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-----Merge Analysis-----

Analyst: JP  
Agency/Co.: Florence & Hutcheson  
Date performed: 9/23/2011  
Analysis time period: AM  
Freeway/Dir of Travel: I-85 NB  
Junction: Pelham Rd  
Jurisdiction: Greenville, SC  
Analysis Year: 2015  
Description: I-85/I-385 Alternate 4A

-----Freeway Data-----

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	60.0	mph
Volume on freeway	3351	vph

-----On Ramp Data-----

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	30.0	mph
Volume on ramp	751	vph
Length of first accel/decel lane	650	ft
Length of second accel/decel lane		ft

-----Adjacent Ramp Data (if one exists)-----

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1858	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1300	ft

-----Conversion to pc/h Under Base Conditions-----

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3351	751	1858	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	931	209	516	v
Trucks and buses	18	18	18	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.917	0.917	0.917	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4058	910	2250	pcph

#### Estimation of V12 Merge Areas

$$L = 518.35 \quad (\text{Equation 13-6 or 13-7})$$

$$EQ$$

$$P = 0.596 \quad \text{Using Equation 1}$$

$$FM$$

$$v_{12} = v_F (P_{FM}) = 2417 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
$v_{FO}$	4968	6900	No
$v_3$ or $v_{av34}$	1641 pc/h	(Equation 13-14 or 13-17)	
Is $v_3$ or $v_{av34} > 2700$ pc/h?		No	
Is $v_3$ or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2417$		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
$v_{R12}$	4968	4600	No

#### Level of Service Determination (if not F)

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 26.9 \quad \text{pc/mi/ln}$$

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

#### Speed Estimation

Intermediate speed variable,	$M_S = 0.391$	
Space mean speed in ramp influence area,	$S_R = 53.0$	mph
Space mean speed in outer lanes,	$S_0 = 55.9$	mph
Space mean speed for all vehicles,	$S = 53.9$	mph