RUNOUT LENGTH (L$_R$) (SEE TABLE A)

RUNOUT LENGTH (L$_R$) (SEE TABLE A)

MINIMUM BARRIER INSTALLATION LENGTH (SEE NOTE (F))

APPROX. 12'-6" LON$_f$ LON$_n$ APPROX. 12'-6"

CLEAR ZONE LINE FOR APPROACHING TRAFFIC

CLEAR ZONE LINE FOR OPPOSING TRAFFIC

RIGID OBJECT

ROADWAY FILL SLOPE

TYPE 38 OR TYPE 13 GR. ANCHOR (S-GRA-3) SEE NOTE (D)

L$_A$ MIN. 5' L$_A$

L$_2$

SHOULDER

L$_2$

EDGE OF LANE

BEGINNING OF LENGTH OF NEED POINT

GUARDRAIL TERMINAL

SHOULDER

THE VARIABLES (L$_A$ AND L$_2$) FOR THE LENGTH OF NEED FOR THE FAR SIDE APPROACH (LON$_f$) ARE TO BE MEASURED FROM THE CENTERLINE OR THE INSIDE EDGE OF THE LANE FOR DIVIDED ROADS.

THE VARIABLES (L$_A$ AND L$_2$) FOR THE LENGTH OF NEED FOR THE NEARSIDE APPROACH (LON$_n$) ARE TO BE MEASURED FROM THE NEARSIDE EDGE OF LANE.

BARRIER LENGTH OF NEED FOR A TRAVERSABLE RIGID OBJECT (LIGHT POLE, SIGN STRUCTURE ETC.) LOCATED INSIDE THE CLEAR ZONE

TABLE A

RUNOUT LENGTHS (L$_R$) FOR BARRIER DESIGN (FT)

DESIGN SPEED (MPH)	DESIGN TRAFFIC VOLUME (ADT)			
	OVER 10000	5000- 10000	1000- 5000	UNDER 1000
70	360	330	290	250
65	330	290	250	225
60	300	250	210	200
55	265	220	185	175
50	230	190	160	150
45	195	160	135	125
40	160	130	110	100
35	135	110	95	85
30	110	90	80	70
25	85	70	60	50
20	60	50	35	25

NOTE: SEE "ROADSIDE DESIGN GUIDE", AASHTO, 2011, FOR MORE INFORMATION.

BARRIER LENGTH OF NEED CALCULATION FOR TANGENT ROADS WITH RIGID OBJECT

$$\text{LON}_f \text{ or } \text{LON}_n = \frac{L_A - L_2}{L_A / L_R}$$

SEE "ROADSIDE DESIGN GUIDE" SECTION 5.6.4, AASHTO, 2011, FOR ADDITIONAL INFORMATION.

LEGEND

L$_A$ = DISTANCE FROM EDGE OF TRAVELED WAY (EDGE OF PAVEMENT) TO THE LATERAL EXTENT OF OBSTACLE.
NOTE: L$_A$ ≤ L$_C$.

L$_C$ = THE CLEAR ZONE DISTANCE AS DETERMINED IN TABLE "A" ON S-CZ-1.

L$_2$ = DISTANCE FROM EDGE OF TRAVELED WAY TO BARRIER.

L$_R$ = RUNOUT LENGTH (SEE TABLE A FOR VALUE).

NOTES: 1. THE EQUATION FOR LON FOR THE NEARSIDE AND FARSIDE APPROACHES IS THE SAME. THE ONLY DIFFERENCE IS THE FARSIDE VARIABLES ARE MEASURED FROM THE CENTERLINE OR THE INSIDE EDGE OF THE LANE FOR DIVIDED ROADS.

2. RIGID OBJECTS OUTSIDE THE CLEAR ZONE SHOULD BE EVALUATED BASED ON CRASH SEVERITY OR CONSEQUENCES TO OPERATION.

3. AS A CONSERVATIVE APPROCH DESIGNER MAY USE RUNOUT LENGTH (L$_R$) DIMENSIONS WHEN DETERMINING LENGTH OF NEED.

GENERAL NOTES

(A) EVERY LOCATION WHERE GUARDRAIL IS REQUIRED MUST BE INVESTIGATED SEPARATELY. THE OBJECT MUST BE IDENTIFIED AND THE "POINT OF NEED" CALCULATED TO DETERMINE THE BEST TREATMENT FOR PROTECTION OF VEHICLES FROM THE OBJECT.

(B) LENGTH OF NEED STARTS FROM THE THIRD POST OF THE END TREATMENT.

(C) IF THE CLEAR ZONE FALLS INSIDE OF 3:1 SLOPE OR STEEPER, EXTEND THE CLEAR ZONE TO THE TOE OF THE SLOPE.

(D) TRAILING END GUARDRAIL ANCHORS (TYPE 13) MAY ONLY BE USED FOR DIVIDED ROADWAYS, ONE WAY ROADS, OR TWO WAY MULTI-LANE ROADS WHERE LOCATION IS OUTSIDE THE CLEAR ZONE FOR THE OPPOSING DIRECTION TRAFFIC.

(E) SEE THE FOLLOWING STANDARD DRAWINGS :

S-PL-1: SAFETY PLAN FOR BARRIER LENGTH OF NEED

S-PL-1B: SAFETY PLAN FOR BARRIER LENGTH OF NEED ON CURVED ROADWAYS

S-PL-3: SAFETY PLAN MINIMUM INSTALLATION AT BRIDGE ENDS

S-PL-4: SAFETY PLAN FOR BRIDGE PIERS IN CLEAR ZONE

S-PL-5: SAFETY PLAN FOR BRIDGE ENDS IN MEDIANS

S-PL-6: SAFETY PLAN SAFETY HARDWARE PLACEMENT ON OUTSIDE EDGE

S-PL-6A: SAFETY PLAN SAFETY HARDWARE PLACEMENT IN MEDIAN

S-GRS-7 & S-GRS-7A: SHORT- RADIUS GUARDRAIL SYSTEM AND DETAILS

S-GRT SERIES FOR GUARDRAIL TERMINALS.

(F) THE MINIMUM BARRIER INSTALLATION LENGTH IS EQUAL TO THE LON$_n$ + LON$_f$ + THE LENGTH OF RIGID OBJECT + (2 x 12.5'). CALCULATE THE FINAL GUARDRAIL QUANTITY IN AN INCREMENT OF 12'-6".

STATE OF TENNESSEE
STANDARD DRAWING
DEPARTMENT OF TRANSPORTATION

SAFETY PLAN FOR BARRIER LENGTH OF NEED (FOR RIGID OBJECTS)

01-28-2022 S-PL-1A

NOT TO SCALE