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Diverge Analysis

Analyst: JP
Agency/Co.: Florence & Hutcheson
Date performed: 1/24/2012
Analysis time period: PM
Freeway/Dir of Travel: I-85 NB C-D
Junction: I-85NB C-D to I-385NB
Jurisdiction: Greenville, SC
Analysis Year: 2015
Description: I-85/I-385 Alternate 4A

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1755	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	424	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1018	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1755	424	1018	vph
Peak-hour factor, PHF	0.90	0.90	0.90	
Peak 15-min volume, v15	488	118	283	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	2126	506	1216	pcph

Estimation of V12 Diverge Areas

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

EQ

P = 1.000 Using Equation 0

FD

$v_{12} = v_R + (v_F - v_R) P_{FD} = 2126 \text{ pc/h}$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2126	4500	No
$v_{FO} = v_F - v_R$	1620	4500	No
v_R	506	2100	No
v_3 or v_{av34}	0 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or $v_{av34} > 2700 \text{ pc/h?}$		No	
Is v_3 or $v_{av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} = 2126$		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2126	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D = 22.5 \text{ pc/mi/ln}$

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

Speed Estimation

Intermediate speed variable,	$D_S = 0.344$	
Space mean speed in ramp influence area,	$S_R = 50.5$	mph
Space mean speed in outer lanes,	$S_0 = \text{N/A}$	mph
Space mean speed for all vehicles,	$S = 50.5$	mph