### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst**: AL
- **Agency or Company**: AIM ENGINEERING
- **Date Performed**: 3/8/2012
- **Analysis Time Period**: PM

#### Site Information
- **Freeway/Dir of Travel**: I-75 WB
- **Junction**: SR 29 OFF RAMP
- **Jurisdiction**: Analysis Year 2019 EVERGLADES

#### Inputs
- **Number of Lanes, N**: 2
- **Acceleration Lane Length, L_A**: 215 ft
- **Deceleration Lane Length L_D**: 215 ft
- **Freeway Volume, V_F**: 1193 pc/h
- **Ramp Volume, V_R**: 157 pc/h
- **Freeway Free-Flow Speed, S_FF**: 70.0 veh/h
- **Ramp Free-Flow Speed, S.FR**: 45.0 veh/h

#### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>V (Veh/h)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%Rv</th>
<th>f_{HV}</th>
<th>f_p</th>
<th>v = W/PHF x f_{HV} x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1193</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>0.90</td>
<td>1517</td>
</tr>
<tr>
<td>Ramp</td>
<td>157</td>
<td>0.90</td>
<td>Level</td>
<td>22</td>
<td>0</td>
<td>0.901</td>
<td>0.90</td>
<td>215</td>
</tr>
</tbody>
</table>

#### Estimation of \( v_{12} \)

\[
L_{EQ} = \frac{V_{f}}{P_{FM}} \quad \text{(Equation 13-6 or 13-7)}
\]

\[
P_{FM} = \text{using Equation (Exhibit 13-6)}
\]

\[
V_{12} = \frac{V_{3}}{P_{FM}} \quad \text{pc/h (Equation 13-14 or 13-17)}
\]

\[
V_{3} \text{ or } V_{av34} > 2,700 \text{ pc/h?} \quad \text{Yes} \quad \text{No}
\]

\[
V_{3} \text{ or } V_{av34} > 1.5 \times V_{12}/2 \quad \text{Yes} \quad \text{No}
\]

\[
\text{If Yes, } V_{12a} = \text{ pc/h (Equation 13-16, 13-18, or 13-19)}
\]

#### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

#### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

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

\[
D_R = 5.475 + 0.00734 V_{R} + 0.0078 V_{12} - 0.00627 L_A
\]

\[
D_R = (pc/ml/in)
\]

\[
\text{LOS = (Exhibit 13-2)}
\]

---

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3/21/2012
## RAMPS AND RAMP JUNCTIONS WORKSHEET

### General Information
- **Analyst**: AL
- **Agency or Company**: AIM ENGINEERING
- **Date Performed**: 3/16/2012
- **Analysis Time Period**: PM
- **Project Description**: Downstream Adj Ramp

### Site Information
- **Freeway/Dir of Travel**: I-75 WB
- **Junction**: SR 29 WB ON
- **Jurisdiction**: Analysis Year 2019 EVERGLADES

### Inputs
- **Number of Lanes, N**: 2
- **Acceleration Lane Length, L_A**: 415
- **Deceleration Lane Length, L_D**:
- **Freeway Volume, V_F**: 1036
- **Ramp Volume, V_R**: 340
- **Freeway Free-Flow Speed, S_FF**: 70.0
- **Ramp Free-Flow Speed, S_FR**: 35.0

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>V (Veh/h)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%RV</th>
<th>f_{HV}</th>
<th>f_p</th>
<th>V = V/PHF x f_{HV} x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1036</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>0.90</td>
<td>1317</td>
</tr>
<tr>
<td>Ramp</td>
<td>340</td>
<td>0.90</td>
<td>Level</td>
<td>22</td>
<td>0</td>
<td>0.901</td>
<td>0.90</td>
<td>466</td>
</tr>
</tbody>
</table>

### Estimation of v_{12}

- **V_{12} = V_F (P_{FM})**
- **P_{FM} = 1.000 using Equation (Exhibit 13-6)**
- **V_{12} = 1317 pc/h**
- **V_3 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)**
- **Is V_3 or V_{av34} > 2700 pc/h? [Yes/No]**
- **Is V_3 or V_{av34} > 1.5 * V_{12}/2? [Yes/No]**
- **If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)**

### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>1783</td>
<td>No</td>
</tr>
</tbody>
</table>

### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td>1783</td>
<td>No</td>
</tr>
</tbody>
</table>

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

- **D_R = 5.475 + 0.00734 * V_{R} + 0.0078 * V_{12} - 0.00627 * L_A**
- **D_R = 4.252 + 0.0086 * V_{12} - 0.009 * L_D**
- **D_R = 16.6 (pc/mi/ln)**
- **LOS = B (Exhibit 13-2)**

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3/21/2012
HCS+: Ramps and Ramp Junctions Release 5.21

Diverge Analysis

Analyst: GSR
Agency/Co.: AIM ENGINEERING
Date performed: 3/27/2012
Analysis time period: PM
Freeway/Dir of Travel: I-75 EB
Junction: EVERGLADES BLVD OFF RAMP
Jurisdiction: 
Analysis Year: 2019 EVERGLADES
Description: 

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 2289 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 659 vph
Length of first accel/decel lane 400 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp vph
Position of adjacent ramp 
Type of adjacent ramp 
Distance to adjacent ramp ft

Conversion to pc/h Under Base Conditions

Junction Components Freeway Ramp Adjacent Ramp

<table>
<thead>
<tr>
<th>Volume, V (vph)</th>
<th>2289</th>
<th>659</th>
<th>vph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>636</td>
<td>183</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type: Level</td>
<td>Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>%</td>
<td>0.00</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>mi</td>
<td>0.00</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

L = (Equation 25-8 or 25-9)
P = 1.000 Using Equation 0
v = v + (v - v) P = 2620 pc/h
12 R F R FD

Capacity Checks

v = v
Fi F 2620 4800 No

v = v - v
FO F R 1866 4800 No

v = v
R 754 2100 No

v = v
3 or av34 0 pc/h (Equation 25-15 or 25-16)

Is v > 2700 pc/h? No
Is v > 1.5 v /2 No
If yes, v =
12A

Flow Entering Diverge Influence Area
v
v = v
Fi F 2620 4600 No

Flow Level of Service Determination (if not F)

Density,
D = 4.252 + 0.0086 v - 0.009 L = 23.2 pc/mi/ln
12 R

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

Speed Estimation

Intermediate speed variable, S

Space mean speed in ramp influence area, S = 59.8 mph R

Space mean speed in outer lanes, S = N/A mph 0

Space mean speed for all vehicles, S = 59.8 mph
### Merge Analysis

**Analyst:** GSR
**Agency/Co.:** AIM ENGINEERING
**Date performed:** 3/28/2012
**Analysis time period:** PM
**Freeway/Dir of Travel:** I-75 EB
**Junction:** EVERGLADES BLVD EB ON
**Jurisdiction:**
**Analysis Year:** 2019 EVERGLADES

### Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1630 vph</td>
</tr>
</tbody>
</table>

### On Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>35.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>121 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1200 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

### Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent Ramp</td>
<td>vph</td>
</tr>
<tr>
<td>Position of adjacent Ramp</td>
<td></td>
</tr>
<tr>
<td>Type of adjacent Ramp</td>
<td></td>
</tr>
<tr>
<td>Distance to adjacent Ramp</td>
<td>ft</td>
</tr>
</tbody>
</table>

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1630</td>
<td>121</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>453</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>5</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, \( f_{HV} \) & 0.971 & 0.971 \\
Driver population factor, \( f_{P} \) & 0.90 & 0.90 \\
Flow rate, \( v_p \) & 2073 & 154 pcph

---

**Estimation of V12 Merge Areas**

\[
L = \text{EQ} \\
P = 1.000 \quad \text{Using Equation 0} \\
v = \frac{v}{(P)} = 2073 \text{ pc/h} \\
12 \quad F \quad \text{FM}
\]

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>v</th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>2227</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>( v \frac{v}{FQ} )</td>
<td>0 pc/h</td>
<td>(Equation 25-4 or 25-5)</td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>&gt; 2700 pc/h?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>( v \frac{v_{av34}}{3} )</td>
<td>&gt; 1.5 ( v \frac{v}{12} )</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>v</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v \frac{v}{12} )</td>
<td>2073</td>
<td>4400</td>
<td>No</td>
</tr>
</tbody>
</table>

---

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

\[
D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 15.3 \text{ pc/mi/ln} \\
R \quad R \quad 12 \quad A \quad A
\]

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

---

**Speed Estimation**

<table>
<thead>
<tr>
<th>Intermediate speed variable,</th>
<th>( M = 0.273 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space mean speed in ramp influence area,</td>
<td>( S = 62.4 \text{ mph} )</td>
</tr>
<tr>
<td>Space mean speed in outer lanes,</td>
<td>( S = N/A \text{ mph} )</td>
</tr>
<tr>
<td>Space mean speed for all vehicles,</td>
<td>( S = 62.4 \text{ mph} )</td>
</tr>
</tbody>
</table>
Diverge Analysis

Analyst: GSR
Agency/Co.: AIM ENGINEERING
Date performed: 3/8/2012
Analysis time period: PM
Freeway/Dir of Travel: I-75 WB
Junction: EVERGLADES BLVD OFF RAMP
Jurisdiction: 2019 EVERGLADES
Description:

Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1376 vph</td>
</tr>
</tbody>
</table>

Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>95 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>400 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

Adjacent Ramp Data (if one exists)

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent ramp</td>
<td>vph</td>
</tr>
<tr>
<td>Position of adjacent ramp</td>
<td></td>
</tr>
<tr>
<td>Type of adjacent ramp</td>
<td></td>
</tr>
<tr>
<td>Distance to adjacent ramp</td>
<td>ft</td>
</tr>
</tbody>
</table>

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1376</td>
<td>95</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>vph</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>382</td>
<td>26</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td>mi</td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \quad \text{(Equation 25-8 or 25-9)} \]
\[ EQ \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ PD \]
\[ v = v + (v - v) P = 1750 \quad \text{pc/h} \]
\[ 12 \quad R \quad F \quad R \quad FD \]

Capacity Checks

<table>
<thead>
<tr>
<th>( v = v )</th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1750</td>
<td>4800</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

| \( v = v - v \) FO F R |
|---|---|
| 1629 | 4800 | No |

<table>
<thead>
<tr>
<th>( v = v ) R</th>
</tr>
</thead>
<tbody>
<tr>
<td>121</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>( v = v ) 3 or av34</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 pc/h</td>
</tr>
</tbody>
</table>

\[ v > 2700 \text{ pc/h?} \]
\[ 3 \text{ or av34} \]

\[ v > 1.5 \frac{v}{2} \]
\[ 3 \text{ or av34} \]

If yes, \( v = \)
\[ 12A \]

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>( v )</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1750</td>
<td>4600</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

| Density, \( D = 4.252 + 0.0086v - 0.009 \frac{L}{12} \) |
|---|---|---|
| 15.7 | pc/mi/ln |

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

Speed Estimation

<table>
<thead>
<tr>
<th>Intermediate speed variable, ( S = 0.309 )</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Space mean speed in ramp influence area, ( S = R )</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Space mean speed in outer lanes, ( S = N/A )</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Space mean speed for all vehicles, ( S = 61.4 )</th>
</tr>
</thead>
</table>
HCS+: Ramps and Ramp Junctions Release 5.21

Phone:
Fax:
E-mail:

---

**Merge Analysis**

**Analyst:** GSR  
**Agency/Co.:** AIM ENGINEERING  
**Date performed:** 3/28/2012  
**Analysis time period:** PM  
**Freeway/Dir of Travel:** I-75 WB  
**Junction:** EVERGLADES BLVD WB ON  
**Jurisdiction:**  
**Analysis Year:** 2019 EVERGLADES  
**Description:**

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**Freeway Data**

**Type of analysis**  Merge  
**Number of lanes in freeway** 2  
**Free-flow speed on freeway** 70.0 mph  
**Volume on freeway** 1281 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** 518 vph  
**Length of first accel/decel lane** 1200 ft  
**Length of second accel/decel lane** ft

---

**Adjacent Ramp Data (if one exists)**

**Does adjacent ramp exist?** No  
**Volume on adjacent Ramp** vph  
**Position of adjacent Ramp** 
**Type of adjacent Ramp** 
**Distance to adjacent Ramp** ft

---

**Conversion to pc/h Under Base Conditions**

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1281</td>
<td>518</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>356</td>
<td>144</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV 0.971 0.971
Driver population factor, fp 1.00 1.00
Flow rate, vp 1466 593 pcph

Estimation of V12 Merge Areas

\[
L = \text{EQ}
\]
\[
P = 1.000 \text{ Using Equation 0}
\]
\[
v = v \left(\frac{P}{FM}\right) = 1466 \text{ pc/h}
\]

Capacity Checks

\[
v \quad \text{Actual} \quad \text{Maximum} \quad \text{LOS} \quad F? \\
F_0 \quad 2059 \quad 4800 \quad \text{No}
\]
\[
v \quad \text{or} \quad v \quad 0 \text{ pc/h} \quad (\text{Equation 25-4 or 25-5})
\]
\[
\text{Is } v > 2700 \text{ pc/h?} \quad \text{No}
\]
\[
\text{Is } v > 1.5 \frac{v}{2} \quad \text{No}
\]
\[
\text{If yes, } v = 12A
\]

Flow Entering Merge Influence Area

\[
v \quad \text{Actual} \quad \text{Max Desirable} \quad \text{Violation?} \\
12 \quad 1466 \quad 4400 \quad \text{No}
\]

Level of Service Determination (if not F)

\[
R \quad 12 \quad 13.7 \text{ pc/mi/ln}
\]

Density, \( D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 13.7 \text{ pc/mi/ln} \)

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

Speed Estimation

Intermediate speed variable, \( M = 0.268 \)
Space mean speed in ramp influence area, \( S = 62.5 \text{ mph} \)
Space mean speed in outer lanes, \( S = \text{N/A} \text{ mph} \)
Space mean speed for all vehicles, \( S = 62.5 \text{ mph} \)
**Diverge Analysis**

<table>
<thead>
<tr>
<th>Analyst</th>
<th>GSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency/Co.</td>
<td>AIM ENGINEERING</td>
</tr>
<tr>
<td>Date performed</td>
<td>4/4/2012</td>
</tr>
<tr>
<td>Analysis time period</td>
<td>PM</td>
</tr>
<tr>
<td>Freeway/Dir of Travel</td>
<td>I-75 EB</td>
</tr>
<tr>
<td>Junction</td>
<td>SR 951 OFF RAMP</td>
</tr>
<tr>
<td>Jurisdiction</td>
<td>2019 EVERGLADES</td>
</tr>
<tr>
<td>Analysis Year</td>
<td></td>
</tr>
</tbody>
</table>

**Freeway Data**

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>3545 vph</td>
</tr>
</tbody>
</table>

**Off Ramp Data**

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>2</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>1859 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>500 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>0 ft</td>
</tr>
</tbody>
</table>

**Adjacent Ramp Data (if one exists)**

| Does adjacent ramp exist? | No                      |
| Volume on adjacent ramp  | vph                     |
| Position of adjacent ramp |                       |
| Type of adjacent ramp    |                         |
| Distance to adjacent ramp | ft                      |

**Conversion to pc/h Under Base Conditions**

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>3545</td>
<td>1859</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td>vph</td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>985</td>
<td>516</td>
<td>pc/h</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00 %</td>
<td>0.00 %</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, FHV: 0.971
Driver population factor, FP: 1.00
Flow rate, vp: 4057 pcph

--- Estimation of V12 Diverge Areas ---

\[ L = \text{EQ} \]
\[ P = 1.000 \text{ Using Equation 0} \]
\[ v = v_{12} + (v - v_F) P = 4057 \text{ pc/h} \]

--- Capacity Checks ---

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = v_{12}</td>
<td>4057</td>
<td>4800</td>
</tr>
<tr>
<td>v_{FO} = v - v_F</td>
<td>1929</td>
<td>4800</td>
</tr>
<tr>
<td>v_{FR} = v_F</td>
<td>2128</td>
<td>4100</td>
</tr>
<tr>
<td>v_{3} or av34</td>
<td>0 pc/h</td>
<td>(Equation 25-15 or 25-16)</td>
</tr>
</tbody>
</table>

Is \( v_{3} \) or av34 > 2700 pc/h? No
Is \( v_{12} \) > 1.5 \( v_{12} \) /2 No
If yes, \( v_{12A} \) = (Equation 25-18)

--- Flow Entering Diverge Influence Area ---

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v_{12} )</td>
<td>4057</td>
<td>4600</td>
</tr>
</tbody>
</table>

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

Density, \( D = 4.252 + 0.0086 v - 0.009 L_{12} \)
\( D = 30.1 \text{ pc/mi/ln} \)

--- Speed Estimation ---

Intermediate speed variable, \( S = 0.490 \)
Space mean speed in ramp influence area, \( S_R = 56.3 \text{ mph} \)
Space mean speed in outer lanes, \( S_0 = \text{N/A} \text{ mph} \)
Space mean speed for all vehicles, \( S = 56.3 \text{ mph} \)
RAMPS AND RAMP JUNCTIONS WORKSHEET

<table>
<thead>
<tr>
<th>General Information</th>
<th>Site Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst</td>
<td>AL</td>
</tr>
<tr>
<td>Agency or Company</td>
<td>AIM ENGINEERING</td>
</tr>
<tr>
<td>Date Performed</td>
<td>3/16/2012</td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>PM</td>
</tr>
</tbody>
</table>

Project Description

**Inputs**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Acceleration Lane Length, L_A</td>
<td>465 ft</td>
</tr>
<tr>
<td>Deceleration Lane Length L_D</td>
<td></td>
</tr>
<tr>
<td>Freeway Volume, V_F</td>
<td>1686 veh/h</td>
</tr>
<tr>
<td>Ramp Volume, V_R</td>
<td>603 veh/h</td>
</tr>
<tr>
<td>Freeway Free-Flow Speed, S_{FF}</td>
<td>70.0 veh/h</td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_{FR}</td>
<td>35.0 veh/h</td>
</tr>
</tbody>
</table>

**Conversion to pc/h Under Base Conditions**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(pc/h)</td>
<td></td>
</tr>
<tr>
<td>V (Veh/hr)</td>
<td></td>
</tr>
<tr>
<td>PHF</td>
<td>0.90</td>
</tr>
<tr>
<td>Terrain</td>
<td>Level</td>
</tr>
<tr>
<td>%Truck</td>
<td>6</td>
</tr>
<tr>
<td>%Rv</td>
<td>0</td>
</tr>
<tr>
<td>f_{HV}</td>
<td>0.971</td>
</tr>
<tr>
<td>f_p</td>
<td>1.00</td>
</tr>
<tr>
<td>V = V/PHF x f_{HV} x f_p</td>
<td>1930 veh/h</td>
</tr>
</tbody>
</table>

**Inputs**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td></td>
</tr>
<tr>
<td>On</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Off</td>
<td></td>
</tr>
<tr>
<td>L_{up}</td>
<td></td>
</tr>
<tr>
<td>V_{D}</td>
<td></td>
</tr>
</tbody>
</table>

**Merge Areas**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation of v_{12}</td>
<td></td>
</tr>
<tr>
<td>V_{12} = V_F (P_{FM})</td>
<td></td>
</tr>
<tr>
<td>L_{EQ}</td>
<td></td>
</tr>
<tr>
<td>P_{FM}</td>
<td></td>
</tr>
<tr>
<td>V_{12}</td>
<td></td>
</tr>
<tr>
<td>V_{3} or V_{a34}</td>
<td></td>
</tr>
<tr>
<td>Is V_{3} or V_{a34} &gt; 2,700 pc/h?</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is V_{3} or V_{a34} &gt; 1.5 * V_{12}/2</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
<tr>
<td>If Yes, V_{12a}</td>
<td></td>
</tr>
</tbody>
</table>

**Diverge Areas**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimation of v_{12}</td>
<td></td>
</tr>
<tr>
<td>V_{12} = V_R + (V_F - V_R)P_{FD}</td>
<td></td>
</tr>
<tr>
<td>L_{EQ}</td>
<td></td>
</tr>
<tr>
<td>P_{FD}</td>
<td></td>
</tr>
<tr>
<td>V_{12}</td>
<td></td>
</tr>
<tr>
<td>V_{3} or V_{a34}</td>
<td></td>
</tr>
<tr>
<td>Is V_{3} or V_{a34} &gt; 2,700 pc/h?</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is V_{3} or V_{a34} &gt; 1.5 * V_{12}/2</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
<tr>
<td>If Yes, V_{12a}</td>
<td></td>
</tr>
</tbody>
</table>

**Capacity Checks**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>2620</td>
<td>Exhibit 13-8</td>
<td>No</td>
</tr>
</tbody>
</table>

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td>2620</td>
<td>Exhibit 13-8</td>
<td>4600:All</td>
</tr>
</tbody>
</table>

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{12}</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D_R = 5.475 + 0.00734 V_R + 0.0078 V_{12} - 0.00627 L_A</td>
<td></td>
</tr>
<tr>
<td>D_R = 22.7 (pc/mi/ln)</td>
<td></td>
</tr>
<tr>
<td>LOS = C (Exhibit 13-2)</td>
<td></td>
</tr>
<tr>
<td>D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D</td>
<td></td>
</tr>
<tr>
<td>D_R = (pc/mi/ln)</td>
<td></td>
</tr>
<tr>
<td>LOS = (Exhibit 13-2)</td>
<td></td>
</tr>
</tbody>
</table>
### RAMPS AND RAMPS JUNCTIONS WORKSHEET

#### General Information
- **Analyst:** AL
- **Agency or Company:** AI M ENGINNEERING
- **Date Performed:** 3/8/2012
- **Analysis Time Period:** PM

#### Site Information
- **Freeway/Dir of Travel:** I-75 WB
- **Jurisdiction:** SR 951 OFF RAMP
- **Analysis Year:** 2019 EVERGLADES

#### Inputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Acceleration Lane Length, L_A</td>
<td></td>
</tr>
<tr>
<td>Deceleration Lane Length, L_D</td>
<td>220</td>
</tr>
<tr>
<td>Freeway Volume, V_F</td>
<td>1799</td>
</tr>
<tr>
<td>Ramp Volume, V_R</td>
<td>474</td>
</tr>
<tr>
<td>Freeway Free-Flow Speed, S_FF</td>
<td>70.0</td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_FR</td>
<td>45.0</td>
</tr>
</tbody>
</table>

#### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>V (Veh/hr)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%RV</th>
<th>f_p</th>
<th>V = V/PHF x f_HV x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1799</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>2059</td>
</tr>
<tr>
<td>Ramp</td>
<td>474</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>542</td>
</tr>
</tbody>
</table>

#### Estimation of \( v_{12} \)

\[
L_{EQ} = \frac{P_{FM}}{V_{12}} = \begin{cases} 
\text{(Equation 13-6 or 13-7)} & \text{using Equation (Exhibit 13-6)} \\
V_{12} = \text{pc/h} & \text{pc/h (Equation 13-14 or 13-17)} \\
V_3\text{ or } V_{av34} = 2,700 \text{ pc/h?} & \text{Yes} \quad \text{No} \\
\text{Is } V_3\text{ or } V_{av34} > 1.5 \times V_{12}^2 & \text{Yes} \quad \text{No} \\
\text{If Yes, } V_{12a} = & \text{pc/h (Equation 13-16, 13-18, or 13-19)}
\end{cases}
\]

#### Estimation of \( v_{12} \)

\[
L_{EQ} = \frac{P_{FD}}{V_{12}} = \begin{cases} 
\text{(Equation 13-12 or 13-13)} & \text{using Equation (Exhibit 13-7)} \\
V_{12} = 1.000 & \text{pc/h} \\
V_3\text{ or } V_{av34} = 0 \text{ pc/h (Equation 13-14 or 13-17)} & \text{Yes} \quad \text{No} \\
\text{Is } V_3\text{ or } V_{av34} > 1.5 \times V_{12}^2 & \text{Yes} \quad \text{No} \\
\text{If Yes, } V_{12a} = V_{12} \text{ pc/h (Equation 13-16, 13-18, or 13-19)} & \text{pc/h (Equation 13-16, 13-18, or 13-19)}
\end{cases}
\]

#### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

#### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

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

\[
D_R = 5.475 + 0.00734 V_R + 0.0078 V_{12} - 0.00627 L_A \\
D_R = \text{(pc/mi/ln)} \\
LOS = \text{(Exhibit 13-2)}
\]
### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst**: AL
- **Agency or Company**: AIM ENGINEERING
- **Date Performed**: 3/16/2012
- **Analysis Time Period**: PM
- **Project Description**

#### Site Information
- **Freeway/Dir of Travel**: I-75 WB
- **Junction**: SR 951 WB ON
- **Jurisdiction**
- **Analysis Year**: 2019 EVERGLADES

#### Inputs
- **Upstream Adj Ramp**
  - Number of Lanes, N
  - Acceleration Lane Length, L_A
  - Deceleration Lane Length, L_D
- **Downstream Adj Ramp**
  - Number of Lanes, N
  - No
  - Acceleration Lane Length, L_A
  - Deceleration Lane Length, L_D

#### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th></th>
<th>(pc/h)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%Re</th>
<th>f_HV</th>
<th>f_p</th>
<th>V = V/PHF x f_HV x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1325</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
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<td>1461</td>
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<td>1.00</td>
<td>1672</td>
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<tr>
<td>UpStream</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DownStream</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Merge Areas

#### Diverge Areas

#### Estimation of v_{12}

\[
V_{12} = V_F \times (P_{FM})
\]

\[
L_{EQ} = \text{Equation 13-6 or 13-7}
\]

\[
P_{FM} = 1.000 \text{ using Equation (Exhibit 13-6)}
\]

\[
V_{12} = 1516 \text{ pc/h}
\]

\[
V_3 \text{ or } V_{av34} > 2700 \text{ pch} \Rightarrow \text{Yes} \noindent \text{No}
\]

\[
V_3 \text{ or } V_{av34} > 1.5 \times V_{12}/2 \Rightarrow \text{Yes} \noindent \text{No}
\]

If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

#### Diverge Areas

#### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>3188</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

#### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td>3188</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

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

\[
D_R = 5.475 + 0.00734 V_R + 0.0078 V_{12} - 0.00627 L_A
\]

\[
D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D
\]

\[
D_R = 27.2 \text{ (pc/mi/ln)}
\]

\[
D_R = (pc/mi/ln)
\]

\[
LOS = \text{C (Exhibit 13-2)}
\]

\[
LOS = \text{ (Exhibit 13-2)}
\]
Ramps and Ramp Juncions Worksheet

**General Information**
- Analyst: AL
- Agency or Company: AIM ENGINNEERING
- Date Performed: 3/8/2012
- Analysis Time Period: PM
- Project Description: Freeway/Dir of Travel, I-75 NB
- Site Information:
  - Freeway/Dir of Travel: GGP NB OFF RAMP
  - Jurisdiction: Analysis Year: 2019 EVERGLADES

**Inputs**
- Number of Lanes, N: 3
- Acceleration Lane Length, L_A: 310 ft
- Deceleration Lane Length, L_D: 310 ft
- Freeway Volume, V_F: 2786 veh/h
- Ramp Volume, V_R: 438 veh/h
- Freeway Free-Flow Speed, S_FF: 70.0 mph
- Ramp Free-Flow Speed, S_FR: 45.0 mph
- Upstream Adj Ramp: Yes
- Downstream Adj Ramp: No

**Conversion to pc/h Under Base Conditions**
- V (Veh/h): 2786
- PHF: 0.90
- Terrain: Level
- % Truck: 6
- % Rv: 0
- f_HV: 0.971
- f_p: 1.00
- v = V/PHF x f_HV x f_p: 3188 pc/h

**Merge Areas**

**Estimation of V_{12}**

- V_{12} = V_F \cdot P_{FM}
- L_{EQ} = (Equation 13-6 or 13-7)
- P_{FM} = using Equation (Exhibit 13-6)
- V_{12} = pc/h
- V_{34} or V_{av34} = pc/h (Equation 13-14 or 13-17)
- Is V_3 or V_{av34} > 2,700 pc/h? Yes No
- Is V_3 or V_{av34} > 1.5 \cdot V_{12}/2? Yes No
- If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_F: 3188</td>
<td>Exhibit 13-8</td>
<td>7200</td>
</tr>
<tr>
<td>V_{FC} = V_F \cdot V_R: 2667</td>
<td>Exhibit 13-8</td>
<td>7200</td>
</tr>
<tr>
<td>V_R: 501</td>
<td>Exhibit 13-10</td>
<td>2100</td>
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</table>

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}: 2267</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

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

- D_R = 5.475 + 0.00734 V_R + 0.0078 V_{12} - 0.00627 L_A
- D_R = (pc/ml/in)
- LOS = (Exhibit 13-2)
BASIC FREEWAY WORKSHEET

BASIC FREEWAY SEGMENTS WORKSHEET

<table>
<thead>
<tr>
<th>Application</th>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational (LOS)</td>
<td>FFS, N, (v_p)</td>
<td>LOS, S, D</td>
</tr>
<tr>
<td>Design (N)</td>
<td>FFS, LOS, (v_p)</td>
<td>N, S, D</td>
</tr>
<tr>
<td>Design ((v_p))</td>
<td>FFS, LOS, N</td>
<td>(v_p), S, D</td>
</tr>
<tr>
<td>Planning (LOS)</td>
<td>FFS, N, AADT</td>
<td>LOS, S, D</td>
</tr>
<tr>
<td>Planning (N)</td>
<td>FFS, LOS, AADT</td>
<td>N, S, D</td>
</tr>
<tr>
<td>Planning ((v_p))</td>
<td>FFS, LOS, N</td>
<td>(v_p), S, D</td>
</tr>
</tbody>
</table>

General Information

<table>
<thead>
<tr>
<th>Analyst</th>
<th>GSR</th>
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<tbody>
<tr>
<td>Agency or Company</td>
<td>AIM ENGINEERING</td>
</tr>
<tr>
<td>Date Performed</td>
<td>3/26/2012</td>
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<tr>
<td>Analysis Time Period</td>
<td>PM</td>
</tr>
<tr>
<td>Project Description</td>
<td>EVERGLADES IJR</td>
</tr>
</tbody>
</table>

Site Information

| Highway/Direction of Travel | I-75     |
| From/To                     | BTWN NB GG PKW ON/-OFF- RAMPS |
| Jurisdiction                |         |
| Analysis Year               | 2019 EVERGLADES |

Oper (LOS) Des. (N) Planning Data

Flow Inputs

- Volume, \(V\) 2348 veh/h
- AADT veh/day
- Peak-Hr Prop. of AADT, \(K\)
- Peak-Hr Direction Prop, \(D\)
- DDHV = AADT \(\times K\) \(\times D\)
- Driver type adjustment 1.00 veh/h

Calculate Flow Adjustments

\[ f_p = 1.00 \]
\[ E_T = 1.5 \]
\[ E_R = 1.2 \]
\[ f_{HV} = \frac{1}{[1 + P_T(E_T - 1)]} \]
\[ P_T = 0.90 \]
\[ P_R = 0 \]

Speed Inputs

- Lane Width 12.0 ft
- Rt-Shoulder Lat. Clearance 6.0 ft
- Interchange Density 0.50 l/mi
- Number of Lanes, \(N\) 2
- FFS (measured) 75.0 mi/h

Calc Speed Adj and FFS

\[ f_{LW} = 0.0 \] mi/h
\[ f_{LC} = 0.0 \] mi/h
\[ f_{ID} = 0.0 \] mi/h
\[ f_{N} = 4.5 \] mi/h

LOS and Performance Measures

- Base free-flow Speed, BFFS 75.0 mi/h

Operational (LOS)

\[ v_p = \frac{(V \text{ or } DDHV)}{(PHF \times N \times f_{HV} \times f_{p})} \]
\[ S = 70.5 \text{ mi/h} \]
\[ D = v_p / S = 19.1 \text{ pc/mi} \]

Design (N)

\[ v_p = \frac{(V \text{ or } DDHV)}{(PHF \times N \times f_{HV} \times f_{p})} \]
\[ S = \text{ mi/h} \]
\[ D = v_p / S = \text{ pc/mi} \]

Glossary

- \(N\) - Number of lanes
- \(V\) - Hourly volume
- \(D\) - Density
- \(v_p\) - Flow rate
- LOS - Level of service
- DDHV - Directional design hour volume

Factor Location

\[ E_R - \text{Exhibits 23-8, 23-10} \]
\[ f_{LW} - \text{Exhibit 23-4} \]
\[ E_T - \text{Exhibits 23-8, 23-10, 23-11} \]
\[ f_{LC} - \text{Exhibit 23-5} \]
\[ f_{p} - \text{Page 23-12} \]
\[ f_{ID} - \text{Exhibit 23-7} \]

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BASIC FREEWAY WORKSHEET

General Information
Analyst: AL
Agency or Company: AIM ENGINEERING
Date Performed: 3/6/2012
Analysis Time Period: PM
Project Description: EVERGLADES I/JR

Flow Inputs
Volume, V: 4360 veh/h
AADT: veh/day
Peak-Hr Prop. of AADT, K: %
Peak-Hr Direction Prop, D: veh/h
Driver type adjustment: 1.00

Calculate Flow Adjustments
\( f_p \) = 1.00
\( E_T \) = 1.5
\( E_R \) = 1.2

Speed Inputs
Lane Width: 12.0 ft
Rt-Shoulder Lat. Clearance: 6.0 ft
Interchange Density: 0.50 lmi
Number of Lanes, N: 3
FFS (measured): mi/h
Base free-flow Speed, BFFS: 75.0 mi/h

LOS and Performance Measures
Operational (LOS)
\( v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p) \times 1663 \) pc/h/ln
\( S = 70.6 \) mi/h
\( D = v_p / S = 23.5 \) pc/mi/ln

Design (N)
Design LOS
\( v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p) \times 1663 \) pc/h
\( S = \) mi/h
\( D = v_p / S = \) pc/mi/ln

Glossary
N - Number of lanes
V - Hourly volume
\( v_p \) - Flow rate
LOS - Level of service
DDHV - Directional design hour volume

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4/24/2012
**General Information**

- **Analyst**: AL
- **Agency or Company**: AIM ENGINEERING
- **Date Performed**: 3/6/2012
- **Analysis Time Period**: PM
- **Project Description**: EVERGLADES IJU

**Flow Inputs**

- **Volume, V**: 4514 veh/h
- **AADT**: veh/day
- **Peak-Hr Prop. of AADT, K**: 0.90
- **Peak-Hr Direction Prop, D**: veh/h
- **Driver type adjustment**: 1.00

**Calculate Flow Adjustments**

- **f_p**: 1.00
- **E_T**: 1.5
- **f_{HV} = 1/[1 + P_r(E_t - 1) + P_m(E_r - 1)]**: 0.971

**Speed Inputs**

- **Lane Width**: 12.0 ft
- **Rt-Shoulder Lat. Clearance**: 6.0 ft
- **Interchange Density**: 0.50 l/mi
- **Number of Lanes, N**: 3
- **FFS (measured)**: mi/h
- **Base free-flow speed, BFFS**: 75.0 mi/h

**LOS and Performance Measures**

**Operational (LOS)**

\[
S = \frac{e_p}{(V \text{ or } DDHV) / \left( PHF \times N \times f_{HV} \times f_p \right)} 1722 \text{ pc/h/mi}
\]

**Calc Speed Adj and FFS**

- **f_{LV}**: 0.0 mi/h
- **f_{LC}**: 0.0 mi/h
- **f_{ID}**: 0.0 mi/h
- **f_N**: 3.0 mi/h

**Design (N)**

- **Design LOS**:
- **Design LOS**:
- **D = \frac{v_p}{S}**: pc/mi
- **LOS**:

**Factor Location**

- **N**: Number of lanes
- **V**: Hourly volume
- **v_p**: Flow rate
- **LOS**: Level of service
- **DDHV**: Directional design hour volume

**Site Information**

- **Highway/Direction of Travel**: I-75
- **From/To**: N OF GG PKWY_SB
- **Jurisdiction**: Level
- **Analysis Year**: 2019 EVERGLADES
BASIC FREEWAY WORKSHEET

GENERAL INFORMATION

Analyst: GSR
Agency or Company: AIM ENGINEERING
Date Performed: 3/26/2012
Analysis Time Period: PM
Project Description: GREATS ADR

SITE INFORMATION

Highway/Direction of Travel: I-75
From/To: BTWN SB GG PKW ON-OFF-RAMPS
Jurisdiction:
Analysis Year: 2019 EVERGLADES

FLOW INPUTS

Volume, V: 2989 veh/h
AADT: veh/day
Peak-Hr Prop. of AADT, K:
Peak-Hr Direction Prop, D:
DDHV = AADT x K x D: veh/h
Driver type adjustment: 1.00

Calculate Flow Adjustments

f_p: 1.00
E_T: 1.5
E_R: 1.2
f_HV = f_p x E_T = 0.971

SPEED INPUTS

Lane Width: 12.0 ft
Rt-Shoulder Lat. Clearance: 6.0 ft
Interchange Density: 0.50 l/mi
Number of Lanes, N: 2
FFS (measured): 75.0 mi/h
Base free-flow speed, BFFS: 75.0 mi/h

CALC SPEED ADJ AND FFS

\( f_{lw} = 0.0 \) mi/h
\( f_{lc} = 0.0 \) mi/h
\( f_{id} = 0.0 \) mi/h
\( f_N = 4.5 \) mi/h

LOS AND PERFORMANCE MEASURES

Operational (LOS)

\( \nu_p = \frac{(V \text{ or } DDHV)}{(PHF \times N \times f_{HV} \times f_p)} = 1710 \) pc/h/ln
S = 69.1 mi/h
D = \( \frac{\nu_p}{S} \) 24.7 pc/mi/ln
LOS = C

Design (N)

Design LOS

\( \nu_p = \frac{(V \text{ or } DDHV)}{(PHF \times N \times f_{HV} \times f_p)} \) pc/h
S = \( f_{lw} \) mi/h
D = \( \frac{\nu_p}{S} \) pc/mi/ln

GLOSSARY

N - Number of lanes
V - Hourly volume
\( \nu_p \) - Flow rate
LOS - Level of service
DDHV - Directional design hour volume

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4/24/2012
### RAMPS AND RAMP JUNCTIONS WORKSHEET

**General Information**

- **Analyst**: AL
- **Agency or Company**: AIM ENGINEERING
- **Date Performed**: 3/16/2012
- **Analysis Time Period**: PM
- **Project Description**: I-75 SB
- **Junction**: GOLDEN GATE PKWY SB ON
- **Analysis Year**: 2019 EVERGLADES

**Inputs**

- **Upstream Adj Ramp**
  - Number of Lanes, N
  - Acceleration Lane Length, L_A: 550 ft
  - Deceleration Lane Length, L_D
- **Freeway Volume, V_F**: 2989 veh/h
- **Ramp Volume, V_R**: 556 veh/h
- **Ramp Free-Flow Speed, S_{RF}**: 70.0 veh/h
- **Upstream Free-Flow Speed, S_{FU}**: 35.0 veh/h

#### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>V (Veh/hr)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%RV</th>
<th>f_{HV}</th>
<th>f_p</th>
<th>V = V/PHF x f_{HV} x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>2989</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
<td>3421</td>
</tr>
<tr>
<td>Ramp</td>
<td>556</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
<td>636</td>
</tr>
</tbody>
</table>

#### Estimation of \( V_{12} \)

\[
L_{EQ} = \frac{V_{12}}{P_{PM}} \quad \text{(Equation 13-6 or 13-7)}
\]

\[
P_{FM} = 0.593 \quad \text{using Equation (Exhibit 13-6)}
\]

\[
V_{12} = 2028 \quad \text{pc/h}
\]

\[
V_{3} \text{ or } V_{av34} = 1393 \quad \text{pc/h (Equation 13-14 or 13-17)}
\]

Is \( V_{3} \text{ or } V_{av34} > 2,700 \text{ pc/h?} \)

- Yes
- No

Is \( V_{3} \text{ or } V_{av34} > 1.5 \times V_{12}/2 \)

- Yes
- No

If Yes, \( V_{12a} = \)

pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{FO} )</td>
<td>4057</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

#### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{R12} )</td>
<td>2664</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

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

\[
D_{R} = 5.475 + 0.00734 V_{R} + 0.0078 V_{12} - 0.00627 L_{A}
\]

\[
D_{R} = 22.5 \quad \text{(pc/mi/ln)}
\]

\[
\text{LOS} = c \quad \text{(Exhibit 13-2)}
\]
## RAMPS AND RAMP JUNCTIONS WORKSHEET

### General Information
- **Analyst:** AL
- **Agency or Company:** AIM ENGINEERING
- **Date Performed:** 3/21/2012
- **Analysis Time Period:** AM

### Site Information
- **Freeway/Dir of Travel:** I-75 EB
- **Jurisdiction:** SR 29 OFF RAMP
- **Analysis Year:** 2019 DESOTO

### Inputs
- **Upstream Adj Ramp:** Yes
- **Acceleration Lane Length, $L_A$:** 202
- **Deceleration Lane Length $L_D$:**
- **Freeway Volume, $V_F$:** 1384
- **Ramp Volume, $V_R$:** 342
- **Freeway Free-Flow Speed, $S_{FF}$:** 70.0
- **Ramp Free-Flow Speed, $S_{FR}$:** 45.0

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>$V$ (Veh/hr)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%RV</th>
<th>$f_{HV}$</th>
<th>$f_p$</th>
<th>$v = V/PHF 	imes f_{HV} 	imes f_p$</th>
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<tr>
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<td>Ramp</td>
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<td>Level</td>
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<td>0.901</td>
<td>0.90</td>
<td>469</td>
</tr>
</tbody>
</table>

### Estimation of $v_{12}$

- $v_{12} = V_F (P_{FM})$
- $L_{EO} = (Equation 13-6 or 13-7)$
- $P_{FM} = $ using Equation (Exhibit 13-6)
- $V_{12} = $ pc/h
- $V_{12}$ or $V_{av34} = $ pc/h (Equation 13-14 or 13-17)
- If $V_{12} > 2,700$ pc/h? Yes No
- If $V_{12} > 1.5 \times V_{12}$? Yes No
- If Yes, $V_{12} = $ pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

| V FO | Exhibit 13-8 |

### Flow Entering Merge Influence Area

| V R12 | Exhibit 13-8 |

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

$D_R = 5.475 + 0.00734 \cdot V_R + 0.0078 \cdot V_{12} - 0.00627 \cdot L_A$

### Flow Entering Diverge Influence Area

| V 12 | Exhibit 13-8 |

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

$D_R = 4.252 + 0.0086 \cdot V_{12} - 0.009 \cdot L_D$

$D_R = 17.6 \text{ (pc/ml/hr)}$

$LOS = B \text{ (Exhibit 13-2)}$
### General Information
- **Analyst**: AL
- **Agency or Company**: AIM ENGINEERING
- **Date Performed**: 3/16/2012
- **Analysis Time Period**: AM
- **Freeway/Dir of Travel**: I-75 EB
- **Junction**: SR 29 EB ON
- **Jurisdiction**: Analysis Year 2019 DESOTO

### Inputs
- **Number of Lanes, N**: 2
- **Acceleration Lane Length, L_A**: 560 ft
- **Deceleration Lane Length L_D**: 560 ft
- **Freeway Volume, V_F**: 1042 pc/h
- **Ramp Volume, V_R**: 151 pc/h
- **Freeway Free-Flow Speed, S_{FF}**: 70.0 veh/h
- **Ramp Free-Flow Speed, S_{FR}**: 35.0 veh/h

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>V (Veh/hr)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%Rv</th>
<th>f_{HV}</th>
<th>f_p</th>
<th>v = V/PHF x f_{HV} x f_p</th>
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<tbody>
<tr>
<td>Freeway</td>
<td>1042</td>
<td>0.90</td>
<td>Level</td>
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<td>1325</td>
</tr>
<tr>
<td>Ramp</td>
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<td>0.90</td>
<td>Level</td>
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<td>0</td>
<td>0.901</td>
<td>0.90</td>
<td>207</td>
</tr>
</tbody>
</table>

### Estimation of v_{12}

- **V_{12} = V_F (P_FM)**
- **P_{FM} = 1.000** using Equation (Exhibit 13-6)
- **V_{12} = 1325 pc/h**
- **V_3 or V_{av34} = 0 pc/h** (Equation 13-14 or 13-17)
- **Is V_3 or V_{av34} > 2,700 pc/h?**  
  - **Yes**: \( V_{12a} = \) pc/h (Equation 13-16, 13-18, or 13-19)
  - **No**: \( V_{12} = V_R + (V_F - V_R)P_{FD} \)

### Estimation of V_{12a}

- **L_{EQ} =** (Equation 13-6 or 13-7)
- **P_{FD} =** using Equation (Exhibit 13-7)
- **V_{12} = pc/h**
- **V_3 or V_{av34} = pc/h** (Equation 13-14 or 13-17)
- **Is V_3 or V_{av34} > 2,700 pc/h?**  
  - **Yes**: \( V_{12a} = \) pc/h (Equation 13-16, 13-18, or 13-19)
  - **No**: \( V_{12} = V_R + (V_F - V_R)P_{FD} \)

### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1532</td>
<td>Exhibit 13-8</td>
<td>No</td>
</tr>
</tbody>
</table>

### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>V_{R12}</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1532</td>
<td>Exhibit 13-8</td>
<td>4600:All</td>
<td>No</td>
</tr>
</tbody>
</table>

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

- **D_R = 13.8 (pc/mi/ln)**
- **LOS = B (Exhibit 13-2)**

---

3/21/2012
## RAMPS AND RAMP JUNCTIONS WORKSHEET

### General Information
- **Analyst**: AL
- **Agency or Company**: AIM ENGINEERING
- **Date Performed**: 3/21/2012
- **Analysis Time Period**: AM

### Site Information
- **Freeway/Dir of Travel**: I-75 WB
- **Jurisdiction**: SR 29 OFF RAMP
- **Analysis Year**: 2019 DESOTO

### Inputs
- **Number of Lanes, N**: 2
- **Freeway Volume, V_F**: 1518
- **Ramp Volume, V_R**: 193
- **Freeway Free-Flow Speed, S_{FF}**: 70.0
- **Ramp Free-Flow Speed, S_{FR}**: 45.0
- **Deceleration Lane Length, L_D**: 215

### Conversion to pc/h Under Base Conditions
- **V (Veh/hr)**: 1518
- **PHF**: 0.90
- **Terrain**: Level
- **%Truck**: 6
- **%Rv**: 0
- **f_{HV}**: 0.971
- **f_p**: 0.90
- **v = V/PHF x f_{HV} x f_p**: 1930

### Merge Areas
- **Merge Areas Capacity Checks**
  - **v_{12} = V_F (P_{FM})**
  - **L_{EQ} =** (Equation 13-6 or 13-7)
  - **P_{FM} =** using Equation (Exhibit 13-6)
  - **V_{12} =** pc/h
  - **V_3 or V_{av34} =** pc/h (Equation 13-14 or 13-17)
  - **Is V_3 or V_{av34} > 2,700 pc/h?**
    - **Yes**
    - **No**
  - **Is V_3 or V_{av34} > 1.5 * V_{12}/2?**
    - **Yes**
    - **No**
  - **If Yes, V_{12a} =** pc/h (Equation 13-16, 13-18, or 13-19)

### Diverge Areas
- **Diverge Areas Capacity Checks**
  - **V_{12} = V_R + (V_F - V_R)P_{FD}**
  - **L_{EQ} =** (Equation 13-12 or 13-13)
  - **P_{FD} =** 1.000 using Equation (Exhibit 13-7)
  - **V_{12} =** 1930 pc/h
  - **V_3 or V_{av34} =** 0 pc/h (Equation 13-14 or 13-17)
  - **Is V_3 or V_{av34} > 2,700 pc/h?**
    - **Yes**
    - **No**
  - **Is V_3 or V_{av34} > 1.5 * V_{12}/2?**
    - **Yes**
    - **No**
  - **If Yes, V_{12a} =** pc/h (Equation 13-16, 13-18, or 13-19)

### Flow Entering Merge Influence Area
- **V_{R12} =** Exhibit 13-8

### Flow Entering Diverge Influence Area
- **V_{12} =** 1930

### Level of Service Determination (if not F)
- **D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A**
- **D_R = 18.9 (pc/mln)**
- **LOS = B (Exhibit 13-2)**
**RAMPS AND RAMP JUNCTIONS WORKSHEET**

### General Information
- Analyst: AL
- Agency or Company: AIM ENGINEERING
- Date Performed: 3/16/2012
- Analysis Time Period: AM
- Site Information: Freeway/Dir of Travel I-75 WB
- Jurisdiction: Junction SR 29 WB ON
- Analysis Year: 2019 DESOTO

### Inputs
- Upstream Adj Ramp:
  - Number of Lanes, N: 2
  - Acceleration Lane Length, $L_A$: 415
  - Deceleration Lane Length, $L_D$: ft
- Freeway Volume, $V_F$: 1325
- Ramp Volume, $V_R$: 436
- Freeway Free-Flow Speed, $S_{FF}$: 70.0
- Ramp Free-Flow Speed, $S_{FR}$: 35.0

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>V (Veh/hr)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%Rv</th>
<th>fHV</th>
<th>fP</th>
<th>V = V/PHF x fHV x fP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1325</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>0.90</td>
<td>1685</td>
</tr>
<tr>
<td>Ramp</td>
<td>436</td>
<td>0.90</td>
<td>Level</td>
<td>22</td>
<td>0</td>
<td>0.901</td>
<td>0.90</td>
<td>597</td>
</tr>
</tbody>
</table>

### Estimation of $v_{12}$

- $v_{12} = V_F \left( P_{FM} \right)$
- $L_{EQ} = (Equation \ 13-6 \ or \ 13-7)$
- $P_{FM} = 1.000 \ using \ Equation \ (Exhibit \ 13-6)$
- $V_{12} = 1685 \ pc/h$
- $V_3$ or $V_{av34} = 0 \ pc/h \ (Equation \ 13-14 \ or \ 13-17)$
- Is $V_3$ or $V_{av34} > 2,700 \ pc/h? \ Yes \ No$
- Is $V_3$ or $V_{av34} > 1.5 \cdot v_{12}/2? \ Yes \ No$
- If $v_{12a} = \frac{1}{13-19}$

### Capacity Checks

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{FO}$</td>
<td>2282</td>
<td>Exhibit 13-8</td>
<td>No</td>
</tr>
</tbody>
</table>

### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{R12}$</td>
<td>2282</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

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

- $D_R = 5.475 + 0.00734 \cdot V_R + 0.0076 \cdot V_{12} - 0.00627 \cdot L_A$
- $D_R = 20.4 \ (pc/mi/ln)$
- LOS = C (Exhibit 13-2)

### Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
</table>

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

- $D_R = 4.252 + 0.0086 \cdot V_{12} - 0.009 \cdot L_D$
- $D_R = (pc/mi/ln)$
- LOS = (Exhibit 13-2)
**Diverge Analysis**

Analyst: GSR  
Agency/Co.: AIM ENGINEERING  
Date performed: 3/28/2012  
Analysis time period: AM  
Freeway/Dir of Travel: I-75 EB  
Junction: DESOTO BLVD OFF RAMP  
Jurisdiction:  
Analysis Year: 2019 DESOTO  
Description:  

---

**Freeway Data**

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1727 vph</td>
</tr>
</tbody>
</table>

---

**Off Ramp Data**

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>447 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>400 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

---

**Adjacent Ramp Data (if one exists)**

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent ramp</td>
<td>vph</td>
</tr>
<tr>
<td>Position of adjacent ramp</td>
<td></td>
</tr>
<tr>
<td>Type of adjacent ramp</td>
<td></td>
</tr>
<tr>
<td>Distance to adjacent ramp</td>
<td>ft</td>
</tr>
</tbody>
</table>

---

**Conversion to pc/h Under Base Conditions**

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1727</td>
<td>447</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>480</td>
<td>124</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00 %</td>
<td>0.00 %</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \] (Equation 25-8 or 25-9)
\[ P = 1.000 \] Using Equation 0
\[ v = v + (v - v) P = 1976 \] pc/h
\[ 12 \] R F R FD

Capacity Checks

\[
\begin{align*}
v &= v \\
Fi &= F \\
v &= v - v \\
FO &= F R \\
v &= 512 \\
R &= 2100 \\
v &= 0 \text{ pc/h} \quad \text{(Equation 25-15 or 25-16)} \\
\text{Is } v &= v > 2700 \text{ pc/h?} \\
3 &\text{ or av34} \\
\text{Is } v &= v > 1.5 v / 2 \\
3 &\text{ or av34} \\
\text{If yes, } v &= v \quad \text{(Equation 25-18)} \\
12A &
\end{align*}
\]

Flow Entering Diverge Influence Area

\[
\begin{align*}
v &= 1976 \\
\text{Max Desirable} &= 4600 \\
\text{Violation?} &= \text{No}
\end{align*}
\]

Level of Service Determination (if not F)

Density,
\[ D = 4.252 + 0.0086 v - 0.009 L = 17.6 \text{ pc/mi/ln} \]

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

Speed Estimation

\[
\begin{align*}
\text{Intermediate speed variable, } D &= 0.344 \\
\text{Space mean speed in ramp influence area, } S &= 60.4 \text{ mph} \\
\text{Space mean speed in outer lanes, } S &= N/A \text{ mph} \\
\text{Space mean speed for all vehicles, } S &= 60.4 \text{ mph}
\end{align*}
\]
### Merge Analysis

- **Analyst:** GSR
- **Agency/Co.:** AIM ENGINEERING
- **Date performed:** 3/28/2012
- **Analysis time period:** AM
- **Freeway/Dir of Travel:** I-75 EB
- **Junction:** DESOTO BLVD EB ON
- **Jurisdiction:**
- **Analysis Year:** 2019 DESOTO
- **Description:**

### Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1280 vph</td>
</tr>
</tbody>
</table>

### On Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>35.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>104 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1200 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1280</td>
<td>104</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>356</td>
<td>29</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV  0.971  0.971  
Driver population factor, fP     0.90  0.90  
Flow rate, vp                          1628  132  pcph

Estimation of V12 Merge Areas

\[
L = \text{EQ}
\]
\[
P = 1.000 \quad \text{Using Equation 0}
\]
\[
v = v \left( P \right) = 1628 \quad \text{pc/h}
\]
\[
\frac{12}{F} \quad \text{FM}
\]

Capacity Checks

\[
\begin{array}{ccc}
\text{v} & \text{Actual} & \text{Maximum} & \text{LOS F?} \\
\text{FO} & 1760 & 4800 & \text{No} \\
v_3 & 0 \quad \text{pc/h} & \text{(Equation 25-4 or 25-5)} & \\
v_3 \text{ or av34} & \text{No} & \\
\text{Is } v & > 2700 \text{ pc/h?} & \text{No} \\
\text{Is } \frac{v}{v_3} \text{ or av34} & > 1.5 \frac{v}{12} \text{ or av34} & \text{No} \\
\text{If yes, } v & = \frac{12}{12A} & \text{(Equation 25-8)} &
\end{array}
\]

Flow Entering Merge Influence Area

\[
\begin{array}{ccc}
\text{v} & \text{Actual} & \text{Max Desirable} & \text{Violation?} \\
\text{12} & 1628 & 4400 & \text{No} \\
\end{array}
\]

Level of Service Determination (if not F)

\[
D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 11.6 \quad \text{pc/mi/ln}
\]
\[
R \quad R \quad 12 \quad A
\]

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

Speed Estimation

Intermediate speed variable, \( S \)  \( M = 0.260 \)
Space mean speed in ramp influence area, \( S \)  \( R \)  \( S = 62.7 \) mph
Space mean speed in outer lanes, \( S \)  \( 0 \)  \( S = N/A \) mph
Space mean speed for all vehicles, \( S \)  \( S = 62.7 \) mph
Phone: 
Fax: 
E-mail: 

Diverge Analysis

Analyst: GSR
Agency/Co.: AIM ENGINEERING
Date performed: 3/28/2012
Analysis time period: AM
Freeway/Dir of Travel: I-75 WB
Junction: DESOTO BLVD OFF RAMP
Jurisdiction:
Analysis Year: 2019 DESOTO
Description:

Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1761 vph</td>
</tr>
</tbody>
</table>

Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>132 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>400 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

Adjacent Ramp Data (if one exists)

| Does adjacent ramp exist? | No |
| Volume on adjacent ramp | vph |
| Position of adjacent ramp | |
| Type of adjacent ramp | |
| Distance to adjacent ramp | ft |

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1761</td>
<td>132</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHP</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>489</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV: 0.971 0.971
Driver population factor, fP: 0.90 0.90
Flow rate, vp: 2239 168 pcph

---

**Estimation of V12 Diverge Areas**

\[ L = \quad \text{(Equation 25-8 or 25-9)} \]

\[ EQ \]

\[ P = 1.000 \quad \text{Using Equation 0} \]

\[ PD \]

\[ v = v + (v - v) P = 2239 \quad \text{pc/h} \]

---

**Capacity Checks**

\[ v = v \]

\[ v = v - v \]

\[ FO \quad F \quad R \]

\[ v = 168 \quad 2100 \quad \text{No} \]

\[ R \]

\[ v = 0 \quad \text{pc/h} \quad (\text{Equation 25-15 or 25-16}) \]

**Is**

\[ v > 2700 \quad \text{pc/h?} \quad \text{No} \]

**Is**

\[ v > 1.5 v / 2 \quad \text{No} \]

**If yes, \( v = \)**

\[ 12A \]

---

**Flow Entering Diverge Influence Area**

\[ \begin{array}{ccc}
\text{Actual} & \text{Max} & \text{Desirable} \\
2239 & 4800 & \\
\end{array} \]

**Violation?**

---

**Density,**

\[ D = 4.252 + 0.0086 v - 0.009 L = 19.9 \quad \text{pc/mi/ln} \]

\[ R \quad 12 \quad D \]

---

**Level of service for ramp-freeway junction areas of influence B**

---

**Speed Estimation**

Intermediate speed variable,

\[ D = 0.313 \]

Space mean speed in ramp influence area,

\[ S = 61.2 \quad \text{mph} \]

Space mean speed in outer lanes,

\[ S = N/A \quad \text{mph} \]

Space mean speed for all vehicles,

\[ S = 61.2 \quad \text{mph} \]
HCS+: Ramps and Ramp Junctions Release 5.21

Phone: 
Fax: 
E-mail: 

Merge Analysis

Analyst: GSR 
Agency/Co.: AIM ENGINEERING 
Date performed: 3/28/2012 
Analysis time period: AM 
Freeway/Dir of Travel: I-75 WB 
Junction: DESOTO BLVD WB ON 
Jurisdiction: 
Analysis Year: 2019 DESOTO 
Description: 

Freeway Data

Type of analysis: Merge 
Number of lanes in freeway: 2 
Free-flow speed on freeway: 70.0 mph 
Volume on freeway: 1629 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: 569 vph 
Length of first accel/decel lane: 1200 ft 
Length of second accel/decel lane: ft 

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No 
Volume on adjacent Ramp: vph 
Position of adjacent Ramp: 
Type of adjacent Ramp: 
Distance to adjacent Ramp: ft 

Conversion to pc/h Under Base Conditions

Junction Components | Freeway | Ramp | Adjacent Ramp |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1629</td>
<td>569</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHP</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>453</td>
<td>158</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV 0.971 0.971
Driver population factor, fP 1.00 1.00
Flow rate, vp 1864 651 pcph

---

Estimation of V12 Merge Areas

\[ L = \text{ (Equation 25-2 or 25-3) } \]
\[ \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ \frac{v}{F} = \frac{v}{(P \cdot FM)} = 1864 \quad \text{pc/h} \]
\[ 12 \quad F \quad FM \]

---

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = 2515</td>
<td>4800</td>
<td>No</td>
</tr>
</tbody>
</table>

\[ \begin{array}{ll}
\text{Is } v & > 2700 \text{ pc/h?} \\
\text{Is } v & > 1.5 \frac{v}{12} \\
\text{If yes, } & v = \frac{v}{12A} \\
\end{array} \]

---

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v = 1864</td>
<td>4400</td>
<td>No</td>
</tr>
</tbody>
</table>

---

Level of Service Determination (if not F)

\[ \text{Density, } D = 5.475 + 0.00734 v + 0.0078 v^2 - 0.00627 \frac{L}{R} = 17.3 \quad \text{pc/mi/ln} \]

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

---

Speed Estimation

Intermediate speed variable, \( M = 0.285 \)
Space mean speed in ramp influence area, \( S = 62.0 \) mph
Space mean speed in outer lanes, \( S = \text{N/A} \) mph
Space mean speed for all vehicles, \( S = 62.0 \) mph
Diverge Analysis

Analyst: GSR
Agency/Co.: AIM ENGINEERING
Date performed: 4/4/2012
Analysis time period: AM
Freeway/Dir of Travel: I-75 EB
Junction: SR 951 OFF RAMP
Jurisdiction: 2019 EVERGLADES
Description:

Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>2761 vph</td>
</tr>
</tbody>
</table>

Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>2</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>1462 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>500 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>0 ft</td>
</tr>
</tbody>
</table>

Adjacent Ramp Data (if one exists)

| Does adjacent ramp exist? | No |
| Volume on adjacent ramp   | vph |
| Position of adjacent ramp |     |
| Type of adjacent ramp     |     |
| Distance to adjacent ramp | ft |

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2761</td>
<td>1462</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHP</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>767</td>
<td>406</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>%</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV 0.971
Driver population factor, fP 1.00
Flow rate, vp 3160 1673 pcph

---

**Estimation of V12 Diverge Areas**

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation} \quad 0 \]
\[ v = v + (v - v) P = 3160 \quad \text{pc/h} \]
\[ 12 \\ R \quad F \quad R \quad FD \]

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3160</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>1487</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>1673</td>
<td>4100</td>
<td>No</td>
</tr>
<tr>
<td>0</td>
<td>pc/h</td>
<td>(Equation 25-15 or 25-16)</td>
</tr>
</tbody>
</table>

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3160</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

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

\[ D = 4.252 + 0.0086v - 0.009 \quad L = 22.4 \quad \text{pc/mi/ln} \]
\[ R \quad 12 \\ D \]

**Density, Level of service for ramp-freeway junction areas of influence C**

**Speed Estimation**

Intermediate speed variable, \( D = 0.449 \)
Space mean speed in ramp influence area, \( S = 57.4 \quad \text{mph} \)
Space mean speed in outer lanes, \( S = \text{N/A} \quad \text{mph} \)
Space mean speed for all vehicles, \( S = 57.4 \quad \text{mph} \)
### General Information

- **Analyst**: AL
- **Agency or Company**: AIM ENGINEERING
- **Date Performed**: 3/16/2012
- **Analysis Time Period**: AM
- **Freeway/Dir of Travel**: I-75 EB
- **Junction**: SR 951 EB ON
- **Jurisdiction**: Analysis Year 2019
- **Desoto**

### Site Information

- **Downstream Adj Ramp**: Yes
- **On**: Yes
- **Off**: No
- **Freeway Volume, V_f**: 1299
- **Ramp Volume, V_r**: 428
- **Freeway Free-Flow Speed, S_{FF}**: 70.0
- **Ramp Free-Flow Speed, S_{FR}**: 35.0

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th></th>
<th>V (Veh/hr)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%Rv</th>
<th>f_{HV}</th>
<th>f_p</th>
<th>v = V/PHF x f_{HV} x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1299</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
<td>1487</td>
</tr>
<tr>
<td>Ramp</td>
<td>428</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
<td>490</td>
</tr>
</tbody>
</table>

### Estimation of v_{12}

- \( V_{12} = V_f \times \left(\frac{P_{PM}}{1200}\right) \)
- \( \ell_{EQ} (\text{Equation 13-6 or 13-7}) \)
- \( P_{PM} = 1.00 \text{ using Equation (Exhibit 13-6)} \)
- \( \ell_{EQ} = \) \( \ell_{EQ} = \) \( \text{(Equation 13-12 or 13-13)} \)
- \( P_{FD} = \) \( P_{FD} = \) \( \text{using Equation (Exhibit 13-7)} \)
- \( V_{12} = \) \( V_{12} = \) \( \text{pc/h} \)
- \( V_3 \text{ or } V_{av34} \text{ pc/h (Equation 13-14 or 13-17)} \)
- \( V_3 \text{ or } V_{av34} > 2700 \text{ pc/h?} \) Yes No
- \( V_3 \text{ or } V_{av34} > 1.5 \times V_{12}/2 \) Yes No
- \( V_{12a} = \) \( V_{12a} = \) \( \text{pc/h (Equation 13-16, 13-18, or 13-19)} \)

### Capacity Checks

- \( V_{FO} = 1977 \text{ Exhibit 13-8} \)
- Actual | Capacity | LOS F?
- --- | --- | ---
- 1977 | Exhibit 13-8 | No

### Flow Entering Merge Influence Area

- \( V_{R12} = 1977 \text{ Exhibit 13-8} \)
- Actual | Max Desirable | Violation?
- --- | --- | ---
- 1977 | 4600:All | No

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

- \( D_R = 5.475 + 0.00734 V_r + 0.0078 V_{12} - 0.00627 L_A \)
- \( D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D \)
- \( D_R = 17.6 \text{ (pc/mln)} \)
- \( L_O S = B \text{ (Exhibit 13-2)} \)
**RAMPS AND RAMP JUNCTIONS WORKSHEET**

### General Information
- **Analyst:** AL
- **Agency or Company:** AIM ENGINEERING
- **Date Performed:** 3/8/2012
- **Analysis Time Period:** AM
- **Project Description:**

### Site Information
- **Freeway/Dir of Travel:** I-75 WB
- **Junction:** SR 951 OFF RAMP
- **Jurisdiction:**
- **Analysis Year:** 2019
- **DESOTO EVERGLADES**

### Inputs
- **Upstream Adj Ramp:** 2
- **Acceleration Lane Length, L_A:** 220
- **Deceleration Lane Length, L_D:** 220
- **Freeway Volume, V_F:** 2198
- **Ramp Volume, V_R:** 545
- **Ramp Free-Flow Speed, S_FF:** 70.0
- **Ramp Free-Flow Speed, S_FR:** 45.0

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>V (Veh/hr)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%Rv</th>
<th>f_VHV</th>
<th>f_p</th>
<th>v = V/PHF x f_VHV x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>2198</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
<td>2515</td>
</tr>
<tr>
<td>Ramp</td>
<td>545</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
<td>624</td>
</tr>
</tbody>
</table>

### Estimation of V_12

- **V_12 = V_F (P_FM)**

### Estimation of V_12

- **V_12 = V_R + (V_F - V_R)P_{FD}**

### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

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

- **D_R = 5.475 + 0.00734 V_R + 0.0078 V_{12} - 0.00627 L_A**
- **D_R = 23.9 (pc/ml/in)**
- **LOS = (Exhibit 13-2)**

---

3/21/2012
## RAMPS AND RAMP JUNCTIONS WORKSHEET

### General Information

<table>
<thead>
<tr>
<th>Analyst</th>
<th>AL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency or Company</td>
<td>AIM ENGINEERING</td>
</tr>
<tr>
<td>Date Performed</td>
<td>3/16/2012</td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>AM</td>
</tr>
</tbody>
</table>

### Site Information

<table>
<thead>
<tr>
<th>Freeway/Dir of Travel</th>
<th>I-75 WB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jurisdiction</td>
<td>SR 951 WB ON</td>
</tr>
<tr>
<td>Analysis Year</td>
<td>2019 EVERGLADES</td>
</tr>
</tbody>
</table>

### Project Description

**Inputs**

- Upstream Adj Ramp
  - Number of Lanes, N: 2
  - Acceleration Lane Length, L<sub>A</sub>: 385 ft
  - Deceleration Lane Length L<sub>D</sub>: / ft
- Downstream Adj Ramp
  - Freeway Volume, V<sub>F</sub>: 1653 ft<sup>3</sup>/h
  - Ramp Volume, V<sub>R</sub>: 1860 ft<sup>3</sup>/h

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>V (Veh/hr)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%Rv</th>
<th>f&lt;sub&gt;HV&lt;/sub&gt;</th>
<th>f&lt;sub&gt;P&lt;/sub&gt;</th>
<th>V = V/PHF x f&lt;sub&gt;HV&lt;/sub&gt; x f&lt;sub&gt;P&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1653</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
<td>1892</td>
</tr>
<tr>
<td>Ramp</td>
<td>1860</td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
<td>2129</td>
</tr>
</tbody>
</table>

### Estimation of \( v_{12} \)

\[
V_{12} = V_F \left( \frac{P_{FM}}{1.00} \right)
\]

### Estimation of \( V_{12} \)

\[
V_{12} = V_R + (V_F - V_R)P_{FD}
\]

### Capacity Checks

<table>
<thead>
<tr>
<th>V&lt;sub&gt;FO&lt;/sub&gt;</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4021</td>
<td>Exhibit 13-8</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>V&lt;sub&gt;R12&lt;/sub&gt;</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4021</td>
<td>Exhibit 13-8</td>
<td>4600:All</td>
<td>No</td>
</tr>
</tbody>
</table>

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

\[
D_R = \frac{5.475 + 0.00734 V_R + 0.0078 V_{12} - 0.00627 L_A}{33.4 \text{ (pc/mi)/ln}}
\]

\[
D_R = \frac{4.252 + 0.0086 V_{12} - 0.009 L_D}{(pc/mi)/ln}
\]
## RAMPS AND RAMP JUNCTIONS WORKSHEET

### General Information
- **Analyst**: AL
- **Agency or Company**: AIM ENGINEERING
- **Date Performed**: 3/8/2012
- **Analysis Time Period**: AM

### Site Information
- **Freeway/Dir of Travel**: I-75 NB
- **Junction**: GGP NB OFF RAMP
- **Jurisdiction**:
- **Analysis Year**: 2019

### Inputs

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream Adj Ramp</td>
<td>Yes</td>
</tr>
<tr>
<td>Number of Lanes, N</td>
<td>3</td>
</tr>
<tr>
<td>Acceleration Lane Length, L_A</td>
<td>310</td>
</tr>
<tr>
<td>Deceleration Lane Length L_D</td>
<td></td>
</tr>
<tr>
<td>Downstream Adj Ramp</td>
<td>On</td>
</tr>
<tr>
<td>Freeway Volume, V_F</td>
<td>3513</td>
</tr>
<tr>
<td>Ramp Volume, V_R</td>
<td>529</td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_FF</td>
<td>70.0</td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_FR</td>
<td>45.0</td>
</tr>
</tbody>
</table>

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>p/h</th>
<th>PHF</th>
<th>Terrain</th>
<th>% Truck</th>
<th>% RV</th>
<th>f_rv</th>
<th>f_p</th>
<th>v = V/PHF x f_rv x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td></td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
<td>4020</td>
</tr>
<tr>
<td>Ramp</td>
<td></td>
<td>0.90</td>
<td>Level</td>
<td>6</td>
<td>0</td>
<td>0.971</td>
<td>1.00</td>
<td>605</td>
</tr>
</tbody>
</table>

### Estimation of V_12

\[
L_{EQ} = \frac{V_{12}}{V_F} (P_{FM})
\]

- Equation 13-6 or 13-7
- Using Equation (Exhibit 13-6)
- \( V_{12} = \) pc/h
- \( V_3 \) or \( V_{av34} > 2,700 \) pc/h?
- Yes
- No
- \( V_3 \) or \( V_{av34} > 1.5 \times V_{12/2} \)?
- Yes
- No
- If Yes, \( V_{12a} = \) pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks

<table>
<thead>
<tr>
<th>Condition</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_FO</td>
<td></td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Condition</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{12}</td>
<td></td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

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

\[
D_R = 5.475 + 0.00734 V_R + 0.0078 V_{12} - 0.00627 L_A
\]

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

\[
D_R = 4.252 + 0.0066 V_{12} - 0.009 L_D
\]

\[
D_R = 25.2 \text{ (pc/mi/Ln)}
\]

\[
LOS = C \text{ (Exhibit 13-2)}
\]