

Heavy vehicle adjustment, fHV	0.971	0.971	
Driver population factor, fP	0.90	0.90	
Flow rate, vp	2494	188	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 25-8 or 25-9)
 EQ
 P = 1.000 Using Equation 0
 FD
 $v_{12} = v_R + (v_F - v_R) P = 2494 \text{ pc/h}$
 12 R F R FD

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

	Actual	Maximum	LOS F?
$v_{12} = v_{12}$	2494	4800	No
$v_{12} = v_{12} - v_{12}$	2306	4800	No
v_{12}	188	2100	No
v_{12}	0 pc/h	(Equation 25-15 or 25-16)	
Is $v_{12} > 2700 \text{ pc/h?}$		No	
Is $v_{12} > 1.5 v_{12} / 2$		No	
If yes, $v_{12} =$		(Equation 25-18)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	2494	4600	No

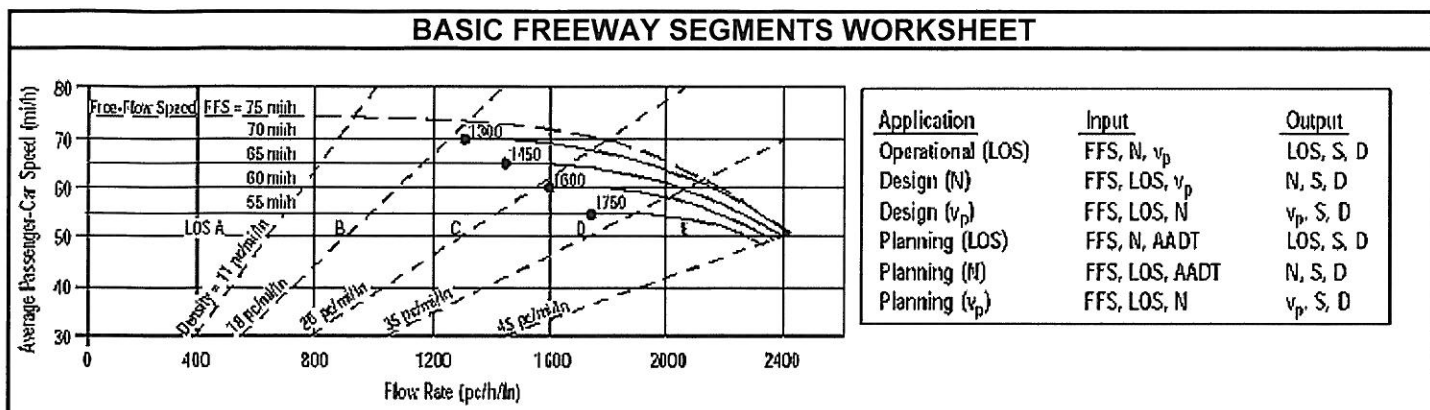
----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 22.1 \text{ pc/mi/ln}$
 Level of service for ramp-freeway junction areas of influence C

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

Intermediate speed variable,	D = 0.315	
Space mean speed in ramp influence area,	S = 61.2	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 61.2	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET										
General Information					Site Information					
Analyst	AL	Freeway/Dir of Travel	I-75 WB			Agency or Company	AIM ENGINEERING	Junction	EVERGLADES BLVD WB ON	
Date Performed	3/16/2012	Jurisdiction				Analysis Time Period	AM	Analysis Year	2029 EVERGLADES	
Project Description										
Inputs										
Upstream Adj Ramp	Number of Lanes, N		2 ✓		Downstream Adj Ramp					
<input type="checkbox"/> Yes <input type="checkbox"/> On	Acceleration Lane Length, L _A		1200		<input type="checkbox"/> Yes <input type="checkbox"/> On					
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Deceleration Lane Length L _D				<input checked="" type="checkbox"/> No <input type="checkbox"/> Off					
L _{up} = ft	Freeway Volume, V _F		1914 ✓		L _{down} = ft					
V _u = veh/h	Ramp Volume, V _R		1379 ✓		V _D = veh/h					
	Freeway Free-Flow Speed, S _{FF}		70.0 ✓							
	Ramp Free-Flow Speed, S _{FR}		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	1914	0.95 ✓	Level	6	0	0.971	1.00 ✓	2075		
Ramp	1379	0.95	Level	6	0	0.971	1.00 ✓	1495		
UpStream										
DownStream										
Merge Areas					Diverge Areas					
Estimation of v₁₂					Estimation of v₁₂					
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = P _{FM} = 1.000 using Equation (Exhibit 13-6) V ₁₂ = 2075 pc/h V ₃ or V _{av34} = 0 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					
Capacity Checks					Capacity Checks					
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?	
V _{FO}	3570	Exhibit 13-8		No	V _F		Exhibit 13-8			
					V _{FO} = V _F - V _R		Exhibit 13-8			
					V _R		Exhibit 13-10			
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area					
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?	
V _{R12}	3570	Exhibit 13-8		No	V ₁₂		Exhibit 13-8			
Level of Service Determination (if not F)					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 = 25.1 (pc/mi/ln) LOS = C (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)					



General Information		Site Information	
Analyst	AL	Highway/Direction of Travel	I-75 EB
Agency or Company	AIM ENGINEERING	From/To	GG PKWY/CR 951
Date Performed	3/6/2012	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2029 EVERGLADES

Project Description EVERGLADES IJR

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

Flow Inputs

Volume, V	3714	veh/h	Peak-Hour Factor, PHF	0.95
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 x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.971

Speed Inputs		Calc Speed Adj and FFS			
Lane Width	12.0	ft	f_{LW}	0.0	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	0.0	mi/h
Interchange Density	0.50	l/mi	f_{ID}	0.0	mi/h
Number of Lanes, N	3		f_N	3.0	mi/h
FFS (measured)		mi/h	FFS	72.0	mi/h
Base free-flow Speed, BFFS	75.0	mi/h			

LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	1342	Design LOS	
S	72.0	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	18.6	S	mi/h
LOS	C	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

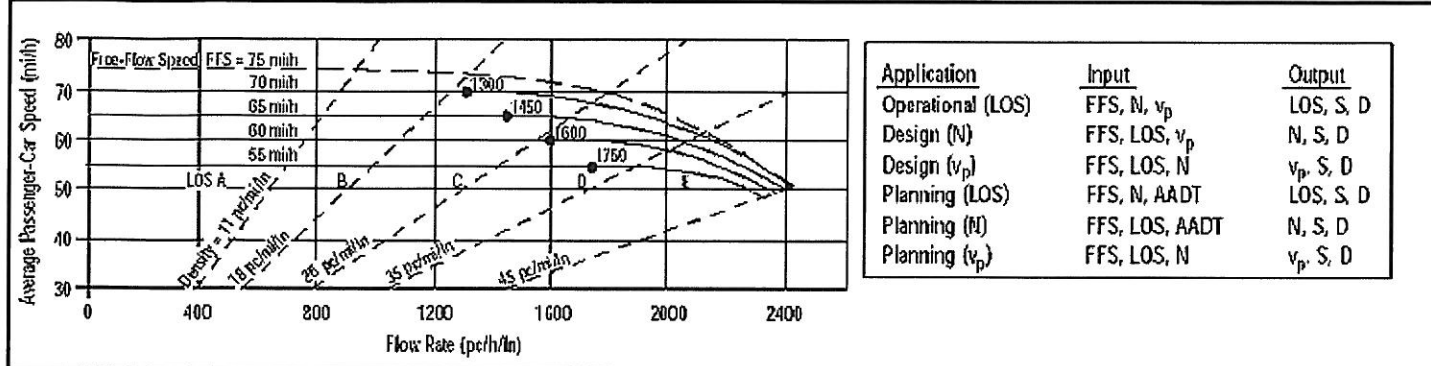
Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																								
		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Application</th> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Operational (LOS)</td> <td>FFS, N, v_p</td> <td>LOS, S, D</td> </tr> <tr> <td>Design (N)</td> <td>FFS, LOS, v_p</td> <td>N, S, D</td> </tr> <tr> <td>Design (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> <tr> <td>Planning (LOS)</td> <td>FFS, N, AADT</td> <td>LOS, S, D</td> </tr> <tr> <td>Planning (N)</td> <td>FFS, LOS, AADT</td> <td>N, S, D</td> </tr> <tr> <td>Planning (v_p)</td> <td>FFS, LOS, N</td> <td>v_p, S, D</td> </tr> </tbody> </table>		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
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		Site Information																						
Analyst	AL	Highway/Direction of Travel	I-75																					
Agency or Company	AIM ENGINEERING	From/To	BTWN EB CR 951 ON/OFF-RAMPS																					
Date Performed	3/25/2012	Jurisdiction																						
Analysis Time Period	AM	Analysis Year	2029 EVERGLADES																					
Project Description EVERGLADES IJR																								
<input type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)																						
<input type="checkbox"/> Planning Data																								
Flow Inputs																								
Volume, V	1844	veh/h	Peak-Hour Factor, PHF																					
AADT		veh/day	%Trucks and Buses, P_T																					
Peak-Hr Prop. of AADT, K			%RVs, P_R																					
Peak-Hr Direction Prop, D			General Terrain:																					
DDHV = AADT x K x D		veh/h	Grade % Length																					
Driver type adjustment	1.00		Up/Down %																					
Calculate Flow Adjustments																								
f_p	1.00		E_R																					
E_T	1.5		$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$																					
Speed Inputs		Calc Speed Adj and FFS																						
Lane Width	12.0	ft	f_{LW}																					
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}																					
Interchange Density	0.50	l/mi	f_{ID}																					
Number of Lanes, N	2		f_N																					
FFS (measured)		mi/h	FFS																					
Base free-flow Speed, BFFS	75.0	mi/h																						
LOS and Performance Measures		Design (N)																						
Operational (LOS)		Design (N)																						
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	1000	pc/h/ln	Design LOS																					
S	70.5	mi/h	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$																					
D = v_p / S	14.2	pc/mi/ln	S																					
LOS	B		D = v_p / S																					
		Required Number of Lanes, N																						
Glossary		Factor Location																						
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5																					
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																								

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL				Freeway/Dir of Travel	I-75 EB			
Agency or Company	AIM ENGINEERING				Junction	SR 951 EB ON			
Date Performed	3/16/2012				Jurisdiction				
Analysis Time Period	AM				Analysis Year	2029 EVERGLADES			
Project Description									
Inputs									
Upstream Adj Ramp		Number of Lanes, N			2 ✓			Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		Acceleration Lane Length, L _A			465			<input type="checkbox"/> Yes <input type="checkbox"/> On	
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Deceleration Lane Length L _D						<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	
L _{up} = ft		Freeway Volume, V _F			1844 ✓			L _{down} = ft	
V _u = veh/h		Ramp Volume, V _R			743 ✓			V _D = veh/h	
		Freeway Free-Flow Speed, S _{FF}			70.0 ✓				
		Ramp Free-Flow Speed, S _{FR}			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	1844	0.95 ✓	Level	6	0	0.971	1.00 ✓	1999	
Ramp	743	0.95 ✓	Level	6	0	0.971	1.00 ✓	806	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = P _{FM} = 1.000 using Equation (Exhibit 13-6) V ₁₂ = 1999 pc/h V ₃ or V _{av34} = 0 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	2805	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	2805	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)					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 = 24.1 (pc/mi/ln) LOS = C (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 WB						
Agency or Company	AIM ENGINEERING	Junction	SR 951 OFF RAMP						
Date Performed	3/8/2012	Jurisdiction							
Analysis Time Period	AM	Analysis Year	2029 EVERGLADES						
Project Description									
Inputs									
Upstream Adj Ramp	Number of Lanes, N		2 ✓		Downstream Adj Ramp				
<input type="checkbox"/> Yes <input type="checkbox"/> On	Acceleration Lane Length, L _A				<input type="checkbox"/> Yes <input type="checkbox"/> On				
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Deceleration Lane Length L _D		220		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off				
L _{up} = ft	Freeway Volume, V _F		3293 ✓		L _{down} = ft				
V _u = veh/h	Ramp Volume, V _R		946 ✓		V _D = veh/h				
	Freeway Free-Flow Speed, S _{FF}		70.0 ✓						
	Ramp Free-Flow Speed, S _{FR}		45.0 ✓						
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	3293	0.95 ✓	Level	6	0	0.971	1.00 ✓	3570	
Ramp	946	0.95	Level	6	0	0.971	1.00	1026	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = using Equation (Exhibit 13-6) P _{FM} = pc/h V ₁₂ = pc/h (Equation 13-14 or 13-17) V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = 1.000 using Equation (Exhibit 13-7) P _{FD} = 3570 pc/h V ₁₂ = 0 pc/h (Equation 13-14 or 13-17) V ₃ or V _{av34} 0 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	3570	Exhibit 13-8	4800	No
					V _{FO} = V _F - V _R	2544	Exhibit 13-8	4800	No
					V _R	1026	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	3570	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					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/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 33.0 (pc/mi/ln) LOS = D (Exhibit 13-2)				

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	AL	Highway/Direction of Travel	I-75 WB
Agency or Company	AIM ENGINEERING	From/To	CR 951/GG PKWY
Date Performed	3/6/2012	Jurisdiction	
Analysis Time Period	AM	Analysis Year	2029 EVERGLADES
Project Description EVERGLADES IJR			

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

Flow Inputs			
Volume, V	4727	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	% Trucks and Buses, P _T
Peak-Hr Prop. of AADT, K			% RVs, P _R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f _{LW}	0.0 mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f _{LC}	0.0 mi/h
Interchange Density	0.50 l/mi	f _{ID}	0.0 mi/h
Number of Lanes, N	3	f _N	3.0 mi/h
FFS (measured)		FFS	72.0 mi/h
Base free-flow Speed, BFFS	75.0 mi/h		

LOS and Performance Measures		Design (N)	
<u>Operational (LOS)</u>		<u>Design (N)</u>	
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	1708 pc/h/ln	Design LOS	
S	70.2 mi/h	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	pc/h
D = v _p / S	24.3 pc/mi/ln	S	mi/h
LOS	C	D = v _p / S	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E _R - Exhibits 23-8, 23-10	f _{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E _T - Exhibits 23-8, 23-10, 23-11	f _{LC} - Exhibit 23-5
v _p - Flow rate	FFS - Free-flow speed	f _p - Page 23-12	f _N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v _p - Exhibits 23-2, 23-3	f _{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

BASIC FREEWAY SEGMENTS WORKSHEET																										
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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			Site Information																							
Analyst	AL		Highway/Direction of Travel	I-75																						
Agency or Company	AIM ENGINEERING		From/To	BTWN WB CR 951 ON/OFF-RAMPS																						
Date Performed	3/25/2012		Jurisdiction																							
Analysis Time Period	AM		Analysis Year	2029 EVERGLADES																						
Project Description EVERGLADES IJR																										
<input type="checkbox"/> Oper.(LOS) <input type="checkbox"/> Des.(N) <input type="checkbox"/> Planning Data																										
Flow Inputs																										
Volume, V	2347		veh/h	Peak-Hour Factor, PHF	0.95																					
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 x K x D			veh/h	Grade %	Length																					
Driver type adjustment	1.00			Up/Down %																						
Calculate Flow Adjustments																										
f_p	1.00			E_R	1.2																					
E_T	1.5			$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.971																					
Speed Inputs			Calc Speed Adj and FFS																							
Lane Width	12.0		ft	f_{LW}	0.0																					
Rt-Shoulder Lat. Clearance	6.0		ft	f_{LC}	0.0																					
Interchange Density	0.50		I/mi	f_{ID}	0.0																					
Number of Lanes, N	2			f_N	4.5																					
FFS (measured)			mi/h	FFS	70.5																					
Base free-flow Speed, BFFS	75.0		mi/h																							
LOS and Performance Measures			Design (N)																							
<u>Operational (LOS)</u>			<u>Design (N)</u>																							
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	1272		pc/h/ln	Design LOS																						
S	70.5		mi/h	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$																						
$D = v_p / S$	18.0		pc/mi/ln	S																						
LOS	C			$D = v_p / S$																						
			Required Number of Lanes, N																							
Glossary			Factor Location																							
N - Number of lanes	S - Speed		E_R - Exhibits 23-8, 23-10		f_{LW} - Exhibit 23-4																					
V - Hourly volume	D - Density		E_T - Exhibits 23-8, 23-10, 23-11		f_{LC} - Exhibit 23-5																					
v_p - Flow rate	FFS - Free-flow speed		f_p - Page 23-12		f_N - Exhibit 23-6																					
LOS - Level of service	BFFS - Base free-flow speed		LOS, S, FFS, v_p - Exhibits 23-2, 23-3		f_{ID} - Exhibit 23-7																					
DDHV - Directional design hour volume																										

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 NB						
Agency or Company	AIM ENGINEERING	Junction	GGP NB OFF RAMP						
Date Performed	3/8/2012	Jurisdiction							
Analysis Time Period	AM	Analysis Year	2029 EVERGLADES						
Project Description									
Inputs									
Upstream Adj Ramp	Number of Lanes, N		3 ✓		Downstream Adj Ramp				
<input type="checkbox"/> Yes <input type="checkbox"/> On	Acceleration Lane Length, L _A				<input type="checkbox"/> Yes <input type="checkbox"/> On				
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Deceleration Lane Length L _D		310		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off				
L _{up} = ft	Freeway Volume, V _F		4727 ✓		L _{down} = ft				
V _u = veh/h	Ramp Volume, V _R		762 ✓		V _D = veh/h				
	Freeway Free-Flow Speed, S _{FF}		70.0 ✓						
	Ramp Free-Flow Speed, S _{FR}		45.0 ✓						
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	4727	0.95 ✓	Level	6	0	0.971	1.00 ✓	5125	
Ramp	762	0.95 ✓	Level	6	0	0.971	1.00 ✓	826	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
L _{EQ} =		V ₁₂ = V _F (P _{FM})			L _{EQ} =		V ₁₂ = V _R + (V _F - V _R)P _{FD}		
		(Equation 13-6 or 13-7)					(Equation 13-12 or 13-13)		
P _{FM} =		using Equation (Exhibit 13-6)			P _{FD} =		0.594 using Equation (Exhibit 13-7)		
V ₁₂ =		pc/h			V ₁₂ =		3379 pc/h		
V ₃ or V _{av34}		pc/h (Equation 13-14 or 13-17)			V ₃ or V _{av34}		1746 pc/h (Equation 13-14 or 13-17)		
Is V ₃ or V _{av34} > 2,700 pc/h?		<input type="checkbox"/> Yes <input type="checkbox"/> No			Is V ₃ or V _{av34} > 2,700 pc/h?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2		<input type="checkbox"/> Yes <input type="checkbox"/> No			Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
If Yes, V _{12a} =		pc/h (Equation 13-16, 13-18, or 13-19)			If Yes, V _{12a} =		pc/h (Equation 13-16, 13-18, or 13-19)		
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	5125	Exhibit 13-8	7200	No
					V _{FO} = V _F - V _R	4299	Exhibit 13-8	7200	No
					V _R	826	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	3379	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					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 = (pc/mi/ln)					D _R = 30.5 (pc/mi/ln)				
LOS = (Exhibit 13-2)					LOS = D (Exhibit 13-2)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 NB						
Agency or Company	AIM ENGINEERING	Junction	GGP NB OFF RAMP						
Date Performed	3/8/2012	Jurisdiction							
Analysis Time Period	PM	Analysis Year	2029 EVERGLADES						
Project Description									
Inputs									
Upstream Adj Ramp	Number of Lanes, N		3 ✓		Downstream Adj Ramp				
<input type="checkbox"/> Yes <input type="checkbox"/> On	Acceleration Lane Length, L _A				<input type="checkbox"/> Yes <input type="checkbox"/> On				
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Deceleration Lane Length L _D		310		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off				
L _{up} = ft	Freeway Volume, V _F		3714 ✓		L _{down} = ft				
V _u = veh/h	Ramp Volume, V _R		599 ✓		V _D = veh/h				
	Freeway Free-Flow Speed, S _{FF}		70.0 ✓						
	Ramp Free-Flow Speed, S _{FR}		45.0 ✓						
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	3714	0.95 ✓	Level	6	0	0.971	1.00 ✓	4027	
Ramp	599	0.95 ✓	Level	6	0	0.971	1.00 ✓	649	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = 0.629 using Equation (Exhibit 13-7) V ₁₂ = 2775 pc/h V ₃ or V _{av34} 1252 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	4027	Exhibit 13-8	7200	No
					V _{FO} = V _F - V _R	3378	Exhibit 13-8	7200	No
					V _R	649	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	2775	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					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/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 25.3 (pc/mi/ln) LOS = C (Exhibit 13-2)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 NB						
Agency or Company	AIM ENGINEERING	Junction	GOLDEN GATE PKWY NB ON						
Date Performed	3/16/2012	Jurisdiction							
Analysis Time Period	AM	Analysis Year	2029 EVERGLADES						
Project Description									
Inputs									
Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Number of Lanes, N 3 ✓ Acceleration Lane Length, L _A 500 Deceleration Lane Length L _D Freeway Volume, V _F 3965 ✓ Ramp Volume, V _R 1561 ✓ Freeway Free-Flow Speed, S _{FF} 70.0 ✓ Ramp Free-Flow Speed, S _{FR} 35.0	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h							
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	3965	0.95 ✓	Level	6	0	0.971	1.00 ✓	4299	
Ramp	1561	0.95	Level	6	0	0.971	1.00 ✓	1692	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = P _{FM} = 0.591 using Equation (Exhibit 13-6) V ₁₂ = 2543 pc/h V ₃ or V _{av34} = 1756 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?		
V _{FO}	5991	Exhibit 13-8	No	V _F	Exhibit 13-8				
				V _{FO} = V _F - V _R	Exhibit 13-8				
				V _R	Exhibit 13-10				
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?		
V _{R12}	4235	Exhibit 13-8	4600:All	No	V ₁₂	Exhibit 13-8			
Level of Service Determination (if not F)					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 = 34.6 (pc/mi/ln) LOS = D (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 SB						
Agency or Company	AIM ENGINEERING	Junction	GGP SB OFF RAMP						
Date Performed	3/8/2012	Jurisdiction							
Analysis Time Period	AM	Analysis Year	2029 EVERGLADES						
Project Description									
Inputs									
Upstream Adj Ramp		Number of Lanes, N		3 ✓		Downstream Adj Ramp			
<input type="checkbox"/> Yes <input type="checkbox"/> On		Acceleration Lane Length, L _A				<input type="checkbox"/> Yes <input type="checkbox"/> On			
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Deceleration Lane Length L _D		165		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off			
L _{up} = ft		Freeway Volume, V _F		5162 ✓		L _{down} = ft			
V _u = veh/h		Ramp Volume, V _R		2047 ✓		V _D = veh/h			
		Freeway Free-Flow Speed, S _{FF}		70.0 ✓					
		Ramp Free-Flow Speed, S _{FR}		45.0 ✓					
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	5162	0.95 ✓	Level	6	0	0.971	1.00 ✓	5597	
Ramp	2047	0.95 ✓	Level	6	0	0.971	1.00 ✓	2219	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = 0.450 using Equation (Exhibit 13-7) V ₁₂ = 3739 pc/h V ₃ or V _{av34} 1858 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	5597	Exhibit 13-8	7200	No
					V _{FO} = V _F - V _R	3378	Exhibit 13-8	7200	No
					V _R	2219	Exhibit 13-10	4200	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	3739	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					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/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 29.3 (pc/mi/ln) LOS = D (Exhibit 13-2)				

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 SB
 Junction: GOLDEN GATE PKWY SB ON
 Jurisdiction:
 Analysis Year: 2029 EVERGLADES
 Description:

_____ Freeway Data _____

Type of analysis	Merge		
Number of lanes in freeway	3		
Free-flow speed on freeway	70.0	mph	
Volume on freeway	3115	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	599	vph	
Length of first accel/decel lane	550	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)	3115	599		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	820	158		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	1.00	1.00	
Flow rate, vp	3377	649	pcph

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

L = (Equation 25-2 or 25-3)
 EQ
 P = 0.593 Using Equation 1
 FM
 $v_{12} = v_{F \text{ FM}} (P) = 2002 \text{ pc/h}$

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

	Actual	Maximum	LOS F?
v	4026	7200	No
FO			
v	1375 pc/h	(Equation 25-4 or 25-5)	
3 or av34			
Is v > 2700 pc/h?		No	
3 or av34			
Is v > 1.5 v /2		No	
3 or av34	12		
If yes, v =		(Equation 25-8)	
12A			

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

	Actual	Max Desirable	Violation?
v	2002	4400	No
12			

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

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 22.4 \text{ pc/mi/ln}$
 Level of service for ramp-freeway junction areas of influence C

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

Intermediate speed variable,	M = 0.338	
Space mean speed in ramp influence area,	S = 60.5	mph
Space mean speed in outer lanes,	S = 66.8	mph
Space mean speed for all vehicles,	S = 62.6	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 EB						
Agency or Company	AIM ENGINEERING	Junction	SR 29 OFF RAMP						
Date Performed	3/8/2012	Jurisdiction							
Analysis Time Period	PM	Analysis Year	2029 EVERGLADES						
Project Description									
Inputs									
Upstream Adj Ramp	Number of Lanes, N		2 ✓		Downstream Adj Ramp				
<input type="checkbox"/> Yes <input type="checkbox"/> On	Acceleration Lane Length, L _A				<input type="checkbox"/> Yes <input type="checkbox"/> On				
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Deceleration Lane Length L _D		202		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off				
L _{up} = ft	Freeway Volume, V _F		2070 ✓		L _{down} = ft				
V _u = veh/h	Ramp Volume, V _R		527 ✓		V _D = veh/h				
	Freeway Free-Flow Speed, S _{FF}		70.0 ✓						
	Ramp Free-Flow Speed, S _{FR}		45.0 ✓						
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	2070	0.95 ✓	Level	6	0	0.971	0.90 ✓	2494	
Ramp	527	0.95 ✓	Level	22	0	0.901	0.90 ✓	684	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = 1.000 using Equation (Exhibit 13-7) V ₁₂ = 2494 pc/h V ₃ or V _{av34} 0 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	2494	Exhibit 13-8	4800	No
					V _{FO} = V _F - V _R	1810	Exhibit 13-8	4800	No
					V _R	684	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	2494	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					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/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 23.9 (pc/mi/ln) LOS = C (Exhibit 13-2)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL				Freeway/Dir of Travel	I-75 EB			
Agency or Company	AIM ENGINEERING				Junction	SR 29 EB ON			
Date Performed	3/16/2012				Jurisdiction				
Analysis Time Period	PM				Analysis Year	2029 EVERGLADES			
Project Description									
Inputs									
Upstream Adj Ramp		Number of Lanes, N			2 ✓			Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		Acceleration Lane Length, L _A			560			<input type="checkbox"/> Yes <input type="checkbox"/> On	
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Deceleration Lane Length L _D						<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	
L _{up} = ft		Freeway Volume, V _F			1543 ✓			L _{down} = ft	
V _u = veh/h		Ramp Volume, V _R			270 ✓			V _D = veh/h	
		Freeway Free-Flow Speed, S _{FF}			70.0 ✓				
		Ramp Free-Flow Speed, S _{FR}			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	1543	0.95 ✓	Level	6	0	0.971	0.90 ✓	1859	
Ramp	270	0.95	Level	22	0	0.901	0.90	351	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = P _{FM} = 1.000 using Equation (Exhibit 13-6) V ₁₂ = 1859 pc/h V ₃ or V _{av34} = 0 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	2210	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	2210	Exhibit 13-8		No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)					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 = 19.0 (pc/mi/ln) LOS = B (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL				Freeway/Dir of Travel	I-75 WB			
Agency or Company	AIM ENGINEERING				Junction	SR 29 WB ON			
Date Performed	3/16/2012				Jurisdiction				
Analysis Time Period	PM				Analysis Year	2029 EVERGLADES			
Project Description									
Inputs									
Upstream Adj Ramp		Number of Lanes, N			2 ✓			Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		Acceleration Lane Length, L _A			415			<input type="checkbox"/> Yes <input type="checkbox"/> On	
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Deceleration Lane Length L _D						<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	
L _{up} = ft		Freeway Volume, V _F			1212 ✓			L _{down} = ft	
V _u = veh/h		Ramp Volume, V _R			414 ✓			V _D = veh/h	
		Freeway Free-Flow Speed, S _{FF}			70.0 ✓				
		Ramp Free-Flow Speed, S _{FR}			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	1212	0.95 ✓	Level	6	0	0.971	0.90 ✓	1460	
Ramp	414	0.95	Level	22	0	0.901	0.90 ✓	537	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13)				
L _{EQ} =					L _{EQ} =				
P _{FM} = 1.000 using Equation (Exhibit 13-6)					P _{FD} = using Equation (Exhibit 13-7)				
V ₁₂ = 1460 pc/h					V ₁₂ = pc/h				
V ₃ or V _{av34} = 0 pc/h (Equation 13-14 or 13-17)					V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17)				
Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No				
If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	1997	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	1997	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)					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 = 18.2 (pc/mi/ln)					D _R = (pc/mi/ln)				
LOS = B (Exhibit 13-2)					LOS = (Exhibit 13-2)				

Phone: Fax:
E-mail:

----- Diverge Analysis -----

Analyst: GSR
Agency/Co.: AIM ENGINEERING
Date performed: 3/31/2012
Analysis time period: PM
Freeway/Dir of Travel: I-75 EB
Junction: EVERGLADES BLVD OFF RAMP
Jurisdiction:
Analysis Year: 2029 EVERGLADES
Description:

----- Freeway Data -----

Type of analysis	Diverge		
Number of lanes in freeway	2		
Free-flow speed on freeway	70.0	mph	
Volume on freeway	3293	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	1379	vph	
Length of first accel/decel lane	400	ft	
Length of second accel/decel lane		ft	

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

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

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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3293	1379		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	867	363		v
Trucks and buses	6	6		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	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	1.00	1.00	
Flow rate, vp	3570	1495	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 25-8 or 25-9)
EQ
P = 1.000 Using Equation 0
FD
 $v_{12} = v_R + (v_F - v_R) P = 3570$ pc/h
FD

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

	Actual	Maximum	LOS F?
$v = v_{Fi}$	3570	4800	No
$v = v_{FO} - v_R$	2075	4800	No
v_R	1495	2100	No
$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 \text{ or } av34} > 2700$ pc/h?		No	
Is $v_{3 \text{ or } av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} =$		(Equation 25-18)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	3570	4600	No

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

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 31.4$ pc/mi/ln
Level of service for ramp-freeway junction areas of influence D

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

Intermediate speed variable,	D = 0.433	
Space mean speed in ramp influence area,	S = 57.9	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 57.9	mph

Phone: Fax:
E-mail:

----- Merge Analysis -----

Analyst: AL
Agency/Co.: AIM ENGINEERING
Date performed: 3/16/2012
Analysis time period: PM
Freeway/Dir of Travel: I-75 EB
Junction: EVERGLADES BLVD EB ON
Jurisdiction:
Analysis Year: 2029 EVERGLADES
Description:

----- Freeway Data -----

Type of analysis	Merge		
Number of lanes in freeway	2		
Free-flow speed on freeway	70.0	mph	
Volume on freeway	1914	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	156	vph	
Length of first accel/decel lane	1200	ft	
Length of second accel/decel lane		ft	

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

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

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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1914	156		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	504	41		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	2306	188	pcph

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

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
 $v_{12} = v_F (P_{FM}) = 2306 \text{ pc/h}$

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

	Actual	Maximum	LOS F?
v _{FO}	2494	4800	No
v _{3 or av34}	0 pc/h	(Equation 25-4 or 25-5)	
Is v _{3 or av34} > 2700 pc/h?		No	
Is v _{3 or av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} =		(Equation 25-8)	

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

	Actual	Max Desirable	Violation?
v ₁₂	2306	4400	No

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

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 17.3 \text{ pc/mi/ln}$
Level of service for ramp-freeway junction areas of influence B

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

Intermediate speed variable,	M = 0.284	
Space mean speed in ramp influence area,	S _R = 62.0	mph
Space mean speed in outer lanes,	S ₀ = N/A	mph
Space mean speed for all vehicles,	S = 62.0	mph

Phone: Fax:
E-mail:

----- Diverge Analysis -----

Analyst: GSR
 Agency/Co.: AIM ENGINEERING
 Date performed: 3/31/2012
 Analysis time period: PM
 Freeway/Dir of Travel: I-75 WB
 Junction: EVERGLADES BLVD OFF RAMP
 Jurisdiction:
 Analysis Year: 2029 EVERGLADES
 Description:

----- Freeway Data -----

Type of analysis	Diverge		
Number of lanes in freeway	2		
Free-flow speed on freeway	70.0	mph	
Volume on freeway	1626	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	122	vph	
Length of first accel/decel lane	400	ft	
Length of second accel/decel lane		ft	

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

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

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

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	1626	122	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	428	32	v
Trucks and buses	6	6	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	0.00	%	0.00 %
Length	0.00	mi	0.00 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	1959	147	pcph

----- Estimation of V12 Diverge Areas -----

L = (Equation 25-8 or 25-9)
 EQ
 P = 1.000 Using Equation 0
 FD
 $v_{12} = v_R + (v_F - v_R) P = 1959 \text{ pc/h}$

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

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1959	4800	No
$v_{FO} = v_F - v_R$	1812	4800	No
v_R	147	2100	No
$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 \text{ or } av34} > 2700 \text{ pc/h?}$		No	
Is $v_{3 \text{ or } av34} > 1.5 v_{12} / 2$		No	
If yes, $v_{12A} =$		(Equation 25-18)	

----- Flow Entering Diverge Influence Area -----

	Actual	Max Desirable	Violation?
v_{12}	1959	4600	No

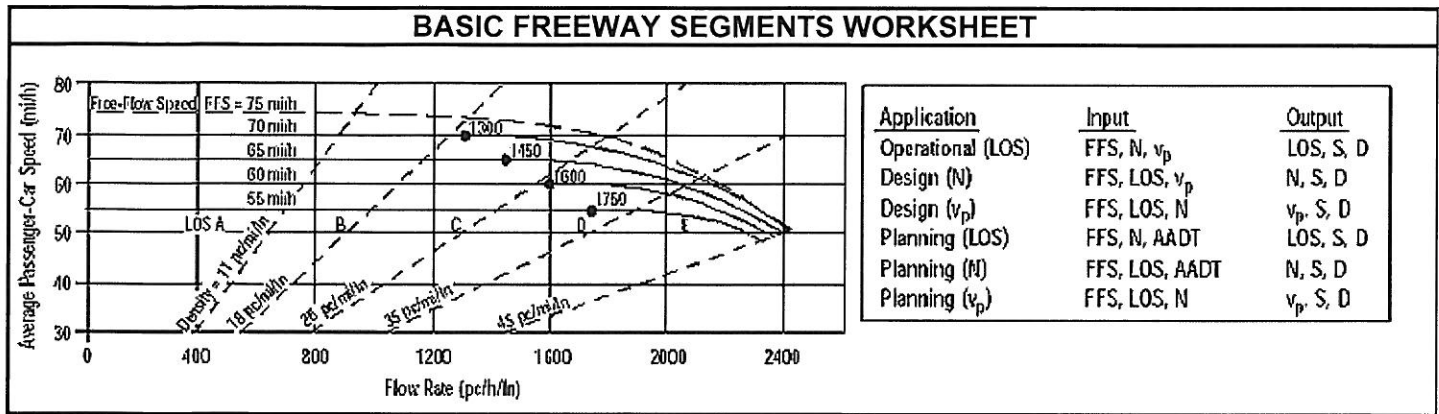
----- Level of Service Determination (if not F) -----

Density, $D = 4.252 + 0.0086 v_{12} - 0.009 L_D = 17.5 \text{ pc/mi/ln}$
 Level of service for ramp-freeway junction areas of influence B

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

Intermediate speed variable,	D = 0.311	
Space mean speed in ramp influence area,	S = 61.3	mph
Space mean speed in outer lanes,	S = N/A	mph
Space mean speed for all vehicles,	S = 61.3	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 WB						
Agency or Company	AIM ENGINEERING	Junction	EVERGLADES BLVD WB ON						
Date Performed	3/16/2012	Jurisdiction							
Analysis Time Period	PM	Analysis Year	2029 EVERGLADES						
Project Description									
Inputs									
Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Number of Lanes, N Acceleration Lane Length, L _A Deceleration Lane Length L _D	2 ✓ 1200	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off	L _{down} =	ft				
L _{up} =	ft	Freeway Volume, V _F	1504 ✓	V _D =	veh/h				
V _u =	veh/h	Ramp Volume, V _R	1083 ✓						
		Freeway Free-Flow Speed, S _{FF}	70.0 ✓						
		Ramp Free-Flow Speed, S _{FR}	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	1504	0.95 ✓	Level	6	0	0.971	1.00 ✓	1631	
Ramp	1083	0.95 ✓	Level	6	0	0.971	1.00	1174	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = P _{FM} = 1.000 using Equation (Exhibit 13-6) V ₁₂ = 1631 pc/h V ₃ or V _{av34} = 0 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	2805	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	2805	Exhibit 13-8		No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)					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 = 19.3 (pc/mi/ln) LOS = B (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)				



General Information		Site Information	
Analyst	AL	Highway/Direction of Travel	I-75 EB
Agency or Company	AIM ENGINEERING	From/To	GG PKWY/CR 951
Date Performed	3/6/2012	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2029 EVERGLADES
Project Description EVERGLADES IJR			

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

Flow Inputs

Volume, V	4727	veh/h	Peak-Hour Factor, PHF	0.95
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 x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

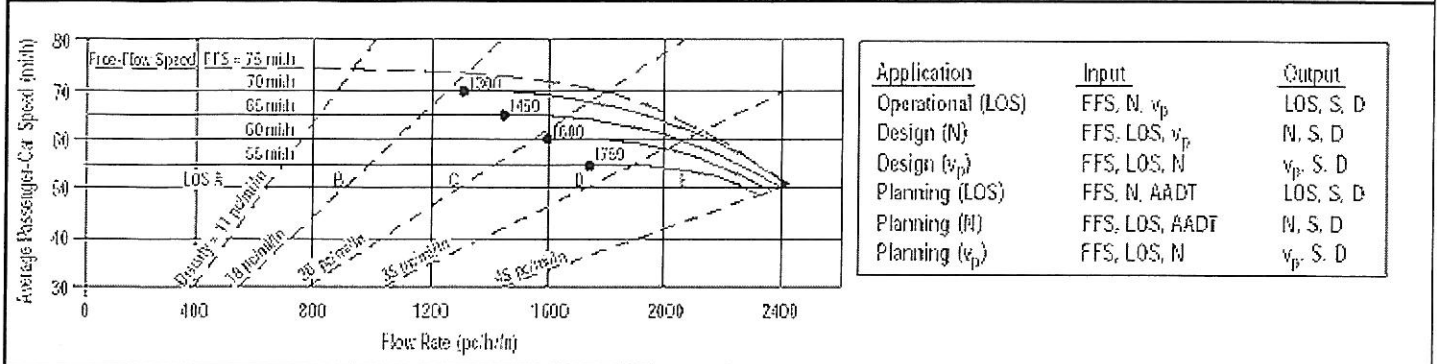
f _p	1.00	E _R	1.2
E _T	1.5	f _{HV} = 1/[1+P _T (E _T - 1) + P _R (E _R - 1)]	0.971

Speed Inputs		Calc Speed Adj and FFS			
Lane Width	12.0	ft	f _{LW}	0.0	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f _{LC}	0.0	mi/h
Interchange Density	0.50	l/mi	f _{ID}	0.0	mi/h
Number of Lanes, N	3		f _N	3.0	mi/h
FFS (measured)		mi/h	FFS	72.0	mi/h
Base free-flow Speed, BFFS	75.0	mi/h			

LOS and Performance Measures	Design (N)
Operational (LOS)	Design (N)
v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)	Design LOS
S	v _p = (V or DDHV) / (PHF x N x f _{HV} x f _p)
D = v _p / S	S
LOS	D = v _p / S
	Required Number of Lanes, N

Glossary	Factor Location
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	
	E _R - Exhibits 23-8, 23-10
	E _T - Exhibits 23-8, 23-10, 23-11
	f _p - Page 23-12
	LOS, S, FFS, v _p - Exhibits 23-2, 23-3
	f _{LW} - Exhibit 23-4
	f _{LC} - Exhibit 23-5
	f _N - Exhibit 23-6
	f _{ID} - Exhibit 23-7

BASIC FREEWAY SEGMENTS WORKSHEET



General Information		Site Information	
Analyst	AL	Highway/Direction of Travel	I-75
Agency or Company	AIM ENGINEERING	From/To	BTWN EB CR 951 ON-/OFF-RAMPS
Date Performed	3/25/2012	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2029 EVERGLADES
Project Description EVERGLADES IJR			

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

Flow Inputs			
Volume, V	2347	veh/h	Peak-Hour Factor, PHF
AADT		veh/day	%Trucks and Buses, P_T
Peak-Hr Prop. of AADT, K			%RVs, P_R
Peak-Hr Direction Prop, D			General Terrain:
DDHV = AADT x K x D		veh/h	Grade % Length
Driver type adjustment	1.00		Up/Down %

Calculate Flow Adjustments			
f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.971

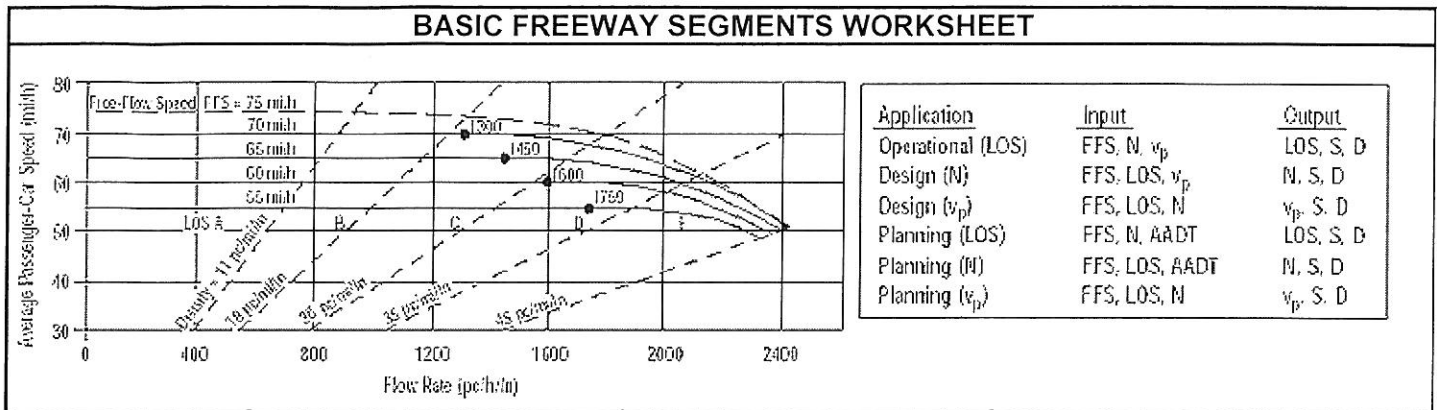
Speed Inputs		Calc Speed Adj and FFS	
Lane Width	12.0 ft	f_{LW}	0.0 mi/h
Rt-Shoulder Lat. Clearance	6.0 ft	f_{LC}	0.0 mi/h
Interchange Density	0.50 l/mi	f_{ID}	0.0 mi/h
Number of Lanes, N	2	f_N	4.5 mi/h
FFS (measured)		FFS	70.5 mi/h
Base free-flow Speed, BFFS	75.0 mi/h		

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	1272 pc/h/ln	Design LOS	
S	70.5 mi/h	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	18.0 pc/mi/ln	S	mi/h
LOS	C	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL				Freeway/Dir of Travel	I-75 EB			
Agency or Company	AIM ENGINEERING				Junction	SR 951 EB ON			
Date Performed	3/16/2012				Jurisdiction				
Analysis Time Period	PM				Analysis Year	2029 EVERGLADES			
Project Description									
Inputs									
Upstream Adj Ramp		Number of Lanes, N			2 ✓			Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		Acceleration Lane Length, L _A			465			<input type="checkbox"/> Yes <input type="checkbox"/> On	
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Deceleration Lane Length L _D						<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	
L _{up} = ft		Freeway Volume, V _F			2347 ✓			L _{down} = ft	
V _u = veh/h		Ramp Volume, V _R			946 ✓			V _D = veh/h	
		Freeway Free-Flow Speed, S _{FF}			70.0 ✓				
		Ramp Free-Flow Speed, S _{FR}			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	2347	0.95 ✓	Level	6	0	0.971	1.00 ✓	2545	
Ramp	946	0.95	Level	6	0	0.971	1.00	1026	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = P _{FM} = 1.000 using Equation (Exhibit 13-6) V ₁₂ = 2545 pc/h V ₃ or V _{av34} = 0 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	3571	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	3571	Exhibit 13-8		No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)					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 = 29.9 (pc/mi/ln) LOS = D (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 WB						
Agency or Company	AIM ENGINEERING	Junction	SR 951 OFF RAMP						
Date Performed	3/8/2012	Jurisdiction							
Analysis Time Period	PM	Analysis Year	2029 EVERGLADES						
Project Description									
Inputs									
Upstream Adj Ramp	Number of Lanes, N		2		Downstream Adj Ramp				
<input type="checkbox"/> Yes <input type="checkbox"/> On	Acceleration Lane Length, L _A				<input type="checkbox"/> Yes <input type="checkbox"/> On				
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Deceleration Lane Length L _D		220		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off				
L _{up} = ft	Freeway Volume, V _F		2587		L _{down} = ft				
V _u = veh/h	Ramp Volume, V _R		743		V _D = veh/h				
	Freeway Free-Flow Speed, S _{FF}		70.0						
	Ramp Free-Flow Speed, S _{FR}		45.0						
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	2587	0.95	Level	6	0	0.971	1.00	2805	
Ramp	743	0.95	Level	6	0	0.971	1.00	806	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = using Equation (Exhibit 13-6) P _{FM} = V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = 1.000 using Equation (Exhibit 13-7) V ₁₂ = 2805 pc/h V ₃ or V _{av34} 0 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?		
V _{FO}		Exhibit 13-8			V _F	2805	Exhibit 13-8	4800	No
					V _{FO} = V _F - V _R	1999	Exhibit 13-8	4800	No
					V _R	806	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?		
V _{R12}		Exhibit 13-8			V ₁₂	2805	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					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/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 26.4 (pc/mi/ln) LOS = C (Exhibit 13-2)				



General Information		Site Information	
Analyst	AL	Highway/Direction of Travel	I-75
Agency or Company	AIM ENGINEERING	From/To	BTWN WB CR 951 ON/OFF-RAMPS
Date Performed	3/25/2012	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2029 EVERGLADES
Project Description EVERGLADES IJR			
<input type="checkbox"/> Oper.(LOS)		<input type="checkbox"/> Des.(N)	
<input type="checkbox"/> Planning Data			

Flow Inputs

Volume, V	1844	veh/h	Peak-Hour Factor, PHF	0.95
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 x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

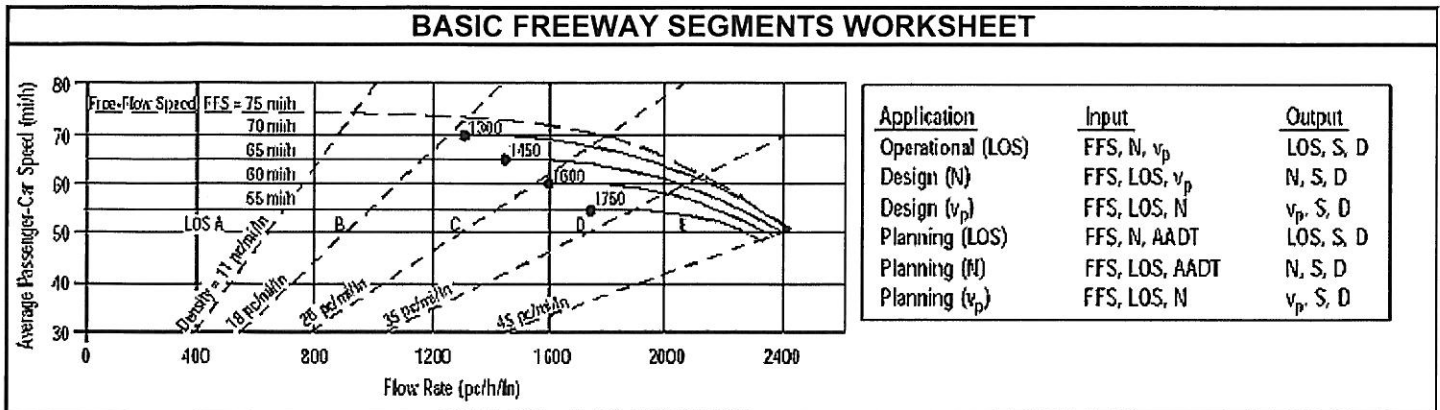
Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.971

Speed Inputs		Calc Speed Adj and FFS			
Lane Width	12.0	ft	f_{LW}	0.0	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	0.0	mi/h
Interchange Density	0.50	l/mi	f_{ID}	0.0	mi/h
Number of Lanes, N	2		f_N	4.5	mi/h
FFS (measured)		mi/h	FFS	70.5	mi/h
Base free-flow Speed, BFFS	75.0	mi/h			

LOS and Performance Measures	Design (N)
Operational (LOS)	Design (N)
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	Design LOS
v_p	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$
S	S
D = v_p / S	D = v_p / S
LOS	Required Number of Lanes, N

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			



General Information		Site Information	
Analyst	AL	Highway/Direction of Travel	I-75 WB
Agency or Company	AIM ENGINEERING	From/To	CR 951/GG PKWY
Date Performed	3/6/2012	Jurisdiction	
Analysis Time Period	PM	Analysis Year	2029 EVERGLADES

Project Description EVERGLADES IJR

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

Flow Inputs

Volume, V	3714	veh/h	Peak-Hour Factor, PHF	0.95
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 x K x D		veh/h	Grade % Length	mi
Driver type adjustment	1.00		Up/Down %	

Calculate Flow Adjustments

f_p	1.00	E_R	1.2
E_T	1.5	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.971

Speed Inputs		Calc Speed Adj and FFS			
Lane Width	12.0	ft	f_{LW}	0.0	mi/h
Rt-Shoulder Lat. Clearance	6.0	ft	f_{LC}	0.0	mi/h
Interchange Density	0.50	l/mi	f_{ID}	0.0	mi/h
Number of Lanes, N	3		f_N	3.0	mi/h
FFS (measured)		mi/h	FFS	72.0	mi/h
Base free-flow Speed, BFFS	75.0	mi/h			

LOS and Performance Measures		Design (N)	
Operational (LOS)		Design (N)	
$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	1342	Design LOS	
S	72.0	$v_p = (V \text{ or } DDHV) / (PHF \times N \times f_{HV} \times f_p)$	pc/h
$D = v_p / S$	18.6	S	mi/h
LOS	C	$D = v_p / S$	pc/mi/ln
		Required Number of Lanes, N	

Glossary		Factor Location	
N - Number of lanes	S - Speed	E_R - Exhibits 23-8, 23-10	f_{LW} - Exhibit 23-4
V - Hourly volume	D - Density	E_T - Exhibits 23-8, 23-10, 23-11	f_{LC} - Exhibit 23-5
v_p - Flow rate	FFS - Free-flow speed	f_p - Page 23-12	f_N - Exhibit 23-6
LOS - Level of service	BFFS - Base free-flow speed	LOS, S, FFS, v_p - Exhibits 23-2, 23-3	f_{ID} - Exhibit 23-7
DDHV - Directional design hour volume			

Phone: Fax:
E-mail:

----- Merge Analysis -----

Analyst: AL
Agency/Co.: AIM ENGINEERING
Date performed: 3/16/2012
Analysis time period: PM
Freeway/Dir of Travel: I-75 NB
Junction: GOLDEN GATE PKWY NB ON
Jurisdiction:
Analysis Year: 2029 EVERGLADES
Description:

----- Freeway Data -----

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3115	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	2047	vph
Length of first accel/decel lane	500	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)	3115	2047		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	820	539		v
Trucks and buses	6	6		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	%
Length	mi	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	1.00	1.00	
Flow rate, vp	3377	2219	pcph

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

L = (Equation 25-2 or 25-3)
 EQ
 P = 0.591 Using Equation 1
 FM
 $v_{12} = v_F (P_{FM}) = 1997 \text{ pc/h}$

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

	Actual	Maximum	LOS F?
v _{FO}	5596	7200	No
v _{3 or av34}	1380 pc/h	(Equation 25-4 or 25-5)	
Is v _{3 or av34} > 2700 pc/h?		No	
Is v _{3 or av34} > 1.5 v ₁₂ / 2		No	
If yes, v _{12A} =		(Equation 25-8)	

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

	Actual	Max Desirable	Violation?
v ₁₂	1997	4400	No

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

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A = 34.2 \text{ pc/mi/ln}$
 Level of service for ramp-freeway junction areas of influence D

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

Intermediate speed variable,	M = 0.550	
Space mean speed in ramp influence area,	S _R = 54.6	mph
Space mean speed in outer lanes,	S ₀ = 66.8	mph
Space mean speed for all vehicles,	S = 57.2	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 SB						
Agency or Company	AIM ENGINEERING	Junction	GGP SB OFF RAMP						
Date Performed	3/8/2012	Jurisdiction							
Analysis Time Period	PM	Analysis Year	2029 EVERGLADES						
Project Description									
Inputs									
Upstream Adj Ramp		Number of Lanes, N		3 ✓		Downstream Adj Ramp			
<input type="checkbox"/> Yes <input type="checkbox"/> On		Acceleration Lane Length, L _A				<input type="checkbox"/> Yes <input type="checkbox"/> On			
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Deceleration Lane Length L _D		165		<input checked="" type="checkbox"/> No <input type="checkbox"/> Off			
L _{up} = ft		Freeway Volume, V _F		5526 ✓		L _{down} = ft			
V _u = veh/h		Ramp Volume, V _R		1561 ✓		V _D = veh/h			
		Freeway Free-Flow Speed, S _{FF}		70.0 ✓					
		Ramp Free-Flow Speed, S _{FR}		45.0 ✓					
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	5526	0.95 ✓	Level	6	0	0.971	1.00 ✓	5991	
Ramp	1561	0.95 ✓	Level	6	0	0.971	1.00 ✓	1692	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) P _{FD} = 0.450 using Equation (Exhibit 13-7) V ₁₂ = 3627 pc/h V ₃ or V _{av34} 2364 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	5991	Exhibit 13-8	7200	No
					V _{FO} = V _F - V _R	4299	Exhibit 13-8	7200	No
					V _R	1692	Exhibit 13-10	4200	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	3627	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					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/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 28.3 (pc/mi/ln) LOS = D (Exhibit 13-2)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL		Freeway/Dir of Travel	I-75 SB					
Agency or Company	AIM ENGINEERING		Junction	GOLDEN GATE PKWY SB ON					
Date Performed	3/16/2012		Jurisdiction						
Analysis Time Period	PM		Analysis Year	2029 EVERGLADES					
Project Description									
Inputs									
Upstream Adj Ramp	Number of Lanes, N		3 ✓		Downstream Adj Ramp				
<input type="checkbox"/> Yes <input type="checkbox"/> On	Acceleration Lane Length, L _A		550		<input type="checkbox"/> Yes <input type="checkbox"/> On				
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Deceleration Lane Length L _D				<input checked="" type="checkbox"/> No <input type="checkbox"/> Off				
L _{up} = ft	Freeway Volume, V _F		3965 ✓		L _{down} = ft				
V _u = veh/h	Ramp Volume, V _R		762 ✓		V _D = veh/h				
	Freeway Free-Flow Speed, S _{FF}		70.0 ✓						
	Ramp Free-Flow Speed, S _{FR}		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	3965	0.95	Level	6	0	0.971	1.00 ✓	4299	
Ramp	762	0.95	Level	6	0	0.971	1.00 ✓	826	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v ₁₂					Estimation of v ₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13)				
L _{EQ} =	0.593 using Equation (Exhibit 13-6)				L _{EQ} =	using Equation (Exhibit 13-7)			
P _{FM} =	2549 pc/h				P _{FD} =	pc/h			
V ₁₂ =	1750 pc/h (Equation 13-14 or 13-17)				V ₁₂ =	pc/h (Equation 13-14 or 13-17)			
V ₃ or V _{av34}	Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				V ₃ or V _{av34}	Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No			
	Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No			
If Yes, V _{12a} =	pc/h (Equation 13-16, 13-18, or 13-19)				If Yes, V _{12a} =	pc/h (Equation 13-16, 13-18, or 13-19)			
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	5125	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	3375	Exhibit 13-8 4600:All		No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)					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 = 28.0 (pc/mi/ln)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = (pc/mi/ln)				
LOS = C (Exhibit 13-2)									

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 EB						
Agency or Company	AIM ENGINEERING	Junction	SR 29 OFF RAMP						
Date Performed	3/22/2012	Jurisdiction							
Analysis Time Period	AM	Analysis Year	2029 DESOTO						
Project Description									
Inputs									
Upstream Adj Ramp	Number of Lanes, N	2	Downstream Adj Ramp						
<input type="checkbox"/> Yes <input type="checkbox"/> On	Acceleration Lane Length, L_A		<input type="checkbox"/> Yes <input type="checkbox"/> On						
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Deceleration Lane Length L_D	202	<input checked="" type="checkbox"/> No <input type="checkbox"/> Off						
$L_{up} =$ ft	Freeway Volume, V_F	1654	$L_{down} =$ ft						
$V_u =$ veh/h	Ramp Volume, V_R	419	$V_D =$ veh/h						
	Freeway Free-Flow Speed, S_{FF}	70.0							
	Ramp Free-Flow Speed, S_{FR}	45.0							
Conversion to pc/h Under Base Conditions									
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$	
Freeway	1654	0.95	Level	6	0	0.971	0.90	1993	
Ramp	419	0.95	Level	22	0	0.901	0.90	544	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v_{12}					Estimation of v_{12}				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13)				
$L_{EQ} =$ using Equation (Exhibit 13-6)					$L_{EQ} =$ using Equation (Exhibit 13-7)				
$P_{FM} =$ pc/h					$P_{FD} =$ 1.000 using Equation (Exhibit 13-7)				
$V_{12} =$ pc/h (Equation 13-14 or 13-17)					$V_{12} =$ 1993 pc/h				
V_3 or V_{av34} pc/h (Equation 13-14 or 13-17)					V_3 or V_{av34} 0 pc/h (Equation 13-14 or 13-17)				
Is V_3 or $V_{av34} > 2,700$ pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No					Is V_3 or $V_{av34} > 2,700$ pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ <input type="checkbox"/> Yes <input type="checkbox"/> No					Is V_3 or $V_{av34} > 1.5 * V_{12}/2$ <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
If Yes, $V_{12a} =$ pc/h (Equation 13-16, 13-18, or 13-19)					If Yes, $V_{12a} =$ pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity	LOS F?		Actual	Capacity	LOS F?		
V_{FO}		Exhibit 13-8		V_F	1993	Exhibit 13-8	4800	No	
				$V_{FO} = V_F - V_R$	1449	Exhibit 13-8	4800	No	
				V_R	544	Exhibit 13-10	2100	No	
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable	Violation?		Actual	Max Desirable	Violation?		
V_{R12}		Exhibit 13-8		V_{12}	1993	Exhibit 13-8	4400:All	No	
Level of Service Determination (if not F)					Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$				
$D_R =$ (pc/mi/ln)					$D_R =$ 19.6 (pc/mi/ln)				
LOS = (Exhibit 13-2)					LOS = B (Exhibit 13-2)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 EB						
Agency or Company	AIM ENGINEERING	Junction	SR 29 EB ON						
Date Performed	3/16/2012	Jurisdiction							
Analysis Time Period	AM	Analysis Year	2029 DESOTO						
Project Description									
Inputs									
Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Number of Lanes, N Acceleration Lane Length, L _A Deceleration Lane Length L _D	2 ✓ 560 1235 ✓	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off	L _{up} = ft V _u = veh/h	Ramp Volume, V _R Freeway Free-Flow Speed, S _{FF} Ramp Free-Flow Speed, S _{FR}	189 ✓ 70.0 ✓ 35.0 ✓	L _{down} = ft V _D = veh/h		
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	1235	0.95 ✓	Level	6	0	0.971	0.90 ✓	1488	
Ramp	189	0.95	Level	22	0	0.901	0.90 ✓	245	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) P _{FM} = 1.000 using Equation (Exhibit 13-6) V ₁₂ = 1488 pc/h V ₃ or V _{av34} = 0 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) P _{FD} = using Equation (Exhibit 13-7) V ₁₂ = pc/h V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	1733	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	1733	Exhibit 13-8		No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)					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 = 15.4 (pc/mi/ln) LOS = B (Exhibit 13-2)					$D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 13-2)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL	Freeway/Dir of Travel	I-75 WB						
Agency or Company	AIM ENGINEERING	Junction	SR 29 OFF RAMP						
Date Performed	3/22/2012	Jurisdiction							
Analysis Time Period	AM	Analysis Year	2029 DESOTO						
Project Description									
Inputs									
Upstream Adj Ramp	Number of Lanes, N		2						
<input type="checkbox"/> Yes <input type="checkbox"/> On	Acceleration Lane Length, L _A								
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Deceleration Lane Length L _D		215						
L _{up} = ft	Freeway Volume, V _F		1813						
V _u = veh/h	Ramp Volume, V _R		241						
	Freeway Free-Flow Speed, S _{FF}		70.0						
	Ramp Free-Flow Speed, S _{FR}		45.0						
	Downstream Adj Ramp								
	<input type="checkbox"/> Yes <input type="checkbox"/> On								
	<input checked="" type="checkbox"/> No <input type="checkbox"/> Off								
	L _{down} = ft								
	V _D = veh/h								
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	1813	0.95	Level	6	0	0.971	0.90	2184	
Ramp	241	0.95	Level	22	0	0.901	0.90	313	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7) L _{EQ} = P _{FM} = using Equation (Exhibit 13-6) V ₁₂ = pc/h V ₃ or V _{av34} pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13) L _{EQ} = P _{FD} = 1.000 using Equation (Exhibit 13-7) V ₁₂ = 2184 pc/h V ₃ or V _{av34} 0 pc/h (Equation 13-14 or 13-17) Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}		Exhibit 13-8			V _F	2184	Exhibit 13-8	4800	No
					V _{FO} = V _F - V _R	1871	Exhibit 13-8	4800	No
					V _R	313	Exhibit 13-10	2100	No
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}		Exhibit 13-8			V ₁₂	2184	Exhibit 13-8	4400:All	No
Level of Service Determination (if not F)					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/mi/ln) LOS = (Exhibit 13-2)					$D_R = 4.252 + 0.0086 V_{12} - 0.009 L_D$ D _R = 21.1 (pc/mi/ln) LOS = C (Exhibit 13-2)				

RAMPS AND RAMP JUNCTIONS WORKSHEET									
General Information					Site Information				
Analyst	AL				Freeway/Dir of Travel	I-75 WB			
Agency or Company	AIM ENGINEERING				Junction	SR 29 WB ON			
Date Performed	3/16/2012				Jurisdiction				
Analysis Time Period	AM				Analysis Year	2029 DESOTO			
Project Description									
Inputs									
Upstream Adj Ramp		Number of Lanes, N			2 ✓			Downstream Adj Ramp	
<input type="checkbox"/> Yes <input type="checkbox"/> On		Acceleration Lane Length, L _A			415			<input type="checkbox"/> Yes <input type="checkbox"/> On	
<input checked="" type="checkbox"/> No <input type="checkbox"/> Off		Deceleration Lane Length L _D						<input checked="" type="checkbox"/> No <input type="checkbox"/> Off	
L _{up} =	ft	Freeway Volume, V _F			1572 ✓			L _{down} =	ft
V _u =	veh/h	Ramp Volume, V _R			534 ✓			V _D =	veh/h
		Freeway Free-Flow Speed, S _{FF}			70.0 ✓				
		Ramp Free-Flow Speed, S _{FR}			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	1572	0.95 ✓	Level	6	0	0.971	0.90 ✓	1894	
Ramp	534	0.95	Level	22	0	0.901	0.90 ✓	693	
UpStream									
DownStream									
Merge Areas					Diverge Areas				
Estimation of v₁₂					Estimation of v₁₂				
$V_{12} = V_F (P_{FM})$ (Equation 13-6 or 13-7)					$V_{12} = V_R + (V_F - V_R)P_{FD}$ (Equation 13-12 or 13-13)				
L _{EQ} =					L _{EQ} =				
P _{FM} = 1.000 using Equation (Exhibit 13-6)					P _{FD} = using Equation (Exhibit 13-7)				
V ₁₂ = 1894 pc/h					V ₁₂ = pc/h				
V ₃ or V _{av34} = 0 pc/h (Equation 13-14 or 13-17)					V ₃ or V _{av34} = pc/h (Equation 13-14 or 13-17)				
Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					Is V ₃ or V _{av34} > 2,700 pc/h? <input type="checkbox"/> Yes <input type="checkbox"/> No				
Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No					Is V ₃ or V _{av34} > 1.5 * V ₁₂ /2 <input type="checkbox"/> Yes <input type="checkbox"/> No				
If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)					If Yes, V _{12a} = pc/h (Equation 13-16, 13-18, or 13-19)				
Capacity Checks					Capacity Checks				
	Actual	Capacity		LOS F?		Actual	Capacity		LOS F?
V _{FO}	2587	Exhibit 13-8		No	V _F		Exhibit 13-8		
					V _{FO} = V _F - V _R		Exhibit 13-8		
					V _R		Exhibit 13-10		
Flow Entering Merge Influence Area					Flow Entering Diverge Influence Area				
	Actual	Max Desirable		Violation?		Actual	Max Desirable		Violation?
V _{R12}	2587	Exhibit 13-8	4600:All	No	V ₁₂		Exhibit 13-8		
Level of Service Determination (if not F)					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 = 22.7 (pc/mi/ln)					D _R = (pc/mi/ln)				
LOS = C (Exhibit 13-2)					LOS = (Exhibit 13-2)				

Phone: Fax:
E-mail:

----- Diverge Analysis -----

Analyst: GSR
 Agency/Co.: AIM ENGINEERING
 Date performed: 3/31/2012
 Analysis time period: AM
 Freeway/Dir of Travel: I-75 EB
 Junction: DESOTO BLVD OFF RAMP
 Jurisdiction:
 Analysis Year: 2029 DESOTO
 Description:

----- Freeway Data -----

Type of analysis	Diverge		
Number of lanes in freeway	2		
Free-flow speed on freeway	70.0	mph	
Volume on freeway	2400	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	896	vph	
Length of first accel/decel lane	400	ft	
Length of second accel/decel lane		ft	

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

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

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

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2400	896		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	632	236		v
Trucks and buses	6	6		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00	%	0.00	%
Length	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5*	1.5		
Recreational vehicle PCE, ER	1.2	1.2		