DDP.03 Clear zone and guardrail length of need.xls
Length of Need Calculations (N)

N line

Enter Values for Equations found in Chapter 1610 of the Design Manual and field conditions encountered.

LH1=	37
LH2=	
L1=	
L2=	6.64
L4=	

L5=	
Y=	
LR=	220
F=	

$$X1= \frac{LH1 -(L2+Y)}{(LH1/LR)}$$

$$X1= \frac{37-(6.64+)}{(37/220)}$$

$$X1= \frac{30.36}{0.168181818}$$

X1= 180.52

$$X2= \frac{LH2 -(L5+Y)}{(LH2/LR)}$$

$$X2= \frac{-(+)}{(/220)}$$

$$X2= \frac{0}{0}$$

X2= #DIV/0!

Adjacent-Side Hazard
Barrier Parallel to Roadway

$$X1= \frac{LH1 -(L2+Y)}{(1/F)+(LH1/LR)}$$

$$X1= \frac{37-(6.64+)}{(1/)+(37/220)}$$

$$X1= \frac{30.36}{\#DIV/0!}$$

X1= #DIV/0!

Opposite-Side Hazard
Barrier Parallel to Roadway

$$X2= \frac{LH2 -(L5+Y)}{(1/F)+(LH2/LR)}$$

$$X2= \frac{-(+)}{(1/)+(/220)}$$

$$X2= \frac{0}{\#DIV/0!}$$

X2= #DIV/0!

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Length of Need Calculations (N)

Adjacent-Side Hazard
Barrier Flare Begins at Hazard

$$X1= \frac{(LH1+L1/F) -(L2+Y)}{(1/F)+(LH1/LR)}$$

$$X1= \frac{(37+/)-(6.64+)}{(1/)+(37/220)}$$

$$X1= \frac{\#DIV/0!}{\#DIV/0!}$$

X1= #DIV/0!

Opposite-Side Hazard
Barrier Flare Begins at Hazard

$$X2= \frac{(LH2+L4/F) -(L5+Y)}{(1/F)+(LH2/LR)}$$

$$X2= \frac{(+/)-(+)}{(1/)+(/220)}$$

$$X2= \frac{\#DIV/0!}{\#DIV/0!}$$

X2= #DIV/0!

Adjacent-Side Hazard
Barrier Flare Begins Before Hazard

Opposite-Side Hazard
Barrier Flare Begins Before Hazard

DDP.03 Clear zone and guardrail length of need.xls
Length of Need Calculations (N)

LOCATION: Protection for CCTV control equipment
HAZARD:

ALIGNMENT	**N**	LH1=	35.07	L5=	
STATION	**303+17.72**	LH2=		Y=	3.72
		L1=		LR=	110
X1=	LH1 -(L2+Y)	L2=	8	F=	
	(LH1/LR)	L4=			

X1= 35.07-(8+3.72)
(35.07/110)

X1= 23.35
0.318818182

X1= 73.24

LOCATION: 3:1 side slope on right side approaching overcrossing bridge
HAZARD:

ALIGNMENT	**N**	LH1=	37	L5=	
STATION	**307+10.35**	LH2=		Y=	
		L1=		LR=	220
X1=	LH1 -(L2+Y)	L2=	6.64	F=	
	(LH1/LR)	L4=			

X1= 37-(6.64+)
(37/220)

X1= 30.36
0.168181818

X1= 180.52

DDP.03 Clear zone and guardrail length of need.xls
Length of Need Calculations (N)

LOCATION: 4:1 side slope on left side approaching overcrossing bridge
HAZARD:

ALIGNMENT	**N**	LH1=	5.5	L5=	
STATION	**307+10.35**	LH2=		Y=	
		L1=		LR=	220
X1=	LH1 -(L2+Y)	L2=	4	F=	
	(LH1/LR)	L4=			

X1= 5.5-(4+)
(5.5/220)

X1= 1.5
0.025

X1=	**60.00**