TIER II TRAFFIC TECHNICAL REPORT

STATE ROUTE 11/
OTAY MESA EAST LAND PORT OF ENTRY

Appendix G – Horizon Year (2035)
Freeway Capacity Analysis

Prepared for:

Caltrans – District 11

Prepared by:

VRPA Technologies
9520 Padgett Street, Suite 213
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In association with:

AECOM

November 5, 2010

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2102	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	703	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2102	703		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	553	185		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2383	797	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2383 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3180	4700	No
v_{R12}	3180	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 26.8 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 = 56.3 mph

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

Space mean speed for all vehicles, S = 56.3 mph

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Merge Analysis

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Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2245	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	639	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2245	639		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	591	168		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2545	724	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2545 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3269	4700	No
v_{R12}	3269	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.389	
Space mean speed in ramp influence area,	S_R = 56.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.1	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	Sr 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	2805	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	738	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1060	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1060	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	17.8	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	2884	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	759	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1090	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1090	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	18.3	pc/mi/ln

Level of service, LOS	C

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2805	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	1346	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2805		1346			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	738		354			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3180	1526	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3180 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3180	4700	No
v_{12}	3180	4400	No
$v_{FO} = v_F - v_R$	1654	4700	No
v_R	1526	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 18.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.565	
Space mean speed in ramp influence area,	S_R = 52.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.0	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2884	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	1224	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2884	1224		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	759	322		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3270	1388	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3270 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3270	4700	No
v_{12}	3270	4400	No
$v_{FO} = v_F - v_R$	1882	4700	No
v_R	1388	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 18.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.553	
Space mean speed in ramp influence area,	S_R = 52.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.3	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1459	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	834	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1459	834		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	384	219		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1728	988	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1728 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2716	4700	No
v_{R12}	2716	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 23.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.345	
Space mean speed in ramp influence area,	S_R = 57.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.1	mph

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Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1660	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	1133	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1660	1133		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	437	298		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1966	1342	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1966 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3308	4700	No
v_{R12}	3308	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.393	
Space mean speed in ramp influence area,	S_R = 56.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.0	mph

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	2293	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	603	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	905	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	905	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	15.2	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	2793	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	735	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	1103	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1103	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	18.5	pc/mi/ln

Level of service, LOS	C

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2293	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	2107	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2293	2107		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	603	554		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2600	2389	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2600 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2600	4700	No
v_{12}	2600	4400	No
$v_{FO} = v_F - v_R$	211	4700	No
v_R	2389	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 13.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.643	
Space mean speed in ramp influence area,	S_R = 50.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 50.2	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV RD & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2793	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	2626	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2793		2626			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	735		691			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3166	2977	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3166 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3166	4700	No
v_{12}	3166	4400	No
$v_{FO} = v_F - v_R$	189	4700	No
v_R	2977	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 18.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.696	
Space mean speed in ramp influence area,	S_R = 49.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 49.0	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	186	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	49	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	110	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	110	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.9	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	167	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	44	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	99	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	99	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.7	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1394	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	367	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	734	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	734	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.7	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1978	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	521	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1041	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1041	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	17.9	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	2342	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	616	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1233	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1233	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	21.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	2124	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	559	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1118	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1118	pc/h/ln
..e-flow speed, FFS	58.0	mi/h
..erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	19.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	248	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	65	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	147	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	147	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
rage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.5	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	59	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	133	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	133	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.3	pc/mi/ln

Level of service, LOS	A

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

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2590	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	583	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2590	583		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	682	153		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2936	661	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1737 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3597	7050	No
v_{R12}	2398	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 20.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.329	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = 62.5	mph
Space mean speed for all vehicles,	S = 59.0	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2349	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	792	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2349	792		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	618	208		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2663	898	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1575 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3561	7050	No
v_{R12}	2473	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.332	
pace mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = 62.9	mph
Space mean speed for all vehicles,	S = 58.9	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - EF Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	3173	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	835	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1199	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1199	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	20.2	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - EF Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	3141	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	827	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1187	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1187	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	19.9	pc/mi/ln

Level of service, LOS	C

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3173	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	1020	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3173	1020		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	835	268		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3597	1156	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3597 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3597	4700	No
v_{12}	3597	4400	No
$v_{FO} = v_F - v_R$	2441	4700	No
v_R	1156	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.532	
Space mean speed in ramp influence area,	S_R = 52.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.8	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3141	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	927	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3141		927			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	827		244			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3561	1051	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3561 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3561	4700	No
v_{12}	3561	4400	No
$v_{FO} = v_F - v_R$	2510	4700	No
v_R	1051	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.523	
Space mean speed in ramp influence area,	S_R = 53.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.0	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2153	vph

On Ramp Data

le of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1102	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2153	1102		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	567	290		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2441	1249	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2441 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3690	4700	No
v_{R12}	3690	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 30.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.442	
Space mean speed in ramp influence area,	S_R = 54.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.8	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2214	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	1496	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2214	1496		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	583	394		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2510	1696	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2510 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4206	4700	No
v_{R12}	4206	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 34.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.548	
Space mean speed in ramp influence area,	S_R = 52.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.4	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	3255	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	857	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1230	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1230	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	20.7	pc/mi/ln

Level of service, LOS	C

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	3710	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	976	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1402	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1402	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	23.6	pc/mi/ln

Level of service, LOS	C

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3255	vph

Off Ramp Data

le of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3255	575		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	857	151		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3690	652	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3690 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3690	4700	No
v_{12}	3690	4400	No
$v_{FO} = v_F - v_R$	3038	4700	No
v_R	652	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.487	
Space mean speed in ramp influence area,	S_R = 53.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.8	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3710	vph

Off Ramp Data

le of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	781	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3710	781		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	976	206		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4206	885	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4206 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4206	4700	No
v_{12}	4206	4400	No
$v_{FO} = v_F - v_R$	3321	4700	No
v_R	885	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.508	
Space mean speed in ramp influence area,	S_R = 53.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.3	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1424	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	700	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1424	700		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	375	184		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1614	794	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1614 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2408	4700	No
v_{R12}	2408	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 20.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.329	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.4	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1637	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	603	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1637	603		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	431	159		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1856	684	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1856 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2540	4700	No
v_{R12}	2540	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.335

Space mean speed in ramp influence area, S_R = 57.3 mph

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

Space mean speed for all vehicles, S = 57.3 mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - Alta Rd Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	2124	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	559	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1204	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1204	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	20.8	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - Alta Rd Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	2240	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	589	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1270	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1270	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	21.9	pc/mi/ln

Level of service, LOS	C

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2124	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	1435	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2124		1435			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	559		378			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2408	1627	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2408 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2408	4700	No
v_{12}	2408	4400	No
$v_{FO} = v_F - v_R$	781	4700	No
v_R	1627	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.574	
Space mean speed in ramp influence area,	S_R = 51.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.8	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	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	1305	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2240		1305			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	589		343			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2539	1479	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2539 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2539	4700	No
v_{12}	2539	4400	No
$v_{FO} = v_F - v_R$	1060	4700	No
v_R	1479	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.561	
Space mean speed in ramp influence area,	S_R = 52.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.1	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	689	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	891	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	689	891		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	181	234		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	816	1055	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 816 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1871	4700	No
v_{R12}	1871	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.311	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.8	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	935	vph

On Ramp Data

le 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	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	935	1210		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	246	318		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1107	1433	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1107 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2540	4700	No
v_{R12}	2540	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.335	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.3	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	AM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Southbound / Eastbound
Weaving Location:	Alta Road On Ramp - P.C Off Ra
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	1400	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
ume ratio, VR	0.55	
Weaving ratio, R	0.18	

Conversion to pc/h Under Base Conditions

	Non-Weaving		Weaving		
	V A-C	V B-D	V A-D	V B-C	
Volume, V	194	594	178	802	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	51	156	47	211	v
Trucks and buses	0	0	0	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	1.000	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	204	625	187	844	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
(Exhibit 24-6)	0.80	0.75
aving intensity factor, Wi	1.44	0.22
Weaving and non-weaving speeds, Si	37.58	60.17
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.57
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	45.13	mph
Weaving segment density, D	13.74	pc/mi/ln
Level of service, LOS	B	
Capacity of base condition, cb	4800	pc/h
Capacity as a 15-minute flow rate, c	4800	pc/h
Capacity as a full-hour volume, ch	4560	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1031	2800	a
Average flow rate (pcphpl)	620	2350	b
Volume ratio, VR	0.55	0.45	c
Weaving ratio, R	0.18	N/A	d
Weaving length (ft)	1400	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	PM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Southbound / Eastbound
Weaving Location:	Alta Road On Ramp - P.C Off Ra
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	1700	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
.ume ratio, VR	0.53	
Weaving ratio, R	0.18	

Conversion to pc/h Under Base Conditions

	Non-Weaving		Weaving		
	V A-C	V B-D	V A-D	V B-C	
Volume, V	92	1096	242	1089	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	24	288	64	287	v
Trucks and buses	0	0	0	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	1.000	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	96	1153	254	1146	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
' 'Exhibit 24-6)	0.80	0.75
, aving intensity factor, Wi	1.67	0.28
Weaving and non-weaving speeds, Si	35.60	58.02
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.63
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	43.53	mph
Weaving segment density, D	20.28	pc/mi/ln
Level of service, LOS	C	
Capacity of base condition, cb	4978	pc/h
Capacity as a 15-minute flow rate, c	4978	pc/h
Capacity as a full-hour volume, ch	4729	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1400	2800	a
Average flow rate (pcphpl)	883	2350	b
Volume ratio, VR	0.53	0.45	c
Weaving ratio, R	0.18	N/A	d
Weaving length (ft)	1700	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Passenger car off ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1580	vph

Off Ramp Data

le of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1394	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1580		1394			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	416		367			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1791	1580	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1791 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1791	4700	No
v_{12}	1791	4400	No
$v_{FO} = v_F - v_R$	211	4700	No
v_R	1580	3800	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 = 0.570	
Space mean speed in ramp influence area,	S_R = 51.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.9	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Passenger car off ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2145	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	1978	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2145		1978			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	564		521			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2432	2242	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2432 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2432	4700	No
v_{12}	2432	4400	No
$v_{FO} = v_F - v_R$	190	4700	No
v_R	2242	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 11.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.630	
Space mean speed in ramp influence area,	S_R = 50.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 50.5	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	1394	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	367	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	734	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	734	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.7	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	1978	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	521	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1041	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1041	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	17.9	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	186	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	49	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	110	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	110	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.9	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	167	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	44	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	99	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	99	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.7	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	2342	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	616	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1233	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1233	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	21.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	2124	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	559	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1118	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1118	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	19.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	248	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	65	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	147	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	147	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.5	pc/mi/ln

Level of service, LOS	A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	59	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	133	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	133	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.3	pc/mi/ln

Level of service, LOS	A

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Passenger Car On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	248	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	2342	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	248	2342		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	65	616		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	294	2773	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 294 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3067	4700	No
v_{R12}	3067	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 25.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.370

Space mean speed in ramp influence area, S_R = 56.5 mph

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

Space mean speed for all vehicles, S = 56.5 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Passenger Car On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	225	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	2124	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	225	2124		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	59	559		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	266	2515	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 266 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2781	4700	No
v_{R12}	2781	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 22.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.349	
Space mean speed in ramp influence area,	S_R = 57.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.0	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	AM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Northbound / Westbound
Weaving Location:	P.C On Ramp - Alta Rd Off Ramp
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	2300	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
ume ratio, VR	0.59	
Weaving ratio, R	0.12	

Conversion to pc/h Under Base Conditions

	Non-Weaving V A-C	Non-Weaving V B-D	Weaving V A-D	Weaving V B-C	
Volume, V	980	278	218	1610	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	258	73	57	424	v
Trucks and buses	0	0	0	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	1.000	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	1031	292	229	1694	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
(Exhibit 24-6)	0.80	0.75
aving intensity factor, Wi	1.75	0.34
Weaving and non-weaving speeds, Si	35.02	56.02
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.88
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	41.33	mph
Weaving segment density, D	26.18	pc/mi/ln
Level of service, LOS	C	
Capacity of base condition, cb	5260	pc/h
Capacity as a 15-minute flow rate, c	5260	pc/h
Capacity as a full-hour volume, ch	4997	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1923	2800	a
Average flow rate (pcphpl)	1082	2350	b
Volume ratio, VR	0.59	0.45	c
Weaving ratio, R	0.12	N/A	d
Weaving length (ft)	2300	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	PM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Northbound / Westbound
Weaving Location:	P.C On Ramp - Alta Rd Off Ramp
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	2300	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
ume ratio, VR	0.59	
Weaving ratio, R	0.12	

Conversion to pc/h Under Base Conditions

	Non-Weaving V A-C	Non-Weaving V B-D	Weaving V A-D	Weaving V B-C	
Volume, V	891	252	198	1458	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	234	66	52	384	v
Trucks and buses	0	0	0	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	1.000	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	937	265	208	1534	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
(Exhibit 24-6)	0.80	0.75
aving intensity factor, Wi	1.59	0.30
Weaving and non-weaving speeds, Si	36.25	57.32
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.85
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	42.65	mph
Weaving segment density, D	23.01	pc/mi/ln
Level of service, LOS	C	
Capacity of base condition, cb	5260	pc/h
Capacity as a 15-minute flow rate, c	5260	pc/h
Capacity as a full-hour volume, ch	4997	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1742	2800	a
Average flow rate (pcphpl)	981	2350	b
Volume ratio, VR	0.59	0.45	c
Weaving ratio, R	0.12	N/A	d
Weaving length (ft)	2300	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2590	vph

Off Ramp Data

ie of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1089	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2590		1089			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	682		287			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2936	1235	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2936 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2936	4700	No
v_{12}	2936	4400	No
$v_{FO} = v_F - v_R$	1701	4700	No
v_R	1235	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.539	
Space mean speed in ramp influence area,	S_R = 52.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.6	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2349	vph

Off Ramp Data

ie of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	990	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2349		990			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	618		261			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2663	1122	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2663 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2663	4700	No
v_{12}	2663	4400	No
$v_{FO} = v_F - v_R$	1541	4700	No
v_R	1122	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.529	
Space mean speed in ramp influence area,	S_R = 52.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.8	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1501	vph

On Ramp Data

ie of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1174	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1501	1174		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	395	309		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1702	1331	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1702 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3033	4700	No
v_{R12}	3033	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 25.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.367	
Space mean speed in ramp influence area,	S_R = 56.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.6	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1359	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	1595	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1359	1595		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	358	420		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1541	1808	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1541 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3349	4700	No
v_{R12}	3349	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.397

Space mean speed in ramp influence area, S_R = 55.9 mph

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

Space mean speed for all vehicles, S = 55.9 mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	Alta Rd On Rmp - SR 125 Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	2675	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	704	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1516	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1516	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	26.1	pc/mi/ln

Level of service, LOS	D

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	Alta Rd On Rmp - SR 125 Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Flow Inputs and Adjustments

Volume, V	2954	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	777	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1674	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1674	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	28.9	pc/mi/ln

Level of service, LOS	D

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2675	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	543	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2675		543			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	704		143			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3033	616	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

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

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3033	4700	No
v_{12}	3033	4400	No
$v_{FO} = v_F - v_R$	2417	4700	No
v_R	616	2000	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 = 0.483	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.9	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2954	vph

Off Ramp Data

ie of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	737	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2954		737			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	777		194			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3349	836	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3349 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3349	4700	No
v_{12}	3349	4400	No
$v_{FO} = v_F - v_R$	2513	4700	No
v_R	836	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.503	
Space mean speed in ramp influence area,	S_R = 53.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.4	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Sr 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	728	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	852	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	728	852		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	192	224		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	825	966	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 825 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1791	4700	No
v_{R12}	1791	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.309	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.9	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1371	vph

On Ramp Data

le of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	774	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1371	774		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	361	204		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1554	877	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1554 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2431	4700	No
v_{R12}	2431	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 20.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.330

Space mean speed in ramp influence area, S_R = 57.4 mph

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

Space mean speed for all vehicles, S = 57.4 mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	Sr 125 On Rmp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1580	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	416	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	896	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	896	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	15.4	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2145	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	564	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1216	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1216	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	21.0	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	186	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	49	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	110	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	110	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.9	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	167	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	44	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	99	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	99	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.7	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1394	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	367	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	790	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	790	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	13.6	pc/mi/ln

Level of service, LOS	B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1978	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	521	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1121	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1121	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	19.3	pc/mi/ln

Level of service, LOS	C

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2342	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	616	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1328	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1328	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	22.9	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2124	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	559	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1204	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1204	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	20.8	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	248	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	65	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	147	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	147	pc/h/ln
..ee-flow speed, FFS	58.0	mi/h
..erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.5	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	59	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	133	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	133	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.3	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2590	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	682	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1468	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1468	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	25.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2349	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	618	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1332	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1332	pc/h/ln
..ee-flow speed, FFS	58.0	mi/h
. .erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	23.0	pc/mi/ln

Level of service, LOS	C

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2590	vph

On Ramp Data

le of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	696	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2590	696		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	682	183		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2936	789	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2936 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3725	4700	No
v_{R12}	3725	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 31.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.448

Space mean speed in ramp influence area, S_R = 54.7 mph

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

Space mean speed for all vehicles, S = 54.7 mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2349	vph

On Ramp Data

ie of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	946	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2349	946		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	618	249		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2663	1072	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2663 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3735	4700	No
v_{R12}	3735	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 31.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.449	
Space mean speed in ramp influence area,	S_R = 54.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.7	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2392	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	941	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2392	941		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	629	248		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2712	1067	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2712 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3779	4700	No
v_{R12}	3779	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 31.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.457	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.5	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2195	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	855	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2195	855		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	578	225		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2488	969	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2488 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3457	4700	No
v_{R12}	3457	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 = 0.410

Space mean speed in ramp influence area, S_R = 55.6 mph

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

Space mean speed for all vehicles, S = 55.6 mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	3333	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	877	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1260	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1260	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	21.2	pc/mi/ln

Level of service, LOS	C

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	3050	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	803	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1153	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1153	pc/h/ln
ee-flow speed, FFS	59.5	mi/h
erage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	19.4	pc/mi/ln

Level of service, LOS	C

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3333	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	1286	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3333	1286		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	877	338		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3779	1458	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3779 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3779	4700	No
v_{12}	3779	4400	No
$v_{FO} = v_F - v_R$	2321	4700	No
v_R	1458	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.559	
Space mean speed in ramp influence area,	S_R = 52.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.1	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3050	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	1170	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3050	1170		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	803	308		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3458	1326	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3458 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3458	4700	No
v_{12}	3458	4400	No
$v_{FO} = v_F - v_R$	2132	4700	No
v_R	1326	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.547	
Space mean speed in ramp influence area,	S_R = 52.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.4	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2047	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	923	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2047	923		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	539	243		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2424	1093	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2424 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3517	4700	No
v_{R12}	3517	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 29.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.417	
Space mean speed in ramp influence area,	S_R = 55.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.4	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1880	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	1254	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1880	1254		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	495	330		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2226	1485	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2226 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3711	4700	No
v_{R12}	3711	4600	No

Level of Service Determination (if not F)

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

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

Speed Estimation

Intermediate speed variable,	M_S = 0.445	
Space mean speed in ramp influence area,	S_R = 54.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.8	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	2970	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	782	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	1172	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1172	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	19.7	pc/mi/ln

Level of service, LOS	C

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd Off Rmp - SV Rd On Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	3134	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	825	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	1237	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1237	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	20.8	pc/mi/ln

Level of service, LOS	C

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2970	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	2752	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2970		2752			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	782		724			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3367	3120	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3367 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3367	4700	No
v_{12}	3367	4400	No
$v_{FO} = v_F - v_R$	247	4700	No
v_R	3120	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.709	
Space mean speed in ramp influence area,	S_R = 48.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 48.7	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3131	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	2938	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3131		2938			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	824		773			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3550	3331	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v - v_F) P_{FD}$ = 3550 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3550	4700	No
v_{12}	3550	4400	No
$v_{FO} = v_F - v_R$	219	4700	No
v_R	3331	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 21.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.728	
Space mean speed in ramp influence area,	S_R = 48.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 48.3	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	218	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	57	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	129	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	129	pc/h/ln
..ee-flow speed, FFS	58.0	mi/h
. .erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.2	pc/mi/ln

Level of service, LOS	A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	196	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	52	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	116	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	116	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.0	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	1613	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	424	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	849	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	849	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	14.6	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	2288	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	602	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1204	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1204	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	20.8	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	2709	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	713	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1426	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1426	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	24.6	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	2457	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	647	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1293	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1293	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	22.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	288	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	76	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	171	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	171	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.9	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	261	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	69	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	155	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	155	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.7	pc/mi/ln

Level of service, LOS	A

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2709	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	931	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2709	931		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	713	245		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3071	1055	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1816 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4126	7050	No
v_{R12}	2871	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 24.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.355

Space mean speed in ramp influence area, S_R = 56.8 mph

Space mean speed in outer lanes, S_O = 62.3 mph

Space mean speed for all vehicles, S = 58.4 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2457	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	1265	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2457	1265		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	647	333		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2785	1434	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1647 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4219	7050	No
v_{R12}	3081	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 25.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.371	
Space mean speed in ramp influence area,	S_R = 56.5	mph
Space mean speed in outer lanes,	S_O = 62.7	mph
Space mean speed for all vehicles,	S = 58.0	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	3927	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1033	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1484	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1484	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	24.9	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	3983	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1048	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1505	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1505	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	25.3	pc/mi/ln

Level of service, LOS	C

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3927	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	1129	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3927		1129			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1033		297			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4452	1280	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4452 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4452	4700	No
v_{12}	4452	4400	Yes
$v_{FO} = v_F - v_R$	3172	4700	No
v_R	1280	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.543	
Space mean speed in ramp influence area,	S_R = 52.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.5	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3983	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	1026	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3983		1026			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1048		270			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4515	1163	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4515 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4515	4700	No
v_{12}	4515	4400	Yes
$v_{FO} = v_F - v_R$	3352	4700	No
v_R	1163	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.533	
Space mean speed in ramp influence area,	S_R = 52.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.7	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2798	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	1053	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2798	1053		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	736	277		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3172	1194	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

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

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4366	4700	No
v_{R12}	4366	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 35.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.593

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

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

Space mean speed for all vehicles, S = 51.4 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2957	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	1430	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2957	1430		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	778	376		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3352	1621	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3352 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4973	4700	Yes
v_{R12}	4973	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 40.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.849	
Space mean speed in ramp influence area,	S_R = 45.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 45.5	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	3851	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1013	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1455	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1455	pc/h/ln
ree-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	24.5	pc/mi/ln

Level of service, LOS	C

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Flow Inputs and Adjustments

Volume, V	4387	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1154	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1658	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1658	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	27.9	pc/mi/ln

Level of service, LOS	D

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3851	vph

Off Ramp Data

ide of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	769	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3851	769		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1013	202		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4366	872	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4366 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4366	4700	No
v_{12}	4366	4400	No
$v_{FO} = v_F - v_R$	3494	4700	No
v_R	872	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 37.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.506	
Space mean speed in ramp influence area,	S_R = 53.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.4	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll Two Interchanges

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4387	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	1045	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4387	1045		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1154	275		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4973	1185	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4973 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4973	4700	Yes
v_{12}	4973	4400	Yes
$v_{FO} = v_F - v_R$	3788	4700	No
v_R	1185	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 42.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.535	
Space mean speed in ramp influence area,	S_R = 52.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.7	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1800	vph

On Ramp Data

:e of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	921	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1800	921		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	474	242		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2041	1044	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2041 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3085	4700	No
v_{R12}	3085	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 25.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.371	
Space mean speed in ramp influence area,	S_R = 56.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.5	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2019	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	837	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2019	837		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	531	220		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2289	949	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2289 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3238	4700	No
v_{R12}	3238	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.385	
Space mean speed in ramp influence area,	S_R = 56.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.1	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - Alta Rd Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	2721	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	716	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1542	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1542	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	26.6	pc/mi/ln

Level of service, LOS	D

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - Alta Rd Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	2856	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	752	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1619	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1619	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	27.9	pc/mi/ln

Level of service, LOS	D

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2721	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	1870	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2721		1870			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	716		492			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3085	2120	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3085 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3085	4700	No
v_{12}	3085	4400	No
$v_{FO} = v_F - v_R$	965	4700	No
v_R	2120	2000	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.619	
Space mean speed in ramp influence area,	S_R = 50.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 50.8	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2856	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	1701	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2856		1701			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	752		448			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3238	1928	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3238 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3238	4700	No
v_{12}	3238	4400	No
$v_{FO} = v_F - v_R$	1310	4700	No
v_R	1928	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.602	
Space mean speed in ramp influence area,	S_R = 51.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	851	vph

On Ramp Data

..e of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	980	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	851	980		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	224	258		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1008	1161	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1008 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2169	4700	No
v_{R12}	2169	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.320

Space mean speed in ramp influence area, S_R = 57.6 mph

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

Space mean speed for all vehicles, S = 57.6 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1155	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	1331	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1155	1331		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	304	350		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1368	1576	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1368 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2944	4700	No
v_{R12}	2944	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 24.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.360	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.7	mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	AM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Southbound / Eastbound
Weaving Location:	Alta Road On Ramp - P.C Off Ra
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2035
Description:	No Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	1400	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
.ume ratio, VR	0.48	
Weaving ratio, R	0.24	

Conversion to pc/h Under Base Conditions

	Non-Weaving V A-C	Non-Weaving V B-D	Weaving V A-D	Weaving V B-C	
Volume, V	202	863	750	234	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	53	227	197	62	v
Trucks and buses	0	0	0	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	1.000	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	212	908	789	246	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
d (Exhibit 24-6)	0.80	0.75
.aving intensity factor, Wi	1.49	0.22
Weaving and non-weaving speeds, Si	37.11	60.20
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.45
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	46.35	mph
Weaving segment density, D	15.50	pc/mi/ln
Level of service, LOS	B	
Capacity of base condition, cb	4800	pc/h
Capacity as a 15-minute flow rate, c	4800	pc/h
Capacity as a full-hour volume, ch	4560	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1035	2800	a
Average flow rate (pcphpl)	718	2350	b
Volume ratio, VR	0.48	0.45	c
Weaving ratio, R	0.24	N/A	d
Weaving length (ft)	1400	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	PM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Southbound / Eastbound
Weaving Location:	Alta Road On Ramp - P.C Off Ra
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	1700	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
ume ratio, VR	0.53	
Weaving ratio, R	0.18	

Conversion to pc/h Under Base Conditions

	Non-Weaving		Weaving		
	V A-C	V B-D	V A-D	V B-C	
Volume, V	92	1096	242	1089	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	24	288	64	287	v
Trucks and buses	0	0	0	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	1.000	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	96	1153	254	1146	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
(Exhibit 24-6)	0.80	0.75
aving intensity factor, Wi	1.67	0.28
Weaving and non-weaving speeds, Si	35.60	58.02
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.63
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	43.53	mph
Weaving segment density, D	20.28	pc/mi/ln
Level of service, LOS	C	
Capacity of base condition, cb	4978	pc/h
Capacity as a 15-minute flow rate, c	4978	pc/h
Capacity as a full-hour volume, ch	4729	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1400	2800	a
Average flow rate (pcphpl)	883	2350	b
Volume ratio, VR	0.53	0.45	c
Weaving ratio, R	0.18	N/A	d
Weaving length (ft)	1700	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Passenger car off ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1831	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	1613	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1831		1613			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	482		424			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2076	1829	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2076 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2076	4700	No
v_{12}	2076	4400	No
$v_{FO} = v_F - v_R$	247	4700	No
v_R	1829	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 8.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.593	
Space mean speed in ramp influence area,	S_R = 51.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.4	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Passenger car off ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2486	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	2288	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2486	2288		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	654	602		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2818	2594	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2818 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2818	4700	No
v_{12}	2818	4400	No
$v_{FO} = v_F - v_R$	224	4700	No
v_R	2594	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 15.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.661	
Space mean speed in ramp influence area,	S_R = 49.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 49.8	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	1613	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	424	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	849	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	849	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	14.6	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	2288	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	602	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1204	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1204	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	20.8	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	218	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	57	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	135	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	135	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.3	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	196	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	52	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	121	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	121	pc/h/ln
..ee-flow speed, FFS	58.0	mi/h
. .erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.1	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	2709	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	713	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1426	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1426	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	24.6	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	2457	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	647	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1293	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1293	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	22.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	288	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	76	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	178	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	178	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	3.1	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Alta Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	261	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	69	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	161	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	161	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.8	pc/mi/ln

Level of service, LOS	A

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

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Passenger Car On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	288	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	2709	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	288	2709		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	76	713		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	341	3208	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 341 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3549	4700	No
v_{R12}	3549	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.422	
Space mean speed in ramp influence area,	S_R = 55.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.3	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Passenger Car On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	261	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	2457	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	261	2457		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	69	647		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	309	2910	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 309 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3219	4700	No
v_{R12}	3219	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 26.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.384

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

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

Space mean speed for all vehicles, S = 56.2 mph

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	AM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Northbound / Westbound
Weaving Location:	P.C On Ramp - Alta Rd Off Ramp
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	2300	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
ume ratio, VR	0.59	
Weaving ratio, R	0.12	

Conversion to pc/h Under Base Conditions

	Non-Weaving V A-C	Non-Weaving V B-D	Weaving V A-D	Weaving V B-C	
Volume, V	980	278	218	1610	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	258	73	57	424	v
Trucks and buses	0	0	0	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5*	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	1.000	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	1031	292	229	1694	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
(Exhibit 24-6)	0.80	0.75
aving intensity factor, Wi	1.75	0.34
Weaving and non-weaving speeds, Si	35.02	56.02
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.88
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	41.33	mph
Weaving segment density, D	26.18	pc/mi/ln
Level of service, LOS	C	
Capacity of base condition, cb	5260	pc/h
Capacity as a 15-minute flow rate, c	5260	pc/h
Capacity as a full-hour volume, ch	4997	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1923	2800	a
Average flow rate (pcphpl)	1082	2350	b
Volume ratio, VR	0.59	0.45	c
Weaving ratio, R	0.12	N/A	d
Weaving length (ft)	2300	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

HCS2000: Freeway Weaving Release 4.1f

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	VRPA Technologies
Agency/Co.:	VRPA Technologies
Date Performed:	5/7/2009
Analysis Time Period:	PM PEAK HOUR
Freeway/Dir of Travel:	SR 11 Northbound / Westbound
Weaving Location:	P.C On Ramp - Alta Rd Off Ramp
Jurisdiction:	CALTRANS - District 11
Analysis Year:	2035
Description:	Toll One Interchange

Inputs

Freeway free-flow speed, SFF	65	mph
Weaving number of lanes, N	3	
Weaving segment length, L	2300	ft
Terrain type	Level	
Grade		%
Length		mi
Weaving type	A	
.ume ratio, VR	0.59	
Weaving ratio, R	0.12	

Conversion to pc/h Under Base Conditions

	Non-Weaving		Weaving		
	V A-C	V B-D	V A-D	V B-C	
Volume, V	891	252	198	1458	veh/h
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Peak 15-min volume, v15	234	66	52	384	v
Trucks and buses	0	0	0	0	%
Recreational vehicles	0	0	0	0	%
Trucks and buses PCE, ET	1.5	1.5	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	1.2	1.2	
Heavy vehicle adjustment, fHV	1.000	1.000	1.000	1.000	
Driver population adjustment, fP	1.00	1.00	1.00	1.00	
Flow rate, v	937	265	208	1534	pc/h

Weaving and Non-Weaving Speeds

	Weaving	Non-Weaving
a (Exhibit 24-6)	0.15	0.00
b (Exhibit 24-6)	2.20	4.00
c (Exhibit 24-6)	0.97	1.30
' (Exhibit 24-6)	0.80	0.75
. aving intensity factor, Wi	1.59	0.30
Weaving and non-weaving speeds, Si	36.25	57.32
Number of lanes required for		

unconstrained operation, Nw (Exhibit 24-7)	1.85
Maximum number of lanes, Nw (max) (Exhibit 24-7)	1.40
Type of operation is	Constrained

Weaving Segment Speed, Density, Level of Service and Capacity

Weaving segment speed, S	42.65	mph
Weaving segment density, D	23.01	pc/mi/ln
Level of service, LOS	C	
Capacity of base condition, cb	5260	pc/h
Capacity as a 15-minute flow rate, c	5260	pc/h
Capacity as a full-hour volume, ch	4997	pc/h

Limitations on Weaving Segments

	Analyzed	If Max Exceeded Maximum	See Note Note
Weaving flow rate, Vw	1742	2800	a
Average flow rate (pcphpl)	981	2350	b
Volume ratio, VR	0.59	0.45	c
Weaving ratio, R	0.12	N/A	d
Weaving length (ft)	2300	2500	e

Notes:

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such cases.
i. Type C weaving segments do not operate well at volume ratios greater than 0.50. Poor operations and some local queuing are expected in such cases.

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2997	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	1198	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2997		1198			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	789		315			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3398	1358	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3398 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3398	4700	No
v_{12}	3398	4400	No
$v_{FO} = v_F - v_R$	2040	4700	No
v_R	1358	2000	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 = 0.550	
Space mean speed in ramp influence area,	S_R = 52.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.3	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2718	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	1089	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2718		1089			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	715		287			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3081	1235	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3081 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3081	4700	No
v_{12}	3081	4400	No
$v_{FO} = v_F - v_R$	1846	4700	No
v_R	1235	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.539	
Space mean speed in ramp influence area,	S_R = 52.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.6	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1799	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	1531	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1799	1531		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	473	403		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2039	1736	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2039 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3775	4700	No
v_{R12}	3775	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 31.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.456	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.5	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Alta Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1629	vph

On Ramp Data

de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	2079	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1629	2079		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	429	547		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1847	2357	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1847 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4204	4700	No
v_{R12}	4204	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 34.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.547	
Space mean speed in ramp influence area,	S_R = 52.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.4	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	Alta Rd On Rmp - SR 125 Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	3330	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	876	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1888	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1888	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	57.5	mi/h
Number of lanes, N	2	
Density, D	32.9	pc/mi/ln

Level of service, LOS	D

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	Alta Rd On Rmp - SR 125 Off Rp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Flow Inputs and Adjustments

Volume, V	3708	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	976	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	2102	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2102	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	55.0	mi/h
Number of lanes, N	2	
Density, D	38.2	pc/mi/ln

Level of service, LOS	E

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3330	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	753	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3330		753			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	876		198			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3775	854	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3775 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3775	4700	No
v_{12}	3775	4400	No
$v_{FO} = v_F - v_R$	2921	4700	No
v_R	854	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.505	
Space mean speed in ramp influence area,	S_R = 53.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.4	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	NoToll One Interchange

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3708	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	1023	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3708		1023			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	976		269			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4204	1160	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4204 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4204	4700	No
v_{12}	4204	4400	No
$v_{FO} = v_F - v_R$	3044	4700	No
v_R	1160	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 35.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.532	
Space mean speed in ramp influence area,	S_R = 52.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.8	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	979	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	852	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	979	852		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	258	224		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1110	966	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1110 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2076	4700	No
v_{R12}	2076	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 18.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.317	
Space mean speed in ramp influence area,	S_R = 57.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.7	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1712	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	774	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1712	774		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	451	204		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1941	877	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1941 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2818	4700	No
v_{R12}	2818	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 23.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.351	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.9	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1831	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	482	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1038	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1038	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	17.9	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2486	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	654	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1409	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1409	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	24.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	218	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	57	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	129	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	129	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.2	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	196	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	52	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	116	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	116	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.0	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	1613	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	424	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	914	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	914	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	15.8	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2288	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	602	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1297	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1297	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	22.4	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2709	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	713	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1536	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1536	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	26.5	pc/mi/ln

Level of service, LOS	D

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2457	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	647	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1393	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1393	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	24.0	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	288	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	76	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	171	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	171	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.9	pc/mi/ln

Level of service, LOS	A

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	261	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	69	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	155	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	155	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.7	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2997	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	789	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1699	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1699	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	29.3	pc/mi/ln

Level of service, LOS	D

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Flow Inputs and Adjustments

Volume, V	2718	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	715	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1541	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1541	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	26.6	pc/mi/ln

Level of service, LOS	D

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2997	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	696	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2997	696		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	789	183		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3398	789	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3398 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4187	4700	No
v_{R12}	4187	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 34.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.543	
Space mean speed in ramp influence area,	S_R = 52.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.5	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	No Toll No Interchanges

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2718	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	946	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2718	946		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	715	249		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3081	1072	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3081 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4153	4700	No
v_{R12}	4153	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 34.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.534	
Space mean speed in ramp influence area,	S_R = 52.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.7	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	812	vph

On Ramp Data

de of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	752	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	812	752		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	214	198		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	921	853	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 921 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1774	4700	No
v_{R12}	1774	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.309	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.9	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1439	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	684	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1439	684		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	379	180		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1631	775	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1631 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2406	4700	No
v_{R12}	2406	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 20.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.329	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.4	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Ramp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	1564	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	412	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	887	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	887	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	15.3	pc/mi/ln

Level of service, LOS	B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Ramp - SV Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	2123	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	559	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1203	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1203	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	20.7	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	1377	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	362	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	781	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	781	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	13.5	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	1955	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	514	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1108	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1108	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	19.1	pc/mi/ln

Level of service, LOS	C

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	186	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	49	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	110	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	110	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.9	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	167	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	44	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	99	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	99	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.7	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	2322	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	611	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1316	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1316	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	22.7	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Autos
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	2106	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	554	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1194	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1194	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	20.6	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

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Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	248	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	65	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	147	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	147	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.5	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of Siempre Viva Rd Comme
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	59	v
Trucks and buses	25	%
Recreational vehicles	1	%
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	0.887	
Driver population factor, fp	1.00	
Flow rate, vp	133	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	133	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.3	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	2570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	676	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1457	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1457	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	25.1	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation - Add Ramps

Flow Inputs and Adjustments

Volume, V	2331	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	613	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1321	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1321	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	22.8	pc/mi/ln

Level of service, LOS	C

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

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2570	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	615	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2570	615		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	676	162		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2914	697	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2914 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3611	4700	No
v_{R12}	3611	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 30.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.430	
Space mean speed in ramp influence area,	S_R = 55.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.1	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2331	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	836	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2331	836		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	613	220		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2643	948	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2643 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3591	4700	No
v_{R12}	3591	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 29.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.427

Space mean speed in ramp influence area, S_R = 55.2 mph

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

Space mean speed for all vehicles, S = 55.2 mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1851	vph

On Ramp Data

le of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	644	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1851	644		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	487	169		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2098	730	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2098 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2828	4700	No
v_{R12}	2828	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 24.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.352	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.9	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SR 125 On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1944	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	585	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1944	585		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	512	154		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2204	663	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2204 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2867	4700	No
v_{R12}	2867	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 24.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable, M_S = 0.355

Space mean speed in ramp influence area, S_R = 56.8 mph

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

Space mean speed for all vehicles, S = 56.8 mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	2495	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	657	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	943	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	943	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	15.8	pc/mi/ln

Level of service, LOS	B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	SR 125 On Rmp - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	2529	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	666	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	956	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	956	pc/h/ln
ree-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	16.1	pc/mi/ln

Level of service, LOS	B

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2495	vph

Off Ramp Data

..e of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1257	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2495		1257			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	657		331			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2829	1425	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.450 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2057 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2829	7050	No
v_{12}	2057	4400	No
$v_{FO} = v_F - v_R$	1404	7050	No
v_R	1425	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 8.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.556	
Space mean speed in ramp influence area,	S_R = 52.2	mph
Space mean speed in outer lanes,	S_O = 71.3	mph
Space mean speed for all vehicles,	S = 56.3	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2529	vph

Off Ramp Data

ide of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1143	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2529		1143			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	666		301			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2867	1296	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2867 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2867	4700	No
v_{12}	2867	4400	No
$v_{FO} = v_F - v_R$	1571	4700	No
v_R	1296	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 15.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.545	
Space mean speed in ramp influence area,	S_R = 52.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.5	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1238	vph

On Ramp Data

le of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	348	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1238	348		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	326	92		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1466	412	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1466 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1878	4700	No
v_{R12}	1878	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.312	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.8	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Rd Design Vari

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1386	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	473	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1386	473		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	365	124		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1641	560	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1641 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2201	4700	No
v_{R12}	2201	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 19.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.321	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.6	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1586	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	417	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	626	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	626	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	10.5	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1859	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	489	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	734	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	734	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	12.3	pc/mi/ln

Level of service, LOS	B

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1586	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	1400	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1586		1400			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	417		368			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1798	1587	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1798 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	1798	4700	No
v_{12}	1798	4400	No
$v_{FO} = v_F - v_R$	211	4700	No
v_R	1587	3800	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 = 0.571	
Space mean speed in ramp influence area,	S_R = 51.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.9	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1859	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	1692	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1859	1692		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	489	445		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2108	1918	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2108 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2108	4700	No
v_{12}	2108	4400	No
$v_{FO} = v_F - v_R$	190	4700	No
v_R	1918	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 8.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.601	
Space mean speed in ramp influence area,	S_R = 51.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	932	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	648	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	932	648		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	245	171		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1104	767	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1104 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1871	4700	No
v_{R12}	1871	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.311	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.8	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1265	vph

On Ramp Data

ie of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	880	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1265	880		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	333	232		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1498	1042	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1498 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2540	4700	No
v_{R12}	2540	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.335	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 57.3	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	186	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	49	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	110	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	110	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.9	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
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Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	167	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	44	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	99	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	99	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.7	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1394	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	367	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	734	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	734	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.7	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	1978	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	521	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1041	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1041	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	17.9	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	2342	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	616	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1233	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1233	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	21.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	2124	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	559	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1118	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1118	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	19.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	248	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	65	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	147	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	147	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.5	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	59	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	133	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	133	pc/h/ln
F ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.3	pc/mi/ln

Level of service, LOS	A

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2580	vph

Off Ramp Data

le of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	792	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2580		792			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	679		208			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2925	898	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.646 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2207 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2925	7050	No
v_{12}	2207	4400	No
$v_{FO} = v_F - v_R$	2027	7050	No
v_R	898	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 18.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.509	
Space mean speed in ramp influence area,	S_R = 53.3	mph
Space mean speed in outer lanes,	S_O = 71.3	mph
Space mean speed for all vehicles,	S = 56.8	mph

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2340	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	720	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2340		720			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	616		189			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2653	816	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 0.656 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2021 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2653	7050	No
v_{12}	2021	4400	No
$v_{FO} = v_F - v_R$	1837	7050	No
v_R	816	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 17.1 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.501	
Space mean speed in ramp influence area,	S_R = 53.5	mph
Space mean speed in outer lanes,	S_O = 71.3	mph
Space mean speed for all vehicles,	S = 56.9	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1798	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	534	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1798	534		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	473	141		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2038	605	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1205 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2643	7050	No
v_{R12}	1810	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.2 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.310	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_O = 63.8	mph
Space mean speed for all vehicles,	S = 59.6	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1629	vph

On Ramp Data

le of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	726	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1629	726		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	429	191		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1847	823	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1093 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2670	7050	No
v_{R12}	1916	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.312	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = 64.1	mph
Space mean speed for all vehicles,	S = 59.5	mph

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - EF Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	2322	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	611	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	877	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	877	pc/h/ln
..ee-flow speed, FFS	59.5	mi/h
..erage passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	14.7	pc/mi/ln

Level of service, LOS	B

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

HCS2000: Basic Freeway Segments Release 4.1f

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - EF Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	2346	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	617	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	887	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	887	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	14.9	pc/mi/ln

Level of service, LOS	B

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2322	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	426	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2322		426			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	611		112			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2632	483	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2632 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2632	4700	No
v_{12}	2632	4400	No
$v_{FO} = v_F - v_R$	2149	4700	No
v_R	483	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 13.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.471	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2346	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	387	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2346		387			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	617		102			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2660	439	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2660 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2660	4700	No
v_{12}	2660	4400	No
$v_{FO} = v_F - v_R$	2221	4700	No
v_R	439	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 13.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.468	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.2	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1896	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	1029	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1896	1029		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	499	271		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2149	1167	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2149 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3316	4700	No
v_{R12}	3316	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.7 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.393	
Space mean speed in ramp influence area,	S_R = 56.0	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.0	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1959	vph

On Ramp Data

ie of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1397	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1959	1397		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	516	368		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2221	1584	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2221 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3805	4700	No
v_{R12}	3805	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 31.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.461	
Space mean speed in ramp influence area,	S_R = 54.4	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.4	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	2925	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	770	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1105	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1105	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	18.6	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - SR 125 Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Variation

Flow Inputs and Adjustments

Volume, V	3356	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	883	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1268	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1268	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	21.3	pc/mi/ln

Level of service, LOS	C

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2925	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	526	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2925		526			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	770		138			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3316	596	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3316 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3316	4700	No
v_{12}	3316	4400	No
$v_{FO} = v_F - v_R$	2720	4700	No
v_R	596	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.3 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.482	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.9	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	SR 125 Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 11/Siempre Viva Road Design Va

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3356	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	715	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3356		715			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	883		188			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3805	811	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3805 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3805	4700	No
v_{12}	3805	4400	No
$v_{FO} = v_F - v_R$	2994	4700	No
v_R	811	2000	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.501	
Space mean speed in ramp influence area,	S_R = 53.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.5	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	West of EF Rd - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	2593	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	682	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	980	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	980	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	16.5	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	West of EF Rd - EF Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	2659	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	700	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1005	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1005	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	16.9	pc/mi/ln

Level of service, LOS	B

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2593	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	1039	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2593	1039		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	682	273		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2940	1178	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2940 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2940	4700	No
v_{12}	2940	4400	No
$v_{FO} = v_F - v_R$	1762	4700	No
v_R	1178	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 16.0 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.534	
Space mean speed in ramp influence area,	S_R = 52.7	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.7	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2659	vph

Off Ramp Data

le of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	945	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2659		945			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	700		249			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3014	1071	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3014 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3014	4700	No
v_{12}	3014	4400	No
$v_{FO} = v_F - v_R$	1943	4700	No
v_R	1071	3800	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 = 0.524	
Space mean speed in ramp influence area,	S_R = 52.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.9	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1554	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	907	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1554	907		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	409	239		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1840	1074	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1840 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2914	4700	No
v_{R12}	2914	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 24.6 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.358	
Space mean speed in ramp influence area,	S_R = 56.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 56.8	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1714	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	1232	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1714	1232		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	451	324		v
Trucks and buses	15	15		%
Recreational vehicles	25	25		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.889	0.889	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2030	1459	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2030 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3489	4700	No
v_{R12}	3489	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 = 0.414	
Space mean speed in ramp influence area,	S_R = 55.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.5	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	2461	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	648	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	971	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	971	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	16.3	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	EF Rd On Rmp - SV Rd Off Rmp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	2946	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	775	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	1163	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1163	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	19.5	pc/mi/ln

Level of service, LOS	C

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

HCS2000: Ramps and Ramp Junctions Release 4.1f

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2461	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	2275	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2461		2275			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	648		599			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2790	2579	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2790 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2790	4700	No
v_{12}	2790	4400	No
$v_{FO} = v_F - v_R$	211	4700	No
v_R	2579	3800	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 = 0.660	
Space mean speed in ramp influence area,	S_R = 49.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 49.8	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Eastbound
Junction:	SV Rd & P.C Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2946	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	2779	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2946		2779			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	775		731			v
Trucks and buses	15		15			%
Recreational vehicles	1		1			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3340	3151	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3340 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3340	4700	No
v_{12}	3340	4400	No
$v_{FO} = v_F - v_R$	189	4700	No
v_R	3151	3800	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 = 0.712	
Space mean speed in ramp influence area,	S_R = 48.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 48.6	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	186	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	49	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	110	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	110	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.9	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	167	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	44	v
Trucks and buses	15	%
Recreational vehicles	25	%
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	0.889	
Driver population factor, fp	1.00	
Flow rate, vp	99	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	99	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	1.7	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	1394	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	367	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	734	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	734	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	12.7	pc/mi/ln

Level of service, LOS B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Eastbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	1978	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	521	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1041	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1041	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	17.9	pc/mi/ln

Level of service, LOS	B

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	2332	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	614	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1227	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1227	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	21.2	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Auto's)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	2115	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	557	v
Trucks and buses	0	%
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	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1113	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1113	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	19.2	pc/mi/ln

Level of service, LOS	C

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

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2332	vph

On Ramp Data

ide of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	721	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2332	721		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	614	190		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2644	817	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1564 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3461	7050	No
v_{R12}	2381	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 20.5 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 = 57.5 mph

Space mean speed in outer lanes, S_O = 62.9 mph

Space mean speed for all vehicles, S = 59.1 mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Siempre Viva Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2115	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	979	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2115	979		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	557	258		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2398	1110	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1418 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3508	7050	No
v_{R12}	2528	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.5 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.335	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = 63.3	mph
Space mean speed for all vehicles,	S = 58.9	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	248	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	65	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	153	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	153	pc/h/ln
ee-flow speed, FFS	58.0	mi/h
erage passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.6	pc/mi/ln

Level of service, LOS A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	South of SV Rd (Commerc)
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	59	v
Trucks and buses	25	%
Recreational vehicles	25	%
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	0.851	
Driver population factor, fp	1.00	
Flow rate, vp	139	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	58.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	139	pc/h/ln
Free-flow speed, FFS	58.0	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	2	
Density, D	2.4	pc/mi/ln

Level of service, LOS	A

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - EF Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	3301	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	869	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1247	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1247	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	21.0	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	SV Rd - EF Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	3319	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	873	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1254	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1254	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	21.1	pc/mi/ln

Level of service, LOS	C

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

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3301	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	1109	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3301	1109		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	869	292		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3742	1257	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3742 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3742	4700	No
v_{12}	3742	4400	No
$v_{FO} = v_F - v_R$	2485	4700	No
v_R	1257	3800	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.9 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	D_S = 0.541	
Space mean speed in ramp influence area,	S_R = 52.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.6	mph

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Diverge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd Off Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3319	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	1008	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane	500	ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3319	1008		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	873	265		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3763	1143	pcph

Estimation of V12 Diverge Areas

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

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3763 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3763	4700	No
v_{12}	3763	4400	No
$v_{FO} = v_F - v_R$	2620	4700	No
v_R	1143	3800	No

Level of Service Determination (if not F)

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

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

Speed Estimation

Intermediate speed variable,	D_S = 0.531	
Space mean speed in ramp influence area,	S_R = 52.8	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 52.8	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	AM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2192	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	851	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2192	851		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	577	224		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2485	965	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2485 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3450	4700	No
v_{R12}	3450	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 28.8 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.409	
Space mean speed in ramp influence area,	S_R = 55.6	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 55.6	mph

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Merge Analysis

Analyst:	VRPA Technologies, Inc.
Agency/Co.:	
Date performed:	2/24/2009
Analysis time period:	PM Peak
Freeway/Dir of Travel:	SR 11 / Westbound
Junction:	Enrico Fermi Rd On Ramp
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variat

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2311	vph

On Ramp Data

ie of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1155	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

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

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2311	1155		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	608	304		v
Trucks and buses	15	15		%
Recreational vehicles	1	1		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.929	0.929	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2620	1309	pcph

Estimation of V12 Merge Areas

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

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2620 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3929	4700	No
v_{R12}	3929	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 32.4 pc/mi/ln

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

Speed Estimation

Intermediate speed variable,	M_S = 0.484	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 53.9	mph

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	AM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - West of EF Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	3043	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	801	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1150	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1150	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	19.3	pc/mi/ln

Level of service, LOS	C

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

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Operational Analysis

Analyst:	VRPA Technologies, Inc.
Agency or Company:	
Date Performed:	2/24/2009
Analysis Time Period:	PM Peak
Freeway/Direction:	SR 11 / Westbound
From/To:	EF Rd On Rmp - West of EF Rd
Jurisdiction:	Caltrans - District 11
Analysis Year:	2035
Description:	SR 905/SR 125/SR 11 Design Variation-Delete Ramps

Flow Inputs and Adjustments

Volume, V	3466	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	912	v
Trucks and buses	15	%
Recreational vehicles	1	%
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	0.929	
Driver population factor, fp	1.00	
Flow rate, vp	1310	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	1.00	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	2.5	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	59.5	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1310	pc/h/ln
Free-flow speed, FFS	59.5	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	3	
Density, D	22.0	pc/mi/ln

Level of service, LOS	C

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