APPENDIX I

EXISTING TRAFFIC CONDITIONS FREEWAY MERGE AND DIVERGE LEVEL OF SERVICE CALCULATION WORKSHEETS
# RAMPS AND RAMPS JUNCTIONS WORKSHEET

## General Information
- **Analyst**: JT
- **Agency or Company**: LLG
- **Date Performed**: 09/22/2015
- **Analysis Time Period**: AM Peak Hour
- **Project Description**: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

## Site Information
- **Freeway/Dir of Travel**: I-10 Westbound
- **Junction**: Cottonwood Springs Rd On-Ramp
- **Jurisdiction**: Existing

## Inputs
- **Upstream Adj Ramp**
  - Freeway Number of Lanes, N: 2
  - Ramp Number of Lanes, N: 1
  - Acceleration Lane Length, L_A: 640 ft
  - Deceleration Lane Length, L_D: 1336 ft
  - Freeway Volume, V_F: 2050 ft
  - Freeway Free-Flow Speed, S_{FF}: 7 veh/h
  - Ramp Volume, V_R: 8 veh/h
  - Ramp Free-Flow Speed, S_{FR}: 65.0 veh/h

## Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>V (Veh/h)/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>1336</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>1420</td>
</tr>
<tr>
<td>Ramp</td>
<td>8</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>9</td>
</tr>
<tr>
<td>UpStream</td>
<td>7</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>7</td>
</tr>
</tbody>
</table>

## Estimation of v_{12}

- **V_{12} = V_C (P_{FM})**
- **E_{EQ} = (Equation 13-6 or 13-7)**
- **P_{FM} = 1.000 using Equation (Exhibit 13-6)**
- **V_{12} = 1420 pc/h**
- **V_{a} or V_{a34} = 5 pc/h (Equation 13-14 or 13-17)**
- **If V_{a} or V_{a34} > 2,700 pc/h**, **Yes**, **No**

## Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>1429</td>
<td>No</td>
</tr>
</tbody>
</table>

## Flow Entering Merge Influence Area

- **Actual**: 1429
- **Max Desirable**: 4600 All
- **Violated**: No

## Level of Service Determination (if not F)

- **D_{P} = 5.475 + 0.00734 V_{R} - 0.0078 V_{12} - 0.00627 L_{A}**
- **D_{P} = 12.6 (pc/mil/hr)**
- **LOS = B (Exhibit 13-2)**

## Speed Determination

- **M_{D} = 0.292 (Exhibit 13-11)**
- **S_{R} = 58.3 mph (Exhibit 13-11)**
- **S_{D} = 0 mph (Exhibit 13-12)**
- **S = 58.3 mph (Exhibit 13-13)**
## RAMPS AND RAMP JUNCTIONS WORKSHEET

### General Information

<table>
<thead>
<tr>
<th>Analyst</th>
<th>JT</th>
<th>Freeway/Dir of Travel</th>
<th>I-10 Eastbound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency or Company</td>
<td>LLG</td>
<td>Junction</td>
<td>Cottonwood Springs Rd Off-Ramp</td>
</tr>
<tr>
<td>Date Performed</td>
<td>09/22/2015</td>
<td>Jurisdiction</td>
<td>Existing</td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>AM Peak Hour</td>
<td>Analysis Year</td>
<td>Existing</td>
</tr>
<tr>
<td>Project Description</td>
<td>2-10-3136-2 Paradise Valley Specific Plan, Riverside County</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Inputs

- **Upstream Adj Ramp:** Freeway Number of Lanes, N = 2
- **Downstream Adj Ramp:** Ramp Number of Lanes, N = 1
- **Yes** □ Yes □ On
- **Acceleration Lane Length, LA:** 250 ft
- **Deceleration Lane Length, LD:** 8 ft
- **Freeway Volume, VF:** 892 veh/h
- **VF = 892 (Equation 13-6 or 13-7)**
- **PfM = using Equation (13-6)**
- **V12 = pc/h**
- **V3 or Vav = pc/h (Equation 13-14 or 13-17)**
- **Is V3 or Vav > 2,700 veh/h?** Yes □ No
- **If Yes, V12a = pc/h (Equation 13-16, 13-18, or 13-19)**

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>(PC/CH)</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%RV</th>
<th>fHV</th>
<th>fP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>892</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
</tr>
<tr>
<td>Ramp</td>
<td>8</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
</tr>
<tr>
<td>DownStream</td>
<td>15</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
</tr>
</tbody>
</table>

### Estimation of v12

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

- **L_F = (Equation 13-6 or 13-7)**
- **P_F = using Equation (13-6)**
- **V12 = pc/h**
- **V3 or Vav = pc/h (Equation 13-14 or 13-17)**
- **Is V3 or Vav > 2,700 veh/h?** Yes □ No
- **If Yes, V12a = pc/h (Equation 13-16, 13-18, or 13-19)**

### Estimation of v12

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

- **V12 = 948 pc/h**
- **V12 = 948 pc/h (Equation 13-12 or 13-3)**
- **P_F = 1.00 using Equation (13-7)**
- **V12 = 948 pc/h**
- **V3 or Vav = 0 pc/h (Equation 13-14 or 13-17)**
- **Is V3 or Vav > 2,700 pc/h?** Yes □ No
- **If Yes, V12a = 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</td>
<td>Ex 13-8</td>
<td></td>
</tr>
<tr>
<td>V_{FD}</td>
<td>Exhibit 13-8</td>
<td>4700  No</td>
</tr>
<tr>
<td>V_R</td>
<td>Exhibit 13-8</td>
<td>4700  No</td>
</tr>
<tr>
<td>V_{R12}</td>
<td>Exhibit 13-8</td>
<td>4400 All</td>
</tr>
</tbody>
</table>

### Flow Entering Merge Influence Area

- **V_{R12} = (Equation 13-11)**
- **S_{RL} = mph (Equation 13-13)**
- **S_{R0} = mph (Equation 13-11)**
- **S = mph (Equation 13-13)**

### 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/mln)**
- **LOS = (Exhibit 13-2)**

### Speed Determination

\[ V_R = \text{(Exhibit 13-11)} \]

- **S_{RL} = mph (Equation 13-13)**
- **S_{R0} = mph (Equation 13-11)**
- **S = mph (Equation 13-13)**

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9/28/2015
RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information
- Analyst: JT
- Agency or Company: LLG
- Date Performed: 09/22/2015
- Analysis Time Period: AM Peak Hour

Project Description: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

Inputs
- Upstream Adj Ramp: Freeway Number of Lanes, N = 2
- Ramp Number of Lanes, N = 1
- No Ramp
- Acceleration Lane Length, L_A = 190 ft
- Deceleration Lane Length L_D = 68 ft
- Freeway Volume, V_F = 1344 veh/h
- Ramp Volume, V_R = 68 veh/h
- Freeway Free-Flow Speed, S_FF = 65.0
- Ramp Free-Flow Speed, S_TR = 35.0

Downstream Adj Ramp
- Yes
- On
- No
- Off
- Acceleration Lane Length, L_A = 2380 ft
- Deceleration Lane Length L_D = 119 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>
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<tbody>
<tr>
<td>Freeway</td>
<td>1344</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>1429</td>
</tr>
<tr>
<td>Ramp</td>
<td>68</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>72</td>
</tr>
<tr>
<td>DownStream</td>
<td>119</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>127</td>
</tr>
</tbody>
</table>

Estimation of $v_{12}$

$V_{12} = V_F \left( \frac{P_{FM}}{P_{FM}} \right)

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

Estimation of $v_{12}$

$V_{12} = V_R + (V_F - V_R) \frac{P_{FD}}{P_{FD}}$

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

Capacity Checks

<table>
<thead>
<tr>
<th>$V_{FO}$</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{12}</td>
<td></td>
<td>Exhibit 13-8</td>
<td></td>
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</table>

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>$V_{H12}$</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)

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

$D_R = 4.252 + 0.0986 \cdot V_{12} - 0.009 \cdot L_D$

$D_R = (pc/mln)$

$D_R = (pc/mln)$

LOS = (Exhibit 13-2)

LOS = (Exhibit 13-2)

Speed Determination

$V_S = (Exhibit 13-11)$

$S_R = mph (Exhibit 13-11)$

$S_R = mph (Exhibit 13-11)$

$S = mph (Exhibit 13-13)$

$D_I = 0.434 (Exhibit 13-12)$

$D_I = 14.8 (pc/mln)$

$D_I = (pc/mln)$

$S = 55.0 mph (Exhibit 13-12)$

$S = N/A mph (Exhibit 13-12)$

$S = 55.0 mph (Exhibit 13-13)$

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9/28/2015
### RAMPS AND RAMP JUNCTIONS WORKSHEET

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<thead>
<tr>
<th>General Information</th>
<th>Site Information</th>
</tr>
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<tbody>
<tr>
<td>Analyst</td>
<td>Freeway/Dir of Travel</td>
</tr>
<tr>
<td>Agency or Company</td>
<td>Junction</td>
</tr>
<tr>
<td>Date Performed</td>
<td>Dillon Rd On-Ramp</td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>2-10-3136-2 Paradise Valley Specific Plan, Riverside County</td>
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#### Inputs

<table>
<thead>
<tr>
<th>Upstream Adj Ramp</th>
<th>Freeway Number of Lanes, N</th>
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<tbody>
<tr>
<td>Yes</td>
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</tr>
<tr>
<td>No</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ramp Number of Lanes, N</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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</table>

<table>
<thead>
<tr>
<th>Acceleration Lane Length, L_A</th>
</tr>
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<tbody>
<tr>
<td>700 ft</td>
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</table>

<table>
<thead>
<tr>
<th>Deceleration Lane Length, L_D</th>
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</thead>
<tbody>
<tr>
<td>803 ft</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Freeway Volume, V_F</th>
</tr>
</thead>
<tbody>
<tr>
<td>803 veh/h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Upstream Ramp Volume, V_R</th>
</tr>
</thead>
<tbody>
<tr>
<td>89</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Freeway Free-Flow Speed, S_{FF}</th>
</tr>
</thead>
<tbody>
<tr>
<td>65.0 veh/h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ramp Free-Flow Speed, S_{FR}</th>
</tr>
</thead>
<tbody>
<tr>
<td>35.0 veh/h</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>%Vr</th>
<th>f_{HV}</th>
<th>f_p</th>
<th>V = V/PHF</th>
<th>f_{HV}</th>
<th>f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>803</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>854</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ramp</td>
<td>89</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
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<tr>
<td>Upstream</td>
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<tr>
<td>Downstream</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Estimation of v_{12}

\[ V_{12} = V_F \left( \frac{P_{FM}}{P_{FM} + 1.000} \right) \]

\[ V_{12} = V_F \left( \frac{V_{P1}}{V_{P1} + V_{P2}} \right) \]

\[ V_{12} = V_R \left( \frac{V_{F}}{V_{F} - V_{R}} \right) \]

#### Estimation of v_{12}

<table>
<thead>
<tr>
<th>Merge Areas</th>
<th>Diverge Areas</th>
</tr>
</thead>
</table>

#### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{F0}</td>
<td>949</td>
<td>Exhibit 13-8</td>
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<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
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<tr>
<td>V_{F}</td>
<td>Exhibit 13-8</td>
<td></td>
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<table>
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<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
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</thead>
<tbody>
<tr>
<td>V_{R}</td>
<td>Exhibit 13-10</td>
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#### Flow Entering Merge Influence Area

<table>
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<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td>949</td>
<td>4600 ALL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{12}</td>
<td>949</td>
<td></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>V_{R12}</td>
<td>949</td>
<td>4600 ALL</td>
</tr>
</tbody>
</table>

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

\[ D_R = 5.475 + 0.00734 V_R + 0.0078 V_{12} + 0.00827 L_A \]

\[ D_R = 8.4 \text{ (pc/mi/hr)} \]

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

#### Speed Determination

\[ M_R = 0.282 \text{ (Exhibit 13-11)} \]

\[ S_R = 58.5 \text{ mph (Exhibit 13-11)} \]

\[ V_R = \text{N/A mph (Exhibit 13-11)} \]

\[ S = 58.5 \text{ mph (Exhibit 13-13)} \]

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### General Information
- **Analyst:** JT
- **Agency or Company:** LLG
- **Date Performed:** 09/22/2015
- **Project Description:** 2-10-3135-2 Paradise Valley Specific Plan, Riverside County

### Site Information
- **Freeway/Dr of Travel:** I-10 Westbound
- **Junction:** Golf Center Pkwy Off-ramp
- **Jurisdiction:**

### Inputs
- **Upstream Adj Ramp:**
  - Freeway Number of Lanes, N: 4
  - Ramp Number of Lanes, N: 1
  - Acceleration Lane Length, L_A: 235 ft
  - Deceleration Lane Length, L_D: 139 ft
  - Freeway Volume, V_f: 2464 veh/h
  - Ramp Volume, V_R: 139 veh/h
  - Freeway Free-Flow Speed, S_ff: 65.0 veh/h
  - Ramp Free-Flow Speed, S_rr: 35.0 veh/h

- **Downstream Adj Ramp:**
  - Yes
  - Ramp Number of Lanes, N: 1
  - Acceleration Lane Length, L_A: 1950 ft
  - Deceleration Lane Length, L_D: 1950 ft
  - Freeway Volume, V_f: 534 veh/h

### Conversion to pc/h Under Base Conditions
- **Freeway:**
  - V = 2464 (pc/h)
  - PHF = 0.95
  - Terrain = Level
  - %Truck = 2%
  - %Rv = 0
  - f_HV = 0.990
  - f_p = 1.00
  - V = V/PHF x f_HV x f_p

### Estimation of \( V_{12} \)
- \( V_{12} = V_f \times (P_{FM}) \)
- \( P_{FM} = \) using Equation (13-6 or 13-7)
- \( V_{12} = \) pc/h
- \( V_f \) or \( V_{awd} \) = pc/h (Equation 13-14 or 13-17)
  - If \( V_f \) or \( V_{awd} > 2700 \) pc/h: Yes
  - If \( V_f \) or \( V_{awd} > 1.5 \times V_{12} / 2 \): Yes

### Capacity Checks
- **V_Fo**
  - Exhibit 13-8

### Flow Entering Merge Influence Area
- **Actual**
- **Desirable**
- **Violation?**

### Level of Service Determination (if not F)
- **D_R = 5.475 + 0.00734 \* V_f + 0.0078 \* V_12 - 0.00627 \* L_A**
- **D_R = 4.252 + 0.0086 \* V_12 - 0.009 \* L_D**
- **D_R = \( (pc/mln) \)**
- **LOS = (Equation 13-2)**

### Speed Determination
- **M_S = (Equation 13-11)**
- **S_R = mph (Equation 13-11)**
- **S_H = mph (Equation 13-11)**
- **S = mph (Equation 13-13)**

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### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst**: JT
- **Agency or Company**: LLG
- **Date Performed**: 09/22/2015
- **Analysis Time Period**: AM Peak Hour
- **Project Description**: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

#### Site Information
- **Freeway/Dir of Travel**: I-10 Eastbound
- **Junction**: Gold Center Pkwy On-Ramp
- **Jurisdiction**: Existing

#### Inputs
- **Upstream Adj Ramp**: Freeway Number of Lanes, N = 3
  - Ramp Number of Lanes, N = 1
  - Acceleration Lane Length, L_A = 1500 ft
  - Deceleration Lane Length, L_D = 1500 ft
  - Freeway Volume, V_f = 1674 veh/h
  - Ramp Volume, V_R = 155 veh/h
  - Freeway Free-Flow Speed, S_FF = 65.0
  - Ramp Free-Flow Speed, S_R = 35.0
- **Downstream Adj Ramp**: Yes, On
- **V_12 = 2220 ft**
- **V_m = 301 veh/h**

#### Conversion to pc/h Under Base Conditions
- **Freeway**: 1674, 0.95, Level, 2, 0, 0.990, 1.00, 1.00, 1780
- **Ramp**: 155, 0.95, Level, 2, 0, 0.990, 1.00, 1.00, 155
- **UpStream**: 301, 0.94, Level, 0, 0, 1.000, 1.00, 1.00, 320

#### Estimation of \( V_{12} \)
- \( V_{12} = V_f \cdot P_{FM} \)
  - \( P_{FM} = 0.819 \) using Equation (13-6)
  - \( V_12 = 1103 \) pc/h
  - \( V_3 = 677 \) pc/h (Equation 13-14 or 13-17)
- \( V_3 = 2700 \) pc/h? Yes, No

#### Estimation of \( V_{12} \)
- \( V_{12} = V_r + (V_f - V_D)P_{FD} \)
  - \( P_{FD} = \) using Equation (Exhibit 13-7)
  - \( V_12 = \) pc/h
  - \( V_D = \) pc/h (Equation 13-14 or 13-17)
- \( V_3 = 2700 \) pc/h? Yes, No

#### Capacity Checks
- **V_F0**: 1945, Exhibit 13-8, No

#### Flow Entering Merge Influence Area
- **V_{12}**: 1288, Exhibit 13-8, 4600 All, No, V_{12}, Exhibit 13-8

#### Level of Service Determination (if not F)
- \( D_R = 5.475 + 0.00734 \cdot V_f + 0.0078 \cdot V_{12} - 0.00627 \cdot L_A \)
- \( D_R = 5.9 \) (pc/mi/ln)
- \( \text{LOS} = \text{(Exhibit 13-2)} \)

#### Speed Determination
- \( V_m = 0.230 \) (Exhibit 13-11)
- \( S_H = 59.7 \) mph (Exhibit 13-11)
- \( S_B = 64.4 \) mph (Exhibit 13-11)
- \( S = 61.5 \) mph (Exhibit 13-13)
RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: JT
Freeway/Dir. of Travel: I-10 Westbound
Agency or Company: LLG
Junction: Monroe St Off-Ramp
Date Performed: 09/22/2015
Jurisdiction: Monroe St Off-Ramp
Analysis Time Period: AM Peak Hour
Analysis Year: Existing
Project Description: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

Inputs

Upstream Adj Ramp: Freeway Number of Lanes, N = 3
Ramp Number of Lanes, N = 1
Acceleration Lane Length, L_A = 180 ft
Deceleration Lane Length, L_D = 180 ft
Freeway Volume, V_F = 3690 veh/h
Ramp Volume, V_R = 255 veh/h
Freeway Free-Flow Speed, S_FF = 65.0 veh/h
Ramp Free-Flow Speed, S_R = 35.0 veh/h

Downstream Adj Ramp: Yes
On
Yes
On
Yes
On

Conversion to pc/h Under Base Conditions

(pch) V (Veh/hr) PHF Terrain %Truck %Rv f_NV f_p
Freeway 3690 0.95 Level 2 0 0.990 1.00 3923
Ramp 255 0.95 Level 2 0 0.990 1.00 271
DownStream 766 0.94 Level 0 0 1.000 1.00 815

Diverge Areas

Estimation of V_12

V_12 = V_F (P_Pmax)
V_12 = (Equation 13-6 or 13-7)
P_Pmax = using Equation (Exhibit-16)
V_12 = pc/h
V_3 or V_34 > 2,700 pch? Yes No
Is V_3 or V_34 > 1.5 * V_12? Yes No
If Yes, V_12 = pc/h (Equation 13-16, 13-18, or 13-19)

Capacity Checks

V_F = Exhibit 13-8

Flow Entering Merge Influence Area

V_M = Exhibit 13-8

Level of Service Determination (if not F)

D_R = 5.475 + 0.00734 V_R + 0.0078 V_12 - 0.00527 L_A
D_R = (pc/mi/ln)
LOS = (Exhibit 13-2)

Speed Determination

M_R = (Exhibit 13-11)
S_R = mph (Exhibit 13-11)
S_0 = mph (Exhibit 13-11)
S = mph (Exhibit 13-13)

D_R = 4.252 + 0.0086 V_12 - 0.009 L_D
D_R = (pc/mi/ln)
LOS = C (Exhibit 13-2)

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9/28/2015
### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst:** JT
- **Agency or Company:** LLG
- **Date Performed:** 09/22/2015
- **Analysis Time Period:** AM Peak Hour
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

#### Site Information
- **Freeway/Dir of Travel:** I-10 Eastbound
- **Junction:** Monroe St On-Ramp
- **Jurisdiction:** Existing

#### Inputs
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
<th>Equation/Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream Adj Ramp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ramp Number of Lanes, N</td>
<td>3</td>
<td>Freeway Number of Lanes, N</td>
<td></td>
</tr>
<tr>
<td>Ramp Number of Lanes, N</td>
<td>1</td>
<td>Ramp Number of Lanes, N</td>
<td></td>
</tr>
<tr>
<td>Acceleration Lane Length, L_A</td>
<td>870</td>
<td>Acceleration Lane Length, L_A</td>
<td></td>
</tr>
<tr>
<td>Deceleration Lane Length, L_D</td>
<td></td>
<td>Deceleration Lane Length, L_D</td>
<td></td>
</tr>
<tr>
<td>Freeway Volume, V_F</td>
<td>2288</td>
<td>Freeway Volume, V_F</td>
<td></td>
</tr>
<tr>
<td>Ramp Volume, V_R</td>
<td>182</td>
<td>Ramp Volume, V_R</td>
<td></td>
</tr>
<tr>
<td>Upstream Free-Flow Speed, S_FF</td>
<td>65.0</td>
<td>Upstream Free-Flow Speed, S_FF</td>
<td></td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_RR</td>
<td>35.0</td>
<td>Ramp Free-Flow Speed, S_RR</td>
<td></td>
</tr>
</tbody>
</table>

#### Conversion to pc/h Under Base Conditions
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
<th>Equation/Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway Veh/h</td>
<td>2288</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ramp Veh/h</td>
<td>182</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upstream Veh/h</td>
<td>406</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Downstream Veh/h</td>
<td>406</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Estimation of \( v_{12} \)
- **V_{12} = V_F \cdot P_{FM} \)
- **P_{FM} = 0.602 \text{ pc/h} \) using Equation (13-6)
- **V_{12} = 1464 \text{ pc/h} \)
- **V_{12} = 969 \text{ pc/h} \) using Equation (13-14 or 13-17)
- **V_{12} = V_R + (V_F - V_R) \cdot P_{FO} \)

#### Estimation of \( v_{12} \)
- **V_{12} = V_R + (V_F - V_R) \cdot P_{FO} \)

#### Capacity Checks
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
<th>Equation/Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>2625</td>
<td></td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

#### Flow Entering Merge Influence Area
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
<th>Equation/Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td>1657</td>
<td></td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

#### Speed Determination
- **M_s = 0.281 (Exhibit 13-11) \)
- **S_R = 58.5 \text{ mph} (Exhibit 13-11) \)
- **S_0 = 63.3 \text{ mph} (Exhibit 13-11) \)
- **S = 60.2 \text{ mph} (Exhibit 13-13) \)

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10/20/2015
## RAMPS AND RAMP JUNCTIONS WORKSHEET

### General Information
- **Analyst:** JT
- **Freeway/Dir of Travel:** I-10 Westbound
- **Agency or Company:** LLG
- **Junction:** Washington St Off-Ramp
- **Date Performed:** 09/22/2015
- **Jurisdiction:**
- **Analysis Time Period:** AM Peak Hour
- **Analysis Year:** Existing
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

### Site Information
- **Upstream Adj Ramp:** Freeway Number of Lanes, N = 3
  - Ramp Number of Lanes, N = 1
  - Acceleration Lane Length, L_A = 240
  - Free Flow Volume, V_F = 4958
  - Ramp Volume, V_R = 667
  - Free Flow Speed, S_FF = 65.0
- **Downstream Adj Ramp:** Ramp Free Flow Speed, S_FFR = 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>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>4958</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>5271</td>
</tr>
<tr>
<td>Ramp</td>
<td>867</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>709</td>
</tr>
<tr>
<td>DownStream</td>
<td>679</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>722</td>
</tr>
</tbody>
</table>

### Estimation of V_{12}

<table>
<thead>
<tr>
<th>V_{12} = V_F (P_{FM})</th>
</tr>
</thead>
<tbody>
<tr>
<td>L_{FO} =</td>
</tr>
<tr>
<td>P_{FM} = using Equation (Exhibit-13-6)</td>
</tr>
<tr>
<td>V_{12} = pch/h</td>
</tr>
<tr>
<td>V_3 or V_{av34} = pch/h using Equation (Exhibit-13-14 or 13-17)</td>
</tr>
<tr>
<td>Is V_3 or V_{av34} &gt; 2.700?</td>
</tr>
<tr>
<td>Is V_3 or V_{av34} &gt; 1.5 * V_{12}?</td>
</tr>
<tr>
<td>If Yes, V_{12a} = pch/h (Exhibit-13-16, 13-18, or 13-19)</td>
</tr>
</tbody>
</table>

### Diverge Areas

<table>
<thead>
<tr>
<th>V_{12} = V_R + (V_F - V_R)P_{FD}</th>
</tr>
</thead>
<tbody>
<tr>
<td>L_{FO} =</td>
</tr>
<tr>
<td>P_{FD} = 0.595 using Equation (Exhibit-13-7)</td>
</tr>
<tr>
<td>V_{12} = 3426 pc/h</td>
</tr>
<tr>
<td>V_3 or V_{av34} = 1845 pc/h (Exhibit-13-14 or 13-17)</td>
</tr>
<tr>
<td>Is V_3 or V_{av34} &gt; 2.700?</td>
</tr>
<tr>
<td>Is V_3 or V_{av34} &gt; 1.5 * V_{12}?</td>
</tr>
<tr>
<td>If Yes, V_{12a} = pch/h (Exhibit-13-16, 13-18, or 13-19)</td>
</tr>
</tbody>
</table>

### Capacity Checks

<table>
<thead>
<tr>
<th>V_{FO} = V_F - V_R</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO} = 5271</td>
<td>Exhibit-13-8</td>
<td>7050</td>
<td>No</td>
</tr>
<tr>
<td>V_{R} = 4562</td>
<td>Exhibit-13-8</td>
<td>7050</td>
<td>No</td>
</tr>
<tr>
<td>709</td>
<td>Exhibit-13-10</td>
<td>2000</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>V_{R12} = 3426</td>
<td>Exhibit-13-8</td>
<td>4400:All</td>
<td>No</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>D_R = 5.475 + 0.00754 V_R + 0.0078 V_{12} * 0.00627 L_A</th>
</tr>
</thead>
<tbody>
<tr>
<td>D_R = (pc/mln)</td>
</tr>
<tr>
<td>LOS = (Exhibit 13-2)</td>
</tr>
<tr>
<td>M_8 = (Exhibit 13-11)</td>
</tr>
<tr>
<td>S_8 = mph (Exhibit 13-11)</td>
</tr>
<tr>
<td>S_0 = mph (Exhibit 13-11)</td>
</tr>
<tr>
<td>S = mph (Exhibit 13-13)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D_R = 4.252 + 0.0386 V_{12} - 0.009 L_D</th>
</tr>
</thead>
<tbody>
<tr>
<td>D_R = 31.6 (pc/mln)</td>
</tr>
<tr>
<td>LOS = D (Exhibit 13-2)</td>
</tr>
</tbody>
</table>

### Speed Determination

9/28/2015
### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst:** JT
- **Freeway/Dir of Travel:** I-10 Eastbound
- **Agency or Company:** LLG
- **Junction:** Washington St On-Ramp
- **Date Performed:** 09/22/2015
- **Jurisdiction:** Analysis
- **Time Period:** AM Peak Hour
- **Analysis Year:** Existing
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

#### Inputs
- **Upstream Adj Ramp:**
  - Freeway Number of Lanes, N
  - Ramp Number of Lanes, N
  - Yes □ Yes □ On
  - Acceleration Lane Length, L_a
  - Deceleration Lane Length, L_d
  - Freeway Volume, V_F
  - Ramp Volume, V_R
  - L_up = 2050 ft
  - V_u = 784 veh/h

- **Downstream Adj Ramp:**
  - Ramp Free-Flow Speed, S_FF
  - Ramp Free-Flow Speed, S_FF

#### 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_{IV}</th>
<th>f_p</th>
<th>v = V/PHF x f_{IV} x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>2543</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>2704</td>
</tr>
<tr>
<td>Ramp</td>
<td>454</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>461</td>
</tr>
<tr>
<td>Upstream</td>
<td>784</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>834</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>

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

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

\[ L_{EQ} = 398.55 \quad \text{(#13-6 or 13-7)} \]

\[ P_{FM} = 0.596 \quad \text{(#13-6)} \]

\[ V_{12} = 1612 \quad \text{pc/h} \]

\[ V_3 \text{ or } V_{av34} = 1092 \quad \text{pc/h (#13-14 or 13-17)} \]

Is \( V_3 \text{ or } V_{av34} > 2700 \text{pc/h?} \) □ Yes □ No

Is \( V_3 \text{ or } V_{av34} > 1.5 \times V_{12} \) □ Yes □ No

If Yes, \( V_{12a} = 1612 \quad \text{pc/h (#13-16, 13-18, or 13-19)} \)

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

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

\[ L_{FD} = 398.55 \quad \text{(#13-12 or 13-13)} \]

\[ P_{FD} = 0.596 \quad \text{(#13-7)} \]

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

Is \( V_3 \text{ or } V_{av34} > 2700 \text{pc/h?} \) □ Yes □ No

Is \( V_3 \text{ or } V_{av34} > 1.5 \times V_{12} \) □ Yes □ No

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

#### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>F_D \footnote{F_D M_3}</td>
<td>3165</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

#### Flow Entering Merge Influence Area

- **Actual:** 2073
- **Max Desirable:** 4600
- **Violation?:** No

#### Flow Entering Diverge Influence Area

- **Actual:** 2073
- **Max Desirable:** 4600
- **Violation?:** No

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

\[ D_R = \frac{5.475 + 0.00734 V_R + 0.0078 V_{12} - 0.00627 L_A}{17.3 (pc/mln)} \]

\[ D_R = \frac{4.252 + 0.0086 V_{12} - 0.0092 L_D}{17.3 (pc/mln)} \]

#### Speed Determination

\[ M_S = 0.306 \quad \text{(Exhibit 13-11)} \]

\[ S_R = 58.0 \quad \text{mph (Exhibit 13-11)} \]

\[ S_{av} = 62.9 \quad \text{mph (Exhibit 13-11)} \]

\[ S = 59.6 \quad \text{mph (Exhibit 13-13)} \]

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9/28/2015
## General Information

<table>
<thead>
<tr>
<th>Analyst</th>
<th>JT</th>
<th>Freeway/Dir of Travel</th>
<th>I-10 Westbound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency or Company</td>
<td>LLG</td>
<td>Junction</td>
<td>Cook St Off-Ramp</td>
</tr>
<tr>
<td>Date Performed</td>
<td>09/22/2015</td>
<td>Jurisdiction</td>
<td></td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>AM Peak Hour</td>
<td>Analysis Year</td>
<td>Existing</td>
</tr>
</tbody>
</table>

| Project Description | 2-10-3136-2 Paradise Valley Specific Plan, Riverside County |

## Inputs

<table>
<thead>
<tr>
<th>Upstream Adj Ramp</th>
<th>Freeway Number of Lanes, N</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramp Number of Lanes, N</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>□ Yes □ On</td>
<td>Acceleration Lane Length, L_A</td>
<td></td>
</tr>
<tr>
<td>□ No □ Off</td>
<td>Deceleration Lane Length, L_D</td>
<td>190</td>
</tr>
<tr>
<td>Freeway Volume, V_F</td>
<td>6338</td>
<td></td>
</tr>
<tr>
<td>L_up = ft</td>
<td>Ramp Volume, V_R</td>
<td>934</td>
</tr>
<tr>
<td>V_u = veh/h</td>
<td>Freeway Free-Flow Speed, S_FF</td>
<td>65.0</td>
</tr>
<tr>
<td>□ Yes □ On</td>
<td>Ramp Free-Flow Speed, S_FF</td>
<td>934</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Downstream Adj Ramp</th>
</tr>
</thead>
</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_IW</th>
<th>f_p</th>
<th>V = V_PHF x f_IW x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>6338</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.995</td>
<td>1.00</td>
<td>6738</td>
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<td>Ramp</td>
<td>934</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.995</td>
<td>1.00</td>
<td>934</td>
</tr>
</tbody>
</table>

## Merger Areas

| Downstream | 251 | 0.94 | Level | 0 | 0 | 1.000 | 1.00 | 267 |

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

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

\( L_{EQ} = \) (Equation 13-6 or 13-7)

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

\( V_{12} = \) pc/h

Is \( V_2 \) or \( V_{av34} \) > 2,700 pc/h? □ Yes □ No

Is \( V_2 \) or \( V_{av34} \) > (Equation 13-14 or 13-17)

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

\( V_{12} = V_F + V_{R} - V_{R} P_{FD} \)

\( L_{FD} = \) (Equation 13-12 or 13-13)

\( P_{FD} = \) 0.546 using Equation (Exhibit 13-7)

\( V_{12} = \) pc/h

Is \( V_2 \) or \( V_{av34} \) > 2,700 pc/h? □ Yes □ No

Is \( V_2 \) or \( V_{av34} \) > 1.5 \* \( V_{av34} \)? □ Yes □ No

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

## Capacity Checks

### Merge Areas

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

### Diverge Areas

| \( V_{FO} \) = \( V_{F} - V_{R} \) | Actual | Exhibit 13-8 | 7050 | No |
| \( V_{FO} \) = \( V_{F} - V_{R} \) | Actual | Exhibit 13-8 | 7050 | No |
| \( V_{R} \) | 993 | Exhibit 13-10 | 2000 | No |

## Flow Entering Merge Influence Area

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

## Level of Service Determination (if not F)

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

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

\( LOS = \) (Exhibit 13-2)

## Speed Determination

\[
M_S = \text{(Exhibit 13-11)}
\]

\( S_6 = \) (Exhibit 13-11)

\( S_8 = \) (Exhibit 13-11)

\( S = \) (Exhibit 13-13)

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

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

\( LOS = \) E (Exhibit 13-2)

## Generated: 9/28/2015 3:01 PM
## RAMPS AND RAMP JUNCTIONS WORKSHEET

### General Information
- **Analyst**: JT
- **Agency or Company**: LLC
- **Date Performed**: 09/22/2015
- **Analysis Time Period**: AM Peak Hour
- **Project Description**: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

### Site Information
- **Freeway/Dir of Travel**: I-10 Eastbound
- **Junction**: Cook St On-Ramp
- **Jurisdiction**: Existing

### Inputs
- **Upstream Adj Ramp**: Freeway Number of Lanes, N = 3
- **Ramp Number of Lanes, N**: 1
- **Acceleration Lane Length, L_A**: 670 ft
- **Deceleration Lane Length, L_D**: 2987 ft
- **Freeway Volume, V_F**: 340 veh/h
- **Ramp Volume, V_R**: 834 veh/h
- **Freeway Free-Flow Speed, S_{FF}**: 65.0 veh/h
- **Ramp Free-Flow Speed, S_{RF}**: 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_{NV}</th>
<th>f_p</th>
<th>v = V/PHF x f_{NV} x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>2987</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>3176</td>
</tr>
<tr>
<td>Ramp</td>
<td>340</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>361</td>
</tr>
<tr>
<td>UpStream</td>
<td>834</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>887</td>
</tr>
</tbody>
</table>

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

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

- **L_EQ**: 482.60 ft (Equation 13-6 or 13-7)
- **P_{FM}**: 0.596 using Equation (13-6)
- **V_{12}**: 1894 pc/h
- **V_{3 or V_{av34}}**: 1282 pc/h (Equation 13-14 or 13-17)

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

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

- **P_{FD}**: using Equation (13-12 or 13-13)
- **V_{12}**: pc/h
- **V_{3 or V_{av34}}**: pc/h (Equation 13-14 or 13-17)

### Capacity Checks

<table>
<thead>
<tr>
<th>( V_{FD} )</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3537 pc/h</td>
<td>Exhibit 13-8</td>
<td>No</td>
<td></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>2255 pc/h</td>
<td>Exhibit 13-8</td>
<td>4600 All</td>
<td>No</td>
</tr>
</tbody>
</table>

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

- \( D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} + 0.00627 L_A \)
- \( D_R = 18.7 (pc/mln) \)
- \( LOS = B (Exhibit 13-2) \)

### Speed Determination

- \( V_S = 0.311 (Exhibit 13-11) \)
- \( S_R = 57.8 mph (Exhibit 13-11) \)
- \( S_0 = 62.2 mph (Exhibit 13-11) \)
- \( S = 59.3 mph (Exhibit 13-13) \)
**RAMPS AND RAMP JUNCTIONS WORKSHEET**

### General Information
- **Analyst:** JT
- **Freeway/Dir of Travel:** I-10 Westbound
- **Agency or Company:** LLG
- **Junction:** Cottonwood Springs Rd On-Ramp
- **Date Performed:** 09/22/2015
- **Jurisdiction:**
- **Analysis Time Period:** PM Peak Hour
- **Analysis Year:** Existing
- **Project Description:** 2-10-3138-2 Paradise Valley Specific Plan, Riverside County

### Site Information
- **Upstream Adj Ramp:** Freeway Number of Lanes, N = 2
- **Ramp Number of Lanes, N = 1**
- **Acceleration Lane Length, L_A = 640 ft**
- **Deceleration Lane Length, L_D**
- **Freeway Volume, V_F = 1253 veh/h**
- **Ramp Volume, V_R = 12 veh/h**
- **Freeway Free-Flow Speed, S_{FF} = 65.0 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>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1253</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>1332</td>
</tr>
<tr>
<td>Ramp</td>
<td>12</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>13</td>
</tr>
<tr>
<td>UpStream</td>
<td>17</td>
<td>0.94</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>18</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>

### Estimation of v_{12}

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

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

\[ P_{FM} = 1.00 \text{ using Equation (Exhibit 13-6)} \]

\[ V_{12} = 1332 \text{ pc/h} \]

\[ V_{av34} = 0 \text{ pc/h (Equation 13-14 or 13-17)} \]

Is \( V_3 \) or \( V_{av34} > 2,700 \text{ pc/h} \)?

| Yes | No |

Is \( V_3 \) or \( V_{av34} > 1.5 \cdot V_{12} \)?

| Yes | No |

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

### Estimation of v_{12}

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

\[ L_{EQ} = \text{Equation 13-12 or 13-13} \]

\[ P_{FM} = \text{using Equation (Exhibit 13-7)} \]

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

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

Is \( V_3 \) or \( V_{av34} > 2,700 \text{ pc/h} \)?

| Yes | No |

Is \( V_3 \) or \( V_{av34} > 1.5 \cdot V_{12} \)?

| Yes | No |

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

### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{FD} )</td>
<td>1345</td>
<td>Exhibit 13-8</td>
<td>No</td>
<td>( V_F )</td>
<td>Exhibit 13-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>( V_{FD} = V_F - V_R )</td>
<td>Exhibit 13-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>( V_R )</td>
<td>Exhibit 13-10</td>
</tr>
</tbody>
</table>

### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{R12} )</td>
<td>1345</td>
<td>Exhibit 13-8</td>
<td>4600:All</td>
<td>No</td>
<td>( V_{12} )</td>
</tr>
</tbody>
</table>

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

\[ D_R = 5.475 + 0.00734 \cdot V_R + 0.0078 \cdot V_{12} - 0.00527 \cdot L_A \]

\[ D_R = 11.9 \text{ pc/mi} \]

\[ L_O S = \text{B (Exhibit 13-2)} \]

### Speed Determination

\[ V_a = 0.291 \text{ (Exhibit 13-11)} \]

\[ S_R = 58.3 \text{ mph (Exhibit 13-11)} \]

\[ S_P = \text{N/A mph (Exhibit 13-11)} \]

\[ S = 58.3 \text{ mph (Exhibit 13-13)} \]

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

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

\[ D_R = \text{pc/mi} \]

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

\[ \text{S}_{4} = \text{mph (Exhibit 13-12)} \]

\[ \text{S}_{6} = \text{mph (Exhibit 13-12)} \]

\[ \text{S} = \text{mph (Exhibit 13-13)} \]
RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: JT
Agency or Company: LLG
Date Performed: 09/22/2015
Analysis Time Period: PM Peak Hour
Project Description: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

Freeway/Dir of Travel: I-10 Eastbound
Junction: Cottonwood Springs Rd Off-Ramp
Jurisdiction: Existing

Inputs

Upstream Adj Ramp: Freeway Number of Lanes, N = 2
Ramp Number of Lanes, N = 1
Acceleration Lane Length, L_A = 250 ft
Deceleration Lane Length, L_D = 1980 ft
Freeway Volume, V_F = 824 veh/h
Ramp Volume, V_R = 10 veh/h
Freeway Free-Flow Speed, S_FF = 65.0 mph
Ramp Free-Flow Speed, S_FF = 35.0 mph

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>fHV</th>
<th>f_p</th>
<th>v = V/PHF \times fHV \times f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>824</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.95</td>
<td>1.00</td>
<td>876</td>
</tr>
<tr>
<td>Ramp</td>
<td>10</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.95</td>
<td>1.00</td>
<td>11</td>
</tr>
<tr>
<td>DownStream</td>
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<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.00</td>
<td>1.00</td>
<td>12</td>
</tr>
</tbody>
</table>

Estimation of v_{12}

\[ V_{12} = V_F \left( P_{FM} \right) \]
\[ L_{ED} = \] (Equation 13-6 or 13-7)
\[ P_{FM} = \] (Equation 13-6)
\[ V_{12} = \] pc/h
\[ V_3 \text{ or } V_{av34} = \] pc/h (Equation 13-14 or 13-17)
\[ \text{If } V_3 \text{ or } V_{av34} > 2,700 \text{pc/h} \]
\[ \text{If } V_3 \text{ or } V_{av34} > 1.5 \times V_{y2}^2 \]
\[ \text{If } \text{we have } V_{12a} = \] pc/h (Equation 13-16, 13-18, or 13-19)

Estimation of v_{12}

\[ V_{12} = V_R + (V_F - V_R)P_{FD} \]
\[ L_{ED} = \] (Equation 13-12 or 13-13)
\[ P_{FD} = \] (Equation 13-7)
\[ V_{12} = \] 876 pc/h
\[ V_3 \text{ or } V_{av34} = \] 0 pc/h (Equation 13-14 or 13-17)
\[ \text{If } V_3 \text{ or } V_{av34} > 2,700 \text{pc/h} \]
\[ \text{If } V_3 \text{ or } V_{av34} > 1.5 \times V_{y2}^2 \]
\[ \text{If } \text{we have } V_{12a} = \] 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>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>Exhibit 13-8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Flow Entering Merge Influence Area

Actual | Max Desirable | Violation? | Actual | Max Desirable | Violation?
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td>Exhibit 13-8</td>
<td></td>
<td></td>
<td></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/mln)
\[ \text{LOS} = \] (Exhibit 13-2)
\[ V_3 = \] (Exhibit 13-11)
\[ S_{R} = \] mph (Exhibit 13-11)
\[ S_{R} = \] mph (Exhibit 13-11)
\[ S = \] mph (Exhibit 13-13)

Speed Determination

\[ D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D \]
\[ S = \] mph (Exhibit 13-11)
\[ S_{R} = \] mph (Exhibit 13-12)
\[ S_{R} = \] mph (Exhibit 13-12)
\[ S = \] mph (Exhibit 13-13)

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO} = V_F - V_R</td>
<td>Exhibit 13-8</td>
<td>4700</td>
</tr>
<tr>
<td>V_{R} = 11</td>
<td>Exhibit 13-10</td>
<td>2000</td>
</tr>
<tr>
<td>V_{12} = 876</td>
<td>Exhibit 13-8</td>
<td>4400:All</td>
</tr>
</tbody>
</table>

Generated: 9/28/2015 3:01 PM
### RAMPS AND RAMP JUNCTIONS WORKSHEET

<table>
<thead>
<tr>
<th>General Information</th>
<th>Site Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst</td>
<td>Freeway/Dir of Travel</td>
</tr>
<tr>
<td>Agency or Company</td>
<td>Junction</td>
</tr>
<tr>
<td>Date Performed</td>
<td>Dillon Rd Off-Ramp</td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>PM Peak Hour</td>
</tr>
<tr>
<td>Project Description</td>
<td>2-10-3136-2 Paradise Valley Specific Plan, Riverside County</td>
</tr>
</tbody>
</table>

#### Inputs

- **Upstream Adj Ramp**: Freeway Number of Lanes, N = 2
- **Ramp Number of Lanes, N** = 1
- **Acceleration Lane Length, L_A** = 190 ft
- **Deceleration Lane Length, L_D** = 140 ft
- **Freeway Volume, V_F** = 1265 vph
- **Ramp Volume, V_R** = 140 vph
- **Freeway Free-Flow Speed, S_FF** = 65.0 veh/h
- **Ramp Free-Flow Speed, S_FF** = 35.0 veh/h
- **Yes** □/ **On** □
- **No** □/ **Off** □

#### 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_V</th>
<th>f_p</th>
<th>( v = \frac{V}{PHF} \times f_V \times f_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1265</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
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<tr>
<td>Ramp</td>
<td>140</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>149</td>
</tr>
<tr>
<td>DownStream</td>
<td>148</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>157</td>
</tr>
</tbody>
</table>

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

\[ v_{12} = V_{12} = \frac{V}{PHF} \times \frac{P_{FM}}{L_{EQ}} \]

- **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)

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

\[ v_{12} = V_{12} = V_{R} + (V_{F} - V_{R}) \times \frac{P_{FD}}{L_{EQ}} \]

- **L_EQ** (Equation 13-12 or 13-13)
- **P_{FD}** = 1.00 using Equation (Exhibit 13-7)
- **V_{12}** = 1345 pc/h
- **V_3 or V_{av34}** = 0 pc/h (Equation 13-14 or 13-17)

#### Capacity Checks

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

<table>
<thead>
<tr>
<th>V_{R12}</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exhibit 13-8</td>
<td></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** = 4.252 + 0.0086 V_{12} - 0.009 L_D
- **D_R** = 14.1 (pc/mln)
- **LOS** = B (Exhibit 13-2)

#### Speed Determination

\[ M_S = \frac{D_R}{S_R^2} \]

- **M_S** = \( D_R \) (Exhibit 13-11)
- **S_R** = 54.8 mph (Exhibit 13-12)
- **S_R** = N/A mph (Exhibit 13-12)
- **S** = 54.8 mph (Exhibit 13-13)

---

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9/28/2015
## RAMPS AND RAMP JUNCTIONS WORKSHEET

### General Information
- **Analyst:** JT
- **Agency or Company:** LLG
- **Date Performed:** 09/22/2015
- **Analysis Time Period:** PM Peak Hour
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

### Site Information
- **Freeway/Dir of Travel:** I-10 Eastbound
- **Junction:** Dillon Rd On-Ramp
- **Jurisdiction:** Existing

### Inputs
- **Upstream Adj Ramp:** Freeway Number of Lanes, N = 2
- **Ramp Number of Lanes, N:** 1
- **Acceleration Lane Length, L_a:** 700
- **Deceleration Lane Length, L_d:** 300
- **Freeway Volume, V_F:** 718
- **Ramp Volume, V_R:** 106
- **Freeway Free-Flow Speed, S_F:** 65.0
- **Ramp Free-Flow Speed, S_R:** 35.0
- **V_up = 2420 ft**
- **V_down = 40 ft**

### 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>718</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>763</td>
</tr>
<tr>
<td>Ramp</td>
<td>106</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>113</td>
</tr>
<tr>
<td>UpStream</td>
<td>119</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>127</td>
</tr>
</tbody>
</table>

### Estimation of v_{12}

- **V_{12} = V_{L} \times (P_{FM})**
- **P_{FM} = 1.000** using Equation (Exhibit 13-6)
- **V_{12} = 763 pc/h**
- **V_{d} or V_{av34} > 2700 pc/h (Equation 13-14 or 13-17)**
- **Is V_{d} or V_{av34} > 2700 pc/h?** Yes No
- **Is V_{d} or V_{av34} > 1.5 \times V_{d/2}?** Yes No
- **if Yes, V_{12a} =** pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks
- **V_{FO} = 876** Exhibit 13-8
- **V_{FO} = V_{F} - V_{R}** Exhibit 13-8

### Flow Entering Merge Influence Area
- **Actual:** 876 Exhibit 13-8
- **Max Desirable:** 4600 All

### Level of Service Determination (if not F)
- **D_{R} = 5.475 + 0.00734 \times V_{R} + 0.0078 \times V_{12} - 0.00627 \times L_{a}**
- **D_{R} = 7.9 (pc/mi/ln)**
- **LOS = A (Exhibit 13-2)**

### Speed Determination
- **M_o = 0.281 (Exhibit 13-11)**
- **S_R = 58.5 mph (Exhibit 13-11)**
- **S_L = N/A mph (Exhibit 13-11)**
- **S = 58.5 mph (Exhibit 13-13)**

### Flow Entering Diverge Influence Area
- **Actual:**
- **Max Desirable:**
- **Violation:**

### Level of Service Determination (if not F)
- **D_{R} = 4.252 + 0.0086 \times V_{12} - 0.0091 \times L_{d}**
- **D_{R} = (pc/mi/ln)**
- **LOS = (Exhibit 13-2)**
### RAMPS AND RAMP JUNCTIONS WORKSHEET

**General Information**
- **Analyst:** JT
- **Agency or Company:** LLG
- **Date Performed:** 09/02/2015
- **Analysis Time Period:** PM Peak Hour
- **Project Description:** 2-10-3135-2 Paradise Valley Specific Plan, Riverside County

**Site Information**
- **Freeway/Dir of Travel:** I-10 Westbound
- **Junction:** Golf Center Pkwy Off-Ramp
- **Jurisdiction:** Existing

**Inputs**
- **Upstream Adj Ramp:**
  - Freeway Number of Lanes, N: 4
  - Ramp Number of Lanes, N: 1
  - Acceleration Lane Length, LA: 235 ft
  - Deceleration Lane Length, LD: 2320 ft
  - Ramp Volume, VR: 144 veh/h

  **Downstream Adj Ramp:**
  - Freeway Free-Flow Speed, SPF: 65.0 veh/h
  - Ramp Free-Flow Speed, SR: 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>fHV</th>
<th>fR</th>
<th>V = V/PHF x fHV x fR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>2320</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>2467</td>
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<tr>
<td>Ramp</td>
<td>144</td>
<td>0.95</td>
<td>Level</td>
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<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>153</td>
</tr>
<tr>
<td>DownStream</td>
<td>403</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>429</td>
</tr>
</tbody>
</table>

**Estimation of V12**

- **V12 = Vf (PfM)**
- **fEd =** (Equation 13-6 or 13-7)
- **PfM =** using Equation (Exhibit 13-6)
- **V12 =** pc/h
- **Vf or Vmhd =** pc/h (Equation 13-14 or 13-17)
- **Is Vf or Vmhd > 2,700 pc/h?**
  - Yes
  - No
- **Is Vf or Vmhd > 1.5 * V12/2?**
  - Yes
  - No

**Capacity Checks**

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

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>Vr12</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>Vfo</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

**Speed Determination**

- **Ms =** (Exhibit 13-11)
- **Sr =** mph (Exhibit 13-11)
- **Sp =** mph (Exhibit 13-11)
- **S =** mph (Exhibit 13-13)
# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information
- **Analyst**: JT
- **Agency or Company**: LLG
- **Data Performed**: 09/22/2016
- **Analysis Time Period**: PM Peak Hour
- **Project Description**: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

## Site Information
- **Freeway/Dir of Travel**: I-10 Eastbound
- **Junction**: Gold Center Pkwy On-Ramp
- **Jurisdiction**: Analysis Year: Existing

## Inputs
- **Upstream Adj Ramp**: Freeway Number of Lanes, N
  - Yes: 3
  - No: 1
- **Downstream Adj Ramp**: Freeway Number of Lanes, N
  - Yes: 2
  - No: 1
- **Acceleration Lane Length, LA**: 1500 ft
- **Deceleration Lane Length, LD**: 2200 ft
- **Freeway Volume, VF**: 1557 veh/ft
- **Ramp Volume, VR**: 151 veh/ft
- **Free Flow Speed, SFF**: 65.0 veh/h
- **Ramp Free Flow Speed, SFR**: 35.0 veh/h

## Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>V (Veh/hr)</td>
<td>PHF</td>
</tr>
<tr>
<td>Freeway</td>
<td>1557</td>
</tr>
<tr>
<td>Ramp</td>
<td>151</td>
</tr>
<tr>
<td>UpStream</td>
<td>455</td>
</tr>
</tbody>
</table>

## Estimation of v12

- **V12 = Vf(PFM)**
  - FEQ = 482.82 (Equation 13-6 or 13-7)
  - PFM = 0.619 using Equation (Exhibit 13-6)
  - V12 = 1025 pc/h (Equation 13-14 or 13-17)
  - V3 or Vw34 = 630 pc/h (Equation 13-16, 13-18, or 13-19)
- **Is V3 or Vw34 > 2,700 pc/h?**
  - Yes: 0.0
  - No: 1
- **Is V3 or Vw34 > 1.5 * V12/2?**
  - Yes: 0
  - No: 1
- **If Yes, V12a = 1025 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>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>VFO</td>
<td>1816</td>
<td>Exhibit 13-8</td>
<td>No</td>
<td>Vf</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
<tr>
<td>VFO = Vf - VR</td>
<td>Exhibit 13-8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vr</td>
<td>Exhibit 13-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

## Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Condition</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V12</td>
<td>1186</td>
<td>Exhibit 13-8</td>
<td>No</td>
<td>V12</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
<tr>
<td>4600:All</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Level of Service Determination (if not F)

- **Dr = 5.475 + 0.00734 VR + 0.0078 V12 - 0.00627 lA**
- **Dr = 5.2 (pc/mln)**
- **LOS = A (Exhibit 13-2)**

## Speed Determination

- **Mx = 0.229 (Exhibit 13-11)**
- **Sx = 59.7 mph (Exhibit 13-11)**
- **Sx = 64.5 mph (Exhibit 13-11)**
- **S = 61.3 mph (Exhibit 13-13)**

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1/27/2016
**General Information**

- **Analyst**: JT
- **Agency or Company**: LLG
- **Date Performed**: 09/22/2015
- **Analysis Time Period**: PM Peak Hour
- **Project Description**: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

**Site Information**

- **Freeway/Dir of Travel**: I-10 Westbound
- **Junction**: Monroe St Off-Ramp
- **Analysis Year**: Existing

**Inputs**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream Adj Ramp</td>
<td>Freeway Number of Lanes, N = 3</td>
</tr>
<tr>
<td>Ramp Number of Lanes, N</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Acceleration Lane Length, L_A</td>
<td>180 ft</td>
</tr>
<tr>
<td>Deceleration Lane Length, L_D</td>
<td>3488 ft</td>
</tr>
<tr>
<td>Freeway Volume, V_f</td>
<td>208 veh/h</td>
</tr>
<tr>
<td>Ramp Volume, V_R</td>
<td>65.0 veh/h</td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_FF</td>
<td>35.0 ft</td>
</tr>
<tr>
<td>充分 Flow Speed, S_TR</td>
<td>394 veh/h</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>ITEM</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>3488</td>
</tr>
<tr>
<td>Ramp</td>
<td>208</td>
</tr>
<tr>
<td>Upstream</td>
<td>394</td>
</tr>
</tbody>
</table>

**Estimation of V_{12}**

\[- \text{V}_{12} = \text{V}_f \left( \frac{P_{FM}}{P_{FD}} \right) \]

- \(L_{FD} = \text{(Equation 13-6 or 13-7)}\)
- \(P_{FM} = \text{using Equation (Exhibit 13-6)}\)
- \(V_{12} = \text{pc/h}\)
- \(V_3 = V_{av34} = \text{pc/h (Equation 13-14 or 13-17)}\)

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{RT12}</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{F}</td>
<td>3708</td>
</tr>
<tr>
<td>V_{FO} = V_{F} - V_{R}</td>
<td>3487</td>
</tr>
<tr>
<td>V_{R}</td>
<td>208</td>
</tr>
</tbody>
</table>

**Speed Determination**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>M_{R} = \text{(Exhibit 13-11)}</td>
<td>D_{R} = 0.448 (Exhibit 13-12)</td>
</tr>
<tr>
<td>S_{R} = \text{mph (Exhibit 13-11)}</td>
<td>S_{P} = 54.7 mph (Exhibit 13-12)</td>
</tr>
<tr>
<td>S_{U} = \text{mph (Exhibit 13-11)}</td>
<td>S_{V} = 70.5 mph (Exhibit 13-12)</td>
</tr>
<tr>
<td>S = \text{mph (Exhibit 13-13)}</td>
<td>S = 59.0 mph (Exhibit 13-13)</td>
</tr>
</tbody>
</table>

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HCS2010™ Version 6.70  Generated: 9/28/2015  3:02 PM
### RAMP AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst**: JT
- **Freeway/Dir of Travel**: I-10 Eastbound
- **Agency or Company**: LLG
- **Jurisdiction**: Monroe St On-Ramp
- **Date Performed**: 09/22/2015
- **Analysis Time Period**: PM Peak Hour
- **Analysis Year**: Existing
- **Project Description**: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

#### Inputs
- **Upstream Adj Ramp**: Freeway Number of Lanes, N = 3
  - Ramp Number of Lanes, N = 1
- **Yes** □ On □ Off
  - Acceleration Lane Length, $L_A = 970$
  - Deceleration Lane Length $L_D = 470$
  - Freeway Volume, $V_f = 2063$
  - Ramp Volume, $V_R = 202$
  - Freeway Free-Flow Speed, $S_{ff} = 65.0$
  - Ramp Free-Flow Speed, $S_{ffR} = 35.0$
- **$l_{up} = 2600$ ft**
- **$V_u = 530$ veh/h**
- **$V_D = veh/h$**

#### 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>2063</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>2193</td>
</tr>
<tr>
<td>Ramp</td>
<td>202</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>215</td>
</tr>
<tr>
<td>UpStream</td>
<td>530</td>
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<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>564</td>
</tr>
</tbody>
</table>

#### Estimation of $v_{12}$

- **$V_{12} = V_{f} (P_{FM})$**
- **$-EQ = 329.79$ (Equation 13-5 or 13-7)**
- **$P_{FM} = 0.602$ using Equation (13-6)**
- **$V_{12} = 1320$ pc/h**
- **$V_{3} or V_{av34} = 873$ pc/h (Equation 13-14 or 13-17)**
- **Is $V_{3} or V_{av34} > 2700$ pc/h? □ Yes □ No**
- **Is $V_{3} or V_{av34} > 1.5 * V_{12}$? □ Yes □ No**
- **If Yes, $V_{12a} = 1320$ 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>$V_{FO} = 2406$</td>
<td>Exhibit 13-8</td>
<td>No</td>
</tr>
</tbody>
</table>

#### Flow Entering Merge Influence Area

- **$V_{R12} = 1535$ (Exhibit 13-8)**
- **4600:All No | $V_{12}$**

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

- **$D_R = 5.475 + 0.00734 v_R + 0.000827 V_{12} - 0.00627 L_A$**
- **$D_R = 11.9$ (pcmi/ln)**
- **LOS = B (Exhibit 13-2)**

#### Speed Determination

- **$M_0 = 0.278$ (Exhibit 13-11)**
- **$S_R = 58.6$ mph (Exhibit 13-11)**
- **$S_{ff} = 63.7$ mph (Exhibit 13-11)**
- **$S_{ffR} = 60.3$ mph (Exhibit 13-13)**

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

- **$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$**
- **$D_R = (pcm/lm)$**
- **LOS = (Exhibit 13-2)**

#### Flow Entering Diverge Influence Area

- **$V_{12}$**

#### Speed Determination

- **$D_s = (Exhibit 13-12)$**
- **$S_R = mph (Exhibit 13-12)$**
- **$S_0 = mph (Exhibit 13-12)$**
- **$S = mph (Exhibit 13-13)$**
### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst:** JT, Freeway/Dir of Travel, I-10 Westbound
- **Agency or Company:** LLG, Junction, Washington St Off-Ramp
- **Date Performed:** 09/22/2015
- **Analysis Time Period:** PM Peak Hour
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

#### Site Information
- **Downstream Adj Ramp**
  - Ramp Number of Lanes, N
  - Freeway Number of Lanes, N

#### Inputs
- **Upstream Adj Ramp**
  - Freeway Number of Lanes, N: 3
  - Ramp Number of Lanes, N: 1
  - Acceleration Lane Length, L_A
  - Deceleration Lane Length, L_D: 240
  - Freeway Volume, V_F: 4686
  - Ramp Volume, V_R: 403
  - Freeway Free-Flow Speed, S_FF: 65.0
  - Ramp Free-Flow Speed, S_RR: 35.0
  - □ Yes □ On
  - □ No □ Off

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

<table>
<thead>
<tr>
<th>(pch)</th>
<th>V</th>
<th>PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%Rv</th>
<th>f_NV</th>
<th>f_p</th>
<th>V = V/PHF x f_NV x f_p</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Level</td>
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<td>0.990</td>
<td>1.00</td>
<td>4982</td>
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<tr>
<td>Ramp</td>
<td>403</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>428</td>
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<tr>
<td>DownStream</td>
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<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>446</td>
</tr>
</tbody>
</table>

#### Estimation of V_{12}

- \( V_{12} = V_F \left( P_{FM} \right) \)
  - \( L_FO = \) (Equation 13-6 or 13-7)
  - \( P_{FM} = \) using Equation (Exhibit-13)
- \( V_{12} = \) pc/h
  - \( V_3 \) or \( V_{avg3} = \) pc/h (Equation 13-14 or 13-17)
  - Is \( V_3 \) or \( V_{avg3} > 2.700 \) pch? □ Yes □ No
  - Is \( V_3 \) or \( V_{avg3} > 1.5 \) * \( V_{12} \)? □ Yes □ No
  - If Yes, \( V_{12} = \) pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks
- \( V_{FO} = \) Exhibit 13-8
- \( V_3 = \) Exhibit 13-8

#### Flow Entering Merge Influence Area
- \( V_{HF} = V_R = V_R \)
- \( V_{FO} = V_E = V_E \)
- Actual | Capacity | LOS F? | Actual | Capacity |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4982</td>
<td>7050</td>
<td>No</td>
<td></td>
<td></td>
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<tr>
<td>4554</td>
<td>7050</td>
<td>No</td>
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<td></td>
</tr>
<tr>
<td>428</td>
<td>2000</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Flow Entering Diverge Influence Area
- \( V_{12} = \) Exhibit 13-8
- \( V_{12} = \) Exhibit 13-8

#### Level of Service Determination (if not F)
- \( D_{FO} = 5.475 + 0.00734 V_R + 0.0078 V_{12} + 0.00627 L_A \)
- \( D_R = 29.9 \) (pc/mi/ln)
- \( D_{12} = 4.252 + 0.0086 V_{12} - 0.009 L_D \)
- \( S \) = (Exhibit 13-2)

#### Speed Determination
- \( M_s \) = (Exhibit 13-11)
- \( S_R \) = (Exhibit 13-11)
- \( S_o \) = (Exhibit 13-11)
- \( S \) = (Exhibit 13-13)

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9/28/2015
### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst:** JT
- **Freeway/Dir of Travel:** I-10 Eastbound
- **Agency or Company:** LLG
- **Junction:** Washington St On-Ramp
- **Date Performed:** 09/22/2015
- **Jurisdiction:** 
- **Analysis Time Period:** PM Peak Hour
- **Analysis Year:** Existing
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

#### Inputs
- **Upstream Adj Ramp:**
  - Freeway Number of Lanes, N: 3
  - Ramp Number of Lanes, N: 1
  - Yes: 1
  - On: 1
  - Acceleration Lane Length, L_A: 660 ft
  - Deceleration Lane Length, L_D: 
  - Freeway Volume, V_F: 2879 veh/h
  - Ramp Volume, V_R: 531 veh/h
  - L_up: 2050 ft
  - V_u = 836 veh/h
  - Freeway Free-Flow Speed, S_FF: 65.0
  - Ramp Free-Flow Speed, S_R: 35.0

#### Conversion to pc/h Under Base Conditions
- (pc/h) V (Veh/hr) PHF Terrain %Truck %Rv f_HV f_p V = V/PHF x f_HV x f_p
  - Freeway: 2879 0.95 Level 2 0 0.990 1.00 3081
  - Ramp: 531 0.95 Level 2 0 0.990 1.00 565
  - Upstream: 836 0.94 Level 0 0 1.000 1.00 889

#### Estimation of v_{12}
- **L_EQ** = 497.2 (Equation 13-6 or 13-7)
- **P_FM** = 0.598 using Equation (13-6)
- **V_{12}** = 1824 pc/h
- **V_3 or V_{a34}** = 1237 pc/h (Equation 13-14 or 13-15)
- **Is V_3 or V_{a34} > 2.700 pc/h?** Yes
- **Is V_3 or V_{a34} > 1.5 * V_{12}^2?** Yes
- **If Yes, V_{12a} =** 1824 pc/h (Equation 13-16, 13-17, or 13-18)

#### Estimation of v_{12}
- **L_EQ** = 497.2 (Equation 13-6 or 13-7)
- **P_FM** = 0.598 using Equation (13-6)
- **V_{12}** = 1824 pc/h
- **V_3 or V_{a34}** = 1237 pc/h (Equation 13-14 or 13-15)
- **Is V_3 or V_{a34} > 2.700 pc/h?** Yes
- **Is V_3 or V_{a34} > 1.5 * V_{12}^2?** Yes
- **If Yes, V_{12a} =** 1824 pc/h (Equation 13-16, 13-17, or 13-18)

#### Capacity Checks
- **V_{FD}** = 3626 Exhibit 13-8
- **V_F** = 
- **V_{FD} = V_F - V_R** Exhibit 13-8
- **V_R** = Exhibit 13-10

#### Flow Entering Merge Influence Area
- **V_{R12}** = 2389 Exhibit 13-8
- **Max Deseirable**
- **Violation?**
- **V_{12}** = Exhibit 13-8

#### 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 = 19.7 (pcmi/ln)
- **LOS = B (Exhibit 13-2)**

#### Speed Determination
- **M_s = 0.317 (Exhibit 13-11)
- **S_{R3} = 57.7 mph (Exhibit 13-11)
- **S_{0} = 62.3 mph (Exhibit 13-11)
- **S = 59.2 mph (Exhibit 13-13)**

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9/28/2015
### RAMPS AND RAMP JUNCTIONS WORKSHEET

<table>
<thead>
<tr>
<th>General Information</th>
<th>Site Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst</td>
<td>Freeway/Dir of Travel I-10 Westbound</td>
</tr>
<tr>
<td>Agency or Company</td>
<td>Junction Cook St Off-Ramp</td>
</tr>
<tr>
<td>Date Performed</td>
<td>09/22/2015 Jurisdiction</td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>PM Peak Hour Existing</td>
</tr>
<tr>
<td>Project Description</td>
<td>2-10-3136-2 Paradise Valley Specific Plan, Riverside County</td>
</tr>
</tbody>
</table>

#### Inputs

- **Upstream Adj Ramp** Freeway Number of Lanes, N 3
- Ramp Number of Lanes, N 1
- **Acceleration Lane Length**, L_a 190 ft
- **Deceleration Lane Length**, L_d 376 ft
- **Free Way Volume**, V_f 5238 veh/h
- **Free Way Free-Flow Speed**, S_ff 65.0 veh/h
- **Ramp Volume**, V_r 501 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_v</th>
<th>f_p</th>
<th>V = V/PHF x f_v x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>5238</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>5569</td>
</tr>
<tr>
<td>Ramp</td>
<td>376</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>400</td>
</tr>
<tr>
<td>DownStream</td>
<td>501</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>533</td>
</tr>
</tbody>
</table>

#### Estimation of V₁₂

- **V₁₂ = V₁₂ (P FM)**
- **(Equation 13-6 or 13-7)**
- **P FM =** using Equation (Exhibit 13-6)
- **V₁₂ =** pc/h
- **V₃ or V₃₄₃₄ =** pc/h (Equation 13-14 or 13-17)
- **Is V₃ or V₃₄₃₄ > 2,700 pc/h?**
  - **Yes**
  - **No**
- **If Yes, V₁₂₃₄₃₄ =** pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

<table>
<thead>
<tr>
<th>V_FO</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
<th>V₁₂</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exhibit 13-8</td>
<td></td>
<td></td>
<td></td>
<td>Exhibit 13-8</td>
<td>7050</td>
<td>No</td>
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<td>5669</td>
<td>Exhibit 13-8</td>
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<td></td>
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<td>400</td>
<td>Exhibit 13-10</td>
<td>2000</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

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

- **D_R = 5.475 + 0.0073 v_R + 0.0078 V₁₂ - 0.0062 L_a**
- **D_R =** (pc/mln)
- **LOS =** (Exhibit 13-2)

#### Speed Determination

- **M₅ =** (Exhibit 13-11)
- **S₉ =** mph (Exhibit 13-11)
- **S₀ =** mph (Exhibit 13-11)
- **S =** mph (Exhibit 13-13)

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9/28/2015
**RAMPS AND RAMP JUNCTIONS WORKSHEET**

**General Information**
- Analyst: JT
- Agency or Company: LLG
- Date Performed: 09/22/2015
- Analysis Time Period: PM Peak Hour
- Project Description: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

**Site Information**
- Freeway/Dir of Travel: I-10 Eastbound
- Junction: Cook St On-Ramp
- Jurisdiction: Existing

**Inputs**
- Upstream Adj Ramp: Freeway Number of Lanes, N = 3
- Ramp Number of Lanes, N = 1
- Acceleration Lane Length, L_A = 670
- Deceleration Lane Length, L_D = 618
- Freeway Volume, V_F = 3099
- Ramp Volume, V_R = 616
- Freeway Free-Flow Speed, S_F = 65.0
- Ramp Free-Flow Speed, S_R = 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>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>3099</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.900</td>
<td>1.00</td>
<td>3295</td>
</tr>
<tr>
<td>Ramp</td>
<td>616</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.900</td>
<td>1.00</td>
<td>655</td>
</tr>
<tr>
<td>UpStream</td>
<td>406</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>432</td>
</tr>
</tbody>
</table>

**Estimation of v_{12}**

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

\[ L_{EQ} = 570.98 \text{ (Equation 13-6 or 13-7)} \]

\[ P_{FM} = 0.596 \text{ using Equation (Exhibit 13-6)} \]

\[ v_{12} = 1965 \text{ pc/h} \]

\[ v_{3} = 1330 \text{ pc/h (Equation 13-14 or 13-17)} \]

\[ v_{3} \text{ or } v_{w34} > 2.700 \text{ pc/h?} \]

\[ \Box \text{ Yes } \Box \text{ No} \]

\[ v_{3} \text{ or } v_{w34} > 1.5 \times v_{12}/2 \]

\[ \Box \text{ Yes } \Box \text{ No} \]

\[ v_{12} \text{ or } v_{12e} = 1965 \text{ pc/h (Equation 13-16, 13-18, or 13-19)} \]

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>3950</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

**Flow Entering Merge Influence Area**

**Flow Entering Diverge Influence Area**

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

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

\[ D_R = 21.4 \text{ (pc/mi/ln)} \]

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

**Speed Determination**

\[ \text{M}_{0} = 0.328 \text{ (Exhibit 13-11)} \]

\[ \text{S}_{R} = 57.5 \text{ mph (Exhibit 13-11)} \]

\[ \text{S}_{0} = 62.0 \text{ mph (Exhibit 13-11)} \]

\[ S = 58.9 \text{ mph (Exhibit 13-13)} \]

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

\[ D_{s} = \text{(Exhibit 13-12)} \]

\[ S_{R} = \text{mph (Exhibit 13-12)} \]

\[ S_{0} = \text{mph (Exhibit 13-12)} \]

\[ S = \text{mph (Exhibit 13-13)} \]
APPENDIX I-II

EXISTING WITH PROJECT TRAFFIC CONDITIONS
### RAMPS AND RAMP JUNCTIONS WORKSHEET

**General Information**
- **Analyst:** JT
- **Agency or Company:** LLG
- **Date Performed:** 09/22/2015
- **Analysis Time Period:** AM Peak Hour
- **Project Description:** 2-10-3135-2 Paradise Valley Specific Plan, Riverside County

**Site Information**
- **Freeway/Dir of Travel:** I-10 Westbound
- **Junction:** Cottonwood Springs Rd On-Ramp
- **Jurisdiction:**
- **Existing + Project:**

### Inputs

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream Adj Ramp</td>
<td></td>
</tr>
<tr>
<td>Freeway Number of Lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Ramp Number of Lanes, N</td>
<td>1</td>
</tr>
<tr>
<td>Acceleration Lane Length, L_A</td>
<td>640</td>
</tr>
<tr>
<td>Deceleration Lane Length, L_D</td>
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</tr>
<tr>
<td>Freeway Volume, V_F</td>
<td>1405</td>
</tr>
<tr>
<td>Ramp Volume, V_R</td>
<td>111</td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_{FF}</td>
<td>65.0</td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_{FR}</td>
<td>35.0</td>
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</table>

### Conversion to pch/h Under Base Conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td></td>
</tr>
<tr>
<td>Ramp</td>
<td></td>
</tr>
<tr>
<td>UpStream</td>
<td></td>
</tr>
<tr>
<td>DownStream</td>
<td></td>
</tr>
</tbody>
</table>

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

#### Freeway

\[
v_{12} = V_F \left( F_{PM} \right)
\]

- \( F_{PM} = 1.000 \) using Equation (13-6)
- \( V_{12} = 1494 \) pch

#### Ramp

\[
v_{12} = V_R \left( F_{PM} \right)
\]

- \( F_{PM} = 1.000 \) using Equation (13-6)
- \( V_{12} = 1494 \) pch

### Merger Areas

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>1612</td>
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</table>

### Capacity Checks

#### Density Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>1612</td>
<td>No</td>
</tr>
</tbody>
</table>

#### Stop Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>V_{F}</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>1612</td>
<td>4600 All</td>
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### 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></td>
<td></td>
</tr>
</tbody>
</table>

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

\[
D_R = 5.475 + 0.00734 \cdot V_R + 0.0078 \cdot V_{12} + 0.00027 \cdot L_A
\]

\[
D_R = 14.0 \text{ pch/mile/ln}
\]

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

### Speed Determination

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>M_s = \text{ (Equation 13-11)}</td>
<td>0.296</td>
</tr>
<tr>
<td>S_{R} = \text{ (Equation 13-11)}</td>
<td>56.2 mph</td>
</tr>
<tr>
<td>S_{0} = \text{ (Equation 13-11)}</td>
<td>N/A mph</td>
</tr>
<tr>
<td>S = \text{ (Equation 13-13)}</td>
<td>58.2 mph</td>
</tr>
</tbody>
</table>

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

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

\[
D_R = \text{ (Equation 13-2)}
\]

### Speed Determination

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_s = \text{ (Equation 13-12)}</td>
<td></td>
</tr>
<tr>
<td>S_{R} = \text{ (Equation 13-12)}</td>
<td></td>
</tr>
<tr>
<td>S_{0} = \text{ (Equation 13-12)}</td>
<td></td>
</tr>
<tr>
<td>S = \text{ (Equation 13-13)}</td>
<td></td>
</tr>
</tbody>
</table>
### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst:** JT  
- **Agency or Company:** LLG  
- **Date Performed:** 09/22/2015  
- **Analysis Time Period:** AM Peak Hour  

#### Site Information
- **Freeway/Dir of Travel:** I-10 Eastbound  
- **Junction:** Cottonwood Springs Rd Off-Ramp  
- **Jurisdiction:** Analysis Year  
- **Existing + Project:**

#### Project Description
2-10-3156-2 Paradise Valley Specific Plan, Riverside County

#### Inputs
- **Upstream Adj Ramp:** Freeway Number of Lanes, N 2  
- **Downstream Adj Ramp:** Ramp Number of Lanes, N 1  
- **Yes** □ Off □ No □ On □  
- **Acceleration Lane Length, L_A:**  
- **Deceleration Lane Length, L_D:** 250  
- **Freeway Volume, V_F:** 1055  
- **Ramp Volume, V_R:** 106  
- **Freeway Free-Flow Speed, S_{FF}:** 65.0  
- **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 × f_HV × f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1055</td>
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<td>Level</td>
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<tr>
<td>Ramp</td>
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<td>0.95</td>
<td>Level</td>
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<td>DownStream</td>
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<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>16</td>
</tr>
</tbody>
</table>

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

- \( V_{12} = V_F (P_{FM}) \)  
- \( L_{ED} = \) (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)  

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

- \( V_{12} = V_R + (V_F - V_R)P_{FD} \)  
- \( L_{ED} = \) (Equation 13-12 or 13-13)  
- \( P_{FD} = 1.00 \) using Equation (Exhibit 13-7)  
- \( V_{12} = 1122 \) pc/h  
- \( V_{3} \) or \( V_{av34} \) pc/h (Equation 13-14 or 13-17)  

#### Capacity Checks

<table>
<thead>
<tr>
<th>Capacity Checks</th>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{FO} )</td>
<td>Exhibit 13-8</td>
<td>1122</td>
<td>Exhibit 13-8</td>
</tr>
<tr>
<td>( V_{RD} )</td>
<td>Exhibit 13-8</td>
<td>1122</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

#### Flow Entering Merger Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desired</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{R12} )</td>
<td>Exhibit 13-8</td>
<td>1122</td>
</tr>
</tbody>
</table>

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

- \( D_R = 5.475 + 0.00734 V_{R} + 0.0078 V_{12} + 0.00627 L_A \)  
- \( D_R = 11.7 \) (pc/mln)  
- \( LOS = (Exhibit 13-2) \)  

#### Speed Determination

- \( M_{8} = (Exhibit 13-11) \)  
- \( S_{R} = mph (Exhibit 13-11) \)  
- \( S_{0} = mph (Exhibit 13-11) \)  
- \( S = mph (Exhibit 13-13) \)  

---

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**General Information**

<table>
<thead>
<tr>
<th>Analyst</th>
<th>JT</th>
<th>Site Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency or Company</td>
<td>LLG</td>
<td>Freeway/Dir of Travel: I-10 Westbound</td>
</tr>
<tr>
<td>Date Performed</td>
<td>09/22/2015</td>
<td>Junction: Dillon Rd Off-Ramp</td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>AM Peak Hour</td>
<td>Analysis Year: Existing + Project</td>
</tr>
<tr>
<td>Project Description</td>
<td>2-10-3136-2 Paradise Valley Specific Plan, Riverside County</td>
<td></td>
</tr>
</tbody>
</table>

**Inputs**

<table>
<thead>
<tr>
<th>Upstream Adj Ramp</th>
<th>Freeway Number of Lanes, N</th>
<th>Downstream Adj Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes On</td>
<td>2</td>
<td>Yes On</td>
</tr>
<tr>
<td>No Off</td>
<td>1</td>
<td>No Off</td>
</tr>
<tr>
<td>L&lt;sub&gt;up&lt;/sub&gt; =</td>
<td>ft</td>
<td>L&lt;sub&gt;down&lt;/sub&gt; = 2380 ft</td>
</tr>
<tr>
<td>V&lt;sub&gt;u&lt;/sub&gt; =</td>
<td>veh/h</td>
<td>V&lt;sub&gt;d&lt;/sub&gt; = 119 veh/h</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>(pc/h)</th>
<th>V (Veh/hs)</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>2435</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.950</td>
<td>1.00</td>
<td>2589</td>
</tr>
<tr>
<td>Ramp</td>
<td>629</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.950</td>
<td>1.00</td>
<td>669</td>
</tr>
<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>119</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>127</td>
</tr>
</tbody>
</table>

**Estimation of v<sub>12</sub>**

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

L<sub>EQ</sub> = (Equation 13-6 or 13-7)

L<sub>EO</sub> = (Equation 13-12 or 13-13)

P<sub>FM</sub> = using Equation (Exhibit 13-6)

P<sub>FD</sub> = 1.00 using Equation (Exhibit 13-7)

V<sub>12</sub> = pc/h

V<sub>3</sub> = pc/h (Equation 13-14 or 13-17)

V<sub>12</sub> = 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&lt;sub&gt;FO&lt;/sub&gt;</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&lt;sub&gt;R12&lt;/sub&gt;</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

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

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

\[
D_R = 2.452 + 0.0396 V_{12} - 0.009 L_D
\]

\[
D_L = (pc/mln) \quad \text{(Exhibit 13-2)}
\]

\[
L_O S = C \quad \text{(Exhibit 13-2)}
\]

**Speed Determination**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V&lt;sub&gt;12&lt;/sub&gt;</td>
<td>2589 pc/h</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V&lt;sub&gt;FO&lt;/sub&gt; = V&lt;sub&gt;F&lt;/sub&gt; - V&lt;sub&gt;R&lt;/sub&gt;</td>
<td>1920 pc/h</td>
<td>Exhibit 13-8</td>
</tr>
<tr>
<td>V&lt;sub&gt;R&lt;/sub&gt;</td>
<td>669 pc/h</td>
<td>Exhibit 13-10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V&lt;sub&gt;12&lt;/sub&gt;</td>
<td>2589 pc/h</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

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

\[
D_R = 0.488 \quad \text{(Exhibit 13-12)}
\]

\[
S_R = 53.8 \quad \text{mph (Exhibit 13-12)}
\]

\[
S_0 = \quad \text{n/a mphp (Exhibit 13-12)}
\]

\[
S = 53.8 \quad \text{mph (Exhibit 13-13)}
\]
**RAMPS AND RAMP JUNCTIONS WORKSHEET**

### General Information
- **Analyst:** JT
- **Agency or Company:** LLG
- **Date Performed:** 09/22/2015
- **Analysis Time Period:** AM Peak Hour
- **Project Description:** 2-10-3135-2 Paradise Valley Specific Plan, Riverside County

### Site Information
- **Freeway/Dir of Travel:** I-10 Eastbound
- **Junction:** Dillon Rd On-Ramp
- **Jurisdiction:** Existing + Project

### Inputs

<table>
<thead>
<tr>
<th>Upstream Adj Ramp</th>
<th>Downstream Adj Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway Number of Lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Ramp Number of Lanes, N</td>
<td>1</td>
</tr>
<tr>
<td>Acceleration Lane Length, L_A</td>
<td>700</td>
</tr>
<tr>
<td>Deceleration Lane Length, L_D</td>
<td></td>
</tr>
<tr>
<td>Freeway Volume, V_F</td>
<td>1336</td>
</tr>
<tr>
<td>Ramp Volume, V_R</td>
<td>656</td>
</tr>
<tr>
<td>V_0 = 2420 ft</td>
<td></td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_{FF}</td>
<td>65.0</td>
</tr>
<tr>
<td>V_D = 105 veh/h</td>
<td></td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_{FR}</td>
<td>35.0</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_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>1336</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>1420</td>
</tr>
<tr>
<td>Ramp</td>
<td>656</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>657</td>
</tr>
<tr>
<td>UpStream</td>
<td>105</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>112</td>
</tr>
</tbody>
</table>

### Estimation of v_{12}

- **V_{12} = V_F \left(\frac{P_{FM}}{P_{FM}}\right)\)**
- **V_{12} = V_R + (V_F - V_R)P_{FD}**

### Estimation of v_{12}

- **L_{EQ} = (Equation 13-6 or 13-7)**
- **P_{FM} = 1.000 using Equation (Exhibit 13-6)**
- **V_{12} = 1420 pc/h**
- **V_0 or V_{av34} = 0 pc/h (Equation 13-14 or 13-17)**
- **Is V_3 or V_{av34} > 7,200 pc/h?**
- **Is V_3 or V_{av34} > 1.5 \cdot V_{12}?**
- **If Yes, V_{12} = \text{pc/h (Equation 13-16, 13-18, or 13-19)}**

### Capacity Checks

| V_{FO} = 2117 | Exhibit 13-8 |
| V_{FO} = V_F - V_R | Exhibit 13-8 |
| V_R | Exhibit 13-10 |

### 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} = 2117</td>
<td>Exhibit 13-8</td>
<td>4600:All No</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>V_{12}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

- **D_R = 5.475 + 0.00734 V + 0.0078 V_{12} - 0.00827 L_A**
- **D_R = 17.3 (pc/mln)**

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

- **D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D**
- **LOS = B (Exhibit 13-2)**

### Speed Determination

- **M_0 = 0.304 (Exhibit 13-11)**
- **S_{R} = 58.0 mph (Exhibit 13-11)**
- **S_{0} = N/A mph (Exhibit 13-11)**
- **S = 58.0 mph (Exhibit 13-13)**
**RAMPS AND RAMP JUNCTIONS WORKSHEET**

### General Information
- **Analyst:** JT
- **Agency or Company:** LLG
- **Date Performed:** 09/22/2015
- **Analysis Time Period:** AM Peak Hour
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

### Site Information
- **Freeway/Dir of Travel:** I-10 Westbound
- **Junction:** Golf Center Pkwy Off-Ramp
- **Jurisdiction:** Existing + Project
- **Analysis Year:** 2016

### Inputs
- **Upstream Adj Ramp:** Freeway Number of Lanes, N
  - Yes: 4
  - Off: 1
- **Deceleration Lane Length, Ld:** 235 ft
- **Fremy Volume, V_f:** 2994 veh/h
- **Ramp Volume, V_r:** 366 veh/h
- **Fremy Free-Flow Speed, S_ff:** 65 veh/h
- **Ramp Free-Flow Speed, S_rr:** 35 veh/h
- **Downstream Adj Ramp:** Ramp Number of Lanes, N
  - Yes: 1
  - Off: 0

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Description</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 = ( \frac{V}{PHF} \times f_{HV} \times f_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>2994</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>3183</td>
</tr>
<tr>
<td>Ramp</td>
<td>356</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>378</td>
</tr>
<tr>
<td>DownStream</td>
<td>534</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>588</td>
</tr>
</tbody>
</table>

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

- For Freeway:
  \[ V_{12} = V_f \left( \frac{P_{FM}}{P_{FM}} \right) \]
  - Using Equation (Exhibit 13-6)

- For Ramp:
  \[ V_{12} = 1601 \text{ pc/h} \]
  - Using Equation (Exhibit 13-7)

### Capacity Checks

<table>
<thead>
<tr>
<th>Description</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>
<tr>
<td>V_{R12}</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 \( V_r + 0.0078 \times V_{12} - 0.00627 \times L_A \)
  - D_r = 4.252 + 0.0086 \( V_{12} - 0.009 \times L_d \)

<table>
<thead>
<tr>
<th>Description</th>
<th>Actual</th>
<th>Max Desirable Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Speed Determination

- D_s = 0.462 (Exhibit 13-12)
- S_r = 54.4 mph (Exhibit 13-12)
- S_p = 71.3 mph (Exhibit 13-12)
- S = 61.6 mph (Exhibit 13-13)
### RAMPS AND RAMP JUNCTIONS WORKSHEET

**General Information**
- Analyst: JT
- Agency or Company: LLG
- Date Performed: 09/22/2015
- Analysis Time Period: AM Peak Hour
- Project Description: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

**Site Information**
- Freeway/Dir of Travel: I-10 Eastbound
- Junction: Gold Center Pkwy On-Ramp
- Jurisdiction: Existing + Project

**Inputs**
- Upstream Adj Ramp: Freeway Number of Lanes, N = 3
- Ramp Number of Lanes, N = 1
- Acceleration Lanes Length, L_a = 1500 ft
- Deceleration Lanes Length, L_d = 1987 ft
- Freeway Volume, V_F = 2220 ft
- Ramp Volume, V_R = 375 veh/h
- Freeway Free-Flow Speed, S_FF = 65.0 veh/h
- Ramp Free-Flow Speed, S_RF = 35.0 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_P</th>
<th>V = V/PHF x f_P + f_P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1987</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.99</td>
<td>V_F = (V_F - V_R) x 0.99</td>
</tr>
<tr>
<td>Ramp</td>
<td>375</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.99</td>
<td>V_R = V/PHF x f_P</td>
</tr>
<tr>
<td>UpStream</td>
<td>301</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.00</td>
<td>V_D = V/PHF x f_P</td>
</tr>
<tr>
<td>DownStream</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}**
- \( V_{12} = V_F \cdot F_{FM} \)
- \( F_{FM} = 0.619 \) using Equation (13-6)
- \( V_{12} = 1308 \) pc/h
- \( V_3 \) or \( V_{a34} \) = 804 pc/h (Equation 13-14 or 13-17)

**Is V_3 or V_{a34} > 2,700 pc/h?**
- Yes \( \checkmark \) No \( \square \)

**If Yes, V_{12a} =**
- \( V_{12a} = 1308 \) 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>2511</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_{at12}</td>
<td>1707</td>
<td>4600All</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>V_{at12}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Level of Service Determination (if not F)**
- \( D_R = 5.475 + 0.00734 \) V_F + 0.0078 \( V_{12} \) - 0.00627 \( t_A \)
- \( D_R = 9.2 \) (pc/ml/m)
- \( D_R = 2.9 \) (pc/ml/m)
- \( D_R = 2.1 \) (pc/ml/m)

**Speed Determination**
- \( M_o = 0.237 \) (Exhibit 13-11)
- \( S_{a} = 59.5 \) mph (Exhibit 13-11)
- \( S_{b} = 63.9 \) mph (Exhibit 13-11)
- \( S = 60.9 \) mph (Exhibit 13-13)

**Speed Determination**
- \( D_S = 0.237 \) (Exhibit 13-12)
- \( S_{a} = 59.5 \) mph (Exhibit 13-13)
- \( S_{b} = 63.9 \) mph (Exhibit 13-13)
- \( S = 60.9 \) mph (Exhibit 13-13)

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file://C:/Users/tucker/AppData/Local/Temp/r2k9242.tmp

1/27/2016
### RAMPS AND RAMP JUNCTIONS WORKSHEET

**General Information**
- **Analyst**: JT
- **Agency or Company**: LLG
- **Date Performed**: 09/22/2015
- **Analysis Time Period**: AM Peak Hour
- **Project Description**: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

**Site Information**
- **Freeway/Dir of Travel**: I-10 Westbound
- **Junction**: Monroe St Off-Ramp
- **Analysis Year**: Existing + Project

### Inputs
- **Upstream Adj Ramp**: Freeway Number of Lanes, N
- **Ramp Number of Lanes, N**: 3
- **Acceleration Lane Length, L_A**: 1
- **Deceleration Lane Length, L_D**: 180
- **Freeway Volume, V_F**: 4003
- **Ramp Volume, V_R**: 410
- **Freeway Free-Flow Speed, S_FF**: 65.0
- **Ramp Free-Flow Speed, S_FR**: 35.0

**Downstream Adj Ramp**
- **Yes**  **No**  **On**  **Off**
- **Acceleration Lane Length, L_A**: 180
- **Deceleration Lane Length, L_D**: 2320 ft
- **Freeway Volume, V_F**: 766 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>fHV</th>
<th>f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>4003</td>
<td>0.95</td>
<td>Level 2</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
</tr>
<tr>
<td>Ramp</td>
<td>410</td>
<td>0.95</td>
<td>Level 2</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
</tr>
</tbody>
</table>

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

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

- **L_EQ** = (Equation 13-6 or 13-7)
- **P_{FM}** = using Equation (Exhibit 13-6)
- **V_{12}** = pc/h
- **V_F or V_{av34}** = pc/h (Equation 13-14 or 13-17)

### Capacity Checks

**V_{FO}**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></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></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

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

**Speed Determination**

- **M_8** = (Exhibit 13-11)
- **S_{0}** = mph (Exhibit 13-11)
- **S** = mph (Exhibit 13-13)

---

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# Ramps and Ramp Juncions Worksheet

**General Information**
- Analyst: JT
- Agency or Company: LLG
- Date Performed: 09/22/2015
- Analysis Time Period: AM Peak Hour
- Project Description: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

**Site Information**
- Freeway/Dir of Travel: I-10 Eastbound
- Junction: Monroe St On-Ramp

## Inputs
- Upstream Adj Ramp: Freeway Number of Lanes, N = 3
- Ramp Number of Lanes, N = 1
- Yes □ On
- Acceleration Lane Length, L_A = 870
- Deceleration Lane Length, L_D = 1
- Freeway Volume, V_F = 2444
- Ramp Volume, V_R = 339
- Ramp Free-Flow Speed, S_{FF} = 65.0
- 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/ht)</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>2444</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>2598</td>
</tr>
<tr>
<td>Ramp</td>
<td>339</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>360</td>
</tr>
<tr>
<td>UpStream</td>
<td>406</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>432</td>
</tr>
</tbody>
</table>

## Estimation of v_{12}

\[
\begin{align*}
V_{12} &= V_F \left( P_{FM} \right) \\
L_{EO} &= 447.49 \quad \text{(Equation 13-6 or 13-7)} \\
F_{FM} &= 0.602 \quad \text{using Equation (Exhibit 13-6)} \\
V_{12} &= 1564 \text{ pc/h} \\
V_3 \text{ or } V_{av3} &= 1034 \text{ pc/h (Equation 13-14 or 13-17)} \\
\text{Is } V_3 \text{ or } V_{av3} &> 2,700 \text{ pc/h?} \quad \square \text{Yes} \quad \square \text{No} \\
\text{Is } V_3 \text{ or } V_{av3} &> 1.5 \times V_{12}^2 \quad \square \text{Yes} \quad \square \text{No} \\
\text{If } V_3 \text{ or } V_{av3} &= 1564 \text{ pc/h (Equation 13-16, 13-18, or 13-19)} \\
\end{align*}
\]

## Estimation of v_{12}

\[
\begin{align*}
V_{EO} &= \text{(Equation 13-12 or 13-13)} \\
P_{EO} &= \text{using Equation (Exhibit 13-7)} \\
V_{12} &= \text{pc/h} \\
V_3 \text{ or } V_{av3} &= \text{pc/h (Equation 13-14 or 13-17)} \\
\text{Is } V_3 \text{ or } V_{av3} &> 2,700 \text{ pc/h?} \quad \square \text{Yes} \quad \square \text{No} \\
\text{Is } V_3 \text{ or } V_{av3} &> 1.5 \times V_{12}^2 \quad \square \text{Yes} \quad \square \text{No} \\
\text{If } V_3 \text{ or } V_{av3} &= \text{pc/h (Equation 13-16, 13-18, or 13-19)} \\
\end{align*}
\]

## Capacity Checks

**Capacity Checks**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>2958</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

## Flow Entering Merge Influence Area

**Flow Entering Merge Influence Area**

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
<th>Exhibit 13-8</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{R12}</td>
<td>1924</td>
<td>4600:All</td>
<td>No</td>
</tr>
</tbody>
</table>

## Level of Service Determination (if not F)

\[
\begin{align*}
D_R &= 5.475 + 0.00734 V_R + 0.0078 V_{12} - 0.00627 L_A \\
D_R &= 14.9 \text{ (pc/mln)} \\
L_{OS} &= B \quad \text{(Exhibit 13-2)} \\
D_R &= 4.252 + 0.0086 V_{12} - 0.009 L_D \\
D_R &= \text{(pc/mln)} \\
L_{OS} &= \text{ (Exhibit 13-2)} \\
\end{align*}
\]

## Speed Determination

\[
\begin{align*}
M_{s} &= 0.287 \quad \text{(Exhibit 13-11)} \\
S_{R} &= 58.4 \text{ mph (Exhibit 13-11)} \\
S_{F} &= 63.1 \text{ mph (Exhibit 13-11)} \\
S &= 60.0 \text{ mph (Exhibit 13-13)} \\
\end{align*}
\]

---

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10/19/2015
## RAMPS AND RAMP JUNCTIONS WORKSHEET

### General Information
- **Analyst:** JT Freeway/Dir of Traffic I-10 Westbound
- **Agency or Company:** LLG Junction Washington St Off-Ramp
- **Date Performed:** 09/22/2015 Jurisdiction
- **Analysis Time Period:** AM Peak Hour Analysis Year Existing + Project
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

### Inputs
- **Upstream Adj Ramp:** Freeway Number of Lanes, N 3
- **Ramp Number of Lanes, N:** 1
- **Acceleration Lane Length, L_A:** □ Yes □ On
- **Deceleration Lane Length, L_D:** □ No □ Off
- **Freeway Volume, V_F:** 240 ft
- **Ramp Volume, V_R:** 5116 ft
- **Free Flow Speed, \( V_{ff} \):** 65.0 veh/h
- **Ramp Free-Flow Speed, \( V_{rr} \):** 35.0 veh/h
- **L_{up} =** ft
- **L_{down} =** 2200 ft

### 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/P\phi f_{HV} f_p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>5116</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>5439</td>
</tr>
<tr>
<td>Ramp</td>
<td>698</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>722</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>679</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>722</td>
</tr>
</tbody>
</table>

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

\[
V_{12} = V_F \left( P_{FM} \right) = \left( \text{Equation 13-6 or 13-7} \right)
\]

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

\[
V_{12} = \frac{V_3}{p_{ch}} = \left( \text{Equation 13-14 or 13-17} \right)
\]

\[
V_3 \geq 2,700 \text{pc/h} \quad \text{?} \quad \text{No}
\]

\[
V_3 \geq 1.5 \cdot V_{12} \quad \text{?} \quad \text{No}
\]

\[
V_{12} = \frac{V_3}{p_{ch}} \left( \text{Equation 13-16, 13-18, or 13-19} \right)
\]

### Capacity Checks

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

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

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

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

\[
D_R = \frac{pc}{mi/h} \quad \text{(Exhibit 13-2)}
\]

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

### Speed Determination

\[
N = \text{(Exhibit 13-11)}
\]

\[
S_F = \text{mph (Exhibit 13-11)}
\]

\[
S_R = \text{mph (Exhibit 13-11)}
\]

\[
S = \text{mph (Exhibit 13-13)}
\]

\[
D_F = 0.495 \left( \text{Exhibit 13-12} \right)
\]

\[
S_F = 53.6 \text{ mph (Exhibit 13-12)}
\]

\[
S_R = 67.7 \text{ mph (Exhibit 13-12)}
\]

\[
S = 57.9 \text{ mph (Exhibit 13-13)}
\]

### 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></td>
<td>Exhibit 13-8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>V_{12}</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exhibit 13-8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- Analyst: JT
- Freeway/Dir of Travel: I-10 Eastbound
- Agency or Company: LLG
- Junction: Washington St On-Ramp
- Date Performed: 09/22/2015
- Jurisdiction: Existing + Project
- Analysis Time Period: AM Peak Hour
- Analysis Year: Existing + Project
- Project Description: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

#### Inputs
- Upstream Adj Ramp: Freeway Number of Lanes, N = 3
- Ramp Number of Lanes, N = 1
- Yes □ No □ On
- Acceleration Lane Length, L_A = 660
- Deceleration Lane Length, L_D = 2667
- Freeway Volume, V_F = 2667
- Ramp Volume, V_R = 466
- V_u = 764 veh/h
- Ramp Free-Flow Speed, S_FF = 65.0
- Ramp Free-Flow Speed, S_PR = 35.0
- Downstream Adj Ramp: Yes □ No □ On
- No □ Off
- I_down = 2050 ft
- V_D = 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/IPH × f_HV × f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>2667</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>2835</td>
</tr>
<tr>
<td>Ramp</td>
<td>466</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>495</td>
</tr>
<tr>
<td>UpStream</td>
<td>764</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>834</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>

#### Estimation of v_{12}

- \( V_{12} = V_F \cdot \left( \frac{P_{FM}}{3} \right) \)
- \( L_{EQ} = 433.86 \) (Equation 13-6 or 13-7)
- \( P_{FM} = 0.998 \) using Equation (Exhibit 13-6)
- \( V_{12} = 1690 \) pc/h
- \( V_3 \) or \( V_{av3} > 2,700 \) pc/h? Yes □ No
- Is \( V_3 \) or \( V_{av3} > 1.5 \cdot V_{12}^{2} \)? Yes □ No
- If Yes, \( V_{12} = \) 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>3330</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

#### Flow Entering Merge Influence Area

- \( V_{R12} = 2185 \) pc/h (Exhibit 13-8)
- 4600:All

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

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

| D_R = 18.2 | (pm/c/m) |

| LOS = B (Exhibit 13-2) |

#### Flow Entering Diverge Influence Area

- \( V_{12} = 2185 \) pc/h (Exhibit 13-8)
- 4600:All

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

\( D_R = 4.252 + 0.0086 \cdot V_{12} - 0.0099 \cdot L_D \)

| D_R = | (pm/c/m) |

| LOS = | (Exhibit 13-2) |

#### Speed Determination

- \( M_8 = 0.309 \) (Exhibit 13-11)
- \( V_R = 57.9 \) mph (Exhibit 13-11)
- \( S_0 = 62.7 \) mph (Exhibit 13-11)
- \( S = 59.4 \) mph (Exhibit 13-13)

| M_8 = | (Exhibit 13-11) |
| V_R = | mph (Exhibit 13-12) |
| S_0 = | mph (Exhibit 13-12) |
| S = | mph (Exhibit 13-13) |

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10/19/2015
### RAMPS AND RAMP JUNCTIONS WORKSHEET

**General Information**
- Analyst: JT
- Freeway/Dir of Travel: I-10 Westbound
- Agency or Company: LLG
- Junction: Cook St Off-Ramp
- Date Performed: 09/22/2015
- Jurisdiction:
- Analysis Time Period: AM Peak Hour
- Analysis Year: Existing + Project
- Project Description: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

**Inputs**
- Upstream Adj Ramp: Freeway Number of Lanes, N = 3
- Ramp Number of Lanes, N = 1
- □ Yes □ Off: Acceleration Lane Length, L_A
- □ No □ On: Deceleration Lane Length, L_D
- Freeway Volume, V_F = 190
- Freeway Free-Flow Speed, S_FF = 65.0
- Ramp Volume, V_R = 996
- Ramp Free-Flow Speed, S_RF = 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_P</th>
<th>f_P</th>
<th>V = V/PHF x f_P x f_P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>6485</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>6873</td>
</tr>
<tr>
<td>Ramp</td>
<td>956</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>1059</td>
</tr>
<tr>
<td>DownStream</td>
<td>251</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>267</td>
</tr>
</tbody>
</table>

**Estimation of V_{12}**

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

\[ P_{FM} = \text{(Equation 13-6 or 13-7)} \]

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

\[ V_5 \text{ or } V_{axd} = \text{pc/h (Equation 13-14 or 13-17)} \]

Is \[ V_5 \text{ or } V_{axd} \geq 2.700 \text{ pc/h} \] ?

\[ \square \text{Yes} \quad \square \text{No} \]

Is \[ V_5 \text{ or } V_{axd} \geq 1.5 \times V_{12} \]

\[ \square \text{Yes} \quad \square \text{No} \]

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

**Capacity Checks**

**Flow Entering Merge Influence Area**

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

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>V_{RD}</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4195</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

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

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

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

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

**Speed Determination**

\[ V_5 \text{ = (Exhibit 13-11)} \]

\[ V_R \text{ = mph (Exhibit 13-11)} \]

\[ S \text{ = mph (Exhibit 13-13)} \]
RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

<table>
<thead>
<tr>
<th>Analyst</th>
<th>JT</th>
<th>Freeway/Dir of Travel</th>
<th>I-10 Eastbound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency or Company</td>
<td>LLG</td>
<td>Junction</td>
<td>Cook St On-Ramp</td>
</tr>
<tr>
<td>Date Performed</td>
<td>09/22/2015</td>
<td>Jurisdiction</td>
<td></td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>AM Peak Hour</td>
<td>Analysis Year</td>
<td>Existing + Project</td>
</tr>
<tr>
<td>Project Description</td>
<td>2-10-3316-2 Paradise Valley Specific Plan, Riverside County</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inputs

| Upstream Adj Ramp | Freeway Number of Lanes, N | 3 |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, L_A | 670 |
| Deceleration Lane Length, L_D | |
| Freeway Volume, V_F | 3048 |
| Ramp Volume, V_R | 403 |
| Freeway Free-Flow Speed, S_FF | 65.0 |
| Ramp Free-Flow Speed, S_R | 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_RH</th>
<th>f_P</th>
<th>V = V/PHF x f_RH x f_P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>3048</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>3241</td>
</tr>
<tr>
<td>Ramp</td>
<td>403</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>428</td>
</tr>
<tr>
<td>UpStream</td>
<td>834</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>887</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>

Estimation of $v_{12}$

$$v_{12} = v_F \cdot (P_{FM})$$

| $L_{EQ}$ = | 510.85 (Equation 13-6 or 13-7) |
| $P_{FM}$ = | 0.596 using Equation (Exhibit 13-6) |
| $v_{12}$ = | 1932 pc/h |
| $V_5$ or $V_{av34}$ = | 1309 pc/h (Equation 13-14 or 13-17) |

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{FO}$</td>
<td>3669</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

Estimation of $v_{12}$

$$v_{12} = v_F + (V_F - V_R)P_{FD}$$

| $V_{EQ}$ = | |
| $P_{FD}$ = | using Equation (Exhibit 13-7) |
| $v_{12}$ = | pc/h |
| $V_5$ or $V_{av34}$ = | pc/h (Equation 13-14 or 13-17) |

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>2360</td>
<td>Exhibit 13-8</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>$V_{R12}$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

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

| $D_R$ = | 19.5 (pc/mi/ln) |
| LOS = | B (Exhibit 13-2) |

Speed Determination

$$M_s = 0.315 (Exhibit 13-11)$$

| $S_R$ = | 57.7 mph (Exhibit 13-11) |
| $S_o$ = | 62.1 mph (Exhibit 13-11) |
| $S$ = | 59.2 mph (Exhibit 13-13) |

Level of Service Determination (if not F)

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

| $D_R$ = | pc/mi/ln |
| LOS = | (Exhibit 13-2) |

Speed Determination

$$D_s = (Exhibit 13-12)$$

| $S_R$ = | mph (Exhibit 13-12) |
| $S_o$ = | mph (Exhibit 13-12) |
| $S$ = | mph (Exhibit 13-13) |

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10/19/2015
# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information
- **Analyst:** JT
- **Freeway/Dir of Travel:** I-10 Westbound
- **Agency or Company:** LLG
- **Junction:** Cottonwood Springs Rd On-Ramp
- **Date Performed:** 09/22/2015
- **Jurisdiction:**
- **Analysis Time Period:** PM Peak Hour
- **Analysis Year:** Existing + Project
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

## Inputs
- **Upstream Adj Ramp:** Freeway Number of Lanes, N = 2
- **Acceleration Lane Length, L_A:** 640 ft
- **Deceleration Lane Length, L_D:**
- **Freeway Volume, V_F:** 1328 veh/h
- **Ramp Volume, V_R:** 123 veh/h
- **Freeway Free-Flow Speed, S_FF:** 65.0 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>fHV</th>
<th>f_p</th>
<th>v = V/PHF x fHV x f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>1328</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>1412</td>
</tr>
<tr>
<td>Ramp</td>
<td>123</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>131</td>
</tr>
<tr>
<td>UpStream</td>
<td>17</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>18</td>
</tr>
</tbody>
</table>

## Estimation of $v_{12}$

\[
V_{12} = V_F \left( P_{FM} \right) \\
I_{EO} = \text{(Equation 13-6 or 13-7)} \\
P_{FM} = 1.000 \text{ using Equation (Exhibit 13-6)} \\
V_{12a} = 1412 \text{ pc/h} \\
V_{3} \text{ or } V_{a34} = 0 \text{ pc/h (Equation 13-14 or 13-17)} \\
V_{12} = V_F + (V_F - V_R)P_{FD} \\
I_{EO} = \text{(Equation 13-12 or 13-13)} \\
P_{FD} = \text{using Equation (Exhibit 13-7)} \\
V_{12} = \text{pc/h} \\
V_{3} \text{ or } V_{a34} = \text{pc/h (Equation 13-14 or 13-17)} \\
\]

## Capacity Checks

### FO Capacity
- **Actual:** 1543 pc/h
- **Capacity:** Exhibit 13-8
- **LOS F:** No

### FO Capacity
- **Actual:** V_F = V_R
- **Capacity:** Exhibit 13-8

### R12 Capacity
- **Actual:** V_R12 = 1543 pc/h
- **Max Desirable:** 4600 pc/h
- **Violation:** No
- **Decision Criteria:** D_R = 4.252 = 0.0086 V_{12} - 0.009 L_D

### Level of Service Determination (if not F)
- **D_R:** 5.475 = 0.00734 V_R - 0.0078 V_{12} - 0.00827 L_A
- **LOS:** B (Exhibit 13-2)

### Speed Determination
- **M_a:** 0.294 (Exhibit 13-11)
- **S_R:** 58.2 mph (Exhibit 13-11)
- **S_u:** N/A mph (Exhibit 13-11)
- **S:** 58.2 mph (Exhibit 13-13)
**RAMPS AND RAMP JUNCTIONS WORKSHEET**

**General Information**
- Analyst: JT
- Agency or Company: LLG
- Date Performed: 09/22/2015
- Analysis Time Period: PM Peak Hour
- Project Description: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

**Site Information**
- Freeway/Dir of Travel: I-10 Eastbound
- Junction: Cottonwood Springs Rd Off-Ramp
- Analysis Year: Existing + Project

**Inputs**
- Upstream Adj Ramp: Freeway Number of Lanes, N = 2
- Ramp Number of Lanes, N = 1
- Acceleration Lane Length, L_A = 250
- Deceleration Lane Length, L_D = 1980
- Freeway Volume, V_F = 1009
- Ramp Volume, V_R = 120
- Freeway Free-Flow Speed, S_FF = 65.0
- Ramp Free-Flow Speed, S_R = 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>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>1009</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
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<td>1073</td>
</tr>
<tr>
<td>Ramp</td>
<td>120</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>128</td>
</tr>
</tbody>
</table>

**Merge Areas**

- **Estimation of V_{12}**
  - V_{12} = V_F (P_{FM})
  - P_{FM} = using Equation (Exhibit 13-6)
  - V_{12} = pc/h
  - V_2 or V_{av34} pc/h (Equation 13-14 or 13-17)
  - If V_2 or V_{av34} > 2,700 pc/h? [Yes] [No]
  - If Yes, V_{12a} = pc/h (Equation 13-16, 13-18, or 13-19)

- **Diverge Areas**
  - V_{12} = V_R + (V_F - V_R) P_{FD}
  - P_{FD} = 1.00 using Equation (Exhibit 13-7)
  - V_{12} = 1073 pc/h
  - V_2 or V_{av34} = pc/h (Equation 13-14 or 13-17)
  - Is V_2 or V_{av34} > 2,700 pc/h? [Yes] [No]
  - If Yes, V_{2a} = 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_{FD}</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
<tr>
<td>V_{12}</td>
<td>1073</td>
<td>Exhibit 13-8</td>
</tr>
<tr>
<td>V_{R}</td>
<td>945</td>
<td>Exhibit 13-8</td>
</tr>
<tr>
<td>V_{R}</td>
<td>128</td>
<td>Exhibit 13-10</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>1073</td>
<td></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>V_{12}</td>
<td>1073</td>
<td>4700</td>
</tr>
<tr>
<td>V_{R}</td>
<td>945</td>
<td>4700</td>
</tr>
<tr>
<td>V_{R}</td>
<td>128</td>
<td>2000</td>
</tr>
</tbody>
</table>

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

- D_{R} = 5.475 + 0.00734 v_{R} + 0.0075 V_{12} - 0.00627 L_{A}
- D_{R} = 11.2 (pc/mln)
- LOS = (Exhibit 13-2)

**Speed Determination**

- M_5 = (Exhibit 13-11)
- S_{5r} = mph (Exhibit 13-11)
- S_{10} = mph (Exhibit 13-11)
- S = mph (Exhibit 13-13)

**Appendix**

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10/19/2015
**RAMPS AND RAMP JUNCTIONS WORKSHEET**

### General Information
- **Analyst**: JT
- **Agency or Company**: LLG
- **Date Performed**: 09/22/2015
- **Project Description**: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

### Site Information
- **Freeway/Dir of Travel**: I-10 Westbound
- **Junction**: Dillon Rd Off-Ramp
- **Jurisdiction**: Analysis Year
- **Analysis Year**: Existing + Project

### Inputs

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Freeway Number of Lanes, N</td>
<td>2</td>
</tr>
<tr>
<td>Ramp Number of Lanes, N</td>
<td>1</td>
</tr>
<tr>
<td>Acceleration Lane Length, La</td>
<td>190</td>
</tr>
<tr>
<td>Deceleration Lane Length, Ld</td>
<td>2380 ft</td>
</tr>
<tr>
<td>Freeway Volume, Vf</td>
<td>2405</td>
</tr>
<tr>
<td>Ramp Volume, Vr</td>
<td>728</td>
</tr>
<tr>
<td>Freeway Free-Flow Speed, Sff</td>
<td>65.0</td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, Sfr</td>
<td>35.0</td>
</tr>
</tbody>
</table>

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>V = V/PHF x f AV x f P</td>
<td></td>
</tr>
<tr>
<td>PHF</td>
<td>0.95</td>
</tr>
<tr>
<td>Terrain</td>
<td>Level</td>
</tr>
<tr>
<td>%truck</td>
<td>2</td>
</tr>
<tr>
<td>%RV</td>
<td>0</td>
</tr>
<tr>
<td>f AV</td>
<td>0.990</td>
</tr>
<tr>
<td>f P</td>
<td>1.00</td>
</tr>
</tbody>
</table>

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

\[
V_{12} = V_f \left( \frac{P_{FM}}{P_{FO}} \right)
\]

\[
L_EO = (Equation 13-6 or 13-7)
\]

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

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

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

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

\[
L_{EO} = (Equation 13-12 or 13-13)
\]

\[
P_{CO} = 1.00 \text{ using Equation (Exhibit 13-7)}
\]

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

\[
V_2 \text{ or } V_{avg} \geq 2.700 \text{ pc/h?} \quad \begin{cases} \text{Yes} & 0 \\ \text{No} & \end{cases}
\]

\[
V_1 \text{ or } V_{avg} \geq 1.5 \cdot V_{12} \quad \begin{cases} \text{Yes} & 0 \\ \text{No} & \end{cases}
\]

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

### Capacity Checks

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

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{12}</td>
<td></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></td>
<td></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>V_{12}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

\[
D_R = 5.475 + 0.00734 v_R + 0.0075 V_{12} - 0.00627 L_A
\]

\[
D_R = 4.252 + 0.0036 V_{12} - 0.009 L_D
\]

\[
S_{d} = (pc/mln) \quad \text{LOS} = (Exhibit 13-2)
\]

### Speed Determination

<table>
<thead>
<tr>
<th>M_{S}</th>
<th>(Exhibit 13-11)</th>
<th>( S_{d} ) = 0.458 (Exhibit 13-12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S_{0}</td>
<td>(Exhibit 13-11)</td>
<td>( S_{d} ) = 53.6 mph (Exhibit 13-12)</td>
</tr>
<tr>
<td>S</td>
<td>(Exhibit 13-11)</td>
<td>( S_{d} ) = 53.6 mph (Exhibit 13-13)</td>
</tr>
</tbody>
</table>

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file://C:/Users/tucker/AppData/Local/Temp/r2kB87.tmp

10/19/2015
**General Information**

**Analyst**
JT

**Agency or Company**
LLG

**Date Performed**
09/22/2015

**Analysis Time Period**
PM Peak Hour

**Project Description**
2-10-3135-2 Paradise Valley Specific Plan, Riverside County

**Site Information**

**Freeway/Dir of Travel**
I-10 Eastbound

**Junction**
Dillon Rd On-Ramp

**Jurisdiction**

**Analysis Year**
Existing + Project

**Inputs**

- **Upstream Adj Ramp**
  - Freeway Number of Lanes, N: 2
  - Ramp Number of Lanes, N: 1
  - Acceleration Lane Length, L_A: 700 ft
  - Deceleration Lane Length L_D: 1291 ft
  - Freeway Volume, V_F: 716 veh/h
  - Ramp Volume, V_R: 65.0 veh/h

- **Downstream Adj Ramp**
  - Ramp Number of Lanes, N: 1

- **L_up = 2420 ft**

- **V_u = 119 veh/h**

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

<table>
<thead>
<tr>
<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>1291</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
</tr>
<tr>
<td>Ramp</td>
<td>716</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
</tr>
<tr>
<td>UpStream</td>
<td>119</td>
<td>0.94</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
</tr>
<tr>
<td>DownStream</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Merge Areas**

- **V_{F0} = 2134 veh/h**

**Diverge Areas**

**Estimation of v_{12}**

- \( V_{12} = V_F \) (Equation 13-6 or 13-7)
- \( P_{FM} = 1000 \) using Equation (Exhibit 13-6)
- \( V_{12} = 1373 \) pc/h
- \( V_{12} = 716 \) pc/h (Equation 13-14 or 13-17)

**Capacity Checks**

- **V_{F0} = 2134 veh/h**
- **V_{F0} = V_F - V_R** (Exhibit 13-8)

**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>2134 veh/h</td>
<td>4600 All</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>V_{12}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

- \( D_R = 5.475 + 0.00734 V_R + 0.0078 V_{12} - 0.00827 L_A \)
- \( D_R = 17.4 \) (pc/mln)

**Speed Determination**

- \( M_0 = 0.305 \) (Exhibit 13-11)
- \( S_R = 58.0 \) mph (Exhibit 13-11)
- \( S_0 = 58.0 \) mph (Exhibit 13-11)
- \( S = 58.0 \) mph (Exhibit 13-13)

---

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**Date:** 10/19/2015
# RAMPS AND RAMP JUNCTIONS WORKSHEET

## General Information
- **Analyst:** JT
- **Agency or Company:** LLG
- **Date Performed:** 09/22/2015
- **Analysis Time:** PM Peak Hour
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

## Site Information
- **Freeway/Dir of Travel:** I-10 Westbound
- **Junction:** Golf Center Pkwy Off-Ramp
- **Jurisdiction:** Existing + Project

## Inputs
- **Upstream Adj Ramp:** Freeway Number of Lanes, N = 4
- **Acceleration Lane Length, L_A:** 235 ft
- **Deceleration Lane L, L_D:** 372 ft
- **Freeway Volume, V_F:** 2872 veh/h
- **Ramp Volume, V_R:** 65.0 veh/h
- **Freeway Free-Flow Speed, S_FF:** 35.0 veh/h
- **Downstream Adj Ramp:** Ramp Number of Lanes, N = 1

## Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>(poch)</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>2872</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>3053</td>
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<tr>
<td>Ramp</td>
<td>372</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>355</td>
</tr>
<tr>
<td>Downstream</td>
<td>403</td>
<td>0.94</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>429</td>
</tr>
</tbody>
</table>

## Merge Areas

### Estimation of V_{12}

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

(Equation 13-6 or 13-7)

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

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

If \( V_{12} > 2,700 \text{ pch} \):

- Yes
- No

### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F7</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{FO} )</td>
<td>Exhibit 13-6</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 13-6</td>
<td></td>
</tr>
</tbody>
</table>

### Speed Determination

\[
M_S = (Exhibit 13-11)
\]

\[
S_R = \text{mph (Exhibit 13-11)}
\]

\[
S_R = \text{mph (Exhibit 13-11)}
\]

\[
S = \text{mph (Exhibit 13-13)}
\]

---

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HCS2010™ Version 6.70

Generated: 1/27/2016 10:29 AM

file:///C:/Users/tucker/AppData/Local/Temp/r2kCBF7.tmp
### General Information

<table>
<thead>
<tr>
<th>Site Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst</td>
</tr>
<tr>
<td>Agency or Company</td>
</tr>
<tr>
<td>Date Performed</td>
</tr>
<tr>
<td>Analysis Time Period</td>
</tr>
<tr>
<td>Project Description</td>
</tr>
</tbody>
</table>

### Inputs

<table>
<thead>
<tr>
<th>Freeway Number of Lanes, N</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramp Number of Lanes, N</td>
<td>1</td>
</tr>
<tr>
<td>Acceleration Lane Length, L_A</td>
<td>1500</td>
</tr>
<tr>
<td>Deceleration Lane Length, L_D</td>
<td>1893</td>
</tr>
<tr>
<td>Freeway Volume, V_F</td>
<td>388</td>
</tr>
<tr>
<td>Ramp Volume, V_R</td>
<td>65.0</td>
</tr>
<tr>
<td>Freeway Free-Flow Speed, S_{FF}</td>
<td>35.0</td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_{RR}</td>
<td>484</td>
</tr>
</tbody>
</table>

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<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>1893</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.000</td>
</tr>
<tr>
<td>Ramp</td>
<td>388</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.000</td>
</tr>
<tr>
<td>Upstream</td>
<td>455</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Downstream</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Estimation of v_{12}

\[
V_{12} = V_F \cdot P_{FM} \\
V_{12}^* = 613.36 \quad \text{(Equation 13-6 or 13-7)}
\]

### Estimation of V_{12}

\[
V_{12} = V_R + (V_F - V_R) \cdot P_{FD} \\
V_{12}^* = \text{using Equation (Exhibit 13-7)}
\]

### Merge Areas

<table>
<thead>
<tr>
<th>V_{3} or V_{av3} &gt; 2,700 pc/h?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{3} or V_{av3} &gt; 1.5 \cdot V_{12}/2</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>If Yes, V_{12a} = 1247 pc/h (Equation 13-16, 13-19)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Diverge Areas

<table>
<thead>
<tr>
<th>V_{3} or V_{av3} &gt; 2,700 pc/h?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{3} or V_{av3} &gt; 1.5 \cdot V_{12}/2</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>If Yes, V_{12a} = 1247 pc/h (Equation 13-16, 13-19)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Capacity Checks

<table>
<thead>
<tr>
<th>V_{FO} Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2426</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>1660</td>
<td>Exhibit 13-8</td>
<td>4600 All</td>
</tr>
</tbody>
</table>

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

\[
D_R = 5.475 + 0.00734 R + 0.0078 V_{12} - 0.00627 I_A \\
D_R = 8.8 (pc/ml/m) \\
\text{LOS} = A (Exhibit 13-2) \\
S = 0.237 (Exhibit 13-11) \\
S = 59.6 mph (Exhibit 13-11) \\
S = 64.0 mph (Exhibit 13-11) \\
S = 60.9 mph (Exhibit 13-13) \\
\text{Speed Determination} = \text{(Exhibit 13-12)} \\
D_R = 4.252 + 0.0086 V_{12} - 0.009 I_D \\
D_R = 5.475 + 0.00734 R + 0.0078 V_{12} - 0.00627 I_A \\
\text{LOS} = A (Exhibit 13-2) \\
S = 0.237 (Exhibit 13-11) \\
S = 59.6 mph (Exhibit 13-11) \\
S = 64.0 mph (Exhibit 13-11) \\
S = 60.9 mph (Exhibit 13-13) \\
\text{Speed Determination} = \text{(Exhibit 13-12)} \\
\text{LOS} = A (Exhibit 13-2) \\
\text{Speed Determination} = \text{(Exhibit 13-12)} \\
\text{LOS} = A (Exhibit 13-2) \\
\text{Speed Determination} = \text{(Exhibit 13-12)} \\
\text{LOS} = A (Exhibit 13-2) \\
\text{Speed Determination} = \text{(Exhibit 13-12)}
### RAMPS AND RAMP JUNCTIONS WORKSHEET

**General Information**
- **Analyst**: JT
- **Agency or Company**: LLG
- **Date Performed**: 09/22/2015
- **Analysis Time Period**: PM Peak Hour

**Site Information**
- **Freeway/Dir of Travel**: I-10 Westbound
- **Junction**: Monroe St Off-Ramp
- **Jurisdiction**: Existing + Project

**Project Description**: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

### Inputs
- **Upstream Adj Ramp**: Freeway Number of Lanes, N = 3
- **Ramp Number of Lanes, N**: 1
- **Acceleration Lane Length, L_A**: 180
- **Deceleration Lane Length, L_D**: 371
- **Freeway Volume, V_F**: 3812
- **Ramp Volume, V_R**: 394
- **Freeway Free-Flow Speed, S_FF**: 65.0
- **Ramp Free-Flow Speed, S_FR**: 35.0

**Downstream Adj Ramp**
- **Yes**
- **On**
- **No**
- **Off**

**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_H</th>
<th>f_p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>3812</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
</tr>
<tr>
<td>Ramp</td>
<td>371</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
</tr>
</tbody>
</table>

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

\[ L_{EO} = \text{(Equation 13-6 or 13-7)} \]

\[ L_{EO} = \text{using Equation (Exhibit 13-6)} \]

\[ v_{12} = \text{pc/h (Equation 13-14 or 13-17)} \]

\[ V_9 \text{ or } V_{av34} \text{pc/h (Equation 13-16, 13-18, or 13-19)} \]

### Capacity Checks

<table>
<thead>
<tr>
<th>Capacity Checks</th>
<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>
<td></td>
</tr>
</tbody>
</table>

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

\[ D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A \]

\[ D_R = (pc/mln) \]

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

<table>
<thead>
<tr>
<th>Speed Determination</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{R_{12}} )</td>
<td>Exhibit 13-8</td>
<td></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_{R_{12}} )</td>
<td>Exhibit 13-8</td>
<td></td>
</tr>
</tbody>
</table>

### Flow Entering Diverge Influence Area

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

### Speed Determination

\[ D_S = 0.463 (\text{Exhibit 13-12}) \]

\[ S = 58.6 \text{ mph (Exhibit 13-13)} \]
### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst**: JT
- **Agency or Company**: LLG
- **Date Performed**: 09/22/2015
- **Analysis Time Period**: PM Peak Hour
- **Project Description**: 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

#### Site Information
- **Freeway/Dir of Travel**: I-10 Eastbound
- **Junction**: Monroe St On-Ramp
- **Jurisdiction**: "Existing + Project"

#### Inputs
- **Upstream Adj Ramp**
  - Freeway Number of Lanes, N: 3
  - Ramp Number of Lanes, N: 1
  - Acceleration Lane Length, L_A: 870
  - Deceleration Lane Length, L_D: 371
  - Freeway Volume, V_F: 2230
  - Ramp Volume, V_R: 371
  - Freeway Free-Flow Speed, S_FF: 65.0
  - Ramp Free-Flow Speed, S_R: 35.0
- **Downstream Adj Ramp**
  - Freeway Number of Lanes, N: 3
  - Ramp Number of Lanes, N: 1

#### 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_FV</th>
<th>f_R</th>
<th>V = V/PHF x f_FV x f_R</th>
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</thead>
<tbody>
<tr>
<td>Freeway</td>
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<td>0.95</td>
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<td>0.990</td>
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<td>2371</td>
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<tr>
<td>Ramp</td>
<td>371</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>394</td>
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<tr>
<td>UpStream</td>
<td>530</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>564</td>
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<tr>
<td>DownStream</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Estimation of V_{12}

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

| F_{EQ} = 406.19 (Equation 13-6 or 13-7) |
| F_{FM} = 0.602 using Equation (Exhibit 13-6) |
| V_{12} = 1427 pc/h |
| V_{3} or V_{av34} = 944 pc/h (Equation 13-14 or 13-17) |

#### Estimation of V_{12}

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

| V_{12} = V_F + \left( V_F - V_R \right) P_{FD} |
| F_{EQ} = 406.19 (Equation 13-12 or 13-13) |
| P_{FD} = using Equation (Exhibit 13-7) |
| V_{12} = pc/h |
| V_{3} or V_{av34} = pch (Equation 13-14 or 13-17) |

#### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>2765</td>
<td>Exhibit 13-8</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}</td>
<td>1821</td>
<td>Exhibit 13-8</td>
</tr>
</tbody>
</table>

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

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

\[
D_R = 4.252 + 0.0086 V_{12} - 0.0099 L_D |
\]

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

\[
D_R = 14.0 \text{ pc/mi/ln} |
\]

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

#### Speed Determination

\[
M_S = 0.284 (Exhibit 13-11) |
\]

\[
S_R = 56.5 \text{ mph (Exhibit 13-11)} |
\]

\[
S_I = 63.4 \text{ mph (Exhibit 13-11)} |
\]

\[
S = 60.1 \text{ mph (Exhibit 13-13)} |
\]
<table>
<thead>
<tr>
<th>General Information</th>
<th>Site Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst</td>
<td>JT</td>
</tr>
<tr>
<td>Agency or Company</td>
<td>LLG</td>
</tr>
<tr>
<td>Date Performed</td>
<td>09/22/2015</td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>PM Peak Hour</td>
</tr>
<tr>
<td>Project Description</td>
<td>2-10-3136-2 Paradise Valley Specific Plan, Riverside County</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream Adj Ramp</td>
</tr>
<tr>
<td>Ramp Number of Lanes, N = 1</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Acceleration Lane Length, Lₐ = 240 ft</td>
</tr>
<tr>
<td>Deceleration Lane Length, Lₐ = 4647 ft</td>
</tr>
<tr>
<td>Freeway Volume, Vₐ = 436 veh/h</td>
</tr>
<tr>
<td>Ramp Volume, Vᵣ = 65.0 Free Flow Speed, Sᵣ = 35.0 veh/h</td>
</tr>
<tr>
<td>Downstream Adj Ramp</td>
</tr>
<tr>
<td>Ramp</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Lₑₒₙ = 2200 ft</td>
</tr>
<tr>
<td>Vₒ = 419 veh/h</td>
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</tbody>
</table>

<p>| Conversion to pc/h Under Base Conditions |</p>
<table>
<thead>
<tr>
<th>(pc/h) V (Veh/h) PHF</th>
<th>Terrain</th>
<th>%Truck</th>
<th>%RV</th>
<th>fᵥ</th>
<th>fᵣ</th>
<th>fₑ</th>
<th>V = V/PHF x fᵥ x fᵣ x fₑ</th>
</tr>
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<tbody>
<tr>
<td>Freeway</td>
<td>4847</td>
<td>0.95</td>
<td>Level</td>
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<td>0.990</td>
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</tr>
<tr>
<td>Ramp</td>
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<td>0.95</td>
<td>Level</td>
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<td>0</td>
<td>0.990</td>
<td>1.00</td>
</tr>
<tr>
<td>DownStream</td>
<td>419</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
</tr>
</tbody>
</table>

| Estimation of V₁₂ |
| V₁₂ = Vᵣ (Pᵣm) |
| Lₑₒₙ = (Equation 13-6 or 13-7) |
| Pᵣm = using Equation (Exhibit 13-6) |
| V₁₂ = pc/h |
| Vₒ or Vₒₐₙ > 2,700 pc/h? | Yes | No |
| Is Vₒ or Vₒₐₙ > 1.5 * V₁₂? | Yes | No |
| If Yes, V₁₂ₐ = pc/h (Equation 13-16, 13-18, or 13-19) |

<table>
<thead>
<tr>
<th>Capacity Checks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Capacity</td>
</tr>
<tr>
<td>Vᵣᵦ =</td>
</tr>
<tr>
<td>Vᵣᵦ = Vᵣ - Vᵣ</td>
</tr>
<tr>
<td>Vᵣᵦ = Vᵣ - Vᵣ</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flow Entering Merge Influence Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
</tr>
<tr>
<td>Vᵣᵦ =</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of Service Determination (if not F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dₑᵦ = 5.475 + 0.00734 Vᵣ + 0.0078 V₁₂ - 0.00627 Lₐ</td>
</tr>
<tr>
<td>Dₑᵦ = (pc/mln)</td>
</tr>
<tr>
<td>LOS = (Exhibit 13-2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Speed Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mₑᵦ = (Exhibit 13-11)</td>
</tr>
<tr>
<td>Sₑᵦ = mph (Exhibit 13-11)</td>
</tr>
<tr>
<td>Sₑᵦ = mph (Exhibit 13-11)</td>
</tr>
<tr>
<td>Sᵦ = mph (Exhibit 13-13)</td>
</tr>
</tbody>
</table>

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Generated: 10/19/2015 4:11 PM

file://C:/Users/tucker/AppData/Local/Temp/r2kDD20.tmp
10/19/2015
**RAMPS AND RAMP JUNCTIONS WORKSHEET**

### General Information
- **Analyst:** JT
- **Freeway/Dir of Travel:** I-10 Eastbound
- **Agency or Company:** LLG
- **Junction:** Washington St On-Ramp
- **Date Performed:** 09/22/2015
- **Jurisdiction:**
- **Analysis Time Period:** PM Peak Hour
- **Analysis Year:**
- **Existing + Project:**

### Project Description
- **2-10-3136-2 Paradise Valley Specific Plan, Riverside County**

### Inputs
- **Upstream Adj Ramp:** Freeway Number of Lanes, N
  - Yes
  - On
  - 3
  - No
  - Off
  - 1
- **Deceleration Lane Length, Ld:** 660 ft
- **Freeway Volume, \( V_F \):** 3012 veh/h
- **Ramp Volume, \( V_R \):** 555 veh/h
- **Freeway Free-Flow Speed, \( S_{FF} \):** 65.0 mph
- **Ramp Free-Flow Speed, \( S_{RF} \):** 35.0 mph

### 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 \times f_{HV} \times f_P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>3012</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>3202</td>
</tr>
<tr>
<td>Ramp</td>
<td>555</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>601</td>
</tr>
<tr>
<td>UpStream</td>
<td>836</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>889</td>
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<tr>
<td>DownStream</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Estimation of \( V_{12} \)
- \( V_{12} = V_F \left( P_{FM} \right) \)
- \( P_{FM} = 0.596 \) (Equation 13-6 or 13-7)
- \( V_{12} = 1908 \) pc/h
- Is \( V_3 \) or \( V_{av34} > 2.700 \) pc/h? Yes
- Is \( V_3 \) or \( V_{av34} > 1.5 \times V_{12} \)? Yes
- If Yes, \( V_{12a} = \) pc/h (Equation 13-16, 13-18, or 13-19)

### Capacity Checks
- **Actual** | **Capacity** | **LOS F?**
- 3803 | Exhibit 13-8 | No

### Flow Entering Merge Influence Area
- **Actual** | **Max Desirable** | **Violation?**
- 2509 | Exhibit 13-8 | 4600:All | No

### Level of Service Determination (If not F)
- \( D_R = 5.475 + 0.00734 \times V_R + 0.0078 \times V_{12} - 0.00627 \times L_A \)
- \( D_R = 20.6 \) (pc/mi/ln)

### Level of Service Determination (If not F)
- \( D_R = 4.252 + 0.0068 \times V_{12} - 0.009 \times L_D \)
- \( D_R = \) (pc/mi/ln)

### Speed Determination
- \( M_S = 0.323 \) (Exhibit 13-11)
- \( S_R = 57.6 \) mph (Exhibit 13-11)
- \( S_D = 62.1 \) mph (Exhibit 13-11)
- \( S = 59.1 \) mph (Exhibit 13-13)

---

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10/19/2015
### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information
- **Analyst:** JT
- **Agency or Company:** LLG
- **Date Performed:** 09/22/2015
- **Analysis Time Period:** PM Peak Hour
- **Project Description:** 2-10-3136-2 Paradise Valley Specific Plan, Riverside County

#### Site Information
- **Freeway/Dir of Travel:** I-10 Westbound
- **Junction:** Cook St Off-Ramp
- **Jurisdiction:** Existing + Project

#### Inputs

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream Adj Ramp</td>
<td>Freeway Number of Lanes, N</td>
</tr>
<tr>
<td>Ramp Number of Lanes, N</td>
<td>1</td>
</tr>
<tr>
<td>Acceleration Lane Length, L_A</td>
<td>190 ft</td>
</tr>
<tr>
<td>Deceleration Lane Length, L_D</td>
<td>5366 ft</td>
</tr>
<tr>
<td>Freeway Volume, V_F</td>
<td>441 veh/h</td>
</tr>
<tr>
<td>Ramp Volume, V_R</td>
<td>501 veh/h</td>
</tr>
<tr>
<td>Freeway Free-Flow Speed, S_FF</td>
<td>65.0</td>
</tr>
<tr>
<td>Ramp Free-Flow Speed, S_RF</td>
<td>35.0</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>5366</td>
</tr>
<tr>
<td>PHF</td>
<td>0.95</td>
</tr>
<tr>
<td>Terrain</td>
<td>Level</td>
</tr>
<tr>
<td>%Truck</td>
<td>0</td>
</tr>
<tr>
<td>%Rv</td>
<td>0</td>
</tr>
<tr>
<td>f_HV</td>
<td>1.00</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>5705</td>
</tr>
</tbody>
</table>

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

- \( V_{12} = V_F \ (P_{FM}) \)
- \( t_{ED} = \) (Equation 13-6 or 13-7)
- \( P_{FM} = \) using Equation (Exhibit 13-6)
- \( V_{12} = \) pc/h
- \( V_1 \) or \( V_{av16} < 7,200 \) pc/h? Yes No
- \( V_1 \) or \( V_{av16} \geq 7,200 \) pc/h? Yes No
- \( V_1 \) = pc/h (Equation 13-16, 13-18, or 13-19)

#### Capacity Checks

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{FO}</td>
<td>Exhibit 13-6</td>
</tr>
<tr>
<td>Actual</td>
<td>5705</td>
</tr>
<tr>
<td>Capacity</td>
<td>Exhibit 13-8</td>
</tr>
<tr>
<td>LOS F?</td>
<td>7050</td>
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</tbody>
</table>

#### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( V_{R12} )</td>
<td>Exhibit 13-8</td>
</tr>
<tr>
<td>Actual</td>
<td>5236</td>
</tr>
<tr>
<td>Max Desirable</td>
<td>Exhibit 13-8</td>
</tr>
<tr>
<td>Violation?</td>
<td>4000</td>
</tr>
</tbody>
</table>

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

- \( D_B = 5.475 + 0.00734 \ V_F + 0.0078 \ V_{12} + 0.00627 \ L_A \)
- \( D_B = 3.34 \pc/mi/ln \)
- \( LOS = (\text{Exhibit 13-2}) \)

#### Speed Determination

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( M_S )</td>
<td>(Exhibit 13-11)</td>
</tr>
<tr>
<td>( S_{R1} )</td>
<td>mph (Exhibit 13-11)</td>
</tr>
<tr>
<td>( S_{R2} )</td>
<td>mph (Exhibit 13-11)</td>
</tr>
<tr>
<td>( S )</td>
<td>mph (Exhibit 13-13)</td>
</tr>
</tbody>
</table>

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10/19/2015
### RAMPS AND RAMP JUNCTIONS WORKSHEET

#### General Information

<table>
<thead>
<tr>
<th>Analyst</th>
<th>JT</th>
<th>Freeway/Dir of Travel</th>
<th>I-10 Eastbound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency or Company</td>
<td>LLG</td>
<td>Junction</td>
<td>Cook St On-Ramp</td>
</tr>
<tr>
<td>Date Performed</td>
<td>09/22/2015</td>
<td>Jurisdiction</td>
<td></td>
</tr>
<tr>
<td>Analysis Time Period</td>
<td>PM Peak Hour</td>
<td>Analysis Year</td>
<td>Existing + Project</td>
</tr>
<tr>
<td>Project Description</td>
<td>2-10-3136-2 Paradise Valley Specific Plan, Riverside County</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Inputs

| Upstream Adj Ramp | Freeway Number of Lanes, N | 3 |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, Lₐ | 670 |
| Deceleration Lane Length, L₀ | |
| Freeway Volume, Vₐ | 3164 |
| Ramp Volume, Vᵢ | 684 |
| Lᵤ | 2620 ft |
| Vᵤ | 406 veh/h |
| Ramp Free-Flow Speed, Sᵢ | 35.0 |
| Downstream Adj Ramp |
| Ramp Number of Lanes, N | 1 |
| Acceleration Lane Length, Lₐ | 670 |
| Deceleration Lane Length, L₀ | 0 |
| Freeway Volume, Vₐ | 3164 |
| Ramp Volume, Vᵢ | 684 |
| Lᵢ | |
| Vᵢ | |
| Ramp Free-Flow Speed, Sᵢ | |

#### 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>fᵥ</th>
<th>fᵢ</th>
<th>V = Vᵢ/PHF x fᵥ x fᵢ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeway</td>
<td>3164</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>3364</td>
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<tr>
<td>Ramp</td>
<td>684</td>
<td>0.95</td>
<td>Level</td>
<td>2</td>
<td>0</td>
<td>0.990</td>
<td>1.00</td>
<td>727</td>
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<tr>
<td>UpStream</td>
<td>406</td>
<td>0.94</td>
<td>Level</td>
<td>0</td>
<td>0</td>
<td>1.000</td>
<td>1.00</td>
<td>432</td>
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<tr>
<td>DownStream</td>
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</tbody>
</table>

#### Merge Areas

<table>
<thead>
<tr>
<th>Estimation of v₁₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>V₁₂ = Vₐ (Pₘᵢ)</td>
</tr>
<tr>
<td>θ_ₑₒ = 601.15 (Equation 13-6 or 13-7)</td>
</tr>
<tr>
<td>Pₘᵢ = 0.596 using Equation (Exhibit 13-6)</td>
</tr>
<tr>
<td>V₁₂ = 2006 pc/h</td>
</tr>
<tr>
<td>Vₐ or Vₐ₉₄ = 1358 pc/h (Equation 13-14 or 13-17)</td>
</tr>
<tr>
<td>Is Vₐ or Vₐ₉₄ &gt; 2700 pc/h?</td>
</tr>
<tr>
<td>Is Vₐ or Vₐ₉₄ &gt; 1.5 * V₁₂?</td>
</tr>
<tr>
<td>If Yes, V₁₂a = 2006 pc/h (Equation 13-16, 13-18)</td>
</tr>
</tbody>
</table>

#### Diverge Areas

<table>
<thead>
<tr>
<th>Estimation of v₁₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>V₁₂ = Vᵢ + (Vᵢ - Vᵢ₋₁)Pᵢ₋₁</td>
</tr>
<tr>
<td>θₑₒ = 601.15 (Equation 13-12 or 13-13)</td>
</tr>
<tr>
<td>Pᵢ₋₁ = using Equation (Exhibit 13-7)</td>
</tr>
<tr>
<td>V₁₂ = pch</td>
</tr>
<tr>
<td>Vₐ or Vₐ₉₄ = pch (Equation 13-14 or 13-17)</td>
</tr>
<tr>
<td>Is Vₐ or Vₐ₉₄ &gt; 2700 pc/h?</td>
</tr>
<tr>
<td>Is Vₐ or Vₐ₉₄ &gt; 1.5 * V₁₂?</td>
</tr>
<tr>
<td>If Yes, V₁₂a = pch (Equation 13-16, 13-18, or 13-19)</td>
</tr>
</tbody>
</table>

#### Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Capacity</th>
<th>LOS F?</th>
<th>( V₉ )</th>
</tr>
</thead>
<tbody>
<tr>
<td>4091</td>
<td>Exhibit 13-8</td>
<td>No</td>
<td></td>
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</tbody>
</table>

#### Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
<th>Vᵢ₊₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>2733</td>
<td>Exhibit 13-8</td>
<td>4600:All</td>
<td>No</td>
</tr>
</tbody>
</table>

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

| \( Dᵣ = 5.475 + 0.00734 Vᵢ - 0.00078 V₁₂ - 0.00627 Lₐ \) |
| Dᵣ = 22.3 (pc/mln) |
| LOS = C (Exhibit 13-2) |

#### Speed Determination

| \( Mₗ = 0.334 \) (Exhibit 13-11) |
| \( Sₐ = \) (Exhibit 13-12) |
| \( S₉ = 57.3 \) mph (Exhibit 13-11) |
| \( Sᵢ = 61.9 \) mph (Exhibit 13-11) |
| \( S = 58.8 \) mph (Exhibit 13-13) |
APPENDIX I-III

EXISTING WITH PROJECT WITH IMPROVEMENTS
TRAFFIC CONDITIONS
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