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### Diverge Analysis

Analyst: JP  
Agency/Co.: Florence & Hutcheson  
Date performed: 4/5/2011  
Analysis time period: AM  
Freeway/Dir of Travel: I-385 NB  
Junction: I-85  
Jurisdiction: Greenville, SC  
Analysis Year: 2015  
Description: I-85/I-385 No-Build

### Freeway Data

|                            |         |     |
|----------------------------|---------|-----|
| Type of analysis           | Diverge |     |
| Number of lanes in freeway | 3       |     |
| Free-flow speed on freeway | 55.0    | mph |
| Volume on freeway          | 4884    | 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                    | 1139  | vph |
| Length of first accel/decel lane  | 1000  | ft  |
| Length of second accel/decel lane |       | ft  |

### Adjacent Ramp Data (if one exists)

|                           |          |     |
|---------------------------|----------|-----|
| Does adjacent ramp exist? | Yes      |     |
| Volume on adjacent ramp   | 1219     | vph |
| Position of adjacent ramp | Upstream |     |
| Type of adjacent ramp     | On       |     |
| Distance to adjacent ramp | 1100     | ft  |

### Conversion to pc/h Under Base Conditions

| Junction Components          | Freeway |    | Ramp  |    | Adjacent Ramp |     |
|------------------------------|---------|----|-------|----|---------------|-----|
| Volume, V (vph)              | 4884    |    | 1139  |    | 1219          | vph |
| Peak-hour factor, PHF        | 0.90    |    | 0.90  |    | 0.90          |     |
| Peak 15-min volume, v15      | 1357    |    | 316   |    | 339           | 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                 | 5915  | 1379  | 1476  | pcph |

#### Estimation of V12 Diverge Areas

L = 14436.48 Equation 13-12 or 13-13)

EQ

P = 1.000 Using Equation 6

FD

$v_{12} = v_R + (v_F - v_R) P_{FD} = 5915 \text{ pc/h}$

#### Capacity Checks

|  | Actual | Maximum                                  | LOS F? |
|--|--------|--|--------|
| $v_{Fi} = v_F$                                     | 5915   | 6750                                     | No     |
| $v_{FO} = v_F - v_R$                               | 4536   | 6750                                     | No     |
| $v_R$  | 1379   | 2100                                     | No     |
| $v_3 \text{ or } v_{av34}$                         | 0 pc/h | (Equation 13-14 or 13-17)                |        |
| Is $v_3 \text{ or } v_{av34} > 2700 \text{ pc/h?}$ |        | No                                       |        |
| Is $v_3 \text{ or } v_{av34} > 1.5 v_{12} / 2$     |        | No                                       |        |
| If yes, $v_{12A} = 5915$                           |        | (Equation 13-15, 13-16, 13-18, or 13-19) |        |

#### Flow Entering Diverge Influence Area

|          | Actual | Max Desirable | Violation? |
|----------|--------|---------------|------------|
| $v_{12}$ | 5915   | 4400          | Yes        |

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

Density,  $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 46.1 \text{ pc/mi/ln}$

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

#### Speed Estimation

|  |               |     |
|--|---------------|-----|
| Intermediate speed variable,             | $D_S = 0.422$ |     |
| Space mean speed in ramp influence area, | $S_R = 49.5$  | mph |
| Space mean speed in outer lanes,         | $S_0 = 60.3$  | mph |
| Space mean speed for all vehicles,       | $S = 49.5$    | mph |