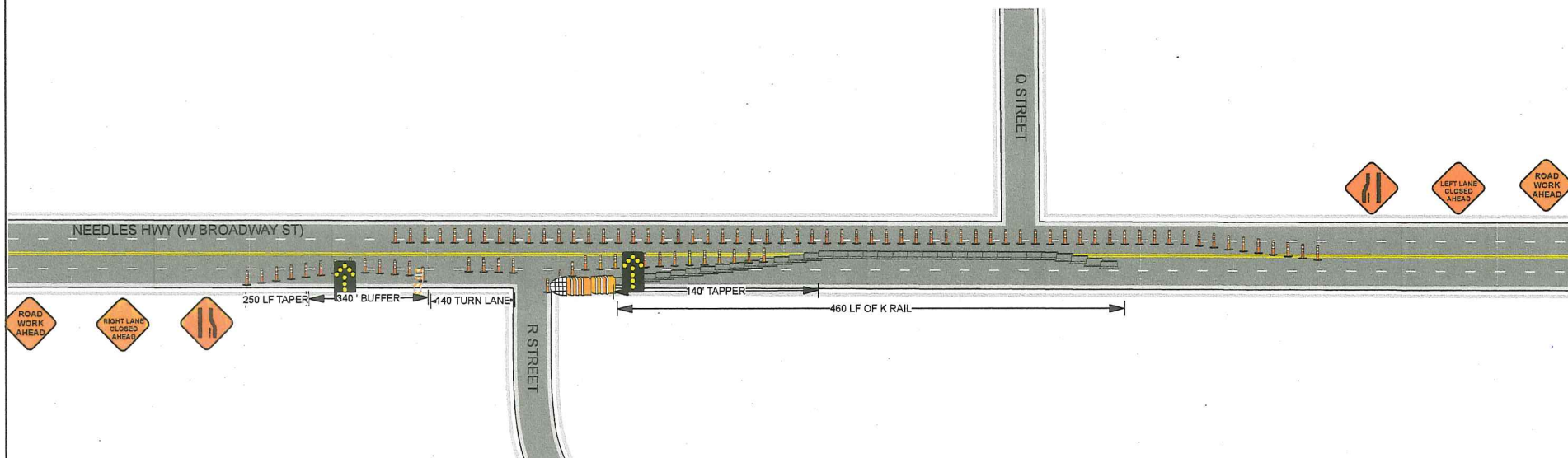


**Date:** 4/28/2017 **Author:** MATT MARRIOTT **Project:** NEEDLES HWY (W BROADWAY ST)

**Comments:**  
 TYPICAL HARD CLOSURE ON NEEDLE HWY (W BROADWAY ST)  
 SIGN SPACING SEE CHART, CONE SPACING @ 25'. WITH 10' MIN CLEAR LANE.  
 SEE TABLES FOR STANDARD SPACING OF SIGNS, CONES AND TAPERS  
 PER CALTRANS STANDARD PLAN T 9 AND T 10  
 24 HOUR CONTACT JOE 480-389-7360



**TABLE 1**  
**TAPER LENGTH CRITERIA AND CHANNELIZING DEVICE SPACING**

SPEED (S)	MINIMUM TAPER LENGTH * FOR WIDTH OF OFFSET 12 FEET (W)				MAXIMUM CHANNELIZING DEVICE SPACING		
	TANGENT 2L	MERGING L	SHIFTING L/2	SHOULDER L/3	X Y Z **		
					TAPER	TANGENT	CONFLICT
10	40	40	40	20	40	10	
20	80	80	80	40	80	20	
25	125	125	125	60	120	30	
30	160	160	160	80	160	40	
35	200	200	200	100	200	50	
40	240	240	240	120	240	60	
45	280	280	280	140	280	70	
50	320	320	320	160	320	80	
55	360	360	360	180	360	90	
60	400	400	400	200	400	100	
65	440	440	440	220	440	110	
70	480	480	480	240	480	120	

\* - For other offsets, use the following merging taper length formula for L:  
 $L = WS^2/60$   
 For speed of 45 mph or more, L = 85

Where: L = Taper length in feet  
 W = width of offset in feet  
 S = Posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

\*\* - Use for taper and tangent sections where there are no pavement markings or where there is a conflict between existing pavement markings and channelizers (CA).

**TABLE 2**  
**LONGITUDINAL BUFFER SPACE AND FLAGGER STATION SPACING**

SPEED X	Min D. **	DOWNGRADE Min D. ***		
		-3%	-4%	-5%
		10	116	116
20	155	158	165	
25	200	205	215	
30	250	257	271	
40	350	375	397	
45	360	378	400	
50	425	446	474	
55	495	520	553	
60	570	598	638	
65	645	682	728	
70	730	771	825	

X - Speed is posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

\*\* - Longitudinal buffer space or flagger station spacing

\*\*\* - Use on steepest downgrade steeper than -3 percent and longer than 1 mile.

**TABLE 3**  
**ADVANCE WARNING SIGN SPACING**

ROAD TYPE	DISTANCE BETWEEN SIGNS *		
	A	B	C
URBAN - 25 mph OR LESS	100	100	100
URBAN - MORE THAN 25 mph TO 40 mph	250	250	250
URBAN - MORE THAN 40 mph	350	350	350
RURAL	500	500	500
EXPRESSWAY / FREEWAY	1000	1000	2000

\* - The distances are approximate, are intended for guidance purposes only, and should be applied with engineering judgment. These distances should be adjusted by the Engineer for field conditions, if necessary, by increasing or decreasing the recommended distances.

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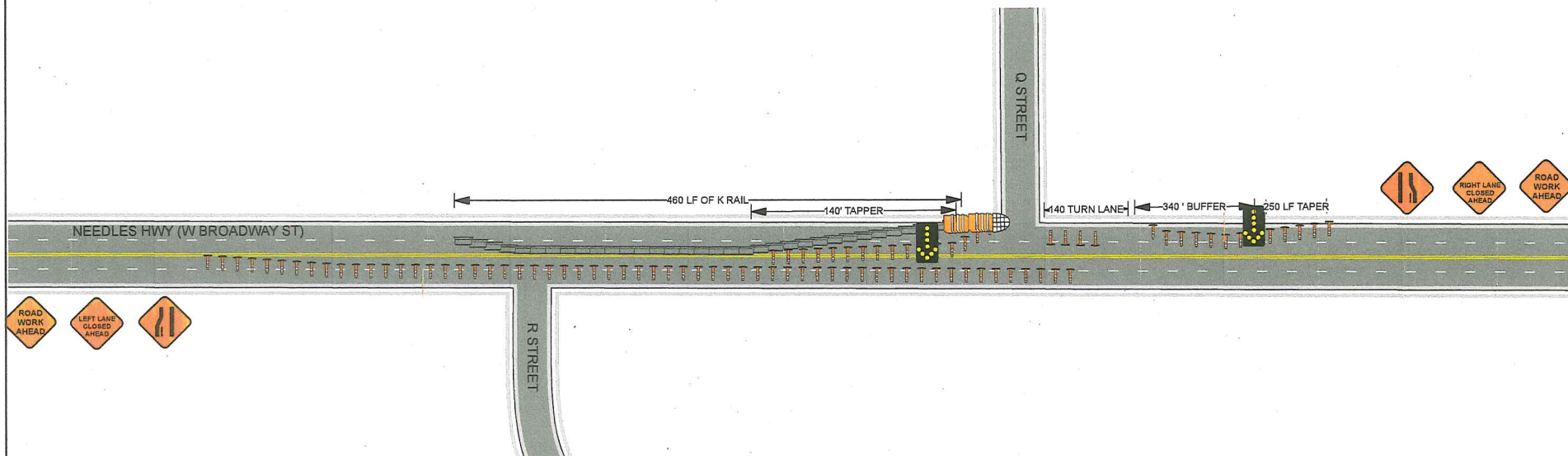


TABLE 1

SPEED (5)	MINIMUM TAPER LENGTH * FOR WIDTH OF OFFSET, 12' FEET (N)				MAXIMUM CHANNELIZING DEVICE SPACING		
	TANGENT 2L	MERGING L	SHIFTING L/2	SHOULDER L/3	TAPER	TANGENT	CONFLICT
	ft	ft	ft	ft	ft	ft	ft
20	160	80	40	27	30	40	10
25	250	125	63	42	35	50	15
30	360	180	90	60	30	60	15
35	490	245	123	82	35	70	17
40	640	320	160	107	40	80	20
45	1070	540	270	180	45	90	22
50	1200	600	300	200	50	100	25
55	1320	660	330	220	55	110	27
60	1440	720	360	240	60	120	30
65	1560	780	390	260	65	130	32
70	1680	840	420	280	70	140	35

\* - For other offsets, use the following merging taper length formula for Lt:  
 For speeds of 40 mph or less, L = 15S<sup>2</sup>/60  
 For speeds of 45 mph or more, L = 8S

Where: L = Taper length in feet  
 W = Width of offset in feet  
 S = Posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph

\*\* - Use for taper and tangent sections where there are no pavement markings or where there is a conflict between existing pavement markings and channelizers (CA).

TABLE 2

SPEED X	W/D **	LONGITUDINAL BUFFER SPACE AND FLAGGER STATION SPACING			
		DOWNGRADE W/D ***			
		-3%	-4%	-5%	-6%
20	115	116	120	126	
25	155	158	165	173	
30	200	205	216	227	
35	250	257	271	287	
40	305	315	335	354	
45	360	378	400	427	
50	425	446	474	507	
55	495	520	553	593	
60	570	598	638	686	
65	645	682	728	785	
70	730	771	825	891	

X - Speed is posted speed limit, off-peak 85th-percentile speed prior to work starting, or the anticipated operating speed in mph.

\*\* - Longitudinal buffer space or flagger station spacing

\*\*\* - Use on sustained downgrade steeper than +3 percent and longer than 1 mile.

TABLE 3

ROAD TYPE	ADVANCE WARNING SIGN SPACING		
	DISTANCE BETWEEN SIGNS **		
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URBAN - 25 mph OR LESS	100	100	100
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