

APPENDIX Q

FREEWAY LEVEL OF SERVICE WORKSHEETS

EXISTING (2004)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	Site Information
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Analyst: K. Lund	Freeway/Dir of Travel: SR-30 Northbound
Agency or Company: LSA Associates	Junction: 5th Street Off-Ramp
Date Performed: 1/16/2007	Jurisdiction: Caltrans
Analysis Time Period: AM Peak Hour	Analysis Year: 2004

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	2919	0.92	Level	0	0	1.000	1.00	3173
Ramp	712	0.92	Level	0	0	1.000	1.00	774
UpStream								
DownStream								

Merge Areas	Diverge Areas
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Estimation of v ₁₂	Estimation of v ₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = using Equation (Exhibit 25-5) V ₁₂ = pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = 1.000 using Equation (Exhibit 25-11) V ₁₂ = 3173 pc/h
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Capacity Checks	Capacity Checks
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	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}				V _{F1} = V _F	3173	4680	No
				V ₁₂	3173	4400:All	No
V _{R12}				V _{FO} = V _F - V _R	2399	4680	No
				V _R	774	2100	No

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$ D _R = 31.5 (pc/mi/ln) LOS = D (Exhibit 25-4)
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Speed Estimation	Speed Estimation
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M _S = (Exhibit 25-19) S _R = mph (Exhibit 25-19) S ₀ = mph (Exhibit 25-19) S = mph (Exhibit 25-14)	D _S = 0.368 (Exhibit 25-19) S _R = 55.9 mph (Exhibit 25-19) S ₀ = N/A mph (Exhibit 25-19) S = 55.9 mph (Exhibit 25-15)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	Site Information
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Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2004

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3807	0.92	Level	0	0	1.000	1.00	4138
Ramp	827	0.92	Level	0	0	1.000	1.00	899
UpStream								
DownStream								

Merge Areas	Diverge Areas
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Estimation of v ₁₂	Estimation of v ₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = using Equation (Exhibit 25-5) V ₁₂ = pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = 1.000 using Equation (Exhibit 25-11) V ₁₂ = 4138 pc/h
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Capacity Checks	Capacity Checks
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	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}				V _{F1} = V _F	4138	4680	No
				V ₁₂	4138	4400:All	No
V _{R12}				V _{FO} = V _F - V _R	3239	4680	No
				V _R	899	2100	No

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$ D _R = 39.8 (pc/mi/ln) LOS = E (Exhibit 25-4)
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Speed Estimation	Speed Estimation
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M _S = (Exhibit 25-19) S _R = mph (Exhibit 25-19) S ₀ = mph (Exhibit 25-19) S = mph (Exhibit 25-14)	D _S = 0.379 (Exhibit 25-19) S _R = 55.7 mph (Exhibit 25-19) S ₀ = N/A mph (Exhibit 25-19) S = 55.7 mph (Exhibit 25-15)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street On-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2004

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> $S_{FF} = 64.0 \text{ mph}$ $S_{FR} = 25.0 \text{ mph}$ </div> Sketch (show lanes, L _A , L _D , V _R , V _F)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	2207	0.92	Level	0	0	1.000	1.00	2399
Ramp	282	0.92	Level	0	0	1.000	1.00	307
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 2399 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	2706	See Exhibit 25-7	No
V _{R12}	2706	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 26.4 (pc/mi/ln)
 LOS = C (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.379 (Exhibit 25-19)
 S_R = 55.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 55.7 mph (Exhibit 25-14)

Speed Estimation

D_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street On-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2004

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 25.0 mph Sketch (show lanes, L_A, L_D, V_R, V_F) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	2980	0.92	Level	0	0	1.000	1.00	3239
Ramp	225	0.92	Level	0	0	1.000	1.00	245
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3239 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	3484	See Exhibit 25-7	No
V _{R12}	3484	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 32.5 (pc/mi/ln)
 LOS = D (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.448 (Exhibit 25-19)
 S_R = 54.1 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 54.1 mph (Exhibit 25-14)

Speed Estimation

D_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	Site Information
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Analyst K. Lund	Freeway/Dir of Travel SR-30 Southbound
Agency or Company LSA Associates	Junction 5th Street Off-Ramp
Date Performed 1/16/2007	Jurisdiction Caltrans
Analysis Time Period AM Peak Hour	Analysis Year 2004

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3165	0.92	Level	0	0	1.000	1.00	3440
Ramp	291	0.92	Level	0	0	1.000	1.00	316
UpStream								
DownStream								

Merge Areas	Diverge Areas
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Estimation of v ₁₂	Estimation of v ₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = using Equation (Exhibit 25-5) V ₁₂ = pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = 1.000 using Equation (Exhibit 25-11) V ₁₂ = 3440 pc/h
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Capacity Checks	Capacity Checks
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	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}				V _{F1} = V _F	3440	4680	No
				V ₁₂	3440	4400:All	No
V _{R12}				V _{FO} = V _F - V _R	3124	4680	No
				V _R	316	2100	No

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$ D _R = 33.8 (pc/mi/ln) LOS = D (Exhibit 25-4)
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Speed Estimation	Speed Estimation
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M _S = (Exhibit 25-19) S _R = mph (Exhibit 25-19) S ₀ = mph (Exhibit 25-19) S = mph (Exhibit 25-14)	D _S = 0.326 (Exhibit 25-19) S _R = 56.8 mph (Exhibit 25-19) S ₀ = N/A mph (Exhibit 25-19) S = 56.8 mph (Exhibit 25-15)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	Site Information
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Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2004

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_f) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3045	0.92	Level	0	0	1.000	1.00	3310
Ramp	281	0.92	Level	0	0	1.000	1.00	305
UpStream								
DownStream								

Merge Areas	Diverge Areas
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Estimation of v ₁₂	Estimation of v ₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = using Equation (Exhibit 25-5) V ₁₂ = pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = 1.000 using Equation (Exhibit 25-11) V ₁₂ = 3310 pc/h
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Capacity Checks	Capacity Checks
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	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}				V _{F1} = V _F	3310	4680	No
				V ₁₂	3310	4400:All	No
V _{R12}				V _{FO} = V _F - V _R	3005	4680	No
				V _R	305	2100	No

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = (pc/mi/ln) LOS = (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$ D _R = 32.7 (pc/mi/ln) LOS = D (Exhibit 25-4)
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Speed Estimation	Speed Estimation
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M _S = (Exhibit 25-19) S _R = mph (Exhibit 25-19) S ₀ = mph (Exhibit 25-19) S = mph (Exhibit 25-14)	D _S = 0.325 (Exhibit 25-19) S _R = 56.8 mph (Exhibit 25-19) S ₀ = N/A mph (Exhibit 25-19) S = 56.8 mph (Exhibit 25-15)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 1/16/2007
 Analysis Time Period: AM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Southbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2004

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	2874	0.92	Level	0	0	1.000	1.00	3124
Ramp	1074	0.92	Level	0	0	1.000	1.00	1167
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3124 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	4291	See Exhibit 25-7	No
V _{R12}	4291	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F -			
V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 38.4 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.606 (Exhibit 25-19)
 S_R = 50.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 50.7 mph (Exhibit 25-14)

Speed Estimation

D_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 1/16/2007
 Analysis Time Period: PM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Southbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2004

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> $S_{FF} = 64.0 \text{ mph}$ $S_{FR} = 25.0 \text{ mph}$ </div> Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	2764	0.92	Level	0	0	1.000	1.00	3004
Ramp	695	0.92	Level	0	0	1.000	1.00	755
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3004 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	3759	See Exhibit 25-7	No
V _{R12}	3759	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 34.4 (pc/mi/ln)
 LOS = D (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.488 (Exhibit 25-19)
 S_R = 53.3 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 53.3 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

YEAR 2008 BACKGROUND

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2008 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _p)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	3299	0.92	Level	0	0	1.000	1.00	3586
Ramp	789	0.92	Level	0	0	1.000	1.00	858
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 3586 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	3586	4680	No
V ₁₂	3586	4400:All	No
V _{FO} = V _F - V _R	2728	4680	No
V _R	858	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 35.1 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.375 (Exhibit 25-19)
 S_R = 55.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 55.7 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	8/30/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2008 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	4246	0.92	Level	0	0	1.000	1.00	4615
Ramp	897	0.92	Level	0	0	1.000	1.00	975
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 4615 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
			V _{F1} = V _F
			V ₁₂
V _{R12}			
			V _{FO} = V _F - V _R
			V _R
			V _R

Capacity Checks

	Actual	Maximum	LOS F?
			V _{F1} = V _F
	4615	4680	No
			V ₁₂
	4615	4400:All	Yes
			V _{FO} = V _F - V _R
	3640	4680	No
			V _R
	975	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 43.9 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.386 (Exhibit 25-19)
 S_R = 55.5 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 55.5 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street On-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2008 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 25.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	2510	0.92	Level	0	0	1.000	1.00	2728
Ramp	295	0.92	Level	0	0	1.000	1.00	321
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 2728 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	3049	See Exhibit 25-7	No
V _{R12}	3049	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 29.1 (pc/mi/ln)
 LOS = D (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.403 (Exhibit 25-19)
 S_R = 55.1 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 55.1 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street On-Ramp
Date Performed		Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2008 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	3348	0.92	Level	0	0	1.000	1.00	3639
Ramp	254	0.92	Level	0	0	1.000	1.00	276
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3639 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	3915	See Exhibit 25-7	No
V _{R12}	3915	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 35.9 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.517 (Exhibit 25-19)
 S_R = 52.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 52.6 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2008 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3595	0.92	Level	0	0	1.000	1.00	3908
Ramp	349	0.92	Level	0	0	1.000	1.00	379
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 3908 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	3908	4680	No
V ₁₂	3908	4400:All	No
V _{FO} = V _F - V _R	3529	4680	No
V _R	379	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 37.9 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.332 (Exhibit 25-19)
 S_R = 56.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 56.7 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2008 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3288	0.92	Level	0	0	1.000	1.00	3574
Ramp	287	0.92	Level	0	0	1.000	1.00	312
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 3574 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	3574	4680	No
V ₁₂	3574	4400:All	No
V _{FO} = V _F - V _R	3262	4680	No
V _R	312	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 35.0 (pc/mi/ln)
 LOS = D (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.326 (Exhibit 25-19)
 S_R = 56.8 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 56.8 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 1/16/2007
 Analysis Time Period: AM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Southbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2008 Background

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3246	0.92	Level	0	0	1.000	1.00	3528
Ramp	1134	0.92	Level	0	0	1.000	1.00	1233
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3528 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	4761	See Exhibit 25-7	Yes
V _{R12}	4761	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 42.0 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.777 (Exhibit 25-19)
 S_R = 46.9 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 46.9 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street On-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2008 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 25.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3000	0.92	Level	0	0	1.000	1.00	3261
Ramp	804	0.92	Level	0	0	1.000	1.00	874
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3261 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	4135	See Exhibit 25-7	No
V _{R12}	4135	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 37.3 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.565 (Exhibit 25-19)
 S_R = 51.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 51.6 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

YEAR 2008 – LAND USE ALTERNATIVE 1

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 1/16/2007
 Analysis Time Period: AM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Northbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2008 Land Use Alt. 1

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	2510	0.92	Level	0	0	1.000	1.00	2728
Ramp	298	0.92	Level	0	0	1.000	1.00	324
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 2728 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	3052	See Exhibit 25-7	No
V _{R12}	3052	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 29.1 (pc/mi/ln)
 LOS = D (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.404 (Exhibit 25-19)
 S_R = 55.1 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 55.1 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	8/30/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2008 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	4248	0.92	Level	0	0	1.000	1.00	4617
Ramp	899	0.92	Level	0	0	1.000	1.00	977
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 4617 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
			V _{F1} = V _F
			V ₁₂
V _{R12}			
			V _{FO} = V _F - V _R
			V _R
			V _R

Capacity Checks

	Actual	Maximum	LOS F?
			V _{F1} = V _F
			V ₁₂
			V _{FO} = V _F - V _R
			V _R
			V _R

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 44.0 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.386 (Exhibit 25-19)
 S_R = 55.5 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 55.5 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2008 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _p)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3305	0.92	Level	0	0	1.000	1.00	3592
Ramp	795	0.92	Level	0	0	1.000	1.00	864
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 3592 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
			V _{F1} = V _F
			V ₁₂
V _{R12}			
			V _{FO} = V _F - V _R
			V _R

Capacity Checks

	Actual	Maximum	LOS F?
	3592	4680	No
	3592	4400:All	No
	2728	4680	No
	864	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 35.1 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.376 (Exhibit 25-19)
 S_R = 55.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 55.7 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 8/30/2007
 Analysis Time Period: PM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Northbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2008 Land Use Alt. 1

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <hr/> S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	3348	0.92	Level	0	0	1.000	1.00	3639
Ramp	254	0.92	Level	0	0	1.000	1.00	276
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3639 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	3915	See Exhibit 25-7	No
V _{R12}	3915	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F -			
V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 35.9 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.517 (Exhibit 25-19)
 S_R = 52.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 52.6 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2008 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	3597	0.92	Level	0	0	1.000	1.00	3910
Ramp	351	0.92	Level	0	0	1.000	1.00	382
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 3910 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	3910	4680	No
V ₁₂	3910	4400:All	No
V _{FO} = V _F - V _R	3528	4680	No
V _R	382	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 37.9 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.332 (Exhibit 25-19)
 S_R = 56.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 56.7 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2008 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3288	0.92	Level	0	0	1.000	1.00	3574
Ramp	287	0.92	Level	0	0	1.000	1.00	312
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 3574 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
			V _{F1} = V _F
			V ₁₂
V _{R12}			
			V _{FO} = V _F - V _R
			V _R

Capacity Checks

	Actual	Maximum	LOS F?
			V _{F1} = V _F
	3574	4680	No
			V ₁₂
	3574	4400:All	No
			V _{FO} = V _F - V _R
	3262	4680	No
			V _R
	312	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 35.0 (pc/mi/ln)
 LOS = D (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.326 (Exhibit 25-19)
 S_R = 56.8 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 56.8 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 1/16/2007
 Analysis Time Period: AM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Southbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2008

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3246	0.92	Level	0	0	1.000	1.00	3528
Ramp	1140	0.92	Level	0	0	1.000	1.00	1239
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3528 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	4767	See Exhibit 25-7	Yes
V _{R12}	4767	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 42.1 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.780 (Exhibit 25-19)
 S_R = 46.9 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 46.9 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst
Agency or Company
Date Performed
Analysis Time Period

K. Lund
LSA Associates
1/16/2007
PM Peak Hour

Site Information

Freeway/Dir of Travel
Junction
Jurisdiction
Analysis Year

SR-30 Southbound
5th Street On-Ramp
Caltrans
2008 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	3000	0.92	Level	0	0	1.000	1.00	3261
Ramp	806	0.92	Level	0	0	1.000	1.00	876
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3261 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	4137	See Exhibit 25-7	No
V _{R12}	4137	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F -			
V _R			

Level of Service Determination (if not F)

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

D_R = 37.3 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.565 (Exhibit 25-19)
 S_R = 51.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 51.6 mph (Exhibit 25-14)

Speed Estimation

D_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

YEAR 2008 – LAND USE ALTERNATIVE 2

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2030 Land Use Alt. 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 63.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	5411	0.92	Level	0	0	1.000	1.00	5882
Ramp	1235	0.92	Level	0	0	1.000	1.00	1342
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 5882 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	5882	4660	Yes
V ₁₂	5882	4400:All	Yes
V _{FO} = V _F - V _R	4540	4660	No
V _R	1342	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 54.8 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.419 (Exhibit 25-19)
 S_R = 54.2 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 54.2 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	8/30/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2008 Land Use Alt. 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	4251	0.92	Level	0	0	1.000	1.00	4621
Ramp	902	0.92	Level	0	0	1.000	1.00	980
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 4621 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	4621	4680	No
V ₁₂	4621	4400:All	Yes
V _{FO} = V _F - V _R	3641	4680	No
V _R	980	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 44.0 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.386 (Exhibit 25-19)
 S_R = 55.5 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 55.5 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET								
General Information				Site Information				
Analyst	K. Lund			Freeway/Dir of Travel	SR-30 Northbound			
Agency or Company	LSA Associates			Junction	5th Street Off-Ramp			
Date Performed	1/16/2007			Jurisdiction	Caltrans			
Analysis Time Period	PM Peak Hour			Analysis Year	2008 Land Use Alt. 2			
Project Description Upper Santa Ana River Wash Traffic Study								
Inputs								
Upstream Adj Ramp		Terrain: Level				Downstream Adj Ramp		
<input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off						<input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off		
$L_{up} =$	ft	$S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph				$L_{down} =$	ft	
$V_u =$	veh/h	Sketch (show lanes, L_A, L_D, V_R, V_P)				$V_D =$	veh/h	
Conversion to pc/h Under Base Conditions								
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4256	0.92	Level	0	0	1.000	1.00	4626
Ramp	926	0.92	Level	0	0	1.000	1.00	1007
UpStream								
DownStream								
Merge Areas				Diverge Areas				
Estimation of v_{12}				Estimation of v_{12}				
$V_{12} = V_F (P_{FM})$				$V_{12} = V_R + (V_F - V_R)P_{FD}$				
$L_{EQ} =$ (Equation 25-2 or 25-3)				$L_{EQ} =$ (Equation 25-8 or 25-9)				
$P_{FM} =$ using Equation (Exhibit 25-5)				$P_{FD} = 1.000$ using Equation (Exhibit 25-11)				
$V_{12} =$ pc/h				$V_{12} = 4626$ pc/h				
Capacity Checks				Capacity Checks				
	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?	
V_{FO}				$V_{FI} = V_F$	4626	4680	No	
				V_{12}	4626	4400:All	Yes	
V_{R12}				$V_{FO} = V_F - V_R$	3619	4680	No	
				V_R	1007	2100	No	
Level of Service Determination (if not F)				Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$				$D_R = 4.252 + 0.0086 v_{12} - 0.0009 L_D$				
$D_R =$ (pc/mi/ln)				$D_R = 44.0$ (pc/mi/ln)				
LOS = (Exhibit 25-4)				LOS = F (Exhibit 25-4)				
Speed Estimation				Speed Estimation				
$M_S =$ (Exhibit 25-19)				$D_S = 0.389$ (Exhibit 25-19)				
$S_R =$ mph (Exhibit 25-19)				$S_R = 55.5$ mph (Exhibit 25-19)				
$S_0 =$ mph (Exhibit 25-19)				$S_0 =$ N/A mph (Exhibit 25-19)				
$S =$ mph (Exhibit 25-14)				$S = 55.5$ mph (Exhibit 25-15)				

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 8/30/2007
 Analysis Time Period: PM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Northbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2008 Land Use Alt. 2

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <hr/> S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	3348	0.92	Level	0	0	1.000	1.00	3639
Ramp	256	0.92	Level	0	0	1.000	1.00	278
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3639 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	3917	See Exhibit 25-7	No
V _{R12}	3917	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 35.9 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.517 (Exhibit 25-19)
 S_R = 52.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 52.6 mph (Exhibit 25-14)

Speed Estimation

D_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET								
General Information				Site Information				
Analyst	K. Lund			Freeway/Dir of Travel	SR-30 Northbound			
Agency or Company	LSA Associates			Junction	5th Street On-Ramp			
Date Performed	1/16/2007			Jurisdiction	Caltrans			
Analysis Time Period	PM Peak Hour			Analysis Year	2008 Land Use Alt. 2			
Project Description Upper Santa Ana River Wash Traffic Study								
Inputs								
Upstream Adj Ramp		Terrain: Level				Downstream Adj Ramp		
<input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off						<input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off		
L _{up} = ft						L _{down} = ft		
V _u = veh/h		S _{FF} = 64.0 mph		S _{FR} = 25.0 mph		V _D = veh/h		
Sketch (show lanes, L _A , L _D , V _R , V _P)								
Conversion to pc/h Under Base Conditions								
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	3329	0.92	Level	0	0	1.000	1.00	3618
Ramp	284	0.92	Level	0	0	1.000	1.00	309
UpStream								
DownStream								
Merge Areas					Diverge Areas			
Estimation of v₁₂					Estimation of v₁₂			
$V_{12} = V_F (P_{FM})$					$V_{12} = V_R + (V_F - V_R)P_{FD}$			
L _{EQ} = (Equation 25-2 or 25-3)					L _{EQ} = (Equation 25-8 or 25-9)			
P _{FM} = 1.000 using Equation (Exhibit 25-5)					P _{FD} = using Equation (Exhibit 25-11)			
V ₁₂ = 3618 pc/h					V ₁₂ = pc/h			
Capacity Checks					Capacity Checks			
	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?	
V _{FO}	3927	See Exhibit 25-7	No	V _{FI} = V _F				
				V ₁₂				
V _{R12}	3927	4600:All	No	V _{FO} = V _F -				
				V _R				
				V _R				
Level of Service Determination (if not F)					Level of Service Determination (if not F)			
$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$					$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$			
D _R = 36.0 (pc/mi/ln)					D _R = (pc/mi/ln)			
LOS = E (Exhibit 25-4)					LOS = (Exhibit 25-4)			
Speed Estimation					Speed Estimation			
M _S = 0.519 (Exhibit 25-19)					D _s = (Exhibit 25-19)			
S _R = 52.6 mph (Exhibit 25-19)					S _R = mph (Exhibit 25-19)			
S ₀ = N/A mph (Exhibit 25-19)					S ₀ = mph (Exhibit 25-19)			
S = 52.6 mph (Exhibit 25-14)					S = mph (Exhibit 25-15)			

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2008 Land Use Alt. 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	3601	0.92	Level	0	0	1.000	1.00	3914
Ramp	355	0.92	Level	0	0	1.000	1.00	386
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 3914 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
			V _{F1} = V _F
			V ₁₂
V _{R12}			
			V _{FO} = V _F - V _R
			V _R
			V _R

Capacity Checks

	Actual	Maximum	LOS F?
			3914
			4680
			No
			3914
			4400:All
			No
			3528
			4680
			No
			386
			2100
			No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 37.9 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.333 (Exhibit 25-19)
 S_R = 56.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 56.7 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2008 Land Use Alt 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	3290	0.92	Level	0	0	1.000	1.00	3576
Ramp	289	0.92	Level	0	0	1.000	1.00	314
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 3576 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	3576	4680	No
V ₁₂	3576	4400:All	No
V _{FO} = V _F - V _R	3262	4680	No
V _R	314	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 35.0 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.326 (Exhibit 25-19)
 S_R = 56.8 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 56.8 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 1/16/2007
 Analysis Time Period: AM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Southbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2008 Land Use Alt. 2

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3246	0.92	Level	0	0	1.000	1.00	3528
Ramp	1154	0.92	Level	0	0	1.000	1.00	1254
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3528 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	4782	See Exhibit 25-7	Yes
V _{R12}	4782	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 42.2 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.786 (Exhibit 25-19)
 S_R = 46.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 46.7 mph (Exhibit 25-14)

Speed Estimation

D_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 1/16/2007
 Analysis Time Period: PM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Southbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2008 Land Use Alt. 2

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <hr/> S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	3000	0.92	Level	0	0	1.000	1.00	3261
Ramp	807	0.92	Level	0	0	1.000	1.00	877
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 3261 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	4138	See Exhibit 25-7	No
V _{R12}	4138	4600:All	No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 37.3 (pc/mi/ln)
 LOS = E (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.565 (Exhibit 25-19)
 S_R = 51.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 51.6 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

YEAR 2030 BACKGROUND

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2030 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	5391	0.92	Level	0	0	1.000	1.00	5860
Ramp	1215	0.92	Level	0	0	1.000	1.00	1321
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 5860 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
			V _{F1} = V _F 5860 4680 Yes
			V ₁₂ 5860 4400:All Yes
V _{R12}			
			V _{FO} = V _F - V _R 4539 4680 No
			V _R 1321 2100 No

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
			V _{F1} = V _F 5860 4680 Yes
			V ₁₂ 5860 4400:All Yes
V _{R12}			
			V _{FO} = V _F - V _R 4539 4680 No
			V _R 1321 2100 No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 54.6 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.417 (Exhibit 25-19)
 S_R = 54.8 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 54.8 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	8/30/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2030 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	6658	0.92	Level	0	0	1.000	1.00	7237
Ramp	1285	0.92	Level	0	0	1.000	1.00	1397
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 7237 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	7237	4680	Yes
V ₁₂	7237	4400:All	Yes
V _{FO} = V _F - V _R	5840	4680	Yes
V _R	1397	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 66.5 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.424 (Exhibit 25-19)
 S_R = 54.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 54.7 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst
Agency or Company
Date Performed
Analysis Time Period

K. Lund
LSA Associates
1/16/2007
AM Peak Hour

Site Information

Freeway/Dir of Travel
Junction
Jurisdiction
Analysis Year

SR-30 Northbound
5th Street On-Ramp
Caltrans
2030 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	4176	0.92	Level	0	0	1.000	1.00	4539
Ramp	367	0.92	Level	0	0	1.000	1.00	399
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 4539 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	4938	See Exhibit 25-7	Yes
V _{R12}	4938	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F -			
V _R			

Level of Service Determination (if not F)

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

D_R = 43.8 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.865 (Exhibit 25-19)
 S_R = 45.0 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 45.0 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 8/30/2007
 Analysis Time Period: PM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Northbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2030 Background

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	5373	0.92	Level	0	0	1.000	1.00	5840
Ramp	416	0.92	Level	0	0	1.000	1.00	452
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 5840 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	6292	See Exhibit 25-7	Yes
V _{R12}	6292	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F -			
V _R			

Level of Service Determination (if not F)

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

D_R = 54.3 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 2.428 (Exhibit 25-19)
 S_R = 10.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 10.6 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2030 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	5961	0.92	Level	0	0	1.000	1.00	6479
Ramp	667	0.92	Level	0	0	1.000	1.00	725
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 6479 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	6479	4680	Yes
V ₁₂	6479	4400:All	Yes
V _{FO} = V _F - V _R	5754	4680	Yes
V _R	725	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 60.0 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.363 (Exhibit 25-19)
 S_R = 56.0 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 56.0 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET								
General Information				Site Information				
Analyst	K. Lund			Freeway/Dir of Travel	SR-30 Southbound			
Agency or Company	LSA Associates			Junction	5th Street Off-Ramp			
Date Performed	1/16/2007			Jurisdiction	Caltrans			
Analysis Time Period	PM Peak Hour			Analysis Year	2030 Background			
Project Description Upper Santa Ana River Wash Traffic Study								
Inputs								
Upstream Adj Ramp		Terrain: Level				Downstream Adj Ramp		
<input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off						<input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off		
$L_{up} =$	ft	$S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph				$L_{down} =$	ft	
$V_u =$	veh/h	Sketch (show lanes, L_A, L_D, V_R, V_P)				$V_D =$	veh/h	
Conversion to pc/h Under Base Conditions								
(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	4622	0.92	Level	0	0	1.000	1.00	5024
Ramp	321	0.92	Level	0	0	1.000	1.00	349
UpStream								
DownStream								
Merge Areas				Diverge Areas				
Estimation of v_{12}				Estimation of v_{12}				
$V_{12} = V_F (P_{FM})$				$V_{12} = V_R + (V_F - V_R)P_{FD}$				
$L_{EQ} =$ (Equation 25-2 or 25-3)				$L_{EQ} =$ (Equation 25-8 or 25-9)				
$P_{FM} =$ using Equation (Exhibit 25-5)				$P_{FD} = 1.000$ using Equation (Exhibit 25-11)				
$V_{12} =$ pc/h				$V_{12} = 5024$ pc/h				
Capacity Checks				Capacity Checks				
	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?	
V_{FO}				$V_{FI} = V_F$	5024	4680	Yes	
				V_{12}	5024	4400:All	Yes	
V_{R12}				$V_{FO} = V_F - V_R$	4675	4680	No	
				V_R	349	2100	No	
Level of Service Determination (if not F)				Level of Service Determination (if not F)				
$D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$				$D_R = 4.252 + 0.0086 v_{12} - 0.0009 L_D$				
$D_R =$ (pc/mi/ln)				$D_R = 47.5$ (pc/mi/ln)				
LOS = (Exhibit 25-4)				LOS = F (Exhibit 25-4)				
Speed Estimation				Speed Estimation				
$M_S =$ (Exhibit 25-19)				$D_S = 0.329$ (Exhibit 25-19)				
$S_R =$ mph (Exhibit 25-19)				$S_R = 56.8$ mph (Exhibit 25-19)				
$S_0 =$ mph (Exhibit 25-19)				$S_0 =$ N/A mph (Exhibit 25-19)				
$S =$ mph (Exhibit 25-14)				$S = 56.8$ mph (Exhibit 25-15)				

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 1/16/2007
 Analysis Time Period: AM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Southbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2030 Background

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	5294	0.92	Level	0	0	1.000	1.00	5754
Ramp	1461	0.92	Level	0	0	1.000	1.00	1588
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 5754 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	7342	See Exhibit 25-7	Yes
V _{R12}	7342	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F -			
V _R			

Level of Service Determination (if not F)

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

D_R = 62.0 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 6.342 (Exhibit 25-19)
 S_R = -75.5 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = -75.5 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst
Agency or Company
Date Performed
Analysis Time Period

K. Lund
LSA Associates
1/16/2007
PM Peak Hour

Site Information

Freeway/Dir of Travel
Junction
Jurisdiction
Analysis Year

SR-30 Southbound
5th Street On-Ramp
Caltrans
2030 Background

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	4301	0.92	Level	0	0	1.000	1.00	4675
Ramp	1405	0.92	Level	0	0	1.000	1.00	1527
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 4675 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	6202	See Exhibit 25-7	Yes
V _{R12}	6202	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F -			
V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 53.1 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 2.247 (Exhibit 25-19)
 S_R = 14.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 14.6 mph (Exhibit 25-14)

Speed Estimation

D_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

YEAR 2030 – LAND USE ALTERNATIVE 1

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2030 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	---	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	5397	0.92	Level	0	0	1.000	1.00	5866
Ramp	1221	0.92	Level	0	0	1.000	1.00	1327
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 5866 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	5866	4680	Yes
V ₁₂	5866	4400:All	Yes
V _{FO} = V _F - V _R	4539	4680	No
V _R	1327	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 54.7 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.417 (Exhibit 25-19)
 S_R = 54.8 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 54.8 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	8/30/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2030 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	6660	0.92	Level	0	0	1.000	1.00	7239
Ramp	1287	0.92	Level	0	0	1.000	1.00	1399
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 7239 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	7239	4680	Yes
V ₁₂	7239	4400:All	Yes
V _{FO} = V _F - V _R	5840	4680	Yes
V _R	1399	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 66.5 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.424 (Exhibit 25-19)
 S_R = 54.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 54.7 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	Site Information
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Analyst K. Lund	Freeway/Dir of Travel SR-30 Northbound
Agency or Company LSA Associates	Junction 5th Street On-Ramp
Date Performed 1/16/2007	Jurisdiction Caltrans
Analysis Time Period AM Peak Hour	Analysis Year 2030 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 25.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	4176	0.92	Level	0	0	1.000	1.00	4539
Ramp	370	0.92	Level	0	0	1.000	1.00	402
UpStream								
DownStream								

Merge Areas	Diverge Areas
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Estimation of v₁₂	Estimation of v₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = 1.000 using Equation (Exhibit 25-5) V ₁₂ = 4539 pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = using Equation (Exhibit 25-11) V ₁₂ = pc/h
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Capacity Checks	Capacity Checks
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	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}	4941	See Exhibit 25-7	Yes	V _{FI} = V _F			
				V ₁₂			
V _{R12}	4941	4600:All	Yes	V _{FO} = V _F -			
				V _R			
				V _R			

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 43.8 (pc/mi/ln) LOS = F (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 25-4)
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Speed Estimation	Speed Estimation
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M _S = 0.867 (Exhibit 25-19) S _R = 44.9 mph (Exhibit 25-19) S ₀ = N/A mph (Exhibit 25-19) S = 44.9 mph (Exhibit 25-14)	D _s = (Exhibit 25-19) S _R = mph (Exhibit 25-19) S ₀ = mph (Exhibit 25-19) S = mph (Exhibit 25-15)
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RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 8/30/2007
 Analysis Time Period: PM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Northbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2030 Land Use Alt. 1

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <hr/> S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	5373	0.92	Level	0	0	1.000	1.00	5840
Ramp	416	0.92	Level	0	0	1.000	1.00	452
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 5840 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	6292	See Exhibit 25-7	Yes
V _{R12}	6292	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F -			
V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 54.3 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 2.428 (Exhibit 25-19)
 S_R = 10.6 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 10.6 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2030 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _p)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	5963	0.92	Level	0	0	1.000	1.00	6482
Ramp	669	0.92	Level	0	0	1.000	1.00	727
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 6482 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	6482	4680	Yes
V ₁₂	6482	4400:All	Yes
V _{FO} = V _F - V _R	5755	4680	Yes
V _R	727	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 60.0 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.363 (Exhibit 25-19)
 S_R = 56.0 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 56.0 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2030 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 64.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	4622	0.92	Level	0	0	1.000	1.00	5024
Ramp	321	0.92	Level	0	0	1.000	1.00	349
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 5024 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	5024	4680	Yes
V ₁₂	5024	4400:All	Yes
V _{FO} = V _F - V _R	4675	4680	No
V _R	349	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 47.5 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.329 (Exhibit 25-19)
 S_R = 56.8 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 56.8 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst
Agency or Company
Date Performed
Analysis Time Period

K. Lund
LSA Associates
1/16/2007
AM Peak Hour

Site Information

Freeway/Dir of Travel
Junction
Jurisdiction
Analysis Year

SR-30 Southbound
5th Street On-Ramp
Caltrans
2030 Land Use Alt. 1

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 64.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	5294	0.92	Level	0	0	1.000	1.00	5754
Ramp	1467	0.92	Level	0	0	1.000	1.00	1595
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 5754 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	7349	See Exhibit 25-7	Yes
V _{R12}	7349	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F -			
V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 62.1 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 6.384 (Exhibit 25-19)
 S_R = -76.5 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = -76.5 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information	Site Information
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Analyst: K. Lund	Freeway/Dir of Travel: SR-30 Southbound
Agency or Company: LSA Associates	Junction: 5th Street On-Ramp
Date Performed: 1/16/2007	Jurisdiction: Caltrans
Analysis Time Period: PM Peak Hour	Analysis Year: 2030 Land Use Alt. 1

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 64.0 mph S_{FR} = 25.0 mph </div> Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	4301	0.92	Level	0	0	1.000	1.00	4675
Ramp	1407	0.92	Level	0	0	1.000	1.00	1529
UpStream								
DownStream								

Merge Areas	Diverge Areas
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Estimation of v₁₂	Estimation of v₁₂
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$V_{12} = V_F (P_{FM})$ L _{EQ} = (Equation 25-2 or 25-3) P _{FM} = 1.000 using Equation (Exhibit 25-5) V ₁₂ = 4675 pc/h	$V_{12} = V_R + (V_F - V_R)P_{FD}$ L _{EQ} = (Equation 25-8 or 25-9) P _{FD} = using Equation (Exhibit 25-11) V ₁₂ = pc/h
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Capacity Checks	Capacity Checks
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	Actual	Maximum	LOS F?		Actual	Maximum	LOS F?
V _{FO}	6204	See Exhibit 25-7	Yes	V _{FI} = V _F			
				V ₁₂			
V _{R12}	6204	4600:All	Yes	V _{FO} = V _F - V _R			
				V _R			

Level of Service Determination (if not F)	Level of Service Determination (if not F)
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$D_R = 5.475 + 0.00734 v_R + 0.0078 V_{12} - 0.00627 L_A$ D _R = 53.2 (pc/mi/ln) LOS = F (Exhibit 25-4)	$D_R = 4.252 + 0.0086 V_{12} - 0.0009 L_D$ D _R = (pc/mi/ln) LOS = (Exhibit 25-4)
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Speed Estimation	Speed Estimation
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M _S = 2.250 (Exhibit 25-19) S _R = 14.5 mph (Exhibit 25-19) S ₀ = N/A mph (Exhibit 25-19) S = 14.5 mph (Exhibit 25-14)	D _s = (Exhibit 25-19) S _R = mph (Exhibit 25-19) S ₀ = mph (Exhibit 25-19) S = mph (Exhibit 25-15)
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YEAR 2030 – LAND USE ALTERNATIVE 2

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2030 Land Use Alt. 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 63.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	5411	0.92	Level	0	0	1.000	1.00	5882
Ramp	1235	0.92	Level	0	0	1.000	1.00	1342
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 5882 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
			V _{F1} = V _F
			V ₁₂
V _{R12}			
			V _{FO} = V _F - V _R
			V _R

Capacity Checks

	Actual	Maximum	LOS F?
			V _{F1} = V _F
	5882	4660	Yes
	5882	4400:All	Yes
	4540	4660	No
	1342	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 54.8 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.419 (Exhibit 25-19)
 S_R = 54.2 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 54.2 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	8/30/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2030 Land Use Alt. 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level <div style="text-align: center;"> S_{FF} = 63.0 mph S_{FR} = 45.0 mph Sketch (show lanes, L_A, L_D, V_R, V_P) </div>	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	6663	0.92	Level	0	0	1.000	1.00	7242
Ramp	1290	0.92	Level	0	0	1.000	1.00	1402
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 7242 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
V _{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
V _{F1} = V _F	7242	4660	Yes
V ₁₂	7242	4400:All	Yes
V _{FO} = V _F - V _R	5840	4660	Yes
V _R	1402	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 66.5 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.424 (Exhibit 25-19)
 S_R = 54.1 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 54.1 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Northbound
Agency or Company	LSA Associates	Junction	5th Street On-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2030 Land Use Alt. 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 63.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	4176	0.92	Level	0	0	1.000	1.00	4539
Ramp	373	0.92	Level	0	0	1.000	1.00	405
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 4539 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	4944	See Exhibit 25-7	Yes
V _{R12}	4944	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 43.9 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 0.868 (Exhibit 25-19)
 S_R = 44.8 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 44.8 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst
Agency or Company
Date Performed
Analysis Time Period

K. Lund
LSA Associates
8/30/2007
PM Peak Hour

Site Information

Freeway/Dir of Travel
Junction
Jurisdiction
Analysis Year

SR-30 Northbound
5th Street On-Ramp
Caltrans
2030 Land Use Alt. 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 63.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	5373	0.92	Level	0	0	1.000	1.00	5840
Ramp	418	0.92	Level	0	0	1.000	1.00	454
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 5840 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	6294	See Exhibit 25-7	Yes
V _{R12}	6294	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F -			
V _R			

Level of Service Determination (if not F)

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

D_R = 54.4 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 2.432 (Exhibit 25-19)
 S_R = 11.9 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 11.9 mph (Exhibit 25-14)

Speed Estimation

D_s = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	AM Peak Hour	Analysis Year	2030 Land Use Alt. 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off	Terrain: Level $S_{FF} = 63.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L_A, L_D, V_R, V_P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off
$L_{up} =$ ft $V_u =$ veh/h		$L_{down} =$ ft $V_D =$ veh/h

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f_{HV}	f_p	$v = V/PHF \times f_{HV} \times f_p$
Freeway	5967	0.92	Level	0	0	1.000	1.00	6486
Ramp	673	0.92	Level	0	0	1.000	1.00	732
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v_{12}

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

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

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

$V_{12} =$ pc/h

Estimation of v_{12}

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

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

$P_{FD} = 1.000$ using Equation (Exhibit 25-11)

$V_{12} = 6486$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V_{FO}			
V_{R12}			

Capacity Checks

	Actual	Maximum	LOS F?
$V_{F1} = V_F$	6486	4660	Yes
V_{12}	6486	4400:All	Yes
$V_{FO} = V_F - V_R$	5754	4660	Yes
V_R	732	2100	No

Level of Service Determination (if not F)

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

$D_R =$ (pc/mi/ln)

LOS = (Exhibit 25-4)

Level of Service Determination (if not F)

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

$D_R = 60.0$ (pc/mi/ln)

LOS = F (Exhibit 25-4)

Speed Estimation

$M_S =$ (Exhibit 25-19)

$S_R =$ mph (Exhibit 25-19)

$S_0 =$ mph (Exhibit 25-19)

$S =$ mph (Exhibit 25-14)

Speed Estimation

$D_S = 0.364$ (Exhibit 25-19)

$S_R = 55.4$ mph (Exhibit 25-19)

$S_0 =$ N/A mph (Exhibit 25-19)

$S = 55.4$ mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street Off-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2030 Land Use Alt. 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level $S_{FF} = 63.0$ mph $S_{FR} = 45.0$ mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	V = V/PHF x f _{HV} x f _p
Freeway	4624	0.92	Level	0	0	1.000	1.00	5026
Ramp	323	0.92	Level	0	0	1.000	1.00	351
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = using Equation (Exhibit 25-5)
 V₁₂ = pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = 1.000 using Equation (Exhibit 25-11)
 V₁₂ = 5026 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}			
			V _{F1} = V _F
			V ₁₂
V _{R12}			
			V _{FO} = V _F - V _R
			V _R
			V _R

Capacity Checks

	Actual	Maximum	LOS F?
			V _{F1} = V _F
	5026	4660	Yes
	5026	4400:All	Yes
	4675	4660	Yes
	351	2100	No

Level of Service Determination (if not F)

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

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

Level of Service Determination (if not F)

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

D_R = 47.5 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Speed Estimation

M_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-14)

Speed Estimation

D_S = 0.330 (Exhibit 25-19)
 S_R = 56.1 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 56.1 mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information

Analyst: K. Lund
 Agency or Company: LSA Associates
 Date Performed: 1/16/2007
 Analysis Time Period: AM Peak Hour

Site Information

Freeway/Dir of Travel: SR-30 Southbound
 Junction: 5th Street On-Ramp
 Jurisdiction: Caltrans
 Analysis Year: 2030 Land Use Alt. 2

Project Description: Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 63.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
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Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	5294	0.92	Level	0	0	1.000	1.00	5754
Ramp	1481	0.92	Level	0	0	1.000	1.00	1610
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 5754 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	7364	See Exhibit 25-7	Yes
V _{R12}	7364	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 62.2 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 6.476 (Exhibit 25-19)
 S_R = -73.0 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = -73.0 mph (Exhibit 25-14)

Speed Estimation

D_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)

RAMPS AND RAMP JUNCTIONS WORKSHEET

General Information		Site Information	
Analyst	K. Lund	Freeway/Dir of Travel	SR-30 Southbound
Agency or Company	LSA Associates	Junction	5th Street On-Ramp
Date Performed	1/16/2007	Jurisdiction	Caltrans
Analysis Time Period	PM Peak Hour	Analysis Year	2030 Land Use Alt. 2

Project Description Upper Santa Ana River Wash Traffic Study

Inputs

Upstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{up} = ft V _u = veh/h	Terrain: Level S _{FF} = 63.0 mph S _{FR} = 25.0 mph Sketch (show lanes, L _A , L _D , V _R , V _P)	Downstream Adj Ramp <input type="checkbox"/> Yes <input type="checkbox"/> On <input checked="" type="checkbox"/> No <input type="checkbox"/> Off L _{down} = ft V _D = veh/h
--	--	--

Conversion to pc/h Under Base Conditions

(pc/h)	V (Veh/hr)	PHF	Terrain	%Truck	%Rv	f _{HV}	f _p	v = V/PHF x f _{HV} x f _p
Freeway	4301	0.92	Level	0	0	1.000	1.00	4675
Ramp	1408	0.92	Level	0	0	1.000	1.00	1530
UpStream								
DownStream								

Merge Areas

Diverge Areas

Estimation of v₁₂

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

L_{EQ} = (Equation 25-2 or 25-3)
 P_{FM} = 1.000 using Equation (Exhibit 25-5)
 V₁₂ = 4675 pc/h

Estimation of v₁₂

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

L_{EQ} = (Equation 25-8 or 25-9)
 P_{FD} = using Equation (Exhibit 25-11)
 V₁₂ = pc/h

Capacity Checks

	Actual	Maximum	LOS F?
V _{FO}	6205	See Exhibit 25-7	Yes
V _{R12}	6205	4600:All	Yes

Capacity Checks

	Actual	Maximum	LOS F?
V _{FI} = V _F			
V ₁₂			
V _{FO} = V _F - V _R			
V _R			

Level of Service Determination (if not F)

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

D_R = 53.2 (pc/mi/ln)
 LOS = F (Exhibit 25-4)

Level of Service Determination (if not F)

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

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

Speed Estimation

M_S = 2.252 (Exhibit 25-19)
 S_R = 15.7 mph (Exhibit 25-19)
 S₀ = N/A mph (Exhibit 25-19)
 S = 15.7 mph (Exhibit 25-14)

Speed Estimation

D_S = (Exhibit 25-19)
 S_R = mph (Exhibit 25-19)
 S₀ = mph (Exhibit 25-19)
 S = mph (Exhibit 25-15)