

Phone: _____ Fax: _____
 E-mail: _____

_____ Merge Analysis _____

Analyst: _____
 Agency/Co.: Stantec
 Date performed: 11/10/2016
 Analysis time period: 2:00PM-3:00PM
 Freeway/Dir of Travel: I-85 Southbound
 Junction: US 29 On Ramp to I-85 SB
 Jurisdiction: SCDOT
 Analysis Year: 2040 Build Conditions
 Description: _____

_____ Freeway Data _____

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.3	mph
Volume on freeway	2933	vph

_____ On Ramp Data _____

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	157	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

_____ Adjacent Ramp Data (if one exists) _____

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	181	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2738	ft

_____ Conversion to pc/h Under Base Conditions _____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2933	157	181	vph
Peak-hour factor, PHF	0.94	0.94	0.94	
Peak 15-min volume, v15	780	42	48	v
Trucks and buses	30	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Rolling	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	2.5	1.5	1.5	
Recreational vehicle PCE, ER	2.0	1.2	1.2	

Heavy vehicle adjustment, fHV	0.690	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4524	167	193	pcph

Estimation of V12 Merge Areas

$$L = 1098.07 \text{ (Equation 13-6 or 13-7)}$$

$$EQ$$

$$P = 0.619 \text{ Using Equation 1}$$

$$FM$$

$$v_{12} = v_F (P_{FM}) = 2803 \text{ pc/h}$$

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4691	7200	No
v_3 or v_{av34}	1721 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700 \text{ pc/h?}$		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		Yes	
If yes, $v_{12A} = 2803$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2970	4600	No

Level of Service Determination (if not F)

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 19.2 \text{ pc/mi/ln}$$

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	$M_S = 0.292$	
Space mean speed in ramp influence area,	$S_R = 62.0$	mph
Space mean speed in outer lanes,	$S_0 = 65.9$	mph
Space mean speed for all vehicles,	$S = 63.4$	mph