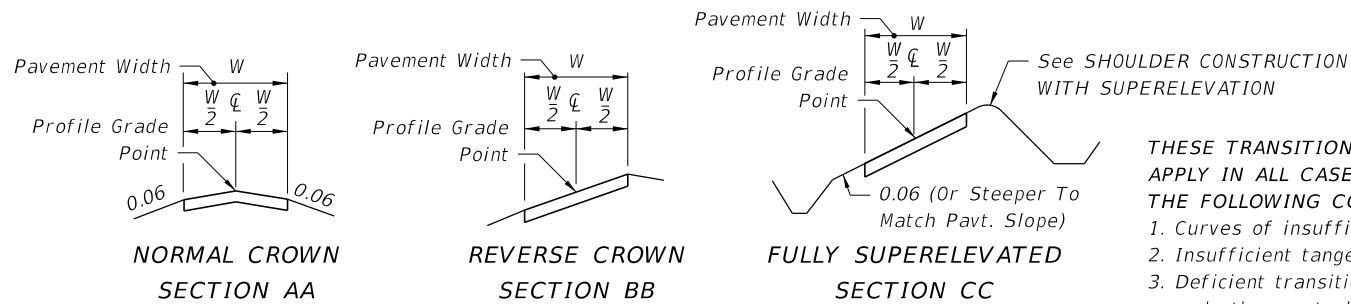
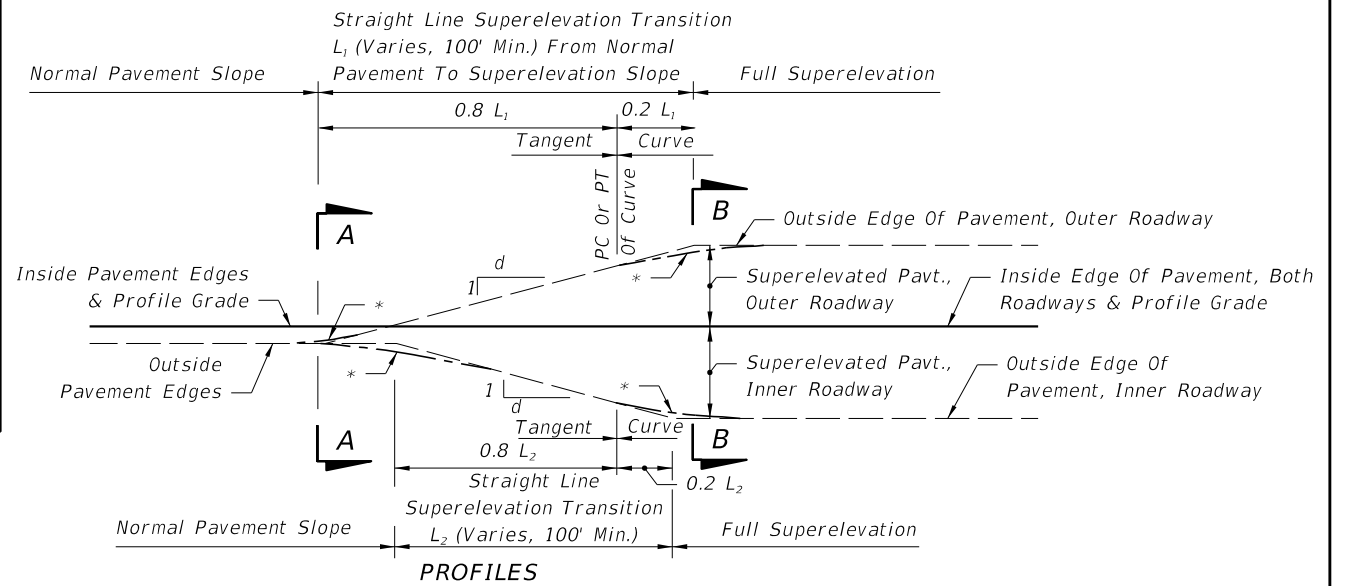


**SLOPE RATIOS FOR SUPERELEVATION TRANSITIONS**

SECTION	DESIGN SPEED, MPH		
	45-50	55-60	65-70
2 Lane & 4 Lane	1:200	1:225	1:250
6 Lane	1:160	1:180	1:200
8 Lane	1:150	1:170	1:190

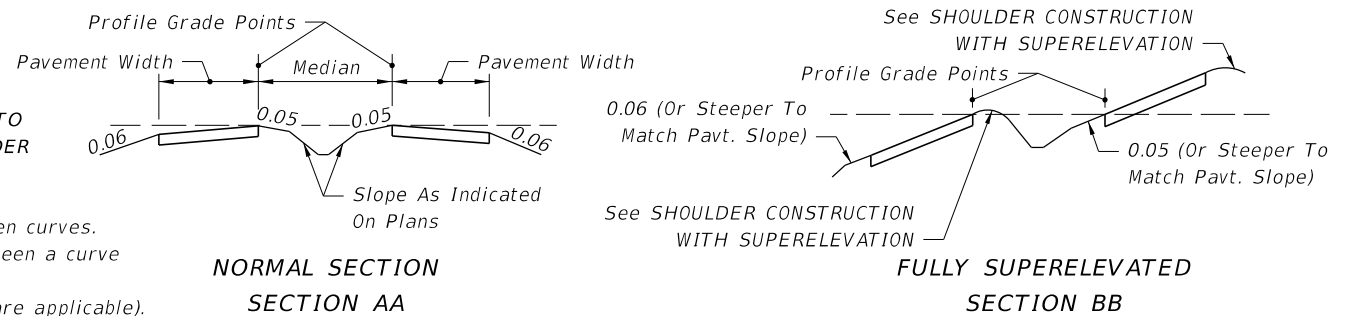
The length of superelevation transition is to be determined by the relative slope between the travel way edge of pavement and the profile grade, except that the minimum length of transition shall be 100 ft.

\* Short Vertical Curves Are To Be Used On Construction To Avoid Angular Breaks In Edge Profiles



- THESE TRANSITION DETAILS ARE TO APPLY IN ALL CASES, EXCEPT UNDER THE FOLLOWING CONDITIONS:
1. Curves of insufficient length.
  2. Insufficient tangent length between curves.
  3. Deficient transition distance between a curve and other control point(s).
  4. At PCC's or PRC's (Runoff rates are applicable).

Transitions for these exceptions are to be as detailed in the plans.



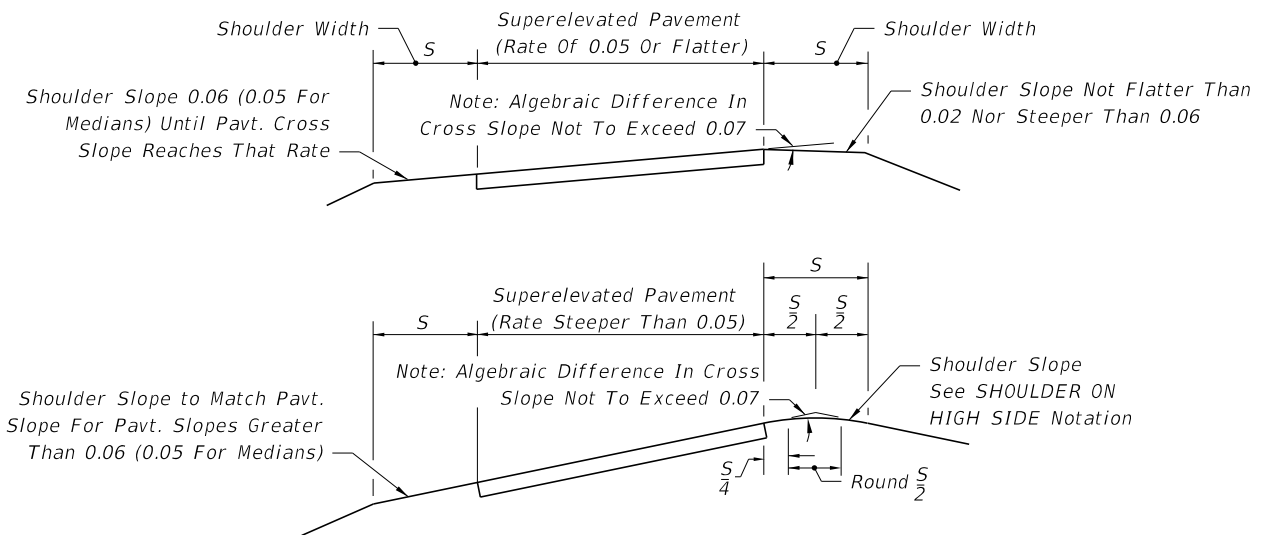
2-LANE, 4-LANE OR 6-LANE PAVEMENT, NO MEDIAN

4-LANE OR 6-LANE PAVEMENT WITH MEDIAN

**SUPERELEVATION TRANSITIONS**

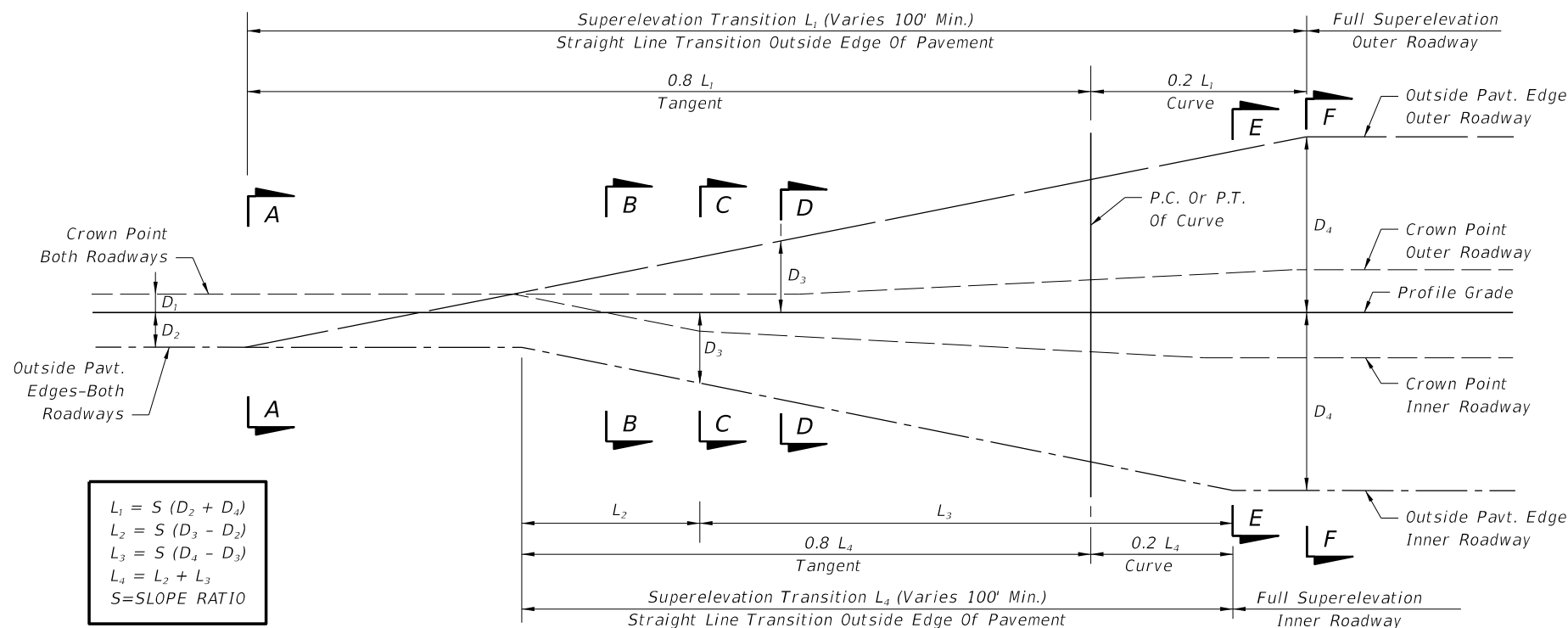
**NOTES:**

1. These details apply to both paved and grassed shoulders. For median shoulders use 0.05 in lieu of 0.06.
2. **SHOULDER ON HIGH SIDE:** A shoulder slope of 0.06 downward from the edge of travel way will be maintained until a 0.07 break in slope at the pavement edge is reached due to superelevation of the pavement. As the pavement superelevation increases, the 0.07 break in slope will be maintained and the shoulder flattened until the shoulder slope reaches the minimum of 0.02 downward from the edge of travel way. Any further increase in pavement superelevation will necessitate sloping the inside half of the shoulder toward the travel way and the outer half outward, both at 0.02 for superelevations 0.06-0.09 and both at 0.03 for superelevation 0.10. For shoulders with paved widths 5 feet or less see Special Shoulder Break Over Details on Sheet 2 of 2.
3. **SHOULDER ON LOW SIDE:** Maintain 0.06 cross slope across shoulder until pavement cross slope reaches 0.06. For pavement cross slopes greater than 0.06, shoulder to have same slope as pavement. See SHOULDER SLOPES ON SUPERELEVATION SECTION (Sheet 2).



**SHOULDER CONSTRUCTION WITH SUPERELEVATION**

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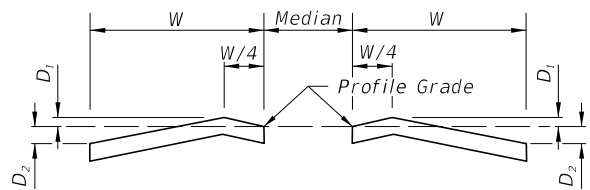
$$L_1 = S (D_2 + D_4)$$

$$L_2 = S (D_3 - D_2)$$

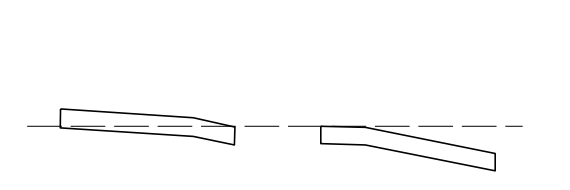
$$L_3 = S (D_4 - D_3)$$

$$L_4 = L_2 + L_3$$

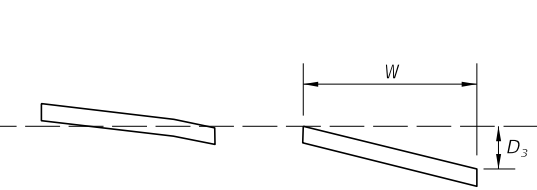
$$S = \text{SLOPE RATIO}$$



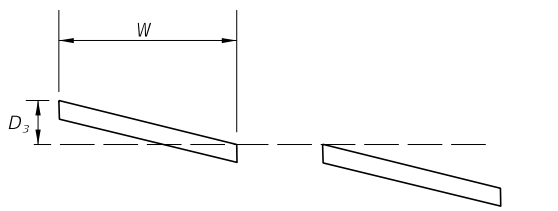
SECTION A-A  
NORMAL CROWNED SECTION



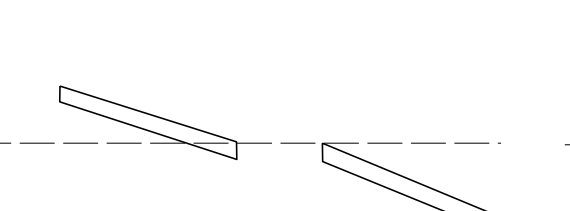
SECTION B-B  
SUPERELEVATION SECTION LT. & RT.



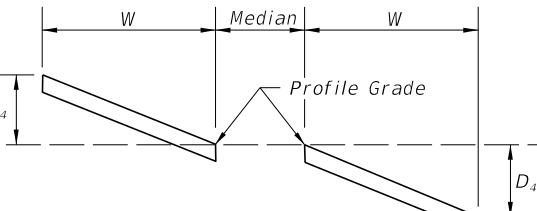
SECTION C-C  
SUPERELEVATION SECTION LT.  
PLANE INCLINED SECTION RT.



SECTION D-D  
PLANE INCLINED SECTION LT.  
SUPERELEVATION TRANSITION RT.

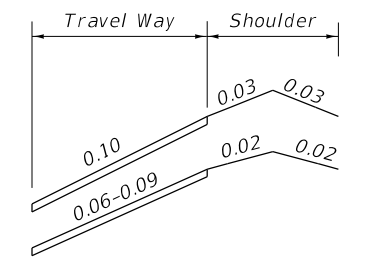
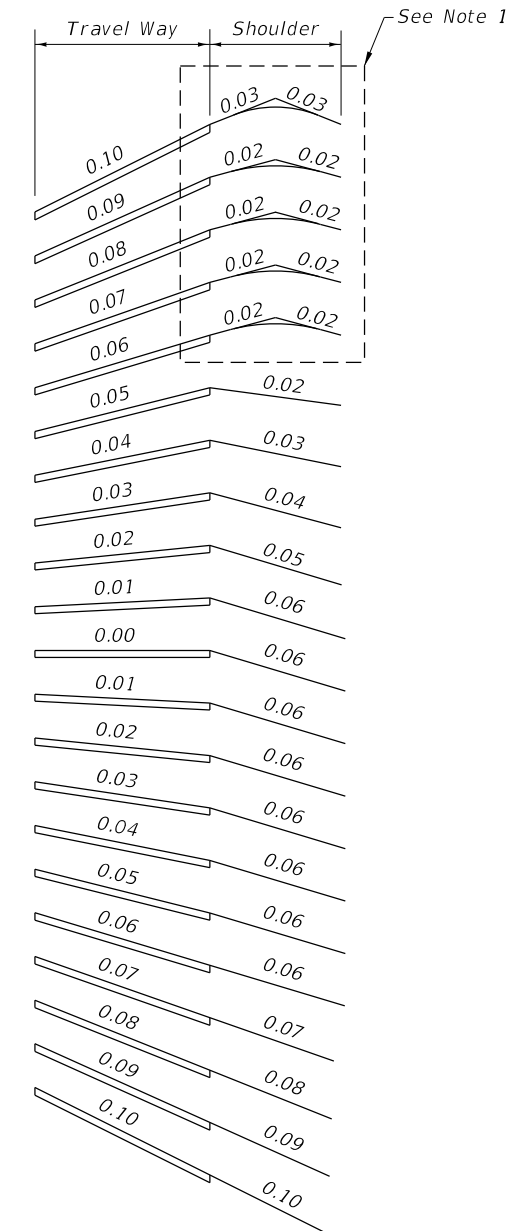


SECTION E-E  
SUPERELEVATION TRANSITION LT.  
FULL SUPERELEVATION RT.



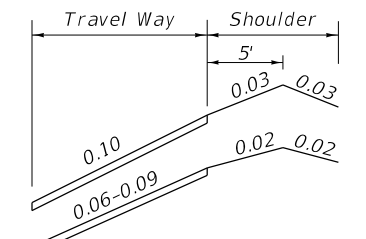
SECTION F-F  
FULL SUPERELEVATION LT. & RT.

8-LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN

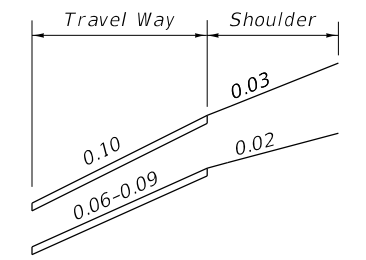


a) 12' AND 10' FULL WIDTH SHOULDERS WITH 5' OR LESS PAVED WIDTHS,

b) 8' FULL WIDTH SHOULDERS WITH 4' OR LESS PAVED WIDTHS,



8' FULL WIDTH SHOULDER WITH 5' PAVED WIDTH



6' FULL WIDTH SHOULDER WITH 5' OR LESS PAVED WIDTH

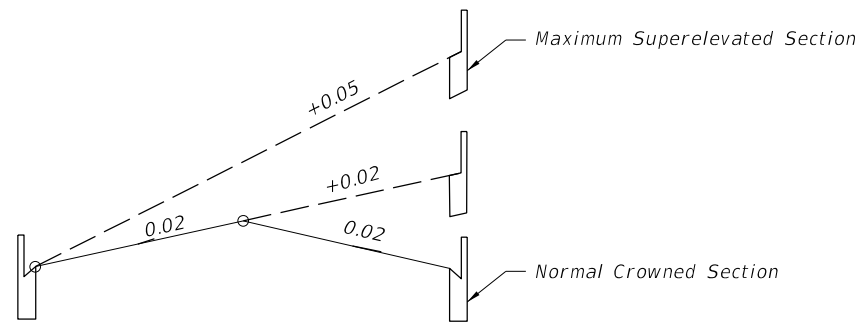
SPECIAL SHOULDER BREAK OVER DETAILS

SLOPES OF TRAVELED WAY AND ABUTTING SHOULDERS  
SHOULDER SLOPES ON SUPERELEVATION SECTIONS

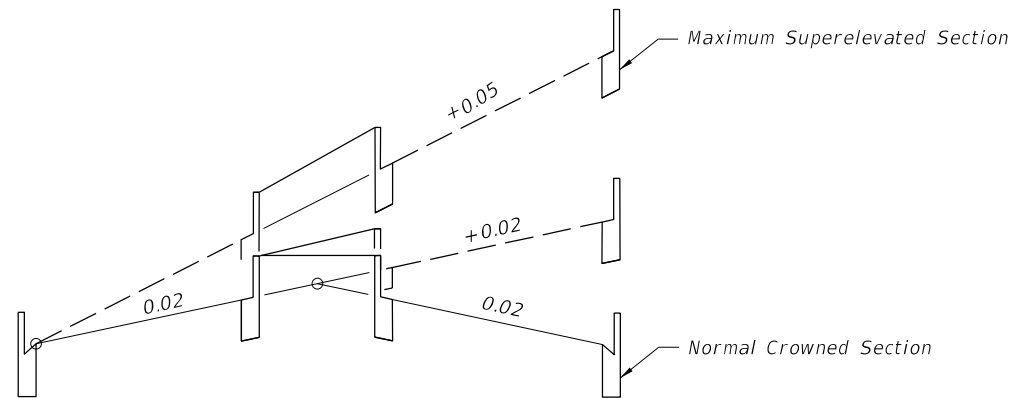
1. For shoulders with paved widths 5 feet or less see special shoulder break over details.
2. For Concrete pavement, the first 1'-0" of the outside shoulder is cast with the outside travel lane and will have the same cross slope as the outside lane. The shoulder break over will occur at the outside edge of the outside slab.

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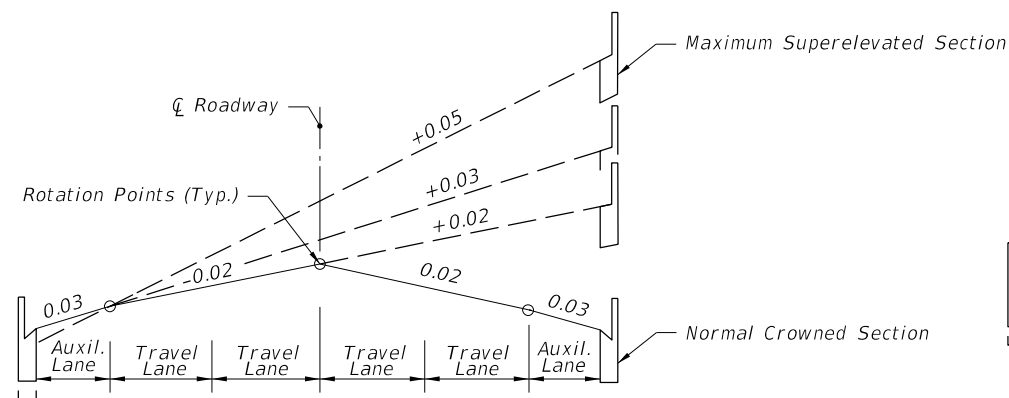
LAST REVISION 11/01/18	DESCRIPTION:
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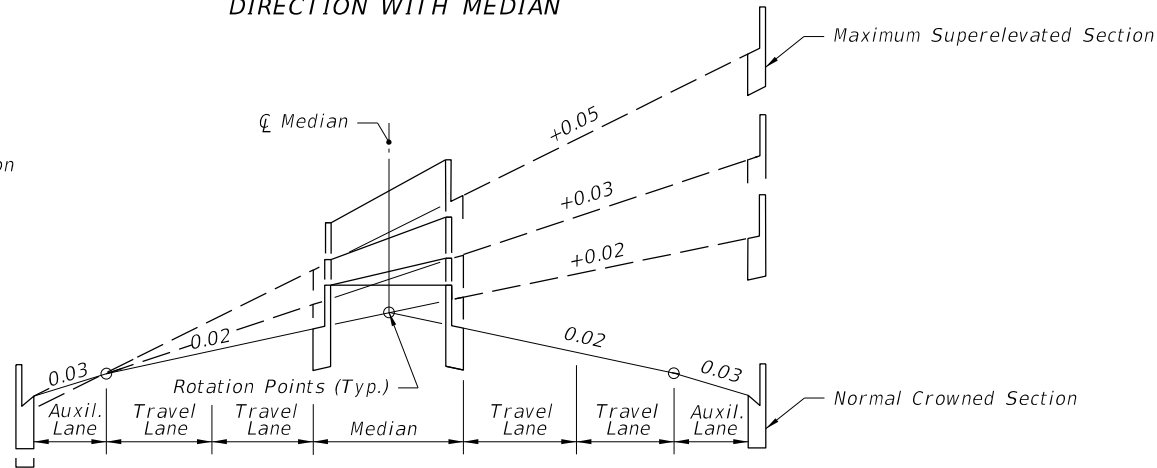
TWO TRAVEL LANES EACH DIRECTION



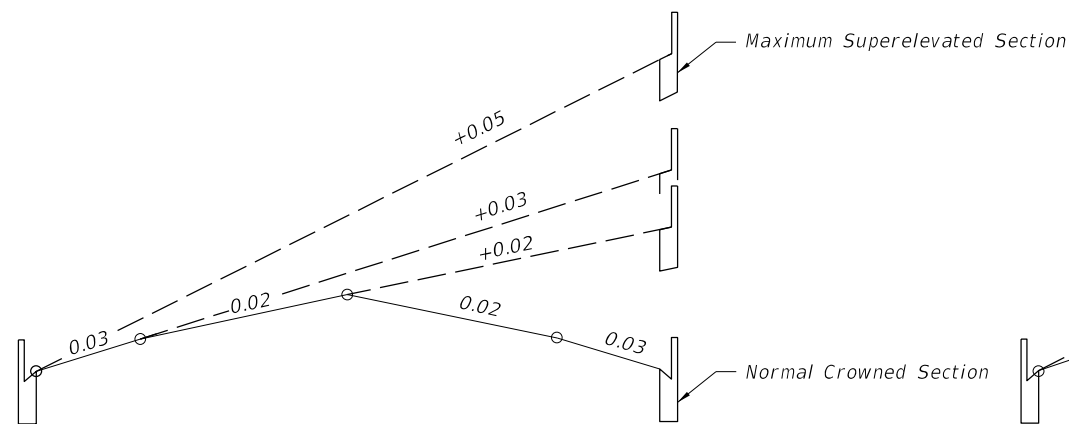
TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN



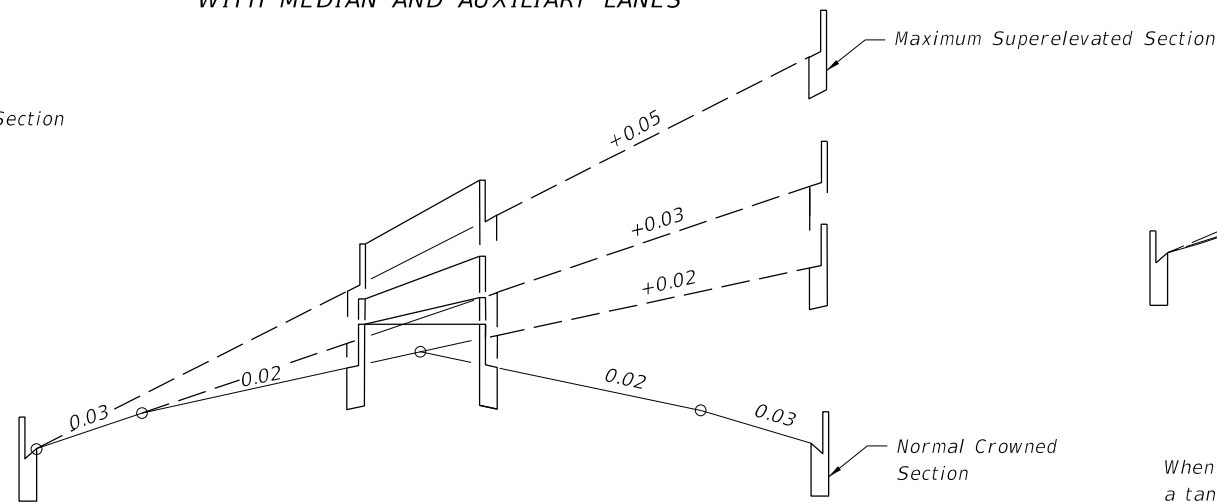
TWO TRAVEL LANES EACH DIRECTION WITH AUXILIARY LANES



TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANES

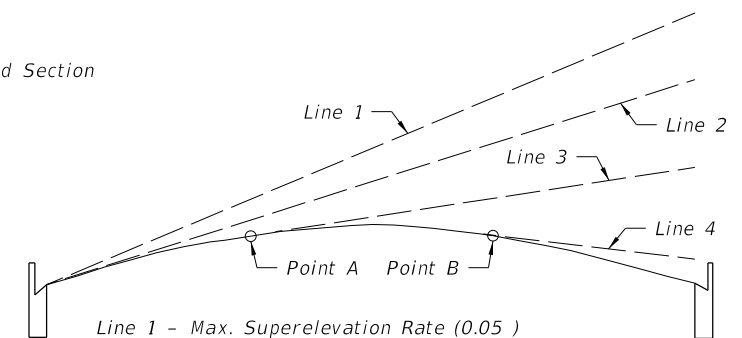


UNDIVIDED FACILITIES



THREE TRAVEL LANES EACH DIRECTION WITH MEDIAN

DIVIDED FACILITIES



- Line 1 - Max. Superelevation Rate (0.05)
- Line 2 - Slope Of Parabola At Inside Edge Of Pavt.
- Line 3 - Positive Superelevation Rate Less Than Max. Slope Of Parabola.
- Line 4 - Adverse Superelevation.

When this section is used, superelevation is established by rotating a tangent about the arc of the parabolic crown until the desired slope is attained (points A & B on sketch). The normal parabolic crown will be maintained outside the limits of the plane thus formed.


**GENERAL NOTES:**

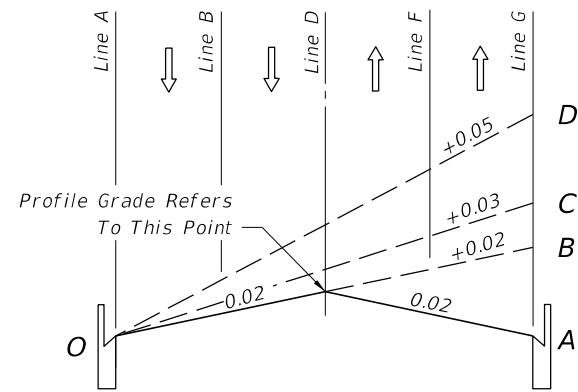
1. Obtain Superelevation by rotating the plane successively about the break points of the section until the plane has attained a slope equal to that required by the Plans. Should the rotation traverse the entire section and further superelevation be required, the remaining rotation of the plane shall be about the low edge of the inside travel lane. Crown is to be removed in the auxiliary lane to the outside of the curve only when the adjoining travel lanes require positive superelevation.
2. When positive superelevation is required, continue the slope of the pavement across the gutter on the high side.
3. Place short vertical curves at all angular profile breaks within the limits of the superelevation transition.
4. The variable superelevation transition length "L" has a minimum value of 50 feet for design speeds under 40 MPH and 75 feet for design speeds of 40 MPH or greater.
5. Roadway sections having lane arrangements different from those shown, but composed of a series of planes, are superelevation in a similar manner.

**SUPERELEVATION TRANSITION SECTIONS FOR LOW SPEED HIGHWAYS**

PARABOLIC SECTION

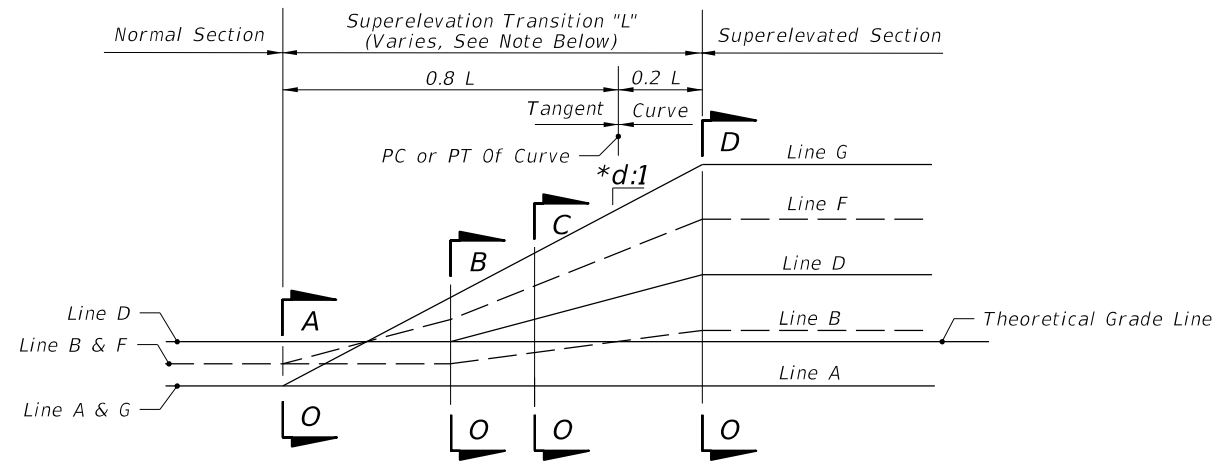
10/29/2019 8:13:44 AM

LAST REVISION 11/01/18	REVISION	DESCRIPTION:	 FY 2020-21 STANDARD PLANS	<b>SUPERELEVATION TRANSITIONS -          LOW SPEED HIGHWAYS</b>	INDEX 000-511	SHEET 1 of 2
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SECTION 0-A to 0-D

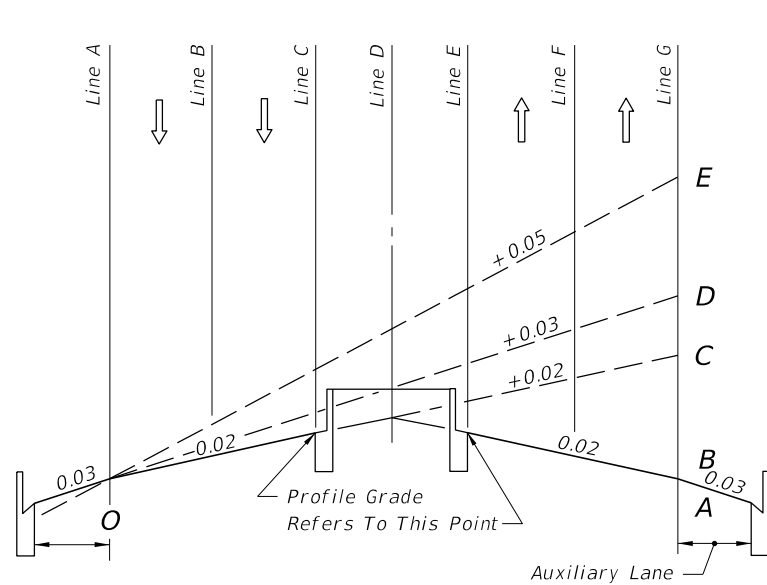
TWO LANES EACH DIRECTION



PROFILE

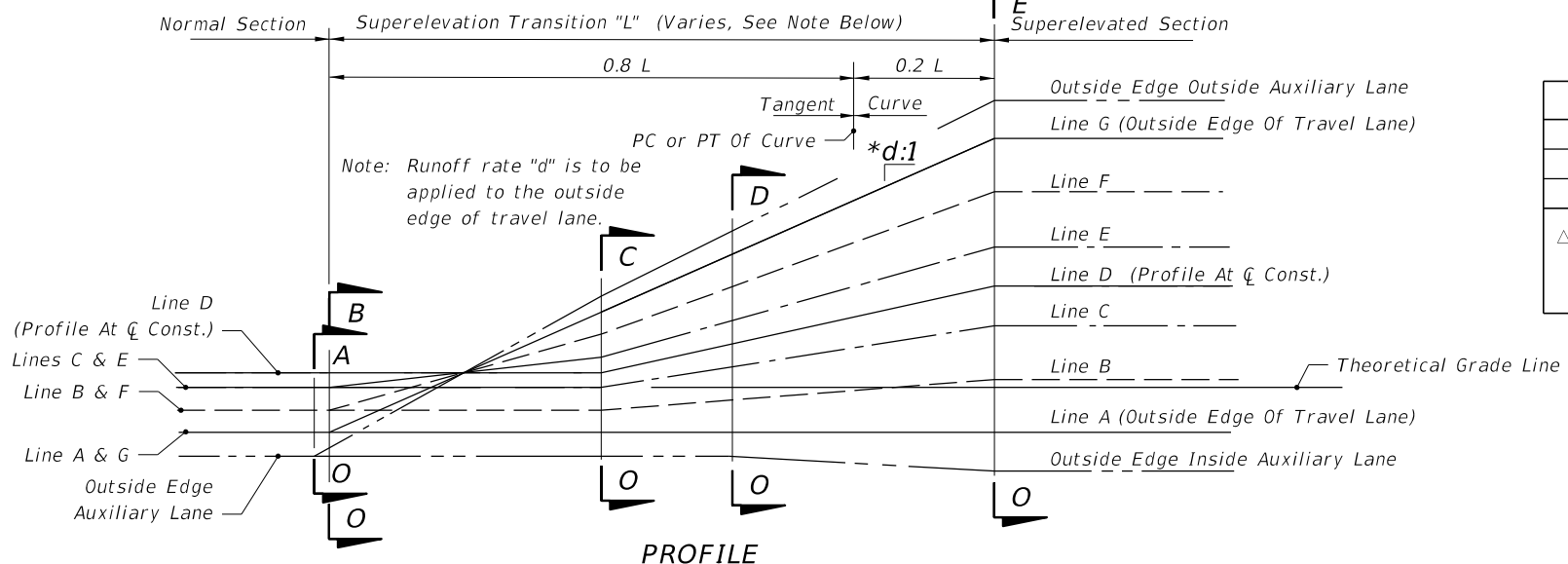
LINE	DESCRIPTION
A	Inside Travel Lane
B	Inside Lane Line
C	Inside Median Edge Pavement
D	℄ Construction
E	Outside Median Edge Pavement
F	Outside Lane Line
G	Outside Travel Lane

Inside And Outside Are Relative To Curve Center



SECTION 0-A to 0-E

TWO LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANE



PROFILE

*d (Slope Ratio)	
30 MPH	1: 100
40 MPH	1: 125
45-50 MPH Δ	1: 150

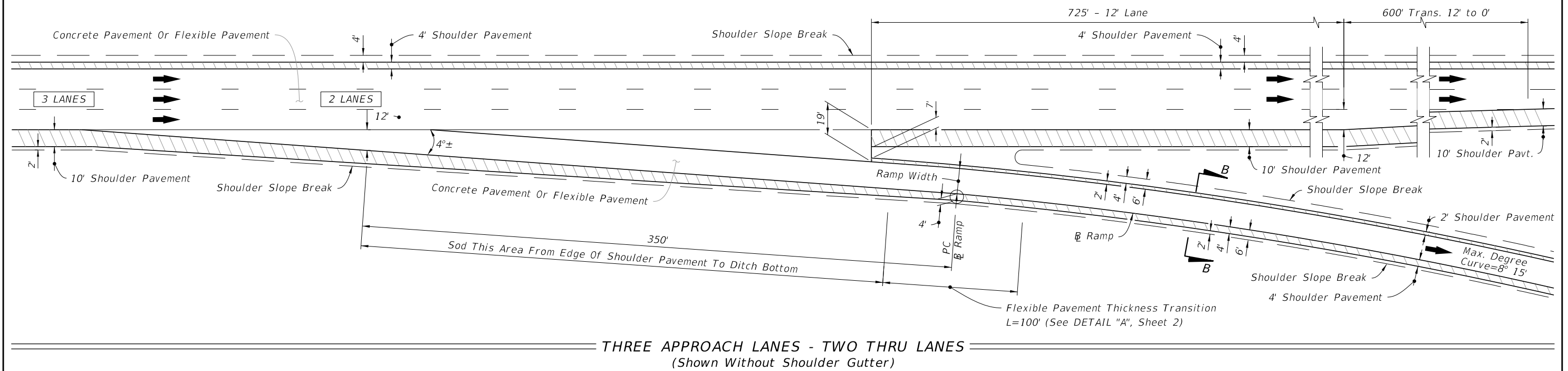
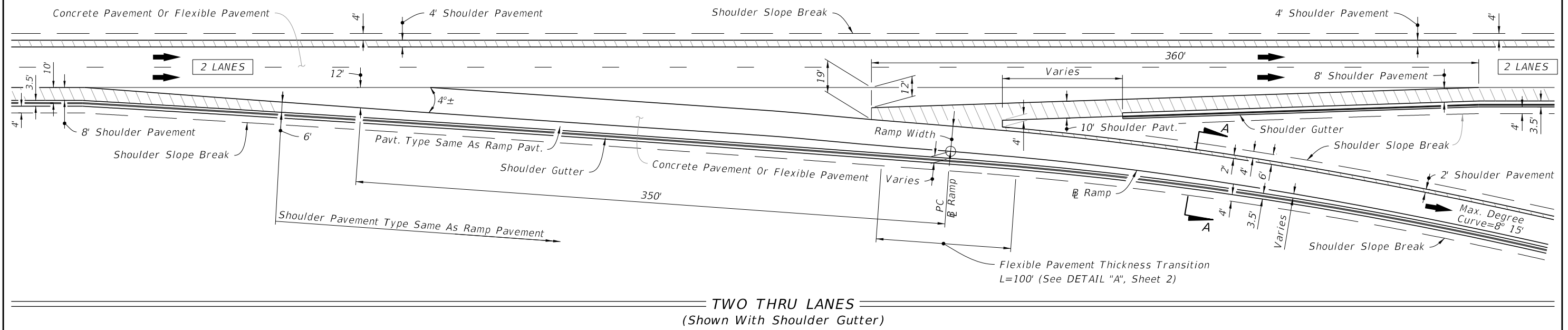
Δ 1: 125 May Be Used For 45 MPH Under Restricted Conditions.

Note:  
The sections and profiles shown are examples of superelevation transitions.  
Similar schemes should be used for roadways having other sections.

EXAMPLE SUPERELEVATION SECTIONS AND PROFILES FOR LOW SPEED HIGHWAYS

10/29/2019 8:13:45 AM

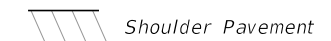
LAST REVISION 11/01/18	DESCRIPTION:
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**GENERAL NOTES:**

1. Taper-Type exit and entrance terminals as detailed shall not be used on ramps for which a speed of 50 MPH or greater cannot be maintained. For such ramps, parallel deceleration and acceleration lanes shall be used in place of tapers with lengths set according to AASHTO.
2. Shoulder Pavement:
  - A. Concrete Pavement Projects: Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identical to the adjacent roadway pavement beginning with the transverse joint nearest the point of 6' width.
  - B. Flexible Pavement Projects: Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be identical to the adjacent roadway pavement.
3. For concrete pavement joint details and layouts at entrance and exit ramp terminals, see Index 350-001.

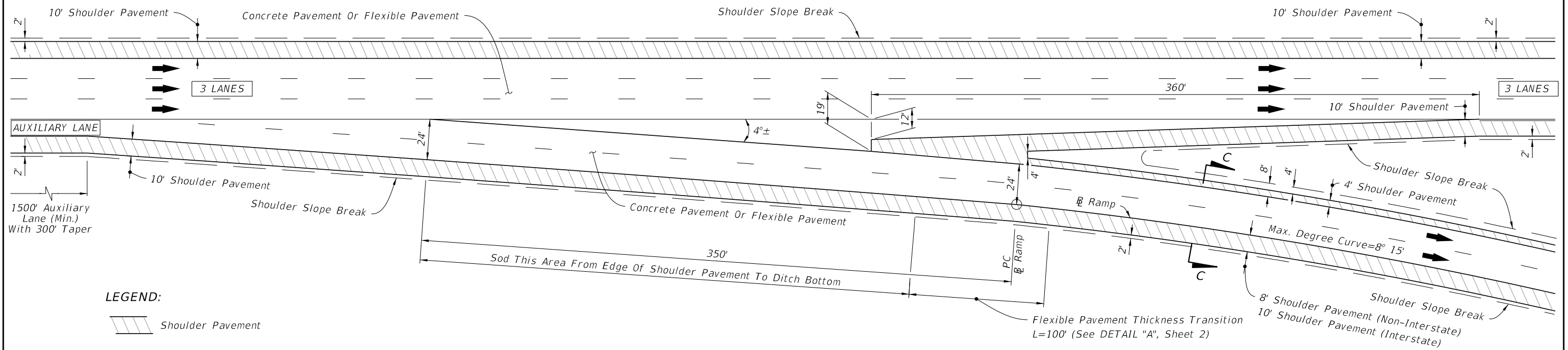
**LEGEND:**



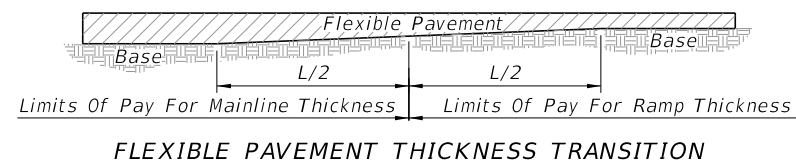
10/29/2019 8:13:46 AM

**SINGLE LANE RAMPS - EXIT TERMINALS**

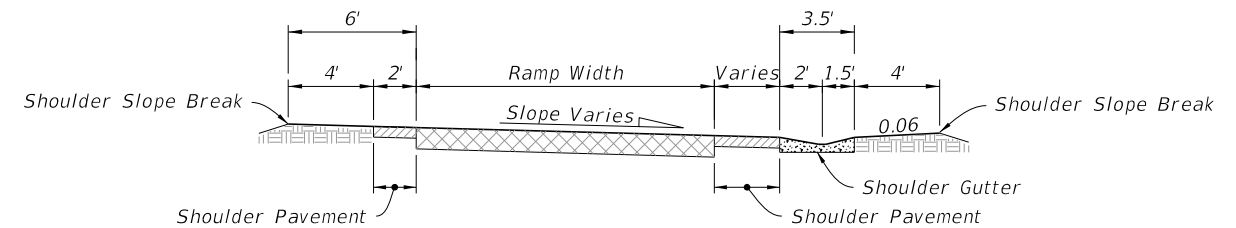
LAST REVISION 11/01/17	DESCRIPTION:	 FY 2020-21 STANDARD PLANS	RAMP TERMINALS	INDEX 000-525	SHEET 1 of 5
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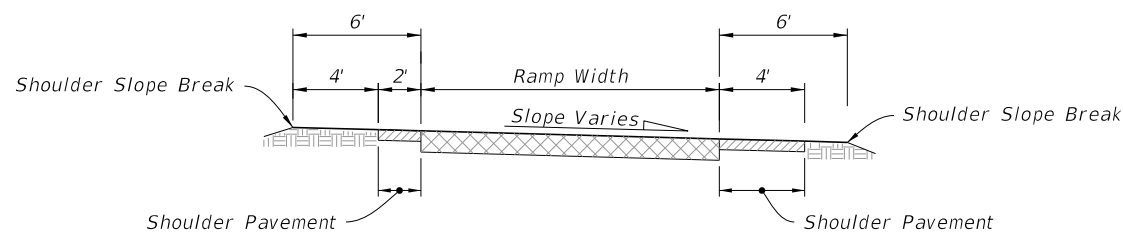
THREE THRU LANES - APPROACH AUXILIARY LANE  
(Shown Without Shoulder Gutter)



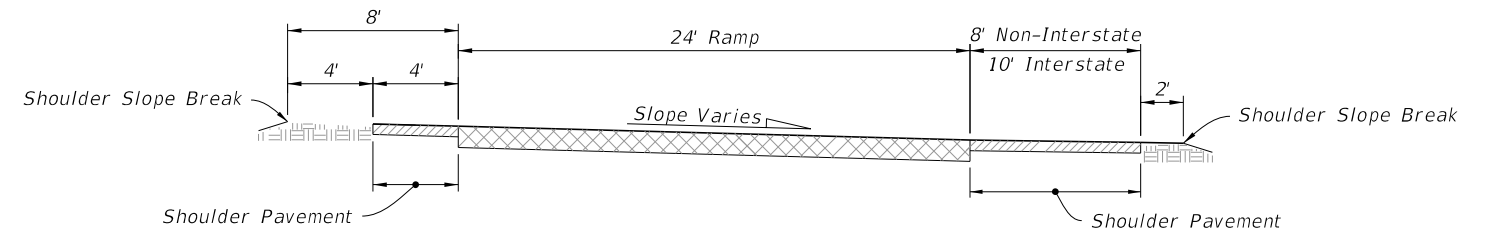
DETAIL "A"



SECTION A-A



SECTION B-B



SECTION C-C

TWO LANE RAMPS - EXIT TERMINALS

LAST REVISION 11/01/17	REVISION	DESCRIPTION:
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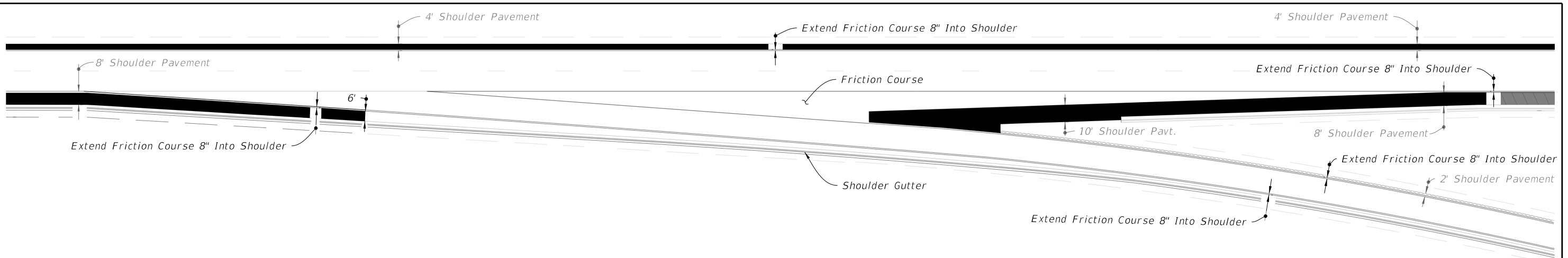
FY 2020-21  
STANDARD PLANS

RAMP TERMINALS

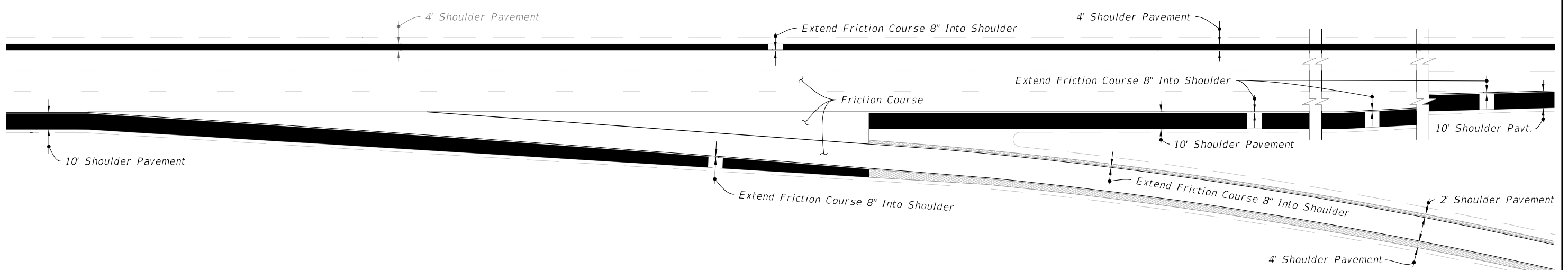
INDEX  
000-525

SHEET  
2 of 5

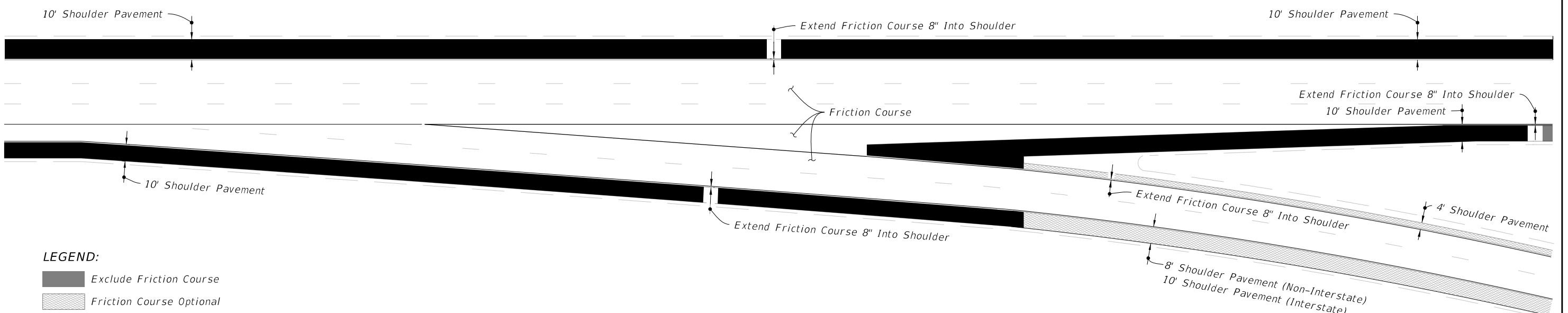
10/29/2019 8:13:46 AM



**TWO THRU LANES**  
(Shown With Shoulder Gutter)



**THREE APPROACH LANES - TWO THRU LANES**  
(Shown Without Shoulder Gutter)



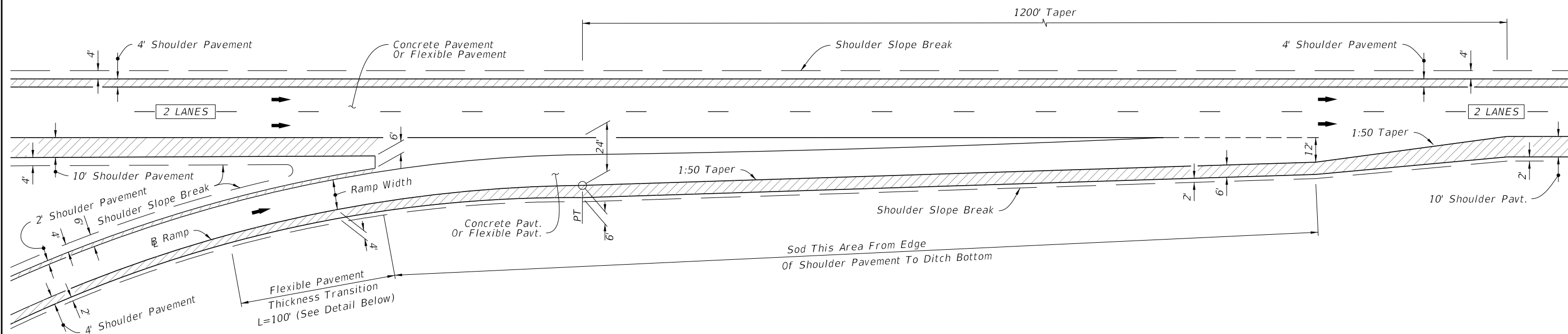
**THREE THRU LANES - APPROACH AUXILIARY LANE**  
(Shown Without Shoulder Gutter)

**EXIT TERMINALS - FRICTION COURSE LOCATION (FOR FLEXIBLE PAVEMENT)**

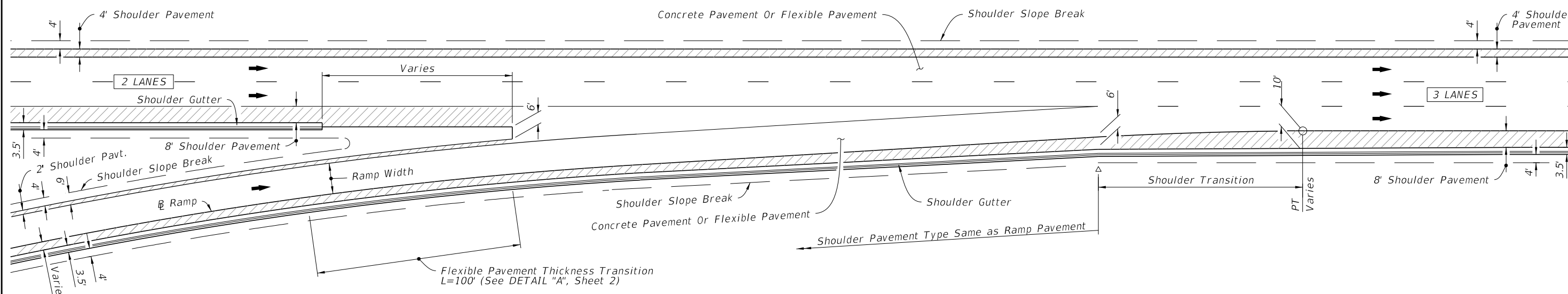
**LEGEND:**  
 Exclude Friction Course  
 Friction Course Optional

10/29/2019 8:13:47 AM

LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2020-21 STANDARD PLANS	RAMP TERMINALS	INDEX 000-525	SHEET 3 of 5
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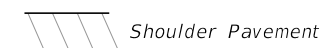


TAPER - TYPE ENTRANCE




PARALLEL - TYPE ENTRANCE

LEGEND:

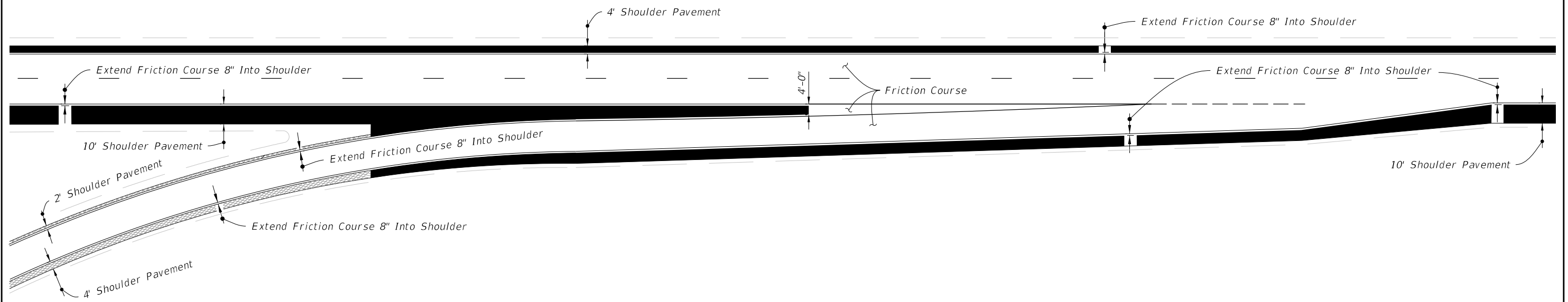


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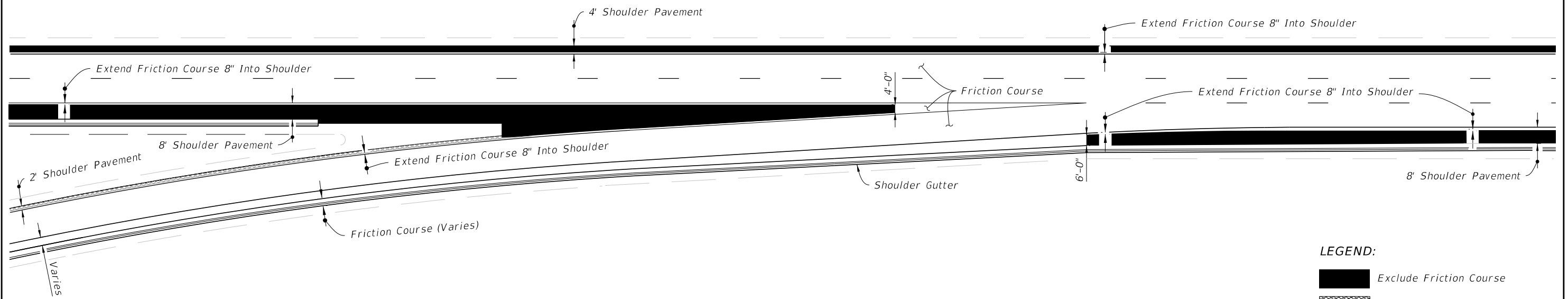
SINGLE LANE RAMPS - ENTRANCE TERMINALS

LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2020-21 STANDARD PLANS	RAMP TERMINALS	INDEX 000-525	SHEET 4 of 5
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**TAPER - TYPE ENTRANCE**  
(Shown Without Shoulder Gutter)




**PARALLEL - TYPE ENTRANCE**  
(Shown With Shoulder Gutter)

**LEGEND:**  
 Exclude Friction Course  
 Friction Course Optional

**ENTRANCE TERMINALS - FRICTION COURSE LOCATION (FOR FLEXIBLE PAVEMENT)**

10/29/2019 8:13:48 AM

LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2020-21 STANDARD PLANS	RAMP TERMINALS	INDEX 000-525	SHEET 5 of 5
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