

Florence & Hutcheson  
501 Huger Street  
Columbia, SC 29201

Phone: (803)254-5800  
E-mail:

Fax: (803)929-0334

### Diverge Analysis

Analyst: JP  
Agency/Co.: Florence & Hutcheson  
Date performed: 9/29/2011  
Analysis time period: AM  
Freeway/Dir of Travel: I-85 NB  
Junction: C-D ROAD  
Jurisdiction: Greenville, SC  
Analysis Year: 2010  
Description: I-85/I-385 Existing

### Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	60.0	mph
Volume on freeway	4002	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	1606	vph
Length of first accel/decel lane	350	ft
Length of second accel/decel lane		ft

### Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	326	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	4500	ft

### Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4002	1606	326	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	1112	446	91	v
Trucks and buses	18	15	15	%
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	0.930	0.930	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4847	1918	389	pcph

#### Estimation of V12 Diverge Areas

$$L = \text{(Equation 13-12 or 13-13)}$$

EQ

$$P = 0.551 \quad \text{Using Equation 5}$$

FD

$$v_{12} = v_R + (v_F - v_R) P = 3531 \quad \text{pc/h}$$

#### Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4847	6900	No
$v_{FO} = v_F - v_R$	2929	6900	No
$v_R$	1918	2100	No
$v_3$ or $v_{av34}$	1316 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, $v_{12A} = 3531$		(Equation 13-15, 13-16, 13-18, or 13-19)	

#### Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
$v_{12}$	3531	4400	No

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

Density,	$D = 4.252 + 0.0086 v_R - 0.009 L_D$	$= 31.5$	pc/mi/ln
Level of service for ramp-freeway junction areas of influence D			

#### Speed Estimation

Intermediate speed variable,	$D_S = 0.471$	
Space mean speed in ramp influence area,	$S_R = 51.5$	mph
Space mean speed in outer lanes,	$S_0 = 64.6$	mph
Space mean speed for all vehicles,	$S = 54.5$	mph