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_____Merge Analysis_____

Analyst: JP
Agency/Co.: Florence & Hutcheson
Date performed: 4/5/2011
Analysis time period: AM
Freeway/Dir of Travel: I-85 NB
Junction: US 276
Jurisdiction: Greenville, SC
Analysis Year: 2015
Description: I-85/I-385 No-Build

_____Freeway Data_____

| | | |
|----------------------------|-------|-----|
| Type of analysis | Merge | |
| Number of lanes in freeway | 3 | |
| Free-flow speed on freeway | 60.0 | mph |
| Volume on freeway | 4314 | vph |

_____On Ramp Data_____

| | | |
|-----------------------------------|-------|-----|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 25.0 | mph |
| Volume on ramp | 237 | vph |
| Length of first accel/decel lane | 420 | ft |
| Length of second accel/decel lane | | ft |

_____Adjacent Ramp Data (if one exists)_____

| | | |
|---------------------------|----------|-----|
| Does adjacent ramp exist? | Yes | |
| Volume on adjacent Ramp | 276 | vph |
| Position of adjacent Ramp | Upstream | |
| Type of adjacent Ramp | Off | |
| Distance to adjacent Ramp | 500 | ft |

_____Conversion to pc/h Under Base Conditions_____

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|------------------------------|---------|-------|---------------|-----|
| Volume, V (vph) | 4314 | 237 | 276 | vph |
| Peak-hour factor, PHF | 0.90 | 0.90 | 0.90 | |
| Peak 15-min volume, v15 | 1198 | 66 | 77 | 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 | 5225 | 287 | 334 | pcph |

-----Estimation of V12 Merge Areas-----

$$L = 271.05 \quad (\text{Equation 13-6 or 13-7})$$

$$EQ$$

$$P = 0.589 \quad \text{Using Equation 1}$$

$$FM$$

$$v_{12} = v_F(P_{FM}) = 3079 \quad \text{pc/h}$$

-----Capacity Checks-----

| | Actual | Maximum | LOS F? |
|--|-----------|--|--------|
| v _{FO} | 5512 | 6900 | No |
| v ₃ or v _{av34} | 2146 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} = 3079 | | (Equation 13-15, 13-16, 13-18, or 13-19) | |

-----Flow Entering Merge Influence Area-----

| | Actual | Max Desirable | Violation? |
|------------------|--------|---------------|------------|
| v _{R12} | 5512 | 4600 | No |

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

$$\text{Density, } D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 29.0 \quad \text{pc/mi/ln}$$

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

-----Speed Estimation-----

| | | |
|--|------------------------|-----|
| Intermediate speed variable, | M _S = 0.413 | |
| Space mean speed in ramp influence area, | S _R = 52.6 | mph |
| Space mean speed in outer lanes, | S ₀ = 54.1 | mph |
| Space mean speed for all vehicles, | S = 53.1 | mph |