2016 Design Standards eBooklet Update

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Design Standards eBooklet Page

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Design Standards

- Modification Request Origination Form
- Industry Review
- Status of Proposed Revisions

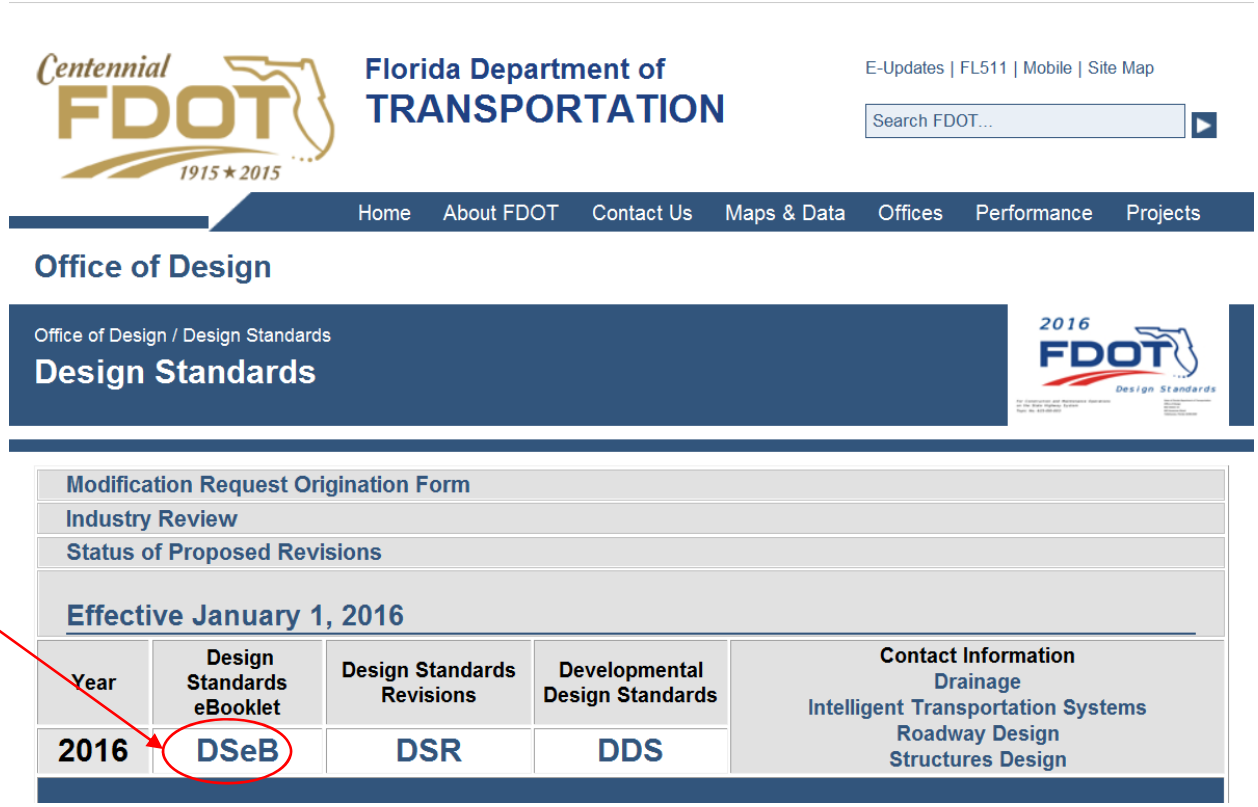
Effective January 1, 2016

Year	Design Standards eBooklet	Design Standards Revisions	Developmental Design Standards	Contact Information
2016	DSeB	DSR	DDS	Drainage Intelligent Transportation Systems Roadway Design Structures Design

http://www.dot.state.fl.us/rddesign/DesignStandards/Standards.shtm

Design Standards eBooklet Page

The 2016 eBooklet:



2016 eBooklet

Design Standards eBooklet Page

Index Number (PDF)	Design Standards Revision (DSR)	Index Title	Design Information: Instructions for Design Stds (IDS) (PDF)	Design Information: Data Table Cell Library (ZIP)	Design Information: Borderless DGNs (ZIP) Terms of Use
Complete eBooklet *(252mb)* 2016 Design Standards eBooklet			Combined Available IDS *(11mb)*	Combined Available CEL *(1mb)*	Combined DGN *(129mb)*
		COVER, TABLE OF CONTENTS AND REVISIONS			
Cover		Booklet Cover	Cover		
Content		Table of Contents	Content		
Revisions		Revision History	Introduction Revisions		

		DRAINAGE (200-295)	(200-288, 293-295) Drainage Contact (289-292) Structures Contact		
200		Structure Bottoms - Type J & P			DGN-00200
201		Supplementary Details for Manholes & Inlets			DGN-00201
206		Trench Drain			DGN-00206
210		Curb Inlet Tops - Types 1, 2, 3 & 4			DGN-00210
211		Curb Inlet Tops - Types 5 & 6			DGN-00211
212		Curb Inlet - Type 7			DGN-00212
213		Curb Inlet - Type 8			DGN-00213
214		Curb Inlet Top - Type 9			DGN-00214
215		Curb Inlet Top - Type 10			DGN-00215
216		Closed Flume Inlet			DGN-00216
217		Median Barrier Inlets Types 1, 2, 3, 4 and 5			DGN-00217

Design Standards Revisions

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2016	DSeB	DSR	DDS	Drainage Intelligent Transportation Systems Roadway Design Structures Design

2015 Design Standard Revisions

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Office of Design / Design Standards / Design Standards Revisions 2015

Design Standards Revisions 2015

n/a = Non Applicable
n/c = No Change

Index Number	Revised Sheets	Index Title	Design Information			
			Instructions for Design Standards (IDS)	Data Table Cell Library	Borderless DGNs	Associated Design Bulletin
	(PDF)		(PDF)	(ZIP)	(ZIP) Terms of Use	(PDF)
412	1 of 5	Low Profile Barriers	N/A	N/A	N/A	RDB14-18
501	N/A	Geosynthetic Reinforced Soils	IDS-00501	N/A	N/A	RDB14-15
519	1 of 1	Rumble Striping	IDS-00519	N/A	N/A	RDB15-03
600	1-12 of 12	General Information for Traffic Control Through Zones	N/A	N/A	N/A	RDB14-18
603	1-2 of 2	Two-Lane Two-Way Work Within the Travel Way	N/A	N/A	N/A	
607	1 of 1	Two-Lane, Two-Way Mobile Operation, Work on Shoulder and Work within the Travel Way	N/A	N/A	N/A	RDB15-06
619	1-2 of 2	Multilane, Mobile Operations, Work on Shoulder, Work Within the Travel Way	N/A	N/A	N/A	

2015 Roadway/Structures Design Bulletins

Roadway Design Bulletin

Index Number	Revised Sheets	Index Title	Design Information			
			Instructions for Design Standards (IDS)	Data Table Cell Library	Borderless DGNs	Associated Design Bulletin
	(PDF)		(PDF)	(ZIP)	(ZIP) Terms of Use	(PDF)
412	1 of 5	Low Profile Barriers	N/A	N/A	N/A	RDB14-18
501	N/A	Geosynthetic Reinforced Soils	IDS-00501	N/A	N/A	RDB14-15
519	1 of 1	Rumble Striping	IDS-00519	N/A	N/A	RDB15-03
600	1-12 of 12	General Information for Traffic Control Through Zones	N/A	N/A	N/A	RDB14-18
603	1-2 of 2	Two-Lane Two-Way Work Within the Travel Way	N/A	N/A	N/A	
607	1 of 1	Two-Lane, Two-Way Mobile Operation, Work on Shoulder and Work within the Travel Way	N/A	N/A	N/A	RDB15-06
619	1-2 of 2	Multilane, Mobile Operations, Work on Shoulder, Work Within the Travel Way	N/A	N/A	N/A	

Roadway/Structures Design Bulletin

Florida Department of Transportation

RICK SCOTT
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

ANANTH PRASAD, P.E.
SECRETARY

ROADWAY DESIGN BULLETIN 14-13

(FHWA Approved: June 20, 2014)

DATE: June 20, 2014

TO: District Directors of Transportation Operations, District Directors of Transportation Development, District Design Engineers, District Construction Engineers, District Geotechnical Engineers, District Structures Design Engineers, and Program Management Engineers

FROM: Michael A. Shepard, P. E., State Roadway Design Engineer

COPIES: Brian Blanchard, Tom Byron, Duane Brautigam, Robert Robertson, David Sadler, Tim Lattner, Mark Wilson, Bruce Dana, John Krause, Greg Schiess, Trey Tillander, Rudy Powell, Nick Finch (FHWA), Chad Thompson (FHWA) and Felix Delgado (FHWA)

SUBJECT: **Guardrail Systems**

This bulletin provides revisions and additional requirements for guardrail systems.

REQUIREMENTS

1. The following ***Design Standards Revisions (DSR)*** are released:
   A. Revised Index 400 (Guardrail) is released.
   B. The new IDS-400 (Guardrail) is released.

2. Delete Item 2 under "Shielding drop-off hazards for vehicle occupants:" in ***Plans Preparation Manual***, Volume 1, Section 4.2.2 and replace it with the following:

   When a drop-off is to be shielded with guardrail, a minimum of 62.5 feet of guardrail is required to develop proper ribbon strength. A minimum clear area 5'-0" wide from the face of the guardrail is to be provided behind the standard W-beam guardrail to allow for dynamic deflection when impacted. Alternates shown in Table 4.3.1 may be used to allow for a clear area less than 5'-0" wide. A minimum distance of 2'-0" shall be provided from the back face of the guardrail posts to the shoulder slope break in order to provide proper soil bearing resistance for the posts.

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Instruction for Design Standards (IDS)

Instruction for Design Standards

		TRAFFIC RAILINGS	(400-403,410-415, 430 & 461) Roadway Contact (404,405,420-425, 470-484) Structures Contact		
400		Guardrail	IDS-400		
402		Guardrail Transitions and Connections for Existing Bridges	IDS-402		
403		Guardrail Transitions for Existing Bridge Traffic Railing Retrofits	IDS-403		
404		Guardrail Transitions - Existing Post & Beam Bridge Railings (Narrow & Recessed Curbs)	IDS-404		DGN-404
405		Guardrail Transitions - Existing Post & Beam Bridge Railings (Wide Curbs)	IDS-405		DGN-405
410		Concrete Barrier Wall			
411		Pier Protection Barrier	IDS-411		
412		Low Profile Barrier			
414		Type K Temporary Concrete Barrier System	IDS-414		

Instruction for Design Standards (IDS)

Index 402 Guardrail Transitions and Connections for Existing Bridges

Design Criteria

NCHRP Report 350; *AASHTO LRFD Bridge Design Specifications*, 6th Edition, Section 13; *Structures Design Guidelines (SDG)*

Design Assumptions and Limitations

This standard contains details for attaching thrie beam guardrail approach transition retrofits to Index 470 and 480 Series bridge railing retrofits and also to existing safety shape bridge traffic railings. Use this standard with Indexes 410, 470, 471, 472, 473, 474, 475, 476, 480, 481, 482, 483 and 484.

The appropriate Index 402 approach transition retrofit for Index 470 and 480 Series bridge railing retrofits must be selected and specified in the plans based on the shapes and designs of the existing bridge traffic railings, approach slabs and end bent wing walls. See the Instructions for Index 470 and Index 480 and *SDG* 6.7 for more information.

The following three sections of instructions address the use of Index 402 with existing safety shape bridge traffic railings:

1. A Historical Compilation of Superseded Florida Department of Transportation "Structures Standard Drawings" for "F" and "New Jersey" Shape Structure Mounted Traffic Railings
2. Guardrail Approach Transition Retrofit Instructions for Existing Flat Slab Bridges
3. Guardrail Approach Transition Retrofit Instructions for Existing Beam/Girder Bridges

Index 402 Thrie-Beam Guardrail transition retrofits are bolted to existing safety shape bridge traffic railings through field drilled holes utilizing the pre-drilled Thrie-Beam Terminal Connector as a template. This method of attachment creates the potential for conflicts between the new attachment bolts and existing utilities and/or conduits. Compare the locations of the new attachment bolts with the positions of any existing utilities and/or conduits. Guidance is provided on Index 402 for selecting a bolt pattern for the Thrie-Beam Terminal Connector that may avoid existing utilities and/or conduits. Existing utilities and/or conduits that conflict with the possible bolt patterns shall be relocated if possible or placed out of service. Include all necessary utility adjustment information in the Roadway Plans.

Revision History

- *Over 75 revisions to the Design Standards for the 2016 eBooklet*
- *All revisions are listed on the Revisions History Sheets along with descriptions of the changes*

Revision History

Index Number (PDF)	Design Standards Revision (DSR)	Index Title	Design Information: Instructions for Design Stds (IDS) (PDF)	Design Information: Data Table Cell Library (ZIP)	Design Information: Borderless DGNs (ZIP) Terms of Use
Complete eBooklet *(252mb)*			Combined Available IDS *(11mb)*	Combined Available CELs *(1mb)*	Combined Available DGNs *(57mb)*
		COVER, TABLE OF CONTENTS AND REVISIONS			
Cover		Booklet Cover	Cover		
Content		Table of Contents	Content		
Revisions		Revision History	Introduction Revisions		

Revision History

2016 REVISIONS

Index No	Sheet No	Description
Standard Abbreviations		
1	3 of 4	Deleted MSTCSD - Minimum Specifications For Traffic Control Signal Devices.
Standard Symbols		
2	3 of 4	Added back in the Existing Overhead Electric, Overhead Cable Television, Overhead Telephone, Overhead Fiber Optic line types.
Drainage		
200	5 of 5	Changed WWF to WWR.
201		
205		
216		
251		
252		
253		
261		
270		
281	2 of 2	section SOD PLACEMENT AT PIPE/CULVERT END TREATMENTS; Added TABLE 2: to the title of the SOD QUANTITIES (SY) Table; Labeled the right side FILTER FABRIC PLACEMENT AT CONCRETE STRUCTURE; Changed callouts for clarification.
289	1 of 8	Deleted Splice Length for #10 & #11 bars in TABLE 1.
291	2 of 5	Added Option 2 for Top Slab Placement in SCHEMATIC "A".
292	2 of 14	Changed Note #5 minimum size of deformed wire to D4.0 (per ASTM A1064 - 8.3.1); Changed Note #4 cover requirements to 2" for slightly and moderately aggressive, and 3" for extremely aggressive. (to match SDG).
Curbs	**Concrete Pavement and Sidewalks**	
304	1 of 7	Changed General Note #10.
310	1 of 2	Changed the Index references from 851 and 861 to Indexes 852 and 862 for the SIDEWALK WITH EDGE BEAM FOR SURFACE MOUNTED RAILS detail.
Traffic Railings		
400	2 of 26	Changed Note #1 web address; Changed Note #8, QPL to APL.
	18 of 26	Changed Note #3, QPL to APL.
	24 of 26	Changed Notes #2 and #3, QPL to APL.

Index No	Sheet No	Description
	1 of 25	Added New Note #2 Longitudinal Reinforcement note; Renumbered Notes.
	3 of 25	Changed Note #5.
	4 of 25	Added construction joint and dowels; Added additional Notes for construction joint and dowels; Added Longitudinal Reinforcement Note and Vertical Reinforcement spacing Note.
	5-7 of 25	Removed foundation lines within the ELEVATION view of the barrier.
	[illegible]	Added Centerline callout to OPPOSING LANE APPROACH detail for clarification; Updated
423	1 of 3	Changed bullet railing maximum height to 48" and rail splice/expansion joint location tolerance to 1'-0".
	2 of 3	Changed SHBR to 48" in TYPICAL SECTION and VIEW B-B, Changed Post callouts in NOTE.
461	1 of 1	Changed Note #2.
470	1 of 3	Corrected ASTM A449 reference designation in ANCHOR BOLT, NUTS AND WASHERS note.
General		
500	1 of 2	Changed the notes for the HALF SECTIONS WITH AND WITHOUT OVERBURDEN.
501	All	Deleted Index. The remaining details moved to the PPM and Structures Manual.
514	1 of 2	Changed General Notes; Added new Base Options column; Changed "*" note and added "**" note.
515	6 of 7	Changed Note #2; Deleted 5' dimension and added See Note #2; Added See Note #1 to the Auxiliary Lane Width callout.
518	2 of 3	Added back details for rigid pavement with rigid shoulders and showed Profiled Thermoplastic Markings.
519	1 of 1	New Index; Changed Note #1; Deleted Notes #4-#7.
521	1 of 1	Changed the mounting location to inside the cheekwall with minor adjustments to the widths.

Index No	Sheet No	Description
526	2 of 8	Deleted the Varies Dimension Line on all three details; Corrected Table "Minimum Under Restraints" changed to "Minimum Under Constraints".
546	1 of 6	Added "driveways" to Note #1; Added new note to provide definition of Minor Road, which includes "driveways"; Added "Design" to Tree spacing Table (i.e. Design Speed).
	2 of 6	Changed the Minor Road Under Stop Control (dL Dimension) from the center of the roadway to the centerline of the lane.
		ONES
		rom work zone signs and e Index; Deleted lights ces.
		for Sheet #8 and #11; he "Orange Flag for TCZ for TCZ signs";
		hanged PROJECT
		hanged the DROP-OFF #3; added Note #5; Note #7 and #9; Added Note for the DROP-OFF d the SHOULDER es; Changed the CLIST WAY DROP-OFF #2; Changed WARNING ed Table 1-Condition #4; 1 and #2.
	11 of 13	Renumbered to 10 of 12.
	12 of 13	Renumbered to 11 of 12; Deleted Note #4; Renumbered Notes #5- #12; Added new Note #12. Added Note #12; Added Barrier Delineators to the LONGITUDINAL CHANNELIZING DEVICES details.
	13 of 13	Renumbered to 12 of 12.
603	All	Redeveloped Index; Deleted lights and flags from work zone signs and their references within the Index; Added Index 600 Sheet 4 to this Index.
604	1 of 1	Deleted lights and flags from work zone signs and their references within the Index; Clarified reference to, and use of, Temporary Raised Rumble Strips.
605	1 of 1	Deleted lights and flags from work zone signs and their references within the Index; Clarified reference to, and use of, Temporary Raised Rumble Strips.
606	All	Deleted lights and flags from work zone signs and their references within the Index.
	1 of 4	Changed General Notes #2, #3, #4 and #8; Added Note #10.
607	1 of 1	Added Option 1 and 2 to the WORK IN TRAVEL WAY detail; Changed the Arrow Board in the WORK WITHIN TRAVEL LANE and WORK ON SHOULDER details.
608	1 of 1	Deleted lights and flags from work zone signs and their references within the Index.

Drainage

200	5 of 5	Changed WWF to WWR.
201	3 of 5	Added embedment length of dowel bars into slabs on OPTIONAL CONSTRUCTION JOINTS Detail and changed Note #4 to welded wire reinforcing.
	4 of 5	Changed minimum size of deformed wire to D4.0 to meet ASTM A1064-8.3.1.
205	1 of 1	Deleted Index.

2016 Design Standards
Drainage Indexes

Drainage Design Office Updates

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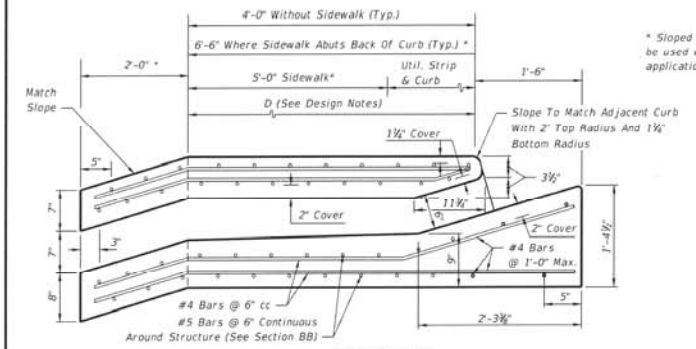
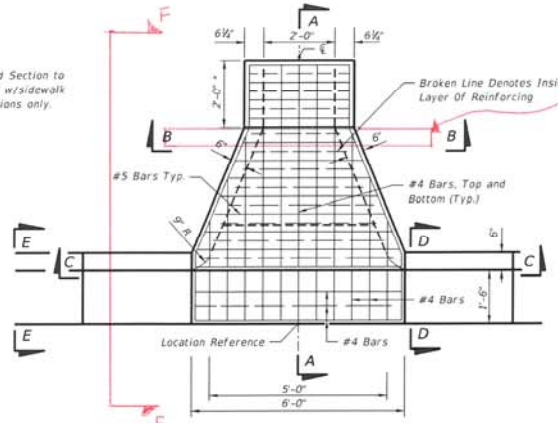


SECTION AA

* Sloped Section to be used w/sidewalk applications only.



TOP VIEW

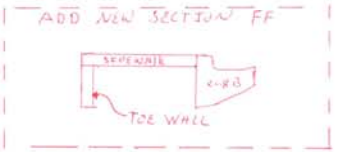
Add: TOE WALL 4'-0" x 1'-5" x 6"

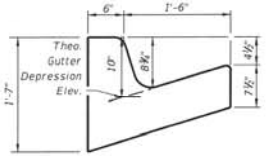
NOTE: Re-Arrange Sheet

GENERAL NOTES

1. The finished grade and slope of the inlet top are to conform with the finished cross slope and grade of the proposed sidewalk and/or border.
2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.
3. All steel shall have 2" minimum cover unless otherwise shown. Inlets can be either cast-in-place or precast concrete. Chamfer all exposed edges ¾".
4. All reinforcement is ASTM A615/A615M Grade 60 steel, either smooth or deformed. Equivalent area grade 40 steel or 65 ksi welded wire fabric may be substituted.
5. Inlets to be paid for under the contract unit price for Inlets (Closed Flume) EA.

ADD NEW SECTION FF





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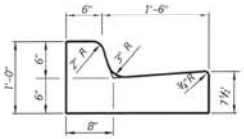
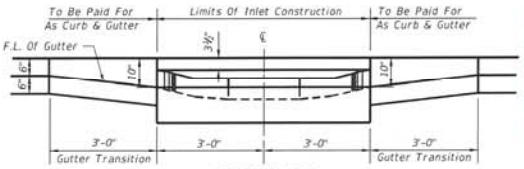
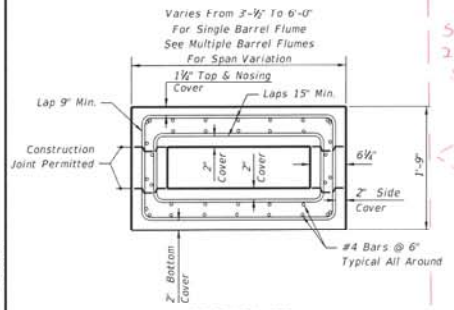


Curb And Gutter Type F
SECTION EE



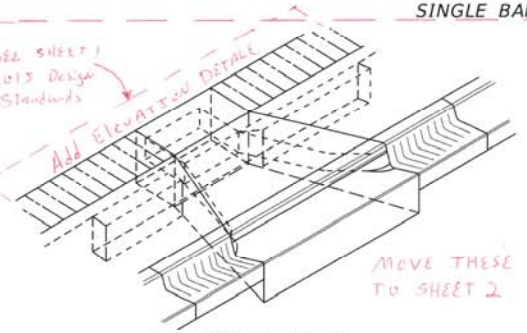
SECTION CC
SINGLE BARREL FLUME



SECTION BB

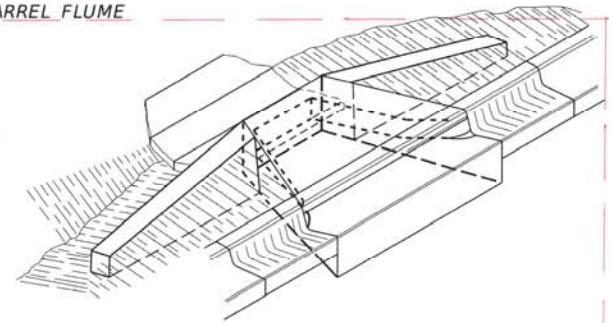
SEE SHEET 1 2015 Design Standards

Add ELEVATION DETAIL



MOVE THESE TO SHEET 2

SINGLE BARREL FLUME DEPICTED
FLUME W/SIDEWALK INLET (CLOSED FLUME) TYPE I



SINGLE BARREL FLUME DEPICTED
FLUME W/O SIDEWALK INLET (CLOSED FLUME) TYPE II

LAST REVISION	REVISION	DESCRIPTION:	FDOT 2015 DESIGN STANDARDS	CLOSED FLUME INLET	INDEX NO.	SHEET NO.
07/01/14					216	1 of 3

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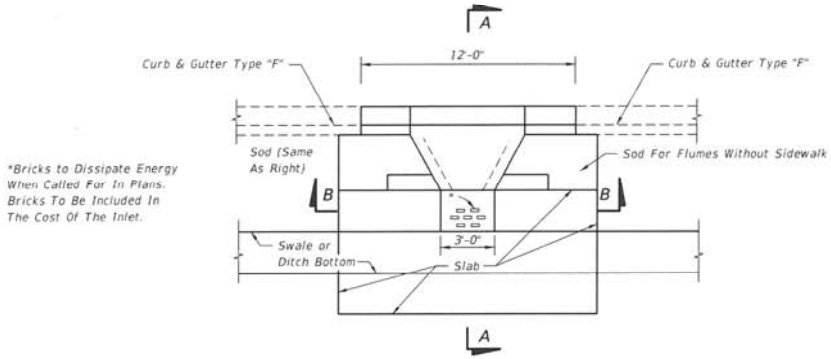

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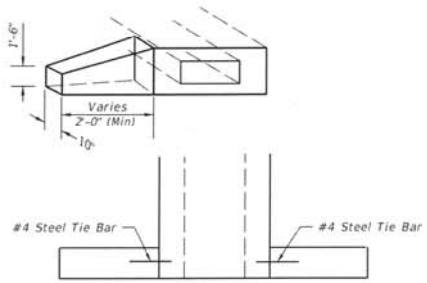
PLAN



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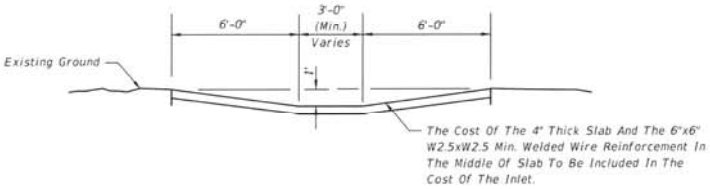
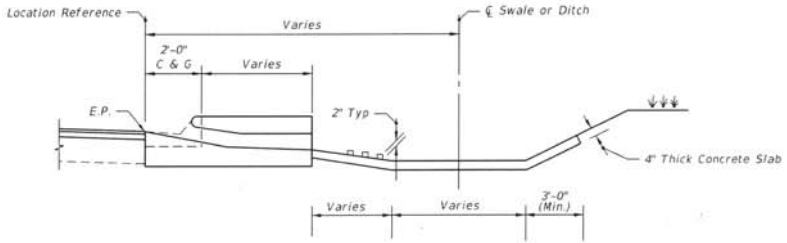
ENDWALL



SINGLE BARREL FLUME DEPICTED
SECTION BB



SECTION AA

Move up and rearrange sheet.

SLOPES, DITCH APRON AND ENDWALLS

Add DETAILS Form SHEET 1

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/14			FDOT 2015 DESIGN STANDARDS	CLOSED FLUME INLET	216	2 of 3

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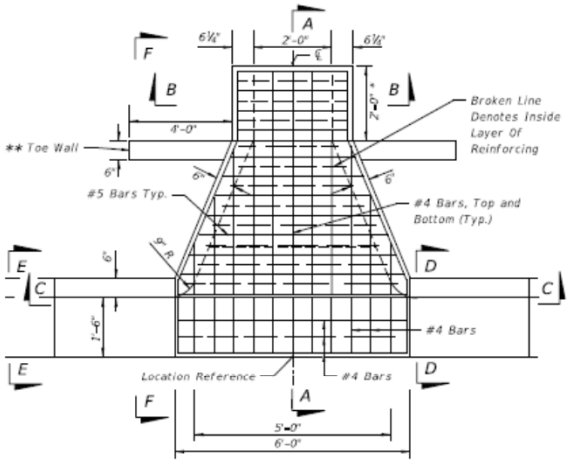
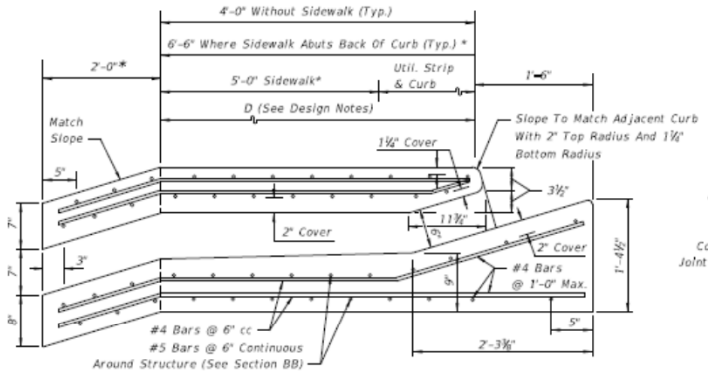


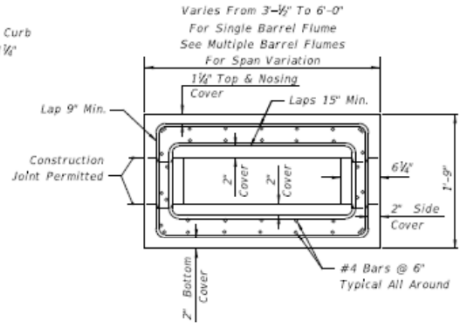
TOP VIEW



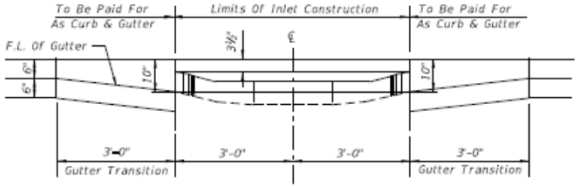
SECTION AA

* Sloped Section to be used w/sidewalk applications only.

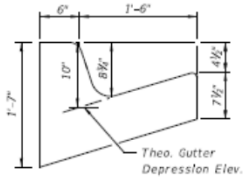
** Toe Walls as depicted to be used with sidewalk application only. For endwall without sidewalk see detail on Sheet 2.



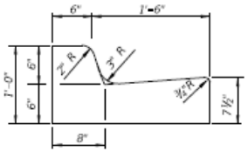
SECTION BB



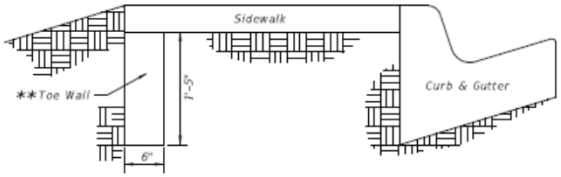
SECTION CC



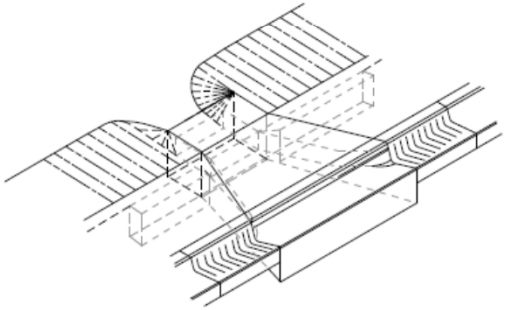
SECTION DD



SECTION EE
(Curb And Gutter Type F)



SECTION FF



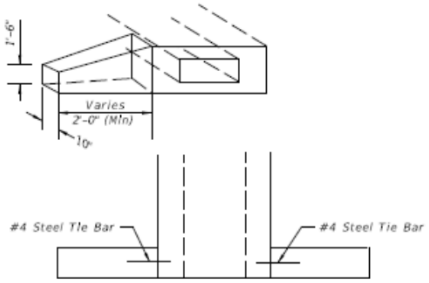
FLUME W/SIDEWALK INLET (CLOSED FLUME) TYPE I
SINGLE BARREL FLUME DEPICTED

GENERAL NOTES

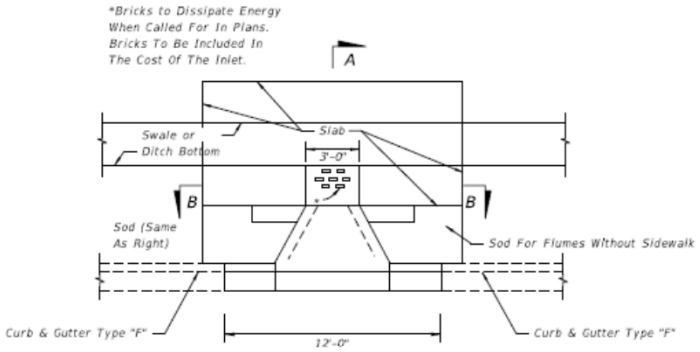
1. The finished grade and slope of the inlet top are to conform with the finished cross slope and grade of the proposed sidewalk and/or border.
2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when ecessary.
3. All steel shall have 2" minimum cover unless otherwise shown. Inlets can be either cast-in-place or precast concrete. Chamfer all exposed edges ¾".
4. All reinforcement is ASTM A615/A615M Grade 60 steel, either smooth or deformed. Equivalent area grade 40 steel or 65 ksi welded wire fabric may be substituted.
5. Inlets to be paid for under the contract unit price for Inlets (Closed Flume) EA.

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/15			FDOT 2016 DESIGN STANDARDS	CLOSED FLUME INLET	216	1 of 3

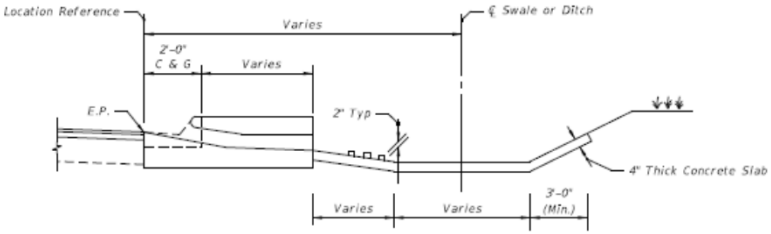
6/9/2015 2:42:51 PM



ENDWALL



PLAN



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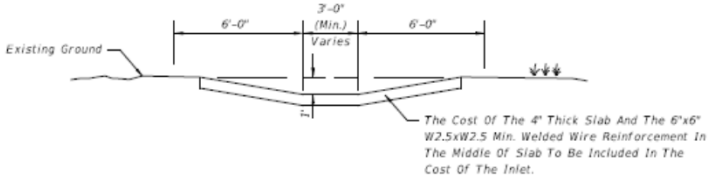

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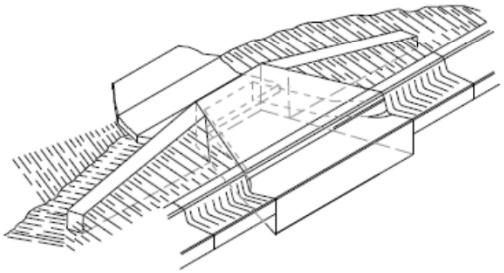
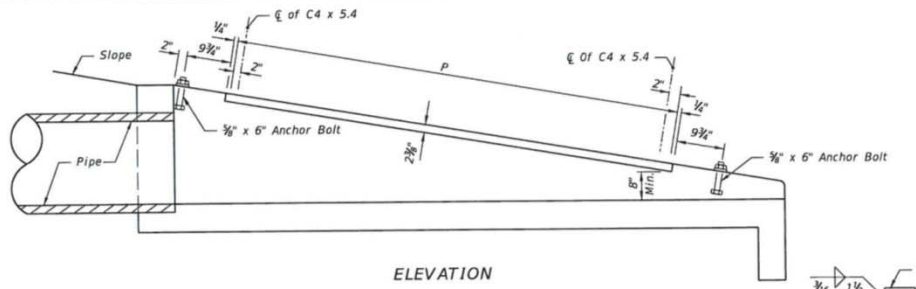


FLUME W/O SIDEWALK INLET (CLOSED FLUME) TYPE II

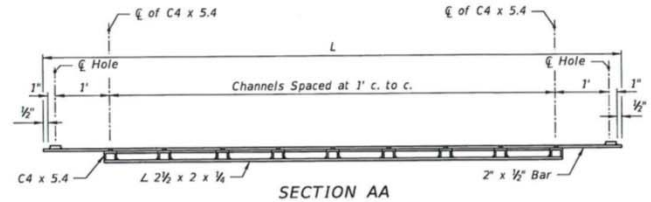
SINGLE BARREL FLUME DEPICTED

6/19/2015 3:21:51 PM

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/15			FDOT 2016 DESIGN STANDARDS	CLOSED FLUME INLET	216	2 of 3



ELEVATION



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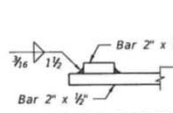
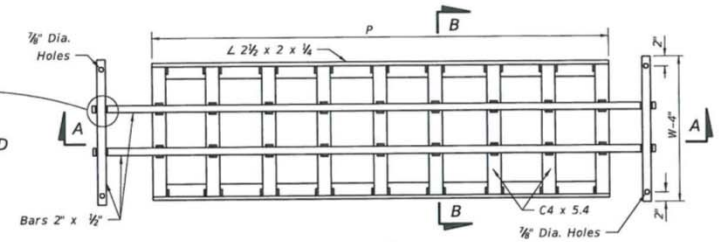
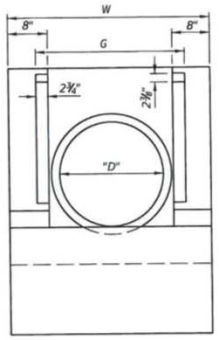


BAR TO BAR WELD



PLAN



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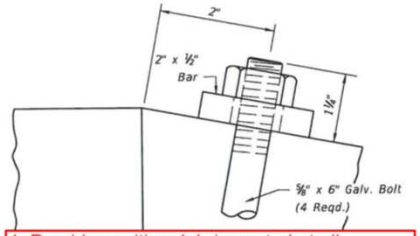
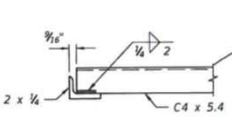
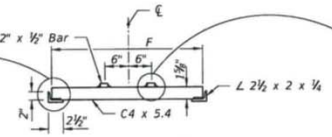


MOUNTING FOR S



CHANNEL TO ANGLE WELD



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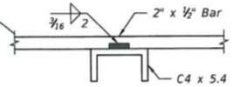


BAR TO CHANNEL WELD

STEEL GRATE

1. Provide positive debris control at all upgradient openings. Do not install grates unless one or more of the following conditions exist:
A. Pipe culvert endwalls are located within the designated clear zones.
Re-letter the others.

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE GRATE

Rate Of Slope	Size Pipe D	G	2 Each Bars @ 3.4 lb/ft			(X) Channels @ 5.4 lb/ft			2 Angles @ 3.62 lb/ft		Total Weight (lb)
			L	W-4"	lb	(X)	F	lb	P	lb	
1:6	15"	2' -8½"	9'-3"	3'-3"	85	8	2' -6⅞"	111	7'-4"	53	249
	18"	2' -11½"	10'-3"	3'-6"	94	9	3' -9⅞"	137	8'-4"	62	292
	24"	3' -5½"	13'-3"	4'-0"	117	12	3' -3⅞"	215	11'-4"	82	414
	30"	3' -11½"	16'-3"	4'-6"	141	15	3' -9⅞"	310	14'-4"	104	555
1:4	15"	2' -8½"	6'-3"	3'-3"	65	5	2' -6⅞"	70	4'-4"	32	167
	18"	2' -11½"	7'-3"	3'-6"	73	6	2' -9⅞"	92	5'-4"	39	204
	24"	3' -5½"	9'-3"	4'-0"	90	8	3' -3⅞"	144	7'-4"	53	287
	30"	3' -11½"	11'-3"	4'-6"	107	10	3' -9⅞"	206	9'-4"	68	381
1:3	15"	2' -8½"	4'-3"	3'-3"	51	3	2' -6⅞"	42	2'-4"	17	110
	18"	2' -11½"	5'-3"	3'-6"	60	4	2' -9⅞"	61	3'-4"	24	145
	24"	3' -5½"	6'-3"	4'-0"	70	5	3' -3⅞"	90	4'-4"	31	191
	30"	3' -11½"	8'-3"	4'-6"	87	7	3' -9⅞"	145	6'-4"	46	278

2'-9 7/8"

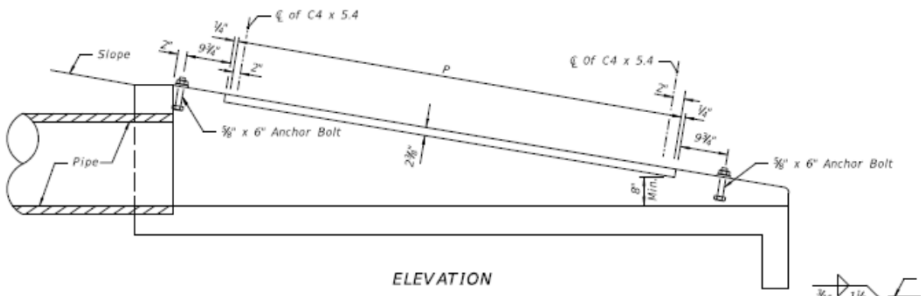
STEEL GRATING USE CRITERIA

1. Grates to be used on pipe culvert endwalls located within the designated clear zone. Positive debris control shall be provided at all upgradient openings. Grates shall not be used unless one or more of the following conditions exist:

   A. Drainage area to culvert consists of median or infield areas or areas where debris and/or drift is negligible.
   B. Runoff to culvert is by sheet flow or in such ill defined channels that debris transport is not considered a major problem.
   C. Runoff to culvert is minor except on an infrequent basis (10 to 15 year frequency); for example a drainage basin in flat sandy terrain with normally low ground water table.
   D. Areas where culvert blockage with resultant backwater would not seriously affect roadway embankment, traffic operation or upland property.

2. Steel grating to be used only where called for in plans.

LAST REVISION	REVISION	DESCRIPTION:	FDOT 2014 DESIGN STANDARDS	U-TYPE CONCRETE ENDWALLS BAFFLES & GRATE OPTIONAL 15" TO 30" PIPE	INDEX NO.	SHEET NO.
07/01/00					261	3 of 3



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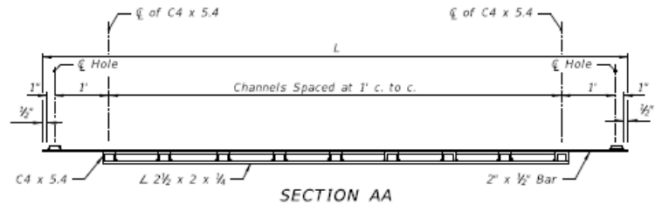
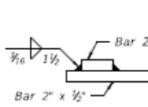
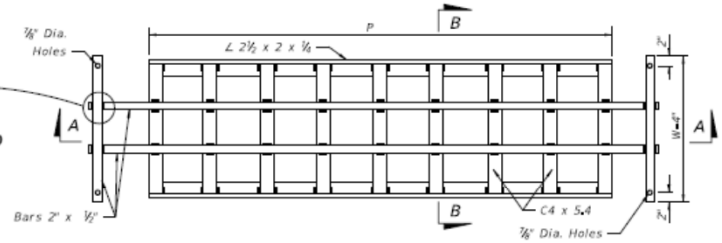


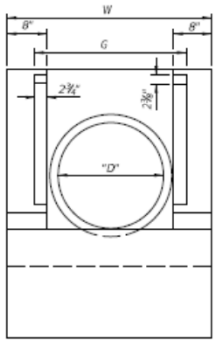
SECTION AA



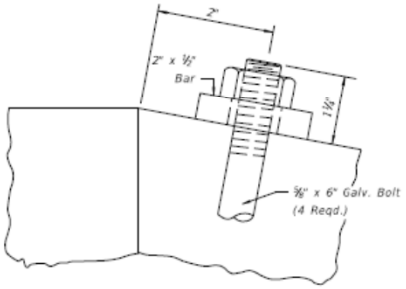
BAR TO BAR WELD



PLAN

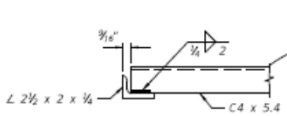


END VIEW

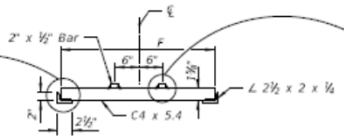


ANCHOR BOLT DETAIL

MOUNTING FOR STEEL GRATE



CHANNEL TO ANGLE WELD



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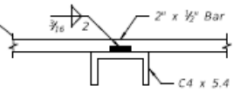

BAR TO CHANNEL WELD

STEEL GRATE

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   C. Runoff to culvert is by sheet flow or in such ill defined channels that debris transport is not considered a major problem.

   D. Runoff to culvert is minor except on an infrequent basis (10 to 15 year frequency); for example a drainage basin in flat sandy terrain with normally low ground water table.

   E. Areas where culvert blockage with resultant backwater would not seriously affect roadway embankment, traffic operation or upland property.

2. Steel grating to be used only where called for in plans.

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE GRATE

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			L	W-4"	lb	(X)	F	lb	P	lb	
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	30"	3' -11½"	16'-3"	4'-6"	141	15	3' -9⅞"	310	14'-4"	104	555
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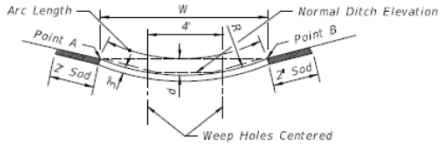
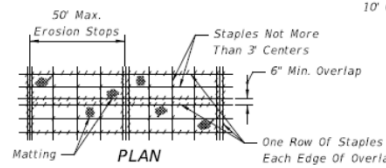
	24"	3' -5½"	6'-3"	4'-0"	70	5	3' -3⅞"	90	4'-4"	31	191
	30"	3' -11½"	8'-3"	4'-6"	87	7	3' -9⅞"	145	6'-4"	46	278



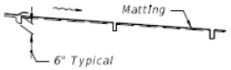
TO REPLACE:	W	d	R	Rows Of Weep Holes	Arc Length
6' Median Swale	6'	0.24'	19'	0	6.0'
1:6 Front Slopes; 1:4 Back Slope					
5' BW Ditch	10'	0.67'	19'	2	10.1'
4' BW Ditch	9'	0.54'	19'	2	9.1'
1:4 Front Slopes & Back Slope					
5' BW Ditch	9'	0.74'	14'	2	9.2'
4' BW Ditch	8'	0.58'	14'	1 (in center)	8.1'

For use only where side slopes are 1:4 or flatter. Point "A" and "B" are to be the same elevation and should be used to locate the paved section.

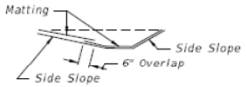
ALTERNATE DITCH PAVEMENT



PLAN

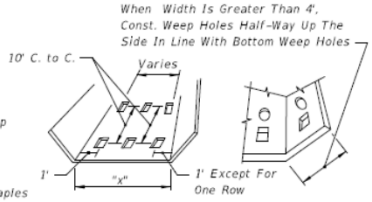


LONGITUDINAL SECTION



SECTION

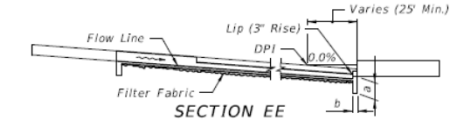
MATTING FOR DITCH



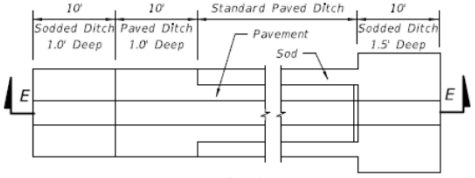
When "x"= 1' To 4' Const. 1 Row (Centered)
"x"= 5' To 7' Const. 2 Rows
"x"= 8' To 12' Const. 3 Rows
"x"= 13' To 17' Const. 4 Rows
"x"= 18' To 22' Const. 5 Rows

Note: All weep holes to be 3"x4" rectangle or 4" or 5" dia. circle hole. ½ cu. ft. (12" x 12" x 6") of No. 6 aggregate to be placed under each hole. 1 sq. ft. of galv. wire mesh (¼" openings) shall be placed between the aggregate and the concrete. Cost of holes, aggregate and wire mesh to be included in the cost of ditch pavement.

WEEP HOLE ARRANGEMENT

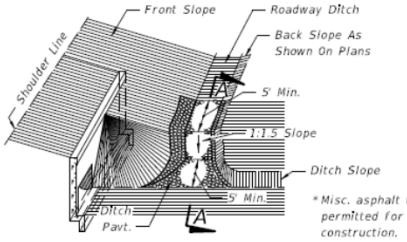


SECTION EE



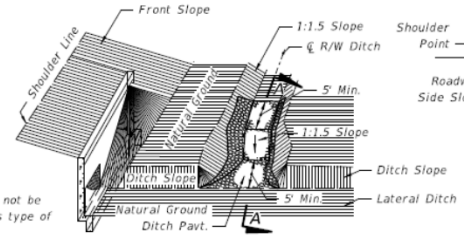
PLAN

PAVED DITCH END TREATMENT

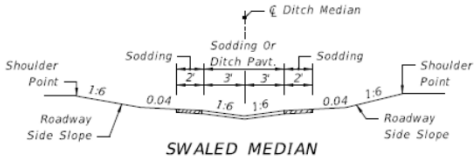


* Misc. asphalt will not be permitted for this type of construction.

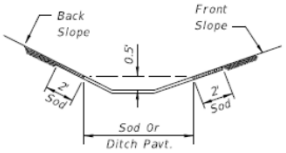
JUNCTION OF ROADWAY DITCH* AND LATERAL DITCH



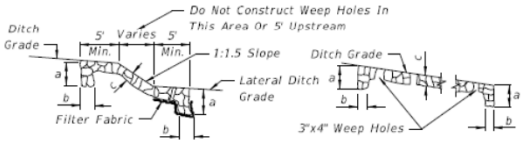
JUNCTION OF R/W DITCH* AND LATERAL DITCH



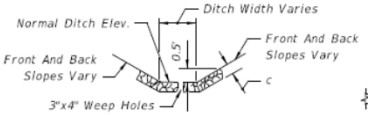
SWALED MEDIAN
(No Weep Holes)



ROADWAY SIDE DITCH

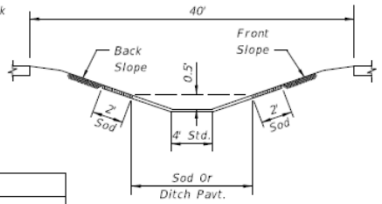


SECTION AA



TYPICAL SECTION

PROFILE OF DITCH PAVEMENT
AT LOCATIONS OTHER THAN JUNCTION WITH LATERAL DITCH



40' MEDIAN

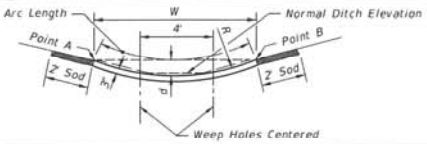
DITCH PAVEMENT

Pavement Type	Dimensions a	Dimensions b	Dimensions c	Payment Unit	Basis Of Estimate	Filter Fabric Type	Velocity Range	References & Remarks
Concrete	24"	6"	3"	SY	SY	D-6	Low-High	Section 524 of the Standard Specifications.
Miscellaneous Asphalt	24"	12"	4"	TN	0.2 TN/SY	None	Low-Moderate	Section 339.
Riprap (Sand-Cement)	24"	12"	4"	CY	0.11 CY/SY	D-4	Low-Moderate	Section 530. Grouting of joints required.
Riprap (Ditch Lining)				TN	TN	D-2	Moderate-High	Section 530.

GENERAL NOTES

1. Type of ditch pavement shall be as shown on plans.
2. In concrete ditch pavement, contraction joints are to be spaced at 25' maximum intervals, or as directed by the Engineer. Contraction joints may be either formed (construction joint) or tooled. No open joints will be permitted in concrete ditch pavement.

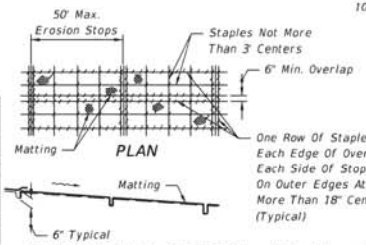
   Expansion joints with ½" preformed joint filler shall be constructed at all inlets, endwalls, and at intervals of not more than 200'.
3. Lip at end of ditch pavement shall normally be located downstream of DPI or on flatter grades where there is a decrease in ditch velocity.
4. Toewalls are to be used with all ditch paving. A toewall is not required adjacent to drainage structures.
5. When directed by the Engineer, weep hole spacing may be reduced to 5' minimum.
6. For junction of R/W ditch spillway and lateral ditch, sides of paving to be 1' high minimum.
7. For ditch pavements requiring filter fabric, the fabric shall be placed directly beneath the pavement for the entire length and width of the pavement. When weep holes with aggregate are used, the filter fabric shall be placed below the aggregate to form a mat continuous with or underlapping the pavement fabric. (See Specifications Section 985) for fabric type and application).
8. Ditch pavement requiring reinforcement shall be detailed in the plan.
9. Cost of plastic filter fabric to be included in the contract unit price for ditch pavement.
10. Sodding to be paid for under contract unit price for Performance Turf, SY



TO REPLACE:	W	d	R	Rows Of Weep Holes	Arc Length
6' Median Swale	6'	0.24'	19'	0	6.0'
1:6 Front Slopes; 1:4 Back Slope					
5' BW Ditch	10'	0.67'	19'	2	10.1'
4' BW Ditch	9'	0.54'	19'	2	9.1'
1:4 Front Slopes & Back Slope					
5' BW Ditch	9'	0.74'	14'	2	9.2'
4' BW Ditch	8'	0.58'	14'	1 (in center)	8.1'

For use only where side slopes are 1:4 or flatter. Point "A" and "B" are to be the same elevation and should be used to locate the paved section.

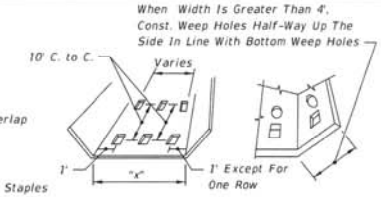
ALTERNATE DITCH PAVEMENT



PLAN

LONGITUDINAL SECTION

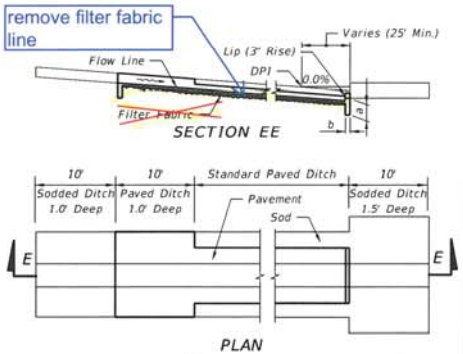
SECTION
MATTING FOR DITCH



When "x"= 1' To 4' Const. 1 Row (Centered)
"x"= 5' To 7' Const. 2 Rows
"x"= 8' To 12' Const. 3 Rows
"x"= 13' To 17' Const. 4 Rows
"x"= 18' To 22' Const. 5 Rows

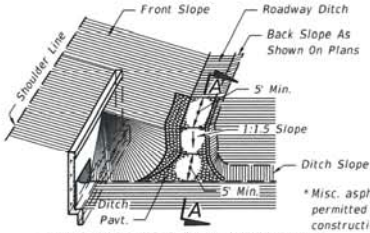
Note: All weep holes to be 3"x4" rectangle or 4" or 5" dia. circle hole. ½ cu. ft. (12" x 12" x 6") of No. 6 aggregate to be placed under each hole. 1 sq. ft. of galv. wire mesh (¼" openings) shall be placed between the aggregate and the ~~concrete~~ ditch pavement. Cost of holes, aggregate and wire mesh to be included in the cost of ditch pavement.

WEEP HOLE ARRANGEMENT



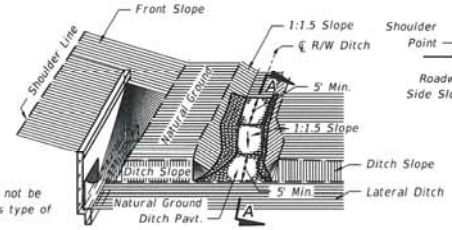
PLAN

PAVED DITCH END TREATMENT

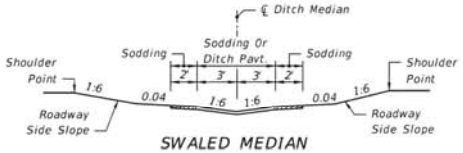


* Misc. asphalt will not be permitted for this type of construction.

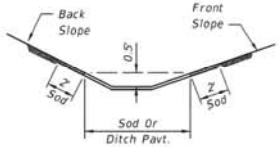
JUNCTION OF ROADWAY DITCH*
AND LATERAL DITCH



JUNCTION OF R/W DITCH*
AND LATERAL DITCH

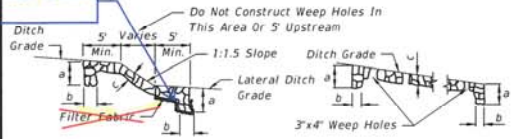


SWALED MEDIAN
(No Weep Holes)

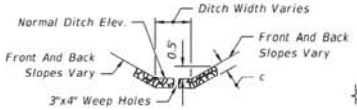


ROADWAY SIDE DITCH

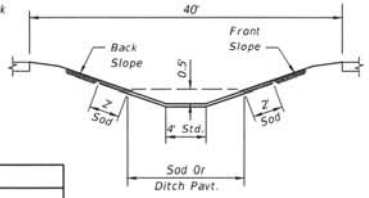
remove filter fabric line



SECTION AA



PROFILE OF DITCH PAVEMENT
AT LOCATIONS OTHER THAN JUNCTION WITH LATERAL DITCH



40' MEDIAN

Add asterisk

TABLE 1: DITCH PAVEMENT

Pavement Type	Dimensions a	b	c	Payment Unit	Basis Of Estimate	Filter Fabric Type	Velocity Range	References & Remarks
Concrete	24"	6"	3"	SY	SY	D-6*	Low-High	Section 524 of the Standard Specifications.
Miscellaneous Asphalt	24"	12"	4"	TN	0.2 TN/SY	None	Low-Moderate	Section 339.
Riprap (Sand-Cement)	24"	12"	4"	CY	0.11 CY/SY	D-4*	Low-Moderate	Section 530. Grouting of joints required.
Riprap (Ditch Lining)				TN	TN	D-2*	Moderate-High	Section 530.

*Filter Fabric Required.

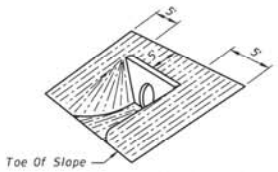
GENERAL NOTES

1. Type of ditch pavement shall be as shown on plans.
2. In concrete ditch pavement, contraction joints are to be spaced at 25' maximum intervals, or as directed by the Engineer. Contraction joints may be either formed (construction joint) or tooled. No open joints is permitted in concrete ditch pavement.

   Expansion joints with ½" preformed joint filler shall be constructed at all inlets, endwalls, and at intervals of not more than 200'.
3. Lip at end of ditch pavement shall normally be located downstream of DPI or on flatter grades where there is a decrease in ditch velocity.
4. Toewalls are to be used with all ditch paving. A toewall is not required adjacent to drainage structures.
5. When directed by the Engineer, weep hole spacing may be reduced to 5' minimum.
6. For junction of R/W ditch spillway and lateral ditch, sides of paving to be 1' high minimum.
7. For ditch pavements requiring filter fabric (See Table 1) place the filter fabric directly beneath the pavement for the entire length and width of the pavement. See Standard Specification Section 985 for fabric type and application.
8. When weep holes with aggregate are used, place filter fabric below the aggregate to form a mat continuous with the pavement filter fabric or underlapping the pavement filter fabric, if present.
9. Ditch pavement requiring reinforcement shall be detailed in the plans.
10. Cost of plastic filter fabric to be included in the contract unit price for ditch pavement.
11. Sodding to be paid for under contract unit price for Performance Turf, SY

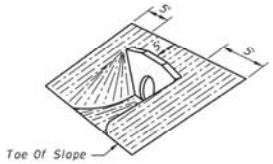
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/14			FDOT 2015 DESIGN STANDARDS	DITCH PAVEMENT AND SODDING	281	1 of 2

6/5/2014 10:39:03 AM

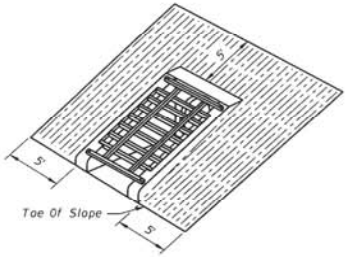


Note: Sodding quantities for each endwall to be determined by the designer from this detail.

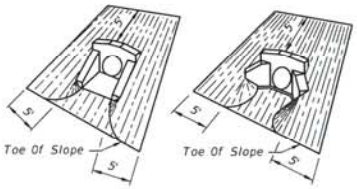
(EXCEPT INDEX NO. 250)
STRAIGHT ENDWALL



STRAIGHT ENDWALL
INDEX NO. 250

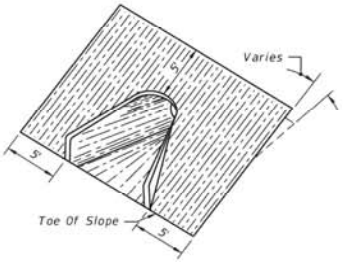


U-TYPE ENDWALL
INDEX NO. 261



U-TYPE WINGS 45° WINGS

WINGED ENDWALLS
INDEX NO. 266

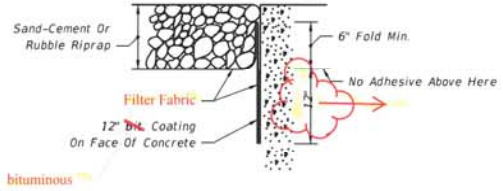


FLARED END SECTION
INDEX NO. 270

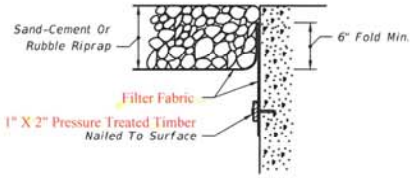
TABLE 2: SOD QUANTITIES (SY)

PIPE SIZE	INDEX NO. 250												INDEX NO. 261				INDEX NO. 266				INDEX NO. 270
	SLOPE												SLOPE				SLOPE				ALL SLOPES
	1:2			1:3			1:4			1:6			1:2	1:3	1:4	1:6	1:2	1:3	1:4	1:6	
	PIPES												PIPES				PIPES				PIPES
	1	2	3	1	2	3	1	2	3	1	2	3	1	1	1	1	1	1	1	1	1
12"																	14	15	18	22	10
15"	19	21	24	22	26	29	26	30	33	34	38	43	13 (15)	16	17	23	15	17	20	25	11
18"	21	24	27	25	29	33	30	34	38	39	44	50	14 (16)	17	19	25	16	18	22	28	11
21"																					12
24"	26	30	34	32	37	42	38	44	50	50	58	66	15 (17)	19	21	28	19	22	26	34	14
27"																					15
30"	31	37	42	39	46	53	46	55	63	62	74	85	17 (18)	21	24	32	21	25	30	40	16
36"	37	44	52	46	56	65	56	67	79	76	91	107					24	29	35	47	18
42"	43	53	62	55	67	79	67	82	96	91	111	132					27	32	39	54	19
48"	50	62	73	64	79	93	78	97	115	108	133	158					30	36	44	61	21
54"	57	71	85	74	92	110	91	113	136	126	157	188									21
60"																					22
66"																					25
72"																					26
													() Endwall With Baffles								

SOD PLACEMENT AT PIPE/CULVERT END TREATMENTS



BONDED OPTION



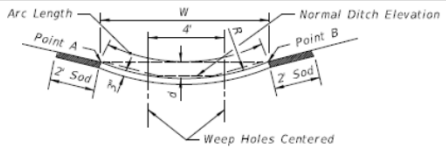
NAILED OPTION

Note: Either option may be used unless otherwise called for in the plans.

FILTER FABRIC PLACEMENT AT CONCRETE STRUCTURE

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/00			FDOT 2015 DESIGN STANDARDS	DITCH PAVEMENT AND SODDING	281	2 of 2

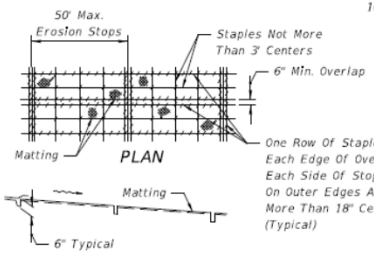
6/5/2014 10:39:04 AM



TO REPLACE:	W	d	R	Rows Of Weep Holes	Arc Length
6' Median Swale	6'	0.24'	19'	0	6.0'
1:6 Front Slopes; 1:4 Back Slope					
5' BW Ditch	10'	0.67'	19'	2	10.1'
4' BW Ditch	9'	0.54'	19'	2	9.1'
1:4 Front Slopes & Back Slope					
5' BW Ditch	9'	0.74'	14'	2	9.2'
4' BW Ditch	8'	0.58'	14'	1 (in center)	8.1'

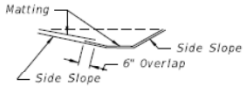
For use only where side slopes are 1:4 or flatter. Point "A" and "B" are to be the same elevation and should be used to locate the paved section.

ALTERNATE DITCH PAVEMENT



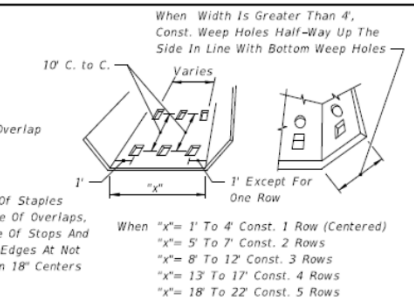
PLAN

LONGITUDINAL SECTION



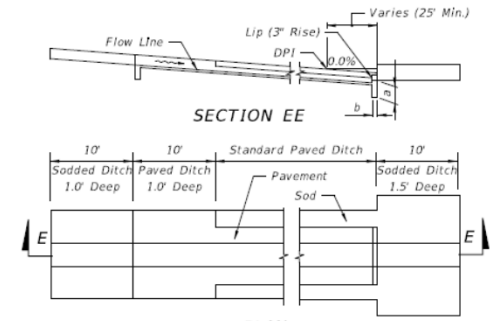
SECTION

MATTING FOR DITCH



Note: All weep holes to be 3"x4" rectangle or 4" or 5" dia. circle hole. ½ cu. ft. (12" x 12" x 6") of No. 6 aggregate to be placed under each hole. 1 sq. ft. of galv. wire mesh (¼" openings) shall be placed between the aggregate and the ditch pavement. Cost of holes, aggregate and wire mesh to be included in the cost of ditch pavement.

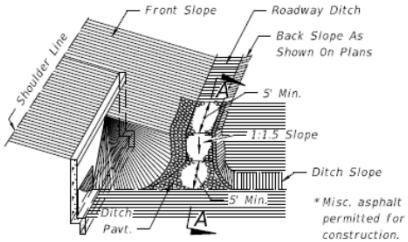
WEEP HOLE ARRANGEMENT



SECTION EE

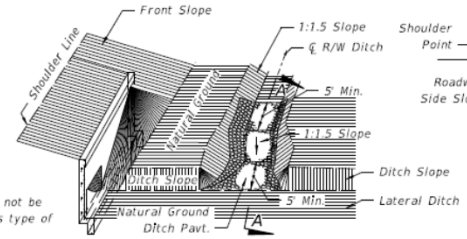
PLAN

PAVED DITCH END TREATMENT

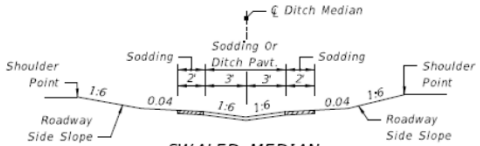


*Misc. asphalt will not be permitted for this type of construction.

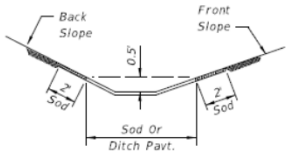
JUNCTION OF ROADWAY DITCH* AND LATERAL DITCH



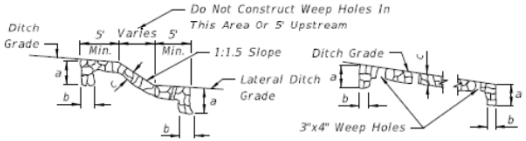
JUNCTION OF R/W DITCH* AND LATERAL DITCH



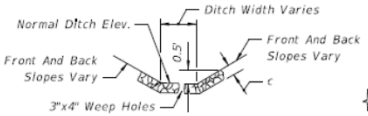
SWALED MEDIAN (No Weep Holes)



ROADWAY SIDE DITCH

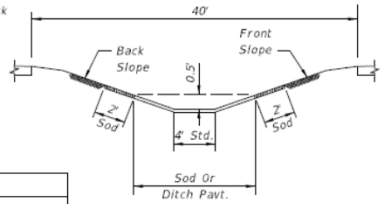


SECTION AA



TYPICAL SECTION

PROFILE OF DITCH PAVEMENT AT LOCATIONS OTHER THAN JUNCTION WITH LATERAL DITCH



40' MEDIAN

TABLE 1: DITCH PAVEMENT

Pavement Type	Dimensions a	Dimensions b	Dimensions c	Payment Unit	Basis Of Estimate	Filter Fabric Type	Velocity Range	References & Remarks
Concrete	24"	6"	3"	SY	SY	D-6*	Low-High	Section 524 of the Standard Specifications.
Miscellaneous Asphalt	24"	12"	4"	TN	0.2 TN/SY	None	Low-Moderate	Section 339.
Riprap (Sand-Cement)	24"	12"	4"	CY	0.11 CY/SY	D-4*	Low-Moderate	Section 530. Grouting of joints required.
Riprap (Ditch Lining)				TN	TN	D-2*	Moderate-High	Section 530.

* Filter Fabric Required.

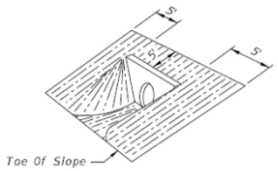
GENERAL NOTES

1. Type of ditch pavement shall be as shown on plans.
2. In concrete ditch pavement, contraction joints are to be spaced at 25' maximum intervals, or as directed by the Engineer. Contraction joints may be either formed (construction joint) or tooled. No open joints will be permitted in concrete ditch pavement.

   Expansion joints with ½" preformed joint filler shall be constructed at all inlets, endwalls, and at intervals of not more than 200'.
3. Lip at end of ditch pavement shall normally be located downstream of DPI or on flatter grades where there is a decrease in ditch velocity.
4. Toewalls are to be used with all ditch paving. A toewall is not required adjacent to drainage structures.
5. When directed by the Engineer, weep hole spacing may be reduced to 5' minimum.
6. For junction of R/W ditch spillway and lateral ditch, sides of paving to be 1' high minimum.
7. For ditch pavements requiring filter fabric (See Table 1) place the filter fabric directly beneath the pavement for the entire length and width of the pavement. See Standard Specification Section 985 for fabric requirements and application.
8. When weep holes with aggregate are used, place filter fabric below the aggregate to form a mat continuous with the pavement filter fabric or underlapping the pavement filter fabric, if present.
9. Ditch pavement requiring reinforcement shall be detailed in the plans.
10. Cost of plastic filter fabric to be included in the contract unit price for ditch pavement.
11. Sodding to be paid for under contract unit price for Performance Turf, SY

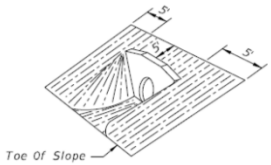
6/9/2015 2:22:36 PM

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/15			FDOT 2016 DESIGN STANDARDS	DITCH PAVEMENT AND SODDING	281	1 of 2

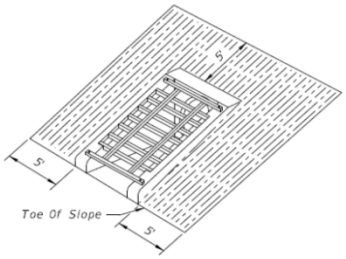


Note: Sodding quantities for each endwall to be determined by the designer from this detail.

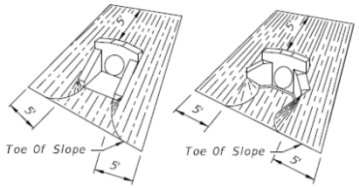
(EXCEPT INDEX NO. 250)
STRAIGHT ENDWALL



STRAIGHT ENDWALL
INDEX NO. 250

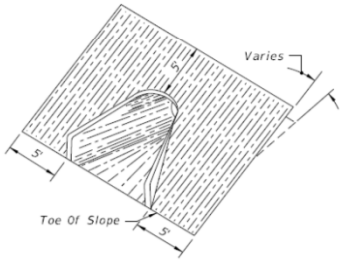


U-TYPE ENDWALL
INDEX NO. 261



U-TYPE WINGS 45° WINGS

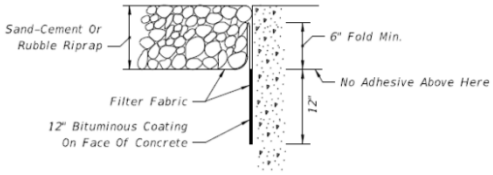
WINGED ENDWALLS
INDEX NO. 266



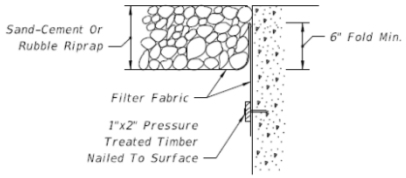
FLARED END SECTION
INDEX NO. 270

TABLE 2: SOD QUANTITIES (SY)																					
PIPE SIZE	INDEX NO. 250												INDEX NO. 261				INDEX NO. 266				INDEX NO. 270
	SLOPE												SLOPE				SLOPE				ALL SLOPES
	1:2			1:3			1:4			1:6			1:2	1:3	1:4	1:6	1:2	1:3	1:4	1:6	
	PIPES												PIPES				PIPES				PIPES
	1	2	3	1	2	3	1	2	3	1	2	3	1	1	1	1	1	1	1	1	1
12"																	14	15	18	22	10
15"	19	21	24	22	26	29	26	30	33	34	38	43	13 (15)	16	17	23	15	17	20	25	11
18"	21	24	27	25	29	33	30	34	38	39	44	50	14 (16)	17	19	25	16	18	22	28	11
21"																					12
24"	26	30	34	32	37	42	38	44	50	50	58	66	15 (17)	19	21	28	19	22	26	34	14
27"																					15
30"	31	37	42	39	46	53	46	55	63	62	74	85	17 (18)	21	24	32	21	25	30	40	16
36"	37	44	52	46	56	65	56	67	79	76	91	107					24	29	35	47	18
42"	43	53	62	55	67	79	67	82	96	91	111	132					27	32	39	54	19
48"	50	62	73	64	79	93	78	97	115	108	133	158					30	36	44	61	21
54"	57	71	85	74	92	110	91	113	136	126	157	188									21
60"																					22
66"																					25
72"																					26
() Endwall With Baffles																					

SOD PLACEMENT AT PIPE/CULVERT END TREATMENTS



BONDED OPTION



NAILED OPTION

Note: Either option may be used unless otherwise called for in the plans.

FILTER FABRIC PLACEMENT AT CONCRETE STRUCTURE

2016 Design Standards
Index 410

Roadway Design Office Updates

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Roadway Design Standards Group
derwood.sheppard@dot.state.fl.us
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Index 410
Concrete Barrier Wall

- Longitudinal Reinforcement
  - Continuous
  - Lap Splices
- Trailing End Guardrail Mounting Height
- Construction Joint
- Vertical Reinforcement Spacing for Bifurcated Median Walls
- Consistency of Notes
  - Longitudinal Reinforcement
  - Reduced Spacing for Vertical Reinforcement

Index 410
Concrete Barrier Wall

- Longitudinal Reinforcement (Sheet 2 of 25)
  - Continuous
  - Lap Splices

GENERAL NOTES

1. *Class II concrete shall be used for the construction of Concrete Barrier Walls; except, in moderately and extremely aggressive environments, Class IV concrete shall be used. All nondesignated size reinforcing steel shall be No. 5 bars. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Specification Section 521 or as required in the plans.*

2. *Longitudinal reinforcement to be continuous or spliced No. 5 Bars. Lap splices a minimum of 2'-0".*

3. *Concrete barrier wall terminal notes for design speeds ≥=50 mph.*

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

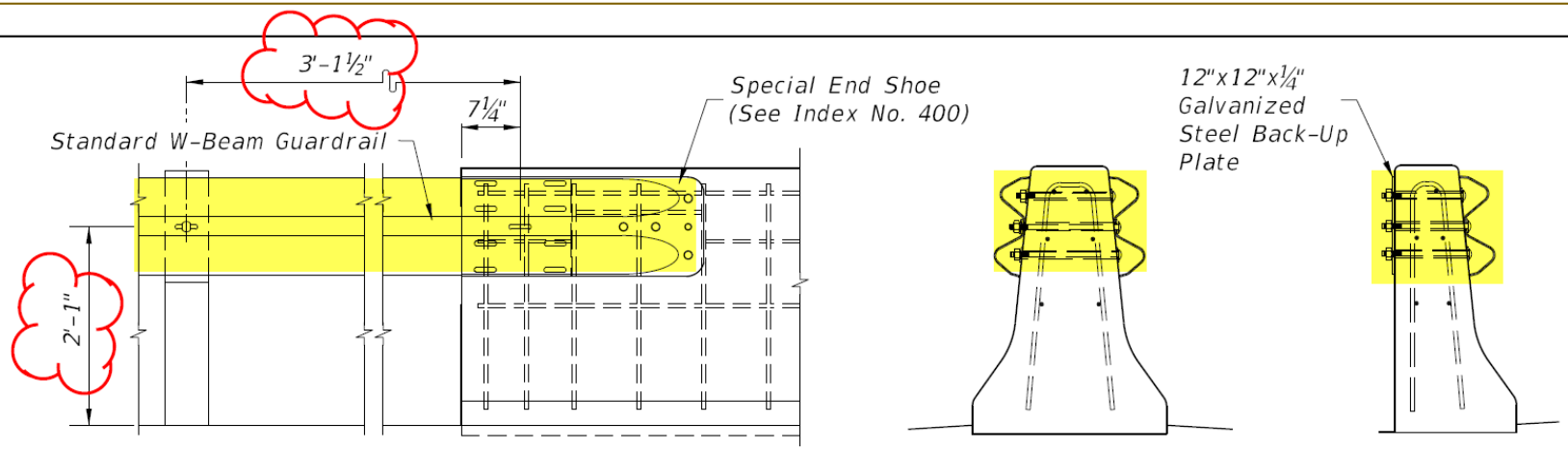
4. *Expansion joints are required at bridge ends and/or at locations where the wall is an integral part of an existing or proposed concrete slab. Construct required joints to match existing or proposed expansion joints.*

5. *When the barrier is installed adjacent to the pavement, compact the top 12" of the subgrade to at least 98% of the maximum density determined by FM 1-T 180, Method D.*

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

Index 410
Concrete Barrier Wall

- Trailing End Guardrail Mounting Height (Sheet 2 of 25)



ELEVATION END VIEW END VIEW

NOTES:

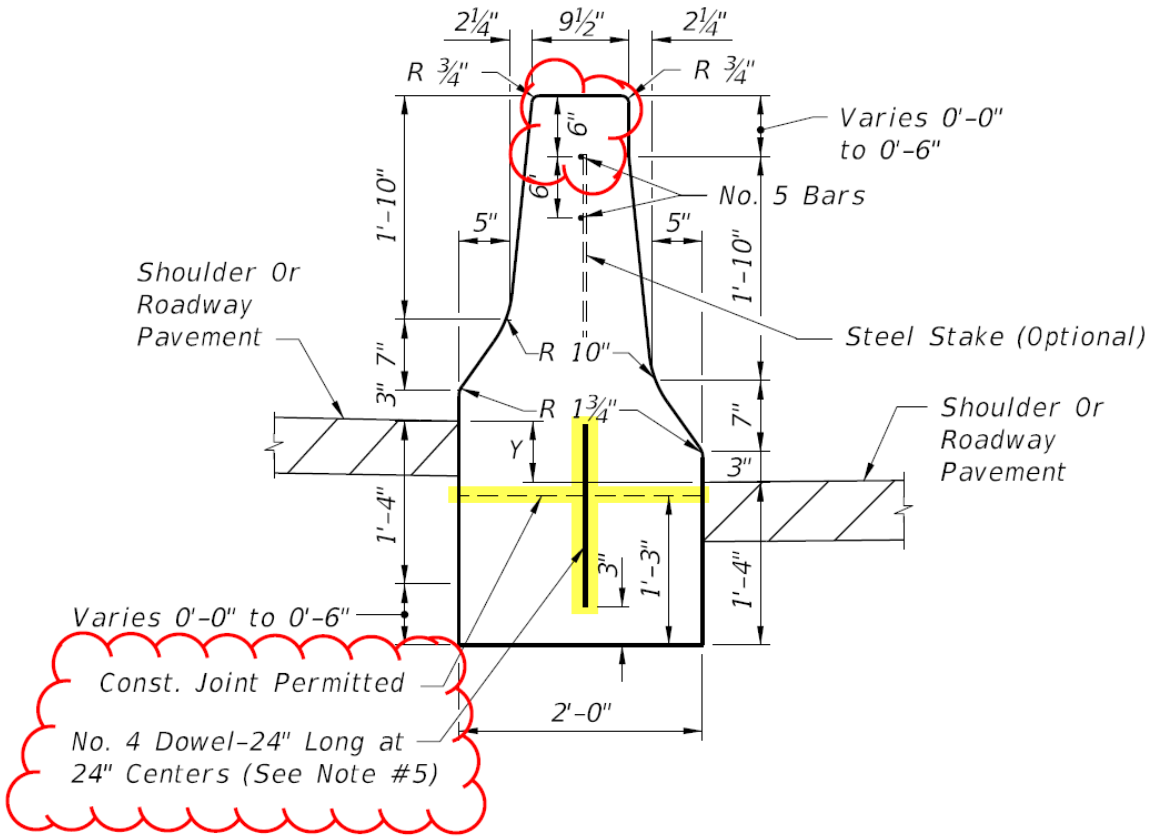
1. End of wall flush mounted connections are not applicable to two-lane two-way facilities. For trailing end connections on two-lane two-way facilities, see SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS WHEN GUARDRAIL OFFSET FROM HAZARD < 3'.

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

W-BEAM GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL TRAILING ENDS

Index 410
Concrete Barrier Wall

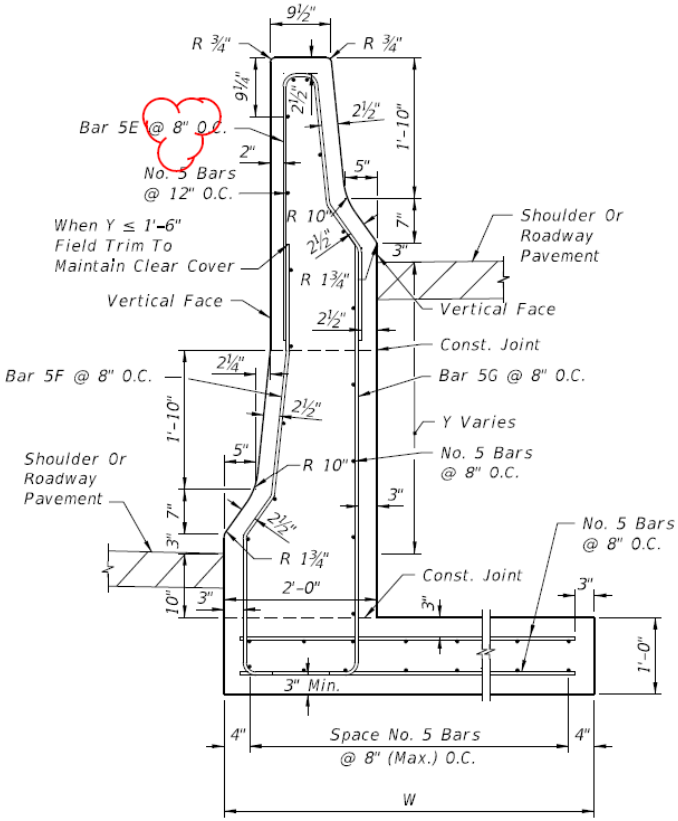
- Construction Joint (Sheet 4 of 25)



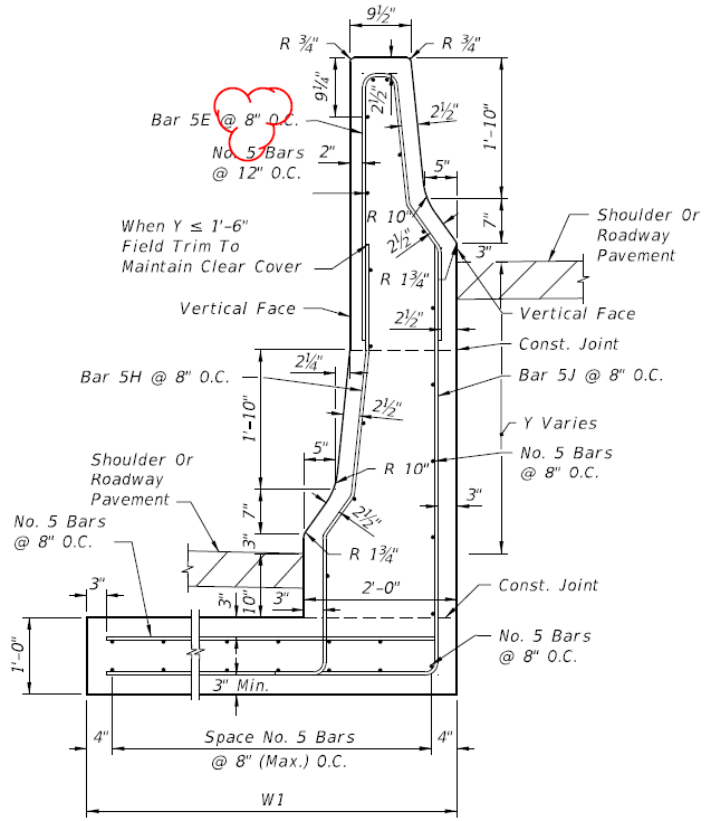
F-SHAPE MEDIAN BARRIER
WHEN Y IS LESS THAN OR EQUAL TO 6 INCHES

Index 410
Concrete Barrier Wall

- Vertical Reinforcement Spacing for Bifurcated Median Walls (Sheet 4 of 25)



CANTILEVER WALL
SUPERELEVATED SECTION



L-WALL
SUPERELEVATED SECTION

Index 410
Concrete Barrier Wall

- Consistency of Notes (Sheets 3, 4, 14, 15, 20, & 21 of 25)
  - Longitudinal Reinforcement
  - Reduced Spacing for Vertical Reinforcement

NOTES:

1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet for each side of all cold or expansion joints.
2. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
3. Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'.
4. For Concrete Barrier Wall Inlet details with Rigid Curb and Gutter applications, see Index No. 219.
5. Minimum Segment Wall Length = 20 LF.
6. For additional information on Bar 5K, see BAR BENDING DIAGRAM.

2016 Design Standards
MOT/600 Series

Roadway Design Office Updates

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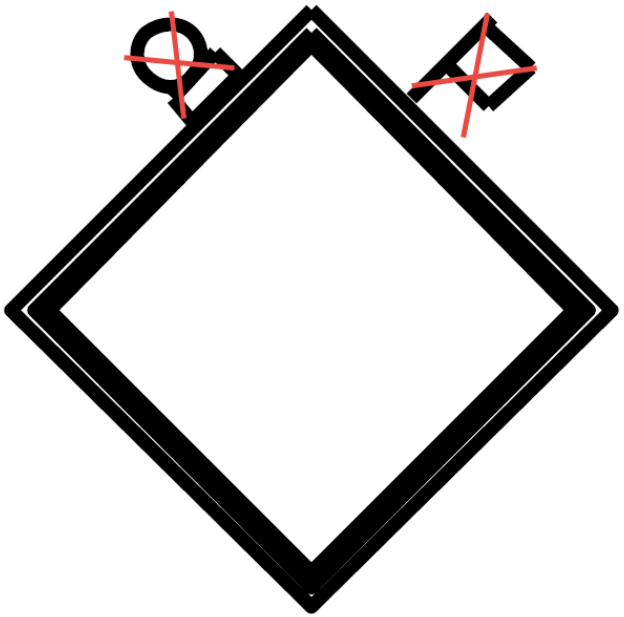
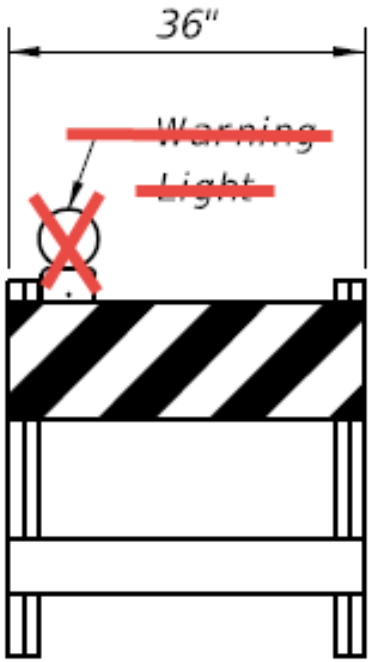
Index 600 Series

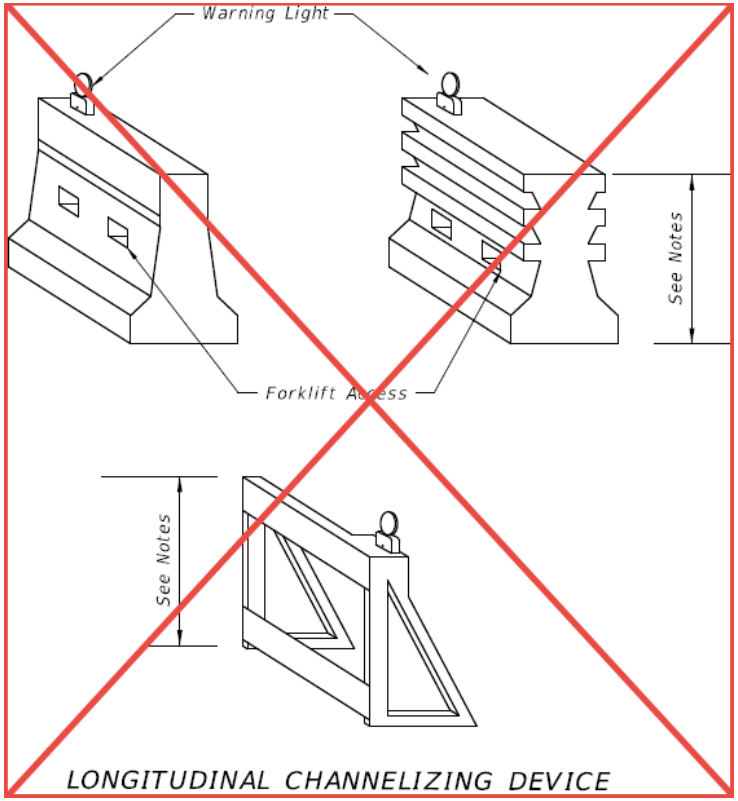
- Removed warning lights and flags from Work Zone Signs.
- Removed warning lights from all channelizing devices.
- For more information, see RDB 15-10: Temporary Traffic Control – Warning Lights and Flags

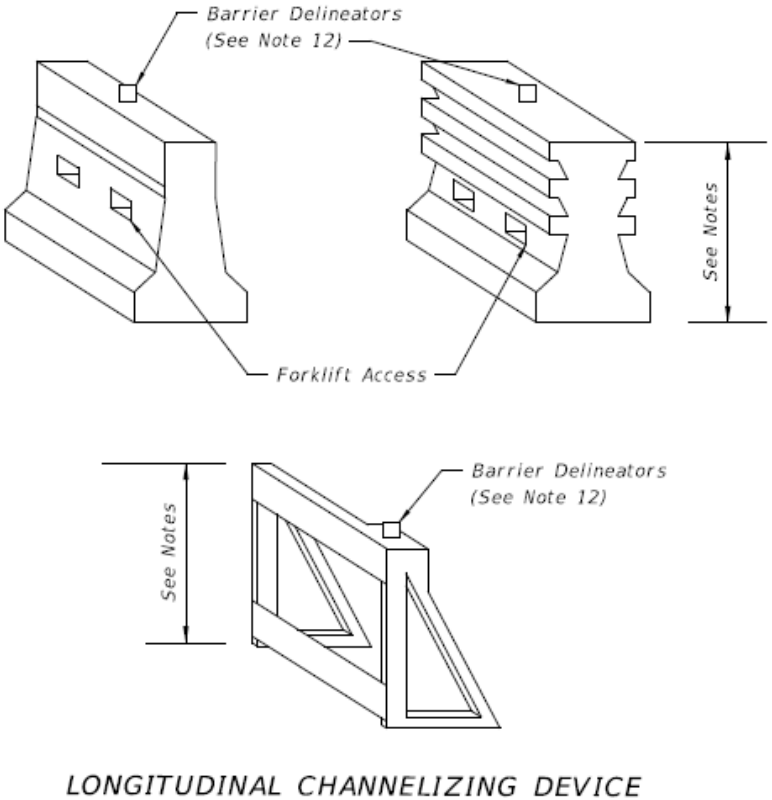




Index 600 Series

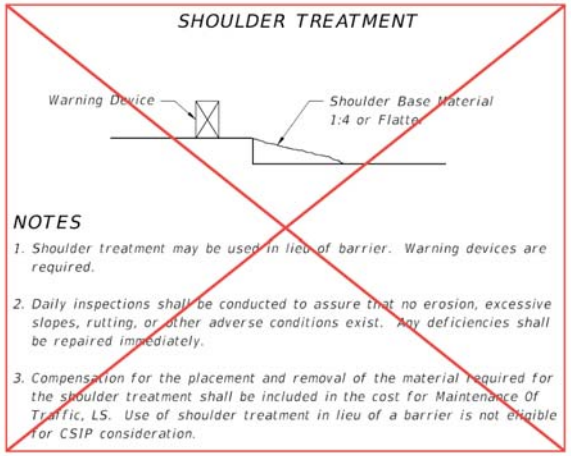
- For Barriers and Longitudinal Channelizing Devices, Barrier Delineators are now used instead of Warning Lights

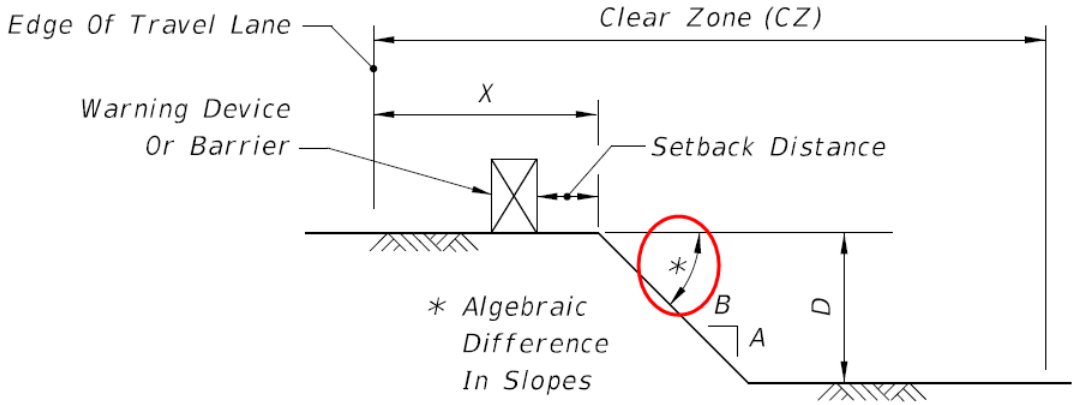




Index 600

- Drop-Off Conditions





DROP-OFF CONDITION DETAIL

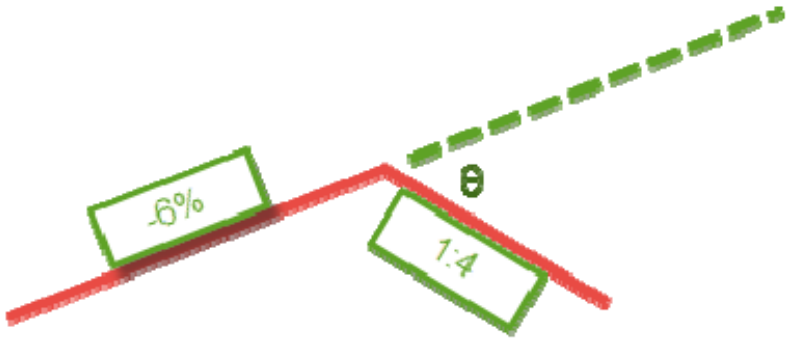
2. A drop-off is defined as a drop in elevation, parallel to the adjacent travel lanes, greater than 3" with slope (A:B) steeper than 1:4 and an algebraic difference in slopes greater than 0.25 (See Drop-off Condition Detail). When drop-offs occur within the clear zone due to construction or maintenance activities, protection devices are required (See Table 1).

3. Drop-offs may be mitigated by placement of slopes with optional base material per Specifications Section 285. Slopes shallower than 1:4 may be required to avoid algebraic difference in slopes greater than 0.25. Include the cost for the placement and removal of the material in Maintenance of Traffic, LSD. Use of this treatment in lieu of a barrier is not eligible for CSIP consideration. Conduct daily inspections for deficiencies related to erosion, excessive slopes, rutting or other adverse conditions. Repair any deficiencies immediately.

Index 600

- Drop-Off Conditions

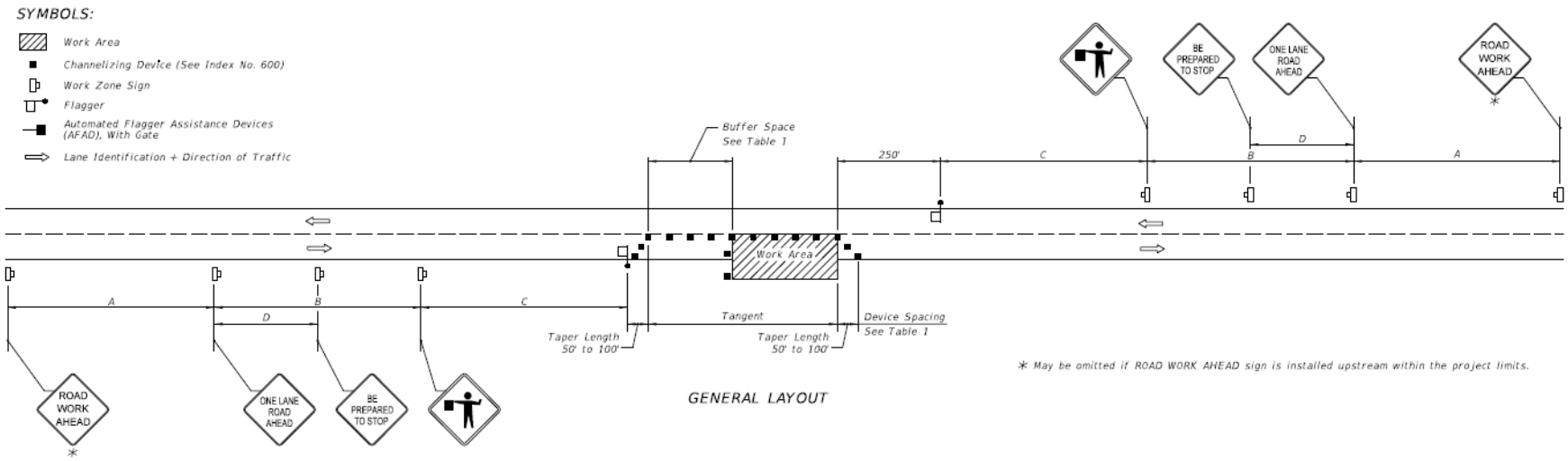
OK



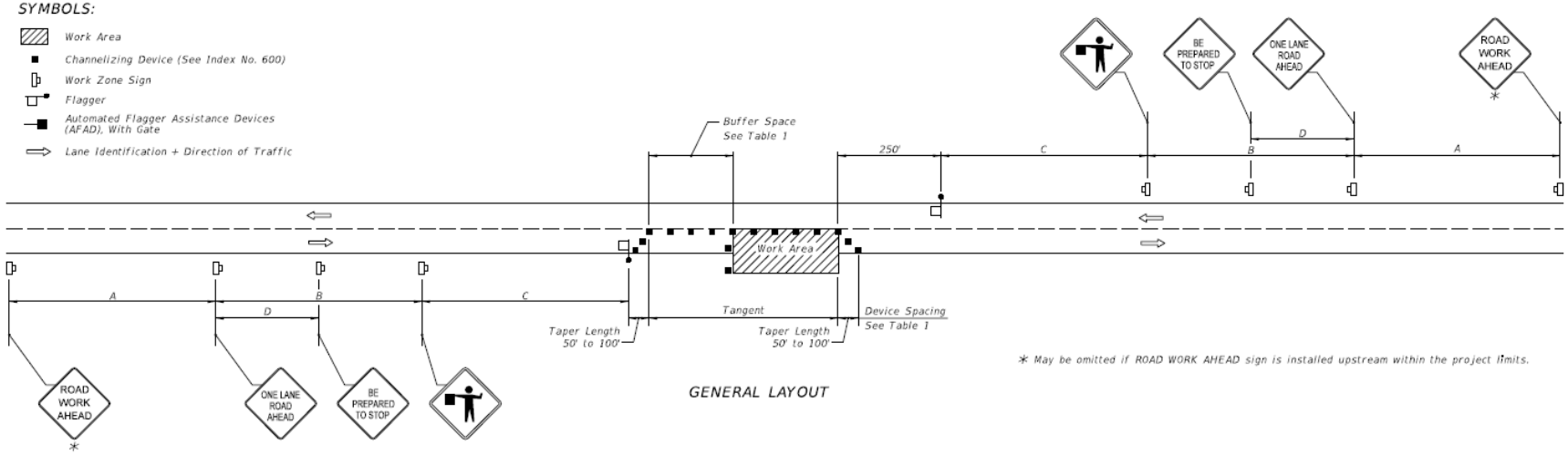
NOT OK

Index 603: Reorganized

- Temporary Raised Rumble Strips were removed from Index 600, Sheet 4 and merged with Index 603
- New Special Conditions:
  - Index 635 (RR Crossing) deleted; merged with Index 603
  - New Center Line Rumble Striping requirements created need for a <u>standard</u> MOT scheme for work encroaching centerline.



Index 603: Reorganized



GENERAL LAYOUT

GENERAL NOTES:

1. Special Conditions may be required in accordance with these notes and the following sheets.

2. If the Work Area encroaches on the Centerline, use the Layout for Temporary Lane Shift to Shoulder on Sheet 2 only if the Existing Paved Shoulder width is sufficient to provide for an 11' lane between the Work Area and the Edge of Existing Paved Shoulder. Reduce the posted speed when appropriate.

3. Temporary Raised Rumble Strips:
   a. Use when both of the following conditions are met concurrently:
      i. Existing Posted Speed is 50 mph or greater;
      ii. Work duration is greater than 60 minutes.
   b. Use a consistent Strip color throughout the work zone.
   c. Place each Rumble Strip Set transversely across the lane at locations shown.
   d. Use Option 1 or Option 2 as shown on Sheet 2. Use only one option throughout work zone.

4. Additional one-way control may be provided by the following means:
   a. Flag-carrying vehicle;
   b. Official vehicle;
   c. Pilot vehicles;
   d. Traffic signals.

   When flaggers are the sole means of one-way control, the flaggers must be in sight of each other or in direct communication at all times.

5. When a side road intersects the highway within the TTC zone, place additional TTC devices in accordance with other applicable TCZ Indexes.

6. The two channelizing devices directly in front of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.

7. When Buffer Space cannot be attained due to geometric constraints, use the greatest attainable length, not less than 200 ft.

8. Railroad Crossings:
   a. If an active railroad crossing is located closer to the Work Area than the queue length plus 300 feet, extend the Buffer Space as shown on Sheet 2.
   b. If the queuing of vehicles across an active railroad crossing cannot be avoided, provide a uniformed traffic control officer or flagger at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic train warning devices are in place.

9. ROAD WORK AHEAD and the BE PREPARED TO STOP signs may be omitted if all of the following conditions are met:
   a. Work operations are 60 minutes or less.
   b. Speed limit is 45 mph or less.
   c. There are no sight obstructions to vehicles approaching the work area for a distance equal to the Buffer Space shown in Table 1.
   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.
   f. If a railroad crossing is present, vehicles will not queue across rail tracks.
   g. AFADs are not in use.

10. See Index 600 for general TCZ requirements and additional information.

11. Automated Flagger Assistance Devices (AFADs) may be used in accordance with the Notes on Sheet 3.

TABLE 1

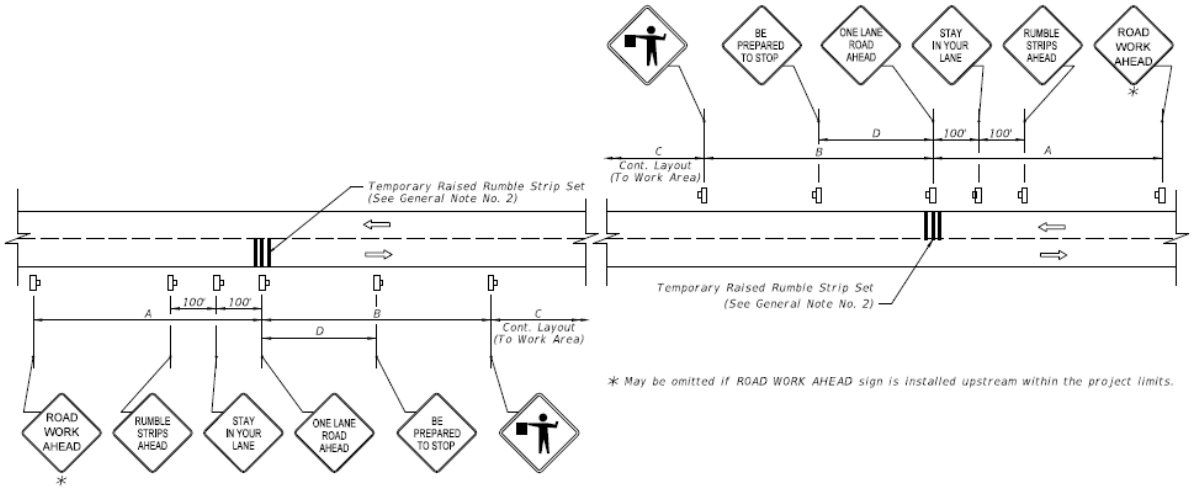
Posted Speed	DEVICE SPACING: Maximum Spacing of Cones or Tubular Markers		Maximum Spacing of Type I or Type II Barricades/Panels/Drums		Distance Between Signs				Buffer Space
	On a Taper	On a Tangent	On a Taper	On a Tangent	A	B	C	D	
25	20'	50'	20'	50'	200'	200'	200'	100'	155'
30	20'	50'	20'	50'	200'	200'	200'	100'	200'
35	20'	50'	20'	50'	200'	200'	200'	100'	250'
40	20'	50'	20'	50'	200'	200'	200'	100'	305'
45	20'	50'	20'	50'	350'	350'	350'	175'	360'
50	20'	50'	20'	100'	500'	500'	500'	250'	425'
55	20'	50'	20'	100'	2640'	1500'	1000'	500'	495'
60	20'	50'	20'	100'	2640'	1500'	1000'	500'	570'
65	20'	50'	20'	100'	2640'	1500'	1000'	500'	645'
70	20'	50'	20'	100'	2640'	1500'	1000'	500'	730'

CONDITIONS

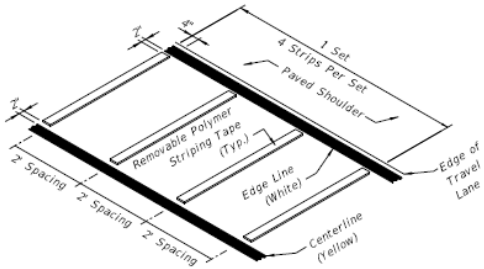
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF TRAVEL WAY.

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/15			FDOT 2016 DESIGN STANDARDS	TWO-LANE, TWO-WAY, WORK WITHIN THE TRAVEL WAY	603	1 of 3

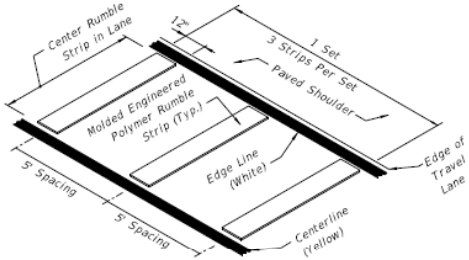
Index 603: Reorganized



LAYOUT FOR TEMPORARY RAISED RUMBLE STRIPS WHEN REQUIRED WITH ADDITIONAL SIGNS

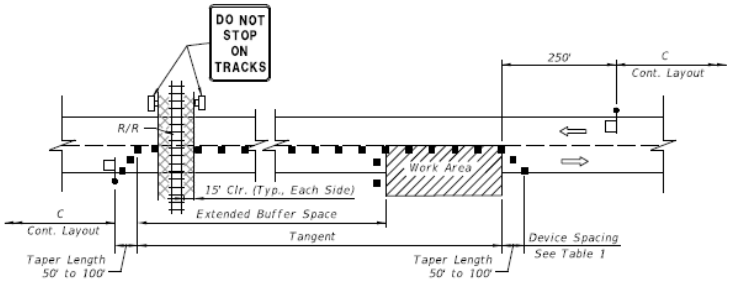


OPTION 1 - REMOVABLE POLYMER STRIPING TAPE RUMBLE STRIP SET

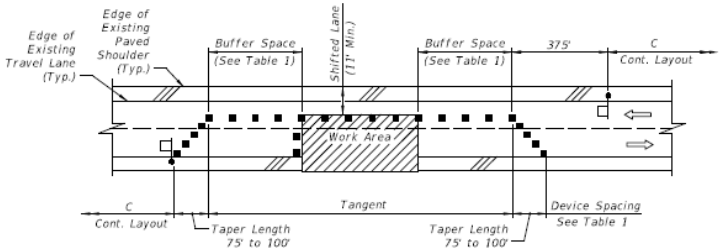


OPTION 2 - MOLDED ENGINEERED POLYMER RUMBLE STRIP SET

TEMPORARY RAISED RUMBLE STRIPS



LAYOUT FOR RAILROAD CROSSING BUFFER SPACE EXTENSION

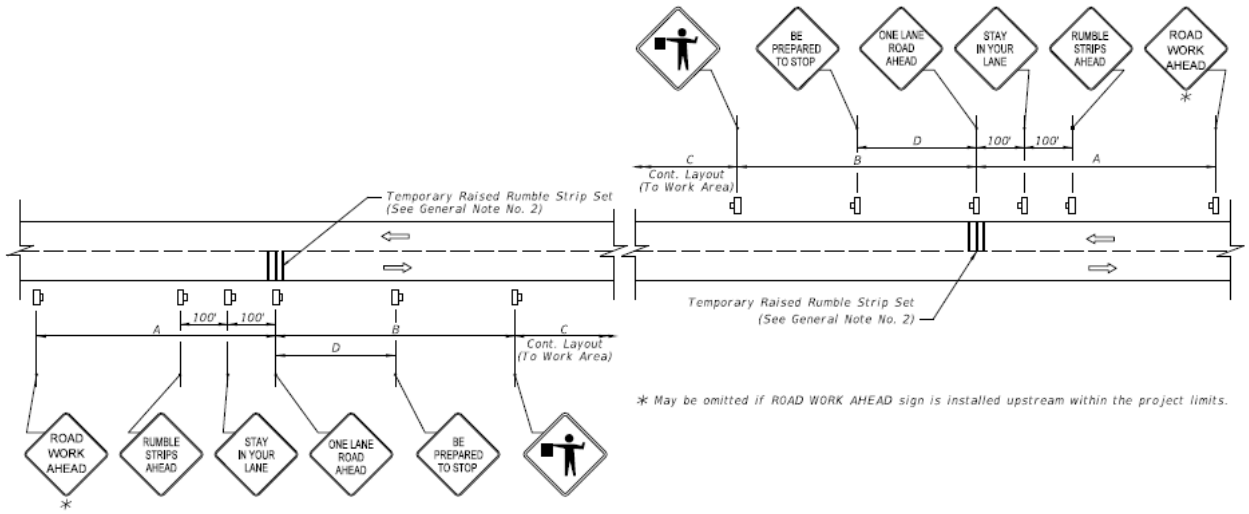


LAYOUT FOR TEMPORARY LANE SHIFT TO SHOULDER WHEN WORK AREA ENCROACHES ON THE CENTERLINE

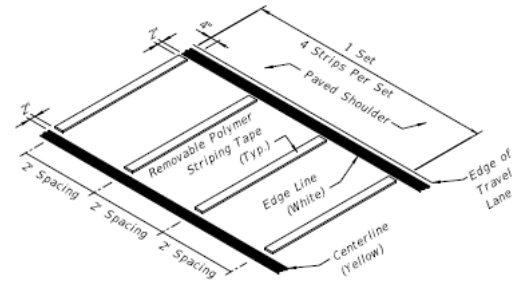
SPECIAL CONDITIONS

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/15			FDOT 2016 DESIGN STANDARDS	TWO-LANE, TWO-WAY, WORK WITHIN THE TRAVEL WAY	603	2 of 3

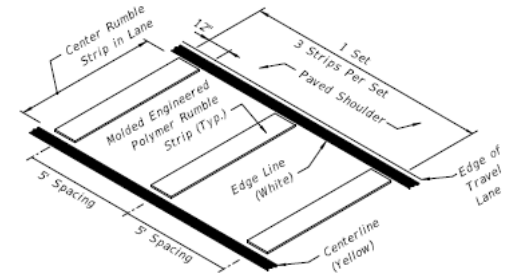
Index 603: Temporary Raised Rumble Strips



LAYOUT FOR TEMPORARY RAISED RUMBLE STRIPS WHEN REQUIRED WITH ADDITIONAL SIGNS



OPTION 1 - REMOVABLE POLYMER STRIPING TAPE RUMBLE STRIP SET

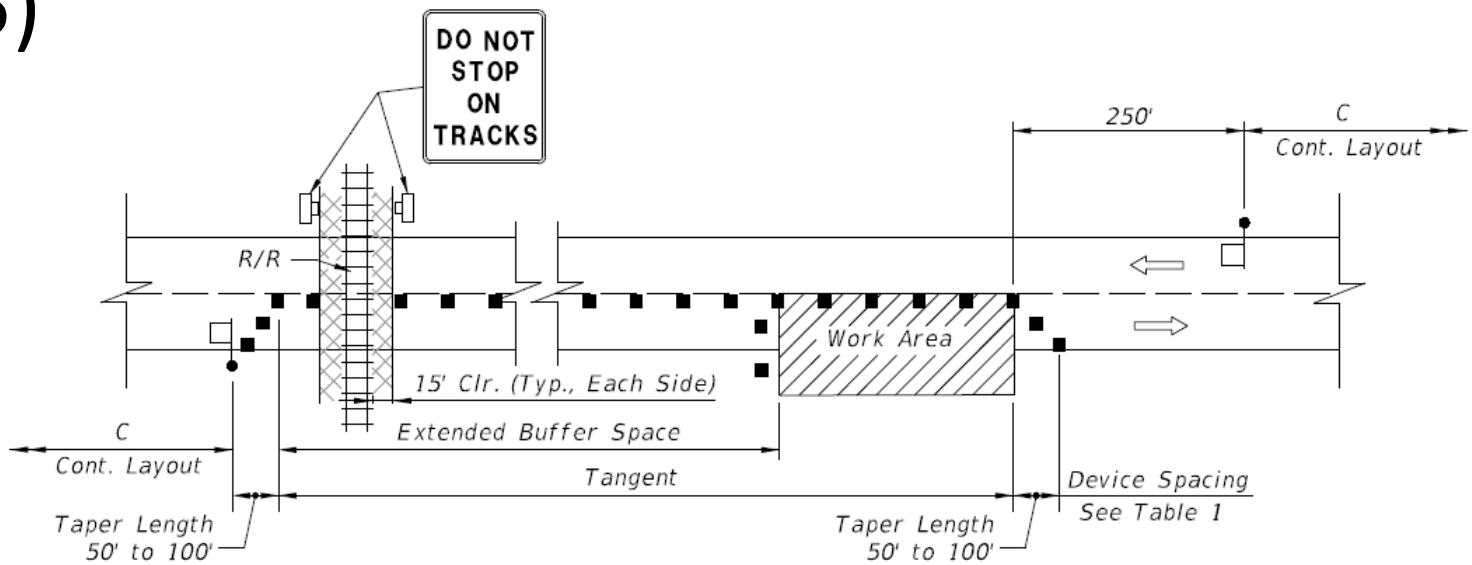


OPTION 2 - MOLDED ENGINEERED POLYMER RUMBLE STRIP SET

TEMPORARY RAISED RUMBLE STRIPS

3. Temporary Raised Rumble Strips:
   a. Use when both of the following conditions are met concurrently:
      i. Existing Posted Speed is 50 mph or greater;
      ii. Work duration is greater than 60 minutes.
   b. Use a consistent Strip color throughout the work zone.
   c. Place each Rumble Strip Set transversely across the lane at locations shown.
   d. Use Option 1 or Option 2 as shown on Sheet 2. Use only one option throughout work zone.

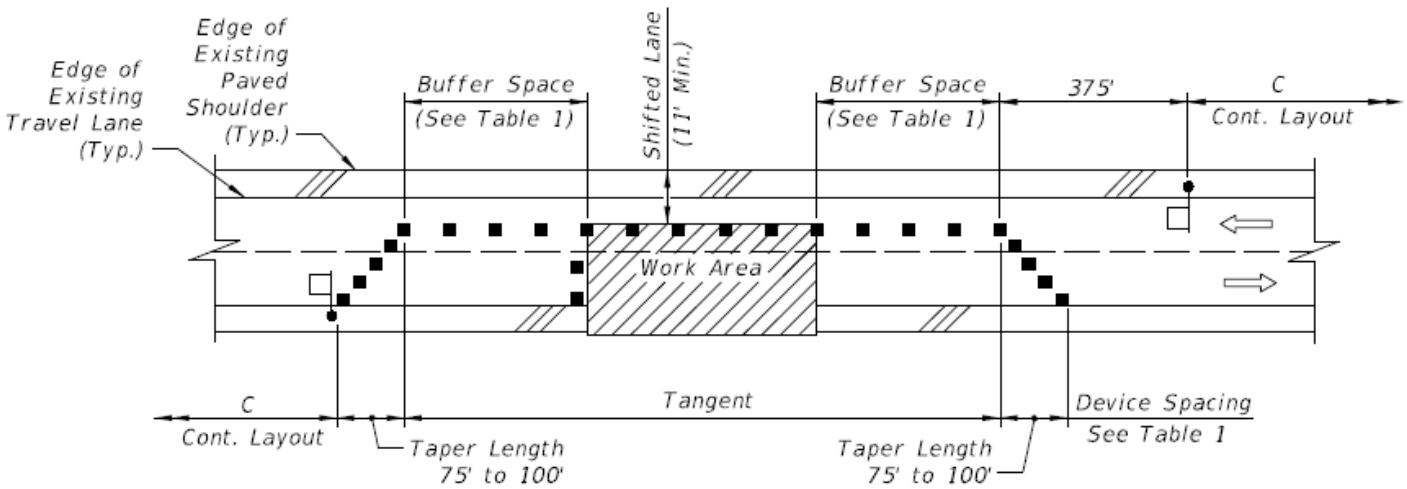
Index 603: Railroad Crossings (From Index 635)



LAYOUT FOR RAILROAD CROSSING BUFFER SPACE EXTENSION

8. Railroad Crossings:
   a. If an active railroad crossing is located closer to the Work Area than the queue length plus 300 feet, extend the Buffer Space as shown on Sheet 2.
   b. If the queuing of vehicles across an active railroad crossing cannot be avoided, provide a uniformed traffic control officer or flagger at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic train warning devices are in place.

Index 603: Encroaching Centerline



LAYOUT FOR TEMPORARY LANE SHIFT TO SHOULDER
WHEN WORK AREA ENCROACHES ON THE CENTERLINE

SPECIAL CONDITIONS

2. If the Work Area encroaches on the Centerline, use the Layout for Temporary Lane Shift to Shoulder on Sheet 2 only if the Existing Paved Shoulder width is sufficient to provide for an 11' lane between the Work Area and the Edge of Existing Paved Shoulder. Reduce the posted speed when appropriate.

Index 603: Reorganized

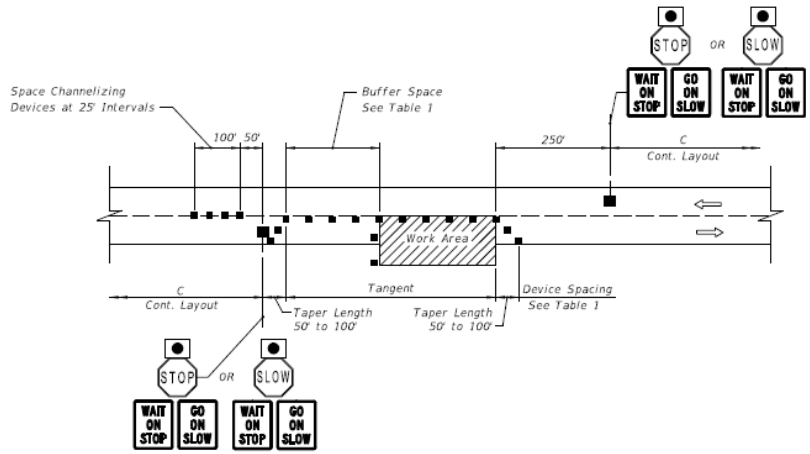
AUTOMATED FLAGGER ASSISTANCE DEVICES NOTES:

1. Illuminate the flagging station when the AFAD is used at nighttime.

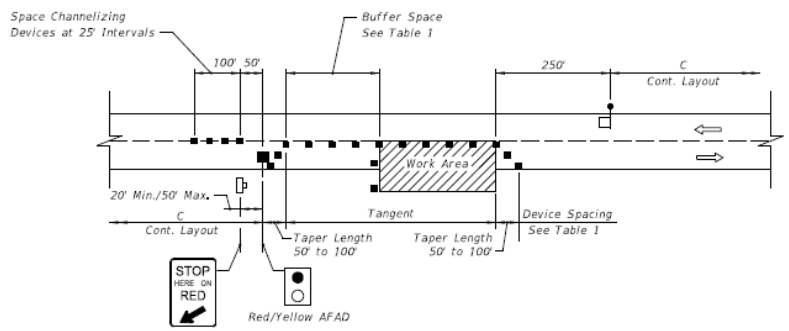
2. When the AFAD is not in use, remove or cover signs and move AFAD device outside the clear zone or shield it with a barrier or crash cushion.

3. Only qualified flaggers who have been trained in the operation of the AFAD may operate the AFAD. When in use, each AFAD must be in view of and attended at all times by the flagger operating the device. Use two flaggers and one of the following methods in the deployment of AFAD's:
   Method 1:Place an AFAD at each end of the temporary traffic control zone.
   Method 2:Place an AFAD at one end of the temporary traffic control zone and a flagger at the opposite end.

4. A single flagger may simultaneously operate two AFAD's (Method 1) or may operate a single AFAD on one end of the temporary traffic control zone while being the flagger at the opposite end of the temporary traffic control zone (Method 2) if all four of the following conditions are present:
   a. The flagger has an unobstructed view of the AFAD(s);
   b. The flagger has an unobstructed view of approaching traffic in both directions;
   c. For Method 1, the AFAD's are less than 800 ft apart. For Method 2, the AFAD and the flagger are less than 800 ft apart.
   d. Two trained flaggers are available on-site to provide normal flagging operations should an AFAD malfunction.



LAYOUT FOR STOP/SLOW AFAD
METHOD 1 - 2 AFAD's



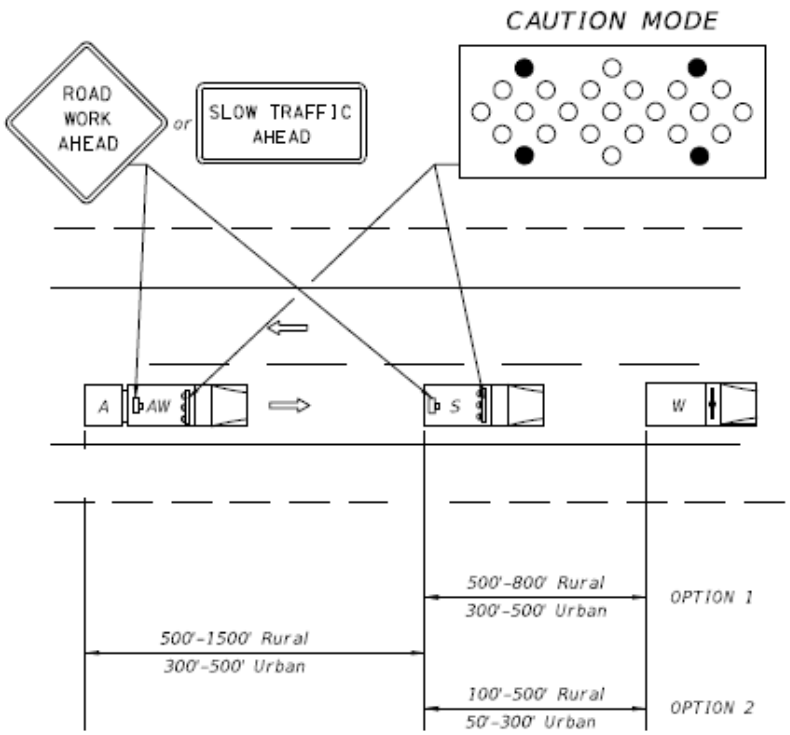
LAYOUT FOR RED/YELLOW AFAD
METHOD 2 - 1 AFAD & FLAGGER

AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADs)

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/15			FDOT 2016 DESIGN STANDARDS	TWO-LANE, TWO-WAY, WORK WITHIN THE TRAVEL WAY	603	3 of 3

Index 607:
Added Option 2

- Requested by the Materials Office
- Intended to allow the drivers of the Shadow Vehicles to position themselves closer to the Work Vehicle
- Reduce the likelihood of vehicles entering the Work Area between the Shadow Vehicle and the Work Vehicle



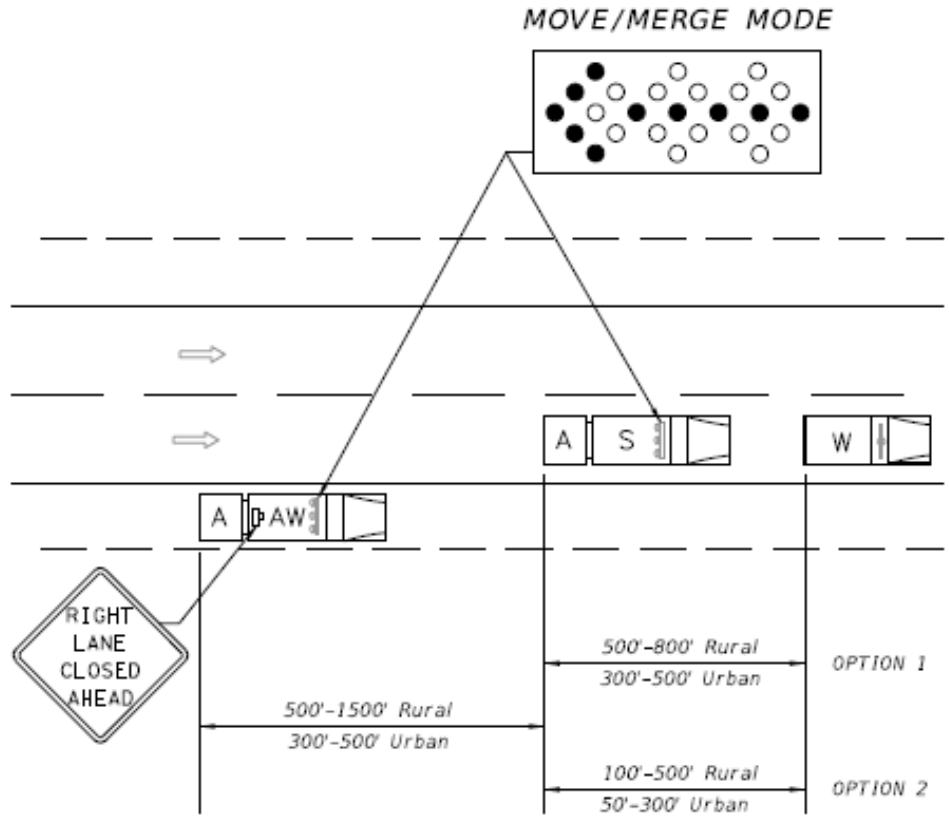
OPTION 1: Advance Warning Vehicle is optional and is to be operated in the shoulder when feasible. If an Advance Warning Vehicle is operated in the shoulder, an approved Truck Mounted Attenuator is required on both the Advance Warning and Shadow Vehicles. If an Advance Warning Vehicle is operated in the lane behind the Shadow Vehicle, an approved Truck Mounted Attenuator will be required on the Advance Warning Vehicle, but not required on the Shadow Vehicle. The Advance Warning Arrow Board and Warning Sign is required on both the Advance Warning and Shadow Vehicles.

OPTION 2: Advanced Warning Vehicle is required and must be operated in the lane behind the Shadow Vehicle. An approved Truck Mounted Attenuator will be required on the Advance Warning Vehicle but not required on the Shadow Vehicle. The Advance Warning Arrow Board and Warning Sign is required on both the Advance Warning and Shadow Vehicles.

WORK IN TRAVEL WAY
(Option 2 Shown, Option 1 Similar)

Index 619:
Added Option 2

- Requested by the Materials Office
- Intended to allow the drivers of the Shadow Vehicles to position themselves closer to the Work Vehicle
- Reduce the likelihood of vehicles entering the Work Area between the Shadow Vehicle and the Work Vehicle



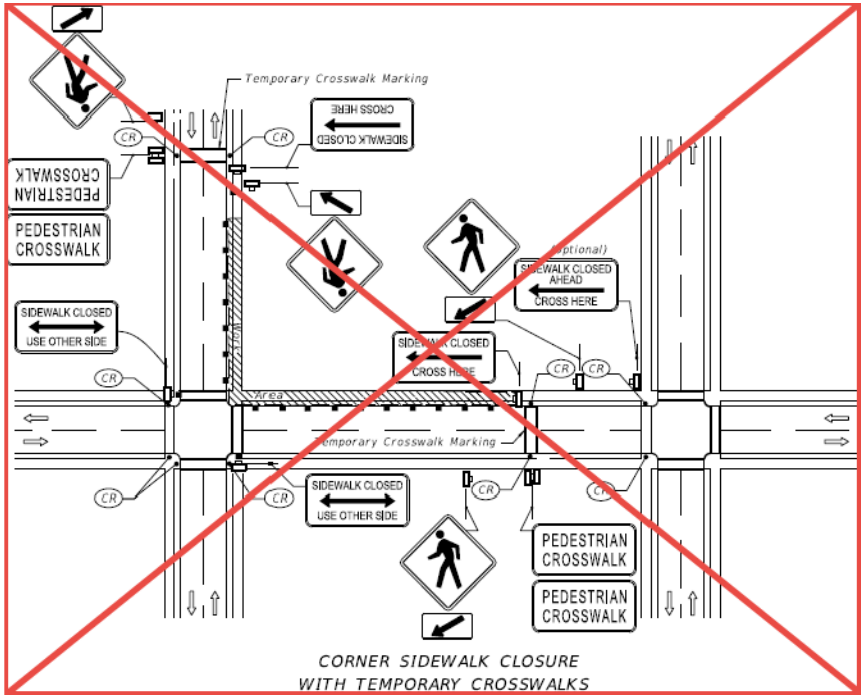
OPTION 1: Advance Warning Vehicle may be operated in the lane behind the Shadow Vehicle where adequate shoulder width is not available. Approved Truck Mounted Attenuators are required on both the Advance Warning Vehicle and the Shadow Vehicle.

OPTION 2: Advance Warning Vehicle must be operated in the lane behind the Shadow Vehicle. Approved Truck Mounted Attenuators are required on both the Advance Warning Vehicle and the Shadow Vehicle.

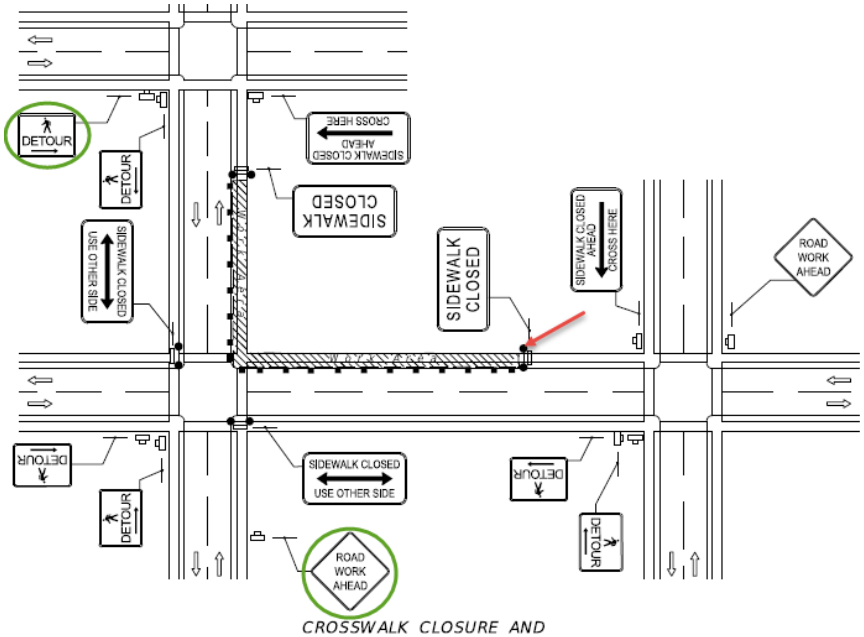
WORK WITHIN TRAVEL LANE
(Option 1 Shown, Option 2 Similar)

Index 660:

- Modified to be more in-line with MUTCD Typical Applications
- Utilized Pedestrian LCDs
- Removed Temporary Mid-block Crossings from the Index
  - May still be used; project-specific with proper justification



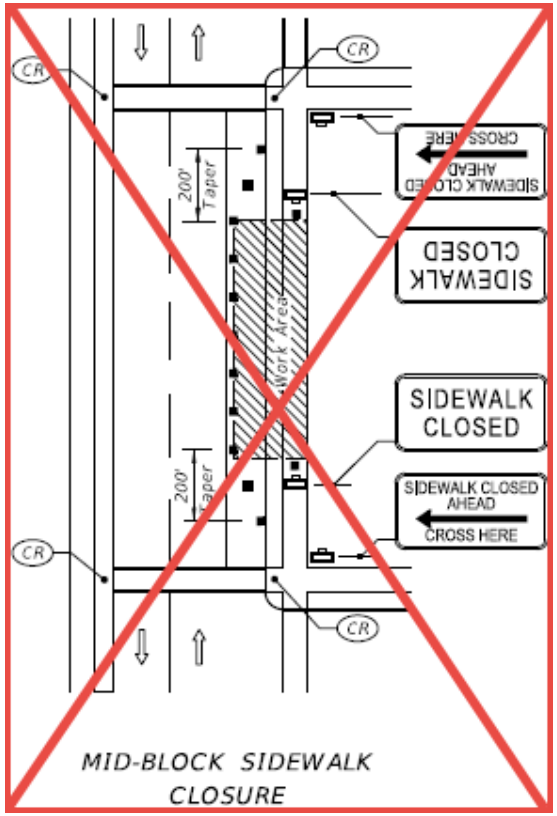
CORNER SIDEWALK CLOSURE
WITH TEMPORARY CROSSWALKS

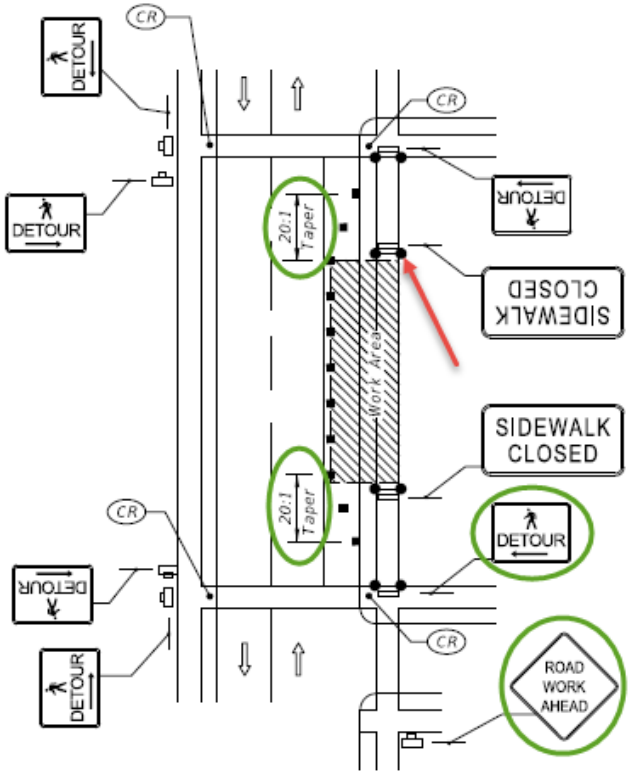


CROSSWALK CLOSURE AND
PESESTRIAN DETOUR

Index 660: Sidewalk Detour

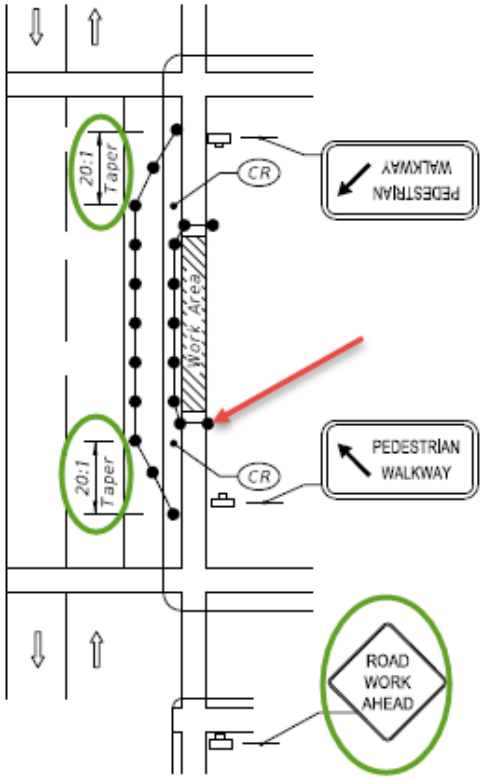
- Utilized Pedestrian LCDs
- Clarified Detour Information





Index 660: Sidewalk Diversion

- Utilized Pedestrian LCDs
- Clarified Diversion Information



New Team Member in the Roadway Design Standards Section

Maintenance of Traffic Engineer

Daniel Strickland, P.E.

(850) 414-4352

Daniel.Strickland@dot.state.fl.us

Maintenance of Traffic (MOT) will transition to:
Temporary Traffic Control (TTC)

Keep a look out for coming changes to TTC requirements to be more consistent with the MUTCD

Coming Soon:

- New Statewide Lane Closure Procedure
- New Temporary Traffic Control Training Handbook (See Proposed Changes to Specifications Section 105)

Questions

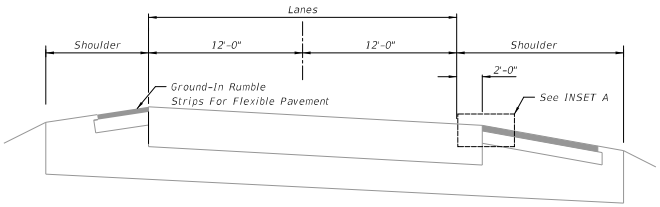
??????

2016 Design Standards
Traffic Standards

Roadway Design Office Updates

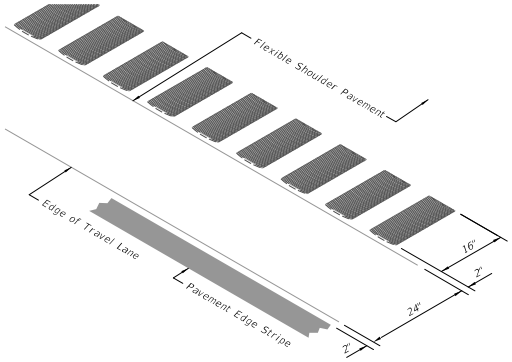
Chester Hensen, P.E.
Roadway Design Standards Group
chester.hensen@dot.state.fl.us
(850) 414-4117

Index 518

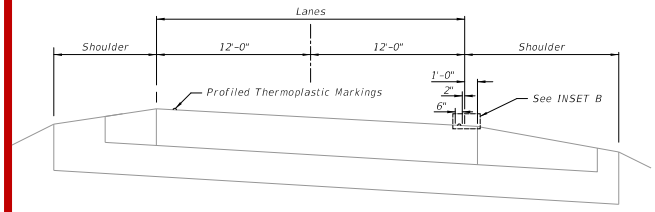


NTS

RIGID PAVEMENT WITH FLEXIBLE PAVEMENT SHOULDER

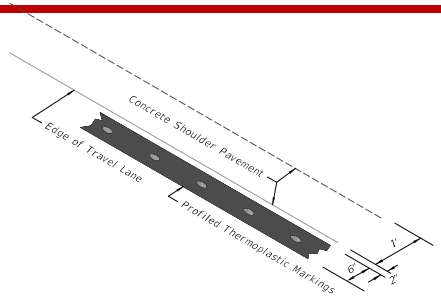


ISOMETRIC - LONGITUDINAL CUT
INSET A



NTS

RIGID PAVEMENT WITH RIGID PAVEMENT SHOULDER

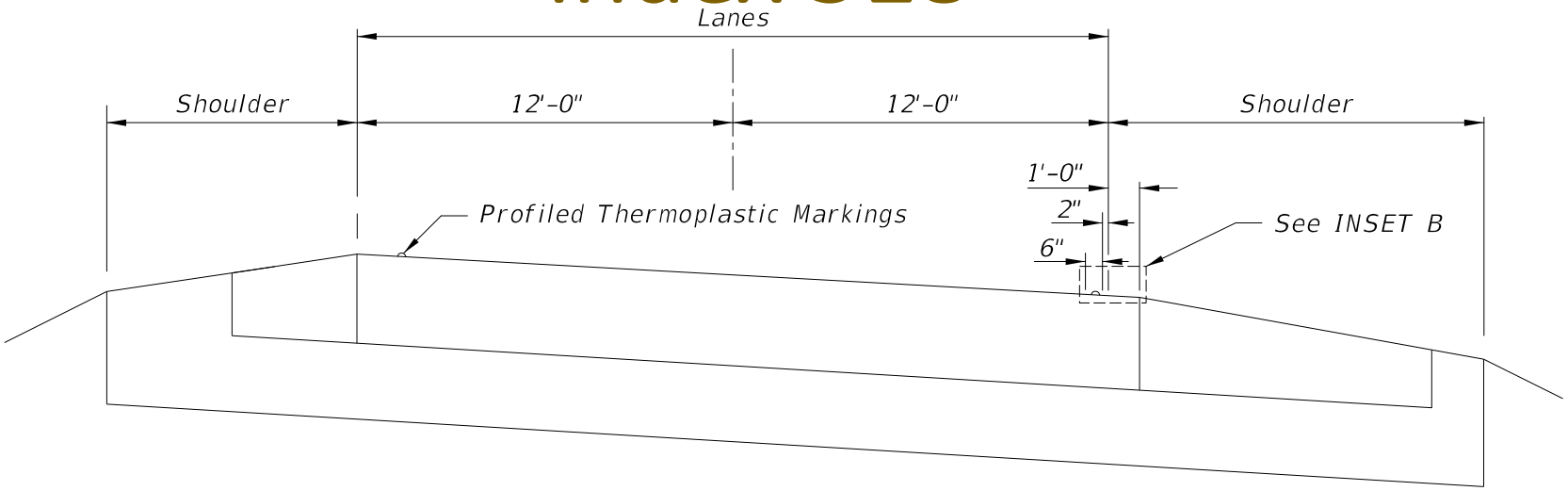


ISOMETRIC - LONGITUDINAL CUT (RIGID PAVEMENT)
INSET B

7/23/2015 1:51:17 PM

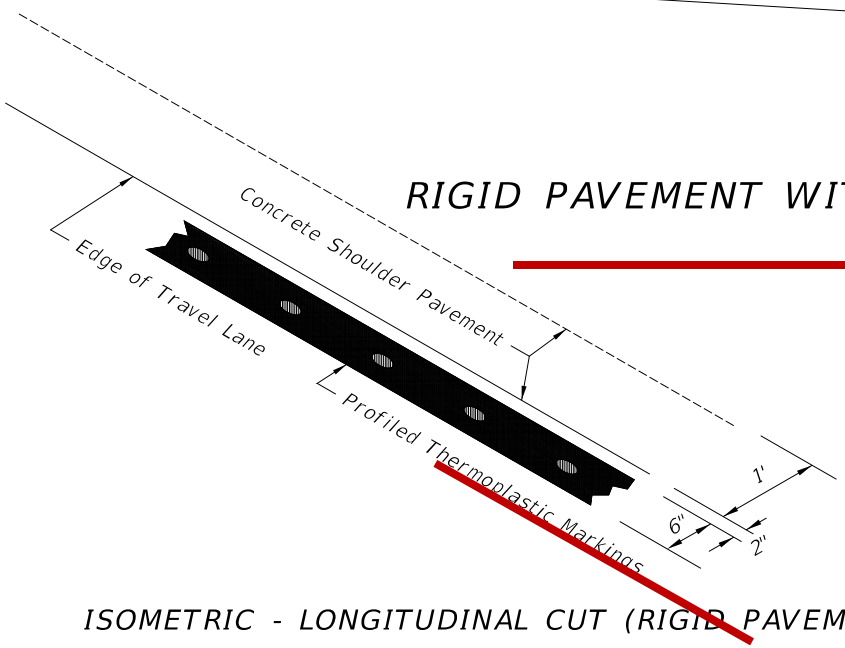
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/15			FDOT 2017 DESIGN STANDARDS	SHOULDER RUMBLE STRIPS	518	2 of 2

Index 518



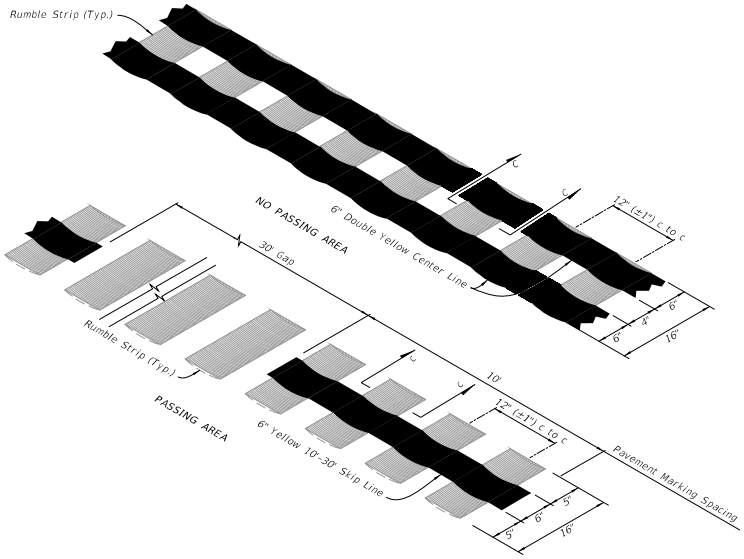
NTS

RIGID PAVEMENT WITH RIGID PAVEMENT SHOULDER

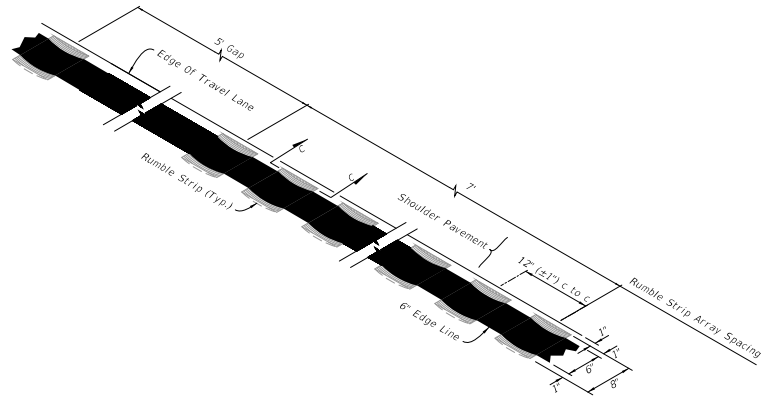


ISOMETRIC - LONGITUDINAL CUT (RIGID PAVEMENT)
INSET B

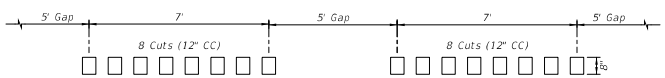
Index 519 in RDB 15-03



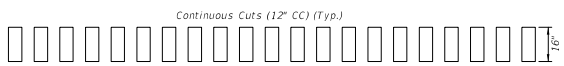
CENTER LINE RUMBLE STRIPING
ISOMETRIC - LONGITUDINAL CUT



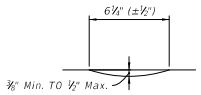
EDGE LINE RUMBLE STRIPING
ISOMETRIC - LONGITUDINAL CUT



SKIP ARRAY RUMBLE STRIP
(For All Edge Lines)



CONTINUOUS ARRAY RUMBLE STRIP
(For All Center Lines)



SECTION C-C
RUMBLE STRIP DEPTH

GENERAL NOTES:

1. Rumble Striping consists of a ground-in rumble strip with a pavement marking applied over the strip. Construct ground-in rumble strips centered on the proposed center line or edge line markings in accordance with Specification Section 546.
2. The rumble strip depth detailed on this sheet is for use on dense-graded flexible pavement only.
3. Use the Skip Array Rumble Strip for edge line rumble striping and use the Continuous Array Rumble Strip for center line rumble striping.
4. Remove raised retroreflective pavement markers when in conflict with the installation of center line rumble strip grinding operations. The cost of removal is included in the cost of the rumble strip.
5. Replacement of retroreflective pavement markers which were removed during the installation of center line rumble strip grinding operations will be paid for under Pay Item 706.
6. An extra application of paint is required within 24 hours of each day's grinding operation. Payment for the extra application of paint is not included in 710-90 and will be paid for under the appropriate 710 pay item structure.
7. The quantity of center line and edge line ground-in rumble strips will be the length in net miles constructed and accepted. No deduction will be made when the skip array is used.

2/3/2015 16:32:36 AM

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/21/15		New Index.	FDOT 2015 DESIGN STANDARDS	RUMBLE STRIPING	519	1 of 1

Index 519 in RDB 15-03

GENERAL NOTES:

1. *Rumble Striping consists of a ground-in rumble strip with a pavement marking applied over the strip. Construct ground-in rumble strips centered on the proposed center line or edge line markings in accordance with Specification Section 546.*

2. *The rumble strip depth detailed on this sheet is for use on dense-graded flexible pavement only.*

3. *Use the Skip Array Rumble Strip for edge line rumble striping and use the Continuous Array Rumble Strip for center line rumble striping.*

4. *Remove raised retroreflective pavement markers when in conflict with the installation of center line rumble strip grinding operations. The cost of removal is included in the cost of the rumble strip.*

5. *Replacement of retroreflective pavement markers which were removed during the installation of center line rumble strip grinding operations will be paid for under Pay Item 706.*

6. *An extra application of paint is required within 24 hours of each day's grinding operation. Payment for the extra application of paint is not included in 710-90 and will be paid for under the appropriate 710 pay item structure.*

7. *The quantity of center line and edge line ground-in rumble strips will be the length in net miles constructed and accepted. No deduction will be made when the skip array is used.*

Jan. 2016 - Specification Section 710-4.1.1

710-4.1.1 Painted Pavement Marking (Final Surface):

When permanent pavement markings are placed on newly constructed asphalt with rumble striping,

- apply two applications of standard paint,
- one application of Class D retroreflective pavement markers, if applicable,
- and one application of Class B retroreflective pavement markers.
- For center line rumble striping installations, install Class D retroreflective pavement markers, remove them prior to grinding, and install Class B retroreflective pavement markers on the non-ground surface after grinding.

Jan. 2016 - Specification Section 710-4.1.1

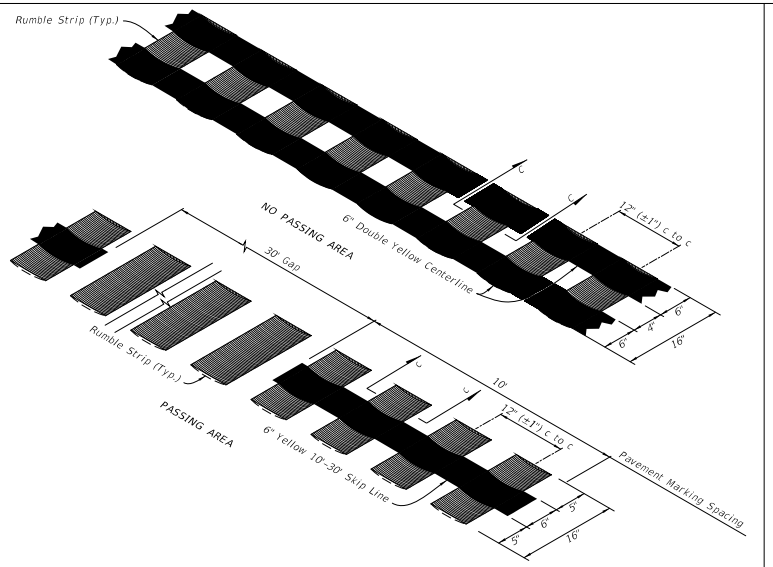
710-4.1.1 Painted Pavement Marking (Final Surface):

When permanent pavement markings are placed on newly constructed asphalt with rumble striping,

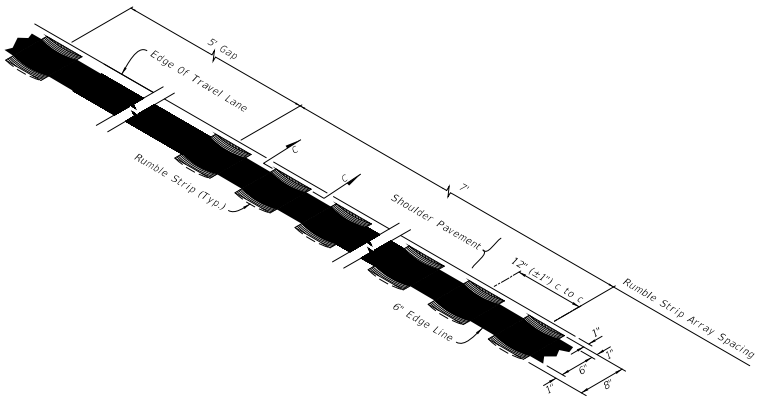
- apply two applications of standard paint,
- one application of Class D retroreflective pavement markers, if applicable,
- and one application of Class B retroreflective pavement markers.
- For center line rumble striping installations, install Class D retroreflective pavement markers, remove them prior to grinding, and install Class B retroreflective pavement markers on the non-ground surface after grinding.

Class D RPM's

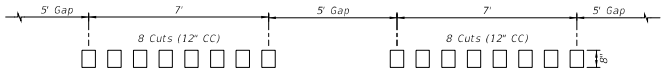
Index 519 in 2016 DSeB



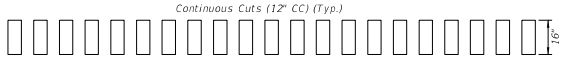
CENTER LINE RUMBLE STRIPING
ISOMETRIC - LONGITUDINAL CUT



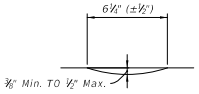
EDGE LINE RUMBLE STRIPING
ISOMETRIC - LONGITUDINAL CUT



SKIP ARRAY RUMBLE STRIP
(For All Edge Lines)



CONTINUOUS ARRAY RUMBLE STRIP
(For All Centerlines)



SECTION C-C
RUMBLE STRIP DEPTH

GENERAL NOTES:

1. Construct ground-in rumble strips centered on the proposed centerline or edge line markings in accordance with Specification Section 546.
2. The rumble strip depth detailed on this sheet is for use on dense-graded flexible pavement only.
3. Use the Skip Array Rumble Strip for edge line rumble striping and use the Continuous Array Rumble Strip for center line rumble striping.

7/22/2015 3:37:50 PM

LAST REVISION	REVISION	DESCRIPTION:	FDOT 2016 DESIGN STANDARDS	RUMBLE STRIPING	INDEX NO.	SHEET NO.
07/01/15					519	1 of 1

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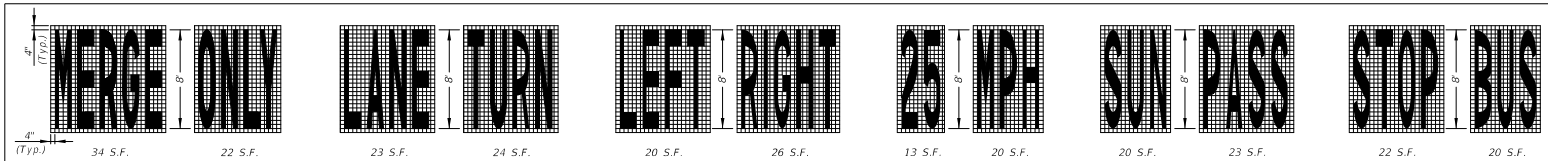
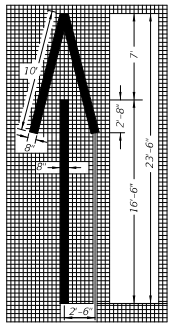
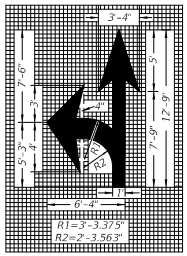




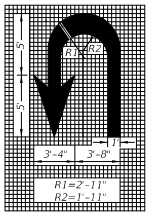
Wrong-Way Arrow

24 S.F.



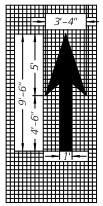
Turn and Through Lane-Use Arrow

29 S.F.



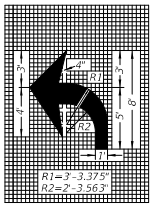
U Turn Lane-Use Arrow

27 S.F.



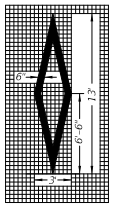
Through Lane-Use Arrow

12 S.F.



Turn Lane-Use Arrow (Left Turn Shown - Right Turn Similar by Opposite Hand)

17 S.F.



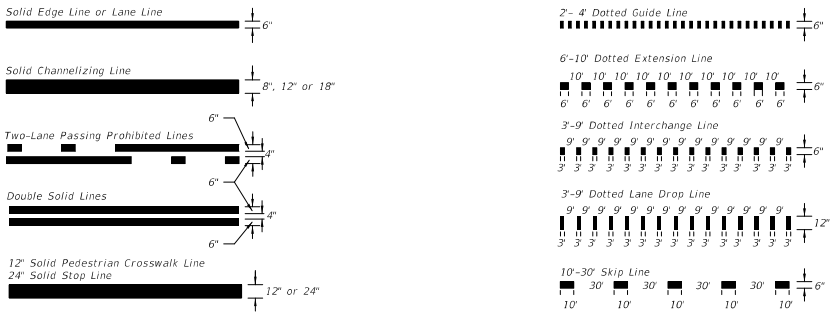
Preferential Lane Symbol

11 S.F.

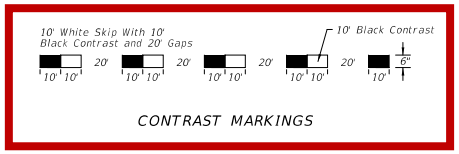
PAVEMENT ARROW AND MESSAGE DETAILS NOTE: When arrow and pavement message are used together, the arrow shall be located down stream of the pavement message and shall be separated from the pavement message by a distance of 25' (Base of the arrow to the base of the message). Stop message shall be placed 25' back of stop line.

DIMENSIONS ARE WITHIN 1" ±

PAVEMENT ARROW AND MESSAGE DETAILS



TYPES OF PAVEMENT MARKING LINES



CONTRAST MARKINGS

Yield Lines consist of five - 18" X 27" white triangles which face traffic. Equally space triangles within travel lane. Add one additional triangle using same spacing when a bike lane is present.

YIELD LINES

LAST REVISION	REVISION	DESCRIPTION:	FDOT 2016 DESIGN STANDARDS	SPECIAL MARKING AREAS	INDEX NO.	SHEET NO.
01/21/15					17346	1 of 14

7/22/2015 2:13:24 PM

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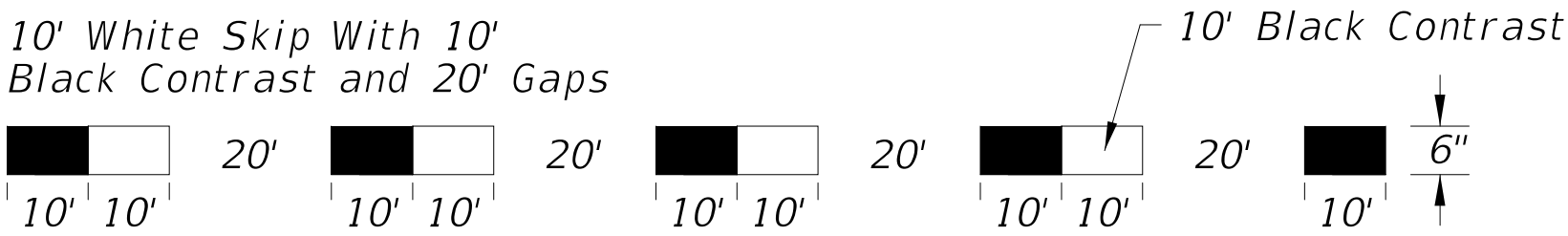
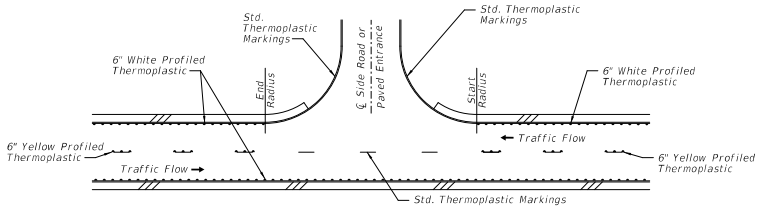
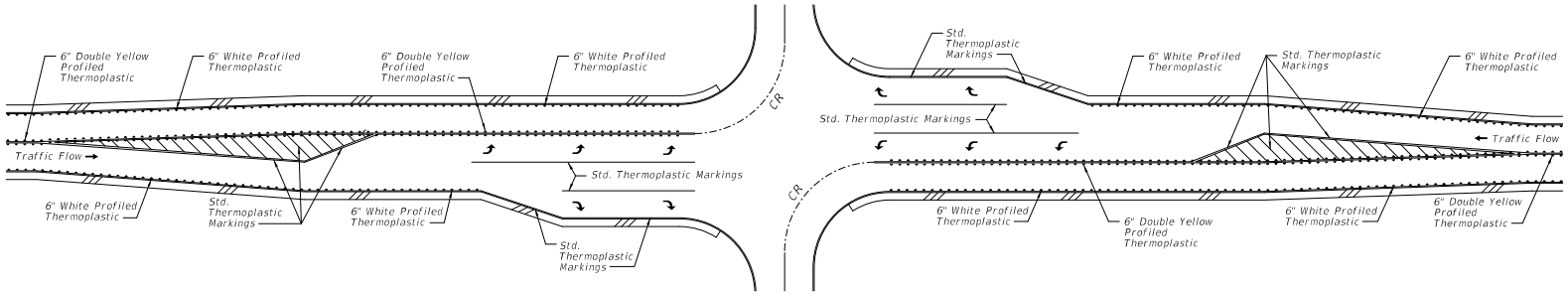


CONTRAST MARKINGS

Index 17346



TYPICAL RURAL INTERSECTION WITHOUT TURN LANES



TYPICAL RURAL INTERSECTION WITH TURN LANES

GENERAL NOTES:

1. Remove raised retroreflective pavement markers when in conflict with the installation of the centerline profiled thermoplastic pavement markings. The cost of removal is included in the cost of the profiled thermoplastic pavement marking.

2. Replacement of retroreflective pavement markers removed during the installation of the centerline profiled thermoplastic pavement markings will be paid for under Pay Item 706.

PROFILED THERMOPLASTIC MARKINGS
2 LANE CONCRETE ROADWAYS

LAST REVISION	REVISION	DESCRIPTION:	FDOT 2016 DESIGN STANDARDS	SPECIAL MARKING AREAS	INDEX NO.	SHEET NO.
01/21/15					17346	13 of 14

7/22/2015 2:06:34 PM

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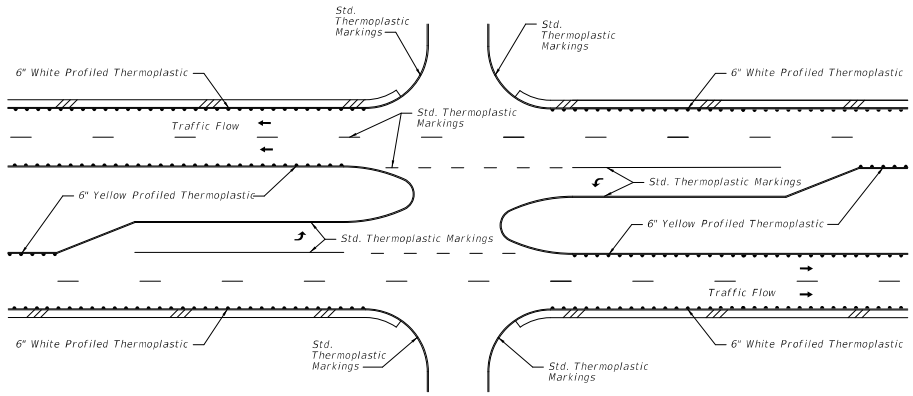
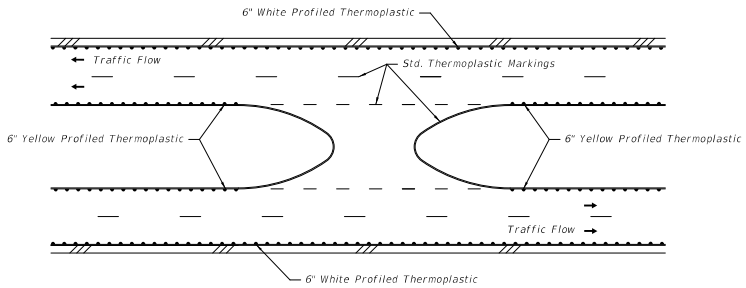
REFERENCE:

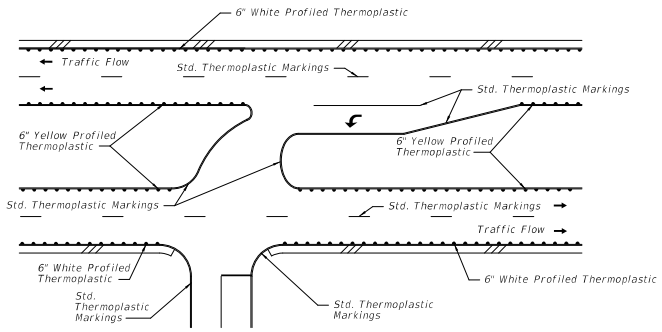
See Profiled Thermoplastic Markings General Notes on Sheet 13.



TYPICAL RURAL INTERSECTION



TYPICAL RURAL MEDIAN OPENING



TYPICAL RURAL DIRECTIONAL INTERSECTION

PROFILED THERMOPLASTIC MARKINGS
MULTI-LANE CONCRETE ROADWAYS

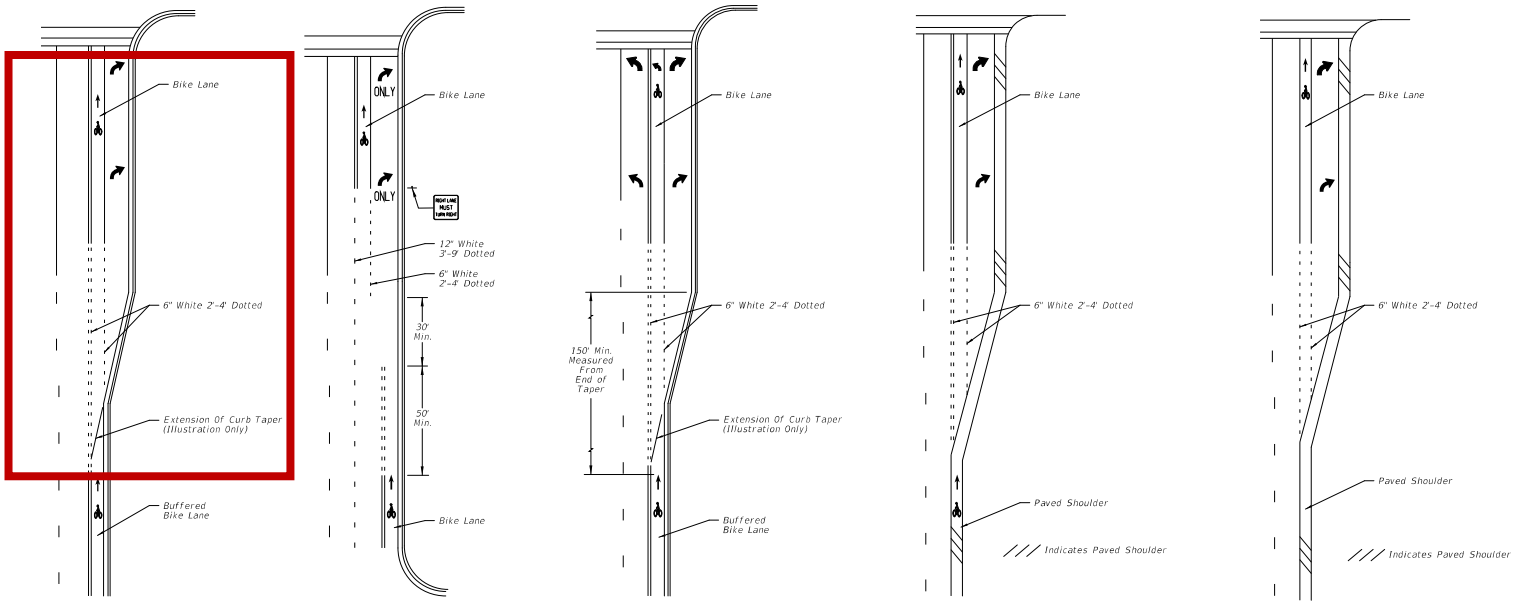
7/22/2015 2:18:26 PM

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/21/15			FDOT 2016 DESIGN STANDARDS	SPECIAL MARKING AREAS	17346	14 of 14

Rumble Striping Details

Index Number (PDF)	Design Standards Revision (DSR)	Index Title	Design Information: Instructions for Design Stds (IDS) (PDF)	Design Information: Data Table Cell Library (ZIP)	Design Information: Borderless DGNs (ZIP) Terms of Use
		Complete eBooklet *(252mb)* 2016 Design Standards eBooklet	Combined Available IDS *(11mb)*	Combined Available CEL *(1mb)*	Combined DGN *(129mb)*
		COVER, TABLE OF CONTENTS AND REVISIONS			
515		Turnouts			DGN-00515
516		Turnouts - Resurfacing Projects			DGN-00516
517		Raised Rumble Strips			DGN-00517
518		Shoulder Rumble Strips			DGN-00518
519		Rumble Striping	IDS-00519		DGN-00519
521		Concrete Steps	IDS-00521		DGN-00521
525		Ramp Terminals			DGN-00525
526		Roadway Transitions			DGN-00526
527		Directional Median Openings			DGN-00527
530		Rest Area Pavilion			DGN-00530
532		Mailboxes			DGN-00532
535		Tractor Crossings			DGN-00535
540		Settlement Plate			DGN-00540

Index 17347



KH-1
INTERSECTION WITH
SEPARATE RIGHT TURN LANE,
CURB AND GUTTER TYPICAL SECTION

KH-2
INTERSECTION WITH
RIGHT TURN DROP LANE,
CURB AND GUTTER TYPICAL SECTION

KH-3
"TEE" INTERSECTION WITH
SEPARATE RIGHT TURN LANE,
CURB & GUTTER TYPICAL SECTION

KH-4
INTERSECTION WITH
SEPARATE RIGHT TURN LANE,
IN OR WITHIN ONE MILE OF AN URBAN AREA
FLUSH SHOULDER TYPICAL SECTION

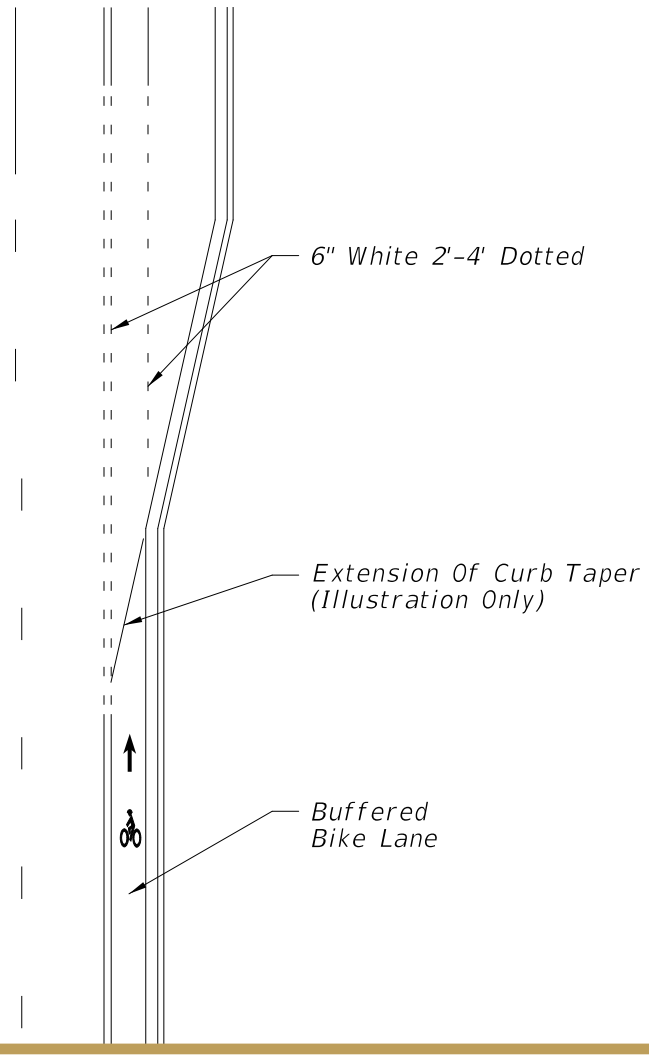
KH-5
INTERSECTION WITH
SEPARATE RIGHT TURN LANE, IN RURAL AREA
FLUSH SHOULDER TYPICAL SECTION

KEYHOLE MARKINGS

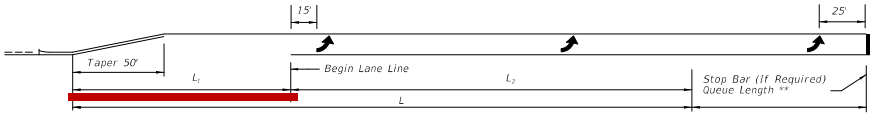
7/22/2015 2:30:23 PM

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/15			FDOT 2016 DESIGN STANDARDS	BICYCLE MARKINGS	17347	5 of 5

Index 17347

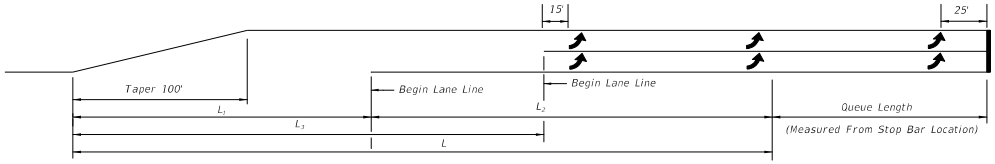

6" White 2'-4' Dotted
Extension Of Curb Taper
(Illustration Only)
Buffered
Bike Lane

Index 17346

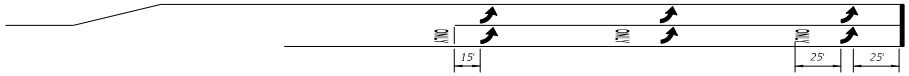


SINGLE LEFT TURNS

** Queue Length Is Measured From The Median Nose Radial Point Or, When A Stop Bar Is Required, From The Stop Bar.

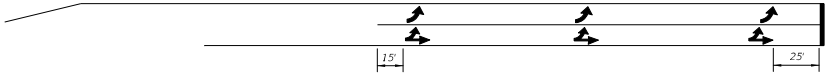


DOUBLE LEFT TURNS



The ONLY pavement message is required for turn lanes, where the thru lane becomes turn lane.

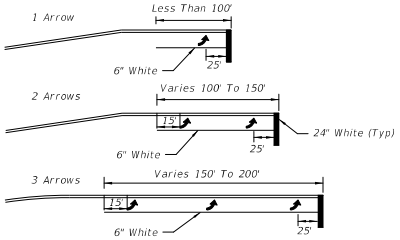
Through Lane Becomes Exclusive Left Turn



Through Lane Becomes Optional Left Turn

DOUBLE LEFT TURN MARKINGS

	TURN LANES ◦ CURBED AND UNCURBED MEDIANS						
		URBAN CONDITIONS			RURAL CONDITIONS		
Design Speed (mph)	Clearance Distance L_1	Brake To Stop Distance L_2	Total Decel. Distance L	Clearance Distance L_3	Brake To Stop Distance L_2	Total Decel. Distance L	Clearance Distance L_3
35	70'	75'	145'	110'	— —	— —	— —
40	80'	75'	155'	120'	— —	— —	— —
45	85'	100'	185'	135'	— —	— —	— —
50	105'	135'	240'	160'	185'	290'	160'
55	125'	— —	— —	— —	225'	350'	195'
60	145'	— —	— —	— —	260'	405'	230'
65	170'	— —	— —	— —	290'	460'	270'



Arrow should be evenly spaced between first and last arrow. Turn lanes longer than 200' add one arrow for each 100' additional length.

ARROW SPACING

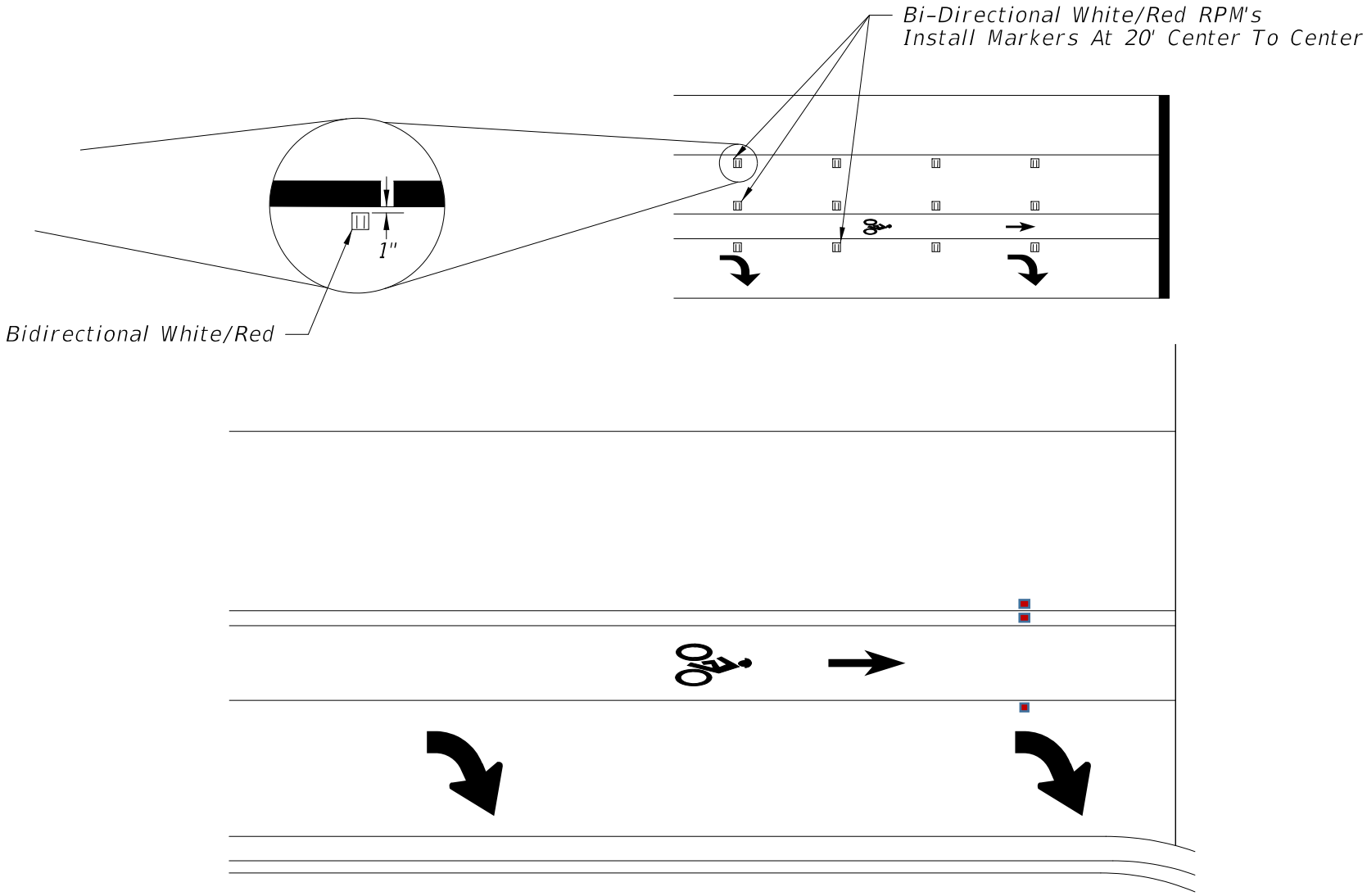
NOTES:

1. The "Begin Lane Line" locations are based on the standard lengths shown in Design Standard 301. These locations must be adjusted on a case by case basis for turn lanes not meeting the standard lengths.
2. Yellow left turn edge marking may be used adjacent to raised curb or grass medians if lane use is not readily apparent to drivers approaching a left turn storage lane.
3. Refer to Design Standard Index 301 for Roadway Details.
4. This Index also applies to right turn lanes.

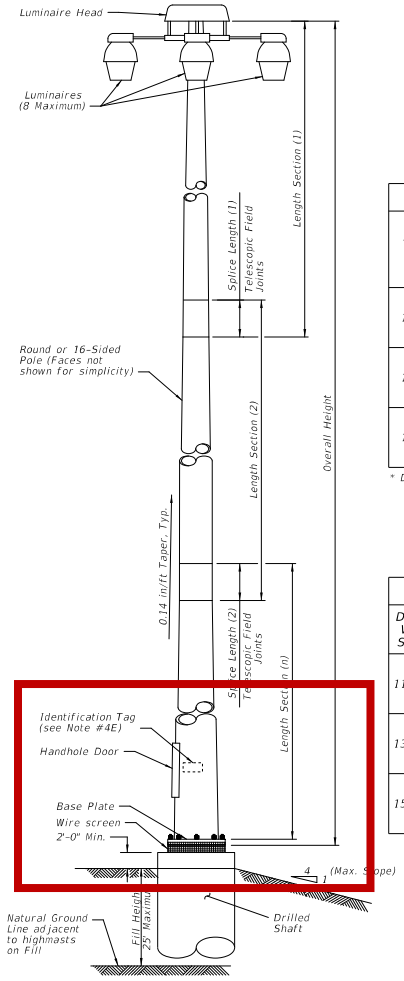
7/27/2015 10:06:24 AM

LAST REVISION	REVISION	DESCRIPTION:				
11/12/14			FDOT 2017 DESIGN STANDARDS	SPECIAL MARKING AREAS	INDEX NO. 17346	SHEET NO. 11 of 14

Index 17352


Bi-Directional White/Red RPM's
Install Markers At 20' Center To Center
1"
Bidirectional White/Red

Index 17502



ELEVATION

POLE DESIGN TABLE*																
Design Wind Speed	Pole Overall Height (ft)	SECTION 1 (TOP)					SECTION 2					SECTION 3				
		Length	Wall Thickness (in.)	Minimum Splice L.	Tip Dia. (in.)	Base Dia. (in.)	Length	Wall Thickness (in.)	Minimum Splice L.	Tip Dia. (in.)	Base Dia. (in.)	Length	Wall Thickness (in.)	Minimum Splice L.	Tip Dia. (in.)	Base Dia. (in.)
110 mph	80	41'-9"	0.250	2'-0"	5.375	11.219	40'-0"	0.250	—	10.375	16.000	—	—	—	—	—
	100	24'-3"	0.179	2'-0"	6.438	9.844	40'-0"	0.250	2'-6"	9.188	14.781	40'-0"	0.250	—	13.875	19.500
	120	44'-6"	0.250	2'-0"	6.313	12.531	40'-0"	0.250	2'-9"	11.688	17.313	40'-0"	0.313	—	16.375	22.000
130 mph	80	41'-9"	0.250	2'-0"	5.344	11.188	40'-0"	0.313	—	10.375	16.000	—	—	—	—	—
	100	24'-3"	0.179	2'-0"	6.938	10.344	40'-0"	0.250	2'-6"	9.656	15.281	40'-0"	0.313	—	14.375	20.000
	120	45'-3"	0.250	2'-6"	9.281	15.625	40'-0"	0.250	3'-0"	14.719	20.344	40'-0"	0.313	—	19.375	25.000
150 mph	80	42'-0"	0.250	2'-3"	7.344	13.219	40'-0"	0.313	—	12.375	18.000	—	—	—	—	—
	100	24'-3"	0.250	2'-0"	8.219	11.625	40'-0"	0.313	2'-6"	10.781	16.406	40'-0"	0.375	—	15.375	21.000
	120	46'-3"	0.250	3'-0"	12.469	18.938	40'-0"	0.313	3'-6"	17.938	23.563	40'-0"	0.375	—	22.375	28.000

* Diameter Measured Flat to Flat

BASE PLATE AND BOLTS DESIGN TABLE							
Design Wind Speed	Pole Overall Height (ft)	Base Plate Diameter (in.)	Base Plate Thickness (in.)	Bolt Circle (in.)	No. Bolts	Bolt Diameter (in.)	Bolt Embedment (in.)
110 mph	80	30.0	3.0	23.0	8	1.75	38
	100	33.5	3.0	26.5	8	1.75	42
	120	36.0	3.0	29.0	8	1.75	45
130 mph	80	30.0	3.0	23.0	8	1.75	43
	100	34.0	3.0	27.0	8	1.75	50
	120	41.0	3.5	33.0	8	2.00	52
150 mph	80	32.0	3.0	25.0	8	1.75	49
	100	37.0	3.0	29.0	8	2.00	53
	120	46.0	3.5	37.0	10	2.25	57

SHAFT DESIGN TABLE				
Design Wind Speed	Pole Overall Height (ft)	Shaft Diameter	Shaft Length	Longitudinal Reinforcement
110 mph	80	4'-0"	13'-0"	14- #11
	100	4'-6"	14'-0"	16- #11
	120	4'-6"	16'-0"	16- #11
130 mph	80	4'-0"	14'-0"	14- #11
	100	4'-6"	16'-0"	16- #11
	120	5'-0"	17'-0"	18- #11
150 mph	80	4'-6"	15'-0"	16- #11
	100	4'-6"	17'-0"	16- #11
	120	5'-0"	20'-0"	18- #11

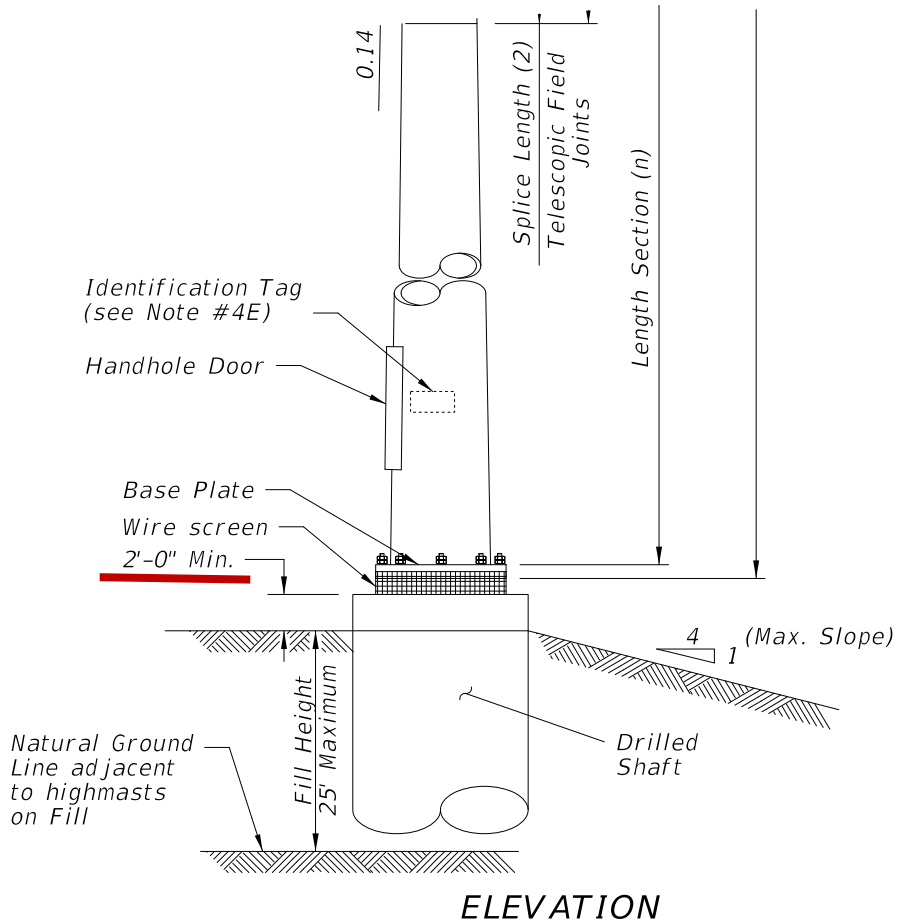
NOTE:
Foundation for slopes 1:4 or flatter. Provide a 2'-0" drilled shaft projection on the high side.

POLE DESIGN TABLES

7/22/2015 2:36:57 PM

LAST REVISION	REVISION	DESCRIPTION:				
07/01/15			FDOT 2016 DESIGN STANDARDS	HIGH MAST LIGHTING	INDEX NO. 17502	SHEET NO. 2 of 6

Index 17502


0.14
Splice Length (2)
Telescopic Field Joints
Length Section (n)
Identification Tag (see Note #4E)
Handhole Door
Base Plate
Wire screen
2'-0" Min.
4
1
(Max. Slope)
Fill Height
25' Maximum
Natural Ground Line adjacent to highmasts on Fill
Drilled Shaft
ELEVATION

Index 17723

NOTES:

1. Work with Index 17727 for grounding and span wire details. See the Plans for clamp spacing, cable sizes and forces, signals and sign mounting locations and details.

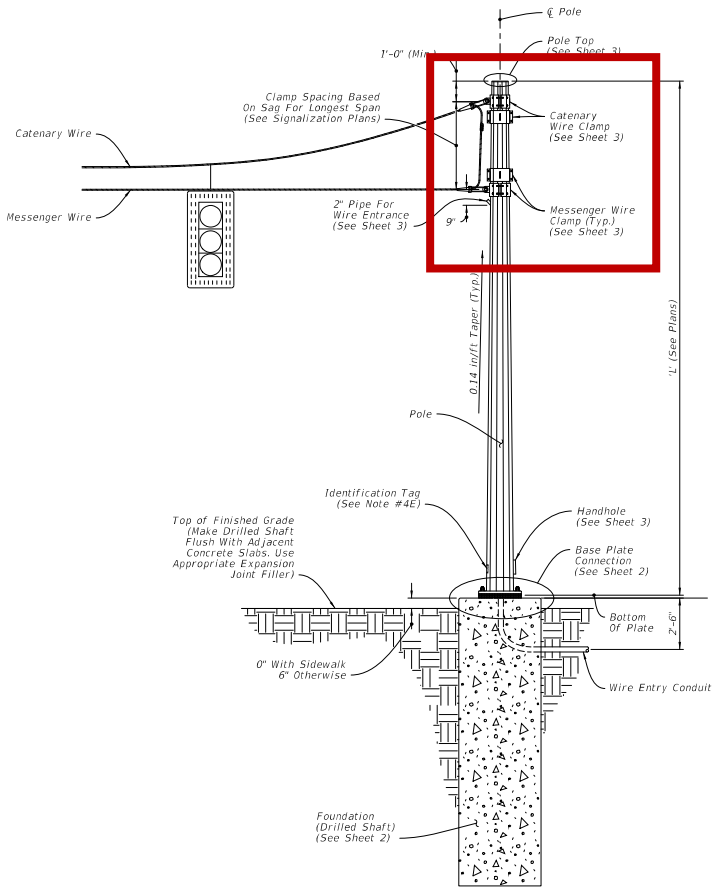
2. Shop Drawings: This Index is considered fully detailed, only submit shop drawings for minor modifications not detailed in the Plans.

3. Materials: Split-lock washers and self-locking nuts are not permitted
   - A. Strain Pole and Backing Rings:
     - a. Less than 3/16": ASTM A1011 Grade 50, 55, 60 or 65
     - b. Greater than or equal to 3/16": ASTM A572 Grade 50, 55, 60 or 65
     - c. ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
   - B. Steel Plates: ASTM A36
   - C. Weld Metal: E70XX
   - D. Bolts, Nuts and Washers:
     - a. High Strength Bolts: ASTM A325 Type 1
     - b. Nuts: ASTM A563 Grade DH Heavy-Hex
     - c. Washers: ASTM F436 Type 1, one under turned element
   - E. Anchor Bolts, Nuts and Washers:
     - a. Anchor Bolts: ASTM F1554 Grade 55
     - b. Nuts: ASTM A563 Grade A Heavy-Hex (5 per anchor bolt)
     - c. Plate Washers: ASTM A36 (2 per bolt)
   - F. Handhole Frame: ASTM A709 or ASTM A36, Grade 36
   - G. Handhole Cover: ASTM A1011 Grade 50, 55, 60 or 65
   - H. Aluminum Pole Caps and Nut Covers: ASTM B26 (319-F)
   - I. Stainless Steel Screws: AISI Type 316
   - J. Threaded Bars/Studs: ASTM A36 or ASTM A307
   - K. Concrete: Class IV (Drilled Shaft) for all environmental classifications.
   - L. Reinforcing Steel: Specification Section 415

4. Fabrication:
   - A. Pole Taper: Change diameter at a rate of 0.14 inches per foot.
   - B. Upright splices are not allowed. Transverse welds are only permitted at the base.
   - C. Provide bolt hole diameters as follows:
     - a. Bolts (except Anchor Bolts): Bolt diameter plus 1/16", prior to galvanizing.
     - b. Anchor Bolts: Bolt diameter plus 1/8", maximum.
   - D. Locate handhole 180° from 2" wire entrance pipe.
   - E. Identification Tag: (Submit details for approval.)
     - a. 2"x 4" (Max.) aluminum identification tag.
     - b. Locate on the inside of the pole and visible from the handhole.
     - c. Secure to pole with 1/8" diameter stainless steel rivets or screws.
     - d. Include the following information on the ID Tag:
       1. Financial Project ID
       2. Pole Type
       3. Pole height
       4. Manufacturers' Name
       5. Fy of Steel
       6. Base Wall Thickness
   - F. Provide a 'J' or 'C' hook at the top of the pole for signal wiring support (See Sheet 3).
   - G. Perform all welding in accordance with Specification Section 460-6.4.
   - H. Hot Dip Galvanize after fabrication.

5. Coatings:
   - A. All Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F2329
   - B. All other steel items ASTM A123

6. Construction:
   - A. Foundation: Specification Section 455, except that payment is included in the cost of the strain pole.
   - B. After installation, place wire screen between top of foundation and bottom of baseplate in accordance with Specification Section 649-6.



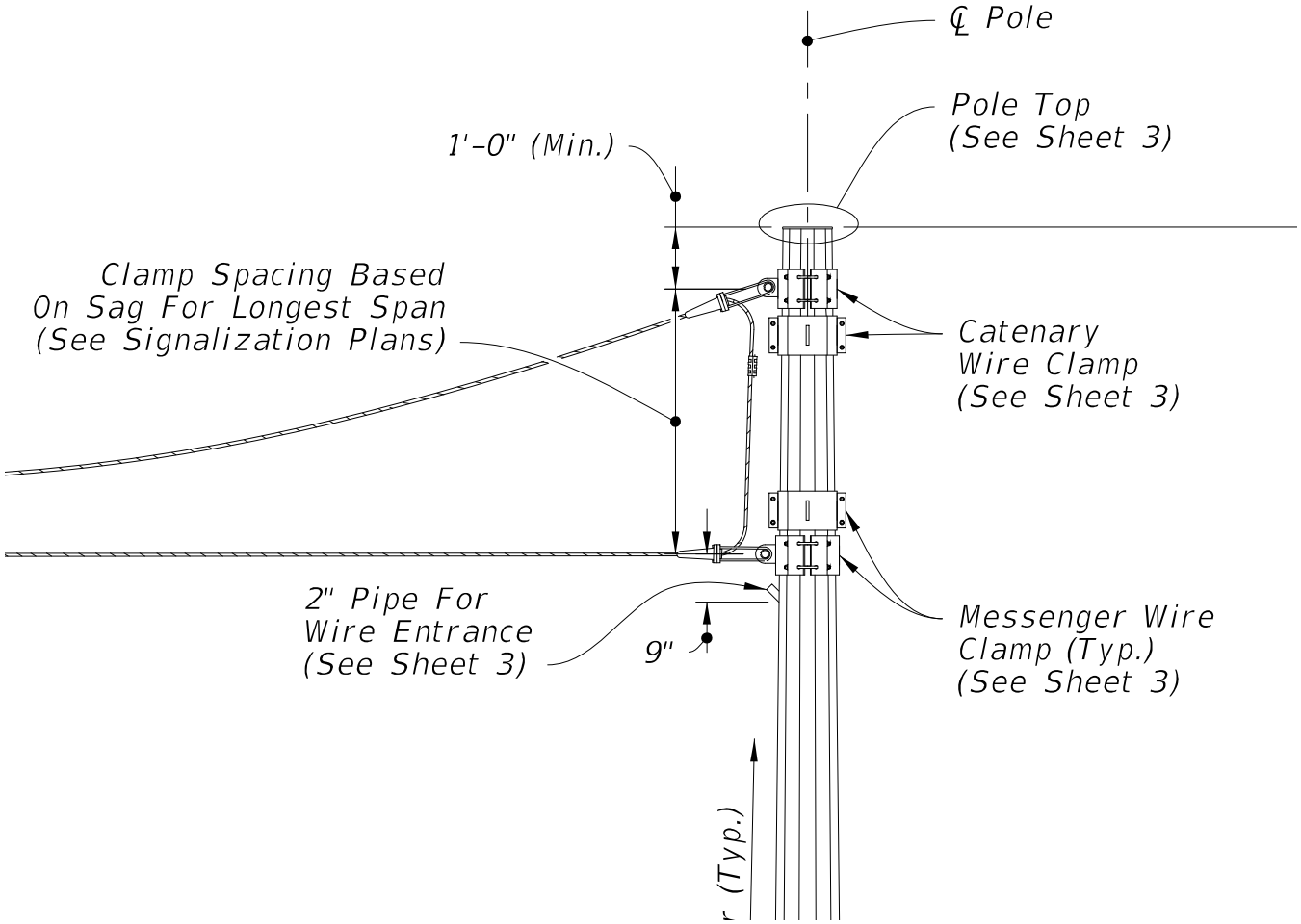
STRAIN POLE ASSEMBLY

ELEVATION AND NOTES

7/22/2015 2:42:08 PM

LAST REVISION	REVISION	DESCRIPTION:	FDOT 2016 DESIGN STANDARDS	STEEL STRAIN POLE	INDEX NO.	SHEET NO.
07/01/15					17723	1 of 3

Index 17723


℄ Pole
Pole Top
(See Sheet 3)
1'-0" (Min.)
Clamp Spacing Based
On Sag For Longest Span
(See Signalization Plans)
Catenary
Wire Clamp
(See Sheet 3)
2" Pipe For
Wire Entrance
(See Sheet 3)
9"
Messenger Wire
Clamp (Typ.)
(See Sheet 3)
(Typ.)

Questions

??????

2016 Design Standards Structures Update

Structures Design Office Updates

Steven Nolan, P.E.
Structures Design Standards Group
steven.nolan@dot.state.fl.us
(850) 414-4272

Introduction:

- Overview
- Deleted ***Design Standards***
- General Revisions
- Minor Revisions
- Significant Revisions
- Structural Revisions to Drainage related ***Design Standards***
- ***Developmental Design Standards***
- Looking Ahead

Design Standards Overview

Index Number

Design Standards

Design Information

Instructions for Design Stds (IDS)

Data Table Cell Library

Borderless DGNs

(PDF)

(PDF)

(ZIP)

Indexes
(for Contractor)

IDS
(for Designer)

Data Tables
(Convey Designer's project specific intent to the Contractor)

2016 FDOT Design Standards

For Construction and Maintenance Operations on the State Highway System
Topic No. 625-020-003

FDOT Office of Design

INSTRUCTIONS FOR DESIGN STANDARDS
2016

FDOTSS3 for PowerGEOPAK

Combined Available IDS (11mb)

Cover

Content

Introduction

Revision History

ABBREVIA

001 Standard Abbreviatio

002 Standard Symbo

EROSION CONT

104 Permanent Erosion C

105 Shoulder Sodding an

With Spread Footing (No Piles)

FLORIDA I BEAM - TABLE OF BEAM VARIABLES

STRIP SEAL EXPANSION JOINT DATA TABLE
INDEX NO. 21100

Table Date 01/01/12

LOCATION	TOTAL DESIGN MOVEMENT: IN DIRECTION OF MOVEMENT	TOTAL DESIGN MOVEMENT: PERPENDICULAR TO ℄ JOINT	TOTAL DESIGN MOVEMENT: PARALLEL TO ℄ JOINT	MOVEMENT ANGLE α	SKEW ANGLE: LEFT SIDE	SKEW ANGLE: RIGHT SIDE	DIM. A @ 70°F	DIM. A ADJUSTMENT PER 10°F

NOTE:
Dim. A adjustment per 10°F shown is measured perpendicular to ℄ Expansion Joint. For theoretical direction of movement, see Index No. 21100, Sheet 1.

TYPE① 35 STRANDS

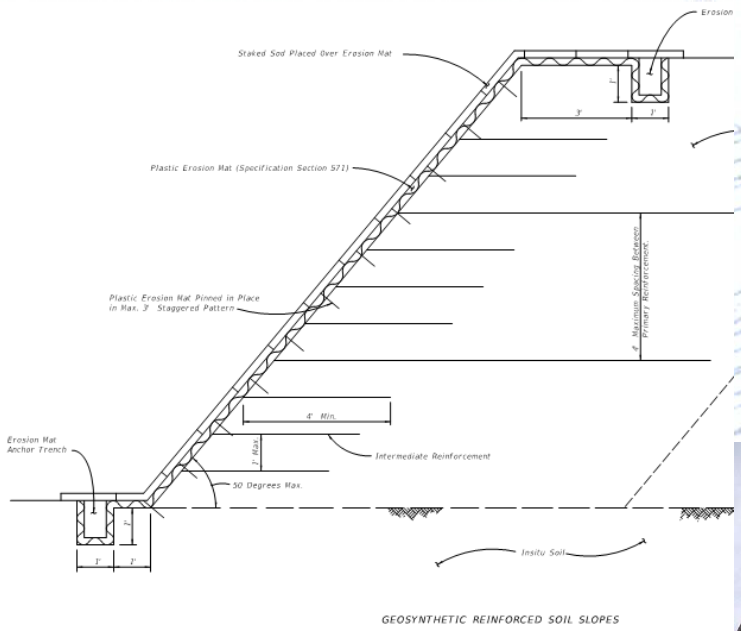
TYPE② 30 STRANDS

STRAND PATTERNS

REVISIONS

SAMPLE

Deleted ***Design Standards***



- ***Index 501:*** *Geosynthetic Reinforced Soils*
- ***Index 20005:*** *Prestressed I-Beam Temporary Bracing*

General Revisions – *Design Standards*

- ***Index 810, 811 & 812:***
  - ✓ Updated specification reference for repair of galvanizing to Section 562

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 562.

COATINGS:
Hot-dip galvanize all Nuts, Washers, Bolts, C-I-P 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.

General Revisions – *Design Standards* (Continued)

Major Note <u>Reorganization</u>

- ***Index: 11310, 11320, 17502, 17515, 17723, 17725*** *&* ***17745***
  - ✓ Same Information
  - ✓ Organized by consistent subject heading
    - Shop Drawings
    - Materials
    - Fabrication
    - Construction
  - ✓ Notes similar across Indexes (simplified, less wordy)
  - ✓ Soil Information - ***17502*** *&* ***17723*** - moved to ***IDS***

General Revisions – *IDS's*

- Editorial Change: Deleted 6th Edition from the ***AASHTO LRFD*** References
- Relaxed the requirement in ***Plan Contents*** to cross reference Standards to reference "by name or index number".

Instructions for Design Standards — Topic No. 625-0~~20~~
Index 420 Traffic Railing (32" F Shape)

Index 420 Traffic Railing (32" F Shape)

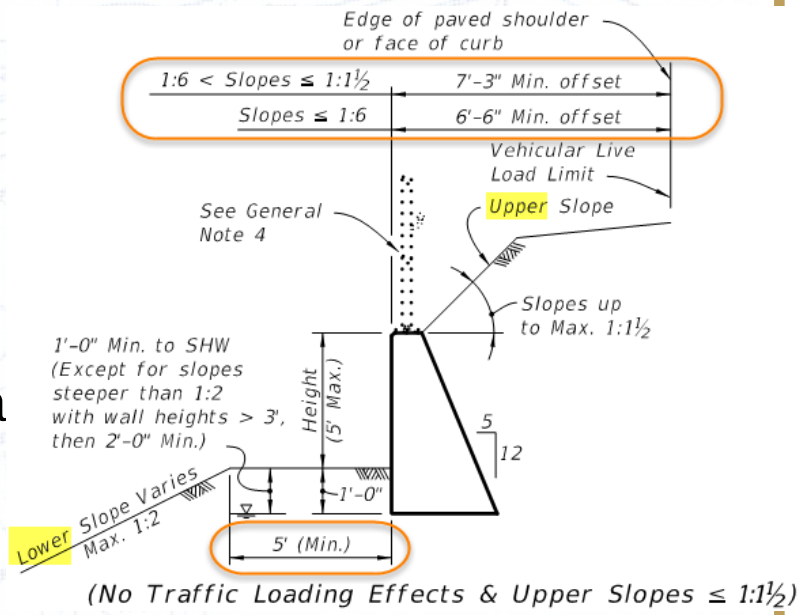
Design Criteria

NCHRP Report 350 Test Level 4 Criteria; ***AASHTO LRFD Bridge Design Specifications***~~, 6th Edition~~; ***Structures Design Guidelines (SDG)***

Show and label, by name or Index number, the 32" F-Shape Traffic Railing on the Retaining Wall Control Drawings, and other sheets as required. Show limiting stations when transitioning to other type traffic railings. Include cross references to ***Design Standards*** Index ~~420 and~~ 6100 Series as appropriate.

Minor Revisions/Updates

- ***Index 423 & 821:*** *Bullet Rails on Traffic Railings*
  - ✓ Increased rail splice/expansion joint tolerance
- ***IDS-00470:*** *Thrie-Beam Retrofits*
  - ✓ Scupper consideration
- ***Index 6011:*** *Gravity Wall*
  - ✓ Added “Upper” and “Lower” slope la
  - ✓ Moved lower slope berm width information to ***IDS***



- ***Indexes 21250 & 20251****: Access Hatch Assemblies*
  - ✓ Changed Payment Note - included in cost of the box

Cell Revisions

- **Many of the Structures Data Table cells were updated:**
  - ✓ Notes
  - ✓ General clean-ups (formatting, spelling, etc.)
  - ✓ Change in height of SHBR's
  - ✓ Load Rating Summary Tables

Update your cells!!

4.) FDOT Structures Menu v8 Structures Cell Library:
(in Microstation or AutoCAD format on request.)

TTF_v8structures.cel (FDOTSS3 MR2 & FDOTSS4)
(0.6MB)
TTF_v8structures.cel (FDOTSS2 MR1)
(0.6MB)

http://www.dot.state.fl.us/structures/CADD/standards/CurrentStandards/MicrostationDrawings.shtm

- **Data Table cells with Significant Changes:**
  - ✓ ***11310***: added columns "FF" & "FG"
  - ✓ ***17745***: added columns "RE" & "RF"

SPECIAL MAST ARM ASSEMBLIES DATA TABLE (CONT

SHAFT AND REINF.									
DA(ft)	DB(ft)	RA	RB	RC	RD(in)	RE	RF(in)	LA(ft)	LB(ft)

Significant Revisions – Pedestrian/Bicycle Railings

- Changed all *Special Height Pedestrian/Bicycle Railings (SHBR)* from 54” to 48” (4’-6” to 4’-0”) Standard height remains at 42” (3’-6”).
  - ✓ Updated to comply with ***PPM*** *Vol.1, Chapter 8.8*
  - ✓ Picket/Panel Rail changes were minor (*Index 851, 852, 861 & 862*)
  - ✓ Bullet Railings more involved (*Index 820, 821, & 822*) and minor change to *Index 6130* drawings.

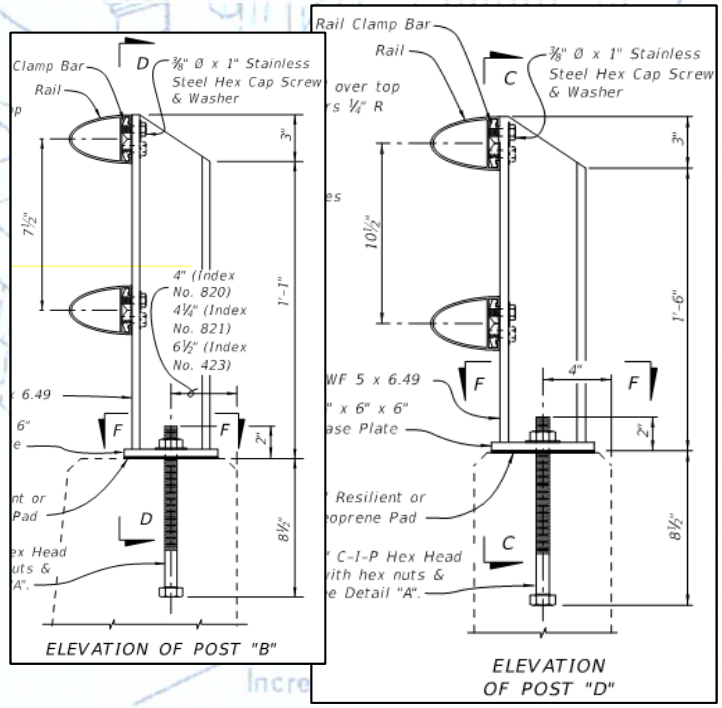
8.8 Drop-off Hazards for Pedestrians and Bicyclists

Drop-off hazards are defined as steep or abrupt downward slopes that can be perilous to pedestrians and bicyclists. The Engineer should consider shielding any drop-off determined to be a hazard. Railings or fences should be provided for vertical drop-off hazards or where shielding is required as described in this section. Note that the Pedestrian/Bicycle Picket Railings (***Design Standards Index 850*** or ***860 Series***) and the Pipe Guiderail (***Index 870*** and ***880 Series***) have not been crash tested, and shall not be placed within the lateral offset of the roadway.

The standard height for pedestrian/bicycle railing is 42 inches. *Provide a 48 inch tall*

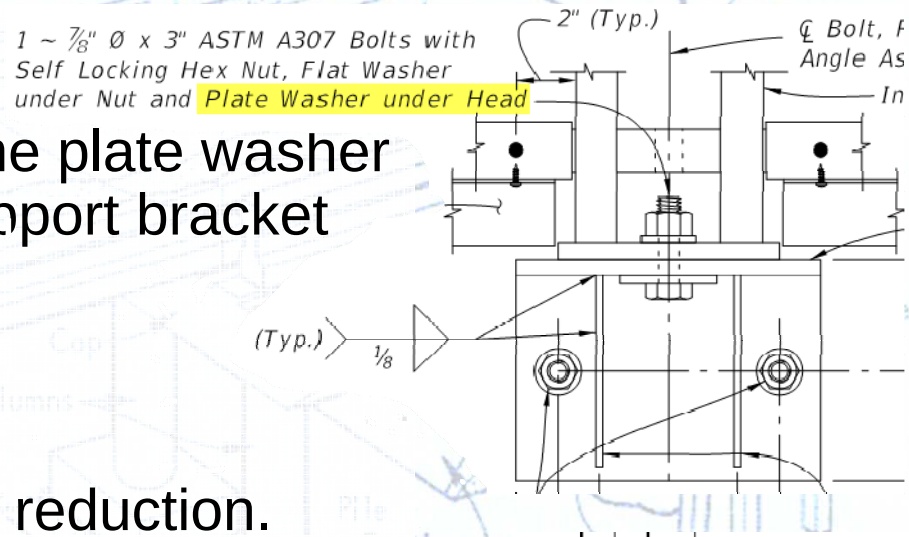
Significant Revisions – Bullet Rails

- ***Index 820***: Title changed to better reflect contents
  - ✓ Was: *'Bridge Pedestrian/Bicycle Bullet Railing'*
  - ✓ Now: *'27" Concrete Parapet with Pedestrian/Bicycle Bullet Railing'*
- **Post changes (*Index 820, 821* & *822*):**
  - ✓ Deleted Triple Rail (Post A)
  - ✓ Combined Double Rail (Post B)
    - 42" height on 27" parapet or
    - 48" SHBR on 32" Railing.
  - ✓ Added Double Rail (Post D) for 48" *SHBR* on 27" parapet

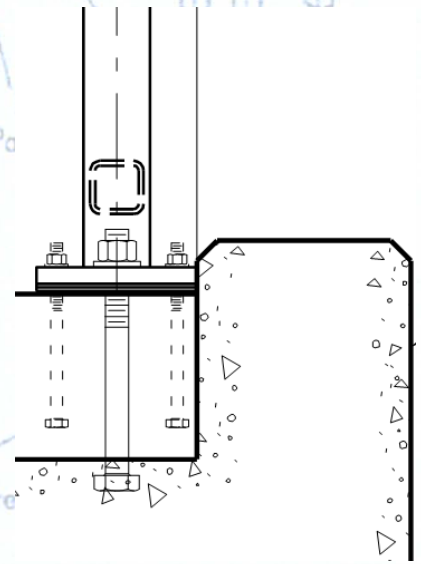


Significant Revisions – Picket/Panel Railings

- ***Index 851 & 861***
  - ✓ Changed the position of the plate washer to the underside of the support bracket for *SCHEME 3*.

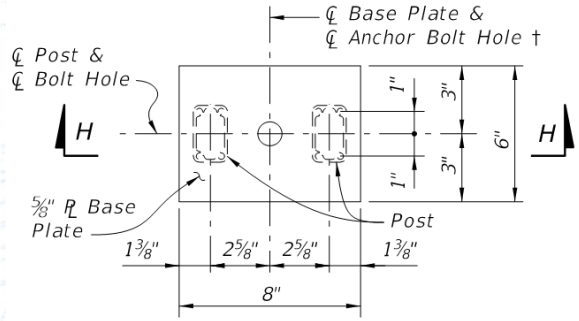


- ***Index 852 & 862***
  - ✓ Changes for *SHBR* height reduction.
  - ✓ Simplify fabrication & installation
    - Added 4-bolt Anchorage Option
    - Changed recommended location of baseplate on stairways from cheekwall to top of steps.

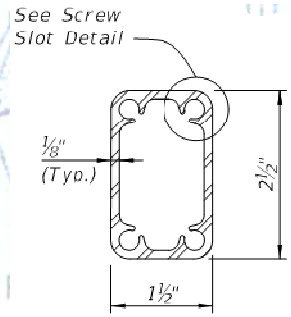


Significant Revisions – Picket/Panel Railings (Continued)

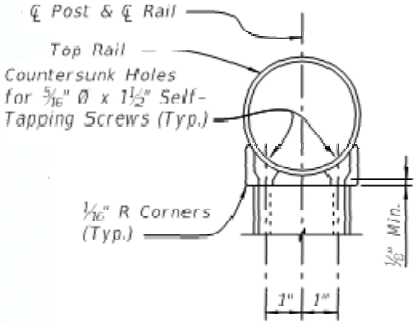
- ***Index 862**: Aluminum Bicycle/Pedestrian Picket Railings*
  - ✓ Added Extrusion for Post (Type C)
  - ✓ Added Extrusion for Post Top Plate (facilitates Post to Top Rail connection
    - Eliminates welding of aluminum at critical connections.
    - Simplifies fabrication and Installation

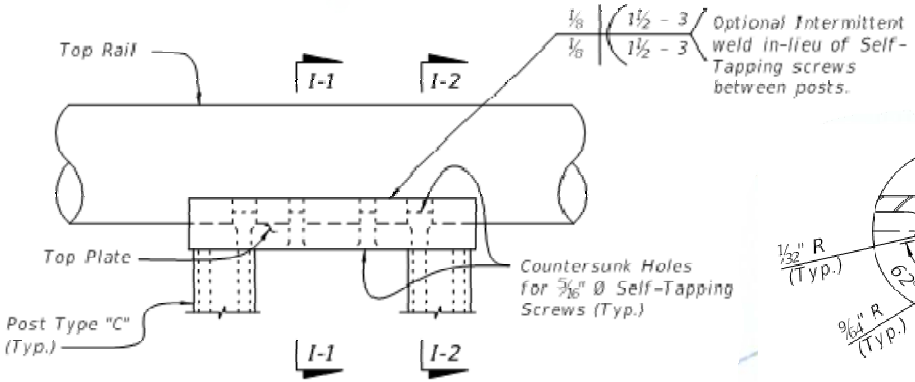


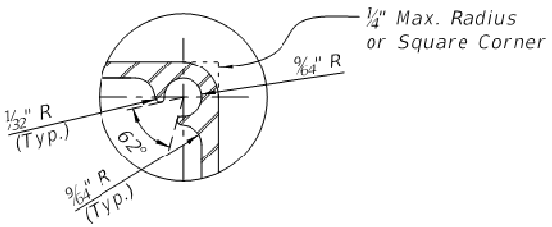
BASE PLATE A



POST TYPE "C" CREW SLOT SECTION





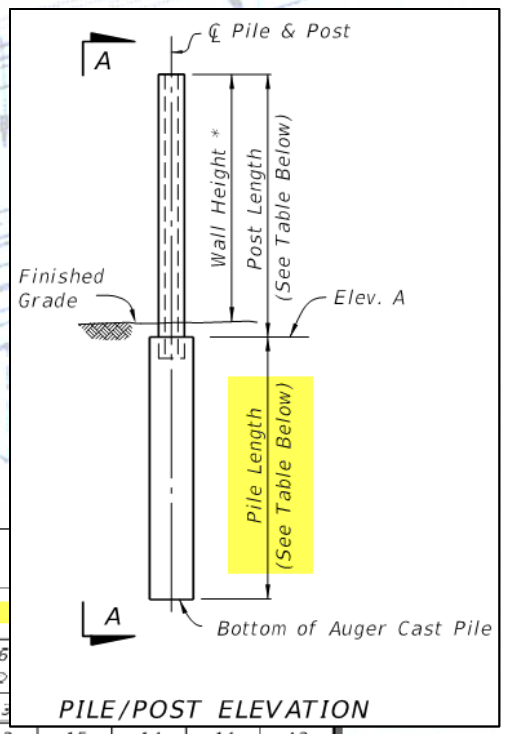


SCREW SLOT DETAIL

Significant Revisions – Noise Walls

- ***Index 5200:*** Cleaned up note references
  - ✓ Updated Pile Lengths
  - ✓ Note 10.A.2 now includes 17' height

2. Plain Pads with a may be substituted for Fiber Reinforced Pads when sufficient bearing area is available on the concrete collar for the following:
   a. 10' Post Spacing: 4"x 4"x ½"
   b. 20' Post Spacing and Wall Height < 17 feet: 4"x 4"x ½"
   c. 20' Post Spacing and Wall Height ≥ 17 feet: 4"x 5"x ½"



H POSTS

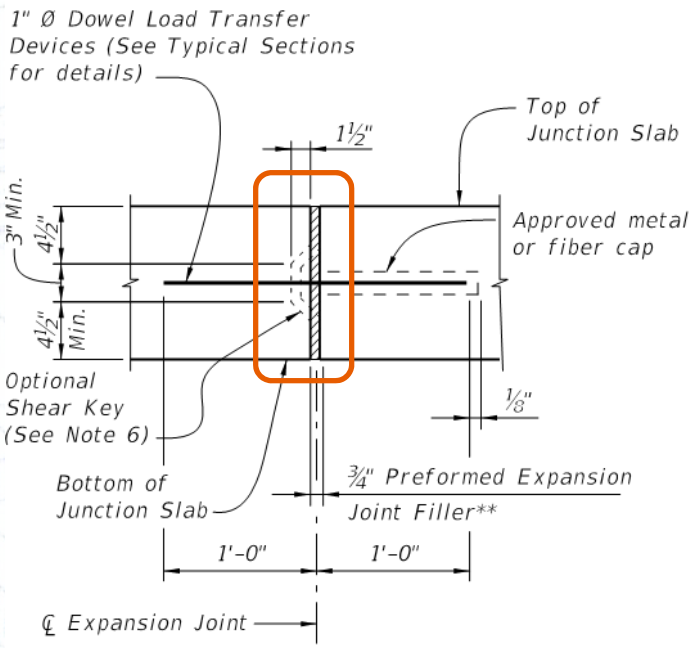
SOIL 1		SOIL 2					
30" ⌀	36" ⌀	30" ⌀	36 ⌀				
15	14	14	13				
16	15	14	13	15	14	14	13
17	15	15	14	16	15	14	13
17	16	15	14	17	15	15	14
18	17	16	15	17	16	15	14
19	17	16	15	18	17	16	15
19	18	17	16	19	17	16	15
20	18	17	16	19	18	17	16
20	19	18	17	20	18	17	16
21	19	18	17	20	19	18	17
21	20	19	17	21	19	18	17

TABLE NOTE:
1. Bars D and Bars E are for 45° Corner Posts only.
2. See Contract Plans for project wind speed.
3. Soil 1 = Loose Granular Soil, N = 4 to 9.
   Soil 2 = Medium Dense Granular Soil, N = 10 to 40.

- ***IDS 5200:*** Soil Type descriptions now match the Index:
  - ✓ Type 1 – (N = 4 to 9)
  - ✓ Type 2 – (N = 10 to 40)

Significant Revisions – Doweled Expansion Joints

- ***Indexes 5215, 6110 & 6120***
  - ✓ Added a Note to allow the use of Preformed Polymer Stay-in-Place (SIP) Bond Breaker
- ***Indexes 6110 & 6120***
  - ✓ Added Optional Shear Key
  - ✓ Added GFRP Bars as Dowels
    - Requires use of Shear Key



EXPANSION JOINT DETAIL

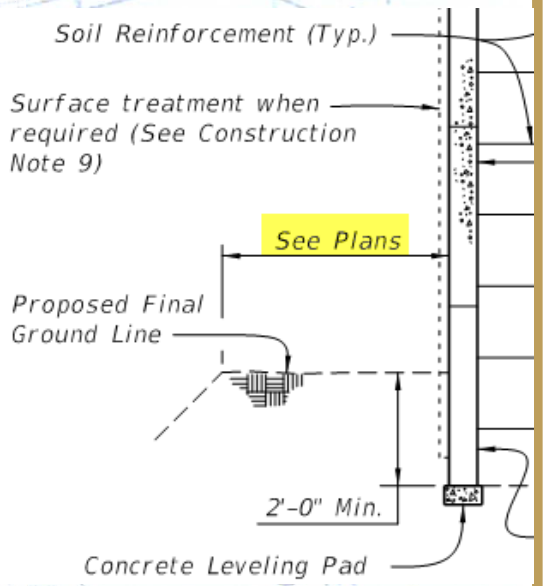
(Junction Slab expansion joints are to coincide with ¾" open joints in Traffic Railing)

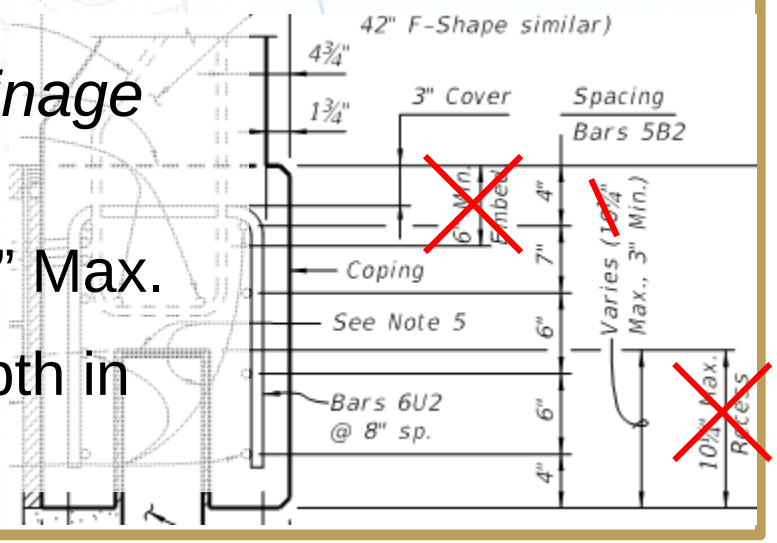
** Stay-In-Place Plastic Preformed Bond Breakers are permitted to form joints.

6. Shear Keys in Junction Slab are required when GFRP bars are used for Dowel Transfer Devices and are optional with steel dowel bars. Tongue Slope on Shear Key must be constant and between 5° to 45° from horizontal.

Significant Revisions - 6000 Series

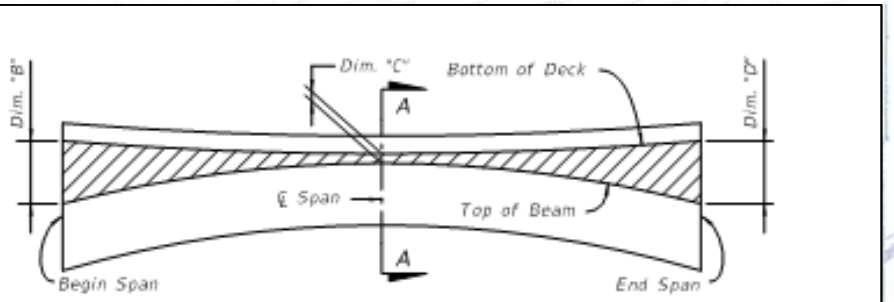
- ***Index 6020:*** *Permanent MSE Retaining Wall Systems:*
  - ✓ Changed toe of wall dimension & Deleted half of Note 13 - Details moved to ***IDS***
- ***Index 6120:*** *Wall Coping with Traffic Railing/Raised Sidewalk*
  - ✓ Deleted slip-forming restriction.
- ***Index 6201:*** *Junction Slab at Drainage Inlet Openings:*
  - ✓ Changed recess depth to 1'-1¼" Max.
  - ✓ Deleted 6" Min. embedment depth in Section A-A



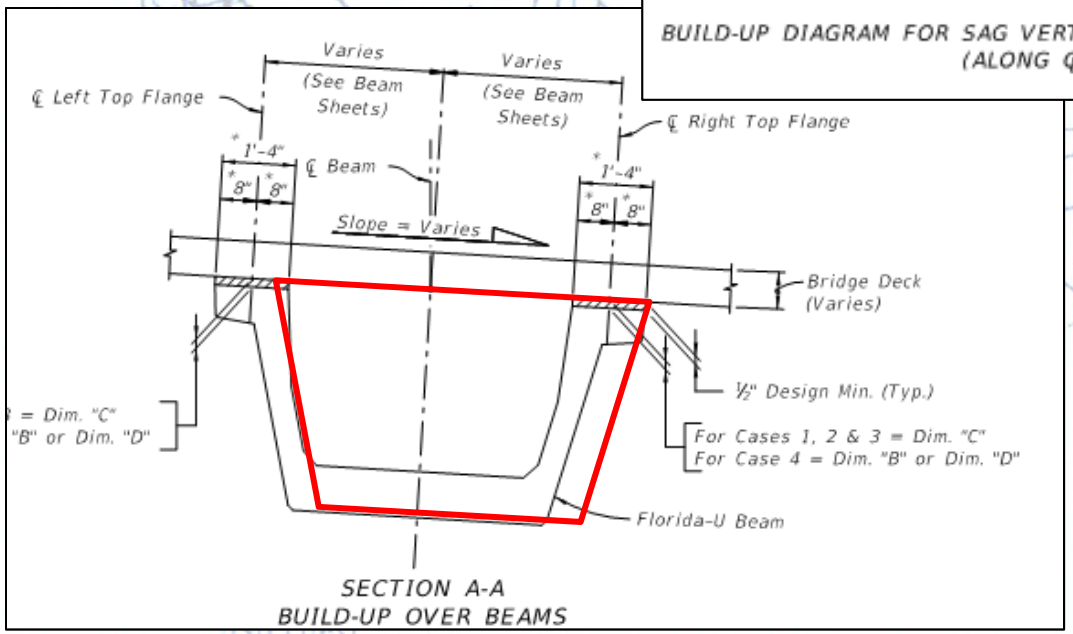


Significant Revisions

- ***Index 20199 & 20299:*** *Build-Up & Deflection Data*
  - ✓ Horizontal Curve added to *CASE 2* Titles



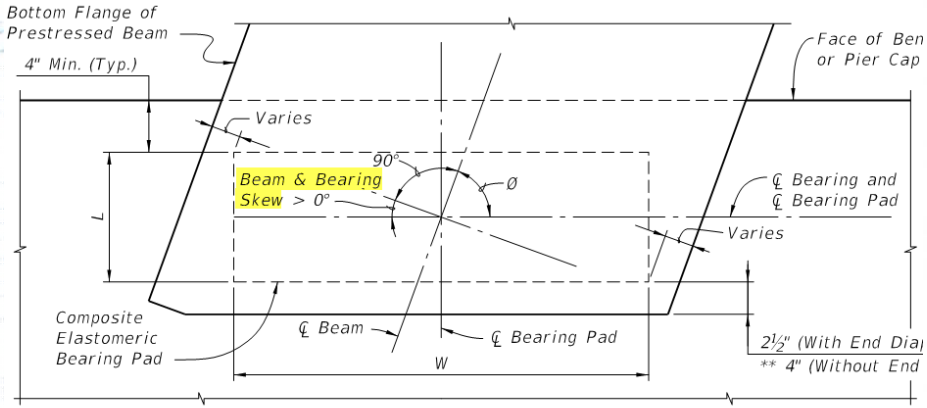
BUILD-UP DIAGRAM FOR SAG VERTICAL CURVE & HORIZONTAL CURVE SPANS (ALONG ℄ BEAM) (CASE 2)



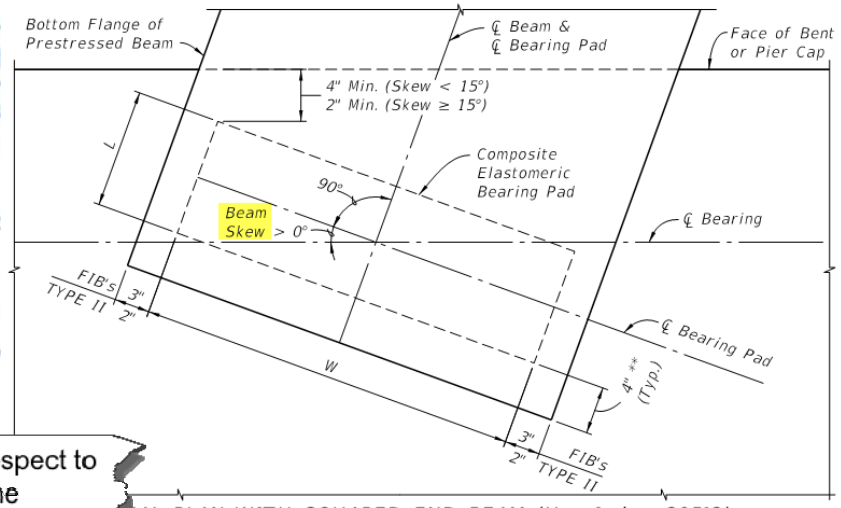
SECTION A-A
BUILD-UP OVER BEAMS

Significant Revisions – Elastomeric Bearing Pads

- ***Index 20510:*** *Composite Elastomeric Bearing Pads*
  - ✓ Skew Angle Definition Clarified
    - Skew of Bridge
    - Skew of Bearing Pad to direction of moment
- ***IDS-20510:***
  - ✓ Revised to clarify design requirements



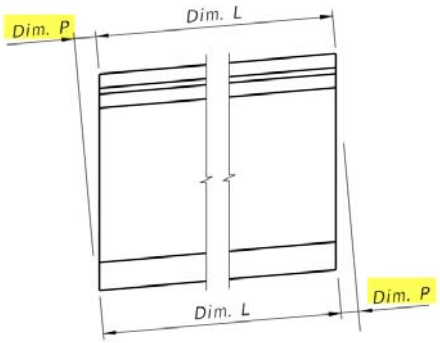
PARTIAL PLAN (Beam & Bearing Skew > 0°) (Use Index 20511)



AL PLAN WITH SQUARED END BEAM (Use Index 20512)
(Beam Skew > 0°; Bearing Skew = 0°)

Skew angle for Bearing Pad design is based on the direction of rotation with respect to the centerline of the Bearing Pad; and is usually taken as the angle between the centerline of the beam and the longitudinal centerline of the Bearing Pad, except on curved bridges.

Significant Revisions – Prestressed Concrete Beams



- ***IDS 20010, 20110 & 20120***
  - ✓ Added Guidance for Dim. P

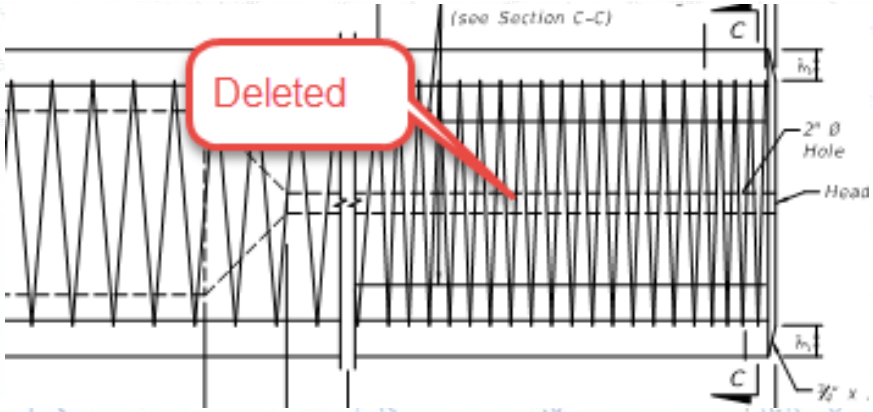
Report DIM P for beams placed on grade if the calculated value is equal or greater than 1" using ⅛" increments. Also consider the effect of beam end rotations for Florida-I 84 and 96 beams, if significant. Different "P" dimensions at each end may be necessary for accommodating these effects, which will require modifying the "FLORIDA-I BEAM - TABLE OF BEAM VARIABLES" using suggested DIM P1 and DIM P2.

- ***IDS-20299*** *Florida-U Beams*
  - ✓ Added clarification on vertical curve geometry along Centerline

Consider the effects of horizontal curvature with bridge deck cross slope when determining the minimum theoretical build-up over the tip of the inside flange. Consider that the vertical curve geometry is along the effective alignment along a chord at the centerline of the beam, which may be different from the alignment parallel to the Profile Grade Line.

Significant Revisions – Prestressed Concrete Piles

- ***Indexes 20602, 20630 & 20631***
  - ✓ Deleted 2” diameter upper vents from center of pile.
  - ✓ Rearranged Notes to reflect the change



NOTES:

~~1. Venting shall be provided by the use of a 1" Ø PVC conduit through a substructure cap or column. Voids between segments of spliced piles shall be connected by 2" Ø hole(s).~~

1. Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows: Place one strand at each corner and place the remaining strands equally spaced between the corner

Significant Revisions - Conduit

- ***IDS-21200*** *Light Pole Pedestal*
  - ✓ Moved Design Load Case Information from ***Index 21200*** Sheet 3 to IDS
  - ✓ Added commentary on issues with use of Corral Shape Railings

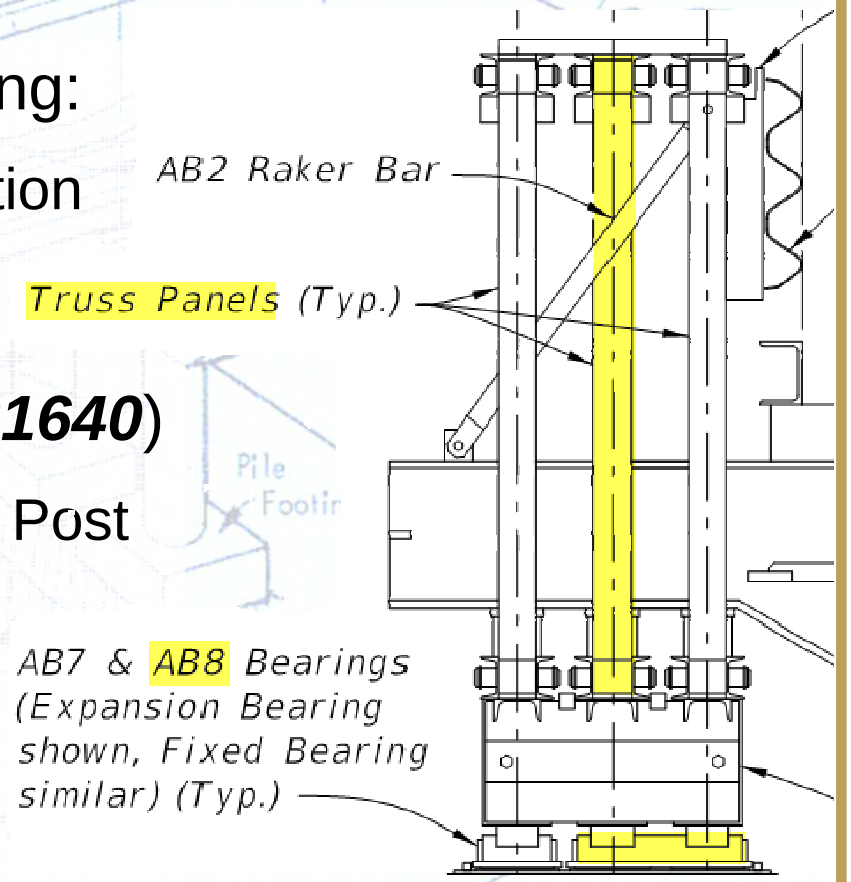
Commentary: Use of this Index with Index 424 (Corral Shape) Traffic Railings is not recommended because the Standard Corral Shape Railing cannot accommodate the required electrical conduit and embedded junction boxes (EJB's).

- ***IDS-21210:*** *Conduit Details*
  - ✓ Added Railing Index Numbers that are crash worthy with 2" conduit
  - ✓ Excludes Corral Shape

The details as shown for installing two 2" diameter conduits and associated Embedded Junction Boxes (EJBs) in traffic railings have been determined to be crashworthy in accordance with the requirements of ***NCHRP Report 350*** and the ***AASHTO LRFD Bridge Design Specifications*** for ***Design Standards*** Indexes 420, 421, 422, 423, 425, 5210 and 5211.

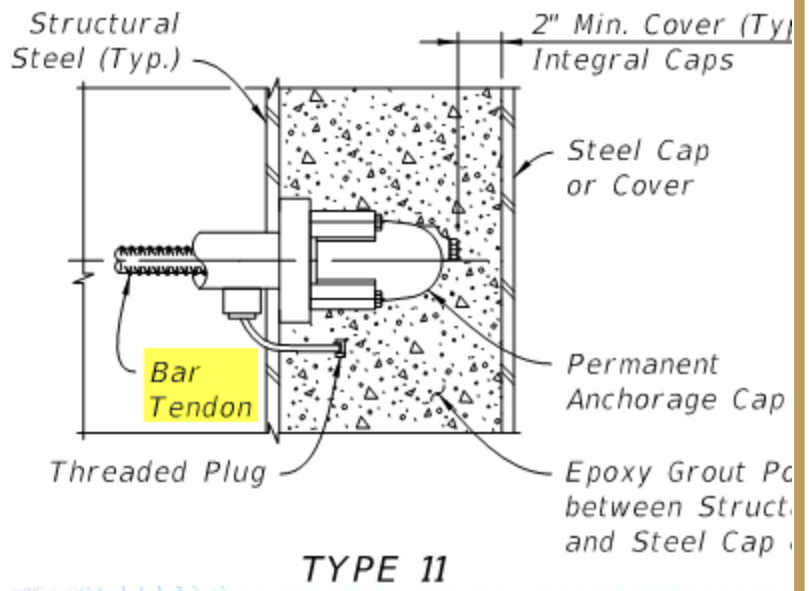
Significant Revisions – Temporary Detour Bridge

- To meet **FL-120** & **HS 25** loading:
  - ✓ Triple-Single Panel Configuration
  - ✓ AB8 Bearings
- Thrie-Beam Guardrail (***Index 21640***)
  - ✓ Changed W-Beam height and Post spacing's to match Roadway Standards (***Index 400***).



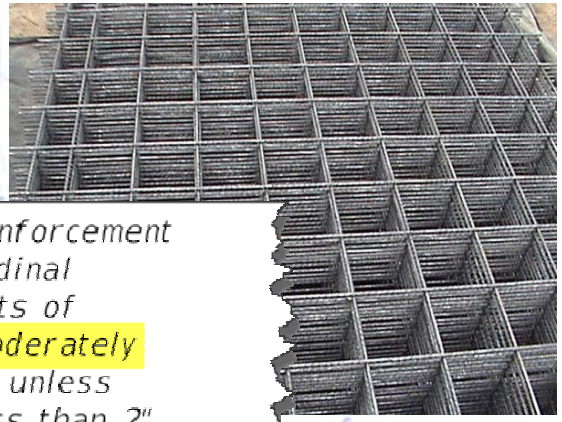
Significant Revisions – Post Tensioning

- ***Indexes 21801, 21802 & 21803***
- Terminology changed:
  - ✓ "PT Bar" to "Bar Tendon"
    - Consistency with industry practice
- Additional Changes for Flexible Filler
- ***IDS-21800*** *Series*
  - ✓ Major revisions to **Plan Content Requirements**
  - ✓ Added Figures and References.



Drainage Related Standard Updates

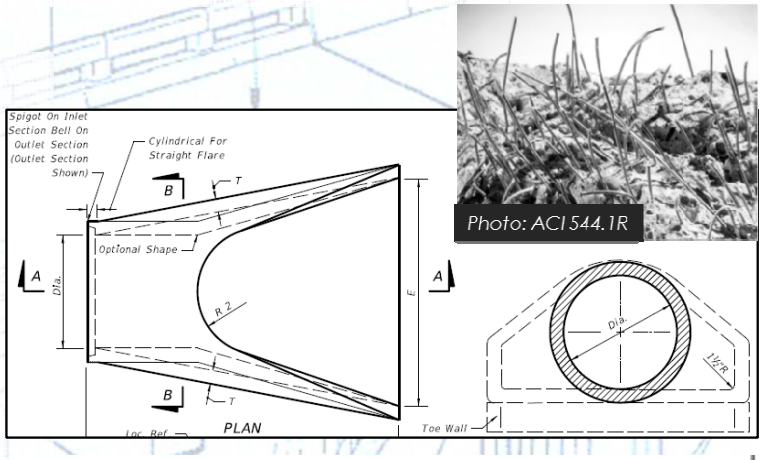
- ***Index 201:*** *Supplementary Details for Manholes & Inlets*
  - ✓ Increased the minimum size of deformed wire to D4.0 to meet ***ASTM*** A1064-8.3.1
- ***Index 292:*** *Standard Precast Concrete Box Culvert*
  - ✓ Increased the minimum size of deformed wire to D4.0 to meet ***ASTM*** A1064-8.3.1
  - ✓ Cover requirement corrected in Note 4.



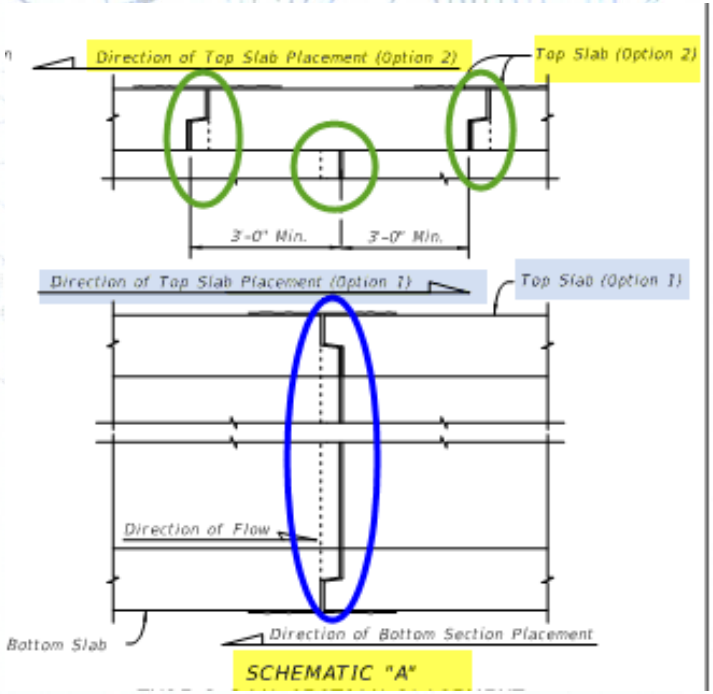
4. *Reinforcing steel must consist of smooth or deformed welded wire reinforcement (WWR) meeting the requirements of Specification Section 931. Longitudinal reinforcement may consist of reinforcing bars meeting the requirements of Specification Section 931. Minimum cover must be 2" for slightly or moderately aggressive environments or 3" for extremely aggressive environments, unless otherwise shown. The spacing of circumferential wires must not be less than 2" nor more than 4". The spacing of longitudinal wires or bars must not be more than 8".*

Drainage Related Standard Updates

- ***Index 270:*** *Flared End Section*
  - ✓ *New: Allow Fiber-Reinforced Concrete in lieu of conventional steel bar reinforcing*



- ***Index 291:*** *Supplemental Details for Precast Concrete Box Culverts*
  - ✓ *Schematic "A"*
  - ✓ *Added Option 2*
    - *Top Slab placement*



Developmental Indexes & ***IDDS***

- Adding ***Developmental Design Standards*** to the Plan Set.
  - ✓ Added to the IDDS's **Plan Content Requirements** section
- D6025, D17749, D20310, D20350, D22440 & D22600

Plan Content Requirements

Insert the entire ***Developmental Design Standards*** Index, received from the Central Office monitor, into the appropriate component plan set in accordance with ***PPM***, Volume 2, Section 3.8.

Recently Published ***DDS***

- **Fiber Reinforced Polymer (FRP) Standards** *(cont.)*:
  - ✓ ***DDS Index D21310*** – FRP Bar Bending Details
    - Includes commonly used types, shapes and configurations of straight and bent pultruded reinforcing Fiber-Reinforced Polymer (FRP) reinforcing bars.
    - The bar bend types and properties are limited and cannot be field formed or modified
    - shapes must be obtained utilizing splices
  - ✓ ***DDS Index D22440*** – Precast Concrete CFRP/GFRP Sheet Pile Wall
  - ✓ ***DDS Index D22600*** series – Square CFRP Prestressed Concrete Piles

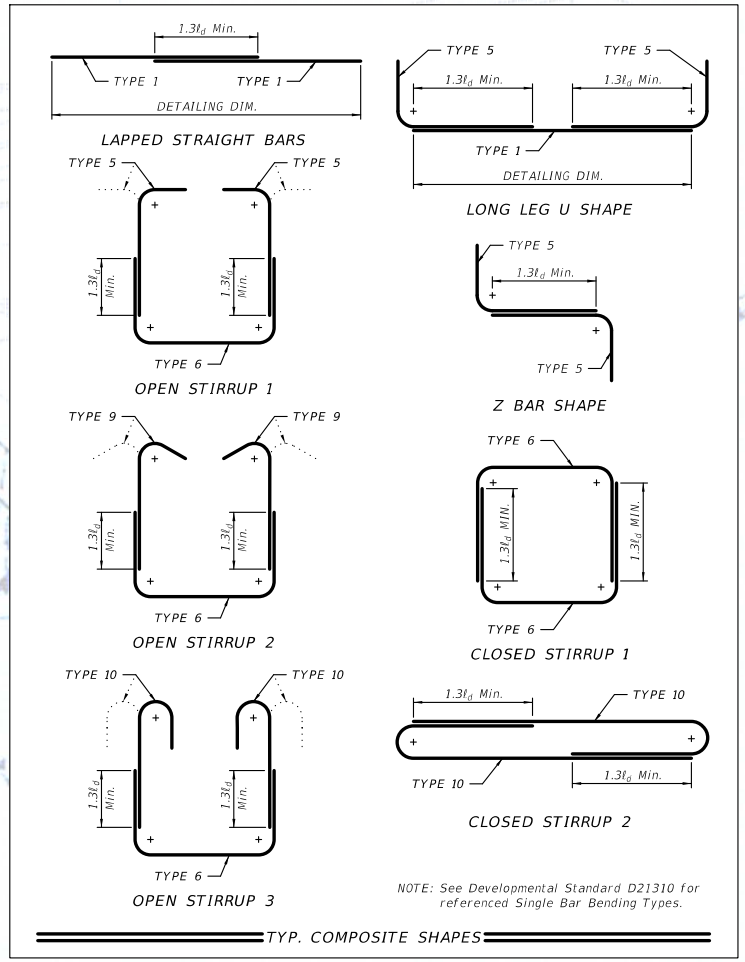
Recently Published ***DDS***

- **Fiber Reinforced Polymer (FRP) Standards** *(cont.)*:

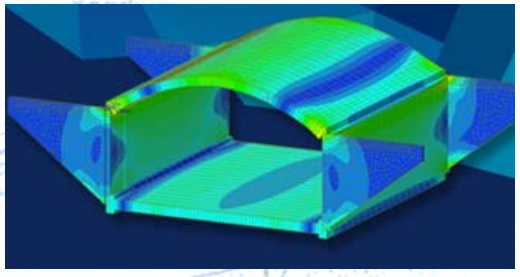
✓ ***DDS Index D21310 Cont.*** – FRP Bar Bending Details

- Design Aids in the ***IDS*** contain examples of typical composite shapes.

http://www.dot.state.fl.us/officeofdesign/training/designexpo/2015/presentations/DesignOfFirstFRPReinforcedConcreteBridge-Masseus-Siddiqui-Pelham-Suarez.pdf

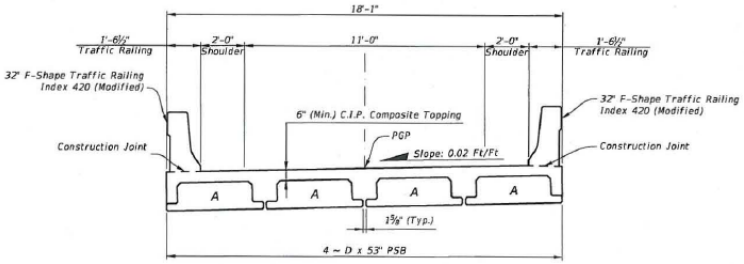


Looking Ahead

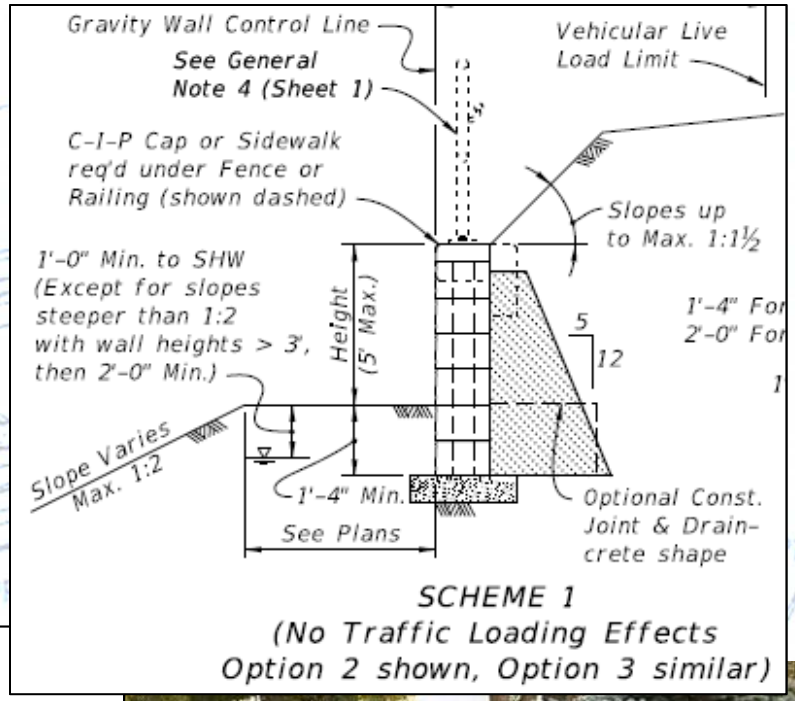


Other *Developmental Design Standards in the works:*

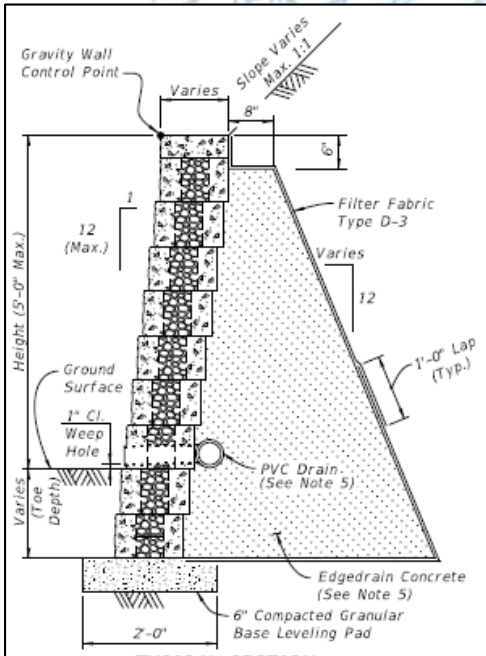
- ✓ ***Index D296*** – Three-Sided Concrete Culvert Details *(Aug. 2015);*
- ✓ ***Index D420*** – Precast 32”-F Shape Traffic Railing;
- ✓ ***Index D6011*** –Gravity Block Wall *(Aug. 2015);*
- ✓ ***Index D6012*** – Slope Cut Retaining Wall;
- ✓ ***Index D20700 series*** – Precast Intermediate Bent Cap;
- ✓ ***Index D20450 series*** – Florida Slab Beam (FSB) *(Aug. 2015);*
- ✓ ***Index D30000 series*** – Off-system Bridge Packages (Superstructure):
  - 4 span lengths - 30’, 40’, 50’ and 60’;
  - 4 bridge clear widths – 18’, 27’, 35’ and 40’.



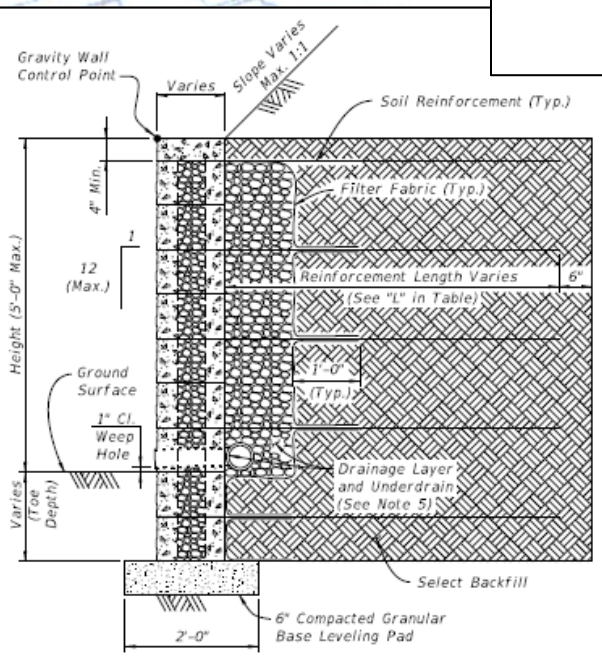
Developmental Design Standard Index D6011 (Gravity Block Walls)



SCHEME 1
(No Traffic Loading Effects
Option 2 shown, Option 3 similar)



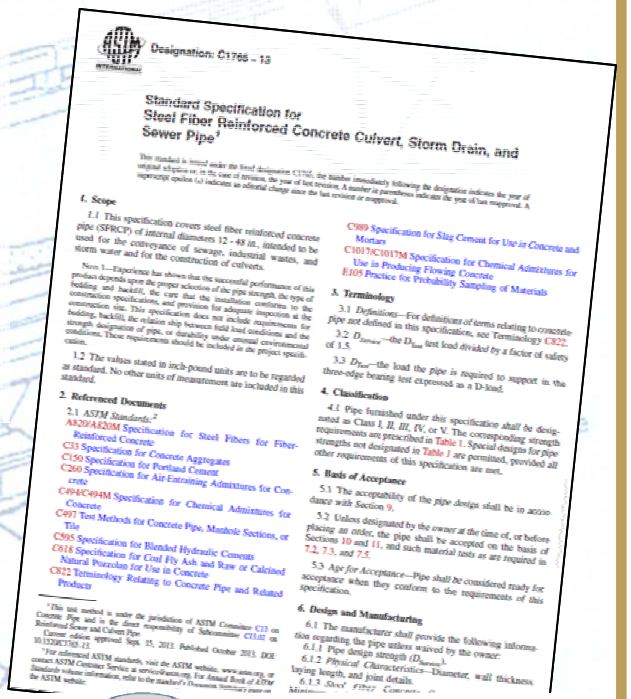
TYPICAL SECTION
MODULAR BLOCK WALL
(OPTION 2)



TYPICAL SECTION
REINFORCED SEGMENTAL BLOCK WALL
(OPTION 3)

Looking Ahead

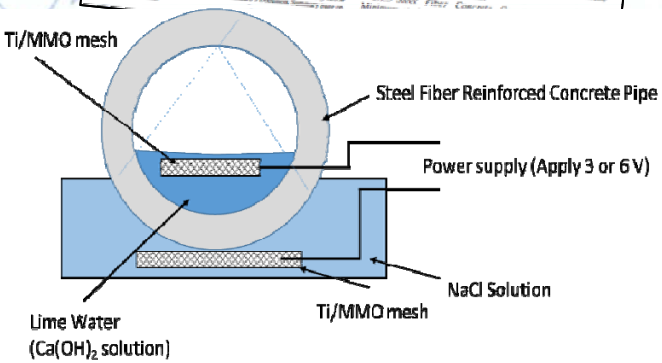
- Fiber-Reinforced Concrete
  - ✓ Prestressed Beam Research Project
  - ✓ SFRC & SYNFRC Pipe ASTM's with additional durability research promoted by the State Materials Office.



Designation: C1765 – 13

Standard Specification for Steel Fiber Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe[1]

Photos courtesy of TxDOT: FHWA/TX-06/ 0-4819-1 *Fiber Reinforcement in Prestressed Concrete Beams (2005)*



Schematic of proposed test to accelerate the corrosion of the fibers *(courtesy of FAU).*

Message from the Structures Standards Group

- We are here to assist you with your questions and concerns. Please contact us:

  - ✓ If you have a suggestion:
    - for a new standard or
    - for an improvement to an existing standard.
  - ✓ If you have any issues during design or construction:
    - Fully explain the issue (photos help);
    - Provide suggestions (if you have any) and;
    - Provide any documentation that might support a proposed change and assist us during development.
  - ✓ Anytime you have questions or concerns *(but, we recommend reviewing the **IDS** first)*.

Contact Information:

Steve Nolan, P.E.

State Structures Design Office

Steven.nolan@dot.state.fl.us

(850) 414-4272

2016 Design Standards Index 17900

Planning Office Updates

James Whitley
Planning Group
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(850) 921-7378

INDEX 17900
TRAFFIC MONITORING SITES
Transportation Statistics Office

- PLACE IN ROADWAY PLANS ONLY no longer in Utility, ITS, Signal, etc.
- ALUMINUM POLES - no longer using concrete poles
- 10 day notification is now in Spec. 695 and is no longer in the plan notes.