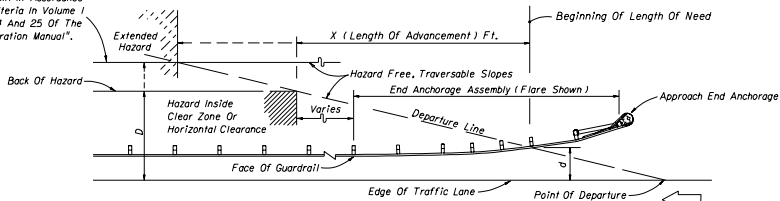


## GENERAL NOTES

1. The illustrations for guardrail applications are standard configurations; adjustments are to be made as required by site specific condition to attain optimum design for function, economy and serviceability.
  2. The beginning of guardrail need shall be at the greatest of the upstream distances from the hazard, as determined from Figure 1, and other application details of this Index.
  3. One Panel equals 12'-6". Guardrail shall be constructed with rail elements 12'-6" in length except where 25'-0" elements are called for by this and other standards (Indexes) or specifically called for in the plans.  
  
Post spacings shall be 6'-3" except that reduced spacings shall be used for (a) transitions to anchorages at rigid structures such as bridges (See Details E and J) and transitions to redirective crash cushions, (b) the conditions in note no. 7 below, (c) special post applications, (d) the specific posts spacing shown in Index No. 401, (e) reduced post spacing required for specific end anchorage assemblies, and, (f) specific spacings called for in the plans.
  4. Guardrail mounting height for the W-beam without rubrail and for three-beam is 1'-9" to the center of beam, and for W-beam with rubrail 2'-0" to center of beam. Modified three-beam shall be mounted at a height of 2'-0" to center of beam. The height is critical and shall be attained in all cases; a tolerance of 3" above and 1" below the standard mounting heights is permissible over necessary surface irregularities (e.g., across shoulder gutters, inlets and roadway surface break lines).
  5. All guardrail panels, end sections and special end shoes shall be lapped in the direction of adjacent traffic.
  6. Flared end anchorage assemblies providing 4' offset are the standard end treatments for single face free standing guardrail approach ends. Parallel end anchorage assemblies for guardrail approach end treatments will be constructed only when restraints prevent construction of flared end anchorages.
  7. At above ground rigid hazards where the face of guardrail is offset from the hazard less than the 4' minimum for standard W-beam, other guardrail configurations may be applicable; see General Note No. 10 and the minimum offset table on Sheet 1B. For guardrail with post spacing less than 6'-3" the reduced spacing should extend a minimum of one panel in advance of the hazard. When minimum offset cannot be attained safety shape concrete barrier shall be used unless other shielding is approved by the Engineer of record. See Index No. 410 for safety shape concrete barriers and typical applications, and the plans for special barrier shapes and applications.
  8. In addition to use at conventional roadside hazards, guardrail will be required on flush shoulder sections where fill slopes are steeper than 1:3 within the clear zone, and on curbed sections where fill slopes are steeper than 1:3 within 4' of the face of curb. However, when fill heights are less than 6' the guardrail may be omitted, unless in the opinion the Engineer its use is deemed necessary due to other roadside features.
  9. The guardrail to bridge connections contained in this Index are for bridges with Test Level 4 safety shaped traffic rails. For guardrail to bridge connections on existing bridges with less than Test Level 4 rails see Index No. 401. For guardrail to concrete barrier wall connections see Index No. 410.
  10. Three-beam guardrail panels shall be used in guardrail transitions to bridge traffic rail barriers, to concrete and certain water filled safety shaped barriers, certain crash cushion and as a continuous barrier when called for in the plans. For additional information on rail attachment, post spacings, nested rails, location of three-beam transition panels and offset block configurations see details elsewhere in this Index, and Index Nos. 410, 416 and 435. The use of three-beam guardrail with standard offset blocks may be considered where one or more of the conditions listed below or similar conditions are anticipated or exist:
    - a. W-beam deflection is marginal,
    - b. W-beam with rubrail considered functionally deficient,
    - c. Overriding W-beam is probable,
    - d. Drainage will be impeded or blocked by the use of concrete barrier wall,
    - e. High frequency of repairs to W-beam,
    - f. Spandrel beam with low deflection needed around unrellocatable structure, and,
    - g. Accommodating passenger vehicles heavier or larger than the standard passenger car (e.g. passenger vans and small buses)
- The modified three-beam guardrail may have application to accommodate large buses.
11. Single face median guardrail for bridges located on divided roadways shall be constructed the same as outer roadway guardrail under the following conditions:
    - (a) Wide medians where approach end anchor is located outside of opposing roadway clear zone.
    - (b) Medians of uniform width that are occupied by other transportation and joint use facilities.
    - (c) Medians of uniform or variable widths with independent vertical alignments not suited to normal median guardrail installations.
    - (d) Medians of bifurcated roadways.
  12. Straight rail sections may be used to construct radii of 125' or greater. For radii less than 125' the rail must be fabricated (crash-bent) to fit.
  13. Crash cushions may be required in lieu of or in conjunction with guardrail at locations where space does not permit development of sufficient guardrail length, offset or crashworthiness at terminals. Crash cushions shall be constructed at or in lieu of Type II assemblies located in the approach clear zones.
  14. Corrugated sheet steel beams, end shoes, end sections and back-up plates shall conform to the current requirements of AASHTO M180, Class A, Type II (zinc) coating. Aluminum guardrail elements will not be permitted unless specifically called for in the plans. All other metallic components, hardware and accessories shall be in performance with the appropriate current AASHTO requirements.  
  
Recycled beams: Used Class A guardrail beams that have been refurbished to condition new (AASHTO M180) may be used for both construction of new guardrail and maintenance of existing guardrail. Refurbishing shall include stripping of the existing galvanizing, restoration of the base metal in section and straightness free of warp and deformation, and, regalvanizing to AASHTO Type II specifications. Refurbished beams that retain ruptured holes, gashes or tears will not be accepted.
  15. Steel offset blocks other than modified three-beam offset blocks are not permitted for new guardrail construction. Existing steel offset blocks may remain throughout the service life of the existing guardrail. Permissible post and offset block combinations are tabulated on Sheet 16.
  16. Where necessary to enlarge or add holes to galvanized guardrail, the work will be done by drilling or reaming. Damaged galvanized guardrail will be metalized in accordance with Sections 562 and 971 of the Standard Specifications. No burning of holes will be permitted.
  17. Guardrail reflector color (white or yellow) shall conform to the color of the near lane edge line.
  18. Any run of guardrail with existing concrete posts that is being reset under a construction or maintenance contract shall be reset using timber or steel posts. Repair within a run of guardrail with existing concrete posts can be made with either steel, timber, sound salvaged concrete posts; replacement in kind of damaged posts is to be made when like posts are on hand at time of repair.
  19. Substitutions between three-beam guardrail and concrete barrier wall are not eligible for V.E.C.P. consideration.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
GUARDRAIL			
Designed By	Name	Date	Approved By
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Checked By	REV	DATE	DATE
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Clear Zone Limit Or Horizontal Clearance Limit In Accordance With The Criteria In Volume I Chapters 2, 4 And 25 Of The "Plans Preparation Manual".



Design Speed mph	X (Length Of Advancement) Ft. <sup>1</sup>
≤ 45	= 16 (D-d)
≥ 50	= 13 (D-d)

<sup>1</sup> Length of advancement determined from the diagram and equations above establishes the location of the upstream beginning length of need for guardrail, however, the length of advancement can be no less than that required by other details of this index.

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

**Equation Variables:**

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

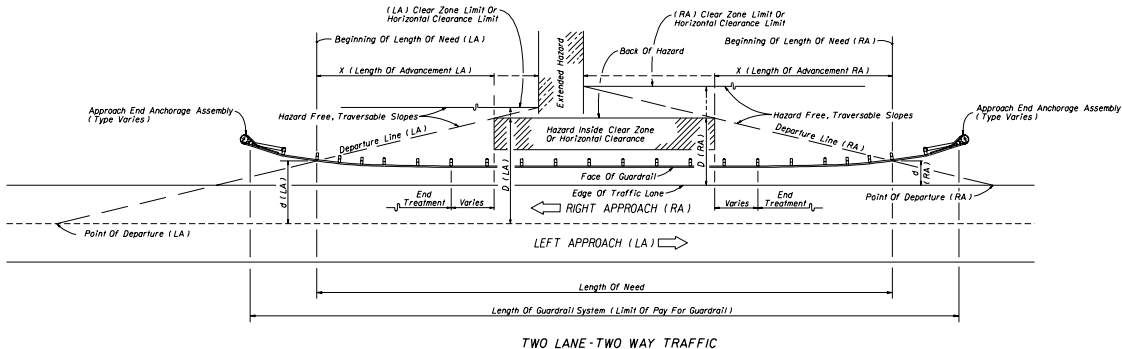
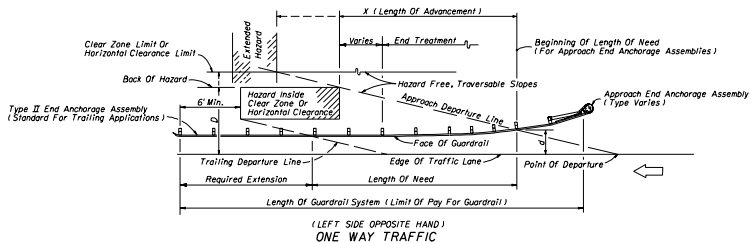
d = Distance in feet from the near edge of the near approach traffic lane to the face of guardrail at its intersection with the departure line. For left side hazards on two-way undivided facilities, d is measured from the inside edge of the near approach traffic lane (see Figure 2).

LENGTH OF ADVANCEMENT - FIGURE 1

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ROAD DESIGN

GUARDRAIL

DESIGNED BY	DATE	APPROVED BY	DATE
Drawn By: 800	3/97	Checked By: 800	3/97
Checked By: 200	3/97	Scale: 00	2 of 31



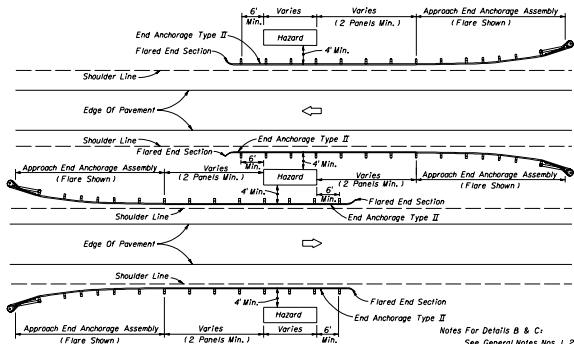
For description of the dimensions  $D$ ,  $d$  and  $X$ , see Length of Advancement - Figure 1.  
For additional shoulder guardrail information, see Details B and C.

LOCATING TERMINALS ON SHOULDER GUARDRAILS - FIGURE 2

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
ROAD DESIGN

GUARDRAIL

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800	300	3/97	00
Drawn By	Checked By	Date	Scale
800	300	3/97	00
Sheet No.			of
3			31
Weight			400



**DIVIDED ROADWAY - DETAIL B**

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

Notes For Details B & C:

See General Notes Nos. 1, 2, 3, 4, 5, 6, 7 and 8.

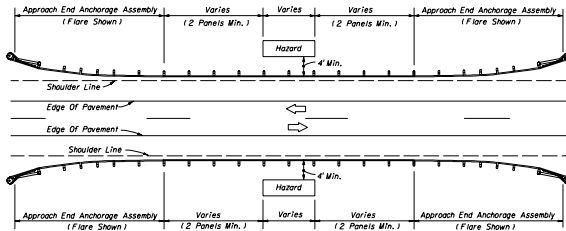
See Details K and L for guardrail offsets.

For end anchorage assemblies see sheets elsewhere in this index and the plans.

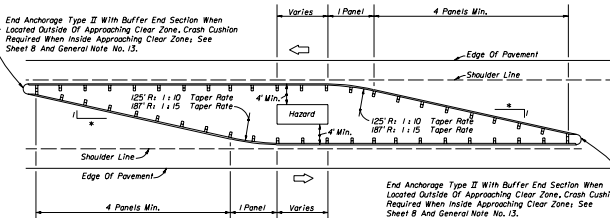
For hazards that require shielding and are located back of curb see other sheets of this index, and where rigid barrier is required see index No. 40.

When divided roadways are designated evacuation routes, approach end anchorage assemblies should be used for trailing end anchorage.

**GUARDRAIL APPLICATION FOR ROADSIDE HAZARDS**



**UNDIVIDED ROADWAY - DETAIL C**



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

**OPPOSING TRAFFIC - DETAIL D**

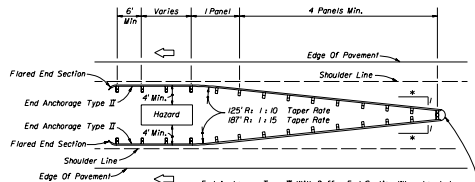
Notes For Details D & G:

See General Notes Nos. 1, 2, 3, 4, 5, 7, and 12.

See Details K and L for guardrail offsets.

For hazards that require shielding and are located back of curb see other sheets of this index, and where rigid barrier is required see index No. 40.

**GUARDRAIL APPLICATION FOR NARROW MEDIAN AND GORE HAZARDS**



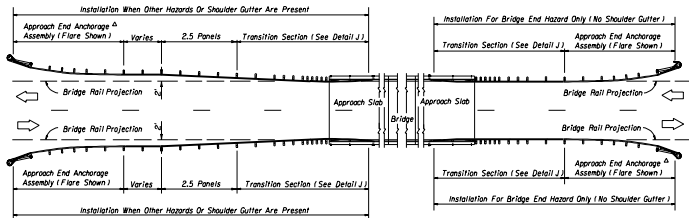
**ONE-WAY TRAFFIC - DETAIL G**

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

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
 ROAD DESIGN

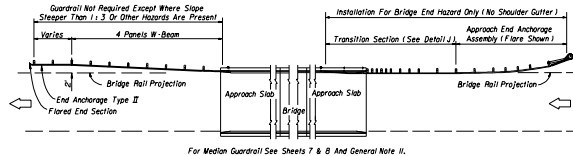
**GUARDRAIL**

DESIGNED BY	DATE	APPROVED BY	DATE
300	2/97	300	2/97
CHECKED BY	DATE	SCALE	REVISIONS
300	2/97	00	4 of 31

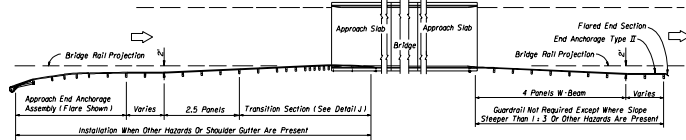


<sup>A</sup>With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown in Detail P Unless Other Anchorage Called Out in The Plans

**UNDIVIDED ROADWAY - DETAIL O**



For Median Guardrail See Sheets 7 & 8 And General Note II.



**DIVIDED ROADWAY - DETAIL P**

**Notes For Details O & P:**

See General Notes Nos. 1, 2, 3, 4, 5, 6, 8 and 9. See Detail J for connections to bridges.

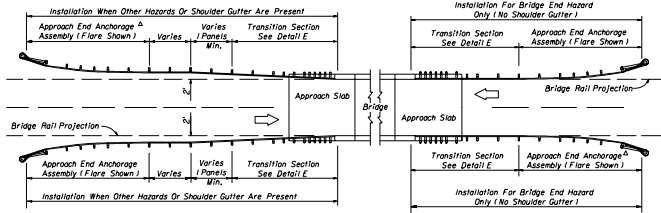
For end anchorage assemblies see sheets elsewhere in this index and the plans.

When divided roadways are designated evacuation routes, approach end anchorage assemblies should be used for trailing end anchorage.

Shoulder gutter in itself does not require the installation of guardrail.

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

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
<b>GUARDRAIL</b>			
DESIGNED BY	DATE	APPROVED BY	
DRAWN BY	NO. 20193	REVISIONS	DATE
CHECKED BY	201-201-20177	00	5 of 31 400

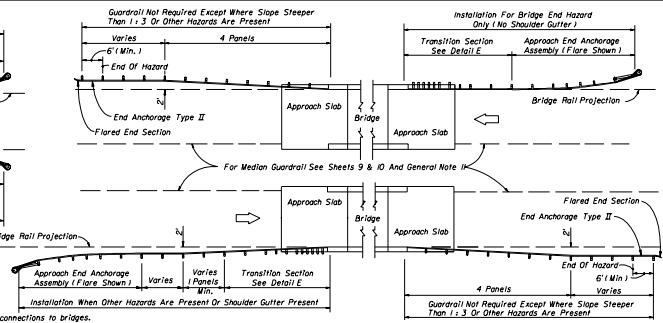


<sup>a</sup>With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail I Unless Other Anchorage Called Out In The Plans

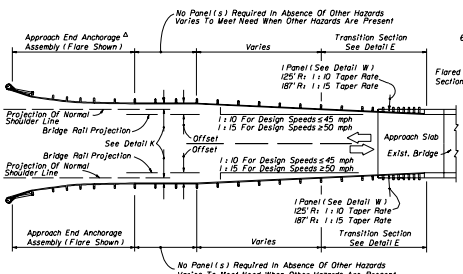
**UNDIVIDED ROADWAY - DETAIL H**

Notes For Details H & I:  
 See General Notes Nos. 1, 2, 3, 4, 5, 6, 8, and 9. See Details E and N for approach connections to bridges.  
 For end anchorage assemblies see sheets elsewhere in this index and in the plans.  
 When divided roadways are designated evacuation routes, approach end anchorage assemblies should be used for trailing end anchorage.  
 Shoulder gutter in itself does not require the installation of guardrail.

**SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH**



**DIVIDED ROADWAY - DETAIL I**

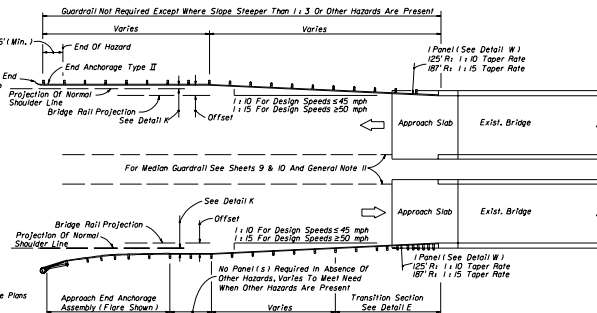


<sup>a</sup>With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail I Unless Other Anchorage Called Out In The Plans

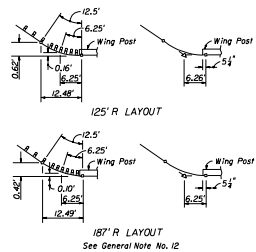
**UNDIVIDED ROADWAY - DETAIL S**

Notes For Details S & T:  
 See General Notes Nos. 1, 2, 3, 4, 5, 6, 8 and 9. See Details E and N for approach connections to bridges.  
 For end anchorage assemblies see sheets elsewhere in this index and the plans.  
 When divided roadways are designated evacuation routes, approach end anchorage assemblies should be used for trailing end anchorage.

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

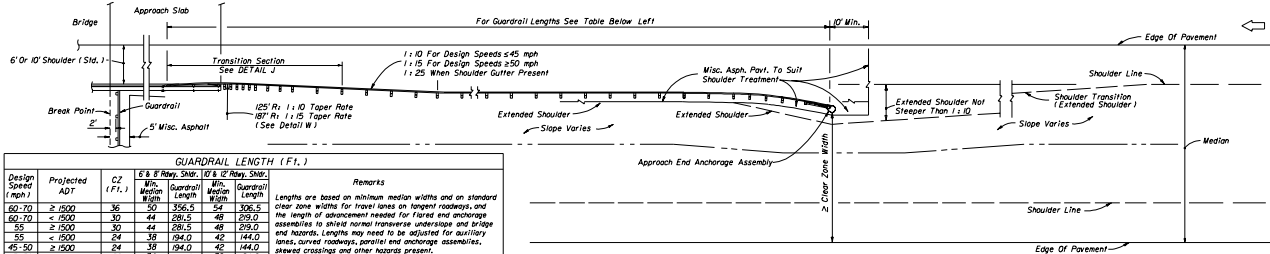


**DIVIDED ROADWAY - DETAIL T**



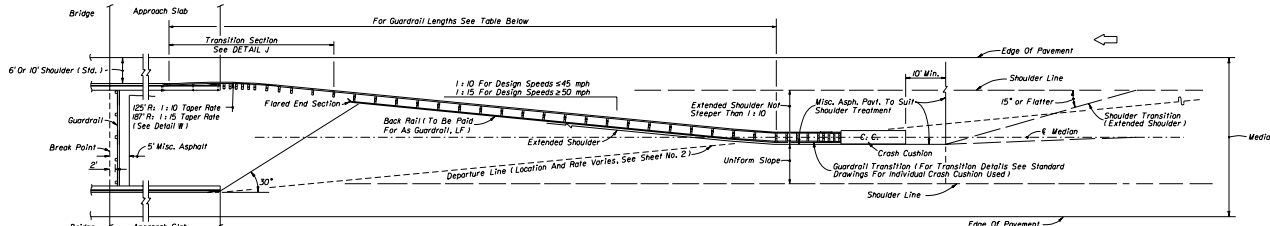
**STANDARD PANELS SET TO RADIALS ADJOINING BRIDGES  
 DETAIL W**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
DESIGNED BY		DATE	APPROVED BY
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CHECKED BY		NO. OF SHEETS	
		OF	



Design Speed (mph)	Projected ADT	CZ (Ft.)	6' & 8' Hwy. Shldr.		10' & 12' Hwy. Shldr.		Remarks
			Min. Median Width	Guardrail Length	Min. Median Width	Guardrail Length	
60-70	≥ 1500	36	50	356.5	54	306.5	Lengths are based on minimum median widths and on standard clear zone widths for travel lanes on tangent roadways, and the length of advancement needed for tapered end anchorage assemblies to shield normal transverse under-slab and bridge end hazards. Lengths may need to be adjusted for auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present.
60-70	< 1500	30	44	280.5	48	279.0	
55	≥ 1500	30	44	280.5	48	279.0	
55	< 1500	24	36	194.0	42	144.0	
45-50	≥ 1500	24	36	194.0	42	144.0	
45-50	< 1500	20	34	144.0	38	94.0	
45-50	Urban % Curb	24	36	194.0	42	144.0	
45-50	Urban % Curb	18	32	144.0	36	81.5	

Note: For approach end anchorage assemblies see sheets elsewhere in this index and the plans.  
**WHEN END TERMINAL IS OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE**



Median Width (Ft.)	1:10 TAPER RATE								1:15 TAPER RATE							
	6' Bridge Shoulder				10' Bridge Shoulder				6' Bridge Shoulder				10' Bridge Shoulder			
	Panels (No.)		Length (Ft.)		Panels (No.)		Length (Ft.)		Panels (No.)		Length (Ft.)		Panels (No.)		Length (Ft.)	
	Front	Back	Total	Total	Front	Back	Total	Total	Front	Back	Total	Total	Front	Back	Total	Total
32	9.5	6	15.5	193.75	6.5	4	10.5	131.25	13.5	10	23.5	293.75	8.5	6	14.5	181.25
34	10.5	7	17.5	208.75	7.5	5	12.5	156.25	14.5	11	25.5	316.75	9.5	7	16.5	206.25
36	10.5	7	17.5	208.75	7.5	5	12.5	156.25	15.5	12	27.5	343.75	10.5	8	18.5	233.25
38	11.5	8	19.5	243.75	8.5	6	14.5	181.25	16.5	13	29.5	368.75	11.5	9	20.5	256.25
40	12.5	9	21.5	268.75	9.5	6	15.5	193.75	17.5	13	30.5	381.25	13.5	11	24.5	306.25
42	13.5	9	22.5	281.25	10.5	7	17.5	218.75	19.5	15	34.5	431.25	14.5	11	25.5	318.75
44	14.5	10	24.5	306.25	10.5	7	17.5	218.75	20.5	16	36.5	456.25	15.5	12	27.5	343.75
46	14.5	10	24.5	306.25	11.5	8	19.5	243.75	21.5	17	38.5	481.25	16.5	13	29.5	368.75
48	15.5	11	26.5	331.25	12.5	9	21.5	268.75	22.5	17	39.5	493.75	17.5	13	30.5	381.25

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

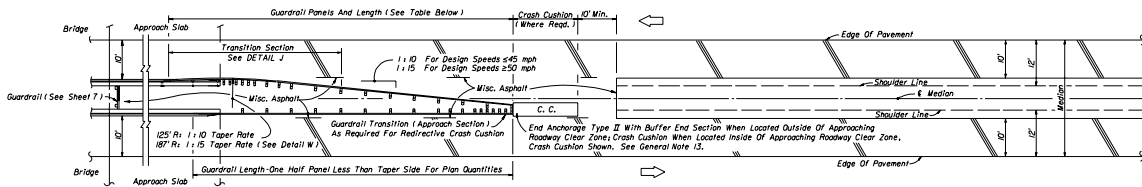
WHEN END TERMINAL CANNOT BE LOCATED OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE

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

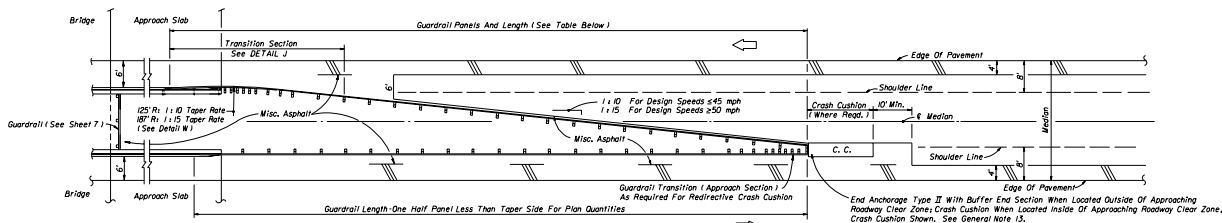
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
 ROAD DESIGN

**GUARDRAIL**

Revised Date: \_\_\_\_\_ Approved By: \_\_\_\_\_  
 Drawn By: BJB 3/17/17 Checked By: BJB/MS/3/17/17  
 Checked By: BJB/MS/3/17/17 of 7 of 31 400

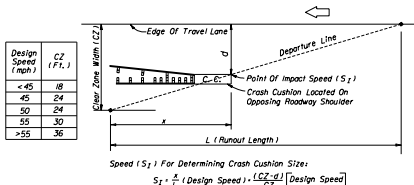


MEDIANS WITH 10' BRIDGE SHOULDERS



MEDIANS WITH 6' BRIDGE SHOULDERS

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



Speed ( $S_1$ ) For Determining Crash Cushion Size:

$$S_1 = \frac{L}{CZ} (\text{Design Speed})$$

SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS

		6' BRIDGE SHOULDERS				10' BRIDGE SHOULDERS			
MEDIAN WIDTH (FT.)	CZ (FT.)	1:10 TAPER RATE		1:15 TAPER RATE		1:10 TAPER RATE		1:15 TAPER RATE	
		PANELS (No.)	LENGTH (FT.)	PANELS (No.)	LENGTH (FT.)	PANELS (No.)	LENGTH (FT.)	PANELS (No.)	LENGTH (FT.)
30	18	14.5	181.25	20.5	296.25	7.5	93.75	10.5	131.25
28	24	12.5	156.25	18.5	231.25	6.5	81.25	8.5	106.25
26	24	11.5	143.75	17.5	218.75	5.5*	68.75	6.5	81.25
24	36	9.5	118.75	13.5	168.75	5.5*	68.75	5.5*	68.75

The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorage or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their sizes may be determined by the residual speeds ( $S_1$ 's) along the runouts from the approach roadways; however, when calculated speeds ( $S_1$ 's) are less than 30 mph; crash cushions shall be no less in size than for 30 mph, see speed diagram left. The number of panels may be reduced when installing a crash cushion more than 2.5' in width, see \* below.

\* Number shown is the minimum number of panels plus a W-36Ie beam transition panel; single faced guardrail must have a length of five (5) or more panels.

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

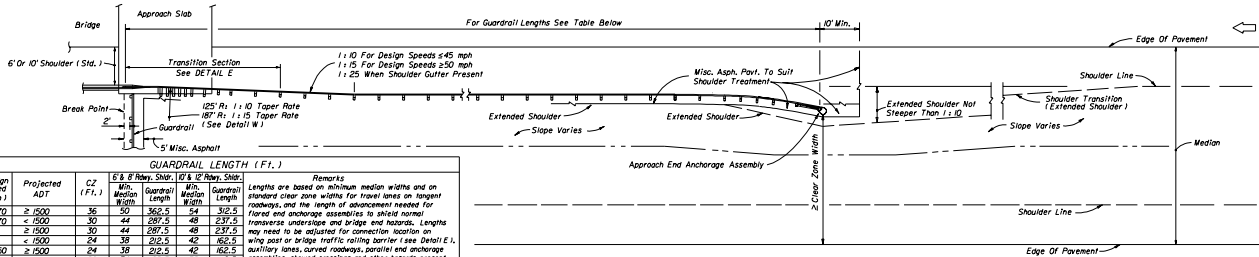
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
ROAD DESIGN

GUARDRAIL

DESIGNED BY	DRAWN BY	CHECKED BY	DATE	APPROVED BY

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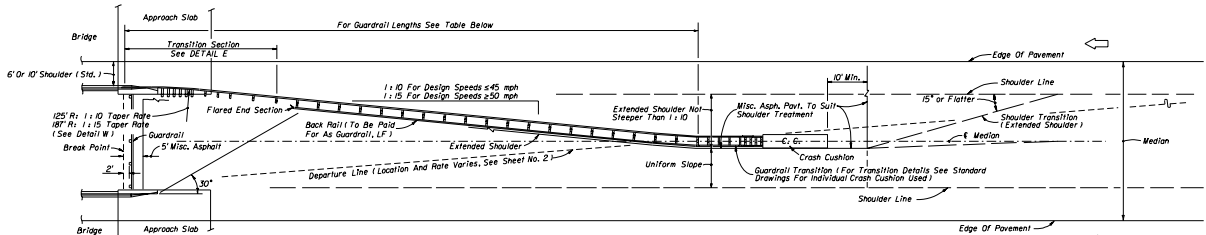




GUARDRAIL LENGTH (FT.)						Remarks
Design Speed (mph)	Projected ADT	CZ (FT.)	6' & 8' Hwy. Shdr. Min. Median Width	10' & 12' Hwy. Shdr. Min. Median Width	Guardrail Length	
60-70	$\ge 1500$	36	50	362.5	54	312.5
60-70	$< 1500$	30	44	287.5	48	237.5
55	$\ge 1500$	30	44	287.5	48	237.5
55	$< 1500$	24	38	212.5	42	162.5
45-50	$\ge 1500$	24	38	212.5	42	162.5
45-50	$< 1500$	20	34	162.5	38	112.5
45-50	Urban % Curb	24	38	212.5	42	162.5
30-40	Urban % Curb	18	32	162.5	36	100.0

Lengths are based on minimum median widths and on standard clear zone widths for travel lanes on tangent roadways, and the length of anchorage needed for flared end anchorage assemblies to shield normal transverse understructure and bridge end hazards. Lengths may need to be adjusted for connection location on wing post or bridge traffic railing barrier (see Detail E), auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present. When the wing post is replaced by bridge traffic railing barrier, see Detail E with reference to Detail J.

Note: For approach end anchorage assemblies see sheets elsewhere in this index and the plans.  
**WHEN END TERMINAL IS OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE**



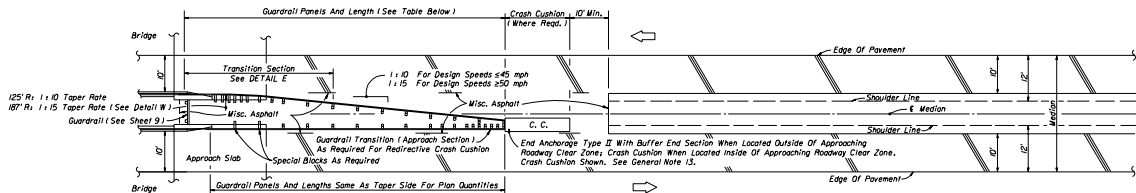
Median Width (FT.)	1:10 TAPER RATE				1:15 TAPER RATE											
	6' Bridge Shoulder		10' Bridge Shoulder		6' Bridge Shoulder		10' Bridge Shoulder									
	Panels (No.)	Length (FT.)	Panels (No.)	Length (FT.)	Panels (No.)	Length (FT.)	Panels (No.)	Length (FT.)								
32	7.5	6	13.5	168.75	4.5	3	7.5	93.75	11.5	9	20.5	256.25	7.5	6	13.5	168.75
34	8.5	6	14.5	181.25	5.5	4	9.5	108.75	12.5	10	22.5	281.25	7.5	6	13.5	168.75
36	9.5	7	16.5	206.25	6.5	5	11.5	143.75	13.5	11	24.5	306.25	8.5	7	15.5	191.25
38	10.5	8	18.5	231.25	7.5	6	13.5	168.75	14.5	12	26.5	331.25	9.5	8	17.5	216.25
40	10.5	8	18.5	231.25	7.5	6	13.5	168.75	16.5	13	29.5	368.75	11.5	9	20.5	256.25
42	11.5	8	19.5	243.75	8.5	6	14.5	181.25	17.5	14	31.5	393.75	12.5	10	22.5	281.25
44	12.5	9	21.5	268.75	9.5	7	16.5	206.25	18.5	15	33.5	418.75	13.5	11	24.5	306.25
46	12.5	9	21.5	268.75	10.5	8	18.5	231.25	19.5	16	35.5	443.75	14.5	12	26.5	331.25
48	14.5	11	25.5	318.75	11.5	9	20.5	256.25	20.5	16	36.5	456.25	16.5	13	29.5	368.75

The lengths shown on this table are typical for roadways with standard width shoulders and a relocated connection to the existing wing post. When the wing post is replaced by bridge traffic railing barrier, see Detail E with reference to Detail J. Length requirements shall be determined on a site specific basis for both standard width and narrow bridge shoulders and for end anchorage or end shielding use.

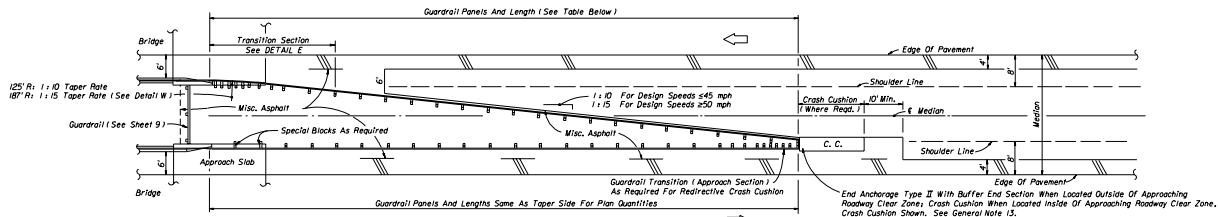
**WHEN END TERMINAL CANNOT BE LOCATED OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE**

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

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN			
<b>GUARDRAIL</b>			
Designed By	Date	Approved By	
Drawn By	301-2197	Checked By	301-2197
Checked By	301-2197	Scale	as 9 of 31 400

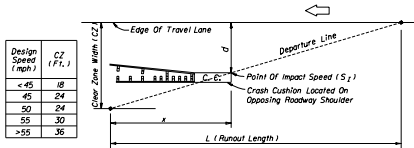


MEDIANS WITH 10' BRIDGE SHOULDERS



MEDIANS WITH 6' BRIDGE SHOULDERS

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



Speed ( $S_1$ ) For Determining Crash Cushion Size:

$$S_1 = \frac{CZ - 2}{CZ} (\text{Design Speed})$$

SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS

GUARDRAIL LENGTHS

MEDIAN WIDTH (FT.)	6' BRIDGE SHOULDERS				10' BRIDGE SHOULDERS			
	1:10 TAPER RATE		1:15 TAPER RATE		1:10 TAPER RATE		1:15 TAPER RATE	
	PANELS (No.)	LENGTH (FT.)	PANELS (No.)	LENGTH (FT.)	PANELS (No.)	LENGTH (FT.)	PANELS (No.)	LENGTH (FT.)
30	12.5	196.25	18.5	231.25	6.5	81.25	9.5	118.75
28	11.5	143.75	16.5	206.25	5.5	68.75	7.5	93.75
26	9.5	118.75	14.5	181.25	5.5*	68.75	5.5*	68.75
24	8.5	106.25	11.5	143.75	5.5*	66.75	5.5*	66.75

The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorage or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their sizes may be determined by the residual speeds ( $S_2$ 's) along the runouts from the approach roadways; however, when calculated speeds ( $S_2$ 's) are less than 30 mph crash cushions shall be no less in size than for 30 mph see speed diagram left. The number of panels may be reduced when installing a crash cushion more than 2.5' in width see \* below.

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

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
ROAD DESIGN

GUARDRAIL

DESIGNED BY	DATE	APPROVED BY	DATE
DRN	09/97	[Signature]	09/97
CHECKED BY	09/97	00	10 of 31

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