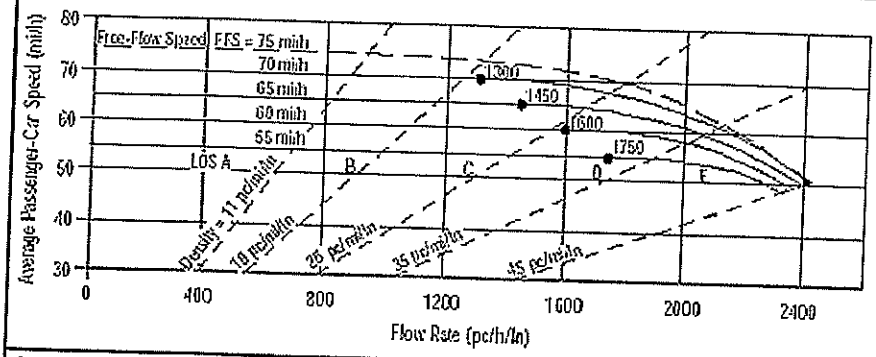
2032 Build - Preferred Alternative with Service Road

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	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*I-4/Eastbound*
From/To	*Lake Mary Blvd /CR 46A/SR417*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

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

Flow Inputs

Volume, V	*6470*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*9*
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*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.45*	I/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*0.0*	mi/h
f_N	*3.0*	mi/h
FFS	*67.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p) *2372*		pc/h/ln
S		mi/h
D = v_p / S		pc/mi/ln
LOS	*F*	

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		

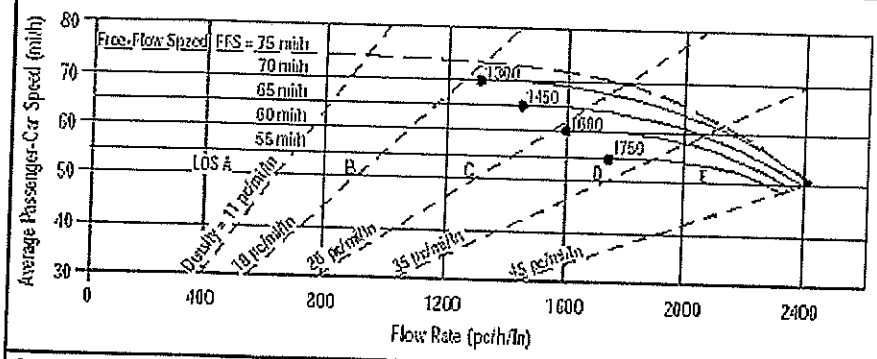
Glossary

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	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*I-4/Eastbound*
From/To	*CR 46A/SR 417/SR 46*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

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

Flow Inputs

Volume, V	*4820*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*9*
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*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.54*	I/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*0.2*	mi/h
f_N	*3.0*	mi/h
FFS	*66.8*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1767*	pc/h/ln
S	*65.6*	mi/h
D = v_p / S	*26.9*	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

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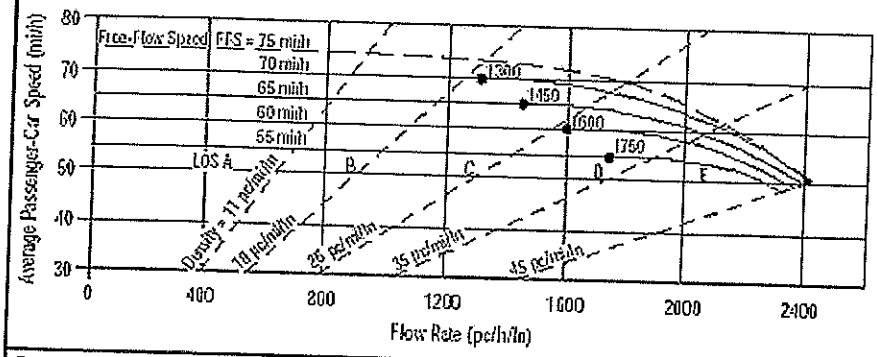
BASIC FREEWAY SEGMENTS WORKSHEET



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	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*I-4/Eastbound*
From/To	*SR 46/US17/92*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

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

Flow Inputs

Volume, V	*7130*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*9*
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*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.67*	l/mi
Number of Lanes, N	*4*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*0.9*	mi/h
f_N	*1.5*	mi/h
FFS	*67.6*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1961*	pc/h/ln
S	*63.9*	mi/h
D = v_p / S	*30.7*	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

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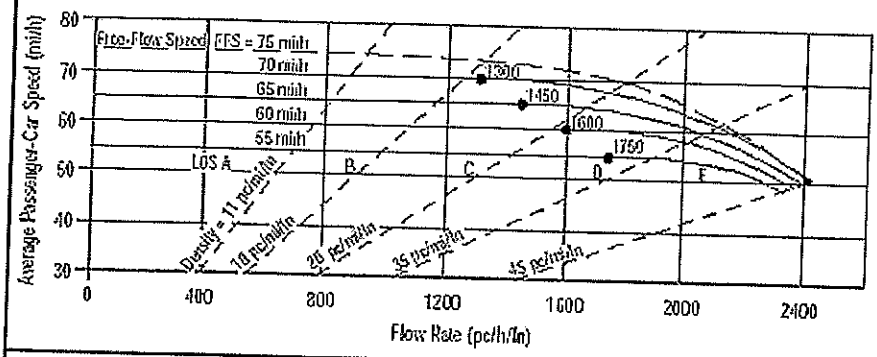
BASIC FREEWAY SEGMENTS WORKSHEET



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	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*I-4/Eastbound*
From/To	*Us17/92 to Volusia County Line*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

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

Flow Inputs

Volume, V	*6560*	veh/h	Peak-Hour Factor, PHF	*0.95*	
AADT		veh/day	%Trucks and Buses, P_T	*9*	
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*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.957*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*2.00*	I/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*7.5*	mi/h
f_N	*3.0*	mi/h
FFS	*59.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p) *2405*		pc/h/ln
S		mi/h
D = v_p / S		pc/mi/ln
LOS	*F*	

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

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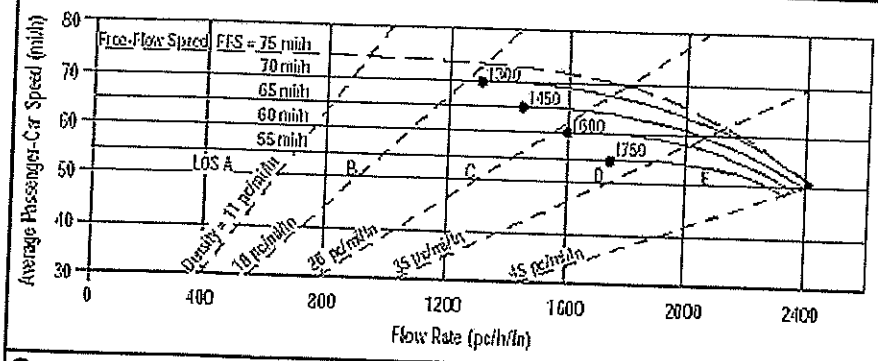
BASIC FREEWAY SEGMENTS WORKSHEET



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	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*SR 417/Westbound*
From/To	*North of Rinehart Rd/Rinehart*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

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

Flow Inputs

Volume, V	*6150*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*10*
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*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*0.40*	l/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*0.0*	mi/h
f_N	*3.0*	mi/h
FFS	*67.0*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*2266*	pc/h/ln
S	*56.3*	mi/h
D = v_p / S	*40.3*	pc/mi/ln
LOS	*E*	

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

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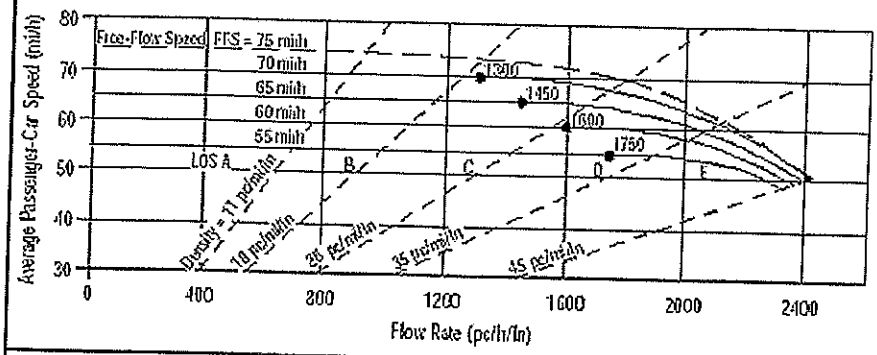
BASIC FREEWAY SEGMENTS WORKSHEET



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	*KNM*
Agency or Company	*HNTB*
Date Performed	*3/25/2008*
Analysis Time Period	*Peak*

Site Information

Highway/Direction of Travel	*SR 417/Westbound*
From/To	*Rinehart Rd to I-4*
Jurisdiction	
Analysis Year	*2032 Build*

Project Description Wekiva Parkway PD&E

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

Flow Inputs

Volume, V	*5420*	veh/h	Peak-Hour Factor, PHF	*0.95*
AADT		veh/day	%Trucks and Buses, P_T	*10*
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*	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	*0.952*

Speed Inputs

Lane Width	*12.0*	ft
Rt-Shoulder Lat. Clearance	*6.0*	ft
Interchange Density	*2.00*	I/mi
Number of Lanes, N	*3*	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	*70.0*	mi/h

Calc Speed Adj and FFS

f_{LW}	*0.0*	mi/h
f_{LC}	*0.0*	mi/h
f_{ID}	*7.5*	mi/h
f_N	*3.0*	mi/h
FFS	*59.5*	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	*1997*	pc/h/ln
S	*57.6*	mi/h
D = v_p / S	*34.7*	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

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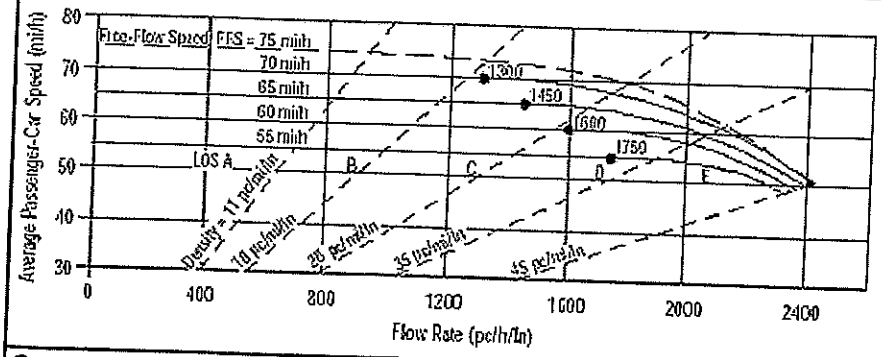
BASIC FREEWAY SEGMENTS WORKSHEET



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	KNM
Agency or Company	HNTB
Date Performed	3/25/2008
Analysis Time Period	Peak
Project Description	Wekiva Parkway PD&E

Site Information

Highway/Direction of Travel	SR 417/Westbound
From/To	I-4 to CD Road
Jurisdiction	
Analysis Year	2032 Build

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

Flow Inputs

Volume, V	4460	veh/h	Peak-Hour Factor, PHF	0.95
AADT		veh/day	%Trucks and Buses, P_T	10
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	$f_{HV} = 1/[1+P_T(E_T - 1) + P_R(E_R - 1)]$	0.952

Speed Inputs

Lane Width	12.0	ft
Rt-Shoulder Lat. Clearance	6.0	ft
Interchange Density	2.00	I/mi
Number of Lanes, N	3	
FFS (measured)		mi/h
Base free-flow Speed, BFFS	70.0	mi/h

Calc Speed Adj and FFS

f_{LW}	0.0	mi/h
f_{LC}	0.0	mi/h
f_{ID}	7.5	mi/h
f_N	3.0	mi/h
FFS	59.5	mi/h

LOS and Performance Measures

Operational (LOS)

v_p = (V or DDHV) / (PHF x N x f_{HV} x f_p)	1643	pc/h/ln
S	59.5	mi/h
D = v_p / S	27.6	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

Generated: 3/26/2008 5:17 PM

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	08/03/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 WB
Junction:	Off Ramp to I-4 EB/WB
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5310	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1960	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1260	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	3765	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5310		1960		1260	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	1443		533		342	v
Trucks and buses	10		10		10	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	
Heavy vehicle adjustment, fHV	0.952		0.952		0.952	
Driver population factor, fP	1.00		1.00		1.00	

Flow rate, vp 6060 2237 1438 pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3231 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6060	9000	No
$v_{FO} = v_F - v_R$	3823	9000	No
v_R	2237	3800	No
$v_{3 \text{ or } av34}$	1414 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} = 3231		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3231	4400	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 = 0.629

Space mean speed in ramp influence area, S_R = 46.8 mph

Space mean speed in outer lanes, S_O = 58.7 mph

Space mean speed for all vehicles, S = 51.7 mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 03/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: SR 417 WB
Junction: Off Ramp to I-4 EB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5310	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1960	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?	Yes	
Volume on adjacent ramp	1260	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	3765	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5310	1960	1260	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1475	544	350	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5900	2178	1400	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3853 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v$	5900	6750	No
$v_{FO} = v - v_F$	3722	6750	No
v_R	2178	3800	No

v_{av34} = 2047 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} = 3853 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3853	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 23.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.624

Space mean speed in ramp influence area, S = 46.9 mph

Space mean speed in outer lanes, S_R = 56.3 mph

Space mean speed for all vehicles, S_0 = 49.8 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 WB
Junction:	Off Ramp to International Pkwy
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3350	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1260	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1160	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2076	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3350		1260		1160		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	910		342		315		v
Trucks and buses	11		11		9		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	0.948	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3842	1445	1318	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.597 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2877 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3842	6750	No
$v_{FO} = v_F - v_R$	2397	6750	No
v_R	1445	2000	No
v_3 or v_{av34}	965 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} = 2877		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2877	4400	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 = 0.558

Space mean speed in ramp influence area, S_R = 47.7 mph

Space mean speed in outer lanes, S_O = 60.3 mph

Space mean speed for all vehicles, S = 50.4 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	07/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 WB
Junction:	Off Ramp to International Pkwy
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3350	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1260	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1960	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	3765	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3350		1260		1960		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	910		342		533		v
Trucks and buses	11		11		11		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	0.948	0.948	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3842	1445	2248	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.597 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2877 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3842	6750	No
$v_{FO} = v_F - v_R$	2397	6750	No
v_R	1445	2000	No
v_3 or v_{av34}	965 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} = 2877		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2877	4400	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 = 0.558	
Space mean speed in ramp influence area,	S_R = 47.7	mph
Space mean speed in outer lanes,	S_O = 60.3	mph
Space mean speed for all vehicles,	S = 50.4	mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 03/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: SR 417 WB
Junction: On Ramp from I-4 EB & WB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2090	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1160	vph
Length of first accel/decel lane	1325	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1260	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2076	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2090	1160	1260	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	581	322	350	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2322	1289	1400	pcph

Estimation of V12 Merge Areas

L_{EQ} = 789.25 (Equation 25-2 or 25-3)

P_{FM} = 0.615 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1427 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3611	6750	No

$v_{3 \text{ or } av34}$ = 895 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 No

If yes, v_{12A} = 1427 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1427	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_{R} + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.287

Space mean speed in ramp influence area, S_R = 51.3 mph

Space mean speed in outer lanes, S_0 = 53.6 mph

Space mean speed for all vehicles, S = 51.8 mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 03/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: SR 417 WB
Junction: On Ramp from I-4 EB & WB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2090	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1160	vph
Length of first accel/decel lane	1325	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	680	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1325	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2090	1160	680	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	581	322	189	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2322	1289	756	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.615 Using Equation 1

$v_{12} = v_{12}(P_{FM})$ = 1427 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3611	6750	No

v_{3} or v_{av34} 895 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 No

If yes, v_{12A} = 1427 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1427	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_{R} + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.287

Space mean speed in ramp influence area, S_R = 51.3 mph

Space mean speed in outer lanes, S_0 = 53.6 mph

Space mean speed for all vehicles, S = 51.8 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	08/03/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 WB
Junction:	On Ramp from International Pwy
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3250	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	900	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1160	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1325	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3250	680	1160	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	883	185	315	v
Trucks and buses	11	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.948	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3727	772	1318	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.121 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 452 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4499	9000	No
v_3 or v_{av34}	1637 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} = 1490		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1490	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 17.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.295	
Space mean speed in ramp influence area,	S_R = 51.2	mph
Space mean speed in outer lanes,	S_O = 52.8	mph
Space mean speed for all vehicles,	S = 52.0	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	Off Ramp to International Pkwy
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3930	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1160	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1250	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3930		680		1160		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1068		185		315		v
Trucks and buses	11		11		11		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	0.948	0.948	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4507	780	1330	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 1853.76 (Equation 25-8 or 25-9)

P_{FD} = 0.654 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3218 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4507	6750	No
$v_{FO} = v_F - v_R$	3727	6750	No
v_R	780	2000	No
$v_{3 \text{ or } av34}$	1289 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} = 3218		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3218	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 31.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.498

Space mean speed in ramp influence area, S_R = 48.5 mph

Space mean speed in outer lanes, S_O = 59.2 mph

Space mean speed for all vehicles, S = 51.2 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	Off Ramp to I-4 EB & WB
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3250	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1160	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1210	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1964	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3250		1160		1210		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	883		315		329		v
Trucks and buses	11		11		11		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	0.948	0.948	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3727	1330	1388	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.606 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2782 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3727	6750	No
$v_{FO} = v_F - v_R$	2397	6750	No
v_R	1330	2000	No
v_3 or v_{av34}	945 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} = 2782		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2782	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.548

Space mean speed in ramp influence area, S_R = 47.9 mph

Space mean speed in outer lanes, S_O = 60.3 mph

Space mean speed for all vehicles, S = 50.5 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	Off Ramp to I-4 EB & WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3250	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1160	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	680	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1250	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3250		1160		680		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	883		315		185		v
Trucks and buses	11		11		11		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	0.948	0.948	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3727	1330	780	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.606 Using Equation 5

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2782 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3727	6750	No
$v_{FO} = v - v_R$	2397	6750	No
v_R	1330	2000	No
v_3 or v_{av34}	945 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} = 2782		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2782	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 28.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.548	
Space mean speed in ramp influence area,	S_R = 47.9	mph
Space mean speed in outer lanes,	S_O = 60.3	mph
Space mean speed for all vehicles,	S = 50.5	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: . Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	On Ramp from International Pky
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Project

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2090	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1210	vph
Length of first accel/decel lane	1200	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1160	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1964	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2090	1210	1160	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	568	329	315	v
Trucks and buses	11	10	10	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.948	0.952	0.952	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 2397 1381 1324 pcph

Estimation of V12 Merge Areas

L_{EQ} = 769.49 (Equation 25-2 or 25-3)

P_{FM} = 0.611 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1465 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3778	6750	No
v_3 or v_{av34}	932 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		No
If yes, v_{12A} = 1465		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1465	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.304

Space mean speed in ramp influence area, S_R = 51.0 mph

Space mean speed in outer lanes, S_O = 53.4 mph

Space mean speed for all vehicles, S = 51.6 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	On Ramp from International Pky
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Project

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2090	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1210	vph
Length of first accel/decel lane	1200	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	2060	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3106	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2090	1210	2060	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	568	329	560	v
Trucks and buses	11	10	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.948	0.952	0.957	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp 2397 1381 2340 pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.611 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1465 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
v_{FO}		3778	6750	No
v_3 or v_{av34}		932 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		No	
If yes, v_{12A} = 1465			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1465	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.304

Space mean speed in ramp influence area, S_R = 51.0 mph

Space mean speed in outer lanes, S_O = 53.4 mph

Space mean speed for all vehicles, S = 51.6 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	On Ramp from I-4 EB & WB
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Project

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3300	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	2060	vph
Length of first accel/decel lane	900	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1210	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3106	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3300	2060	1210	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	897	560	329	v
Trucks and buses	11	9	11	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.948	0.957	0.948	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3784	2340	1388	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2100 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6124	6750	No
$v_{3 \text{ or } av34}$	1684 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} = 2162		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2162	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.442

Space mean speed in ramp influence area, S_R = 49.3 mph

Space mean speed in outer lanes, S_O = 51.0 mph

Space mean speed for all vehicles, S = 49.7 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	Off Ramp to Rinehart Rd
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5360	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	620	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1410	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2402	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5360		620		1410	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	1457		168		383	v
Trucks and buses	10		10		9	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.952	0.952	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6117	708	1602	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3066 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6117	9000	No
$v_{FO} = v_F - v_R$	5409	9000	No
v_R	708	2000	No
v_3 or v_{av34}	1525 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} = 3066		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3066	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 30.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.492	
Space mean speed in ramp influence area,	S_R = 48.6	mph
Space mean speed in outer lanes,	S_O = 58.3	mph
Space mean speed for all vehicles,	S = 53.0	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	Off Ramp to Rinehart Rd
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5360	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	620	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	2060	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5360		620		2060		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1457		168		560		v
Trucks and buses	10		10		9		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6117	708	2340	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3066 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6117	9000	No
$v_{FO} = v - v_F - v_R$	5409	9000	No
v_R	708	2000	No
v_3 or v_{av34}	1525 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} = 3066		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3066	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 30.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.492	
Space mean speed in ramp influence area,	S_R = 48.6	mph
Space mean speed in outer lanes,	S_O = 58.3	mph
Space mean speed for all vehicles,	S = 53.0	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 EB
Junction:	On Ramp from Rinehart Rd
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4740	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1410	vph
Length of first accel/decel lane	1000	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	620	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2402	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4740	1410	620	vph
Peak-hour factor, PHF	0.95	0.95	0.95	
Peak 15-min volume, v15	1247	371	163	v
Trucks and buses	10	10	10	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.952	0.952	0.952	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5239	1558	685	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1326.76 (Equation 25-2 or 25-3)

P_{FM} = 0.605 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3172 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6797	6750	Yes
$v_{3 \text{ or } av34}$	2067 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		No	
If yes, v_{12A} = 3172		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3172	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 35.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.693	
Space mean speed in ramp influence area,	S_R = 46.0	mph
Space mean speed in outer lanes,	S_O = 49.4	mph
Space mean speed for all vehicles,	S = 47.0	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 WB
Junction:	Off Ramp to Rinehart Rd
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6150	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1460	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	620	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1833	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6150		1460		620	vph
Peak-hour factor, PHF	0.95		0.95		0.95	
Peak 15-min volume, v15	1618		384		163	v
Trucks and buses	10		10		10	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.952	0.952	0.952	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6797	1614	685	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3946 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6797	6750	Yes
$v_{FO} = v_F - v_R$	5183	6750	No
v_R	1614	3800	No
v_3 or v_{av34}	2851 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} = 4097		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4097	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 30.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.573	
Space mean speed in ramp influence area,	S_R = 47.5	mph
Space mean speed in outer lanes,	S_O = 53.7	mph
Space mean speed for all vehicles,	S = 49.8	mph

SR 417 WB ON Ramp from Rinehart.txt

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	8/03/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	SR 417 WB
Junction:	On Ramp from Rinehart Rd
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4690	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	620	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?	Yes	
Volume on adjacent Ramp	1460	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1700	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4690	620	1460	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1274	168	397	v
Trucks and buses	10	10	10	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	0.952	0.952	0.952	
Driver population factor, fP	1.00	1.00	1.00	

Flow rate, vp	5353	708	1666	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1391.25 (Equation 25-2 or 25-3)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3316 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6061	6750	No
v_3 or v_{av34}	2037 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		No
If yes, v_{12A} = 3316		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3316	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.434

Space mean speed in ramp influence area, S_R = 49.4 mph

Space mean speed in outer lanes, S_O = 49.5 mph

Space mean speed for all vehicles, S = 49.4 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	07/30/2010
Analysis time period:	Build
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from US 1792
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5910 ✓	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	650 ✓	vph
Length of first accel/decel lane	900	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes ✓	
Volume on adjacent Ramp	1220 ✓	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1948	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5910	650	1220	vph
Peak-hour factor, PHF	0.95 ✓	0.95	0.95	
Peak 15-min volume, v15	1555	171	321	v
Trucks and buses	9 ✓	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6501	715	1342	pcph

Estimation of V12 Merge Areas

L_{EQ} = 1372.02 (Equation 25-2 or 25-3)

P_{FM} = 0.603 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3918 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7216	7200	Yes
v_3 or v_{av34}	2583 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	No	
If yes, v_{12A} = 3918		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3918	4600	Yes

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.659	
Space mean speed in ramp influence area,	S_R = 51.5	mph
Space mean speed in outer lanes,	S_O = 61.8	mph
Space mean speed for all vehicles,	S = 54.8	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build
Freeway/Dir of Travel:	I-4 WB
Junction:	Off Ramp to US 1792
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6560	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	650	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?	Yes	
Volume on adjacent ramp	1220	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1948	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	6560		650		1220		vph
Peak-hour factor, PHF	0.95		0.95		0.95		
Peak 15-min volume, v15	1726		171		321		v
Trucks and buses	9		9		9		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7216	715	1342	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.547 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4269 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7216	7200	Yes
$v_{FO} = v_F - v_R$	6501	7200	No
v_R	715	2000	No
v_3 or v_{av34}	2947 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} = 4516		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4516	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 38.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.492

Space mean speed in ramp influence area, S_R = 56.2 mph

Space mean speed in outer lanes, S_O = 70.2 mph

Space mean speed for all vehicles, S = 60.7 mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 03/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: I-4 EB
Junction: Off Ramp to SR 417 & SR 46
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4630	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2070	vph
Length of first accel/decel lane	406	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1840	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1906	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4630	2070	1840	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1286	575	511	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5144	2300	2044	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3580 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v$	5144	6750	No
$v_{FO} = v - v_R$	2844	6750	No
v_R	2300	3800	No

$v_{3 \text{ or } av34}$ = 1564 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} = 3580 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3580	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ = 14.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.635

Space mean speed in ramp influence area, S = 46.7 mph

Space mean speed in outer lanes,	S_R = 58.1	mph
Space mean speed for all vehicles,	S_0 = 49.7	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 EB
Junction:	Off Ramp to CR 46A
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6450	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1840	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	2070	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1906	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6450	1840	2070	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1753	500	562	v
Trucks and buses	9	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7326	2090	2351	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3451 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7326	9000	No
$v_{FO} = v_F - v_R$	5236	9000	No
v_R	2090	3800	No
v_3 or v_{av34}	1937 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} = 3451		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3451	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.616	
Space mean speed in ramp influence area,	S_R = 47.0	mph
Space mean speed in outer lanes,	S_O = 56.7	mph
Space mean speed for all vehicles,	S = 51.7	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 03/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: I-4 EB
Junction: Off Ramp to SR 417 & SR 46
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4630	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2070	vph
Length of first accel/decel lane	406	ft
Lengtb of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	810	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1410	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4630	2070	810	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1286	575	225	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5144	2300	900	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3580 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5144	6750	No
$v_{FO} = v_F - v_R$	2844	6750	No
v_R	2300	3800	No

$v_{3 \text{ or } av34}$ = 1564 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} = 3580 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3580	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 14.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.635

Space mean speed in ramp influence area, S = 46.7 mph

Space mean speed in outer lanes,	S_R = 58.1	mph
Space mean speed for all vehicles,	S_0 = 49.7	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from CR 46A
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2540	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	830	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?	Yes	
Volume on adjacent Ramp	1450	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	4826	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2540	830	1450	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	690	226	394	v
Trucks and buses	9	9	10	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.952	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2885	943	1655	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.597 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1723 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3828	6750	No
v_3 or v_{av34}	1162 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	No	
If yes, v_{12A} = 1723		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1723	4600	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 C

Speed Estimation

Intermediate speed variable,	M_S = 0.328	
Space mean speed in ramp influence area,	S_R = 50.7	mph
Space mean speed in outer lanes,	S_O = 52.6	mph
Space mean speed for all vehicles,	S = 51.3	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from CR 46A
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0 ✓	mph
Volume on freeway	2540 ✓	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	830 ✓	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?	Yes	
Volume on adjacent Ramp	2070 ✓	vph
Position of adjacent Ramp	Upstream ✓	
Type of adjacent Ramp	Off ✓	
Distance to adjacent Ramp	1410 ✓	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2540	830	2070	vph
Peak-hour factor, PHF	0.92 ✓	0.92	0.92	
Peak 15-min volume, v15	690	226	562	v
Trucks and buses	9 ✓	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2885	943	2351	pcph

Estimation of V12 Merge Areas

L_{EQ} = 558.19 (Equation 25-2 or 25-3)

P_{FM} = 0.597 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1723 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3828	6750	No
v_3 or v_{av34}	1162 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	No	
If yes, v_{12A} = 1723		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1723	4600	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 C ✓

Speed Estimation

Intermediate speed variable, M_S = 0.328

Space mean speed in ramp influence area, S_R = 50.7 mph

Space mean speed in outer lanes, S_O = 52.6 mph

Space mean speed for all vehicles, S = 51.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from SR ~~417~~ 429 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4820	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	940	vph
Length of first accel/decel lane	900	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1370	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3172	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4820	940	1370	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	1310	255	372	v
Trucks and buses	9	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5475	1068	1556	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.603 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3300 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6543	6750	No
v_3 or v_{av34}	2175 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	No	
If yes, v_{12A} = 3300		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3300	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 33.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.566	
Space mean speed in ramp influence area,	S_R = 47.6	mph
Space mean speed in outer lanes,	S_O = 49.0	mph
Space mean speed for all vehicles,	S = 48.1	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from SR 417 WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3370	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1450	vph
Length of first accel/decel lane	900	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	830	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	4826	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3370	1450	830	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	916	394	226	v
Trucks and buses	9	10	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.952	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3828	1655	943	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2125 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5483	6750	No
v_3 or v_{av34}	1703 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} = 2187 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2187	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 14.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.272

Space mean speed in ramp influence area, S_R = 51.5 mph

Space mean speed in outer lanes, S_O = 50.9 mph

Space mean speed for all vehicles, S = 51.3 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from SR 417 WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3370	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1450	vph
Length of first accel/decel lane	900	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	940	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1976	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3370	1450	940	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	916	394	255	v
Trucks and buses	9	10	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.952	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3828	1655	1068	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2125 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5483	6750	No
v_3 or v_{av34}	1703 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} = 2187		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2187	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 14.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.272	
Space mean speed in ramp influence area,	S_R = 51.5	mph
Space mean speed in outer lanes,	S_O = 50.9	mph
Space mean speed for all vehicles,	S = 51.3	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 EB
Junction:	On Ramp from SR 417 EB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4820 ✓	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	940 ✓	vph
Length of first accel/decel lane	900	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	1450 ✓	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1976	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4820 ✓	940	1450	vph
Peak-hour factor, PHF	0.92 ✓	0.92	0.92	
Peak 15-min volume, v15	1310	255	394	v
Trucks and buses	9 ✓	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5475	1068	1647	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.603 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 3300 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6543	6750	No
v_3 or v_{av34}	2175 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		No	
If yes, v_{12A} = 3300		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3300	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 33.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.566	
Space mean speed in ramp influence area,	S_R = 47.6	mph
Space mean speed in outer lanes,	S_O = 49.0	mph
Space mean speed for all vehicles,	S = 48.1	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: I-4 EB
Junction: On Ramp from SR 417 EB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4820	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	940	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?	Yes	
Volume on adjacent Ramp	1370	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3172	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4820	940	1370	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1339	261	381	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5356	1044	1522	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.087 Using Equation 4

$v_{12} = v (P_{FM}) =$ 468 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6400	9000	No

$v_{3 \text{ or } av34}$ = 2444 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} = 2142 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2142	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A =$ 26.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.380

Space mean speed in ramp influence area, S_R = 50.1 mph

Space mean speed in outer lanes, S_0 = 51.0 mph

Space mean speed for all vehicles, S = 50.5 mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: I-4 EB
Junction: On Ramp from SR 46
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5760	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1370	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?	Yes	
Volume on adjacent Ramp	940	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3172	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5760	1370	940	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1600	381	261	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6400	1522	1044	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_{12} (P_{FM})$ = 1338 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7922	9000	No

$v_{3 \text{ or } av34}$ = 2531 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} = 2560 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2560	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_{12} + 0.0078\, v_{R} - 0.00627\, L_{A}$ = 27.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.447

Space mean speed in ramp influence area, S_R = 49.2 mph

Space mean speed in outer lanes, S_0 = 49.9 mph

Space mean speed for all vehicles, S = 49.5 mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: I-4 WB
Junction: Off Ramp to SR 46
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	6600	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1370	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	3210	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	6098	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6600	1370	3210	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1833	381	892	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	7333	1522	3567	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3033 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7333	9000	No
$v_{FO} = v_F - v_R$	5811	9000	No
v_R	1522	3800	No

$v_{3 \text{ or } av34}$ = 2150 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} = 3033 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3033	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ = 25.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.565

Space mean speed in ramp influence area, S = 47.7 mph

Space mean speed in outer lanes,	S_R = 55.8	mph
Space mean speed for all vehicles,	S_0 = 52.1	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: I-4 WB
Junction: Off Ramp to SR 417 & CR 46A
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5230	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	3210	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?	Yes	
Volume on adjacent ramp	1370	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	6098	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5230	3210	1370	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1453	892	381	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5811	3567	1522	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4150 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5811	9000	No
$v_{FO} = v_F - v_R$	2244	9000	No
v_R	3567	3800	No

$v_{3 \text{ or } av34}$ = 830 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} = 4150 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4150	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ = 26.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.749

Space mean speed in ramp influence area, S = 45.3 mph

Space mean speed in outer lanes,	S_R = 60.3	mph
Space mean speed for all vehicles,	S_0 = 48.7	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: I-4 WB
Junction: Off Ramp to SR 417 & CR 46A
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	5230	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	3210	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?	Yes	
Volume on adjacent ramp	730	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3490	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5230	3210	730	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1453	892	203	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5811	3567	811	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4150 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5811	9000	No
$v_{FO} = v_F - v_R$	2244	9000	No
v_R	3567	3800	No

$v_{3 \text{ or } av34}$ = 830 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} = 4150 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4150	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ = 26.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.749

Space mean speed in ramp influence area, S = 45.3 mph

Space mean speed in outer lanes, S_R = 60.3 mph

Space mean speed for all vehicles, S_0 = 48.7 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 WB
Junction:	On Ramp from SR 417
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2540	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	730	vph
Length of first accel/decel lane	600	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	3180	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3654	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2540	730	3180	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	690	198	864	v
Trucks and buses	9	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	. %	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2885	829	3612	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1601 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3714	6750	No
$v_{3 \text{ or } av34}$	1284 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} = 1648 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1648	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 7.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.178	
Space mean speed in ramp influence area,	S_R = 52.7	mph
Space mean speed in outer lanes,	S_O = 52.3	mph
Space mean speed for all vehicles,	S = 52.6	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 WB
Junction:	On Ramp from SR 417
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2540	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	730	vph
Length of first accel/decel lane	600	ft
Length of second accel/decel lane	1500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	3220	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3490	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2540	730	3220	vph
Peak-hour factor, PHF	0.92	0.92	0.92	
Peak 15-min volume, v15	690	198	875	v
Trucks and buses	9	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2885	829	3657	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1601 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3714	6750	No
$v_{3 \text{ or } av34}$	1284 pc/h	(Equation 25-4 or 25-5)	
Is $v_{3 \text{ or } av34}$ v_{av34}	> 2700 pc/h?	No	
Is $v_{3 \text{ or } av34}$ v_{av34}	> 1.5 v_{12} /2	Yes	
If yes, v_{12A} = 1648		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1648	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 7.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.178	
Space mean speed in ramp influence area,	S_R = 52.7	mph
Space mean speed in outer lanes,	S_O = 52.3	mph
Space mean speed for all vehicles,	S = 52.6	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: I-4 WB
Junction: On Ramp from SR 46 & CR 46A
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2750	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	3170	vph
Length of first accel/decel lane	900	ft
Length of second accel/decel lane	900	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	730	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	3654	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2750	3170	730	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	764	881	203	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3056	3522	811	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_{12} (P_{FM}) =$ 1696 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6578	6750	No

$v_{3 \text{ or } av34}$ = 1360 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} = 1746 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1746	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_{12} + 0.0078\, v_R - 0.00627\, L_A =$ 28.0+ pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.889

Space mean speed in ramp influence area, S_R = 43.4 mph

Space mean speed in outer lanes, S_0 = 52.1 mph

Space mean speed for all vehicles, S = 44.9 mph

HCS+: Basic Freeway Segments Release 5.4

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	CTR
Agency or Company:	HNTB
Date Performed:	8/10/2010
Analysis Time Period:	Build
Freeway/Direction:	I-4 WB
From/To:	On Ramp from CR 46A & SR 46
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway PD&E

Flow Inputs and Adjustments

Volume, V	6450	veh/h
Peak-hour factor, PHF	0.92	
Peak 15-min volume, v15	1753	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1832	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.90	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	66.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1832	pc/h/ln
Free-flow speed, FFS	66.5	mi/h
Average passenger-car speed, S	64.8	mi/h
Number of lanes, N	4	
Density, D	28.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	CD Rd (West of I-4) WB
Junction:	On Ramp from CR 46A to CD Rd
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0 ✓	mph
Volume on freeway	1340 ✓	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1840 ✓	vph
Length of first accel/decel lane	600	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	900 ✓	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1320	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1340	1840	900	vph
Peak-hour factor, PHF	0.92 ✓	0.92	0.92	
Peak 15-min volume, v15	364	500	245	v
Trucks and buses	9 ✓	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1522	2090	1022	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1522 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3612	4500	No
$v_{3 \text{ or } av34}$	0 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		No	
If yes, v_{12A} = 1522		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1522	4600	No

Level of Service Determination (if not F)

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

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

Speed Estimation

Intermediate speed variable,	M_S = 0.423	
Space mean speed in ramp influence area,	S_R = 49.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 49.5	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	CD Rd (East of I-4) EB
Junction:	Off Ramp to SR 417 EB
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0 ✓	mph
Volume on freeway	2070 ✓	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0 ✓	mph
Volume on ramp	510 ✓	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes ✓	
Volume on adjacent ramp	220	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1584	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	2070 ✓		510		220		vph
Peak-hour factor, PHF	0.92 ✓		0.92		0.92		
Peak 15-min volume, v15	562		139		60		v
Trucks and buses	9 ✓		9		9		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2351	579	250	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2351 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2351	4500	No
$v_{FO} = v_F - v_R$	1772	4500	No
v_R	579	2000	No
v_3 or v_{av34}	0 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}	= 2351	(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2351	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 24.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.480	
Space mean speed in ramp influence area,	S_R = 48.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 48.8	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	CD Rd (East of I-4) EB
Junction:	Off Ramp to SR 417 WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0 ✓	mph
Volume on freeway	1560 ✓	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0 ✓	mph
Volume on ramp	220 ✓	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	510 ✓	vph
Position of adjacent ramp	Upstream ✓	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1584	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1560 ✓		220		510	vph
Peak-hour factor, PHF	0.92 ✓		0.92		0.92	
Peak 15-min volume, v15	424 ✓		60		139	v
Trucks and buses	9 ✓		9		9	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1772	250	579	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1772 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1772	4500	No
$v_{FO} = v_F - v_R$	1522	4500	No
v_R	250	2000	No
v_3 or v_{av34}	0 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} = 1772		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1772	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_R - 0.009\ L_D$ = 19.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.451	
Space mean speed in ramp influence area,	S_R = 49.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 49.1	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	CD Rd (East of I-4) EB
Junction:	Off Ramp to SR 417 WB
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1560	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	220	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	940	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1478	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1560		220		940	vph
Peak-hour factor, PHF	0.92		0.92		0.92	
Peak 15-min volume, v15	424		60		255	v
Trucks and buses	9		9		9	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level		Level	
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5*		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1772	250	1068	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1772 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1772	4500	No
$v_{FO} = v_F - v_R$	1522	4500	No
v_R	250	2000	No
$v_{3 \text{ or } av34}$	0 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 \text{ or } av34}$	> 2700 pc/h?	No	
Is $v_{3 \text{ or } av34}$	> 1.5 v_{12} /2	No	
If yes, v_{12A} = 1772		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1772	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.451

Space mean speed in ramp influence area, S_R = 49.1 mph

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

Space mean speed for all vehicles, S = 49.1 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 03/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (East of I-4) EB
Junction: Off Ramp to SR 417 WB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1560	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	220	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?	Yes	
Volume on adjacent ramp	510	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1584	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1560	220	510	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	433	61	142	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1733	244	567	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1733 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1733	4500	No
$v_{FO} = v_F - v_R$	1489	4500	No
v_R	244	2000	No

$v_{3 \text{ or } av34}$ = 0 pc/h (Equation 25-15 or 25-16)

Is $v_{3 \text{ or } av34}$ > 2700 pc/h? No

Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2 No

If yes, v_{12A} = 1733 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1733	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 14.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.450

Space mean speed in ramp influence area, S = 49.2 mph

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

Space mean speed for all vehicles, S_0 = 49.2 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 03/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (East of I-4) EB
Junction: Off Ramp to SR 417 WB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1560	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	220	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?	Yes	
Volume on adjacent ramp	940	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1478	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1560	220	940	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	433	61	261	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1733	244	1044	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1733 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1733	4500	No
$v_{FO} = v_F - v_R$	1489	4500	No
v_R	244	2000	No

$v_{3 \text{ or } av34}$ = 0 pc/h (Equation 25-15 or 25-16)

Is $v_{3 \text{ or } av34}$ > 2700 pc/h? No

Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2 No

If yes, v_{12A} = 1733 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1733	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 14.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.450

Space mean speed in ramp influence area, S = 49.2 mph

Space mean speed in outer lanes, $S_{R0} = N/A$ mph

Space mean speed for all vehicles, $S = 49.2$ mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 03/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (East of I-4) EB
Junction: On Ramp from SR 417 EB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1340	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	940	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?	Yes	
Volume on adjacent Ramp	220	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	1478	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1340	940	220	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	372	261	61	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1489	1044	244	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 1.000 Using Equation 0
FM
v = v (P) = 1489 pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v	2533	4500	No
FO			

v v 0 pc/h (Equation 25-4 or 25-5)
3 or av34

Is v v > 2700 pc/h? No
3 or av34

Is v v > 1.5 v /2 No
3 or av34 I2

If yes, v = 1489 (Equation 25-8)
12A

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v	1489	4600	No
R12			

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 15.3$ pc/mi/ln

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

Speed Estimation

Intermediate speed variable, $M_S = 0.275$

Space mean speed in ramp influence area, $S_R = 51.4$ mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 51.4 mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 03/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (East of I-4) EB
Junction: On Ramp from SR 417 EB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1340	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	940	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?	Yes	
Volume on adjacent Ramp	940	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	3010	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1340	940	940	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	372	261	261	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1489	1044	1044	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_{12}(P_{FM})$ = 1489 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2533	4500	No

$v_{3 \text{ or } av34}$ = 0 pc/h (Equation 25-4 or 25-5)

Is $v_{3 \text{ or } av34} > 2700$ pc/h? No

Is $v_{3 \text{ or } av34} > 1.5\, v_{12}/2$ No

If yes, v_{12A} = 1489 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1489	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.275

Space mean speed in ramp influence area, S_R = 51.4 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 51.4 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 03/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (East of I-4) EB
Junction: Off Ramp to I-4 EB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2280	vph

Off Ramp Data

Side of freeway	Left	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	940	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?	Yes	
Volume on adjacent ramp	940	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	3010	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2280	940	940	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	633	261	261	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2533	1044	1044	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1714 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v$	2533	6750	No
$v_{FO} = v - v$	1489	6750	No
v_R	1044	3800	No
$v_{3 \text{ or } av34}$	819 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} = 1714 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1714	4400	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 = 0.522

Space mean speed in ramp influence area, S = 48.2 mph

Space mean speed in outer lanes, $S_{R} = 60.3$ mph

Space mean speed for all vehicles, $S_{0} = 51.2$ mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	I-4 WB
Junction:	Off Ramp to SR 46
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	7130	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1370	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	3220	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	6098	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	7130		1370		3220		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1937		372		875		v
Trucks and buses	9		9		9		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	8099	1556	3657	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3257 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	8099	9000	No
$v_{FO} = v_F - v_R$	6543	9000	No
v_R	1556	3800	No
v_3 or v_{av34}	2421 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} = 3257 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3257	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.568	
Space mean speed in ramp influence area,	S_R = 47.6	mph
Space mean speed in outer lanes,	S_O = 54.8	mph
Space mean speed for all vehicles,	S = 51.7	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (West of I-4) WB
Junction: On Ramp from SR 46 EB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	860	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	650	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?	Yes	
Volume on adjacent Ramp	3210	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1426	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	860	650	3210	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	239	181	892	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	956	722	3567	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v\ (P_{FM}) =$ 956 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1678	4500	No

$v_{3 \text{ or } av34}$ = 0 pc/h (Equation 25-4 or 25-5)

Is $v_{3 \text{ or } av34} > 2700$ pc/h? No

Is $v_{3 \text{ or } av34} > 1.5\ v_{12}/2$ No

If yes, $v_{12A} =$ 956 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	956	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A =$ 15.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.307

Space mean speed in ramp influence area, S_R = 51.0 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 51.0 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (West of I-4) WB
Junction: On Ramp from I-4 WB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1510	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	3210	vph
Length of first accel/decel lane	530	ft
Length of second accel/decel lane	530	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	650	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1426	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1510	3210	650	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	419	892	181	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1678	3567	722	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.209 Using Equation 0
FM
v = v (P) = 351 pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v FO	5245	9000	No
v v 3 or av34	663 pc/h	(Equation 25-4 or 25-5)	
Is v v 3 or av34	> 2700 pc/h?	No	
Is v v 3 or av34	> 1.5 v /2 12	Yes	
If yes, v 12A	= 671	(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v 12A	671	4600	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 28.0- pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, M = 0.502
S
Space mean speed in ramp influence area, S = 48.5 mph
R
Space mean speed in outer lanes, S = 55.0 mph
0
Space mean speed for all vehicles, S = 49.5 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (West of I-4) WB
Junction: On Ramp from I-4 WB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1510	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	3210	vph
Length of first accel/decel lane	530	ft
Length of second accel/decel lane	530	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	940	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	2851	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1510	3210	940	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	419	892	261	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	1678	3567	1044	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.209 Using Equation 0

$v_{12} = v (P_{FM}) =$ 351 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5245	9000	No

$v_{3 \text{ or } av34}$ = 663 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} = 671 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	671	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.0- pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.502

Space mean speed in ramp influence area, S_R = 48.5 mph

Space mean speed in outer lanes, S_0 = 55.0 mph

Space mean speed for all vehicles, S = 49.5 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (West of I-4) WB
Junction: Off Ramp to SR 417 WB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4720	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	940	vph
Length of first accel/decel lane	730	ft
Length of second accel/decel lane	730	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	3210	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	2851	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4720	940	3210	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1311	261	892	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5244	1044	3567	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 2934 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v$	5244	6750	No
$v_{FO} = v - v_F$	4200	6750	No
v_R	1044	3800	No

$v_{3 \text{ or } av34}$ 2310 pc/h (Equation 25-15 or 25-16)

Is $v_{3 \text{ or } av34} > 2700$ pc/h? No

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

If yes, v_{12A} = 2996 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2996	4400	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 B

Speed Estimation

Intermediate speed variable, D_S = 0.522

Space mean speed in ramp influence area, S = 48.2 mph

Space mean speed in outer lanes, S_R = 55.5 mph

Space mean speed for all vehicles, S_0 = 51.1 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	CD Rd (West of I-4) WB
Junction:	Off Ramp to SR 417 WB
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4730	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	940	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?	Yes	
Volume on adjacent ramp	1550	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1531	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	4730		940		1550		vph
Peak-hour factor, PHF	0.92		0.92		0.92		
Peak 15-min volume, v15	1285		255		421		v
Trucks and buses	9		9		9		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level		Level		
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		
Heavy vehicle adjustment, fHV	0.957		0.957		0.957		
Driver population factor, fP	1.00		1.00		1.00		

Flow rate, v_p 5373 1068 1761 pcph

Estimation of V12 Diverge Areas

L_{EQ} = 3018.61 (Equation 25-8 or 25-9)

P_{FD} = 0.647 Using Equation 7

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3852 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5373	6750	No
$v_{FO} = v_F - v_R$	4305	6750	No
v_R	1068	2000	No
v_3 or v_{av34}	1521 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} = 3852 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3852	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.524

Space mean speed in ramp influence area, S_R = 48.2 mph

Space mean speed in outer lanes, S_O = 58.3 mph

Space mean speed for all vehicles, S = 50.7 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (West of I-4) WB
Junction: Off Ramp to SR 417 EB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3780	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1550	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?	Yes	
Volume on adjacent ramp	940	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	1531	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3780	1550	940	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1050	431	261	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4200	1722	1044	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 4200 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4200	4500	No
$v_{FO} = v - v_F$	2478	4500	No
v_R	1722	3800	No

$v_{3 \text{ or } av34}$ = 0 pc/h (Equation 25-15 or 25-16)

Is $v_{3 \text{ or } av34} > 2700$ pc/h? No

Is $v_{3 \text{ or } av34} > 1.5 v / 2$ No

If yes, v_{12A} = 4200 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4200	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ = 26.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.583

Space mean speed in ramp influence area, S = 47.4 mph

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

Space mean speed for all vehicles, S_0 = 47.4 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/05/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: CD Rd (West of I-4) WB
Junction: Off Ramp to SR 417 EB
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3780	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1550	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?	Yes	
Volume on adjacent ramp	900	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	Off	
Distance to adjacent ramp	4594	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3780	1550	900	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1050	431	250	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4200	1722	1000	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 4200 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4200	4500	No
$v_{FO} = v - v_R$	2478	4500	No
v_R	1722	3800	No

$v_{3 \text{ or } av34}$ = 0 pc/h (Equation 25-15 or 25-16)

Is $v_{3 \text{ or } av34} > 2700$ pc/h? No

Is $v_{3 \text{ or } av34} > 1.5 v_{12}/2$ No

If yes, v_{12A} = 4200 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4200	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ = 26.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.583

Space mean speed in ramp influence area, S = 47.4 mph

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

Space mean speed for all vehicles, S_0 = 47.4 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	CD Rd (West of I-4) WB
Junction:	Off Ramp to CR 46A
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0 ✓	mph
Volume on freeway	2240 ✓	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0 ✓	mph
Volume on ramp	900 ✓	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1840 ✓	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	1320	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2240 ✓	900	1840	vph
Peak-hour factor, PHF	0.92 ✓	0.92	0.92	
Peak 15-min volume, v15	609	245	500	v
Trucks and buses	9 ✓	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2544	1022	2090	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2544 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2544	4500	No
$v_{FO} = v_F - v_R$	1522	4500	No
v_R	1022	2000	No
v_3 or v_{av34}	0 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} = 2544		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2544	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 26.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.520	
Space mean speed in ramp influence area,	S_R = 48.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 48.2	mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/29/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	CD Rd (West of I-4) WB
Junction:	Off Ramp to CR 46A
Jurisdiction:	Seminole County
Analysis Year:	2032
Description:	Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0 ✓	mph
Volume on freeway	2240 ✓	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0 ✓	mph
Volume on ramp	900 ✓	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	1550 ✓	vph
Position of adjacent ramp	Upstream ✓	
Type of adjacent ramp	Off	
Distance to adjacent ramp	4594	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2240 ✓	900	1550	vph
Peak-hour factor, PHF	0.92 ✓	0.92	0.92	
Peak 15-min volume, v15	609 ✓	245	421	v
Trucks and buses	9 ✓	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2544	1022	1761	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2544 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2544	4500	No
$v_{FO} = v_F - v_R$	1522	4500	No
v_R	1022	2000	No
v_3 or v_{av34}	0 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} = 2544		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2544	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 26.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.520

Space mean speed in ramp influence area, S_R = 48.2 mph

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

Space mean speed for all vehicles, S = 48.2 mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	CTR
Agency/Co.:	HNTB
Date performed:	7/30/2010
Analysis time period:	Build Service Road Concept
Freeway/Dir of Travel:	CD Rd (West of I-4) WB
Junction:	On Ramp from SR 46 EB
Jurisdiction:	Seminole County
Analysis Year:	2032

Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0 ✓	mph
Volume on freeway	860 ✓	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0 ✓	mph
Volume on ramp	650 ✓	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?	Yes	
Volume on adjacent Ramp	3220 ✓ ✓	vph
Position of adjacent Ramp	Downstream ✓	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	1426	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	860	650	3220	vph
Peak-hour factor, PHF	✓ 0.92	0.92	0.92	
Peak 15-min volume, v15	✓ 234	177	875	v
Trucks and buses	✓ 9	9	9	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	

Heavy vehicle adjustment, fHV	0.957	0.957	0.957	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	977	738	3657	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 977 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1715	4500	No
v_3 or v_{av34}	0 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		No	
If yes, v_{12A} = 977		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	977	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 14.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.294	
Space mean speed in ramp influence area,	S_R = 51.2	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 51.2	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/5/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: Wekiva Pkwy. WB
Junction: On Ramp from SR 46
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3930	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	780	vph
Length of first accel/decel lane	800	ft
Length of second accel/decel lane	640	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	680	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	On	
Distance to adjacent Ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3930	780	680	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1092	217	189	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4367	867	756	pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)
EQ
P = 0.555 Using Equation 0
FM
v = v (P) = 2424 pc/h
12 F FM

Capacity Checks

	Actual	Maximum	LOS F?
v FO	5234	6750	No

v v 1943 pc/h (Equation 25-4 or 25-5)
3 or av34
Is v v > 2700 pc/h? No
3 or av34
Is v v > 1.5 v /2 Yes
3 or av34 12
If yes, v = 2495 (Equation 25-8)
12A

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v 12A	2495	4600	No

Level of Service Determination (if not F)

Density, D = 5.475 + 0.00734 v + 0.0078 v - 0.00627 L = 17.3 pc/mi/ln
R R 12 A
Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M = 0.277
S
Space mean speed in ramp influence area, S = 51.4 mph
R
Space mean speed in outer lanes, S = 50.1 mph
0
Space mean speed for all vehicles, S = 50.9 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/5/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: Wekiva Pkwy. WB
Junction: On Ramp from SR 46
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	3930	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	780	vph
Length of first accel/decel lane	800	ft
Length of second accel/decel lane	640	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent Ramp	360	vph
Position of adjacent Ramp	Downstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	6684	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3930	780	360	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1092	217	100	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4367	867	400	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_{12}(P_{FM})$ = 2424 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5234	6750	No

$v_{3 \text{ or } av34}$ = 1943 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} = 2495 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2495	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_{12} + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.277

Space mean speed in ramp influence area, S_R = 51.4 mph

Space mean speed in outer lanes, S_0 = 50.1 mph

Space mean speed for all vehicles, S = 50.9 mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/5/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: Wekiva Pkwy. WB
Junction: Off Ramp to WB CD
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4710	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	1340	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	780	vph
Position of adjacent ramp	Upstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	6684	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4710	360	780	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1308	100	217	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5233	400	867	pcph

Estimation of V12 Diverge Areas

L_{EQ} = 5386.46 (Equation 25-8 or 25-9)

P_{FD} = 0.611 Using Equation 5

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3352 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5233	6750	No
$v_{FO} = v - v_R$	4833	6750	No
v_R	400	2000	No

$v_{3 \text{ or } av34}$ = 1881 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} = 3352 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3352	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ = 21.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.464

Space mean speed in ramp influence area, S = 49.0 mph

Space mean speed in outer lanes, S_R = 56.9 mph

Space mean speed for all vehicles, S_0 = 51.6 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/5/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: Wekiva Pkwy. WB
Junction: Off Ramp to WB CD
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4710	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	1340	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	Yes	
Volume on adjacent ramp	50	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4710	360	50	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1308	100	14	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00 %	0.00 %	0.00 %	
Length	0.00 mi	0.00 mi	0.00 mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5233	400	56	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.611 Using Equation 5

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3352 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v$	5233	6750	No
$v_{FO} = v - v_R$	4833	6750	No
v_R	400	2000	No

$v_{3 \text{ or } av34}$ = 1881 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} = 3352 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3352	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 21.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, D_S = 0.464

Space mean speed in ramp influence area, S = 49.0 mph

Space mean speed in outer lanes,	S_R = 56.9	mph
Space mean speed for all vehicles,	S_0 = 51.6	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/5/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: Wekiva Pkwy. WB
Junction: On Ramp from WB CD
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	55.0	mph
Volume on freeway	4350	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	50	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?	Yes	
Volume on adjacent Ramp	360	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4350	50	360	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	1208	14	100	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	4833	56	400	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.211 Using Equation 4

$v_{12} = v_{12}(P_{FM})$ = 1019 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4889	9000	No

$v_{3 \text{ or } av34}$ = 1907 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} = 1933 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1933	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_{12} + 0.0078\, v_R - 0.00627\, L_A$ = 17.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.315

Space mean speed in ramp influence area, S_R = 50.9 mph

Space mean speed in outer lanes, S_0 = 51.6 mph

Space mean speed for all vehicles, S = 51.3 mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Diverge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/5/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: Wekiva Pkwy. EB
Junction: Off Ramp to EB CD
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2570	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	40	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?	Yes	
Volume on adjacent ramp	300	vph
Position of adjacent ramp	Downstream	
Type of adjacent ramp	On	
Distance to adjacent ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2570	40	300	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	714	11	83	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	0.00	% 0.00	% 0.00	%
Length	0.00	mi 0.00	mi 0.00	mi
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2856	44	333	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.687 Using Equation 5

$v_{12} = v_R + (v - v_F) P_{FD}$ = 1975 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2856	6750	No
$v_{FO} = v - v_R$	2812	6750	No
v_R	44	2000	No

$v_{3 \text{ or } av34}$ = 881 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} = 1975 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1975	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 16.7 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 = 49.4 mph

Space mean speed in outer lanes,	S_R = 60.3	mph
Space mean speed for all vehicles,	S_0 = 52.3	mph

HCS+: Ramps and Ramp Junctions Release 5.4

Phone: Fax:
E-mail:

Merge Analysis

Analyst: CTRR
Agency/Co.: HNTB
Date performed: 3/5/2010
Analysis time period: Build Service Road Concept
Freeway/Dir of Travel: Wekiva Pkwy. EB
Junction: On Ramp from EB CD
Jurisdiction: Seminole County
Analysis Year: 2032
Description: Wekiva Parkway Project Development & Environment Study

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	55.0	mph
Volume on freeway	2530	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	300	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?	Yes	
Volume on adjacent Ramp	40	vph
Position of adjacent Ramp	Upstream	
Type of adjacent Ramp	Off	
Distance to adjacent Ramp	6336	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2530	300	40	vph
Peak-hour factor, PHF	0.90	0.90	0.90	

Peak 15-min volume, v15	703	83	11	v
Trucks and buses	0	0	0	%
Recreational vehicles	0	0	0	%
Terrain type:	Level	Level	Level	
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	2811	333	44	pcph

Estimation of V12 Merge Areas

L_{EQ} = 323.02 (Equation 25-2 or 25-3)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1663 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3144	6750	No

v_{3} or v_{av34} = 1148 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 No

If yes, v_{12A} = 1663 (Equation 25-8)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1663	4600	No

Level of Service Determination (if not F)

$D_R = 5.475 + 0.00734\, v_{12} + 0.0078\, v_R - 0.00627\, L_A$ = 17.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.315

Space mean speed in ramp influence area, S_R = 50.9 mph

Space mean speed in outer lanes, S_0 = 52.7 mph

Space mean speed for all vehicles, S = 51.5 mph