## General Information
- **Analyst**: AIM Engineering & Surveying
- **Agency or Company**: Highway/Direction of Travel
- **Date Performed**: 6/12/2008
- **Analysis Time Period**: AM Peak Hour
- **Project Description**: I-75/Everglades Boulevard IJR

## Site Information
- **Highway/Direction of Travel**: WB I-75
- **From/To**: East of SR 29
- **Jurisdiction**: Collier County
- **Analysis Year**: 2008

## Flow Inputs
- **Volume, V**: 437 veh/h
- **AADT**: veh/day
- **Peak-Hr Prop. of AADT, K**: %
- **Peak-Hr Direction Prop, D**: veh/h
- **Driver type adjustment**: 0.90
- **Oper. (LOS)**: Peak-Hour Factor, PHF
- **Des. (N)**: %Trucks and Buses, P_T
- **Planning Data**: %RVs, P_R

## Calculate Flow Adjustments
- \( f_p = 0.90 \)
- \( E_T = 1.5 \)
- \( f_{HV} = \frac{1}{(1 + P_T(E_T - 1) + P_R(E_R - 1))} \)

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

## LOS and Performance Measures
- **Operational (LOS)**: E_R = 1.2
- **Calc Speed Adj and FFS**
- \( f_{lw} = 0.0 \) mi/h
- \( f_{lc} = 0.0 \) mi/h
- \( f_d = 0.0 \) mi/h
- \( f_n = 0.0 \) mi/h
- \( FFS = 75.0 \) mi/h

## Glossary
- **N**: Number of lanes
- **S**: Speed
- **V**: Hourly volume
- **D**: Density
- **v_p**: Flow rate
- **LOS**: Level of service
- **BFFS**: Base free-flow speed
- **DDHV**: Directional design hour volume

## Factor Location
- **ER**: Exhibits 23-8, 23-10
- **ET**: Exhibits 23-8, 23-10, 23-11
- **FL**: Page 23-12
- **IN**: Exhibit 23-6
- **LODS**: Exhibits 23-2, 23-3
- **ID**: Exhibit 23-7
### General Information

**Analyst**  
AIM Engineering & Surveying

**Agency or Company**  
Highway/Direction of Travel

**Date Performed**  
6/12/2008

**Analysis Time Period**  
AM Peak Hour

**Project Description**  
I-75/Everglades Boulevard IJR

### Site Information

**Oper.(LOS)**  
EB I-75

**Des.(N)**  
East of SR 29

**Planning Data**  
Collier County  
2008

### Flow Inputs

<table>
<thead>
<tr>
<th>Application</th>
<th>Input</th>
<th>Output</th>
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<tr>
<td>Operational (LOS)</td>
<td>FFS, N, v_p</td>
<td>LOS, S, D</td>
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<tr>
<td>Design (N)</td>
<td>FFS, LOS, v_p</td>
<td>N, S, D</td>
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<td>Design (v_p)</td>
<td>FFS, LOS, N</td>
<td>v_p, S, D</td>
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#### Calculate Flow Adjustments

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<td>E_T</td>
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#### Speed Inputs

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<tr>
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<tr>
<td>Interchange Density</td>
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<tr>
<td>FFS (measured)</td>
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<td>Base free-flow Speed, BFFS</td>
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#### LOS and Performance Measures

### Design (N)

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<tr>
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#### Glossary

- **N** - Number of lanes
- **S** - Speed
- **V** - Hourly volume
- **D** - Density
- **v_p** - Flow rate
- **LOS** - Level of service
- **DDHV** - Directional design hour volume

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BASIC FREEWAY WORKSHEET

BASIC FREEWAY SEGMENTS WORKSHEET

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<td>LOS, S, D</td>
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<tr>
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<tr>
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<td>( v_p ), S, D</td>
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<td>FFS, N, AADT</td>
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<td>FFS, LOS, AADT</td>
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<td>( v_p ), S, D</td>
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General Information

Analyst: AIM Engineering & Surveying
Agency or Company: From/To
Date Performed: 6/12/2008
Analysis Time Period: AM Peak Hour
Project Description: I-75/Everglades Boulevard IJR

Site Information

Highway/Direction of Travel: WB I-75
From/To: Btwn SR 29 & CR 951
Jurisdiction: Collier County
Analysis Year: 2008

Flow Inputs

| Volume, V | 419 veh/h | Peak-Hour Factor, PHF | 0.90 |
| AADT      | veh/day   | %Trucks and Buses, \( P_T \) | 6    |
| Peak-Hr Prop. of AADT, K | %RVs, \( P_R \) | 0 |
| Peak-Hr Direction Prop, D | General Terrain: | Level |
| DDHV = AADT \times K \times D | Grade | % | Length | mi |
| Driver type adjustment | 0.90 | Up/Down % |

Calculate Flow Adjustments

\( f_p \) = 0.90
\( E_T \) = 1.5
\( E_R \) = f_{HV} = 1/(1+P_T(P_R-1)+P_N(P_R-1)) = 0.971

Speed Inputs

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

Calc Speed Adj and FFS

\( f_{Lw} \) = 0.0 \( mi/h \)
\( f_{C} \) = 0.0 \( mi/h \)
\( f_{D} \) = 0.0 \( mi/h \)
\( f_N \) = 0.0 \( mi/h \)

LOS and Performance Measures

Operational (LOS)

\( v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV}) \times f_p \)
\( S = 75.0 \text{ mi/h} \)
\( D = v_p / S \)
\( LOS = A \)

Design (N)

Design LOS

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

Glossary

| N - Number of lanes | S - Speed |
| V - Hourly volume | D - Density |
| \( v_p \) - Flow rate | FFS - Free-flow speed |
| LOS - Level of service | BFFS - Base free-flow speed |
| DDHV - Directional design hour volume |

Factor Location

| E_R - Exhibits 23-8, 23-10 |
| \( f_{Lw} \) - Exhibit 23-4 |
| \( E_T \) - Exhibits 23-8, 23-10, 23-11 |
| \( f_{C} \) - Exhibit 23-5 |
| \( f_p \) - Page 23-12 |
| \( f_{D} \) - Exhibit 23-6 |
| LOS, S, FFS, \( v_p \) - Exhibits 23-2, 23-3 |
| \( f_{ID} \) - Exhibit 23-7 |

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BASIC FREEWAY WORKSHEET

BASIC FREEWAY SEGMENTS WORKSHEET

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<td>Operational (LOS)</td>
<td>FFS, N, (v_p)</td>
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<td>Design (N)</td>
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<td>Planning (v_p)</td>
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<td>(v_p), S, D</td>
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General Information

Analyst: AIM Engineering & Surveying
Agency or Company: N/A
Date Performed: 6/12/2008
Analysis Time Period: AM Peak Hour
Project Description: I-75/Everglades Boulevard IJR

Site Information

Highway/Direction of Travel: EB I-75
From/To: Btwn SR 29 & CR 951
Jurisdiction: Collier County
Analysis Year: 2008

Flow Inputs

Volume, V 576 veh/h
AADT veh/day
Peak-Hr Prop. of AADT, K
Peak-Hr Direction Prop, D
DDHV = AADT x K x D veh/h
Driver type adjustment 0.90

Calculate Flow Adjustments

\( f_p \) 0.90
\( E_T \) 1.5

Speed Inputs

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

Base free-flow Speed, BFFS 75.0 mi/h

LOS and Performance Measures

Operational (LOS)

\( v_p = \frac{(V \text{ or DDHV})}{(PHF \times N \times f_{HV} \times f_p)} \) pc/h/ln

Calc Speed Adj and FFS

\( f_{LVW} = \frac{1}{1 + P_T (E_T - 1)} \) mi/h

Design (N)

Design LOS

\( v_p = \frac{(V \text{ or DDHV})}{(PHF \times N \times f_{HV} \times f_p)} \) pc/h

Design LOS

\( S = \frac{D \times \text{LOS}}{A} \) mi/h

Factor Location

\( E_R - \text{Exhibits 23-8, 23-10} \)
\( f_{LVW} - \text{Exhibit 23-4} \)
\( E_T - \text{Exhibits 23-8, 23-10, 23-11} \)
\( f_{LC} - \text{Exhibit 23-5} \)
\( f_p - \text{Page 23-12} \)
\( f_N - \text{Exhibit 23-6} \)
\( f_{ID} - \text{Exhibit 23-7} \)

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

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4/26/2012
BASIC FREEWAY SEGMENTS WORKSHEET

General Information
- Analyst: AIM Engineering & Surveying
- Agency or Company: Highway/Direction of Travel
- Date Performed: 6/12/2008
- Analysis Time Period: AM Peak Hour
- Project Description: I-75/Everglades Boulevard IJR

Site Information
- Highway/Direction of Travel: NB I-75
- From/To: Btown CR 951 & GG Pkwy
- Jurisdiction: Collier County
- Analysis Year: 2008

Flow Inputs
- Volume, V: 974 veh/h
- AADT: veh/day
- Peak-Hr Prop. of AADT, K: %Trucks and Buses, P_T: 6
- Peak-Hr Direction Prop, D: %RVs, P_R: 0
- DDHV = AADT x K x D veh/h
- Driver type adjustment: 1.00 veh/h

Calculate Flow Adjustments
- f_p: 1.00
- E_T: 1.5
- f_{HV} = 1/[1 + P_T (E_T - 1) + P_R (E_R - 1)]

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

Calc Speed Adj and FFS
- f_{LW}: 0.0 mi/h
- f_{LC}: 0.0 mi/h
- f_{ID}: 0.0 mi/h
- f_{N}: 0.0 mi/h
- FFS: 75.0 mi/h

LOS and Performance Measures
- Operational (LOS): v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)
- S: 75.0 m/h
- D: v_p / S
- LOS: A

Design (N)
- Design LOS: v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)
- D: v_p / S
- Required Number of Lanes, N

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

Factor Location
- E_R - Exhibits 23-8, 23-10
- f_{LW} - Exhibit 23-4
- E_T - Exhibits 23-8, 23-10, 23-11
- f_{LC} - Exhibit 23-5
- f_p - Page 23-12
- f_{N} - Exhibit 23-6
- LOS, S, FFS, v_p - Exhibits 23-2, 23-3
- f_{ID} - Exhibit 23-7
BASIC FREEWAY WORKSHEET

General Information
Analyist: AIM Engineering & Surveying
Agency or Company: Highway/Direction of Travel: SB I-75
Date Performed: 6/12/2008
Analysis Time Period: AM Peak Hour
Project Description: I-75/Everglades Boulevard IJR

Flow Inputs
Volume, V: 1278 veh/h
AADT: veh/day
Peak-Hr Prop. of AADT, K: %Trucks and Buses, P_T: 0.90
Peak-Hr Direction Prop, D: %RVs, P_R: 0
DDHV = AADT x K x D: veh/h
Driver type adjustment: 1.00

Calculate Flow Adjustments
f_p: 1.00
E_T: 1.5
E_R: 1.2
f_HV = 1/(1+P_T(E_T - 1)) + P_R(E_R - 1): 0.971

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

LOS and Performance Measures
Operational (LOS)

Design (N)

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

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### General Information
- **Analyst:** AIM Engineering & Surveying
- **Agency or Company:**
- **Date Performed:** 6/12/2008
- **Analysis Time Period:** AM Peak Hour
- **Project Description:** I-75/Everglades Boulevard IJR
- **Highway/Direction of Travel:** NB I-75
- **From/To:** North of Golden Gate Pkwy
- **Jurisdiction:** Collier County
- **Analysis Year:** 2008

### Site Information
- **Des.(N):**
- **Planning Data:**

### Flow Inputs
- **Volume, V:** 1499 veh/h
- **AADT:** veh/day
- **Peak-Hr Prop. of AADT, K:**
- **Peak-Hr Direction Prop, D:** veh/h
- **Driver type adjustment:** 1.00
- **Peak-Hour Factor, PHF:** 0.90
- **%Trucks and Buses, P_T:** 6
- **%RVs, P_R:** 0
- **General Terrain:** Level
- **Grade:**
- **Length:** mi

### Calculate Flow Adjustments
- **f_p:** 1.00
- **E_R:** 1.2
- **f_{HV} = 1/(1+P_T(E_r-1) + P_R(E_r-1))**: 0.971

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

### LOS and Performance Measures
- **Operational (LOS):**
- **Design (N):**

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

### Factor Location
- **E_R:** Exhibits 23-8, 23-10
- **E_T:** Exhibits 23-8, 23-10, 23-11
- **f_{LC}:** Exhibit 23-5
- **f_{p}:** Page 23-12
- **f_{ID}:** Exhibit 23-6
- **LOS, S, FFS, v_p:** Exhibits 23-2, 23-3
- **f_{ID}:** Exhibit 23-7

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### General Information
- Analyst: AIM Engineering & Surveying
- Agency or Company: Highway/Direction of Travel
- Date Performed: 6/12/2008
- Analysis Time Period: AM Peak Hour
- Project Description: I-75/Everglades Boulevard IJR

### Site Information
- From/To: North of Golden Gate Pkwy
- Jurisdiction: Collier County
- Analysis Year: 2008

### Flow Inputs
- Volume, V: 2500 veh/h
- AADT: veh/day
- Peak-Hr Prop. of AADT, K
- Peak-Hr Direction Prop, D
- DDHV = AADT x K x D
- Driver type adjustment: 1.00
- Peak-Hour Factor, PHF: 0.90
- %Trucks and Buses, PT: 6
- %RVs, PR: 0
- General Terrain: Level
- Grade % Length: mi
- Up/Down %

### Calculate Flow Adjustments
- \( f_p \): 1.00
- \( E_T \): 1.5
- \( E_R \): 1.2
- \( f_{HV} = \frac{1}{1 + P_T (E_T \cdot 1)} + P_P (E_R \cdot 1) \): 0.971

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

### LOS and Performance Measures
- Operational (LOS): 1431 pc/h/ln
- Design (N):

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

### Factor Location
- \( E_R \) - Exhibits 23-B, 23-10
- \( f_{LW} \) - Exhibit 23-4
- \( E_T \) - Exhibits 23-B, 23-10, 23-11
- \( f_{LC} \) - Exhibit 23-5
- \( f_P \) - Page 23-12
- \( f_N \) - Exhibit 23-6
- LOS, S, FFS, \( v_p \) - Exhibits 23-2, 23-3
- \( f_{ID} \) - Exhibit 23-7

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### Site Information

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<th>AIM Engineering &amp; Surveying</th>
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<td>Collier County</td>
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<td>Analysis Year</td>
<td>2008</td>
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### Flow Inputs

- **Volume, V**: 674 veh/h
- **AADT**: veh/day
- **Peak-Hr Prop. of AADT, K**: %Trucks and Buses, $P_T$
- **Peak-Hr Direction Prop, D**: %RVs, $P_R$
- **DDHV = AADT x K x D**: veh/h
- **Driver type adjustment**: 0.90

### Calculate Flow Adjustments

- $f_p = 0.90$
- $E_T = 1.5$
- $f_{HV} = \frac{1}{1+P_T(E_T-1) + P_R(E_R-1)} = 0.971$

### Speed Inputs

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

### LOS and Performance Measures

<table>
<thead>
<tr>
<th>Operational (LOS)</th>
<th>Design (N)</th>
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<tbody>
<tr>
<td>$v_p = \frac{(V \text{ or } DDHV)}{(PHF \times N \times f_{HV} \times f_p)}$</td>
<td>$v_p = \frac{(V \text{ or } DDHV)}{(PHF \times N \times f_{HV} \times f_p)}$</td>
</tr>
<tr>
<td>429 pc/h/ln</td>
<td>pc/h</td>
</tr>
<tr>
<td>75.0 mi/h</td>
<td>mi/h</td>
</tr>
<tr>
<td>5.7 pc/mi/ln</td>
<td>pc/mi/ln</td>
</tr>
</tbody>
</table>

### Glossary

- **N**: Number of lanes
- **S**: Speed
- **V**: Hourly volume
- **D**: Density
- **$v_p$**: Flow rate
- **FFS**: Free-flow speed
- **LOS**: Level of service
- **BFFS**: Base free-flow speed
- **DDHV**: Directional design hour volume

### Factor Location

- $E_R$: Exhibits 23-8, 23-10
- $f_{LV}$: Exhibit 23-4
- $E_T$: Exhibits 23-8, 23-10, 23-11
- $f_{LC}$: Exhibit 23-5
- $f_p$: Page 23-12
- $f_{ID}$: Exhibit 23-7
- $f_N$: Exhibit 23-6

---

File: C:\Documents and Settings\groot\Local Settings\Temp\f2k41F6.tmp
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BASIC FREEWAY WORKSHEET

Application | Input | Output
---|---|---
Operational (LOS) | FFS, N, v_p | LOS, S, D
Design (N) | FFS, LOS, v_p | N, S, D
Design (v_p) | FFS, LOS, N | v_p, S, D
Planning (LOS) | FFS, N, AADT | LOS, S, D
Planning (N) | FFS, LOS, AADT | N, S, D
Planning (v_p) | FFS, LOS, N | v_p, S, D

General Information
Analyst | AL
Agency or Company | 
Date Performed | 6/12/2008
Analysis Time Period | PM Peak Hour
Project Description | I-75/Everglades Boulevard IJR

Site Information
Highway/Direction of Travel | EB I-75
From/To | East of SR 29
Jurisdiction | Collier County
Analysis Year | 2008

Oper.(LOS) | Des.(N) | Planning Data
---|---|---

Flow Inputs
Volume, V | 704 veh/h
AADT | veh/day
Peak-Hr Prop. of AADT, K | 
Peak-Hr Direction Prop, D | veh/h
DDHV = AADT x K x D | 
Driver type adjustment | 0.90

Peak-Hour Factor, PHF | 0.90
%Trucks and Buses, P_T | 6
%RVs, P_R | 0
General Terrain: | Level
Grade | % Length | mi
Up/Down % | 

Calculate Flow Adjustments
f_p | 0.90
E_T | 1.5

f_pHV = 1/(1+P_T(E_T - 1) + P_R(E_R - 1)) | 0.971

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

Calc Speed Adj and FFS
f_LW | 0.0 mi/h
f_LC | 0.0 mi/h
f_D | 0.0 mi/h
f_N | 0.0 mi/h
f_HV | 0.0 mi/h
FFS | 75.0 mi/h

LOS and Performance Measures
Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_HV x f_p)

Calc LOS
v_p = (V or DDHV) / (PHF x N x f_HV x f_p)

Design (N)

D = v_p / S

LOS

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

Factor Location

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Generated: 4/26/2012 10:49 AM
### General Information

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

### Site Information

- **Agency or Company**: AIM Engineering & Surveying
- **Highway/Direction of Travel**: WB I-75
- **Date Performed**: 6/12/2008
- **Jurisdiction**: Bwn SR 29 & CR 951
- **Analysis Time Period**: PM Peak Hour
- **Analysis Year**: 2008
- **Project Description**: I-75/Everglades Boulevard IJR

### Flow Inputs

- **Volume, \( V \)**: 635 veh/h
- **AADT**: veh/day
- **Peak-Hr Prop. of AADT, \( K \)**: 0.90
- **Peak-Hr Direction Prop, \( D \)**:
- **DDHV = AADT x \( K \) x \( D \)**: veh/h
- **Driver type adjustment**: 0.90

### Calculate Flow Adjustments

- **\( f_p \)**: 0.90
- **\( E_R \)**: 1.2
- **\( f_{HV} = f_p \times E_R \)**: 0.971

### Speed Inputs

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

### Calc Speed Adj and FFS

- **\( f_{LW} \)**: 0.0 mi/h
- **\( f_{LC} \)**: 0.0 mi/h
- **\( f_D \)**: 0.0 mi/h
- **\( f_N \)**: 0.0 mi/h
- **FFS**:

### LOS and Performance Measures

- **Operational (LOS)**:
  - \( v_p = \frac{(V \text{ or DDHV})}{(PHF \times N \times f_{HV} \times f_p)} \) pc/h/ln
  - \( S = \frac{75.0}{404} \) mi/h
  - \( D = \frac{v_p}{S} \) pc/mi/ln
  - \( LOS = A \)

### Design (N)

- **Design LOS**:
  - \( v_p = \frac{(V \text{ or DDHV})}{(PHF \times N \times f_{HV} \times f_p)} \) pc/h
  - \( S = \frac{75.0}{404} \) mi/h
  - \( D = \frac{v_p}{S} \) pc/mi/ln

### Glossary

- **\( N \)** - Number of lanes
- **\( V \)** - Hourly volume
- **\( D \)** - Density
- **\( v_p \)** - Flow rate
- **LOS** - Level of service
- **BFFF** - Base free-flow speed
- **DDHV** - Directional design hour volume
- **E_R** - Exhibits 23-8, 23-10
- **E_T** - Exhibits 23-8, 23-10, 23-11

---

**File Information**

- **File Path**: C:\Documents and Settings\groot\Local Settings\Temp\d2k424A.tmp
- **Generated**: 4/26/2012 11:04 AM
- **Version**: 5.21

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BASIC FREEWAY WORKSHEET

General Information

Analyst: AIM Engineering & Surveying
Agency or Company
Date Performed: 6/12/2008
Analysis Time Period: PM Peak Hour
Project Description: I-75/Everglades Boulevard IJR
Oper.(LOS) Des.(N) Planning Data

Site Information

Highway/Direction of Travel: EB I-75
From/To: Btwn SR 29 & CR 951
Jurisdiction: Collier County
Analysis Year: 2008

Flow Inputs

Volume, V: 665 veh/h
AADT: veh/day
Peak-Hr Prop. of AADT, K
Peak-Hr Direction Prop, D
DDHV = AADT x K x D
Driver type adjustment 0.90

Calculate Flow Adjustments

f_p = 0.90
E_T = 1.5

Calc Speed Adj and FFS

f_LW = 0.0 mi/h
f_LC = 0.0 mi/h
f_ID = 0.0 mi/h
f_N = 0.0 mi/h
FFS = 75.0 mi/h

Speed Inputs

Lane Width: 12.0 ft
Rt-Shoulder Lat. Clearance: 6.0 ft
Interchange Density: 0.50 lmi
Number of Lanes, N: 2

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_HV x f_p)
S = 75.0 mi/h
D = v_p / S
LOS = A

Design (N)

v_p = (V or DDHV) / (PHF x N x f_HV x f_p)
S = mi/h
D = v_p / S

Glossary

N - Number of lanes
V - Hourly volume
v_p - Flow rate
BFS - Base free-flow speed
DDHV - Directional design hour volume

Factor Location

E_R = Exhibits 23-8, 23-10
E_T - Exhibits 23-8, 23-10, 23-11
f_LW - Exhibit 23-4
f_LC - Exhibit 23-5
f_ID - Exhibit 23-7

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file://C:\Documents and Settings\groot\Local Settings\Temp\f2k425A.tmp
4/26/2012
### Basic Freeway Segments Worksheet

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

#### General Information

- **Analyst**: AIM Engineering & Surveying
- **Agency or Company**: Highway/Direction of Travel
- **Date Performed**: 6/12/2008
- **Analysis Time Period**: PM Peak Hour
- **Project Description**: I-75/Everglades Boulevard IJR

#### Site Information

- **From/To**: Btwn CR 951 & GG Pkwy
- **Jurisdiction**: Collier County
- **Analysis Year**: 2008

#### Flow Inputs

- **Volume, V**: 1417 veh/h
- **AADT**: veh/day
- **Peak-Hr Prop. of AADT, K**:
- **Peak-Hr Direction Prop, D**:
- **DDHV = AADT x K x D**: veh/h
- **Driver type adjustment**: 1.00 veh/h

#### Calculate Flow Adjustments

- **f_p**: 1.00
- **E_T**: 1.5
- **E_R**: 1.2
- **f_HV = f_p(1+P_T(E_T-1)+P_R(E_R-1))**: 0.971

#### Speed Inputs

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

#### LOS and Performance Measures

- **Operational (LOS)**
  - \( v_p = \frac{(V \text{ or } DDHV)}{(PHF \times N \times f_HV)} \times f_P \)
  - \( S = \frac{v_p}{D} \)
  - \( D = \frac{v_p}{S} \)
- **Design (N)**
  - \( v_p = \frac{(V \text{ or } DDHV)}{(PHF \times N \times f_HV)} \times f_P \)
  - \( S = \frac{v_p}{D} \)
  - \( D = \frac{v_p}{S} \)

#### Glossary

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

#### Factor Location

- **E_R**: Exhibits 23-8, 23-10
- **E_T**: Exhibits 23-8, 23-10, 23-11
- **f_p**: Page 23-12
- **f_HV**: Exhibit 23-6
- **LOS, S, FFS, v_p**: Exhibits 23-2, 23-3
- **f_ID**: Exhibit 23-7

---

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**BASIC FREEWAY SEGMENTS WORKSHEET**

**General Information**

- **Analyst**: AIM Engineering & Surveying
- **Agency or Company**: Highway/Direction of Travel
- **Date Performed**: 6/12/2008
- **Analysis Time Period**: PM Peak Hour
- **Project Description**: I-75/Everglades Boulevard IJR

**Flow Inputs**

- **Volume, V**: 1232 veh/h
- **AADT**: veh/day
- **Peak-Hr Prop. of AADT, K**: veh/h
- **Peak-Hr Direction Prop, D**: veh/h
- **Driver type adjustment**: 1.00

**Calculate Flow Adjustments**

- **f_p**: 1.00
- **E_T**: 1.5

**Speed Inputs**

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

**LOS and Performance Measures**

**Operational (LOS)**

- **v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)**: 705 pc/h/ln
- **S**: 75.0 mi/h
- **D = v_p / S**: 9.4 pc/mi/ln
- **LOS**: A

**Design (N)**

- **Required Number of Lanes, N**:

**Glossary**

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

**Application**

- **Operational (LOS)**: FFS, N, v_p
- **Design (N)**: FFS, LOS, v_p
- **Planning (LOS)**: FFS, N, AADT
- **Planning (N)**: FFS, LOS, AADT

**Input**

- **Output**

**Regional Information**

- **Highway/Direction of Travel**: SB I-75
- **From/To**: Btwn CR 951 & GG Pkwy
- **Jurisdiction**: Collier County
- **Analysis Year**: 2008

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4/26/2012
BASIC FREEWAY WORKSHEET

BASIC FREEWAY SEGMENTS WORKSHEET

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

General Information

Analyst: AIM Engineering & Surveying
Agency or Company: Highway/Direction of Travel
Date Performed: 6/12/2008
Analysis Time Period: PM Peak Hour
Project Description: I-75/Everglades Boulevard IJR

Site Information

Highway/Direction of Travel: SB I-75
From/To: North of Golden Gate Pkwy
Jurisdiction: Collier County
Analysis Year: 2008

Flow Inputs

Volume, V: 1875 veh/h
AADT: veh/day
Peak-Hr Prop. of AADT, K
Peak-Hr Direction Prop, D
DDHV = AADT x K x D
Driver type adjustment: 1.00

%Trucks and Buses, P_T: 6
%RVs, P_R: 0
General Terrain: Level
Grade: %
Length: mi

Calculate Flow Adjustments

f_p: 1.00
E_T: 1.5
E_R: 1.2
f_HV = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]

Calc Speed Adj and FFS

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

Speed Inputs

Calc Speed Adj and FFS

Design (N)

Design LOS

Operational (LOS)

V_p = (V or DDHV) / (PHF x N x f_HV x f_p)
S
D = V_p / S
LOS

LOS and Performance Measures

1073 pc/h/ln
75.0 mi/h
14.3 pc/mi/ln

Required Number of Lanes, N

LOS: B

Glossary

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

Factor Location

E_R - Exhibits 23-8, 23-10
E_T - Exhibits 23-8, 23-10, 23-11
f_p - Page 23-12
f_v_p - Exhibits 23-2, 23-3

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4/26/2012
Diverge Analysis

Analyst: AL
Agency/Co.: AIM ENGINEERING
Date performed: 3/8/2012
Analysis time period: AM
Freeway/Dir of Travel: I-75 EB
Junction: SR 29 OFF RAMP
Jurisdiction: Analysis Year: 2008

Freeway Data

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 70.0 mph
Volume on freeway: 576 vph

Off Ramp Data

Side of freeway: Right
Number of lanes in ramp: 1
Free-Flow speed on ramp: 45.0 mph
Volume on ramp: 21 vph
Length of first accel/decel lane: 202 ft
Length of second accel/decel lane: ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist? No
Volume on adjacent ramp: vph

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>576</td>
<td>21</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHP</td>
<td>0.90</td>
<td>0.90</td>
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<tr>
<td>Peak 15-min volume, v15</td>
<td>160</td>
<td>6</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>22</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, BR</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV 0.971 0.901
Driver population factor, fP 0.90 0.90
Flow rate, vp 732 29 pcph

---

**Estimation of V12 Diverge Areas**

\[
L = \frac{(v - v)}{12} + v \quad \text{FD}
\]

**Capacity Checks**

\[
v = v\quad \text{Actual}
\]

\[
\frac{v}{F} = 732 \quad \text{Maximum}
\]

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

\[
\frac{v}{R} = 29 \quad \text{LOS F?}
\]

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

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

\[
\text{If yes, } v = \quad \text{3 or av34}
\]

---

**Flow Entering Diverge Influence Area**

\[
v = v\quad \text{Actual}
\]

\[
\frac{v}{V} = 732 \quad \text{Max Desirable}
\]

\[
is v > 4600 \quad \text{pc/h}?\quad \text{No}
\]

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

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

---

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

\[
D = 4.252 + 0.0086 v - 0.009 L = 8.7 \quad \text{pc/mi/ln}
\]

**Density,**

\[
D = \frac{4.252 + 0.0086 v - 0.009 L}{12} = \frac{8.7}{D}
\]

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

---

**Speed Estimation**

Intermediate speed variable, \(S = 0.301\)

Space mean speed in ramp influence area, \(S = 61.6 \quad \text{mph}\)

Space mean speed in outer lanes, \(S = N/A \quad \text{mph}\)

Space mean speed for all vehicles, \(S = 61.6 \quad \text{mph}\)
HCS+: Ramps and Ramp Junctions Release 5.21

Phone: 
Fax: 
E-mail: 

---

Merge Analysis

Analyst: AL
Agency/Co.: AIM ENGINEERING
Date performed: 3/16/2012
Analysis time period: AM
Freeway/Dir of Travel: I-75 EB
Junction: SR 29 EB ON
Jurisdiction: 
Analysis Year: 2008
Description: 

---

Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2.0</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>555 vph</td>
</tr>
</tbody>
</table>

---

On Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>35.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>99 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>560 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

---

Adjacent Ramp Data (if one exists)

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

---

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>555</td>
<td>99</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>154</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fhv 0.971  0.901
Driver population factor, fp 0.90  0.90
Flow rate, vp 706  136 pcph

Estimation of V12 Merge Areas

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v \left( \frac{P}{FM} \right) = 706 \quad \text{pc/h} \]
\[ \frac{12}{F} \quad \frac{FM}{FM} \]

Capacity Checks

<table>
<thead>
<tr>
<th>( v )</th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( v_p )</td>
<td>842 pc/h</td>
<td>4800 pc/h</td>
<td>No</td>
</tr>
<tr>
<td>( v_{av34} )</td>
<td>0 pc/h</td>
<td>(Equation 25-4 or 25-5)</td>
<td></td>
</tr>
<tr>
<td>( v_{av34} )</td>
<td>&gt; 2700 pc/h</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>( v_{av34} )</td>
<td>&gt; 1.5 ( v )/2</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
| If yes, \( v \) = \( \frac{12}{A} \) \]

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>( v )</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{12}{2} )</td>
<td>706 pc/h</td>
<td>4400 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 v^2 - 0.00627 L = 8.5 \quad \text{pc/mi/ln} \]

Level of service for ramp-freeway junction areas of influence \( A \)

Speed Estimation

Intermediate speed variable, \( M = 0.291 \)
Space mean speed in ramp influence area, \( S = 61.9 \quad \text{mph} \)
Space mean speed in outer lanes, \( S = \text{N/A} \quad \text{mph} \)
Space mean speed for all vehicles, \( S = 61.9 \quad \text{mph} \)
### Diverge Analysis

**Analyst:** AL  
**Agency/Co.:** AIM ENGINEERING  
**Date performed:** 3/8/2012  
**Analysis time period:** AM  
**Freeway/Dir of Travel:** I-75 WB  
**Junction:** WB SR 29 OFF RAMP  
**Jurisdiction:**  
**Analysis Year:** 2008  
**Description:**

### Freeway Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of analysis</td>
<td>Diverge</td>
</tr>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>437</td>
</tr>
</tbody>
</table>

### Off Ramp Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side of freeway</td>
<td>Right</td>
</tr>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>37</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>215</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td></td>
</tr>
</tbody>
</table>

### Adjacent Ramp Data (if one exists)

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

### Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>437</td>
<td>37</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, vl5</td>
<td>121</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Estimation of V12 Diverge Areas

\[ L = \frac{(v - v_0) P}{FD} \]

Using Equation 0

\[ v = v + (v - v_0) \]

12 R F R FD pc/h

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>556</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>505</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>51</td>
<td>2100</td>
<td>No</td>
</tr>
</tbody>
</table>

Is \( v \geq 2700 \) pc/h? No

Is \( v \geq 1.5 \frac{v}{2} \)? No

If yes, \( v = \) (Equation 25-18)

Flow Entering Diverge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>556</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[ D = 4.252 + 0.0086 \frac{v}{12} - 0.009 \]

\[ L = 7.1 \] pc/mi/ln 12

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

Speed Estimation

Intermediate speed variable, \( s = 0.303 \) mph

Space mean speed in ramp influence area, \( s = 61.5 \) mph

Space mean speed in outer lanes, \( s = N/A \) mph

Space mean speed for all vehicles, \( s = 61.5 \) mph
Merge Analysis

Analyst: AL
Agency/Co.: AIM ENGINEERING
Date performed: 3/16/2012
Analysis time period: AM
Freeway/Dir of Travel: I-75 WB
Junction: SR 29 WB ON
Jurisdiction: 2008
Analysis Year:
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 400 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 19 vph
Length of first accel/decel lane 415 ft
Length of second accel/decel lane

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components Freeway Ramp Adjacent Ramp

Volume, V (vph) 400 19 vph
Peak-hour factor, PHF 0.90 0.90
Peak 15-min volume, v15 111 5 v
Trucks and buses 6 22 %
Recreational vehicles 0 0 %
Terrain type: Level Level
Grade % % %
Length mi mi mi
Trucks and buses PCE, ET 1.5* 1.5
Recreational vehicle PCE, ER 1.2 1.2
Estimation of V12 Merge Areas

\[ L = \] (Equation 25-2 or 25-3)
\[ P = 1.000 \] Using Equation 0
\[ v = v (P) = 509 \text{ pc/h} \]
\[ 12 \text{ F FM} \]

Capacity Checks

\[ \text{v} \]
\[ 535 \text{ pc/h} \] (Equation 25-4 or 25-5)
\[ 3 \text{ or av34} \]
\[ 0 \text{ pc/h} \]

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

Is \[ v \]
\[ > 1.5 \text{ v} /2 \]
\[ 3 \text{ or av34} \]
\[ 12 \]

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

Flow Entering Merge Influence Area

\[ \text{v} \]
\[ 509 \text{ pc/h} \]
\[ 4400 \text{ pc/h} \]

Level of Service Determination (if not F)

\[ D = 5.475 + 0.00734 \text{ v} + 0.0078 \text{ v} - 0.00627 \text{ L} = 7.0 \text{ pc/mi/ln} \]
\[ R \]
\[ 12 \text{ A} \]

Level of service for ramp-freeway junction areas of influence \[ A \]

Speed Estimation

\[ M = 0.299 \]
\[ S \]
\[ S = 61.6 \text{ mph} \]
\[ R \]
\[ S = \text{N/A} \text{ mph} \]
\[ 0 \]
\[ S = 61.6 \text{ mph} \]
Diverge Analysis

Analyst: GSR
Agency/Co.: AIM ENGINEERING
Date performed: 4/4/2012
Analysis time period: AM
Freeway/Dir of Travel: I-75 EB
Junction: CR 951 OFF RAMP
Jurisdiction: 2019 NO-BUILD
Description:

Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1278 vph</td>
</tr>
</tbody>
</table>

Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>789 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>200 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1278</td>
<td>789</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>355</td>
<td>219</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level 1</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV \( \quad \) 0.971 0.971
Driver population factor, fP \( \quad \) 1.00 1.00
Flow rate, \( v_p \) \( \quad \) 1463 903 pcph

---

**Estimation of V12 Diverge Areas**

\[
L = \text{EQ} \\
P = 1.000 \quad \text{Using Equation 0} \\
\frac{v}{12} = v + \left( v - v_0 \right) P = \frac{1463}{F} \text{ pc/h} \\
R \quad R \quad \text{FD}
\]

---

**Capacity Checks**

<table>
<thead>
<tr>
<th>( v ) = ( v )</th>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( F )</td>
<td>1463</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>( F )</td>
<td>560</td>
<td>4800</td>
<td>No</td>
</tr>
<tr>
<td>( F )</td>
<td>903</td>
<td>2100</td>
<td>No</td>
</tr>
</tbody>
</table>

\( v \) = \( v_3 \) or \( av34 \)

Is \( v = v_3 \) or \( v \) \( > \) 2700 pc/h? No

Is \( v = \frac{1.5 v}{2} \) or \( v_3 \) \( > \) 12 No

If yes, \( v = \frac{12A}{12} \) (Equation 25-18)

---

**Flow Entering Diverge Influence Area**

<table>
<thead>
<tr>
<th>( v ) = ( v )</th>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>( 12 )</td>
<td>1463</td>
<td>4600</td>
<td>No</td>
</tr>
</tbody>
</table>

---

**Density**

\[
D = 4.252 + 0.0086 v - 0.009 L = \frac{15.0}{12} \text{ pc/mi/ln} \\
R \quad D
\]

---

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

---

**Speed Estimation**

Intermediate speed variable, \( D = 0.379 \) mph

Space mean speed in ramp influence area, \( S = 59.4 \) mph

Space mean speed in outer lanes, \( S = N/A \) mph

Space mean speed for all vehicles, \( S = 59.4 \) mph
Merge Analysis

Analyst: AL
Agency/Co.: AIM ENGINEERING
Date performed: 3/16/2012
Analysis time period: AM
Freeway/Dir of Travel: I-75 EB
Junction: CR 951 EB ON
Jurisdiction:
Analysis Year: 2008
Description:

Freeway Data

Type of analysis Merge
Number of lanes in freeway 2
Free-flow speed on freeway 70.0 mph
Volume on freeway 489 vph

On Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-flow speed on ramp 35.0 mph
Volume on ramp 87 vph
Length of first accel/decel lane 465 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components Freeway Ramp Adjacent Ramp
Volume, V (vph) 489 87 vph
Peak-hour factor, PHF 0.90 0.90
Peak 15-min volume, v15 136 24 v
Trucks and buses 6 6 %
Recreational vehicles 0 0 %
Terrain type: Level Level
Grade % % %
Length mi mi mi
Trucks and buses PCE, ET 1.5* 1.5
Recreational vehicle PCE, ER 1.2 1.2
Heavy vehicle adjustment, fHV 0.971 0.971
Driver population factor, fP 0.90 0.90
Flow rate, vp 622 111 pcph

Estimation of V12 Merge Areas

\[
L = (\text{Equation 25-2 or 25-3}) \\
EQ \\
P = 1.000 \quad \text{Using Equation 0} \\
PM \\
v = v \left(\frac{P}{F}\right) = 622 \quad \text{pc/h} \\
12 \quad F \quad PM
\]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>733 pc/h</td>
<td>4800 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

\[
3 \quad \text{or} \quad \text{av34} \\
v > 2700 \quad \text{pc/h?} \\
\text{No} \\
\]

\[
3 \quad \text{or} \quad \text{av34} \\
v > 1.5 \quad \frac{v}{2} \\
\text{No} \\
\]

If yes, \( v = \frac{12}{12A} \)

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
<th>Violation?</th>
</tr>
</thead>
<tbody>
<tr>
<td>622 pc/h</td>
<td>4400 pc/h</td>
<td>No</td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

\[
D = 5.475 + 0.00734 \cdot v + 0.0078 \cdot v - 0.00627 \cdot L = 8.2 \quad \text{pc/mi/ln} \\
R \quad R \quad 12 \quad A \\
\text{Level of service for ramp-freeway junction areas of influence A} \\
\]

Speed Estimation

Intermediate speed variable, \( M = 0.297 \)

Space mean speed in ramp influence area, \( S = 61.7 \quad \text{mph} \)

Space mean speed in outer lanes, \( S = \text{N/A} \quad \text{mph} \)

Space mean speed for all vehicles, \( S = 61.7 \quad \text{mph} \)
HCS+: Ramps and Ramp Junctions Release 5.21

Phone:
Fax:
E-mail:

**Diverge Analysis**

Analyst: AL
Agency/Co.: AIM ENGINEERING
Date performed: 3/8/2012
Analysis time period: AM
Freeway/Dir of Travel: I-75 WB
Junction: CR 951 OFF RAMP
Jurisdiction: 
Analysis Year: 2008

**Freeway Data**

Type of analysis: Diverge
Number of lanes in freeway: 2
Free-flow speed on freeway: 70.0 mph
Volume on freeway: 419 vph

**Off Ramp Data**

Side of freeway: Right
Number of lanes in ramp: 1
Free-Flow speed on ramp: 45.0 mph
Volume on ramp: 83 vph
Length of first accel/decel lane: 220 ft
Length of second accel/decel lane: ft

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

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

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>419</td>
<td>83</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>116</td>
<td>23</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00</td>
<td>0.00</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV 0.971 0.971
Driver population factor, fP 0.90 0.90
Flow rate, \( v_p \) 533 106 pcph

---

**Estimation of V12 Diverge Areas**

\[
L = \text{EQ} \\
\text{PD} \\
v = v + (v - v) P = 533 \text{ pc/h}
\]

---

**Capacity Checks**

\[
\begin{align*}
&\text{v} = v \\
&F_i = F \\
v &= v - v \\
&F_0 = F \quad R \\
v &= 106 \\
&R \\
v &= 0 \text{ pc/h} \\
\end{align*}
\]

Is \( \text{v} \) greater than \( 2700 \text{ pc/h} \)?

Is \( \text{v} \) greater than \( 1.5 \text{v}/2 \)?

If yes, \( \text{v} = \)

---

**Flow Entering Diverge Influence Area**

\[
\begin{align*}
&v = v \\
&F = F \\
ev &= v - v \\
&F_0 = F \quad R \\
v &= 106 \\
R \\
v &= 0 \text{ pc/h} \\
3 \text{ or av34} \\
\end{align*}
\]

---

**Density**

\[
D = 4.252 + 0.0086 v - 0.009 \frac{L}{12} = 6.9 \text{ pc/mi/ln}
\]

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

---

**Speed Estimation**

Intermediate speed variable, \( D = 0.308 \) mph

Space mean speed in ramp influence area, \( S = 61.4 \) mph

Space mean speed in outer lanes, \( S = \text{N/A} \) mph

Space mean speed for all vehicles, \( S = 61.4 \) mph
__Merge Analysis__

**Analyst:** AL  
**Agency/Co.:** AIM ENGINEERING  
**Date performed:** 3/16/2012  
**Analysis time period:** AM  
**Freeway/Dir of Travel:** I-75 WB  
**Junction:** CR 951 WB ON  
**Jurisdiction:**  
**Analysis Year:** 2008  
**Description:**

---

**Freeway Data**

**Type of analysis:** Merge  
**Number of lanes in freeway:** 2  
**Free-flow speed on freeway:** 70.0 mph  
**Volume on freeway:** 336 vph

---

**On Ramp Data**

**Side of freeway:** Right  
**Number of lanes in ramp:** 1  
**Free-flow speed on ramp:** 35.0 mph  
**Volume on ramp:** 638 vph  
**Length of first accel/decel lane:** 385 ft  
**Length of second accel/decel lane:** ft

---

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

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

---

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>336</td>
<td>638</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>93</td>
<td>177</td>
<td></td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Estimation of Vl2 Merge Areas

\[
L = \quad \text{(Equation 25-2 or 25-3)}
\]

\[
EQ
\]

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

\[
FM
\]

\[
v = \frac{v}{12} \quad \text{(} P \quad \text{)} = 385 \quad \text{pc/h}
\]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1115</td>
<td>4800</td>
</tr>
<tr>
<td>v</td>
<td>v</td>
</tr>
<tr>
<td>FO</td>
<td>v</td>
</tr>
<tr>
<td>0</td>
<td>pc/h</td>
</tr>
<tr>
<td>(Equation 25-4 or 25-5)</td>
<td></td>
</tr>
</tbody>
</table>

Is \( v \) \( > 2700 \) pc/h? No

Is \( v \) \( > \frac{1.5 v}{12} \) No

If yes, \( v = \frac{v}{12} \) A

Flow Entering Merge Influence Area

<table>
<thead>
<tr>
<th>Actual</th>
<th>Max Desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>385</td>
<td>4400</td>
</tr>
<tr>
<td>v</td>
<td>v</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

Density, \( D = 5.475 + 0.00734 v + 0.0078 v^2 - 0.00627 L \) = 11.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, \( M = 0.306 \)

Space mean speed in ramp influence area, \( S = 61.4 \) mph

Space mean speed in outer lanes, \( S = N/A \) mph

Space mean speed for all vehicles, \( S = 61.4 \) mph
Diverge Analysis

Analyst: AL
Agency/Co.: AIM ENGINEERING
Date performed: 3/8/2012
Analysis time period: AM
Freeway/Dir of Travel: I-75 NB
Junction: GGP NB OFF RAMP
Jurisdiction: 
Analysis Year: 2008
Description: 

Freeway Data

Type of analysis Diverge
Number of lanes in freeway 3
Free-flow speed on freeway 70.0 mph
Volume on freeway 974 vph

Off Ramp Data

Side of freeway Right
Number of lanes in ramp 1
Free-Flow speed on ramp 45.0 mph
Volume on ramp 91 vph
Length of first accel/decel lane 310 ft
Length of second accel/decel lane ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>974</td>
<td>91</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>271</td>
<td>25</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type: Level</td>
<td>Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00 %</td>
<td>0.00 %</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fhv = 0.971
Driver population factor, fp = 1.00
Flow rate, vp = 1115 pcph

Estimation of V12 Diverge Areas

\[ L = \frac{v}{F} \] (Equation 25-8 or 25-9)

EQ
PD
\[ P = 0.727 \] Using Equation 5

\[ v = v + (v - v) P = 839 \text{ pc/h} \]
\[ 12 \quad R \quad F \quad R \quad FD \]

Capacity Checks

\[ v = v \]
\[ P_I = F \]
\[ v = v - v \]
FO
\[ v = v \]
\[ 3 \text{ or av34} \]
Is
\[ v > 2700 \text{ pc/h?} \]
Is
\[ v > 1.5 v/2 \]

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

Flow Entering Diverge Influence Area

\[ v = 839 \text{ pc/h} \]
\[ 12 \]

Level of Service Determination (if not F) !

Density,
\[ D = 4.252 + 0.0086 v - 0.009 L = 8.7 \text{ pc/mi/ln} \]
\[ R \quad 12 \quad D \]

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

Speed Estimation

Intermediate speed variable,
\[ D = 0.307 \]
\[ S \]
Space mean speed in ramp influence area,
\[ S = 61.4 \text{ mph} \]
Space mean speed in outer lanes,
\[ S = 76.8 \text{ mph} \]
Space mean speed for all vehicles,
\[ S = 64.6 \text{ mph} \]
Phone: 
Fax: 
E-mail: 

---

**Merge Analysis**

Analyst: AL 
Agency/Co.: AIM ENGINEERING 
Date performed: 3/16/2012 
Analysis time period: AM 
Freeway/Dir of Travel: I-75 NB 
Junction: GOLDEN GATE PKWY NB ON 
Jurisdiction: 
Analysis Year: 2008 
Description: 

---

**Freeway Data**

Type of analysis: Merge 
Number of lanes in freeway: 3 
Free-flow speed on freeway: 70.0 mph 
Volume on freeway: 883 vph 

---

**On Ramp Data**

Side of freeway: Right 
Number of lanes in ramp: 1 
Free-flow speed on ramp: 35.0 mph 
Volume on ramp: 616 vph 
Length of first accel/decel lane: 600 ft 
Length of second accel/decel lane: ft 

---

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

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

---

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>883</td>
<td>616</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>245</td>
<td>171</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>mi</td>
<td>mi</td>
<td>mi</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV 0.971 0.971
Driver population factor, fP 1.00 1.00
Flow rate, vp 1011 705 pcph

Estimation of V12 Merge Areas

\[ L = \text{EQ} \]
\[ P = 0.594 \text{ Using Equation 1} \]
\[ v = v_\text{P} = 601 \text{ pc/h} \]
\[ \frac{12}{F} \text{ FM} \]

Capacity Checks

<table>
<thead>
<tr>
<th>Actual</th>
<th>Maximum</th>
<th>LOS F?</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>1716</td>
<td>7200</td>
</tr>
<tr>
<td>FO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>410 pc/h</td>
<td>(Equation 25-4 or 25-5)</td>
</tr>
<tr>
<td>3 or av34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is v</td>
<td>v &gt; 2700 pc/h?</td>
<td>No</td>
</tr>
<tr>
<td>3 or av34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is v</td>
<td>v &gt; 1.5 v /2</td>
<td>No</td>
</tr>
<tr>
<td>3 or av34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes, v =</td>
<td></td>
<td>(Equation 25-8)</td>
</tr>
<tr>
<td>12A</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</td>
<td>601</td>
<td>4400</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Level of Service Determination (if not F)

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

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

Speed Estimation

Intermediate speed variable, \[ M = 0.293 \]
Space mean speed in ramp influence area, \[ S = 61.8 \text{ mph} \]
Space mean speed in outer lanes, \[ S = 70.0 \text{ mph} \]
Space mean speed for all vehicles, \[ S = 63.6 \text{ mph} \]
Diverge Analysis

Analyst: AL
Agency/Co.: AIM ENGINEERING
Date performed: 3/8/2012
Analysis time period: AM
Freeway/Dir of Travel: I-75 SB
Junction: GGP SB OFF RAMP
Jurisdiction:
Analysis Year: 2008
Description:

Freeway Data

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Diverge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>2500 vph</td>
</tr>
</tbody>
</table>

Off Ramp Data

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>2</td>
</tr>
<tr>
<td>Free-Flow speed on ramp</td>
<td>45.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>1284 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>1500 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>0 ft</td>
</tr>
</tbody>
</table>

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>2500</td>
<td>1284</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Peak 15-min volume, v15</td>
<td>694</td>
<td>357</td>
<td>v</td>
</tr>
<tr>
<td>Trucks and buses</td>
<td>6</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Recreational vehicles</td>
<td>0</td>
<td>0</td>
<td>%</td>
</tr>
<tr>
<td>Terrain type:</td>
<td>Level</td>
<td>Level</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>0.00</td>
<td>0.00</td>
<td>%</td>
</tr>
<tr>
<td>Length</td>
<td>0.00 mi</td>
<td>0.00 mi</td>
<td>%</td>
</tr>
<tr>
<td>Trucks and buses PCE, ET</td>
<td>1.5*</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Recreational vehicle PCE, ER</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>
Heavy vehicle adjustment, fHV = 0.971
Driver population factor, fP = 1.00
Flow rate, vp = 2861 pc/h

**Estimation of V12 Diverge Areas**

\[ L = \text{EQ} \]
\[ P = 1.000 \quad \text{Using Equation 0} \]
\[ v = v + (v - v_0) P = 2861 \quad \text{pc/h} \]
\[ 12 \quad R \quad F \quad R \quad FD \]

**Capacity Checks**

\[ v = v_0 \quad \text{Actual} \quad 2861 \]
\[ Pi = F \quad \text{Maximum} \quad 4800 \]
\[ v = v - v_0 \quad \text{LOS F?} \quad \text{No} \]
\[ FO = F \quad R \quad 1392 \quad 4800 \quad \text{No} \]
\[ v \quad F \quad R \quad 1469 \quad 4100 \quad \text{No} \]
\[ R \quad 0 \quad \text{pc/h} \quad (\text{Equation 25-15 or 25-16}) \]
\[ 3 \text{ or av34} \]

\[ v > 2700 \quad \text{pc/h?} \quad \text{No} \]
\[ 3 \text{ or av34} \]

\[ v > 1.5 \frac{v}{2} \quad \text{No} \]
\[ 3 \text{ or av34} \]
\[ 12 \]

\[ \text{If yes, } v = \quad (\text{Equation 25-18}) \]

**Flow Entering Diverge Influence Area**

\[ v \quad \text{Actual} \quad 2861 \quad \text{Max Desirable} \quad 4600 \quad \text{Violation?} \quad \text{No} \]
\[ 12 \]

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

\[ D = 4.252 + 0.0086 v - 0.009 L = 1.9 \quad \text{pc/mi/ln} \]
\[ R \quad 12 \quad D \]

**Density, for ramp-freeway junction areas of influence A**

\[ \text{Speed Estimation} \]

Intermediate speed variable, \[ D = 0.430 \quad \text{S} \]

Space mean speed in ramp influence area, \[ S = 58.0 \quad \text{mph} \]

Space mean speed in outer lanes, \[ S = \text{N/A} \quad \text{mph} \]

Space mean speed for all vehicles, \[ S = 58.0 \quad \text{mph} \]
**Merge Analysis**

- **Analyst:** AL
- **Agency/Co.:** AIM ENGINEERING
- **Date performed:** 3/16/2012
- **Analysis time period:** AM
- **Freeway/Dir of Travel:** I-75 SB
- **Junction:** GOLDEN GATE PKWY SB ON
- **Jurisdiction:**
- **Analysis Year:** 2008

**Freeway Data**

<table>
<thead>
<tr>
<th>Type of analysis</th>
<th>Merge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in freeway</td>
<td>2</td>
</tr>
<tr>
<td>Free-flow speed on freeway</td>
<td>70.0 mph</td>
</tr>
<tr>
<td>Volume on freeway</td>
<td>1216 vph</td>
</tr>
</tbody>
</table>

**On Ramp Data**

<table>
<thead>
<tr>
<th>Side of freeway</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of lanes in ramp</td>
<td>1</td>
</tr>
<tr>
<td>Free-flow speed on ramp</td>
<td>35.0 mph</td>
</tr>
<tr>
<td>Volume on ramp</td>
<td>62 vph</td>
</tr>
<tr>
<td>Length of first accel/decel lane</td>
<td>550 ft</td>
</tr>
<tr>
<td>Length of second accel/decel lane</td>
<td>ft</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Does adjacent ramp exist?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume on adjacent Ramp</td>
<td>vph</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Junction Components</th>
<th>Freeway</th>
<th>Ramp</th>
<th>Adjacent Ramp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, V (vph)</td>
<td>1216</td>
<td>62</td>
<td>vph</td>
</tr>
<tr>
<td>Peak-hour factor, PHF</td>
<td>0.90</td>
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<td>Peak 15-min volume, v15</td>
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<td>v</td>
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<td>Trucks and buses</td>
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<tr>
<td>Recreational vehicles</td>
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<tr>
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<td>Level</td>
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<td>Recreational vehicle PCE, ER</td>
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