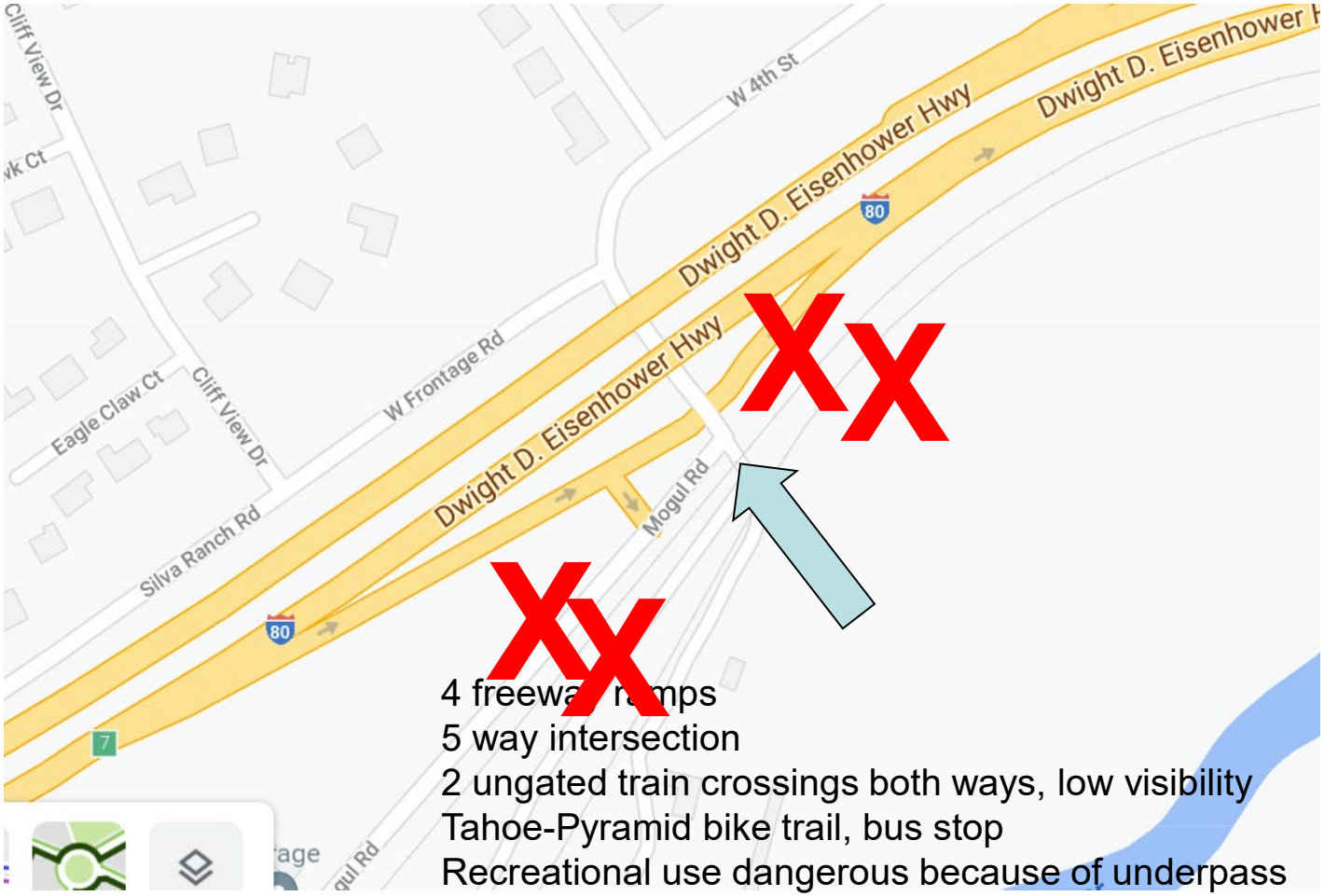
Point C. SOI Rollback Verdi/Mogul Traffic

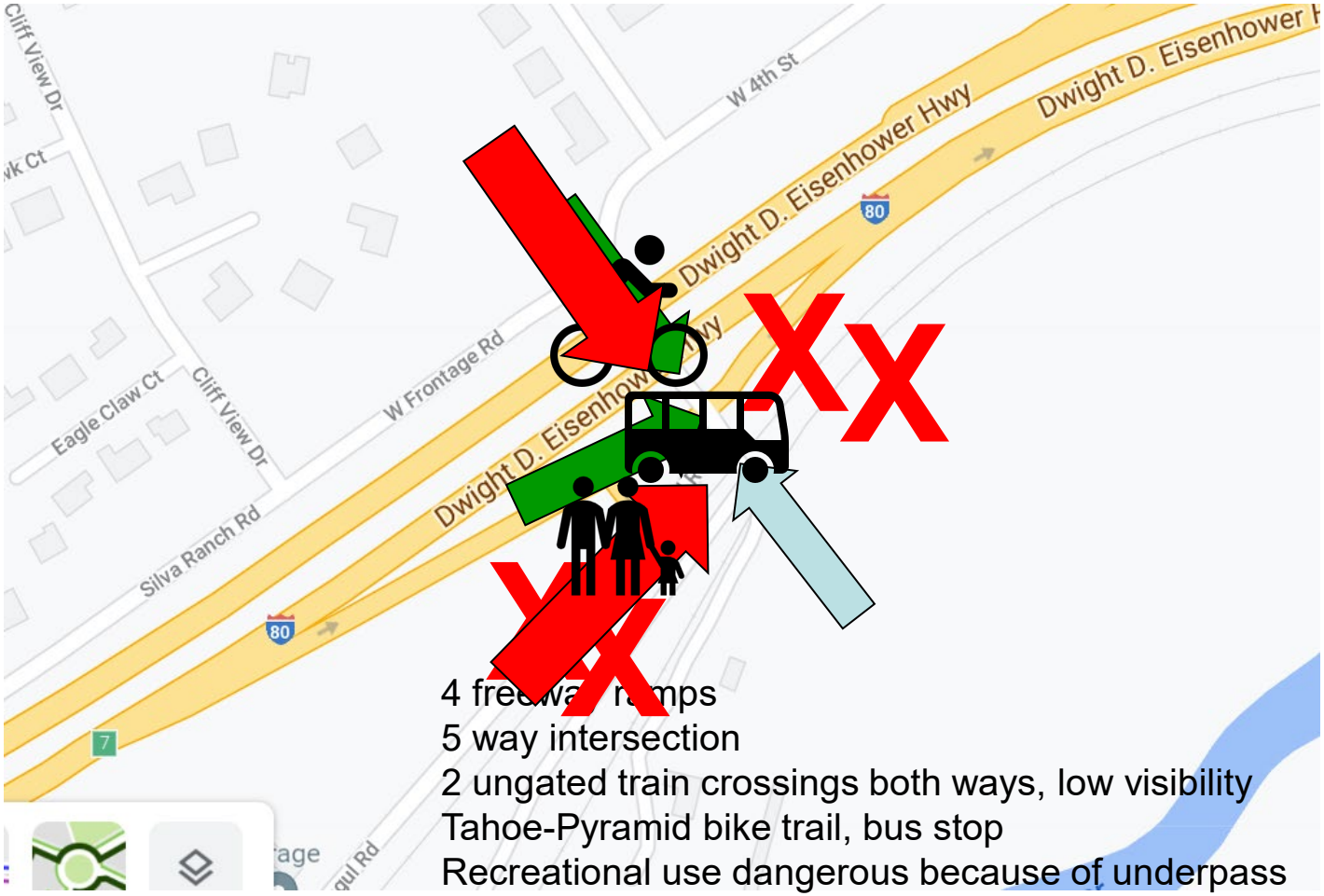
Complex, dangerous and outdated intersection



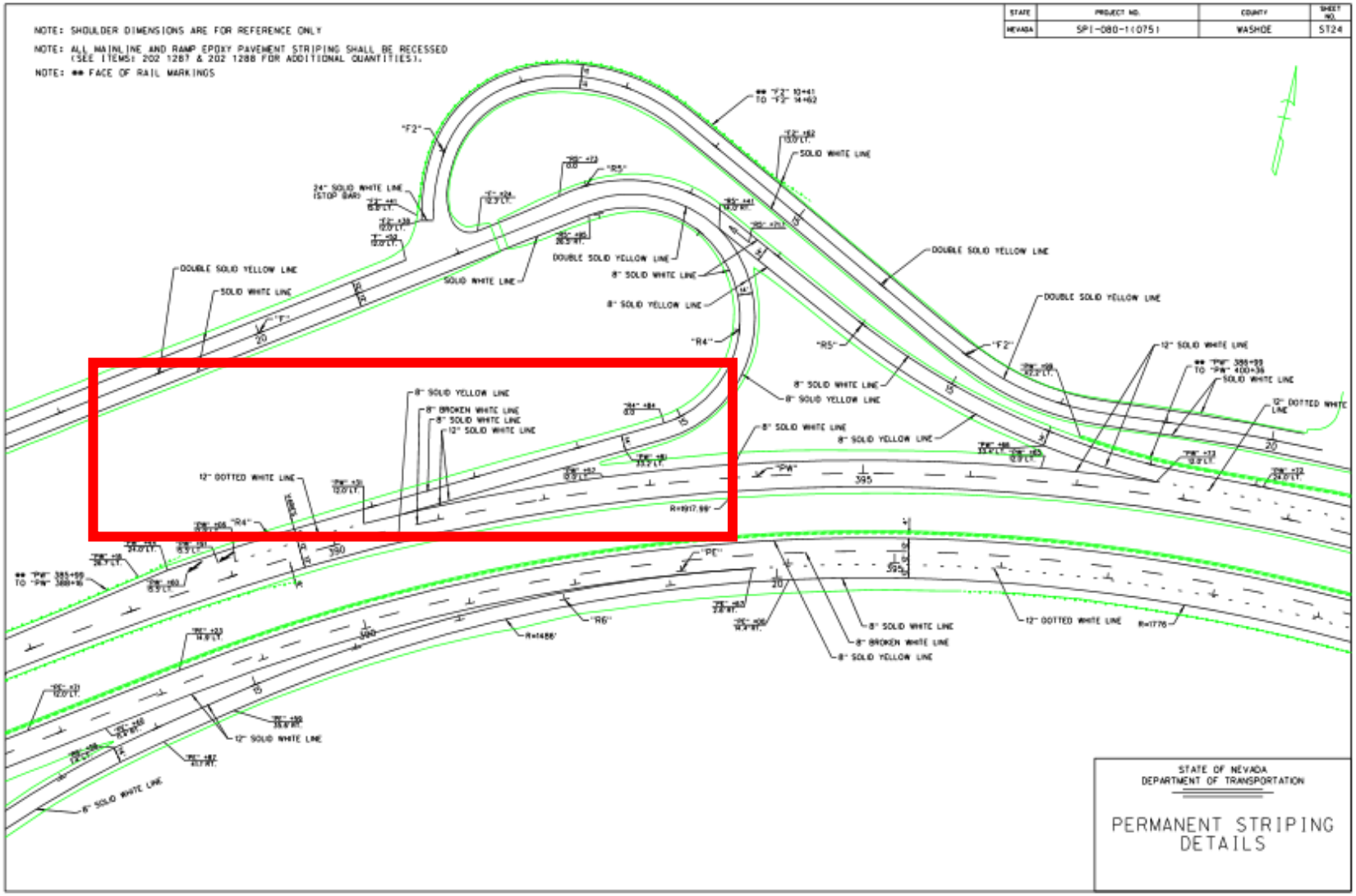
Bad visibility, trains from both sides

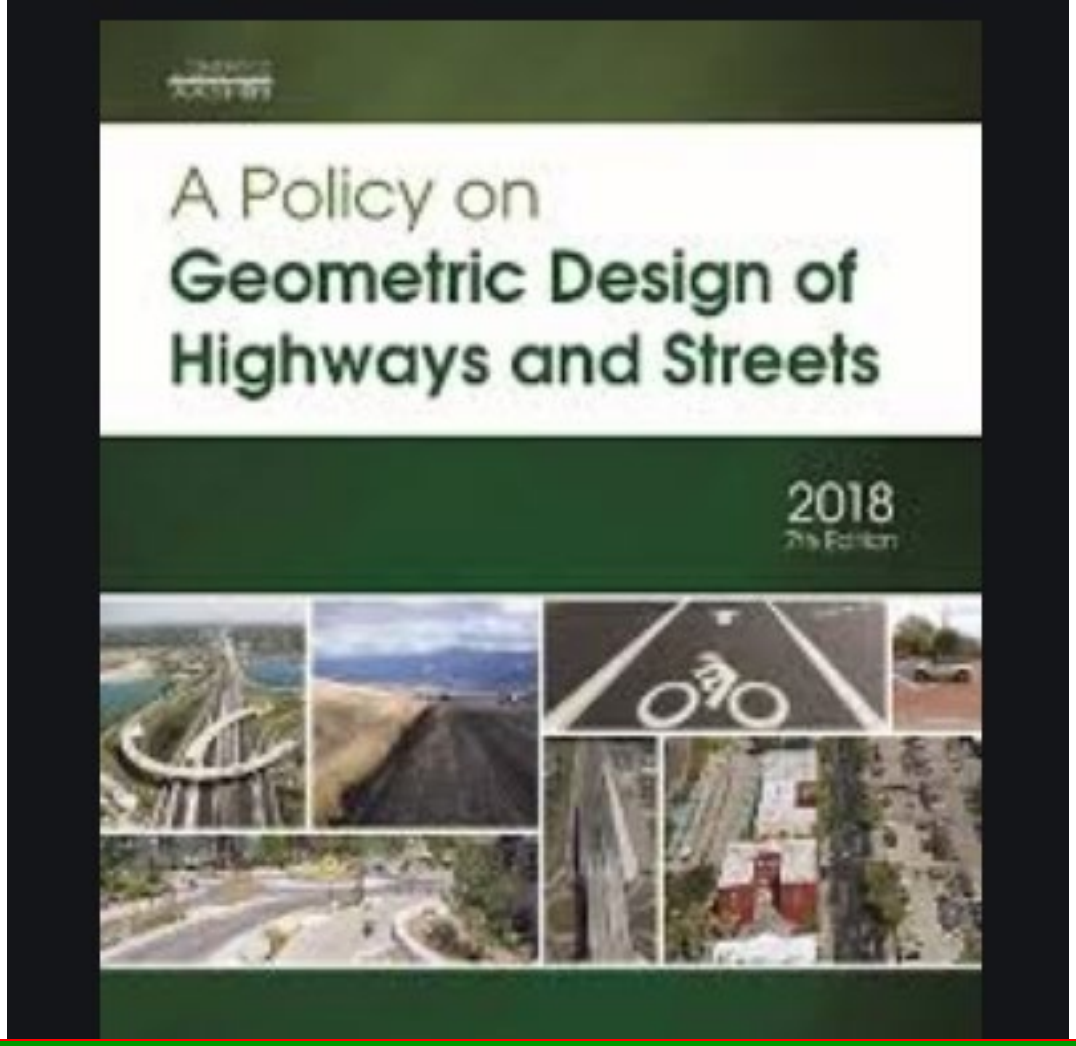

Reno

Industrial traffic detrimental

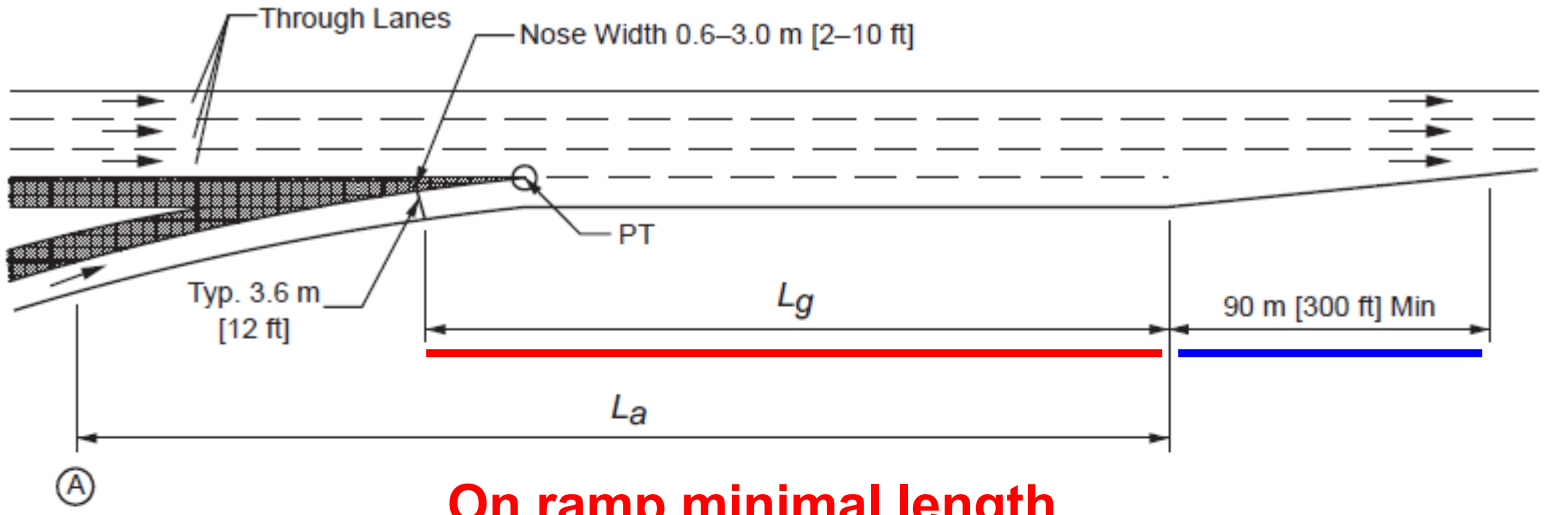


Traffic in Mogul: The west-bound on ramp





The “Green Book” by the American Association of State Highway Transportation Officials (AASHTO)



On ramp minimal length

Parallel Design

– B –

Notes:

1. L_a is the required acceleration length as shown in Table 10-3 or as adjusted by Table 10-4.

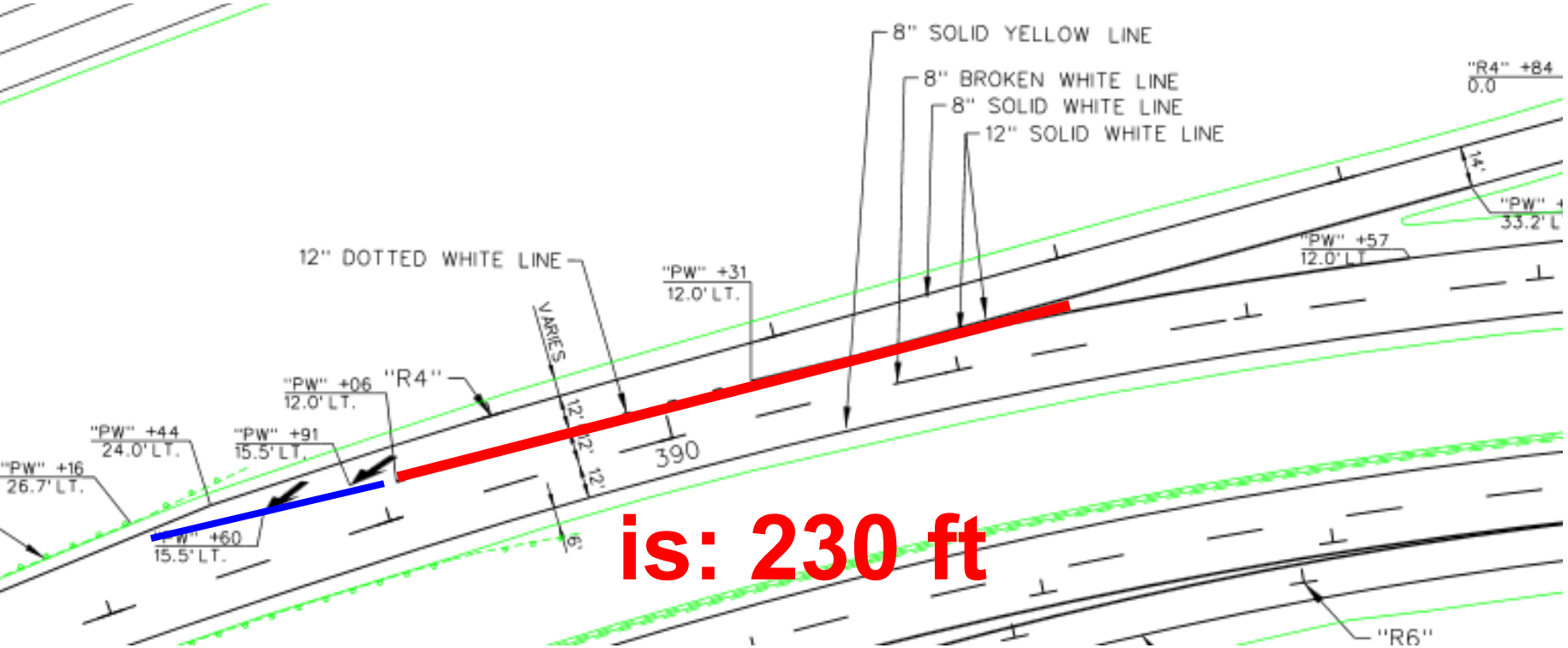
2. Point A controls speed on the ramp. L_a should not start back on the curvature of the ramp unless the radius equals 300 m [100 ft] or more.

3. L_g is the required gap acceptance length. L_g should be a minimum of 150 m [300 ft to 500 ft] depending on the nose width.

4. The value of L_a or L_g, whichever produces the greater distance downstream from where the nose equals 0.6 m [2 ft], is suggested for use in the design of the ramp distance.

Figure 10-69. Typical Single-Lane Entrance Ramps

Westbound on-ramp not up to minimal safety standards



is: 230 ft

<300-500 ft requirement

Table 10-3 in "The Green Book"

U.S. Customary										
Acceleration Length, L (ft) for Entrance Curve Design Speed (mph)										
Highway		Stop Condition	15	20	25	30	35	40	45	50
Design Speed, V (mph)	Speed Reached, V_a (mph)	and Initial Speed, V'_a (mph)								
		0	14	18	22	26	30	36	40	44
30	23	180	140	—	—	—	—	—	—	—
35	27	280	220	160	—	—	—	—	—	—
40	31	360	300	270	210	120	—	—	—	—
45	35	560	490	440	380	280	160	—	—	—
50	39	720	660	610	550	450	350	130	—	—
55	43	960	900	810	780	670	550	320	150	—
60	47	1200	1140	1100	[illegible]	[illegible]	[illegible]	550	420	180
65	50	1410	1350	1310	1220	1120	1000	770	600	370
70	53	1620	1560	1520	1420	1350	1230	1000	820	580
75	55	1790	1730	1630	1580	1510	1420	1160	1040	780

Note: Uniform 50:1 to 70:1 tapers are recommended where lengths of acceleration lanes exceed 1,300 ft.

Table 10-4. Speed Change Lane Adjustment Factors as a Function of Grade (Continued)

U.S. Customary					
Design Speed of Highway (mph)	Deceleration Lanes				
	Ratio of Length on Grade to Length on Level for Design Speed of Turning Curve (mph)[a]				
All Speeds	3 to 4% upgrade			3 to 4% downgrade	
	0.9			1.2	
All Speeds	5 to 6% upgrade			5 to 6% downgrade	
	0.8			1.35	
Design Speed of Highway (mph)	Acceleration Lanes				
	Ratio of Length on Grade to Length of Level for Design Speed of Turning Curve (mph)[a]				
	20	30	40	50	All Speeds
	3 to 4% Upgrade				3 to 4% Downgrade
40	1.3	1.3	—	—	0.7
45	1.3	1.35	—	—	0.675
50	1.3	1.4	1.4	—	0.65
55	1.35	1.45	1.45	—	0.625
60	[illegible]	[illegible]	[illegible]	1.6	0.6
65	1.45	1.55	1.6	1.7	0.6
70	[illegible]	[illegible]	[illegible]	1.8	0.6
	5 to 6% Upgrade				5 to 6% Downgrade
40	1.5	1.5	—	—	0.6
45	1.5	1.6	—	—	0.575
50	1.5	1.7	1.9	—	0.55
55	1.6	1.8	2.05	—	0.525
60	1.7	1.9	2.2	2.5	0.5
65	1.85	2.05	2.4	2.75	0.5

X 1.5

Minimal length of acceleration lane

Should be:

0 - 2 % uphill:1120 ft

3-4 % uphill:1120 ft x 1.5 = 1680 ft

Is: 230 ft, no shoulder

cars, not trucks

Recommended Merging Speed: 60 mph

4. The value of L_a or L_g, whichever produces the greater distance downstream from where the nose equals 0.6 m [2 ft], is suggested for use in the design of the ramp distance.

Figure 10-69. Typical Single-Lane Entrance Ramps

The geometrics of the ramp proper should be such that motorists may attain a speed that is within 10 km/h [5 mph] of the operating speed of the freeway by the time they reach the point where the left edge of the ramp joins the traveled way of the freeway. For consistency of application, this point of convergence of the left edge of the ramp and the right edge of the through lane may be assumed to occur where the right edge of the ramp traveled way is 3.6 m [12 ft] from the right edge of the through lane of the freeway.

The distance needed for acceleration in advance of this point of convergence is governed by the speed differential between the operating speed on the entrance curve of the ramp and the operating speed of the highway. Table 10-3 shows minimum lengths of acceleration distances for entrance terminals.

$$\Delta E_{pot} = m \cdot g \cdot h$$

$$\Delta E_{kin} = \frac{1}{2} m \cdot \left(v_1^2 - v_0^2 \right)$$

$$W_{\max} = F \cdot l = m \cdot a_{\max} \cdot l$$

$$W_{\max} \geq \Delta E_{pot} + \Delta E_{kin}$$

$$m \cdot a_{\max} \cdot l \geq m \cdot g \cdot h + \frac{1}{2} m \cdot \left(v_1^2 - v_0^2 \right)$$

$$v_1 = \sqrt{2 \cdot \left(a_{\max} \cdot l - g \cdot h \right) + v_0^2}$$

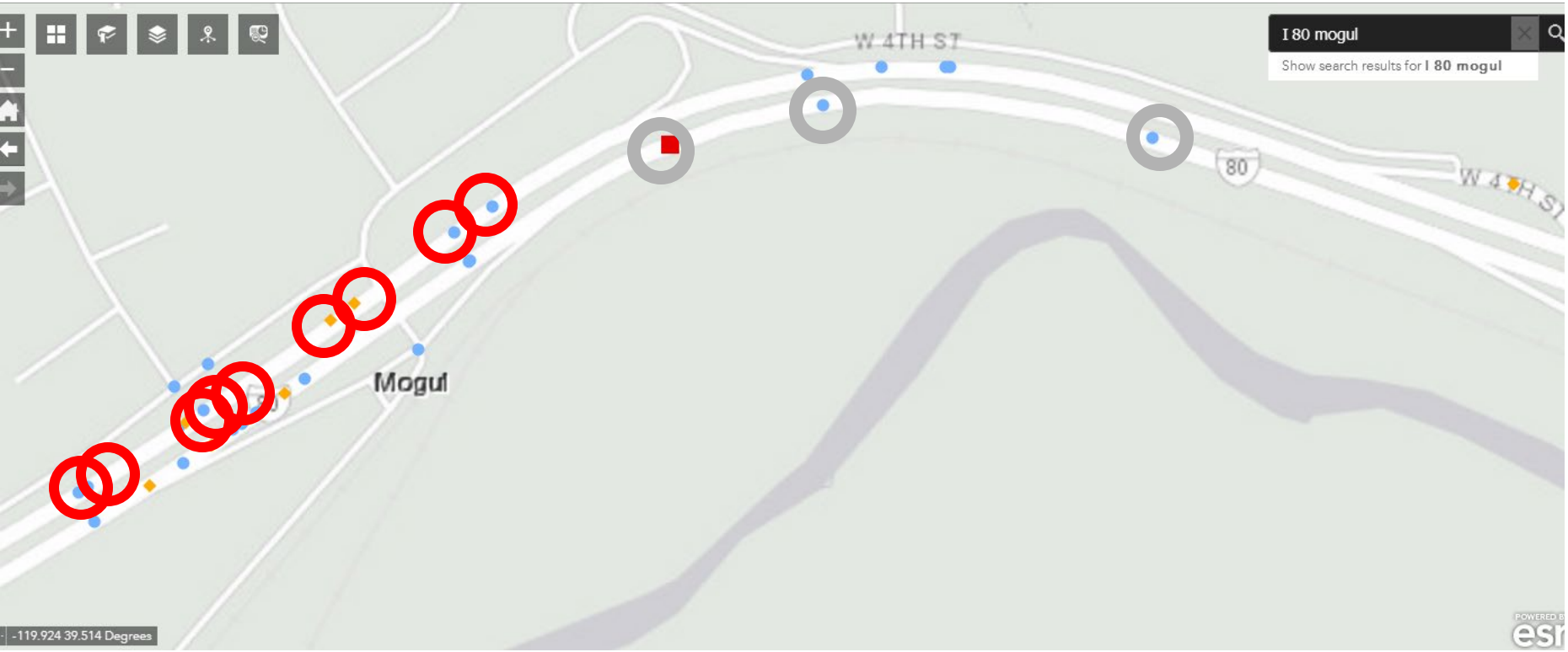
a max = 1 m/s
l = 230 ft
g = 9.81 m/s2
h = 1 m
v = 20 mph (9 m/s)

v1=30 mph

Calculations by Peter Hausamann, UNR engineer, 2019


Trucks merging onto I-80 west at 30 mph
Recommended speed: 60 mph
Photo: 10-15-19 at 3 pm

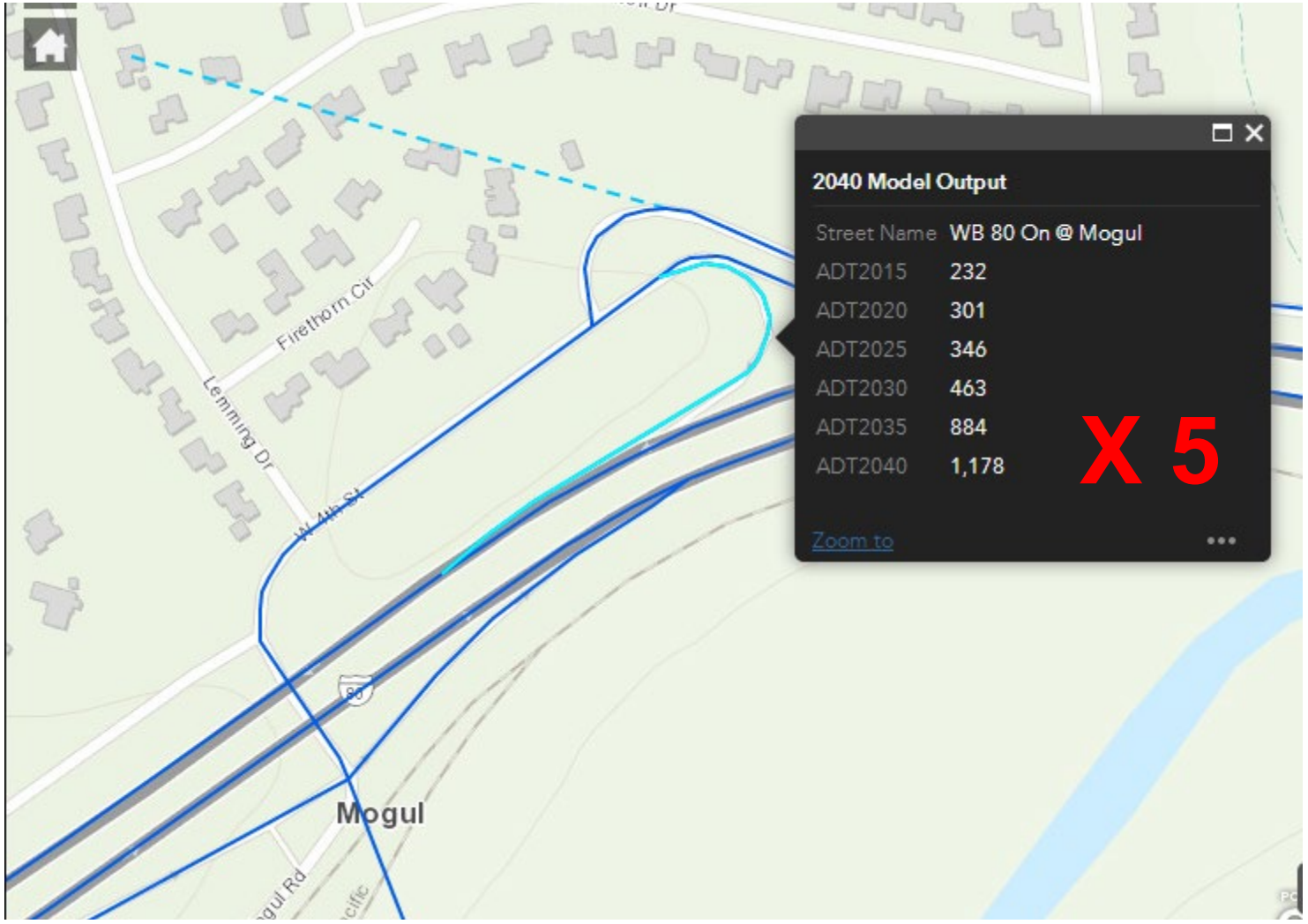
Crash data exit 7 2015-2017



Cluster of crashes around this ramp, 3x more than on the opposite on-ramp

https://ndot.maps.arcgis.com/apps/webappviewer/index.html?id=00d23dc547eb4382bef9beabe07eaefd

RTC (Regional Transportation commission) predicts 5 fold traffic increase of the westbound on-ramp



https://rtcwashoe.maps.arcgis.com/apps/webappviewer/index.html?id=2e4d916f2149

Industrial zoning incompatible with infrastructure

- West bound on-ramp needs to be elongated to avoid future liability
- Underpass needs to be updated ($$$)

- Who's going to pay for this? The developer?
- County: federal relief money?

- => We need independent, non-biased traffic study BEFORE zoning decision!