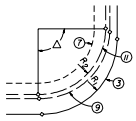
RADIAL GUARDRAIL

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

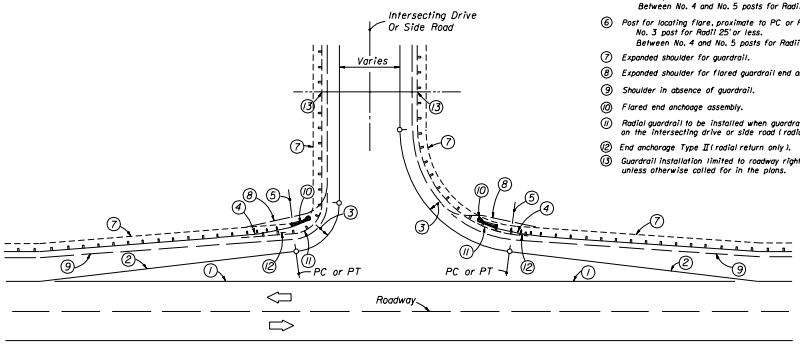
Note: Only 25' and 40' radius panels are to be used for return guardrail on normal turnouts. On skewed turnouts the number of panels used and their arrangement with straight panels will be as shown in the plans or as directed by the Engineer.



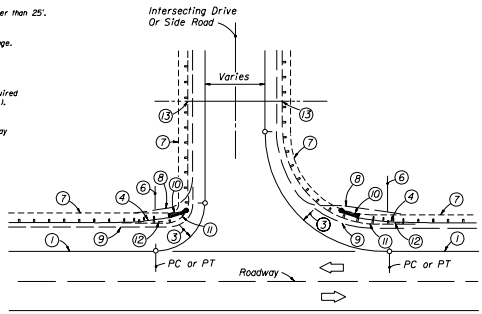
RADIAL GUARDRAIL

LEGEND

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



TAPER TURNOUTS



SIMPLE CURVE TURNOUTS

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

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

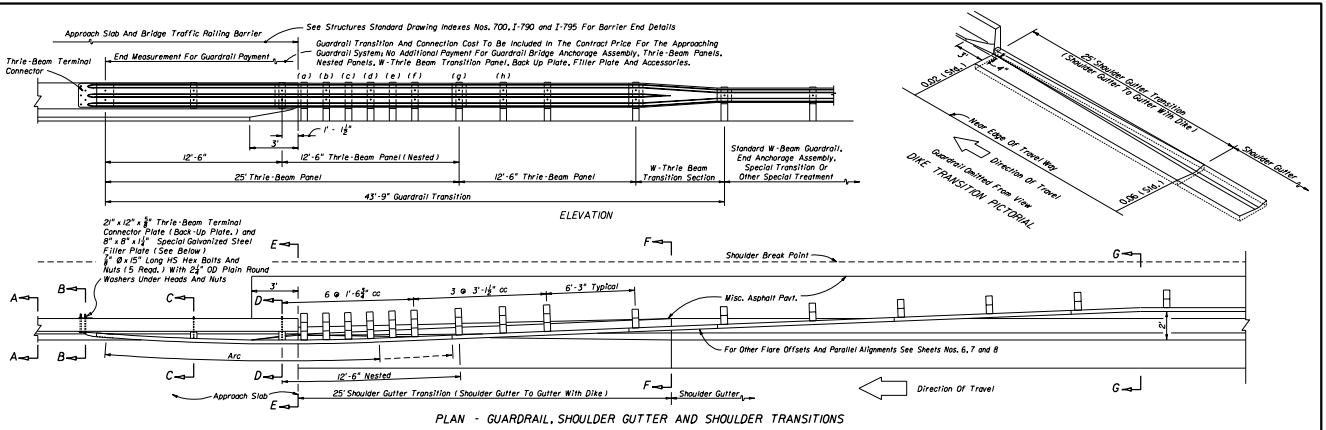
GUARDRAIL APPLICATIONS FOR INTERSECTING DRIVES AND SIDE ROADS ON RURAL FACILITIES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates	Approved By
Designed By			
Drawn By	BSD	04/03	State Roadway Design Engineer
Checked By	JWS	04/03	Bridge / Struct No. / Index No.
			00 / 11 of 31 / 400

$$$$$$STAMP$$$$$$



APPLICATIONS	SECTION CC			SECTION DD		
	U	V	W	X	Y	Z
Single Face Guardrail	6⅛"	4¼"	3⅜"	7½" nom.	5½" nom.	5" nom.
Double Face Guardrail With Timber Posts	5⅛"	3⅛"	2⅜"	6½" nom.	4¼" nom.	4" nom.
Double Face Guardrail With Steel Posts	4⅜"	2⅜"	1⅜"	5⅜"	3½"	3¼"

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

GUARDRAIL TRANSITION NOTE

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

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

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

DETAIL J

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates
Designed By		
Drawn By	DEC	6-98
Checked By	JDC	6-98

Approved By _____
State Roadway Design Engineer

Bridge | Sheet No. 00 | Index No. 400

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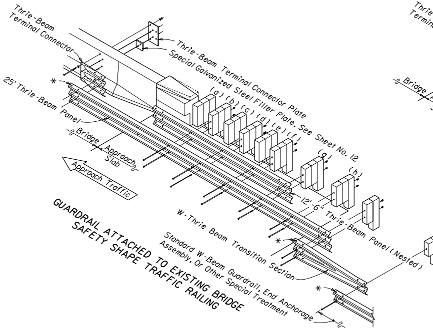
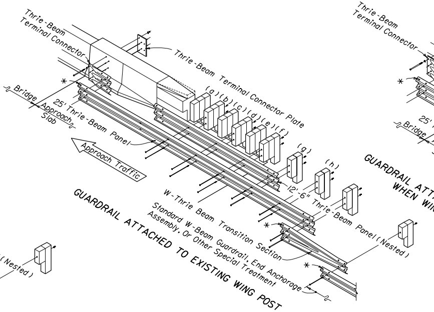


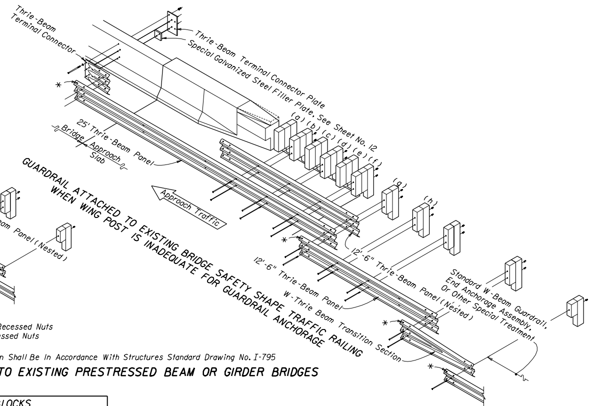
Thrie-Beam Terminal Connector
Thrie-Beam Terminal Connector Plate
Special Galvanized Steel Filler Plate, See Sheet No. 12
25' Thrie-Beam Panel
Bridge
Approach Slab
Approach Traffic
(a) (b) (c) (d) (e) (f) (g) (h)
12'-6" Thrie-Beam Panel (Nested)
W-Thrie Beam Transition Section
Standard W-Beam Guardrail, End Anchorage Assembly, Or Other Special Treatment
GUARDRAIL ATTACHED TO EXISTING BRIDGE SAFETY SHAPE TRAFFIC RAILING

Guardrail Attachment Location Shall Be In Accordance With Structures Standard Drawing No. I-790

GUARDRAIL TRANSITION TO EXISTING FLAT SLAB BRIDGES



Thrie-Beam Terminal Connector
Thrie-Beam Terminal Connector Plate
Bridge
Approach Slab
25' Thrie-Beam Panel
Approach Traffic
(a) (b) (c) (d) (e) (f) (g) (h)
12'-6" Thrie-Beam Panel (Nested)
W-Thrie Beam Transition Section
Standard W-Beam Guardrail, End Anchorage Assembly, Or Other Special Treatment
GUARDRAIL ATTACHED TO EXISTING WING POST



Thrie-Beam Terminal Connector
Thrie-Beam Terminal Connector Plate
Special Galvanized Steel Filler Plate, See Sheet No. 12
25' Thrie-Beam Panel
Bridge
Approach Slab
Approach Traffic
(a) (b) (c) (d) (e) (f) (g) (h)
GUARDRAIL ATTACHED TO EXISTING BRIDGE SAFETY SHAPE TRAFFIC RAILING WHEN WING POST IS INADEQUATE FOR GUARDRAIL ANCHORAGE
12'-6" Thrie-Beam Panel
12'-6" Thrie-Beam Panel (Nested)
W-Thrie Beam Transition Section
Standard W-Beam Guardrail, End Anchorage Assembly, Or Other Special Treatment

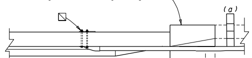
* Splice Locations: Thrie-Beam - 12 Guardrail Splice Bolts And Recessed Nuts
W-Beam - 8 Guardrail Splice Bolts And Recessed Nuts

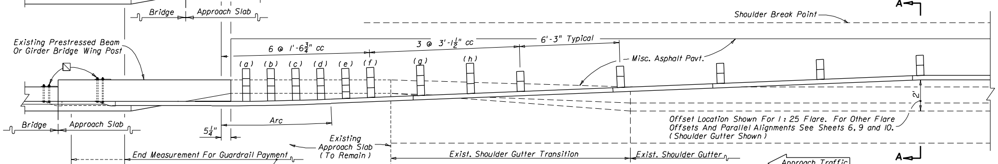
Guardrail Attachment Location Shall Be In Accordance With Structures Standard Drawing No. I-795

GUARDRAIL TRANSITIONS TO EXISTING PRESTRESSED BEAM OR GIRDER BRIDGES

APPROACH POSTS AND SPECIAL OFFSET BLOCKS

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

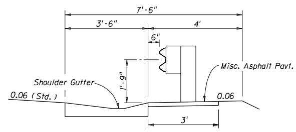




A
Shoulder Break Point
Existing Prestressed Beam Or Girder Bridge Wing Post
6 @ 1'-6¾" cc
3 @ 3'-1½" cc
6'-3" Typical
Misc. Asphalt Pavt.
(a) (b) (c) (d) (e) (f) (g) (h)
2'
Bridge
Approach Slab
5¼"
Arc
Existing Approach Slab (To Remain)
Offset Location Shown For 1 : 25 Flare. For Other Flare Offsets And Parallel Alignments See Sheets 6, 9 and 10. (Shoulder Gutter Shown)
End Measurement For Guardrail Payment
Exist. Shoulder Gutter Transition
Exist. Shoulder Gutter
Approach Traffic

PLAN

Guardrail Transition Cost To Be Included In The Contract Unit Price For The Approaching Guardrail System; No Additional Payment For Thrie-Beam Panels, Nested Panels, W-Thrie Beam Transition Panel, and Accessories.



SECTION AA

☐ 21" x 12" x $\frac{5}{8}$" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And $\frac{7}{8}$"Ø x 18" Long (15" Long For Bridge Safety Shape Railing) HS Hex Bolts And Nuts (5 Reqd.) With $2\frac{1}{4}$" OD Plain Round Washers Under Heads And Nuts. (When Attaching Guardrail To Existing Wing Posts Or Bridge Rails, Care Should Be Exercised To Avoid Damaging Conduits And Their Utilities That May Be Routed Through Wing Posts Or Bridge Rails. When Conduits And Their Utilities Are Encountered, At Least Five $\frac{7}{8}$" HS Hex Bolts Shall Be Installed In Any Of The Seven Holes Provided In The Thrie-Beam Terminal Connector.)

NOTES

1. When the existing wing post is to be replaced with a bridge traffic railing barrier in accordance with Structure Standard Drawings No. I-790 or No. I-795, the thrie-beam guardrail connection shall be in accordance with Detail J.
2. When retrofitting thrie-beam guardrail to existing wing posts or existing bridge safety shape traffic railing, attachment construction to be paid for under the contract unit price for Bridge Anchorage Assembly, EA., and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate(s) and bolts, nuts and washers.

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

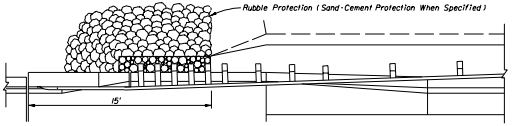
DETAIL E

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

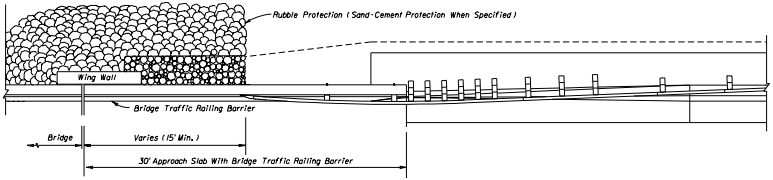
GUARDRAIL

	Names	Dates	Approved By
Designed By			State Roadway Design Engineer
Drawn By	RKH	9-98	Revision: 00 / Sheet No.: 13 of 31 / Index No.: 400
Checked By	JVC	9-98	

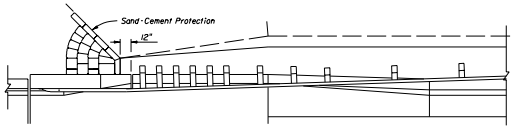
$$$$$$SYTIME$$$$$$



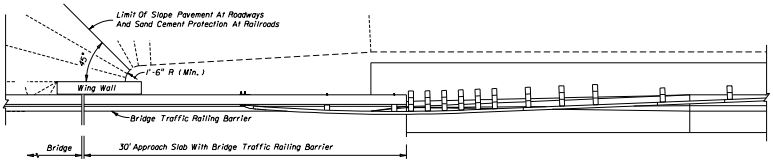
BRIDGES OVER STREAMS



BRIDGES OVER STREAMS



BRIDGES OVER RAILROADS



BRIDGES OVER ROADWAYS OR RAILROADS

For Additional Information See Sheet 13

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

For Additional Guardrail Information See Sheet 12

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

SKETCH NOTES

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

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

SHOULDER INTERFACE BETWEEN ROADWAYS AND BRIDGES

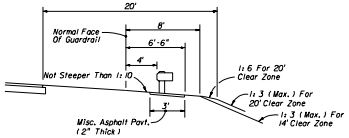
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

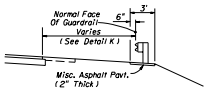
	Names	Dates
Designed By		
Drawn By		
Checked By		

Approved By _____
State Roadway Design Engineer

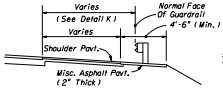
Bridge	Sheet No.	Index No.
00	14 of 31	400



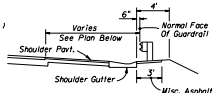
SECTION AA (EXAMPLE FOR 20' CLEAR ZONE)



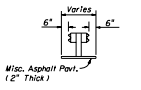
SHOULDER WITH OR WITHOUT 5' PAVEMENT



PAVED SHOULDERS

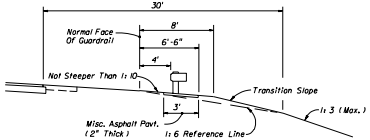


SHOULDER GUTTER

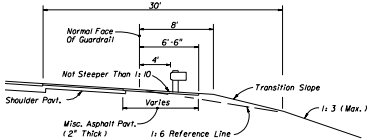


DOUBLE FACE RAIL

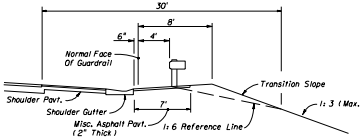
MISCELLANEOUS PAVING FOR STANDARD GUARDRAIL SECTIONS



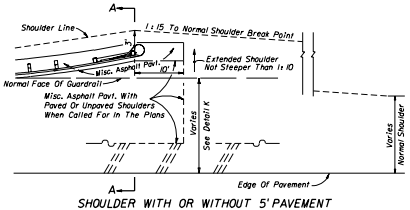
SECTION AA (EXAMPLE FOR 30' CLEAR ZONE)



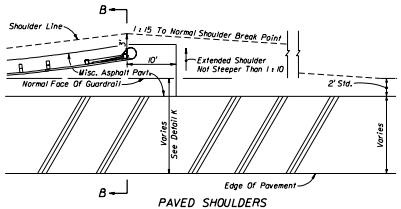
SECTION BB (EXAMPLE FOR 30' CLEAR ZONE)



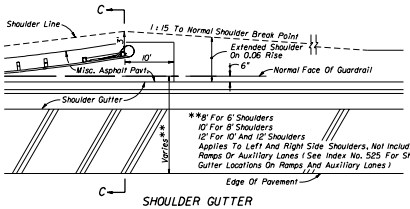
SECTION CC (EXAMPLE FOR 30' CLEAR ZONE)



SHOULDER WITH OR WITHOUT 5' PAVEMENT

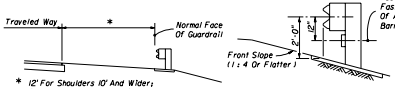


PAVED SHOULDERS

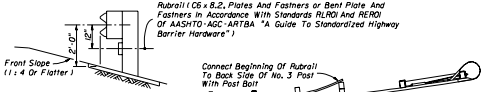


SHOULDER GUTTER

SHOULDERS, SLOPES AND MISCELLANEOUS PAVING FOR FLARED END ANCHORAGE ASSEMBLIES



STANDARD LOCATIONS



LOCATIONS ON FRONT SLOPES

LATERAL PLACEMENT ON FRONTSLOPES (FROM EDGE OF TRAVELED WAY)		
SLOPE	NOT RECOMMENDED	ACCEPTABLE WITH RUBRAIL
4:1	14' to 27'	28' to 45'
5:1	15' to 25'	26' to 45'
6:1	17' to 22'	23' to 45'
7:1	21' to 24'	25' to 45'
8:1	Acceptable to 25'	26' to 45'
9:1	Acceptable to 26'	27' to 45'
10:1	Acceptable to 27'	28' to 45'

Notes:
For shoulders less than 12' in width the tabulated values will be reduced by the difference between 12' and the shoulder width.

Placement of guardrail on frontslopes steeper than 4:1 not recommended.

Cost of rubrail to be included in the contract unit price for guardrail.

GUARDRAIL LOCATION - DETAIL K

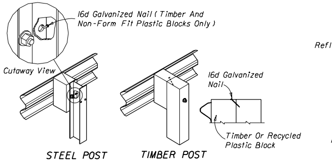
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates	Approved By
Designed By			State Roadway Design Engineer
Drawn By	JB	07/10	Revision
Checked By	JBM/JHS	07/10	00

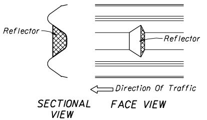
Sheet No. 15 of 31

Index No. 400



16d Galvanized Nail Driven After Post Bolt Pull-Up, Single And Double Face Guardrail, Single Face Guardrail Shown (16d Nail Between Blocks For Multiple Offset Blocks).

16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION

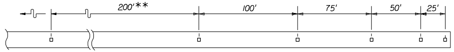


Reflectors shall be centered in the channel of W-beam and in the top channel of thrie-beam.

REFLECTOR MOUNTING

REFLECTOR NOTES

1. Reflectors shall conform to Section 993 of the Standard Specifications.
2. Reflector color (white or yellow) shall conform to the color of the near lane edgeline.
3. Face of rail bolt, screw, rivet or bracket mounted reflectors shall not be used in lieu of adhesive mounted reflectors.
4. Post mounted reflectors approved on the 'Qualified Products List' may be used by FDOT Maintenance to replace damaged or missing reflector in a continuous run of existing post mounted reflectors. Adhesive and post mounted reflectors shall not be intermixed in a continuous run of guardrail.
5. The cost for reflectors shall be included in the contract unit price for Guardrail.



Note: Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer.
For minimum installations (length 68.75') provide one reflector at each end and at approximate center.

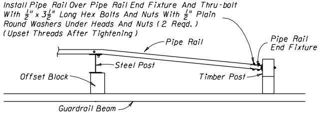
**For curves greater than 2° the spacing shall be reduced to 100' through the curve.

REFLECTOR SPACING
ADHESIVE REFLECTORS-DETAIL M

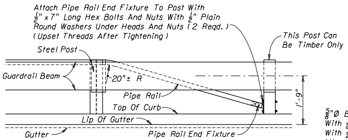
POSTS	OFFSET BLOCKS	REMARKS
Timber	6" x 8" x 14" Timber (Nominal) Or 6" x 8" x 14" Recycled Plastic	Post bolt hole in timber and plastic blocks to be centered (±1/4") All timber offset blocks shall be dressed on all four sides (S4S). See Note 1 below. One 16d galvanized nail per block is to be used to prevent rotation of block (see detail left).
Steel W6 x 9 Or 6" C	6" x 8" x 14" Timber (Nominal) Or 6" x 8" x 14" Recycled Plastic	Same as above for timber and plastic blocks. Form fit plastic block holes align with holes in steel posts and do not require nails.
Steel W6 x 9 Or 6" C	M14 x 18 x 22" Or W14 x 22 x 22" (Steel Modified Thrie-Beam)	5/8"Ø x 1 1/2" long hex head bolts with full length thread and nuts (2 Reqd.) and 5/8" plain round washers (4 Reqd.) for mounting steel block to post. Bolts are to be installed in opposite holes, top and bottom.

Notes: 1. Thrie-beam offset blocks are 22" in length.
2. Timber and recycled plastic offset blocks of equal size can be intermixed within a run of rail.
3. Rubber offset blocks are not to be used on moderate or high volume facilities and used only on low volume facilities when specifically called for in the plans.

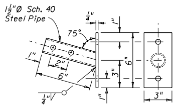
PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS


Install Pipe Rail Over Pipe Rail End Fixture And Thru-bolt With 1/2" x 3 1/2" Long Hex Bolts And Nuts With 1/2" Plain Round Washers Under Heads And Nuts (2 Reqd.) (Upset Threads After Tightening)
Pipe Rail
Pipe Rail End Fixture
Steel Post
Offset Block
Timber Post
Guardrail Beam

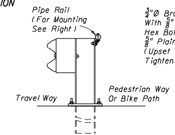
PLAN


Attach Pipe Rail End Fixture To Post With 1/2" x 7" Long Hex Bolts And Nuts With 1/2" Plain Round Washers Under Heads And Nuts (2 Reqd.) (Upset Threads After Tightening)
This Post Can Be Timber Only
Steel Post
Guardrail Beam
20" ± R
Pipe Rail
Top Of Curb
Lip Of Gutter
Gutter
Pipe Rail End Fixture
1'-9"

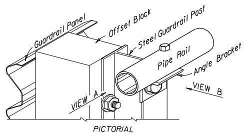
ELEVATION



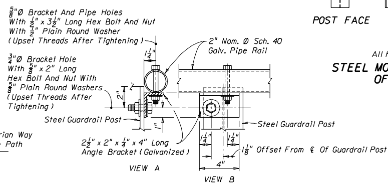
PIPE RAIL END FIXTURE



SECTION



PICTORIAL


5/8"Ø Bracket And Pipe Holes With 1/2" x 3 1/2" Long Hex Bolt And Nut With 1/2" Plain Round Washer (Upset Threads After Tightening)
3/4"Ø Bracket Hole With 5/8" x 2" Long Hex Bolt And Nut With 5/8" Plain Round Washers (Upset Threads After Tightening)
Steel Guardrail Post
2 1/2" x 2" x 1/4" x 4" Long Angle Bracket (Galvanized)
VIEW A
2" Nom. Ø Sch. 40 Galv. Pipe Rail
Steel Guardrail Post
1 1/8" Offset From ℄ Of Guardrail Post
4"
VIEW B

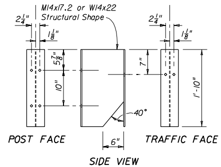
PIPE RAIL MOUNTING

PIPE RAIL NOTES

1. Special Safety Pipe Rail required on steel guardrail posts when pedestrian ways and bikeways are located 4' or less from back of the posts. Begin and end the pipe rail in accordance with this detail.
2. When guardrails with timber posts are located with the back of posts 4' or less from the near edge of the pedestrian way or bikeway, the bolt ends will require one of the following treatments:
   (a) Trimming back flush with the face of nut and metalizing or
   (b) Use of post bolts 15" in length with the washers and nuts counter sunk into sinks 1" to 1 1/2" deep or
   (c) Use of post bolts 15" in length with sleeve nuts and washers.
3. The cost for Special Safety Pipe Rail, mounting components and installation shall be included in the contract unit price for Guardrail.

FOR LOCATIONS USED BY PEDESTRIANS OR CYCLISTS

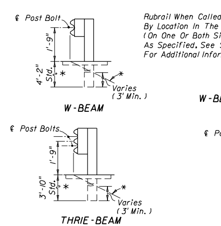
SPECIAL SAFETY PIPE RAIL



SIDE VIEW

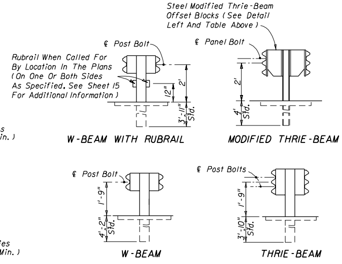
All Holes Are 3/4"Ø

STEEL MODIFIED THRIE-BEAM OFFSET BLOCK



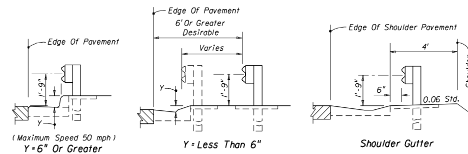
*Front Slope When Right Of Way, Environmental Or Other Restrictions Prohibit Normal Shoulder Extension

SINGLE FACED GUARDRAIL


Steel Modified Thrie-Beam Offset Blocks (See Detail Left And Table Above)
℄ Post Bolt
℄ Panel Bolt
Rubrail When Called For By Location In The Plans (On One Or Both Sides As Specified, See Sheet 15 For Additional Information)
W-BEAM WITH RUBRAIL
MODIFIED THRIE-BEAM
℄ Post Bolt
℄ Post Bolts
W-BEAM
THRIE-BEAM

DOUBLE FACED GUARDRAIL

MOUNTING HEIGHTS ON SHOULDERS AND IN MEDIANS



LOCATION AT CURB & GUTTER SECTIONS-DETAIL L

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN					
GUARDRAIL					
	Names	Dates	Approved By		
Designed By			State Roadway Design Engineer		
Drawn By	HSD	09/81	Revision	Sheet No.	Index No.
Checked By	JBW/JVG	09/81	00	16 of 31	400

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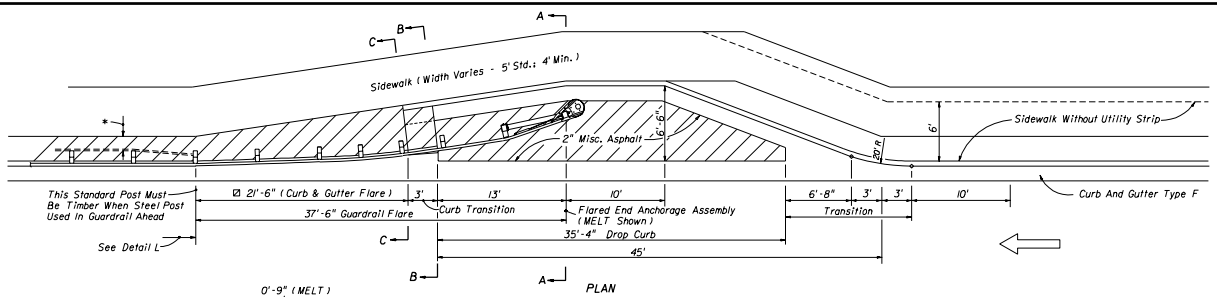
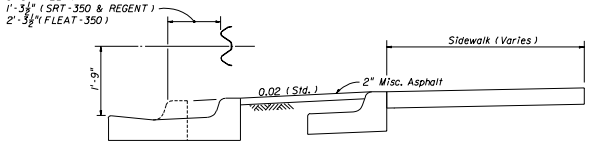
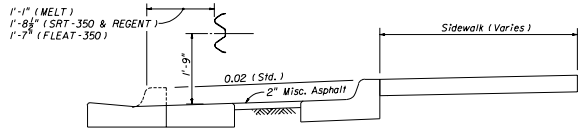


*Safety pipe rail is required when the back of steel guardrail posts are 4' or less from the near edge of a pedestrian way or bikeway and post bolt treatment is required when the back of timber posts are 4' or less from the near edge of a pedestrian way or bikeway; see 'SPECIAL SAFETY PIPE RAIL'

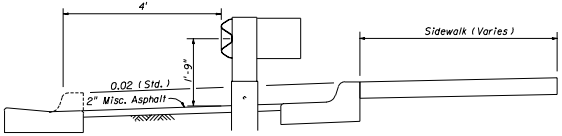
Ø Curb flare shall follow guardrail flare, see elsewhere in this index for additional guardrail flare information.



SECTION CC



SECTION BB



SECTION AA

APPROACH TREATMENT FOR CURB AND GUTTER

DETAIL Q

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates
Designed By	JVG/JBW	10/07
Drawn By	JBW	10/07
Checked By	JVG	10/07

Approved By _____
State Roadway Design Engineer

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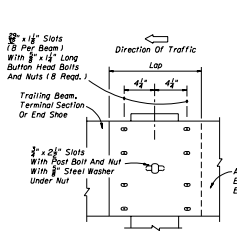
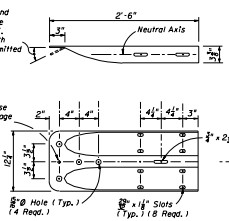
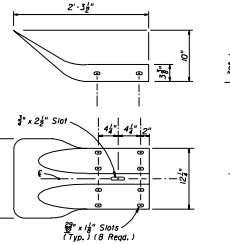


W-BEAM RAIL SPLICE

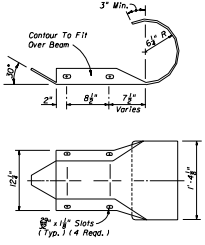


Note: 3/8"Ø Steel washer required with splice bolts

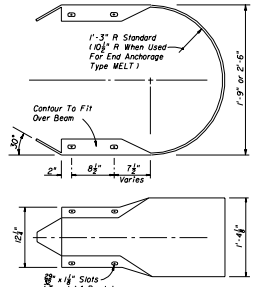
SPECIAL END SHOE



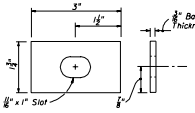
FLARED END SECTION



ROUNDED END SECTION



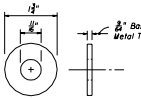
BUFFER END SECTION



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

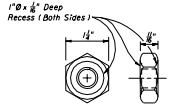
(RECTANGULAR PLATE WASHER)

BEAM WASHER

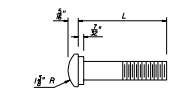


Note: The round washer is not intended for use under the recess nut for the beam to beam rail splice. The washer is required under the recess nut for connecting the beam to the special end shoe; under the post bolt nut for connecting the beam to the timber post and offset blocks; for connecting the beam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

5/8" STEEL WASHER



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



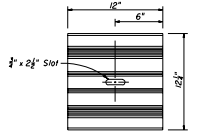
L (In.)	THREAD LENGTH (In.)	APPLICATION
1 1/4"	Full Length	Rail Splice Bolt
10"	4"	Post Bolt - Single Or Double Faced Guardrail - Timber Or Recycled Plastic Offset Block(s) On Steel Post
18"	4"	Post Bolt - Single Faced Guardrail Timber Posts
25"*	4"	Post Bolt - Double Faced Guardrail Timber Posts

Special bolts having lengths of 10" or greater shall have a thread length of not less than 4".

* Use of the 25" AASHTO-AGC-ARTBA standard length post bolt on double faced guardrail that results in the bolt projecting more than 3" beyond the face of the nut after pull-up shall be trimmed to 3" reveal and metalized with organic zinc-rich coating.

Note: Specifications same as for hex bolts.

5/8" OVAL SHOULDER BUTTON HEAD BOLT



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

W-BEAM BACK-UP PLATE

Hex bolts shall conform to the requirements of ASTM F568M and hex nuts to the requirements of ASTM A563M. Heavy hex nuts may be used in lieu of hex nuts and hex nuts used for jam nuts.

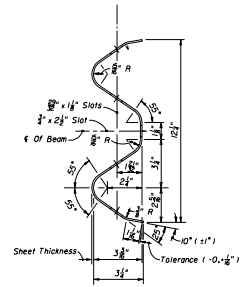
HEX BOLTS AND NUTS

POST SPACING (Ft.)	SINGLE BEAM		NESTED BEAMS	
	W-Beam	Thrie-Beam	W-Beam	Thrie-Beam
6'-3"	4'	3'-3"	N/A	N/A
3'-1 1/2"	2'	2'-6"	2'-8"	2'-4"
1'-6 1/2"	N/A	N/A	2'-4"	2'

OFFSETS (Ft.) Measured From Face Of Guardrail To Front Of Above Ground Rigid Hazard

Note: The values shown should be utilized unless changes are supported by Imperical validation. Those desiring to develop offset values from the simulated deflection values shown in Table 5.3 of the AASHTO Roadside Design Guide are cautioned to procede only if background in the table development is understood.

MINIMUM OFFSET FOR SINGLE FACED GUARDRAIL (Ft.)



W-BEAM

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates	Approved By
Designed By			
Drawn By	HSD	8/18	Roadway Design Engineer
Checked By	JBW/AVG	8/18	State Roadway Design Engineer

Revisions	Sheet No.	Index No.
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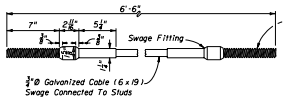
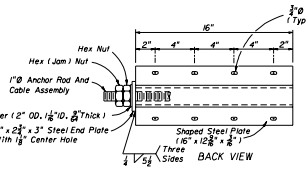
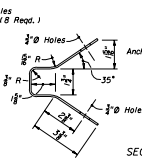
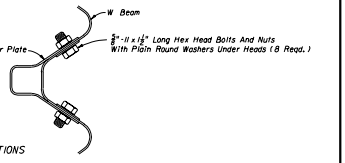


Note: Cable assemblies shall be in accordance with the specifications of AASHTO-AGC-ARTBA 'A Guide To Standardized Highway Barrier Hardware' Cable Anchor Assembly FCAOI. Cable assemblies as detailed above are required as a part of end anchorage assemblies Type II (Cable Option), MELT, SRT-350, CRT, ET-2000, BEST, LET, SKT-350, FLEAT-350 and REGENT. An additional cable assembly 9' in length with a swaged fitting on one (1) end is required for each end anchorage assembly Type CRT.

CABLE ASSEMBLY

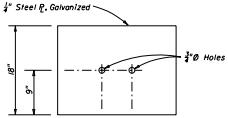




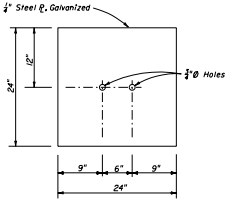


Note: Beam anchor plates are required for use as a part of end anchorage assemblies Type II, MELT, SRT-350, CRT and REGENT.

BEAM ANCHOR PLATE

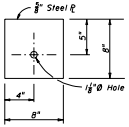


Note: This soil plate is required for use as a part of end anchorage assemblies Type II (Cable Option), CRT, SRT-350, ET-2000 and REGENT.



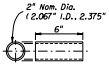
Either soil plate is approved for use as a part of end anchorage assembly Type MELT.

SOIL PLATES



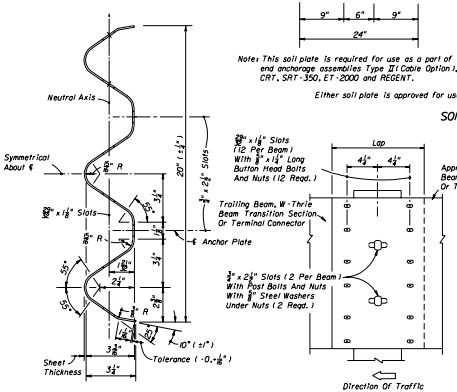
Note: This bearing plate is required for use as a part of end anchorage assemblies Type II (Cable Option), MELT, CRT, ET-2000, BEST, LET, SKT-350 and FLEAT-350.

BEARING PLATE



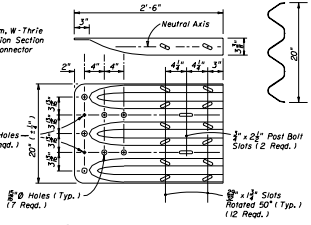
Note: This breakaway terminal post sleeve is required for use as a part of end anchorage assemblies Type II (Cable Option), MELT, CRT, SRT-350, ET-2000, BEST, LET, SKT-350 and FLEAT-350.

BREAKAWAY TERMINAL POST SLEEVE



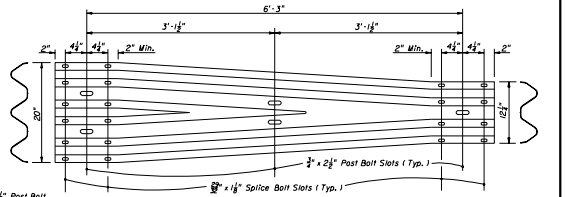
THRIE-BEAM

THRIE-BEAM RAIL SPLICE



Note: 1 1/8"Ø steel washer required with splice bolts

THRIE-BEAM TERMINAL CONNECTOR



W-THRIE BEAM TRANSITION SECTION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates
Designed By		
Drawn By		
Checked By		

Approved By _____
State Roadway Design Engineer

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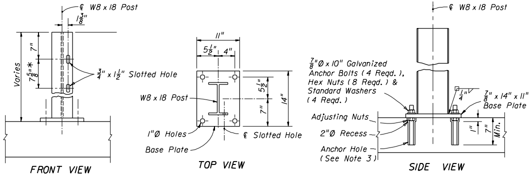
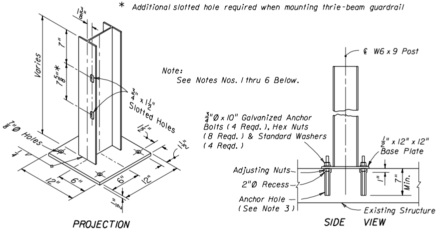


℄ W8 x 18 Post
$\frac{3}{4}$" x $1\frac{1}{2}$" Slotted Hole
W8 x 18 Post
1"Ø Holes
Base Plate
℄ Slotted Hole
$\frac{7}{8}$"Ø x 10" Galvanized Anchor Bolts (4 Reqd.), Hex Nuts (8 Reqd.) & Standard Washers (4 Reqd.)
Adjusting Nuts
2"Ø Recess
Anchor Hole (See Note 3)
$\frac{7}{8}$" x 14" x 11" Base Plate
FRONT VIEW
TOP VIEW
SIDE VIEW

FOR MOUNTING GUARDRAIL ON EXISTING APPROACH SLABS AND BRIDGE SIDEWALKS

* Additional slotted hole required when mounting thrie-beam guardrail

Note:
See Notes Nos. 1 thru 6 Below.



$\frac{3}{4}$" x $1\frac{1}{2}$" Slotted Holes
$\frac{7}{8}$"Ø Holes
PROJECTION
℄ W6 x 9 Post
$\frac{3}{4}$"Ø x 10" Galvanized Anchor Bolts (4 Reqd.), Hex Nuts (8 Reqd.) & Standard Washers (4 Reqd.)
$\frac{1}{2}$" x 12" x 12" Base Plate
Adjusting Nuts
2"Ø Recess
Anchor Hole (See Note 3)
Existing Structure
SIDE VIEW

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

NOTES: (SPECIAL STEEL POST)

1. Either anchor bolts, concrete wedge anchors or approved Adhesive-Bonded Anchors for Structural Applications may be used.

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

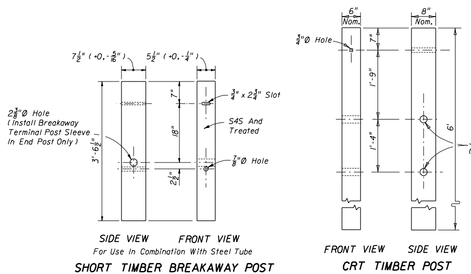
2. Posts are to be plumbed by adjusting nuts or mortar seating. Posts installed using anchor bolts and adhesive anchors are to be set with adjusting nuts as detailed, unless the Engineer approves the use of mortar seating in lieu of adjusting nuts. Posts installed using wedge anchors are to be set with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

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

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

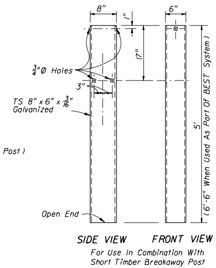
6. Steel post and base units shall be galvanized in accordance with ASTM A123. Any damaged galvanized areas are to be metalized in accordance with Section 562 of the Standard Specifications.

SPECIAL STEEL GUARDRAIL POSTS

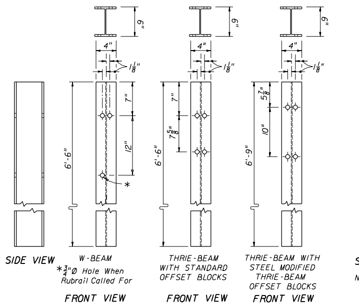


$2\frac{3}{8}$"Ø Hole (Install Breakaway Terminal Post Sleeve In End Post Only)
$\frac{3}{4}$" x $2\frac{3}{4}$" Slot
S4S And Treated
$\frac{7}{8}$"Ø Hole
SIDE VIEW
FRONT VIEW
For Use In Combination With Steel Tube
SHORT TIMBER BREAKAWAY POST
$\frac{3}{4}$"Ø Hole
$3\frac{1}{2}$"Ø Hole (2 Holes Each Post)
FRONT VIEW
SIDE VIEW
CRT TIMBER POST

SPECIAL TIMBER GUARDRAIL POSTS



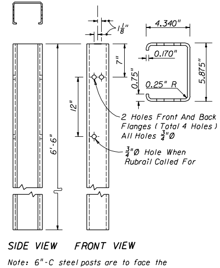
STEEL TUBE



All Holes Shall Be $\frac{3}{4}$"Ø Identical Front And Back Flanges

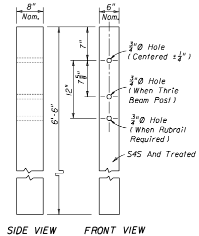
Note: W6 x 8.5 or W6 x 9 steel posts may be either rolled or welded structural shapes conforming to or exceeding the design properties of ASTM A6/A6M. Welding shall be in accordance with the requirements of ASTM A769/A769M. Posts shall be cut to length and the ends seal welded between web and flange before galvanizing. Posts to be galvanized in accordance with ASTM A123.

W6 x 8.5 OR W6 x 9 STEEL POST



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

6"-C STEEL POST



TIMBER POST

STANDARD TIMBER AND STEEL GUARDRAIL POSTS

GUARDRAIL POSTS

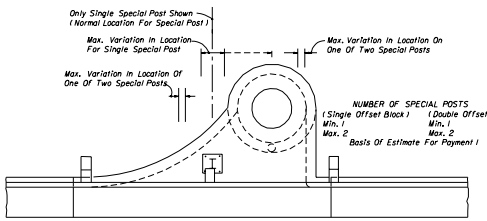
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

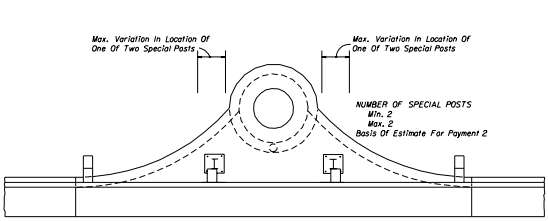
	Names	Dates	Approved By
Designed By			State Roadway Design Engineer
Drawn By	JM	08/81	
Checked By	JVG/JBW	08/81	

Revision	Sheet No.	Index No.
00	20 of 31	400

$$$$$$SYTIME$$$$$$



CURB INLET TYPE 1



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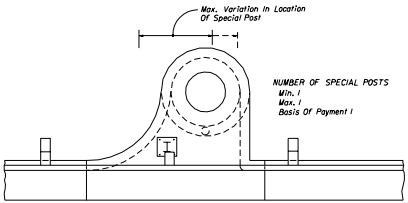

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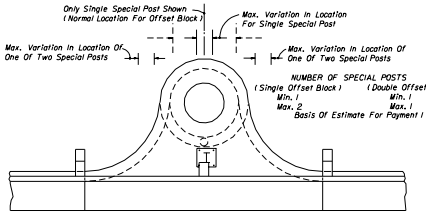

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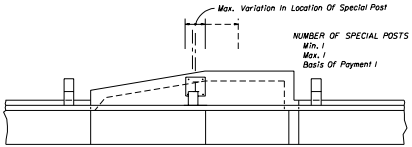

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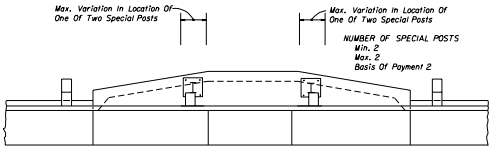
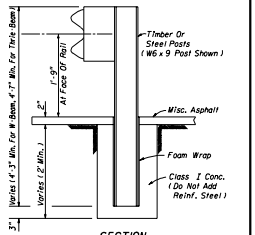
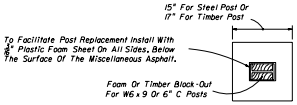


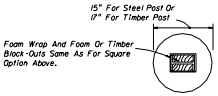
CURB INLET TYPE 6



SECTION



PLAN
(SQUARE OPTION)



PLAN
(ROUND OPTION)

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

TO BE USED PRINCIPALLY OVER SHALLOW UTILITIES

ENCASED GUARDRAIL POST

Notes:

1. The locations shown for special posts mounted on inlets are to be used as guidelines for positioning the posts and for estimating the number of required posts.
2. Special posts and their anchorages mounted on curb inlets shall be in accordance with special steel guardrail posts Sheet 20, and paid for under the contract unit price for Special Guardrail Post, EA.
3. Variations shown for the locations of special posts mounted on inlets are established from standard post spacing (6'-3" ½ clearance of standard posts from inlets (4" min.), use of single and double offset blocks on standard posts adjacent to the inlets, optional flange mountings; and, concrete anchor edge distances (2" for grouted and 3½" for expansion anchors). The number of posts and their locations may vary by reducing post spacing and adjusting the length of rail panel (s).
4. Encased guardrail posts shall conform in section to standard timber and steel posts, and be paid for under the contract unit price for Special Guardrail Post, EA. Payment shall include cost of foam wrap and concrete encasement.

LEGEND

Variation In Location Of Special Post:

Single Offset Block (s) On Adjacent Standard Post (s)

Expanded Location By Using Double Offset Blocks On Adjacent Standard Post (s)

SPECIAL POST LOCATIONS ON CURB INLETS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

	Names	Dates	Approved By
Designed By			State Roadway Design Engineer
Drawn By	HSD	08/03	Revision
Checked By	JAG	08/03	00

Sheet No. 21 of 31

Index No. 400

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