APPENDIX 21-3 (R)
Intersection Analysis Worksheets

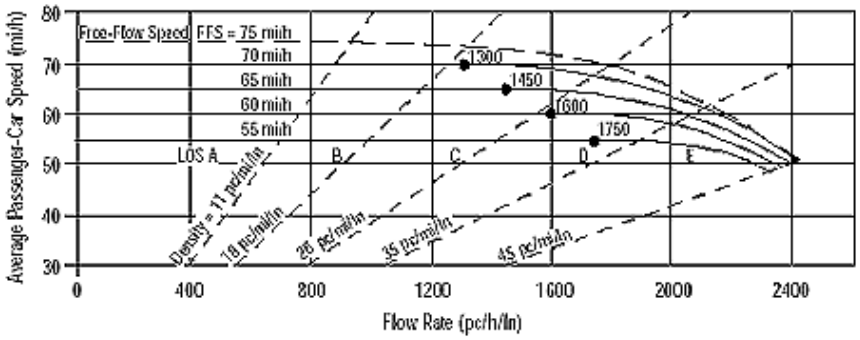
Revised October 2008

Note: Cover page lists date of latest revision for each roadway, intersection or ramp analyzed.

I-75 between NW 138 Street and Palmetto Expressway (SR 826)

REVISED October 2008

BASIC FREEWAY SEGMENTS 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	*DPA*
Agency or Company	
Date Performed	*June 2008*
Analysis Time Period	*Existing PM Peak*

Site Information

Highway/Direction of Travel	*I 75 EB*
From/To	*NW 138 Street to SR 826*
Jurisdiction	*Miami-Dade*
Analysis Year	*2007*

Project Description Beacon Countyline DRI (Third Sufficiency) - #06257

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

Flow Inputs

Volume, V	*5053*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*4*
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*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*4*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1356*	pc/h/ln
S	*70.0*	mi/h
D = v_p / S	*19.4*	pc/mi/ln
LOS	*C*	

Design (N)

Design (N)

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

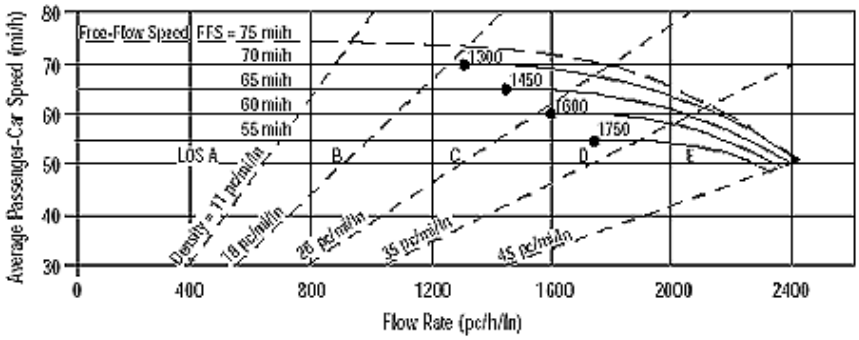
Glossary

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 - Exhibits23-8, 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 SEGMENTS 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		***Site Information***	
Analyst	*DPA*	Highway/Direction of Travel	*I 75 WB*
Agency or Company		From/To	*NW 138 Street to SR 826*
Date Performed	*June 2008*	Jurisdiction	*Miami-Dade*
Analysis Time Period	*Existing PM Peak*	Analysis Year	*2007*

Project Description Beacon Countyline DRI (Third Sufficiency) - #06257

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

Flow Inputs				
Volume, V	*6059*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*4*
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 %	

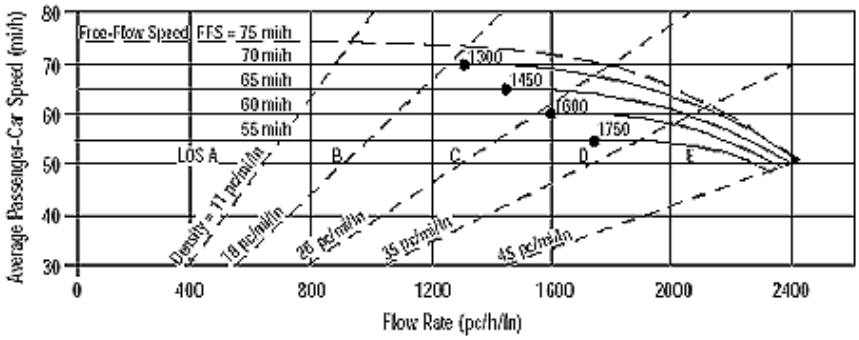
Calculate Flow Adjustments			
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	l/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*70.0*	mi/h	FFS	*70.0*	mi/h
Base free-flow Speed, BFFS		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)	*1626*	pc/h/ln	Design LOS		
			v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
S	*69.3*	mi/h	S		mi/h
D = v_p / S	*23.5*	pc/mi/ln	D = v_p / S		pc/mi/ln
LOS	*C*		Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 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



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	*DPA*	Highway/Direction of Travel	*I 75 EB*
Agency or Company		From/To	*NW 138 Street to SR 826*
Date Performed	*June 2008*	Jurisdiction	*Miami-Dade*
Analysis Time Period	*Future wo Project PM Peak*	Analysis Year	*2018*

Project Description Beacon Countyline DRI (Third Sufficiency) - #06257

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

Flow Inputs

Volume, V	*6894*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*4*
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

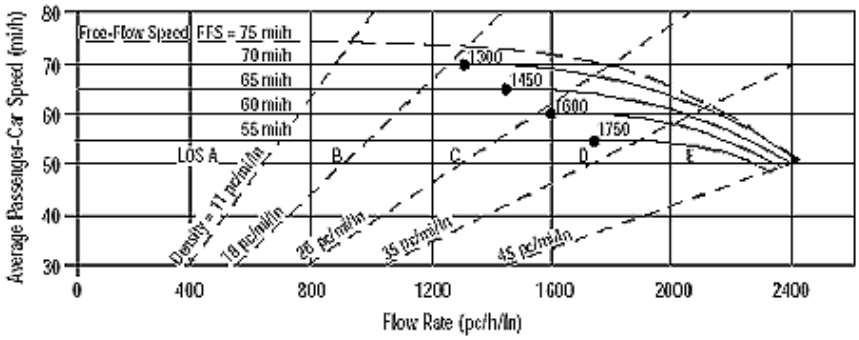
f_p	*1.00*	E_R	*1.2*
E_T	*1.5*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*70.0*	mi/h	FFS	*70.0*	mi/h
Base free-flow Speed, BFFS		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)	*1850*	pc/h/ln	Design LOS		
S	*67.3*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*27.5*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 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



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	*DPA*	Highway/Direction of Travel	*I 75 WB*
Agency or Company		From/To	*NW 138 Street to SR 826*
Date Performed	*June 2008*	Jurisdiction	*Miami-Dade*
Analysis Time Period	*Future wO Project PM Peak*	Analysis Year	*2018*

Project Description Beacon Countyline DRI (Third Sufficiency) - #06257

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

Flow Inputs

Volume, V	*7391*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*4*
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*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*4*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1984*	pc/h/ln
S	*65.2*	mi/h
D = v_p / S	*30.5*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

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

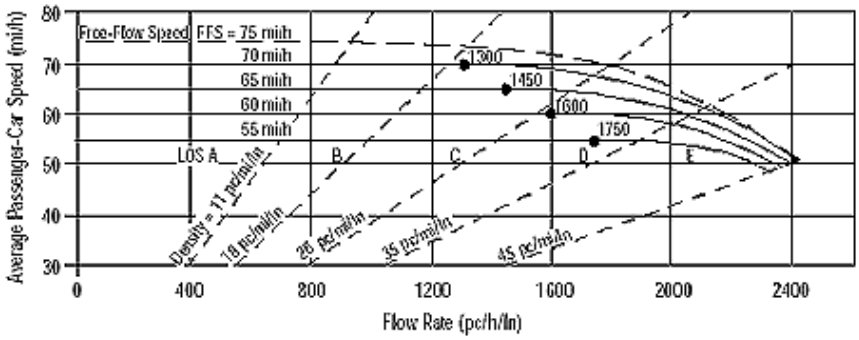
Glossary

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 - Exhibits23-8, 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 SEGMENTS 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	*DPA*
Agency or Company	
Date Performed	*June 2008*
Analysis Time Period	*Future w Project PM Peak*

Site Information

Highway/Direction of Travel	*I 75 EB*
From/To	*NW 138 Street to SR 826*
Jurisdiction	*Miami-Dade*
Analysis Year	*2018*

Project Description Beacon Countyline DRI (Third Sufficiency) - #06257

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

Flow Inputs

Volume, V	*7669*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*4*
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*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.50*	I/mi
Number of Lanes, N	*4*	
FFS (measured)	*70.0*	mi/h
Base free-flow Speed, BFFS		mi/h

Calc Speed Adj and FFS

f_{LW}		mi/h
f_{LC}		mi/h
f_{ID}		mi/h
f_N		mi/h
FFS	*70.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2059*	pc/h/ln
S	*63.6*	mi/h
D = v_p / S	*32.3*	pc/mi/ln
LOS	*D*	

Design (N)

Design (N)

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

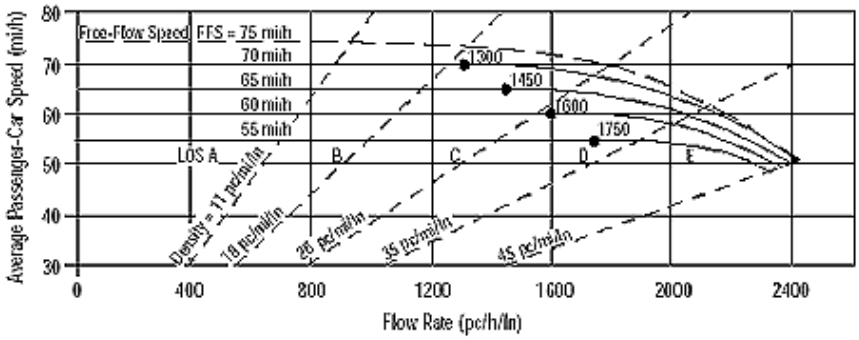
Glossary

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 - Exhibits23-8, 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 SEGMENTS 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		**Site Information**	
Analyst	*DPA*	Highway/Direction of Travel	*I 75 WB*
Agency or Company		From/To	*NW 138 Street to SR 826*
Date Performed	*June 2008*	Jurisdiction	*Miami-Dade*
Analysis Time Period	*Future w Project PM Peak*	Analysis Year	*2018*

Project Description

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

Flow Inputs

Volume, V	*7739*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*4*
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*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.980*

Speed Inputs			**Calc Speed Adj and FFS**		
Lane Width	*12.0*	ft	f_{LW}		mi/h
Rt-Shoulder Lat. Clearance	*6.0*	ft	f_{LC}		mi/h
Interchange Density	*0.50*	I/mi	f_{ID}		mi/h
Number of Lanes, N	*4*		f_N		mi/h
FFS (measured)	*70.0*	mi/h	FFS	*70.0*	mi/h
Base free-flow Speed, BFFS		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)	*2077*	pc/h/ln	Design LOS		
S	*63.2*	mi/h	v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)		pc/h
D = v_p / S	*32.8*	pc/mi/ln	S		mi/h
LOS	*D*		D = v_p / S		pc/mi/ln
			Required Number of Lanes, N		

Glossary		**Factor Location**	
N - Number of lanes	S - Speed	E_R - Exhibits23-8, 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			

NW 170 STREET / NW 87 AVENUE

REVISED October 2008

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*DPA*
Agency/Co.	
Date Performed	*10/13/2008*
Analysis Time Period	*PM Peak Period*

Site Information

Intersection	*NW 170 St/NW 87 Avenue*
Jurisdiction	*Miami Lakes/MDC*
Analysis Year	*2007*

Project ID *Beacon Countyline DRI*

East/West Street: *NW 170 Street* | North/South Street: *NW 87 Avenue*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*6*	*50*	*4*	*124*	*75*	*177*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*6*	*50*	*91*	*168*	*103*	*9*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*TR*	*LTR*		*LTR*		*LTR*	
PHF	*0.95*	*0.95*	*0.95*		*0.95*		*0.95*	
Flow Rate (veh/h)	*6*	*56*	*394*		*153*		*293*	
% Heavy Vehicles	*2*	*2*	*2*		*2*		*2*	
No. Lanes	*2*		*1*		*1*		*1*	
Geometry Group	*5*		*4a*		*2*		*2*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

	Eastbound		Westbound		Northbound		Southbound	
Prop. Left-Turns	*1.0*	*0.0*	*0.3*		*0.0*		*0.6*	
Prop. Right-Turns	*0.0*	*0.1*	*0.5*		*0.6*		*0.0*	
Prop. Heavy Vehicle	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*	
hLT-adj	*0.5*	*0.5*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.7*	*-0.7*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.5*	*-0.0*	*-0.2*		*-0.3*		*0.1*	

Departure Headway and Service Time

	Eastbound		Westbound		Northbound		Southbound	
hd, initial value (s)	*3.20*	*3.20*	*3.20*		*3.20*		*3.20*	
x, initial	*0.01*	*0.05*	*0.35*		*0.14*		*0.26*	
hd, final value (s)	*6.90*	*6.34*	*5.21*		*5.35*		*5.55*	
x, final value	*0.01*	*0.10*	*0.57*		*0.23*		*0.45*	
Move-up time, m (s)	*2.3*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*4.6*	*4.0*	*3.2*		*3.3*		*3.5*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*256*	*306*	*644*		*403*		*543*	
Delay (s/veh)	*9.68*	*9.73*	*14.88*		*9.91*		*13.04*	
LOS	*A*	*A*	*B*		*A*		*B*	
Approach: Delay (s/veh)	*9.73*		*14.88*		*9.91*		*13.04*	
LOS	*A*		*B*		*A*		*B*	
Intersection Delay (s/veh)	*13.09*							
Intersection LOS	*B*							

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 170 Street/87 Avenue*
Agency or Co.		Area Type	*All other areas*
Date Performed	*10/13/2008*	Jurisdiction	*Miami Lakes/MDC*
Time Period	*Future without Project*	Analysis Year	*2018 w Comm Improvements*
		Project ID	*Beacon Countyline DRI*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	*1*	*1*	*0*	*0*	*1*	*0*	*1*	*2*	*0*	*1*	*2*	*0*
Lane Group	*L*	*TR*			*LTR*		*L*	*TR*		*L*	*TR*	
Volume, V (vph)	*59*	*105*	*100*	*128*	*125*	*209*	*53*	*164*	*94*	*233*	*320*	*69*
% Heavy Vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed (P) or Actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up Lost Time, l_1	*2.0*	*2.0*			*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Extension of Effective Green, e	*2.0*	*2.0*			*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Arrival Type, AT	*3*	*3*			*3*		*3*	*3*		*3*	*3*	
Unit Extension, UE	*3.0*	*3.0*			*3.0*		*3.0*	*3.0*		*3.0*	*3.0*	
Filtering/Metering, I	*1.000*	*1.000*			*1.000*		*1.000*	*1.000*		*1.000*	*1.000*	
Initial Unmet Demand, Q_b	*0.0*	*0.0*			*0.0*		*0.0*	*0.0*		*0.0*	*0.0*	
Ped / Bike / RTOR Volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*			*12.0*		*12.0*	*12.0*		*12.0*	*12.0*	
Parking / Grade / Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking Maneuvers, N_m												
Buses Stopping, N_B	*0*	*0*			*0*		*0*	*0*		*0*	*0*	
Min. Time for Pedestrians, G_p	*3.2*			*3.2*			*3.2*			*3.2*		

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = *48.0*	G =	G =	G =	G = *30.0*	G =	G =	G =
	Y = *6*	Y =	Y =	Y =	Y = *6*	Y =	Y =	Y =

Duration of Analysis, T = *0.25* | Cycle Length, C = *90.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v	*62*	*216*			*487*		*56*	*272*		*245*	*410*	
Lane Group Capacity, c	*470*	*939*			*759*		*301*	*1140*		*370*	*1174*	
v/c Ratio, X	*0.13*	*0.23*			*0.64*		*0.19*	*0.24*		*0.66*	*0.35*	
Total Green Ratio, g/C	*0.53*	*0.53*			*0.53*		*0.33*	*0.33*		*0.33*	*0.33*	
Uniform Delay, d_1	*10.5*	*11.2*			*14.9*		*21.3*	*21.7*		*25.7*	*22.6*	
Progression Factor, PF	*1.000*	*1.000*			*1.000*		*1.000*	*1.000*		*1.000*	*1.000*	
Delay Calibration, k	*0.11*	*0.11*			*0.22*		*0.11*	*0.11*		*0.24*	*0.11*	
Incremental Delay, d_2	*0.1*	*0.1*			*1.9*		*0.3*	*0.1*		*4.4*	*0.2*	
Initial Queue Delay, d_3	*0.0*	*0.0*			*0.0*		*0.0*	*0.0*		*0.0*	*0.0*	
Control Delay	*10.7*	*11.3*			*16.7*		*21.6*	*21.8*		*30.0*	*22.8*	
Lane Group LOS	*B*	*B*			*B*		*C*	*C*		*C*	*C*	
Approach Delay	*11.2*			*16.7*			*21.8*			*25.5*		
Approach LOS	*B*			*B*			*C*			*C*		
Intersection Delay	*20.1*			X_C = *0.65*			Intersection LOS			*C*		

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 170 Street/87 Avenue*
Agency or Co.		Area Type	*All other areas*
Date Performed	*10/13/2008*	Jurisdiction	*Miami Lakes/MDC*
Time Period	*Future with Project*	Analysis Year	*2018 w Comm Improvements*
		Project ID	*Beacon Countyline DRI*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	*1*	*1*	*0*	*0*	*1*	*0*	*1*	*2*	*0*	*1*	*2*	*0*
Lane Group	*L*	*TR*			*LTR*		*L*	*TR*		*L*	*TR*	
Volume, V (vph)	*147*	*297*	*105*	*128*	*212*	*209*	*55*	*164*	*94*	*233*	*320*	*109*
% Heavy Vehicles, %HV	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Pretimed (P) or Actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up Lost Time, l_1	*2.0*	*2.0*			*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Extension of Effective Green, e	*2.0*	*2.0*			*2.0*		*2.0*	*2.0*		*2.0*	*2.0*	
Arrival Type, AT	*3*	*3*			*3*		*3*	*3*		*3*	*3*	
Unit Extension, UE	*3.0*	*3.0*			*3.0*		*3.0*	*3.0*		*3.0*	*3.0*	
Filtering/Metering, I	*1.000*	*1.000*			*1.000*		*1.000*	*1.000*		*1.000*	*1.000*	
Initial Unmet Demand, Q_b	*0.0*	*0.0*			*0.0*		*0.0*	*0.0*		*0.0*	*0.0*	
Ped / Bike / RTOR Volumes	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*			*12.0*		*12.0*	*12.0*		*12.0*	*12.0*	
Parking / Grade / Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking Maneuvers, N_m												
Buses Stopping, N_B	*0*	*0*			*0*		*0*	*0*		*0*	*0*	
Min. Time for Pedestrians, G_p	*3.2*			*3.2*			*3.2*			*3.2*		

Phasing	EW Perm	02	03	04	NS Perm	06	07	08
Timing	G = *48.0*	G =	G =	G =	G = *30.0*	G =	G =	G =
	Y = *6*	Y =	Y =	Y =	Y = *6*	Y =	Y =	Y =

Duration of Analysis, T = *0.25* | Cycle Length, C = *90.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v	*155*	*424*			*578*		*58*	*272*		*245*	*452*	
Lane Group Capacity, c	*420*	*973*			*644*		*279*	*1140*		*370*	*1160*	
v/c Ratio, X	*0.37*	*0.44*			*0.90*		*0.21*	*0.24*		*0.66*	*0.39*	
Total Green Ratio, g/C	*0.53*	*0.53*			*0.53*		*0.33*	*0.33*		*0.33*	*0.33*	
Uniform Delay, d_1	*12.2*	*12.8*			*18.8*		*21.5*	*21.7*		*25.7*	*23.0*	
Progression Factor, PF	*1.000*	*1.000*			*1.000*		*1.000*	*1.000*		*1.000*	*1.000*	
Delay Calibration, k	*0.11*	*0.11*			*0.42*		*0.11*	*0.11*		*0.24*	*0.11*	
Incremental Delay, d_2	*0.6*	*0.3*			*15.4*		*0.4*	*0.1*		*4.4*	*0.2*	
Initial Queue Delay, d_3	*0.0*	*0.0*			*0.0*		*0.0*	*0.0*		*0.0*	*0.0*	
Control Delay	*12.8*	*13.1*			*34.2*		*21.9*	*21.8*		*30.0*	*23.2*	
Lane Group LOS	*B*	*B*			*C*		*C*	*C*		*C*	*C*	
Approach Delay	*13.0*			*34.2*			*21.8*			*25.6*		
Approach LOS	*B*			*C*			*C*			*C*		
Intersection Delay	*24.0*			X_C = *0.81*			Intersection LOS			*C*		

NW 170 STREET / NW 78 AVENUE

REVISED October 2008

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*DPA*
Agency/Co.	
Date Performed	*10/13/2008*
Analysis Time Period	*PM Peak Period*

Site Information

Intersection	*NW 170 Street/78 Avenue*
Jurisdiction	*Miami Lakes/MDC*
Analysis Year	*2008 - Existing*

Project Description *Beacon Countyline DRI*

East/West Street: *NW 170 Street* | North/South Street: *NW 78 Avenue*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*5*		*159*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*5*	*0*	*167*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*214*	*431*			*295*	*9*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*225*	*453*	*0*	*0*	*310*	*9*
Percent Heavy Vehicles	*2*	*2*	*0*	*0*	*2*	*2*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*		*L*	*T*				*TR*
v (veh/h)	*5*		*225*	*453*				*319*
C (m) (veh/h)	*1623*		*519*	*882*				*722*
v/c	*0.00*		*0.43*	*0.51*				*0.44*
95% queue length	*0.01*		*2.17*	*3.00*				*2.27*
Control Delay (s/veh)	*7.2*		*17.1*	*13.3*				*13.9*
LOS	*A*		*C*	*B*				*B*
Approach Delay (s/veh)	--	--	*14.6*			*13.9*		
Approach LOS	--	--	*B*			*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*DPA*
Agency/Co.	
Date Performed	*10/13/2008*
Analysis Time Period	*PM Peak Period*

Site Information

Intersection	*NW 170 Street/78 Avenue*
Jurisdiction	*Miami Lakes/MDC*
Analysis Year	*2018 Future wo Project*

Project Description *Beacon Countyline DRI*

East/West Street: *NW 170 Street* | North/South Street: *NW 78 Avenue*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*5*		*275*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*5*	*0*	*289*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*293*	*444*			*304*	*9*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*308*	*467*	*0*	*0*	*320*	*9*
Percent Heavy Vehicles	*2*	*2*	*0*	*0*	*2*	*2*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*		*L*	*T*				*TR*
v (veh/h)	*5*		*308*	*467*				*329*
C (m) (veh/h)	*1623*		*458*	*882*				*618*
v/c	*0.00*		*0.67*	*0.53*				*0.53*
95% queue length	*0.01*		*4.89*	*3.18*				*3.14*
Control Delay (s/veh)	*7.2*		*27.5*	*13.6*				*17.3*
LOS	*A*		*D*	*B*				*C*
Approach Delay (s/veh)	--	--	*19.1*			*17.3*		
Approach LOS	--	--	*C*			*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*DPA*
Agency/Co.	
Date Performed	*10/13/2008*
Analysis Time Period	*PM Peak Period*

Site Information

Intersection	*NW 170 Street/78 Avenue*
Jurisdiction	*Miami Lakes/MDC*
Analysis Year	*2018 Future w Project*

Project Description *Beacon Countyline DRI*

East/West Street: *NW 170 Street* | North/South Street: *NW 78 Avenue*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*5*		*417*			
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*5*	*0*	*438*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*356*	*450*			*319*	*9*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR (veh/h)	*374*	*473*	*0*	*0*	*335*	*9*
Percent Heavy Vehicles	*2*	*2*	*0*	*0*	*2*	*2*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*		*L*	*T*				*TR*
v (veh/h)	*5*		*374*	*473*				*344*
C (m) (veh/h)	*1623*		*358*	*882*				*511*
v/c	*0.00*		*1.04*	*0.54*				*0.67*
95% queue length	*0.01*		*12.88*	*3.26*				*4.99*
Control Delay (s/veh)	*7.2*		*94.6*	*13.7*				*25.4*
LOS	*A*		*F*	*B*				*D*
Approach Delay (s/veh)	--	--	*49.4*			*25.4*		
Approach LOS	--	--	*E*			*D*		

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*DPA*
Agency/Co.	
Date Performed	*10/20/2008*
Analysis Time Period	*PM Peak Period*

Site Information

Intersection	*NW 170 Street/78 Avenue*
Jurisdiction	*Miami Lakes/MDC*
Analysis Year	*2018 Future w Project w Imps*

Project ID *Beacon Countyline DRI*

East/West Street: *NW 170 Street* North/South Street: *NW 78 Avenue*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*5*	*0*	*417*	*0*	*0*	*0*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*356*	*450*	*0*	*0*	*319*	*9*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*L*	*R*			*L*	*T*	*TR*	
PHF	*0.95*	*0.95*			*0.95*	*0.95*	*0.95*	
Flow Rate (veh/h)	*5*	*438*			*374*	*473*	*344*	
% Heavy Vehicles	*2*	*2*			*2*	*2*	*2*	
No. Lanes	*2*		*0*		*2*		*1*	
Geometry Group	*1*				*5*		*3b*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*1.0*	*0.0*			*1.0*	*0.0*	*0.0*	
Prop. Right-Turns	*0.0*	*1.0*			*0.0*	*0.0*	*0.0*	
Prop. Heavy Vehicle	*0.0*	*0.0*			*0.0*	*0.0*	*0.0*	
hLT-adj	*0.2*	*0.2*			*0.5*	*0.5*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*			*-0.7*	*-0.7*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*			*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*0.2*	*-0.6*			*0.5*	*0.0*	*0.0*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*	*3.20*			*3.20*	*3.20*	*3.20*	
x, initial	*0.00*	*0.39*			*0.33*	*0.42*	*0.31*	
hd, final value (s)	*6.83*	*6.02*			*7.18*	*6.67*	*6.85*	
x, final value	*0.01*	*0.73*			*0.75*	*0.88*	*0.65*	
Move-up time, m (s)	*2.0*				*2.3*		*2.0*	
Service Time, t_s (s)	*4.8*	*4.0*			*4.9*	*4.4*	*4.9*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*255*	*586*			*500*	*538*	*513*	
Delay (s/veh)	*9.90*	*23.69*			*28.12*	*40.01*	*21.92*	
LOS	*A*	*C*			*D*	*E*	*C*	
Approach: Delay (s/veh)	*23.54*				*34.76*		*21.92*	
LOS	*C*				*D*		*C*	
Intersection Delay (s/veh)	*29.01*							
Intersection LOS	*D*							

NW 122 STREET / NW 97 AVENUE

REVISED July 2008

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 122 St & NW 97 Ave*
Agency/Co.		Jurisdiction	*City of Hialeah*
Date Performed		Analysis Year	
Analysis Time Period	*Existing Peak Hour*		

Project Description	*Beacon Countline DRI - #06257*
East/West Street: *NW 122 Street*	North/South Street: *NW 97 Avenue*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*75*	*239*	*1*	*2*	*185*	*157*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*81*	*259*	*1*	*2*	*201*	*170*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*93*	*0*	*42*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*101*	*0*	*45*
Percent Heavy Vehicles	*0*	*0*	*0*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*1*	*0*
Configuration		*LTR*		*L*		*TR*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*		*L*		*TR*
v (veh/h)	*81*	*2*		*0*		*101*		*45*
C (m) (veh/h)	*1188*	*1316*				*325*		*753*
v/c	*0.07*	*0.00*				*0.31*		*0.06*
95% queue length	*0.22*	*0.00*				*1.29*		*0.19*
Control Delay (s/veh)	*8.3*	*7.7*				*21.0*		*10.1*
LOS	*A*	*A*				*C*		*B*
Approach Delay (s/veh)	--	--				*17.6*		
Approach LOS	--	--				*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 122 St & NW 97 Ave*
Agency/Co.		Jurisdiction	*City of Hialeah*
Date Performed		Analysis Year	
Analysis Time Period	*Fut wo proj Peak Hour*		

Project Description *Beacon Countline DRI - #06257*

East/West Street: *NW 122 Street* | North/South Street: *NW 97 Avenue*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*78*	*249*	*20*	*2*	*192*	*162*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*84*	*270*	*21*	*2*	*208*	*176*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*1*	*0*	*1*	*96*		*43*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*1*	*0*	*1*	*104*	*0*	*46*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*0*	*1*
Configuration		*LTR*		*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*		*L*		*R*
v (veh/h)	*84*	*2*		*2*		*104*		*46*
C (m) (veh/h)	*1174*	*1271*		*406*		*305*		*743*
v/c	*0.07*	*0.00*		*0.00*		*0.34*		*0.06*
95% queue length	*0.23*	*0.00*		*0.01*		*1.47*		*0.20*
Control Delay (s/veh)	*8.3*	*7.8*		*13.9*		*22.8*		*10.2*
LOS	*A*	*A*		*B*		*C*		*B*
Approach Delay (s/veh)	--	--	*13.9*			*18.9*		
Approach LOS	--	--	*B*			*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 122 St & NW 97 Ave*
Agency/Co.		Jurisdiction	
Date Performed		Analysis Year	
Analysis Time Period	*Fut w proj Peak Hour*		

Project Description	*Beacon Countline DRI - #06257*
East/West Street: *NW 122 Street*	North/South Street: *NW 97 Avenue*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*78*	*287*	*20*	*2*	*209*	*163*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*84*	*311*	*21*	*2*	*227*	*177*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LTR*			*LTR*		
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*1*	*0*	*1*	*97*		*43*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR (veh/h)	*1*	*0*	*1*	*105*	*0*	*46*
Percent Heavy Vehicles	*2*	*2*	*2*	*2*	*0*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*1*	*0*	*1*
Configuration		*LTR*		*L*		*R*

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LTR*	*LTR*		*LTR*		*L*		*R*
v (veh/h)	*84*	*2*		*2*		*105*		*46*
C (m) (veh/h)	*1155*	*1227*		*372*		*277*		*724*
v/c	*0.07*	*0.00*		*0.01*		*0.38*		*0.06*
95% queue length	*0.23*	*0.00*		*0.02*		*1.70*		*0.20*
Control Delay (s/veh)	*8.4*	*7.9*		*14.7*		*25.7*		*10.3*
LOS	*A*	*A*		*B*		*D*		*B*
Approach Delay (s/veh)	--	--	*14.7*			*21.0*		
Approach LOS	--	--	*B*			*C*		

NW 122 STREET / NW 87 AVENUE

REVISED July 2008

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	DPA	Intersection	NW 122 St & NW 87 Ave
Agency or Co.		Area Type	All other areas
Date Performed		Jurisdiction	
Time Period	Existing Peak Hour	Analysis Year	
		Project ID	Beacon Countyline DRI - #06257

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	1	2	0	1	1	1	2	2	0	2	2	0
Lane Group	L	TR		L	T	R	L	TR		L	TR	
Volume, V (vph)	156	394	117	201	426	333	236	858	116	246	626	125
% Heavy Vehicles, %HV	2	2	2	2	2	2	2	2	2	2	2	2
Peak-Hour Factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Pretimed (P) or Actuated (A)	A	A	A	A	A	A	A	A	A	A	A	A
Start-up Lost Time, l_1	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Extension of Effective Green, e	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Arrival Type, AT	3	3		3	3	3	3	3		3	3	
Unit Extension, UE	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Filtering/Metering, I	1.000	1.000		1.000	1.000	1.000	1.000	1.000		1.000	1.000	
Initial Unmet Demand, Q_b	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Ped / Bike / RTOR Volumes	0	0	0	0	0	33	0	0	0	0	0	0
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
Parking / Grade / Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking Maneuvers, N_m												
Buses Stopping, N_B	0	0		0	0	0	0	0		0	0	
Min. Time for Pedestrians, G_p	3.2			3.2			3.2			3.2		

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = 12.0	G = 35.0	G =	G =	G = 21.0	G = 45.0	G =	G =
	Y = 3	Y = 5	Y =	Y =	Y = 4	Y = 5	Y =	Y =

Duration of Analysis, T = 0.25 | Cycle Length, C = 130.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v	161	527		207	439	309	243	1005		254	774	
Lane Group Capacity, c	231	922		312	502	426	876	1206		996	1197	
v/c Ratio, X	0.70	0.57		0.66	0.87	0.73	0.28	0.83		0.26	0.65	
Total Green Ratio, g/C	0.40	0.27		0.40	0.27	0.27	0.55	0.35		0.55	0.35	
Uniform Delay, d_1	30.1	41.0		28.0	45.4	43.1	17.2	39.1		19.6	35.8	
Progression Factor, PF	1.000	1.000		1.000	1.000	1.000	1.000	1.000		1.000	1.000	
Delay Calibration, k	0.26	0.17		0.24	0.40	0.29	0.11	0.37		0.11	0.22	
Incremental Delay, d_2	8.9	0.9		5.2	15.7	6.1	0.2	5.2		0.1	1.2	
Initial Queue Delay, d_3	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay	39.0	41.9		33.2	61.1	49.2	17.4	44.2		19.7	37.0	
Lane Group LOS	D	D		C	E	D	B	D		B	D	
Approach Delay	41.2			51.2			39.0			32.7		
Approach LOS	D			D			D			C		
Intersection Delay	40.7			X_C = 0.82			Intersection LOS			D		

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 122 St & NW 87 Ave*
Agency or Co.		Area Type	*All other areas*
Date Performed		Jurisdiction	
Time Period	*Fut wo proj Peak Hour*	Analysis Year	
		Project ID	*Beacon Countyline DRI - #06257*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	*1*	*2*	*0*	*1*	*1*	*1*	*2*	*2*	*0*	*2*	*2*	*0*
Lane Group	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*		*L*	*TR*	
Volume, V (vph)	*161*	*461*	*121*	*208*	*469*	*351*	*244*	*924*	*120*	*258*	*679*	*129*
% Heavy Vehicles, %HV	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
Peak-Hour Factor, PHF	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*
Pretimed (P) or Actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up Lost Time, l_1	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	
Extension of Effective Green, e	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	
Arrival Type, AT	*3*	*3*		*3*	*3*	*3*	*3*	*3*		*3*	*3*	
Unit Extension, UE	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	
Filtering/Metering, I	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	
Initial Unmet Demand, Q_b	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	
Ped / Bike / RTOR Volumes	*0*	*0*	*0*	*0*	*0*	*33*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*		*12.0*	*12.0*	*12.0*	*12.0*	*12.0*		*12.0*	*12.0*	
Parking / Grade / Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking Maneuvers, N_m												
Buses Stopping, N_B	*0*	*0*		*0*	*0*	*0*	*0*	*0*		*0*	*0*	
Min. Time for Pedestrians, G_p	*3.2*			*3.2*			*3.2*			*3.2*		

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = *12.0*	G = *35.0*	G =	G =	G = *21.0*	G = *45.0*	G =	G =
	Y = *3*	Y = *5*	Y =	Y =	Y = *4*	Y = *5*	Y =	Y =
Duration of Analysis, T = *0.25*					Cycle Length, C = *130.0*			

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v	*166*	*600*		*214*	*484*	*328*	*252*	*1077*		*266*	*833*	
Lane Group Capacity, c	*220*	*925*		*284*	*502*	*426*	*900*	*1206*		*1054*	*1198*	
v/c Ratio, X	*0.75*	*0.65*		*0.75*	*0.96*	*0.77*	*0.28*	*0.89*		*0.25*	*0.70*	
Total Green Ratio, g/C	*0.40*	*0.27*		*0.40*	*0.27*	*0.27*	*0.55*	*0.35*		*0.55*	*0.35*	
Uniform Delay, d_1	*31.1*	*42.1*		*28.8*	*46.9*	*43.8*	*17.7*	*40.2*		*20.6*	*36.6*	
Progression Factor, PF	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	
Delay Calibration, k	*0.31*	*0.23*		*0.31*	*0.47*	*0.32*	*0.11*	*0.42*		*0.11*	*0.26*	
Incremental Delay, d_2	*13.8*	*1.6*		*10.9*	*31.1*	*8.4*	*0.2*	*8.8*		*0.1*	*1.8*	
Initial Queue Delay, d_3	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	
Control Delay	*44.9*	*43.7*		*39.6*	*78.0*	*52.2*	*17.9*	*49.0*		*20.8*	*38.4*	
Lane Group LOS	*D*	*D*		*D*	*E*	*D*	*B*	*D*		*C*	*D*	
Approach Delay	*43.9*			*61.7*			*43.1*			*34.1*		
Approach LOS	*D*			*E*			*D*			*C*		
Intersection Delay	*45.4*			X_C = *0.87*			Intersection LOS			*D*		

HCS+™ Version 5.21 Generated: 3/20/2008 3:02 PM

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 122 St & NW 87 Ave*
Agency or Co.		Area Type	*All other areas*
Date Performed		Jurisdiction	
Time Period	*Fut w proj Peak Hour*	Analysis Year	
		Project ID	*Beacon Countyline DRI - #06257*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	*1*	*2*	*0*	*1*	*1*	*1*	*2*	*2*	*0*	*2*	*2*	*0*
Lane Group	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*		*L*	*TR*	
Volume, V (vph)	*174*	*471*	*129*	*208*	*474*	*358*	*248*	*925*	*120*	*273*	*682*	*135*
% Heavy Vehicles, %HV	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
Peak-Hour Factor, PHF	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*
Pretimed (P) or Actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up Lost Time, l_1	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	
Extension of Effective Green, e	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	
Arrival Type, AT	*3*	*3*		*3*	*3*	*3*	*3*	*3*		*3*	*3*	
Unit Extension, UE	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	
Filtering/Metering, I	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	
Initial Unmet Demand, Q_b	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	
Ped / Bike / RTOR Volumes	*0*	*0*	*0*	*0*	*0*	*33*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*		*12.0*	*12.0*	*12.0*	*12.0*	*12.0*		*12.0*	*12.0*	
Parking / Grade / Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking Maneuvers, N_m												
Buses Stopping, N_B	*0*	*0*		*0*	*0*	*0*	*0*	*0*		*0*	*0*	
Min. Time for Pedestrians, G_p	*3.2*			*3.2*			*3.2*			*3.2*		

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = *12.0*	G = *35.0*	G =	G =	G = *21.0*	G = *45.0*	G =	G =
	Y = *3*	Y = *5*	Y =	Y =	Y = *4*	Y = *5*	Y =	Y =

Duration of Analysis, T = *0.25* — Cycle Length, C = *130.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v	*179*	*619*		*214*	*489*	*335*	*256*	*1078*		*281*	*842*	
Lane Group Capacity, c	*220*	*924*		*277*	*502*	*426*	*903*	*1206*		*1055*	*1197*	
v/c Ratio, X	*0.81*	*0.67*		*0.77*	*0.97*	*0.79*	*0.28*	*0.89*		*0.27*	*0.70*	
Total Green Ratio, g/C	*0.40*	*0.27*		*0.40*	*0.27*	*0.27*	*0.55*	*0.35*		*0.55*	*0.35*	
Uniform Delay, d_1	*31.5*	*42.3*		*28.9*	*47.1*	*44.0*	*17.8*	*40.2*		*20.7*	*36.7*	
Progression Factor, PF	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	
Delay Calibration, k	*0.35*	*0.24*		*0.32*	*0.48*	*0.33*	*0.11*	*0.42*		*0.11*	*0.27*	
Incremental Delay, d_2	*20.4*	*1.9*		*12.7*	*33.4*	*9.4*	*0.2*	*8.8*		*0.1*	*1.9*	
Initial Queue Delay, d_3	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	
Control Delay	*51.8*	*44.2*		*41.6*	*80.5*	*53.5*	*18.0*	*49.1*		*20.9*	*38.6*	
Lane Group LOS	*D*	*D*		*D*	*F*	*D*	*B*	*D*		*C*	*D*	
Approach Delay	*45.9*			*63.8*			*43.1*			*34.2*		
Approach LOS	*D*			*E*			*D*			*C*		
Intersection Delay	*46.3*			X_c = *0.88*			Intersection LOS			*D*		

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 122 St & NW 87 Ave*
Agency or Co.		Area Type	*All other areas*
Date Performed		Jurisdiction	
Time Period	*Fut w proj w Imps Peak Hour*	Analysis Year	
		Project ID	*Beacon Countyline DRI - #06257*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	*1*	*2*	*0*	*1*	*1*	*1*	*2*	*2*	*0*	*2*	*2*	*0*
Lane Group	*L*	*TR*		*L*	*T*	*R*	*L*	*TR*		*L*	*TR*	
Volume, V (vph)	*174*	*471*	*129*	*208*	*474*	*358*	*248*	*925*	*120*	*273*	*682*	*135*
% Heavy Vehicles, %HV	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*	*2*
Peak-Hour Factor, PHF	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*	*0.97*
Pretimed (P) or Actuated (A)	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*	*A*
Start-up Lost Time, l_1	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	
Extension of Effective Green, e	*2.0*	*2.0*		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*		*2.0*	*2.0*	
Arrival Type, AT	*3*	*3*		*3*	*3*	*3*	*3*	*3*		*3*	*3*	
Unit Extension, UE	*3.0*	*3.0*		*3.0*	*3.0*	*3.0*	*3.0*	*3.0*		*3.0*	*3.0*	
Filtering/Metering, I	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	
Initial Unmet Demand, Q_b	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	
Ped / Bike / RTOR Volumes	*0*	*0*	*0*	*0*	*0*	*33*	*0*	*0*	*0*	*0*	*0*	*0*
Lane Width	*12.0*	*12.0*		*12.0*	*12.0*	*12.0*	*12.0*	*12.0*		*12.0*	*12.0*	
Parking / Grade / Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*
Parking Maneuvers, N_m												
Buses Stopping, N_B	*0*	*0*		*0*	*0*	*0*	*0*	*0*		*0*	*0*	
Min. Time for Pedestrians, G_p	*3.2*			*3.2*			*3.2*			*3.2*		

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = *12.0*	G = *40.0*	G =	G =	G = *17.0*	G = *44.0*	G =	G =
	Y = *3*	Y = *5*	Y =	Y =	Y = *4*	Y = *5*	Y =	Y =

Duration of Analysis, T = *0.25* — Cycle Length, C = *130.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v	*179*	*619*		*214*	*489*	*335*	*256*	*1078*		*281*	*842*	
Lane Group Capacity, c	*243*	*1056*		*314*	*573*	*487*	*802*	*1180*		*963*	*1171*	
v/c Ratio, X	*0.74*	*0.59*		*0.68*	*0.85*	*0.69*	*0.32*	*0.91*		*0.29*	*0.72*	
Total Green Ratio, g/C	*0.44*	*0.31*		*0.44*	*0.31*	*0.31*	*0.51*	*0.34*		*0.51*	*0.34*	
Uniform Delay, d_1	*28.2*	*38.0*		*25.4*	*42.2*	*39.5*	*20.4*	*41.2*		*23.4*	*37.6*	
Progression Factor, PF	*1.000*	*1.000*		*1.000*	*1.000*	*1.000*	*1.000*	*1.000*		*1.000*	*1.000*	
Delay Calibration, k	*0.29*	*0.18*		*0.25*	*0.39*	*0.26*	*0.11*	*0.43*		*0.11*	*0.28*	
Incremental Delay, d_2	*11.2*	*0.9*		*5.9*	*11.9*	*4.1*	*0.2*	*10.9*		*0.2*	*2.2*	
Initial Queue Delay, d_3	*0.0*	*0.0*		*0.0*	*0.0*	*0.0*	*0.0*	*0.0*		*0.0*	*0.0*	
Control Delay	*39.4*	*38.9*		*31.3*	*54.2*	*43.6*	*20.7*	*52.1*		*23.6*	*39.8*	
Lane Group LOS	*D*	*D*		*C*	*D*	*D*	*C*	*D*		*C*	*D*	
Approach Delay	*39.0*			*46.1*			*46.0*			*35.7*		
Approach LOS	*D*			*D*			*D*			*D*		
Intersection Delay	*42.0*			X_c = *0.88*			Intersection LOS			*D*		

Intersections at NW 170 Street / HEFT Ramps

Revised July 2008

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 170 St & HEFT West Ramp*
Agency/Co.		Jurisdiction	
Date Performed		Analysis Year	
Analysis Time Period	*Fut w proj Peak Hour*		

Project Description *Beacon Countyline DRI (Second Sufficiency) - #06257*

East/West Street: *NW 170 Street* | North/South Street: *HEFT West Ramp*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)						*397*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*0*	*0*	*441*
Percent Heavy Vehicles	*0*	--	--	*2*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)				*450*		
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*0*	*500*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*0*
Configuration				*L*		

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration						*L*		
v (veh/h)						*500*		
C (m) (veh/h)						*1029*		
v/c						*0.49*		
95% queue length						*2.72*		
Control Delay (s/veh)						*11.8*		
LOS						*B*		
Approach Delay (s/veh)	--	--				*11.8*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 170 St & HEFT East Ramp*
Agency/Co.		Jurisdiction	
Date Performed		Analysis Year	
Analysis Time Period	*Fut w proj Peak Hour*		

Project Description	*Beacon Countyline DRI - #06257*
East/West Street: *NW 170 Street*	North/South Street: *HEFT East Ramp*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*397*			*450*	*607*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*0*	*441*	*0*	*0*	*500*	*674*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*1*	*1*
Configuration		*T*			*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			*278*			
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*308*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*1*	*0*	*0*	*0*
Configuration			*R*			

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration					*R*			
v (veh/h)					*308*			
C (m) (veh/h)					*784*			
v/c					*0.39*			
95% queue length					*1.88*			
Control Delay (s/veh)					*12.5*			
LOS					*B*			
Approach Delay (s/veh)	--	--	*12.5*					
Approach LOS	--	--	*B*					

NW 170 Street /NW 102 Avenue

Revised July 2008

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 170 St & NW 102 Ave*
Agency or Co.		Area Type	*All other areas*
Date Performed		Jurisdiction	
Time Period	*Fut w proj Peak Hour*	Analysis Year	*Future w Project*
		Project ID	*Beacon Countyline DRI (Second Sufficiency) -Future w Project*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1		*2*	*1*	*1*	*2*		*1*		*1*			
Lane Group		*T*	*R*	*L*	*T*		*L*		*R*			
Volume, V (vph)		*348*	*336*	*140*	*390*		*677*		*293*			
% Heavy Vehicles, %HV		*2*	*2*	*2*	*2*		*2*		*2*			
Peak-Hour Factor, PHF		*0.90*	*0.90*	*0.90*	*0.90*		*0.90*		*0.90*			
Pretimed (P) or Actuated (A)		*A*	*A*	*A*	*A*		*A*		*A*			
Start-up Lost Time, l_1		*2.0*	*2.0*	*2.0*	*2.0*		*2.0*		*2.0*			
Extension of Effective Green, e		*2.0*	*2.0*	*2.0*	*2.0*		*2.0*		*2.0*			
Arrival Type, AT		*3*	*3*	*3*	*3*		*3*		*3*			
Unit Extension, UE		*3.0*	*3.0*	*3.0*	*3.0*		*3.0*		*3.0*			
Filtering/Metering, I		*1.000*	*1.000*	*1.000*	*1.000*		*1.000*		*1.000*			
Initial Unmet Demand, Q_b		*0.0*	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*			
Ped / Bike / RTOR Volumes	*0*	*0*	*51*	*0*	*0*		*0*	*0*	*43*			
Lane Width		*12.0*	*12.0*	*12.0*	*12.0*		*12.0*		*12.0*			
Parking / Grade / Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*			
Parking Maneuvers, N_m												
Buses Stopping, N_B		*0*	*0*	*0*	*0*		*0*		*0*			
Min. Time for Pedestrians, G_p		*3.2*			*3.2*			*3.2*				

Phasing	WB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = *6.0*	G = *31.0*	G =	G =	G = *42.0*	G =	G =	G =
	Y = *3*	Y = *4*	Y =	Y =	Y = *4*	Y =	Y =	Y =

Duration of Analysis, T = *0.25* — Cycle Length, C = *90.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v		*387*	*317*	*156*	*433*		*752*		*278*			
Lane Group Capacity, c		*1222*	*1354*	*416*	*1576*		*826*		*739*			
v/c Ratio, X		*0.32*	*0.23*	*0.38*	*0.27*		*0.91*		*0.38*			
Total Green Ratio, g/C		*0.34*	*0.86*	*0.46*	*0.44*		*0.47*		*0.47*			
Uniform Delay, d_1		*21.7*	*1.2*	*15.0*	*15.8*		*22.3*		*15.5*			
Progression Factor, PF		*1.000*	*1.000*	*1.000*	*1.000*		*1.000*		*1.000*			
Delay Calibration, k		*0.11*	*0.11*	*0.11*	*0.11*		*0.43*		*0.11*			
Incremental Delay, d_2		*0.2*	*0.1*	*0.6*	*0.1*		*14.1*		*0.3*			
Initial Queue Delay, d_3		*0.0*	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*			
Control Delay		*21.9*	*1.3*	*15.6*	*15.9*		*36.4*		*15.8*			
Lane Group LOS		*C*	*A*	*B*	*B*		*D*		*B*			
Approach Delay	*12.6*			*15.8*			*30.8*					
Approach LOS	*B*			*B*			*C*					
Intersection Delay	*21.5*			X_C = *0.69*			Intersection LOS			*C*		

NW 170 Street /NW 97 Avenue

Revised July 2008

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 170 St & NW 97 Ave*
Agency or Co.		Area Type	*All other areas*
Date Performed		Jurisdiction	
Time Period	*Fut w proj Peak Hour*	Analysis Year	
		Project ID	*Beacon Countyline DRI - #06257*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1		*1*	*1*	*1*	*1*		*1*		*1*			
Lane Group		*T*	*R*	*L*	*T*		*L*		*R*			
Volume, V (vph)		*393*	*253*	*45*	*248*		*283*		*100*			
% Heavy Vehicles, %HV		*2*	*2*	*2*	*2*		*2*		*2*			
Peak-Hour Factor, PHF		*0.90*	*0.90*	*0.90*	*0.90*		*0.90*		*0.90*			
Pretimed (P) or Actuated (A)		*A*	*A*	*A*	*A*		*A*		*A*			
Start-up Lost Time, l_1		*2.0*	*2.0*	*2.0*	*2.0*		*2.0*		*2.0*			
Extension of Effective Green, e		*2.0*	*2.0*	*2.0*	*2.0*		*2.0*		*2.0*			
Arrival Type, AT		*3*	*3*	*3*	*3*		*3*		*3*			
Unit Extension, UE		*3.0*	*3.0*	*3.0*	*3.0*		*3.0*		*3.0*			
Filtering/Metering, I		*1.000*	*1.000*	*1.000*	*1.000*		*1.000*		*1.000*			
Initial Unmet Demand, Q_b		*0.0*	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*			
Ped / Bike / RTOR Volumes	*0*	*0*	*23*	*0*	*0*		*0*	*0*	*10*			
Lane Width		*12.0*	*12.0*	*12.0*	*12.0*		*12.0*		*12.0*			
Parking / Grade / Parking	*N*	*0*	*N*	*N*	*0*	*N*	*N*	*0*	*N*			
Parking Maneuvers, N_m												
Buses Stopping, N_B		*0*	*0*	*0*	*0*		*0*		*0*			
Min. Time for Pedestrians, G_p		*3.2*			*3.2*			*3.2*				

Phasing	EW Perm	02	03	04	NB Only	06	07	08
Timing	G = *40.0*	G =	G =	G =	G = *40.0*	G =	G =	G =
	Y = *5*	Y =	Y =	Y =	Y = *5*	Y =	Y =	Y =

Duration of Analysis, T = *0.25* | Cycle Length, C = *90.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v		*437*	*256*	*50*	*276*		*314*		*100*			
Lane Group Capacity, c		*828*	*704*	*305*	*828*		*787*		*704*			
v/c Ratio, X		*0.53*	*0.36*	*0.16*	*0.33*		*0.40*		*0.14*			
Total Green Ratio, g/C		*0.44*	*0.44*	*0.44*	*0.44*		*0.44*		*0.44*			
Uniform Delay, d_1		*18.1*	*16.6*	*15.0*	*16.3*		*16.9*		*14.8*			
Progression Factor, PF		*1.000*	*1.000*	*1.000*	*1.000*		*1.000*		*1.000*			
Delay Calibration, k		*0.13*	*0.11*	*0.11*	*0.11*		*0.11*		*0.11*			
Incremental Delay, d_2		*0.6*	*0.3*	*0.3*	*0.2*		*0.3*		*0.1*			
Initial Queue Delay, d_3		*0.0*	*0.0*	*0.0*	*0.0*		*0.0*		*0.0*			
Control Delay		*18.8*	*16.9*	*15.2*	*16.5*		*17.2*		*14.9*			
Lane Group LOS		*B*	*B*	*B*	*B*		*B*		*B*			
Approach Delay	*18.1*			*16.3*			*16.7*					
Approach LOS	*B*			*B*			*B*					
Intersection Delay	*17.3*			X_C = *0.46*			Intersection LOS			*B*		

NW 162 Street /NW 107 Avenue

Revised July 2008

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*DPA*
Agency/Co.	
Date Performed	
Analysis Time Period	*Fut w proj Peak Hour*

Site Information

Intersection	*NW 162 St & NW 107 Ave*
Jurisdiction	
Analysis Year	

Project ID *Beacon Countyline DRI - #06257*

East/West Street: *NW 162 St* | North/South Street: *NW 107 Avenue*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*351*	*0*	*5*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*79*	*158*	*2*	*176*	*0*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration			*L*	*R*	*LT*	*R*	*L*	*TR*
PHF			*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Flow Rate (veh/h)			*390*	*5*	*87*	*175*	*2*	195
% Heavy Vehicles			*0*	*0*	*0*	*0*	*0*	*0*
No. Lanes	*0*		*2*		*2*		*2*	
Geometry Group			*1*		*5*		*5*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns			*1.0*	*0.0*	*0.0*	*0.0*	*1.0*	*0.0*
Prop. Right-Turns			*0.0*	*1.0*	*0.0*	*1.0*	*0.0*	*0.0*
Prop. Heavy Vehicle			*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
hLT-adj			*0.2*	*0.2*	*0.5*	*0.5*	*0.5*	*0.5*
hRT-adj			*-0.6*	*-0.6*	*-0.7*	*-0.7*	*-0.7*	*-0.7*
hHV-adj			*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed			*0.2*	*-0.6*	*0.0*	*-0.7*	*0.5*	*0.0*

Departure Headway and Service Time

hd, initial value (s)			*3.20*	*3.20*	*3.20*	*3.20*	*3.20*	*3.20*
x, initial			*0.35*	*0.00*	*0.08*	*0.16*	*0.00*	*0.17*
hd, final value (s)			*5.28*	*4.48*	*5.93*	*5.22*	*6.49*	*5.98*
x, final value			*0.57*	*0.01*	*0.14*	*0.25*	*0.00*	*0.32*
Move-up time, m (s)			*2.0*		*2.3*		*2.3*	
Service Time, t_s (s)			*3.3*	*2.5*	*3.6*	*2.9*	*4.2*	*3.7*

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)			*640*	*255*	*337*	*425*	*252*	*445*
Delay (s/veh)			*15.10*	*7.51*	*9.61*	*9.68*	*9.21*	*11.52*
LOS			*C*	*A*	*A*	*A*	*A*	*B*
Approach: Delay (s/veh)			*15.01*		*9.66*		*11.50*	
LOS			*C*		*A*		*B*	
Intersection Delay (s/veh)	*12.56*							
Intersection LOS	*B*							

NW 162 Street /NW 97 Avenue

Revised July 2008

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 97 Avenue/NW 162 Street*
Agency/Co.		Jurisdiction	
Date Performed	*4/3/2008*	Analysis Year	
Analysis Time Period	*PM Peak*		

Project Description	
East/West Street: *NW 162 Street*	North/South Street: *NW 97 Avenue*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*92*	*221*			*208*	*74*
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*102*	*245*	*0*	*0*	*231*	*82*
Percent Heavy Vehicles	*2*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*2*	*1*
Configuration	*L*	*T*			*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*162*		*203*			
Peak-Hour Factor, PHF	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*	*0.90*
Hourly Flow Rate, HFR (veh/h)	*180*	*0*	*225*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (veh/h)	*102*					*180*		*225*
C (m) (veh/h)	*1244*					*422*		*921*
v/c	*0.08*					*0.43*		*0.24*
95% queue length	*0.27*					*2.09*		*0.96*
Control Delay (s/veh)	*8.2*					*19.7*		*10.2*
LOS	*A*					*C*		*B*
Approach Delay (s/veh)	--	--				*14.4*		
Approach LOS	--	--				*B*		

NW 162 Street /NW 97 Avenue

Revised July 2008

HCS+™ DETAILED REPORT

General Information		Site Information	
Analyst	*DPA*	Intersection	*NW 156 St & NW 97 Ave*
Agency or Co.		Area Type	*All other areas*
Date Performed		Jurisdiction	
Time Period	*Fut w proj Peak Hour*	Analysis Year	
		Project ID	*Beacon Countyline DRI - #06257*

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Number of Lanes, N_1	*1*		*1*				*1*	*2*			*2*	*1*
Lane Group	*L*		*R*				*L*	*T*			*T*	*R*
Volume, V (vph)	*105*		*629*				*285*	*208*			*360*	*51*
% Heavy Vehicles, %HV	*0*		*2*				*2*	*0*			*0*	*0*
Peak-Hour Factor, PHF	*0.90*		*0.90*				*0.90*	*0.90*			*0.90*	*0.90*
Pretimed (P) or Actuated (A)	*A*		*A*				*A*	*A*			*A*	*A*
Start-up Lost Time, l_1	*2.0*		*2.0*				*2.0*	*2.0*			*2.0*	*2.0*
Extension of Effective Green, e	*2.0*		*2.0*				*2.0*	*2.0*			*2.0*	*2.0*
Arrival Type, AT	*3*		*3*				*3*	*3*			*3*	*3*
Unit Extension, UE	*3.0*		*3.0*				*3.0*	*3.0*			*3.0*	*3.0*
Filtering/Metering, I	*1.000*		*1.000*				*1.000*	*1.000*			*1.000*	*1.000*
Initial Unmet Demand, Q_b	*0.0*		*0.0*				*0.0*	*0.0*			*0.0*	*0.0*
Ped / Bike / RTOR Volumes	*0*	*0*	*64*				*0*	*0*		*0*	*0*	*6*
Lane Width	*12.0*		*12.0*				*12.0*	*12.0*			*12.0*	*12.0*
Parking / Grade / Parking	*N*	*0*	*N*				*N*	*0*	*N*	*N*	*0*	*N*
Parking Maneuvers, N_m												
Buses Stopping, N_B	*0*		*0*				*0*	*0*			*0*	*0*
Min. Time for Pedestrians, G_p	*3.2*						*3.2*			*3.2*		

Phasing	EB Only	02	03	04	NS Perm	NB Only	07	08
Timing	G = *27.0*	G =	G =	G =	G = *42.0*	G = *8.0*	G =	G =
	Y = *5*	Y =	Y =	Y =	Y = *5*	Y = *3*	Y =	Y =

Duration of Analysis, T = *0.25* | Cycle Length, C = *90.0*

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Adjusted Flow Rate, v	*117*		*628*				*317*	*231*			*400*	*50*
Lane Group Capacity, c	*542*		*668*				*710*	*2211*			*1688*	*754*
v/c Ratio, X	*0.22*		*0.94*				*0.45*	*0.10*			*0.24*	*0.07*
Total Green Ratio, g/C	*0.30*		*0.42*				*0.64*	*0.61*			*0.47*	*0.47*
Uniform Delay, d_1	*23.6*		*24.9*				*10.3*	*7.3*			*14.4*	*13.2*
Progression Factor, PF	*1.000*		*1.000*				*1.000*	*1.000*			*1.000*	*1.000*
Delay Calibration, k	*0.11*		*0.45*				*0.11*	*0.11*			*0.11*	*0.11*
Incremental Delay, d_2	*0.2*		*21.4*				*0.4*	*0.0*			*0.1*	*0.0*
Initial Queue Delay, d_3	*0.0*		*0.0*				*0.0*	*0.0*			*0.0*	*0.0*
Control Delay	*23.8*		*46.3*				*10.8*	*7.3*			*14.5*	*13.2*
Lane Group LOS	*C*		*D*				*B*	*A*			*B*	*B*
Approach Delay	*42.8*						*9.3*			*14.3*		
Approach LOS	*D*						*A*			*B*		
Intersection Delay	*24.9*			X_C = *0.78*			Intersection LOS			*C*		

Ramp Roadway Analysis

Revised October 2008

Ramp Roadway Analysis

Beacon Countyline DRI

Ramp	# of Lanes	FF Speed	Ramp Capacity (pc/hr) (1)	PHF	Trucks (2)			Capacity (veh/hr) (3)	AM Peak Hour Conditions						PM Peak Hour Conditions					
									Exisiting		Future wo		Future w		Exisiting		Future wo		Future w	
					I-75	HEFT	Avg		V	V/C	V	V/C	V	V/C	V	V/C	V	V/C	V	V/C
HEFT NEB to I-75 NB On-Ramp	2	45	4,100	0.95	5.6%	8.1%	6.9%	3,766	1,410	0.37	1,862	0.49	1,929	0.51	2,542	0.68	3,333	0.89	3,662	0.97
I-75 SB to HEFT SWB Off-Ramp	2	45	4,100	0.95	5.6%	8.1%	6.9%	3,766	3,300	0.88	4,251	1.13	4,542	1.21	1,510	0.40	2,059	0.55	2,207	0.59
HEFT NB to NW 170 St Off Ramp	1	35	2,000	0.95	NA	8.1%	NA	1,826	NA	NA	NA	NA	NA	NA	NA	NA	119	0.07	283	0.16
NW 170 St to HEFT NB On Ramp	1	35	2,000	0.95	NA	8.1%	NA	1,826	NA	NA	NA	NA	NA	NA	NA	NA	126	0.07	612	0.34
HEFT SB to NW 170 St Off Ramp	1	35	2,000	0.95	NA	8.1%	NA	1,826	NA	NA	NA	NA	NA	NA	NA	NA	180	0.10	402	0.22
NW 170 St to HEFT NB On Ramp	1	35	2,000	0.95	NA	8.1%	NA	1,826	NA	NA	NA	NA	NA	NA	NA	NA	122	0.07	455	0.25
NW 138 St EB I-75 On Ramp	1	35	2,000	0.95	5.6%	NA	NA	1,848	1,122	0.61	1,421	0.77	1,578	0.85	964	0.52	1,639	0.89	2,414	1.31
NW 138 St WB I-75 Off Ramp	2	35	3,800	0.95	5.6%	NA	NA	3,512	638	0.18	1,380	0.39	2,055	0.59	763	0.22	1,147	0.33	1,495	0.43
					I-75	**SR 826**	**Avg**													
I75 EB to SR 826 SB Ramp (3)	1	45	2,100	0.95	5.6%	4.7%	5.1%	1,945	2,172	1.12	2,507	1.29	2,563	1.32	1,811	0.93	2,324	1.19	2,599	1.34
Gratigny WB to SR 826 SB Ramp (3)	1	45	2,100	0.95	5.6%	4.7%	5.1%	1,945	614	0.32	698	0.36	698	0.36	920	0.47	1,103	0.57	1,103	0.57
Combined Ramp @ Merge	2	45	4,100	0.95	5.6%	4.7%	5.1%	3,797	2,786	0.73	3,185	0.84	3,241	0.85	2,731	0.72	3,427	0.90	3,702	0.97
SR 826 NB to I 75 WB Ramp	2	45	4,100	0.95	5.6%	4.7%	5.1%	3,797	1,545	0.41	1,881	0.50	2,121	0.56	3,177	0.84	3,635	0.96	3,758	0.99

(1) Ramp Capacity obtained from Exhibit 25-3, Appropriate Capacity of Ramp Roadways, of the Highway Capacity Manual.

(2) Adjustment Factor for Heavy Vehicles: f HV = 1 / (1 + Avg Truck or Expressway Truck Factor (1.5 - 1)) as calculated in equation 21-4 in page 21-7 of the HCM 2000.

(3) Consistent with methdology provided by FTP, the service volume is obatined by muliplying the Ramp Capacity times the peak hour factor, the corresponding truck factor, and a population factor of 1.0.

HEFT NB TO I75 NB DIVERGE

REVISED OCTOBER 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB
Agency or Company		Junction	I-75 NB
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 AM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 70.0 mph S_{FR} = 55.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	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	3951	0.95	Level	6	0	0.971	1.00	4284
Ramp	1410	0.95	Level	6	0	0.971	1.00	1529
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 using Equation (Exhibit 25-12)

V_{12} = 2769 pc/h

V_3 or V_{av34} 1515 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4284	Exhibit 25-14	7200	No
$V_{FO} = V_F - V_R$	2755	Exhibit 25-14	7200	No
V_R	1529	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2769	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = -12.4 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.306 (Exhibit 25-19)

S_R = 61.4 mph (Exhibit 25-19)

S_0 = 74.8 mph (Exhibit 25-19)

S = 65.6 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	HEFT NEB
Junction:	I-75 NB
Jurisdiction:	
Analysis Year:	2007 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3951	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	1410	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	3951	1410		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1040	371		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		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	4284	1529	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2769 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4284	7200	No
$v_{FO} = v - v_F - v_R$	2755	7200	No
v_R	1529	4400	No
v_3 or v_{av34}	1515 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2769	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = -12.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.306	
Space mean speed in ramp influence area,	S_R = 61.4	mph
Space mean speed in outer lanes,	S_0 = 74.8	mph
Space mean speed for all vehicles,	S = 65.6	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB
Agency or Company		Junction	I-75 NB
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 PM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 70.0 mph S_{FR} = 55.0 mph Sketch (show lanes, L_A, L_D,V_R,V_f)	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	5713	0.95	Level	6	0	0.971	1.00	6194
Ramp	2542	0.95	Level	6	0	0.971	1.00	2756
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 using Equation (Exhibit 25-12)

V_{12} = 4303 pc/h

V_3 or V_{av34} 1891 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6194	Exhibit 25-14	7200	No
$V_{FO} = V_F - V_R$	3438	Exhibit 25-14	7200	No
V_R	2756	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4303	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 0.8 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.416 (Exhibit 25-19)

S_R= 58.4 mph (Exhibit 25-19)

S_0= 73.3 mph (Exhibit 25-19)

S = 62.2 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	HEFT NEB
Junction:	I-75 NB
Jurisdiction:	
Analysis Year:	2007 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5713	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	2542	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	5713	2542		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1503	669		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	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	6194	2756	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4303 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6194	7200	No
$v_{FO} = v_F - v_R$	3438	7200	No
v_R	2756	4400	No
v_3 or v_{av34}	1891 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4303	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 0.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.416	
Space mean speed in ramp influence area,	S_R = 58.4	mph
Space mean speed in outer lanes,	S_0 = 73.3	mph
Space mean speed for all vehicles,	S = 62.2	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB
Agency or Company		Junction	I-75 NB
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 AM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft	S_{FF} = 70.0 mph S_{FR} = 55.0 mph	L_{down} = ft
V_u = veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)	V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	6015	0.95	Level	6	0	0.971	1.00	6522
Ramp	1862	0.95	Level	6	0	0.971	1.00	2019
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 using Equation (Exhibit 25-12)

V_{12} = 4045 pc/h

V_3 or V_{av34} 2477 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6522	Exhibit 25-14	7200	No
$V_{FO} = V_F - V_R$	4503	Exhibit 25-14	7200	No
V_R	2019	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4045	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = -1.5 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.350 (Exhibit 25-19)

S_R = 60.2 mph (Exhibit 25-19)

S_0 = 71.0 mph (Exhibit 25-19)

S = 63.9 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	HEFT NEB
Junction:	I-75 NB
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6015	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	1862	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	6015	1862		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1583	490		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		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	6522	2019	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4045 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6522	7200	No
$v_{FO} = v_F - v_R$	4503	7200	No
v_R	2019	4400	No
v_3 or v_{av34}	2477 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4045	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -1.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.350	
Space mean speed in ramp influence area,	S_R = 60.2	mph
Space mean speed in outer lanes,	S_0 = 71.0	mph
Space mean speed for all vehicles,	S = 63.9	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB
Agency or Company		Junction	I-75 NB
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft	S_{FF} = 70.0 mph S_{FR} = 55.0 mph	L_{down} = ft
V_u = veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)	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	8393	0.95	Level	6	0	0.971	1.00	9100
Ramp	3333	0.95	Level	6	0	0.971	1.00	3614
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 using Equation (Exhibit 25-12)

V_{12} = 6083 pc/h

V_3 or V_{av34} 3017 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 6400 pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	9100	Exhibit 25-14	7200	Yes
$V_{FO} = V_F - V_R$	5486	Exhibit 25-14	7200	No
V_R	3614	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	6083	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 18.8 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.493 (Exhibit 25-19)

S_R = 56.2 mph (Exhibit 25-19)

S_0 = 70.2 mph (Exhibit 25-19)

S = 59.7 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	HEFT NEB
Junction:	I-75 NB
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8393	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	3333	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	8393	3333		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2209	877		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	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	9100	3614	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 6083 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v$	9100	7200	Yes
$v_{FO} = v - v_R$	5486	7200	No
v_R	3614	4400	No
$v_{3 \text{ or } av34}$	3017 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 \text{ or } av34}$	> 2700 pc/h?	Yes	
Is $v_{3 \text{ or } av34}$	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 6400 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6400	4600	No !

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_D$ = 18.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.493	
Space mean speed in ramp influence area,	S_R = 56.2	mph
Space mean speed in outer lanes,	S_0 = 70.2	mph
Space mean speed for all vehicles,	S = 59.7	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB
Agency or Company		Junction	I-75 NB
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 AM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 70.0 mph S_{FR} = 55.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	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	6111	0.95	Level	6	0	0.971	1.00	6626
Ramp	1929	0.95	Level	6	0	0.971	1.00	2091
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 using Equation (Exhibit 25-12)

V_{12} = 4132 pc/h

V_3 or V_{av34} 2494 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6626	Exhibit 25-14	7200	No
$V_{FO} = V_F - V_R$	4535	Exhibit 25-14	7200	No
V_R	2091	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4132	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = -0.7 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.356 (Exhibit 25-19)

S_R = 60.0 mph (Exhibit 25-19)

S_0 = 71.0 mph (Exhibit 25-19)

S = 63.7 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	HEFT NEB
Junction:	I-75 NB
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6111	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	1929	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	6111	1929		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1608	508		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		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	6626	2091	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4132 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6626	7200	No
$v_{FO} = v_F - v_R$	4535	7200	No
v_R	2091	4400	No
v_3 or v_{av34}	2494 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4132	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -0.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.356	
Space mean speed in ramp influence area,	S_R = 60.0	mph
Space mean speed in outer lanes,	S_0 = 71.0	mph
Space mean speed for all vehicles,	S = 63.7	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB
Agency or Company		Junction	I-75 NB
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 70.0 mph S_{FR} = 55.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	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	8859	0.95	Level	6	0	0.971	1.00	9605
Ramp	3662	0.95	Level	6	0	0.971	1.00	3970
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 using Equation (Exhibit 25-12)

V_{12} = 6506 pc/h

V_3 or V_{av34} 3099 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 6905 pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	9605	Exhibit 25-14	7200	Yes
$V_{FO} = V_F - V_R$	5635	Exhibit 25-14	7200	No
V_R	3970	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	6506	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 23.1 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.525 (Exhibit 25-19)

S_R = 55.3 mph (Exhibit 25-19)

S_0 = 70.2 mph (Exhibit 25-19)

S = 58.8 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	HEFT NEB
Junction:	I-75 NB
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8859	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	3662	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	8859	3662		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2331	964		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	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	9605	3970	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 6506 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	9605	7200	Yes
$v_{FO} = v_F - v_R$	5635	7200	No
v_R	3970	4400	No
v_3 or v_{av34}	3099 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	No	

If yes, v_{12A} = 6905 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6905	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ = 23.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.525	
Space mean speed in ramp influence area,	S_R = 55.3	mph
Space mean speed in outer lanes,	S_0 = 70.2	mph
Space mean speed for all vehicles,	S = 58.8	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB
Agency or Company		Junction	I-75 NB
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future with Project w Imps	Analysis Year	2018 AM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 70.0 mph S_{FR} = 55.0 mph Sketch (show lanes, L_A, L_D,V_R,V_f)	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	6111	0.95	Level	6	0	0.971	1.00	6626
Ramp	1929	0.95	Level	6	0	0.971	1.00	2091
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 3012 pc/h

V_3 or V_{av34} 1310 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5633	Exhibit 25-14	9600	No
$V_{FO} = V_F - V_R$	3542	Exhibit 25-14	9600	No
V_R	2091	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3012	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$

D_R = -10.3 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.356 (Exhibit 25-19)

S_R= 60.0 mph (Exhibit 25-19)

S_0= 75.6 mph (Exhibit 25-19)

S = 66.4 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future with Project w Imps
Freeway/Dir of Travel:	HEFT NEB
Junction:	I-75 NB
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6111	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	1929	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	6111	1929		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1608	508		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		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	6626	2091	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3012 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5633	9600	No
$v_{FO} = v - v_R$	3542	9600	No
v_R	2091	4400	No
v_3 or v_{av34}	1310 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3012	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = -10.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.356

Space mean speed in ramp influence area, S_R = 60.0 mph

Space mean speed in outer lanes, S_0 = 75.6 mph

Space mean speed for all vehicles, S = 66.4 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB
Agency or Company		Junction	I-75 NB
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future with Project w Imps	Analysis Year	2018 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 70.0 mph S_{FR} = 55.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	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	8859	0.95	Level	6	0	0.971	1.00	9605
Ramp	3662	0.95	Level	6	0	0.971	1.00	3970
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 4936 pc/h

V_3 or V_{av34} 1374 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7684	Exhibit 25-14	9600	No
$V_{FO} = V_F - V_R$	3714	Exhibit 25-14	9600	No
V_R	3970	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4936	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 6.2 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.525 (Exhibit 25-19)

S_R = 55.3 mph (Exhibit 25-19)

S_0 = 75.3 mph (Exhibit 25-19)

S = 61.1 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future with Project w Imps
Freeway/Dir of Travel:	HEFT NEB
Junction:	I-75 NB
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8859	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	3662	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	8859	3662		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2331	964		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		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	9605	3970	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4936 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7684	9600	No
$v_{FO} = v_F - v_R$	3714	9600	No
v_R	3970	4400	No
v_3 or v_{av34}	1374 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4936	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 6.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.525

Space mean speed in ramp influence area, S_R = 55.3 mph

Space mean speed in outer lanes, S_0 = 75.3 mph

Space mean speed for all vehicles, S = 61.1 mph

HEFT NB TO I75 NB MERGE

REVISED OCTOBER 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB TO I-75 NB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 AM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4413	0.95	Level	6	0	0.971	1.00	4785
Ramp	1410	0.95	Level	6	0	0.971	1.00	1529
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.199 using Equation (Exhibit 25-5)

V_{12} = 952 pc/h

V_3 or V_{av34} = 1916 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1914 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6314	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3443	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 26.3 (pc/mi/ln)

LOS = C (Exhibit 25-4)

Speed Determination

M_S = 0.349 (Exibit 25-19)

S_R = 60.2 mph (Exhibit 25-19)

S_0 = 66.6 mph (Exhibit 25-19)

S = 63.0 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} = pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.0009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	HEFT NEB TO I-75 NB
Junction:	
Jurisdiction:	
Analysis Year:	2007 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4413	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	1410	vph
Length of first accel/decel lane	850	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)	4413	1410		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1161	371		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	4785	1529	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.199 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 952 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6314	9600	No
v_3 or v_{av34}	1916 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	Yes	

If yes, v_{12A} = 1914 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1914	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 26.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.349	
Space mean speed in ramp influence area,	S_R = 60.2	mph
Space mean speed in outer lanes,	S_0 = 66.6	mph
Space mean speed for all vehicles,	S = 63.0	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB TO I-75 NB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 PM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	5899	0.95	Level	6	0	0.971	1.00	6396
Ramp	2542	0.95	Level	6	0	0.971	1.00	2756
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.046 using Equation (Exhibit 25-5)

V_{12} = 292 pc/h

V_3 or V_{av34} 3052 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 996 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	9152	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3752	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 28.1 (pc/mi/ln)

LOS = D (Exhibit 25-4)

Speed Determination

M_S = 0.394 (Exibit 25-19)

S_R= 59.0 mph (Exhibit 25-19)

S_0= 61.1 mph (Exhibit 25-19)

S = 60.2 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	HEFT NEB TO I-75 NB
Junction:	
Jurisdiction:	
Analysis Year:	2007 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5899	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	2542	vph
Length of first accel/decel lane	850	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)	5899	2542		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1552	669		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	6396	2756	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.046 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 292 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9152	9600	No
v_3 or v_{av34}	3052 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 996		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	996	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.394	
Space mean speed in ramp influence area,	S_R = 59.0	mph
Space mean speed in outer lanes,	S_0 = 61.1	mph
Space mean speed for all vehicles,	S = 60.2	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB TO I-75 NB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 AM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	5908	0.95	Level	6	0	0.971	1.00	6406
Ramp	1862	0.95	Level	6	0	0.971	1.00	2019
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.138 using Equation (Exhibit 25-5)

V_{12} = 882 pc/h

V_3 or V_{av34} 2762 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1006 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8425	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3025	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 22.8 (pc/mi/ln)

LOS = C (Exhibit 25-4)

Speed Determination

M_S = 0.308 (Exibit 25-19)

S_R= 61.4 mph (Exhibit 25-19)

S_0= 61.1 mph (Exhibit 25-19)

S = 61.2 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	HEFT NEB TO I-75 NB
Junction:	
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5908	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	1862	vph
Length of first accel/decel lane	850	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)	5908	1862		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1555	490		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	6406	2019	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.138 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 882 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8425	9600	No
v_3 or v_{av34}	2762 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1006 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1006	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 22.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.308	
Space mean speed in ramp influence area,	S_R = 61.4	mph
Space mean speed in outer lanes,	S_0 = 61.1	mph
Space mean speed for all vehicles,	S = 61.2	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB TO I-75 NB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	7184	0.95	Level	6	0	0.971	1.00	7789
Ramp	3333	0.95	Level	6	0	0.971	1.00	3614
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = -0.062 using Equation (Exhibit 25-5)

V_{12} = -479 pc/h

V_3 or V_{av34} 4134 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2389 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	11403	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6003	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 45.3 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

M_S = 1.806 (Exibit 25-19)

S_R = 19.4 mph (Exhibit 25-19)

S_0 = 61.1 mph (Exhibit 25-19)

S = 28.7 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	HEFT NEB TO I-75 NB
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7184	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	3333	vph
Length of first accel/decel lane	850	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)	7184	3333		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1891	877		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	7789	3614	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = -0.062 Using Equation 4

$v_{12} = v_F (P_{FM})$ = -479 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	11403	9600	Yes
v_3 or v_{av34}	4134 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A}	= 2389	(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2389	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 45.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 1.806	
Space mean speed in ramp influence area,	S_R = 19.4	mph
Space mean speed in outer lanes,	S_0 = 61.1	mph
Space mean speed for all vehicles,	S = 28.7	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB TO I-75 NB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 AM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5908	0.95	Level	6	0	0.971	0.90	7117
Ramp	1929	0.95	Level	6	0	0.971	1.00	2091
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.129 using Equation (Exhibit 25-5)

V_{12} = 916 pc/h

V_3 or V_{av34} 3100 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1717 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	9208	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3808	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 28.9 (pc/mi/ln)

LOS = D (Exhibit 25-4)

Speed Determination

M_S = 0.403 (Exibit 25-19)

S_R= 58.7 mph (Exhibit 25-19)

S_0= 61.1 mph (Exhibit 25-19)

S = 60.1 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.0009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	HEFT NEB TO I-75 NB
Junction:	
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5908	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	1929	vph
Length of first accel/decel lane	850	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)	5908	1929		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1555	508		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	1.00	
Flow rate, vp	7117	2091	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.129 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 916 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9208	9600	No

$v_{3 \text{ or } av34}$ = 3100 pc/h (Equation 25-4 or 25-5)

Is $v_{3 \text{ or } av34}$ > 2700 pc/h? Yes

Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1717 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1717	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.403	
Space mean speed in ramp influence area,	S_R = 58.7	mph
Space mean speed in outer lanes,	S_0 = 61.1	mph
Space mean speed for all vehicles,	S = 60.1	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB TO I-75 NB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	7184	0.95	Level	6	0	0.971	1.00	7789
Ramp	3662	0.95	Level	6	0	0.971	1.00	3970
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = -0.106 using Equation (Exhibit 25-5)

V_{12} = -826 pc/h

V_3 or V_{av34} = 4307 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2389 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	11759	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6359	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 47.9 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

M_S = 2.480 (Exibit 25-19)

S_R = 0.5 mph (Exhibit 25-19)

S_0 = 61.1 mph (Exhibit 25-19)

S = 1.0 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	HEFT NEB TO I-75 NB
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7184	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	3662	vph
Length of first accel/decel lane	850	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)	7184	3662		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1891	964		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	7789	3970	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = -0.106 Using Equation 4

$v_{12} = v_F (P_{FM})$ = -826 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	11759	9600	Yes
v_3 or v_{av34}	4307 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A}	= 2389	(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2389	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 47.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 2.480	
Space mean speed in ramp influence area,	S_R = 0.5	mph
Space mean speed in outer lanes,	S_0 = 61.1	mph
Space mean speed for all vehicles,	S = 1.0	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB TO I-75 NB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future with Project w PM Imps	Analysis Year	2018 AM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5908	0.95	Level	6	0	0.971	1.00	6406
Ramp	1929	0.95	Level	6	0	0.971	1.00	2091
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.129 using Equation (Exhibit 25-5)

V_{12} = 627 pc/h

V_3 or V_{av34} 2121 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1947 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6960	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4038	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 30.7 (pc/mi/ln)

LOS = D (Exhibit 25-4)

Speed Determination

M_S = 0.449 (Exibit 25-19)

S_R = 57.4 mph (Exhibit 25-19)

S_0 = 66.5 mph (Exhibit 25-19)

S = 60.9 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.0009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future with Project w PM Imps
Freeway/Dir of Travel:	HEFT NEB TO I-75 NB
Junction:	
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5908	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	1929	vph
Length of first accel/decel lane	850	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)	5908	1929		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1555	508		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	6406	2091	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.129 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 627 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6960	9600	No
v_3 or v_{av34}	2121 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 1947		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1947	4400	No

!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 30.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.449
Space mean speed in ramp influence area,	S_R = 57.4 mph
Space mean speed in outer lanes,	S_0 = 66.5 mph
Space mean speed for all vehicles,	S = 60.9 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT NEB TO I-75 NB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future with Project w Imps	Analysis Year	2018 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 70.0 mph S_{FR} = 55.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	7184	0.95	Level	6	0	0.971	1.00	7789
Ramp	3662	0.95	Level	6	0	0.971	1.00	3970
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = -0.106 using Equation (Exhibit 25-5)

V_{12} = -590 pc/h

V_3 or V_{av34} = 3080 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 170 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	9540	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4140	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 30.6 (pc/mi/ln)

LOS = D (Exhibit 25-4)

Speed Determination

M_S = 0.472 (Exibit 25-19)

S_R = 56.8 mph (Exhibit 25-19)

S_0 = 61.1 mph (Exhibit 25-19)

S = 59.1 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.0009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future with Project w Imps
Freeway/Dir of Travel:	HEFT NEB TO I-75 NB
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7184	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	55.0	mph
Volume on ramp	3662	vph
Length of first accel/decel lane	850	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)	7184	3662		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1891	964		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	7789	3970	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = -0.106 Using Equation 4

$v_{12} = v_F (P_{FM})$ = -590 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9540	9600	No
v_3 or v_{av34}	3080 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 170		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	170	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 30.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.472	
Space mean speed in ramp influence area,	S_R = 56.8	mph
Space mean speed in outer lanes,	S_0 = 61.1	mph
Space mean speed for all vehicles,	S = 59.1	mph

I75 SB TO HEFT SWB DIVERGE

REVISED OCTOBER 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I75 SB TO HEFT SWB
Agency or Company		Junction	
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 AM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	11801	0.95	Level	4	0	0.980	1.00	12671
Ramp	3300	0.95	Level	4	0	0.980	1.00	3543
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 5257 pc/h

V_3 or V_{av34} 2440 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	10137	Exhibit 25-14	9600	Yes
$V_{FO} = V_F - V_R$	6594	Exhibit 25-14	9600	No
V_R	3543	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	5257	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 36.0 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.487 (Exhibit 25-19)

S_R = 56.4 mph (Exhibit 25-19)

S_0 = 71.2 mph (Exhibit 25-19)

S = 62.6 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I75 SB TO HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2007 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	11801	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	3300	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	11801	3300		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	3106	868		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	12671	3543	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 5257 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	10137	9600	Yes
$v_{FO} = v_F - v_R$	6594	9600	No
v_R	3543	4400	No
v_3 or v_{av34}	2440 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	5257	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 36.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.487

Space mean speed in ramp influence area, S_R = 56.4 mph

Space mean speed in outer lanes, S_0 = 71.2 mph

Space mean speed for all vehicles, S = 62.6 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I75 SB TO HEFT SWB
Agency or Company		Junction	
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	7039	0.95	Level	4	0	0.980	1.00	7558
Ramp	1510	0.95	Level	4	0	0.980	1.00	1621
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = using Equation (Exhibit 25-5)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)
S_R = mph (Exhibit 25-19)
S_0 = mph (Exhibit 25-19)
S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = 0.260 using Equation (Exhibit 25-12)
V_{12} = 2772 pc/h
V_3 or V_{av34} 1637 pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6047	Exhibit 25-14	9600	No
$V_{FO} = V_F - V_R$	4426	Exhibit 25-14	9600	No
V_R	1621	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2772	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$

D_R = 14.6 (pc/mi/ln)
LOS = B (Exhibit 25-4)

Speed Determination

D_s = 0.314 (Exhibit 25-19)
S_R = 61.2 mph (Exhibit 25-19)
S_0 = 74.3 mph (Exhibit 25-19)
S = 67.7 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I75 SB TO HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2007 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7039	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	1510	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	7039	1510		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1852	397		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7558	1621	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2772 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6047	9600	No
$v_{FO} = v_F - v_R$	4426	9600	No
v_R	1621	4400	No
v_3 or v_{av34}	1637 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2772	4600	No

!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 14.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.314	
Space mean speed in ramp influence area,	S_R = 61.2	mph
Space mean speed in outer lanes,	S_0 = 74.3	mph
Space mean speed for all vehicles,	S = 67.7	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I75 SB TO HEFT SWB
Agency or Company		Junction	
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 AM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	13899	0.95	Level	4	0	0.980	1.00	14923
Ramp	4251	0.95	Level	4	0	0.980	1.00	4564
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 6481 pc/h

V_3 or V_{av34} 2729 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 6539 pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	11939	Exhibit 25-14	9600	Yes
$V_{FO} = V_F - V_R$	7375	Exhibit 25-14	9600	No
V_R	4564	Exhibit 25-3	4400	Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	6481	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 47.0 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.579 (Exhibit 25-19)

S_R = 53.8 mph (Exhibit 25-19)

S_0 = 70.2 mph (Exhibit 25-19)

S = 60.1 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I75 SB TO HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	13899	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	4251	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	13899	4251		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	3658	1119		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	14923	4564	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 6481 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	11939	9600	Yes
$v_{FO} = v_F - v_R$	7375	9600	No
v_R	4564	4400	Yes
$v_{3 \text{ or } av34}$	2729 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 \text{ or } av34}$	> 2700 pc/h?	Yes	
Is $v_{3 \text{ or } av34}$	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 6539 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	6539	4600	No	!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ = 47.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.579	
Space mean speed in ramp influence area,	S_R = 53.8	mph
Space mean speed in outer lanes,	S_0 = 70.2	mph
Space mean speed for all vehicles,	S = 60.1	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I75 SB TO HEFT SWB
Agency or Company		Junction	
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	9412	0.95	Level	4	0	0.980	1.00	10106
Ramp	2059	0.95	Level	4	0	0.980	1.00	2211
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 3738 pc/h

V_3 or V_{av34} 2173 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8085	Exhibit 25-14	9600	No
$V_{FO} = V_F - V_R$	5874	Exhibit 25-14	9600	No
V_R	2211	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3738	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 22.9 (pc/mi/ln)

LOS = C (Exhibit 25-4)

Speed Determination

D_s = 0.367 (Exhibit 25-19)

S_R = 59.7 mph (Exhibit 25-19)

S_0 = 72.2 mph (Exhibit 25-19)

S = 65.8 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I75 SB TO HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	9412	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	2059	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	9412	2059		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2477	542		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	10106	2211	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3738 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8085	9600	No
$v_{FO} = v_F - v_R$	5874	9600	No
v_R	2211	4400	No
v_3 or v_{av34}	2173 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3738	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 22.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.367

Space mean speed in ramp influence area, S_R = 59.7 mph

Space mean speed in outer lanes, S_0 = 72.2 mph

Space mean speed for all vehicles, S = 65.8 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I75 SB TO HEFT SWB
Agency or Company		Junction	
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 AM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	14190	0.95	Level	4	0	0.980	1.00	15236
Ramp	4542	0.95	Level	4	0	0.980	1.00	4877
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 6778 pc/h

V_3 or V_{av34} 2705 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☑ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = 6789 pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	12189	Exhibit 25-14	9600	Yes
$V_{FO} = V_F - V_R$	7312	Exhibit 25-14	9600	No
V_R	4877	Exhibit 25-3	4400	Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	6778	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 49.1 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.607 (Exhibit 25-19)

S_R = 53.0 mph (Exhibit 25-19)

S_0 = 70.2 mph (Exhibit 25-19)

S = 59.4 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I75 SB TO HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	14190	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	4542	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	14190	4542		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	3734	1195		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	15236	4877	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 6778 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	12189	9600	Yes
$v_{FO} = v_F - v_R$	7312	9600	No
v_R	4877	4400	Yes
v_3 or v_{av34}	2705 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	Yes	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = 6789 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6789	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 49.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.607	
Space mean speed in ramp influence area,	S_R = 53.0	mph
Space mean speed in outer lanes,	S_0 = 70.2	mph
Space mean speed for all vehicles,	S = 59.4	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I75 SB TO HEFT SWB
Agency or Company		Junction	
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	9560	0.95	Level	4	0	0.980	1.00	10264
Ramp	2207	0.95	Level	4	0	0.980	1.00	2370
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = using Equation (Exhibit 25-5)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)
S_R = mph (Exhibit 25-19)
S_0 = mph (Exhibit 25-19)
S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = 0.260 using Equation (Exhibit 25-12)
V_{12} = 3889 pc/h
V_3 or V_{av34} 2161 pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	8212	Exhibit 25-14	9600	No
$V_{FO} = V_F - V_R$	5842	Exhibit 25-14	9600	No
V_R	2370	Exhibit 25-3	4400	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3889	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 24.2 (pc/mi/ln)
LOS = C (Exhibit 25-4)

Speed Determination

D_s = 0.381 (Exhibit 25-19)
S_R = 59.3 mph (Exhibit 25-19)
S_0 = 72.3 mph (Exhibit 25-19)
S = 65.5 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I75 SB TO HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	9560	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	55.0	mph
Volume on ramp	2207	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	9560	2207		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2516	581		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	10264	2370	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3889 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8212	9600	No
$v_{FO} = v_F - v_R$	5842	9600	No
v_R	2370	4400	No
v_3 or v_{av34}	2161 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3889	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.381

Space mean speed in ramp influence area, S_R = 59.3 mph

Space mean speed in outer lanes, S_0 = 72.3 mph

Space mean speed for all vehicles, S = 65.5 mph

I75 SB TO HEFT SWB DIVERGE

REVISED JULY 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I-75 SB to HEFT SWB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 AM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	2751	0.95	Level	4	0	0.980	1.00	2954
Ramp	3300	0.95	Level	4	0	0.980	1.00	3543
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 using Equation (Exhibit 25-5)

V_{12} = 1639 pc/h

V_3 or V_{av34} 1315 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1688 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6497	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5231	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 20.2 (pc/mi/ln)

LOS = C (Exhibit 25-4)

Speed Determination

M_S = 0.660 (Exibit 25-19)

S_R= 51.5 mph (Exhibit 25-19)

S_0= 67.2 mph (Exhibit 25-19)

S = 54.0 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I-75 SB to HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2007 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2751	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3300	vph
Length of first accel/decel lane	1200	ft
Length of second accel/decel lane	1500	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)	2751	3300		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	724	868		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2954	3543	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1639 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6497	7200	No
$v_{3 \text{ or } av34}$	1315 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$	> 2700 pc/h?	No	
Is $v_{3 \text{ or } av34}$	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 1688		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1688	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.660	
Space mean speed in ramp influence area,	S_R = 51.5	mph
Space mean speed in outer lanes,	S_0 = 67.2	mph
Space mean speed for all vehicles,	S = 54.0	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I-75 SB to HEFT SWB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 PM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2424	0.95	Level	4	0	0.980	1.00	2603
Ramp	1510	0.95	Level	4	0	0.980	1.00	1621
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 using Equation (Exhibit 25-5)

V_{12} = 1445 pc/h

V_3 or V_{av34} 1158 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1487 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	4224	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3108	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, V_{12} - 0.00627\, L_A$

D_R = 4.5 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

M_S = -0.021 (Exibit 25-19)

S_R= 70.6 mph (Exhibit 25-19)

S_0= 67.8 mph (Exhibit 25-19)

S = 69.8 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\, V_{12} - 0.0009\, L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I-75 SB to HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2007 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2424	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	55.0	mph
Volume on ramp	1510	vph
Length of first accel/decel lane	1200	ft
Length of second accel/decel lane	1500	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)	2424	1510		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	638	397		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2603	1621	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1445 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4224	7200	No
v_3 or v_{av34}	1158 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1487 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1487	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 4.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = -0.021	
Space mean speed in ramp influence area,	S_R = 70.6	mph
Space mean speed in outer lanes,	S_0 = 67.8	mph
Space mean speed for all vehicles,	S = 69.8	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I-75 SB to HEFT SWB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 AM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3405	0.95	Level	4	0	0.980	1.00	3656
Ramp	4251	0.95	Level	4	0	0.980	1.00	4564
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 2029 pc/h
V_3 or V_{av34} 1627 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2089 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8220	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6653	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 30.8 (pc/mi/ln)
LOS = F (Exhibit 25-4)

Speed Determination

M_S = 2.915 (Exibit 25-19)
S_R= -11.6 mph (Exhibit 25-19)
S_0= 66.2 mph (Exhibit 25-19)
S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I-75 SB to HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3405	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	55.0	mph
Volume on ramp	4251	vph
Length of first accel/decel lane	1200	ft
Length of second accel/decel lane	1500	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)	3405	4251		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	896	1119		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3656	4564	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2029 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8220	7200	Yes
v_3 or v_{av34}	1627 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 2089		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2089	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 30.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 2.915	
Space mean speed in ramp influence area,	S_R = -11.6	mph
Space mean speed in outer lanes,	S_0 = 66.2	mph
Space mean speed for all vehicles,	S =	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I-75 SB to HEFT SWB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 PM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	3813	0.95	Level	4	0	0.980	1.00	4094
Ramp	2059	0.95	Level	4	0	0.980	1.00	2211
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 2272 pc/h
V_3 or V_{av34} 1822 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2339 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6305	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4550	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 15.5 (pc/mi/ln)
LOS = B (Exhibit 25-4)

Speed Determination

M_S = 0.261 (Exibit 25-19)
S_R= 62.7 mph (Exhibit 25-19)
S_0= 65.5 mph (Exhibit 25-19)
S = 63.4 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I-75 SB to HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3813	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	55.0	mph
Volume on ramp	2059	vph
Length of first accel/decel lane	1200	ft
Length of second accel/decel lane	1500	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)	3813	2059		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1003	542		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4094	2211	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2272 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6305	7200	No
v_3 or v_{av34}	1822 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2339		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2339	4400	No

!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.261	
Space mean speed in ramp influence area,	S_R = 62.7	mph
Space mean speed in outer lanes,	S_0 = 65.5	mph
Space mean speed for all vehicles,	S = 63.4	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I-75 SB to HEFT SWB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 AM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3405	0.95	Level	4	0	0.980	1.00	3656
Ramp	4542	0.95	Level	4	0	0.980	1.00	4877
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 2029 pc/h
V_3 or V_{av34} 1627 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 2089 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8533	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6966	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 33.1 (pc/mi/ln)
LOS = F (Exhibit 25-4)

Speed Determination

M_S = 4.026 (Exibit 25-19)
S_R = -42.7 mph (Exhibit 25-19)
S_0 = 66.2 mph (Exhibit 25-19)
S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R = mph (Exhibit 25-19)
S_0 = mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I-75 SB to HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3405	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	55.0	mph
Volume on ramp	4542	vph
Length of first accel/decel lane	1200	ft
Length of second accel/decel lane	1500	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)	3405	4542		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	896	1195		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3656	4877	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2029 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8533	7200	Yes
v_3 or v_{av34}	1627 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2089 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2089	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 33.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 4.026	
Space mean speed in ramp influence area,	S_R = -42.7	mph
Space mean speed in outer lanes,	S_0 = 66.2	mph
Space mean speed for all vehicles,	S =	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I-75 SB to HEFT SWB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future with Project w Imps	Analysis Year	2018 AM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3405	0.95	Level	4	0	0.980	1.00	3656
Ramp	4542	0.95	Level	4	0	0.980	1.00	4877
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.209 using Equation (Exhibit 25-5)
V_{12} = 596 pc/h
V_3 or V_{av34} 1128 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 1140 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7729	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6017	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 21.9 (pc/mi/ln)
LOS = C (Exhibit 25-4)

Speed Determination

M_S = 1.471 (Exibit 25-19)
S_R= 28.8 mph (Exhibit 25-19)
S_0= 68.7 mph (Exhibit 25-19)
S = 33.1 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future with Project w Imps
Freeway/Dir of Travel:	I-75 SB to HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2018 AM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3405	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	4542	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	3405	4542		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	896	1195		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3656	4877	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 596 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7729	9600	No
$v_{3 \text{ or } av34}$	1128 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 1140		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	1140	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 1.471	
Space mean speed in ramp influence area,	S_R = 28.8	mph
Space mean speed in outer lanes,	S_0 = 68.7	mph
Space mean speed for all vehicles,	S = 33.1	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I-75 SB TO HEFT SWB
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future with Project w imp	Analysis Year	2018 PM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 70.0 mph S_{FR} = 55.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	3874	0.95	Level	4	0	0.980	1.00	4159
Ramp	2207	0.95	Level	4	0	0.980	1.00	2370
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.209 using Equation (Exhibit 25-5)
V_{12} = 678 pc/h
V_3 or V_{av34} 1283 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 1298 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5615	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3668	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 4.8 (pc/mi/ln)
LOS = A (Exhibit 25-4)

Speed Determination

M_S = -0.021 (Exibit 25-19)
S_R= 70.6 mph (Exhibit 25-19)
S_0= 68.3 mph (Exhibit 25-19)
S = 69.8 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future with Project w imp
Freeway/Dir of Travel:	I-75 SB TO HEFT SWB
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3874	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	55.0	mph
Volume on ramp	2207	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	3874	2207		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1019	581		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4159	2370	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 678 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5615	9600	No
v_3 or v_{av34}	1283 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1298 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1298	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 4.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = -0.021	
Space mean speed in ramp influence area,	S_R = 70.6	mph
Space mean speed in outer lanes,	S_0 = 68.3	mph
Space mean speed for all vehicles,	S = 69.8	mph

HEFT / NW 170 STREET INTERCHANGE

REVISED OCTOBER 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT/NW 170 STREET NB
Agency or Company		Junction	DIVERGE
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future with Project with Imps	Analysis Year	2018 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D,V_R,V_f)	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	8531	0.95	Level	6	0	0.971	1.00	9249
Ramp	283	0.95	Level	6	0	0.971	1.00	307
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 using Equation (Exhibit 25-12)

V_{12} = 3400 pc/h

V_3 or V_{av34} 2000 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7400	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	7093	Exhibit 25-14	9000	No
V_R	307	Exhibit 25-3	2100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3400	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 29.0 (pc/mi/ln)

LOS = D (Exhibit 25-4)

Speed Determination

D_s = 0.391 (Exhibit 25-19)

S_R= 49.9 mph (Exhibit 25-19)

S_0= 56.4 mph (Exhibit 25-19)

S = 53.2 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future with Project with Imps
Freeway/Dir of Travel:	HEFT/NW 170 STREET NB DIVERGE
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	8531	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	40.0	mph
Volume on ramp	283	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)	8531	283		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2245	74		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		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	9249	307	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3400 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7400	9000	No
$v_{FO} = v_F - v_R$	7093	9000	No
v_R	307	2100	No
v_3 or v_{av34}	2000 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3400	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.391

Space mean speed in ramp influence area, S_R = 49.9 mph

Space mean speed in outer lanes, S_0 = 56.4 mph

Space mean speed for all vehicles, S = 53.2 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT/NW 170 STREET SB
Agency or Company		Junction	DIVERGE
Date Performed	9/25/2007	Jurisdiction	
Analysis Time Period	Future with Project with Imps	Analysis Year	2018 PM Peak Hour

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 40.0 mph Sketch (show lanes, L_A, L_D,V_R,V_f)	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	6282	0.95	Level	6	0	0.971	1.00	6811
Ramp	402	0.95	Level	6	0	0.971	1.00	436
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 using Equation (Exhibit 25-12)

V_{12} = 2770 pc/h

V_3 or V_{av34} 1510 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5790	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	5354	Exhibit 25-14	9000	No
V_R	436	Exhibit 25-3	2100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2770	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 23.6 (pc/mi/ln)

LOS = C (Exhibit 25-4)

Speed Determination

D_s = 0.402 (Exhibit 25-19)

S_R= 49.8 mph (Exhibit 25-19)

S_0= 58.3 mph (Exhibit 25-19)

S = 53.9 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/25/2007
Analysis time period:	Future with Project with Imps
Freeway/Dir of Travel:	HEFT/NW 170 STREET SB DIVERGE
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6282	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	40.0	mph
Volume on ramp	402	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)	6282	402		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1653	106		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	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	6811	436	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2770 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5790	9000	No
$v_{FO} = v_F - v_R$	5354	9000	No
v_R	436	2100	No
v_3 or v_{av34}	1510 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2770	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.402	
Space mean speed in ramp influence area,	S_R = 49.8	mph
Space mean speed in outer lanes,	S_0 = 58.3	mph
Space mean speed for all vehicles,	S = 53.9	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT/NW 170 ST NB MERGE
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future with Project w Imps	Analysis Year	2018 PM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	8268	0.95	Level	6	0	0.971	1.00	8964
Ramp	612	0.95	Level	6	0	0.971	1.00	664
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.274 using Equation (Exhibit 25-5)
V_{12} = 1772 pc/h
V_3 or V_{av34} 2346 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2585 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7128	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3249	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 27.4 (pc/mi/ln)
LOS = C (Exhibit 25-4)

Speed Determination

M_S = 0.381 (Exibit 25-19)
S_R= 50.0 mph (Exhibit 25-19)
S_0= 49.8 mph (Exhibit 25-19)
S = 49.9 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future with Project w Imps
Freeway/Dir of Travel:	HEFT/NW 170 ST NB MERGE
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	8268	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	612	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)	8268	612		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2176	161		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	8964	664	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.274 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1772 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7128	9000	No
v_3 or v_{av34}	2346 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 2585		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2585	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.381	
Space mean speed in ramp influence area,	S_R = 50.0	mph
Space mean speed in outer lanes,	S_0 = 49.8	mph
Space mean speed for all vehicles,	S = 49.9	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	HEFT/NW 170 ST SB MERGE
Agency or Company		Junction	
Date Performed	9/27/2007	Jurisdiction	
Analysis Time Period	Future with Project w Imps	Analysis Year	2018 PM Peak Hour

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 40.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	5893	0.95	Level	6	0	0.971	1.00	6389
Ramp	455	0.95	Level	6	0	0.971	1.00	493
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.296 using Equation (Exhibit 25-5)

V_{12} = 1435 pc/h

V_3 or V_{av34} 1710 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1942 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5349	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2435	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 21.1 (pc/mi/ln)

LOS = C (Exhibit 25-4)

Speed Determination

M_S = 0.326 (Exibit 25-19)

S_R= 50.8 mph (Exhibit 25-19)

S_0= 51.6 mph (Exhibit 25-19)

S = 51.2 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	9/27/2007
Analysis time period:	Future with Project w Imps
Freeway/Dir of Travel:	HEFT/NW 170 ST SB MERGE
Junction:	
Jurisdiction:	
Analysis Year:	2018 PM Peak Hour
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5893	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	40.0	mph
Volume on ramp	455	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)	5893	455		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1551	120		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	6389	493	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.296 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1435 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5349	9000	No
v_3 or v_{av34}	1710 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 1942		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1942	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.326	
Space mean speed in ramp influence area,	S_R = 50.8	mph
Space mean speed in outer lanes,	S_0 = 51.6	mph
Space mean speed for all vehicles,	S = 51.2	mph

NW 138 STREET EB TO I 75 EB RAMP MERGE

REVISED OCTOBER 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	NW 138 ST
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	5173	0.95	Level	4	0	0.980	1.00	5554
Ramp	1122	0.95	Level	4	0	0.980	1.00	1205
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.223 using Equation (Exhibit 25-5)
V_{12} = 1240 pc/h
V_3 or V_{av34} 2157 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 2221 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6759	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3426	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 27.3 (pc/mi/ln)
LOS = C (Exhibit 25-4)

Speed Determination

M_S = 0.371 (Exibit 25-19)
S_R = 50.2 mph (Exhibit 25-19)
S_0 = 50.8 mph (Exhibit 25-19)
S = 50.5 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R = mph (Exhibit 25-19)
S_0 = mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I 75 EB
Junction:	NW 138 ST
Jurisdiction:	
Analysis Year:	2007 AM Peak

Description: Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5173	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	50.0	mph
Volume on ramp	1122	vph
Length of first accel/decel lane	700	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)	5173	1122		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1361	295		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5554	1205	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.223 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1240 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6759	9000	No
v_3 or v_{av34}	2157 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2221 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2221	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 27.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.371	
Space mean speed in ramp influence area,	S_R = 50.2	mph
Space mean speed in outer lanes,	S_0 = 50.8	mph
Space mean speed for all vehicles,	S = 50.5	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	NW 138 ST
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft	S_{FF} = 55.0 mph S_{FR} = 50.0 mph	L_{down} = ft
V_u = veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)	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	4089	0.95	Level	4	0	0.980	1.00	4390
Ramp	964	0.95	Level	2	0	0.990	1.00	1025
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.246 using Equation (Exhibit 25-5)

V_{12} = 1079 pc/h

V_3 or V_{av34} = 1655 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 1756 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5415	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	2781	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 22.3 (pc/mi/ln)

LOS = C (Exhibit 25-4)

Speed Determination

M_S = 0.314 (Exibit 25-19)

S_R = 50.9 mph (Exhibit 25-19)

S_0 = 52.1 mph (Exhibit 25-19)

S = 51.5 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I 75 EB
Junction:	NW 138 ST
Jurisdiction:	
Analysis Year:	2007 PM Peak

Description: Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4089	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	50.0	mph
Volume on ramp	964	vph
Length of first accel/decel lane	700	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)	4089	964		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1076	254		v
Trucks and buses	4	2		%
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	0.980	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4390	1025	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.246 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1079 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5415	9000	No
v_3 or v_{av34}	1655 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 1756		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1756	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 22.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.314

Space mean speed in ramp influence area, S_R = 50.9 mph

Space mean speed in outer lanes, S_0 = 52.1 mph

Space mean speed for all vehicles, S = 51.5 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	NW 138 ST
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	5946	0.95	Level	4	0	0.980	1.00	6384
Ramp	1421	0.95	Level	4	0	0.980	1.00	1526
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.183 using Equation (Exhibit 25-5)
V_{12} = 1169 pc/h
V_3 or V_{av34} 2607 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2553 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7910	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4079	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 32.2 (pc/mi/ln)
LOS = D (Exhibit 25-4)

Speed Determination

M_S = 0.481 (Exibit 25-19)
S_R= 48.7 mph (Exhibit 25-19)
S_0= 49.9 mph (Exhibit 25-19)
S = 49.3 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I 75 EB
Junction:	NW 138 ST
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5946	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	50.0	mph
Volume on ramp	1421	vph
Length of first accel/decel lane	700	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)	5946	1421		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1565	374		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6384	1526	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.183 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1169 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7910	9000	No
$v_{3 \text{ or } av34}$	2607 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$	> 2700 pc/h?	No	
Is $v_{3 \text{ or } av34}$	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 2553		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2553	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 32.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.481	
Space mean speed in ramp influence area,	S_R = 48.7	mph
Space mean speed in outer lanes,	S_0 = 49.9	mph
Space mean speed for all vehicles,	S = 49.3	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	NW 138 ST
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5256	0.95	Level	4	0	0.980	1.00	5643
Ramp	1639	0.95	Level	4	0	0.980	1.00	1760
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.154 using Equation (Exhibit 25-5)

V_{12} = 868 pc/h

V_3 or V_{av34} 2387 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2257 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7403	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4017	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 31.6 (pc/mi/ln)

LOS = D (Exhibit 25-4)

Speed Determination

M_S = 0.468 (Exibit 25-19)

S_R= 48.9 mph (Exhibit 25-19)

S_0= 50.7 mph (Exhibit 25-19)

S = 49.7 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I 75 EB
Junction:	NW 138 ST
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5256	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	50.0	mph
Volume on ramp	1639	vph
Length of first accel/decel lane	700	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)	5256	1639		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1383	431		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5643	1760	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.154 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 868 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7403	9000	No
v_3 or v_{av34}	2387 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	Yes	
If yes, v_{12A} = 2257		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2257	4400	No	!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.468	
Space mean speed in ramp influence area,	S_R = 48.9	mph
Space mean speed in outer lanes,	S_0 = 50.7	mph
Space mean speed for all vehicles,	S = 49.7	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	NW 138 ST
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft	S_{FF} = 55.0 mph S_{FR} = 50.0 mph	L_{down} = ft
V_u = veh/h	Sketch (show lanes, L_A, L_D, V_R, V_f)	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	5946	0.95	Level	4	0	0.980	1.00	6384
Ramp	1578	0.95	Level	4	0	0.980	1.00	1694
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.162 using Equation (Exhibit 25-5)

V_{12} = 1035 pc/h

V_3 or V_{av34} = 2674 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2553 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8078	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4247	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 33.4 (pc/mi/ln)

LOS = D (Exhibit 25-4)

Speed Determination

M_S = 0.524 (Exibit 25-19)

S_R = 48.2 mph (Exhibit 25-19)

S_0 = 49.9 mph (Exhibit 25-19)

S = 49.0 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I 75 EB
Junction:	NW 138 ST
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5946	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	50.0	mph
Volume on ramp	1578	vph
Length of first accel/decel lane	700	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)	5946	1578		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1565	415		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6384	1694	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.162 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1035 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8078	9000	No
v_3 or v_{av34}	2674 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2553 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2553	4400	No

!

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 33.4 \text{ pc/mi/ln}$$

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

Speed Estimation

Intermediate speed variable,	M_S = 0.524	
Space mean speed in ramp influence area,	S_R = 48.2	mph
Space mean speed in outer lanes,	S_0 = 49.9	mph
Space mean speed for all vehicles,	S = 49.0	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	NW 138 ST
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5256	0.95	Level	4	0	0.980	1.00	5643
Ramp	2414	0.95	Level	4	0	0.980	1.00	2592
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.050 using Equation (Exhibit 25-5)
V_{12} = 282 pc/h
V_3 or V_{av34} = 2680 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes, V_{12a} = 2257 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8235	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4849	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 37.7 (pc/mi/ln)
LOS = E (Exhibit 25-4)

Speed Determination

M_S = 0.749 (Exibit 25-19)
S_R = 45.3 mph (Exhibit 25-19)
S_0 = 50.7 mph (Exhibit 25-19)
S = 47.4 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} = pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R = mph (Exhibit 25-19)
S_0 = mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I 75 EB
Junction:	NW 138 ST
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5256	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	50.0	mph
Volume on ramp	2414	vph
Length of first accel/decel lane	700	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)	5256	2414		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1383	635		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5643	2592	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.050 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 282 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8235	9000	No
v_3 or v_{av34}	2680 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2257		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2257	4400	No

!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 37.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.749	
Space mean speed in ramp influence area,	S_R = 45.3	mph
Space mean speed in outer lanes,	S_0 = 50.7	mph
Space mean speed for all vehicles,	S = 47.4	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	NW 138 ST
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project w imp	Analysis Year	2018 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	5946	0.95	Level	4	0	0.980	1.00	6384
Ramp	1578	0.95	Level	4	0	0.980	1.00	1694
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.209 using Equation (Exhibit 25-5)
V_{12} = 1334 pc/h
V_3 or V_{av34} 2525 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2553 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8078	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4247	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 25.9 (pc/mi/ln)
LOS = C (Exhibit 25-4)

Speed Determination

M_S = 0.404 (Exibit 25-19)
S_R= 49.8 mph (Exhibit 25-19)
S_0= 49.9 mph (Exhibit 25-19)
S = 49.8 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project w imp
Freeway/Dir of Travel:	I 75 EB
Junction:	NW 138 ST
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5946	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	1578	vph
Length of first accel/decel lane	700	ft
Length of second accel/decel lane	500	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)	5946	1578		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1565	415		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6384	1694	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1334 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8078	9000	No
v_3 or v_{av34}	2525 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2553 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2553	4400	No	!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 25.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.404	
Space mean speed in ramp influence area,	S_R = 49.8	mph
Space mean speed in outer lanes,	S_0 = 49.9	mph
Space mean speed for all vehicles,	S = 49.8	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	NW 138 ST
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project w Imps	Analysis Year	2018 PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5256	0.95	Level	4	0	0.980	1.00	5643
Ramp	2414	0.95	Level	4	0	0.980	1.00	2592
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.209 using Equation (Exhibit 25-5)
V_{12} = 1179 pc/h
V_3 or V_{av34} 2232 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2257 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8235	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4849	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 30.2 (pc/mi/ln)
LOS = D (Exhibit 25-4)

Speed Determination

M_S = 0.629 (Exibit 25-19)
S_R= 46.8 mph (Exhibit 25-19)
S_0= 50.7 mph (Exhibit 25-19)
S = 48.3 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project w Imps
Freeway/Dir of Travel:	I 75 EB
Junction:	NW 138 ST
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5256	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	2414	vph
Length of first accel/decel lane	700	ft
Length of second accel/decel lane	500	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)	5256	2414		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1383	635		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5643	2592	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1179 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8235	9000	No
v_3 or v_{av34}	2232 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2257 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2257	4400	No

!

Level of Service Determination (if not F)

$$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 30.2 \text{ pc/mi/ln}$$

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

Speed Estimation

Intermediate speed variable,	M_S = 0.629	
Space mean speed in ramp influence area,	S_R = 46.8	mph
Space mean speed in outer lanes,	S_0 = 50.7	mph
Space mean speed for all vehicles,	S = 48.3	mph

I 75 WB TO NW 138 STREET WB RAMP DIVERGE

REVISED OCTOBER 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 WB
Agency or Company		Junction	NW 138 STREET
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D,V_R,V_f)	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	4893	0.95	Level	4	0	0.980	1.00	5254
Ramp	638	0.95	Level	4	0	0.980	1.00	685
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 1736 pc/h

V_3 or V_{av34} 1496 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1891 pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4729	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	4044	Exhibit 25-14	9000	No
V_R	685	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	1736	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 7.0 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.295 (Exhibit 25-19)

S_R= 51.2 mph (Exhibit 25-19)

S_0= 58.7 mph (Exhibit 25-19)

S = 55.4 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I 75 WB
Junction:	NW 138 STREET
Jurisdiction:	
Analysis Year:	2007 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4893	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	638	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	4893	638		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1288	168		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5254	685	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1736 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4729	9000	No
$v_{FO} = v_F - v_R$	4044	9000	No
v_R	685	4100	No
v_3 or v_{av34}	1496 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 1891		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	1891	4600	No	!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 7.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.295	
Space mean speed in ramp influence area,	S_R = 51.2	mph
Space mean speed in outer lanes,	S_0 = 58.7	mph
Space mean speed for all vehicles,	S = 55.4	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 WB
Agency or Company		Junction	NW 138 STREET
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D,V_R,V_f)	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	6059	0.95	Level	4	0	0.980	1.00	6505
Ramp	763	0.95	Level	4	0	0.980	1.00	819
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 2044 pc/h

V_3 or V_{av34} 1743 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 2212 pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5530	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	4711	Exhibit 25-14	9000	No
V_R	819	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2044	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 9.8 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.307 (Exhibit 25-19)

S_R= 51.0 mph (Exhibit 25-19)

S_0= 57.8 mph (Exhibit 25-19)

S = 54.9 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I 75 WB
Junction:	NW 138 STREET
Jurisdiction:	
Analysis Year:	2007 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6059	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	763	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	6059	763		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1594	201		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6505	819	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2044 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5530	9000	No
$v_{FO} = v_F - v_R$	4711	9000	No
v_R	819	4100	No
$v_{3 or av34}$	1743 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 or av34}$	> 2700 pc/h?	No	
Is $v_{3 or av34}$	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2212 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2212	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 9.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.307	
Space mean speed in ramp influence area,	S_R = 51.0	mph
Space mean speed in outer lanes,	S_0 = 57.8	mph
Space mean speed for all vehicles,	S = 54.9	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 WB
Agency or Company		Junction	NW 138 STREET
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	6557	0.95	Level	4	0	0.980	1.00	7040
Ramp	1380	0.95	Level	4	0	0.980	1.00	1482
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 2561 pc/h

V_3 or V_{av34} 1535 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5632	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	4150	Exhibit 25-14	9000	No
V_R	1482	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2561	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 12.8 (pc/mi/ln)

LOS = B (Exhibit 25-4)

Speed Determination

D_s = 0.366 (Exhibit 25-19)

S_R = 50.2 mph (Exhibit 25-19)

S_0 = 58.2 mph (Exhibit 25-19)

S = 54.3 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I 75 WB
Junction:	NW 138 STREET
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6557	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	1380	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	6557	1380		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1726	363		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7040	1482	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2561 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5632	9000	No
$v_{FO} = v - v_R$	4150	9000	No
v_R	1482	4100	No
v_3 or v_{av34}	1535 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	

If yes, v_{12A} = (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2561	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 12.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.366

Space mean speed in ramp influence area, S_R = 50.2 mph

Space mean speed in outer lanes, S_0 = 58.2 mph

Space mean speed for all vehicles, S = 54.3 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 WB
Agency or Company		Junction	NW 138 STREET
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future withou Project	Analysis Year	2018 PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft	S_{FF} = 55.0 mph S_{FR} = 50.0 mph	L_{down} = ft
V_u = veh/h	Sketch (show lanes, L_A, L_D,V_R,V_f)	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	7391	0.95	Level	4	0	0.980	1.00	7936
Ramp	1147	0.95	Level	4	0	0.980	1.00	1232
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 2562 pc/h

V_3 or V_{av34} 1893 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6349	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	5117	Exhibit 25-14	9000	No
V_R	1232	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2562	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 12.8 (pc/mi/ln)

LOS = B (Exhibit 25-4)

Speed Determination

D_s = 0.344 (Exhibit 25-19)

S_R= 50.5 mph (Exhibit 25-19)

S_0= 56.9 mph (Exhibit 25-19)

S = 54.1 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I 75 WB
Junction:	NW 138 STREET
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7391	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	1147	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	7391	1147		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1945	302		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7936	1232	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2562 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6349	9000	No
$v_{FO} = v - v_F - v_R$	5117	9000	No
v_R	1232	4100	No
v_3 or v_{av34}	1893 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2562	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 12.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.344	
Space mean speed in ramp influence area,	S_R = 50.5	mph
Space mean speed in outer lanes,	S_0 = 56.9	mph
Space mean speed for all vehicles,	S = 54.1	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 WB
Agency or Company		Junction	NW 138 STREET
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	V_D = veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	7232	0.95	Level	4	0	0.980	1.00	7765
Ramp	2055	0.95	Level	4	0	0.980	1.00	2206
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 3248 pc/h

V_3 or V_{av34} 1482 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6212	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	4006	Exhibit 25-14	9000	No
V_R	2206	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3248	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 18.7 (pc/mi/ln)

LOS = B (Exhibit 25-4)

Speed Determination

D_s = 0.432 (Exhibit 25-19)

S_R = 49.4 mph (Exhibit 25-19)

S_0 = 58.5 mph (Exhibit 25-19)

S = 53.3 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I 75 WB
Junction:	NW 138 STREET
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7232	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	2055	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	7232	2055		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1903	541		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7765	2206	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3248 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6212	9000	No
$v_{FO} = v_F - v_R$	4006	9000	No
v_R	2206	4100	No
v_3 or v_{av34}	1482 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3248	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 18.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.432

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_0 = 58.5 mph

Space mean speed for all vehicles, S = 53.3 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 WB
Agency or Company		Junction	NW 138 STREET
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	7739	0.95	Level	4	0	0.980	1.00	8309
Ramp	1495	0.95	Level	4	0	0.980	1.00	1605
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = using Equation (Exhibit 25-5)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)
S_R = mph (Exhibit 25-19)
S_0 = mph (Exhibit 25-19)
S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = 0.260 using Equation (Exhibit 25-12)
V_{12} = 2916 pc/h
V_3 or V_{av34} 1866 pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6648	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	5043	Exhibit 25-14	9000	No
V_R	1605	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2916	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 15.8 (pc/mi/ln)
LOS = B (Exhibit 25-4)

Speed Determination

D_s = 0.377 (Exhibit 25-19)
S_R = 50.1 mph (Exhibit 25-19)
S_0 = 57.0 mph (Exhibit 25-19)
S = 53.7 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I 75 WB
Junction:	NW 138 STREET
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7739	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	1495	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	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)	7739	1495		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2037	393		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8309	1605	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2916 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6648	9000	No
$v_{FO} = v_F - v_R$	5043	9000	No
v_R	1605	4100	No
v_3 or v_{av34}	1866 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2916	4600	No

!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_{12}$ = 15.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.377	
Space mean speed in ramp influence area,	S_R = 50.1	mph
Space mean speed in outer lanes,	S_0 = 57.0	mph
Space mean speed for all vehicles,	S = 53.7	mph

I 75 EB TO SR 826 SB RAMP DIVERGE

REVISED OCTOBER 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft	S_{FF} = 55.0 mph S_{FR} = 50.0 mph	L_{down} = ft
V_u = veh/h	Sketch (show lanes, L_A, L_D,V_R,V_f)	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	6295	0.95	Level	4	0	0.980	1.00	6759
Ramp	2172	0.95	Level	4	0	0.980	1.00	2332
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 using Equation (Exhibit 25-12)

V_{12} = 3821 pc/h

V_3 or V_{av34} 962 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5746	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	3414	Exhibit 25-14	9000	No
V_R	2332	Exhibit 25-3	2100	Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3821	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 23.6 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.443 (Exhibit 25-19)

S_R= 49.2 mph (Exhibit 25-19)

S_0= 60.3 mph (Exhibit 25-19)

S = 52.5 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2007 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6295	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	2172	vph
Length of first accel/decel lane	1500	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)	6295	2172		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1657	572		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6759	2332	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3821 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5746	9000	No
$v_{FO} = v - v_F - v_R$	3414	9000	No
v_R	2332	2100	Yes
$v_{3 \text{ or } av34}$	962 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}	3821	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.443

Space mean speed in ramp influence area, S_R = 49.2 mph

Space mean speed in outer lanes, S_0 = 60.3 mph

Space mean speed for all vehicles, S = 52.5 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	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	5053	0.95	Level	4	0	0.980	1.00	5425
Ramp	1811	0.95	Level	4	0	0.980	1.00	1944
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 using Equation (Exhibit 25-12)

V_{12} = 3225 pc/h

V_3 or V_{av34} 829 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4883	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	2939	Exhibit 25-14	9000	No
V_R	1944	Exhibit 25-3	2100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3225	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 18.5 (pc/mi/ln)

LOS = B (Exhibit 25-4)

Speed Determination

D_s = 0.408 (Exhibit 25-19)

S_R = 49.7 mph (Exhibit 25-19)

S_0 = 60.3 mph (Exhibit 25-19)

S = 52.9 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2007 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5053	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	1811	vph
Length of first accel/decel lane	1500	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)	5053	1811		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1330	477		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5425	1944	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3225 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4883	9000	No
$v_{FO} = v_F - v_R$	2939	9000	No
v_R	1944	2100	No
v_3 or v_{av34}	829 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?	
v_{12}	3225	4600	No	!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 18.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.408	
Space mean speed in ramp influence area,	S_R = 49.7	mph
Space mean speed in outer lanes,	S_0 = 60.3	mph
Space mean speed for all vehicles,	S = 52.9	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	7493	0.95	Level	4	0	0.980	1.00	8045
Ramp	2507	0.95	Level	4	0	0.980	1.00	2692
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 using Equation (Exhibit 25-12)

V_{12} = 4324 pc/h

V_3 or V_{av34} 1056 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6436	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	3744	Exhibit 25-14	9000	No
V_R	2692	Exhibit 25-3	2100	Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4324	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 27.9 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.475 (Exhibit 25-19)

S_R = 48.8 mph (Exhibit 25-19)

S_0 = 60.1 mph (Exhibit 25-19)

S = 52.0 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7493	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	2507	vph
Length of first accel/decel lane	1500	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)	7493	2507		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1972	660		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8045	2692	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4324 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6436	9000	No
$v_{FO} = v_F - v_R$	3744	9000	No
v_R	2692	2100	Yes
v_3 or v_{av34}	1056 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4324	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.475

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_0 = 60.1 mph

Space mean speed for all vehicles, S = 52.0 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	6895	0.95	Level	4	0	0.980	1.00	7403
Ramp	2324	0.95	Level	4	0	0.980	1.00	2495
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 using Equation (Exhibit 25-12)

V_{12} = 3990 pc/h

V_3 or V_{av34} 966 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5923	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	3428	Exhibit 25-14	9000	No
V_R	2495	Exhibit 25-3	2100	Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3990	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 25.1 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.458 (Exhibit 25-19)

S_R = 49.1 mph (Exhibit 25-19)

S_0 = 60.3 mph (Exhibit 25-19)

S = 52.2 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6895	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	2324	vph
Length of first accel/decel lane	1500	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)	6895	2324		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1814	612		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7403	2495	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3990 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5923	9000	No
$v_{FO} = v_F - v_R$	3428	9000	No
v_R	2495	2100	Yes
v_3 or v_{av34}	966 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3990	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.458

Space mean speed in ramp influence area, S_R = 49.1 mph

Space mean speed in outer lanes, S_0 = 60.3 mph

Space mean speed for all vehicles, S = 52.2 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	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	7650	0.95	Level	4	0	0.980	1.00	8214
Ramp	2563	0.95	Level	4	0	0.980	1.00	2752
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 using Equation (Exhibit 25-12)

V_{12} = 4418 pc/h

V_3 or V_{av34} 1077 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6572	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	3820	Exhibit 25-14	9000	No
V_R	2752	Exhibit 25-3	2100	Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4418	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 28.7 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.481 (Exhibit 25-19)

S_R = 48.8 mph (Exhibit 25-19)

S_0 = 60.0 mph (Exhibit 25-19)

S = 52.0 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7650	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	2563	vph
Length of first accel/decel lane	1500	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)	7650	2563		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2013	674		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8214	2752	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v - v_F) P_{FD}$ = 4418 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6572	9000	No
$v_{FO} = v - v_F - v_R$	3820	9000	No
v_R	2752	2100	Yes
v_3 or v_{av34}	1077 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4418	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 28.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.481

Space mean speed in ramp influence area, S_R = 48.8 mph

Space mean speed in outer lanes, S_0 = 60.0 mph

Space mean speed for all vehicles, S = 52.0 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	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	7670	0.95	Level	4	0	0.980	1.00	8235
Ramp	2599	0.95	Level	4	0	0.980	1.00	2791
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 using Equation (Exhibit 25-12)

V_{12} = 4446 pc/h

V_3 or V_{av34} 1071 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6588	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	3797	Exhibit 25-14	9000	No
V_R	2791	Exhibit 25-3	2100	Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4446	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$

D_R = 29.0 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.484 (Exhibit 25-19)

S_R = 48.7 mph (Exhibit 25-19)

S_0 = 60.1 mph (Exhibit 25-19)

S = 51.9 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7670	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	2599	vph
Length of first accel/decel lane	1500	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)	7670	2599		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2018	684		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8235	2791	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v - v_F) P_{FD}$ = 4446 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6588	9000	No
$v_{FO} = v - v_R$	3797	9000	No
v_R	2791	2100	Yes
v_3 or v_{av34}	1071 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4446	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 29.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.484

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_0 = 60.1 mph

Space mean speed for all vehicles, S = 51.9 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project w imp	Analysis Year	2018 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	7650	0.95	Level	4	0	0.980	1.00	8214
Ramp	2563	0.95	Level	4	0	0.980	1.00	2752
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = using Equation (Exhibit 25-5)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = 0.260 using Equation (Exhibit 25-12)
V_{12} = 3745 pc/h
V_3 or V_{av34} 1413 pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6572	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	3820	Exhibit 25-14	9000	No
V_R	2752	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3745	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 5.0 (pc/mi/ln)
LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.481 (Exhibit 25-19)
S_R= 48.8 mph (Exhibit 25-19)
S_0= 58.7 mph (Exhibit 25-19)
S = 52.6 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project w imp
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7650	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	2563	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	500	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)	7650	2563		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2013	674		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8214	2752	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3745 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6572	9000	No
$v_{FO} = v_F - v_R$	3820	9000	No
v_R	2752	4100	No
v_3 or v_{av34}	1413 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3745	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 5.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.481	
Space mean speed in ramp influence area,	S_R = 48.8	mph
Space mean speed in outer lanes,	S_0 = 58.7	mph
Space mean speed for all vehicles,	S = 52.6	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project w imp	Analysis Year	2018 PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	7670	0.95	Level	4	0	0.980	1.00	8235
Ramp	2599	0.95	Level	4	0	0.980	1.00	2791
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = using Equation (Exhibit 25-5)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = 0.260 using Equation (Exhibit 25-12)
V_{12} = 3778 pc/h
V_3 or V_{av34} 1405 pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	6588	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	3797	Exhibit 25-14	9000	No
V_R	2791	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3778	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 5.2 (pc/mi/ln)
LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.484 (Exhibit 25-19)
S_R= 48.7 mph (Exhibit 25-19)
S_0= 58.8 mph (Exhibit 25-19)
S = 52.5 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project w imp
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7670	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	2599	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	500	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)	7670	2599		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2018	684		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8235	2791	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3778 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6588	9000	No
$v_{FO} = v_F - v_R$	3797	9000	No
v_R	2791	4100	No
v_3 or v_{av34}	1405 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3778	4600	No

!

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 5.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.484

Space mean speed in ramp influence area, S_R = 48.7 mph

Space mean speed in outer lanes, S_0 = 58.8 mph

Space mean speed for all vehicles, S = 52.5 mph

I 75 EB TO SR 826 SB RAMP MERGE

REVISED OCTOBER 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	2983	0.95	Level	4	0	0.980	1.00	3203
Ramp	2786	0.95	Level	4	0	0.980	1.00	2991
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 1778 pc/h
V_3 or V_{av34} 1425 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 1830 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6194	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4821	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 13.5 (pc/mi/ln)
LOS = B (Exhibit 25-4)

Speed Determination

M_S = 0.355 (Exibit 25-19)
S_R= 50.4 mph (Exhibit 25-19)
S_0= 51.9 mph (Exhibit 25-19)
S = 50.7 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2007 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2983	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	2786	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	2983	2786		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	785	733		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3203	2991	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1778 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6194	6750	No
v_3 or v_{av34}	1425 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1830 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1830	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.355	
Space mean speed in ramp influence area,	S_R = 50.4	mph
Space mean speed in outer lanes,	S_0 = 51.9	mph
Space mean speed for all vehicles,	S = 50.7	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4300	0.95	Level	4	0	0.980	1.00	4617
Ramp	2731	0.95	Level	4	0	0.980	1.00	2932
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 2562 pc/h
V_3 or V_{av34} 2055 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2638 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7549	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5570	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 19.4 (pc/mi/ln)
LOS = F (Exhibit 25-4)

Speed Determination

M_S = 0.894 (Exibit 25-19)
S_R= 43.4 mph (Exhibit 25-19)
S_0= 49.7 mph (Exhibit 25-19)
S = 44.9 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2007PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4300	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	2731	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	4300	2731		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1132	719		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4617	2932	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2562 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7549	6750	Yes
v_3 or v_{av34}	2055 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 $v_{12}/2$	Yes	
If yes, v_{12A}	= 2638	(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2638	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.894	
Space mean speed in ramp influence area,	S_R = 43.4	mph
Space mean speed in outer lanes,	S_0 = 49.7	mph
Space mean speed for all vehicles,	S = 44.9	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	3989	0.95	Level	4	0	0.980	1.00	4283
Ramp	3185	0.95	Level	4	0	0.980	1.00	3420
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 2377 pc/h
V_3 or V_{av34} 1906 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2447 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7703	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5867	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 21.4 (pc/mi/ln)
LOS = F (Exhibit 25-4)

Speed Determination

M_S = 1.248 (Exibit 25-19)
S_R= 38.8 mph (Exhibit 25-19)
S_0= 50.2 mph (Exhibit 25-19)
S = 41.0 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3989	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3185	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	3989	3185		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1050	838		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4283	3420	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2377 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7703	6750	Yes
v_3 or v_{av34}	1906 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 2447		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2447	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 1.248	
Space mean speed in ramp influence area,	S_R = 38.8	mph
Space mean speed in outer lanes,	S_0 = 50.2	mph
Space mean speed for all vehicles,	S = 41.0	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5025	0.95	Level	4	0	0.980	1.00	5395
Ramp	3427	0.95	Level	4	0	0.980	1.00	3680
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 2994 pc/h
V_3 or V_{av34} 2401 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 3082 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	9075	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6762	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 28.3 (pc/mi/ln)
LOS = F (Exhibit 25-4)

Speed Determination

M_S = 3.242 (Exibit 25-19)
S_R= 12.9 mph (Exhibit 25-19)
S_0= 48.4 mph (Exhibit 25-19)
S = 15.8 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5025	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3427	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	5025	3427		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1322	902		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5395	3680	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2994 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9075	6750	Yes

$v_{3 \text{ or } av34}$ = 2401 pc/h (Equation 25-4 or 25-5)

Is $v_{3 \text{ or } av34}$ > 2700 pc/h? No

Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 3082 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3082	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 28.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 3.242	
Space mean speed in ramp influence area,	S_R = 12.9	mph
Space mean speed in outer lanes,	S_0 = 48.4	mph
Space mean speed for all vehicles,	S = 15.8	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	3989	0.95	Level	4	0	0.980	1.00	4283
Ramp	3241	0.95	Level	4	0	0.980	1.00	3480
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 2377 pc/h
V_3 or V_{av34} 1906 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2447 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7763	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5927	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 21.9 (pc/mi/ln)
LOS = F (Exhibit 25-4)

Speed Determination

M_S = 1.334 (Exibit 25-19)
S_R= 37.7 mph (Exhibit 25-19)
S_0= 50.2 mph (Exhibit 25-19)
S = 40.0 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3989	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3241	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	3989	3241		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1050	853		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4283	3480	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2377 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7763	6750	Yes
v_3 or v_{av34}	1906 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2447		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2447	4400	No	!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 1.334	
Space mean speed in ramp influence area,	S_R = 37.7	mph
Space mean speed in outer lanes,	S_0 = 50.2	mph
Space mean speed for all vehicles,	S = 40.0	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	5025	0.95	Level	4	0	0.980	1.00	5395
Ramp	3702	0.95	Level	4	0	0.980	1.00	3975
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 using Equation (Exhibit 25-5)

V_{12} = 2994 pc/h

V_3 or V_{av34} 2401 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 3082 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	9370	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	7057	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 30.5 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

M_S = 4.399 (Exibit 25-19)

S_R= -2.2 mph (Exhibit 25-19)

S_0= 48.4 mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5025	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3702	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	5025	3702		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1322	974		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5395	3975	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2994 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	9370	6750	Yes
v_3 or v_{av34}	2401 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 3082		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	3082	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 30.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 4.399	
Space mean speed in ramp influence area,	S_R = -2.2	mph
Space mean speed in outer lanes,	S_0 = 48.4	mph
Space mean speed for all vehicles,	S =	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project w PM Imps	Analysis Year	2018 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	3989	0.95	Level	4	0	0.980	1.00	4283
Ramp	3241	0.95	Level	4	0	0.980	1.00	3480
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.209 using Equation (Exhibit 25-5)
V_{12} = 698 pc/h
V_3 or V_{av34} 1321 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 1336 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6821	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4816	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 13.2 (pc/mi/ln)
LOS = B (Exhibit 25-4)

Speed Determination

M_S = 0.353 (Exibit 25-19)
S_R= 50.4 mph (Exhibit 25-19)
S_0= 53.2 mph (Exhibit 25-19)
S = 51.2 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project w PM Imps
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3989	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3241	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	3989	3241		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1050	853		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4283	3480	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 698 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6821	9000	No
v_3 or v_{av34}	1321 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1336 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1336	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.353	
Space mean speed in ramp influence area,	S_R = 50.4	mph
Space mean speed in outer lanes,	S_0 = 53.2	mph
Space mean speed for all vehicles,	S = 51.2	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	I 75 EB
Agency or Company		Junction	SR 826 SB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project w Imps	Analysis Year	2018 PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D,V_R,V_f)	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	5025	0.95	Level	4	0	0.980	1.00	5395
Ramp	3702	0.95	Level	4	0	0.980	1.00	3975
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 using Equation (Exhibit 25-5)

V_{12} = 880 pc/h

V_3 or V_{av34} 1664 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes,V_{12a} = 1683 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8184	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5658	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 19.6 (pc/mi/ln)

LOS = B (Exhibit 25-4)

Speed Determination

M_S = 0.989 (Exibit 25-19)

S_R= 42.1 mph (Exhibit 25-19)

S_0= 52.3 mph (Exhibit 25-19)

S = 44.8 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project w Imps
Freeway/Dir of Travel:	I 75 EB
Junction:	SR 826 SB
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5025	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3702	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	5025	3702		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1322	974		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5395	3975	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 880 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8184	9000	No
v_3 or v_{av34}	1664 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 1683 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1683	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.989	
Space mean speed in ramp influence area,	S_R = 42.1	mph
Space mean speed in outer lanes,	S_0 = 52.3	mph
Space mean speed for all vehicles,	S = 44.8	mph

SR 826 NB TO I 75 WB RAMP DIVERGE

REVISED OCTOBER 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	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	4919	0.95	Level	4	0	0.980	1.00	5281
Ramp	1545	0.95	Level	4	0	0.980	1.00	1659
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 2463 pc/h

V_3 or V_{av34} 1145 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	4753	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	3094	Exhibit 25-14	9000	No
V_R	1659	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2463	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = -7.0 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.382 (Exhibit 25-19)

S_R = 50.0 mph (Exhibit 25-19)

S_0 = 59.8 mph (Exhibit 25-19)

S = 54.3 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2007 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4919	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	1545	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	600	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)	4919	1545		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1294	407		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5281	1659	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2463 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4753	9000	No
$v_{FO} = v - v_R$	3094	9000	No
v_R	1659	4100	No
v_3 or v_{av34}	1145 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2463	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = -7.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.382	
Space mean speed in ramp influence area,	S_R = 50.0	mph
Space mean speed in outer lanes,	S_0 = 59.8	mph
Space mean speed for all vehicles,	S = 54.3	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	9040	0.95	Level	4	0	0.980	1.00	9706
Ramp	3177	0.95	Level	4	0	0.980	1.00	3411
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 4543 pc/h

V_3 or V_{av34} 1611 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	7765	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	4354	Exhibit 25-14	9000	No
V_R	3411	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	4543	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 10.9 (pc/mi/ln)

LOS = B (Exhibit 25-4)

Speed Determination

D_s = 0.540 (Exhibit 25-19)

S_R = 48.0 mph (Exhibit 25-19)

S_0 = 58.0 mph (Exhibit 25-19)

S = 51.7 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2007 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	9040	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	3177	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	600	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)	9040	3177		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2379	836		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9706	3411	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4543 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7765	9000	No
$v_{FO} = v_F - v_R$	4354	9000	No
v_R	3411	4100	No
$v_{3 \text{ or } av34}$	1611 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}	4543	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ = 10.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.540

Space mean speed in ramp influence area, S_R = 48.0 mph

Space mean speed in outer lanes, S_0 = 58.0 mph

Space mean speed for all vehicles, S = 51.7 mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f)	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	5849	0.95	Level	4	0	0.980	1.00	6280
Ramp	1881	0.95	Level	4	0	0.980	1.00	2020
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 2883 pc/h

V_3 or V_{av34} 1227 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5338	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	3318	Exhibit 25-14	9000	No
V_R	2020	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	2883	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = -3.4 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.415 (Exhibit 25-19)

S_R = 49.6 mph (Exhibit 25-19)

S_0 = 59.4 mph (Exhibit 25-19)

S = 53.7 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5849	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	1881	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	600	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)	5849		1881			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1539		495			v
Trucks and buses	4		4			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6280	2020	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2883 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5338	9000	No
$v_{FO} = v_F - v_R$	3318	9000	No
v_R	2020	4100	No
v_3 or v_{av34}	1227 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2883	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -3.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.415	
Space mean speed in ramp influence area,	S_R = 49.6	mph
Space mean speed in outer lanes,	S_0 = 59.4	mph
Space mean speed for all vehicles,	S = 53.7	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2018 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D,V_R,V_f)	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	10531	0.95	Level	4	0	0.980	1.00	11307
Ramp	3635	0.95	Level	4	0	0.980	1.00	3903
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 5240 pc/h

V_3 or V_{av34} 1903 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	9046	Exhibit 25-14	9000	Yes
$V_{FO} = V_F - V_R$	5143	Exhibit 25-14	9000	No
V_R	3903	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	5240	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 16.9 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.584 (Exhibit 25-19)

S_R= 47.4 mph (Exhibit 25-19)

S_0= 56.8 mph (Exhibit 25-19)

S = 51.0 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	10531	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	3635	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	600	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)	10531	3635		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2771	957		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	11307	3903	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 5240 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	9046	9000	Yes
$v_{FO} = v_F - v_R$	5143	9000	No
v_R	3903	4100	No
v_3 or v_{av34}	1903 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	5240	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 16.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.584	
Space mean speed in ramp influence area,	S_R = 47.4	mph
Space mean speed in outer lanes,	S_0 = 56.8	mph
Space mean speed for all vehicles,	S = 51.0	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp	Terrain: Level	Downstream Adj Ramp
☐ Yes ☐ On		☐ Yes ☐ On
☑ No ☐ Off		☑ No ☐ Off
L_{up} = ft		L_{down} = ft
V_u = veh/h	S_{FF} = 55.0 mph S_{FR} = 50.0 mph Sketch (show lanes, L_A, L_D,V_R,V_f)	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	6089	0.95	Level	4	0	0.980	1.00	6538
Ramp	2121	0.95	Level	4	0	0.980	1.00	2277
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes,V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R= mph (Exhibit 25-19)

S_0= mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 3130 pc/h

V_3 or V_{av34} 1214 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	5558	Exhibit 25-14	9000	No
$V_{FO} = V_F - V_R$	3281	Exhibit 25-14	9000	No
V_R	2277	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	3130	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = -1.2 (pc/mi/ln)

LOS = A (Exhibit 25-4)

Speed Determination

D_s = 0.438 (Exhibit 25-19)

S_R= 49.3 mph (Exhibit 25-19)

S_0= 59.5 mph (Exhibit 25-19)

S = 53.3 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6089	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	2121	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	600	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)	6089	2121		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1602	558		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6538	2277	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3130 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5558	9000	No
$v_{FO} = v_F - v_R$	3281	9000	No
v_R	2277	4100	No
v_3 or v_{av34}	1214 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3130	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -1.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.438	
Space mean speed in ramp influence area,	S_R = 49.3	mph
Space mean speed in outer lanes,	S_0 = 59.5	mph
Space mean speed for all vehicles,	S = 53.3	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2018 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	10654	0.95	Level	4	0	0.980	1.00	11439
Ramp	3758	0.95	Level	4	0	0.980	1.00	4035
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = using Equation (Exhibit 25-5)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}		Exhibit 25-7		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}		Exhibit 25-7		

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 25-4)

Speed Determination

M_S = (Exibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 using Equation (Exhibit 25-12)

V_{12} = 5365 pc/h

V_3 or V_{av34} 1893 pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☑ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F	9152	Exhibit 25-14	9000	Yes
$V_{FO} = V_F - V_R$	5117	Exhibit 25-14	9000	No
V_R	4035	Exhibit 25-3	4100	No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}	5365	Exhibit 25-14	4400:All	No

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = 18.0 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

D_s = 0.596 (Exhibit 25-19)

S_R = 47.3 mph (Exhibit 25-19)

S_0 = 56.9 mph (Exhibit 25-19)

S = 50.8 mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2018 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	55.0	mph
Volume on freeway	10654	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	50.0	mph
Volume on ramp	3758	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	600	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)	10654	3758		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2804	989		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	11439	4035	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 5365 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	9152	9000	Yes
$v_{FO} = v_F - v_R$	5117	9000	No
v_R	4035	4100	No
v_3 or v_{av34}	1893 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	5365	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 18.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.596	
Space mean speed in ramp influence area,	S_R = 47.3	mph
Space mean speed in outer lanes,	S_0 = 56.9	mph
Space mean speed for all vehicles,	S = 50.8	mph

SR 826 NB TO I 75 WB RAMP MERGE

REVISED OCTOBER 2008

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3348	0.95	Level	4	0	0.980	1.00	3595
Ramp	1545	0.95	Level	4	0	0.980	1.00	1659
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 1995 pc/h
V_3 or V_{av34} 1600 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2054 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	5254	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	3713	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 5.5 (pc/mi/ln)
LOS = A (Exhibit 25-4)

Speed Determination

M_S = 0.031 (Exibit 25-19)
S_R= 54.6 mph (Exhibit 25-19)
S_0= 51.3 mph (Exhibit 25-19)
S = 53.6 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2007 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3348	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	1545	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	3348	1545		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	881	407		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3595	1659	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1995 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5254	6750	No
v_3 or v_{av34}	1600 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 2054		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2054	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 5.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.031	
Space mean speed in ramp influence area,	S_R = 54.6	mph
Space mean speed in outer lanes,	S_0 = 51.3	mph
Space mean speed for all vehicles,	S = 53.6	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Existing	Analysis Year	2007 PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	2882	0.95	Level	4	0	0.980	1.00	3094
Ramp	3177	0.95	Level	4	0	0.980	1.00	3411
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 1717 pc/h
V_3 or V_{av34} 1377 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 1768 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6505	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5179	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 16.1 (pc/mi/ln)
LOS = B (Exhibit 25-4)

Speed Determination

M_S = 0.563 (Exibit 25-19)
S_R= 47.7 mph (Exhibit 25-19)
S_0= 52.0 mph (Exhibit 25-19)
S = 48.5 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Existing
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2007 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2882	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3177	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	2882	3177		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	758	836		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3094	3411	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1717 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6505	6750	No
v_3 or v_{av34}	1377 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 1768		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	1768	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.563	
Space mean speed in ramp influence area,	S_R = 47.7	mph
Space mean speed in outer lanes,	S_0 = 52.0	mph
Space mean speed for all vehicles,	S = 48.5	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2007 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	4633	0.95	Level	4	0	0.980	1.00	4974
Ramp	1881	0.95	Level	4	0	0.980	1.00	2020
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.555 using Equation (Exhibit 25-5)
V_{12} = 2761 pc/h
V_3 or V_{av34} 2213 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2842 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	6994	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4862	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 14.3 (pc/mi/ln)
LOS = F (Exhibit 25-4)

Speed Determination

M_S = 0.375 (Exibit 25-19)
S_R= 50.1 mph (Exhibit 25-19)
S_0= 49.1 mph (Exhibit 25-19)
S = 49.8 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2007 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4633	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	1881	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	4633	1881		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1219	495		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4974	2020	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2761 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6994	6750	Yes
v_3 or v_{av34}	2213 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	

If yes, v_{12A} = 2842 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2842	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 14.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.375	
Space mean speed in ramp influence area,	S_R = 50.1	mph
Space mean speed in outer lanes,	S_0 = 49.1	mph
Space mean speed for all vehicles,	S = 49.8	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future without Project	Analysis Year	2007 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	3668	0.95	Level	4	0	0.980	1.00	3938
Ramp	3635	0.95	Level	4	0	0.980	1.00	3903
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 using Equation (Exhibit 25-5)

V_{12} = 2186 pc/h

V_3 or V_{av34} 1752 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2250 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7841	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6153	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 23.5 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

M_S = 1.704 (Exibit 25-19)

S_R = 32.8 mph (Exhibit 25-19)

S_0 = 50.7 mph (Exhibit 25-19)

S = 35.5 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future without Project
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2007 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3668	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3635	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	3668	3635		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	965	957		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3938	3903	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2186 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7841	6750	Yes
v_3 or v_{av34}	1752 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 2250		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	2250	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 23.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 1.704	
Space mean speed in ramp influence area,	S_R = 32.8	mph
Space mean speed in outer lanes,	S_0 = 50.7	mph
Space mean speed for all vehicles,	S = 35.5	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2007 AM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5068	0.95	Level	4	0	0.980	1.00	5441
Ramp	2121	0.95	Level	4	0	0.980	1.00	2277
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 using Equation (Exhibit 25-5)

V_{12} = 3020 pc/h

V_3 or V_{av34} 2421 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 3109 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7718	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5386	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 18.2 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

M_S = 0.722 (Exibit 25-19)

S_R = 45.6 mph (Exhibit 25-19)

S_0 = 48.3 mph (Exhibit 25-19)

S = 46.4 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2007 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5068	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	2121	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	5068	2121		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1334	558		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5441	2277	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3020 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7718	6750	Yes
v_3 or v_{av34}	2421 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 3109		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	3109	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.722	
Space mean speed in ramp influence area,	S_R = 45.6	mph
Space mean speed in outer lanes,	S_0 = 48.3	mph
Space mean speed for all vehicles,	S = 46.4	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project	Analysis Year	2007 PM Peak

Project Description: Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ Off

L_{up} = ft

V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D, V_R, V_f)

Downstream Adj Ramp: ☐ Yes ☐ On ☑ No ☐ 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	3893	0.95	Level	4	0	0.980	1.00	4180
Ramp	3758	0.95	Level	4	0	0.980	1.00	4035
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 using Equation (Exhibit 25-5)

V_{12} = 2320 pc/h

V_3 or V_{av34} 1860 pc/h (Equation 25-4 or 25-5)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No

If Yes, V_{12a} = 2388 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8215	Exhibit 25-7		Yes

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	6423	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 25.5 (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Determination

M_S = 2.273 (Exibit 25-19)

S_R = 25.5 mph (Exhibit 25-19)

S_0 = 50.3 mph (Exhibit 25-19)

S = 28.5 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = using Equation (Exhibit 25-12)

V_{12} = pc/h

V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)

Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No

Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No

If Yes, V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)

LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)

S_R = mph (Exhibit 25-19)

S_0 = mph (Exhibit 25-19)

S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2007 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3893	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3758	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	3893	3758		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1024	989		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4180	4035	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2320 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8215	6750	Yes
$v_{3 \text{ or } av34}$	1860 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$	> 2700 pc/h?	No	
Is $v_{3 \text{ or } av34}$	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 2388		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2388	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 2.273	
Space mean speed in ramp influence area,	S_R = 25.5	mph
Space mean speed in outer lanes,	S_0 = 50.3	mph
Space mean speed for all vehicles,	S = 28.5	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project w Imps	Analysis Year	2018 AM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	5068	0.95	Level	4	0	0.980	1.00	5441
Ramp	2121	0.95	Level	4	0	0.980	1.00	2277
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.209 using Equation (Exhibit 25-5)
V_{12} = 1137 pc/h
V_3 or V_{av34} 2152 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 2176 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	7718	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	4453	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 10.9 (pc/mi/ln)
LOS = B (Exhibit 25-4)

Speed Determination

M_S = 0.206 (Exibit 25-19)
S_R= 52.3 mph (Exhibit 25-19)
S_0= 50.9 mph (Exhibit 25-19)
S = 51.7 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project w Imps
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2018 AM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5068	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	2121	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	5068	2121		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1334	558		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5441	2277	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1137 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7718	9000	No
$v_{3 \text{ or } av34}$	2152 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 2176		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2176	4400	No

!

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 10.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.206	
Space mean speed in ramp influence area,	S_R = 52.3	mph
Space mean speed in outer lanes,	S_0 = 50.9	mph
Space mean speed for all vehicles,	S = 51.7	mph

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information / Site Information

Analyst	DPA	Freeway/Dir of Travel	SR 826 NB
Agency or Company		Junction	I 75 WB
Date Performed	10/2/2007	Jurisdiction	
Analysis Time Period	Future with Project w AM Imps	Analysis Year	2007 PM Peak

Project Description Beacon Countyline DRI (Third Sufficiency)

Inputs

Upstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ Off
L_{up} = ft
V_u = veh/h

Terrain: Level

S_{FF} = 55.0 mph S_{FR} = 50.0 mph

Sketch (show lanes, L_A, L_D,V_R,V_f)

Downstream Adj Ramp
☐ Yes ☐ On
☑ No ☐ 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	3893	0.95	Level	4	0	0.980	1.00	4180
Ramp	3758	0.95	Level	4	0	0.980	1.00	4035
UpStream								
DownStream								

Merge Areas

Estimation of v_{12}

$V_{12} = V_F (P_{FM})$

L_{EQ} = (Equation 25-2 or 25-3)
P_{FM} = 0.209 using Equation (Exhibit 25-5)
V_{12} = 874 pc/h
V_3 or V_{av34} 1653 pc/h (Equation 25-4 or 25-5)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☑ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☑ Yes ☐ No
If Yes,V_{12a} = 1672 pc/h (Equation 25-8)

Capacity Checks

	Actual	Capacity		LOS F?
V_{FO}	8215	Exhibit 25-7		No

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{R12}	5707	Exhibit 25-7	4600:All	No

Level of Service Determination (if not F)

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

D_R = 19.9 (pc/mi/ln)
LOS = B (Exhibit 25-4)

Speed Determination

M_S = 1.045 (Exibit 25-19)
S_R= 41.4 mph (Exhibit 25-19)
S_0= 52.3 mph (Exhibit 25-19)
S = 44.2 mph (Exhibit 25-14)

Diverge Areas

Estimation of v_{12}

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

L_{EQ} = (Equation 25-8 or 25-9)
P_{FD} = using Equation (Exhibit 25-12)
V_{12} = pc/h
V_3 or V_{av34} pc/h (Equation 25-15 or 25-16)
Is V_3 or V_{av34} > 2,700 pc/h? ☐ Yes ☐ No
Is V_3 or V_{av34} > 1.5 * V_{12}/2 ☐ Yes ☐ No
If Yes,V_{12a} = pc/h (Equation 25-18)

Capacity Checks

	Actual	Capacity		LOS F?
V_F		Exhibit 25-14		
$V_{FO} = V_F - V_R$		Exhibit 25-14		
V_R		Exhibit 25-3		

Flow Entering Merge Influence Area

	Actual	Max Desirable		Violation?
V_{12}		Exhibit 25-14		

Level of Service Determination (if not F)

$D_R = 4.252 + 0.0086\ V_{12} - 0.0009\ L_D$

D_R = (pc/mi/ln)
LOS = (Exhibit 25-4)

Speed Determination

D_s = (Exhibit 25-19)
S_R= mph (Exhibit 25-19)
S_0= mph (Exhibit 25-19)
S = mph (Exhibit 25-15)

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	DPA
Agency/Co.:	
Date performed:	10/2/2007
Analysis time period:	Future with Project w AM Imps
Freeway/Dir of Travel:	SR 826 NB
Junction:	I 75 WB
Jurisdiction:	
Analysis Year:	2007 PM Peak
Description:	Beacon Countyline DRI (Third Sufficiency)

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3893	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	50.0	mph
Volume on ramp	3758	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	1500	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)	3893	3758		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1024	989		v
Trucks and buses	4	4		%
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	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4180	4035	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 874 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8215	9000	No
v_3 or v_{av34}	1653 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34}	> 2700 pc/h?	No	
Is v_3 or v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 1672		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?	
v_{12A}	1672	4400	No	!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 1.045	
Space mean speed in ramp influence area,	S_R = 41.4	mph
Space mean speed in outer lanes,	S_0 = 52.3	mph
Space mean speed for all vehicles,	S = 44.2	mph