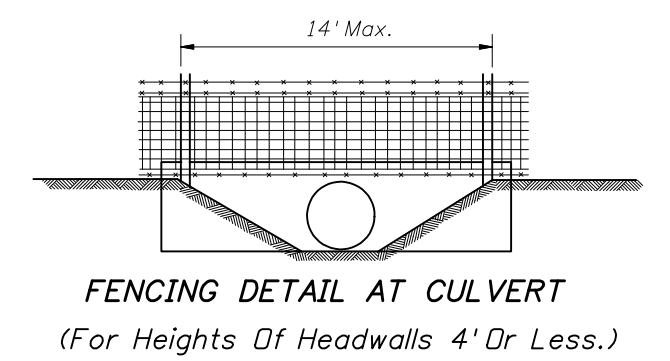
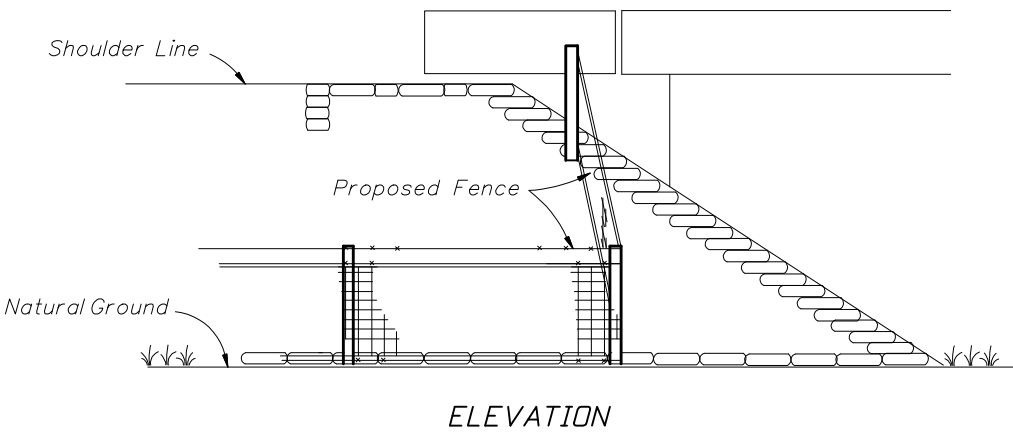
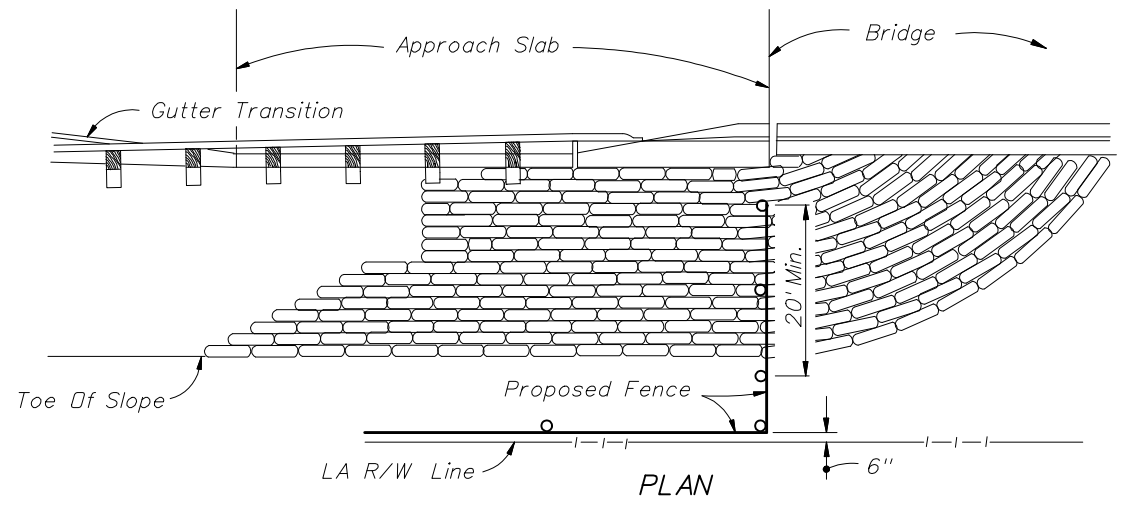
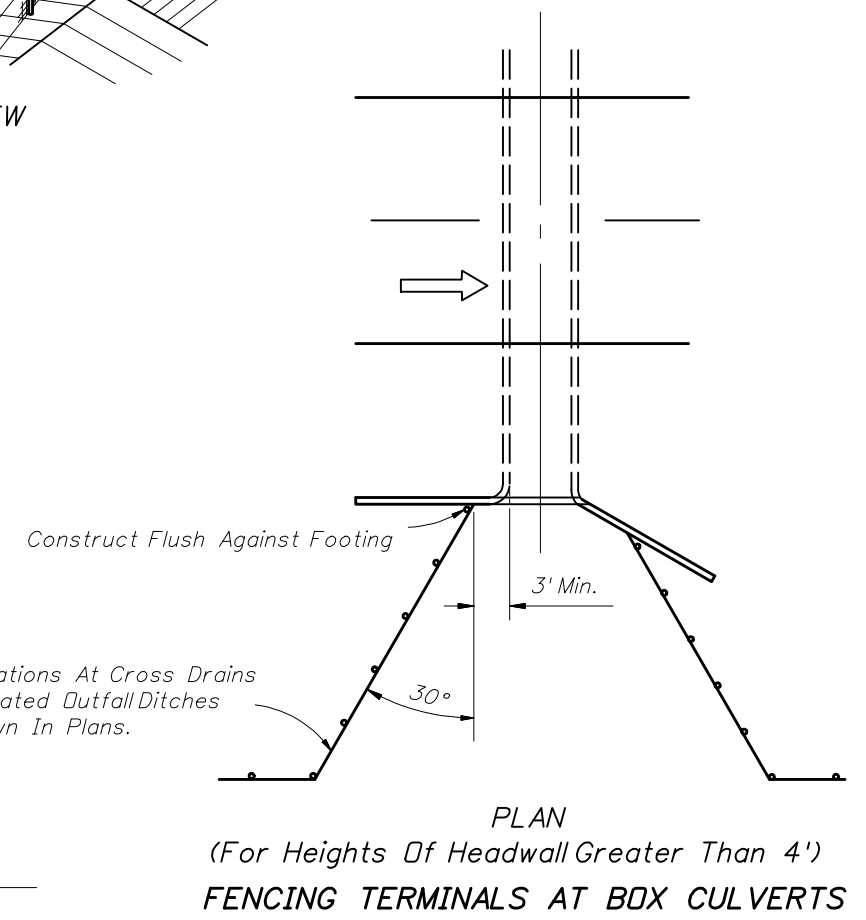
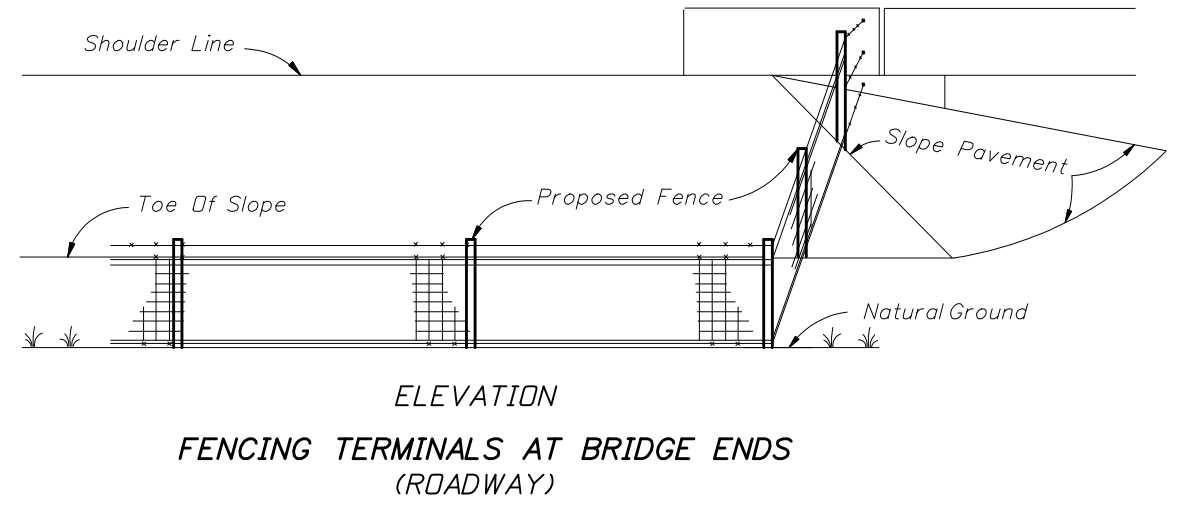
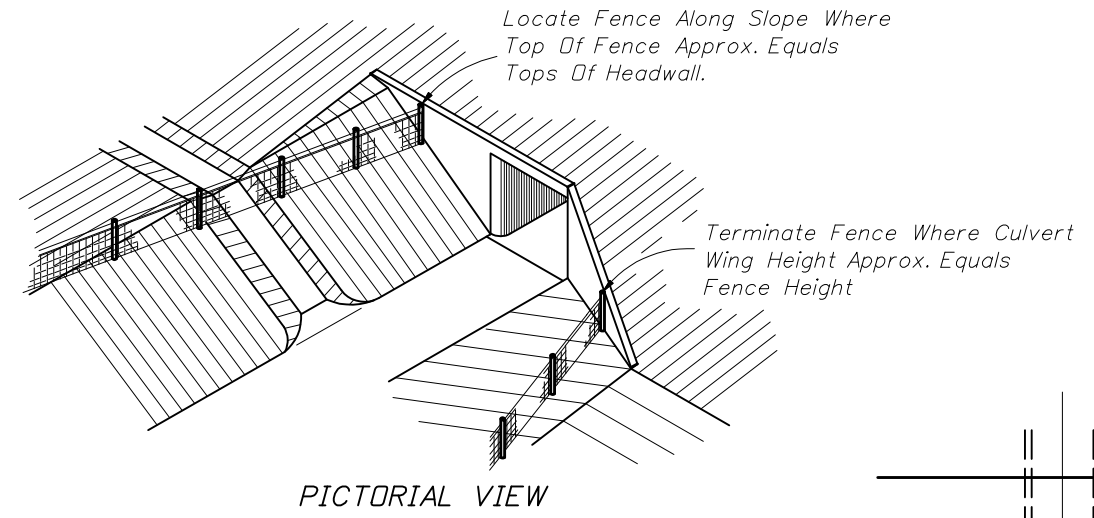
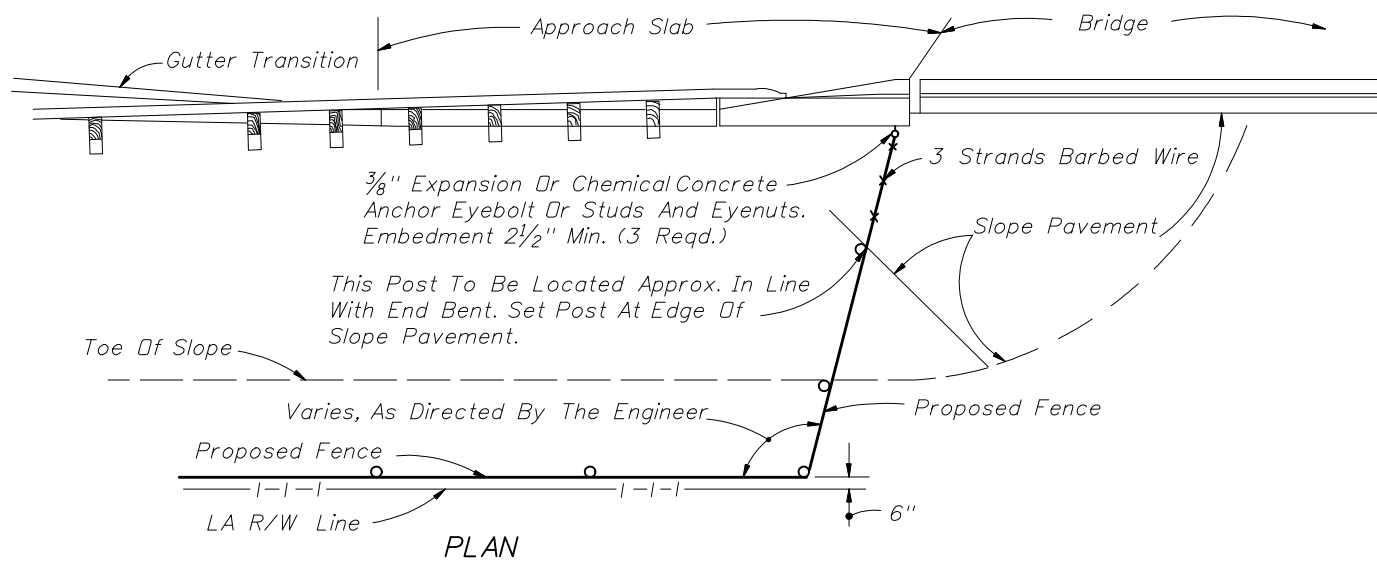
See General Note, Sheet 1 of 3



2010 FDOT Design Standards

### STANDARD SYMBOLS

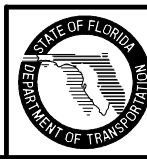
Last Revision 07/01/05	Sheet No. 3 of 3
Index No. <b>002</b>	

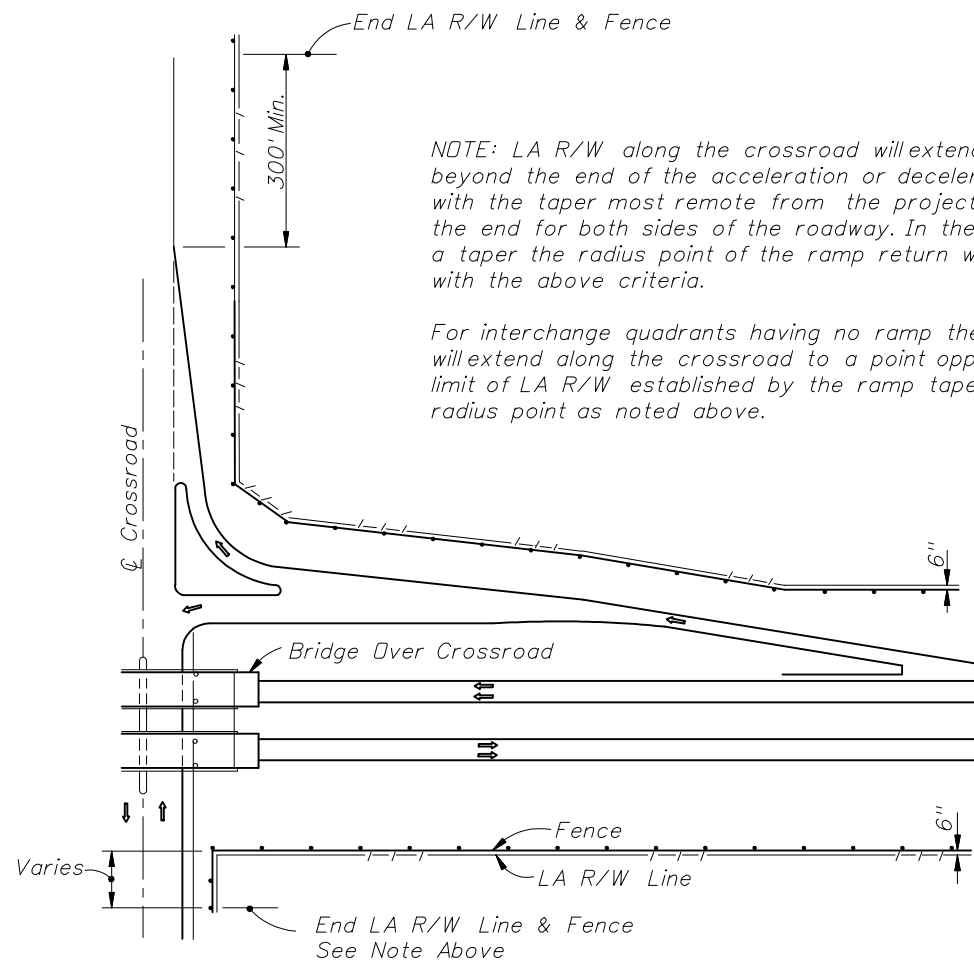


FENCING TERMINALS AT BRIDGE ENDS (STREAM CROSSING)

FENCING TERMINALS AT BOX CULVERTS

Note: When height of headwall is 4' or less (drainage pipe 36" or less) the fence shall not be tied to the headwall, but shall span the lateral ditch.



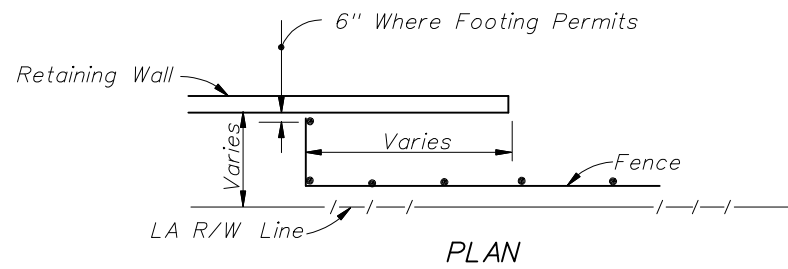


NOTE: LA R/W along the crossroad will extend a minimum 300' beyond the end of the acceleration or deceleration taper, with the taper most remote from the project establishing the end for both sides of the roadway. In the absence of a taper the radius point of the ramp return will be used with the above criteria.

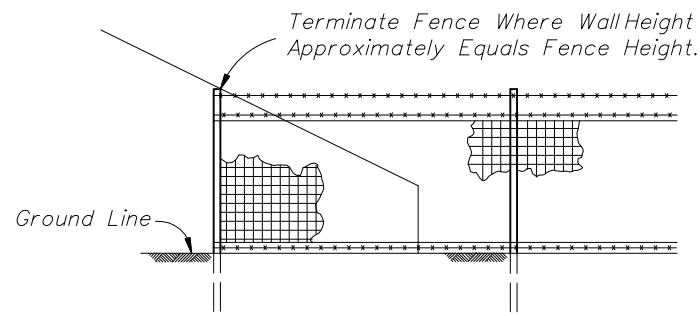
For interchange quadrants having no ramp the LA R/W will extend along the crossroad to a point opposite the limit of LA R/W established by the ramp taper or radius point as noted above.

APPLIES TO BRIDGE OVER CROSSROAD AND CROSSROAD OVER FREEWAY (BRIDGE OVER CROSSROAD SHOWN)

### FENCING TERMINALS AT RURAL INTERCHANGES

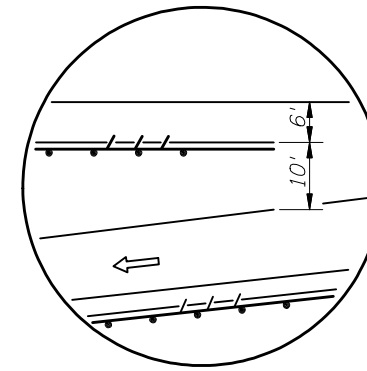


PLAN

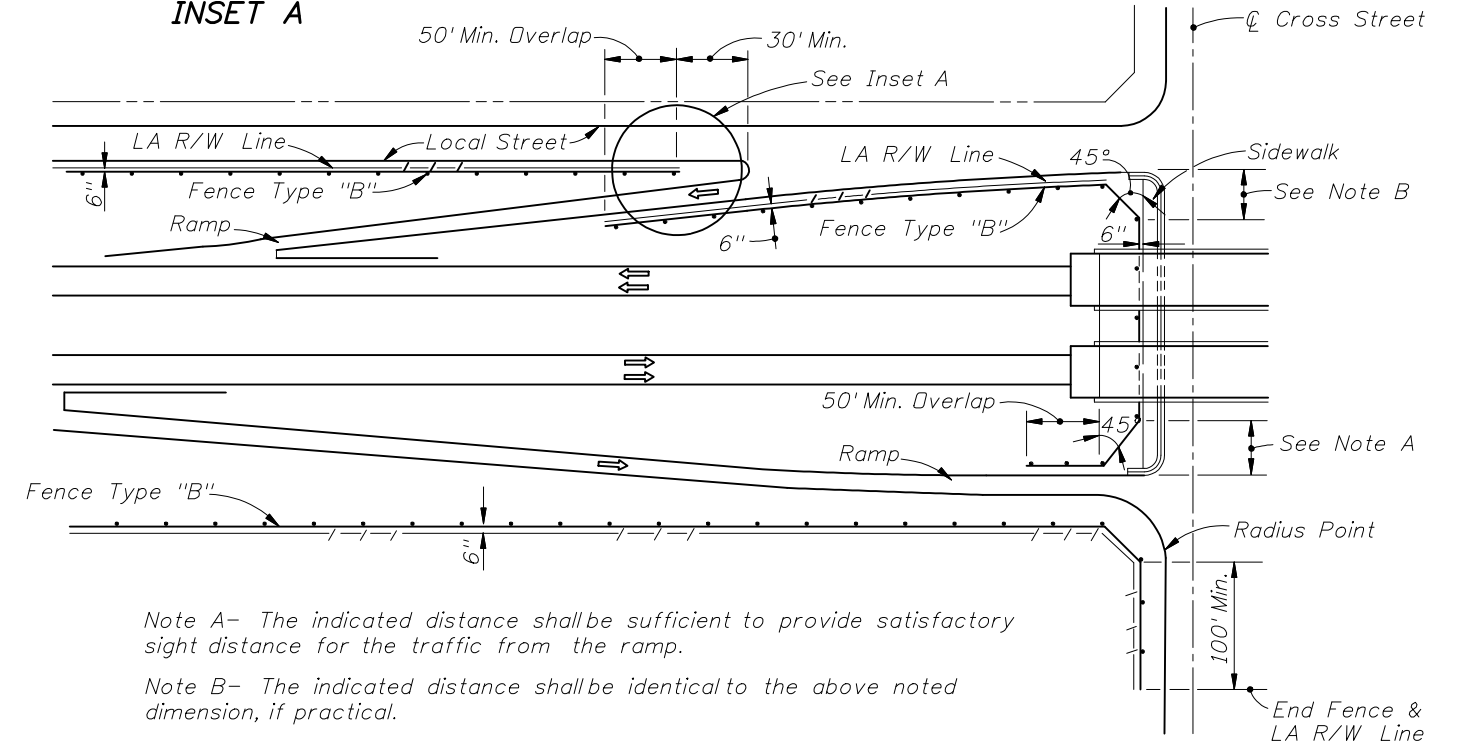


ELEVATION

### FENCING TERMINALS AT RETAINING WALLS



INSET A



Note A- The indicated distance shall be sufficient to provide satisfactory sight distance for the traffic from the ramp.

Note B- The indicated distance shall be identical to the above noted dimension, if practical.

### FENCING TERMINALS AT URBAN INTERCHANGES



2010 FDOT Design Standards

### FENCE LOCATION

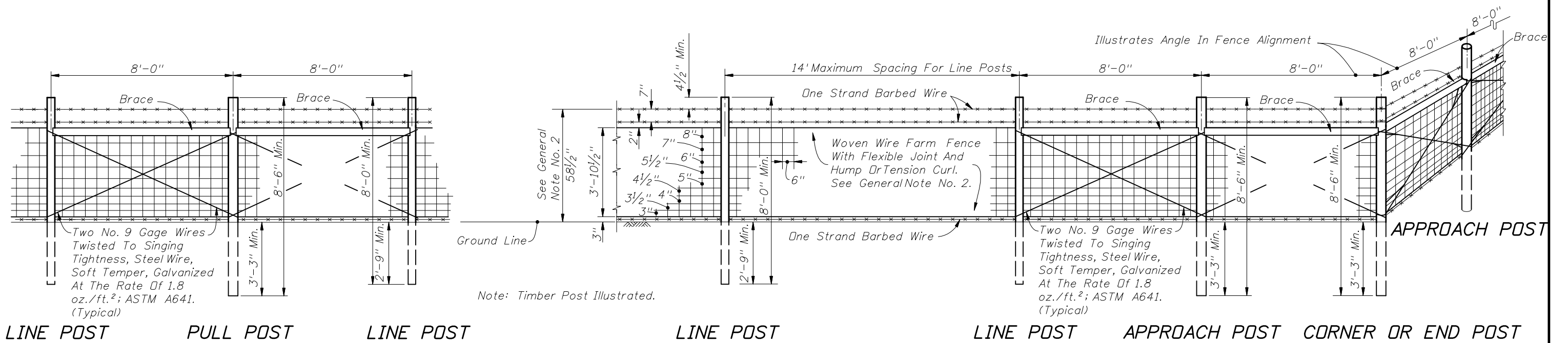
Last Revision 07/01/05	Sheet No. 2 of 2
Index No. 800	



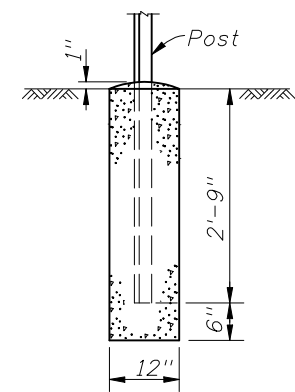
## GENERAL NOTES

1. This fence to be provided generally in rural areas. For supplemental information see Section 550 of the FDOT Specifications.
2. Fabric shall be woven wire, either galvanized steel, meeting the requirements of ASTM A116, No. 9 Farm, Design Number 1047-6-9, with Class 3 zinc coating, or aluminum coated steel, meeting the requirements of ASTM A584, No. 9 Farm, Design Number 1047-6-9, with a minimum coating weight of 0.40 oz./ft.<sup>2</sup>. For additional information see payment note below.
3. Fence shall be installed with wire side to private property except on horizontal curves greater than 3° the fence shall be installed so as to pull against all posts.
4. Posts may be either timber, steel, recycled plastic or concrete. Unless a specific post material is called for in the plans, the Contractor may elect to use either a single material or a combination of timber, steel, recycled plastic or concrete materials. Line posts of one material may be used with corner, pull and end post assemblies of a different material. Line posts of only one optional material and pull post assemblies of only one optional material will be permitted between corner and end post assemblies. Within individual corner and end post assemblies only one optional material will be permitted.
5. Timber posts shall meet the material requirements of Specification Section 954. Timber line posts are to be minimum 4" diameter. Timber corner, pull, approach and end posts are to be a minimum 5" diameter. Timber braces are to be minimum 4" diameter.
  - (A) Staples for line posts to be 1 1/4" minimum length; for approach, corner and pull posts 1 1/2" minimum length. At approach, corner and pull posts, staple every line wire. At line posts, staple every line wire in top half and alternate line wires in bottom half. Staples shall be driven diagonally across the line wire with the points in separate grains.
  - (B) Connections between timber posts and braces to be provided by dowels as shown in fastener details.
  - (C) Wire to be wrapped and tied, as shown in the splice details, at the following locations:
    - (a) All end posts, (b) Corner post, including the assemblies at vertical breaks of 15° or more and
    - (c) Pull posts where the wire is not spliced and pulled through the assembly; see General Note 18.
6. Steel posts and braces shall be standard steel posts, galvanized at the rate of 2 oz./ft.<sup>2</sup>, together with necessary hardware and wire clamps and meeting the following requirements:
  - (A) Line posts: 8' long; 1.33 lbs./ft.; roll formed studding; anchor plate attached (23 in.<sup>2</sup>).
  - (B) Approach posts: 2 1/2" x 2 1/2" x 1/4" angles, 8' long; fabricated for attaching brace; with necessary hardware, clamps, etc.
  - (C) Pull, end and corner posts: 2 1/2" x 2 1/2" x 1/4" angles, 8' long; fabricated for attaching brace; with necessary hardware, clamps, etc.
  - (D) Braces: 2" x 2" x 1/4" angles with necessary hardware and fabricated for attaching to post.
  - (E) The pull, corner, approach and end posts are to be set in concrete as per detail. (Also see General Note No. 15)
7. Recycled plastic posts shall meet the material requirements of specification Section 972 and be one of the products included on the Qualified Products List current at the time of installation. Line posts shall have a minimum section of 4" round or 4" square. Plastic posts shall not be used as corner, pull, end or approach posts unless such use specifically detailed in the plans. Plastic posts can be set by either digging and tamped backfill or by driving into full depth preformed holes 1/4" to 1/2" smaller than cross section of post. Staples for fabric and barbed wire connection to plastic line posts shall be the same size, count and location as that for timber posts.
8. The Contractor, at his option, may use any suitable precast or prestressed concrete posts; however, approval by the Engineer, of posts not shown on this index, will be required prior to construction of the fence. Precast posts shall be Class I concrete. Prestressed posts shall be Class III concrete. Lengths of concrete post to be as indicated for timber posts.
9. Aluminum post, braces and accessory framing hardware shall not be used unless the plans specifically detail their application or the Engineer specifically approves their incorporation in fence construction or repair. Aluminum framed gates are permitted as described in General Note 19.
10. The woven wire shall be attached to steel and concrete posts by a minimum of five tie wires. The single wire ties shall be applied to the top, bottom and three intermittent line wires. The ends of each tie wire shall have a minimum of two tight turns around the line wire. Tie wires shall be steel wire not less than 0.120" diameter, zinc coating Class 3, soft temper, in accordance with ASTM A641.
11. Steel Barbed Wire can be either of the following types:
  - Type I: This type shall conform to the requirements of ASTM A121, with two strands of 12 1/2 gage wire; four-point barbs, wire size 14 gage, twisted around both line wires; and, Class 3 coating.
  - Type II: This type same as Type I except the two strand wires are twisted in alternating directions between consecutive barbs.
 Aluminum Barbed Wire shall be fabricated of two strands of 0.110-inch wire with 0.08-inch diameter four-point barbs spaced at approximately 5 1/2", and at a maximum spacing of 6". The wire for the strands and for the barbs shall be of ASTM B211M Alloy 5052-H38 or equal.
12. The woven wire shall be stretched only until one-half the tension curl has been pulled out of the line wires.
13. Posts to be set by driving or digging. If by digging, the posts shall be set at the center of the hole and the soil tamped securely on all sides.
14. Longer posts than those indicated above may be required by the plans or for deeper installations.
15. Concrete bases for angular steel posts (pull, corner, end and approach) shall be Class NS as specified in Section 347. Materials for Class NS concrete may be proportioned by volume and/or by weight.
16. Pull post assemblies shall be installed at approximately 330' centers except that this maximum interval may be reduced by the Engineer on curves where the radius is less than 3°.
17. Corner post assemblies are to be installed at all horizontal and vertical breaks in fence of 15° or more.
18. A maximum length of 1320' of wire may be installed as a unit. For pulls through a pull post assembly the fabric shall be spliced by crimping sleeves only. Pulls through a corner post assembly will not be permitted.
19. Unless otherwise called for in the plans gates shall be commercially available metal swing gates assembled and installed in accordance with the manufacturer's specifications as approved by the Engineer. Chain link swing gates in accordance with Index No. 802 may be substituted for metal swing gates as approved by the Engineer. Gate size is full opening width whether single leaf or double leaves. Payment for gates shall include the gate, single or double, all necessary hardware for installation and any additional length and/or size for posts at the opening. Gates shall be paid for under the contract unit price for Fence Gates, EA.
20. For construction purposes, assemblies are defined as follows: End post assemblies shall consist of: one end post, one approach post, two braces, four diagonal tension wires and all necessary fittings and hardware. Pull post assemblies shall consist of: one pull post, two braces, four diagonal tension wires and necessary fittings and hardware. Corner post assemblies shall consist of: one corner post, two approach posts, four braces, eight diagonal tension wires and all necessary fittings and hardware.
21. All posts, braces, tension wires, fabric, tie wires, Class NS concrete, and all miscellaneous fittings and hardware to be included in the cost for Fencing, LF. Fencing shall be inclusive of the lengths of pull, end and corner post assemblies, but exclusive of gate widths.

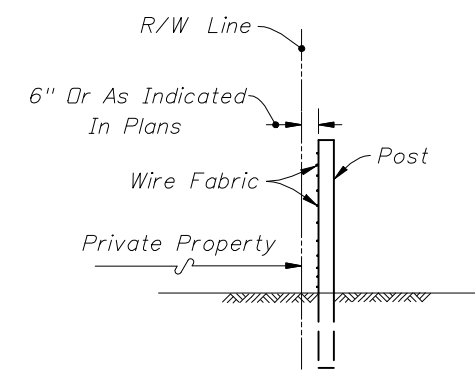




Note: Timber Post Illustrated.



(Pull, Corner, End And Approach Posts)  
**CONCRETE BASE FOR ANGULAR STEEL POST**



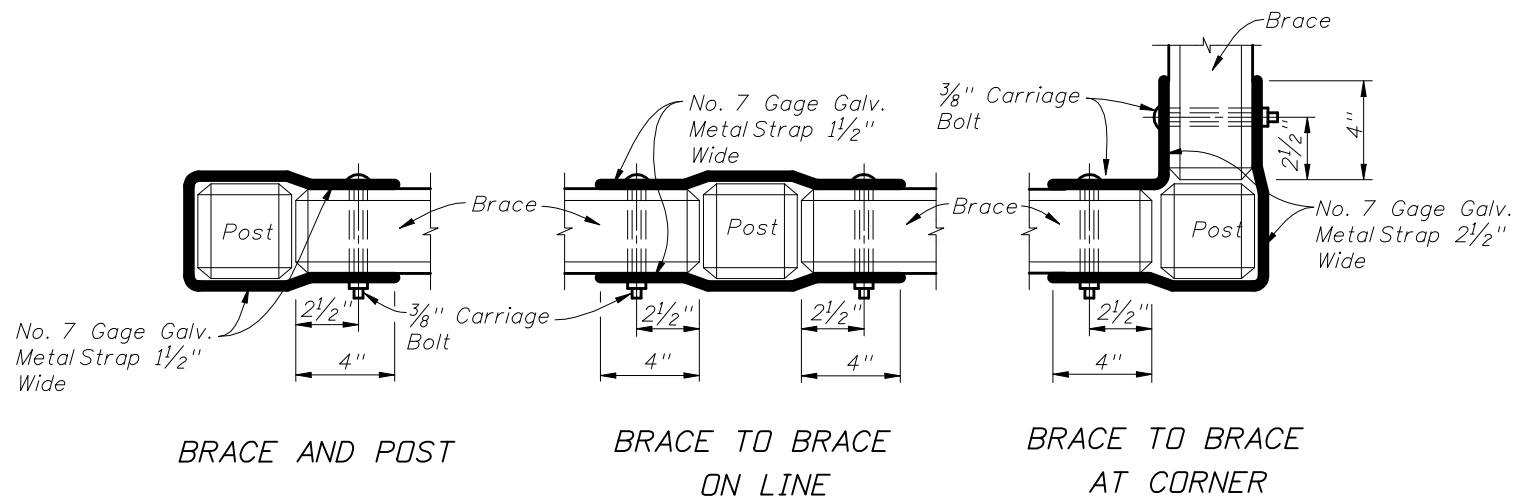
**FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS**

(REFER TO DETAIL PLANS FOR FENCE POSITION AT LOCATIONS WITH FRONTAGE ROADS)

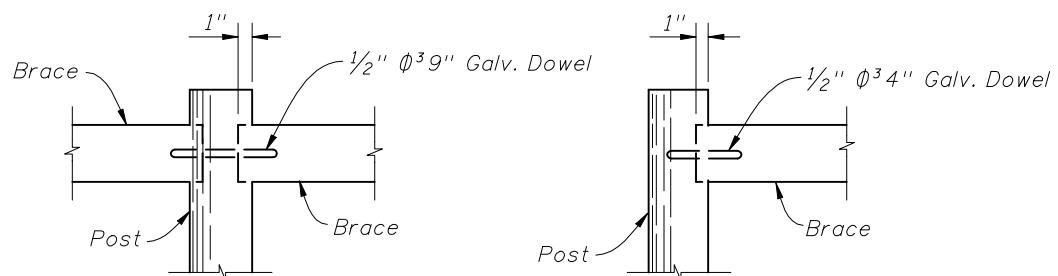
**DESIGN NOTE**

This index details fencing that is constructed with farm fabric 46 1/2" (47" nominal) in height and with specific ground clearance and specific barbed wire spacings. For fencing of different height or installation details, the fence shall be fully detailed in the Contract plans.

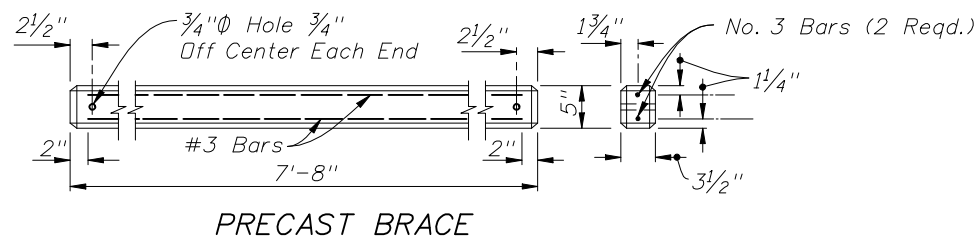
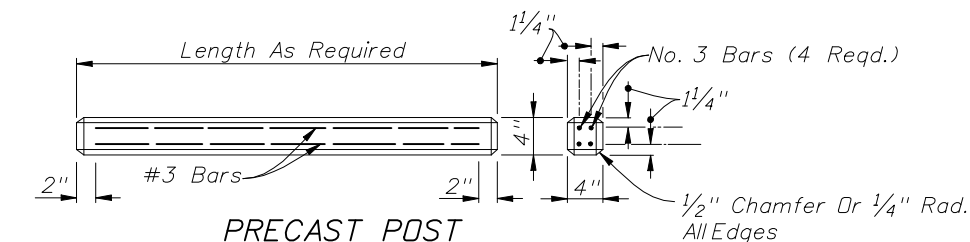
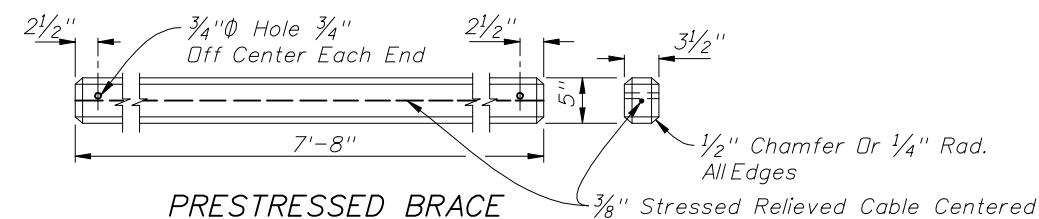
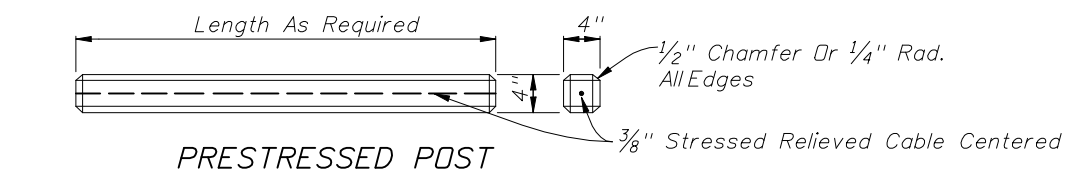




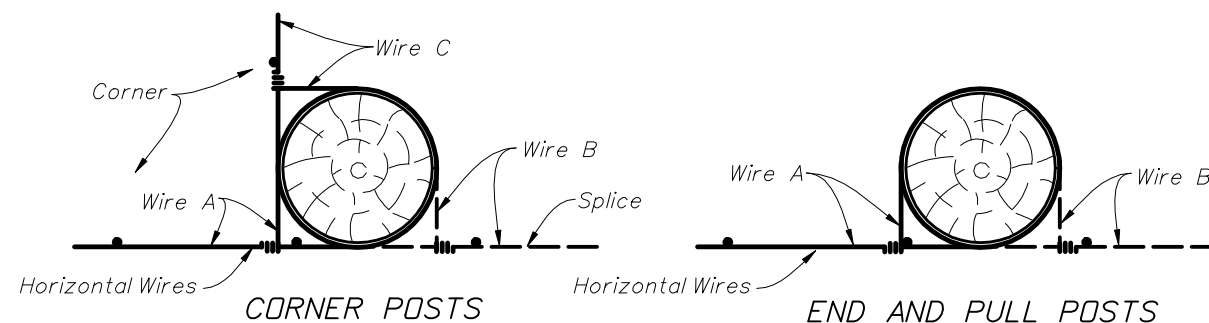
FASTENER FOR CONCRETE POST AND BRACES



FASTENER FOR TIMBER POST AND BRACE



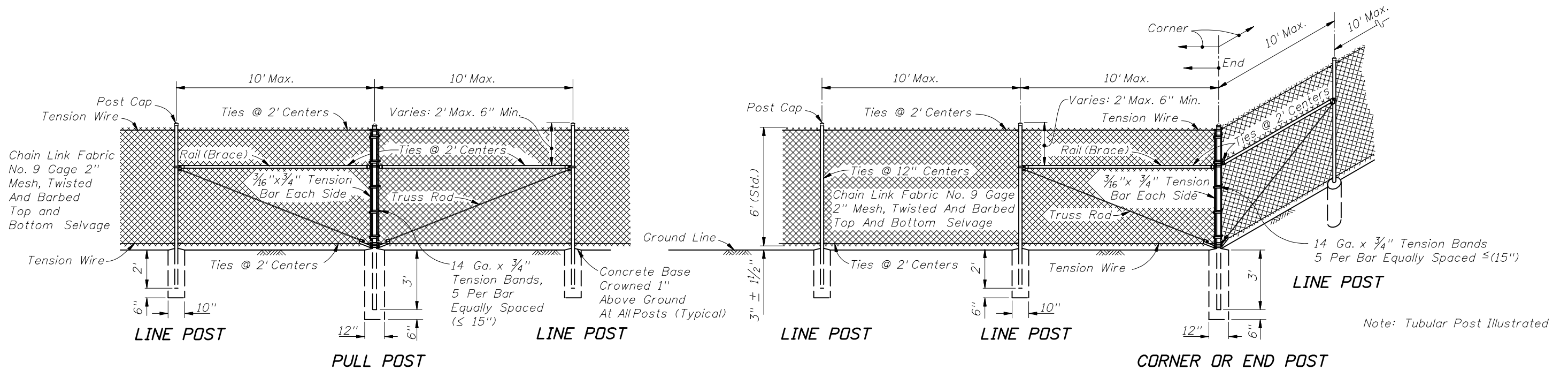
ALTERNATE CONCRETE POSTS AND BRACES



Each horizontal wire to be wrapped around corner, end and pullposts and tied to same wire. See General Notes 5 and 17. Timber post illustrated. These methods also apply to steel and concrete post illustrations.

SPLICES





**GENERAL NOTES**

- This fence to be used generally in urban areas.
- For supplemental information refer to Section 550 of FDOT Standard Specifications.
- Chain link fabric, post, truss rods, tension wires, tie wires, stretcher bars, gates and all miscellaneous fittings and hardware shall meet the requirements of AASHTO and ASTM signify current reference.
- Fence Component Options:
  - Line post options:
    - Galvanized steel pipe, Schedule 40- 1 1/2" nominal dia. zinc galvanized at the rate of 1.8 oz./ft<sup>2</sup>: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
    - Aluminum coated steel pipe: ASTM A53, X 2 Tables: Schedule 40- 1 1/2" nominal dia., 1.90" OD; coated at the rate 0.40 oz./ft.: AASHTO M111.
    - Aluminum alloy pipe- 2" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
    - Steel H-Beam- 1 7/8" x 1 5/8" Zinc Galv. 1.8 oz./ft.: AASHTO M111 and Detail.
    - Aluminum alloy H-Beam- 1 7/8" x 1 5/8" Detail.
    - Steel C- 1 7/8" x 1 5/8" Galv.: 1.8 oz./ft. zinc: AASHTO M111; DR , 0.9 oz./ft<sup>2</sup>. zinc-5% aluminum-mischmetal: ASTM F1043 and Detail.
    - Resistance welded steel pipe; 50,000 psi min. yield strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 2" OD, 1 1/2" NPS, 1.900" dec. equiv., 0.120" min. wall thick. and min. wt. 228 lb./ft.; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15µg/in<sup>2</sup>. min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.
  - Corner, end, and pull post options:
    - Galvanized steel pipe, Schedule 40- 2" nominal dia. zinc galvanized at the rate of 1.8 oz./ft<sup>2</sup>: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
    - Aluminum coated steel pipe: ASTM A53 steel, X 2 Tables: Schedule 40; 2" nominal dia., 2.375" OD; coated at the rate 0.40 oz./ft.: AASHTO M111.
    - Aluminum alloy pipe- 2 1/2" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
    - Resistance welded steel pipe; 50,000 psi min. yield strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 2 1/2" OD, 2" NPS, 2.375" dec. equiv., 0.130" min. wall thick. and min. wt. 3.117 lb./ft.; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15µg/in<sup>2</sup>. min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.

- Rail options:
  - Galvanized steel pipe, Schedule 40- 1 1/4" nominal dia. zinc galvanized at the rate of 1.8 oz./ft<sup>2</sup>: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
  - Aluminum coated steel pipe: ASTM A53 steel, X 2 Tables Schedule 40; 1 1/4" nominal dia., 1.660" OD; coated at the rate 0.40 oz./ft.: AASHTO M111.
  - Aluminum alloy pipe- 1 1/4" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
  - Resistance welded steel pipe; 50,000 psi min. yield strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 1 5/8" OD, 1 1/4" NPS, 1.660" dec. equiv., 0.111" min. wall thick. and min. wt. 1.836 lb./ft.; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15µg/in<sup>2</sup>. min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.
- Chain link fabric options (2" mesh with twisted and barbed selvage top and bottom for all options except as described in Note No. 10):
  - AASHTO M181 Type I - Zinc Coated Steel, No. 9 gage (coated wire diameter), coated at the rate of 1.8 oz./ft<sup>2</sup>. (M181 Class D 2.0 oz./ft<sup>2</sup>. modified to 1.8 oz./ft<sup>2</sup>.)
  - AASHTO M181 Type II - Aluminum Coated Steel, No. 9 gage (coated wire diameter), coated at the rate of 0.40 oz./ft<sup>2</sup>.
  - AASHTO M181 Type IV - Polyvinyl Chloride (PVC) Coated Steel, No. 9 gage (coated core wire diameter), core wire-zinc coated steel. PVC coating: M181 Class A (either extruded or extruded and bonded) or Class B (bonded). See table right. Unless the plans call for M181 standard colors medium green, dark green or black the coating color shall be soft gray matching that of No. 36622 of Federal Standard 595a.
- Tension wire options:
  - Steel wire No. 7 gage zinc galvanized at the rate of 1.2 oz./ft<sup>2</sup>: AASHTO M181.
  - Aluminum alloy wire with a diameter of 0.1875" or larger conforming to the requirements of ASTM B211, Alloy 5056 Temper H38, or, Alclad Alloy 5056 Temper H192.
  - Aluminum coated steel wire No. 7 gage coated at the rate of 0.040 oz./ft<sup>2</sup>: AASHTO M181.
- Tie wire and hog ring operations:
  - Steel wire No. 9 gage zinc galvanized at the rate of 1.2 oz./ft<sup>2</sup>.
  - Aluminum alloy wire with a diameter of 0.1443" or larger conforming to the requirements of ASTM B211, Alloy 5056 Temper H38, or, Alclad Alloy 5056 Temper H192.
  - Aluminum coated steel wire No. 7 gage coated at the rate of 0.040 oz./ft<sup>2</sup>.

**GENERAL NOTES CONTINUED**

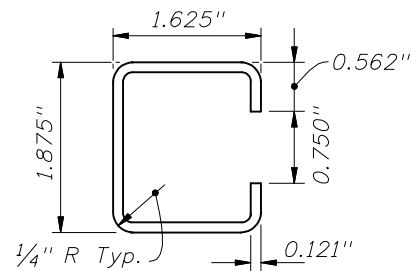
5. Unless a specific material is called for in the plans the Contractor may elect to use either a single type of material or a combination of material types from the component options listed in note 4. Combinations of optional materials are restricted as follows:
- (a) Only one fabric optional material will be permitted between corner and/or end post assemblies.
  - (b) Only one line post optional material will be permitted between corner and/or end post assemblies.
  - (c) Pull post assemblies shall be optional materials identical to either the line post optional material or the corner and end post assembly optional material; but, pull post assemblies shall be the same optional material between any set of corner and/or end post assemblies.
6. Concrete for bases shall be Class NS concrete as specified in Section 347 of the Standard Specifications or a packaged, dry material meeting the requirements of a concrete under ASTM C-387. Materials for Class NS concrete may be proportioned by volume and/or by weight.
7. Line post shall be 8'-6" long (Standard). Line post are to be set in concrete as described above or by the following methods:
- (a) In accordance with special details and/or as specifically described in the contract plans and specifications.
  - (b) In accordance with ASTM F567 Subsections 5.4 through 5.10 as approved by the Engineer. Line post installed in accordance with Section 5.8 shall be 9'-6" long.
  - (c) Post mounted on concrete structure or solid rock shall be mounted in accordance with the base plate detail "Fence Mounting On Concrete Endwalls And Retaining Wall", Sheet 3; or, by embedment in accordance with ASTM F567 Subsection 5.5.
- End, pull and corner post assemblies shall be in concrete as detailed above for all soil conditions other than solid rock. Post within assemblies that are located on concrete structures or solid rock shall be set by base plate or by embedment as prescribed under (b) above for line post.
- Line and assembly post set in concrete bases shall be set an additional 3" in depth for each 1' of fence height greater than 6'.
8. Pull post shall be used at breaks in vertical grades of 15° or more, or at approximately 350' centers except that this maximum interval may be reduced by the Engineer on curves where the curve is greater than 3°.
9. Corner post are to be installed at all horizontal breaks in fence at 15° or more and as required at vertical breaks over 15° as determined by the Engineer.
10. When fence has an installed top of fabric height less than 6' knuckled top and bottom selvages shall be used unless the plans specifically identify locations for twisted selvage fabrics.
11. Unless sliding gates or special gates are called for in the plans, all gates shall be chain link swing gates meeting the material requirements described and as approved by the Engineer. Payment shall include the gates, single or double, all necessary hardware for installation and any additional length and/or size for posts at the opening. Gates shall be paid for under the contract unit price for Fence Gates, EA.
12. For construction purposes corner post assemblies shall consist of one corner post, two braces, two truss rods, and all necessary fittings and hardware as detailed. End post assemblies shall consist of one end post, one brace, one truss rod and all necessary fittings and hardware as detailed.
13. All post, tension wires, chain link fabric, tie wires, Class NS concrete, and all miscellaneous fittings and hardware to be included in the cost for Fencing, LF.

TYPE IV VINYL COATED FABRIC								
AASHTO M181 Table 4 Redefined As Follows								
Specified Diameter Of Metallic Coated Core Wire			Minimum Weight Of Zinc Coating		PVC Thickness Range			
					M181 Class A (Extruded Or Extruded And Bonded Coating)		M181 Class B (Bonded Coating)	
in.	mm	gage	oz./ft <sup>2</sup> .	g/m <sup>2</sup>	in.	mm	in.	mm
0.148	3.77	9	0.30	92	0.015 to 0.025	0.38 to 0.64	0.006 to 0.010	0.15 to 0.25

**DESIGN NOTE**

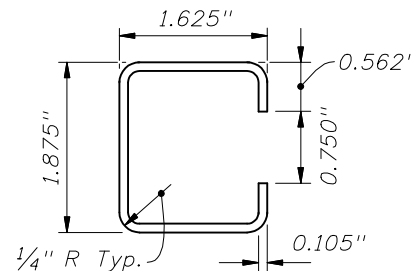
This index details fencing that is constructed with chain link fabric 6' (nominal) in height and with specific ground clearance. For fencing of different height or installation details, the fence shall be fully detailed in the Contract plans.





Galv. Wt. Per. Ft. = 2.34# ±5%  
Yield PSI (Min.) 45,000

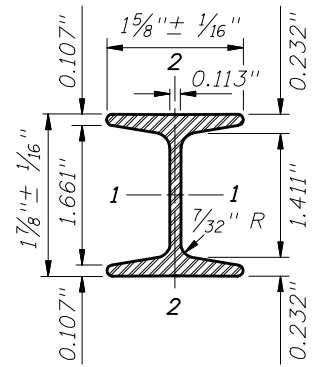
STANDARD WALL



Galv. Wt. Per. Ft. = 1.85# ±5%  
Yield PSI (Min.) 45,000

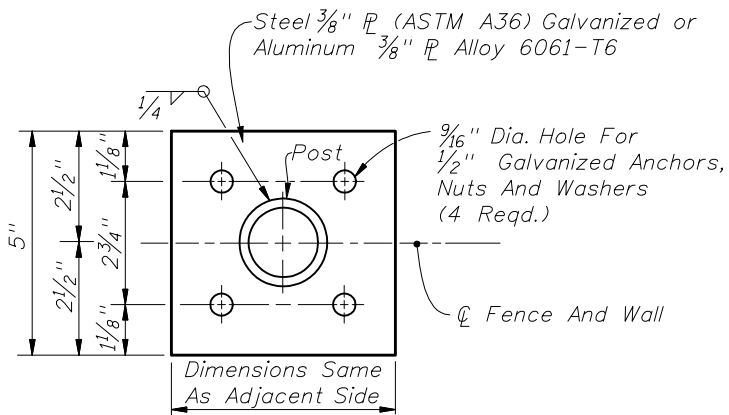
THINWALL

OPTIONAL "C" LINE POST

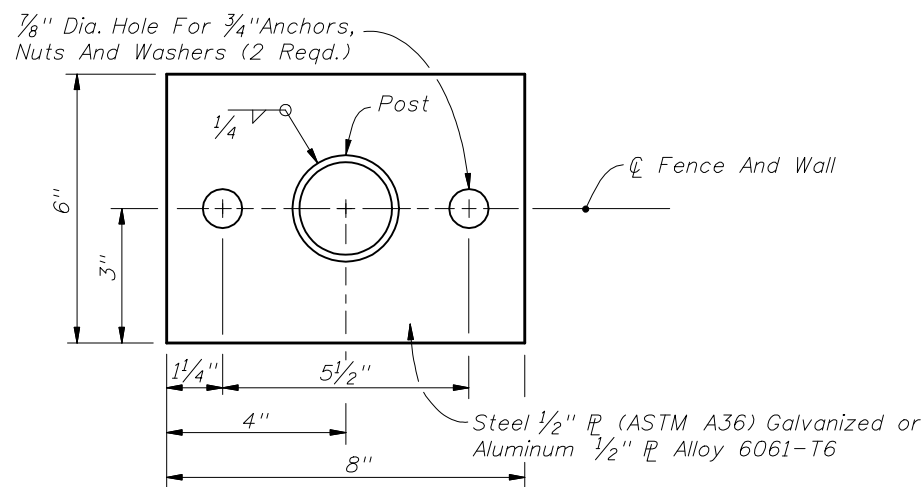


	STEEL		ALUMINUM	
Area (Sq. In.)	724		724	
Weight (Lb./Ft.)	2.72 ± 5% (Galv.)		0.91 ± 5%	
Surface Area (SF/Ft.)	0.776		0.776	
Tensile Strength (psi Min.)	80,000		30,000	
Yielding Point (psi Min.)	48,000		25,000	
	Axes		Axes	
	1-1	2-2	1-1	2-2
Moment Of Inertia	0.428	0.101	0.428	0.101
Section Modulus	0.456	0.124	0.456	0.124
Rad. Of Gyration	0.779	0.373	0.779	0.373

OPTIONAL 1 7/8" x 1 5/8" H-BEAM LINE POST

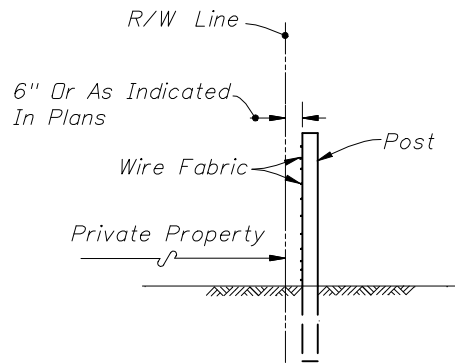


TOP VIEW  
FOUR ANCHOR PLATE OPTION



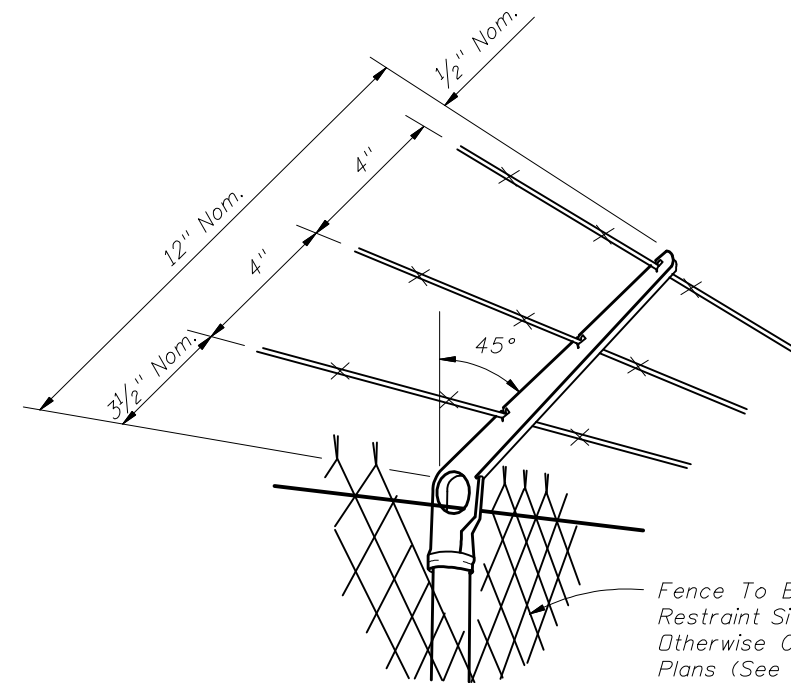
TOP VIEW  
TWO ANCHOR PLATE OPTION

FENCE MOUNTING ON CONCRETE ENDWALL AND RETAINING WALLS



FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS

(REFER TO DETAIL PLANS FOR FENCE POSITION AT LOCATIONS WITH FRONTAGE ROADS)



Fence To Be Mounted On Restraint Side Unless Otherwise Called For In Plans (See Notes)

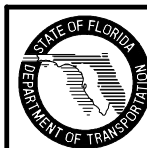
NOTES

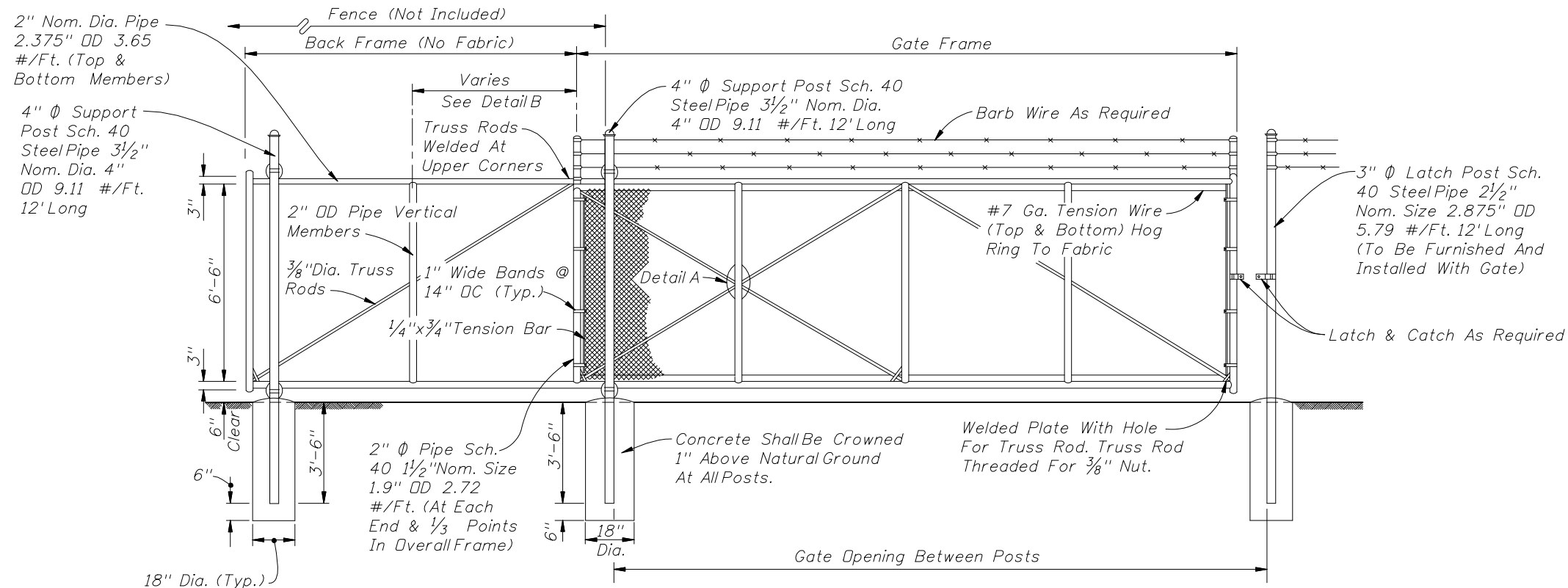
- Attachments to be used only when called for in the plans. Attachments to extend in direction of restraint. Unless otherwise called for in plans, direction of restraint will be as follows:
- Outward on limited access right of way line.
  - Outward on controlled access right of way line.
  - Outward from utilities and hazardous facilities located within highway right of way.
  - Outward from lateral ditches, outfalls, retention basins, canals, borrow areas and similar support facilities.
  - Inward on pedestrian ways.
- The cap-arm shall be designed to provide a drive fit over the top of posts and to exclude moisture in posts with tubular sections.

BARB WIRE ATTACHMENT

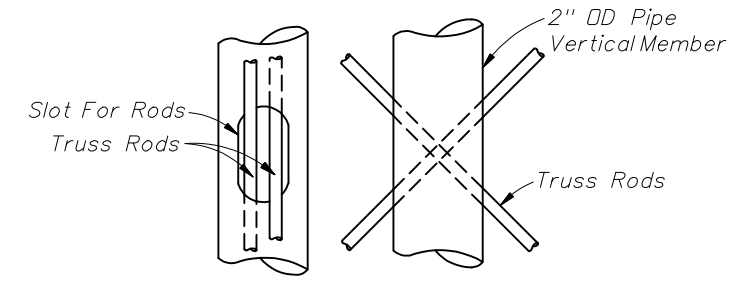
BASE PLATE AND ANCHOR NOTES:

- Base plate identical for line, pull, end and corner posts and shall be considered an integral part of the respective posts for basis of payment.
- Post to be plumbed by grout shim under base plate.
- Anchors (Galvanized Steel):
  - 12" Cast In Place, 10 1/2" Embedment: Headed Bolts, U-Bolts or Cluster Plates.
  - 8" Adhesive Anchors, 6" Min. Embedment.\*
 \*Adhesive anchors shall be headless anchor bolts set in drilled holes with an Adhesive Material System in accordance with Specification Sections 416 and 937; drilled holes shall be 1/8" larger in diameter than the anchor bolt. Expansion Bolts Not Permitted.





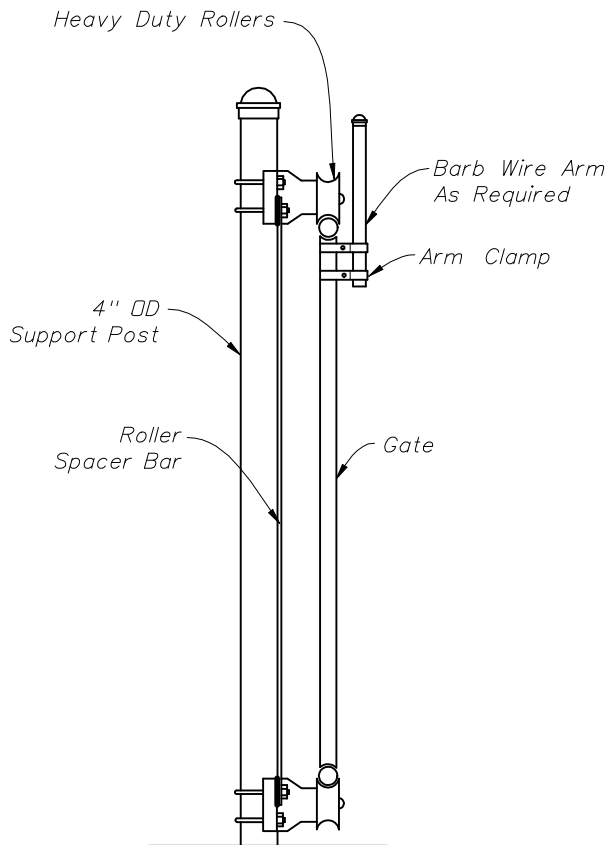
**FRONT ELEVATION**



**DETAIL A**

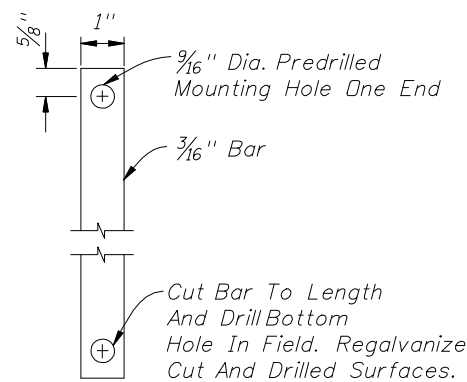
**GENERAL NOTES**

- When approved by the Engineer the Contractor may substitute any cantilever slide gate from the fencing systems on the Qualified Products List.  
  
Extruded, rolled or formed components that provide equal strength and stability may be used in lieu of the pipe components shown; and, internal rollers may be used in lieu of the external roller units shown.  
  
Gate components shall meet or exceed the protective coatings specified on Index No. 802.
- Steel gate frame shall be fabricated prior to galvanizing, except that truss rods may be fabricated following frame galvanizing provided surfaces damaged during welding are galvanized in accordance with Section 24 of AASHTO M36; or, fabricated from pipe components with protective coating meeting the requirements of Index No. 802 that are tolerant of welding (low burn back), and a protective coating applied to the weld and damaged pipe surfaces that is equivalent to the protective coating of the fabricated pipe stock.
- All fabric shall be knuckled top and bottom selvages.
- Concrete for bases shall be either Class NS concrete as specified in Section 347 of the Standard Specifications or a packaged, dry material meeting the requirements of a concrete under ASTM C-387. Materials for Class NS concrete may be proportioned by volume and/or by weight.
- Cost of all gate components shall be included in the contract unit price for Sliding Fence Gate (Cantilever), EA.

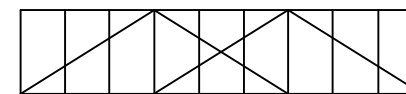


**SUPPORT POST DETAIL**

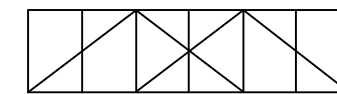
GATE OPENING	GATE FRAME	BACK FRAME
12'	12'-3"	6'
16'	16'-3"	8'
20'	20'-3"	10'
24'	24'-3"	12'



**ROLLER SPACER BAR**

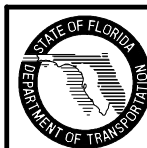


TYPICAL FRAME - 24' Opening



TYPICAL FRAME - 12', 16' & 20' Opening

**DETAIL B**

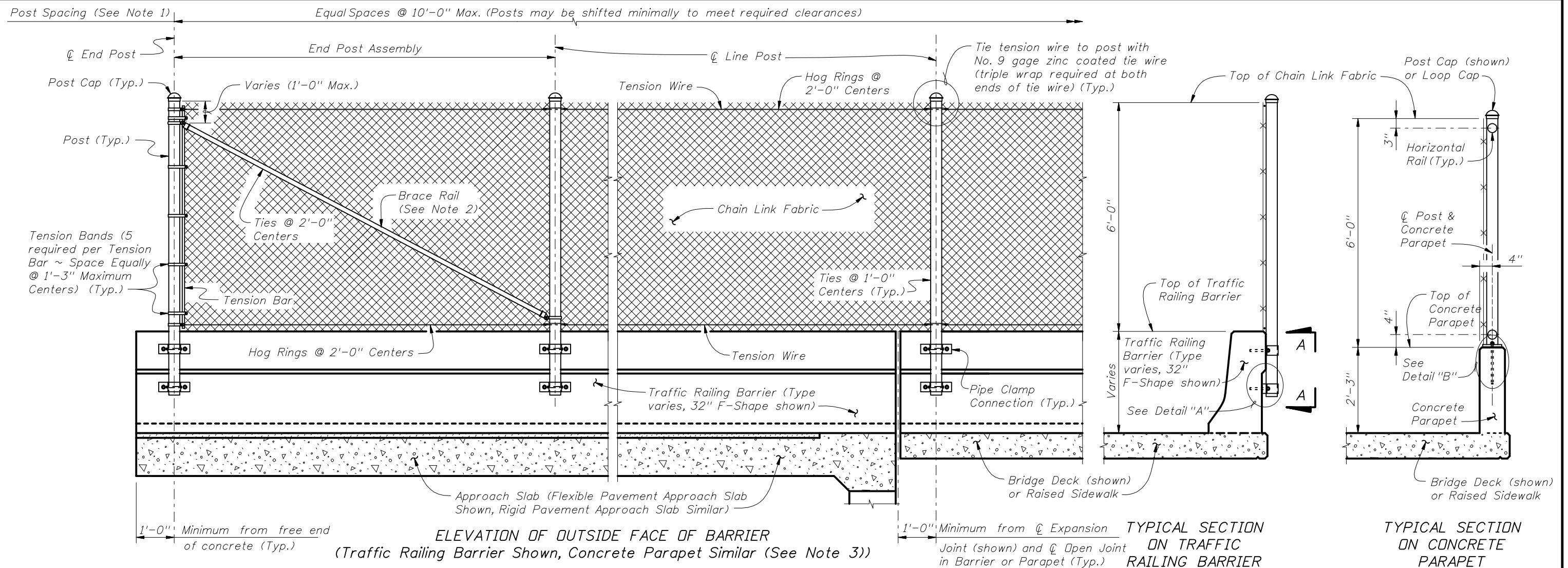


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**CANTILEVERED SLIDE GATE  
TYPE B FENCE**

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

Index No. **803**



**NOTES:**

1. A Pull Post Assembly is required at maximum intervals of 500'-0". See Sheet Nos. 3 of 4 or 4 of 4.
2. Brace rails are only required for vertical fence installations on Traffic Railing Barriers.
3. Provide horizontal rails for vertical fence installations on Concrete Parapets in lieu of tension wire. Locate horizontal rails as shown in the Typical Section for Concrete Parapets at right.

**FENCING NOTES**

**FENCE INSTALLATION:**

Install posts plumb (within a tolerance of  $\pm 1\frac{1}{2}$ " ). Use shim plates as required to achieve plumb. The required quantity and thickness of shim plates will be determined in the field. Install chain link fence in accordance with ASTM F 567 as applicable.

**TRAFFIC RAILING BARRIER DETAILS:**

See Superstructure Sheets for Traffic Railing Barrier details.

**CONCRETE PARAPET DETAILS:**

See Index No. 820 - Pedestrian/Bicycle Railing for Concrete Parapet details. Provide fencing in lieu of aluminum bullet railing as shown on Index No. 820.

**LIMITS OF FENCING:**

Limits of fencing are from begin of approach slab at Begin Bridge to end of approach slab at End Bridge, unless otherwise shown in the plans.

**PAYMENT:**

Payment will be made under Fencing, Type R. Payment includes posts, horizontal and expansion rails, brace rails and bands, rail ends, combination rail ends, boulevard clamps, chain link fabric, tension wire, ties, hog rings, tension bars and bands, post and loop caps, pipe clamps, base plates, anchor rods, bolts, nuts, washers, shim plates, spacers, neoprene pads, miscellaneous fence fittings and hardware and all incidental materials and labor required to complete installation of the fence.

**CROSS REFERENCE:**

For Table of Fence Components, Table of Post Attachment Components, View A-A and Detail "A" see Sheet No. 2 of 4.  
For Pull Post Assembly Detail for Traffic Railing Barriers see Sheet No. 3 of 4.  
For Pull Post Assembly Detail for Concrete Parapets and Detail "B" see Sheet No. 4 of 4.



2010 FDOT Design Standards

**BRIDGE FENCING (VERTICAL)**

Last Revision	Sheet No.
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TABLE OF CHAIN LINK FENCE COMPONENTS

COMPONENT		ASTM DESIGNATION	COMPONENT INFORMATION
Traffic Railing Barriers and Concrete Parapets	Posts	F 1083	Galvanized Steel Pipe - 3" NPS, Schedule 40 (3.500" Outside Diameter, 0.216" Wall Thickness)
	Chain Link Fabric (2" mesh with twisted top and knuckled bottom selvage)	A 392	Zinc Coated Steel - No. 9 gage (coated wire diameter), Class 2 Coating
		A 491	Aluminum Coated Steel - No. 9 gage (coated wire diameter)
		F 668	Polyvinyl Chloride (PVC) Coated Steel - No. 9 gage Zinc Coated Wire (metallic-coated core wire diameter) ~ Specify the color of the polymer coating in the General Notes
	Tie Wires	F 626	Zinc Coated Steel Wire - No. 9 gage
	Brace Bands	F 626	No. 12 Gage (min. thickness) x 3/4" (min. width) Steel Bands (Beveled or Heavy)
	Tension Bars	F 626	3/16" (min. thickness) x 3/4" (min. width) x 5'-10" (min. height) Steel Bars
	Tension Bands	F 626	No. 14 Gage (min. thickness) x 3/4" (min. width) Steel Bands
Miscellaneous Fence Components	F 626	Zinc Coated Steel ~ (includes post or loop caps, horizontal and brace rail ends, combination rail ends, boulevard clamps and all other miscellaneous fittings & hardware)	
Concrete Parapets	Horizontal Rails	F 1083	Galvanized Steel Pipe - 2 1/2" NPS, Schedule 40 (2.875" Outside Diameter, 0.203" Wall Thickness)
	Expansion Rails	F 1083	Galvanized Steel Pipe - 2" NPS, Schedule 40 (2.375" Outside Diameter, 0.154" Wall Thickness)
	Bolts	A 307	1/4" Ø x 4 1/4" Hex Head Bolts for Expansion Rail Connections
	Nuts	A 563	Hex Nuts for Expansion Rail Connections
	Washers	F 436	Flat Washers for Expansion Rail Connections
Traffic Railing Barriers	Tension Wire	A 824 & A 817	Type II (Zinc Coated Steel Wire) - No. 7 gage, Class 4 Coating Type I (Aluminum Coated Steel Wire) - No. 7 gage
		F 626	Zinc Coated Steel Wire - No. 12 gage
	Brace Rails	F 1083	Galvanized Steel Pipe - 1 1/4" NPS, Schedule 40 (1.660" Outside Diameter, 0.140" Wall Thickness)

LEGEND: NPS = Nominal Pipe Size

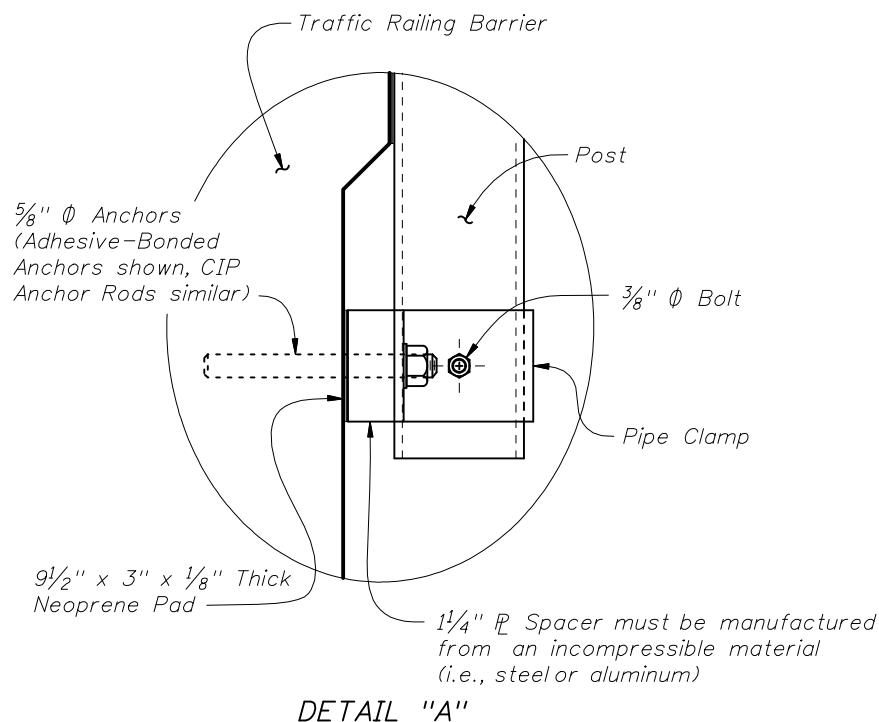
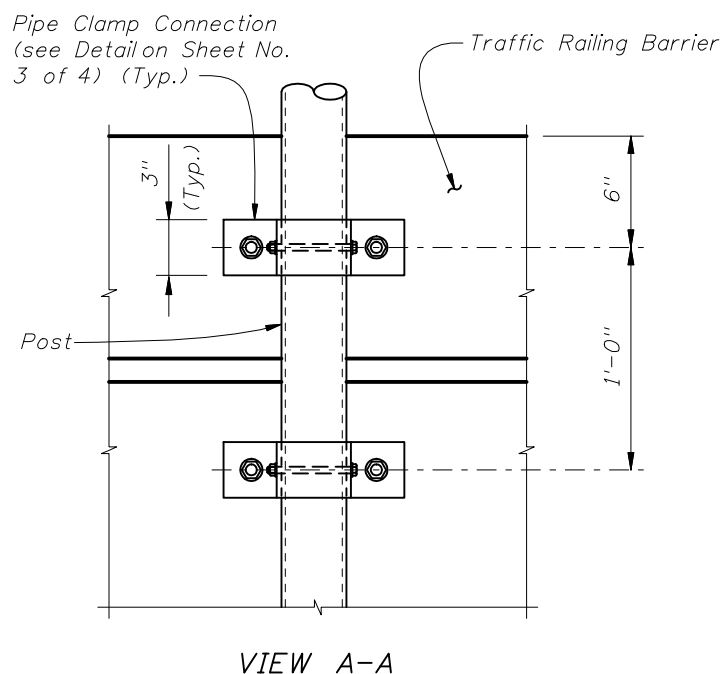


TABLE OF POST ATTACHMENT COMPONENTS

COMPONENT		ASTM DESIGNATION	COMPONENT INFORMATION
Pipe Clamps		A 36 or A 709 Grade 36	1/4" Steel P
Base Plates		A 36 or A 709 Grade 36	3/4" Steel P
Shim Plates		A 36 or A 709 Grade 36 or B 209 Alloy 6061-T6 or B 221 Alloy 6063-T5	Plate thicknesses as required; Holes in shim plates will be 3/4" Ø
Spacers		-	1 1/4" P for all materials
Pipe Clamp Connection	Adhesive Anchor Rods	F 1554 Grade 36	Fully threaded Headless Anchor Rods ~ 5/8" Ø x 6" (no spacer) or 5/8" Ø x 7 1/4" (with spacer)
	CIP Anchor Rods	F 1554 Grade 36	Hex Head Anchor Rods ~ 5/8" Ø x 6" (no spacer) or 5/8" Ø x 7 1/4" (with spacer)
Base Plate Connection	Adhesive Anchor Rods	F 1554 Grade 36	Fully threaded Headless Anchor Rods ~ 7/8" Ø x 14 1/2"
	CIP Anchor Rods	F 1554 Grade 36	Hex Head Anchor Rods ~ 7/8" Ø x 14 1/2"
Bolts		A 307	3/8" Ø x 4 3/4" Hex Head Bolts for Pipe Clamp Connections to Posts
Nuts		A 563	Hex Nuts for Pipe Clamp and Base Plate Connections
Washers		F 436	Flat Washers for Pipe Clamp and Base Plate Connections
Neoprene Pads		-	In accordance with Specification Section 932

POST ATTACHMENT NOTES

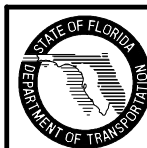
**ANCHOR RODS, NUTS AND WASHERS:**  
After the nuts have been tightened, distort the Anchor Rod threads to prevent removal of the nuts. Coat distorted threads and exposed trimmed ends of anchors with a galvanizing compound in accordance with Specification Section 975.

**COATINGS:**  
Hot-dip galvanize all Nuts, Washers, Bolts, CIP Anchor Rods, Adhesive Anchors and Fence Framework (Posts, Internal Sleeves, Shim Plates, Base Plates, Pipe Clamps and Spacers) in accordance with Specification Section 962. Hot-dip galvanize Fence Framework after fabrication.

**ADHESIVE-BONDED ANCHORS AND DOWELS:**  
Adhesive Bonding Material Systems for Anchors and Dowels will comply with Specification Section 937 and be installed in accordance with Specification Section 416. Cutting of reinforcing steel is permitted for drilled hole installation.

**WELDING:**  
All welding will be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal will be E60XX or E70XX. Nondestructive testing of welds is not required.

**CROSS REFERENCE:**  
For location of View A-A and Detail "A" see Sheet No. 1 of 4.

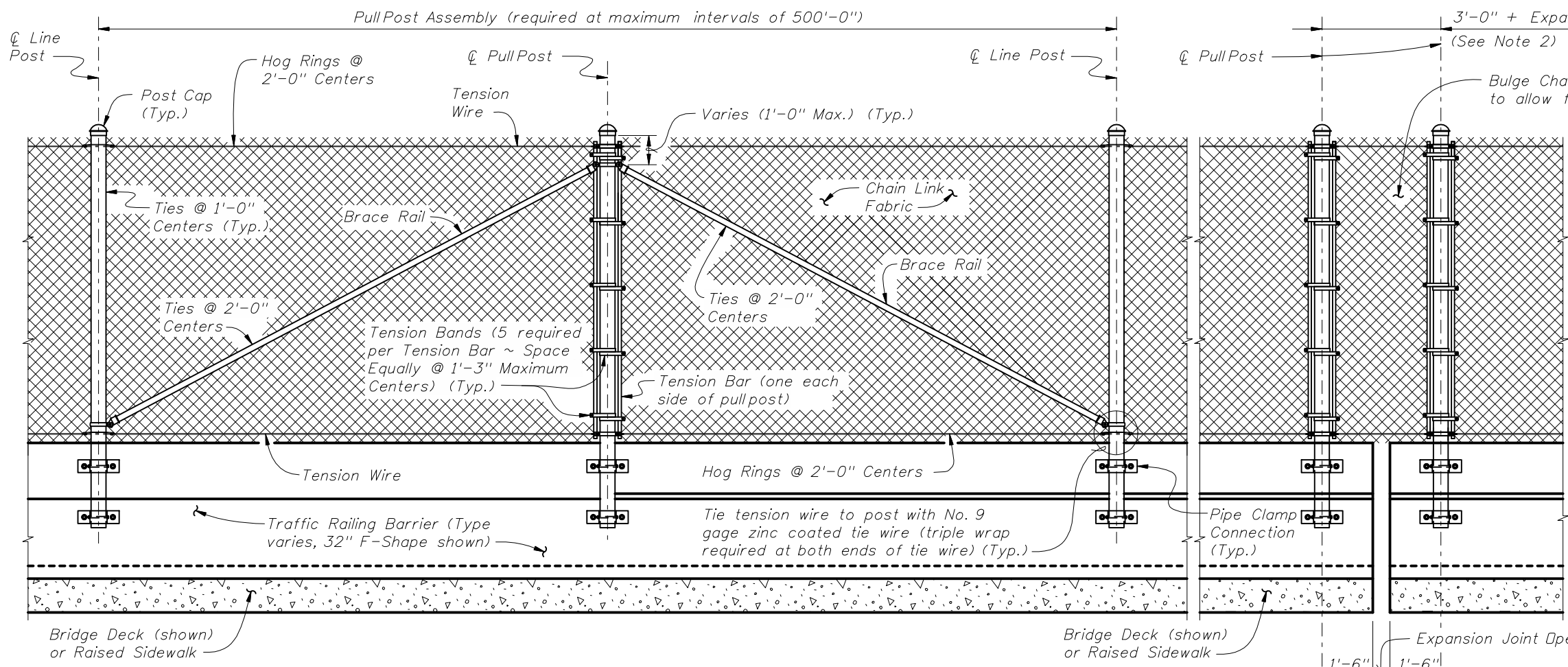


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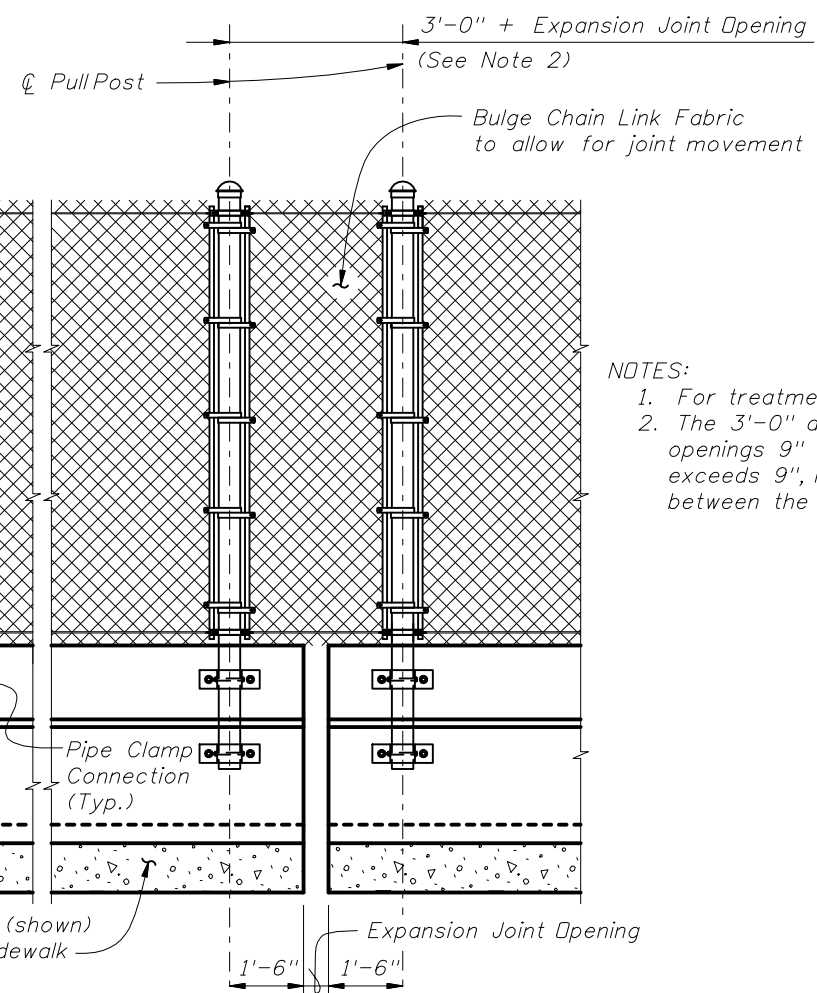
BRIDGE FENCING (VERTICAL)

Last Revision 07/01/08 Sheet No. 2 of 4

Index No. 810



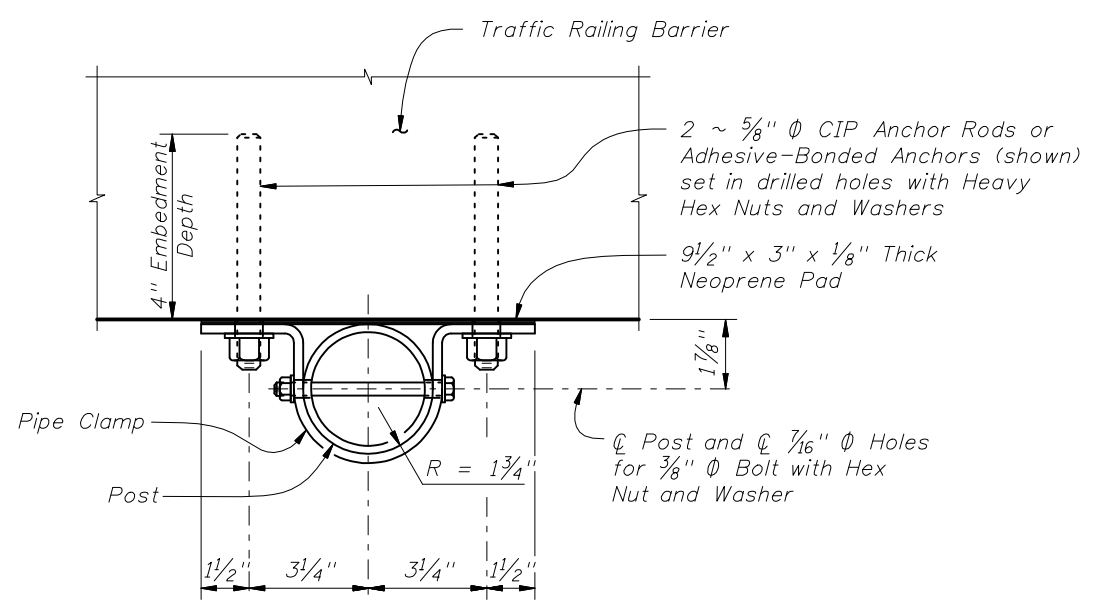
PULL POST ASSEMBLY DETAIL FOR TRAFFIC RAILING BARRIERS



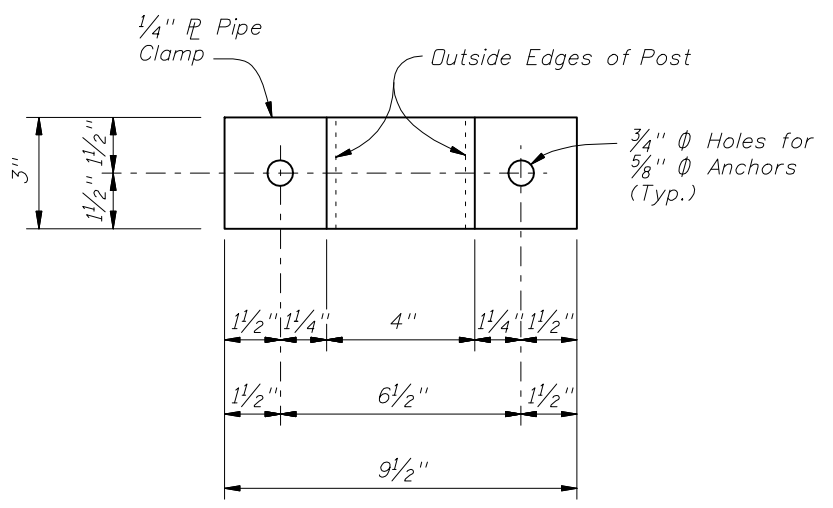
EXPANSION ASSEMBLY DETAIL

(Required only at expansion joint locations where total movement exceeds 6")

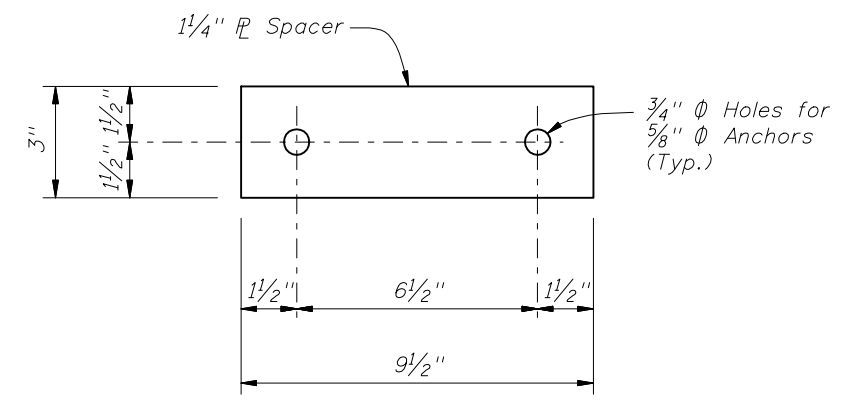
- NOTES:
1. For treatment at bridge ends, see Sheet No. 1 of 4.
  2. The 3'-0" dimension shown is for expansion joint openings 9" or less. If the expansion joint opening exceeds 9", increase this dimension by the difference between the expansion joint opening and 9".



PIPE CLAMP CONNECTION DETAIL  
(Connection without spacer shown, Connection with spacer similar)

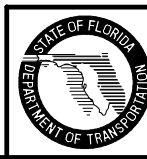


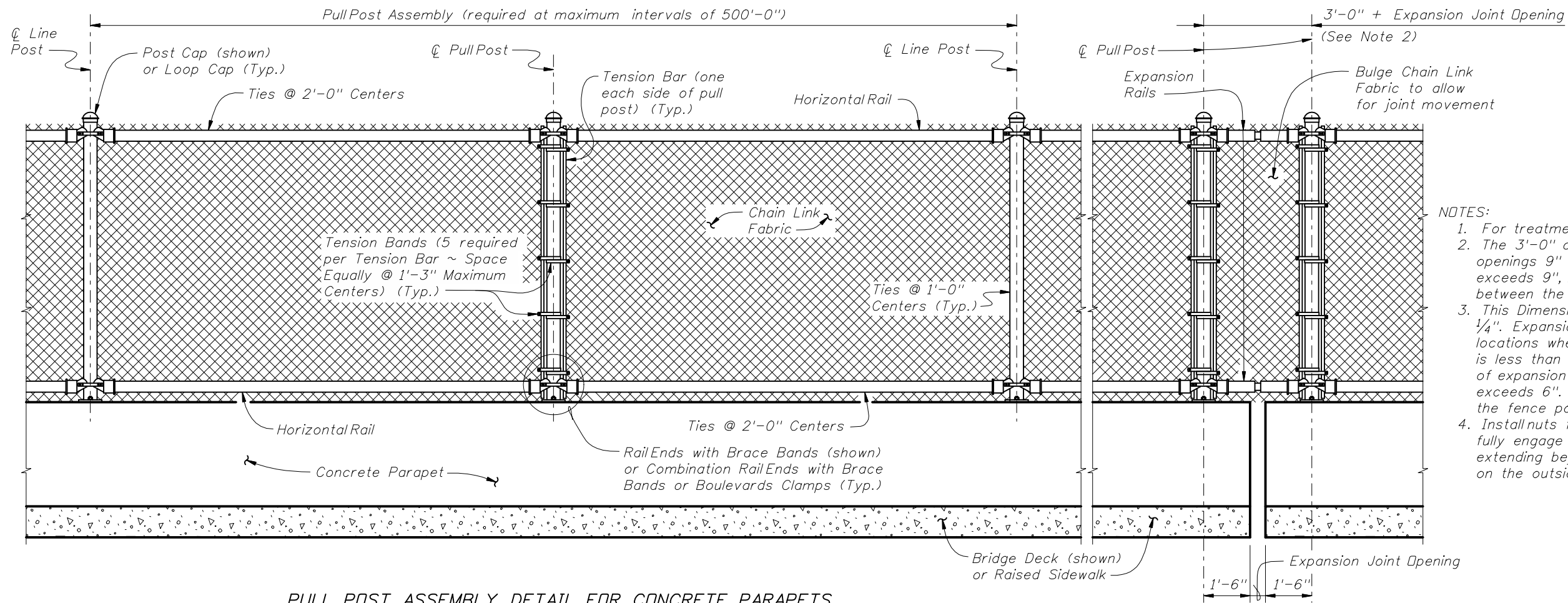
PIPE CLAMP DETAIL



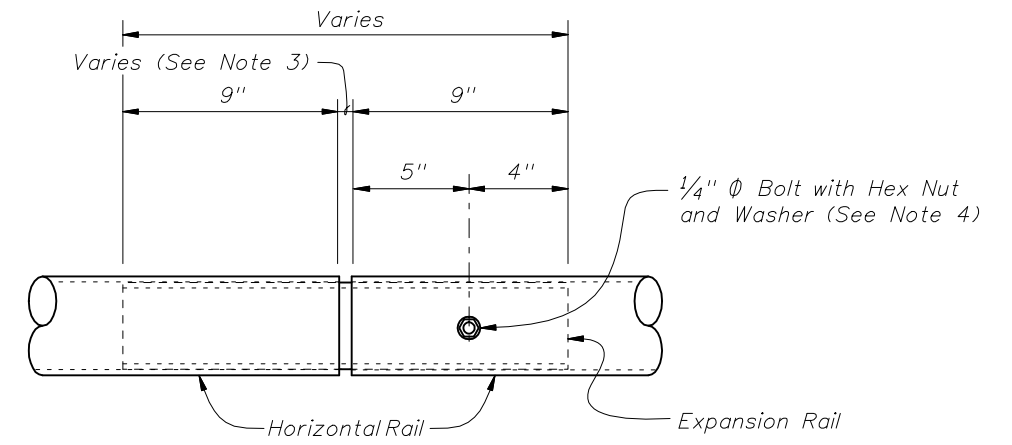
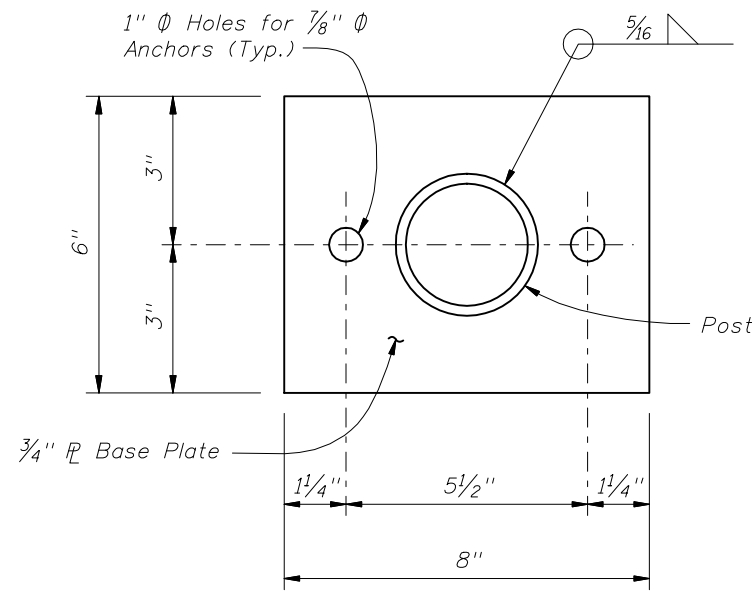
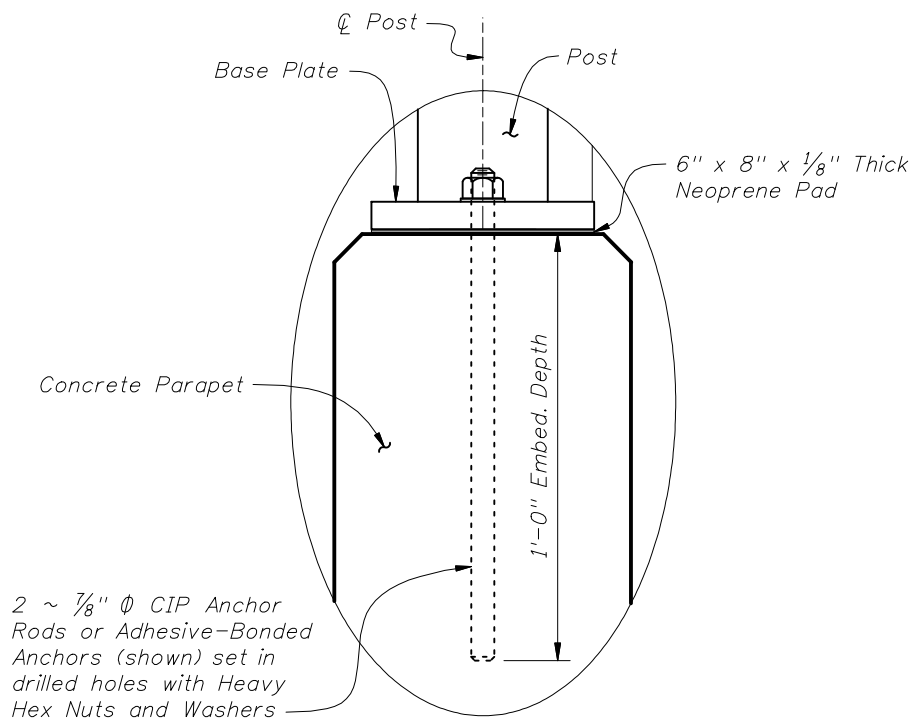
SPACER DETAIL

(Must be manufactured from an incompressible material (i.e., steel or aluminum))



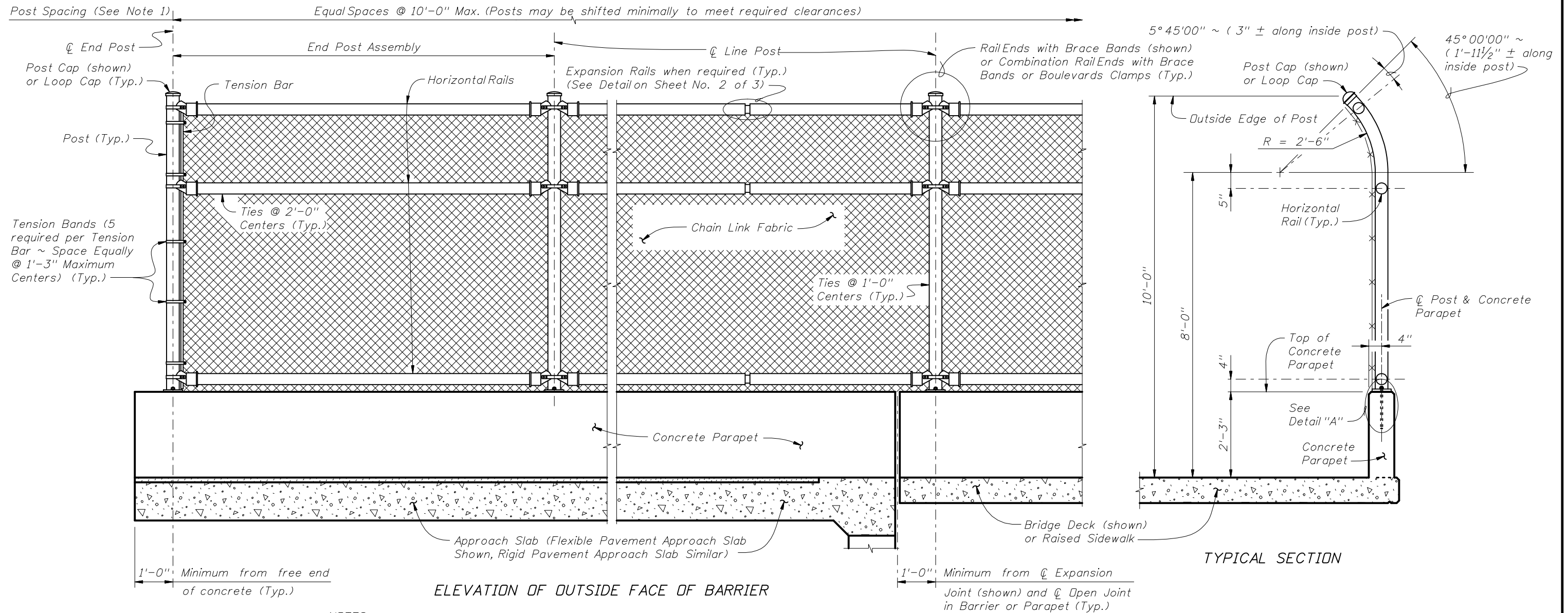


- NOTES:
1. For treatment at bridge ends, see Sheet No. 1 of 4.
  2. The 3'-0" dimension shown is for expansion joint openings 9" or less. If the expansion joint opening exceeds 9", increase this dimension by the difference between the expansion joint opening and 9".
  3. This Dimension is the expansion joint opening plus 1/4". Expansion rails are required at expansion joint locations where the total movement exceeds 1", but is less than or equal to 6". Expansion rails are part of expansion assemblies when the total movement exceeds 6". Install expansion rails midway between the fence posts spanning the expansion joint.
  4. Install nuts for expansion rails finger-tight. Nuts will 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.



CROSS REFERENCE:  
For location of Detail "B" see Sheet No. 1 of 4.





**NOTES:**

1. A Pull Post Assembly is required at maximum intervals of 500'-0". See Sheet No. 2 of 3.

**FENCING NOTES**

**FENCE APPLICATION:**

This bridge fence can only be used on sidewalk installations separated from traffic by a traffic railing barrier.

**FENCE INSTALLATION:**

Install posts plumb (within a tolerance of  $\pm 1/2"$ ). Use shim plates as required to achieve plumb. The required quantity and thickness of shim plates will be determined in the field. Install chain link fence in accordance with ASTM F 567 as applicable.

**CONCRETE PARAPET DETAILS:**

See Index No. 820 - Pedestrian/Bicycle Railing for Concrete Parapet details. Provide fencing in lieu of aluminum bullet railing as shown in Index No. 820.

**LIMITS OF FENCING:**

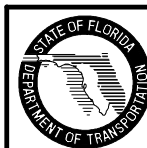
Limits of fencing are from begin of approach slab at Begin Bridge to end of approach slab at End Bridge, unless otherwise shown in the plans.

**PAYMENT:**

Payment will be made under Fencing, Type R. Payment includes posts, horizontal and expansion rails, brace bands, rail ends, combination rail ends, boulevard clamps, chain link fabric, ties, tension bars and bands, post and loop caps, base plates, anchor rods, bolts, nuts, washers, shim plates, neoprene pads, miscellaneous fence fittings and hardware and all incidental materials and labor required to complete installation of the fence.

**CROSS REFERENCE:**

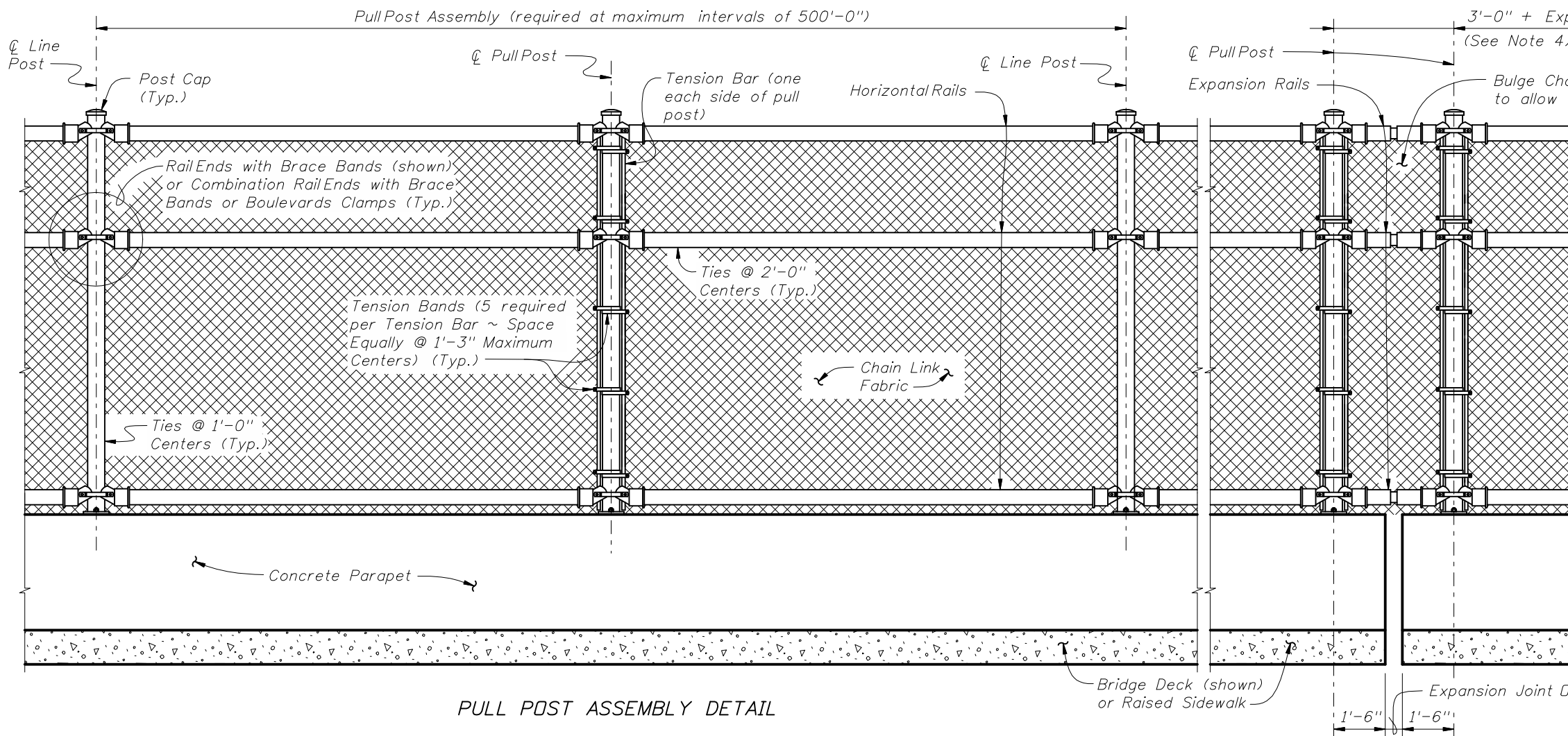
For Table of Fence Components and Pull Post Assembly Detail see Sheet No. 2 of 3.  
For Table of Post Attachment Components and Detail "A" see Sheet No. 3 of 3.



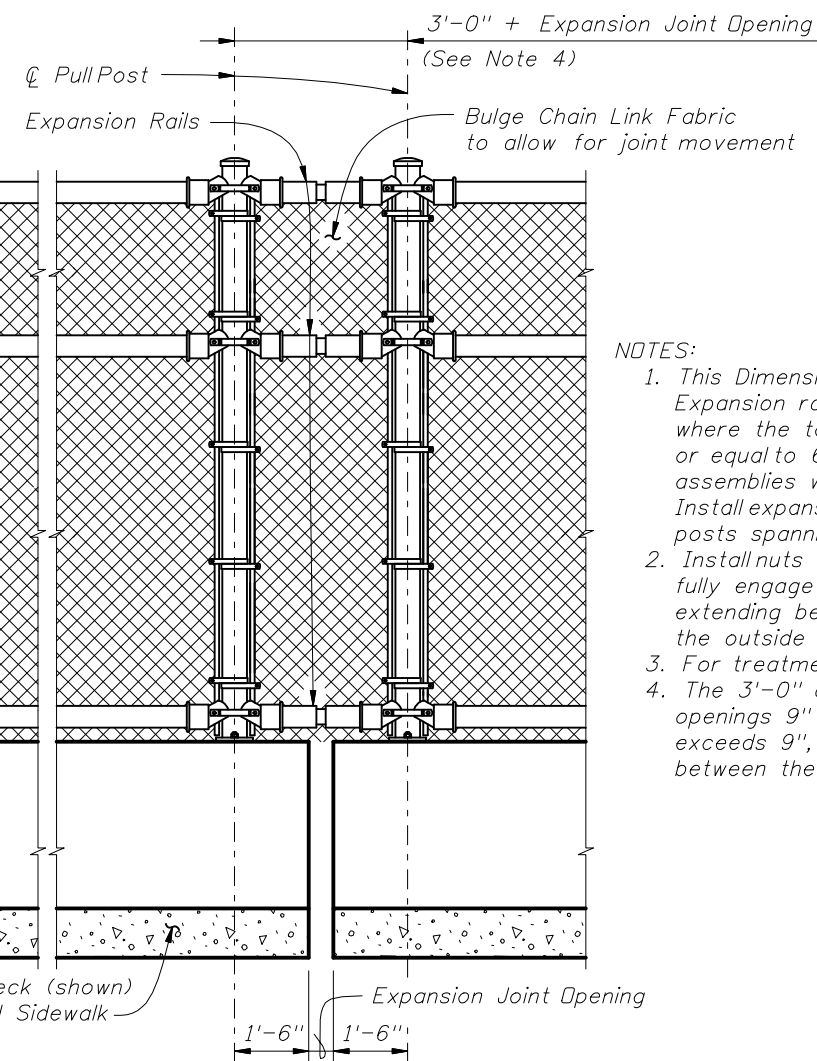
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**BRIDGE FENCING (CURVED TOP)**

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PULL POST ASSEMBLY DETAIL



EXPANSION ASSEMBLY DETAIL

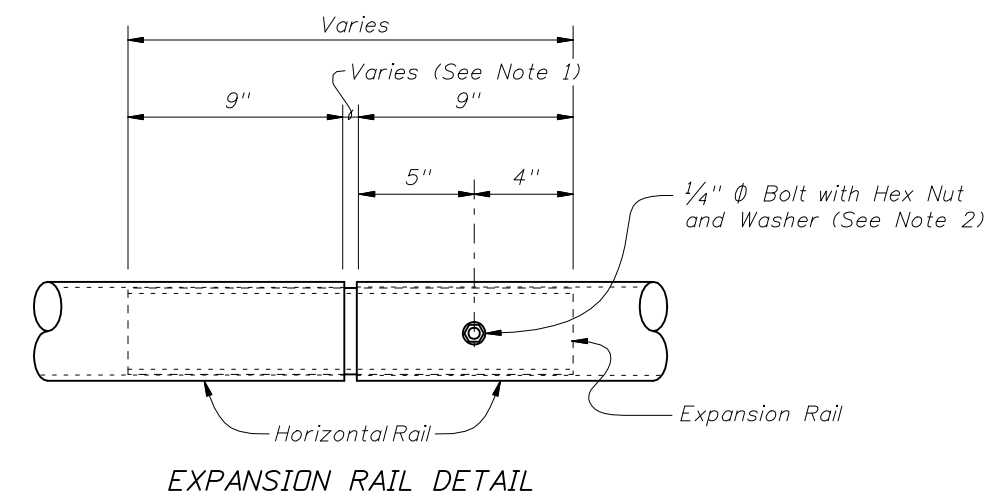
(Required only at expansion joint locations where total movement exceeds 6")

NOTES:

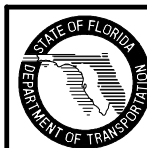
1. This Dimension is the expansion joint opening plus 1/4". Expansion rails are required at expansion joint locations where the total movement exceeds 1", but is less than or equal to 6". Expansion rails are part of expansion assemblies when the total movement exceeds 6". Install expansion rails midway between the fence posts spanning the expansion joint.
2. Install nuts for expansion rails finger-tight. Nuts will 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.
3. For treatment at bridge ends, see Sheet No. 1 of 3.
4. The 3'-0" dimension shown is for expansion joint openings 9" or less. If the expansion joint opening exceeds 9", increase this dimension by the difference between the expansion joint opening and 9".

TABLE OF CHAIN LINK FENCE COMPONENTS		
COMPONENT	ASTM DESIGNATION	COMPONENT INFORMATION
Posts	F 1083	Galvanized Steel Pipe - 3 1/2" NPS, Schedule 40 (4.000" Outside Diameter, 0.226" Wall Thickness)
Horizontal Rails	F 1083	Galvanized Steel Pipe - 3" NPS, Schedule 40 (3.500" Outside Diameter, 0.216" Wall Thickness)
Expansion Rails	F 1083	Galvanized Steel Pipe - 2 1/2" NPS, Schedule 40 (2.875" Outside Diameter, 0.203" Wall Thickness)
Bolts	A 307	1/4" Ø x 4 1/4" Hex Head Bolts for Expansion Rail Connections
Nuts	A 563	Hex Nuts for Expansion Rail Connections
Washers	F 436	Flat Washers for Expansion Rail Connections
Chain Link Fabric (2" mesh with twisted top and knuckled bottom selvage)	A 392	Zinc Coated Steel - No. 9 gage (coated wire diameter), Class 2 Coating
	A 491	Aluminum Coated Steel - No. 9 gage (coated wire diameter)
	F 668	Polyvinyl Chloride (PVC) Coated Steel - No. 9 gage Zinc Coated Wire (metallic-coated core wire diameter) ~ Specify the color of the polymer coating in the General Notes
Tie Wires	F 626	Zinc Coated Steel Wire - No. 9 gage
Brace Bands	F 626	No. 12 Gage (min. thickness) x 3/4" (min. width) Steel Bands (Beveled or Heavy)
Tension Bars	F 626	3/16" (min. thickness) x 3/4" (min. width) x Variable Height Steel Bars ~ Height = Post Length along inside Post - 2" max.
Tension Bands	F 626	No. 14 Gage (min. thickness) x 3/4" (width) Steel Bands
Miscellaneous Fence Components	F 626	Zinc Coated Steel ~ (includes post or loop caps, horizontal and brace rail ends, combination rail ends, boulevard clamps and all other miscellaneous fittings and hardware)

LEGEND: NPS = Nominal Pipe Size



EXPANSION RAIL DETAIL



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BRIDGE FENCING (CURVED TOP)

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TABLE OF POST ATTACHMENT COMPONENTS		
COMPONENT	ASTM DESIGNATION	COMPONENT INFORMATION
Base Plates	A 36 or A 709 Grade 36	$\frac{3}{4}$ " Steel $\mathcal{P}$
Shim Plates	A 36 or A 709 Grade 36 or B 209 Alloy 6061-T6 or B 221 Alloy 6063-T5	Plate thicknesses as required, Holes in shim plates will be $\frac{3}{4}$ " $\Phi$
Adhesive Anchor Rods	F 1554 Grade 36	Fully threaded Headless Anchor Rods $\sim \frac{7}{8}$ " $\Phi$ x $14\frac{1}{2}$ "
CIP Anchor Rods	F 1554 Grade 36	Hex Head Anchor Rods $\sim \frac{7}{8}$ " $\Phi$ x $14\frac{1}{2}$ "
Nuts	A 563	Hex Nuts for Base Plate Connections
Washers	F 436	Flat Washers for Base Plate Connections
Neoprene Pads	-	In accordance with Specification Section 932

### POST ATTACHMENT NOTES

#### ANCHOR RODS, NUTS AND WASHERS:

After the nuts have been tightened, distort the Anchor Rod threads to prevent removal of the nuts. Coat distorted threads and exposed trimmed ends of anchors with a galvanizing compound in accordance with Specification Section 975.

#### COATINGS:

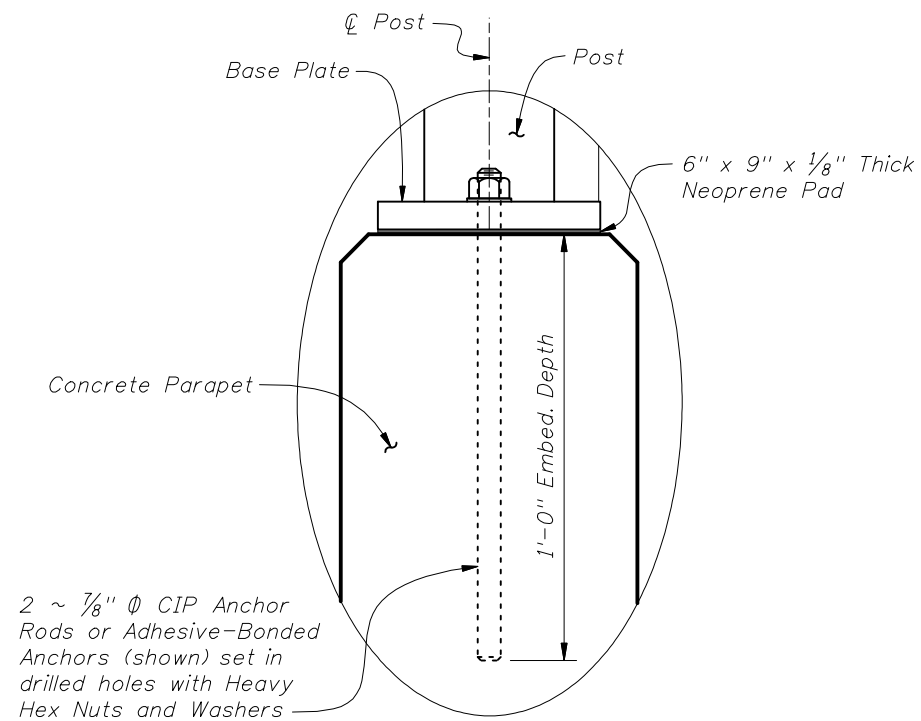
Hot-dip galvanize all Nuts, Washers, Bolts, CIP Anchor Rods, Adhesive Anchors and Fence Framework (Posts, Internal Sleeves, Shim Plates and Base Plates) in accordance with Specification Section 962. Hot-dip galvanize Fence Framework after fabrication.

#### ADHESIVE-BONDED ANCHORS AND DOWELS:

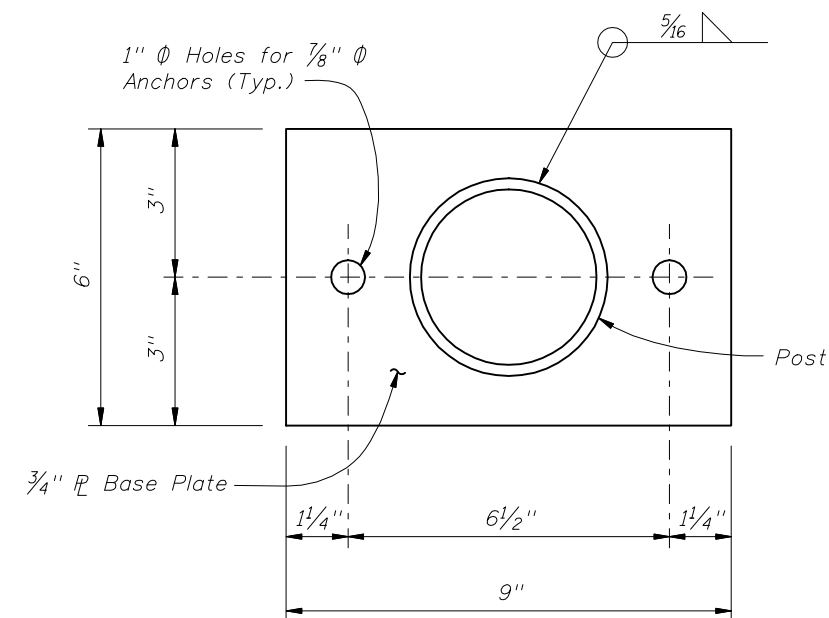
Adhesive Bonding Material Systems for Anchors and Dowels will comply with Specification Section 937 and be installed in accordance with Specification Section 416. Cutting of reinforcing steel is permitted for drilled hole installation.

#### WELDING:

All welding will be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal will be E60XX or E70XX. Nondestructive testing of welds is not required.



DETAIL "A"



BASE PLATE DETAIL

#### CROSS REFERENCE:

For location of Detail "A" see Sheet No. 1 of 3.



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BRIDGE FENCING (CURVED TOP)

Last Revision

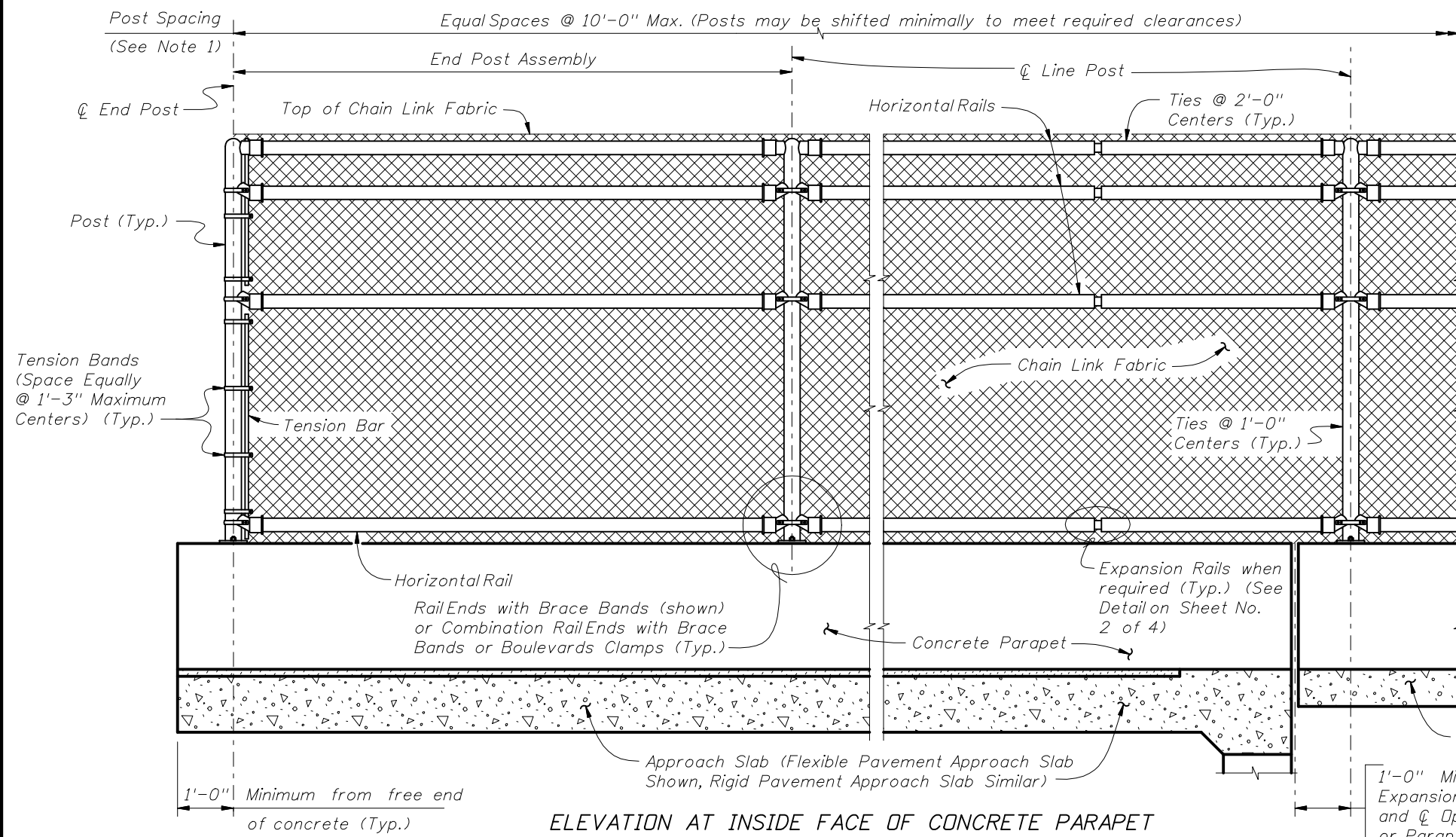
07/01/08

Sheet No.

3 of 3

Index No.

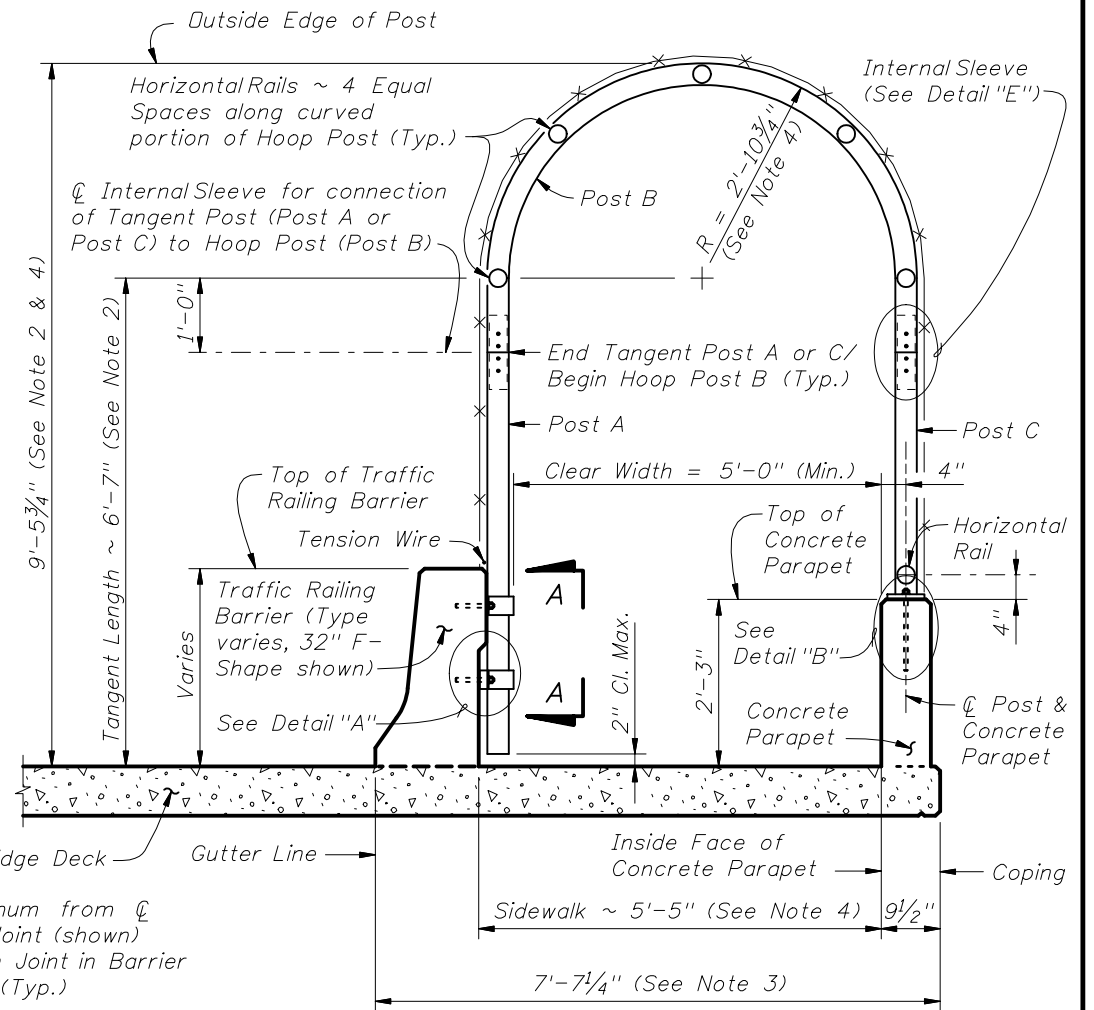
811



ELEVATION AT INSIDE FACE OF CONCRETE PARAPET

NOTES:

1. A Pull Post Assembly is required at maximum intervals of 500'-0". See Sheet No. 3 of 4.
2. Dimension is measured along Inside Face of Concrete Parapet.
3. Dimension shown is for 32" F-Shape Traffic Railing Barriers as shown in Index No. 420. Adjust as required for other Traffic Railing Barriers and sidewalk widths.
4. For sidewalk clear widths greater than 5'-0", increase the radius and height of the curved portion of the Hoop Post at the rate of 6" for every one foot increase in sidewalk width.



TYPICAL SECTION

FENCING NOTES

FENCE INSTALLATION:

Install posts plumb (within a tolerance of  $\pm 1\frac{1}{2}$ " ). Use shim plates as required to achieve plumb. The required quantity and thickness of shim plates will be determined in the field. Install chain link fence in accordance with ASTM F 567 as applicable.

TRAFFIC RAILING BARRIER DETAILS:

See Superstructure Sheets for Traffic Railing Barrier details.

CONCRETE PARAPET DETAILS:

See Index No. 820 - Pedestrian/Bicycle Railing for Concrete Parapet details. Provide fencing in lieu of aluminum bullet railing as shown on Index No. 820.

LIMITS OF FENCING:

Limits of fencing are from begin of approach slab at Begin Bridge to end of approach slab at End Bridge, unless otherwise shown in the plans.

PAYMENT:

Payment will be made under Fencing, Type R. Payment includes posts, horizontal and expansion rails, brace bands, rail ends, combination rail ends, boulevard clamps, chain link fabric, tension wire, ties, hog rings, tension bars and bands, pipe clamps, base plates, anchor rods, bolts, nuts, washers, shim plates, spacers, neoprene pads, miscellaneous fence fittings and hardware and all incidental materials and labor required to complete installation of the fence.

CROSS REFERENCE:

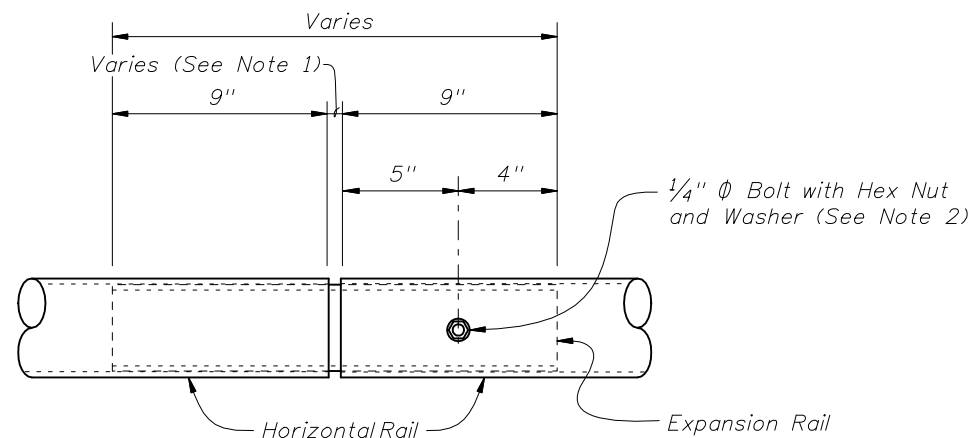
For Table of Fence Components and Table of Post Attachment Components see Sheet No. 2.  
 For Pull Post Assembly Detail, View A-A and Detail "A" see Sheet No. 3.  
 For Detail "B" and "E" see Sheet No. 4.





TABLE OF CHAIN LINK FENCE COMPONENTS		
COMPONENT	ASTM DESIGNATION	COMPONENT INFORMATION
Posts	F 1083	Galvanized Steel Pipe – 3" NPS, Schedule 40 (3.500" Outside Diameter, 0.216" Wall Thickness)
Horizontal Rails and Internal Sleeves	F 1083	Galvanized Steel Pipe – 2½" NPS, Schedule 40 (2.875" Outside Diameter, 0.203" Wall Thickness)
Expansion Rails	F 1083	Galvanized Steel Pipe – 2" NPS, Schedule 40 (2.375" Outside Diameter, 0.154" Wall Thickness)
Chain Link Fabric (2" mesh with knuckled bottom selvages)	A 392	Zinc Coated Steel – No. 9 gage (coated wire diameter), Class 2 Coating
	A 491	Aluminum Coated Steel – No. 9 gage (coated wire diameter)
	F 668	Polyvinyl Chloride (PVC) Coated Steel – No. 9 gage Zinc Coated Wire (metallic-coated core wire diameter) ~ Specify the color of the polymer coating in the General Notes
Tension Wire	A 824 & A 817	Type II (Zinc Coated Steel Wire) – No. 7 gage, Class 4 Coating
		Type I (Aluminum Coated Steel Wire) – No. 7 gage
Tie Wires	F 626	Zinc Coated Steel Wire – No. 9 gage
Hog Rings	F 626	Zinc Coated Steel Wire – No. 12 gage
Brace Bands	F 626	No. 12 Gage (min. thickness) x ¾" (min. width) Steel Bands (Beveled or Heavy)
Tension Bars	F 626	⅜" (min. thickness) x ¾" (min. width) x Variable Height Steel Bars ~ Height = Tangent or Hoop Length – Barrier or Parapet Height – 2" max.
Tension Bands	F 626	No. 14 Gage (min. thickness) x ¾" (min. width) Steel Bands
Miscellaneous Fence Components	F 626	Zinc Coated Steel ~ (includes horizontal rail ends, combination rail ends, boulevard clamps and all other miscellaneous fittings and hardware)
Bolts	A 307	⅜" Ø x 4¼" Hex Head Bolts for Internal Sleeve connections ¼" Ø x 4¼" Hex Head Bolts for Expansion Rail connections
Nuts	A 563	Hex Nuts for Internal Sleeve and Expansion Rail connections
Washers	F 436	Flat Washers for Internal Sleeve and Expansion Rail connections

LEGEND: NPS = Nominal Pipe Size



EXPANSION RAIL DETAIL

NOTES:

1. This Dimension is the expansion joint opening plus ¼". Expansion rails are required at expansion joint locations where the total movement exceeds 1", but is less than or equal to 6". Expansion rails are part of expansion assemblies when the total movement exceeds 6". Install expansion rails midway between the fence posts spanning the expansion joint.
2. Install nuts for expansion rails finger-tight. Nuts will 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.

TABLE OF POST ATTACHMENT COMPONENTS		
COMPONENT	ASTM DESIGNATION	COMPONENT INFORMATION
Pipe Clamps	A 36 or A 709 Grade 36	¼" Steel Ⓟ
Base Plates	A 36 or A 709 Grade 36	¾" Steel Ⓟ
Shim Plates	A 36 or A 709 Grade 36 or B 209 Alloy 6061-T6 or B 221 Alloy 6063-T5	Plate thicknesses as required; Holes in shim plates will be ¾" Ø
Spacers	-	1¼" Ⓟ for all materials
Pipe Clamp Connection	Adhesive Anchor Rods	F 1554 Grade 36 Fully threaded Headless Anchor Rods ~ ⅝" Ø x 6" (no spacer) or ⅝" Ø x 7¼" (with spacer)
	CIP Anchor Rods	F 1554 Grade 36 Hex Head Anchor Rods ~ ⅝" Ø x 6" (no spacer) or ⅝" Ø x 7¼" (with spacer)
Base Plate Connection	Adhesive Anchor Rods	F 1554 Grade 36 Fully threaded Headless Anchor Rods ~ ⅞" Ø x 14½"
	CIP Anchor Rods	F 1554 Grade 36 Hex Head Anchor Rods ~ ⅞" Ø x 14½"
Bolts	A 307	⅜" Ø x 4¾" Hex Head Bolts for Pipe Clamp Connections to Posts
Nuts	A 563	Hex Nuts for Pipe Clamp and Base Plate Connections
Washers	F 436	Flat Washers for Pipe Clamp and Base Plate Connections
Neoprene Pads	-	In accordance with Specification Section 932

POST ATTACHMENT NOTES

ANCHOR RODS, NUTS AND WASHERS:

After the nuts have been tightened, distort the Anchor Rod threads to prevent removal of the nuts. Coat distorted threads and exposed trimmed ends of anchors with a galvanizing compound in accordance with Specification Section 975.

COATINGS:

Hot-dip galvanize all Nuts, Washers, Bolts, CIP Anchor Rods, Adhesive Anchors and Fence Framework (Posts, Internal Sleeves, Shim Plates, Base Plates, Pipe Clamps and Spacers) in accordance with Specification Section 962. Hot-dip galvanize Fence Framework after fabrication.

ADHESIVE-BONDED ANCHORS AND DOWELS:

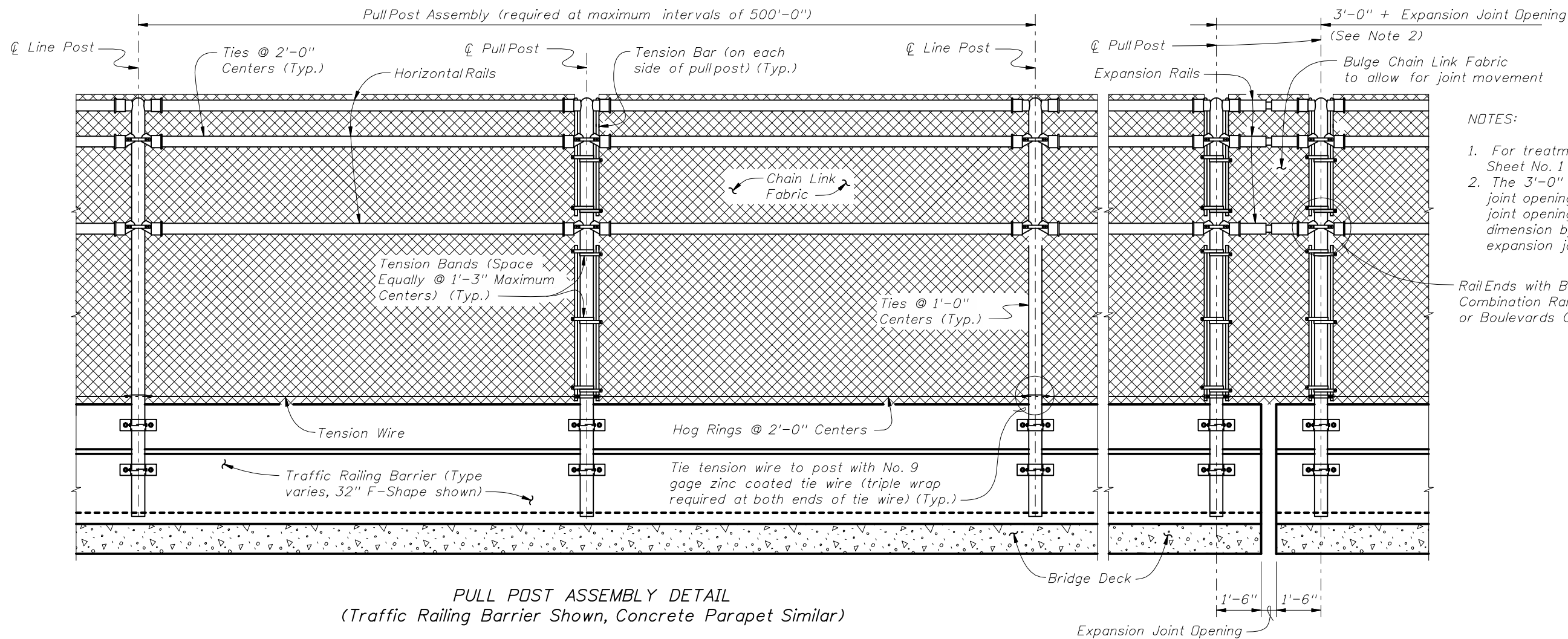
Adhesive Bonding Material Systems for Anchors and Dowels will comply with Specification Section 937 and be installed in accordance with Specification Section 416. Cutting of reinforcing steel is permitted for drilled hole installation.

WELDING:

All welding will be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal will be E60XX or E70XX. Nondestructive testing of welds is not required.





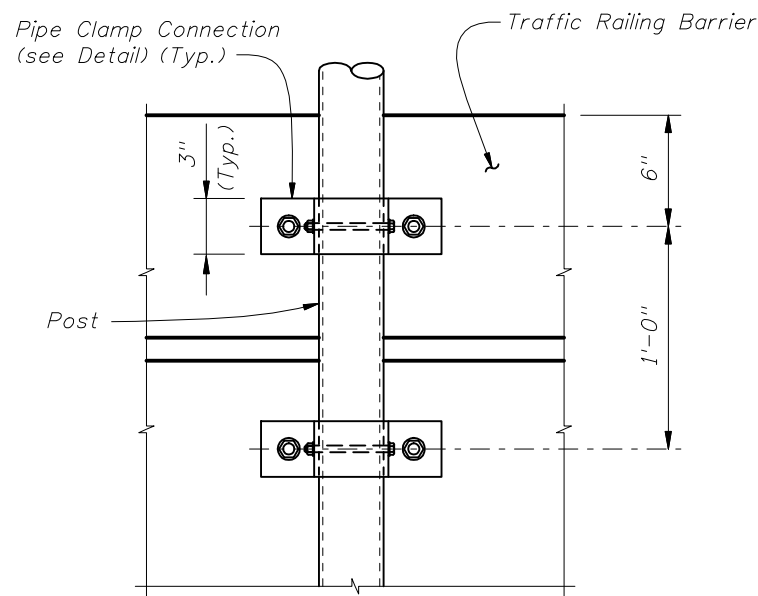


- NOTES:
1. For treatment at bridge ends, see Sheet No. 1 of 4.
  2. The 3'-0" dimension shown is for expansion joint openings 9" or less. If the expansion joint opening exceeds 9", increase this dimension by the difference between the expansion joint opening and 9".

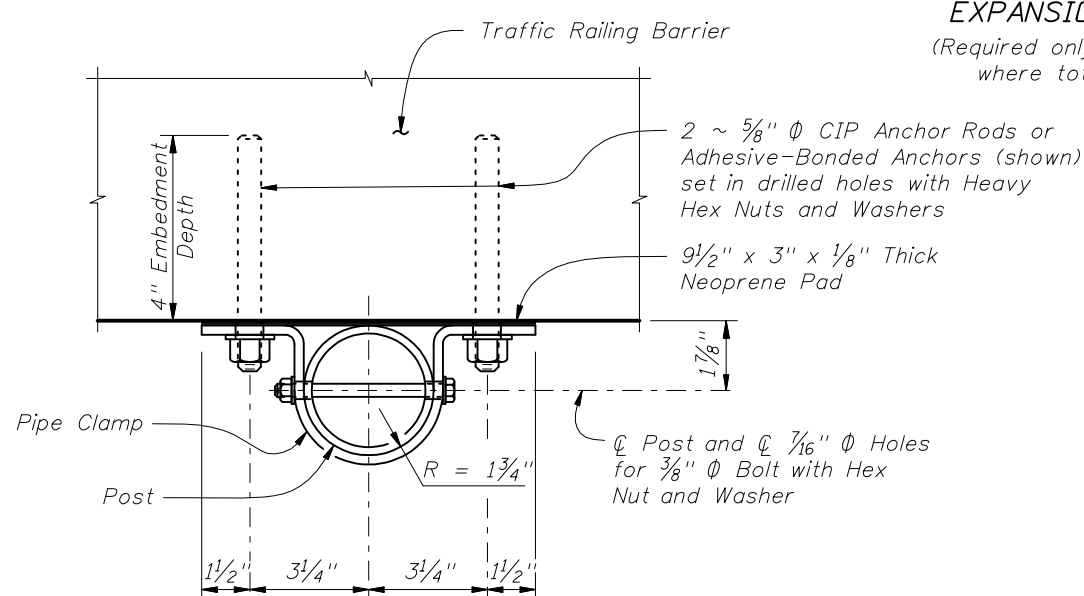
Rail Ends with Brace Bands (shown) or Combination Rail Ends with Brace Bands or Boulevards Clamps (Typ.)

**PULL POST ASSEMBLY DETAIL**  
(Traffic Railing Barrier Shown, Concrete Parapet Similar)

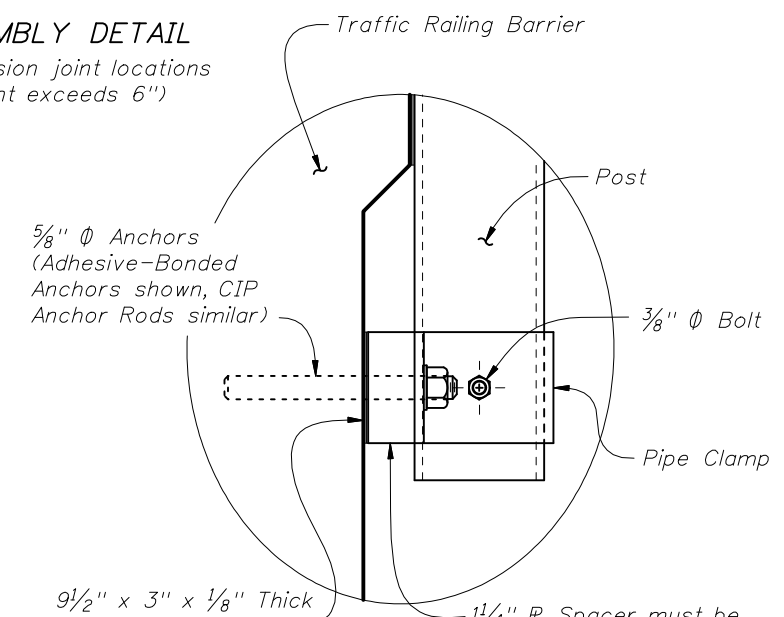
**EXPANSION ASSEMBLY DETAIL**  
(Required only at expansion joint locations where total movement exceeds 6")



VIEW A-A



**PIPE CLAMP CONNECTION DETAIL**  
(Connection without spacer shown, Connection with spacer similar)



DETAIL "A"

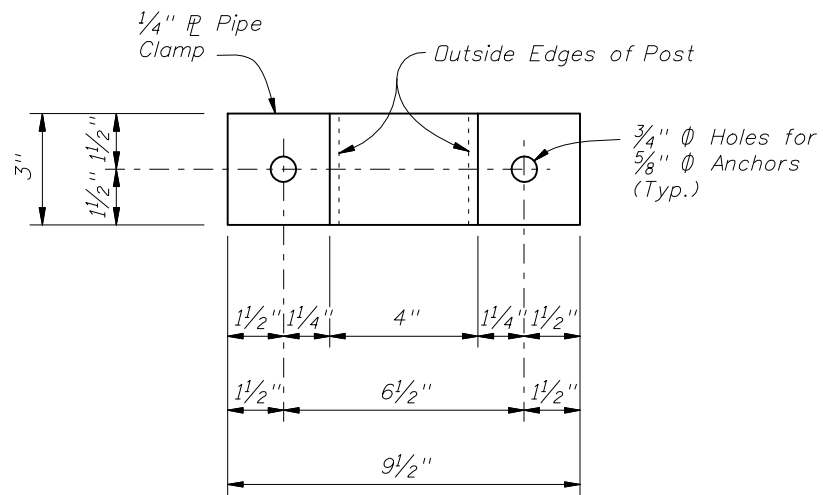
CROSS REFERENCE:  
For location of View A-A and Detail "A" see Sheet No. 1 of 4.



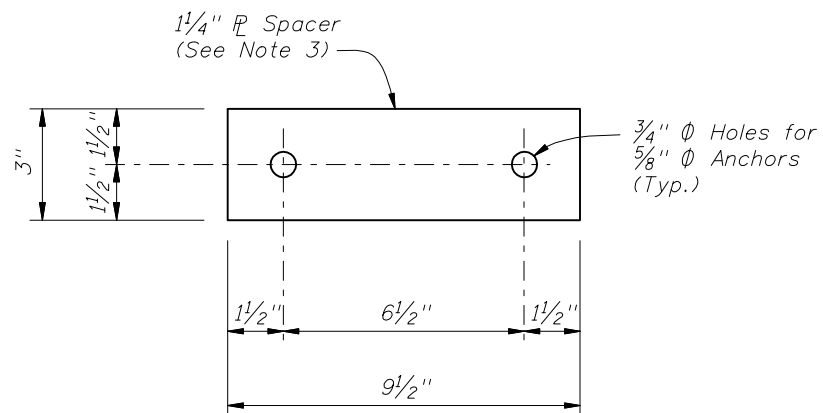
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**BRIDGE FENCING (ENCLOSED)**

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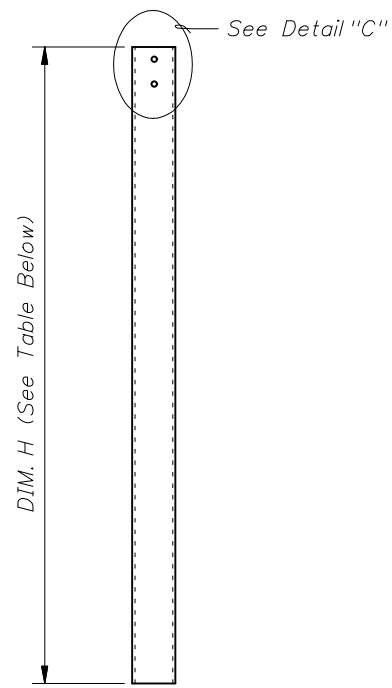


PIPE CLAMP DETAIL

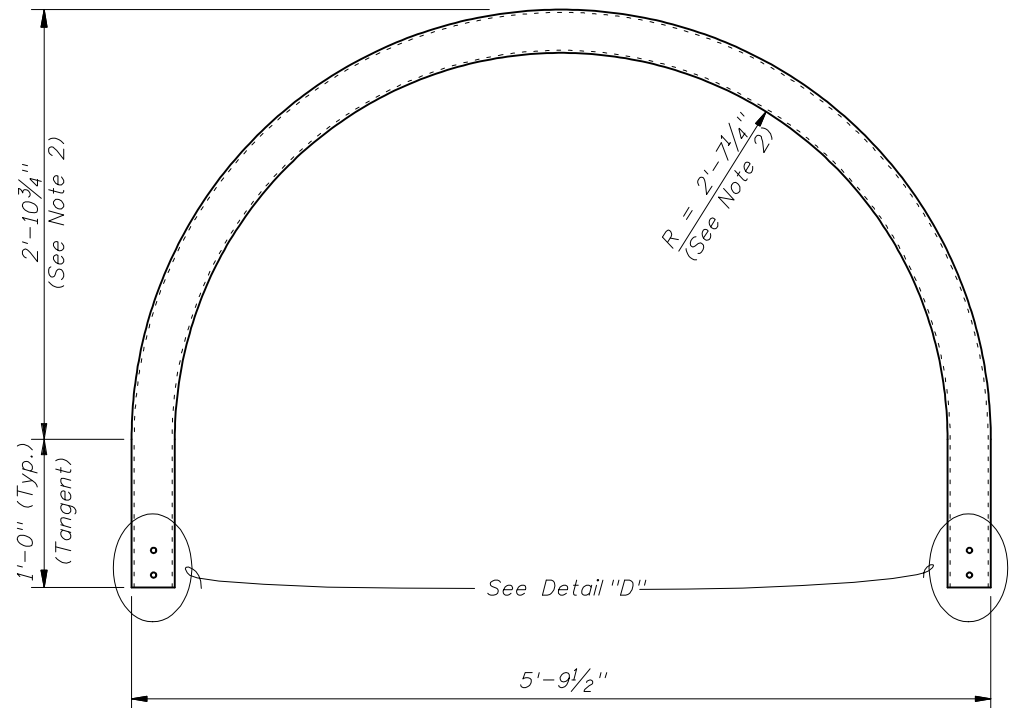


SPACER DETAIL

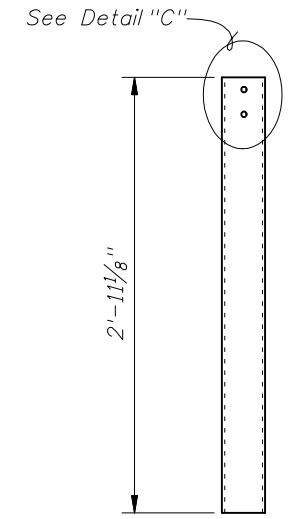
(Must be manufactured from an incompressible material (i.e., steel or aluminum))



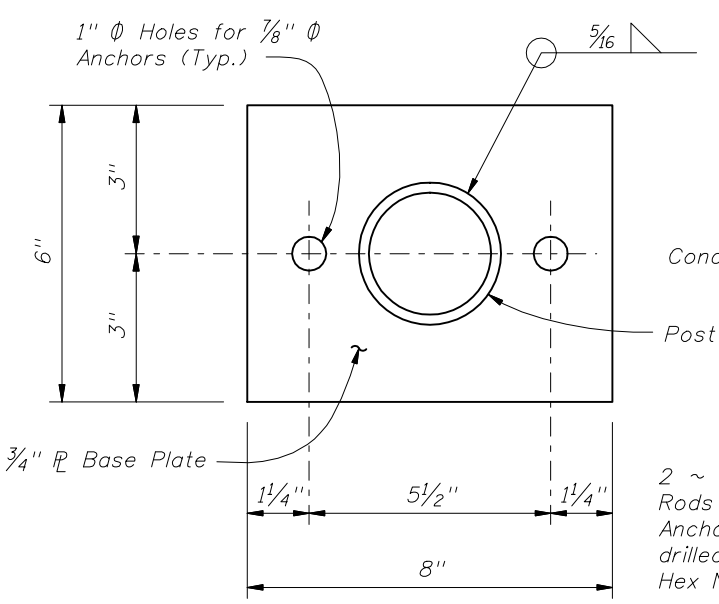
POST A DETAIL



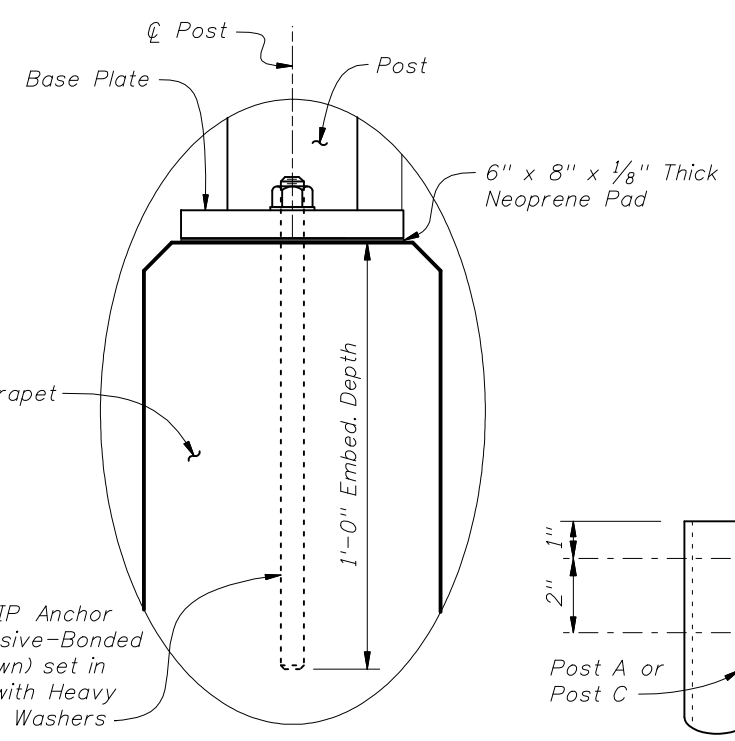
POST B DETAIL



POST C DETAIL



BASE PLATE DETAIL

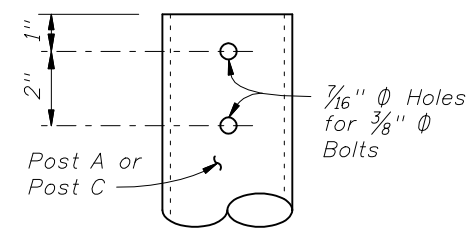


DETAIL "B"

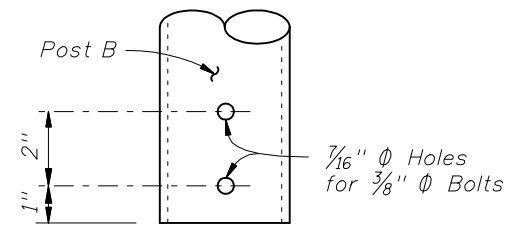
SIDEWALK CROSS-SLOPE	DIM. H (See Note 1)
2% Left	5'-6 1/4"
2% Right	5'-3 3/4"

NOTES:

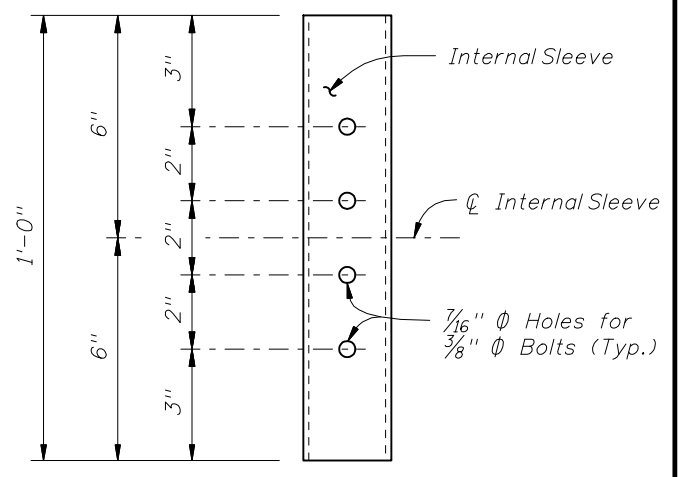
1. Values shown for DIM. H are for a 5'-0" clear sidewalk width. Adjust as required for clear sidewalk widths greater than 5'-0".
2. For clear sidewalk widths greater than 5'-0" increase radius and height by 6" for every one foot increase in sidewalk width.
3. Spacer plate thickness shown is for the 32" F-Shape Traffic Railing shown in Index No. 420. Adjust thickness as required for other Traffic Railings.



DETAIL "C"

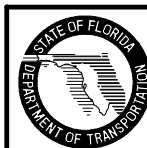


DETAIL "D"



DETAIL "E"  
(INTERNAL SLEEVE DETAIL)

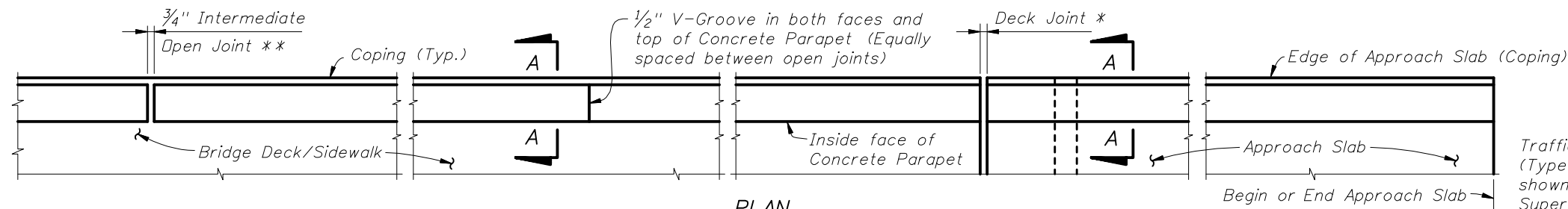
CROSS REFERENCE:  
For location of Details "B" and "E" see Sheet No. 1 of 4.



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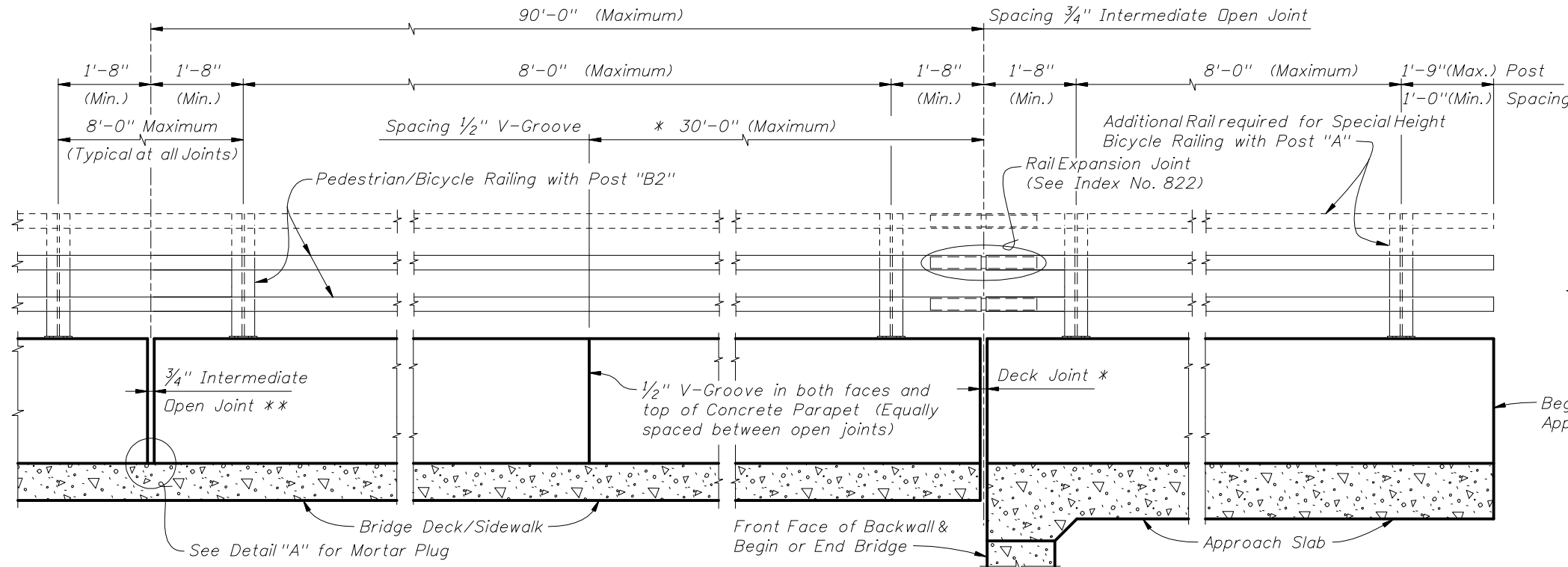
BRIDGE FENCING (ENCLOSED)

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**PLAN**  
(Rails, Posts & Reinforcing Steel not shown for clarity)

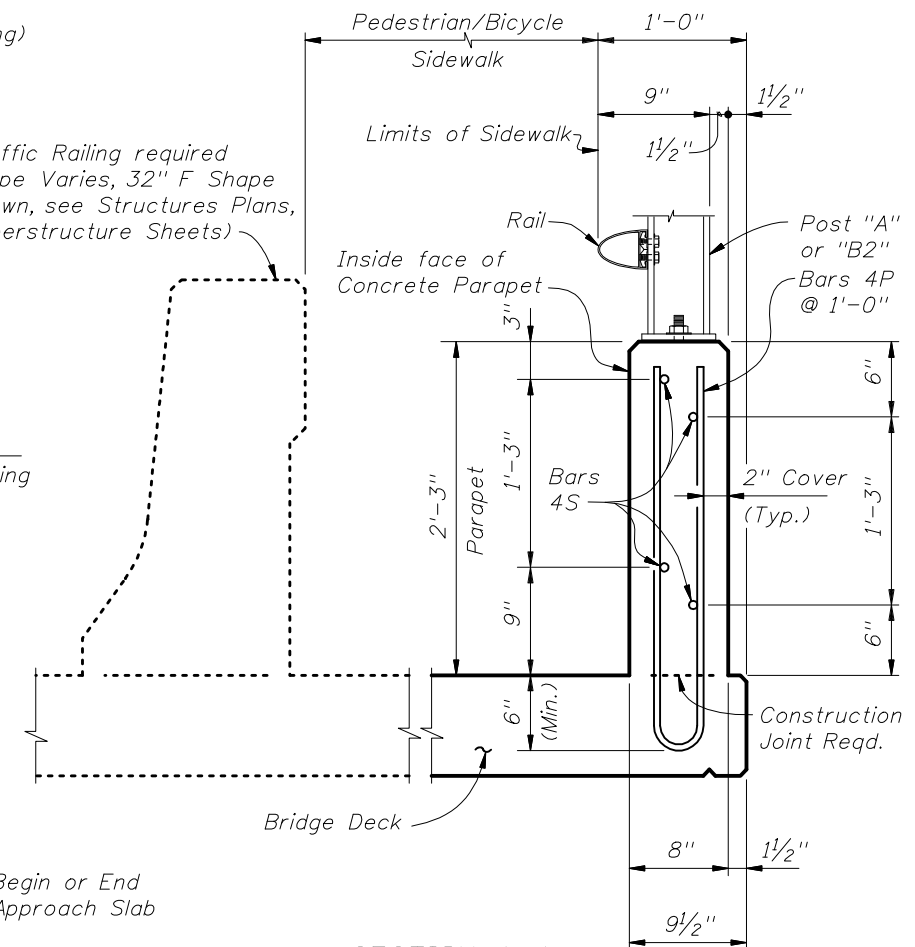
\*\* 3/4" Intermediate Open Joints shall be provided at locations coinciding with 3/4" Joints for the Traffic Railing.



**ELEVATION OF INSIDE FACE OF RAILING**  
(Reinforcing Steel not shown for clarity)  
(Aluminum Bullet Railing Shown, For Bridge Fencing see Index Nos. 810, 811 or 812)

\* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Parapet Joints at Deck Expansion Joint locations shall match the dimension 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.

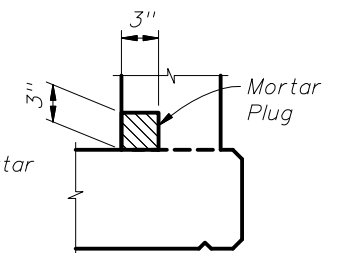
Traffic Railing required (Type Varies, 32" F Shape shown, see Structures Plans, Superstructure Sheets)



**SECTION A-A**  
(Typical Section Thru Bridge Deck Shown, Section Thru Approach Slab Similar)  
(Aluminum Bullet Railing Shown, For Bridge Fencing see Index Nos. 810, 811 or 812)

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.



**DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT**

**ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS**

**CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS**

**ESTIMATED CONCRETE PARAPET QUANTITIES**

**BILL OF REINFORCING STEEL**

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.056
Reinforcing Steel	LB/LF	6.29

(The above quantities are based on a deck with a 2% cross slope)

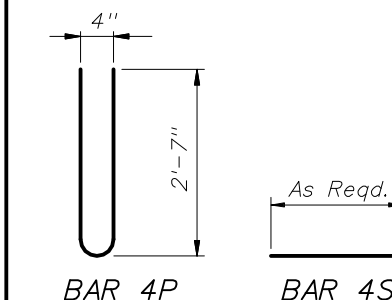
MARK	SIZE	LENGTH
P	4	5'-5"
S	4	As Reqd.

**REINFORCING STEEL NOTES:**

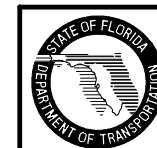
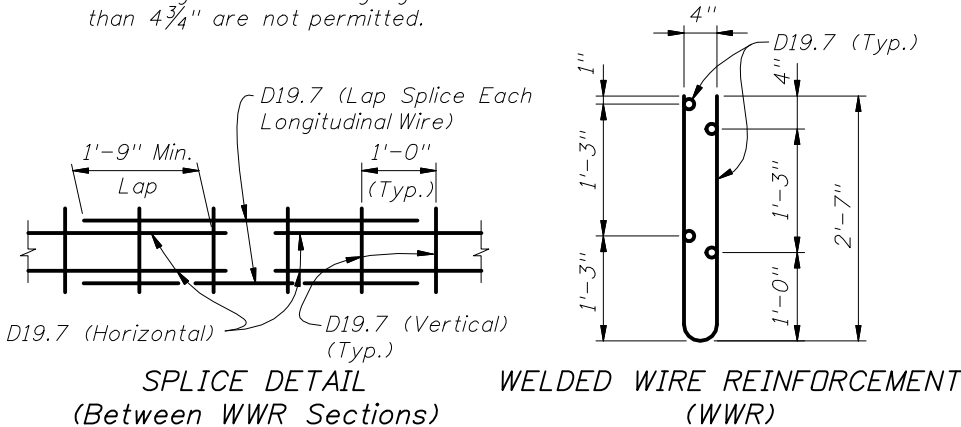
- All bar dimensions in the bending diagrams are out to out.
- The reinforcement for the parapet on a retaining wall shall be the same as detailed above for a 8" deck.
- All reinforcing steel at the open joints shall have a 2" minimum cover.
- Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
- At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 4P and 4S. Welded Wire Reinforcement shall conform to ASTM A497.

**PEDESTRIAN/BICYCLE RAILING NOTES:**

- CONCRETE PARAPET:** Concrete parapet shall be placed vertical and top surface shall be level transversely.
- RAIL AND POST DETAILS:** For Rail, Post, Rail Expansion Joint fabrication and installation details and notes see Index No. 822.
- BRIDGE FENCING:** For Bridge Fencing see Index Nos. 810, 811 or 812 in lieu of Posts and Rails on Index No. 822.



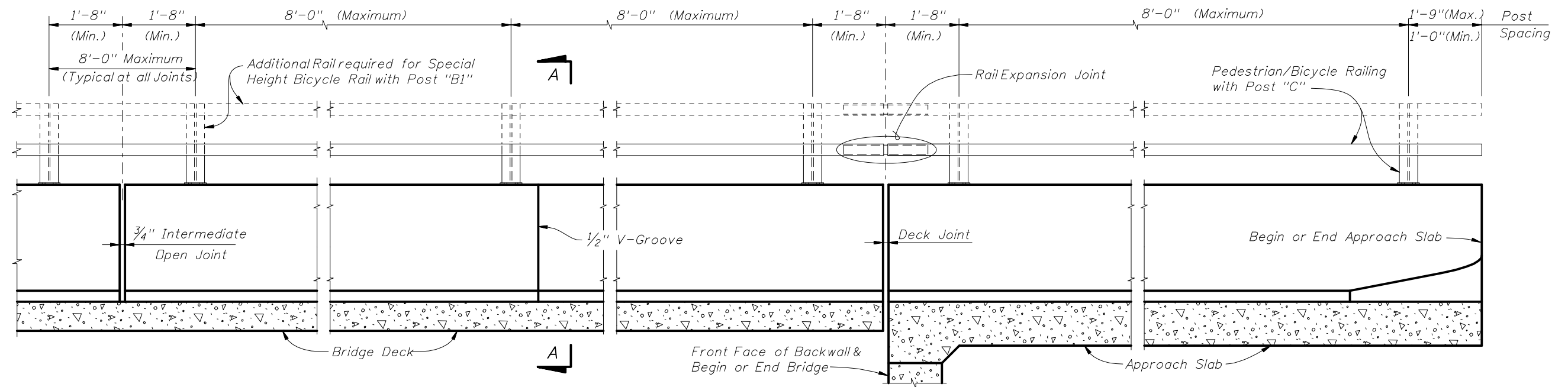
NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4 3/4" are not permitted.



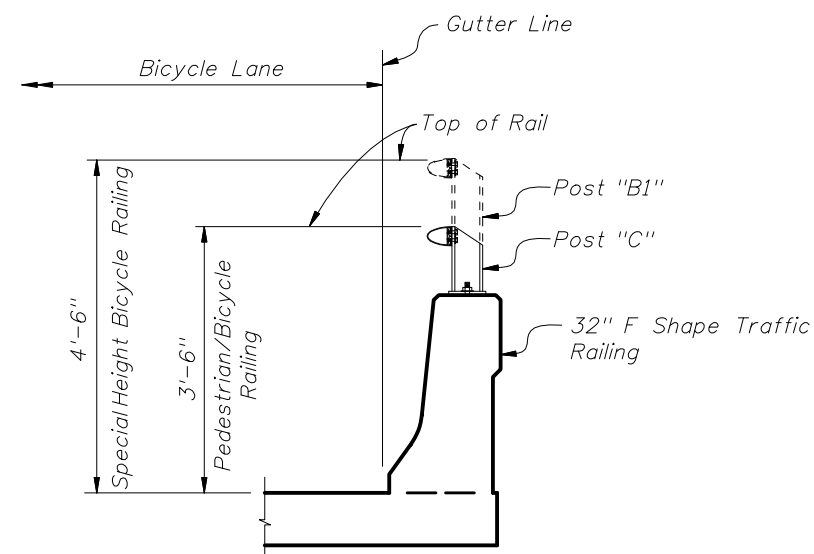
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**PEDESTRIAN/BICYCLE RAILING**

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Sheet No. 1 of 1  
Index No. 820



ELEVATION OF INSIDE FACE OF TRAFFIC RAILING WITH PEDESTRIAN/BICYCLE BULLET RAILING



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

NOTES:

RAIL AND POST DETAILS: For Post, Rail and Rail Expansion Joint fabrication and installation Details and Notes see Index No. 822.

TRAFFIC RAILING DETAILS: For Traffic Railing Details, Reinforcement and Notes see Index No. 420.

INSTRUCTIONS TO DESIGNER:

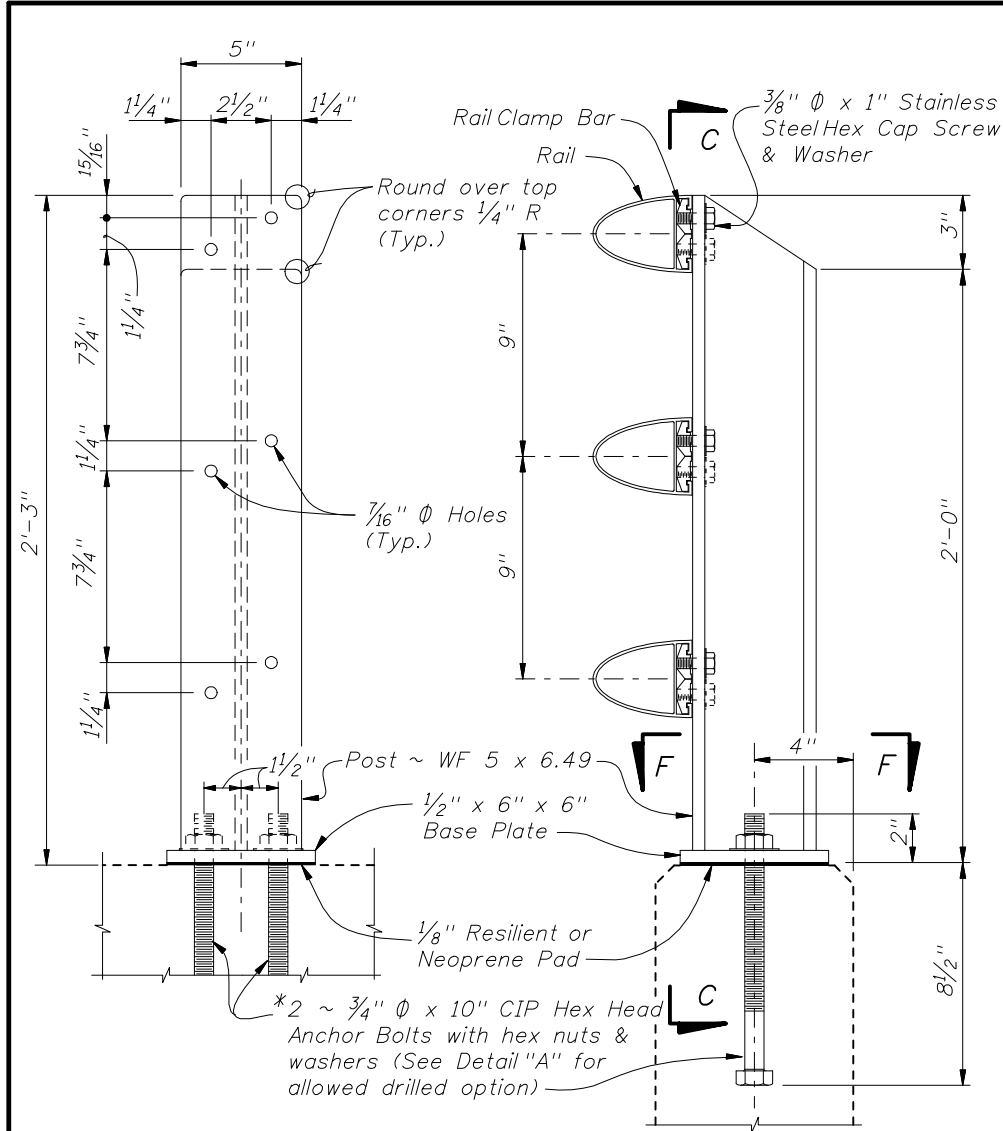
This railing is intended for use when a Bicycle Lane is required and a raised pedestrian sidewalk is not provided. See Index No. 422 and 423 for railings on a raised pedestrian sidewalk.



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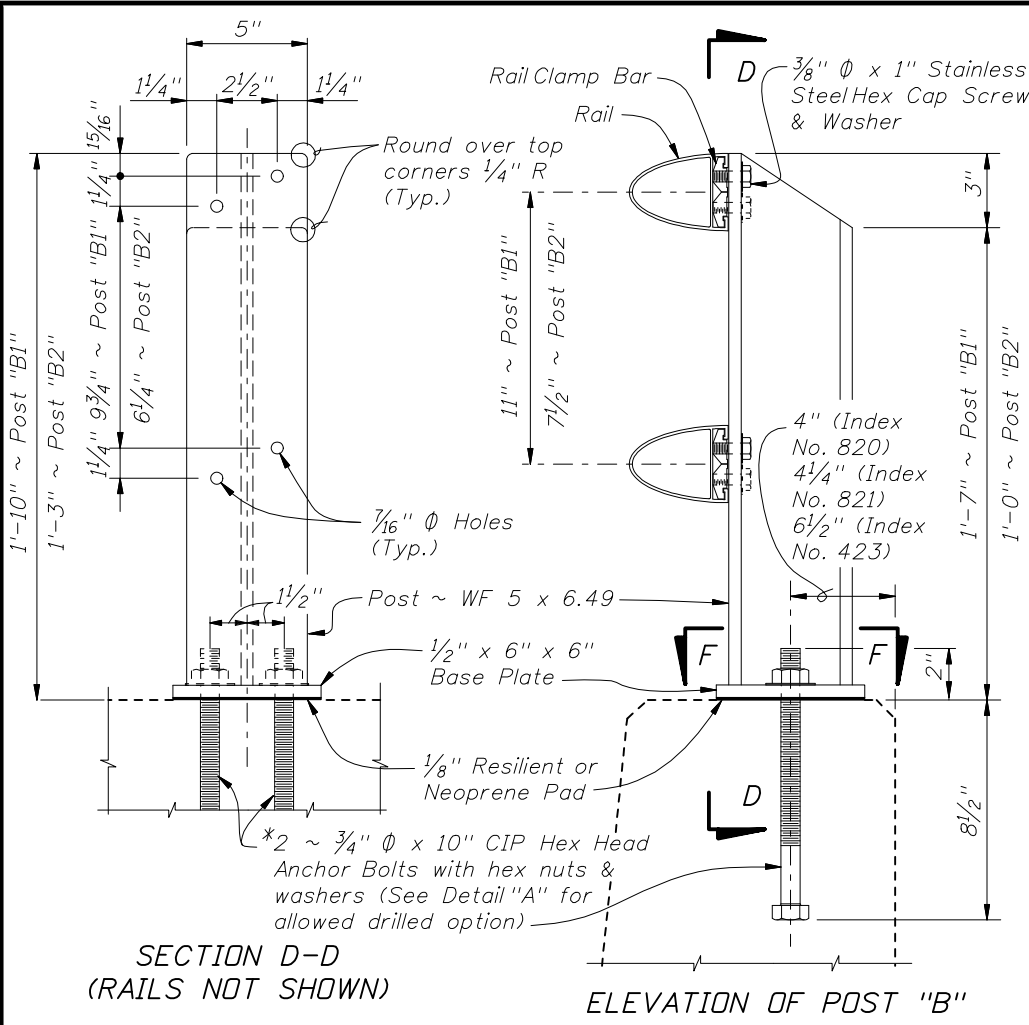
ALUMINUM PEDESTRIAN/BICYCLE BULLET RAILING  
FOR TRAFFIC RAILING (32" F SHAPE)

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SECTION C-C  
(RAILS NOT SHOWN)

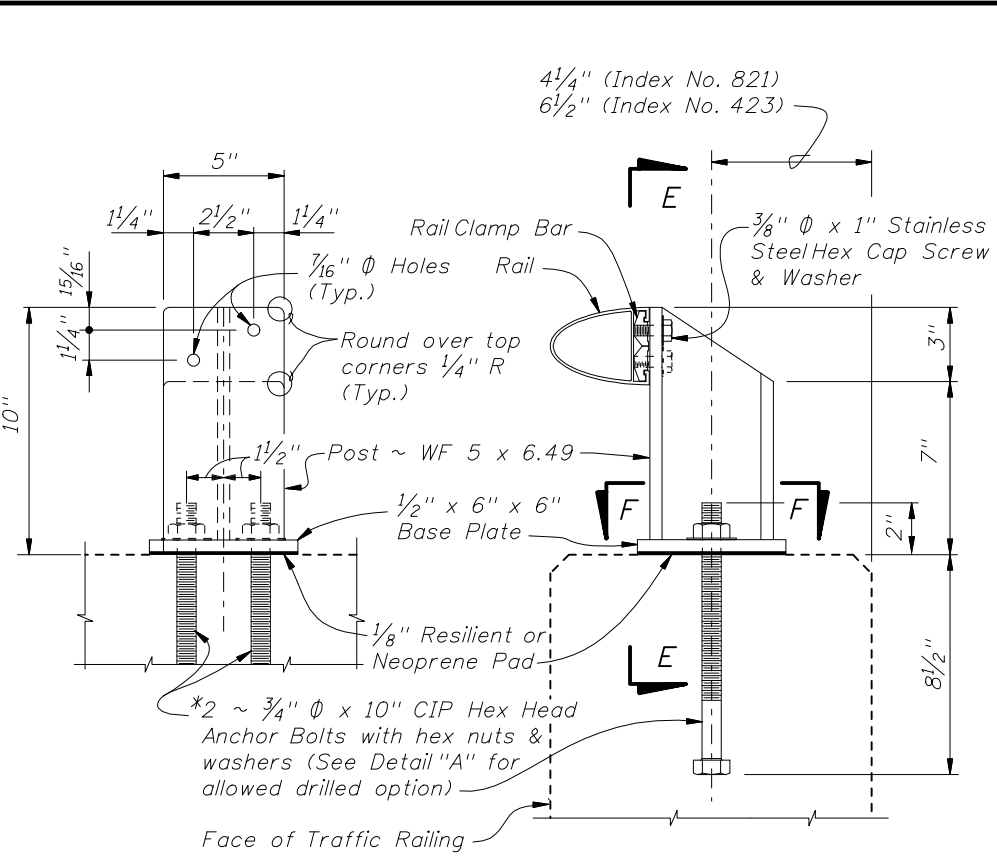
POST "A" DETAILS FOR SPECIAL HEIGHT BICYCLE RAILING ON CONCRETE PARAPET (INDEX NO. 820)



SECTION D-D  
(RAILS NOT SHOWN)

ELEVATION OF POST "B"

POST "B1" DETAILS FOR SPECIAL HEIGHT BICYCLE RAILING ON TRAFFIC RAILINGS (INDEX NO. 423 AND 821) AND POST "B2" DETAILS FOR PEDESTRIAN/BICYCLE RAILING ON CONCRETE PARAPETS (INDEX NO. 820)

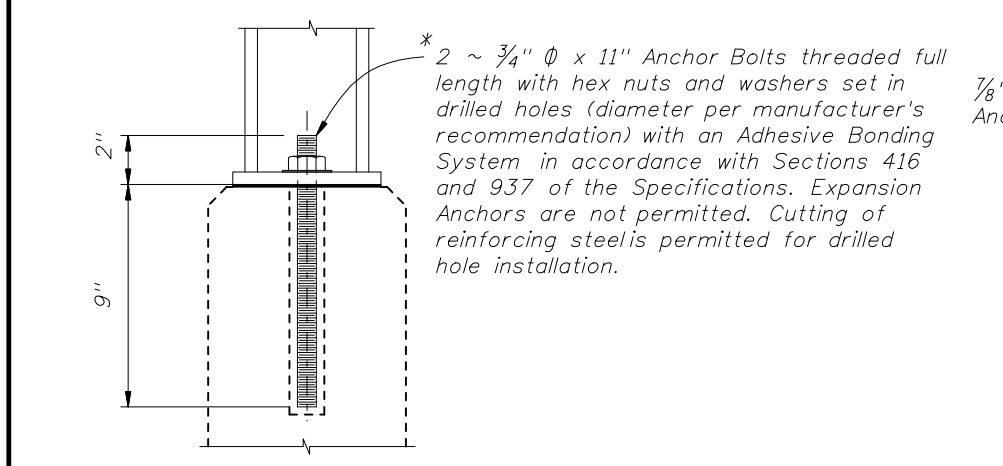


SECTION E-E  
(RAIL NOT SHOWN)

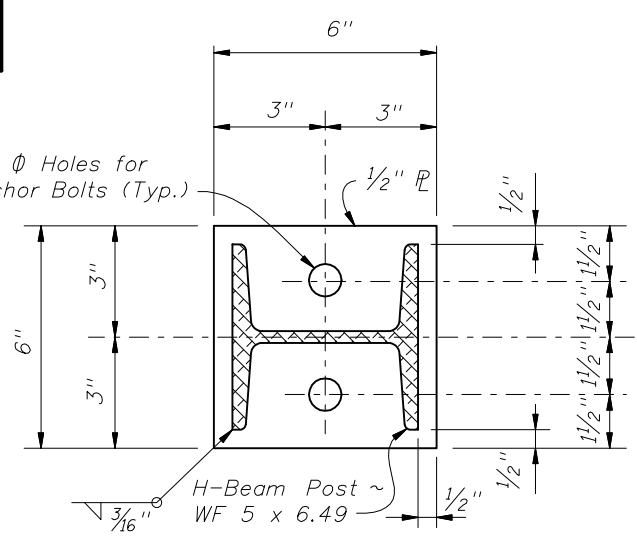
ELEVATION OF POST "C"

POST "C" DETAILS FOR PEDESTRIAN/BICYCLE RAILING ON TRAFFIC RAILINGS (INDEX NO. 423 AND 821)

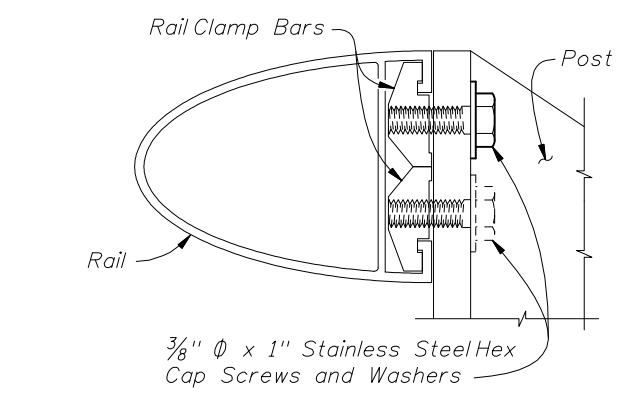
NOTE: After nuts have been tightened, the bolt threads shall be deformed to prevent removal of nuts. Tack welding of nuts to anchor bolts, to prevent theft, is permitted. Coat deformed or tack welded threads with a galvanizing compound in accordance with Section 562 of the Specifications.



ALTERNATE ANCHOR BOLT DETAIL "A"  
(CONCRETE PARAPET SHOWN, TRAFFIC RAILINGS SIMILAR)



SECTION F-F  
BASE PLATE DETAIL



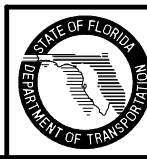
RAIL TO POST CONNECTION DETAIL

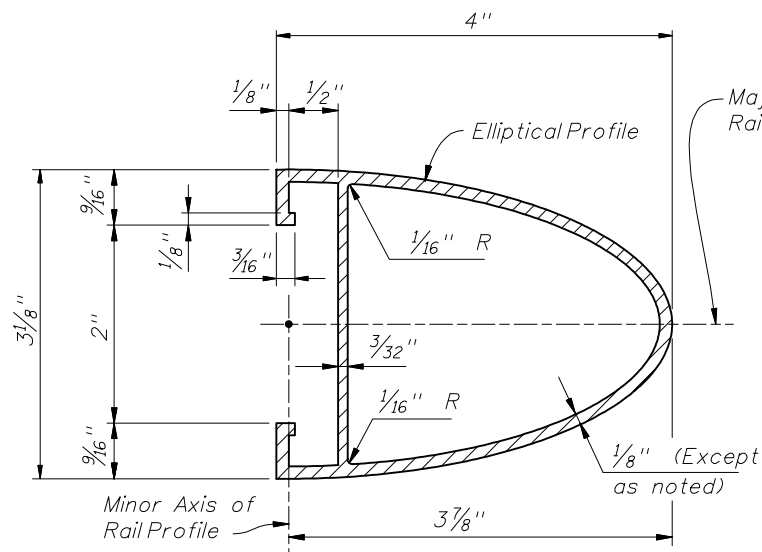
CROSS REFERENCES:

For Post "A" and Post "B2" spacing see Index No. 820.

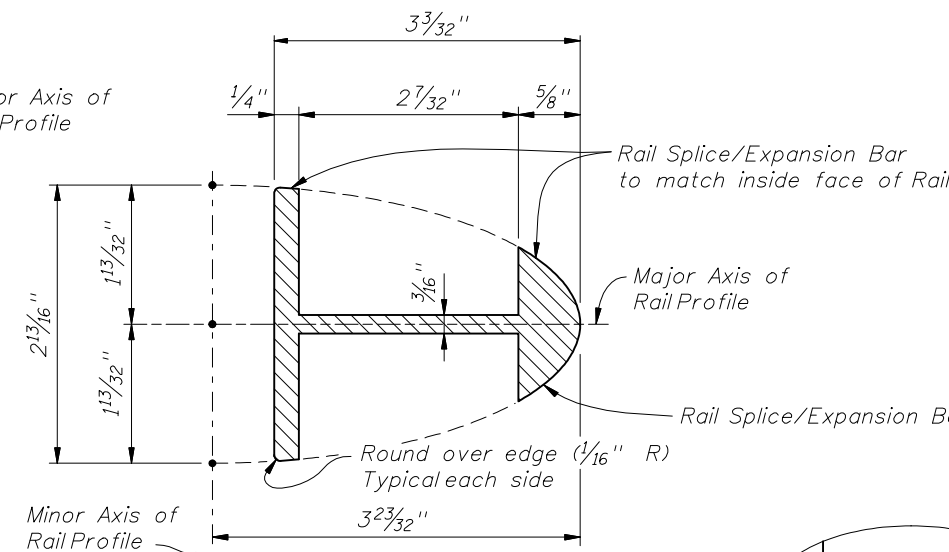
For Post "B1" & Post "C" spacing see Index Nos. 423 or 821.

For Rail Details and Notes see Index No. 822, Sheet 2.

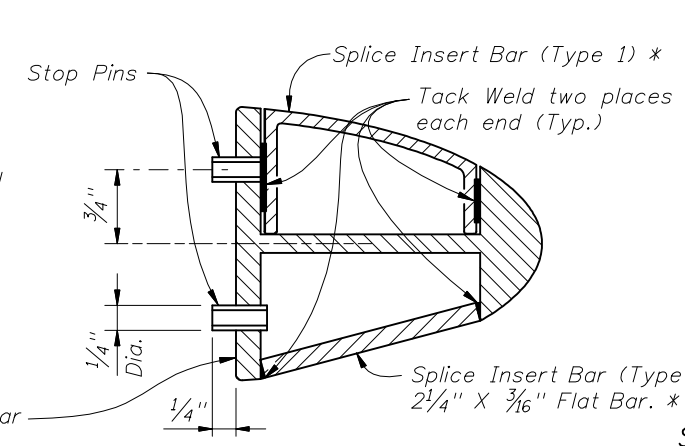




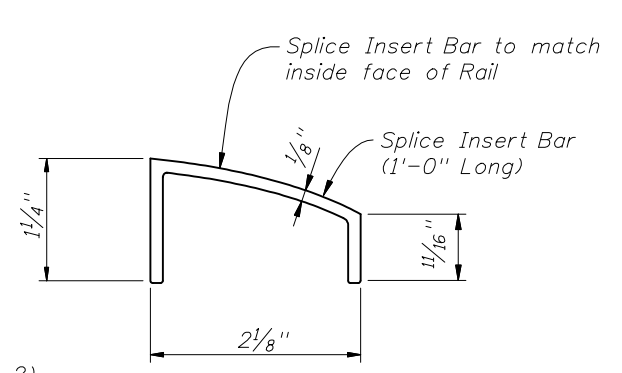
SECTION A-A  
(TYPICAL SECTION THRU RAIL)



SECTION B-B - RAIL SPLICE/EXPANSION BAR  
(RAIL NOT SHOWN FOR CLARITY)

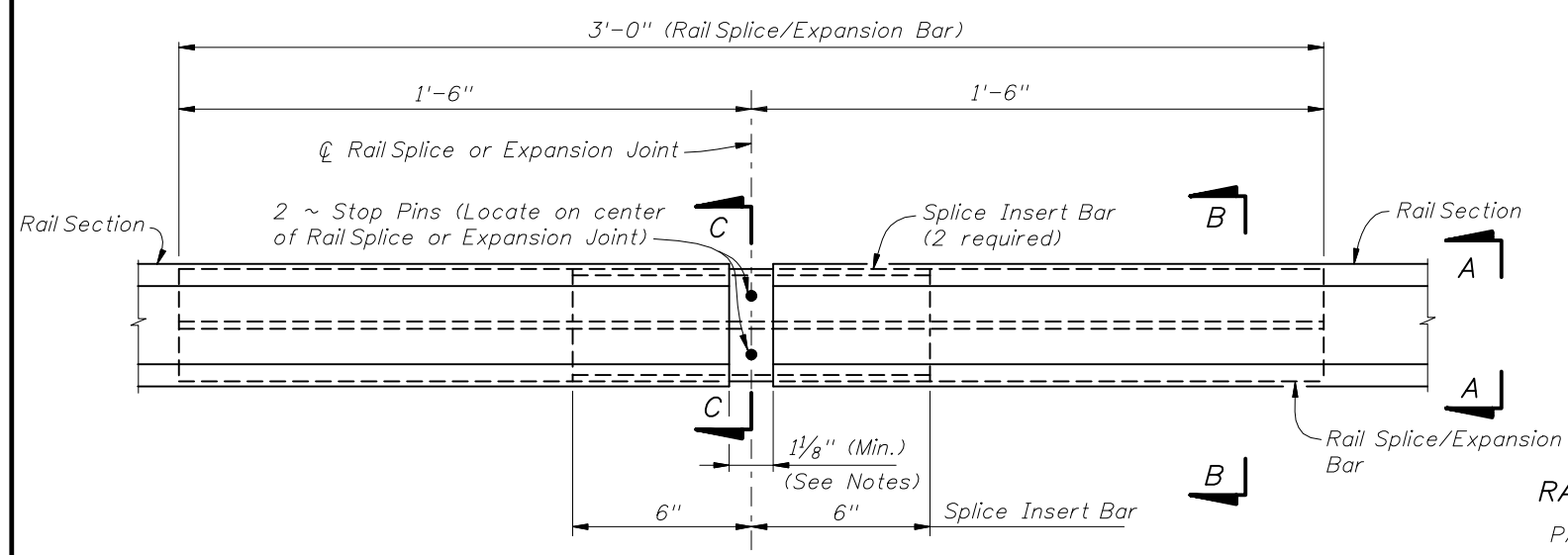


SECTION C-C

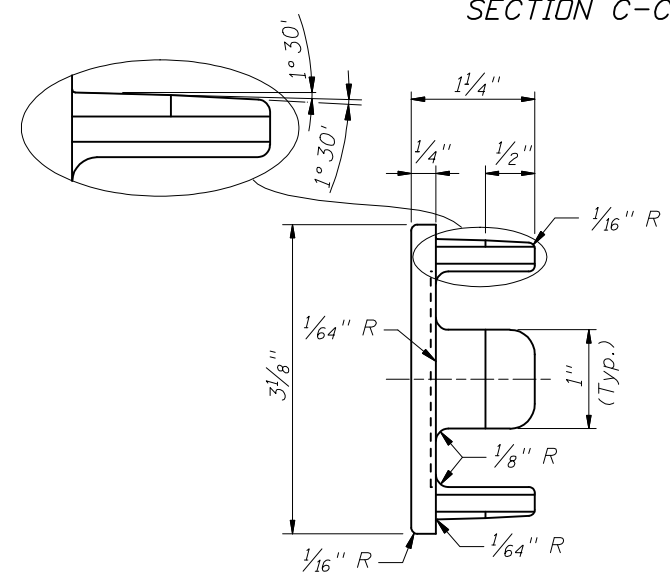


SPLICE INSERT BAR DETAIL (TYPE 1)

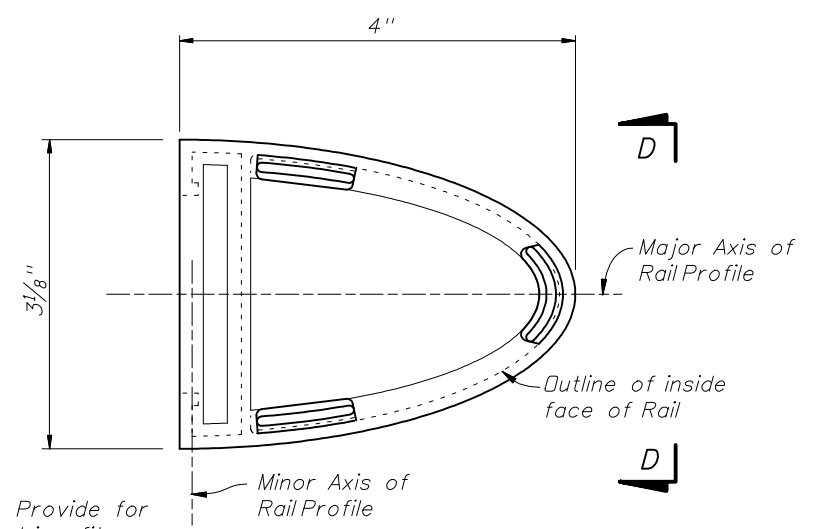
\* Use of either Type 1 or Type 2 Splice Insert Bars is at the option of the Contractor.



RAIL SPLICE ASSEMBLY DETAIL (TYPICAL AT BRIDGE EXPANSION JOINTS AND RAIL SPLICE LOCATIONS)

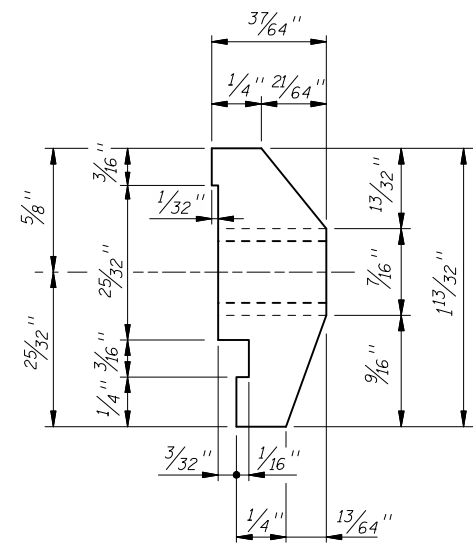


VIEW D-D

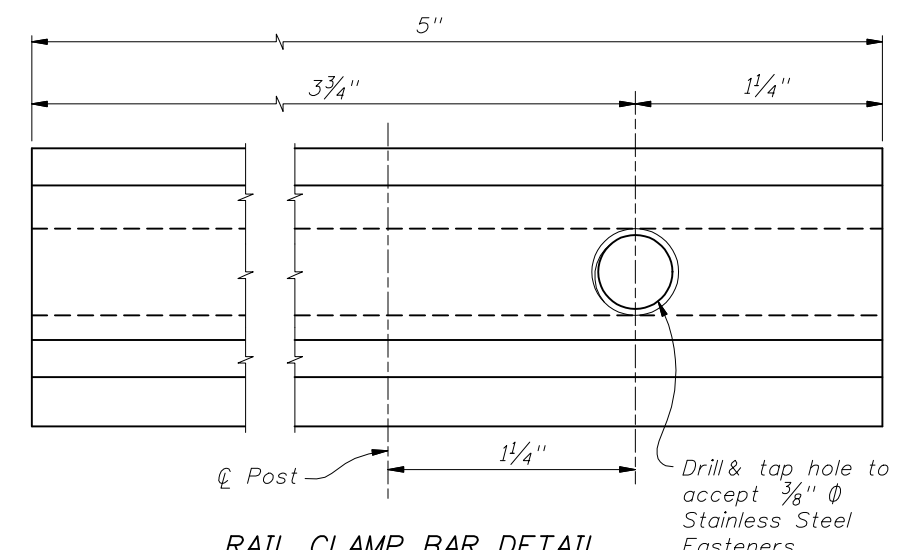


RAIL END CAP DETAIL

NOTE: Provide for drive fit.



VIEW E-E



RAIL CLAMP BAR DETAIL

RAILING NOTES:

**PAYMENT:** Payment for the railing includes Rails, Posts, Rail Splice Assemblies, Rail Clamp Bars, Rail End Caps, Anchor Bolts, Nuts, Resilient Pads, Screws and Washers and all incidental materials and labor required to complete the installation.  
**POST ASSEMBLY:** Fabricated wrought aluminum; Post - ASTM B221, alloy 6061-T6, or alloy 6351-T5; Base Plate - ASTM B209, alloy 6061-T6.  
**WELDING:** Welding of aluminum components shall be in accordance with ANSI and AWS D1.2 "Structures Welding Code - Aluminum".  
**RAIL AND RAIL SPLICE ASSEMBLIES:** Aluminum; ASTM B221, alloy 6061-T6, or alloy 6351-T5. Stop Pins shall be press-fit Aluminum or Stainless Steel pins or tubes, unless otherwise approved by the Engineer.  
**RAIL CLAMP BAR:** Aluminum; ASTM B221, alloy 6061-T6, or alloy 6351-T5.  
**STAINLESS STEEL FASTENERS:** 3/8" Ø Hex Cap Screws and Washers shall be ASTM F-593, alloy group 2 (316).  
**ANCHOR BOLTS:** Anchor bolts shall be in accordance with ASTM A36 or ASTM F1554, Grade 36. Anchor Bolts, Nuts, and Washers shall be hot dip galvanized in accordance with Section 962 of the Specifications.  
**RAIL END CAP:** ASTM B26 sand cast aluminum alloy 356.0-F.  
**RAIL INSTALLATION:** Set Rail Posts normal to Profile Grade longitudinally and vertical transversely. Post spacings that land on barrier or parapet obstacles such as armor expansion plates etc. shall be adjusted to clear obstacles by 9" without exceeding maximum post spacing. Set Posts on 1/8" thick resilient or neoprene pads in accordance with Section 932 of the Specifications. The pad dimension shall be the same as the post base plate. Provide rail expansion joint in panels between posts on either side of Bridge Expansion Joints. Rail expansion joints shall be similar to rail splice with provision for movement equal to 1.5 times the bridge joint opening. Take care to ensure rails are set with the proper openings. Remove any burrs or sharp edges on rails and posts to prevent injury.  
**RAIL SPLICES:** Rails shall be continuous over a minimum of 3 posts, except that lengths less than 12' need only be continuous over 2 posts. Space splices at 40'-0" maximum centers. Locate center of splice 1'-5" minimum from the edge of a post. Splice all rails in any railing section about the same center line.  
**RESILIENT AND NEOPRENE PADS:** Resilient and Neoprene Pads shall be in accordance with the Specifications except that testing of the finished pads is not required. Neoprene pads shall be durometer hardness 60 or 70.  
**SHOP DRAWINGS:** Submit complete details including rail, post and expansion joint locations and description of material of the proposed railing for the Engineer's approval prior to fabrication.  
**CROSS REFERENCE:** For Post Details see Index No. 822, Sheet 1.



**DESIGN SPECIFICATIONS:**

American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Third Edition, 2004, including 75 year Design Life  
 Florida Department of Transportation (FDOT) "Structures Design Guidelines for Load and Resistance Factor Design", January 2006.  
 Florida Building Commission "Florida Building Code", 2004 Edition, except for Handrail diameter.  
 U.S. Access Board "ADA Accessibility Guidelines" July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.  
 National Fire Protection Association (NFPA) 101, "Life Safety Code", 2003 Edition.

**DESIGN LIVE LOADS:**

Post and Base Plate: Equivalent point load = 200 lb. load + (50 lb./ft. x Post Spacing (ft.)) applied transversely at top rail connection.  
 Top & Bottom Rails: 50 lb./ft. uniform load applied simultaneously vertically and transversely + 200 lb. concentrated point load applied at midspan in the directions for both maximum stress and deflection.  
 Handrails: Maximum of either 50 lb./ft. uniform load applied in any direction or 250 lb. concentrated load applied in any direction at any point along the top.  
 Pickets: Concentrated 200 lb. load applied transversely over an area of 1.0 square foot.

**GEOMETRY:**

Clear Opening between Pickets: Shall reject the passage of a 4" diameter sphere below 42" height, and a 8" diameter sphere above 42" height.  
 Clear Opening under Bottom Rail: Shall reject the passage of a 2" diameter sphere.  
 ADA Handrail Height: 34"  
 Standard Pedestrian/Bicycle Railing Height: 42" minimum.  
 Special Height Bicycle Railing Height: 54" minimum.

**DEFLECTION:**

Total combined deflection of the railing system including the resilient or neoprene pads, due to the top rail design live loads, shall not exceed 1/2" when measured at midspan of the top rail.

**APPLICABILITY NOTE TO DESIGNER:**

This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazard exceeds 2'-6" or when a drop-off hazard is less than 2'-6" and is required by design. See Index No. 851 for special requirements and modifications for use on bridges. Adequate foundation support shall be provided for anchorage and stability against overturning. For unusual site conditions a site specific railing is to be designed by the responsible engineer. The railing shown on these drawings requires a handrail for ramps steeper than a 5% grade to conform with the requirements of the Americans with Disabilities Act (ADA). Refer to FDOT Plans Preparation Manual (Volume I) Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

**ALTERNATE DESIGN:**

Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the design life, live loads, geometry and deflection requirements specified herein. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1 1/2" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

**PAYMENT:**

Railing shall be paid for per linear foot (Item No. 515-2-abb). Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the railing.

**RAILS, PICKETS & POSTS:**

Pipe Rails and Pickets shall be in accordance with ASTM A53 Grade B for standard weight pipe (Schedule 40) or ASTM A36 for bars. Structural Tube Posts shall be in accordance with ASTM A500 Grade A, B, C or D, or ASTM A501. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Pickets shall be fabricated parallel to the posts. Corners and changes in tangential longitudinal alignment shall be made continuous with a 9" bend radius or terminate at adjoining sections with mitered end sections when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" x 4" Rectangular Tube	2.00" x 4.00"	0.188"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A
Pickets	1/2" NPS (Sch. 40)	0.840"	0.109"
	3/4" Ø Round Bar	0.750"	N/A

**BASE PLATES & POST CAPS:**

Base Plates and Post Cap plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

**SHIM PLATES:**

Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than 1/4" and localized irregularities greater than 1/8". Field trim shim plates when necessary to match the contours of the foundation. Beveled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with an adhesive bonding material and limited to a maximum total thickness of 1/2", unless longer anchor bolts are provided for the exposed thread length.

**COATINGS:**

The railing shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

**ANCHOR BOLTS:**

Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steel is permitted for drilled hole installation. Expansion Anchors are not permitted. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be 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 tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

**RESILIENT AND NEOPRENE PADS:**

Resilient and Neoprene pads shall be in accordance with Specification Section 932 except that testing of the finished pads shall not be required. Neoprene pads shall be PRESTRESSED hardness 60 or 70.

**JOINTS:**

All fixed joints are to be welded all around and ground smooth. Expansion joints shall be spaced at a maximum 40'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate hot-dip galvanizing and handling, but railing must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments. Metallize rail ends with a galvanizing compound when field adjustments are required.

**WELDING:**

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.

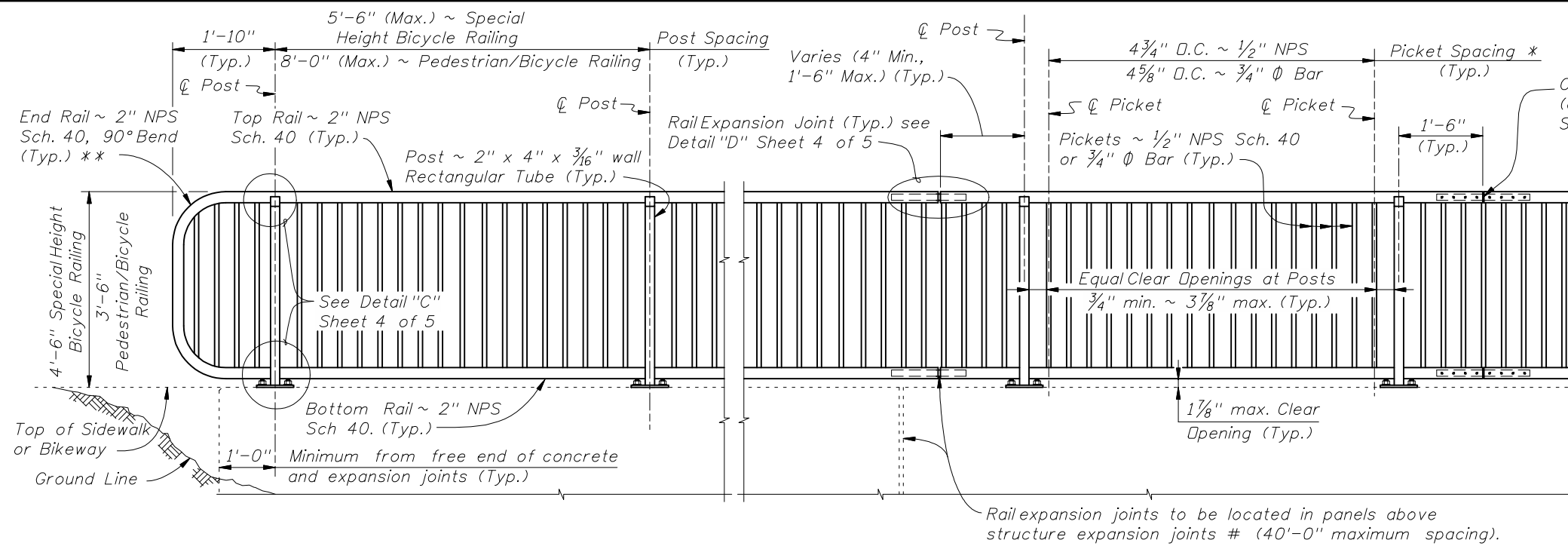
**WEEP HOLES:**

Weep holes shall be 1/4" Ø and located at the low point between adjacent posts for both top and bottom rails. Holes shall be drilled through the underside of the rails prior to hot-dip galvanizing.

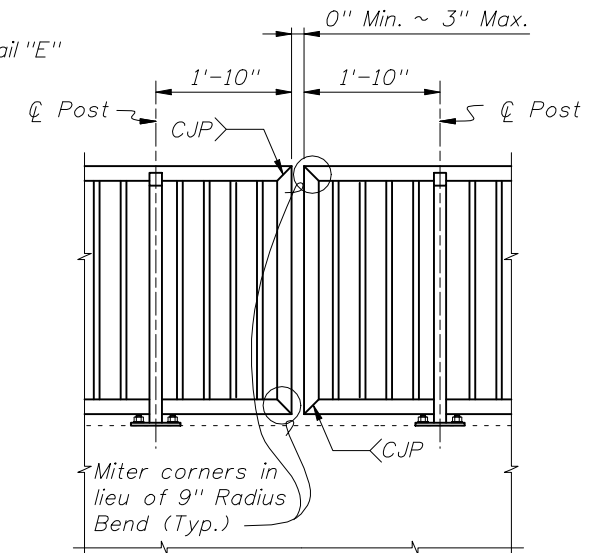
**SHOP DRAWINGS:**

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations, anchor bolt installation "Case" or lengths, and venting holes for galvanizing, must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.





ELEVATION  
(Showing Outside Face of Railing)



Note: Non-continuous corners are permitted when handrails are not required.

EXPANDED ELEVATION AT CORNERS

TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%

DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS

NOTES:

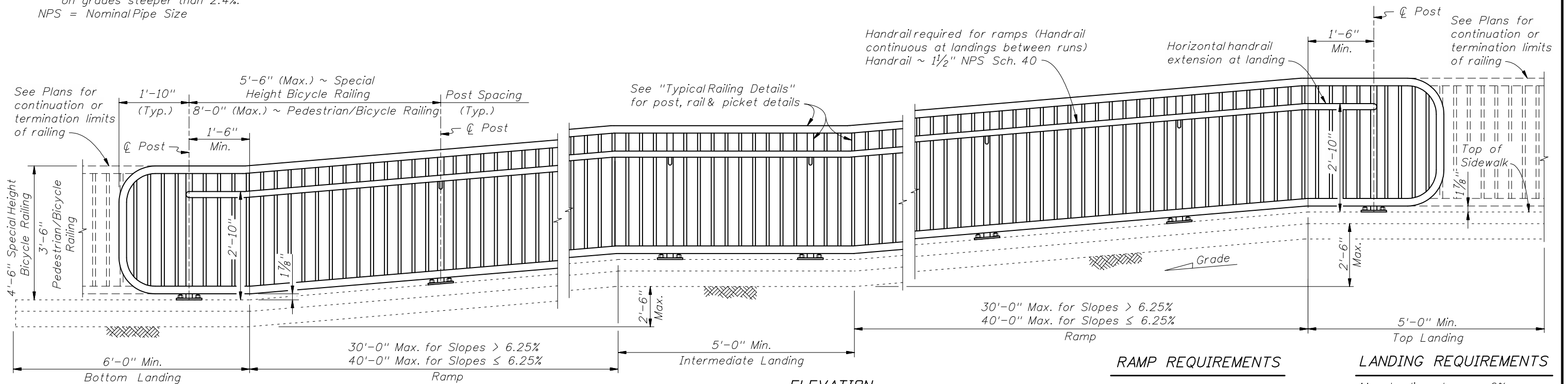
- \* Picket Spacing based on the optional picket members shown. If an alternate design is used maintain a maximum clear opening of 3 7/8".
- \*\* End Rail bend varies for Railings on grades steeper than 2.4%.
- NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:

- # Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

CROSS REFERENCE:

For Details "C", "D" and "E", see Sheet 4 of 5.



ELEVATION  
(Showing Inside Face of Railing)

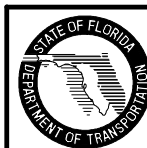
RAMP REQUIREMENTS

For slopes greater than 5%:  
Max. ramp slope = 8.33%  
Max. ramp cross-slope = 2.0%

LANDING REQUIREMENTS

Max. landing slope = 2%  
Max. landing cross-slope = 2%

RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%



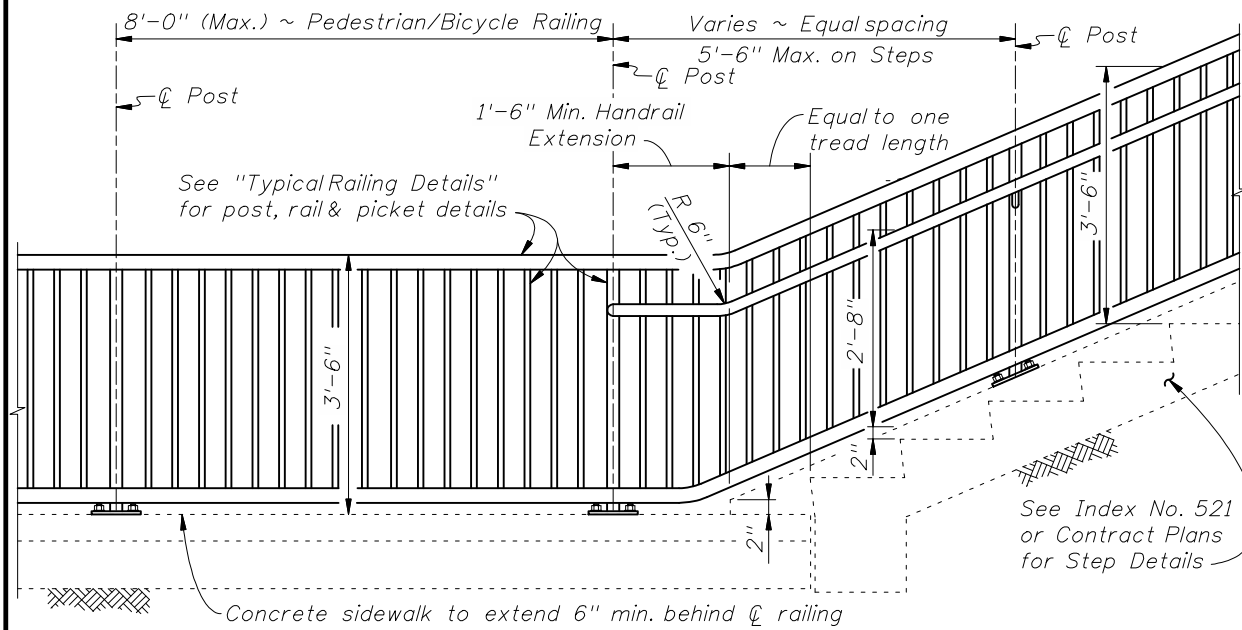
2010 FDOT Design Standards

STEEL PEDESTRIAN/BICYCLE PICKET RAILING

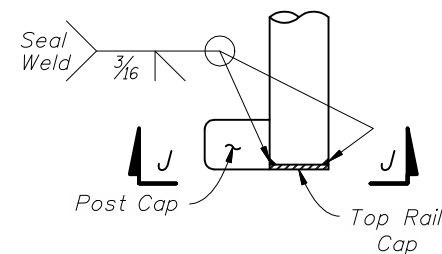
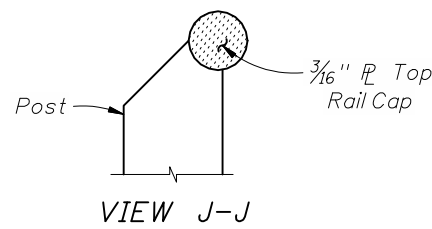
Last Revision  
07/01/08  
Sheet No.  
2 of 5

Index No.  
850

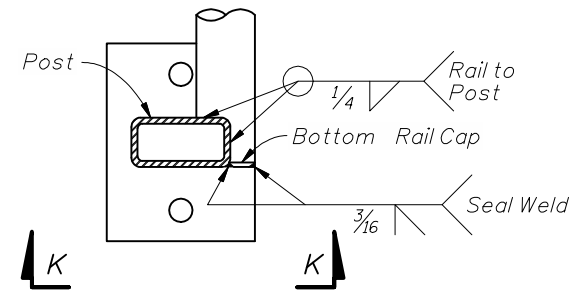
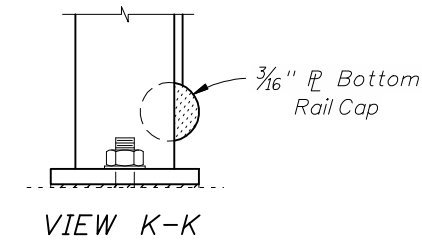




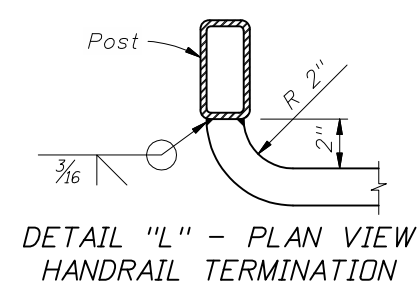
RAILING CONTINUATION BEYOND STEPS OR STAIRS  
(Bottom shown, Top similar)



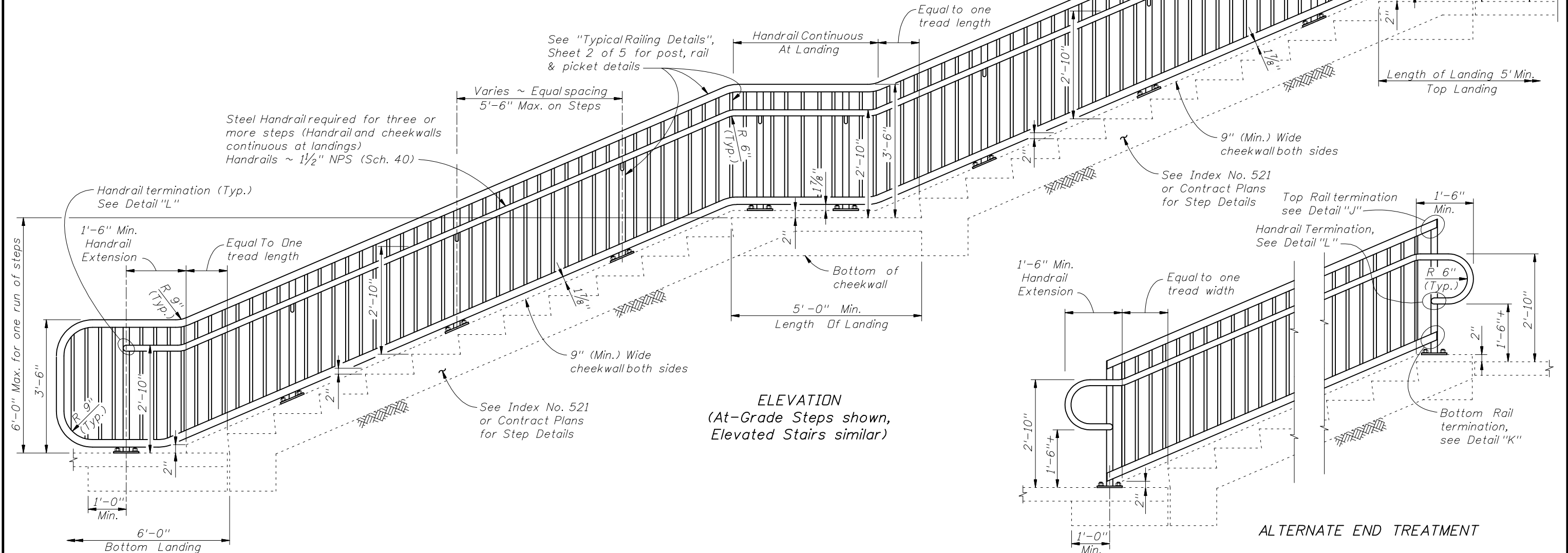
DETAIL "J"  
TOP RAIL TERMINATION



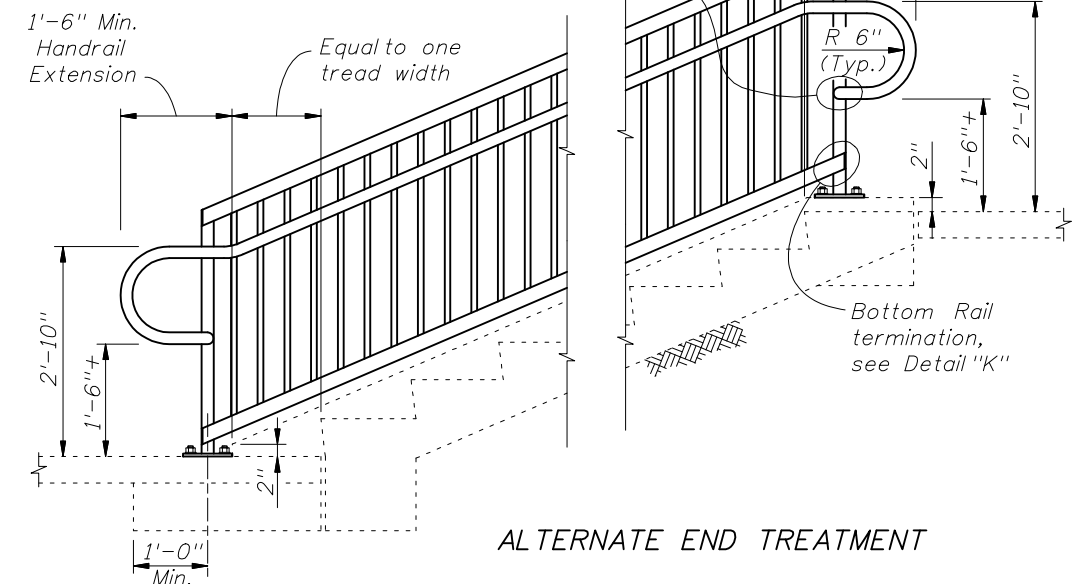
DETAIL "K"  
BOTTOM RAIL TERMINATION



ALTERNATE END TREATMENT DETAILS



ELEVATION  
(At-Grade Steps shown,  
Elevated Stairs similar)



ALTERNATE END TREATMENT

RAILINGS ON STEPS & STAIRS

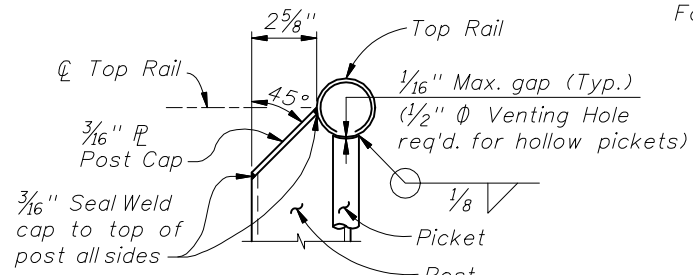


2010 FDOT Design Standards

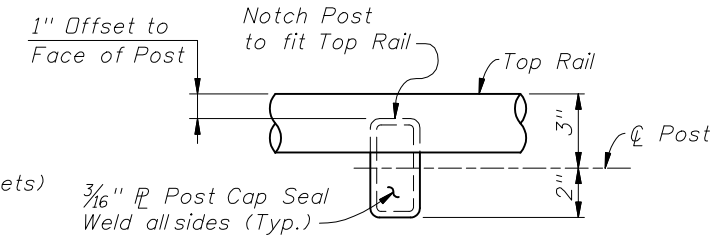
STEEL PEDESTRIAN/BICYCLE PICKET RAILING

Last Revision 01/01/08 Sheet No. 3 of 5

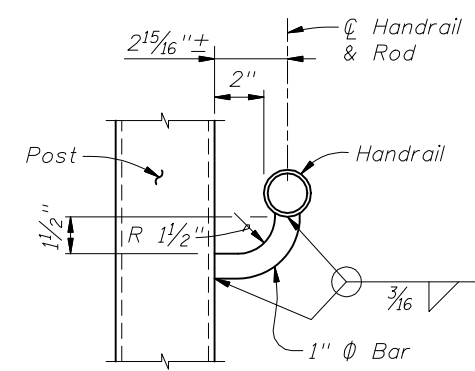
Index No. 850



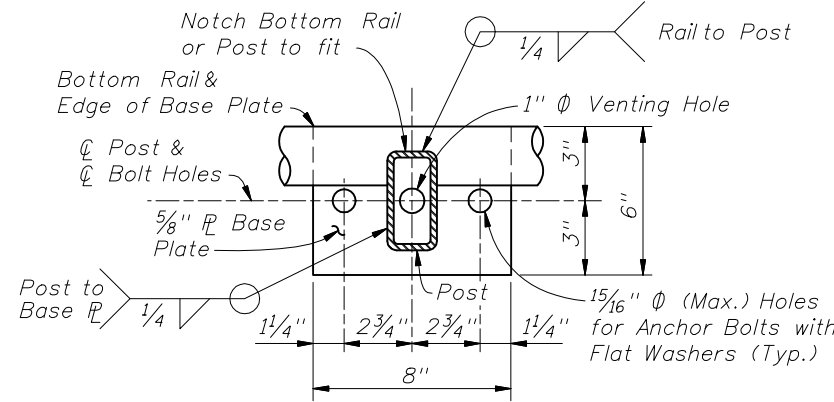
**SECTION A-A**  
(Top of Picket Connection)



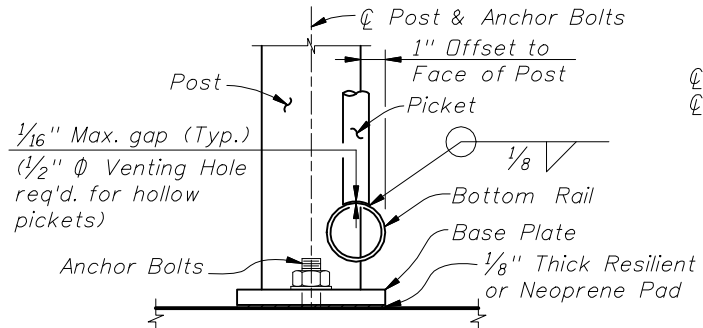
**VIEW F-F**  
**TOP RAIL CONNECTION**  
(Base Plate Not Shown for Clarity)



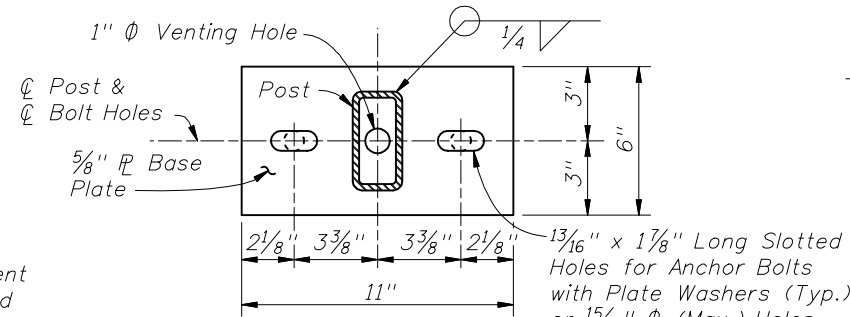
**SECTION B-B**  
(Handrail Connection)



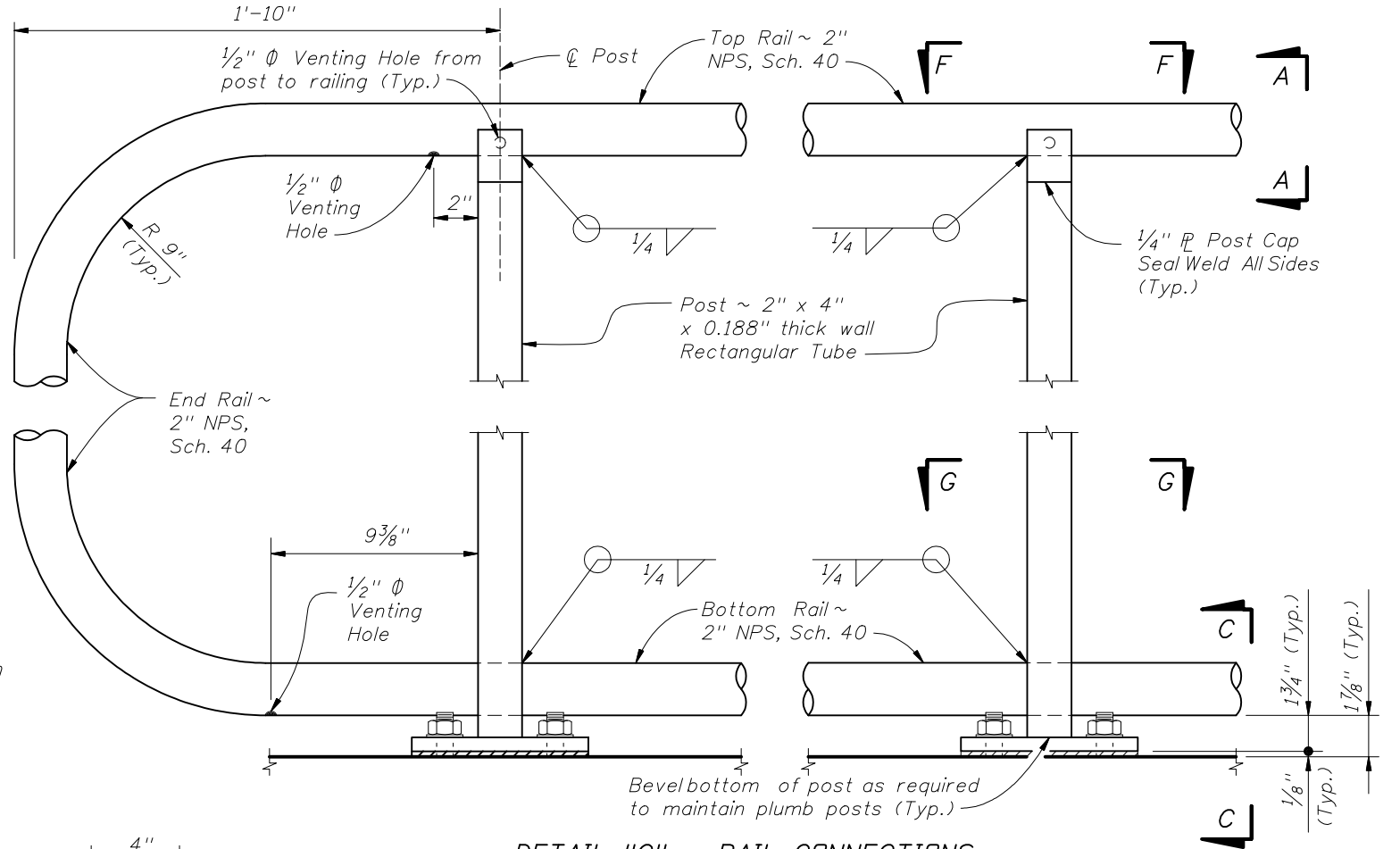
**SECTION G-G**  
**BASE PLATE & BOTTOM RAIL CONNECTION**



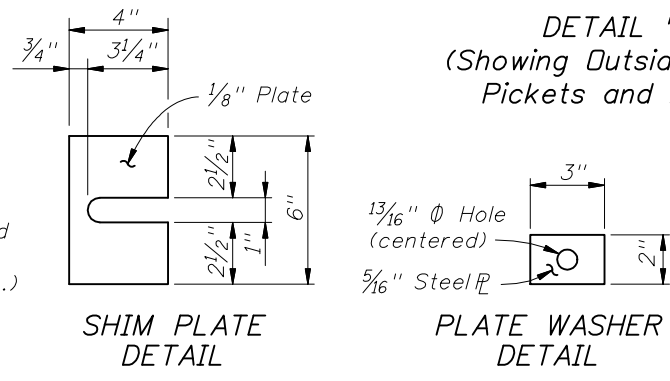
**SECTION C-C**  
(Bottom of Picket connection)



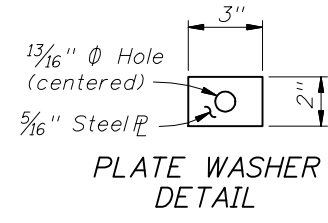
**ALTERNATE**  
**BASE PLATE DETAIL**  
(Recommended for Top of Step Cheekwalls)



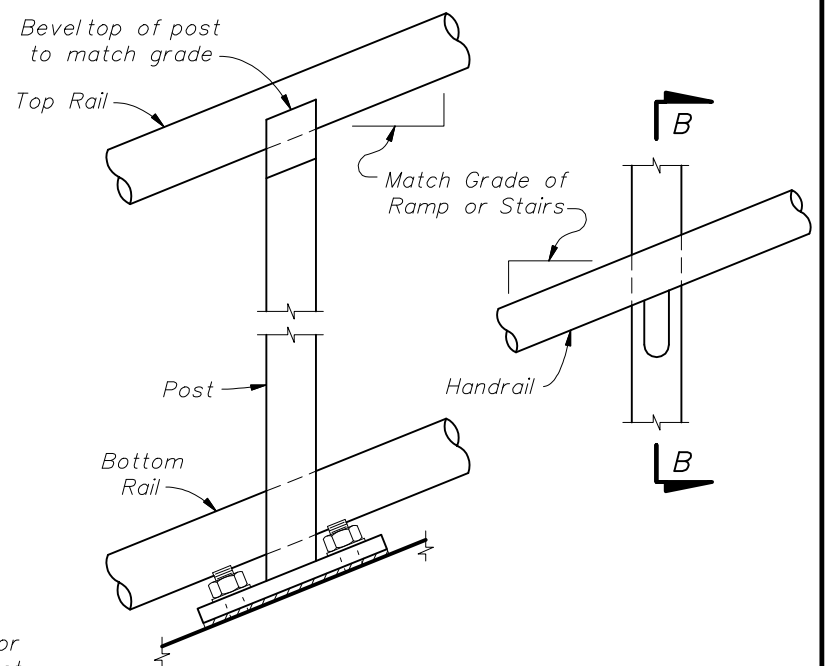
**DETAIL "C" - RAIL CONNECTIONS**  
(Showing Outside Face of Structure and Railing, Pickets and Handrail Not Shown for Clarity)



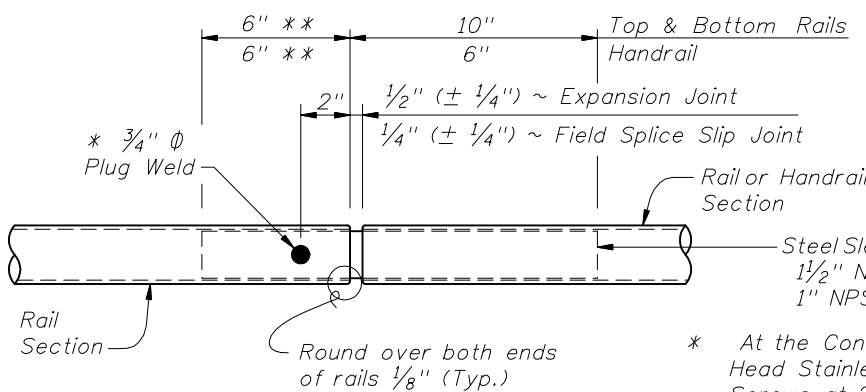
**SHIM PLATE**  
**DETAIL**



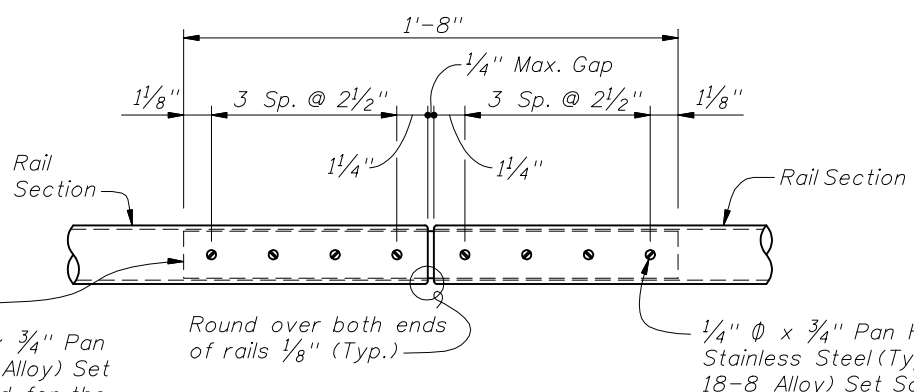
**PLATE WASHER**  
**DETAIL**



**DETAIL "B" - RAIL AND HANDRAIL**  
(Showing Sloped Condition for Stairs or Ramp)



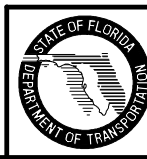
**DETAIL "D" - EXPANSION JOINT**  
(FIELD SPLICE SLIP JOINT SIMILAR)

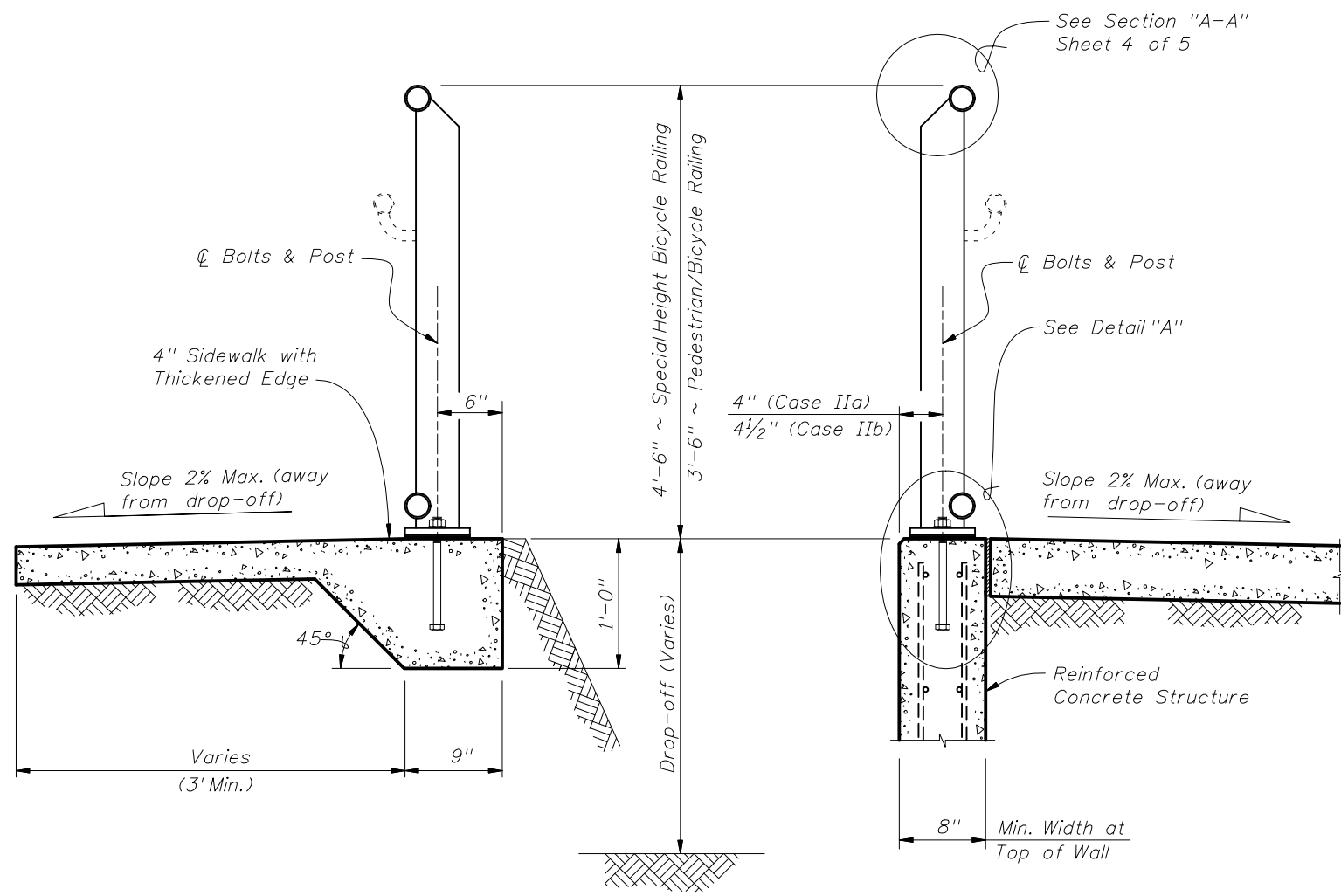


**DETAIL "E" - CONTINUITY**  
**FIELD SPLICE**

\* At the Contractor's option 2 ~ 1/4"  $\phi$  x 3/4" Pan Head Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing may be substituted for the 3/4"  $\phi$  plug weld. Set screws must be set flush against the outside face of rail and underside of handrail.  
\*\* Embedded length may be 4" for plug welded connection. Maintain venting of ends of pickets during galvanizing.

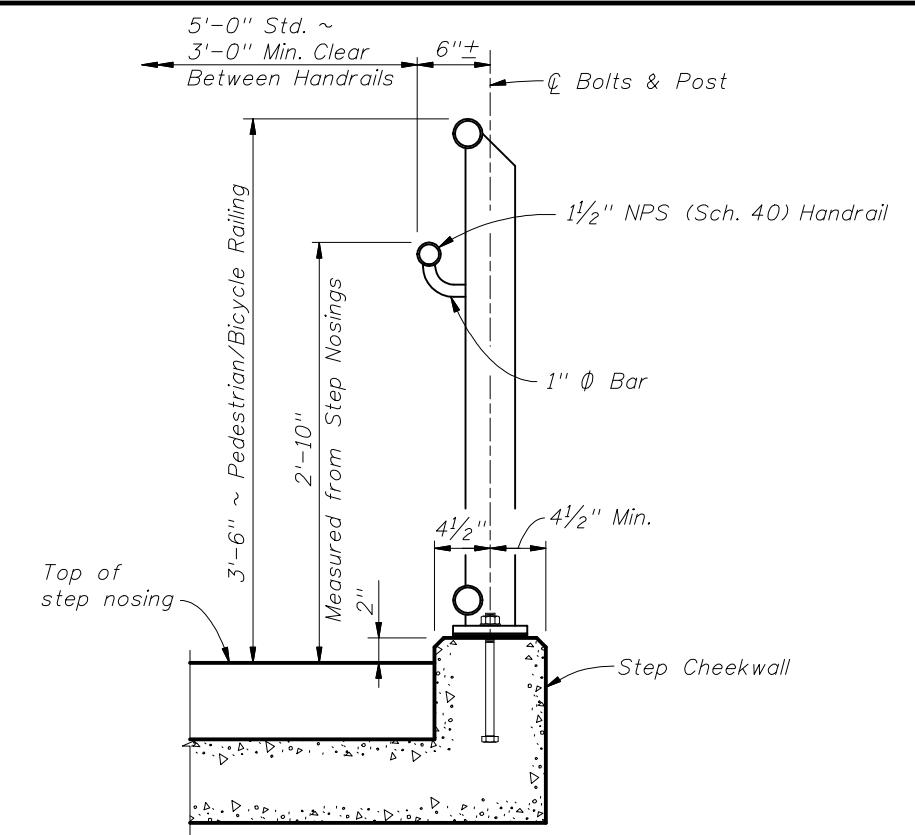
CROSS REFERENCE:  
For locations of Details "C", "D" and "E", see Sheet 2 of 5.



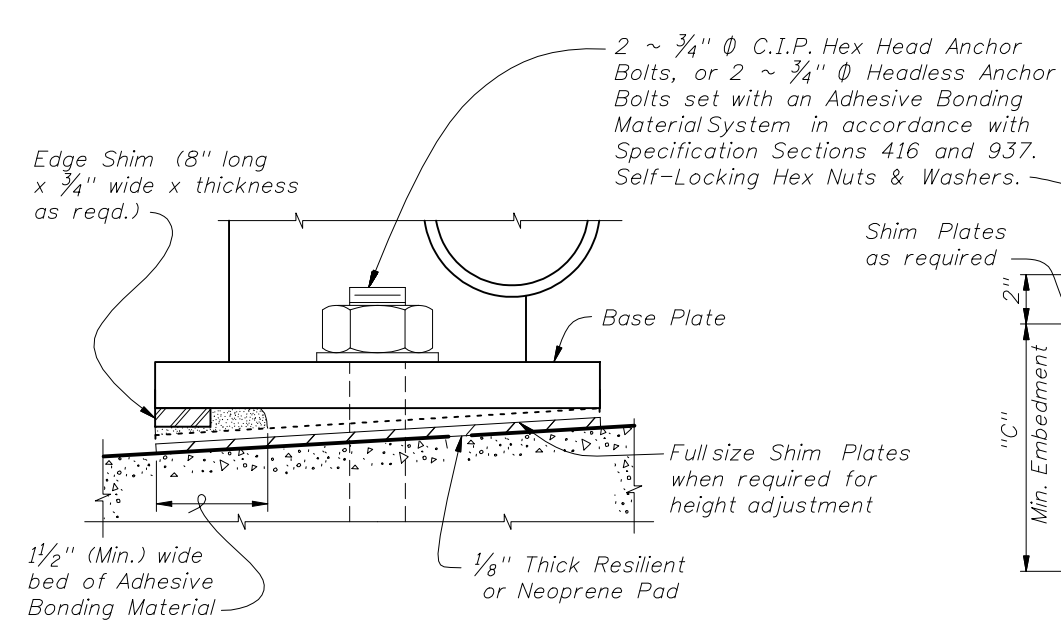


TYPICAL SECTION ON CONCRETE SIDEWALK (Case I)

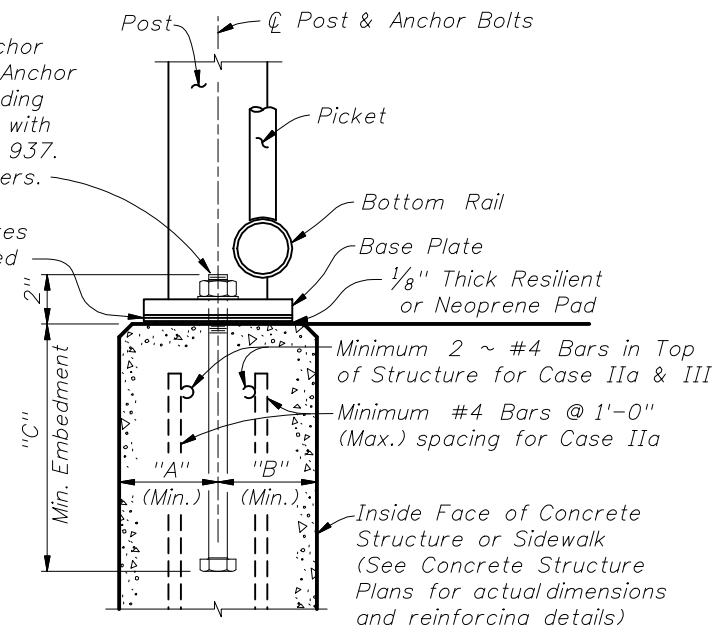
TYPICAL SECTION ON RETAINING WALL (Case II)



TYPICAL SECTION ON STEPS & STAIRS (Case III)



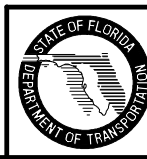
DETAIL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION) (Used in lieu of Beveled Shim Plates)

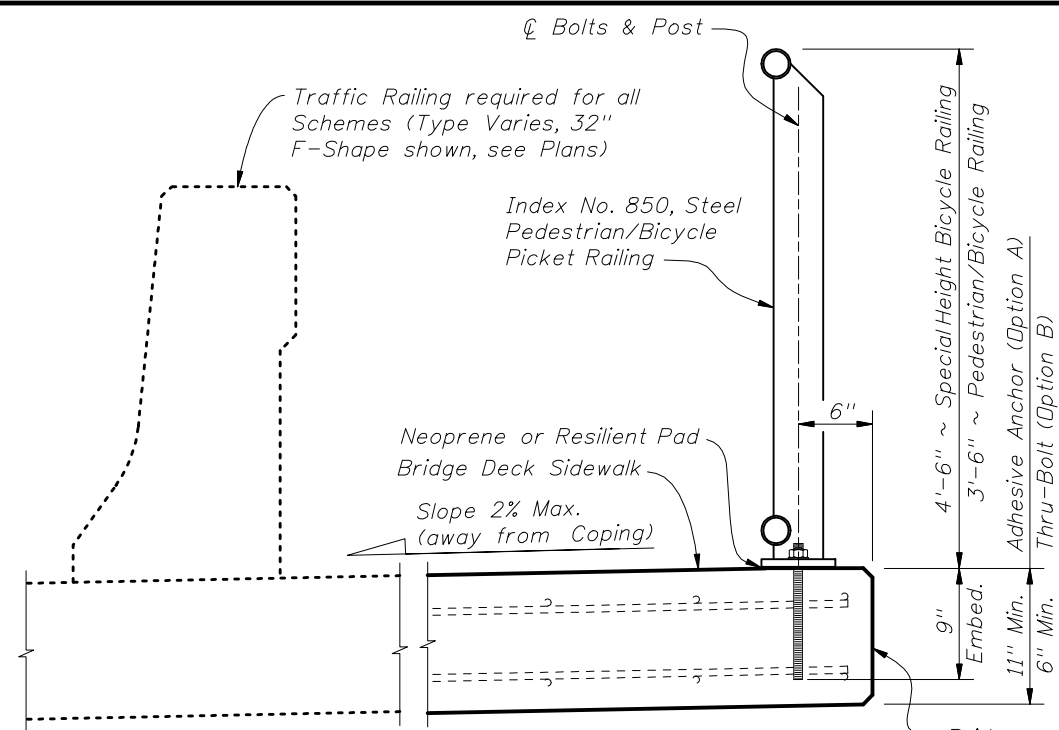


DETAIL "A" (Cast-In-Place Anchor Bolts shown, Adhesive Anchors similar)

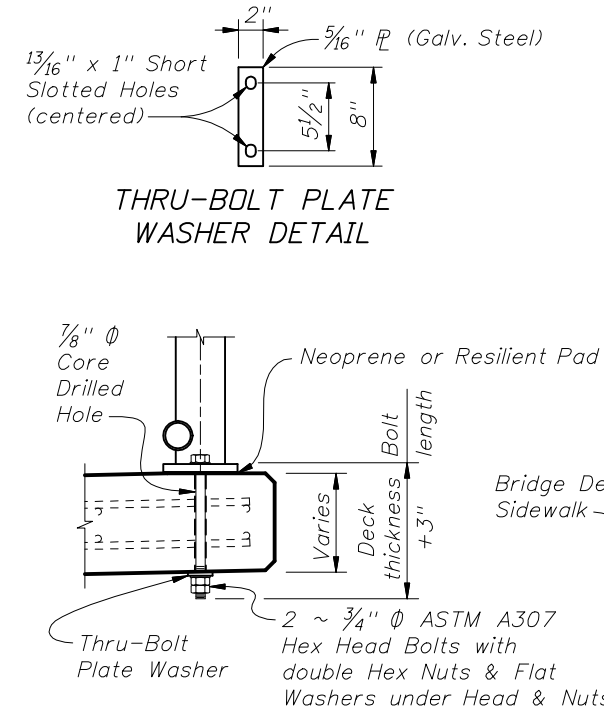
ANCHOR BOLT TABLE							
CASE	STRUCTURE TYPE	DIMENSIONS			ANCHOR LENGTH		ANCHOR SIZE
		"A" Edge Dist.	"B" Edge Dist.	"C" Embedment	C.I.P Hex Head Bolt	Adhesive Anchor	
I	Unreinforced Concrete	6"	1'-2"	9"	10 1/2"	11"	3/4" ϕ
IIa	Reinforced Concrete	4"	4"	9"	10 1/2"	11"	3/4" ϕ
IIb	Gravity Wall Index No. 520	4 1/2"	3 1/2" @ top	1'-0" *	1'-1 1/2"	1'-2"	3/4" ϕ
III	Step Cheekwall	4 1/2"	4 1/2"	9"	10 1/2"	11"	3/4" ϕ

\* Embedment length "C" may be reduced to 9" for the 3'-6" height railings for Case IIb, when the post spacing does not exceed 5'-0".

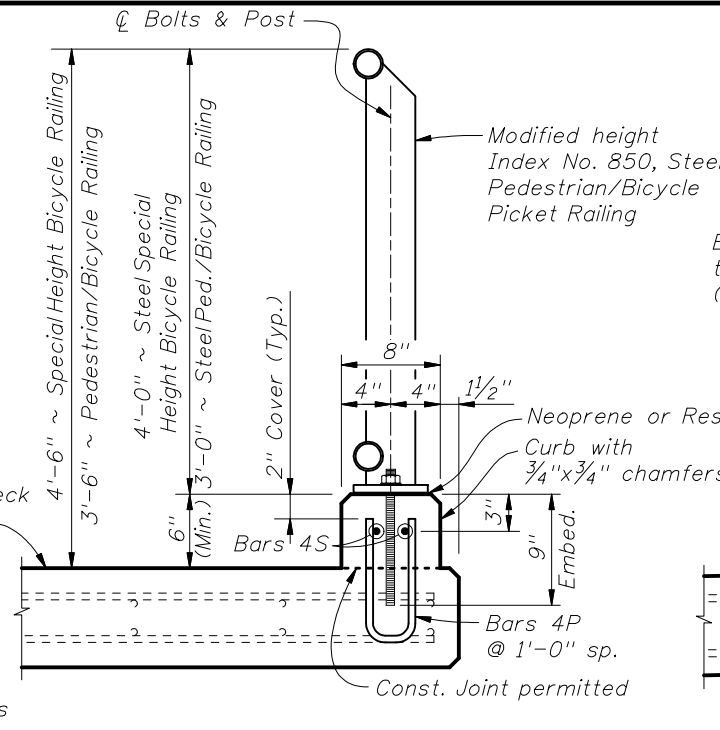




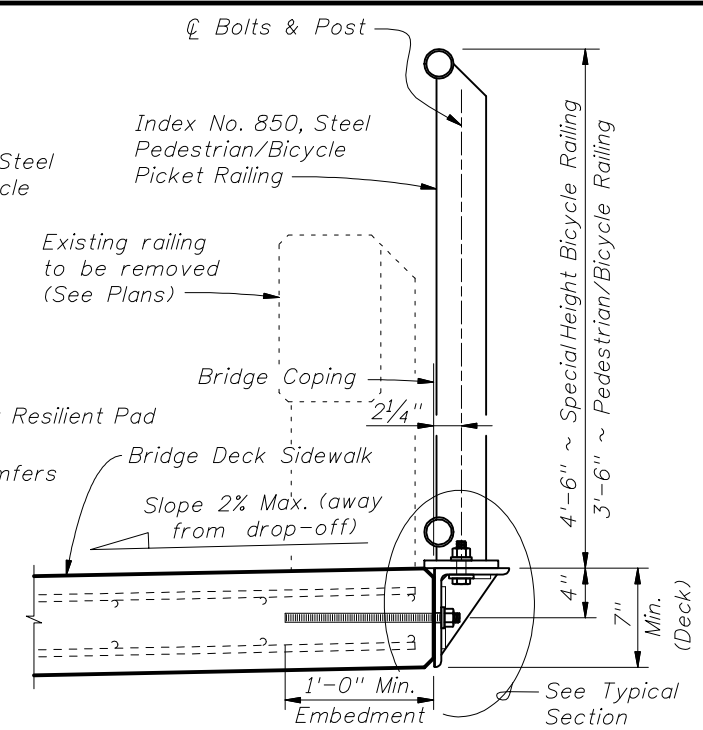
**SCHEME 1 -**  
TYPICAL SECTION THROUGH DECK MOUNTED RAILING  
(Adhesive Anchor Option shown - SCHEME 1A)



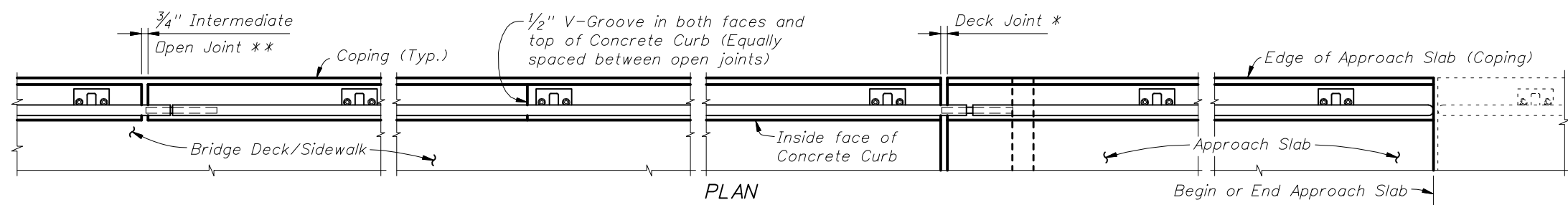
**SCHEME 1B - DETAILS**  
(Thru-Bolt Option)



**SCHEME 2 -**  
TYPICAL SECTION THROUGH CURB MOUNTED RAILING



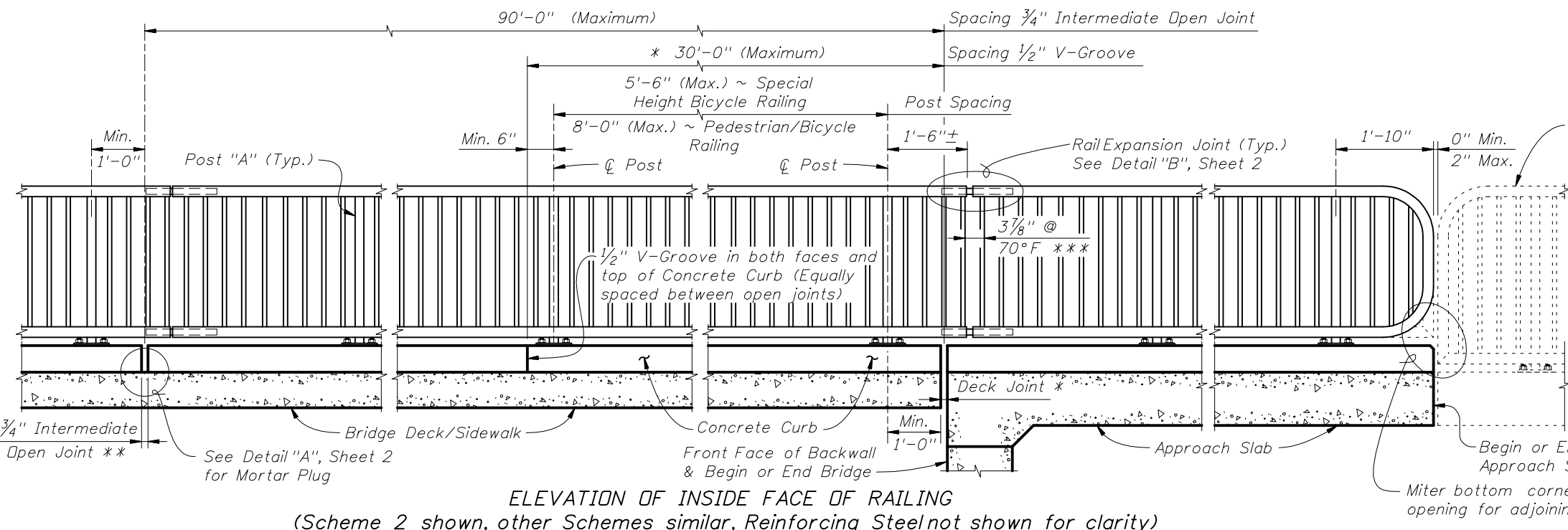
**SCHEME 3 -**  
TYPICAL SECTION THROUGH SIDE MOUNTED RAILING (RETROFIT)



**PLAN**  
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)

**INSTRUCTIONS TO DESIGNER:**

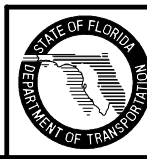
1. Provide railing layout ControlDrawings in the Plans to show post spacing, curb joint, V-groove, deck joint, expansion joint locations and Scheme number.
2. For existing bridge retrofits special end treatment details may be required for perpendicular or flared wingwalls at Begin and End Bridge. Provide existing railing removal details when required.



**ELEVATION OF INSIDE FACE OF RAILING**  
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)

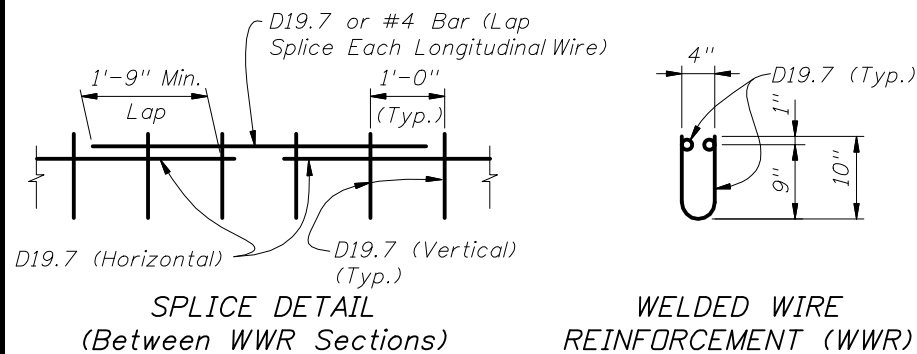
Index No. 850 Railing shown, see Contract Plans for actual railing continuation or termination

- \* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Curb Joints at Deck Expansion Joint locations shall match the dimension 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  $\phi$  Pier or Intermediate Bent similar.
- \*\*  $3/4$ " Intermediate Open Joints shall be provided at locations coinciding with  $3/4$ " Joints for the Traffic Railing.
- \*\*\* Clear opening between adjacent pickets at Rail Expansion Joints, above Deck Expansion Joints with a total thermal movement greater than 4", must be reduced to  $3/2$ ".



**ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS**

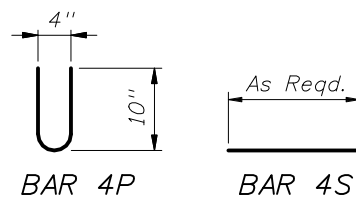
NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4 3/4" are not permitted.



**CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS**

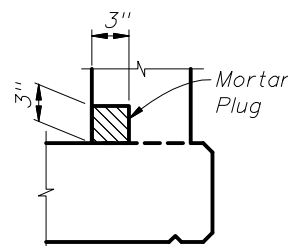
**BILL OF REINFORCING STEEL**

MARK	SIZE	LENGTH
P	4	2'-0"
S	4	As Req.



**CURB REINFORCING STEEL NOTES:**

1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
5. At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 4P and 4S. Welded Wire Reinforcement shall conform to ASTM A497.



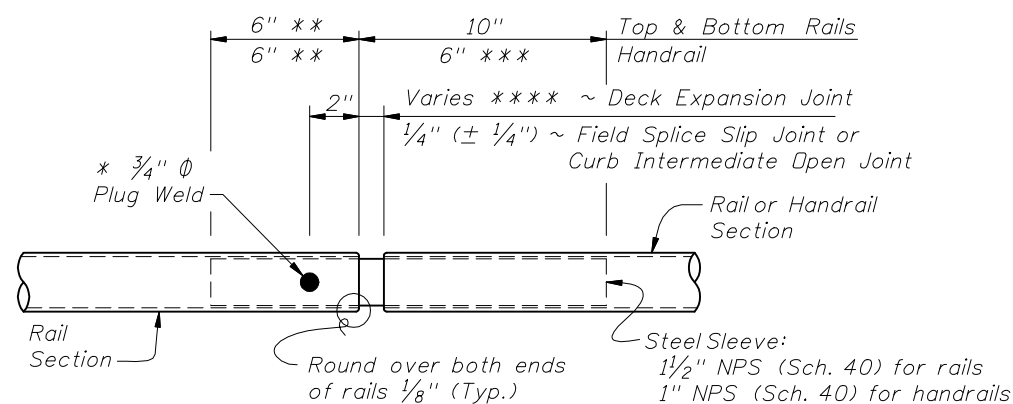
**DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT**

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.

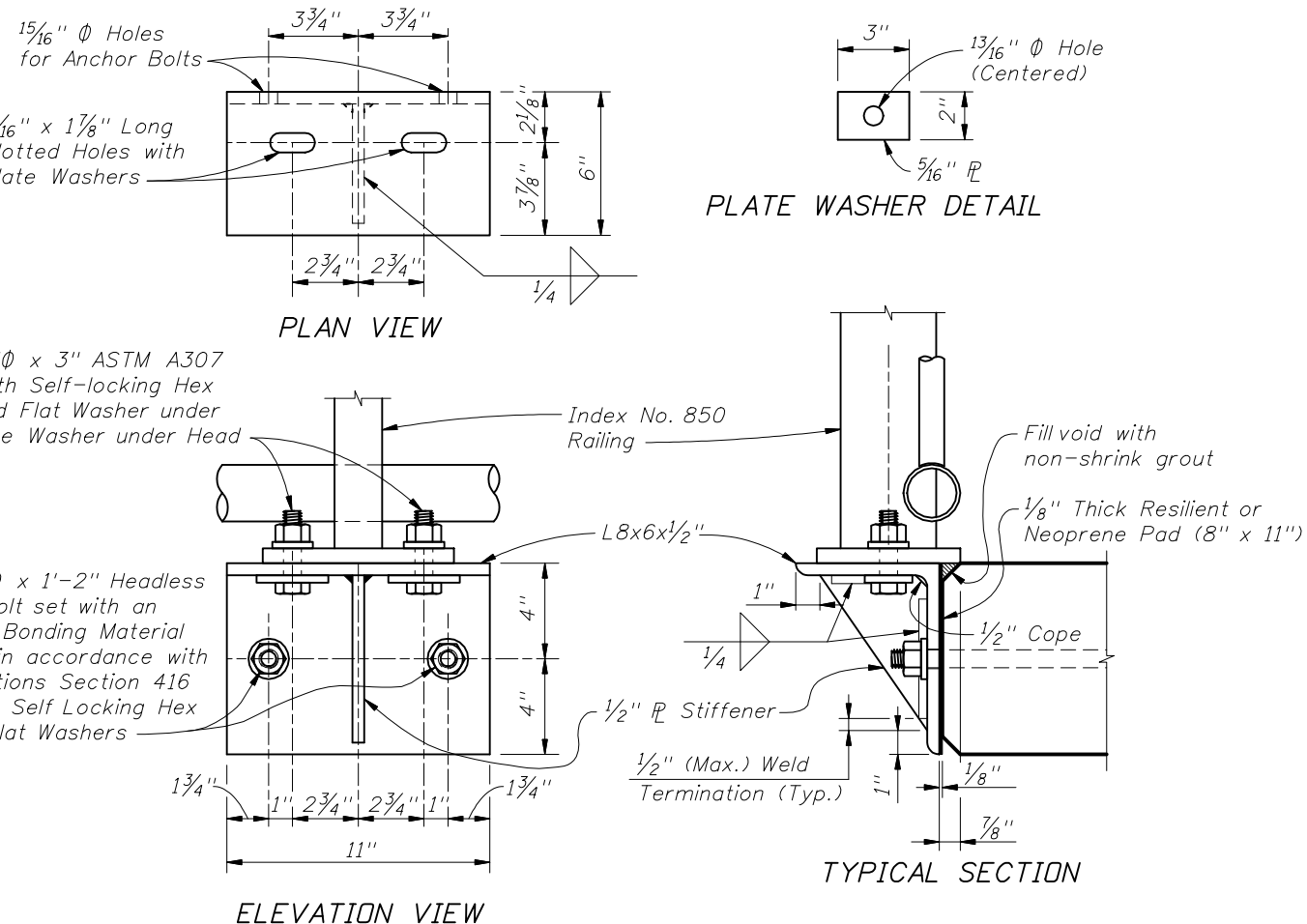
**ESTIMATED CONCRETE CURB QUANTITIES (SCHEME 2)**

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.0124
Reinforcing Steel	LB/LF	4.01

**SCHEME 2 - CONCRETE CURB DETAILS**



- \* At the Contractor's option 2 ~ 1/4" Ø x 3/4" Pan Head Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing along outside face of railing may be substituted for the 3/4" Ø plug weld. Set screws must be set flush against the outside face of rail.
- \*\* Embedded length may be 4" for plug welded connection. Maintain venting of ends of pickets during galvanizing.
- \*\*\* Increase handrail sleeve embedment to 8" for Expansion Joint openings greater than 2".
- \*\*\*\* Expansion Joint opening shall match the clear opening in the deck joint but not greater than 3".



**SCHEME 3 - SIDE MOUNTED SUPPORT BRACKET DETAILS**

**BRIDGE PICKET RAILING NOTES:**

**APPLICABILITY NOTE:** Bridge Picket Railing is limited to use on bridges with an expansion joint thermal movements not exceeding 5". Scheme 3 is limited to bridge retrofit applications where additional sidewalk width is required.

**RAILING DETAILS:** For Railing fabrication and installation details and notes see Index No. 850, except that railing shall be fabricated and installed normal to the Profile Grade longitudinally and vertical transversely.

**CONCRETE CURB (Scheme 2):** Construct concrete curb vertical with the top surface finished level transversely. Concrete class shall be the same as the bridge deck.

**SIDE MOUNTED SUPPORT BRACKET (Scheme 3):** L-Shape and Stiffener Plate shall be in accordance with ASTM A36. Welding shall be in accordance with the American Society of Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required. The bracket shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications.

**PAYMENT:** Railing shall be paid per linear foot (Item No. 515-2-abb) for the steel railing and include the cost of support brackets (Scheme 3). Concrete and reinforcing steel quantities for the concrete curb (Scheme 2), will be included in the bridge deck plan quantity pay items. Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the railing.



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**BRIDGE PEDESTRIAN/BICYCLE PICKET RAILING (STEEL)**

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NOTES

DESIGN SPECIFICATIONS:

American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Third Edition, 2004, including 75 year Design Life  
 Florida Department of Transportation (FDOT) "Structures Design Guidelines for Load and Resistance Factor Design", January 2006.  
 Florida Building Commission "Florida Building Code", 2004 Edition, except for Handrail diameter.  
 U.S. Access Board "ADA Accessibility Guidelines", July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.  
 National Fire Protection Association (NFPA) 101, "Life Safety Code", 2003 Edition.

DESIGN LIVE LOADS:

Post and Base Plate: Equivalent point load = 200 lb. load + (50 lb./ft. x Post Spacing (ft.)) applied transversely at top rail connection.

Top & Bottom Rails: 50 lb./ft. uniform load applied simultaneously vertically and transversely + 200 lb. concentrated point load applied at midspan in the directions for both maximum stress and deflection.

Handrails: Maximum of either 50 lb./ft. uniform load applied in any direction or 250 lb. concentrated load applied in any direction at any point along the top.

Pickets: Concentrated 200 lb. load applied transversely over an area of 1.0 square foot.

GEOMETRY:

Clear Opening between Pickets: Shall reject the passage of a 4" diameter sphere below 42" height, and a 8" diameter sphere above 42" height.

Clear Opening under Bottom Rail: Shall reject the passage of a 2" diameter sphere.

ADA Handrail Height: 34"

Standard Pedestrian/Bicycle Railing Height: 42" minimum.

Special Height Bicycle Railing Height: 54" minimum.

DEFLECTION:

Total combined deflection of the railing system including the resilient or neoprene pads, due to the top rail design live loads, shall not exceed 1/2" when measured at midspan of the top rail.

APPLICABILITY NOTE TO DESIGNER:

This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazard exceeds 2'-6" or when a drop-off hazard is less than 2'-6" and is required by design. See Index No. 861 for special requirements and modifications for use on bridges. Adequate foundation support shall be provided for anchorage and stability against overturning. For unusual site conditions a site specific railing is to be designed by the responsible engineer. The railing shown on these drawings requires a handrail for ramps steeper than a 5% grade to conform with the requirements of the Americans with Disabilities Act (ADA). Refer to FDOT Plans Preparation Manual (Volume I) Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

ALTERNATE DESIGN:

Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the design life, live loads, geometry and deflection requirements specified herein. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1 1/2" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

RAILS, PICKETS & POSTS:

Structural Tube, Pipe and Bar shall be in accordance with ASTM B221 or ASTM B429, Alloy 6061-T6. End Rail 90° bends and corner bends with maximum 4'-0" post spacing, may be Alloy 6063-T6. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Pickets shall be fabricated parallel to the posts. Corners and changes in tangential longitudinal alignment shall be made continuous with a 9" bend radius or terminate at adjoining sections with mitered end sections when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" x 4" Rectangular Tube	2.00" x 4.00"	0.250"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A
Pickets	3/4" NPS (Sch. 40)	1.050"	0.113"

BASE PLATES & POST CAPS:

Base Plates and Post Cap plates shall be in accordance with ASTM B209, Alloy 6061-T6.

SHIM PLATES:

Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than 1/4" and localized irregularities greater than 1/8". Field trim shim plates when necessary to match the contours of the foundation. Beveled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of 1/2", unless longer anchor bolts are provided for the exposed thread length.

COATINGS:

The aluminum railing shall be mill finish unless otherwise noted in the Contract Documents. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

ANCHOR BOLTS:

Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steel is permitted for drilled hole installation. Expansion Anchors are not permitted. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be 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 tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

RESILIENT AND NEOPRENE PADS:

Resilient and Neoprene pads shall be in accordance with Specification Section 932 except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 or 70.

JOINTS:

All fixed joints are to be welded all around and ground smooth. Expansion joints shall be spaced at a maximum 35'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate handling, but railing must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

WELDING:

All welding shall be in accordance with the American Welding Society Structural Welding Code (Aluminum) ANSI/AWS D1.2 (current edition). Filler metal shall be either ER5183, ER5356 or ER5556. Nondestructive testing of welds is not required. Filler metal for picket welds may be ER4043.

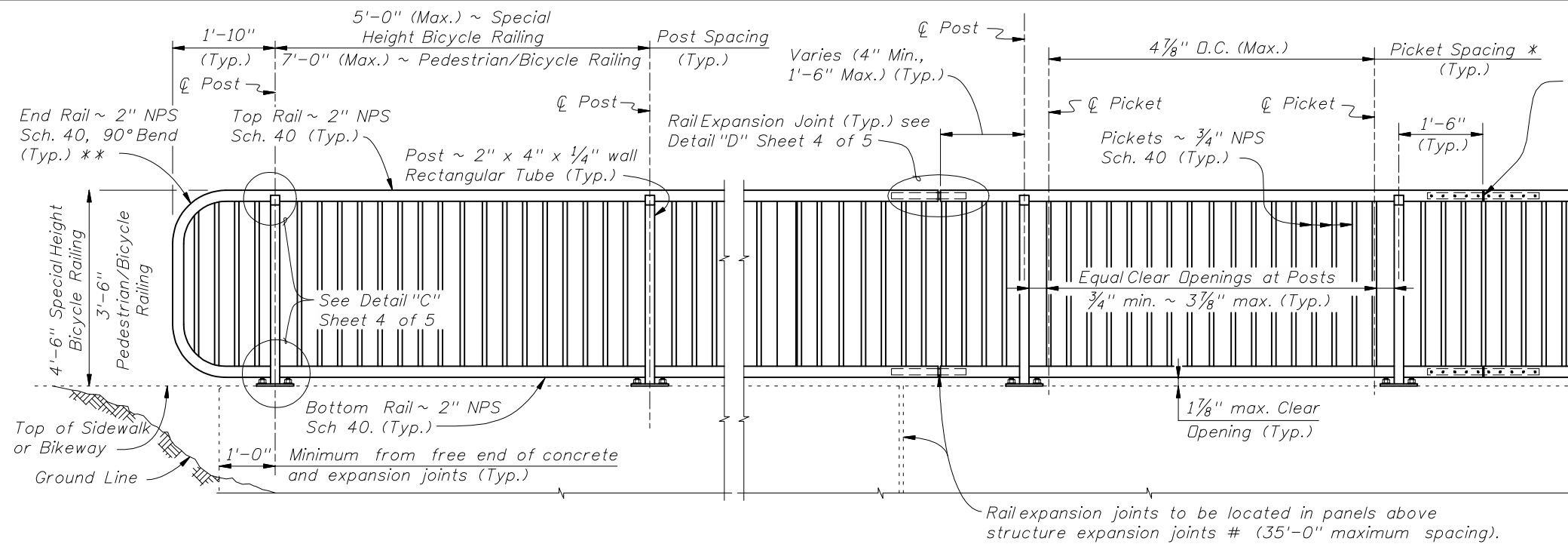
SHOP DRAWINGS:

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations, anchor bolt installation "Case" or lengths, must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

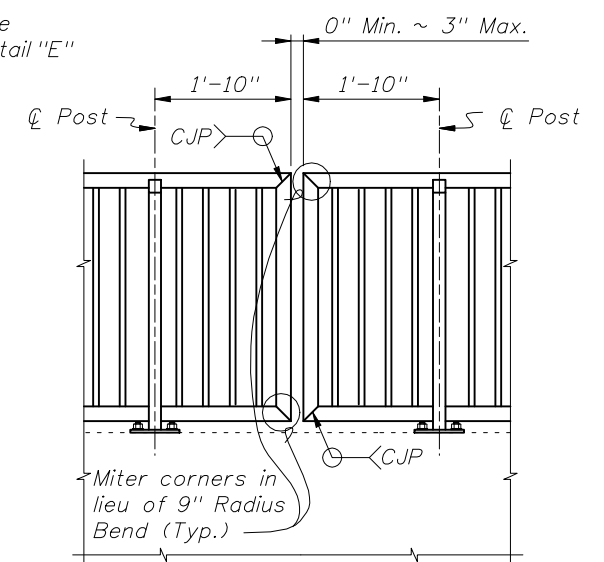
PAYMENT:

Railing shall be paid for per linear foot (Item No. 515-2-abb). Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the railing.





ELEVATION  
(Showing Outside Face of Railing)



EXPANDED ELEVATION AT CORNERS  
Note: Non-continuous corners are permitted when handrails are not required.

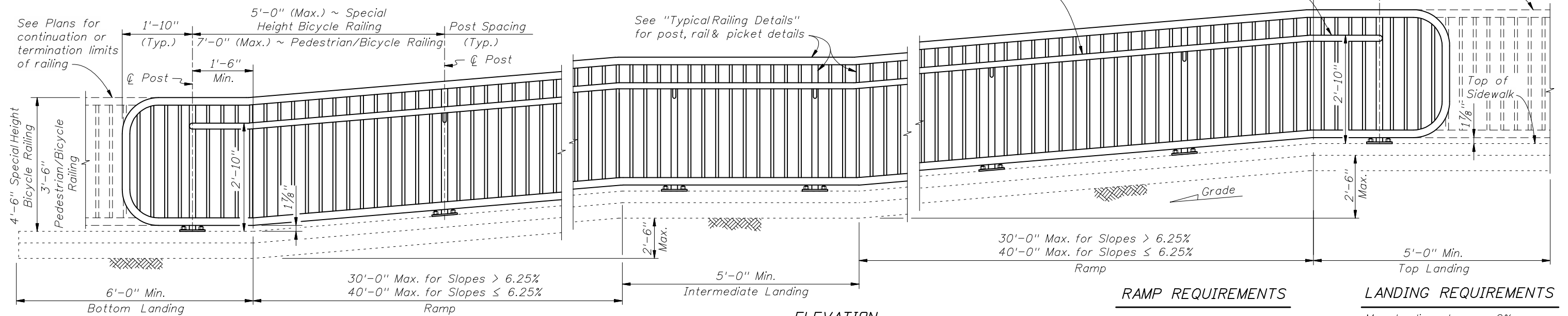
TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%

DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS

NOTES:  
 \* Picket Spacing of 4 7/8" centers is based on a 3/4" NPS. If an alternate design is used maintain a maximum clear opening of 3 7/8".  
 \*\* End Rail bend varies for Railings on grades steeper than 2.4%.  
 NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:  
 # Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.  
 CROSS REFERENCE:  
 For Details "C", "D" and "E", see Sheet 4 of 5.

Handrail required for ramps (Handrail continuous at landings between runs)  
 Handrail ~ 1 1/2" NPS Sch. 40



ELEVATION  
(Showing Inside Face of Railing)

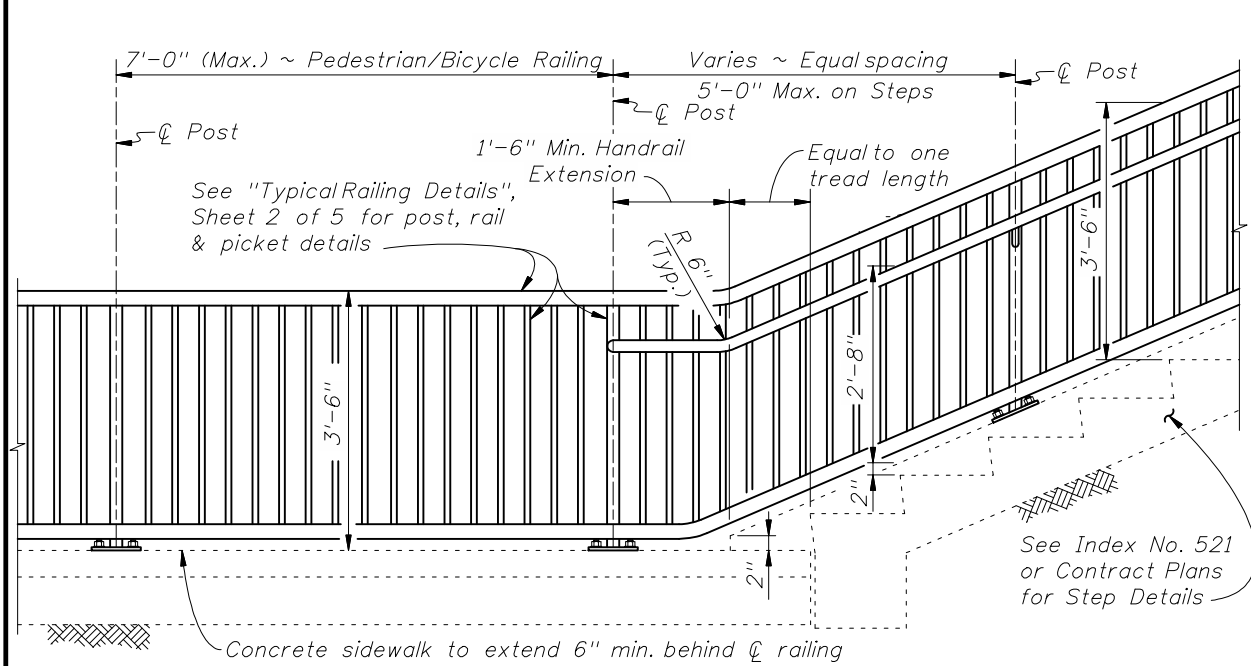
RAMP REQUIREMENTS  
 For slopes greater than 5%:  
 Max. ramp slope = 8.33%  
 Max. ramp cross-slope = 2.0%

LANDING REQUIREMENTS  
 Max. landing slope = 2%  
 Max. landing cross-slope = 2%

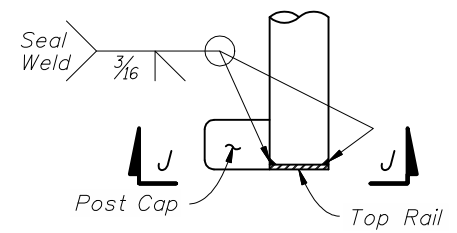
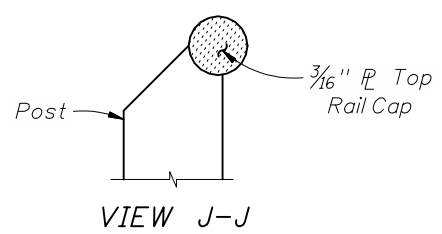
RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%



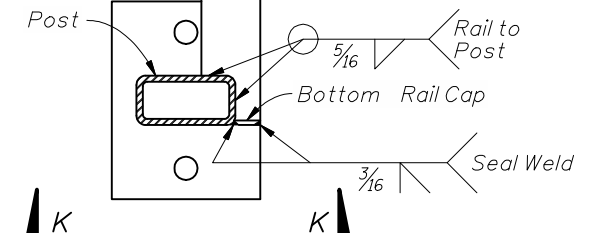
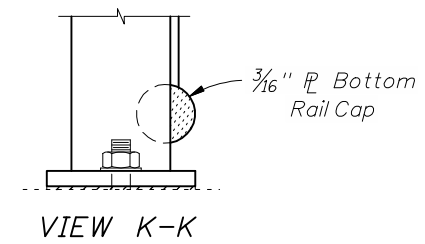




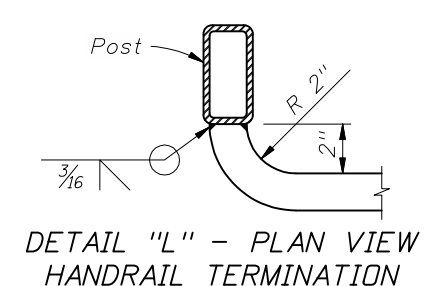
RAILING CONTINUATION BEYOND STEPS OR STAIRS  
(Bottom shown, Top similar)



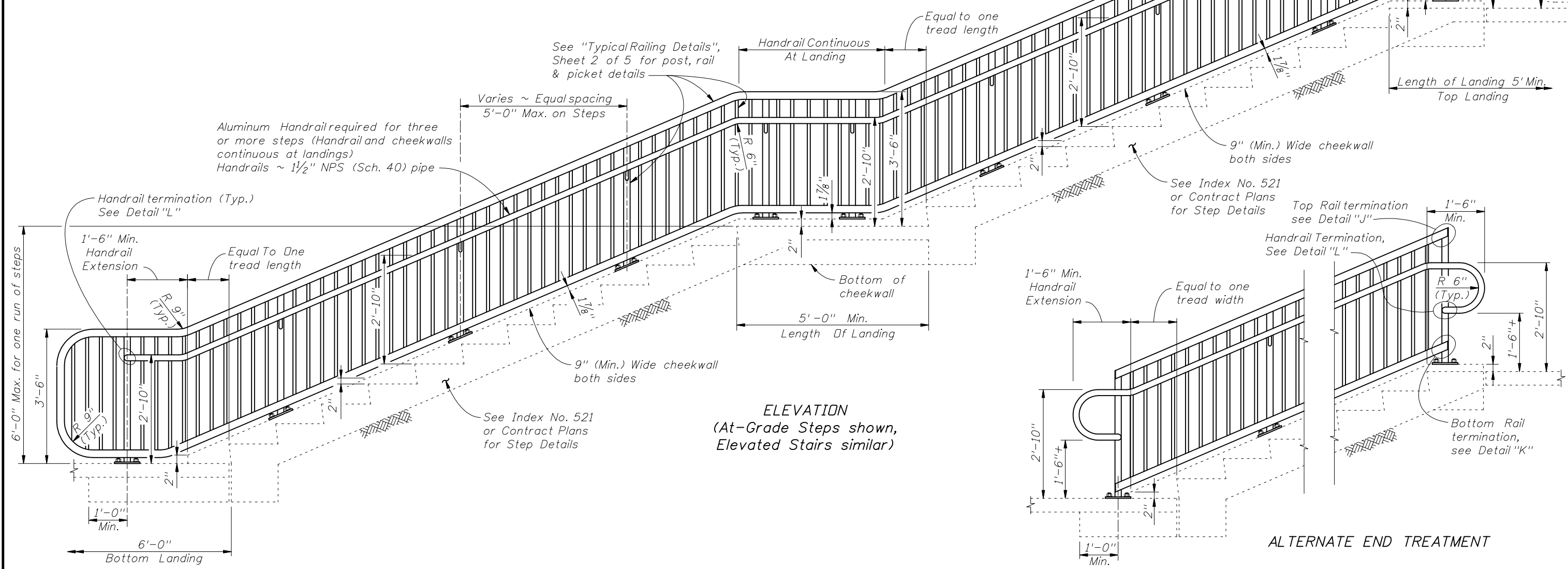
DETAIL "J" - PLAN VIEW  
TOP RAIL TERMINATION



DETAIL "K" - PLAN VIEW  
BOTTOM RAIL TERMINATION



ALTERNATE END TREATMENT DETAILS



ELEVATION  
(At-Grade Steps shown,  
Elevated Stairs similar)

ALTERNATE END TREATMENT

RAILINGS ON STEPS & STAIRS

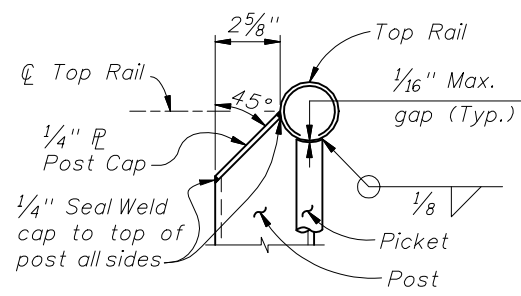


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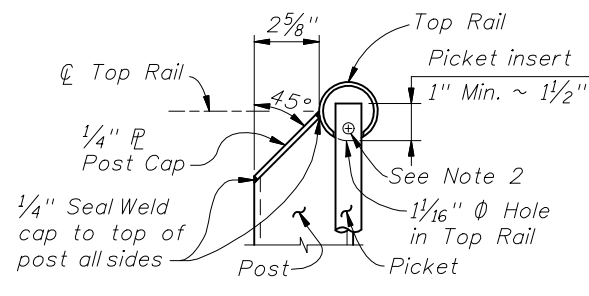
ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING

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Index No. <b>860</b>	

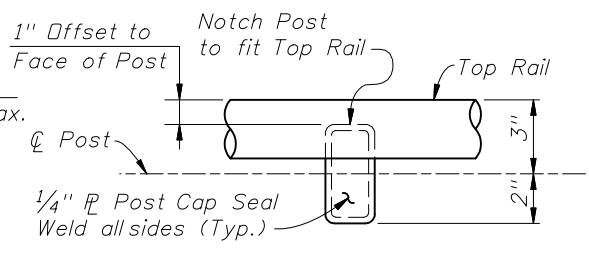




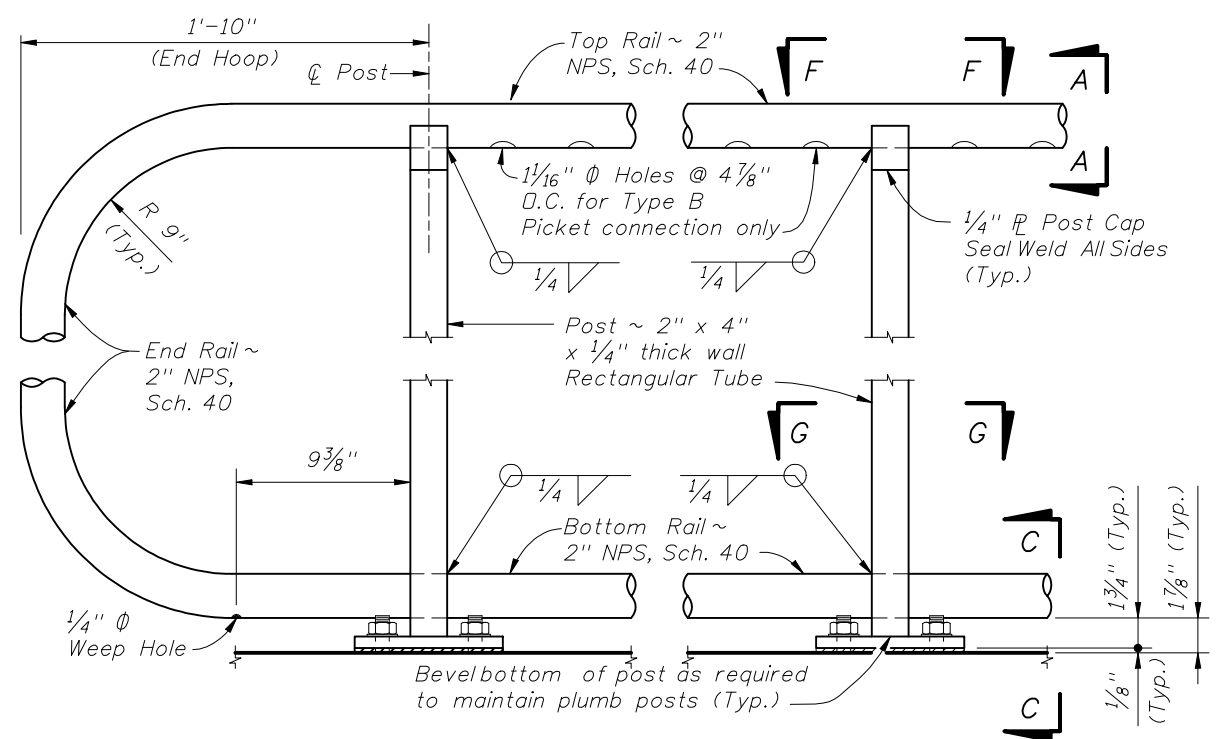
TYPE A (WELDED)



TYPE B (NONWELDED)

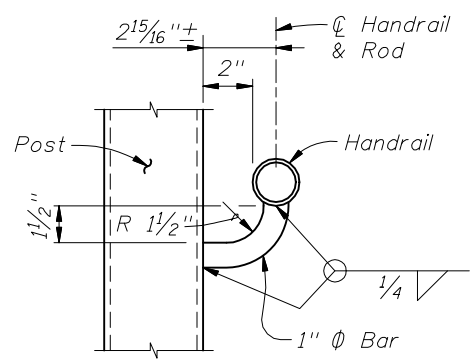


VIEW F-F  
TOP RAIL CONNECTION  
(Base Plate Not Shown for Clarity)

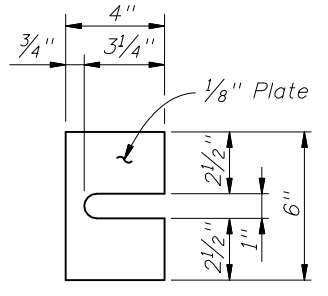


DETAIL "C" - RAIL CONNECTIONS  
(Showing Outside Face of Structure and Railing,  
Pickets and Handrail Not Shown for Clarity)

SECTION A-A  
(Top of Picket Connection)



SECTION B-B  
(Handrail Connection)



SHIM PLATE  
DETAIL

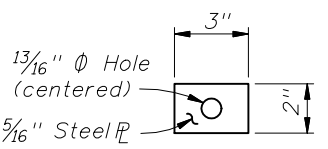
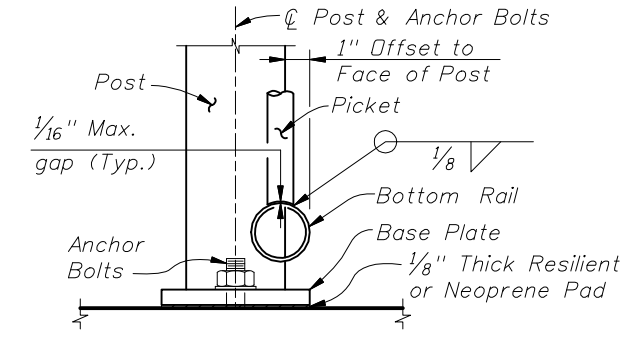
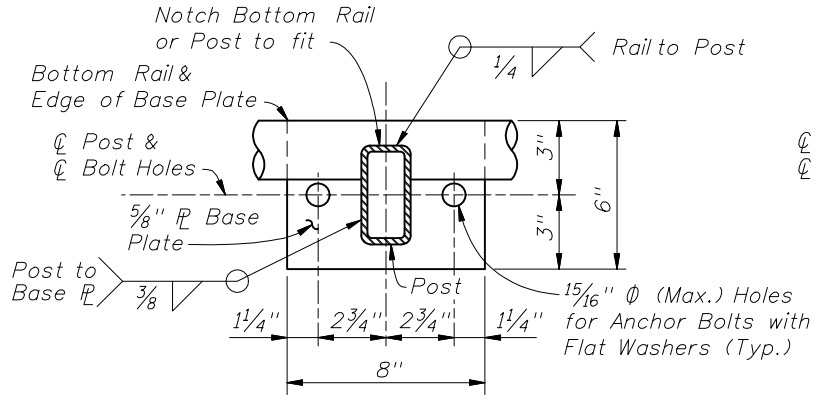


PLATE WASHER  
DETAIL

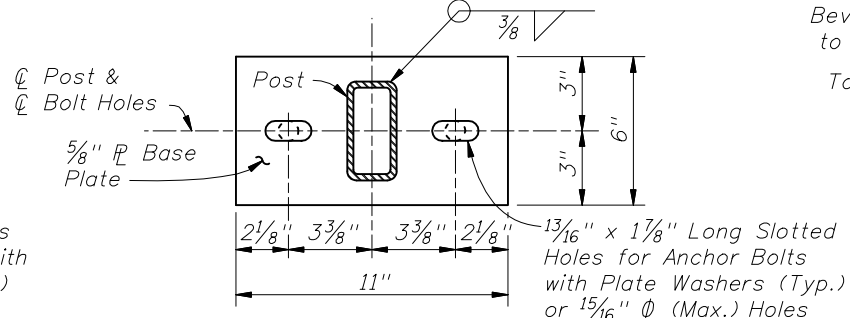
- Notes:
1. Type B connection is required for use with Index No. 861 on bridges, except End Hoops may use Type A connections. Optional for other installations and for connection to bottom rail.
  2. Provide #10 x 1/2 inch Pan Head Stainless Steel (316 or 18-8 Alloy) Screw in the last picket at each expansion or field splice joint to secure the end of the top rail.



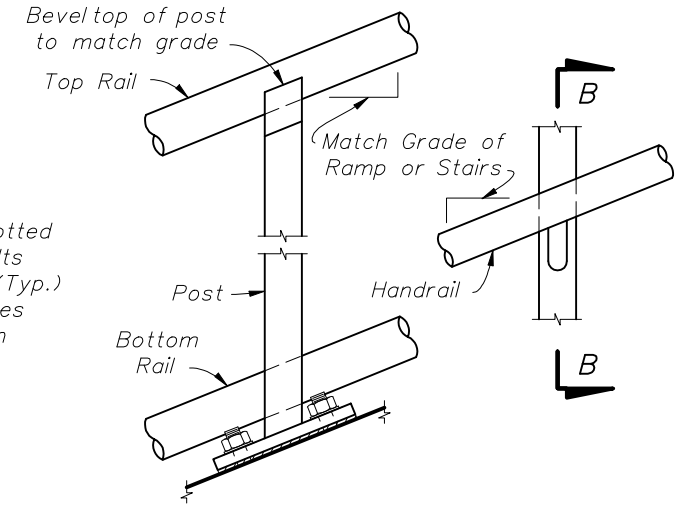
SECTION C-C  
(Bottom of Picket connection)



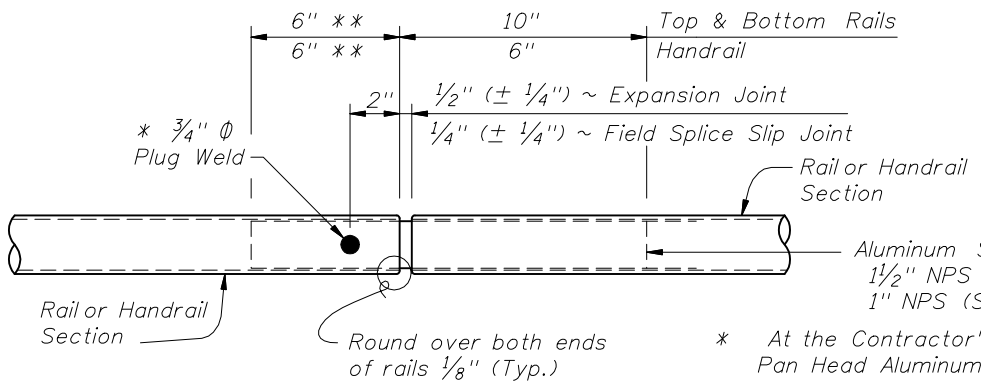
SECTION G-G  
BASE PLATE & BOTTOM RAIL CONNECTION



ALTERNATE  
BASE PLATE DETAIL  
(Recommended for Top of Step Cheekwalls)

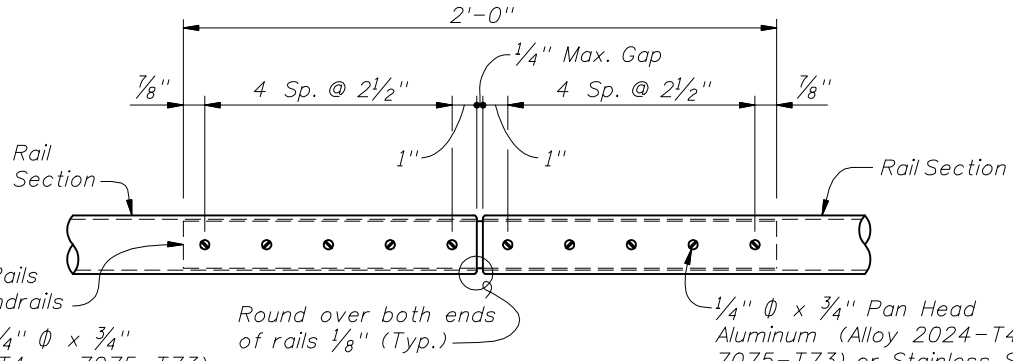


DETAIL "B" - RAIL AND HANDRAIL  
(Showing Sloped Condition for Stairs or Ramp)

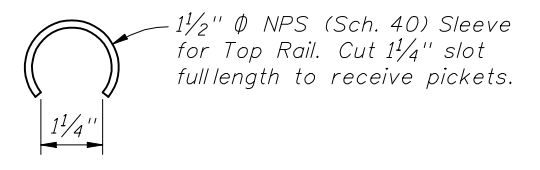


DETAIL "D" - EXPANSION JOINT  
(FIELD SPLICE SLIP JOINT SIMILAR)

- \* At the Contractor's option 2 ~ 1/4 inch diameter x 3/4 inch Pan Head Aluminum (Alloy 2024-T4 or 7075-T73) or Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2 inch spacing may be substituted for the 3/4 inch diameter plug weld. Set screws must be set flush against the outside face of rails and underside of handrails.
- \*\* Embedded length may be 4 inch for plug welded connection.

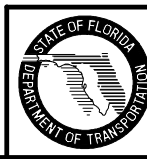


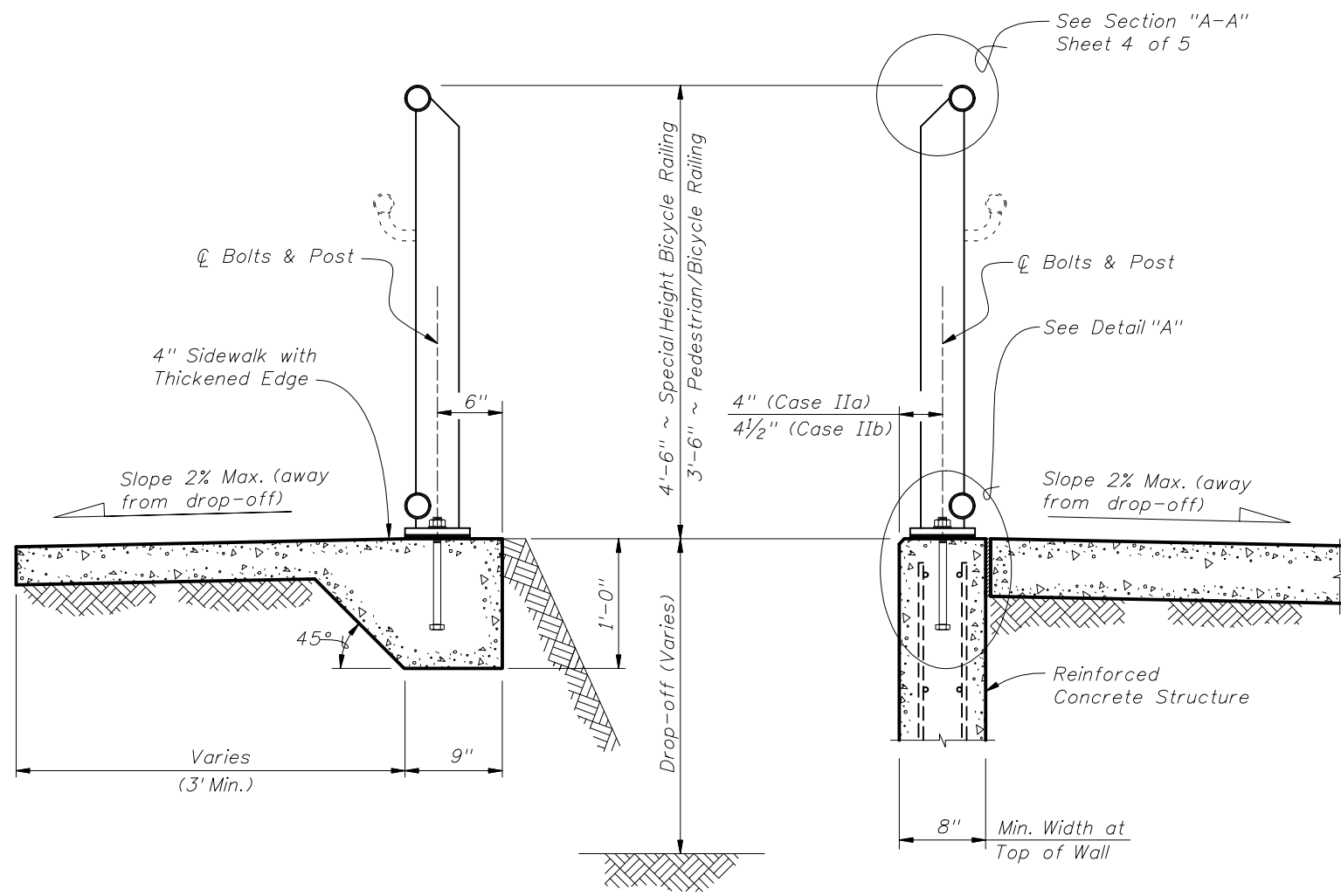
DETAIL "E" - CONTINUITY  
FIELD SPLICE



SLEEVE MODIFICATION FOR  
TOP RAIL TYPE B CONNECTION

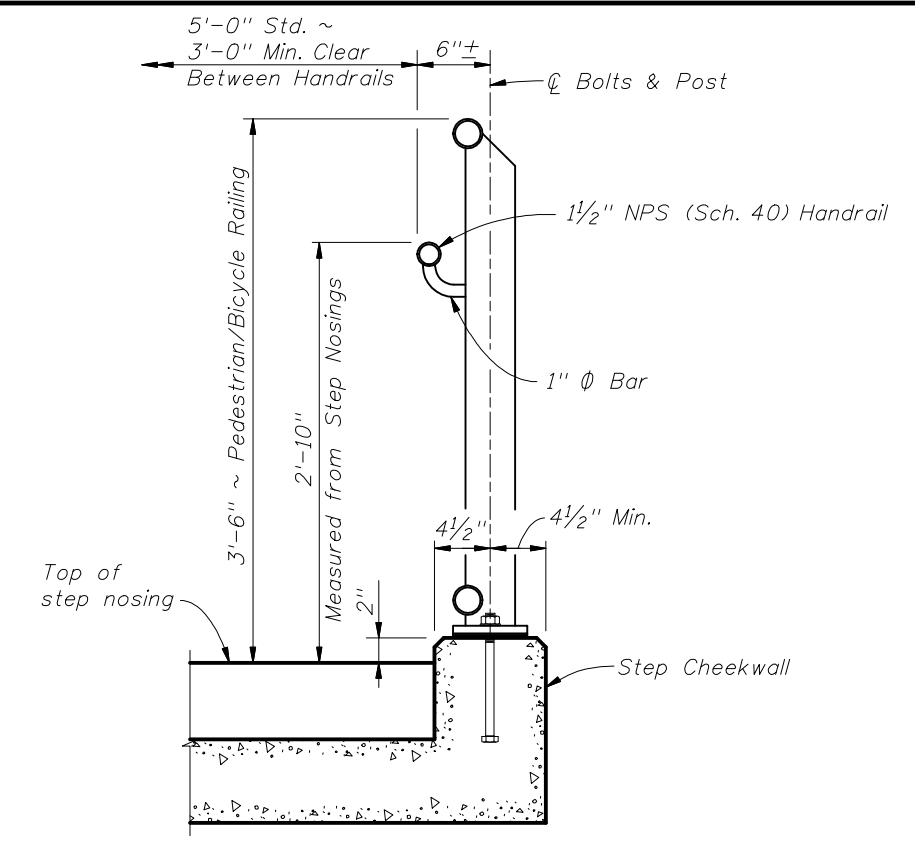
CROSS REFERENCE:  
For locations of Details "C", "D" and "E", see Sheet 2 of 5.



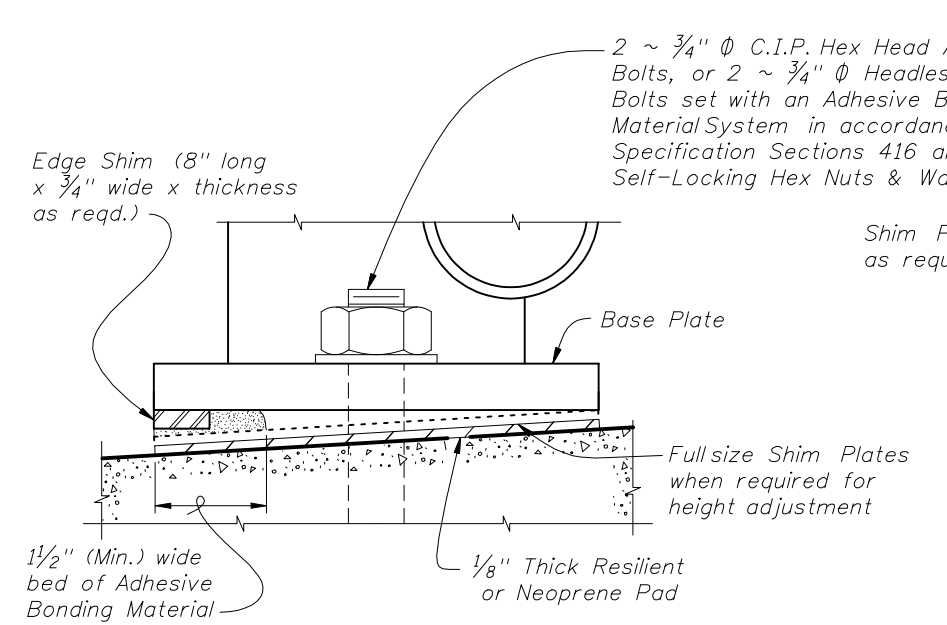


TYPICAL SECTION ON CONCRETE SIDEWALK (Case I)

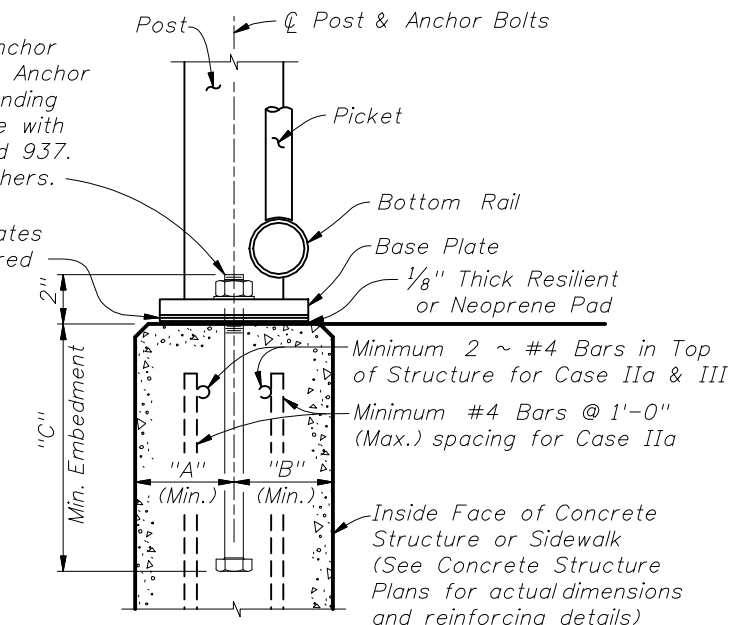
TYPICAL SECTION ON RETAINING WALL (Case II)



TYPICAL SECTION ON STEPS & STAIRS (Case III)



DETAIL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION) (Used in lieu of Beveled Shim Plates)

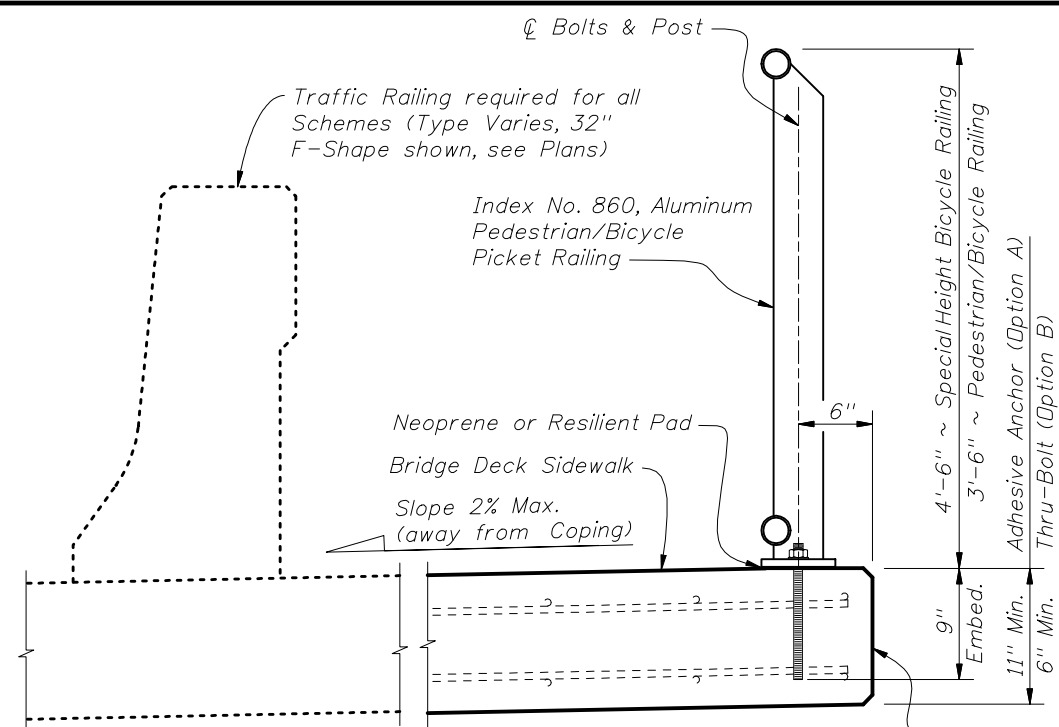


DETAIL "A" (Cast-In-Place Anchor Bolts shown, Adhesive Anchors similar)

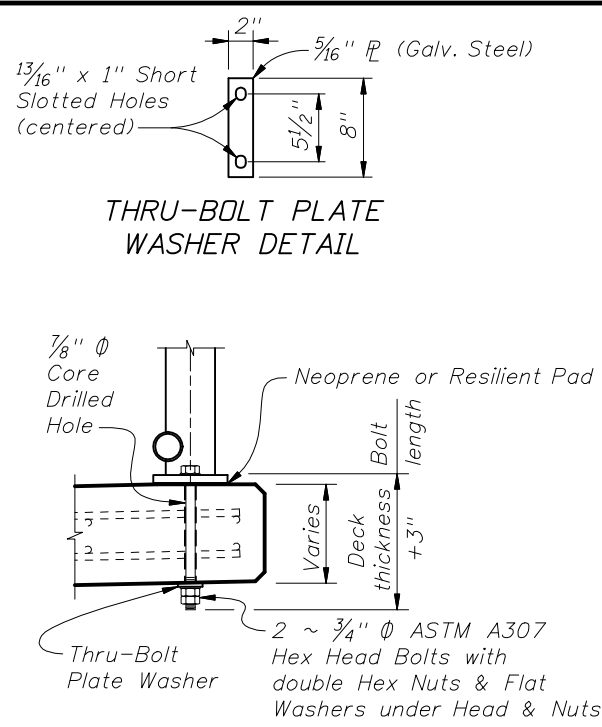
ANCHOR BOLT TABLE							
CASE	STRUCTURE TYPE	DIMENSIONS			ANCHOR LENGTH		ANCHOR SIZE
		"A" Edge Dist.	"B" Edge Dist.	"C" Embedment	C.I.P Hex Head Bolt	Adhesive Anchor	
I	Unreinforced Concrete	6"	1'-2"	9"	10 1/2"	11"	3/4" ϕ
IIa	Reinforced Concrete	4"	4"	9"	10 1/2"	11"	3/4" ϕ
IIb	Gravity Wall Index No. 520	4 1/2"	3 1/2" @ top	1'-0" *	1'-1 1/2"	1'-2"	3/4" ϕ
III	Step Cheekwall	4 1/2"	4 1/2"	9"	10 1/2"	11"	3/4" ϕ

\* Embedment length "C" may be reduced to 9" for the 3'-6" height railings for Case IIb, when the post spacing does not exceed 5'-0".

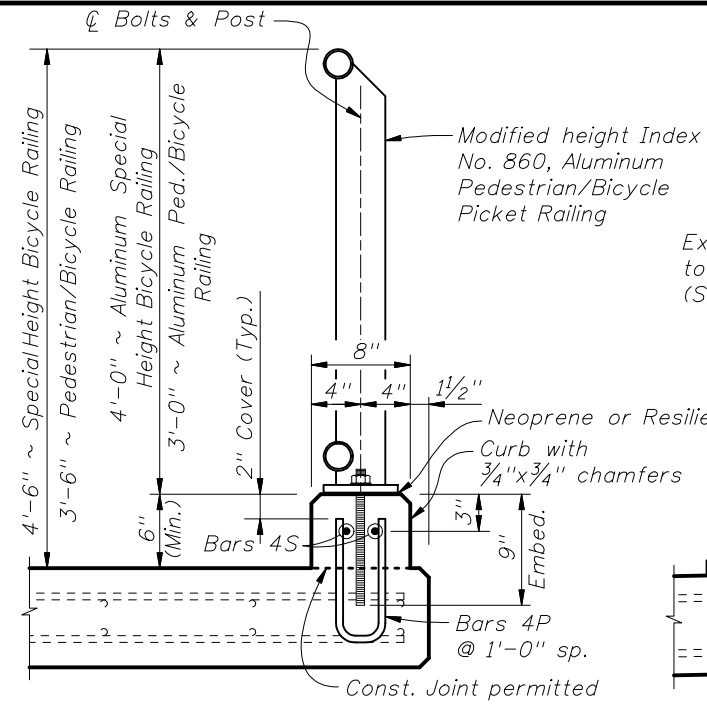




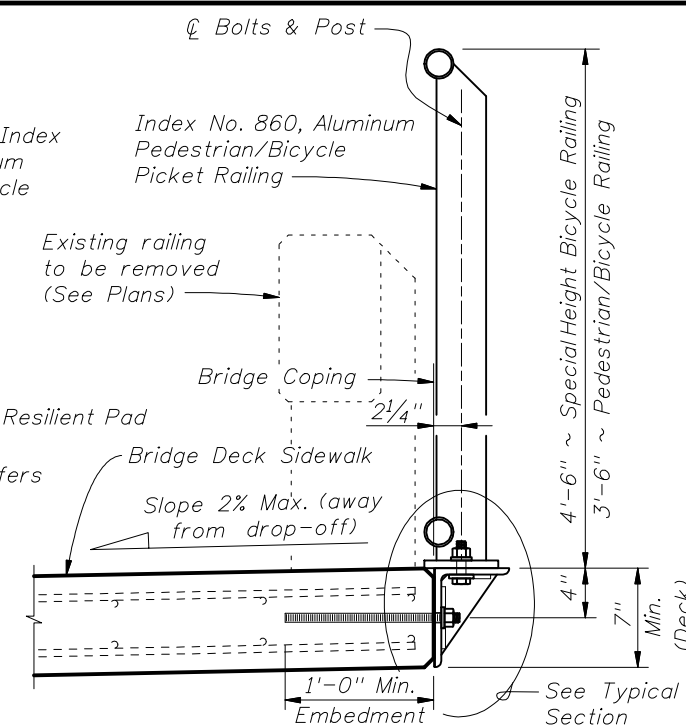
**SCHEME 1 -**  
TYPICAL SECTION THROUGH DECK MOUNTED RAILING  
(Adhesive Anchor Option shown - SCHEME 1A)



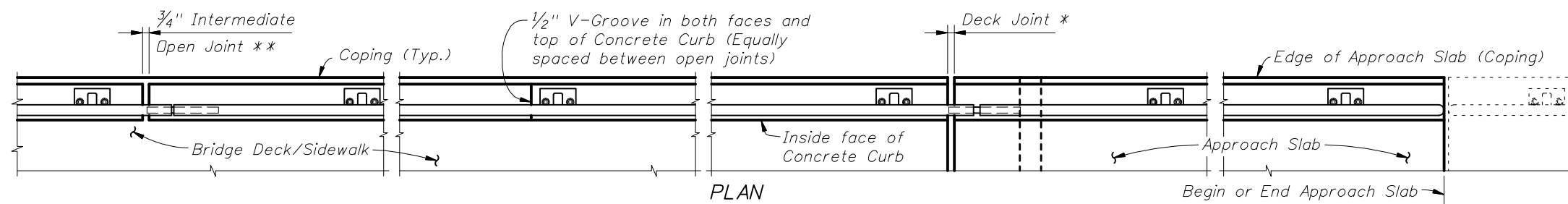
**SCHEME 1B - DETAILS**  
(Thru-Bolt Option)



**SCHEME 2 -**  
TYPICAL SECTION THROUGH CURB MOUNTED RAILING



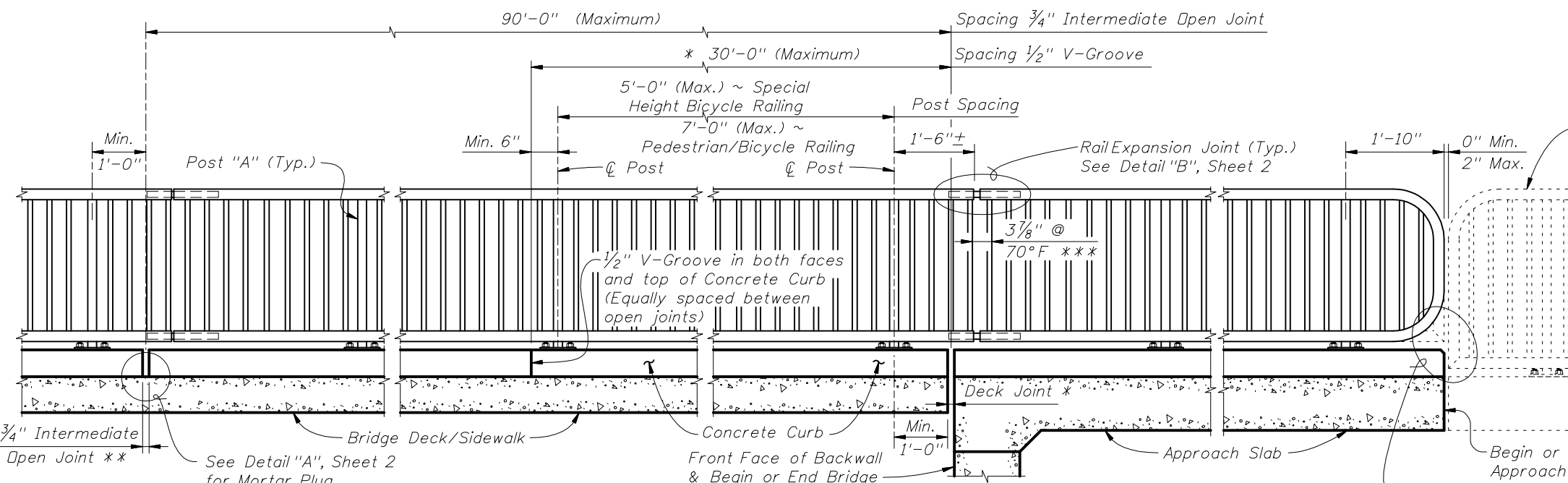
**SCHEME 3 -**  
TYPICAL SECTION THROUGH SIDE MOUNTED RAILING (RETROFIT)



**PLAN**  
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)

**INSTRUCTIONS TO DESIGNER:**

1. Provide railing layout ControlDrawings in the Plans to show post spacing, curb joint, V-groove, deck joint, expansion joint locations and Scheme number.
2. For existing bridge retrofits special end treatment details may be required for perpendicular or flared wingwalls at Begin and End Bridge. Provide existing railing removal details when required.



**ELEVATION OF INSIDE FACE OF RAILING**  
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)

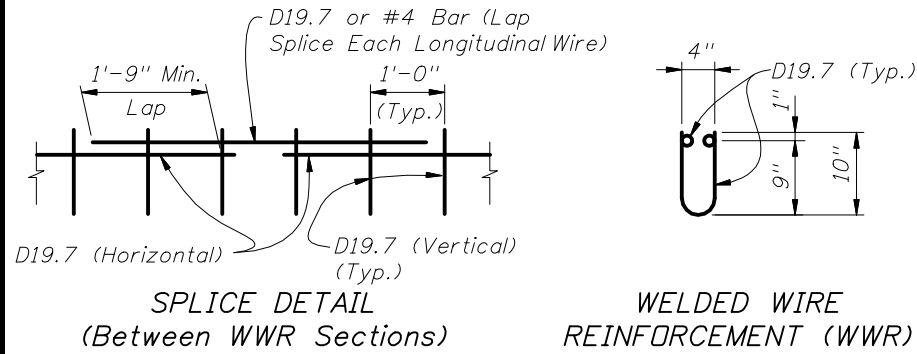
Index No. 860 Railing shown, see Contract Plans for actual railing continuation or termination

- \* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Curb Joints at Deck Expansion Joint locations shall match the dimension 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.
- \*\* 3/4" Intermediate Open Joints shall be provided at locations coinciding with 3/4" Joints for the Traffic Railing.
- \*\*\* Clear opening between adjacent pickets at Rail Expansion Joints, above Deck Expansion Joints with a total thermal movement greater than 4", must be reduced to 3 1/2".



**ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS**

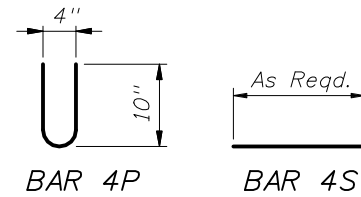
NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4 3/4" are not permitted.



**CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS**

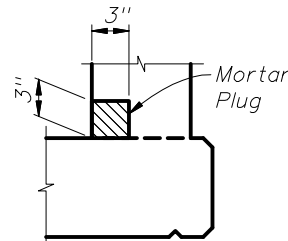
**BILL OF REINFORCING STEEL**

MARK	SIZE	LENGTH
P	4	2'-0"
S	4	As Reqd.



**CURB REINFORCING STEEL NOTES:**

- All bar dimensions in the bending diagrams are out to out.
- The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.
- All reinforcing steel at the open joints shall have a 2" minimum cover.
- Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
- At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 4P and 4S. Welded Wire Reinforcement shall conform to ASTM A497.



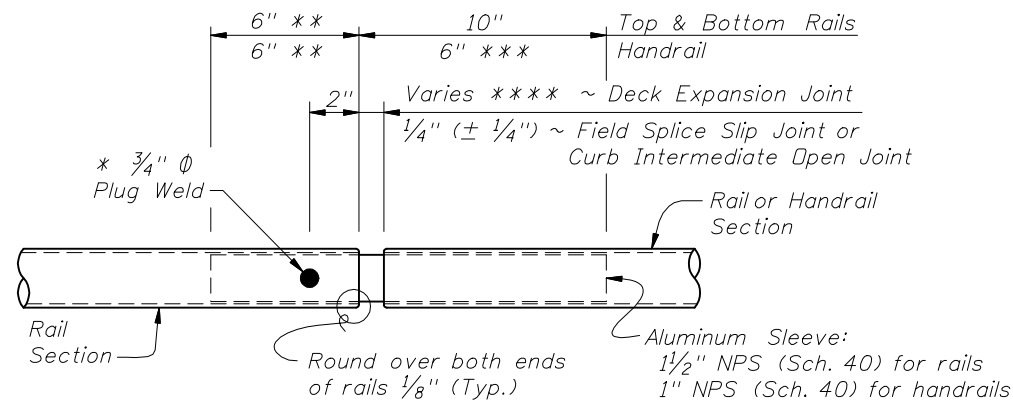
**DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT**

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.

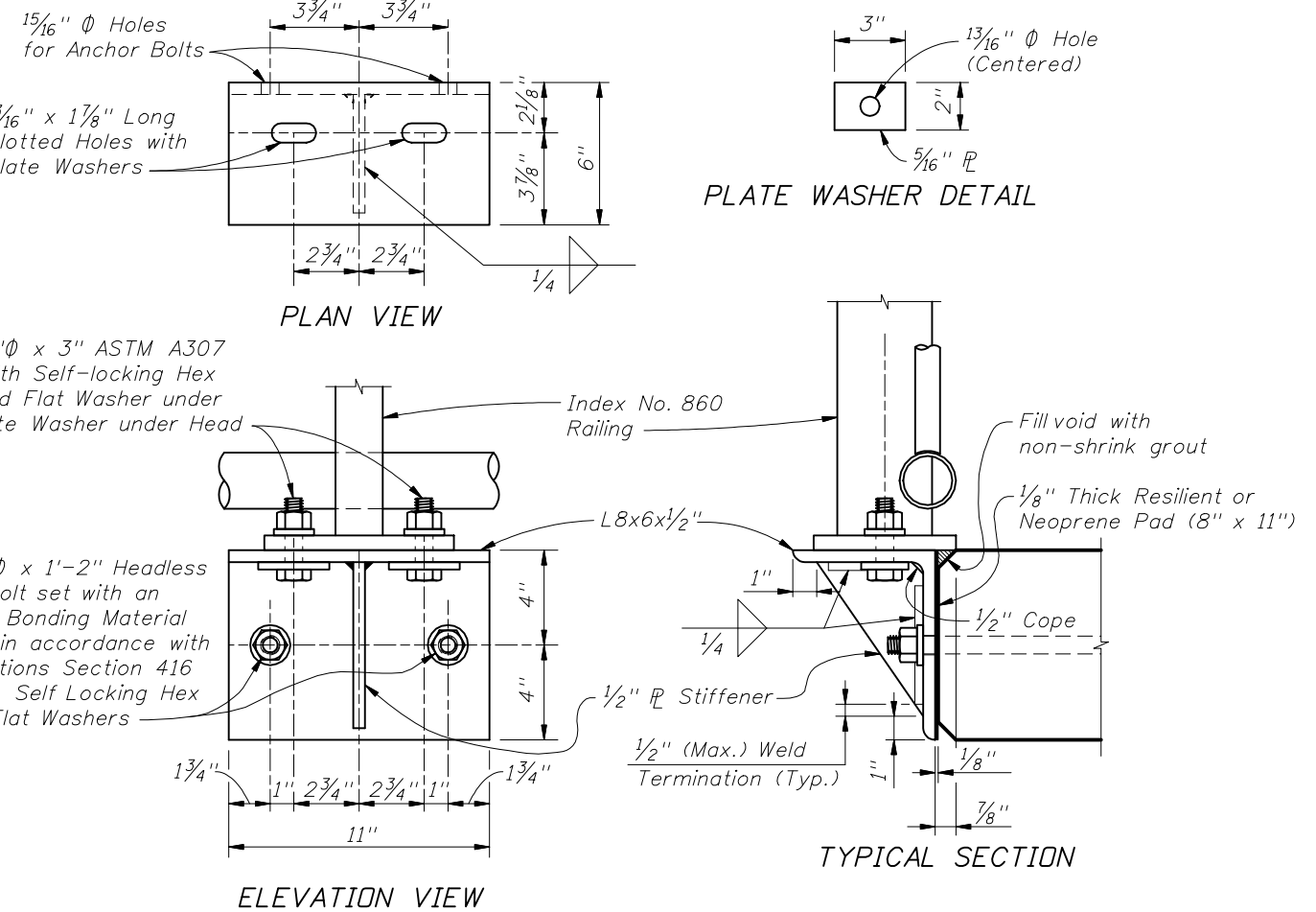
**ESTIMATED CONCRETE CURB QUANTITIES (SCHEME 2)**

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.0124
Reinforcing Steel	LB/LF	4.01

**SCHEME 2 - CONCRETE CURB DETAILS**



- \* At the Contractor's option 2 ~ 1/4" Ø x 3/4" Pan Head Aluminum (Alloy 2024-T4 or 7075-T73) or Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing along outside face of railing may be substituted for the 3/4" Ø plug weld. Set screws must be set flush against the outside face of rail.
- \*\* Embedded length may be 4" for plug welded connection.
- \*\*\* Increase handrail sleeve embedment to 8" for Expansion Joint openings greater than 2".
- \*\*\*\* Expansion Joint opening shall match the clear opening in the deck joint but not greater than 3".



2 ~ 3/4" Ø x 3" ASTM A307 Bolts with Self-locking Hex Nuts and Flat Washer under Nut, Plate Washer under Head

2 ~ 3/4" Ø x 1'-2" Headless Anchor Bolt set with an Adhesive Bonding Material System in accordance with Specifications Section 416 and 937. Self Locking Hex Nuts & Flat Washers

**SCHEME 3 - SIDE MOUNTED SUPPORT BRACKET DETAILS**

**BRIDGE PICKET RAILING NOTES:**

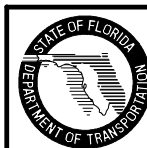
**APPLICABILITY NOTE:** Bridge Picket Railing is limited to use on bridges with an expansion joint thermal movements not exceeding 5". Scheme 3 is limited to bridge retrofit applications where additional sidewalk width is required.

**RAILING DETAILS:** For Railing fabrication and installation details and notes see Index No. 860, except that railing shall be fabricated and installed normal to the Profile Grade longitudinally and vertical transversely.

**CONCRETE CURB (Scheme 2):** Construct concrete curb vertical with the top surface finished level transversely. Concrete class shall be the same as the bridge deck.

**SIDE MOUNTED SUPPORT BRACKET (Scheme 3):** L-Shape and Stiffener Plate shall be in accordance with ASTM B209, Alloy 6061-T6. Welding shall be in accordance with the American Society of Structural Welding Code (Aluminum) ANSI/AWS D1.2 (current edition). Filler metal shall be either ER5183, ER5356 or ER5556. Nondestructive testing of welds is not required.

**PAYMENT:** Railing shall be paid per linear foot (Item No. 515-2-abb) for the aluminum railing and include the cost of support brackets (Scheme 3). Concrete and reinforcing steel quantities for the concrete curb (Scheme 2), will be included in the bridge deck plan quantity pay items. Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the railing.



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**BRIDGE PEDESTRIAN/BICYCLE PICKET RAILING (ALUMINUM)**

Last Revision: 07/01/08  
 Sheet No.: 2 of 2  
 Index No.: 861

**NOTES**

**DESIGN SPECIFICATIONS:**

U.S. Access Board "ADA Accessibility Guidelines", July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.

**DESIGN LIVE LOADS:**

This Guiderail was tested by the FDOT Structural Research Center and found to resist an equivalent Service Loading of 50 lbs./ft. acting simultaneously in the transverse and vertical direction when applied at the height of the Top Rail.

**APPLICABILITY NOTE TO DESIGNER:**

This Index is not approved for use on bridges. This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazards do not exceed 2'-6", Pedestrian/Bicycle Railings for customary applications are provided in Index No's. 850 or 860. Also applicable for select uses on sidewalks within service areas and similar locations or maintenance areas where the drop off exceeds 2'-6". Adequate foundation support shall be provided for anchorage and stability against overturning. For unusual site conditions a site specific railing is to be designed by the responsible engineer. Refer to FDOT Plans Preparation Manual (Volume I) Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

**ALTERNATE DESIGN:**

Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the live load and geometric requirements specified herein, provides a minimum 50 year design life and that deflections due to the Design Live Loads do not exceed 1 1/2" at midspan of the top rail. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1 1/2" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

**PIPE RAILING & POSTS:**

Structural Tube, Pipe and Bar shall be in accordance with ASTM B221 or ASTM B429, Alloy 6061-T6. End Rail 90° bends and corner bends with maximum 4'-0" post spacing, may be Alloy 6063-T6. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Corners and changes in tangential longitudinal alignment, may be made continuous with a 9" bend radius or terminated at adjoining sections with a standard end hoop when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" NPS (Sch. 40)	2.375"	0.154"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrails Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A

**BASE PLATES:**

Base Plates shall be in accordance with ASTM B209, Alloy 6061-T6.

**SHIM PLATES:**

Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than 1/4" and localized irregularities greater than 1/8". Field trim shim plates when necessary to match the contours of the foundation. Bevelled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of 1/2", unless longer anchor bolts are provided for the exposed thread length.

**COATINGS:**

The aluminum railing shall be mill finish unless otherwise noted in the Contract Documents. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

**ANCHOR BOLTS:**

Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steel is permitted for drilled hole installation. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be 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 tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

**RESILIENT AND NEOPRENE PADS:**

Resilient and Neoprene pads shall be in accordance with Specification Section 932, except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 or 70.

**JOINTS:**

All fixed joints are to be welded all around and ground smooth. Expansion Joints shall be spaced at a maximum of 30'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate shipping and handling, but rails must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

**WELDING:**

All welding shall be in accordance with the American Welding Society Structural Welding Code (Aluminum) ANSI/AWS D1.2 (current edition). Filler metal shall be either ER5183, ER5356 or ER5556. Nondestructive testing of welds is not required.

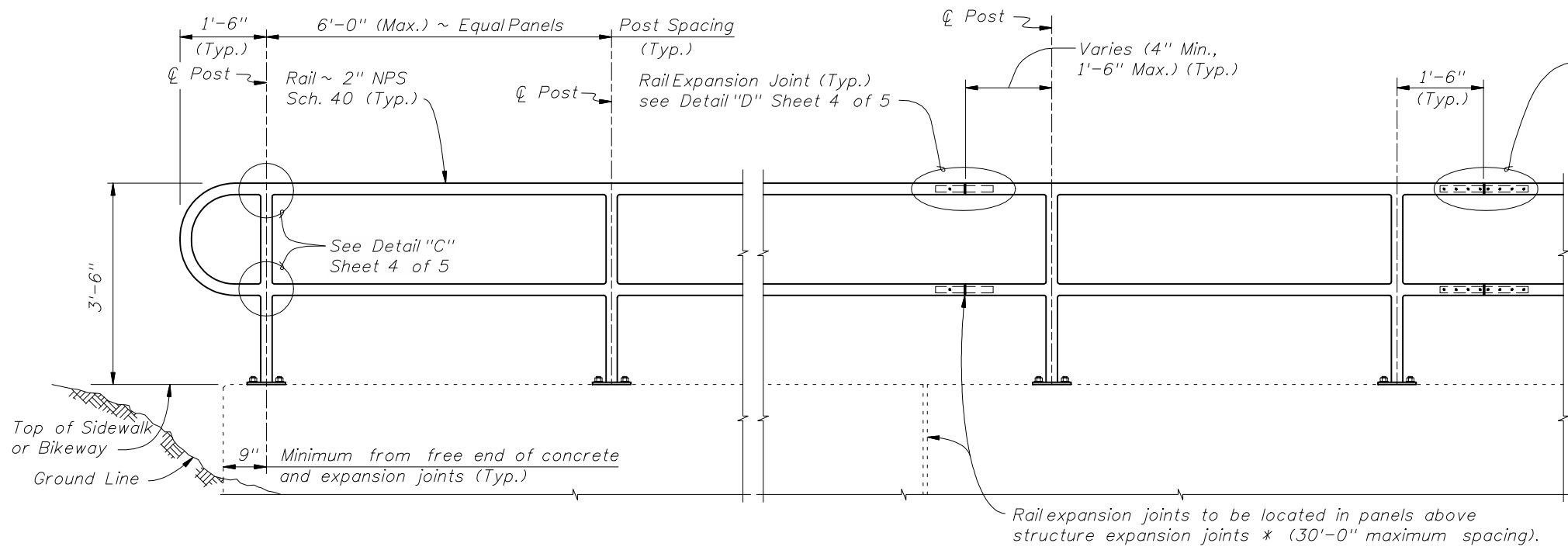
**SHOP DRAWINGS:**

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

**PAYMENT:**

Guiderail shall be paid for under the contract unit price for Pipe Guiderail (Aluminum), LF (Item No. 515-1-2). Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the Guiderail.





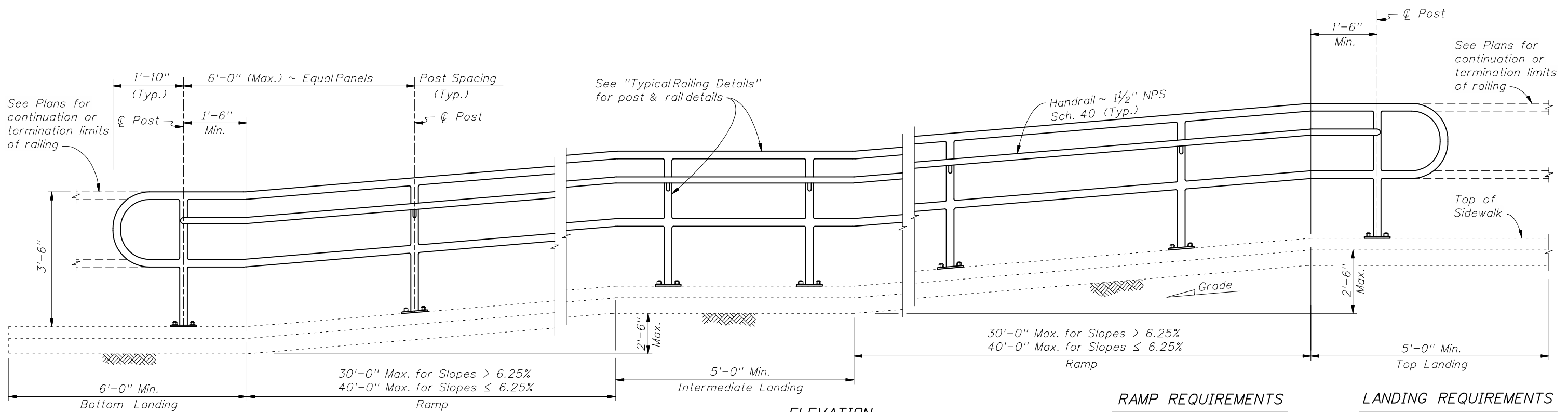
NOTES:  
NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:  
\* Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

CROSS REFERENCE:  
For Details "C", "D" and "E", see Sheet 4 of 5.

ELEVATION

TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%



ELEVATION  
(Showing Inside Face of Railing)

**RAMP REQUIREMENTS**  
For slopes greater than 5%:  
Max. ramp slope = 8.33%  
Max. ramp cross-slope = 2.0%

**LANDING REQUIREMENTS**  
Max. landing slope = 2%  
Max. landing cross-slope = 2%

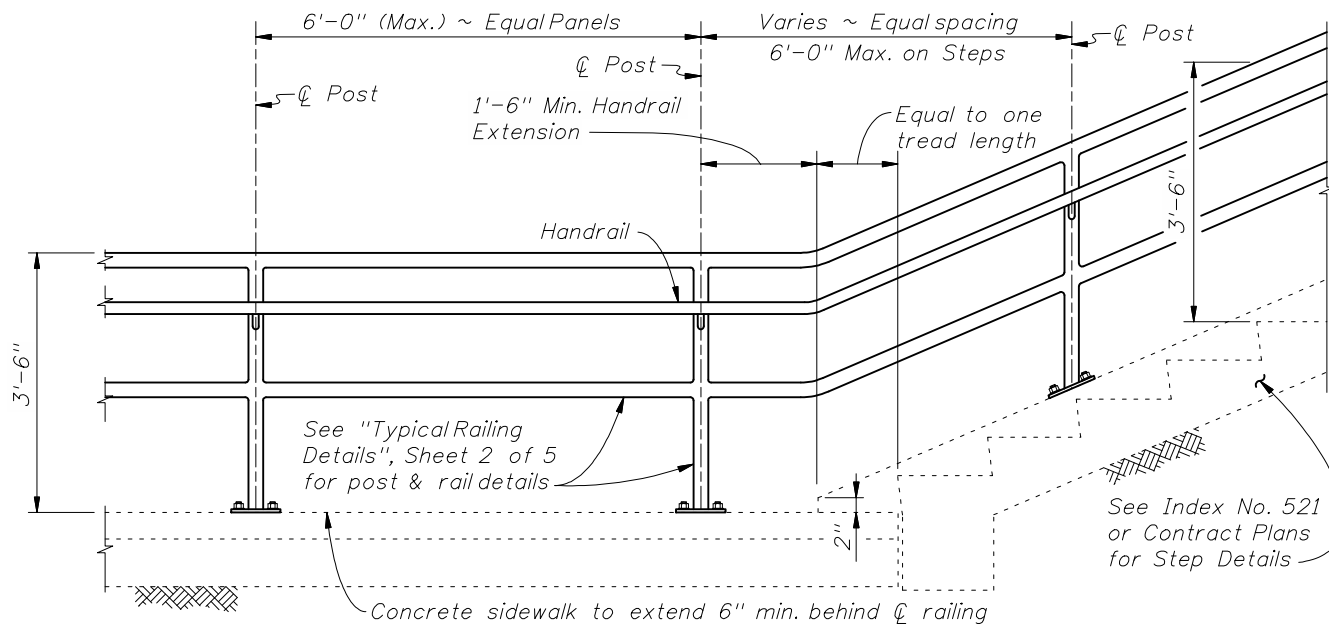
RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%



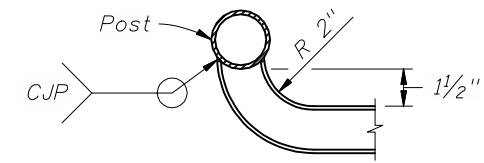
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ALUMINUM PIPE GUIDERAIL

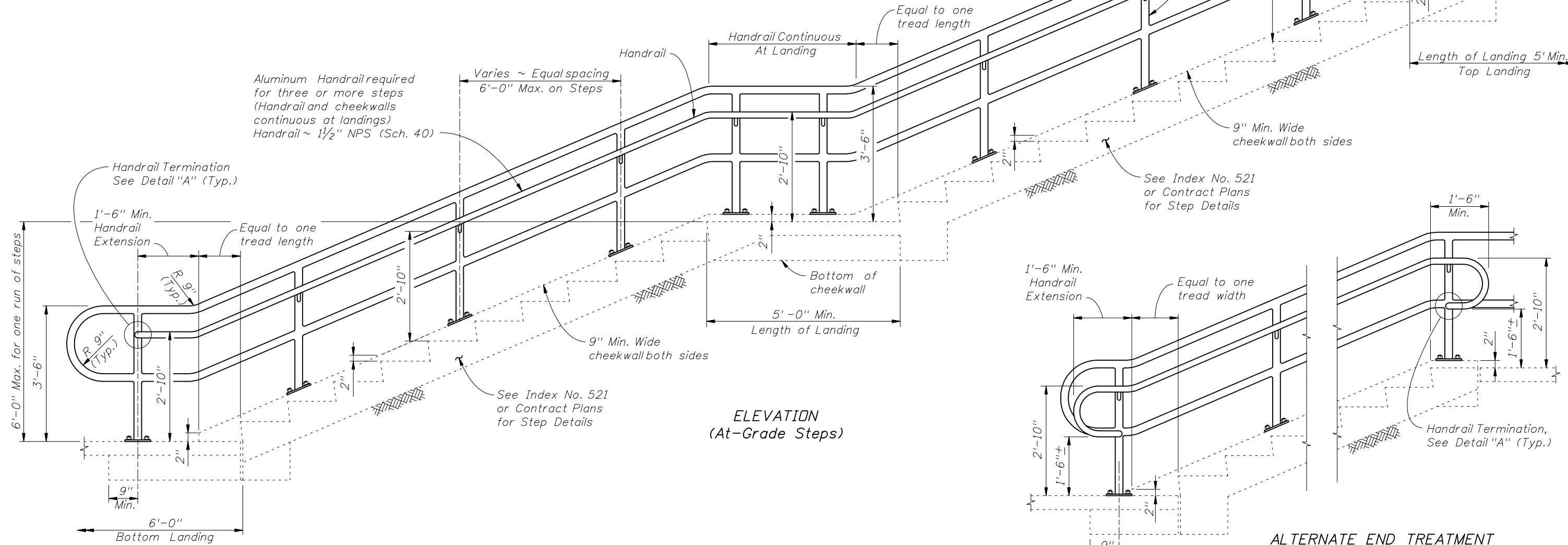
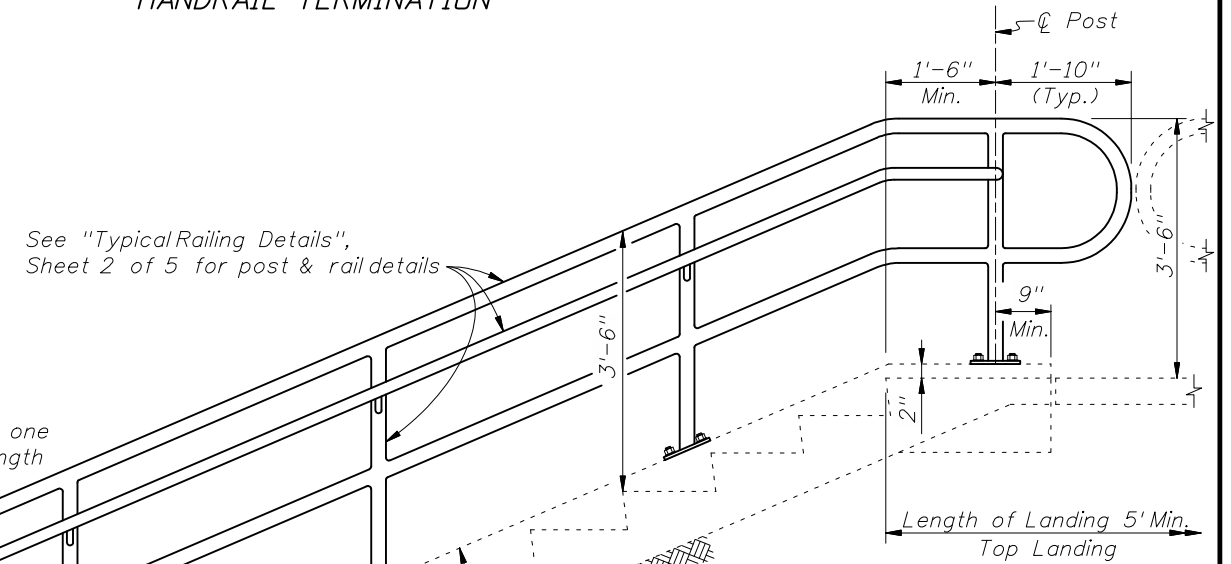
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RAILING CONTINUATION BEYOND STEPS  
(Bottom shown, Top similar)



DETAIL "A" - PLAN VIEW  
HANDRAIL TERMINATION



ELEVATION  
(At-Grade Steps)

ALTERNATE END TREATMENT

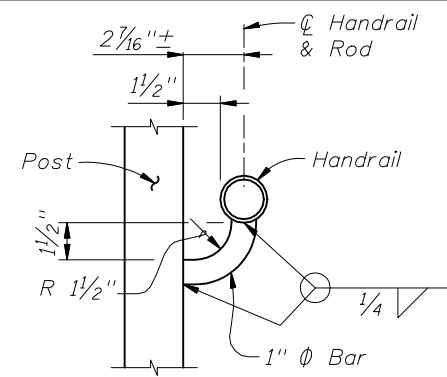
RAILINGS ON STEPS & STAIRS



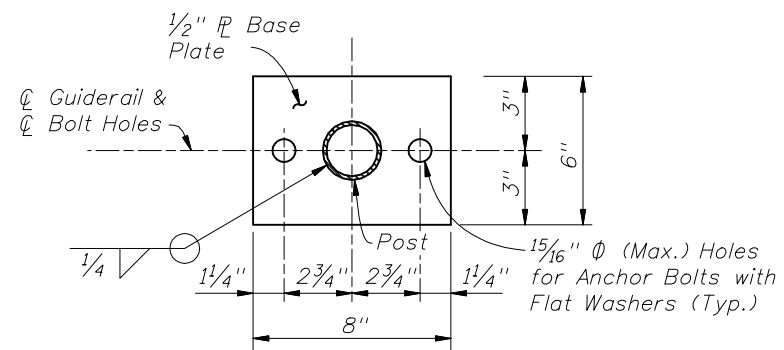
2010 FDOT Design Standards

ALUMINUM PIPE GUIDERAIL

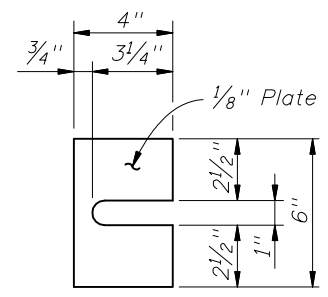
Last Revision 01/01/08	Sheet No. 3 of 5
Index No. 870	



SECTION B-B  
(Handrail Connection)



SECTION C-C  
BASE PLATE DETAIL



SHIM PLATE  
DETAIL

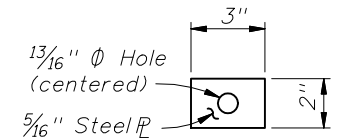
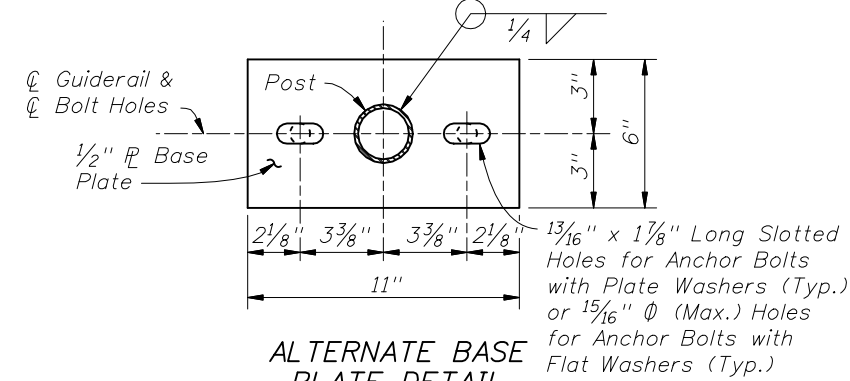
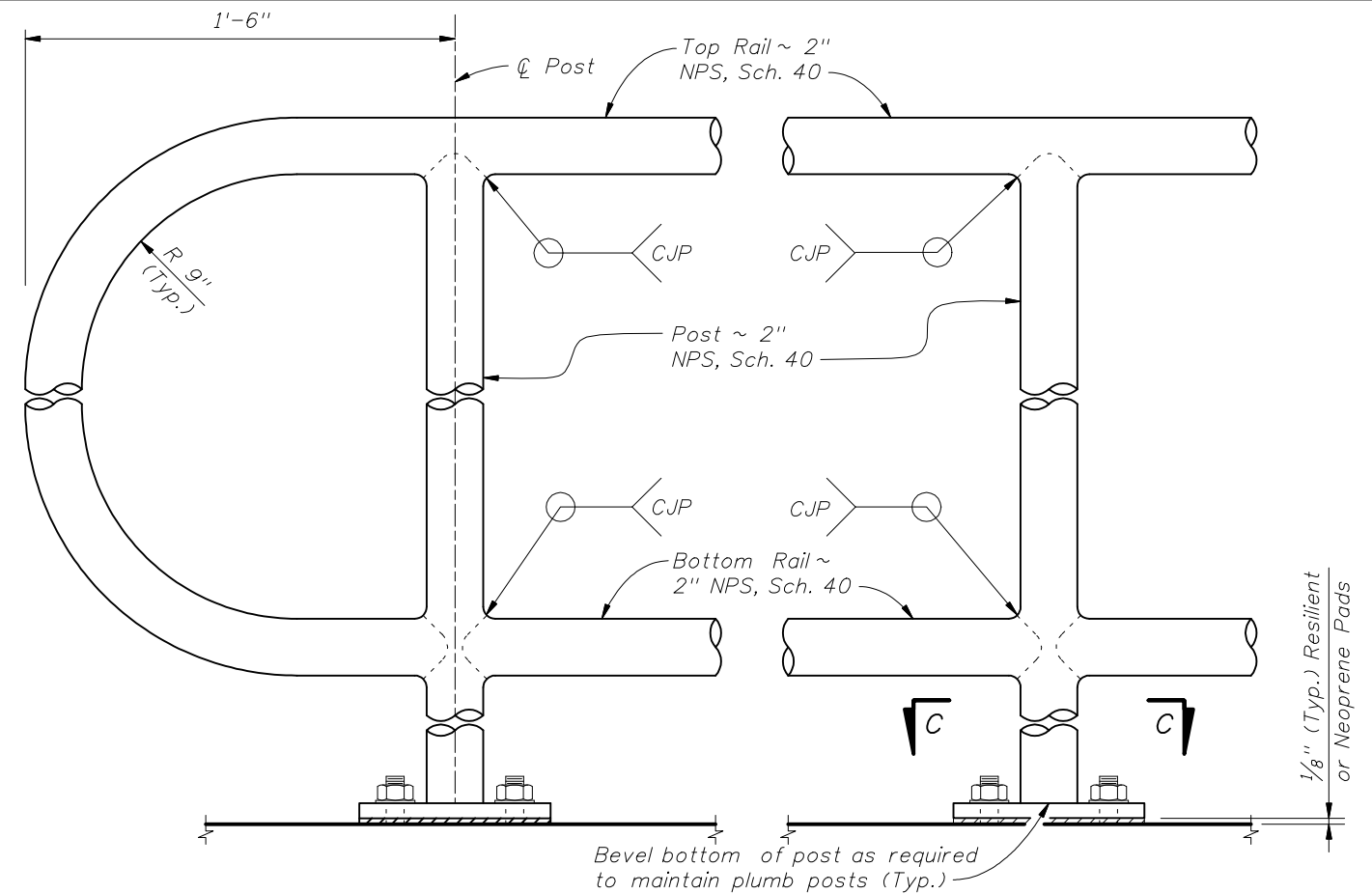


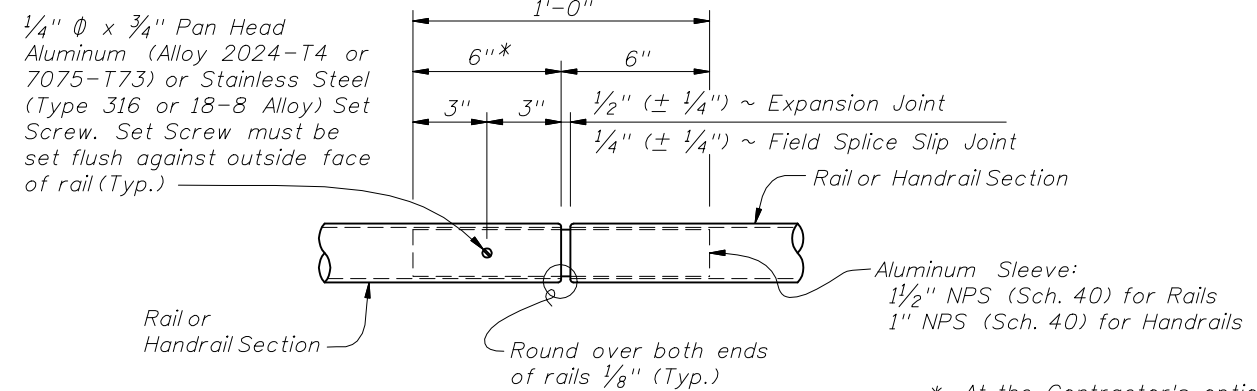
PLATE WASHER  
DETAIL



ALTERNATE BASE  
PLATE DETAIL  
(Recommended for Top of Step Cheekwalls)

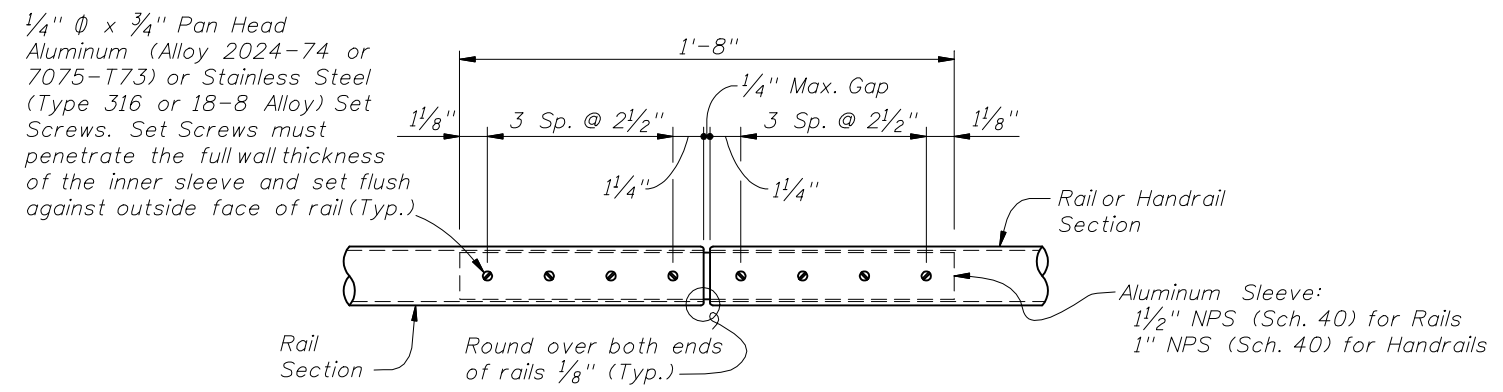


DETAIL "C" - RAIL CONNECTIONS  
(Handrail Not Shown)

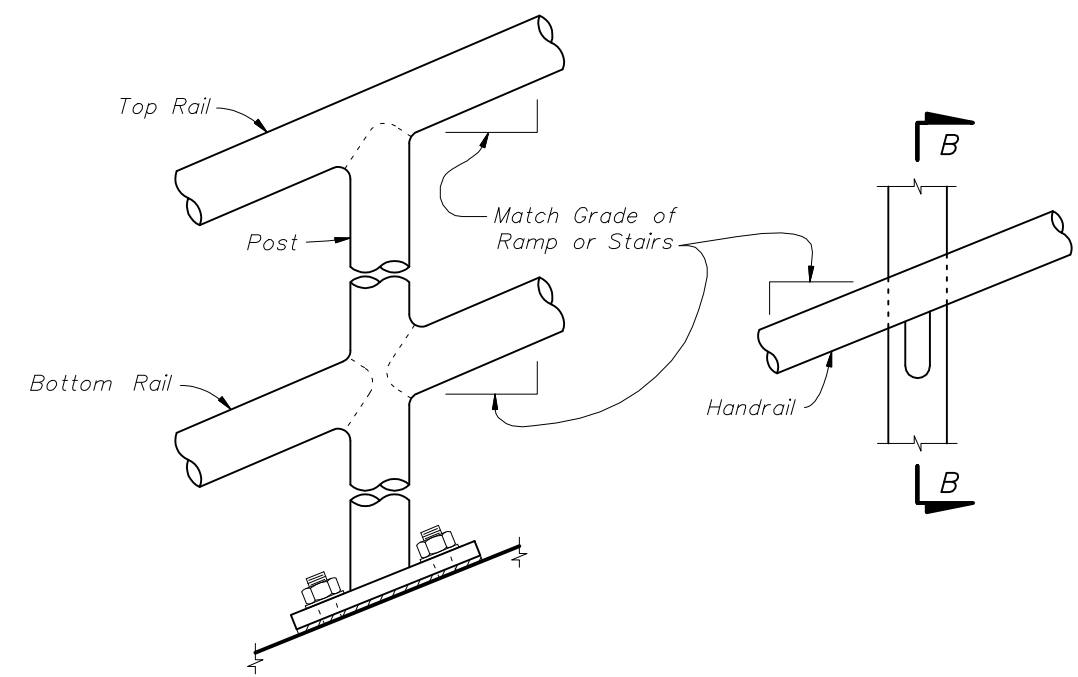


DETAIL "D" - EXPANSION JOINT  
(FIELD SPLICE SLIP JOINT SIMILAR)

\* At the Contractor's option, embedded length may be 4" when a 3/4" diameter plug weld is substituted for the 1/4" diameter set screw.

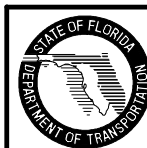


DETAIL "E" - CONTINUITY  
FIELD SPLICE

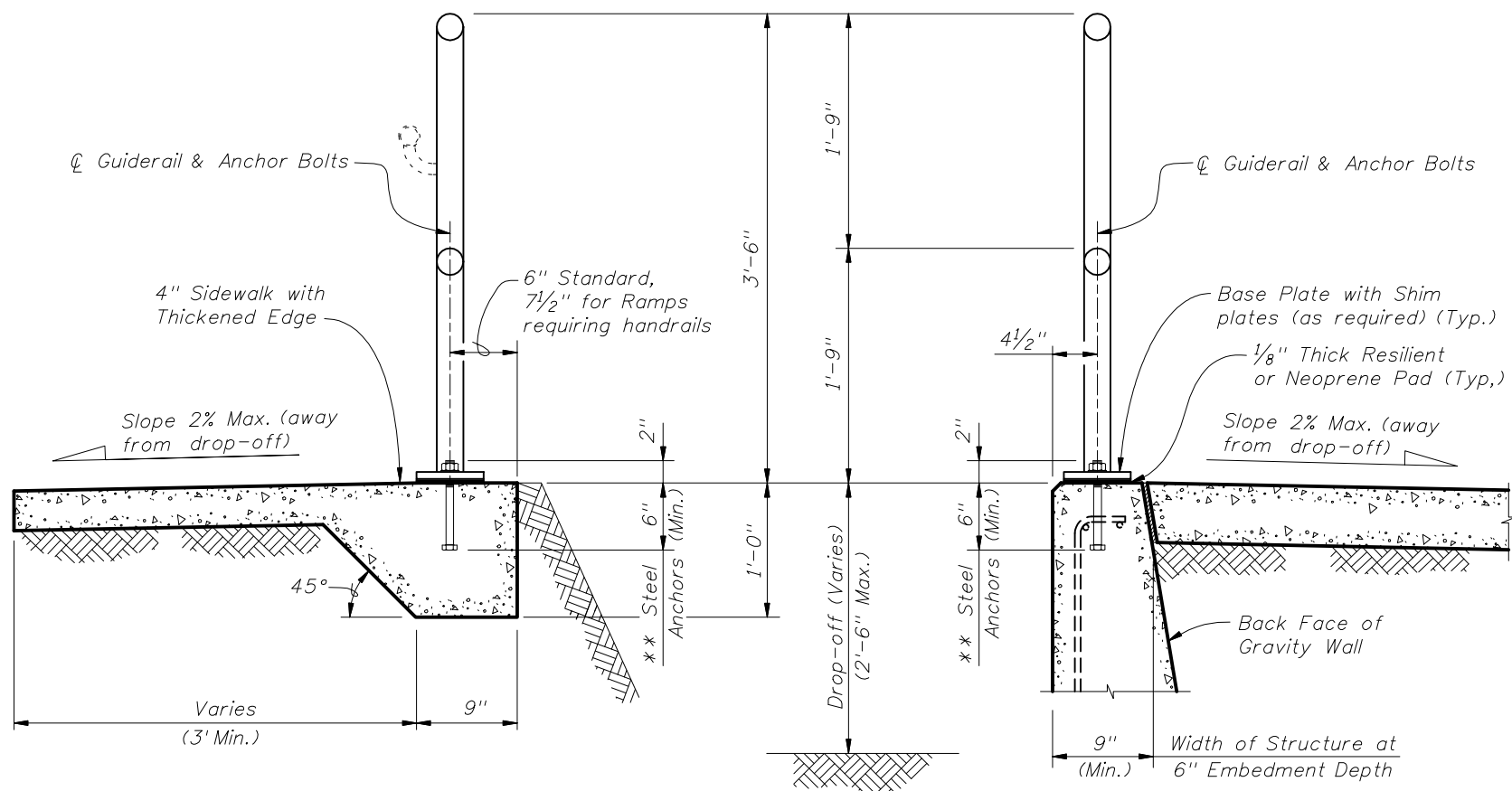


DETAIL "B" - RAIL AND HANDRAIL  
(Showing Sloped Condition for Stairs or Ramp)

CROSS REFERENCE:  
For locations of Details "C", "D" and "E", see Sheet 2 of 5.

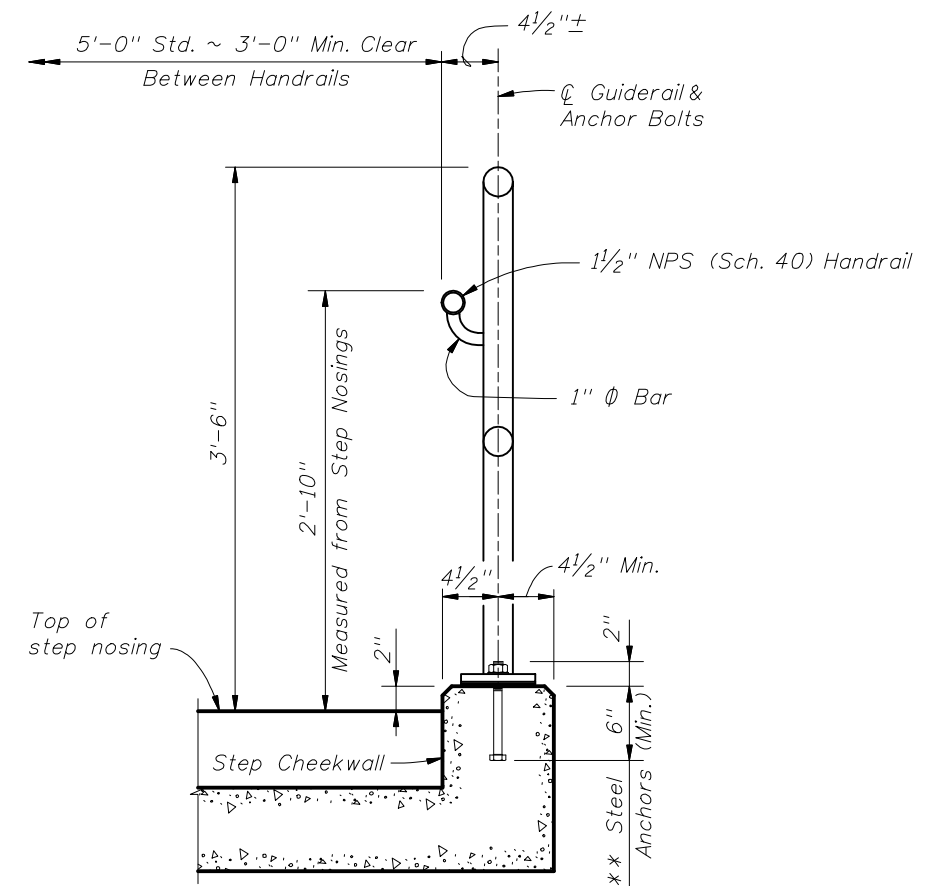




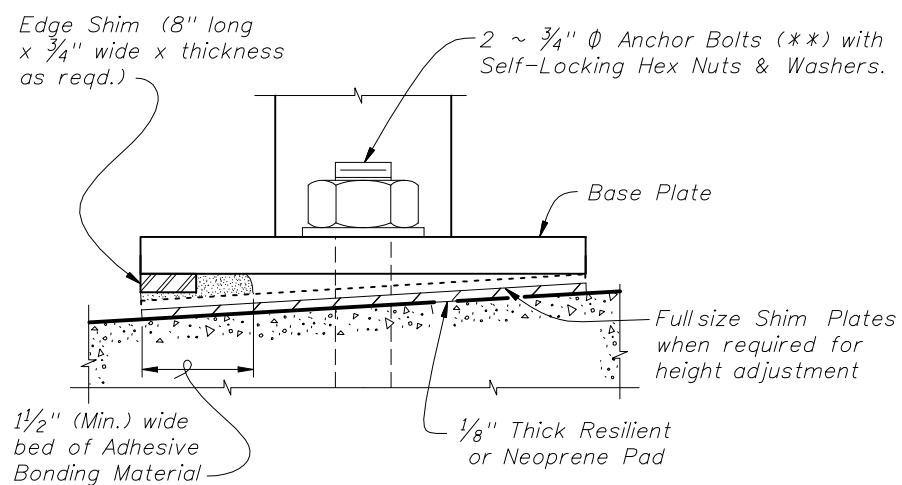


TYPICAL SECTION ON CONCRETE SIDEWALK

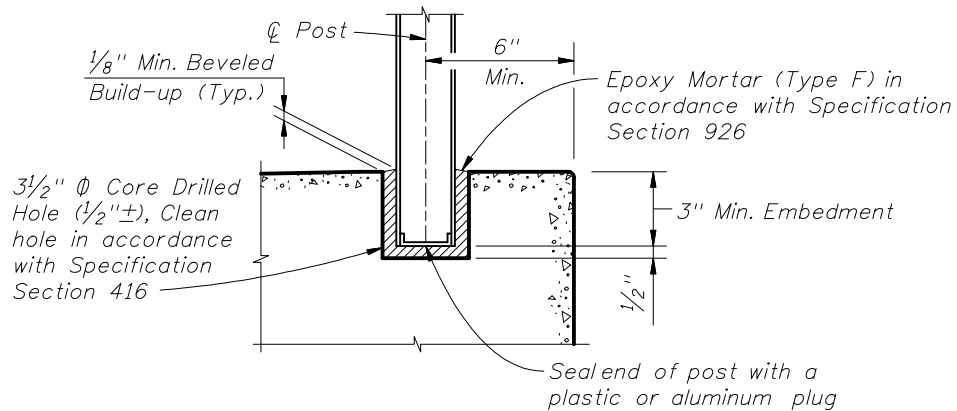
TYPICAL SECTION ON GRAVITY WALL  
(Other Retaining Walls Similar)



TYPICAL SECTION ON STEPS & STAIRS



DETAIL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION)  
(Used in lieu of Beveled Shim Plates)



OPTIONAL SIDEWALK ANCHORAGE DETAIL

NOTES:

- \*\* 2 ~ 3/4"  $\Phi$  x 8" Steel Anchors: Galvanized Steel Bolts (As Shown) (C-I-P); Galvanized U-Bolts Permitted (C-I-P); Galvanized Adhesive Anchors Permitted (\*\*\*) ; Expansion Anchors Not Permitted.
- \*\*\* Adhesive anchors shall be fully threaded headless anchor bolts set in drilled holes (manufacturer recommended diameter) with an Adhesive Bonding Material System in accordance with Specification Section 937 and installed in accordance with Specification Section 416. The minimum embedment is 6".



**NOTES**

**DESIGN SPECIFICATIONS:**

U.S. Access Board "ADA Accessibility Guidelines", July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.

**DESIGN LIVE LOADS:**

The Guiderail shall resist an equivalent Service Loading of 50 lbs./ft. acting simultaneously in the transverse and vertical direction when applied at the height of the top rail.

**APPLICABILITY NOTE TO DESIGNER:**

This Index is not approved for use on bridges. This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazards do not exceed 2'-6"; Pedestrian/Bicycle Railings for customary applications are provided in Index No's. 850 or 860. Also applicable for select uses on sidewalks within service areas and similar locations or maintenance areas where the drop off exceeds 2'-6". Adequate foundation support shall be provided for anchorage and stability against overturning. For unusual site conditions a site specific railing is to be designed by the responsible engineer. Refer to FDOT Plans Preparation Manual (Volume I) Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

**ALTERNATE DESIGN:**

Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the live load and geometric requirements specified herein, provides a minimum 50 year design life and that deflections due to the Design Live Loads do not exceed 1 1/2" at midspan of the top rail. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1 1/2" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

**PIPE RAILING & POSTS:**

Pipe Rails and Posts shall be in accordance with ASTM A53 Grade B for standard weight pipe and ASTM A500 Grade B, C or D or ASTM A501 for structural tube. Bars for handrail supports shall be ASTM A36. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Corners and changes in tangential longitudinal alignment, may be made continuous with a 9" bend radius or terminated at adjoining sections with a standard end hoop when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" NPS (Sch. 40)	2.375"	0.154"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrails Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A

**BASE PLATES:**

Base Plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

**SHIM PLATES:**

Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than 1/4" and localized irregularities greater than 1/8". Field trim shim plates when necessary to match the contours of the foundation. Beveled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of 1/2", unless longer anchor bolts are provided for the exposed thread length.

**COATINGS:**

The railing shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

**ANCHOR BOLTS:**

Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steel is permitted for drilled hole installation. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be 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 tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

**RESILIENT AND NEOPRENE PADS:**

Resilient and Neoprene pads shall be in accordance with Specification Section 932, except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 or 70.

**JOINTS:**

All fixed joints are to be welded all around and ground smooth. Expansion Joints shall be spaced at a maximum of 30'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate shipping and handling, but rails must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

**WELDING:**

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.

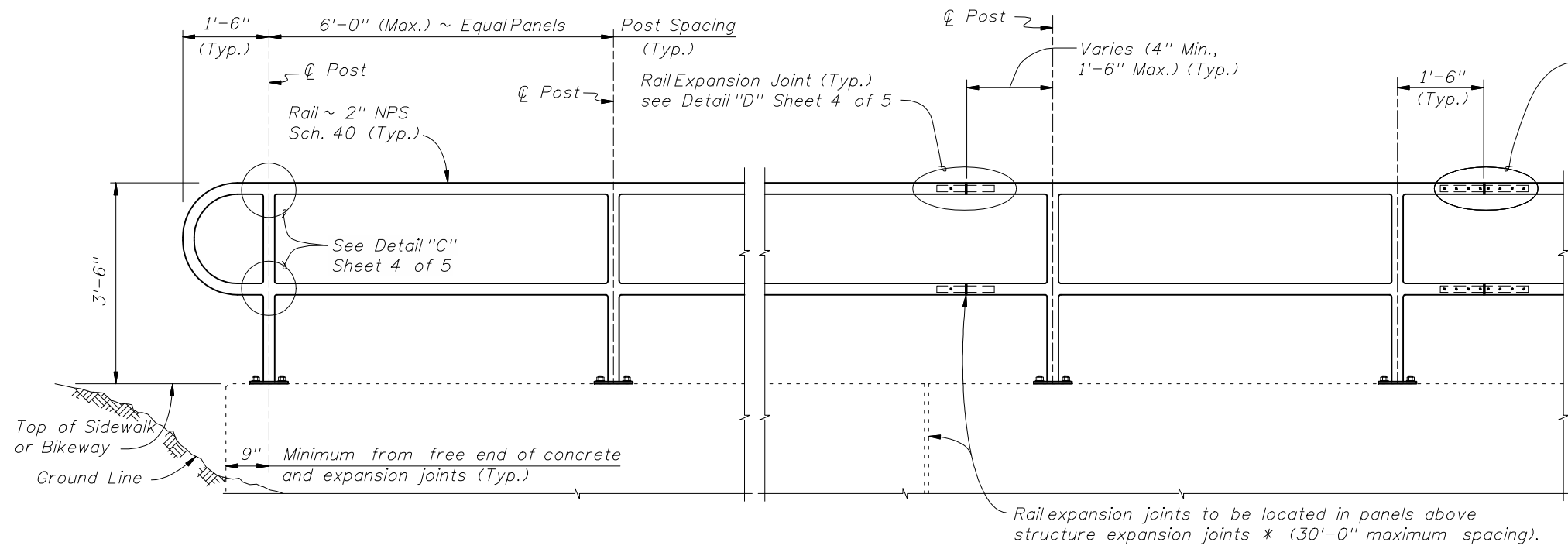
**SHOP DRAWINGS:**

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

**PAYMENT:**

Guiderail shall be paid for under the contract unit price for Pipe Guiderail (Steel), LF (Item No. 515-1-1). Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the Guiderail.





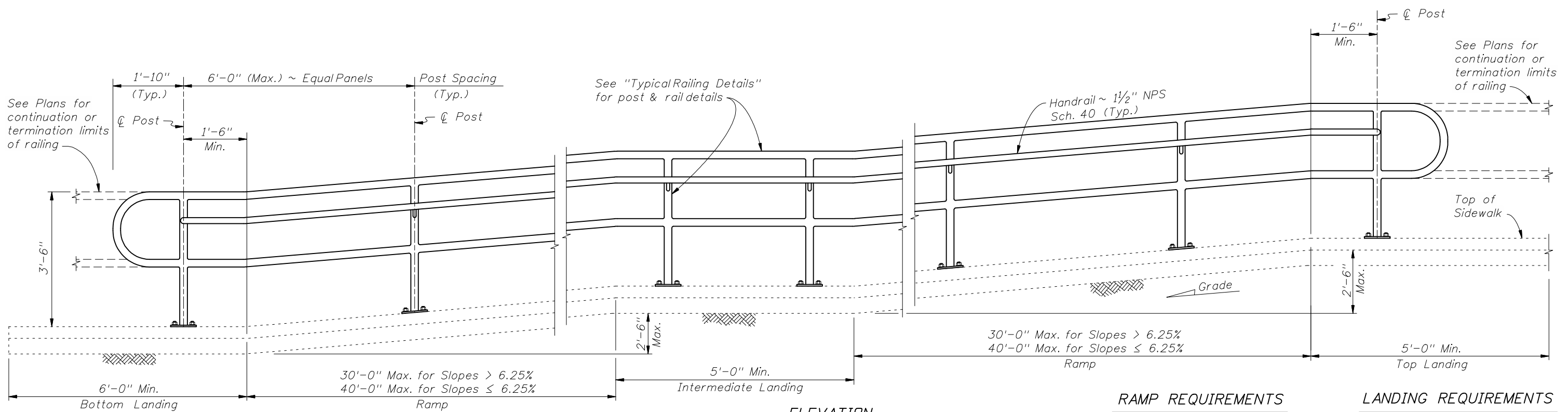
NOTES:  
NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:  
\* Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

CROSS REFERENCE:  
For Details "C", "D" and "E", see Sheet 4 of 5.

ELEVATION

TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%



ELEVATION  
(Showing Inside Face of Railing)

**RAMP REQUIREMENTS**  
For slopes greater than 5%:  
Max. ramp slope = 8.33%  
Max. ramp cross-slope = 2.0%

**LANDING REQUIREMENTS**  
Max. landing slope = 2%  
Max. landing cross-slope = 2%

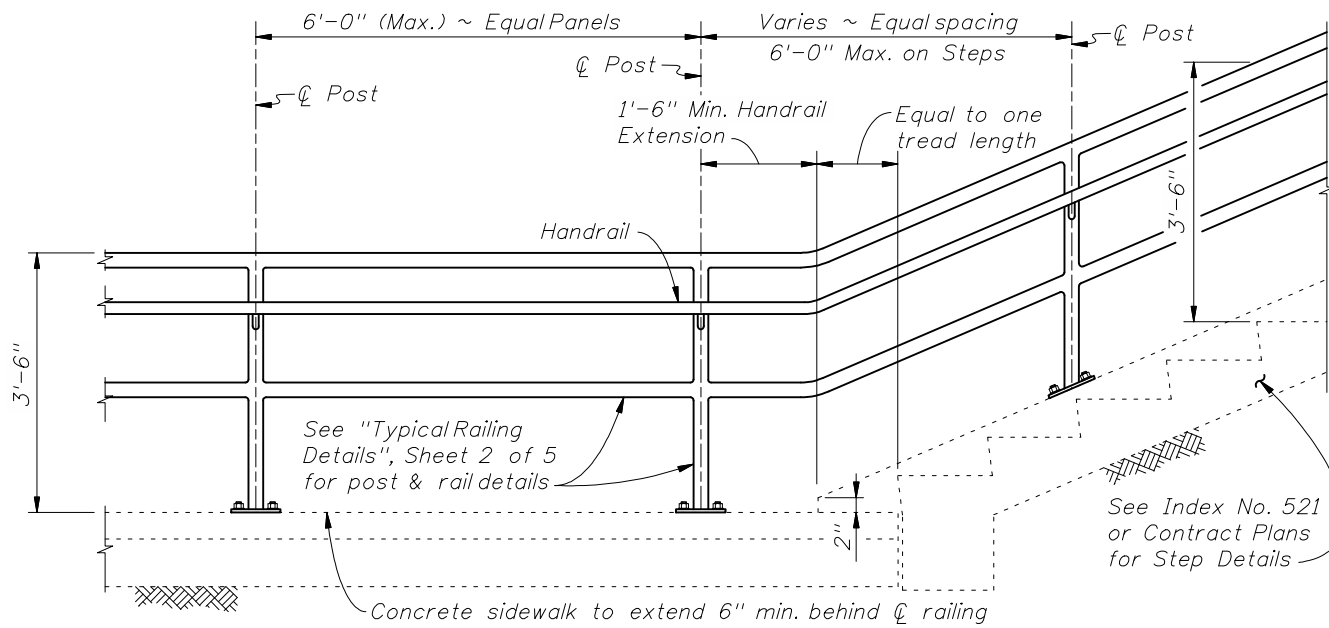
RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%



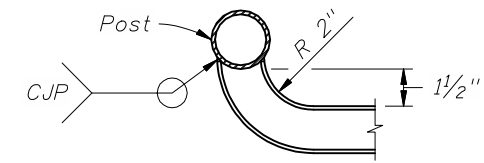
2010 FDOT Design Standards

STEEL PIPE GUIDERAIL

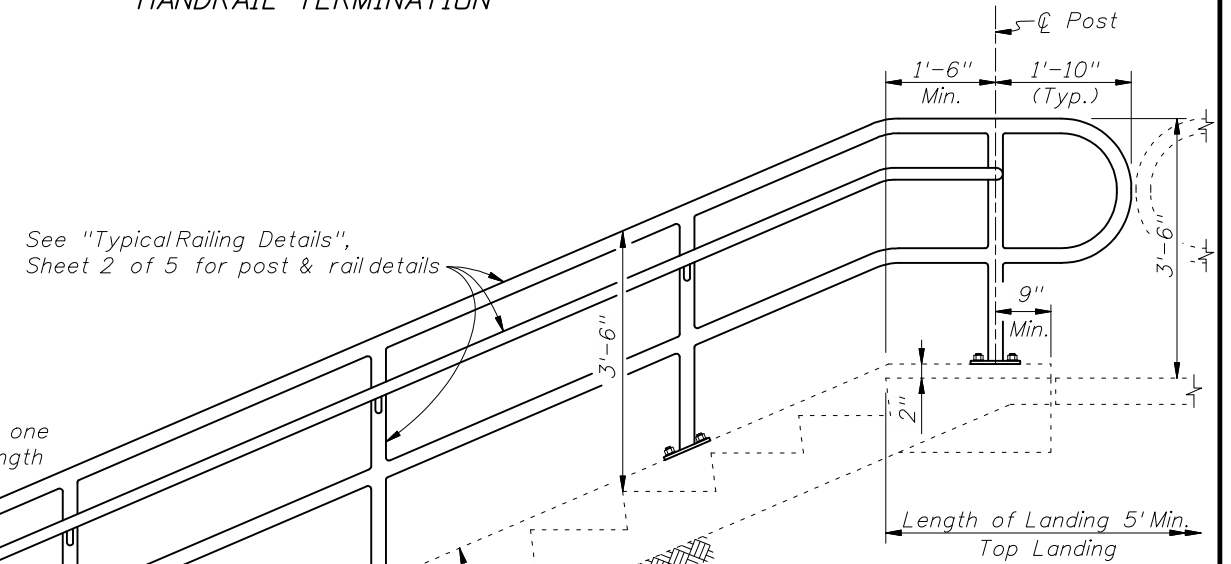
Last Revision 01/01/08	Sheet No. 2 of 5
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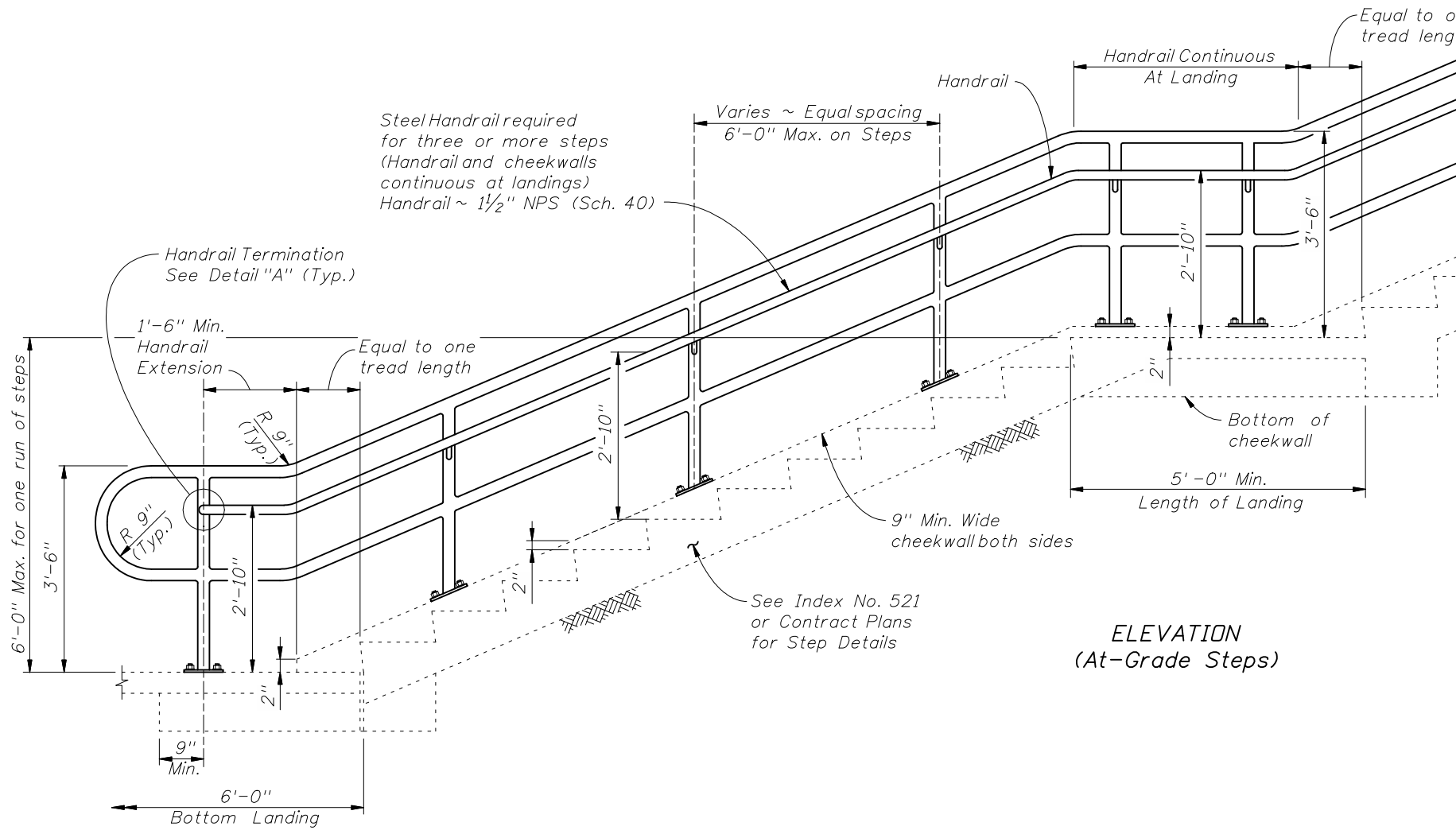
**RAILING CONTINUATION BEYOND STEPS**  
(Bottom shown, Top similar)



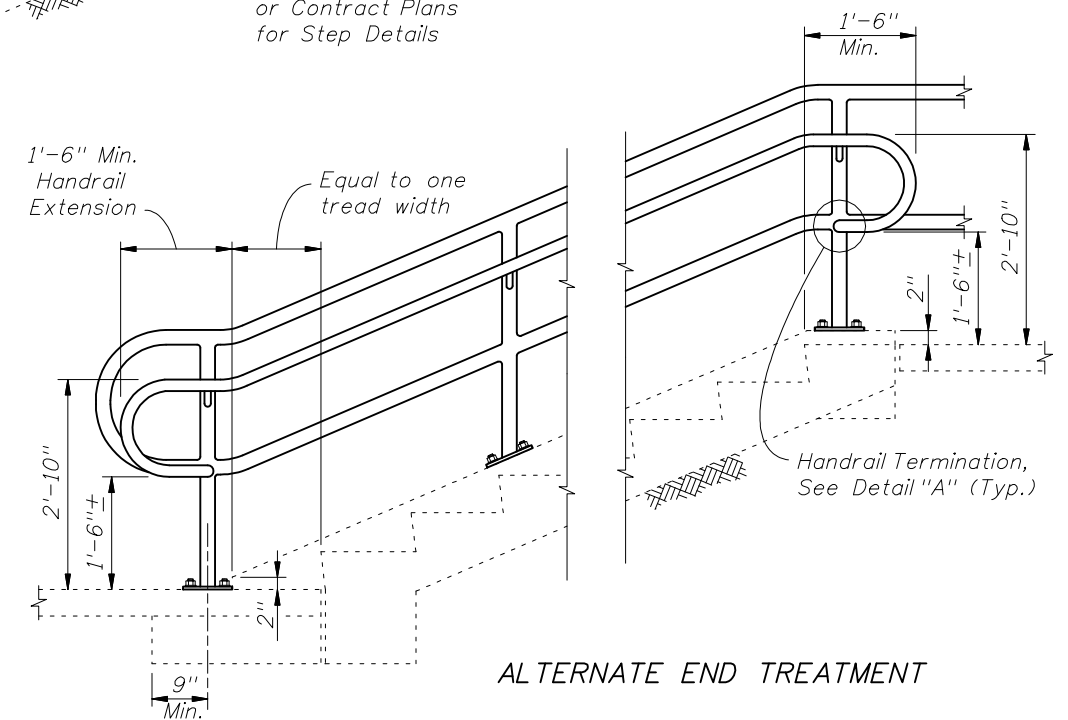
**DETAIL "A" - PLAN VIEW**  
**HANDRAIL TERMINATION**



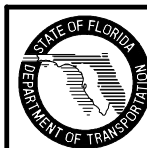
See "Typical Railing Details",  
Sheet 2 of 5 for post & rail details

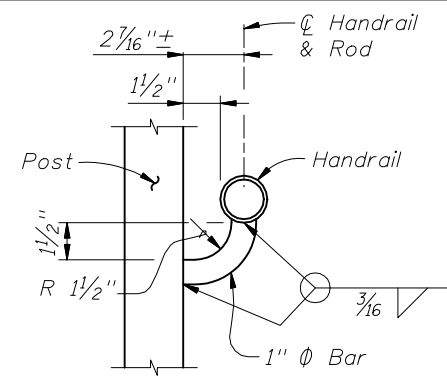


**ELEVATION**  
(At-Grade Steps)

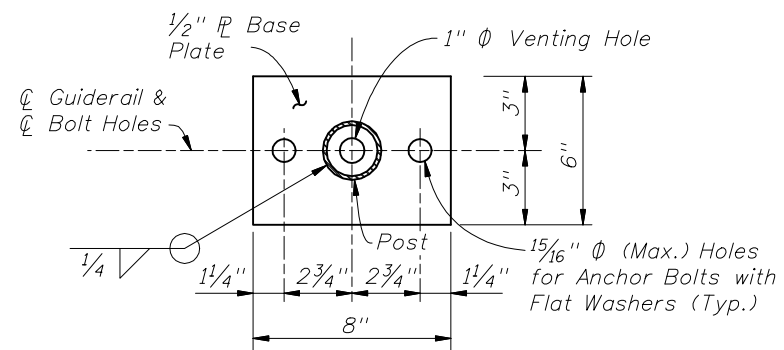


**ALTERNATE END TREATMENT**

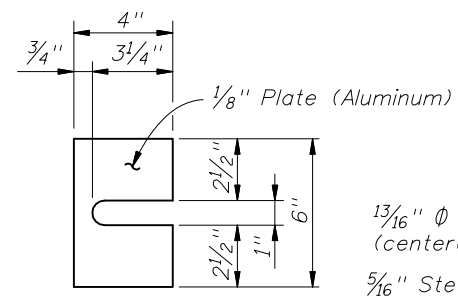




SECTION B-B  
(Handrail Connection)



SECTION C-C  
BASE PLATE DETAIL



SHIM PLATE  
DETAIL

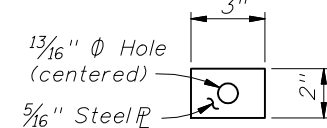
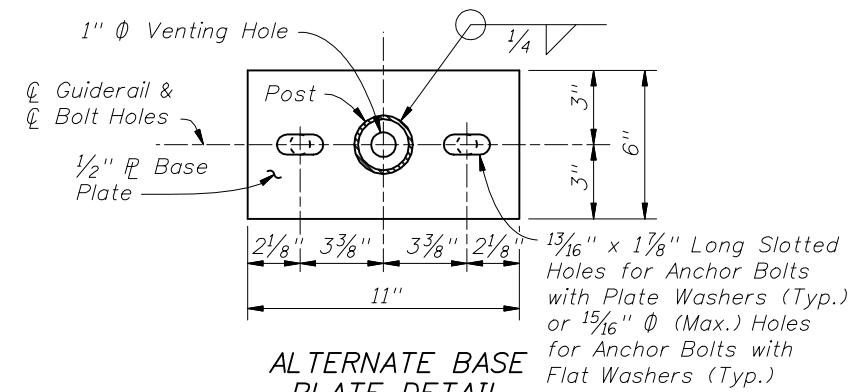
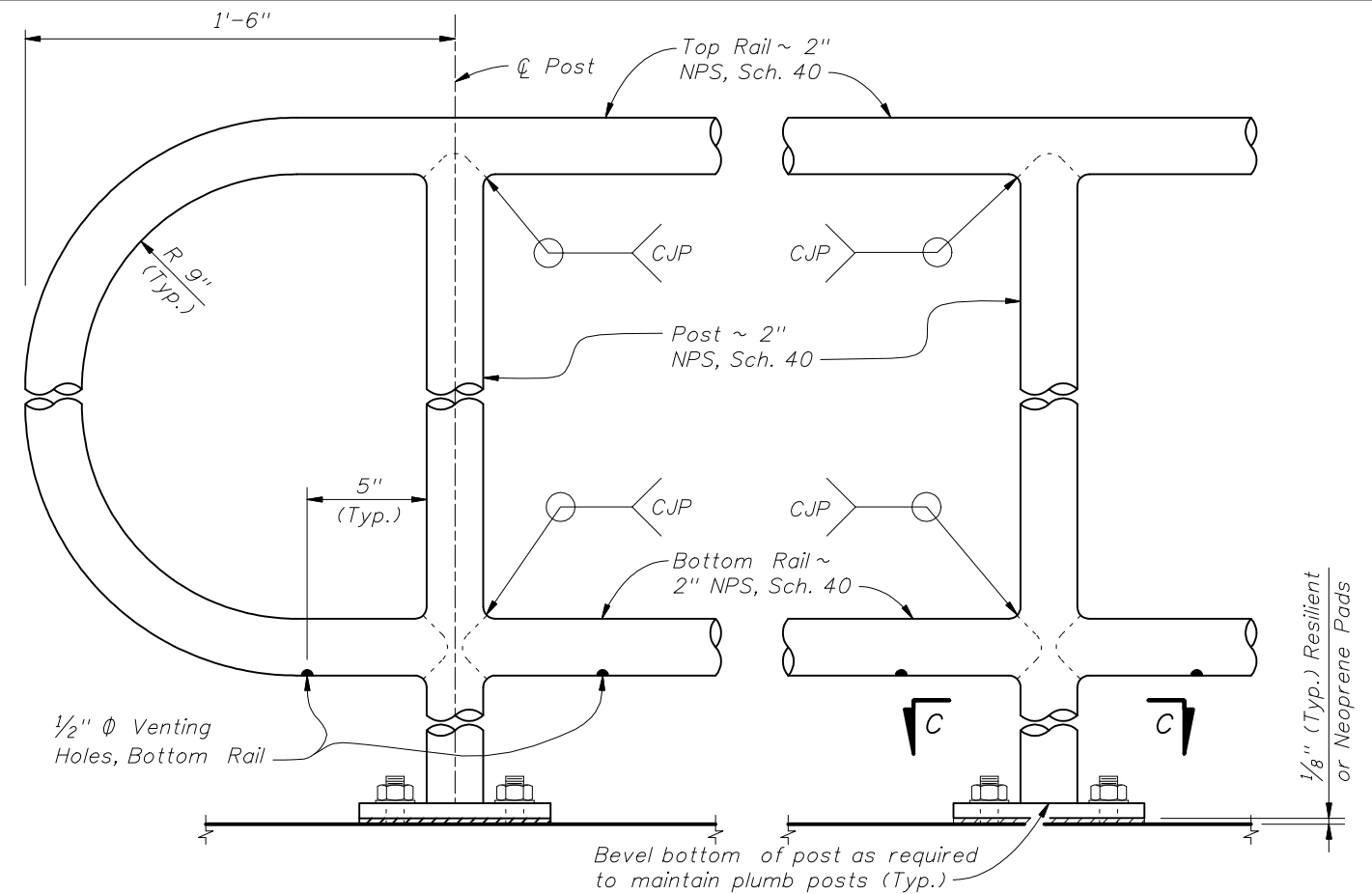


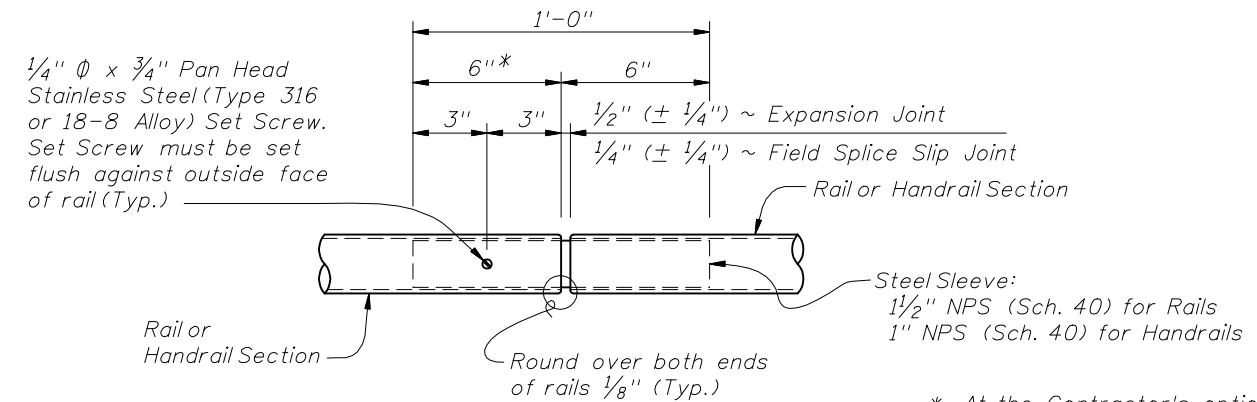
PLATE WASHER  
DETAIL



ALTERNATE BASE  
PLATE DETAIL  
(Recommended for Top of Step Cheekwalls)

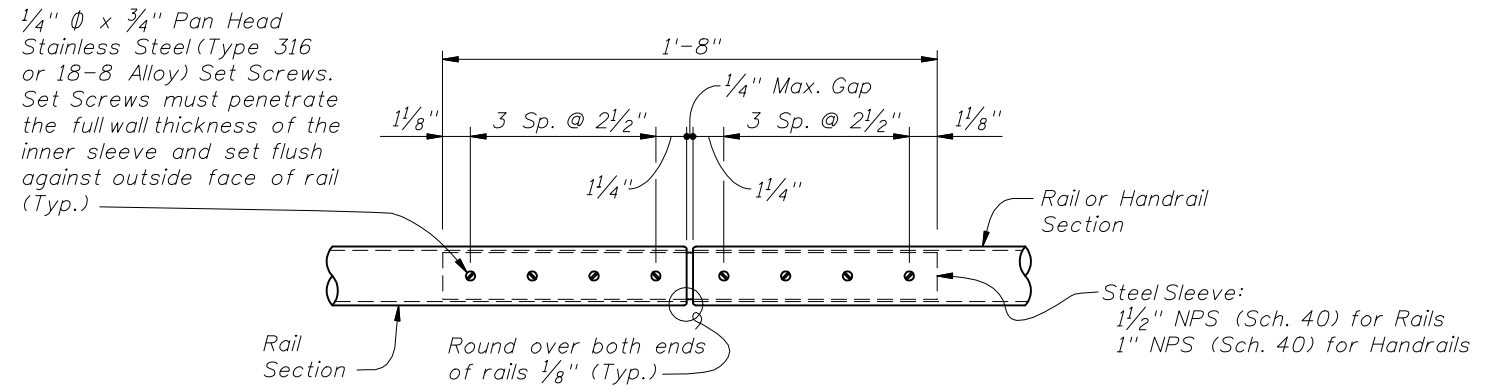


DETAIL "C" - RAIL CONNECTIONS  
(Handrail Not Shown)

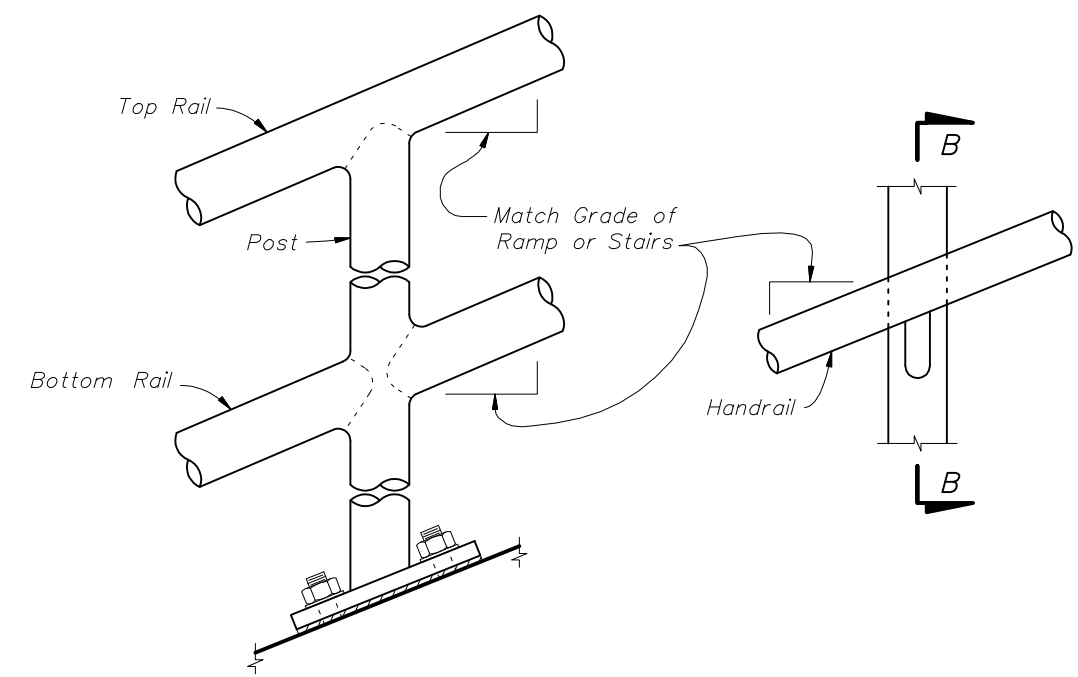


DETAIL "D" - EXPANSION JOINT  
(FIELD SPLICE SLIP JOINT SIMILAR)

\* At the Contractor's option, embedded length may be 4" when a 3/4 inch diameter plug weld is substituted for the 1/4 inch diameter set screw.

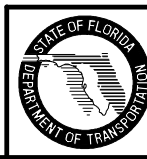


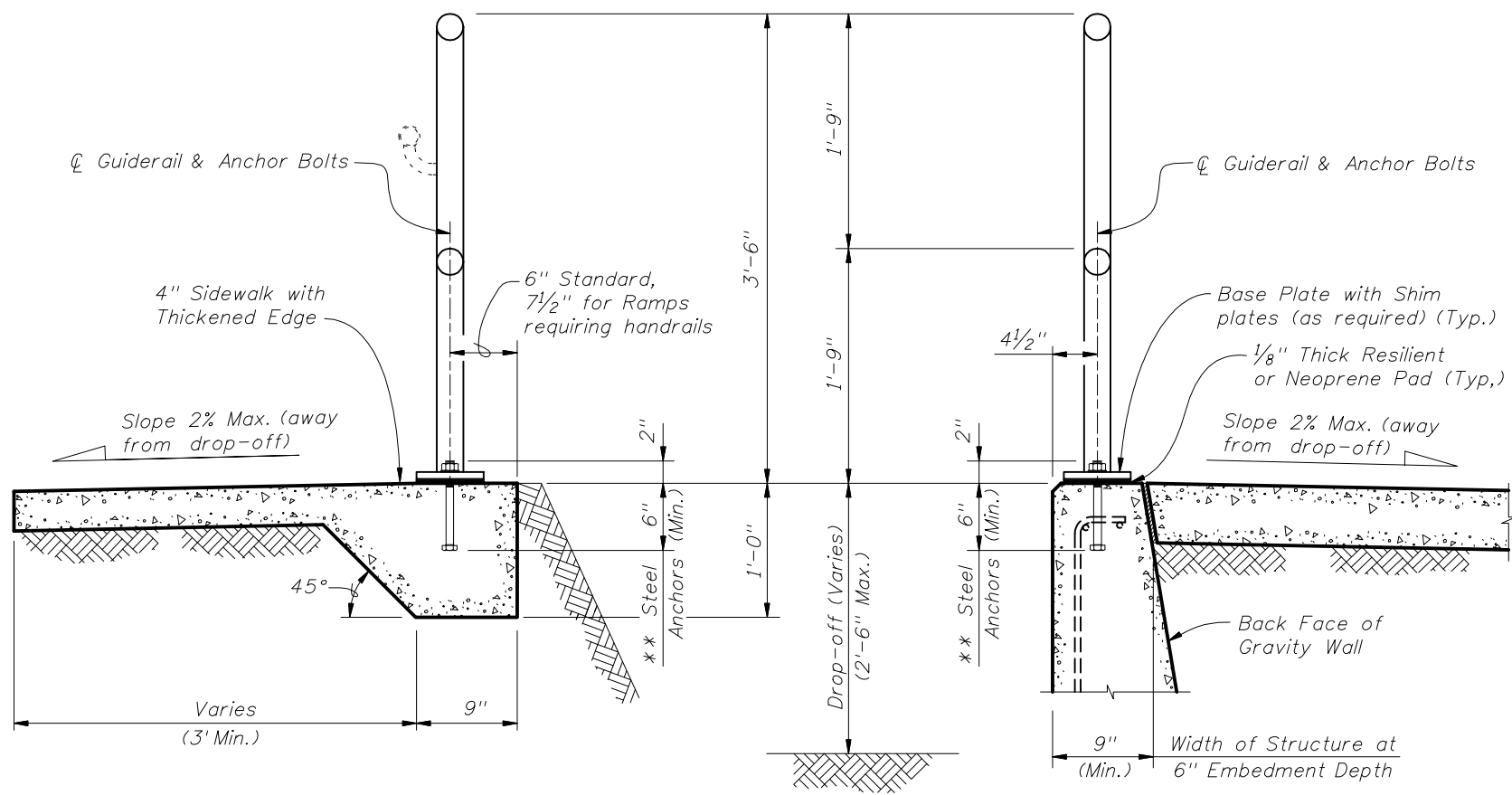
DETAIL "E" - CONTINUITY  
FIELD SPLICE



DETAIL "B" - RAIL AND HANDRAIL  
(Showing Sloped Condition for Stairs or Ramp)

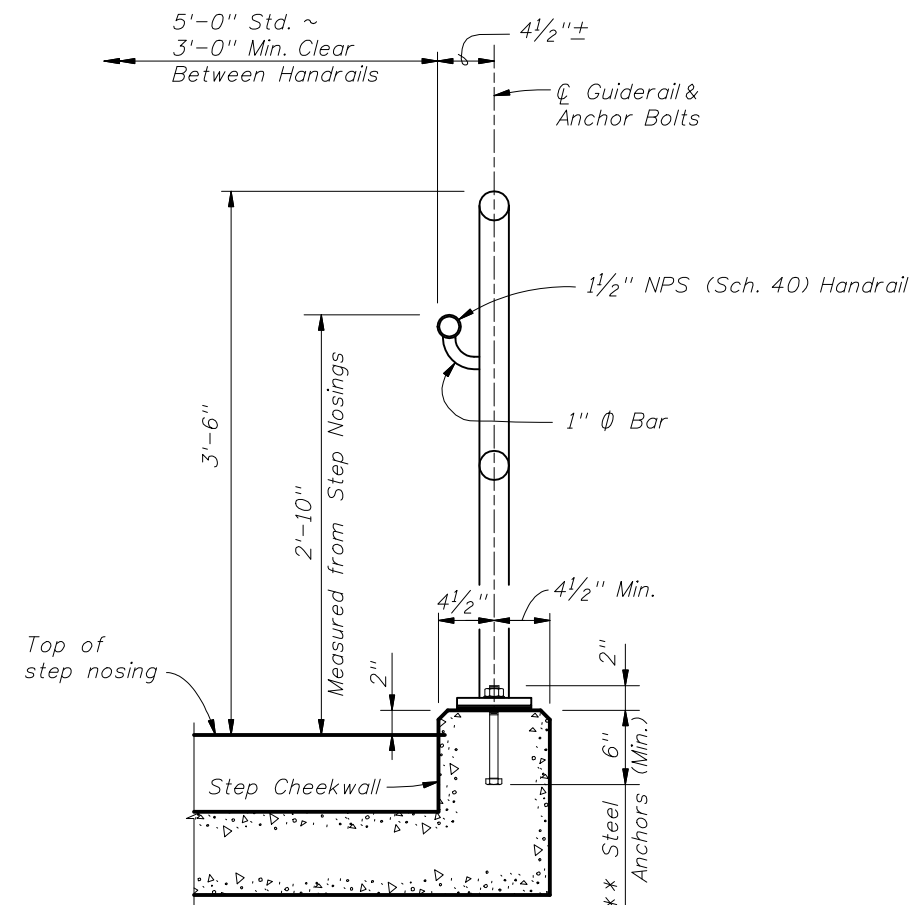
CROSS REFERENCE:  
For locations of Details "C", "D" and "E", see Sheet 2 of 5.



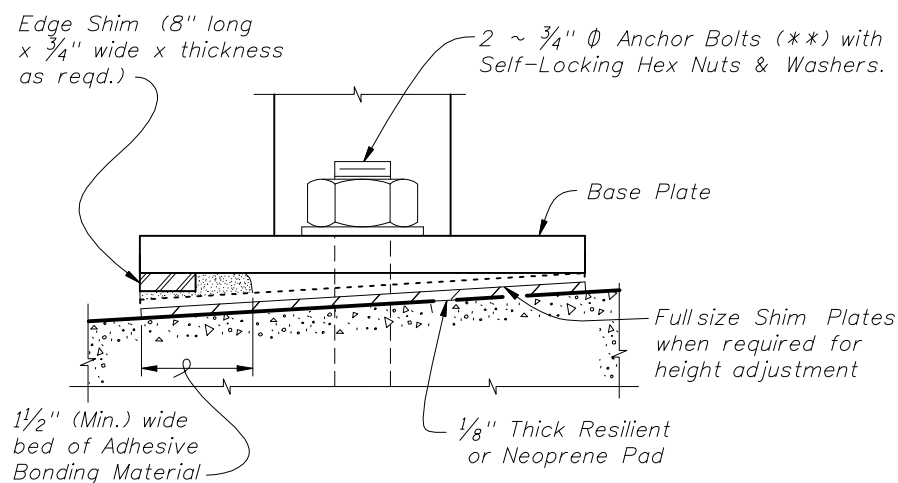


TYPICAL SECTION ON CONCRETE SIDEWALK

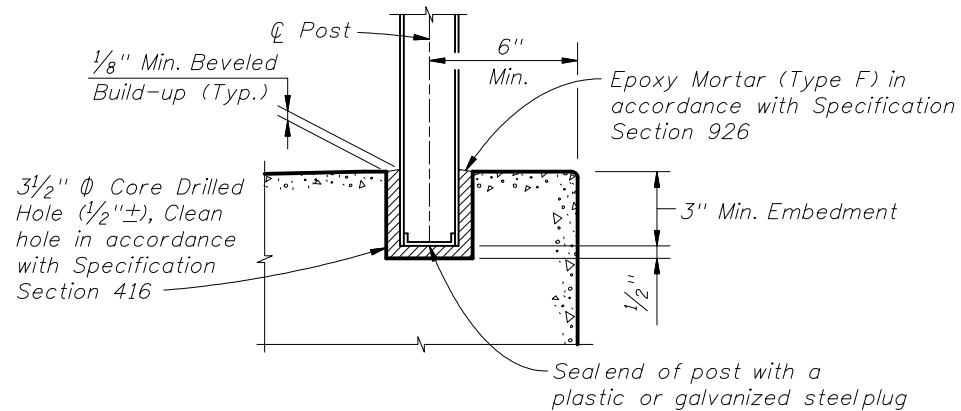
TYPICAL SECTION ON GRAVITY WALL  
(Other Retaining Walls Similar)



TYPICAL SECTION ON STEPS & STAIRS



DETAIL "F" (OPTIONAL SHIMMING DETAIL  
FOR CROSS SLOPE CORRECTION)  
(Used in lieu of Beveled Shim Plates)



OPTIONAL SIDEWALK ANCHORAGE DETAIL

NOTES:  
 \*\* 2 ~ 3/4"  $\Phi$  x 8" Steel Anchors:  
 Galvanized Steel Bolts (As Shown) (C-I-P); Galvanized U-Bolts Permitted (C-I-P); Galvanized Adhesive Anchors Permitted (\*\*\*) ; Expansion Anchors Not Permitted.  
 \*\*\* Adhesive anchors shall be fully threaded headless anchor bolts set in drilled holes (manufacturer recommended diameter) with an Adhesive Bonding Material System in accordance with Specification Section 937 and installed in accordance with Specification Section 416. The minimum embedment is 6".

