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### Diverge Analysis

Analyst: JP  
Agency/Co.: Florence & Hutcheson  
Date performed: 7/8/2011  
Analysis time period: PM  
Freeway/Dir of Travel: I-385 NB  
Junction: Butler Rd off-ramp  
Jurisdiction: Greenville, SC  
Analysis Year: 2035  
Description: I-85/I-385 Alternate 4A

### Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	60.0	mph
Volume on freeway	6638	vph

### Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	45.0	mph
Volume on ramp	368	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	1438	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2960	ft

### Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6638		368		1438	vph
Peak-hour factor, PHF	0.90		0.90		0.90	
Peak 15-min volume, v15	1844		102		399	v
Trucks and buses	18		18		18	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	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	8039	446	1742	pcph

#### Estimation of V12 Diverge Areas

L = (Equation 13-12 or 13-13)

EQ

P = 0.539 Using Equation 5

FD

$v_{12} = v_R + (v_F - v_R) P = 4535 \text{ pc/h}$

#### Capacity Checks

		Actual	Maximum	LOS F?
$v_{Fi} = v_F$		8039	6900	Yes
$v_{FO} = v_F - v_R$		7593	6900	Yes
$v_R$		446	2100	No
$v_3$ or $v_{av34}$		3504 pc/h	(Equation 13-14 or 13-17)	
Is $v_3$ or $v_{av34} > 2700 \text{ pc/h?}$			Yes	
Is $v_3$ or $v_{av34} > 1.5 v_{12} / 2$			No	
If yes, $v_{12A} = 5339$			(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
$v_{12A}$	5339	4400	Yes

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

Density,  $D = 4.252 + 0.0086 v_R - 0.009 L_D = 36.7 \text{ pc/mi/ln}$

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

#### Speed Estimation

Intermediate speed variable,	$D_S = 0.338$	
Space mean speed in ramp influence area,	$S_R = 53.9$	mph
Space mean speed in outer lanes,	$S_0 = 59.2$	mph
Space mean speed for all vehicles,	$S = 55.6$	mph