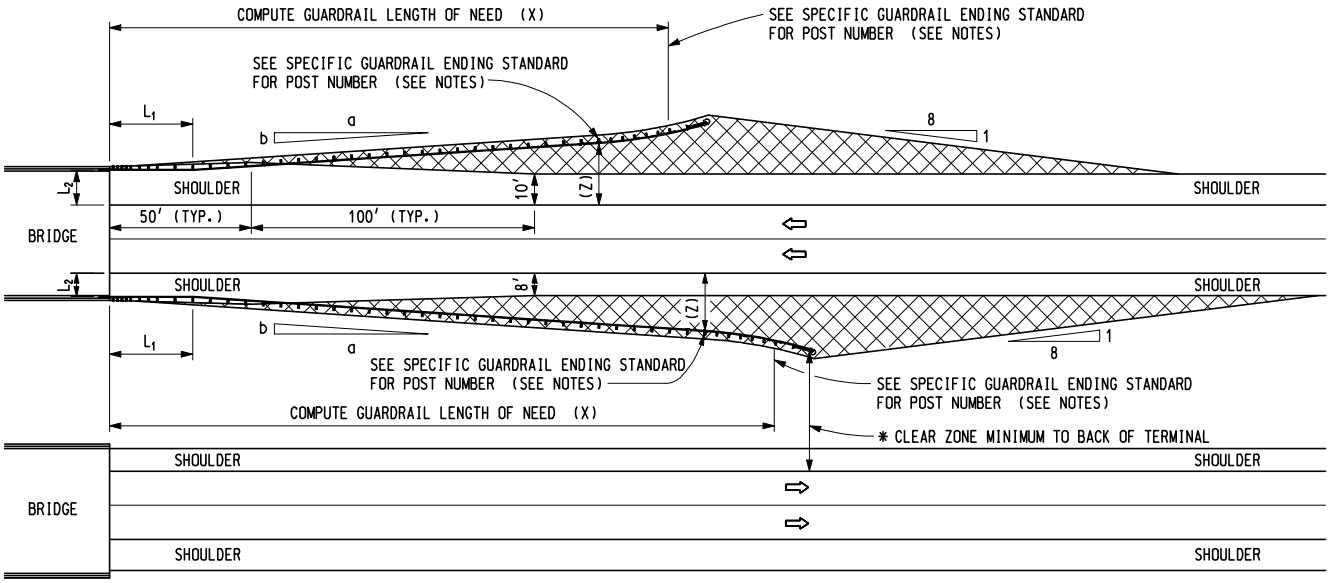
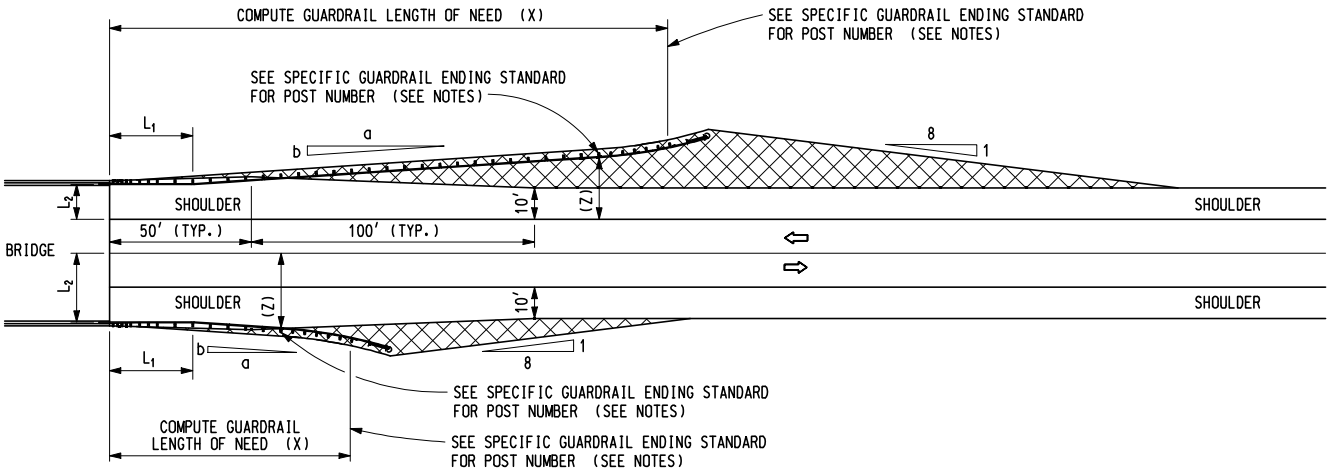


* WHERE CLEAR ZONE DISTANCE CAN NOT BE MET BY USING THE FLARE RATE (1:15), INVESTIGATE IN THE FOLLOWING ORDER OF PREFERENCE THE TREATMENTS LISTED BELOW:

1. USE BULLNOSE WITHIN THE LIMITS SPECIFIED ON STANDARD PLAN R-56-SERIES.
2. INSTALL GUARDRAIL WITH LESS FLARE RATE AS DETERMINED BY BACKSIDE MINIMUM CLEAR ZONE.

BEAM GUARDRAIL AT BRIDGES - DUAL ROADWAYS



BEAM GUARDRAIL AT BRIDGES - TWO-WAY ROADWAYS

LEGEND

- 1:10 SLOPE BETWEEN SHOULDER LINE AND 2'-0" BEHIND FACE OF POST.
- L_1 = TANGENT LENGTH OF BARRIER UPSTREAM FROM THE HAZARD. (25' MIN.)
- L_2 & Z = LATERAL DISTANCES MEASURED FROM FACE OF GUARDRAIL. (AS SHOWN)

MDOT Michigan Department of Transportation

PREPARED BY DESIGN SUPPORT AREA

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MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL AT BRIDGES AND EMBANKMENTS

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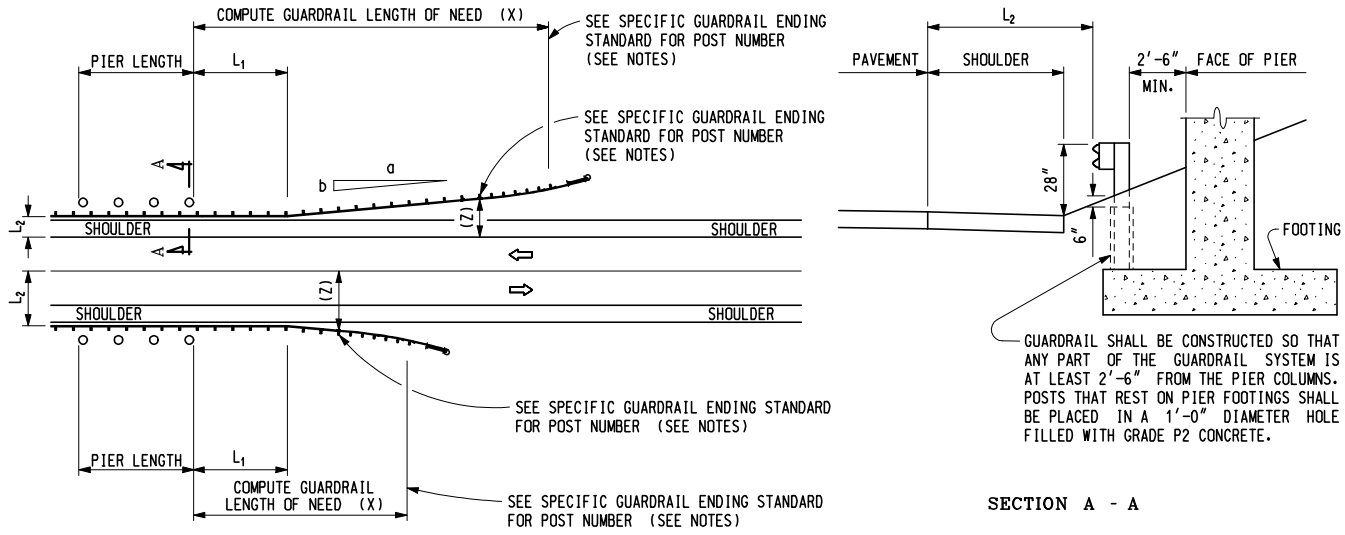
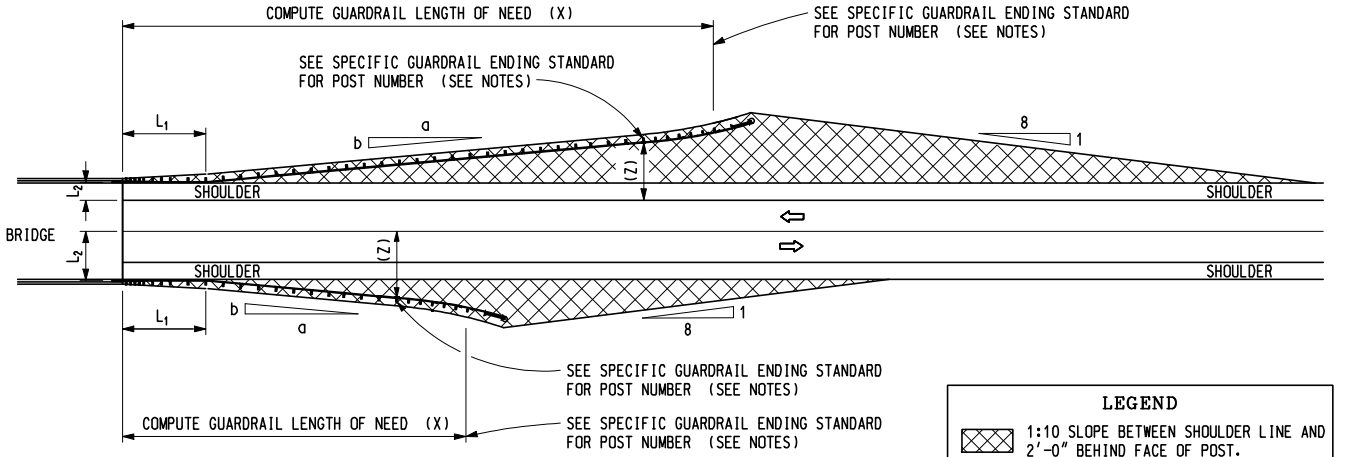


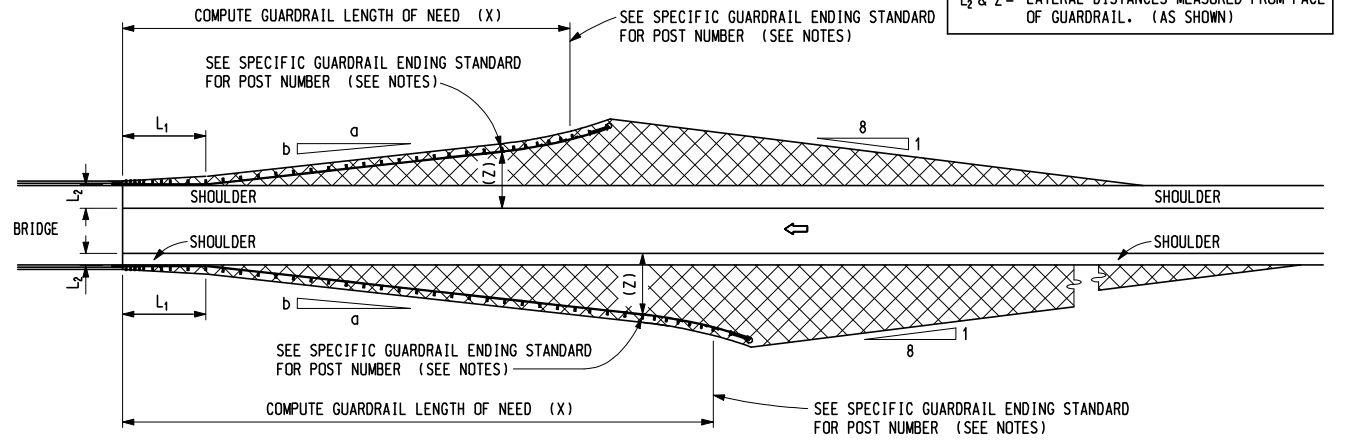
BEAM GUARDRAIL AT PIERS - LOCAL ROADWAYS - UNDER



BEAM GUARDRAIL AT BRIDGES - LOCAL ROADWAYS - OVER

LEGEND

- 1:10 SLOPE BETWEEN SHOULDER LINE AND 2'-0" BEHIND FACE OF POST.
- L_1 = TANGENT LENGTH OF BARRIER UPSTREAM FROM THE HAZARD. (25' MIN.)
- L_2 & Z = LATERAL DISTANCES MEASURED FROM FACE OF GUARDRAIL. (AS SHOWN)



BEAM GUARDRAIL AT BRIDGES - SINGLE RAMPS

MICHIGAN DEPARTMENT OF TRANSPORTATION
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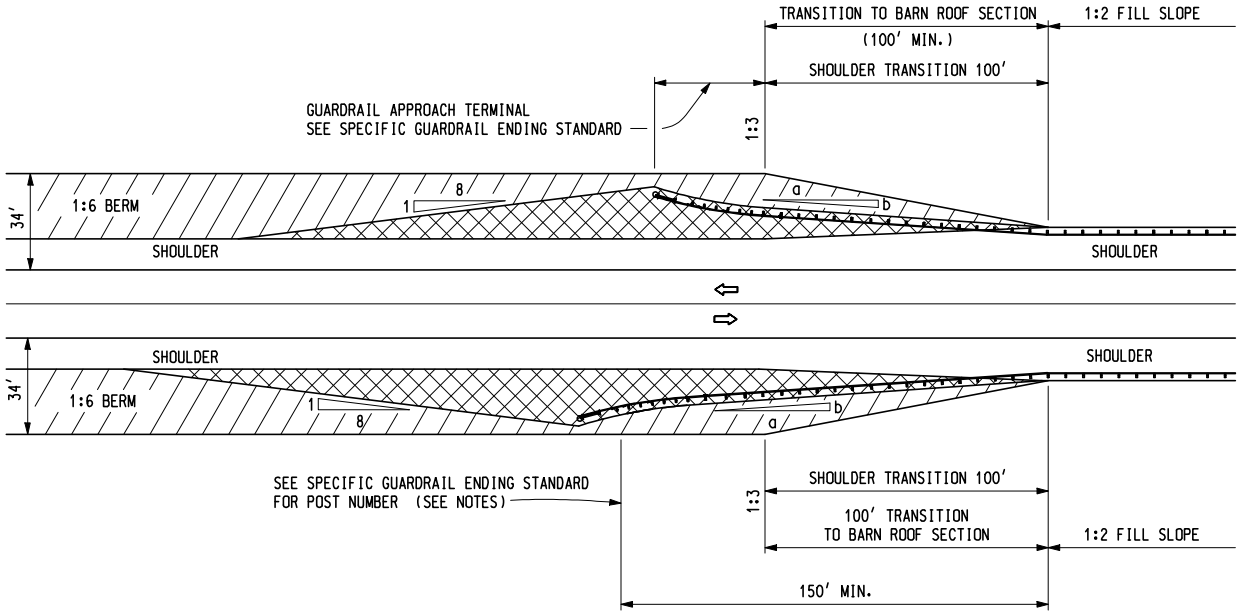
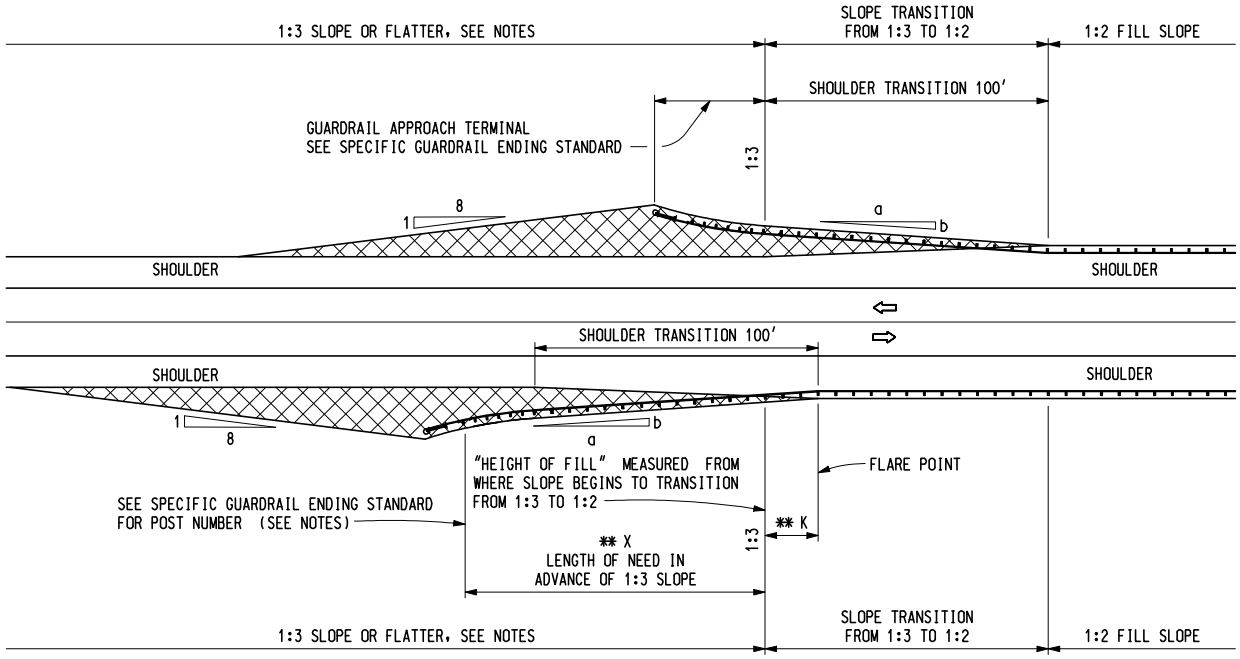


BEAM GUARDRAIL AT EMBANKMENTS - TWO-WAY ROADWAYS

(BARN ROOF SLOPE)



** SEE CHART FOR THE "X" AND THE "K" DISTANCE. (SHEET 6 OF 6)

BEAM GUARDRAIL AT EMBANKMENTS - TWO-WAY ROADWAYS

LEGEND

- 1:10 SLOPE BETWEEN SHOULDER LINE AND 2′-0″ BEHIND FACE OF POST.
- 1:6 BERM

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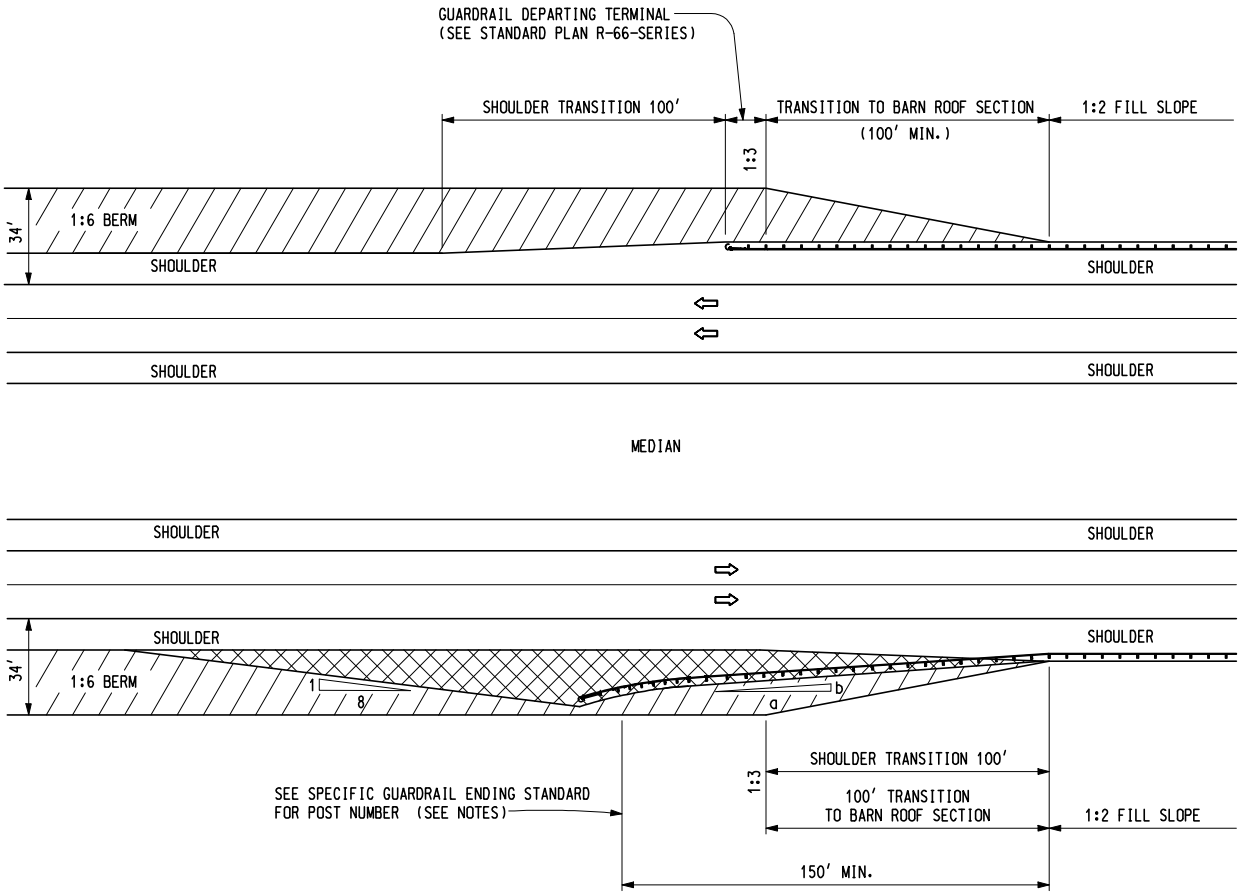

BEAM GUARDRAIL AT EMBANKMENTS - DUAL ROADWAYS

(BARN ROOF SLOPE)

LEGEND

- 1:10 SLOPE BETWEEN SHOULDER LINE AND 2'-0" BEHIND FACE OF POST.
- 1:6 BERM

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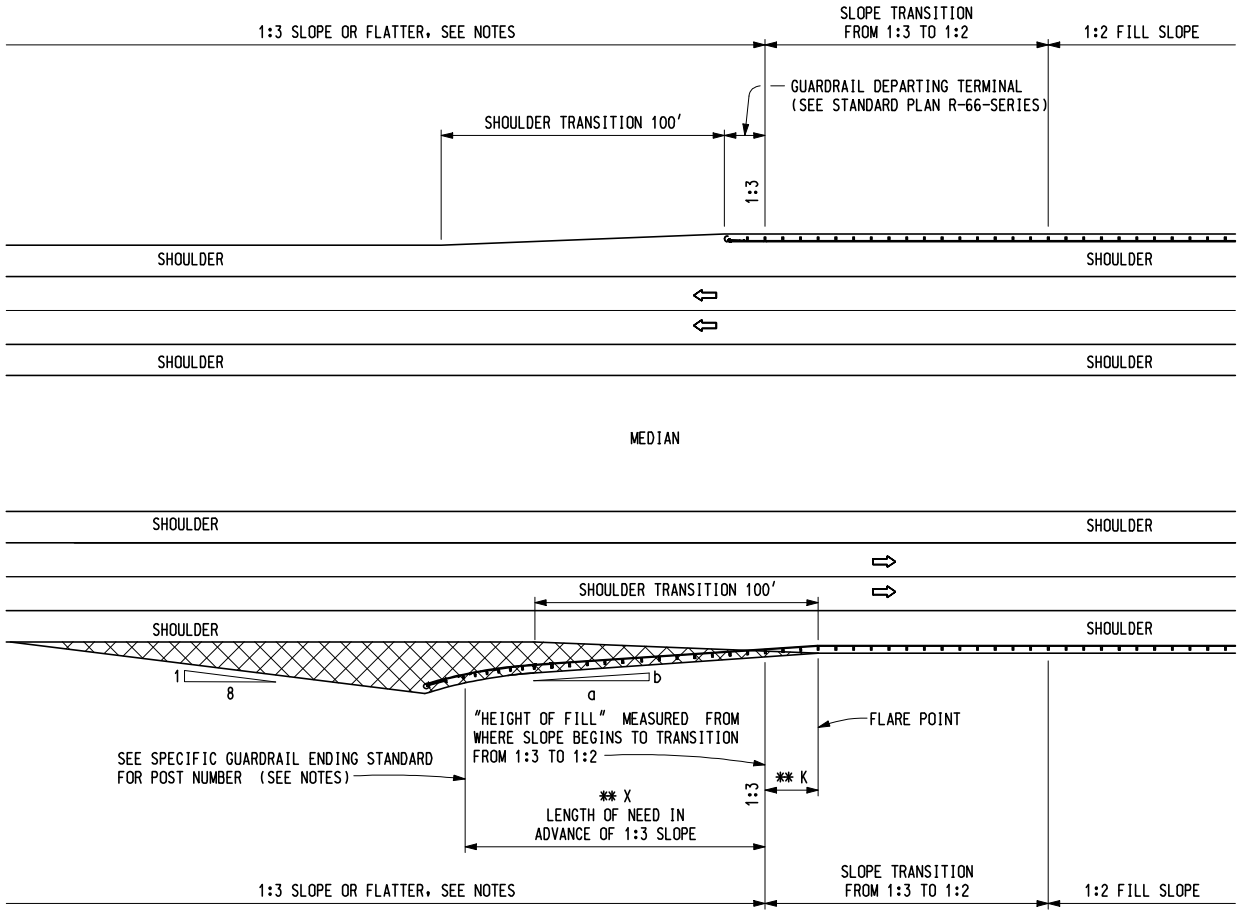

** SEE CHART FOR THE "X" AND THE "K" DISTANCE. (SHEET 6 OF 6)

BEAM GUARDRAIL AT EMBANKMENTS - DUAL ROADWAYS

LEGEND

1:10 SLOPE BETWEEN SHOULDER LINE AND 2'-0" BEHIND FACE OF POST.

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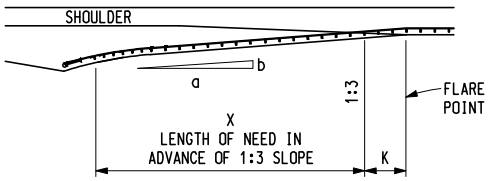
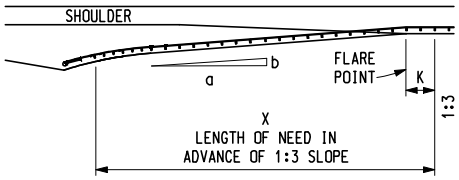
**

GUARDRAIL AT EMBANKMENTS (FLARED INSTALLATIONS, b/a)							
HEIGHT OF FILL AT 1:3 SLOPE (FEET)		70 MPH FLARE 1 : 15		60 MPH FLARE 1 : 14		50 MPH FLARE 1 : 11	
OVER	TO	X	K	X	K	X	K
5	10	100	37.5	100	12.5	100	0
10	12	100	37.5	100	12.5	100	0
12	14	100	37.5	100	12.5	100	0
14	16	113	24.5	110	2.5	100	0
16	18	155	-17.5	149	-36.5	101	-1
18	20	193	-55.5	182	-69.5	127	-27
20	22	223	-85.5	207	-94.5	148	-48
22	24	246	-108.5	227	-113.5	164	-64
24	25	256	-118.5	235	-122.5	171	-71



FOR POSITIVE "K" DISTANCES, BEGIN FLARE POINT BEYOND THE 1:3 SLOPE.



FOR NEGATIVE "K" DISTANCES, BEGIN FLARE POINT IN ADVANCE OF THE 1:3 SLOPE.

NOTES:

THE CONSTRUCTION OF GUARDRAIL SHALL BE ACCORDING TO THE CURRENT STANDARD PLANS. APPROPRIATE APPROACH CURB AND GUTTER DETAILS AND DOWNSPOUT HEADER DETAILS, WHEN USED, ARE SPECIFIED ON THE CURRENT STANDARD PLAN R-32-SERIES.

ALL POST NUMBERS ARE REFERENCED ACCORDING TO THOSE SPECIFIED ON THE SPECIFIC GUARDRAIL ENDING STANDARD.

A 1:10 SLOPE SHALL BE MAINTAINED IN FRONT OF AND 2'-0" BEHIND THE GUARDRAIL BEAM OUTSIDE THE DESIGNATED SHOULDER AREA. SLOPE BEYOND THE 2'-0" HINGE LINE BEHIND THE GUARDRAIL BEAM AREA MAY BE 1:2 OR FLATTER AND SHALL BE TRANSITIONED TO NORMAL GRADED SLOPES IN SUCH A WAY AS TO GIVE A PLEASING APPEARANCE.

GUARDRAIL WILL NOT BE REQUIRED ON DEPARTING END OF STRUCTURES ON DUAL ROADWAYS WHICH HAVE CONTINUOUS ABUTMENTS OR WHEN FILL SLOPES ARE 1:4 OR FLATTER. IF A DOWNSPOUT HEADER IS REQUIRED ON THE DEPARTING ENDS OF STRUCTURES, IT WILL BE NECESSARY TO SHIELD IT WITH GUARDRAIL.

THIS STANDARD PLAN APPLIES ONLY TO NEW CONSTRUCTION UNLESS SPECIFICALLY CALLED FOR ON UPGRADING PROJECTS.

AREA BEHIND THE GUARDRAIL DEPARTING END TERMINAL SHALL HAVE A 1:3 SLOPE OR FLATTER.

AREA BEHIND THE GUARDRAIL APPROACH TERMINAL SHALL HAVE A 1:4 SLOPE OR FLATTER UNLESS THE ENDING CANNOT BE PLACED IN A 1:4 BECAUSE THE PREDOMINATE SLOPE PRECEDING THE APPROACH TERMINAL IS A 1:3. IN THIS CASE, THE ENDING MAY BE PLACED IN THE 1:3 SLOPE.

GUARDRAIL ANCHORAGE, BRIDGE IS INCLUDED IN THE GUARDRAIL LENGTHS SPECIFIED. (SEE CURRENT STANDARD PLAN R-67-SERIES).

ALL 1:10 SLOPES SHALL BE GRADED TO "CLASS A" SLOPE TOLERANCES.

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GUARDRAIL AT BRIDGES AND EMBANKMENTS

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