

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Stantec
Date performed: 11/10/2016
Analysis time period: 2:00PM-3:00PM
Freeway/Dir of Travel: I-85 Southbound
Junction: SC 5 On Ramp to I-85 SB
Jurisdiction: SCDOT
Analysis Year: 2040 No Build Conditions
Description:

Freeway Data

| | | |
|----------------------------|-------|-----|
| Type of analysis | Merge | |
| Number of lanes in freeway | 2 | |
| Free-flow speed on freeway | 69.4 | mph |
| Volume on freeway | 2980 | vph |

On Ramp Data

| | | |
|-----------------------------------|-------|-----|
| Side of freeway | Right | |
| Number of lanes in ramp | 1 | |
| Free-flow speed on ramp | 35.0 | mph |
| Volume on ramp | 343 | vph |
| Length of first accel/decel lane | 675 | ft |
| Length of second accel/decel lane | | ft |

Adjacent Ramp Data (if one exists)

| | | |
|---------------------------|----------|-----|
| Does adjacent ramp exist? | Yes | |
| Volume on adjacent Ramp | 178 | vph |
| Position of adjacent Ramp | Upstream | |
| Type of adjacent Ramp | Off | |
| Distance to adjacent Ramp | 2290 | ft |

Conversion to pc/h Under Base Conditions

| Junction Components | Freeway | Ramp | Adjacent Ramp | |
|------------------------------|---------|-------|---------------|-----|
| Volume, V (vph) | 2980 | 343 | 178 | vph |
| Peak-hour factor, PHF | 0.94 | 0.94 | 0.94 | |
| Peak 15-min volume, v15 | 793 | 91 | 47 | v |
| Trucks and buses | 30 | 0 | 0 | % |
| Recreational vehicles | 0 | 0 | 0 | % |
| Terrain type: | Rolling | Level | Level | |
| Grade | % | % | % | |
| Length | mi | mi | mi | |
| Trucks and buses PCE, ET | 2.5 | 1.5 | 1.5 | |
| Recreational vehicle PCE, ER | 2.0 | 1.2 | 1.2 | |

| | | | | |
|-------------------------------|-------|-------|-------|------|
| Heavy vehicle adjustment, fHV | 0.690 | 1.000 | 1.000 | |
| Driver population factor, fP | 1.00 | 1.00 | 1.00 | |
| Flow rate, vp | 4597 | 365 | 189 | pcph |

Estimation of V12 Merge Areas

$L =$ (Equation 13-6 or 13-7)
 EQ
 $P = 1.000$ Using Equation 0
 FM
 $v_{12} = v_F (P_{FM}) = 4597$ pc/h

Capacity Checks

| | | | |
|---|--------|--|--------|
| | Actual | Maximum | LOS F? |
| v_{FO} | 4962 | 4788 | Yes |
| v_3 or v_{av34} | 0 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, $v_{12A} = 4597$ | | (Equation 13-15, 13-16, 13-18, or 13-19) | |

Flow Entering Merge Influence Area

| | | | |
|-----------|--------|---------------|------------|
| | Actual | Max Desirable | Violation? |
| v_{R12} | 4962 | 4600 | Yes |

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 39.8$ pc/mi/ln
 Level of service for ramp-freeway junction areas of influence F

Speed Estimation

| | | |
|--|---------------|-----|
| Intermediate speed variable, | $M_S = 0.831$ | |
| Space mean speed in ramp influence area, | $S_R = 46.6$ | mph |
| Space mean speed in outer lanes, | $S_0 = N/A$ | mph |
| Space mean speed for all vehicles, | $S = 46.6$ | mph |