
Appendix A

Traffic Volume Data

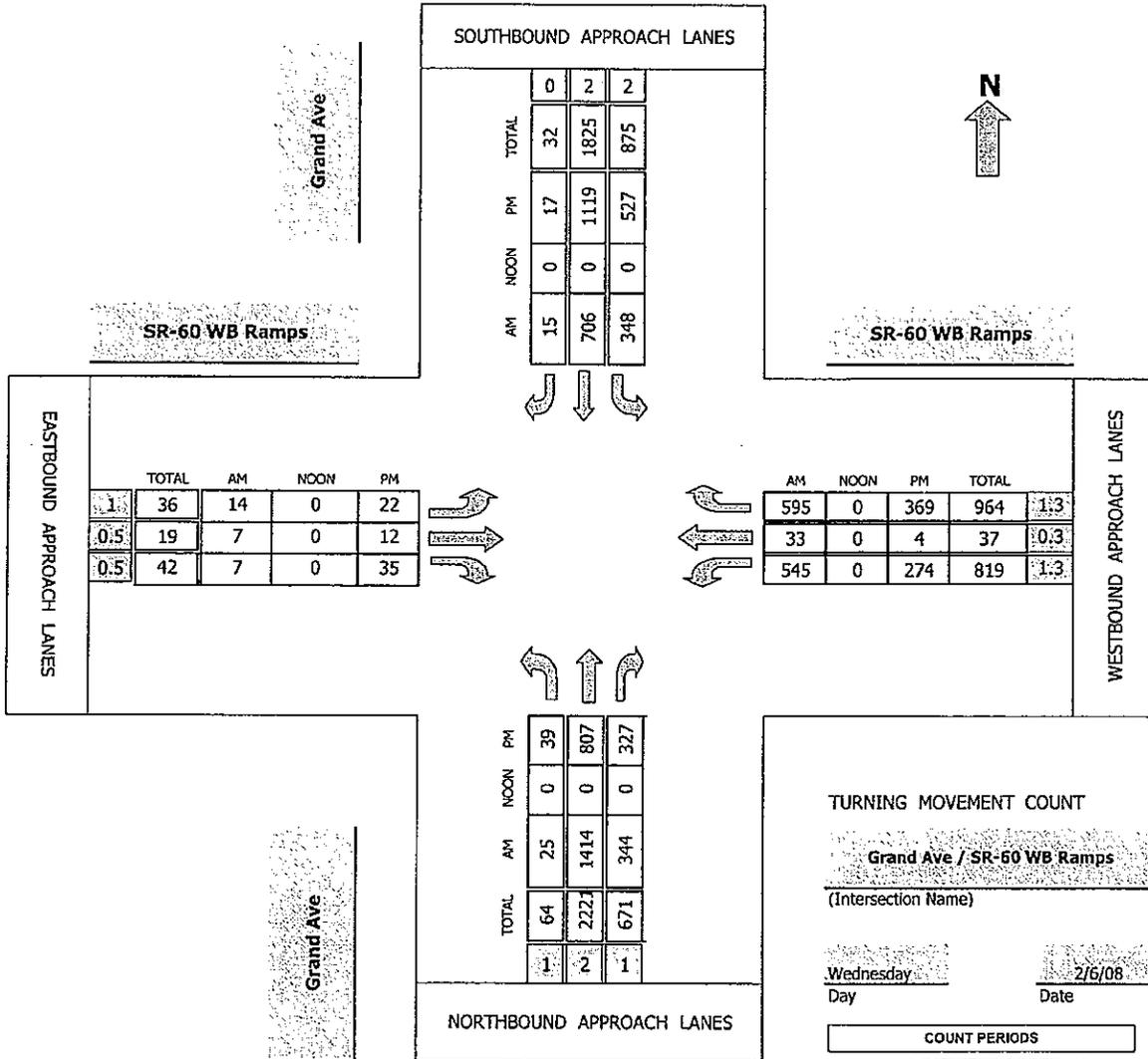
Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of Grand Ave/SR-60 WB Ramps

Project #: 08-2047-056



TURNING MOVEMENT COUNT

Grand Ave / SR-60 WB Ramps

(Intersection Name)

Wednesday
Day

2/6/08
Date

COUNT PERIODS

am	7:00 AM - 9:00 AM
noon	-
pm	4:00 PM - 6:00 PM

AM PEAK HOUR	715 AM
NOON PEAK HOUR	0 AM
PM PEAK HOUR	500 PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Grand Ave

DATE: 2/6/2008

LOCATION: City of Diamond Bar

E-W STREET: SR-60 WB Ramps

DAY: WEDNESDAY

PROJECT# 08-2047-056

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	1	2	1	2	2	0	1	0.5	0.5	1.3	0.3	1.3	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	2	311	50	90	130	2	1	2	2	130	2	140	862
7:15 AM	2	400	67	91	127	2	2	1	4	128	6	178	1008
7:30 AM	4	377	80	80	167	4	3	3	1	141	8	160	1028
7:45 AM	11	326	99	87	201	7	4	2	2	156	11	127	1033
8:00 AM	8	311	98	90	211	2	5	1	0	120	8	130	984
8:15 AM	7	321	70	92	190	4	3	3	1	111	7	100	909
8:30 AM	6	260	72	80	187	6	2	2	2	108	4	111	840
8:45 AM	10	227	68	81	177	2	2	2	1	99	2	126	797
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL VOLUMES =	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	50	2533	604	691	1390	29	22	16	13	993	48	1072	7461

AM Peak Hr Begins at: 7:15 AM

PEAK VOLUMES =	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	25	1414	344	348	706	15	14	7	7	545	33	595	4053
PEAK HR. FACTOR:		0.950		0.882			0.875			0.940			0.981

CONTROL: Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Grand Ave

DATE: 2/6/2008

LOCATION: City of Diamond Bar

E-W STREET: SR-60 WB Ramps

DAY: WEDNESDAY

PROJECT# 08-2047-056

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL 1	NT 2	NR 1	SL 2	ST 2	SR 0	EL 1	ET 0.5	ER 0.5	WL 1.3	WT 0.3	WR 1.3	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	7	207	82	120	250	6	2	7	4	50	2	96	833
4:15 PM	2	221	81	115	261	3	1	8	2	42	1	88	825
4:30 PM	6	217	42	109	252	1	4	11	7	61	2	76	788
4:45 PM	8	207	71	107	301	2	6	8	8	58	0	90	866
5:00 PM	4	221	83	126	270	5	7	6	9	67	0	79	877
5:15 PM	9	190	85	130	288	4	4	3	10	70	1	111	905
5:30 PM	11	188	84	141	269	6	5	1	8	65	2	87	867
5:45 PM	15	208	75	130	292	2	6	2	8	72	1	92	903
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL VOLUMES =	NL 62	NT 1659	NR 603	SL 978	ST 2183	SR 29	EL 35	ET 46	ER 56	WL 485	WT 9	WR 719	TOTAL 6864
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PM Peak Hr Begins at: 500 PM

PEAK VOLUMES =	39	807	327	527	1119	17	22	12	35	274	4	369	3552
PEAK HR. FACTOR:		0.952		0.981				0.784			0.889		0.981

CONTROL: Signalized

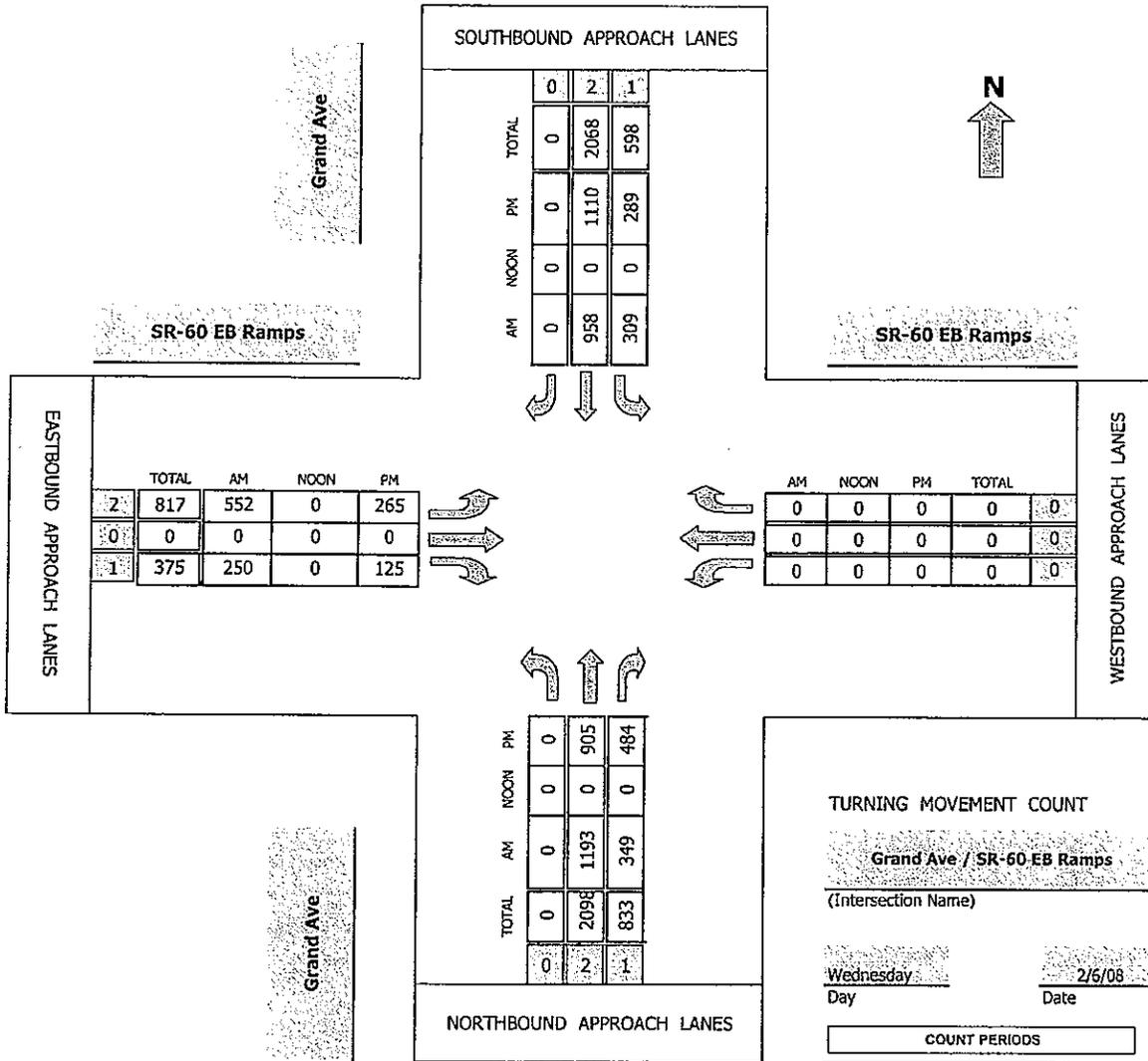
Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of Grand Ave/SR-60 EB Ramps

Project #: 08-2047-057



TURNING MOVEMENT COUNT

Grand Ave / SR-60 EB Ramps

(Intersection Name)

Wednesday

Day

2/6/08

Date

COUNT PERIODS

am	7:00 AM - 9:00 AM
noon	-
pm	4:00 PM - 6:00 PM

AM PEAK HOUR	<u>715 AM</u>
NOON PEAK HOUR	<u>0 AM</u>
PM PEAK HOUR	<u>500 PM</u>

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Grand Ave

DATE: 2/6/2008

LOCATION: City of Diamond Bar

E-W STREET: SR-60 EB Ramps

DAY: WEDNESDAY

PROJECT# 08-2047-057

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	2	1	1	2	0	2	0	1	0	0	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM		271	69	60	180		160		57				797
7:15 AM		356	82	72	211		158		60				939
7:30 AM		301	92	80	256		143		58				930
7:45 AM		261	93	71	270		131		62				888
8:00 AM		275	82	86	221		120		70				854
8:15 AM		240	71	77	205		131		71				795
8:30 AM		221	102	75	211		140		62				811
8:45 AM		196	82	86	226		116		59				765
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL VOLUMES =	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	2121	673	607	1780	0	1099	0	499	0	0	0	6779

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =	0	1193	349	309	958	0	552	0	250	0	0	0	3611
PEAK HR. FACTOR:		0.880		0.929			0.920			0.000			0.961

CONTROL: Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Grand Ave

DATE: 2/6/2008

LOCATION: City of Diamond Bar

E-W STREET: SR-60 EB Ramps

DAY: WEDNESDAY

PROJECT# 08-2047-057

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	0	2	1	1	2	0	2	0	1	0	0	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM		277	162	79	211		56		24				809
4:15 PM		230	154	78	226		62		30				780
4:30 PM		201	112	62	230		68		32				705
4:45 PM		197	116	58	227		70		41				709
5:00 PM		240	132	72	268		66		34				812
5:15 PM		226	116	77	281		62		24				786
5:30 PM		231	131	66	271		71		30				800
5:45 PM		208	105	74	290		66		37				780
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL VOLUMES =	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	0	1810	1028	566	2004	0	521	0	252	0	0	0	6181

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES =	0	905	484	289	1110	0	265	0	125	0	0	0	3178
PEAK HR. FACTOR:		0.933			0.961			0.947			0.000		0.978

CONTROL: Signalized

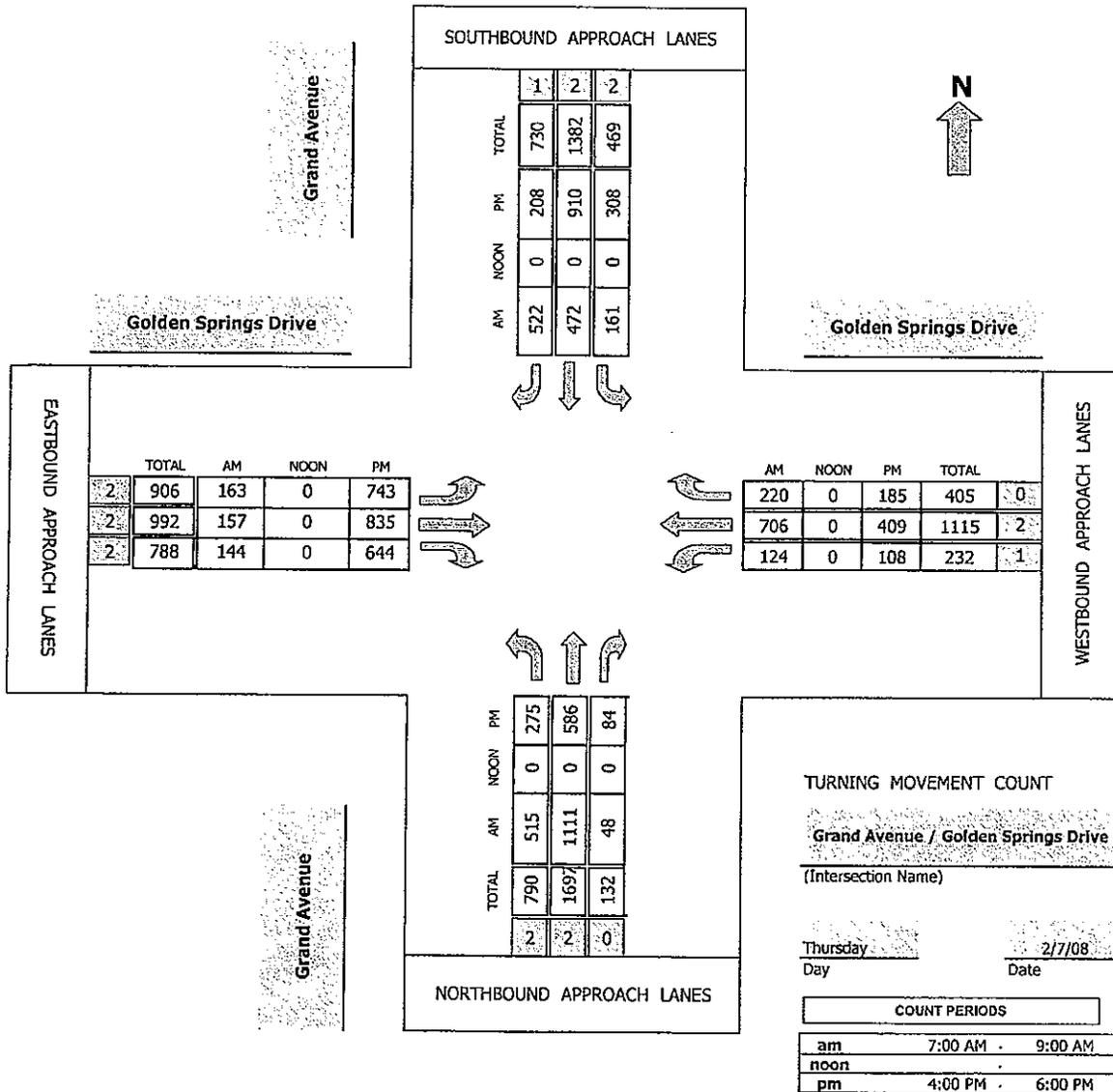
Intersection Turning Movement

Prepared by:

National Data & Surveying Services

TMC Summary of Grand Avenue/Golden Springs Drive

Project #: 08-2047-060



AM PEAK HOUR 715 AM
 NOON PEAK HOUR 0 AM
 PM PEAK HOUR 500 PM

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Grand Ave

DATE: 2/7/2008

LOCATION: City of Diamond Bar

E-W STREET: Golden Springs Dr

DAY: THURSDAY

PROJECT# 08-2047-060

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
	2	2	0	2	2	1	2	2	2	1	2	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	101	300	6	28	108	128	26	27	23	14	148	69	978
7:15 AM	132	323	8	42	123	94	31	28	29	29	150	54	1043
7:30 AM	141	284	13	40	128	135	37	34	30	29	187	50	1108
7:45 AM	140	257	15	36	114	153	44	55	47	41	178	48	1128
8:00 AM	102	247	12	43	107	140	51	40	38	25	191	68	1064
8:15 AM	103	284	6	31	136	158	41	36	39	18	136	43	1031
8:30 AM	130	246	9	37	128	124	42	21	39	17	116	44	953
8:45 AM	120	237	17	20	126	104	37	40	30	22	122	45	920
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													

TOTAL VOLUMES =	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	969	2178	86	277	970	1036	309	281	275	195	1228	421	8225

AM Peak Hr Begins at: 7:15 AM

PEAK VOLUMES =	515	1111	48	161	472	522	163	157	144	124	706	220	4343
PEAK HR. FACTOR:		0.904			0.953			0.795			0.924		0.963

CONTROL: Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Grand Ave

DATE: 2/7/2008

LOCATION: City of Diamond Bar

E-W STREET: Golden Springs Dr

DAY: THURSDAY

PROJECT# 08-2047-060

LANES:	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
1:00 PM	2	2	0	2	2	1	2	2	2	1	2	0	
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	65	114	14	57	183	40	141	176	115	21	73	28	1027
4:15 PM	72	132	16	63	195	47	159	181	127	24	95	37	1148
4:30 PM	78	143	23	73	219	56	164	188	131	27	82	40	1224
4:45 PM	74	139	17	58	208	58	150	191	123	19	88	38	1163
5:00 PM	84	164	15	86	235	50	187	239	142	21	85	44	1352
5:15 PM	66	155	21	74	213	61	169	178	153	27	108	41	1266
5:30 PM	60	151	32	75	228	48	204	224	164	38	112	43	1379
5:45 PM	65	116	16	73	234	49	183	194	185	22	104	57	1298
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													

TOTAL VOLUMES =	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
	564	1114	154	559	1715	409	1357	1571	1140	199	747	328	9857

PM Peak Hr Begins at: 500 PM

PEAK VOLUMES =	275	586	84	308	910	208	743	835	644	108	409	185	5295
PEAK HR. FACTOR:		0.898			0.961			0.938			0.909		0.960

CONTROL: Signalized

TRAFFIC DATA SERVICES, INC.

(714) 541-2228

Summary of Vehicular Turning Movements

N/S ST : SR-57 NB LANES @ PATHFINDER RD

FILENAME: 06912N3A

CITY: DIAMOND BAR

DATE: 6/30/2009

DAY: TUESDAY

PERIOD BEGINS	HOV	LANES				Total
		1	2	3	4	
7:00 AM	57	439	324	156	204	1180
15 AM	95	538	395	179	256	1463
30 AM	69	401	309	138	216	1133
45 AM	110	480	356	180	212	1338
8:00 AM	124	526	366	184	265	1465
15 AM	94	435	335	162	202	1228
30 AM	93	455	337	179	245	1309
45 AM	90	390	317	157	234	1188

PEAK HOUR BEGINS AT:						PHF: 0.92
715 AM						
VOLUMES =	398	1945	1426	681	949	5399

FILENAME: 06912N3P
DATE: 6/30/2009
DAY: TUESDAY

PERIOD BEGINS	HOV	LANES				Total
		1	2	3	4	
4:00 PM	353	291	286	292	374	1596
15 PM	351	308	296	285	418	1658
30 PM	351	269	276	302	429	1627
45 PM	343	259	243	266	348	1459
5:00 PM	356	249	238	274	367	1484
15 PM	354	276	270	300	384	1584
30 PM	352	222	214	267	362	1417
45 PM	315	231	232	266	371	1415

PEAK HOUR BEGINS AT:						PHF: 0.96
1600 PM						
VOLUMES =	1398	1127	1101	1145	1569	6340

COMMENTS:

TRAFFIC DATA SERVICES, INC.

(714) 541-2228

Summary of Vehicular Turning Movements

N/S ST : SR-57 NB LANES @ HIGHLAND VALLEY RD

FILENAME: 06912N1A

CITY: POMONA

DATE: 6/25/2009

DAY: THURSDAY

PERIOD BEGINS	LANES				Total
	1	2	3	4	
7:00 AM	116	239	300	380	1035
15 AM	186	329	346	330	1191
30 AM	218	405	371	335	1329
45 AM	232	374	297	315	1218
8:00 AM	168	318	376	282	1144
15 AM	165	317	303	304	1089
30 AM	190	328	340	302	1160
45 AM	183	326	280	334	1123

PEAK HOUR BEGINS AT:					PHF: 0.92
715 AM					
VOLUMES =	804	1426	1390	1262	4882

FILENAME: 06912N1P
DATE: 6/25/2009
DAY: THURSDAY

PERIOD BEGINS	LANES				Total
	1	2	3	4	
4:00 PM	195	348	493	464	1500
15 PM	244	346	318	328	1236
30 PM	237	373	378	439	1427
45 PM	226	368	293	339	1226
5:00 PM	222	359	330	381	1292
15 PM	259	448	270	308	1285
30 PM	229	330	342	385	1286
45 PM	226	336	297	360	1219

PEAK HOUR BEGINS AT:					PHF: 0.9
1600 PM					
VOLUMES =	902	1435	1482	1570	5389

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228

Summary of Vehicular Turning Movements

N/S ST : SR-60 EB CONNECTOR RAMP TO SR-57 SB

FILENAME: 06912E2A

CITY: DIAMOND BAR

DATE: 7/2/2009

DAY: THURSDAY

PERIOD BEGINS		Total
7:00 AM	370	370
15 AM	390	390
30 AM	441	441
45 AM	299	299
8:00 AM	244	244
15 AM	273	273
30 AM	339	339
45 AM	276	276

PEAK HOUR BEGINS AT: 700 AM PHF: 0.85
VOLUMES = 1500 1500

FILENAME: 06912E2P
DATE: 7/2/2009
DAY: THURSDAY

PERIOD BEGINS		Total
4:00 PM	171	171
15 PM	110	110
30 PM	151	151
45 PM	163	163
5:00 PM	170	170
15 PM	178	178
30 PM	188	188
45 PM	209	209

PEAK HOUR BEGINS AT: 1700 PM PHF: 0.89
VOLUMES = 745 745

COMMENTS:

TRAFFIC DATA SERVICES, INC.

(714) 541-2228

Summary of Vehicular Turning Movements

N/S ST : SR-57 NB CONNECTOR RAMP TO SR-60 WB

FILENAME: 06912W2A

CITY: DIAMOND BAR

DATE: 7/2/2009

DAY: THURSDAY

PERIOD BEGINS		Total
7:00 AM	294	294
15 AM	357	357
30 AM	307	307
45 AM	358	358
8:00 AM	301	301
15 AM	327	327
30 AM	346	346
45 AM	306	306

PEAK HOUR BEGINS AT: PHF: 0.93
 745 AM
 VOLUMES = 1332 1332

FILENAME: 06912W2P
 DATE: 7/2/2009
 DAY: THURSDAY

PERIOD BEGINS		Total
4:00 PM	247	247
15 PM	243	243
30 PM	230	230
45 PM	233	233
5:00 PM	261	261
15 PM	199	199
30 PM	146	146
45 PM	272	272

PEAK HOUR BEGINS AT: PHF: 0.93
 1615 PM
 VOLUMES = 967 967

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : GRAND AVE OVERCROSSING @ SR-60/SR-57 SOUTHBOUND TRAFFIC
 CITY: DIAMOND BAR

FILENAME: 06912W1A
 DATE: 6/24/2009
 DAY: WEDNESDAY

PERIOD BEGINS	HOV	LANES							Total
		1	2	3	4	5	6	7	
7:00 AM	485	524	399	344	254	589	441	167	3203
15 AM	512	403	494	215	130	548	468	190	2960
30 AM	395	506	392	213	146	539	472	194	2857
45 AM	398	471	369	252	176	583	449	177	2875
8:00 AM	377	482	353	203	123	495	411	170	2614
15 AM	381	490	392	198	130	537	390	187	2705
30 AM	384	474	342	214	240	547	392	146	2739
45 AM	292	463	366	233	262	512	393	175	2696

PEAK HOUR BEGINS AT: 700 AM PHF: 0.93
 VOLUMES = 1790 1904 1654 1024 706 2259 1830 728 11895

FILENAME: 06912W1P
 DATE: 6/24/2009
 DAY: WEDNESDAY

PERIOD BEGINS	HOV	LANES							Total
		1	2	3	4	5	6	7	
4:00 PM	280	382	342	228	231	495	370	181	2509
15 PM	323	428	328	259	249	506	402	159	2654
30 PM	296	429	340	258	247	539	435	163	2707
45 PM	310	424	372	284	238	517	413	178	2736
5:00 PM	305	398	324	227	222	514	415	205	2610
15 PM	326	443	361	247	219	536	455	175	2762
30 PM	328	420	343	273	225	532	465	190	2776
45 PM	347	427	316	260	230	540	418	181	2719

PEAK HOUR BEGINS AT: 1645 PM PHF: 0.98
 VOLUMES = 1269 1685 1400 1031 904 2099 1748 748 10884

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : GRAND AVE OVERCROSSING @ SR-60/SR-57 NORTHBOUND TRAFFIC
 CITY: DIAMOND BAR

FILENAME: 06912E1A
 DATE: 6/24/2009
 DAY: WEDNESDAY

PERIOD BEGINS	HOV	LANES						Total
		1	2	3	4	5	6	
7:00 AM	72	393	319	240	225	401	253	1903
15 AM	121	403	361	260	227	458	323	2153
30 AM	110	513	421	257	273	447	371	2392
45 AM	101	470	363	301	303	446	333	2317
8:00 AM	109	454	401	246	194	418	285	2107
15 AM	82	380	327	278	296	439	353	2155
30 AM	87	370	328	257	266	421	301	2030
45 AM	92	356	339	252	262	427	323	2051

PEAK HOUR BEGINS AT:								PHF: 0.94
730 AM								
VOLUMES =	402	1817	1512	1082	1066	1750	1342	8971

FILENAME: 06912E1P
 DATE: 6/24/2009
 DAY: WEDNESDAY

PERIOD BEGINS	HOV	LANES						Total
		1	2	3	4	5	6	
4:00 PM	533	503	447	314	303	382	324	2806
15 PM	445	335	310	224	229	336	262	2141
30 PM	476	473	452	337	334	439	377	2888
45 PM	465	507	458	357	336	343	293	2759
5:00 PM	459	439	434	351	362	415	385	2845
15 PM	451	485	461	353	374	344	306	2774
30 PM	468	444	413	378	355	403	362	2823
45 PM	486	484	418	359	371	344	308	2770

PEAK HOUR BEGINS AT:								PHF: 0.98
1630 PM								
VOLUMES =	1851	1904	1805	1398	1406	1541	1361	11266

COMMENTS:

TRAFFIC DATA SERVICES, INC.

(714) 541-2228

Summary of Vehicular Turning Movements

N/S ST : SR-57 SB ON/OFF RAMPS @ SUNSET CROSSING RD

FILENAME: 06912S2A

CITY: DIAMOND BAR

DATE: 6/25/2009

DAY: THURSDAY

PERIOD BEGINS	ON	OFF	Total
7:00 AM	28	118	146
15 AM	23	188	211
30 AM	28	199	227
45 AM	26	204	230
8:00 AM	22	73	95
15 AM	33	88	121
30 AM	45	96	141
45 AM	28	113	141

PEAK HOUR BEGINS AT:

PHF: 0.88

700 AM

VOLUMES =

105

709

814

FILENAME: 06912S2P

DATE: 6/25/2009

DAY: THURSDAY

PERIOD BEGINS	ON	OFF	Total
4:00 PM	33	204	237
15 PM	29	200	229
30 PM	31	197	228
45 PM	27	188	215
5:00 PM	35	254	289
15 PM	32	226	258
30 PM	24	271	295
45 PM	34	241	275

PEAK HOUR BEGINS AT:

PHF: 0.95

1700 PM

VOLUMES =

125

992

1117

COMMENTS:

TRAFFIC DATA SERVICES, INC.

(714) 541-2228

Summary of Vehicular Turning Movements

N/S ST : SR-57 SB ON/OFF RAMPS @ PATHFINDER RD

FILENAME: 06912S4A

CITY: DIAMOND BAR

DATE: 6/30/2009

DAY: TUESDAY

PERIOD BEGINS	ON	OFF	Total
7:00 AM	64	86	150
15 AM	93	119	212
30 AM	76	100	176
45 AM	59	102	161
8:00 AM	57	98	155
15 AM	61	171	232
30 AM	77	208	285
45 AM	113	184	297

PEAK HOUR BEGINS AT:			PHF: 0.82
800 AM			
VOLUMES =	308	661	969

FILENAME: 06912S4P

DATE: 6/30/2009

DAY: TUESDAY

PERIOD BEGINS	ON	OFF	Total
4:00 PM	57	73	130
15 PM	52	62	114
30 PM	72	72	144
45 PM	54	107	161
5:00 PM	85	54	139
15 PM	86	90	176
30 PM	77	103	180
45 PM	78	96	174

PEAK HOUR BEGINS AT:			PHF: 0.93
1700 PM			
VOLUMES =	326	343	669

COMMENTS:

TRAFFIC DATA SERVICES, INC.

(714) 541-2228

Summary of Vehicular Turning Movements

N/S ST : SR-57 SB LANES @ PATHFINDER RD

FILENAME: 06912S3A

CITY: DIAMOND BAR

DATE: 6/30/2009

DAY: TUESDAY

PERIOD BEGINS	HOV	LANES					Total
		1	2	3	4	5	
7:00 AM	183	481	539	276	216	46	1741
15 AM	279	442	527	329	205	64	1846
30 AM	321	462	517	331	294	146	2071
45 AM	341	359	399	433	468	301	2301
8:00 AM	284	328	330	269	237	89	1537
15 AM	174	159	179	90	91	27	720
30 AM	143	208	219	74	70	12	726
45 AM	171	196	201	196	212	61	1037

PEAK HOUR BEGINS AT:

PHF: 0.86

700 AM

VOLUMES = 1124 1744 1982 1369 1183 557 7959

FILENAME: 06912S3P

DATE: 6/30/2009

DAY: TUESDAY

PERIOD BEGINS	HOV	LANES					Total
		1	2	3	4	5	
4:00 PM	169	455	417	230	137	25	1433
15 PM	183	427	377	234	142	25	1388
30 PM	153	491	449	222	150	16	1481
45 PM	191	458	435	219	149	32	1484
5:00 PM	165	473	425	220	158	23	1464
15 PM	176	471	395	243	183	28	1496
30 PM	199	471	440	264	160	17	1551
45 PM	160	438	422	215	133	28	1396

PEAK HOUR BEGINS AT:

PHF: 0.97

1645 PM

VOLUMES = 731 1873 1695 946 650 100 5995

COMMENTS:

TRAFFIC DATA SERVICES, INC.
(714) 541-2228
Summary of Vehicular Turning Movements

N/S ST : SR-57 SB LANES @ HIGHLAND VALLEY RD

FILENAME: 06912S1A
 DATE: 6/25/2009
 DAY: THURSDAY

CITY: POMONA

PERIOD BEGINS	LANES				Total
	1	2	3	4	
7:00 AM	353	340	264	218	1175
15 AM	365	349	287	329	1330
30 AM	342	331	275	264	1212
45 AM	382	324	261	268	1235
8:00 AM	312	276	247	190	1025
15 AM	332	301	251	214	1098
30 AM	290	290	222	202	1004
45 AM	293	275	226	205	999

PEAK HOUR BEGINS AT:					PHF: 0.93
700 AM					
VOLUMES =	1442	1344	1087	1079	4952

FILENAME: 06912S1P
 DATE: 6/25/2009
 DAY: THURSDAY

PERIOD BEGINS	LANES				Total
	1	2	3	4	
4:00 PM	320	325	291	315	1251
15 PM	348	311	272	293	1224
30 PM	378	334	318	325	1355
45 PM	403	357	315	322	1397
5:00 PM	378	344	331	350	1403
15 PM	444	398	364	379	1585
30 PM	374	350	286	301	1311
45 PM	338	341	313	326	1318

PEAK HOUR BEGINS AT:					PHF: 0.91
1630 PM					
VOLUMES =	1603	1433	1328	1376	5740

COMMENTS:

TRAFFIC DATA SERVICES, INC.

(714) 541-2228

Summary of Vehicular Turning Movements

N/S ST : SR-57 NB ON RAMP @ DIAMOND BAR BLVD

FILENAME: 06912N2A

CITY: DIAMOND BAR

DATE: 6/25/2009

DAY: THURSDAY

PERIOD BEGINS	ON	Total
7:00 AM	213	213
15 AM	223	223
30 AM	216	216
45 AM	214	214
8:00 AM	229	229
15 AM	213	213
30 AM	250	250
45 AM	183	183

PEAK HOUR BEGINS AT:		PHF: 0.91
745 AM		
VOLUMES =	906	906

FILENAME: 06912N2P
DATE: 6/25/2009
DAY: THURSDAY

PERIOD BEGINS	ON	Total
4:00 PM	201	201
15 PM	203	203
30 PM	239	239
45 PM	220	220
5:00 PM	225	225
15 PM	242	242
30 PM	233	233
45 PM	245	245

PEAK HOUR BEGINS AT:		PHF: 0.96
1700 PM		
VOLUMES =	945	945

COMMENTS:

TRAFFIC DATA SERVICES, INC.

(714) 541-2228

Summary of Vehicular Turning Movements

N/S ST : SR-57 NB ON/OFF RAMPS @ PATHFINDER RD

FILENAME: 06912N4A

CITY: DIAMOND BAR

DATE: 6/30/2009

DAY: TUESDAY

PERIOD BEGINS	ON	OFF	Total
7:00 AM	153	46	199
15 AM	214	71	285
30 AM	173	34	207
45 AM	107	68	175
8:00 AM	123	62	185
15 AM	147	62	209
30 AM	163	56	219
45 AM	140	53	193

PEAK HOUR BEGINS AT:			PHF: 0.76
700 AM			
VOLUMES =	647	219	866

FILENAME: 06912N4P

DATE: 6/30/2009

DAY: TUESDAY

PERIOD BEGINS	ON	OFF	Total
4:00 PM	105	133	238
15 PM	99	134	233
30 PM	105	153	258
45 PM	122	121	243
5:00 PM	130	116	246
15 PM	110	107	217
30 PM	124	126	250
45 PM	129	111	240

PEAK HOUR BEGINS AT:			PHF: 0.95
1615 PM			
VOLUMES =	456	524	980

COMMENTS:

True Count
 3401 First Ave #123
 San Diego, CA 92103

File Name : 9085.01.SR-60.AZUSA AVE.AM
 Site Code : 00000000
 Start Date : 9/30/2009
 Page No : 1

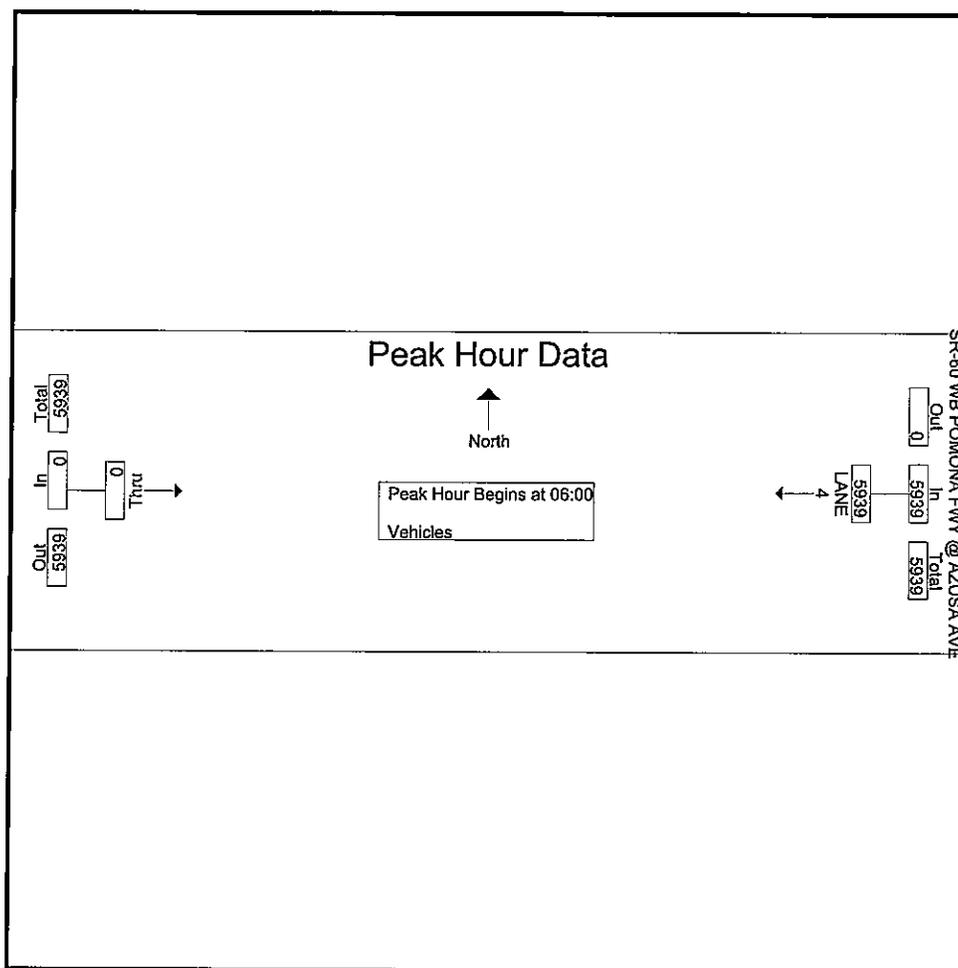
Groups Printed- Vehicles

Start Time	SR-60 WB POMONA FWY @ AZUSA AVE				Eastbound Thru	Int. Total
	LANE 1	LANE 2	LANE 3	LANE 4		
06:00	431	455	337	201	0	1424
06:15	467	490	357	246	0	1560
06:30	456	487	378	245	0	1566
06:45	383	392	318	296	0	1389
Total	1737	1824	1390	988	0	5939
07:00	328	323	226	257	0	1134
07:15	289	292	205	218	0	1004
07:30	302	289	155	212	0	958
07:45	304	320	183	228	0	1035
Total	1223	1224	769	915	0	4131
08:00	335	339	236	222	0	1132
08:15	233	225	132	192	0	782
08:30	311	314	206	226	0	1057
08:45	386	385	266	202	0	1239
Total	1265	1263	840	842	0	4210
09:00	339	341	219	197	0	1096
09:15	397	387	246	229	0	1259
09:30	395	396	293	208	0	1292
09:45	432	412	290	209	0	1343
Total	1563	1536	1048	843	0	4990
Grand Total	5788	5847	4047	3588	0	19270
Apprch %	30	30.3	21	18.6	0	
Total %	30	30.3	21	18.6	0	

True Count
 3401 First Ave #123
 San Diego, CA 92103

File Name : 9085.01.SR-60.AZUSA AVE.AM
 Site Code : 00000000
 Start Date : 9/30/2009
 Page No : 2

Start Time	SR-60 WB POMONA FWY @ AZUSA AVE					Eastbound		
	LANE 1	LANE 2	LANE 3	LANE 4	App. Total	Thru	App. Total	Int. Total
Peak Hour Analysis From 6:00:00 AM to 9:45:00 AM - Peak 1 of 1								
Peak Hour for Entire Intersection Begins at 6:00:00 AM								
6:00:00 AM	431	455	337	201	1424	0	0	1424
6:15:00 AM	467	490	357	246	1560	0	0	1560
6:30:00 AM	456	487	378	245	1566	0	0	1566
6:45:00 AM	383	392	318	296	1389	0	0	1389
Total Volume	1737	1824	1390	988	5939	0	0	5939
% App. Total	29.2	30.7	23.4	16.6		0		
PHF	.930	.931	.919	.834	.948	.000	.000	.948



True Count
 3401 First Ave #123
 San Diego, CA 92103

File Name : 9085.01.SR-60.AZUSA AVE.PM
 Site Code : 00000000
 Start Date : 9/30/2009
 Page No : 1

Groups Printed- Vehicles

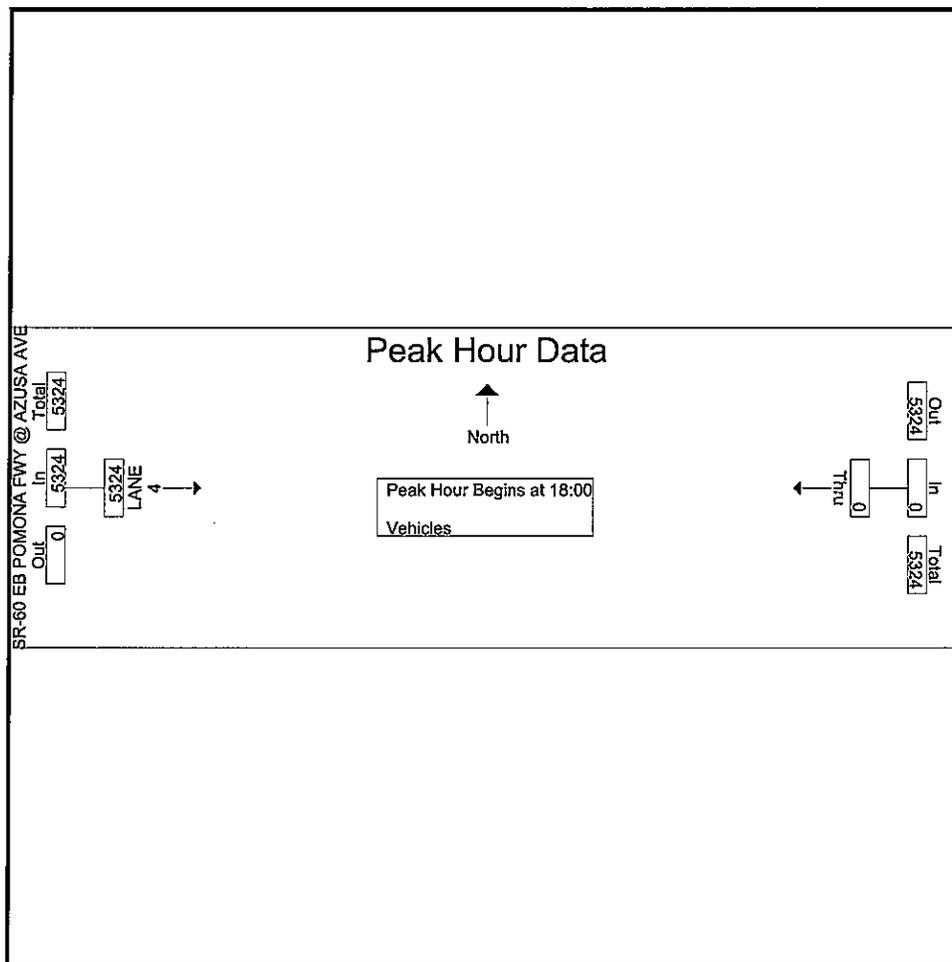
SR-60 EB POMONA FWY @ AZUSA AVE

Start Time	Westbound Thru	Eastbound				Int. Total
		LANE 1	LANE 2	LANE 3	LANE 4	
14:30	0	448	423	320	168	1359
14:45	0	458	421	314	94	1287
Total	0	906	844	634	262	2646
15:00	0	394	388	313	123	1218
15:15	0	390	374	269	197	1230
15:30	0	402	382	283	133	1200
15:45	0	389	372	274	110	1145
Total	0	1575	1516	1139	563	4793
16:00	0	308	307	251	121	987
16:15	0	321	308	223	199	1051
16:30	0	352	350	258	161	1121
16:45	0	253	261	200	141	855
Total	0	1234	1226	932	622	4014
17:00	0	194	232	149	99	674
17:15	0	402	401	284	168	1255
17:30	0	395	330	293	129	1147
17:45	0	378	374	270	145	1167
Total	0	1369	1337	996	541	4243
18:00	0	411	416	324	214	1365
18:15	0	405	416	350	218	1389
18:30	0	386	370	274	186	1216
18:45	0	419	414	314	207	1354
Total	0	1621	1616	1262	825	5324
Grand Total	0	6705	6539	4963	2813	21020
Apprch %	0	31.9	31.1	23.6	13.4	
Total %	0	31.9	31.1	23.6	13.4	

True Count
 3401 First Ave #123
 San Diego, CA 92103

File Name : 9085.01.SR-60.AZUSA AVE.PM
 Site Code : 00000000
 Start Date : 9/30/2009
 Page No : 2

Start Time	Westbound		SR-60 EB POMONA FWY @ AZUSA AVE				App. Total	Int. Total
	Thru	App. Total	LANE 1	LANE 2	LANE 3	LANE 4		
Peak Hour Analysis From 2:30:00 PM to 6:45:00 PM - Peak 1 of 1								
Peak Hour for Entire Intersection Begins at 6:00:00 PM								
6:00:00 PM	0	0	411	416	324	214	1365	1365
6:15:00 PM	0	0	405	416	350	218	1389	1389
6:30:00 PM	0	0	386	370	274	186	1216	1216
6:45:00 PM	0	0	419	414	314	207	1354	1354
Total Volume	0	0	1621	1616	1262	825	5324	5324
% App. Total	0	0	30.4	30.4	23.7	15.5		
PHF	.000	.000	.967	.971	.901	.946	.958	.958



True Count
 3401 First Ave #123
 San Diego, CA 92103

File Name : 9085.02.SR-60.PHILLIPS RANCH RD.AM
 Site Code : 00000000
 Start Date : 9/30/2009
 Page No : 1

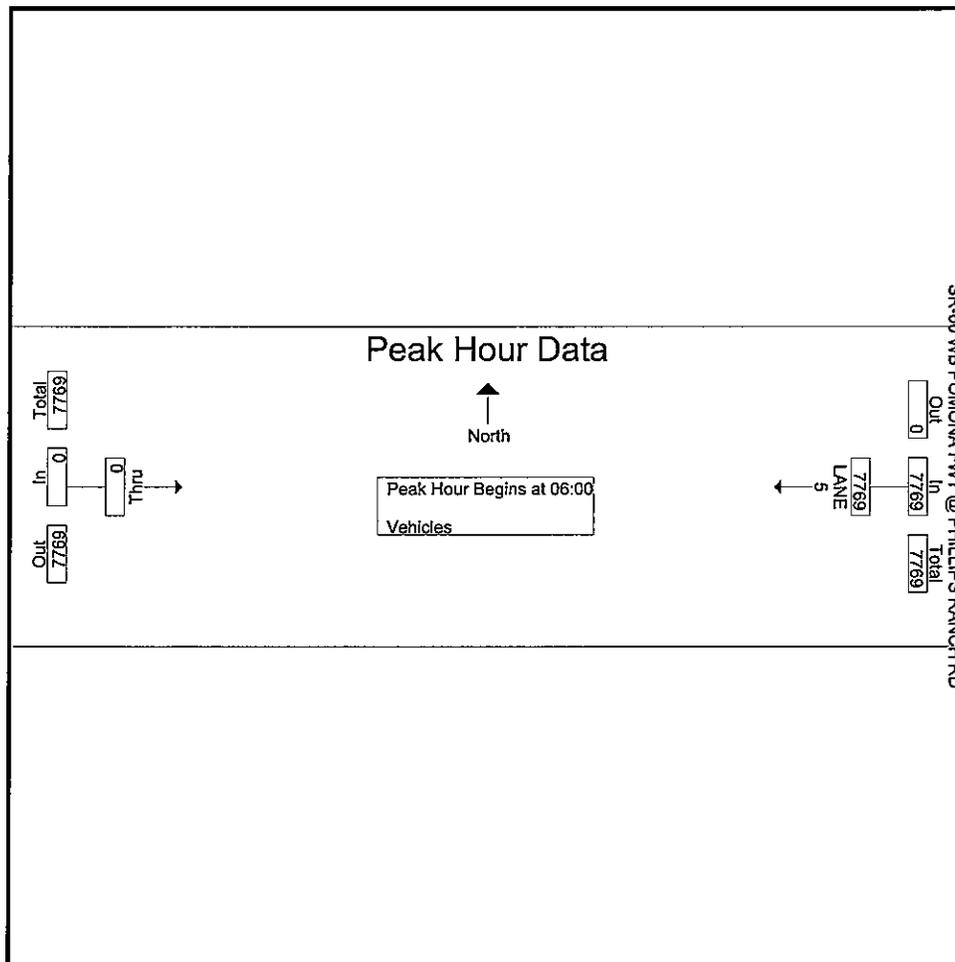
Groups Printed- Vehicles

Start Time	SR-60 WB POMONA FWY @ PHILLIPS RANCH RD					Eastbound		Int. Total
	LANE 1	LANE 2	LANE 3	LANE 4	LANE 5	Thru		
06:00	402	481	490	375	297	0		2045
06:15	442	400	395	330	292	0		1859
06:30	419	403	438	339	309	0		1908
06:45	447	393	446	334	337	0		1957
Total	1710	1677	1769	1378	1235	0		7769
07:00	460	482	451	330	308	0		2031
07:15	445	420	404	275	293	0		1837
07:30	454	419	429	319	297	0		1918
07:45	395	404	446	280	289	0		1814
Total	1754	1725	1730	1204	1187	0		7600
08:00	378	408	395	248	243	0		1672
08:15	327	424	448	278	287	0		1764
08:30	291	432	418	288	275	0		1704
08:45	214	438	394	286	210	0		1542
Total	1210	1702	1655	1100	1015	0		6682
09:00	185	451	368	267	206	0		1477
09:15	204	462	374	295	214	0		1549
09:30	221	449	374	273	225	0		1542
09:45	163	459	398	267	210	0		1497
Total	773	1821	1514	1102	855	0		6065
Grand Total	5447	6925	6668	4784	4292	0		28116
Apprch %	19.4	24.6	23.7	17	15.3	0		
Total %	19.4	24.6	23.7	17	15.3	0		

True Count
 3401 First Ave #123
 San Diego, CA 92103

File Name : 9085.02.SR-60.PHILLIPS RANCH RD.AM
 Site Code : 00000000
 Start Date : 9/30/2009
 Page No : 2

Start Time	SR-60 WB POMONA FWY @ PHILLIPS RANCH RD Westbound						Eastbound		Int. Total
	LANE 1	LANE 2	LANE 3	LANE 4	LANE 5	App. Total	Thru	App. Total	
Peak Hour Analysis From 6:00:00 AM to 9:45:00 AM - Peak 1 of 1									
Peak Hour for Entire Intersection Begins at 6:00:00 AM									
6:00:00 AM	402	481	490	375	297	2045	0	0	2045
6:15:00 AM	442	400	395	330	292	1859	0	0	1859
6:30:00 AM	419	403	438	339	309	1908	0	0	1908
6:45:00 AM	447	393	446	334	337	1957	0	0	1957
Total Volume	1710	1677	1769	1378	1235	7769	0	0	7769
% App. Total	22	21.6	22.8	17.7	15.9		0		
PHF	.956	.872	.903	.919	.916	.950	.000	.000	.950



True Count
 3401 First Ave #123
 San Diego, CA 92103

File Name : 9085.02.SR-60.PHILLIPS RANCH RD.PM
 Site Code : 00000000
 Start Date : 9/30/2009
 Page No : 1

Groups Printed- Vehicles

Start Time	SR-60 EB POMONA FWY Westbound Thru	SR-60 EB POMONA FWY @ PHILLIPS RANCH RD Eastbound					Int. Total
		LANE 1	LANE 2	LANE 3	LANE 4	LANE 5	
14:30	0	208	474	389	329	313	1713
14:45	0	260	484	415	308	313	1780
Total	0	468	958	804	637	626	3493
15:00	0	274	487	402	338	304	1805
15:15	0	280	526	435	343	317	1901
15:30	0	296	475	423	327	317	1838
15:45	0	284	469	409	320	323	1805
Total	0	1134	1957	1669	1328	1261	7349
16:00	0	317	499	403	329	332	1880
16:15	0	317	486	440	366	362	1971
16:30	0	281	493	422	340	359	1895
16:45	0	287	452	441	358	365	1903
Total	0	1202	1930	1706	1393	1418	7649
17:00	0	291	501	420	360	385	1957
17:15	0	303	474	428	383	380	1968
17:30	0	301	496	435	336	385	1953
17:45	0	320	468	443	362	378	1971
Total	0	1215	1939	1726	1441	1528	7849
18:00	0	285	468	404	367	405	1929
18:15	0	265	472	429	391	393	1950
18:30	0	244	448	406	344	384	1826
18:45	0	263	429	346	330	356	1724
Total	0	1057	1817	1585	1432	1538	7429
Grand Total	0	5076	8601	7490	6231	6371	33769
Apprch %	0	15	25.5	22.2	18.5	18.9	
Total %	0	15	25.5	22.2	18.5	18.9	

Appendix B

Traffic Forecast Data

SR-57 NB, 2037+IBC, Without Project

SR-57 Northbound																														
Time Period	Mainline	Brea Canyon On	Mainline	Brea Canyon/Diamond Bar Bl. Off	Mainline	Brea Canyon/Diamond Bar Bl. On	Mainline	HOV Add-On	Pathfinder Off	Mainline	Pathfinder On	Mainline	HOV Add	SR-60 Off	Mainline South of SR-60	SR-60 On	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-60 Off	Alt Off to SR-60	Mainline North of SR-60	Diamond Bar On	Mainline	Temple Off	Mainline
Existing Counts (HR)	4906	300	5206	405	4801	205	5006	0	248	4758	690	5448	200	1332	4316	5055	9371	802	8569	0	8569	658	9227	5251	0	3976	906	4882	787	4095
2008 Base Model (Per)	22830	1145	23975	2163	21894	0	21894	176	1745	20326	1837	22163	2104	5502	18765	11306	30071	1881	28190	0	28190	1867	30057	17540	0	12342	1465	13808	1438	12369
2035 Model (Per)	25890	882	26772	2310	24543	0	24543	252	1819	22976	2171	25148	2712	7757	20101	15622	35724	2144	33580	0	35548	1967	35548	22485	0	12992	1102	14094	1458	12636
Growth (HR) 2035-2008	1163	-100	1063	56	1007	0	1007	29	28	1007	127	1134	231	857	508	1640	2148	100	2048	0	2796	38	2087	1879	0	247	-138	109	8	101
2035 Peak Hour	6069	200	6269	461	5808	205	6013	29	276	5765	817	6582	431	2189	4824	6695	11519	902	10617	0	11365	696	11314	7130	0	4223	768	4991	795	4196
2037 Peak Hour	6190	204	6394	470	5924	209	6133	29	282	5880	833	6714	440	2233	4920	6829	11750	920	10820	0	11592	710	11540	7273	0	4307	783	5090	810	4280
2017 Forecast	5247	283	5547	424	5115	206	5347	9	257	5084	730	5806	269	1577	4511	5639	10151	933	9206	0	9206	693	9905	5751	0	4154	870	5030	794	4239
Rounded 2017 Peak	5200	280	5500	420	5100	210	5300	10	260	5100	730	5800	270	1580	4500	5600	10100	940	9200	0	9200	690	9900	5800	0	4100	870	5000	790	4200
Existing Counts (HR)	4432	700	5132	300	4832	150	4982	0	550	4432	539	4971	430	970	4431	5374	9805	390	9415	0	9415	773	10188	5744	0	4444	945	5389	499	4890
2008 Base Model (Per)	43438	600	44038	3938	40765	0	40765	2688	3130	40324	673	40997	2677	10891	32783	23364	56147	2793	53353	0	53353	2013	55367	34973	0	21230	2179	23409	2016	21393
2035 Model (Per)	44689	69	44759	4018	40740	0	40740	3304	3258	40786	417	41203	3261	13172	31291	24998	56289	2919	53370	0	53370	4622	57993	35726	0	23176	1747	24924	2020	22903
Growth (HR) 2035-2008	350	-149	202	22	-7	0	-7	172	36	129	-72	58	164	639	-418	458	40	35	5	0	5	731	735	211	0	545	-121	424	1	423
2035 Peak Hour	4782	551	5334	322	4825	150	4975	172	586	4561	467	5029	594	1609	4013	5832	9845	425	9420	0	9420	1504	10923	5955	0	4989	824	5813	500	5313
2037 Peak Hour	4878	770	5441	329	4922	153	5075	176	598	4653	477	5129	605	1641	4094	5948	10042	434	9608	0	9608	1534	11142	6074	0	5089	841	5929	510	5419
2017 Forecast	4566	720	5237	309	4909	150	5073	51	564	4566	522	5065	481	1161	4394	5553	9918	461	9468	0	9468	1024	10506	5846	0	4660	915	5564	502	5064
Rounded 2017 Peak	4500	720	5200	310	4900	150	5100	50	560	4600	520	5100	480	1160	4400	5600	10000	470	9500	0	9500	1040	10500	5800	0	4700	920	5600	500	5100

SR-57 SB, 2037+IBC, No Project

SR-57 SB, 2037+IBC, No Project

		SR-57 Southbound																												
	Time Period	Mainline	Sunset Crossing off	Mainline	Sunset Crossing On	Mainline North of SR-60	SR-60 On	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-60 Off	SR-60 Truck Passby	HOV Off	Mainline South of SR-60	SR-60 EB Connector	HOV Off	Pathfinder Off	Mainline	Pathfinder On	Mainline	Diamond Bar Off	Mainline	Diamond Bar On	Mainline	Brea Canyon Off	Mainline
Existing Counts (HR)	AM	4921	709	4212	136	4348	6202	10550	1173	9377	699	10076	0	10076	4080	0	510	5996	1561	0	703	6854	351	7205						
2008 Base Model (Per)		15143	1773	13369	167	13536	22809	36345	1753	34591	807	35399	4034	39433	16185	1608	2	21720	4079	1648	1628	22526	2853	25379	220	24708	4531	29240	1511	27728
2035 Model (Per)		16460	1769	14690	28	14719	21755	36474	2101	34372	403	34776	3735	38511	16078	945	303	21195	6464	3139	1548	22973	2875	25849	278	24962	4549	29512	1302	28210
Growth (HR) 2035-2008		500	-2	502	-53	450	-401	49	132	83	-154	-237	-114	-350	-41	-252	114	-200	906	567	-30	170	8	179	22	97	7	103	-79	FALSE
2035 Peak Hour		5421	707	4714	83	4798	5801	10599	1305	9294	545	9839	-114	9726	4039	-252	561	5797	2467	567	673	7024	359	7384	22	97	7	103	-79	0
2037 Peak Hour		5530	722	4808	340	4893	5918	10811	1331	9480	556	10036	-116	9920	4120	-257	572	5912	2517	979	686	7164	367	7531	22	98	7	105	-81	0
2017 Forecast		5115	712	4409	194	4591	6116	10707	1304	9412	611	10026	114	10140	3886	77	527	6026	1829	280	699	6867	356	7232	6	2086	3	2086	-23	2086
Rounded 2017 Peak			5100	710	4400	190	4600	6120	10700	1320	9400	360	9800	360	10200	3900	80	400	5800	1800	280	700	6600	360	7000	10	7000	0	7000	-20
Existing Counts (HR)	PM	5741	992	4740	133	4873	4641	9514	647	8867	866	9733	0	9733	4871	593	120	4862	745	0	359	5248	326	5574	114	5460	786	6246	280	5966
2008 Base Model (Per)		19734	2425	17309	60	17369	26161	43531	2519	41011	757	41768	4804	46573	17649	1081	32	27907	6123	1907	2457	29670	3161	32831	969	31330	5705	37035	2551	34483
2035 Model (Per)		20377	2415	17962	74	18036	32066	50103	2681	47421	4103	51524	5524	57049	23415	2827	1127	29774	10188	4232	2545	33187	2949	36137	1354	34197	5801	39998	1773	38225
Growth (HR) 2035-2008		180	-3	183	4	187	1653	1840	45	1795	937	2732	202	2933	1614	489	307	523	1138	651	25	985	-59	926	108	803	27	830	-218	1048
2035 Peak Hour		5921	989	4923	137	5060	6294	11354	692	10662	1803	12465	202	12666	6485	1082	427	5385	1883	651	384	6233	267	6500	222	6263	813	7076	62	7014
2037 Peak Hour		6039	1009	5021	140	5161	6420	11581	706	10875	1839	12714	206	12920	6615	1104	435	5492	1921	811	391	6357	272	6630	226	6388	829	7217	63	7154
2017 Forecast		5815	997	4814	238	5052	5144	10196	748	9448	776	10209	426	10638	4994	738	211	5216	1075	231	368	5691	310	6010	147	5871	799	6661	217	6433
Rounded 2017 Peak			5800	1000	4800	240	5100	5100	10200	760	9400	400	9800	830	10600	5000	620	130	4900	1100	230	370	5400	310	5700	150	5600	800	6400	220

SR-60, EB, 2037+IBC, No Project

SR-60, EB, 2037+IBC, No Project

SR-60 Eastbound																											
	Time Period	Mainline	Azusa Off Ramp	Mainline (West of Azusa)	Azusa On Ramp 1	Mainline (East of Azusa)	Azusa On Ramp 2	Mainline	Fullerton Off Ramp	Mainline (West of Fullerton)	Fullerton On Ramp 1	Mainline (East of Fullerton)	Fullerton On Ramp 2	Mainline	Nogales Off Ramp	Mainline (West of Nogales)	Nogales On Ramp 1	Mainline (East of Nogales)	Nogales On Ramp 2	Mainline	Fairway Offramp	Mainline (West of Fairway)	Fairway On Ramp 1	Mainline (East of Fairway)	Fairway On Ramp 2	Mainline	Lemon Ave Off
Existing Counts (HR)																											
2008 Base Model (Per)	AM	18179	1578	16600	1045	17646	278	17924	1636	16288	795	17083	478	17562	1384	16178	496	16674	740	17414	1456	15958	828	16786	486	17272	0
2035 Model (Per)	AM	19067	1572	17495	1885	19181	1202	18697	1618	17347	877	18224	951	19175	1317	17857	809	18667	1030	19805	1354	18451	1121	19572	631	20204	2313
Growth (HR) 2035-2008	AM	337	-2	340	319	583	351	294	-7	402	31	434	180	613	-25	638	119	757	110	909	-39	947	111	1059	55	1114	879
2035 Peak Hour	AM	337	-2	340	319	583	351	294	-7	402	31	434	180	613	-25	638	119	757	110	909	-39	947	111	1059	55	1114	879
2037 Peak Hour	AM	344	-2	347	326	595	358	300	-7	410	32	442	183	625	-26	651	121	772	112	927	-40	966	114	1080	56	1136	897
2017 Forecast	AM																									2486	536
Rounded 2017 Peak		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7400	540
Existing Counts (HR)																											
2008 Base Model (Per)	PM	5941	700	5241	354	5595	581	6176	726	5450	355	5805	376	6181	192	5989	320	6309	348	6657	533	6124	201	6325	200	6525	0
2035 Model (Per)	PM	33864	2106	31758	929	32687	1362	34049	2221	31828	441	32269	1229	33499	1978	31520	987	32508	987	33495	2078	31417	1089	32507	1613	34120	0
Growth (HR) 2035-2008	PM	31725	2228	29497	1483	30980	1385	32004	2377	29627	755	30382	1671	32054	2053	30000	1209	31210	818	32219	2155	30063	712	30776	1340	32117	3637
2035 Peak Hour	PM	-599	34	-633	155	-478	6	-573	44	-616	88	-528	124	-405	21	-426	62	-363	-47	-357	22	-379	-106	-485	-76	-561	1018
2037 Peak Hour	PM	5342	734	4608	509	5117	587	5603	770	4834	443	5277	500	5776	213	5563	382	5946	301	6300	555	5745	95	5840	124	5964	1018
2017 Forecast	PM	5449	749	4700	519	5219	599	5715	785	4930	452	5382	510	5892	217	5675	390	6064	307	6426	566	5860	97	5957	126	6083	1039
Rounded 2017 Peak		5786	714	5372	401	5768	586	6354	744	5607	382	5975	414	6415	200	6192	340	6535	337	6869	544	6346	172	6518	180	6689	437
Rounded 2017 Peak		5800	710	5400	400	5800	590	6400	740	5600	380	6000	410	6400	200	6200	340	6500	340	6900	540	6300	170	6500	180	6700	700

SR-60, WB, 2037+IBC, No Project

SR-60, WB, 2017+IBC, No Project

	Time Period																					
		Philps Ranch On 1	Mainline	Philps Ranch On 2	Mainline East of Diamond Bar	Diamond Bar Off	HOV Off	Mainline	Diamond Bar Loop On	Mainline West of Diamond Bar	SR-57 Merge	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-57 Diverge	Alt 1 Off	HOV Off	Mainline
Existing Counts (HR)	AM	585	6178	440	6618	919	74	5699	503	6202	4348	10550	1173	9377	699	10076	0	10076	5996	230	510	3340
2008 Base Model (Per)		0	20830	1943	22761	1249	277	21236	1572	22809	13536	36345	1753	34591	807	35399	4034	39433	21720	1608	2	16185
2035 Model (Per)		0	19981	2235	22200	1389	968	19842	1912	21755	14719	36747	2101	34372	403	34776	3735	38511	21195	945	303	16078
Growth (HR) 2035-2008		0	-323	111	-213	53	263	-530	129	-401	450	153	132	-83	-154	-237	-114	-350	-200	-252	114	-41
2035 Peak Hour		585	5855	551	6405	972	337	5169	632	5801	4798	10703	1305	9294	545	9839	-114	9726	5797	-22	561	3299
2037 Peak Hour		597	5972	562	6533	992	344	5273	645	5918	4893	10917	1630	9480	390	10036	400	9920	6596	253	572	3365
2037 Ajusted		597	6130	562	6692	992	344	5356	553	5910	5200	11110	1630	9480	390	9870	400	10270	6080	253	572	3364
2017 Forecast		AM	589	6156	474	6641	939	150	5614	516	6116	4591	10707	1304	9412	611	10026	114	10140	6026	236	527
Rounded 2017 Peak		590	6200	470	6700	940	150	5600	520	6100	4600	10700	1320	9400	360	9800	360	10100	6000	240	530	3400
Existing Counts (HR)	PM	0	5168	232	5400	935	5	4465	185	4650	4873	9523	647	8867	866	9733	0	9733	4862	593	120	4158
2008 Base Model (Per)		0	24893	1556	26407	2012	30	24389	1772	26161	17369	43531	2519	41011	757	41768	4804	46573	27907	1081	32	17649
2035 Model (Per)		0	31804	1684	33343	2101	849	30392	1674	32066	18036	50103	2681	47421	4103	51524	5524	57049	29774	2827	1127	23415
Growth (HR) 2035-2008		0	1935	36	1942	25	229	1681	-27	1653	187	1840	45	1795	937	2732	202	2933	523	489	307	1614
2035 Peak Hour		0	7103	268	7342	960	235	6146	158	6303	5060	11363	692	10662	1803	12465	202	12666	5385	1082	427	5772
2037 Peak Hour		0	7245	273	7489	979	240	6269	161	6429	5161	11590	706	10875	1839	12714	206	12920	5492	1104	435	5888
2017 Forecast		PM	0	5749	243	5971	948	72	4961	189	5150	5052	10202	748	9448	776	10209	426	10638	5216	738	200
Rounded 2017 Peak		0	5700	240	5900	950	70	4900	190	5100	5100	10200	760	9400	400	9800	830	10600	5200	740	200	4500

SR-60, WB, 2037+IBC, No Project

SR-60																									
SR-57NB Connector	Mainline	Alt 1 On	Brea Cyn On Ramp	HOV Off	Mainline	Lemon On	Mainline	Fairway Dr. Off	Mainline	Fairway On Ramp	Mainline	Nogales Off Ramp	Mainline (East of Nogales)	Nogales On Ramp 1	Mainline (West of Nogales)	Nogales On Ramp 2	Mainline	Fullerton Off Ramp	Mainline (East of Fullerton)	Fullerton On Ramp 1	Mainline (West of Fullerton)	Fullerton On Ramp 2	Mainline	Azusa Off Ramp	Mainline (East of Azusa)
1332	4672	240	393	0	6085	0																			
3865	20050	57	482	0	22371	0																			
5629	21707	0	1177	1255	21630	891	19625	1433	18191	1136	19328	1531	17687	1311	18999	923	19922	1510	18412	1552	19964	683	20648	1336	19181
670	630	-22	264	477	-282	339	7458	545	6913	432	7345	582	6721	498	7220	351	7570	574	6997	590	7586	260	7846	508	7289
2002	5302	218	657	477	5803	339	7458	545	6913	432	7345	582	6721	498	7220	351	7570	574	6997	590	7586	260	7846	508	7289
1800	5408	264	670	486	5919	345	7607	555	7051	440	7492	593	6855	508	7364	358	7722	585	7136	602	7738	265	8003	518	7435
1800	5164	264	432	486	5374	345	5720	555	5164	440	5605	593	5011	508	5519	358	5877	585	5292	602	5893	265	6158	518	5640
1466	4823	246	404	140	5889	100	1629	160	1486	126	1600	169	1429	146	1571	103	1686	169	1514	171	1686	74	1771	149	1600
1500	4900	250	400	140	5400	100	5500	160	5300	130	5400	170	5200	150	5400	100	5500	170	5300	170	5500	70	5600	150	5500
970	5128	433	376	0	5937	0	7170	641	6765	696	7430	990	5288	220	5288	220	6880	751	6537	444	5288	220	6790	220	5288
7219	24869	0	825	0	27491	825	27491	2231	25260	2266	27527	2160	25366	2006	27373	660	28033	2032	26001	1707	27709	1019	28728	1778	26950
9683	33099	1478	1063	1946	33701	1985	31133	2381	28752	1661	30413	2211	28203	1748	29951	757	30708	2143	28565	1521	30086	1241	31327	1890	29191
690	2304	414	67	545	1739	325	1020	42	978	-169	808	14	794	-72	722	27	749	31	718	-52	666	62	728	31	627
1660	7432	847	443	545	7676	325	8190	683	7743	527	8238	1004	6082	148	6010	247	7629	782	7255	392	5954	282	7518	251	5915
1693	7581	864	451	556	7829	331	8354	697	7898	537	8403	1024	6204	151	6130	252	7782	798	7400	400	6073	288	7668	256	6034
1179	5663	566	397	171	6441	94	7436	658	6946	651	7564	999	5749	200	5777	229	7000	765	6526	431	5749	243	6907	231	5749
1200	5700	570	400	170	6600	400	7100	660	6700	650	7600	1000	5700	200	5800	230	7000	770	6500	430	5700	240	6900	230	5700

SR-57 NB, 2037+IBC, Without Project

SR-57 Northbound																															
	Time Period	Mainline	Brea Canyon On	Mainline	Brea Canyon/Diamond Bar Bl. Off	Mainline	Brea Canyon/Diamond Bar Bl. On	Mainline	HOV Add-On	Pathfinder Off	Mainline	Pathfinder On	Mainline	HOV Add	SR-60 Off	Mainline South of SR-60	SR-60 On	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-60 Off	Alt Off to SR-60	Mainline North of SR-60	Diamond Bar On	Mainline	Temple Off	Mainline
Existing Counts (HR)		4906	300	5206	405	4801	205	5006	0	248	4758	690	5448	200	1332	4316	5055	9371	802	8569	0	8569	658	9227	5251	0	3976	906	4882	787	4095
2008 Base Model (Per)		22830	1145	23975	2163	21894	0	21894	176	1745	20326	1837	22163	2104	5502	18765	11306	30071	1881	28190	0	28190	1867	30057	17540	0	12342	1465	13808	1438	12369
2035 Model (Per)		25890	882	26772	2310	24543	0	24543	252	1819	22976	2171	25148	2712	7757	20101	15622	35724	2144	33580	0	35548	1967	35548	22485	0	12992	1102	14094	1458	12636
Growth (HR) 2035-2008		1163	-100	1063	56	1007	0	1007	29	28	1007	127	1134	231	857	508	1640	2148	100	2048	0	2796	38	2087	1879	0	247	-138	109	8	101
2035 Peak Hour	AM	6069	200	6269	461	5808	205	6013	29	276	5765	817	6582	431	2189	4824	6695	11519	902	10617	0	11365	696	11314	7130	0	4223	768	4991	795	4196
2037 Peak Hour		6190	204	6394	470	5924	209	6133	29	282	5880	833	6714	440	2233	4920	6829	11750	920	10830	0	11592	710	11540	7273	0	4307	783	5090	810	4280
2037 Adjusted Peak Hour		6100	240	6420	470	5950	209	6159	29	282	5907	833	6740	440	2190	4990	7100	12090	1260	10830	0	10830	780	11610	7000	0	4610	783	5393	810	4582
Rounded 2037 Peak		6100	240	6400	470	5900	210	6200	30	280	5900	830	6700	440	2190	5000	7100	12100	1260	10800	0	10800	780	11600	7000	0	4600	780	5400	810	4600
Existing Counts (HR)		4432	700	5132	300	4832	150	4982	0	550	4432	539	4971	430	970	4431	5374	9805	390	9415	0	9415	773	10188	5744	0	4444	945	5389	499	4890
2008 Base Model (Per)		43438	600	44038	3938	40765	0	40765	2688	3130	40324	673	40997	2677	10891	32783	23364	56147	2793	53353	0	53353	2013	55367	34973	0	21230	2179	23409	2016	21393
2035 Model (Per)		44689	69	44759	4018	40740	0	40740	3304	3258	40786	417	41203	3261	13172	31291	24998	56289	2919	53370	0	53370	4622	57993	35726	0	23176	1747	24924	2020	22903
Growth (HR) 2035-2008		350	-149	202	22	-7	0	-7	172	36	129	-72	58	164	639	-418	458	40	35	5	0	5	731	735	211	0	545	-121	424	1	423
2035 Peak Hour	PM	4782	551	5334	322	4825	150	4975	172	586	4561	467	5029	594	1609	4013	5832	9845	425	9420	0	9420	1504	10923	5955	0	4989	824	5813	500	5313
2037 Peak Hour		4878	770	5441	329	4922	153	5075	176	598	4653	477	5129	605	1641	4094	5948	10042	434	9608	0	9608	1534	11142	6074	0	5089	841	5929	510	5419
2037 Adjusted Peak Hour		4878	770	5456	329	5127	153	5280	176	598	4859	477	5335	605	1641	4300	5948	10248	640	9608	0	9608	1650	11258	6074	0	5184	841	6025	510	5515
Rounded 2037 Peak		4900	770	5500	330	5100	150	5300	180	600	4900	480	5300	610	1640	4300	6000	10200	640	9600	0	9600	1650	11300	6100	0	5200	840	6000	510	5500

Note: (1) AM Peak Hour = AM Peak Period X 0.38;
 (2) PM Peak Hour = AM Peak Period X 0.28;

SR-57 SB, 2037+IBC, No Project

SR-57 SB, 2037+IBC, No Project

		SR-57 Southbound																												
	Time Period	Mainline	Sunset Crossing off	Mainline	Sunset Crossing On	Mainline North of SR-60	SR-60 On	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-60 Off	SR-60 Truck Passby	HOV Off	Mainline South of SR-60	SR-60 EB Connector	HOV Off	Pathfinder Off	Mainline	Pathfinder On	Mainline	Diamond Bar Off	Mainline	Diamond Bar On	Mainline	Brea Canyon Off	Mainline
Existing Counts (HR)		4921	709	4212	136	4348	6202	10550	1173	9377	699	10076	0	10076	4080	0	510	5996	1561	0	703	6854	351	7205						
2008 Base Model (Per)		15143	1773	13369	167	13536	22809	36345	1753	34591	807	35399	4034	39433	16185	1608	2	21720	4079	1648	1628	22526	2853	25379	220	24708	4531	29240	1511	27728
2035 Model (Per)		16460	1769	14690	28	14719	21755	36474	2101	34372	403	34776	3735	38511	16078	945	303	21195	6464	3139	1548	22973	2875	25849	278	24962	4549	29512	1302	28210
Growth (HR) 2035-2008		500	-2	502	-53	450	-401	49	132	-83	-154	-237	-114	-350	-41	-252	114	-200	906	567	-30	170	8	179	22	97	7	103	-79	FALSE
2035 Peak Hour		5421	707	4714	83	4798	5801	10599	1305	9294	545	9839	-114	9726	4039	-252	561	5797	2467	567	673	7024	359	7384	22	97	7	103	-79	0
2037 Peak Hour		5530	722	4808	340	4893	5918	10811	1331	9480	556	10036	-116	9920	4120	-257	572	5912	2517	979	686	7164	367	7531	22	98	7	105	-81	0
Adjusted 2037 Peak Hour		5591	722	4870	340	5210	5900	11110	1630	9480	390	9870	400	10270	3364	273	572	6061	2517	979	686	6912	367	7279	22	7256	7	7263	-81	7344
Rounded 2037 Peak		5600	720	4900	340	5200	5900	11100	1630	9500	390	9900	400	10300	3400	270	570	6100	2500	980	690	6900	370	7300	20	7300	10	7300	-80	7300
Existing Counts (HR)		5741	992	4740	133	4873	4641	9514	647	8867	866	9733	0	9733	4871	593	120	4862	745	0	359	5248	326	5574	114	5460	786	6246	280	5966
2008 Base Model (Per)		19734	2425	17309	60	17369	26161	43531	2519	41011	757	41768	4804	46573	17649	1081	32	27907	6123	1907	2457	29670	3161	32831	969	31330	5705	37035	2551	34483
2035 Model (Per)		20377	2415	17962	74	18036	32066	50103	2681	47421	4103	51524	5524	57049	23415	2827	1127	29774	10188	4232	2545	33187	2949	36137	1354	34197	5801	39998	1773	38225
Growth (HR) 2035-2008		180	-3	183	4	187	1653	1840	45	1795	937	2732	202	2933	1614	489	307	523	1138	651	25	985	-59	926	108	803	27	830	-218	1048
2035 Peak Hour		5921	989	4923	137	5060	6294	11354	692	10662	1803	12465	202	12666	6485	1082	427	5385	1883	651	384	6233	267	6500	222	6263	813	7076	62	7014
2037 Peak Hour		6039	1009	5021	140	5161	6420	11581	706	10875	1839	12714	206	12920	6615	1104	435	5492	1921	811	391	6357	272	6630	226	6388	829	7217	63	7154
Adjusted 2037 Peak Hour		5964	1009	4955	500	5455	6420	11875	1000	10875	550	11425	1490	12915	5279	1104	435	6097	1921	811	391	6816	272	7088	226	6862	829	7691	63	7628
Rounded 2037 Peak		6000	1010	5000	500	5500	6400	11900	1000	10900	550	11400	1490	12900	5300	1100	440	6100	1900	810	390	6800	270	7100	230	6900	830	7700	60	7600

Note: (1) AM Peak Hour = AM Peak Period X 0.38;
 (2) PM Peak Hour = AM Peak Period X 0.28;

SR-60, EB, 2037+IBC, No Project

SR-60, EB, 2037+IBC, No Project

SR-60 Eastbound																											
	Time Period	Mainline	Azusa Off Ramp	Mainline (West of Azusa)	Azusa On Ramp 1	Mainline (East of Azusa)	Azusa On Ramp 2	Mainline	Fullerton Off Ramp	Mainline (West of Fullerton)	Fullerton On Ramp 1	Mainline (East of Fullerton)	Fullerton On Ramp 2	Mainline	Nogales Off Ramp	Mainline (West of Nogales)	Nogales On Ramp 1	Mainline (East of Nogales)	Nogales On Ramp 2	Mainline	Fairway Offramp	Mainline (West of Fairway)	Fairway On Ramp 1	Mainline (East of Fairway)	Fairway On Ramp 2	Mainline	Lemon Ave Off
Existing Counts (HR)																											
2008 Base Model (Per)		18179	1578	16600	1045	17646	278	17924	1636	16288	795	17083	478	17562	1384	16178	496	16674	740	17414	1456	15958	828	16786	486	17272	0
2035 Model (Per)		19067	1572	17495	1885	19181	1202	18697	1618	17347	877	18224	951	19175	1317	17857	809	18667	1030	19805	1354	18451	1121	19572	631	20204	2313
Growth (HR) 2035-2008	AM	337	-2	340	319	583	351	294	-7	402	31	434	180	613	-25	638	119	757	110	909	-39	947	111	1059	55	1114	879
2035 Peak Hour		337	-2	340	319	583	351	294	-7	402	31	434	180	613	-25	638	119	757	110	909	-39	947	111	1059	55	1114	879
2037 Peak Hour		344	-2	347	326	595	358	300	-7	410	32	442	183	625	-26	651	121	772	112	927	-40	966	114	1080	56	1136	897
2037 Ajusted		7481	606	6875	457	7332	244	1030	625	1037	348	1069	398	1252	499	1278	269	1400	396	1512	507	1552	438	1665	255	8675	670
Rounded 2037 Peak		7500	610	6900	460	7300	240	1000	630	1000	350	1100	400	1300	500	1300	270	1400	400	1500	510	1600	440	1700	260	8700	670
Existing Counts (HR)		5941	700	5241	354	5595	581	6176	726	5450	355	5805	376	6181	192	5989	320	6309	348	6657	533	6124	201	6325	200	6525	0
2008 Base Model (Per)		33864	2106	31758	929	32687	1362	34049	2221	31828	441	32269	1229	33499	1978	31520	987	32508	987	33495	2078	31417	1089	32507	1613	34120	0
2035 Model (Per)		31725	2228	29497	1483	30980	1385	32004	2377	29627	755	30382	1671	32054	2053	30000	1209	31210	818	32219	2155	30063	712	30776	1340	32117	3637
Growth (HR) 2035-2008	PM	-599	34	-633	155	-478	6	-573	44	-616	88	-528	124	-405	21	-426	62	-363	-47	-357	22	-379	-106	-485	-76	-561	1018
2035 Peak Hour		5342	734	4608	509	5117	587	5603	770	4834	443	5277	500	5776	213	5563	382	5946	301	6300	555	5745	95	5840	124	5964	1018
2037 Peak Hour		5449	749	4700	519	5219	599	5715	785	4930	452	5382	510	5892	217	5675	390	6064	307	6426	566	5860	97	5957	126	6083	1039
2037 Ajusted Peak Hour		5449	749	5655	519	6175	599	6774	785	5989	452	6441	510	6950	217	6733	390	7123	307	7430	566	6864	97	6961	126	7087	1533
Rounded 2037 Peak		5400	750	5700	520	6200	600	6800	790	6000	450	6400	510	7000	220	6700	390	7100	310	7400	570	6900	100	7000	130	7100	1530

Note: (1) AM Peak Hour = AM Peak Period X 0.38;
 (2) PM Peak Hour = AM Peak Period X 0.28;

SR-60, WB, 2037+IBC, No Project

SR-60, WB, 2037+IBC, No Project

	Time Period																					
		Philps Ranch On 1	Mainline	Philps Ranch On 2	Mainline East of Diamond Bar	Diamond Bar Off	HOV Off	Mainline	Diamond Bar Loop On	Mainline West of Diamond Bar	SR-57 Merge	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-57 Diverge	Alt 1 Off	HOV Off	Mainline
Existing Counts (HR)	AM	585	6178	440	6618	919	74	5699	503	6202	4348	10550	1173	9377	699	10076	0	10076	5996	230	510	3340
2008 Base Model (Per)		0	20830	1943	22761	1249	277	21236	1572	22809	13536	36345	1753	34591	807	35399	4034	39433	21720	1608	2	16185
2035 Model (Per)		0	19981	2235	22200	1389	968	19842	1912	21755	14719	36747	2101	34372	403	34776	3735	38511	21195	945	303	16078
Growth (HR) 2035-2008		0	-323	111	-213	53	263	-530	129	-401	450	153	132	-83	-154	-237	-114	-350	-200	-252	114	-41
2035 Peak Hour		585	5855	551	6405	972	337	5169	632	5801	4798	10703	1305	9294	545	9839	-114	9726	5797	-22	561	3299
2037 Peak Hour		597	5972	562	6533	992	344	5273	645	5918	4893	10917	1630	9480	390	10036	400	9920	6596	253	572	3365
2037 Ajusted		597	6130	562	6692	992	344	5356	553	5910	5200	11110	1630	9480	390	9870	400	10270	6080	253	572	3364
Rounded 2037 Peak		600	6100	560	6700	990	340	5400	550	5900	5200	11100	1630	9500	390	9900	400	10300	6100	250	570	3400
Existing Counts (HR)	PM	0	5168	232	5400	935	5	4465	185	4650	4873	9523	647	8867	866	9733	0	9733	4862	593	120	4158
2008 Base Model (Per)		0	24893	1556	26407	2012	30	24389	1772	26161	17369	43531	2519	41011	757	41768	4804	46573	27907	1081	32	17649
2035 Model (Per)		0	31804	1684	33343	2101	849	30392	1674	32066	18036	50103	2681	47421	4103	51524	5524	57049	29774	2827	1127	23415
Growth (HR) 2035-2008		0	1935	36	1942	25	229	1681	-27	1653	187	1840	45	1795	937	2732	202	2933	523	489	307	1614
2035 Peak Hour		0	7103	268	7342	960	235	6146	158	6303	5060	11363	692	10662	1803	12465	202	12666	5385	1082	427	5772
2037 Peak Hour		0	7245	273	7489	979	240	6269	161	6429	5161	11590	706	10875	1839	12714	206	12920	5492	1104	435	5888
2037 Ajusted		0	7162	273	7435	979	240	6217	204	6420	5455	11875	1000	10875	550	11425	1490	12915	6097	1104	435	5279
Rounded 2037 Peak		0	7200	270	7400	980	240	6200	200	6400	5500	11900	1000	10900	550	11400	1490	12900	6100	1100	400	5300

Note: (1) AM Peak Hour = AM Peak Period X 0.38;
 (2) PM Peak Hour = AM Peak Period X 0.28;

SR-60, WB, 2037+IBC, No Project

SR-60																									
SR-57NB Connector	Mainline	Alt 1 On	Brea Cyn On Ramp	HOV Off	Mainline	Lemon On	Mainline	Fairway Dr. Off	Mainline	Fairway On Ramp	Mainline	Nogales Off Ramp	Mainline (East of Nogales)	Nogales On Ramp 1	Mainline (West of Nogales)	Nogales On Ramp 2	Mainline	Fullerton Off Ramp	Mainline (East of Fullerton)	Fullerton On Ramp 1	Mainline (West of Fullerton)	Fullerton On Ramp 2	Mainline	Azusa Off Ramp	Mainline (East of Azusa)
1332	4672	240	393	0	6085	0																			
3865	20050	57	482	0	22371	0																			
5629	21707	0	1177	1255	21630	891	19625	1433	18191	1136	19328	1531	17687	1311	18999	923	19922	1510	18412	1552	19964	683	20648	1336	19181
670	630	-22	264	477	-282	339	7458	545	6913	432	7345	582	6721	498	7220	351	7570	574	6997	590	7586	260	7846	508	7289
2002	5302	218	657	477	5803	339	7458	545	6913	432	7345	582	6721	498	7220	351	7570	574	6997	590	7586	260	7846	508	7289
1800	5408	264	670	486	5919	345	7607	555	7051	440	7492	593	6855	508	7364	358	7722	585	7136	602	7738	265	8003	518	7435
1800	5164	264	432	486	5374	345	5720	555	5164	440	5605	593	5011	508	5519	358	5877	585	5292	602	5893	265	6158	518	5640
1800	5200	260	430	490	5400	350	5700	560	5200	440	5600	590	5000	510	5500	360	5900	590	5300	600	5900	260	6200	520	5600
970	5128	433	376	0	5937	0	7170	641	6765	696	7430	990	5288	220	5288	220	6880	751	6537	444	5288	220	6790	220	5288
7219	24869	0	825	0	27491	825	27491	2231	25260	2266	27527	2160	25366	2006	27373	660	28033	2032	26001	1707	27709	1019	28728	1778	26950
9683	33099	1478	1063	1946	33701	1985	31133	2381	28752	1661	30413	2211	28203	1748	29951	757	30708	2143	28565	1521	30086	1241	31327	1890	29191
690	2304	414	67	545	1739	325	1020	42	978	-169	808	14	794	-72	722	27	749	31	718	-52	666	62	728	31	627
1660	7432	847	443	545	7676	325	8190	683	7743	527	8238	1004	6082	148	6010	247	7629	782	7255	392	5954	282	7518	251	5915
1693	7581	864	451	556	7829	331	8354	697	7898	537	8403	1024	6204	151	6130	252	7782	798	7400	400	6073	288	7668	256	6034
1693	6973	864	451	556	7732	331	8063	697	7367	537	7904	1024	6879	151	7030	252	7282	798	6484	400	6884	288	7172	256	6916
1700	7000	900	450	600	7700	330	8100	700	7400	540	7900	1020	6900	150	7000	250	7300	800	6500	400	6900	300	7200	260	6900



SR-57 NB, 2017+Project +IBC

SR-57 Northbound																															
	Time Period	Mainline	Brea Canyon On	Mainline	Brea Canyon/Diamond Bar Bl. Off	Mainline	Brea Canyon/Diamond Bar Bl. On	Mainline	HOV Add-On	Pathfinder Off	Mainline	Pathfinder On	Mainline	HOV Add	SR-60 Off	Mainline South of SR-60	SR-60 On	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-60 Off	Alt Off to SR-60	Mainline North of SR-60	Diamond Bar On	Mainline	Temple Off	Mainline
Existing Counts (HR)	AM	4906	300	5206	405	4801	205	5006	0	248	4758	690	5448	200	1332	4316	5055	9371	802	8569	0	8569	658	9227	5251	0	3976	906	4882	787	4095
2008 Base Model (Per)		22830	1145	23975	2163	21894	0	21894	176	1745	20326	1837	22163	2104	5502	18765	11306	30071	1881	28190	0	28190	1867	30057	17540	0	12342	1465	13808	1438	12369
2035 Model (Per)		26024	980	27004	2259	24817	0	24817	260	1808	23269	2224	25494	2791	7177	21108	16361	37469	2621	34847	602	35450	2035	37486	21668	1938	13765	944	14710	1485	13224
Growth (HR) 2035-2008		1214	-63	1151	36	1111	0	1111	32	24	1118	147	1266	261	637	890	1921	2811		2530	229	2759	64	2823	1569	736	541	-198	343	18	325
2035 Peak Hour		6120	237	6357	441	5912	205	6117	32	272	5876	837	6714	461	1969	5206	6976	12182	#VALUE!	11099	229	11328	722	12050	6820	736	4517	708	5225	805	4420
2037 Peak Hour		6242	242	6484	450	6030	209	6239	33	277	5994	854	6848	470	2008	5310	7115	12426	#VALUE!	11321	233	11554	736	12291	6956	751	4607	722	5329	821	4508
2017 Forecast		5276	283	5576	418	5144	206	5347	9	257	5113	736	5834	277	1526	4597	5554	9849	790	9349	160	9521	596	10105	5739	143	4240	853	5087	796	4296
Rounded 2017 Peak		5300	280	5600	420	5200	210	5400	10	260	5200	740	5900	280	1530	4600	5200	9800	500	9300	390	9700	380	10100	5700	140	4300	850	5200	800	4400
Existing Counts (HR)		PM	4432	700	5132	300	4832	150	4982	0	550	4432	539	4971	430	970	4431	5374	9805	390	9415	0	9415	773	10188	5744	0	4444	945	5389	499
2008 Base Model (Per)	43438		600	44038	3938	40765	0	40765	2688	3130	40324	673	40997	2677	10891	32783	23364	56147	2793	53353	0	53353	2013	55367	34973	0	21230	2179	23409	2016	21393
2035 Model (Per)	44977		67	45044	4021	41031	0	41031	3255	3098	41187	592	41780	3746	12379	33146	28827	61974	2824	59149	628	59778	5189	64967	34611	4291	26179	1081	27260	2082	25178
Mainline Vol Checking	44977			45044		41023		41023			41180		41772			33139		61966		59142		59770		64959			26057		27138		25056
Growth (HR) 2035-2008	431		-149	282	23	74	0	74	159	-9	242	-23	219	299	417	102	1530	1632	9	1623	176	1799	889	2688	-101	1201	1386	-307	1078	18	1060
2035 Peak Hour	4863		551	5414	323	4906	150	5056	159	541	4674	516	5190	729	1387	4533	6904	11437	399	11038	176	11214	1662	12876	5643	1201	5830	638	6467	517	5950
2037 Peak Hour	4960		562	5522	330	5005	153	5158	162	552	4767	527	5294	744	1414	4623	7042	11665	407	11259	179	11438	1696	13134	5755	1226	5946	650	6597	528	6069
2017 Forecast	4594		660	5209	309	4909	150	5073	46	550	4566	536	5094	519	1096	4508	5839	10244	424	9954	334	10268	804	11077	5749	294	5031	861	5906	508	5407
Rounded 2017 Peak	4600		660	5200	310	4900	150	5100	0	550	4600	540	5100	520	1100	4500	5800	10300	290	10000	560	10600	610	11200	5700	290	5200	860	6100	510	5600

SR-57 SB, 2017+Project +IBC

		SR-57 Southbound																												
	Time Period	Mainline	Sunset Crossing off	Mainline	Sunset Crossing On	Mainline North of SR-60	SR-60 On	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-60 Off	SR-60 Truck Passby	HOV Off	Mainline South of SR-60	SR-60 EB Connector	HOV Off	Pathfinder Off	Mainline	Pathfinder On	Mainline	Diamond Bar Off	Mainline	Diamond Bar On	Mainline	Brea Canyon Off	Mainline
		Existing Counts (HR)		4921	709	4212	136	4348	6202	10550	1173	9377	699	10076	0	10076	4080	0	0	5996	1561	0	703	6854	351	7205				
2008 Base Model (Per)		15143	1773	13369	167	13536	22809	36345	1753	34591	807	35399	4034	39433	16185	1608	2	21720	4079	1648	1628	22526	2853	25379	220	24708	4531	29240	1511	27728
2035 Model (Per)	AM	18387	1658	16728	692	17421	21972	39393	3449	35943	1063	37007	4122	41129	16886	1618	733	21898	5595	2845	1510	23140	2759	25899	344	24963	4504	29468	1269	28198
Growth (HR) 2035-2008		1233	-44	1276	200	1476	-318	1158	644	514	97	611	33	644	266	4	278	68	576	455	-45	233	-36	198	47	97	-10	87	-92	179
2035 Peak Hour		6154	665	5488	336	5824	5884	11708	1817	9891	796	10687	33	10720	4346	4	278	6064	2137	455	658	7087	315	7403	47	97	-10	87	-92	179
2037 Peak Hour		6277	679	5598	342	5941	6002	11942	1854	10089	812	10901	34	10935	4433	4	283	6185	2180	889	671	7229	322	7551	48	99	-10	88	-94	182
2017 Forecast		5258	701	4580	194	4763	6230	10993	1412	9584	642	10226	120	10340	3994	69	229	6054	1744	254	694	6839	342	7175	14	2029	-3	2029	-26	2057
Rounded 2017 Peak			5300	700	4600	190	4800	6200	11000	1440	9600	440	10000	320	10300	4000	70	230	6100	1740	250	690	6900	340	7200	10	7200	0	7200	0
Existing Counts (HR)		5741	992	4740	133	4873	4641	9514	647	8867	866	9733	0	9733	4871	593	120	4862	745	0	359	5248	326	5574	114	5460	786	6246	280	5966
2008 Base Model (Per)		19734	2425	17309	60	17369	26161	43531	2519	41011	757	41768	4804	46573	17649	1081	32	27907	6123	1907	2457	29670	3161	32831	969	31330	5705	37035	2551	34483
2035 Model (Per)	PM	22557	2288	20269	1928	22197	31613	53811	4435	49376	4259	53636	5971	59607	24336	2947	1685	30711	7766	3428	2460	32592	3190	35783	974	34053	5841	39894	1720	38174
Growth (HR) 2035-2008		790	-38	829	523	1352	1527	2878	536	2342	981	3323	327	3650	1872	522	463	785	460	426	1	818	8	827	1	762	38	801	-233	1033
2035 Peak Hour		6531	954	5569	656	6225	6168	12392	1183	11209	1847	13056	327	13383	6743	1115	583	5647	1205	426	360	6066	334	6401	115	6222	824	7047	47	6999
2037 Peak Hour		6662	973	5680	669	6349	6291	12640	1207	11433	1883	13317	333	13650	6878	1138	594	5760	1229	651	367	6187	341	6529	118	6347	841	7187	48	7139
2017 Forecast		5986	986	4986	286	5281	5144	10424	819	9591	859	10466	397	10866	5136	749	254	5216	875	186	362	5549	330	5867	116	5757	801	6576	214	6347
Rounded 2017 Peak			6000	990	5000	290	5300	5100	10400	830	9600	540	10100	740	10800	5100	750	250	5200	880	190	360	5500	330	5900	120	5800	800	6600	210

SR-60, EB, 2037+Project+IBC

SR-60 Eastbound																											
	Time Period	Mainline	Azusa Off Ramp	Mainline (West of Azusa)	Azusa On Ramp 1	Mainline (East of Azusa)	Azusa On Ramp 2	Mainline	Fullerton Off Ramp	Mainline (West of Fullerton)	Fullerton On Ramp 1	Mainline (East of Fullerton)	Fullerton On Ramp 2	Mainline	Nogales Off Ramp	Mainline (West of Nogales)	Nogales On Ramp 1	Mainline (East of Nogales)	Nogales On Ramp 2	Mainline	Fairway Offramp	Mainline (West of Fairway)	Fairway On Ramp 1	Mainline (East of Fairway)	Fairway On Ramp 2	Mainline	Lemon Ave Off
Existing Counts (HR)	AM																										
2008 Base Model (Per)		18179	1578	16600	1045	17646	278	17924	1636	16288	795	17083	478	17562	1384	16178	496	16674	740	17414	1456	15958	828	16786	486	17272	0
2035 Model (Per)		19300	1563	17737	1179	18916	630	19189	1613	17575	899	18475	1026	19502	1287	18214	694	18909	1021	20051	1307	18744	1130	19884	658	20543	2121
Growth (HR) 2035-2008		426	-6	432	51	483	134	481	-9	489	40	529	208	737	-37	774	75	849	107	1002	-57	1059	115	1177	65	1243	806
2035 Peak Hour		426	-6	432	51	483	134	481	-9	489	40	529	208	737	-37	774	75	849	107	1002	-57	1059	115	1177	65	1243	806
2037 Peak Hour		434	-6	441	52	492	136	490	-9	499	40	540	212	752	-38	789	77	866	109	1022	-58	1080	117	1201	67	1268	822
2017 Forecast		6563	488	6075	368	6443	192	6635	504	6131	280	6411	320	6731	400	6331	216	6547	320	6867	408	7275	352	7627	208	7835	536
Rounded 2017 Peak		6600	490	6100	370	6400	190	6600	500	6100	280	6400	320	6700	400	6300	220	6500	320	6900	410	6900	350	7200	210	7400	540
Existing Counts (HR)	PM	5941	700	5241	354	5595	581	6176	726	5450	355	5805	376	6181	192	5989	320	6309	348	6657	533	6124	201	6325	200	6525	0
2008 Base Model (Per)		33864	2106	31758	929	32687	1362	34049	2221	31828	441	32269	1229	33499	1978	31520	987	32508	987	33495	2078	31417	1089	32507	1613	34120	0
2035 Model (Per)		32067	2212	29855	1480	31336	1389	32362	2368	29994	763	30758	1696	32454	2053	30400	1173	31574	889	32688	2101	30587	747	31334	1682	33017	3310
Growth (HR) 2035-2008		-503	30	-533	154	-378	8	-472	41	-514	90	-423	131	-293	21	-314	52	-262	-27	-226	6	-232	-96	-328	19	-309	927
2035 Peak Hour		5438	730	4708	508	5217	589	5704	767	4936	445	5382	507	5888	213	5675	372	6047	321	6431	539	5892	105	5997	219	6216	927
2037 Peak Hour		5547	744	4802	518	5321	600	5818	783	5035	454	5490	517	6006	217	5789	380	6168	327	6560	550	6009	107	6116	224	6340	945
2017 Forecast		5815	711	5372	401	5768	586	6354	741	5607	382	6004	417	6415	200	6221	337	6564	343	6898	538	6374	175	6546	206	6746	389
Rounded 2017 Peak		5900	710	5200	400	5600	590	6200	740	5500	380	5900	420	6300	200	6100	340	6400	340	6700	540	6200	180	6400	210	6600	390

Note: (1) AM Peak Hour = AM Peak Period X 0.38;
 (2) PM Peak Hour = AM Peak Period X 0.28;

SR-60, WB, 2017+Project+IBC

	Time Period																					
		Philps Ranch On 1	Mainline	Philps Ranch On 2	Mainline East of Diamond Bar	Diamond Bar Off	HOV Off	Mainline	Diamond Bar Loop On	Mainline West of Diamond Bar	SR-57 Merge	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-57 Diverge	Alt 1 Off	HOV Off	Mainline
Existing Counts (HR)		585	6178	440	6618	919	74	5699	503	6202	4348	10550	1173	9377	699	10076	0	10076	5996	230	510	3340
2008 Base Model (Per)		0	20830	1943	22761	1249	277	21236	1572	22809	13536	36345	1753	34591	807	35399	4034	39433	21720	1608	2	16185
2035 Model (Per)		0	20272	2132	22389	1182	721	20505	1466	21972	17421	39393	3449	35943	1063	37007	4172	41129	21898	1618	733	16886
Growth (HR) 2035-2008		0	-212	72	-141	-25	169	-278	-40	-318	1476	1158	644	514	97	611	52	644	68	4	278	266
2035 Peak Hour	AM	585	5966	512	6477	894	243	5421	463	5884	5824	11708	1817	9891	796	10687	52	10720	6064	234	788	3606
2037 Peak Hour	AM	597	6085	522	6606	911	248	5530	472	6002	5941	11942	2010	10089	500	10901	420	10935	6185	238	804	3679
2037 Ajusted	AM	597	6085	522	6606	911	248	5530	553	6002	5800	11942	2010	10089	500	10901	420	10935	6185	238	804	3679
Rounded 2017 Peak		590	6200	460	6700	920	120	5700	520	6200	4800	11000	1440	9600	440	10000	320	10300	6100	230	590	3400
Existing Counts (HR)		0	5168	232	5400	935	5	4465	185	4650	4873	9523	647	8867	866	9733	0	9733	4862	593	120	4158
2008 Base Model (Per)		0	24893	1556	26407	2012	30	24389	1772	26161	17369	43531	2519	41011	757	41768	4804	46573	27907	1081	32	17649
2035 Model (Per)		0	32136	1685	33696	2029	446	31221	392	31613	22197	53811	4435	49376	4259	53636	5971	59607	30711	2947	1685	24336
Mainline Vol Checking					33821			31346		31738		53935		49500		53759		59730				24387
Growth (HR) 2035-2008		0	2028	36	2041	5	116	1913	-386	1527	1352	2878	536	2342	981	3323	327	3650	785	522	463	1872
2035 Peak Hour	PM	0	7196	268	7441	940	122	6378	-201	6177	6225	12401	1183	11209	1847	13056	327	13383	5647	1115	583	6030
2037 Peak Hour	PM	0	7340	273	7590	959	124	6506	-205	6300	6349	12649	1207	11433	1883	13317	333	13650	5760	1138	594	6151
2037 Ajusted	PM	0	7340	273	7590	959	240	6506	204	6300	6300	12649	1250	11433	840	13317	1390	13650	6097	1138	594	6151
2017 Forecast	PM	0	5749	243	5971	942	72	4961	189	5150	5281	10431	819	9591	859	10466	397	10866	5216	749	257	4627
Rounded 2017 Peak		0	5700	240	5900	940	70	4900	190	5100	5300	10400	830	9600	540	10100	740	10800	5200	750	260	4600

Note: (1) AM Peak Hour = AM Peak Period X 0.38;
 (2) PM Peak Hour = AM Peak Period X 0.28;

SR-60

SR-57NB Connector	Mainline	Alt 1 On	Brea Cyn On Ramp	HOV Off	Mainline	Lemon On	Mainline	Fairway Dr. Off	Mainline	Fairway On Ramp	Mainline	Nogales Off Ramp	Mainline (East of Nogales)	Nogales On Ramp 1	Mainline (West of Nogales)	Nogales On Ramp 2	Mainline	Fullerton Off Ramp	Mainline (East of Fullerton)	Fullerton On Ramp 1	Mainline (West of Fullerton)	Fullerton On Ramp 2	Mainline	Azusa Off Ramp	Mainline (East of Azusa)
1332	4672	240	393	0	6085	0																			
3865	20050	57	482	0	22371	0																			
5204	22091	607	605	1437	21867	910	19839	1444	18391	1119	19511	1494	17844	1276	19120	951	20072	1584	18487	1541	20028	677	20706	1342	19224
509	776	209	47	546	-192	346	7539	549	6989	425	7414	568	6781	485	7266	361	7627	602	7025	586	7611	257	7868	510	7305
1841	5448	449	440	546	5893	346	7539	549	6989	425	7414	568	6781	485	7266	361	7627	602	7025	586	7611	257	7868	510	7305
1878	5557	458	449	557	6011	353	7690	560	7128	434	7562	579	6916	495	7411	369	7780	614	7166	597	7763	262	8026	520	7451
1878	5557	458	449	557	6011	353	7690	560	7128	434	7562	579	6916	495	7411	369	7780	614	7166	597	7763	262	8026	520	7451
1490	4900	300	410	160	5800	100	5900	160	5700	120	5800	170	5600	140	5700	110	5800	170	1700	170	1900	70	1900	150	1800
970	5128	433	376	0	5937	0	7170	641	6765	696	7430	990	5288	220	5288	220	6880	751	6537	444	5288	220	6790	220	5288
7219	24869	0	825	0	27491	825	27491	2231	25260	2266	27527	2160	25366	2006	27373	660	28033	2032	26001	1707	27709	1019	28728	1778	26950
9069	33406	1550	993	2498	33451	1976	30879	2205	28673	1612	30285	2235	27990	1688	29678	756	30434	2151	28283	1494	29778	1238	31016	1878	28883
	33456				33501		35477		33272		34884		32649		34337		35093		32942		34436		35674		33796
518	2390	434	47	699	1669	322	949	-7	956	-183	772	21	735	-89	645	27	672	33	639	-60	579	61	641	28	541
1488	7518	867	423	699	7606	322	8119	634	7721	513	8202	1011	6023	131	5933	247	7552	784	7176	384	5867	281	7431	248	5829
1518	7669	884	432	713	7758	329	8281	646	7875	523	8366	1031	6143	134	6052	252	7703	800	7319	392	5985	287	7579	253	5946
1518	7669	884	432	713	7758	329	8281	646	7875	523	8366	1031	6143	134	6052	252	7703	800	7319	392	5985	287	7579	253	5946
1121	5777	566	391	200	6526	94	7493	644	7004	646	7650	1001	5806	194	5863	229	7057	765	6584	429	5806	243	6964	229	5806
1120	5700	570	390	160	6500	90	7500	640	7000	650	7700	1000	5800	190	5900	230	7100	770	6600	430	5800	240	7000	230	5800

SR-57 NB, 2037+Project +IBC

SR-57 Northbound																															
	Time Period	Mainline	Brea Canyon On	Mainline	Brea Canyon/Diamond Bar Bl. Off	Mainline	Brea Canyon/Diamond Bar Bl. On	Mainline	HOV Add-On	Pathfinder Off	Mainline	Pathfinder On	Mainline	HOV Add	SR-60 Off	Mainline South of SR-60	SR-60 On	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-60 Off	Alt Off to SR-60	Mainline North of SR-60	Diamond Bar On	Mainline	Temple Off	Mainline
Existing Counts (HR)	AM	4906	300	5206	405	4801	205	5006	0	248	4758	690	5448	200	1332	4316	5055	9371	802	8569	0	8569	658	9227	5251	0	3976	906	4882	787	4095
2008 Base Model (Per)		22830	1145	23975	2163	21894	0	21894	176	1745	20326	1837	22163	2104	5502	18765	11306	30071	1881	28190	0	28190	1867	30057	17540	0	12342	1465	13808	1438	12369
2035 Model (Per)		26024	980	27004	2259	24817	0	24817	260	1808	23269	2224	25494	2791	7177	21108	16361	37469	2621	34847	602	35450	2035	37486	21668	1938	13765	944	14710	1485	13224
Growth (HR) 2035-2008		1214	-63	1151	36	1111	0	1111	32	24	1118	147	1266	261	637	890	1921	2811		2530	229	2759	64	2823	1569	736	541	-198	343	18	325
2035 Peak Hour		6120	237	6357	441	5912	205	6117	32	272	5876	837	6714	461	1969	5206	6976	12182	#VALUE!	11099	229	11328	722	12050	6820	736	4517	708	5225	805	4420
2037 Peak Hour		6242	242	6484	450	6030	209	6239	33	277	5994	854	6848	470	2008	5310	7115	12426	#VALUE!	11321	233	11554	736	12291	6956	751	4607	722	5329	821	4508
2037 Adjusted Peak Hour		6242	242	6480	450	6030	209	6239	33	277	5994	854	6848	470	2008	5311	6765	12076	755	11321	560	11881	440	12321	6956	500	4865	722	5587	821	4766
Rounded 2037 Peak		6200	240	6500	450	6000	210	6200	30	280	6000	850	6800	470	2010	5300	6800	12100	760	11300	560	11900	440	12300	6960	500	4900	720	5600	820	4800
Existing Counts (HR)	PM	4432	700	5132	300	4832	150	4982	0	550	4432	539	4971	430	970	4431	5374	9805	390	9415	0	9415	773	10188	5744	0	4444	945	5389	499	4890
2008 Base Model (Per)		43438	600	44038	3938	40765	0	40765	2688	3130	40324	673	40997	2677	10891	32783	23364	56147	2793	53353	0	53353	2013	55367	34973	0	21230	2179	23409	2016	21393
2035 Model (Per)		44977	67	45044	4021	41031	0	41031	3255	3098	41187	592	41780	3746	12379	33146	28827	61974	2824	59149	628	59778	5189	64967	34611	4291	26179	1081	27260	2082	25178
Growth (HR) 2035-2008		431	-149	282	23	74	0	74	159	-9	242	-23	219	299	417	102	1530	1632	9	1623	176	1799	889	2688	-101	1201	1386	-307	1078	18	1060
2035 Peak Hour		4863	551	5414	323	4906	150	5056	159	541	4674	516	5190	729	1387	4533	6904	11437	399	11038	176	11214	1662	12876	5643	1201	5830	638	6467	517	5950
2037 Peak Hour		4960	562	5522	330	5005	153	5158	162	552	4767	527	5294	744	1414	4623	7042	11665	407	11259	179	11438	1696	13134	5755	1226	5946	650	6597	528	6069
2037 Adjusted Peak Hour		4960	562	5437	330	5108	153	5261	162	552	4871	527	5397	744	1414	4727	7042	11769	510	11259	1170	12429	880	13309	5755	1025	6528	650	7178	528	6651
Rounded 2037 Peak		5000	560	5400	330	5100	150	5300	160	550	4900	530	5400	740	1410	4700	7000	11800	510	11300	1170	12400	880	13300	5760	1030	6500	650	7200	530	6700

Note: (1) AM Peak Hour = AM Peak Period X 0.38;
 (2) PM Peak Hour = AM Peak Period X 0.28;

SR-57 SB, 2037+Project +IBC

	Time Period	SR-57 Southbound																												
		Mainline	Sunset Crossing off	Mainline	Sunset Crossing On	Mainline North of SR-60	SR-60 On	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-60 Off	SR-60 Truck Passby	HOV Off	Mainline South of SR-60	SR-60 EB Connector	HOV Off	Pathfinder Off	Mainline	Pathfinder On	Mainline	Diamond Bar Off	Mainline	Diamond Bar On	Mainline	Brea Canyon Off	Mainline
Existing Counts (HR)		4921	709	4212	136	4348	6202	10550	1173	9377	699	10076	0	10076	4080	0	0	5996	1561	0	703	6854	351	7205						
2008 Base Model (Per)		15143	1773	13369	167	13536	22809	36345	1753	34591	807	35399	4034	39433	16185	1608	2	21720	4079	1648	1628	22526	2853	25379	220	24708	4531	29240	1511	27728
2035 Model (Per)		18387	1658	16728	692	17421	21972	39393	3449	35943	1063	37007	4122	41129	16886	1618	733	21898	5595	2845	1510	23140	2759	25899	344	24963	4504	29468	1269	28198
Growth (HR) 2035-2008		1233	-44	1276	200	1476	-318	1158	644	514	97	611	33	644	266	4	278	68	576	455	-45	233	-36	198	47	97	-10	87	-92	179
2035 Peak Hour		6154	665	5488	336	5824	5884	11708	1817	9891	796	10687	33	10720	4346	4	278	6064	2137	455	658	7087	315	7403	47	97	-10	87	-92	179
2037 Peak Hour		6277	679	5598	342	5941	6002	11942	1854	10089	812	10901	34	10935	4433	4	283	6185	2180	889	671	7229	322	7551	48	99	-10	88	-94	182
Adjusted 2037 Peak Hour		6135	679	5456	342	5799	6300	12099	2010	10089	500	10589	420	11009	3782	238	804	6185	2180	889	671	6804	322	7126	48	7078	-10	7067	-94	7161
Rounded 2037 Peak		6100	680	5500	340	5800	6300	12100	2010	10100	500	10600	420	11000	3780	240	800	6200	2200	890	670	6800	320	7100	50	7100	-10	7100	-90	7200
Existing Counts (HR)		5741	992	4740	133	4873	4641	9514	647	8867	866	9733	0	9733	4871	593	120	4862	745	0	359	5248	326	5574	114	5460	786	6246	280	5966
2008 Base Model (Per)		19734	2425	17309	60	17369	26161	43531	2519	41011	757	41768	4804	46573	17649	1081	32	27907	6123	1907	2457	29670	3161	32831	969	31330	5705	37035	2551	34483
2035 Model (Per)		22557	2288	20269	1928	22197	31613	53811	4435	49376	4259	53636	5971	59607	24336	2947	1685	30711	7766	3428	2460	32592	3190	35783	974	34053	5841	39894	1720	38174
Growth (HR) 2035-2008		790	-38	829	523	1352	1527	2878	536	2342	981	3323	327	3650	1872	522	463	785	460	426	1	818	8	827	1	762	38	801	-233	1033
2035 Peak Hour		6531	954	5569	656	6225	6168	12392	1183	11209	1847	13056	327	13383	6743	1115	583	5647	1205	426	360	6066	334	6401	115	6222	824	7047	47	6999
2037 Peak Hour		6662	973	5680	669	6349	6291	12640	1207	11433	1883	13317	333	13650	6878	1138	594	5760	1229	651	367	6187	341	6529	118	6347	841	7187	48	7139
Ramp Vol		6698	973	5680	669	6349	6400	12640	1250	11433	840	13317	1390	13650	5834	1138	594	5760	1229	651	367	6187	341	6529	118	6347	841	7187	48	7139
Adjusted 2037 Peak Hour		6587	973	5614	669	6283	6400	12683	1250	11433	840	12273	1390	13663	5834	1138	594	6097	1229	651	367	6308	341	6649	118	6532	841	7372	48	7324
Rounded 2037 Peak		6600	970	5600	670	6300	6400	12700	1250	11400	840	12300	1390	13700	5800	1140	590	6100	1200	650	370	6300	340	6600	120	6500	840	7400	50	7300

Note: (1) AM Peak Hour = AM Peak Period X 0.38;
 (2) PM Peak Hour = AM Peak Period X 0.28;

SR-60, EB, 2037+Project+IBC

SR-60 Eastbound																											
	Time Period	Mainline	Azusa Off Ramp	Mainline (West of Azusa)	Azusa On Ramp 1	Mainline (East of Azusa)	Azusa On Ramp 2	Mainline	Fullerton Off Ramp	Mainline (West of Fullerton)	Fullerton On Ramp 1	Mainline (East of Fullerton)	Fullerton On Ramp 2	Mainline	Nogales Off Ramp	Mainline (West of Nogales)	Nogales On Ramp 1	Mainline (East of Nogales)	Nogales On Ramp 2	Mainline	Fairway Offramp	Mainline (West of Fairway)	Fairway On Ramp 1	Mainline (East of Fairway)	Fairway On Ramp 2	Mainline	Lemon Ave Off
Existing Counts (HR)																											
2008 Base Model (Per)		18179	1578	16600	1045	17646	278	17924	1636	16288	795	17083	478	17562	1384	16178	496	16674	740	17414	1456	15958	828	16786	486	17272	0
2035 Model (Per)		19300	1563	17737	1179	18916	630	19189	1613	17575	899	18475	1026	19502	1287	18214	694	18909	1021	20051	1307	18744	1130	19884	658	20543	2121
Growth (HR) 2035-2008	AM	426	-6	432	51	483	134	481	-9	489	40	529	208	737	-37	774	75	849	107	1002	-57	1059	115	1177	65	1243	806
2035 Peak Hour		426	-6	432	51	483	134	481	-9	489	40	529	208	737	-37	774	75	849	107	1002	-57	1059	115	1177	65	1243	806
2037 Peak Hour		434	-6	441	52	492	136	490	-9	499	40	540	212	752	-38	789	77	866	109	1022	-58	1080	117	1201	67	1268	822
2037 Ajusted		7481	606	6875	457	7332	244	629	625	638	348	678	398	890	499	928	269	1005	396	1114	507	1171	438	1288	255	8669	668
Rounded 2037 Peak		7500	610	6900	460	7300	240	600	630	600	350	700	400	900	500	900	270	1000	400	1100	510	1200	440	1300	260	8700	670
Existing Counts (HR)		5941	700	5241	354	5595	581	6176	726	5450	355	5805	376	6181	192	5989	320	6309	348	6657	533	6124	201	6325	200	6525	0
2008 Base Model (Per)		33864	2106	31758	929	32687	1362	34049	2221	31828	441	32269	1229	33499	1978	31520	987	32508	987	33495	2078	31417	1089	32507	1613	34120	0
2035 Model (Per)		32067	2212	29855	1480	31336	1389	32362	2368	29994	763	30758	1696	32454	2053	30400	1173	31574	889	32688	2101	30587	747	31334	1682	33017	3310
Growth (HR) 2035-2008	PM	-503	30	-533	154	-378	8	-472	41	-514	90	-423	131	-293	21	-314	52	-262	-27	-226	6	-232	-96	-328	19	-309	927
2035 Peak Hour		5438	730	4708	508	5217	589	5704	767	4936	445	5382	507	5888	213	5675	372	6047	321	6431	539	5892	105	5997	219	6216	927
2037 Peak Hour		5547	744	4802	518	5321	600	5818	783	5035	454	5490	517	6006	217	5789	380	6168	327	6560	550	6009	107	6116	224	6340	945
2037 Ajusted Peak Hour		5547	744	5710	518	6228	600	6828	783	6046	454	6500	517	7017	217	6800	380	7179	327	7506	550	6956	107	7063	224	7287	1363
Rounded 2037 Peak		5500	740	5700	520	6200	600	6800	780	6000	450	6500	520	7000	220	6800	380	7200	330	7500	550	7000	110	7100	220	7300	1360

Note: (1) AM Peak Hour = AM Peak Period X 0.38;

(2) PM Peak Hour = AM Peak Period X 0.28;

und																											
Lemon Ave On	Mainline	HOV Add-On	Brea Canyon Offramp	Mainline	Brea Canyon Onramp	SR-57 SB Connector	To Grand	Mainline	SR-57 NB Merge	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-57 Off	Alt to SR-60	Mainline West of Diamond Bar	Diamond Bar Off	Mainline	Diamond Bar On	Alt to SR-60	Mainline East of Diamond Bar	Phillips Ranch Off	HOV Off	Mainline
	7300	0	602	6698	598	1571	0	5055	4316	9371	802	8569	0	8569	658	9227	3976	0	5251	460	4791	280	0	5071	250	0	4821
0	17272	0	1648	14103	1283	4079	0	11306	18765	30071	1881	28190	0	28190	1867	30057	12342	0	17540	1454	16085	2042	0	18128	963	443	16720
2297	20718	3195	1786	22127	823	5595	993	16361	21108	37469	2621	34847	602	35450	2035	37486	13765	1938	21668	1749	19918	1757	1938	23614	1426	659	21531
873	1309	1214	52	3049	-175	576	377	1921	890	2811	281	2530	229	2759	64	2823	541	736	1569	112	1457	-108	736	2085	176	82	1828
873	8609	1214	654	9747	423	2147	377	6976	5206	12182	1083	11099	229	11328	722	12050	4517	736	6820	572	6248	172	736	7156	426	82	6649
890	8782	1238	668	9942	432	2190	385	7115	5310	12426	1105	11321	233	11554	736	12291	4607	751	6956	584	6372	175	751	7299	434	84	6782
432	8502	1238	0	9740	0	2190	785	6765	5310	12076	755	11321	560	11881	440	12321	4865	500	6956	584	6372	308	500	7180	434	84	6662
430	8500	1240	0	9700	0	2200	790	6800	5300	12100	760	11300	560	11900	440	12300	4900	500	7000	580	6400	310	500	7200	430	80	6700
0	6525	0	430	6095	344	745	0	5374	4431	9805	390	9415	0	9415	773	10188	4444	0	5744	529	5215	1333	0	6548	880	0	5668
0	34120	0	2788	26854	2633	6123	0	23364	32783	56147	2793	53353	0	53353	2013	55367	21230	0	34973	2174	32799	5081	0	37880	2512	286	35100
4214	33921	4394	2715	35598	3058	7766	2062	28827	33146	61974	2824	59149	628	59778	5189	64967	26179	4291	34611	2464	32146	2971	4291	39410	2566	430	36417
1180	-56	1230	-20	2448	119	460	577	1530	102	1632	9	1623	176	1799	889	2688	1386	1201	-101	81	-183	-591	1201	428	15	40	369
1180	6469	1230	410	8543	463	1205	577	6904	4533	11437	399	11038	176	11214	1662	12876	5830	1201	5643	610	5032	742	1201	6976	895	40	6037
1204	6599	1255	418	8714	472	1229	589	7042	4623	11665	407	11259	179	11438	1696	13134	5946	1226	5755	622	5133	757	1226	7116	913	41	6157
1676	7600	1255	0	8854	0	1229	480	7145	4623	11769	510	11259	1170	12429	880	13309	6528	1025	5756	622	5133	1466	1025	7625	913	41	6670
1680	7600	1250	0	8900	0	1200	480	7200	4600	11800	510	11300	1170	12400	880	13300	6500	1030	5800	620	5100	1470	1030	7600	910	40	6700

SR-60, WB, 2037+Project+IBC

	Time Period																					
		Philps Ranch On 1	Mainline	Philps Ranch On 2	Mainline East of Diamond Bar	Diamond Bar Off	HOV Off	Mainline	Diamond Bar Loop On	Mainline West of Diamond Bar	SR-57 Merge	Mainline	Grand Off	Mainline	Grand Loop On	Mainline	Grand Slip On	Mainline	SR-57 Diverge	Alt 1 Off	HOV Off	Mainline
Existing Counts (HR)	AM	585	6178	440	6618	919	74	5699	503	6202	4348	10550	1173	9377	699	10076	0	10076	5996	230	510	3340
2008 Base Model (Per)		0	20830	1943	22761	1249	277	21236	1572	22809	13536	36345	1753	34591	807	35399	4034	39433	21720	1608	2	16185
2035 Model (Per)		0	20272	2132	22389	1182	721	20505	1466	21972	17421	39393	3449	35943	1063	37007	4172	41129	21898	1618	733	16886
Growth (HR) 2035-2008		0	-212	72	-141	-25	169	-278	-40	-318	1476	1158	644	514	97	611	52	644	68	4	278	266
2035 Peak Hour		585	5966	512	6477	894	243	5421	463	5884	5824	11708	1817	9891	796	10687	52	10720	6064	234	788	3606
2037 Peak Hour		597	6085	522	6606	911	248	5530	472	6002	5941	11942	2010	10089	500	10901	420	10935	6185	238	804	3679
2037 Ajusted		597	6383	522	6905	911	248	5745	553	6299	5800	12099	2010	10089	500	10589	420	11009	6185	238	804	3782
Rounded 2037 Peak		600	6400	520	6900	910	250	5700	550	6300	5800	12100	2010	10100	500	10600	420	11000	6200	240	800	3800
Existing Counts (HR)	PM	0	5168	232	5400	935	5	4465	185	4650	4873	9523	647	8867	866	9733	0	9733	4862	593	120	4158
2008 Base Model (Per)		0	24893	1556	26407	2012	30	24389	1772	26161	17369	43531	2519	41011	757	41768	4804	46573	27907	1081	32	17649
2035 Model (Per)		0	32136	1685	33696	2029	446	31221	392	31613	22197	53811	4435	49376	4259	53636	5971	59607	30711	2947	1685	24336
Growth (HR) 2035-2008		0	2028	36	2041	5	116	1913	-386	1527	1352	2878	536	2342	981	3323	327	3650	785	522	463	1872
2035 Peak Hour		0	7196	268	7441	940	122	6378	-201	6177	6225	12401	1183	11209	1847	13056	327	13383	5647	1115	583	6030
2037 Peak Hour		0	7340	273	7590	959	124	6506	-205	6300	6349	12649	1207	11433	1883	13317	333	13650	5760	1138	594	6151
2037 Ajusted		0	7162	273	7435	959	240	6180	204	6383	6300	12683	1250	11433	840	12273	1390	13663	6097	1138	594	5834
Rounded 2037 Peak		0	7200	270	7400	960	240	6200	200	6400	6300	12700	1250	11400	840	12300	1390	13700	6100	1140	600	5800

Note: (1) AM Peak Hour = AM Peak Period X 0.38;
(2) PM Peak Hour = AM Peak Period X 0.28;

Appendix C

Intersection Level of Service Worksheets

HCM Signalized Intersection Capacity Analysis
1: WB-Off Ramp & Grand

Timing Plan: Existing AM
1/19/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↕	↗	↖	↕	↗	↖↗	↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.93		1.00	0.97	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1758		1715	1615	1534	1805	3610	1615	3502	3610	1615
Flt Permitted	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	1805	1758		1715	1615	1534	1805	3610	1615	503	3610	1615
Volume (vph)	14	7	7	545	33	595	25	1414	344	348	706	15
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	8	8	592	36	647	27	1537	374	378	767	16
RTOR Reduction (vph)	0	7	0	0	14	286	0	0	166	0	0	9
Lane Group Flow (vph)	15	9	0	347	352	276	27	1537	208	378	767	7
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split			Split		Perm	Prot		Perm	Perm		Perm
Protected Phases	4	4		8	8		5	2				6
Permitted Phases						8			2	6		6
Actuated Green, G (s)	2.4	2.4		15.6	15.6	15.6	1.6	32.9	32.9	27.3	27.3	27.3
Effective Green, g (s)	4.4	4.4		17.6	17.6	17.6	3.6	34.9	34.9	29.3	29.3	29.3
Actuated g/C Ratio	0.07	0.07		0.28	0.28	0.28	0.06	0.55	0.55	0.47	0.47	0.47
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	126	123		480	452	429	103	2003	896	234	1682	752
v/s Ratio Prot	0.01	c0.01		0.20	0.23		0.01	c0.43			0.21	
v/s Ratio Perm						0.37			0.23	c0.75		0.01
v/c Ratio	0.12	0.07		0.72	0.78	0.64	0.26	0.77	0.23	1.62	0.46	0.01
Uniform Delay, d1	27.4	27.3		20.4	20.9	19.9	28.4	10.9	7.2	16.8	11.4	9.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2		5.3	8.3	3.3	1.4	2.9	0.6	295.8	0.9	0.0
Delay (s)	27.9	27.6		25.8	29.2	23.2	29.7	13.7	7.8	312.6	12.3	9.0
Level of Service	C	C		C	C	C	C	B	A	F	B	A
Approach Delay (s)		27.7			25.6			12.8			110.0	
Approach LOS		C			C			B			F	

Intersection Summary

HCM Average Control Delay	42.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	62.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↕	↗	↖	↕	↗	↖↗	↕	↖
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Satd. Flow (prot)	1805	1758	0	1715	1615	1534	1805	3610	1615	3502	3610	1615
Flt Permitted	0.950			0.950	0.968		0.950			0.170		
Satd. Flow (perm)	1805	1758	0	1715	1615	1534	1805	3610	1615	627	3610	1615
Satd. Flow (RTOR)		8			19	397			374			16
Volume (vph)	14	7	7	545	33	595	25	1414	344	348	706	15
Lane Group Flow (vph)	15	16	0	347	366	562	27	1537	374	378	767	16
Turn Type	Split			Split		Perm	Prot		Perm	Perm		Perm
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8			2	6		6
Total Split (s)	20.5	20.5	0.0	20.5	20.5	20.5	8.5	34.0	34.0	25.5	25.5	25.5
Act Effct Green (s)	8.1	8.1		17.6	17.6	17.6	6.5	32.3	32.3	29.3	29.3	29.3
Actuated g/C Ratio	0.13	0.13		0.30	0.30	0.30	0.10	0.56	0.56	0.51	0.51	0.51
v/c Ratio	0.07	0.07		0.66	0.72	0.76	0.15	0.76	0.35	1.19	0.42	0.02
Uniform Delay, d1	27.4	13.6		20.4	19.7	5.6	28.4	10.8	0.0	16.8	11.4	0.0
Control Delay	25.1	19.2		25.7	27.5	13.8	28.8	15.0	2.3	135.5	12.5	7.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	19.2		25.7	27.5	13.8	28.8	15.0	2.3	135.5	12.5	7.3
LOS	C	B		C	C	B	C	B	A	F	B	A
Approach Delay		22.0			21.0			12.8			52.5	
Approach LOS		C			C			B			D	
Queue Length 50th (ft)	4	2		95	102	41	8	161	0	~60	58	0
Queue Length 95th (ft)	20	18		#249	#283	#231	31	#422	38	#195	181	11
Internal Link Dist (ft)		848			1418			820			2021	
Turn Bay Length (ft)	150			300		1000	150					
Base Capacity (vph)	451	446		543	525	757	186	2018	1068	318	1830	826
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.04		0.64	0.70	0.74	0.15	0.76	0.35	1.19	0.42	0.02

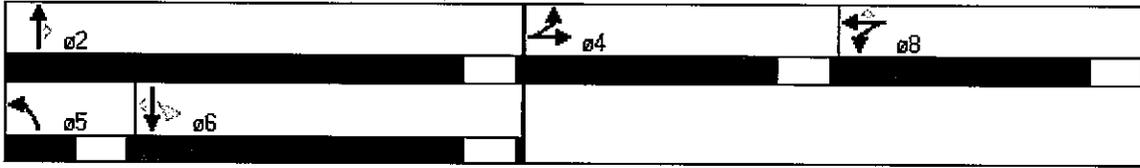
Intersection Summary

Cycle Length: 75
 Actuated Cycle Length: 57.9
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.19
 Intersection Signal Delay: 25.7
 Intersection Capacity Utilization 87.7%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service E

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: WB-Off Ramp & Grand



HCM Signalized Intersection Capacity Analysis
 2: EB Off-Ramp & Grand

Timing Plan: Existing AM
 1/19/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SBT	SBR
Lane Configurations	↖	↗	↘					↑↑	↗	↖	↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1715	1715	1615					3610	1615	1805	3610	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1715	1715	1615					3610	1615	1805	3610	
Volume (vph)	552	0	250	0	0	0	0	1193	349	309	958	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	600	0	272	0	0	0	0	1297	379	336	1041	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	215	0	0	0
Lane Group Flow (vph)	300	300	272	0	0	0	0	1297	164	336	1041	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split		Free						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						2			
Actuated Green, G (s)	11.6	11.6	60.0					23.9	23.9	12.5	40.4	
Effective Green, g (s)	13.6	13.6	60.0					25.9	25.9	14.5	42.4	
Actuated g/C Ratio	0.23	0.23	1.00					0.43	0.43	0.24	0.71	
Clearance Time (s)	4.0	4.0						4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	389	389	1615					1558	697	436	2551	
v/s Ratio Prot	c0.17	0.17						c0.36		c0.19	0.29	
v/s Ratio Perm			0.17						0.23			
v/c Ratio	0.77	0.77	0.17					0.83	0.23	0.77	0.41	
Uniform Delay, d1	21.7	21.7	0.0					15.1	10.8	21.2	3.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.1	9.1	0.2					5.4	0.8	8.2	0.5	
Delay (s)	30.9	30.9	0.2					20.5	11.6	29.4	4.1	
Level of Service	C	C	A					C	B	C	A	
Approach Delay (s)		21.3			0.0			18.5			10.3	
Approach LOS		C			A			B			B	

Intersection Summary

HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: EB Off-Ramp & Grand

Timing Plan: Existing AM
1/19/2010

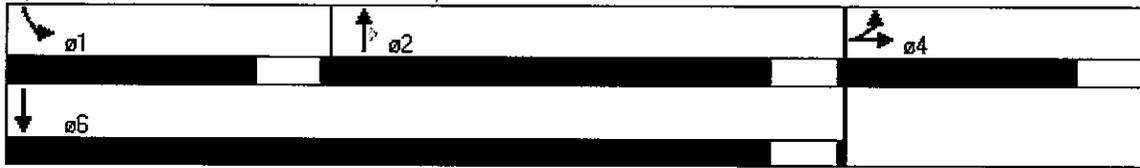


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷	↸					↶↷	↸	↶	↷↸	
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Satd. Flow (prot)	1715	1715	1615	0	0	0	0	3610	1615	1805	3610	0
Flt Permitted	0.950	0.950								0.950		
Satd. Flow (perm)	1715	1715	1615	0	0	0	0	3610	1615	1805	3610	0
Satd. Flow (RTOR)			272						379			
Volume (vph)	552	0	250	0	0	0	0	1193	349	309	958	0
Lane Group Flow (vph)	300	300	272	0	0	0	0	1297	379	336	1041	0
Turn Type	Split		Free						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						2			
Total Split (s)	16.0	16.0	0.0	0.0	0.0	0.0	0.0	27.0	27.0	17.0	44.0	0.0
Act Effect Green (s)	13.6	13.6	60.0					25.8	25.8	14.5	42.4	
Actuated g/C Ratio	0.23	0.23	1.00					0.43	0.43	0.24	0.71	
v/c Ratio	0.77	0.77	0.17					0.84	0.42	0.77	0.41	
Uniform Delay, d1	21.7	21.7	0.0					15.1	0.0	21.2	3.6	
Control Delay	35.9	35.9	0.2					22.1	3.1	33.5	4.3	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	35.9	35.9	0.2					22.1	3.1	33.5	4.3	
LOS	D	D	A					C	A	C	A	
Approach Delay		24.8						17.8			11.4	
Approach LOS		C						B			B	
Queue Length 50th (ft)	106	106	0					215	0	112	64	
Queue Length 95th (ft)	#220	#220	0					#339	42	#224	90	
Internal Link Dist (ft)		895			1197			474			820	
Turn Bay Length (ft)	150		150						300	300		
Base Capacity (vph)	400	400	1615					1553	911	451	2549	
Starvation Cap Reductn	0	0	0					0	0	0	0	
Spillback Cap Reductn	0	0	0					0	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	0.75	0.75	0.17					0.84	0.42	0.75	0.41	

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 17.1
 Intersection LOS: B
 Intersection Capacity Utilization 75.4%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 2: EB Off-Ramp & Grand



HCM Signalized Intersection Capacity Analysis
 9: Golden Springs & Grand

Timing Plan: Existing AM
 1/19/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Util. Factor	0.97	0.95	0.88	1.00	0.95		0.97	0.95		0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	1770	3413		3433	3517		3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	1770	3413		3433	3517		3433	3539	1583
Volume (vph)	163	157	144	124	706	220	515	1111	48	161	472	522
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	171	157	135	767	239	560	1208	52	175	513	567
RTOR Reduction (vph)	0	0	112	0	39	0	0	4	0	0	0	32
Lane Group Flow (vph)	177	171	45	135	967	0	560	1256	0	175	513	535
Turn Type	Prot		Perm	Prot			Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4									6
Actuated Green, G (s)	6.0	19.4	19.4	5.5	18.9		19.0	29.5		4.0	14.5	20.5
Effective Green, g (s)	8.0	21.4	21.4	7.5	20.9		21.0	31.5		6.0	16.5	24.5
Actuated g/C Ratio	0.11	0.29	0.29	0.10	0.28		0.28	0.42		0.08	0.22	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	369	1018	802	178	959		969	1489		277	785	521
v/s Ratio Prot	0.05	0.05		0.08	c0.29		c0.16	c0.36		0.05	0.14	c0.12
v/s Ratio Perm			0.06									0.24
v/c Ratio	0.48	0.17	0.06	0.76	1.01		0.58	0.84		0.63	0.65	1.03
Uniform Delay, d1	31.2	19.8	19.2	32.6	26.8		22.9	19.2		33.1	26.3	25.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	0.1	0.0	16.8	31.2		0.8	4.6		4.6	2.0	46.7
Delay (s)	32.2	19.9	19.2	49.3	57.9		23.7	23.8		37.8	28.3	71.7
Level of Service	C	B	B	D	E		C	C		D	C	E
Approach Delay (s)		24.0			56.9			23.8			49.2	
Approach LOS		C			E			C			D	

Intersection Summary

HCM Average Control Delay	38.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	74.4	Sum of lost time (s)	6.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
9: Golden Springs & Grand

Timing Plan: Existing AM
1/19/2010



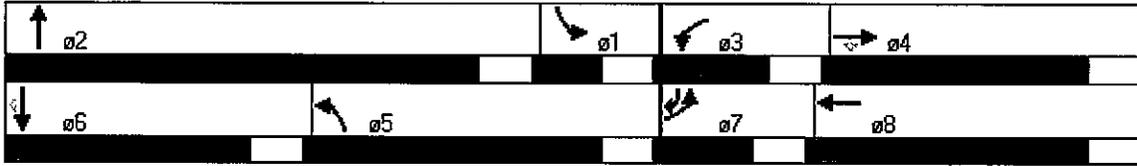
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖↗	↖	↕		↖↗	↕		↖↗	↕	↖
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Satd. Flow (prot)	3433	3539	2787	1770	3412	0	3433	3518	0	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	2787	1770	3412	0	3433	3518	0	3433	3539	1583
Satd. Flow (RTOR)			157		54			7				47
Volume (vph)	163	157	144	124	706	220	515	1111	48	161	472	522
Lane Group Flow (vph)	177	171	157	135	1006	0	560	1260	0	175	513	567
Turn Type	Prot		Perm	Prot			Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4									6
Total Split (s)	10.0	21.0	21.0	11.0	22.0	0.0	23.0	35.0	0.0	8.0	20.0	10.0
Act Effct Green (s)	8.0	21.4	21.4	8.9	20.0		20.9	31.5		6.0	16.5	24.5
Actuated g/C Ratio	0.11	0.29	0.29	0.12	0.27		0.28	0.43		0.08	0.22	0.33
v/c Ratio	0.47	0.17	0.17	0.65	1.04		0.57	0.83		0.62	0.64	1.01
Uniform Delay, d1	31.2	19.8	0.0	32.5	25.3		22.9	19.1		33.1	26.3	15.4
Control Delay	35.9	21.9	4.8	47.2	67.2		25.4	23.7		44.1	29.2	59.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	35.9	21.9	4.8	47.2	67.2		25.4	23.7		44.1	29.2	59.9
LOS	D	C	A	D	E		C	C		D	C	E
Approach Delay		21.5			64.8			24.2			45.1	
Approach LOS		C			E			C			D	
Queue Length 50th (ft)	40	32	0	61	~265		114	256		41	112	152
Queue Length 95th (ft)	70	57	23	#132	#385		164	342		#79	161	#349
Internal Link Dist (ft)		285			258			3184			474	
Turn Bay Length (ft)	250		250	150			300			150		
Base Capacity (vph)	374	1030	922	210	968		991	1552		281	850	559
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.47	0.17	0.17	0.64	1.04		0.57	0.81		0.62	0.60	1.01

Intersection Summary

Cycle Length: 75
 Actuated Cycle Length: 73.5
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 39.3
 Intersection Capacity Utilization 83.6%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service E

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 9: Golden Springs & Grand



HCM Signalized Intersection Capacity Analysis
 1: WB-Off Ramp & Grand

Timing Plan: Existing PM
 1/19/2010



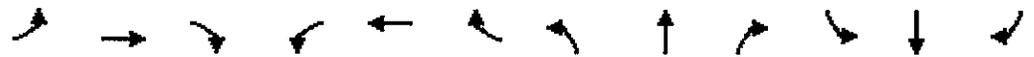
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↕	↗	↖	↕	↗	↖↗	↕	↖↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.89		1.00	0.91	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1688		1715	1541	1534	1805	3610	1615	3502	3610	1615
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00	0.32	1.00	1.00
Satd. Flow (perm)	1805	1688		1715	1541	1534	1805	3610	1615	1187	3610	1615
Volume (vph)	22	12	35	274	4	369	39	807	327	527	1119	17
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	13	38	298	4	401	42	877	355	573	1216	18
RTOR Reduction (vph)	0	35	0	0	66	207	0	0	111	0	0	6
Lane Group Flow (vph)	24	16	0	211	172	47	42	877	244	573	1216	12
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split			Split		Perm	Prot		Perm	Perm		Perm
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8			2	6		6
Actuated Green, G (s)	6.0	6.0		18.4	18.4	18.4	5.5	73.6	73.6	64.1	64.1	64.1
Effective Green, g (s)	8.0	8.0		20.4	20.4	20.4	7.5	75.6	75.6	66.1	66.1	66.1
Actuated g/C Ratio	0.07	0.07		0.19	0.19	0.19	0.07	0.69	0.69	0.60	0.60	0.60
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	131	123		318	286	284	123	2481	1110	713	2169	970
v/s Ratio Prot	0.01	c0.03		0.12	0.15		0.02	c0.24			0.34	
v/s Ratio Perm						0.17			0.22	c0.48		0.01
v/c Ratio	0.18	0.13		0.66	0.60	0.17	0.34	0.35	0.22	0.80	0.56	0.01
Uniform Delay, d1	47.9	47.7		41.6	41.1	37.6	48.9	7.1	6.3	16.9	13.2	8.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.5		5.1	3.5	0.3	1.7	0.4	0.5	9.3	1.1	0.0
Delay (s)	48.6	48.2		46.8	44.6	37.9	50.6	7.5	6.8	26.3	14.3	8.9
Level of Service	D	D		D	D	D	D	A	A	C	B	A
Approach Delay (s)		48.3			42.8			8.7			18.0	
Approach LOS		D			D			A			B	

Intersection Summary

HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
1: WB-Off Ramp & Grand

Timing Plan: Existing PM
1/19/2010



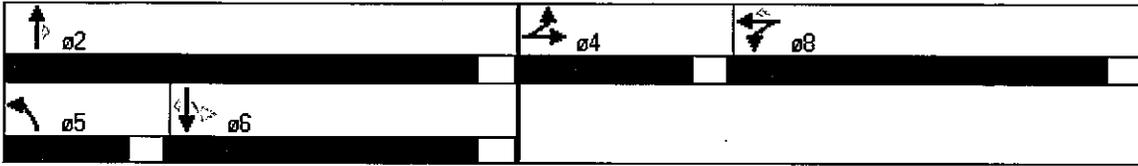
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↕	↗	↖	↕	↗	↖↗	↕	↖
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Satd. Flow (prot)	1805	1687	0	1715	1540	1534	1805	3610	1615	3502	3610	1615
Flt Permitted	0.950			0.950	0.982		0.950			0.285		
Satd. Flow (perm)	1805	1687	0	1715	1540	1534	1805	3610	1615	1051	3610	1615
Satd. Flow (RTOR)		38			81	254			355			14
Volume (vph)	22	12	35	274	4	369	39	807	327	527	1119	17
Lane Group Flow (vph)	24	51	0	211	238	254	42	877	355	573	1216	18
Turn Type	Split			Split		Perm	Prot		Perm	Perm		Perm
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8			2	6		6
Total Split (s)	20.5	20.5	0.0	40.0	40.0	40.0	15.8	49.5	49.5	33.7	33.7	33.7
Act Effct Green (s)	9.1	9.1		20.4	20.4	20.4	9.9	76.4	76.4	68.5	68.5	68.5
Actuated g/C Ratio	0.08	0.08		0.19	0.19	0.19	0.09	0.69	0.69	0.62	0.62	0.62
v/c Ratio	0.16	0.29		0.66	0.68	0.52	0.26	0.35	0.29	0.87	0.54	0.02
Uniform Delay, d1	47.9	12.2		41.6	27.0	0.0	48.9	7.1	0.0	19.3	13.2	1.9
Control Delay	46.9	21.3		42.3	28.3	5.9	47.8	8.6	1.6	39.0	16.4	8.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.9	21.3		42.3	28.3	5.9	47.8	8.6	1.6	39.0	16.4	8.2
LOS	D	C		D	C	A	D	A	A	D	B	A
Approach Delay		29.5			24.4			7.9			23.5	
Approach LOS		C			C			A			C	
Queue Length 50th (ft)	16	9		147	114	0	28	124	0	185	275	1
Queue Length 95th (ft)	42	46		212	192	66	62	211	37	#364	448	15
Internal Link Dist (ft)		848			1418			820			2021	
Turn Bay Length (ft)	150			300		1000	150					
Base Capacity (vph)	304	315		592	585	696	226	2508	1230	655	2249	1011
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	6	0	0	0	0	0
Reduced v/c Ratio	0.08	0.16		0.36	0.41	0.36	0.19	0.35	0.29	0.87	0.54	0.02

Intersection Summary

Cycle Length: 110
 Actuated Cycle Length: 110
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 18.6
 Intersection Capacity Utilization 65.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: WB-Off Ramp & Grand



HCM Signalized Intersection Capacity Analysis
 2: EB Off-Ramp & Grand

Timing Plan: Existing PM
 1/19/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↗					↑↑	↗	↖	↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	2.0	2.0					2.0	2.0	2.0	2.0	
Lane Util. Factor	0.95	0.95	1.00					0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1715	1715	1615					3610	1615	1805	3610	
Flt Permitted	0.95	0.95	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1715	1715	1615					3610	1615	1805	3610	
Volume (vph)	265	0	125	0	0	0	0	905	484	289	1110	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	288	0	136	0	0	0	0	984	526	314	1207	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	303	0	0	0
Lane Group Flow (vph)	144	144	136	0	0	0	0	984	223	314	1207	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split		Free						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						2			
Actuated Green, G (s)	8.7	8.7	60.0					23.4	23.4	15.9	43.3	
Effective Green, g (s)	10.7	10.7	60.0					25.4	25.4	17.9	45.3	
Actuated g/C Ratio	0.18	0.18	1.00					0.42	0.42	0.30	0.75	
Clearance Time (s)	4.0	4.0						4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	306	306	1615					1528	684	538	2726	
v/s Ratio Prot	c0.08	0.08						0.27		c0.17	0.33	
v/s Ratio Perm			0.08						0.33			
v/c Ratio	0.47	0.47	0.08					0.64	0.33	0.58	0.44	
Uniform Delay, d1	22.1	22.1	0.0					13.7	11.6	17.9	2.7	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	1.1	0.1					2.1	1.3	1.6	0.5	
Delay (s)	23.3	23.3	0.1					15.8	12.8	19.5	3.2	
Level of Service	C	C	A					B	B	B	A	
Approach Delay (s)		15.8			0.0			14.8			6.6	
Approach LOS		B			A			B			A	

Intersection Summary

HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
2: EB Off-Ramp & Grand

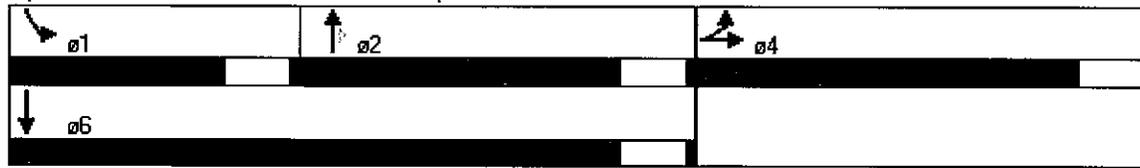
Timing Plan: Existing PM
1/19/2010

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Satd. Flow (prot)	1715	1715	1615	0	0	0	0	3610	1615	1805	3610	0
Flt Permitted	0.950	0.950								0.950		
Satd. Flow (perm)	1715	1715	1615	0	0	0	0	3610	1615	1805	3610	0
Satd. Flow (RTOR)			136						526			
Volume (vph)	265	0	125	0	0	0	0	905	484	289	1110	0
Lane Group Flow (vph)	144	144	136	0	0	0	0	984	526	314	1207	0
Turn Type	Split		Free						Perm	Prot		
Protected Phases	4	4						2		1	6	
Permitted Phases			Free						2			
Total Split (s)	24.0	24.0	0.0	0.0	0.0	0.0	0.0	20.8	20.8	15.2	36.0	0.0
Act Effct Green (s)	11.8	11.8	60.0					26.2	26.2	17.9	46.5	
Actuated g/C Ratio	0.20	0.20	1.00					0.44	0.44	0.30	0.78	
v/c Ratio	0.43	0.43	0.08					0.62	0.53	0.58	0.43	
Uniform Delay, d1	22.1	22.1	0.0					13.7	0.0	17.9	2.7	
Control Delay	21.2	21.2	0.1					18.8	4.1	22.0	3.9	
Queue Delay	0.0	0.0	0.0					0.0	0.0	0.0	0.0	
Total Delay	21.2	21.2	0.1					18.8	4.1	22.0	3.9	
LOS	C	C	A					B	A	C	A	
Approach Delay		14.5						13.7			7.6	
Approach LOS		B						B			A	
Queue Length 50th (ft)	48	48	0					154	0	92	65	
Queue Length 95th (ft)	88	88	0					#278	59	160	127	
Internal Link Dist (ft)		895			1197			474			820	
Turn Bay Length (ft)	150		150						300	300		
Base Capacity (vph)	629	629	1615					1576	1001	543	2800	
Starvation Cap Reductn	0	0	0					0	0	0	0	
Spillback Cap Reductn	0	0	0					0	0	0	0	
Storage Cap Reductn	0	0	0					0	0	0	0	
Reduced v/c Ratio	0.23	0.23	0.08					0.62	0.53	0.58	0.43	

Intersection Summary

Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 11.1
 Intersection Capacity Utilization 63.3%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 2: EB Off-Ramp & Grand



HCM Signalized Intersection Capacity Analysis
 9: Golden Springs & Grand

Timing Plan: Existing PM
 1/19/2010



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖↗	↖	↕↗		↖↗	↕↗		↖↗	↕	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Util. Factor	0.97	0.95	0.88	1.00	0.95		0.97	0.95		0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	1770	3374		3433	3473		3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	1770	3374		3433	3473		3433	3539	1583
Volume (vph)	743	835	644	108	409	185	275	586	84	308	910	208
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	808	908	700	117	445	201	299	637	91	335	989	226
RTOR Reduction (vph)	0	0	372	0	65	0	0	17	0	0	0	44
Lane Group Flow (vph)	808	908	328	117	581	0	299	711	0	335	989	182
Turn Type	Prot		Perm	Prot			Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4									6
Actuated Green, G (s)	11.1	24.0	24.0	4.6	17.5		8.8	19.5		13.5	24.2	35.3
Effective Green, g (s)	13.1	26.0	26.0	6.6	19.5		10.8	21.5		15.5	26.2	39.3
Actuated g/C Ratio	0.17	0.34	0.34	0.09	0.25		0.14	0.28		0.20	0.34	0.51
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	580	1186	934	151	848		478	962		686	1195	842
v/s Ratio Prot	c0.24	c0.26		0.07	0.19		0.09	c0.21		0.10	c0.28	0.05
v/s Ratio Perm			0.25									0.10
v/c Ratio	1.39	0.77	0.35	0.77	0.68		0.63	0.74		0.49	0.83	0.22
Uniform Delay, d1	32.2	23.1	19.4	34.8	26.3		31.5	25.5		27.5	23.6	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	187.3	3.0	0.2	21.6	2.3		2.6	3.0		0.5	4.8	0.1
Delay (s)	219.5	26.1	19.7	56.3	28.6		34.0	28.5		28.1	28.5	10.7
Level of Service	F	C	B	E	C		C	C		C	C	B
Approach Delay (s)		88.9			32.8			30.1			25.8	
Approach LOS		F			C			C			C	

Intersection Summary

HCM Average Control Delay	54.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Queues
9: Golden Springs & Grand

Timing Plan: Existing PM
1/19/2010

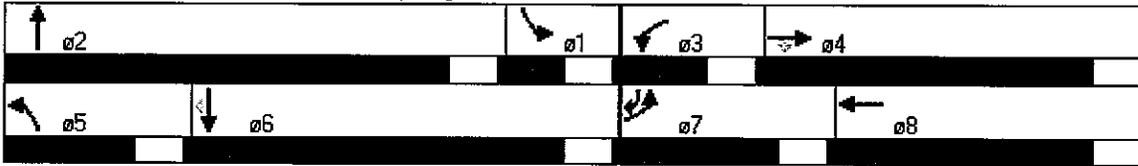
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Total Lost Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Satd. Flow (prot)	3433	3539	2787	1770	3373	0	3433	3472	0	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	2787	1770	3373	0	3433	3472	0	3433	3539	1583
Satd. Flow (RTOR)			559		87			24				89
Volume (vph)	743	835	644	108	409	185	275	586	84	308	910	208
Lane Group Flow (vph)	808	908	700	117	646	0	299	728	0	335	989	226
Turn Type	Prot		Perm	Prot			Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4									6
Total Split (s)	15.0	27.0	27.0	10.0	22.0	0.0	13.0	35.0	0.0	8.0	30.0	15.0
Act Effct Green (s)	13.1	26.0	26.0	8.0	18.6		10.8	21.5		15.6	26.3	41.4
Actuated g/C Ratio	0.17	0.34	0.34	0.10	0.24		0.14	0.28		0.20	0.34	0.54
v/c Ratio	1.38	0.76	0.53	0.65	0.73		0.62	0.74		0.48	0.82	0.25
Uniform Delay, d1	32.3	23.1	3.7	34.8	22.7		31.5	24.6		27.5	23.6	5.7
Control Delay	211.1	29.1	6.5	53.2	27.8		37.7	25.8		32.0	28.5	6.7
Queue Delay	0.0	0.0	0.2	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	211.1	29.1	6.7	53.2	27.8		37.7	25.8		32.0	28.5	6.7
LOS	F	C	A	D	C		D	C		C	C	A
Approach Delay		83.5			31.7			29.3			26.1	
Approach LOS		F			C			C			C	
Queue Length 50th (ft)	~288	218	28	57	134		73	169		75	231	32
Queue Length 95th (ft)	#397	#296	75	#130	193		113	202		#141	306	69
Internal Link Dist (ft)		285			258			3184			474	
Turn Bay Length (ft)	250		250	150			300			150		
Base Capacity (vph)	585	1197	1312	180	930		493	1318		695	1265	894
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	3	158	0	0		0	0		0	0	0
Reduced v/c Ratio	1.38	0.76	0.61	0.65	0.69		0.61	0.55		0.48	0.78	0.25

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 76.8
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.38
 Intersection Signal Delay: 51.5
 Intersection Capacity Utilization 84.8%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service E

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 9: Golden Springs & Grand



HCM Signalized Intersection Capacity Analysis
 3: WB-Off Ramp & Grand

2017 AM Alt 1
 8/31/2011

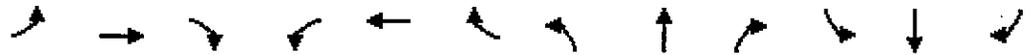


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↕	↗	↖	↕	↗		↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00		0.91	
Fr _t	1.00	0.85		1.00	0.94	0.85	1.00	1.00	0.85		0.99	
Fl _t Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1805	1615		1715	1597	1534	1805	3610	1615		5143	
Fl _t Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1805	1615		1715	1597	1534	1805	3610	1615		5143	
Volume (vph)	40	0	40	570	100	650	80	1750	360	0	1180	70
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	0	40	570	100	650	80	1750	360	0	1180	70
RTOR Reduction (vph)	0	36	0	0	25	119	0	0	164	0	7	0
Lane Group Flow (vph)	40	4	0	404	414	358	80	1750	196	0	1243	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split			Split		Perm	Prot		Perm			
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8			2			
Actuated Green, G (s)	6.1	6.1		22.6	22.6	22.6	7.2	43.4	43.4		31.7	
Effective Green, g (s)	7.6	7.6		24.1	24.1	24.1	8.7	44.9	44.9		33.2	
Actuated g/C Ratio	0.09	0.09		0.28	0.28	0.28	0.10	0.52	0.52		0.39	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	160	143		483	450	432	183	1894	847		1995	
v/s Ratio Prot	0.02	0.02		0.24	0.27		0.04	0.48			0.24	
v/s Ratio Perm						0.31			0.22			
v/c Ratio	0.25	0.02		0.84	0.92	0.83	0.44	0.92	0.23		0.62	
Uniform Delay, d ₁	36.3	35.6		28.9	29.8	28.8	36.1	18.8	11.0		21.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d ₂	0.8	0.1		11.9	23.7	12.4	1.7	8.1	0.1		0.6	
Delay (s)	37.2	35.7		40.8	53.5	41.3	37.8	26.9	11.2		21.8	
Level of Service	D	D		D	D	D	D	C	B		C	
Approach Delay (s)		36.4			45.2			24.7			21.8	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	85.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	40	0	40	570	100	650	80	1750	360	0	1180	70
Lane Group Flow (vph)	40	40	0	404	439	477	80	1750	360	0	1250	0
v/c Ratio	0.21	0.11		0.82	0.90	0.85	0.37	0.92	0.36		0.61	
Control Delay	37.3	0.5		44.5	52.2	35.7	39.0	28.1	2.8		23.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.1	0.0	0.0		0.0	
Total Delay	37.3	0.5		44.5	52.2	35.7	39.0	28.1	2.8		23.5	
Queue Length 50th (ft)	20	0		220	239	177	41	444	4		205	
Queue Length 95th (ft)	50	0		#402	#461	#384	85	#660	47		273	
Internal Link Dist (ft)		848			1418			415			396	
Turn Bay Length (ft)	125			330			150					
Base Capacity (vph)	245	403		496	487	561	248	1922	1021		2052	
Starvation Cap Reductn	0	0		0	0	0	0	0	0		0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0		0	
Storage Cap Reductn	0	0		0	0	0	8	0	0		0	
Reduced v/c Ratio	0.16	0.10		0.81	0.90	0.85	0.33	0.91	0.35		0.61	

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 2: EB Off-Ramp & Grand

2017 AM Alt 1
 8/31/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗		↖					↖↗	↖	↖↗	↖↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97		1.00					0.95	1.00	0.97	0.95	
Fr _t	1.00		0.85					1.00	0.85	1.00	1.00	
Fl _t Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3502		1615					3610	1615	3502	3610	
Fl _t Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3502		1615					3610	1615	3502	3610	
Volume (vph)	680	0	260	0	0	0	0	1510	360	330	1100	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	739	0	283	0	0	0	0	1641	391	359	1196	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	210	0	0	0
Lane Group Flow (vph)	739	0	283	0	0	0	0	1641	181	359	1196	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot		Free						Perm	Prot		
Protected Phases	4							2		1	6	
Permitted Phases			Free						2			
Actuated Green, G (s)	10.5		60.4					26.5	26.5	9.9	40.9	
Effective Green, g (s)	12.0		60.4					28.0	28.0	11.4	42.4	
Actuated g/C Ratio	0.20		1.00					0.46	0.46	0.19	0.70	
Clearance Time (s)	4.5							4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0							3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	696		1615					1674	749	661	2534	
v/s Ratio Prot	c0.21							c0.45		0.10	c0.33	
v/s Ratio Perm			0.18						0.24			
v/c Ratio	1.06		0.18					0.98	0.24	0.54	0.47	
Uniform Delay, d ₁	24.2		0.0					15.9	9.8	22.1	4.0	
Progression Factor	1.00		1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d ₂	51.7		0.2					17.4	0.2	0.9	0.1	
Delay (s)	75.9		0.2					33.4	10.0	23.1	4.2	
Level of Service	E		A					C	A	C	A	
Approach Delay (s)		54.9			0.0			28.9				8.5
Approach LOS		D			A			C				A

Intersection Summary

HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	6.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	739	0	283	0	0	0	0	1641	391	359	1196	0
Lane Group Flow (vph)	739	0	283	0	0	0	0	1641	391	359	1196	0
v/c Ratio	1.06		0.18					0.98	0.41	0.54	0.47	
Control Delay	79.4		0.2					36.2	2.7	25.2	4.7	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	79.4		0.2					36.2	2.7	25.2	4.7	
Queue Length 50th (ft)	~161		0					297	0	61	78	
Queue Length 95th (ft)	#257		0					#462	40	97	109	
Internal Link Dist (ft)		895			1197			1061			427	
Turn Bay Length (ft)	360								400	210		
Base Capacity (vph)	695		1615					1673	958	689	2545	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	1.06		0.18					0.98	0.41	0.52	0.47	

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Golden Springs & Grand

2017 AM Alt 1
8/31/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖	↑↑		↖↗	↑↑		↖↗	↑↑	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	1.00	0.95		0.97	0.95		0.94	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	1770	3757		3794	3891		4990	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	1770	3757		3794	3891		4990	3539	1583
Volume (vph)	230	220	180	140	780	280	540	1360	50	200	630	530
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	239	196	152	848	304	587	1478	54	217	685	576
RTOR Reduction (vph)	0	0	137	0	31	0	0	2	0	0	0	149
Lane Group Flow (vph)	250	239	59	152	1121	0	587	1530	0	217	685	427
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	10.4	32.9	32.9	10.5	33.0		16.5	43.0		9.7	36.2	36.2
Effective Green, g (s)	11.9	34.4	34.4	12.0	34.5		18.0	44.5		11.2	37.7	37.7
Actuated g/C Ratio	0.10	0.30	0.30	0.11	0.30		0.16	0.39		0.10	0.33	0.33
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	358	1067	840	186	1136		599	1518		490	1169	523
v/s Ratio Prot	0.07	0.07		c0.09	c0.31		c0.15	0.39		0.04	0.19	
v/s Ratio Perm			0.07									0.36
v/c Ratio	0.70	0.22	0.07	0.82	0.99		0.98	1.01		0.44	0.59	0.82
Uniform Delay, d1	49.4	29.9	28.4	50.0	39.6		47.9	34.8		48.5	31.7	35.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.8	0.1	0.0	23.4	23.2		31.3	25.0		0.6	0.8	9.6
Delay (s)	55.2	30.0	28.5	73.4	62.8		79.2	59.8		49.1	32.5	44.6
Level of Service	E	C	C	E	E		E	E		D	C	D
Approach Delay (s)		38.8			64.0			65.1			39.7	
Approach LOS		D			E			E			D	

Intersection Summary

HCM Average Control Delay	54.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	114.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	86.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	250	239	196	152	848	304	587	1478	54	217	685	576
Lane Group Flow (vph)	250	239	196	152	1152	0	587	1532	0	217	685	576
v/c Ratio	0.70	0.22	0.20	0.82	0.99		0.98	1.01		0.44	0.59	0.86
Control Delay	60.4	30.7	4.7	82.1	62.0		80.7	59.8		51.1	34.0	34.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	60.4	30.7	4.7	82.1	62.0		80.7	59.8		51.1	34.0	34.8
Queue Length 50th (ft)	93	70	0	112	433		226	-604		54	218	258
Queue Length 95th (ft)	138	103	29	#226	#588		#343	#772		81	281	#466
Internal Link Dist (ft)		810			954			529			1061	
Turn Bay Length (ft)	425		300	270			400			210		
Base Capacity (vph)	361	1069	978	186	1167		599	1522		521	1186	678
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.69	0.22	0.20	0.82	0.99		0.98	1.01		0.42	0.58	0.85

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 3: WB-Off Ramp & Grand

2017 PM Alt 1
 9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↔	↗	↖	↑↑	↗		↑↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00		0.91	
Frt	1.00	0.85		1.00	0.93	0.85	1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1805	1615		1715	1571	1534	1805	3610	1615		5151	
Flt Permitted	0.95	1.00		0.95	0.98	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1805	1615		1715	1571	1534	1805	3610	1615		5151	
Volume (vph)	110	0	190	290	30	440	140	1070	400	0	2260	110
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	0	190	290	30	440	140	1070	400	0	2260	110
RTOR Reduction (vph)	0	167	0	0	39	144	0	0	139	0	6	0
Lane Group Flow (vph)	110	23	0	198	203	176	140	1070	261	0	2364	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split			Split		Perm	Prot		Perm			
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8			2			
Actuated Green, G (s)	9.4	9.4		9.5	9.5	9.5	9.8	56.5	56.5		42.2	
Effective Green, g (s)	10.9	10.9		11.0	11.0	11.0	11.3	58.0	58.0		43.7	
Actuated g/C Ratio	0.12	0.12		0.12	0.12	0.12	0.13	0.65	0.65		0.49	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	221	198		212	194	190	229	2355	1054		2532	
v/s Ratio Prot	0.06	c0.12		0.12	0.15		c0.08	0.30			c0.46	
v/s Ratio Perm						0.21			0.25			
v/c Ratio	0.50	0.12		0.93	1.04	0.93	0.61	0.45	0.25		0.93	
Uniform Delay, d1	36.4	34.7		38.6	39.0	38.6	36.7	7.6	6.4		21.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.8	0.3		43.4	76.7	44.7	4.8	0.6	0.6		7.9	
Delay (s)	38.2	35.0		82.0	115.7	83.3	41.5	8.3	7.0		29.2	
Level of Service	D	C		F	F	F	D	A	A		C	
Approach Delay (s)		36.2			93.2			10.8			29.2	
Approach LOS		D			F			B			C	

Intersection Summary

HCM Average Control Delay	33.4	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	110	0	190	290	30	440	140	1070	400	0	2260	110
Lane Group Flow (vph)	110	190	0	198	242	320	140	1070	400	0	2370	0
v/c Ratio	0.50	0.52		0.93	1.03	0.96	0.61	0.45	0.34		0.93	
Control Delay	42.9	10.2		87.8	101.7	61.5	47.0	8.5	1.5		30.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	1.2	0.0	0.0		0.0	
Total Delay	42.9	10.2		87.8	101.7	61.5	48.2	8.5	1.5		30.2	
Queue Length 50th (ft)	59	0		120	~139	95	76	144	0		456	
Queue Length 95th (ft)	111	57		#257	#303	#272	136	186	29		#593	
Internal Link Dist (ft)		848			1418			415			396	
Turn Bay Length (ft)	125			330			150					
Base Capacity (vph)	241	383		212	234	333	242	2356	1193		2539	
Starvation Cap Reductn	0	0		0	0	0	0	0	0		0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0		0	
Storage Cap Reductn	0	0		0	0	0	22	0	0		0	
Reduced v/c Ratio	0.46	0.50		0.93	1.03	0.96	0.64	0.45	0.34		0.93	

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 2: EB Off-Ramp & Grand

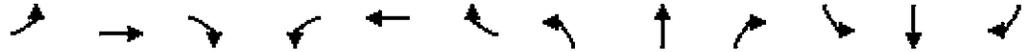
2017 PM Alt 1
 9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↗					↕	↗	↔	↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97		1.00					0.95	1.00	0.97	0.95	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3502		1615					3610	1615	3502	3610	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3502		1615					3610	1615	3502	3610	
Volume (vph)	340	0	130	0	0	0	0	1270	500	540	1370	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	370	0	141	0	0	0	0	1380	543	587	1489	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	329	0	0	0
Lane Group Flow (vph)	370	0	141	0	0	0	0	1380	214	587	1489	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot		Free				Perm		Prot			
Protected Phases	4						2		1			6
Permitted Phases			Free						2			
Actuated Green, G (s)	9.7		53.2				19.5		19.5	10.5	34.5	
Effective Green, g (s)	11.2		53.2				21.0		21.0	12.0	36.0	
Actuated g/C Ratio	0.21		1.00				0.39		0.39	0.23	0.68	
Clearance Time (s)	4.5						4.5		4.5	4.5	4.5	
Vehicle Extension (s)	3.0						3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	737		1615				1425		638	790	2443	
v/s Ratio Prot	c0.11						c0.38			c0.17	0.41	
v/s Ratio Perm			0.09						0.34			
v/c Ratio	0.50		0.09				0.97		0.34	0.74	0.61	
Uniform Delay, d1	18.5		0.0				15.8		11.2	19.2	4.7	
Progression Factor	1.00		1.00				1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.5		0.1				16.7		0.3	3.8	0.4	
Delay (s)	19.1		0.1				32.5		11.5	23.0	5.2	
Level of Service	B		A				C		B	C	A	
Approach Delay (s)			13.8				26.6				10.2	
Approach LOS			B				C				B	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	53.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	70.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	370	0	141	0	0	0	0	1380	543	587	1489	0
Lane Group Flow (vph)	370	0	141	0	0	0	0	1380	543	587	1489	0
v/c Ratio	0.50		0.09					0.97	0.56	0.75	0.61	
Control Delay	20.8		0.1					36.0	3.9	26.8	6.2	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	20.8		0.1					36.0	3.9	26.8	6.2	
Queue Length 50th (ft)	53		0					220	0	90	112	
Queue Length 95th (ft)	87		0					#362	50	#154	159	
Internal Link Dist (ft)		895			1197			1061				427
Turn Bay Length (ft)	360								400	210		
Base Capacity (vph)	779		1615					1426	966	789	2441	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.47		0.09					0.97	0.56	0.74	0.61	

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Golden Springs & Grand

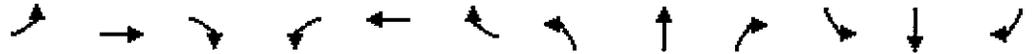
2017 PM Alt 1
 9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖↗	↖	↕		↖↗	↕		↖↗	↕	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	1.00	0.95		0.97	0.95		0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	1770	3726		3794	3843		3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	1770	3726		3794	3843		3433	3539	1583
Volume (vph)	770	900	670	120	520	240	320	760	100	340	940	220
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	837	978	728	130	565	261	348	826	109	370	1022	239
RTOR Reduction (vph)	0	0	391	0	60	0	0	11	0	0	0	167
Lane Group Flow (vph)	837	978	337	130	766	0	348	924	0	370	1022	72
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	19.5	26.3	26.3	9.7	16.5		10.4	25.4		10.5	25.5	25.5
Effective Green, g (s)	21.0	27.8	27.8	11.2	18.0		11.9	26.9		12.0	27.0	27.0
Actuated g/C Ratio	0.23	0.31	0.31	0.12	0.20		0.13	0.30		0.13	0.30	0.30
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	802	1094	862	221	746		502	1150		458	1063	475
v/s Ratio Prot	c0.24	0.28		0.07	c0.22		0.09	0.24		c0.11	c0.29	
v/s Ratio Perm			0.26									0.15
v/c Ratio	1.04	0.89	0.39	0.59	1.03		0.69	0.80		0.81	0.96	0.15
Uniform Delay, d1	34.5	29.6	24.4	37.2	36.0		37.3	29.1		37.8	30.9	23.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	43.7	9.5	0.3	4.0	40.0		4.1	4.2		10.1	18.9	0.1
Delay (s)	78.2	39.2	24.7	41.1	75.9		41.4	33.2		47.9	49.8	23.2
Level of Service	E	D	C	D	E		D	C		D	D	C
Approach Delay (s)		47.9			71.2			35.4			45.5	
Approach LOS		D			E			D			D	

Intersection Summary

HCM Average Control Delay	48.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	9.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Lane/Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	837	978	728	130	565	261	348	826	109	370	1022	239
Lane Group Flow (vph)	837	978	728	130	826	0	348	935	0	370	1022	239
v/c Ratio	1.04	0.89	0.58	0.59	1.02		0.69	0.81		0.81	0.96	0.37
Control Delay	78.8	42.1	8.0	46.6	71.5		45.0	34.9		52.9	51.8	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	78.8	42.1	8.0	46.6	71.5		45.0	34.9		52.9	51.8	5.2
Queue Length 50th (ft)	~269	281	38	70	~246		98	252		106	299	0
Queue Length 95th (ft)	#384	#403	94	128	#366		144	327		#175	#433	52
Internal Link Dist (ft)		810			954			529			1061	
Turn Bay Length (ft)	425		300	270			400			210		
Base Capacity (vph)	802	1094	1252	234	807		506	1165		459	1063	643
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.04	0.89	0.58	0.56	1.02		0.69	0.80		0.81	0.96	0.37

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Grand Crossing & Grand

2017 AM Alt 2
9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	0.95	0.95	0.95	0.76	0.97	0.86	1.00	1.00	0.81	1.00
Fr't	1.00	0.95	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1715	1586	1534	1715	1743	3682	3502	6536	1615	1805	7695	1615
Flt Permitted	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1715	1586	1534	1715	1743	3682	3502	6536	1615	1805	7695	1615
Volume (vph)	40	0	40	570	100	770	80	1830	360	80	1240	70
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	0	40	570	100	770	80	1830	360	80	1240	70
RTOR Reduction (vph)	0	10	27	0	0	272	0	0	217	0	0	39
Lane Group Flow (vph)	20	21	2	326	344	498	80	1830	143	80	1240	31
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split		Perm	Split		pm+ov	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	4.0	4.0	4.0	17.4	17.4	26.3	5.7	29.5	29.5	8.9	32.7	32.7
Effective Green, g (s)	5.5	5.5	5.5	18.9	18.9	29.3	7.2	31.0	31.0	10.4	34.2	34.2
Actuated g/C Ratio	0.07	0.07	0.07	0.24	0.24	0.38	0.09	0.40	0.40	0.13	0.44	0.44
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	121	112	108	417	423	1529	324	2604	644	241	3383	710
v/s Ratio Prot	0.01	c0.02		0.19	c0.20	c0.07	0.02	c0.28		0.04	0.16	
v/s Ratio Perm			0.02			0.14			0.22			0.04
v/c Ratio	0.17	0.19	0.02	0.78	0.81	0.33	0.25	0.70	0.22	0.33	0.37	0.04
Uniform Delay, d1	34.0	34.0	33.6	27.5	27.8	17.2	32.8	19.6	15.4	30.6	14.6	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.8	0.1	9.2	11.4	0.1	0.4	0.9	0.2	0.8	0.1	0.0
Delay (s)	34.6	34.8	33.7	36.7	39.1	17.4	33.2	20.4	15.6	31.4	14.6	12.5
Level of Service	C	C	C	D	D	B	C	C	B	C	B	B
Approach Delay (s)		34.4			27.0			20.1			15.5	
Approach LOS		C			C			C			B	

Intersection Summary

HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	77.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	40	0	40	570	100	770	80	1830	360	80	1240	70
Lane Group Flow (vph)	20	31	29	326	344	770	80	1830	360	80	1240	70
v/c Ratio	0.11	0.17	0.15	0.75	0.78	0.42	0.20	0.71	0.42	0.32	0.35	0.09
Control Delay	36.0	27.5	14.7	35.8	36.7	7.4	35.0	22.0	3.9	36.0	16.0	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	27.5	14.7	35.8	36.7	7.4	35.0	22.0	3.9	36.0	16.0	5.1
Queue Length 50th (ft)	10	10	0	169	180	48	20	244	0	40	113	0
Queue Length 95th (ft)	32	39	26	#310	#331	86	42	304	55	84	150	26
Internal Link Dist (ft)		848			626			550			253	
Turn Bay Length (ft)	200		200	500		270	290		360	220		180
Base Capacity (vph)	254	244	252	497	505	1810	536	2758	890	294	3549	782
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	12	0	0	0
Reduced v/c Ratio	0.08	0.13	0.12	0.66	0.68	0.43	0.15	0.66	0.41	0.27	0.35	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
2: EB On-Ramp & Grand

2017 AM Alt 2
9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↗					↑↑↑	↗	↔	↑↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97		1.00					0.81	0.81	0.97	0.86	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3502		1615					6156	1308	3502	6536	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3502		1615					6156	1308	3502	6536	
Volume (vph)	770	0	260	0	0	0	0	1500	380	390	1140	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	837	0	283	0	0	0	0	1630	413	424	1239	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	283	0	0	0
Lane Group Flow (vph)	837	0	283	0	0	0	0	1630	130	424	1239	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot		Free				Perm		Prot			
Protected Phases	4						2		1 6			
Permitted Phases			Free						2			
Actuated Green, G (s)	17.6		57.7				16.6		16.6		10.0 31.1	
Effective Green, g (s)	19.1		57.7				18.1		18.1		11.5 32.6	
Actuated g/C Ratio	0.33		1.00				0.31		0.31		0.20 0.56	
Clearance Time (s)	4.5						4.5		4.5		4.5 4.5	
Vehicle Extension (s)	3.0						3.0		3.0		3.0 3.0	
Lane Grp Cap (vph)	1159		1615				1931		410		698 3693	
v/s Ratio Prot	c0.24						0.26				c0.12 0.19	
v/s Ratio Perm			0.18						0.32			
v/c Ratio	0.72		0.18				0.84		0.32		0.61 0.34	
Uniform Delay, d1	17.0		0.0				18.5		15.1		21.0 6.7	
Progression Factor	1.00		1.00				1.00		1.00		1.00 1.00	
Incremental Delay, d2	2.3		0.2				3.6		0.4		1.5 0.1	
Delay (s)	19.2		0.2				22.1		15.5		22.5 6.8	
Level of Service	B		A				C		B		C A	
Approach Delay (s)			14.4				20.7				10.8	
Approach LOS			B				C				B	

Intersection Summary

HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NET	NBR	SBL	SBT	SBR
Adj. Flow (vph)	837	0	283	0	0	0	0	1630	413	424	1239	0
Lane Group Flow (vph)	837	0	283	0	0	0	0	1630	413	424	1239	0
v/c Ratio	0.72		0.18					0.85	0.60	0.61	0.34	
Control Delay	20.2		0.2					24.8	6.3	25.2	7.3	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	20.2		0.2					24.8	6.3	25.2	7.3	
Queue Length 50th (ft)	129		0					171	0	72	64	
Queue Length 95th (ft)	186		0					#241	71	112	84	
Internal Link Dist (ft)		895			561			981			480	
Turn Bay Length (ft)	775								360	540		
Base Capacity (vph)	1236		1615					1926	693	723	3712	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.68		0.18					0.85	0.60	0.59	0.33	

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 3: Golden Springs & Grand

2017 AM Alt 2
 9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↗↗	↔↔	↑↑	↗	↔↔	↑↑↔		↔↔	↑↑↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91		0.97	0.91	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	3433	3912	1750	3794	5592		3433	5085	1583
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	3433	3912	1750	3794	5592		3433	5085	1583
Volume (vph)	210	180	160	140	730	270	540	1400	50	200	670	530
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	196	174	152	793	293	587	1522	54	217	728	576
RTOR Reduction (vph)	0	0	67	0	0	9	0	3	0	0	0	154
Lane Group Flow (vph)	228	196	107	152	793	284	587	1573	0	217	728	422
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	9.8	26.7	40.6	9.0	25.9	35.7	13.9	33.1		9.8	29.0	29.0
Effective Green, g (s)	11.3	28.2	43.6	10.5	27.4	38.7	15.4	34.6		11.3	30.5	30.5
Actuated g/C Ratio	0.12	0.29	0.45	0.11	0.28	0.40	0.16	0.36		0.12	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	402	1033	1344	373	1110	755	605	2003		402	1606	500
v/s Ratio Prot	c0.07	0.06	0.02	0.04	c0.20	0.05	c0.15	0.28		0.06	0.14	
v/s Ratio Perm			0.04			0.12						0.36
v/c Ratio	0.57	0.19	0.08	0.41	0.71	0.38	0.97	0.79		0.54	0.45	0.84
Uniform Delay, d ₁	40.3	25.6	15.1	40.1	31.1	20.4	40.4	27.7		40.2	26.4	30.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d ₂	1.8	0.1	0.0	0.7	2.2	0.3	29.1	2.1		1.4	0.2	12.3
Delay (s)	42.2	25.7	15.1	40.9	33.3	20.7	69.5	29.8		41.6	26.6	43.2
Level of Service	D	C	B	D	C	C	E	C		D	C	D
Approach Delay (s)		28.9			31.3			40.6			35.0	
Approach LOS		C			C			D			D	

Intersection Summary

HCM Average Control Delay	35.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	96.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	228	196	174	152	793	293	587	1522	54	217	728	576
Lane Group Flow (vph)	228	196	174	152	793	293	587	1576	0	217	728	576
v/c Ratio	0.57	0.19	0.12	0.41	0.72	0.38	0.97	0.79		0.54	0.46	0.88
Control Delay	48.3	26.6	5.4	46.0	32.9	19.8	74.2	31.4		47.8	28.1	31.2
Queue Delay	0.0	0.0	0.0	87.3	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	48.3	26.6	5.4	133.3	32.9	19.8	74.2	31.4		47.8	28.1	31.2
Queue Length 50th (ft)	73	51	10	47	247	122	~215	321		69	131	218
Queue Length 95th (ft)	127	79	29	89	310	186	#385	460		122	201	#493
Internal Link Dist (ft)		810			954			583			981	
Turn Bay Length (ft)	400		250	145		135	380			380		
Base Capacity (vph)	431	1355	1406	428	1487	748	604	2141		431	1772	698
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	295	0	0	0	0		0	0	0
Reduced v/c Ratio	0.53	0.14	0.12	1.14	0.53	0.39	0.97	0.74		0.50	0.41	0.83

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Grand Crossing & Grand

2017 PM Alt 2
 9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕	↗	↖	↕	↗	↖	↕	↗	↖	↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	0.95	0.95	0.95	0.76	0.97	0.86	1.00	1.00	0.81	1.00
Fr _t	1.00	0.89	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1715	1524	1534	1715	1734	3682	3502	6536	1615	1805	7695	1615
Flt Permitted	0.95	0.99	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1715	1524	1534	1715	1734	3682	3502	6536	1615	1805	7695	1615
Volume (vph)	110	0	190	300	30	500	140	1100	410	130	2350	110
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	0	190	300	30	500	140	1100	410	130	2350	110
RTOR Reduction (vph)	0	70	100	0	0	183	0	0	242	0	0	56
Lane Group Flow (vph)	77	41	12	161	169	317	140	1100	168	130	2350	54
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split		Perm	Split		pm+ov	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	6.3	6.3	6.3	9.3	9.3	19.5	6.1	28.0	28.0	10.2	32.1	32.1
Effective Green, g (s)	7.8	7.8	7.8	10.8	10.8	22.5	7.6	29.5	29.5	11.7	33.6	33.6
Actuated g/C Ratio	0.11	0.11	0.11	0.15	0.15	0.31	0.11	0.41	0.41	0.16	0.47	0.47
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	186	166	167	258	261	1308	371	2685	664	294	3601	756
v/s Ratio Prot	0.04	0.07		0.09	c0.10	c0.06	0.04	0.17		c0.07	c0.31	
v/s Ratio Perm			0.07			0.07			0.25			0.07
v/c Ratio	0.41	0.25	0.07	0.62	0.65	0.24	0.38	0.41	0.25	0.44	0.65	0.07
Uniform Delay, d1	29.9	29.3	28.8	28.6	28.7	18.3	29.9	15.0	13.9	27.1	14.6	10.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.8	0.2	4.6	5.4	0.1	0.6	0.1	0.2	1.1	0.4	0.0
Delay (s)	31.4	30.1	28.9	33.2	34.1	18.4	30.5	15.1	14.1	28.2	15.1	10.6
Level of Service	C	C	C	C	C	B	C	B	B	C	B	B
Approach Delay (s)		30.0			24.5			16.2			15.5	
Approach LOS		C			C			B			B	

Intersection Summary		
HCM Average Control Delay	17.9	HCM Level of Service B
HCM Volume to Capacity ratio	0.59	
Actuated Cycle Length (s)	71.8	Sum of lost time (s) 6.0
Intersection Capacity Utilization	57.0%	ICU Level of Service B
Analysis Period (min)	15	

c Critical Lane Group

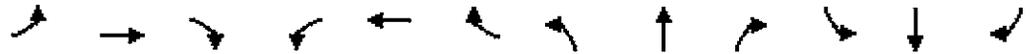


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	110	0	190	300	30	500	140	1100	410	130	2350	110
Lane Group Flow (vph)	77	111	112	161	169	500	140	1100	410	130	2350	110
v/c Ratio	0.30	0.38	0.34	0.49	0.51	0.34	0.27	0.43	0.46	0.41	0.59	0.12
Control Delay	34.6	16.5	9.8	32.8	33.0	8.8	33.2	17.3	3.7	35.7	19.1	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.6	16.5	9.8	32.8	33.0	8.8	33.2	17.3	3.7	35.7	19.1	4.7
Queue Length 50th (ft)	36	16	0	75	80	32	32	114	0	59	236	1
Queue Length 95th (ft)	83	69	47	143	149	64	61	155	56	121	313	33
Internal Link Dist (ft)		848			620			552			253	
Turn Bay Length (ft)	200		200	500		270	290		360	220		180
Base Capacity (vph)	311	340	369	419	424	1549	632	2989	961	370	3998	890
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	53
Reduced v/c Ratio	0.25	0.33	0.30	0.38	0.40	0.32	0.22	0.37	0.43	0.35	0.59	0.13

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 2: EB On-Ramp & Grand

2017 PM Alt 2
 9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖↗		↗					↑↑↑	↗	↖↗	↑↑↑		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0		3.0					3.0	3.0	3.0	3.0		
Lane Util. Factor	0.97		1.00					0.81	0.81	0.97	0.86		
Frt	1.00		0.85					0.99	0.85	1.00	1.00		
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)	3502		1615					6122	1308	3502	6536		
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00		
Satd. Flow (perm)	3502		1615					6122	1308	3502	6536		
Volume (vph)	420	0	150	0	0	0	0	1230	610	560	1540	0	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	457	0	163	0	0	0	0	1337	663	609	1674	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	8	409	0	0	0	
Lane Group Flow (vph)	457	0	163	0	0	0	0	1380	203	609	1674	0	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Turn Type	Prot		Free					Perm		Prot			
Protected Phases	4							2		1 6			
Permitted Phases			Free					2					
Actuated Green, G (s)	12.3		54.3					16.5		12.0 33.0			
Effective Green, g (s)	13.8		54.3					18.0		13.5 34.5			
Actuated g/C Ratio	0.25		1.00					0.33		0.25 0.64			
Clearance Time (s)	4.5							4.5		4.5 4.5			
Vehicle Extension (s)	3.0							3.0		3.0 3.0			
Lane Grp Cap (vph)	890		1615					2029		434 871 4153			
v/s Ratio Prot	c0.13							0.23		c0.17 0.26			
v/s Ratio Perm			0.10							0.47			
v/c Ratio	0.51		0.10					0.68		0.47 0.70 0.40			
Uniform Delay, d1	17.4		0.0					15.7		14.4 18.6 4.9			
Progression Factor	1.00		1.00					1.00		1.00 1.00			
Incremental Delay, d2	0.5		0.1					1.0		0.8 2.5 0.1			
Delay (s)	17.9		0.1					16.6		15.2 21.0 4.9			
Level of Service	B		A					B		B C A			
Approach Delay (s)			13.2					0.0		16.2		9.2	
Approach LOS			B					A		B		A	

Intersection Summary

HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEB	SEB	SBR
Adj. Flow (vph)	457	0	163	0	0	0	0	1337	663	609	1674	0
Lane Group Flow (vph)	457	0	163	0	0	0	0	1388	612	609	1674	0
v/c Ratio	0.51		0.10					0.68	0.73	0.70	0.40	
Control Delay	18.5		0.1					18.2	8.1	23.9	5.5	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	18.5		0.1					18.2	8.1	23.9	5.5	
Queue Length 50th (ft)	65		0					116	0	91	62	
Queue Length 95th (ft)	101		0					175	#120	#157	106	
Internal Link Dist (ft)		895			561			981			480	
Turn Bay Length (ft)	775								360	540		
Base Capacity (vph)	1121		1615					2042	843	898	4177	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.41		0.10					0.68	0.73	0.68	0.40	

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 3: Golden Springs & Grand

2017 PM Alt 2
 9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖↗	↖↗	↕	↖	↖↗	↕↖		↖↗	↕↖	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	3433	3912	1750	3794	5537		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	3433	3912	1750	3794	5537		3433	5085	1583
Volume (vph)	780	870	670	110	480	240	310	820	90	390	1030	270
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	848	946	728	120	522	261	337	891	98	424	1120	293
RTOR Reduction (vph)	0	0	41	0	0	5	0	10	0	0	0	204
Lane Group Flow (vph)	848	946	687	120	522	256	337	979	0	424	1120	89
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	31.9	45.3	56.9	8.9	22.3	37.0	11.6	27.6		14.7	30.7	30.7
Effective Green, g (s)	33.4	46.8	59.9	10.4	23.8	40.0	13.1	29.1		16.2	32.2	32.2
Actuated g/C Ratio	0.29	0.41	0.52	0.09	0.21	0.35	0.11	0.25		0.14	0.28	0.28
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	1001	1447	1531	312	813	657	434	1407		486	1430	445
v/s Ratio Prot	c0.25	c0.27	0.05	0.03	0.13	0.06	0.09	0.18		c0.12	c0.22	
v/s Ratio Perm			0.21			0.09						0.19
v/c Ratio	0.85	0.65	0.45	0.38	0.64	0.39	0.78	0.70		0.87	0.78	0.20
Uniform Delay, d1	38.1	27.3	17.0	49.0	41.5	28.1	49.3	38.7		48.1	37.9	31.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.8	1.1	0.2	0.8	1.7	0.4	8.5	1.5		15.7	2.9	0.2
Delay (s)	44.9	28.4	17.2	49.8	43.2	28.4	57.8	40.2		63.9	40.8	31.6
Level of Service	D	C	B	D	D	C	E	D		E	D	C
Approach Delay (s)		30.7			39.8			44.7			44.7	
Approach LOS		C			D			D			D	

Intersection Summary

HCM Average Control Delay	38.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	114.5	Sum of lost time (s)	6.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	848	946	728	120	522	261	337	891	98	424	1120	293
Lane Group Flow (vph)	848	946	728	120	522	261	337	989	0	424	1120	293
v/c Ratio	0.85	0.66	0.46	0.38	0.64	0.39	0.77	0.70		0.87	0.79	0.45
Control Delay	49.0	29.2	15.0	54.1	42.3	27.4	63.8	41.1		69.1	42.0	6.8
Queue Delay	40.9	0.0	0.1	80.1	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	89.8	29.3	15.1	134.3	42.3	27.4	63.8	41.1		69.1	42.0	6.8
Queue Length 50th (ft)	305	304	164	43	191	140	126	232		160	270	5
Queue Length 95th (ft)	#531	381	220	85	246	209	#245	344		#314	400	79
Internal Link Dist (ft)		810			954			583			981	
Turn Bay Length (ft)	400		250	145		135	380			380		
Base Capacity (vph)	1000	1703	1569	358	1234	662	435	1543		485	1539	677
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	215	55	159	250	0	0	0	0		0	0	0
Reduced v/c Ratio	1.08	0.57	0.52	1.11	0.42	0.39	0.77	0.64		0.87	0.73	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: WB-Off Ramp & Grand

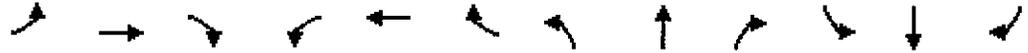
2017 AM Alt 3
 9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕	↗	↖	↖	↖↖↖	↖↖	↑↑↑	↗	↖	↑↑↑↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	0.95	0.95	0.95	0.76	0.97	0.86	1.00	1.00	0.81	1.00
Frt	1.00	0.95	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1715	1586	1534	1715	1743	3682	3502	6536	1615	1805	7695	1615
Flt Permitted	0.95	0.97	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1715	1586	1534	1715	1743	3682	3502	6536	1615	1805	7695	1615
Volume (vph)	40	0	40	570	100	770	80	1830	360	80	1240	70
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	0	40	570	100	770	80	1830	360	80	1240	70
RTOR Reduction (vph)	0	10	27	0	0	367	0	0	232	0	0	41
Lane Group Flow (vph)	20	21	2	326	344	403	80	1830	128	80	1240	29
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split		Perm	Split		pm+ov	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8	1	5	2		1		6
Permitted Phases			4			8			2			6
Actuated Green, G (s)	3.9	3.9	3.9	15.8	15.8	24.5	4.2	23.4	23.4	8.7	27.9	27.9
Effective Green, g (s)	5.4	5.4	5.4	17.3	17.3	27.5	5.7	24.9	24.9	10.2	29.4	29.4
Actuated g/C Ratio	0.08	0.08	0.08	0.25	0.25	0.39	0.08	0.36	0.36	0.15	0.42	0.42
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	133	123	119	425	432	1609	286	2332	576	264	3241	680
v/s Ratio Prot	0.01	c0.02		0.19	c0.20	c0.07	0.02	c0.28		0.04	0.16	
v/s Ratio Perm			0.02			0.14			0.22			0.04
v/c Ratio	0.15	0.17	0.02	0.77	0.80	0.25	0.28	0.78	0.22	0.30	0.38	0.04
Uniform Delay, d1	30.1	30.1	29.8	24.4	24.6	14.2	30.1	20.1	15.7	26.6	13.9	11.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.7	0.1	8.1	9.8	0.1	0.5	1.8	0.2	0.7	0.1	0.0
Delay (s)	30.6	30.8	29.8	32.5	34.4	14.3	30.7	21.9	15.9	27.3	14.0	11.9
Level of Service	C	C	C	C	C	B	C	C	B	C	B	B
Approach Delay (s)		30.4			23.2			21.2			14.7	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	40	0	40	570	100	770	80	1830	360	80	1240	70
Lane Group Flow (vph)	20	31	29	326	344	770	80	1830	360	80	1240	70
v/c Ratio	0.10	0.16	0.14	0.72	0.75	0.38	0.19	0.81	0.45	0.29	0.36	0.09
Control Delay	30.0	23.4	13.0	30.7	31.6	3.3	29.7	26.1	4.8	29.5	15.8	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.1	0.0	0.0	0.0
Total Delay	30.0	23.4	13.0	30.7	31.6	3.3	30.4	26.1	4.8	29.5	15.8	5.7
Queue Length 50th (ft)	8	8	0	137	146	17	17	229	0	32	107	0
Queue Length 95th (ft)	29	35	23	#266	#285	44	36	#332	59	72	145	27
Internal Link Dist (ft)		848			626			513			252	
Turn Bay Length (ft)	200		200	500		270	150		360	220		180
Base Capacity (vph)	281	269	276	508	517	1998	576	2253	793	327	3443	761
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	297	0	26	0	0	0
Reduced v/c Ratio	0.07	0.12	0.11	0.64	0.67	0.39	0.29	0.81	0.47	0.24	0.36	0.09

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 2: EB Off/On-Ramp & Grand

2017 AM Alt 3
 9/8/2011



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗		↑↑↑	↑↑↑↗	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	1.00		0.86	0.81	0.81
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3502	1615		6536	6156	1308
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3502	1615		6536	6156	1308
Volume (vph)	770	260	0	1880	1140	390
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	837	283	0	2043	1239	424
RTOR Reduction (vph)	0	30	0	0	0	0
Lane Group Flow (vph)	837	253	0	2043	1239	424
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Free		
Protected Phases	4			2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	19.6	19.6		28.7	28.7	57.3
Effective Green, g (s)	21.1	21.1		30.2	30.2	57.3
Actuated g/C Ratio	0.37	0.37		0.53	0.53	1.00
Clearance Time (s)	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1290	595		3445	3245	1308
v/s Ratio Prot	c0.24			c0.31	0.20	
v/s Ratio Perm		0.18				0.32
v/c Ratio	0.65	0.43		0.59	0.38	0.32
Uniform Delay, d1	15.0	13.6		9.3	8.0	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	0.5		0.3	0.1	0.7
Delay (s)	16.2	14.1		9.6	8.1	0.7
Level of Service	B	B		A	A	A
Approach Delay (s)	15.6			9.6	6.2	
Approach LOS	B			A	A	

Intersection Summary

HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	57.3	Sum of lost time (s)	6.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Adj. Flow (vph)	837	283	0	2043	1239	424
Lane Group Flow (vph)	837	283	0	2043	1239	424
v/c Ratio	0.65	0.46		0.60	0.38	0.32
Control Delay	17.6	14.3		10.6	8.9	0.7
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	17.6	14.3		10.6	8.9	0.7
Queue Length 50th (ft)	131	64		142	78	0
Queue Length 95th (ft)	201	133		195	113	0
Internal Link Dist (ft)	855			683	303	
Turn Bay Length (ft)	675					320
Base Capacity (vph)	1513	724		3783	3563	1308
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.55	0.39		0.54	0.35	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 3: Golden Springs & Grand

2017 AM Alt 3

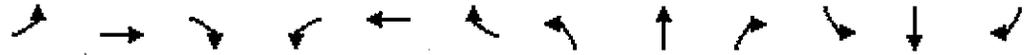
9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↗↗	↗↗	↖↖	↗↗	↗	↖↖	↗↗↗		↖↖	↗↗↗	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Frt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	3433	3912	1750	3794	5592		3433	5085	1583
Frt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	3433	3912	1750	3794	5592		3433	5085	1583
Volume (vph)	210	180	160	140	730	270	540	1400	50	200	670	530
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	196	174	152	793	293	587	1522	54	217	728	576
RTOR Reduction (vph)	0	0	92	0	0	34	0	5	0	0	0	393
Lane Group Flow (vph)	228	196	82	152	793	259	587	1571	0	217	728	183
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		Over
Protected Phases	7	4	5	3	8	1	5	2		1	6	7
Permitted Phases			4			8						
Actuated Green, G (s)	11.0	18.9	34.3	8.6	16.5	26.0	15.4	24.4		9.5	18.5	11.0
Effective Green, g (s)	12.5	20.4	37.3	10.1	18.0	29.0	16.9	25.9		11.0	20.0	12.5
Actuated g/C Ratio	0.16	0.26	0.47	0.13	0.23	0.37	0.21	0.33		0.14	0.25	0.16
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	540	909	1415	437	887	705	808	1824		476	1281	249
v/s Ratio Prot	0.07	0.06	0.03	0.04	c0.20	0.06	c0.15	c0.28		0.06	0.14	c0.36
v/s Ratio Perm			0.04			0.11						
v/c Ratio	0.42	0.22	0.06	0.35	0.89	0.37	0.73	0.86		0.46	0.57	0.74
Uniform Delay, d1	30.2	23.2	11.5	31.6	29.8	18.5	29.1	25.1		31.4	25.9	31.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.1	0.0	0.5	11.4	0.3	3.3	4.4		0.7	0.6	10.8
Delay (s)	30.7	23.3	11.5	32.1	41.2	18.8	32.4	29.5		32.1	26.5	42.7
Level of Service	C	C	B	C	D	B	C	C		C	C	D
Approach Delay (s)		22.7			34.8			30.3			33.4	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	79.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	228	196	174	152	793	293	587	1522	54	217	728	576
Lane Group Flow (vph)	228	196	174	152	793	293	587	1576	0	217	728	576
v/c Ratio	0.42	0.22	0.12	0.35	0.89	0.40	0.73	0.86		0.46	0.57	0.90
Control Delay	33.1	25.0	2.2	33.5	44.8	15.9	34.1	29.5		34.5	27.9	25.6
Queue Delay	0.0	0.0	0.0	51.4	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	33.1	25.0	2.2	84.9	44.8	15.9	34.1	29.5		34.5	27.9	25.6
Queue Length 50th (ft)	53	40	0	36	203	79	138	271		51	118	50
Queue Length 95th (ft)	90	72	17	64	#325	150	202	331		87	156	#250
Internal Link Dist (ft)		746			505			458			683	
Turn Bay Length (ft)	400		250	145		135	380			380		
Base Capacity (vph)	559	908	1478	507	888	711	849	1927		513	1375	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	361	0	0	0	0		0	0	0
Reduced v/c Ratio	0.41	0.22	0.12	1.04	0.89	0.41	0.69	0.82		0.42	0.53	0.89

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: WB-Off Ramp & Grand

2017 PM Alt 3
 9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↔	↗	↖	↖	↖↖↖	↖↖	↑↑↑	↗	↖	↑↑↑↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	0.95	0.95	0.95	0.76	0.97	0.86	1.00	1.00	0.81	1.00
Frt	1.00	0.89	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1715	1515	1534	1715	1734	3682	3502	6536	1615	1805	7695	1615
Flt Permitted	0.95	0.99	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1715	1515	1534	1715	1734	3682	3502	6536	1615	1805	7695	1615
Volume (vph)	110	0	190	300	30	500	140	1100	410	130	2350	110
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	0	190	300	30	500	140	1100	410	130	2350	110
RTOR Reduction (vph)	0	71	97	0	0	226	0	0	248	0	0	60
Lane Group Flow (vph)	84	35	13	161	169	274	140	1100	162	130	2350	50
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split		Perm	Split		pm+ov	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	6.4	6.4	6.4	8.5	8.5	18.5	6.1	25.6	25.6	10.0	29.5	29.5
Effective Green, g (s)	7.9	7.9	7.9	10.0	10.0	21.5	7.6	27.1	27.1	11.5	31.0	31.0
Actuated g/C Ratio	0.12	0.12	0.12	0.15	0.15	0.31	0.11	0.40	0.40	0.17	0.45	0.45
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	198	175	177	250	253	1317	389	2586	639	303	3482	731
v/s Ratio Prot	0.05	0.07		0.09	c0.10	0.06	0.04	0.17		0.07	c0.31	
v/s Ratio Perm			0.07			0.07			0.25			0.07
v/c Ratio	0.42	0.20	0.07	0.64	0.67	0.21	0.36	0.43	0.25	0.43	0.67	0.07
Uniform Delay, d1	28.2	27.4	27.0	27.6	27.7	17.3	28.2	15.0	13.9	25.6	14.8	10.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.6	0.2	5.6	6.5	0.1	0.6	0.1	0.2	1.0	0.5	0.0
Delay (s)	29.6	28.0	27.2	33.2	34.2	17.3	28.8	15.2	14.1	26.5	15.3	10.6
Level of Service	C	C	C	C	C	B	C	B	B	C	B	B
Approach Delay (s)		28.2			23.8			16.1			15.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	68.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	110	0	190	300	30	500	140	1100	410	130	2350	110
Lane Group Flow (vph)	84	106	110	161	169	500	140	1100	410	130	2350	110
v/c Ratio	0.31	0.35	0.33	0.50	0.52	0.33	0.26	0.44	0.47	0.40	0.60	0.13
Control Delay	32.4	14.4	9.2	32.2	32.4	6.4	31.0	17.4	3.8	33.2	19.2	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	14.4	9.2	32.2	32.4	6.4	31.0	17.4	3.8	33.2	19.2	4.4
Queue Length 50th (ft)	37	12	0	71	75	21	30	113	0	56	234	0
Queue Length 95th (ft)	84	60	45	138	144	50	58	150	56	114	302	31
Internal Link Dist (ft)		848			631			513			253	
Turn Bay Length (ft)	200		200	500		270	150		360	220		180
Base Capacity (vph)	322	349	377	392	397	1601	654	2867	939	381	3888	871
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	8	0	0	57
Reduced v/c Ratio	0.26	0.30	0.29	0.41	0.43	0.31	0.21	0.38	0.44	0.34	0.60	0.14

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 2: EB Off/On-Ramp & Grand

2017 PM Alt 3
 9/8/2011



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	1.00		0.86	0.81	0.81
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3502	1615		6536	6156	1308
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3502	1615		6536	6156	1308
Volume (vph)	420	150	0	1840	1540	560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	457	163	0	2000	1674	609
RTOR Reduction (vph)	0	12	0	0	0	0
Lane Group Flow (vph)	457	151	0	2000	1674	609
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type		Perm				Free
Protected Phases	4			2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	11.4	11.4		23.6	23.6	44.0
Effective Green, g (s)	12.9	12.9		25.1	25.1	44.0
Actuated g/C Ratio	0.29	0.29		0.57	0.57	1.00
Clearance Time (s)	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1027	473		3728	3512	1308
v/s Ratio Prot	0.13			0.31	0.27	
v/s Ratio Perm		0.10				0.47
v/c Ratio	0.44	0.32		0.54	0.48	0.47
Uniform Delay, d1	12.6	12.1		5.8	5.6	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	0.4		0.1	0.1	1.2
Delay (s)	12.9	12.5		6.0	5.7	1.2
Level of Service	B	B		A	A	A
Approach Delay (s)	12.8			6.0	4.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	3.0
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Adj. Flow (vph)	457	163	0	2000	1674	609
Lane Group Flow (vph)	457	163	0	2000	1674	609
v/c Ratio	0.45	0.34		0.54	0.48	0.47
Control Delay	14.2	13.4		6.8	6.4	1.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	14.2	13.4		6.8	6.4	1.2
Queue Length 50th (ft)	51	30		72	62	0
Queue Length 95th (ft)	89	72		136	117	0
Internal Link Dist (ft)	855			683	303	
Turn Bay Length (ft)	675					320
Base Capacity (vph)	1340	629		4012	3779	1308
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.34	0.26		0.50	0.44	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
 3: Golden Springs & Grand

2017 PM Alt 3
 9/8/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑	↗↗	↖↖	↑↑	↗	↖↖	↑↑↗		↖↖	↑↑↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91		0.97	0.91	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	3433	3912	1750	3794	5537		3433	5085	1583
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	3433	3912	1750	3794	5537		3433	5085	1583
Volume (vph)	780	870	670	110	480	240	310	820	90	390	1030	270
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	848	946	728	120	522	261	337	891	98	424	1120	293
RTOR Reduction (vph)	0	0	102	0	0	7	0	15	0	0	0	15
Lane Group Flow (vph)	848	946	626	120	522	254	337	974	0	424	1120	278
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	7	4	5	3	8	1	5	2		1	6	7
Permitted Phases			4			8						6
Actuated Green, G (s)	23.0	32.0	42.4	7.0	16.0	28.3	10.4	19.6		12.3	21.5	44.5
Effective Green, g (s)	24.5	33.5	45.4	8.5	17.5	31.3	11.9	21.1		13.8	23.0	47.5
Actuated g/C Ratio	0.28	0.38	0.51	0.10	0.20	0.35	0.13	0.24		0.16	0.26	0.53
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	946	1334	1517	328	770	675	508	1314		533	1316	899
v/s Ratio Prot	c0.25	c0.27	0.06	0.03	0.13	0.06	0.09	0.18		c0.12	c0.22	0.09
v/s Ratio Perm			0.20			0.09						0.10
v/c Ratio	0.90	0.71	0.41	0.37	0.68	0.38	0.66	0.74		0.80	0.85	0.31
Uniform Delay, d ₁	31.0	23.6	13.5	37.7	33.1	21.5	36.6	31.4		36.2	31.3	11.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d ₂	11.0	1.8	0.2	0.7	2.4	0.4	3.3	2.3		8.0	5.5	0.2
Delay (s)	42.0	25.3	13.7	38.4	35.5	21.9	39.9	33.7		44.2	36.8	11.7
Level of Service	D	C	B	D	D	C	D	C		D	D	B
Approach Delay (s)		27.5			31.9			35.2			34.5	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	31.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	88.9	Sum of lost time (s)	6.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	848	946	728	120	522	261	337	891	98	424	1120	293
Lane Group Flow (vph)	848	946	728	120	522	261	337	989	0	424	1120	293
v/c Ratio	0.89	0.70	0.45	0.32	0.71	0.39	0.65	0.74		0.79	0.84	0.32
Control Delay	42.2	27.7	9.9	38.0	38.6	21.3	43.1	34.0		47.2	37.4	9.9
Queue Delay	0.0	0.0	0.0	24.8	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	42.2	27.7	9.9	62.8	38.6	21.3	43.1	34.0		47.2	37.4	9.9
Queue Length 50th (ft)	237	243	94	32	146	101	95	187		121	220	71
Queue Length 95th (ft)	#344	328	150	58	201	165	139	235		#189	274	119
Internal Link Dist (ft)		746			505			458			683	
Turn Bay Length (ft)	400		250	145		135	380			380		
Base Capacity (vph)	972	1347	1610	447	771	660	518	1365		546	1352	926
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	315	0	0	0	0		0	0	0
Reduced v/c Ratio	0.87	0.70	0.45	0.91	0.68	0.40	0.65	0.72		0.78	0.83	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 3: Grand Crossing & Grand

2037 Alt 1 AM
 8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↕	↗	↖	↕	↗		↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00		0.91	
Fr _t	1.00	0.85		1.00	0.93	0.85	1.00	1.00	0.85		0.98	
Fl _t Protected	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1805	1615		1715	1604	1534	1805	3610	1615		5098	
Fl _t Permitted	0.95	1.00		0.95	0.99	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1805	1615		1715	1604	1534	1805	3610	1615		5098	
Volume (vph)	100	0	90	610	250	770	200	2500	390	0	1480	190
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	0	90	610	250	770	200	2500	390	0	1480	190
RTOR Reduction (vph)	0	83	0	0	19	19	0	0	78	0	11	0
Lane Group Flow (vph)	100	7	0	540	557	495	200	2500	312	0	1659	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split			Split		Perm	Prot		Perm			
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8			2			
Actuated Green, G (s)	10.2	10.2		40.5	40.5	40.5	17.9	85.5	85.5		63.1	
Effective Green, g (s)	11.7	11.7		42.0	42.0	42.0	19.4	87.0	87.0		64.6	
Actuated g/C Ratio	0.08	0.08		0.28	0.28	0.28	0.13	0.58	0.58		0.43	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	141	126		481	450	430	234	2098	939		2200	
v/s Ratio Prot	c0.06	0.00		0.31	c0.35		0.11	c0.69			0.33	
v/s Ratio Perm						0.32			0.19			
v/c Ratio	0.71	0.06		1.12	1.24	1.15	0.85	1.19	0.33		0.75	
Uniform Delay, d ₁	67.3	63.9		53.8	53.8	53.8	63.8	31.4	16.3		35.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d ₂	15.1	0.2		79.1	124.5	91.3	24.9	91.3	0.2		1.5	
Delay (s)	82.4	64.1		132.9	178.3	145.2	88.7	122.6	16.5		37.4	
Level of Service	F	E		F	F	F	F	F	B		D	
Approach Delay (s)		73.7			152.8			107.0			37.4	
Approach LOS		E			F			F			D	

Intersection Summary

HCM Average Control Delay	99.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	149.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	116.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	100	0	90	610	250	770	200	2500	390	0	1480	190
Lane Group Flow (vph)	100	90	0	540	576	514	200	2500	390	0	1670	0
v/c Ratio	0.71	0.30		1.12	1.23	1.14	0.85	1.19	0.38		0.76	
Control Delay	93.9	2.5		127.2	162.8	132.6	94.0	121.2	9.4		38.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	27.1	0.0		0.0	
Total Delay	93.9	2.5		127.2	162.8	132.6	94.0	148.4	9.4		38.3	
Queue Length 50th (ft)	97	0		~640	~742	~598	194	~1551	96		499	
Queue Length 95th (ft)	#184	0		#884	#1005	#843	#330	#1672	165		558	
Internal Link Dist (ft)		848			1418			415			396	
Turn Bay Length (ft)	125			330			150					
Base Capacity (vph)	144	305		481	469	450	241	2099	1017		2211	
Starvation Cap Reductn	0	0		0	0	0	0	102	0		0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0		0	
Storage Cap Reductn	0	0		0	0	0	0	0	0		0	
Reduced v/c Ratio	0.69	0.30		1.12	1.23	1.14	0.83	1.25	0.38		0.76	

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
2: EB Off-Ramp & Grand

2037 Alt 1 AM
8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙↘		↘					↑↑	↘	↙↘	↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0					3.0	3.0	3.0	3.0	
Lane Util. Factor	0.97		1.00					0.95	1.00	0.97	0.95	
Frt	1.00		0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	3502		1615					3610	1615	3502	3610	
Flt Permitted	0.95		1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	3502		1615					3610	1615	3502	3610	
Volume (vph)	980	0	280	0	0	0	0	2110	390	390	1390	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1065	0	304	0	0	0	0	2293	424	424	1511	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	179	0	0	0
Lane Group Flow (vph)	1065	0	304	0	0	0	0	2293	245	424	1511	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot		Free						Perm	Prot		
Protected Phases	4							2		1	6	
Permitted Phases			Free						2			
Actuated Green, G (s)	30.5		120.0					60.5	60.5	15.5	80.5	
Effective Green, g (s)	32.0		120.0					62.0	62.0	17.0	82.0	
Actuated g/C Ratio	0.27		1.00					0.52	0.52	0.14	0.68	
Clearance Time (s)	4.5							4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0							3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	934		1615					1865	834	496	2467	
v/s Ratio Prot	c0.30							c0.64		c0.12	0.42	
v/s Ratio Perm			0.19						0.15			
v/c Ratio	1.14		0.19					1.23	0.29	0.85	0.61	
Uniform Delay, d1	44.0		0.0					29.0	16.5	50.3	10.3	
Progression Factor	1.00		1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	76.1		0.3					108.2	0.2	13.5	0.5	
Delay (s)	120.1		0.3					137.2	16.7	63.8	10.8	
Level of Service	F		A					F	B	E	B	
Approach Delay (s)		93.5			0.0			118.4			22.4	
Approach LOS		F			A			F			C	

Intersection Summary

HCM Average Control Delay	81.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	107.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



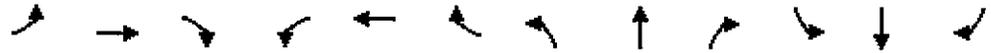
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	1065	0	304	0	0	0	0	2293	424	424	1511	0
Lane Group Flow (vph)	1065	0	304	0	0	0	0	2293	424	424	1511	0
v/c Ratio	1.14		0.19					1.23	0.42	0.85	0.61	
Control Delay	116.5		0.3					136.5	4.0	67.6	11.7	
Queue Delay	123.9		0.0					58.8	0.0	0.0	0.0	
Total Delay	240.3		0.3					195.3	4.0	67.6	11.7	
Queue Length 50th (ft)	~496		0					~1154	20	167	304	
Queue Length 95th (ft)	#628		0					#1288	74	#250	365	
Internal Link Dist (ft)		895			1197			1061			427	
Turn Bay Length (ft)	360								400	210		
Base Capacity (vph)	934		1615					1865	1014	496	2467	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	184		0					180	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	1.42		0.19					1.36	0.42	0.85	0.61	

Intersection Summary

- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Golden Springs & Grand

2037 Alt 1 AM
 8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖↗	↖	↕↗		↖↗	↕↗		↖↗	↕	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	1.00	0.95		0.97	0.95		0.97	0.95	1.00
Fr _t	1.00	1.00	0.85	1.00	0.95		1.00	1.00		1.00	1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	1770	3733		3794	3895		3433	3539	1583
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	1770	3733		3794	3895		3433	3539	1583
Volume (vph)	380	370	260	180	940	410	580	1710	50	280	850	540
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	413	402	283	196	1022	446	630	1859	54	304	924	587
RTOR Reduction (vph)	0	0	200	0	33	0	0	1	0	0	0	157
Lane Group Flow (vph)	413	402	83	196	1435	0	630	1912	0	304	924	430
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	15.5	42.4	42.4	20.6	47.5		24.5	57.5		11.5	44.5	44.5
Effective Green, g (s)	17.0	43.9	43.9	22.1	49.0		26.0	59.0		13.0	46.0	46.0
Actuated g/C Ratio	0.11	0.29	0.29	0.15	0.33		0.17	0.39		0.09	0.31	0.31
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	389	1036	816	261	1219		658	1532		298	1085	485
v/s Ratio Prot	c0.12	0.11		c0.11	c0.38		0.17	c0.49		c0.09	0.26	
v/s Ratio Perm			0.03									0.27
v/c Ratio	1.06	0.39	0.10	0.75	1.18		0.96	1.25		1.02	0.85	0.89
Uniform Delay, d ₁	66.5	42.3	38.7	61.3	50.5		61.5	45.5		68.5	48.8	49.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d ₂	62.9	0.2	0.1	11.5	88.6		24.7	117.2		57.4	6.6	17.5
Delay (s)	129.4	42.6	38.7	72.8	139.1		86.2	162.7		125.9	55.4	67.1
Level of Service	F	D	D	E	F		F	F		F	E	E
Approach Delay (s)		74.2			131.3			143.7			71.0	
Approach LOS		E			F			F			E	

Intersection Summary

HCM Average Control Delay	111.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	111.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	413	402	283	196	1022	446	630	1859	54	304	924	587
Lane Group Flow (vph)	413	402	283	196	1468	0	630	1913	0	304	924	587
v/c Ratio	1.06	0.39	0.28	0.75	1.17		0.96	1.25		1.02	0.85	0.91
Control Delay	124.4	44.6	5.1	78.6	129.2		87.0	155.6		123.2	57.6	50.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	124.4	44.6	5.1	78.6	129.2		87.0	155.6		123.2	57.6	50.4
Queue Length 50th (ft)	~228	166	0	186	~883		319	~1228		~162	447	376
Queue Length 95th (ft)	#339	227	40	268	#1025		#439	#1364		#263	536	#615
Internal Link Dist (ft)		810			954			529			1061	
Turn Bay Length (ft)	425		300	270			400			210		
Base Capacity (vph)	389	1035	1015	309	1252		658	1534		298	1085	642
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.06	0.39	0.28	0.63	1.17		0.96	1.25		1.02	0.85	0.91

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 3: Grand Crossing & Grand

2037 Alt 1 PM
 8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↕	↗	↖	↕	↗		↕	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Util. Factor	1.00	1.00		0.95	0.91	0.95	1.00	0.95	1.00		0.91	
Flt	1.00	0.85		1.00	0.89	0.85	1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (prot)	1805	1615		1715	1541	1534	1805	3610	1615		5118	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00		1.00	
Satd. Flow (perm)	1805	1615		1715	1541	1534	1805	3610	1615		5118	
Volume (vph)	300	0	500	310	90	600	350	1420	550	0	3310	320
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	300	0	500	310	90	600	350	1420	550	0	3310	320
RTOR Reduction (vph)	0	179	0	0	53	53	0	0	180	0	7	0
Lane Group Flow (vph)	300	321	0	293	317	284	350	1420	370	0	3623	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split			Split		Perm	Prot		Perm			
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8			2			
Actuated Green, G (s)	17.5	17.5		19.5	19.5	19.5	20.5	99.5	99.5		74.5	
Effective Green, g (s)	19.0	19.0		21.0	21.0	21.0	22.0	101.0	101.0		76.0	
Actuated g/C Ratio	0.13	0.13		0.14	0.14	0.14	0.15	0.67	0.67		0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5		4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	229	205		240	216	215	265	2431	1087		2593	
v/s Ratio Prot	0.17	c0.20		0.17	c0.21		c0.19	0.39			c0.71	
v/s Ratio Perm						0.18			0.23			
v/c Ratio	1.31	1.57		1.22	1.47	1.32	1.32	0.58	0.34		1.40	
Uniform Delay, d1	65.5	65.5		64.5	64.5	64.5	64.0	13.2	10.4		37.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	167.2	276.9		130.9	233.3	172.6	168.3	0.4	0.2		181.1	
Delay (s)	232.7	342.4		195.4	297.8	237.1	232.3	13.6	10.6		218.1	
Level of Service	F	F		F	F	F	F	B	B		F	
Approach Delay (s)		301.3			247.3			45.9			218.1	
Approach LOS		F			F			D			F	

Intersection Summary

HCM Average Control Delay	178.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	151.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	300	0	500	310	90	600	350	1420	550	0	3310	320
Lane Group Flow (vph)	300	500	0	293	370	337	350	1420	550	0	3630	0
v/c Ratio	1.31	1.30		1.22	1.38	1.26	1.32	0.58	0.43		1.40	
Control Delay	216.0	182.4		182.6	228.7	183.4	215.9	14.4	1.8		211.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Delay	216.0	182.4		182.6	228.7	183.4	215.9	14.4	1.8		211.3	
Queue Length 50th (ft)	~377	~442		~369	~467	~376	~442	368	0		~1738	
Queue Length 95th (ft)	#571	#672		#572	#700	#593	#646	427	37		#1793	
Internal Link Dist (ft)		848			1418			415			396	
Turn Bay Length (ft)	125			330			150					
Base Capacity (vph)	229	384		240	269	268	265	2431	1267		2602	
Starvation Cap Reductn	0	0		0	0	0	0	0	0		0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0		0	
Storage Cap Reductn	0	0		0	0	0	0	0	0		0	
Reduced v/c Ratio	1.31	1.30		1.22	1.38	1.26	1.32	0.58	0.43		1.40	

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 2: EB Off-Ramp & Grand

2037 Alt 1 PM
 8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗		↗					↖↗	↗	↖↗		↖↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0						3.0		3.0	
Lane Util. Factor	0.97		1.00						0.95		0.97	
Frt	1.00		0.85						1.00		0.85	
Flt Protected	0.95		1.00						1.00		0.95	
Satd. Flow (prot)	3502		1615						3610		1615	
Flt Permitted	0.95		1.00						1.00		0.95	
Satd. Flow (perm)	3502		1615						3610		1615	
Volume (vph)	500	0	140	0	0	0	0	1820	540	1110	1520	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	543	0	152	0	0	0	0	1978	587	1207	1652	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	258	0	0	0
Lane Group Flow (vph)	543	0	152	0	0	0	0	1978	329	1207	1652	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot		Free						Perm		Prot	
Protected Phases	4						2		1		6	
Permitted Phases			Free						2			
Actuated Green, G (s)	21.7		118.2						51.5		87.5	
Effective Green, g (s)	23.2		118.2						53.0		89.0	
Actuated g/C Ratio	0.20		1.00						0.45		0.75	
Clearance Time (s)	4.5								4.5		4.5	
Vehicle Extension (s)	3.0								3.0		3.0	
Lane Grp Cap (vph)	687		1615						1619		2718	
v/s Ratio Prot	c0.16								c0.55		c0.34	
v/s Ratio Perm			0.09						0.20			
v/c Ratio	0.79		0.09						1.22		0.61	
Uniform Delay, d1	45.2		0.0						32.6		6.7	
Progression Factor	1.00		1.00						1.00		1.00	
Incremental Delay, d2	6.2		0.1						105.6		0.4	
Delay (s)	51.4		0.1						138.2		7.0	
Level of Service	D		A						F		A	
Approach Delay (s)			40.2		0.0				111.8		70.3	
Approach LOS			D		A				F		E	

Intersection Summary

HCM Average Control Delay	84.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	118.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	106.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	543	0	152	0	0	0	0	1978	587	1207	1652	0
Lane Group Flow (vph)	543	0	152	0	0	0	0	1978	587	1207	1652	0
v/c Ratio	0.79		0.09					1.22	0.60	1.23	0.61	
Control Delay	54.3		0.1					136.6	7.8	151.6	8.0	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	54.3		0.1					136.6	7.8	151.6	8.0	
Queue Length 50th (ft)	204		0					~1001	55	~602	278	
Queue Length 95th (ft)	268		0					#1140	164	#736	334	
Internal Link Dist (ft)		895			1197			1061				427
Turn Bay Length (ft)	360								400	210		
Base Capacity (vph)	730		1615					1618	982	978	2718	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.74		0.09					1.22	0.60	1.23	0.61	

Intersection Summary

- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Golden Springs & Grand

2037 Alt 1 PM
 8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↕	↖↗	↖	↕	↖↗	↖↗	↕	↖↗	↖↗	↕	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	1.00	0.95		0.97	0.95		0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	1770	3725		3794	3849		3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	1770	3725		3794	3849		3433	3539	1583
Volume (vph)	840	1030	720	160	770	360	420	1160	140	400	1020	240
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	913	1120	783	174	837	391	457	1261	152	435	1109	261
RTOR Reduction (vph)	0	0	274	0	41	0	0	7	0	0	0	131
Lane Group Flow (vph)	913	1120	509	174	1187	0	457	1406	0	435	1109	130
Turn Type	Prot		Perm	Prot			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Actuated Green, G (s)	26.5	49.5	49.5	13.5	36.5		13.5	40.5		13.5	40.5	40.5
Effective Green, g (s)	28.0	51.0	51.0	15.0	38.0		15.0	42.0		15.0	42.0	42.0
Actuated g/C Ratio	0.21	0.38	0.38	0.11	0.28		0.11	0.31		0.11	0.31	0.31
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	712	1337	1053	197	1049		422	1197		381	1101	492
v/s Ratio Prot	c0.27	0.32		0.10	c0.32		0.12	c0.37		c0.13	0.31	
v/s Ratio Perm			0.18									0.08
v/c Ratio	1.28	0.84	0.48	0.88	1.13		1.08	1.17		1.14	1.01	0.26
Uniform Delay, d1	53.5	38.2	32.0	59.1	48.5		60.0	46.5		60.0	46.5	34.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	137.6	4.7	0.4	33.9	71.4		67.9	87.7		90.6	28.9	0.3
Delay (s)	191.1	43.0	32.3	93.1	119.9		127.9	134.2		150.6	75.4	35.2
Level of Service	F	D	C	F	F		F	F		F	E	D
Approach Delay (s)		88.1			116.6			132.7			87.7	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	103.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.4%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	913	1120	783	174	837	391	457	1261	152	435	1109	261
Lane Group Flow (vph)	913	1120	783	174	1228	0	457	1413	0	435	1109	261
v/c Ratio	1.28	0.84	0.59	0.88	1.13		1.08	1.17		1.14	1.01	0.42
Control Delay	180.4	45.1	15.7	98.6	111.6		123.0	128.2		142.9	75.0	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	180.4	45.1	15.7	98.6	111.6		123.0	128.2		142.9	75.0	12.7
Queue Length 50th (ft)	~522	466	131	153	~636		~230	~776		~229	~519	45
Queue Length 95th (ft)	#654	560	203	#289	#777		#341	#918		#338	#673	121
Internal Link Dist (ft)		810			954			529			1061	
Turn Bay Length (ft)	425		300	270			400			210		
Base Capacity (vph)	712	1337	1327	197	1089		422	1204		381	1101	623
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	1.28	0.84	0.59	0.88	1.13		1.08	1.17		1.14	1.01	0.42

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Grand Crossing & Grand

2037 Alt 2 AM
 8/19/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↔	↗	↖	↔	↗	↖	↔	↗	↖	↔	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	0.95	0.95	0.95	0.76	0.97	0.86	1.00	1.00	0.81	1.00
Fr _t	1.00	0.96	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fl _t Protected	0.95	0.96	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1715	1601	1534	1715	1767	3682	3502	6536	1615	1805	7695	1615
Fl _t Permitted	0.95	0.96	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1715	1601	1534	1715	1767	3682	3502	6536	1615	1805	7695	1615
Volume (vph)	100	0	90	610	250	1150	200	2750	390	110	1835	190
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	0	90	610	250	1150	200	2750	390	110	1835	190
RTOR Reduction (vph)	0	14	67	0	0	118	0	0	224	0	0	112
Lane Group Flow (vph)	56	46	7	419	441	1032	200	2750	166	110	1835	78
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split		Perm	Split		pm+ov	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.0	7.0	7.0	23.6	23.6	31.9	9.7	39.7	39.7	8.3	38.3	38.3
Effective Green, g (s)	8.5	8.5	8.5	25.1	25.1	34.9	11.2	41.2	41.2	9.8	39.8	39.8
Actuated g/C Ratio	0.09	0.09	0.09	0.26	0.26	0.36	0.12	0.43	0.43	0.10	0.41	0.41
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	151	141	135	446	459	1445	406	2788	689	183	3170	665
v/s Ratio Prot	c0.03	0.03		0.24	c0.25	c0.07	0.06	c0.42		0.06	0.24	
v/s Ratio Perm			0.00			0.21			0.10			0.05
v/c Ratio	0.37	0.33	0.05	0.94	0.96	0.71	0.49	0.99	0.24	0.60	0.58	0.12
Uniform Delay, d1	41.5	41.4	40.3	35.0	35.3	26.6	40.0	27.4	17.7	41.5	21.9	17.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	1.4	0.1	27.6	32.0	1.7	0.9	13.9	0.2	5.5	0.3	0.1
Delay (s)	43.1	42.7	40.5	62.6	67.2	28.3	41.0	41.3	17.9	47.0	22.2	17.6
Level of Service	D	D	D	E	E	C	D	D	B	D	C	B
Approach Delay (s)		42.0			44.0			38.5			23.1	
Approach LOS		D			D			D			C	

Intersection Summary

HCM Average Control Delay	35.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	96.6	Sum of lost time (s)	6.0
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	100	0	90	610	250	1150	200	2750	390	110	1835	190
Lane Group Flow (vph)	56	60	74	419	441	1150	200	2750	390	110	1835	190
v/c Ratio	0.32	0.34	0.33	0.93	0.95	0.73	0.49	0.98	0.43	0.59	0.57	0.24
Control Delay	46.0	38.1	14.3	65.3	68.5	24.3	44.7	40.7	3.6	56.4	23.0	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	38.1	14.3	65.3	68.5	24.3	44.7	40.7	3.6	56.4	23.0	3.9
Queue Length 50th (ft)	34	28	0	272	288	226	60	~495	0	67	219	0
Queue Length 95th (ft)	75	71	43	#484	#508	303	98	#620	55	#137	260	42
Internal Link Dist (ft)		848			626			550			253	
Turn Bay Length (ft)	200		200	500		270	290		360	220		180
Base Capacity (vph)	206	205	249	450	464	1552	437	2812	917	189	3204	784
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.29	0.30	0.93	0.95	0.74	0.46	0.98	0.43	0.58	0.57	0.24

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 2: EB On-Ramp & Grand

2037 Alt 2 AM
 8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖↗		↖				↑↑↑		↖	↖↗		↑↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0		3.0					3.0		3.0		3.0	
Lane Util. Factor	0.97		1.00					0.81		0.97		0.86	
Frt	1.00		0.85					1.00		1.00		1.00	
Flt Protected	0.95		1.00					1.00		0.95		1.00	
Satd. Flow (prot)	3502		1615					6156		1308		3502	
Flt Permitted	0.95		1.00					1.00		1.00		0.95	
Satd. Flow (perm)	3502		1615					6156		1308		3502	
Volume (vph)	1260	0	280	0	0	0	0	2080	440	560	1555	0	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	1370	0	304	0	0	0	0	2261	478	609	1690	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	314	0	0	0	
Lane Group Flow (vph)	1370	0	304	0	0	0	0	2261	164	609	1690	0	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Turn Type	Prot		Free					Perm		Prot			
Protected Phases	4							2		1		6	
Permitted Phases			Free							2			
Actuated Green, G (s)	41.5		108.0					35.5		35.5		17.5	
Effective Green, g (s)	43.0		108.0					37.0		37.0		19.0	
Actuated g/C Ratio	0.40		1.00					0.34		0.34		0.18	
Clearance Time (s)	4.5							4.5		4.5		4.5	
Vehicle Extension (s)	3.0							3.0		3.0		3.0	
Lane Grp Cap (vph)	1394		1615					2109		448		616	
v/s Ratio Prot	c0.39							c0.37		c0.17		0.26	
v/s Ratio Perm			0.19							0.13			
v/c Ratio	0.98		0.19					1.07		0.37		0.99	
Uniform Delay, d1	32.1		0.0					35.5		26.7		44.4	
Progression Factor	1.00		1.00					1.00		1.00		1.00	
Incremental Delay, d2	20.0		0.3					42.2		0.5		33.0	
Delay (s)	52.1		0.3					77.7		27.2		77.4	
Level of Service	D		A					E		C		E	
Approach Delay (s)	42.7				0.0			68.9				31.6	
Approach LOS	D				A			E				C	

Intersection Summary

HCM Average Control Delay	49.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	108.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	94.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	1370	0	304	0	0	0	0	2261	478	609	1690	0
Lane Group Flow (vph)	1370	0	304	0	0	0	0	2261	478	609	1690	0
v/c Ratio	0.98		0.19					1.07	0.63	0.99	0.47	
Control Delay	53.1		0.3					77.0	6.6	78.7	15.5	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	53.1		0.3					77.0	6.6	78.7	15.5	
Queue Length 50th (ft)	475		0					~538	0	219	197	
Queue Length 95th (ft)	#635		0					#618	100	#336	227	
Internal Link Dist (ft)		895			561			981			480	
Turn Bay Length (ft)	775								360	540		
Base Capacity (vph)	1394		1615					2109	762	616	3571	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.98		0.19					1.07	0.63	0.99	0.47	

Intersection Summary

- Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 3: Golden Springs & Grand

2037 Alt 2 AM
 8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖↗	↖↗	↑↑	↖	↖↗	↑↑↔		↖↗	↑↑↑	↖
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91		0.97	0.91	1.00
Fr _t	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Fl _t Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	3433	3912	1750	3794	5598		3433	5085	1583
Fl _t Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	3433	3912	1750	3794	5598		3433	5085	1583
Volume (vph)	300	240	200	160	790	380	580	1840	50	280	1015	540
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	326	261	217	174	859	413	630	2000	54	304	1103	587
RTOR Reduction (vph)	0	0	33	0	0	2	0	3	0	0	0	144
Lane Group Flow (vph)	326	261	184	174	859	411	630	2051	0	304	1103	443
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	10.5	30.0	43.6	9.6	29.1	39.6	13.6	36.7		10.5	33.6	33.6
Effective Green, g (s)	12.0	31.5	46.6	11.1	30.6	42.6	15.1	38.2		12.0	35.1	35.1
Actuated g/C Ratio	0.11	0.30	0.44	0.11	0.29	0.41	0.14	0.36		0.11	0.33	0.33
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	393	1064	1319	364	1142	761	547	2040		393	1703	530
v/s Ratio Prot	c0.09	0.07	0.02	0.05	c0.22	0.06	c0.17	c0.37		0.09	0.22	
v/s Ratio Perm			0.05			0.17						0.28
v/c Ratio	0.83	0.25	0.14	0.48	0.75	0.54	1.15	1.01		0.77	0.65	0.84
Uniform Delay, d1	45.4	27.7	17.2	44.1	33.7	23.6	44.8	33.3		45.1	29.6	32.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.5	0.1	0.0	1.0	2.8	0.7	87.7	21.3		9.2	0.9	11.0
Delay (s)	58.9	27.8	17.3	45.1	36.5	24.4	132.6	54.6		54.2	30.5	43.2
Level of Service	E	C	B	D	D	C	F	D		D	C	D
Approach Delay (s)		37.6			34.1			72.9			37.8	
Approach LOS		D			C			E			D	

Intersection Summary

HCM Average Control Delay	50.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	104.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SEL	SBT	SBR
Adj. Flow (vph)	326	261	217	174	859	413	630	2000	54	304	1103	587
Lane Group Flow (vph)	326	261	217	174	859	413	630	2054	0	304	1103	587
v/c Ratio	0.83	0.25	0.16	0.48	0.75	0.54	1.16	1.01		0.77	0.65	0.87
Control Delay	64.6	28.0	11.4	49.9	38.1	24.3	130.6	55.8		60.2	32.6	36.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	64.6	28.0	11.4	49.9	38.1	24.3	130.6	55.8		60.2	32.6	36.5
Queue Length 50th (ft)	110	70	32	56	273	197	~254	~495		102	225	243
Queue Length 95th (ft)	#211	102	56	100	340	285	#422	#741		#191	319	#523
Internal Link Dist (ft)		810			954			583			981	
Turn Bay Length (ft)	400		250	145		135	380			380		
Base Capacity (vph)	395	1291	1349	391	1416	764	545	2040		395	1704	674
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.83	0.20	0.16	0.45	0.61	0.54	1.16	1.01		0.77	0.65	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Grand Crossing & Grand

2037 Alt 2 PM
 8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	↕	↗	↵	↕	↗↘↙	↗↘	↑↑↑	↗	↵	↑↑↑↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	0.95	0.95	0.95	0.76	0.97	0.86	1.00	1.00	0.81	1.00
Flt	1.00	0.91	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1715	1539	1534	1715	1754	3682	3502	6536	1615	1805	7695	1615
Flt Permitted	0.95	0.98	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1715	1539	1534	1715	1754	3682	3502	6536	1615	1805	7695	1615
Volume (vph)	300	0	500	360	100	790	350	1510	590	250	3760	320
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	300	0	500	360	100	790	350	1510	590	250	3760	320
RTOR Reduction (vph)	0	49	183	0	0	31	0	0	341	0	0	85
Lane Group Flow (vph)	204	203	161	224	236	759	350	1510	249	250	3760	235
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split		Perm	Split		pm+ov	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	15.5	15.5	15.5	15.5	15.5	37.1	14.8	48.8	48.8	21.6	55.6	55.6
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	40.1	16.3	50.3	50.3	23.1	57.1	57.1
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.34	0.14	0.42	0.42	0.19	0.48	0.48
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	244	219	218	244	250	1329	478	2753	680	349	3680	772
v/s Ratio Prot	0.12	c0.13		0.13	c0.13	0.11	0.10	0.23		c0.14	c0.49	
v/s Ratio Perm			0.11			0.10			0.15			0.15
v/c Ratio	0.84	0.93	0.74	0.92	0.94	0.57	0.73	0.55	0.37	0.72	1.02	0.31
Uniform Delay, d1	49.8	50.6	49.1	50.5	50.7	32.6	49.5	26.0	23.6	45.1	31.2	19.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.3	40.8	12.6	35.9	41.5	0.6	5.7	0.2	0.3	6.8	20.7	0.2
Delay (s)	71.1	91.3	61.7	86.4	92.2	33.2	55.2	26.2	24.0	51.9	51.8	19.3
Level of Service	E	F	E	F	F	C	E	C	C	D	D	B
Approach Delay (s)		73.4			53.9			29.8			49.4	
Approach LOS		E			D			C			D	

Intersection Summary

HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	119.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	300	0	500	360	100	790	350	1510	590	250	3760	320
Lane Group Flow (vph)	204	252	344	224	236	790	350	1510	590	250	3760	320
v/c Ratio	0.84	0.94	0.86	0.92	0.94	0.58	0.73	0.55	0.58	0.72	1.02	0.37
Control Delay	78.0	81.4	40.1	90.9	95.9	30.5	59.1	27.3	4.4	56.9	52.3	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.0	81.4	40.1	90.9	95.9	30.5	59.1	27.3	4.4	56.9	52.3	10.7
Queue Length 50th (ft)	164	169	107	183	193	197	135	257	0	180	~769	70
Queue Length 95th (ft)	#303	#351	#282	#342	#361	246	187	300	71	268	#817	137
Internal Link Dist (ft)		848			620			552			253	
Turn Bay Length (ft)	200		200	500		270	290		360	220		180
Base Capacity (vph)	244	268	401	244	250	1362	496	2753	1022	384	3675	856
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.94	0.86	0.92	0.94	0.58	0.71	0.55	0.58	0.65	1.02	0.37

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 2: EB On-Ramp & Grand

2037 Alt 2 PM
 8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔		↗					↑↑↑	↗	↔↔	↑↑↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0				3.0		3.0		3.0	
Lane Util. Factor	0.97		1.00				0.81		0.81		0.97	
Flt	1.00		0.85				0.99		0.85		1.00	
Flt Protected	0.95		1.00				1.00		1.00		0.95	
Satd. Flow (prot)	3502		1615				6070		1308		3502	
Flt Permitted	0.95		1.00				1.00		1.00		0.95	
Satd. Flow (perm)	3502		1615				6070		1308		3502	
Volume (vph)	770	0	220	0	0	0	0	1680	880	1170	2060	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	837	0	239	0	0	0	0	1826	957	1272	2239	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	13	326	0	0	0
Lane Group Flow (vph)	837	0	239	0	0	0	0	2001	443	1272	2239	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Prot		Free						Perm		Prot	
Protected Phases	4						2		1		6	
Permitted Phases			Free						2			
Actuated Green, G (s)	29.8		119.3				35.5		35.5		40.5	
Effective Green, g (s)	31.3		119.3				37.0		37.0		42.0	
Actuated g/C Ratio	0.26		1.00				0.31		0.31		0.35	
Clearance Time (s)	4.5						4.5		4.5		4.5	
Vehicle Extension (s)	3.0						3.0		3.0		3.0	
Lane Grp Cap (vph)	919		1615				1883		406		1233	
v/s Ratio Prot	c0.24						0.33		c0.36		0.34	
v/s Ratio Perm			0.15						c0.34			
v/c Ratio	0.91		0.15				1.06		1.09		1.03	
Uniform Delay, d1	42.6		0.0				41.2		41.2		38.6	
Progression Factor	1.00		1.00				1.00		1.00		1.00	
Incremental Delay, d2	12.9		0.2				39.7		71.2		34.1	
Delay (s)	55.6		0.2				80.8		112.4		72.8	
Level of Service	E		A				F		F		E	
Approach Delay (s)	43.3		0.0				89.6				32.1	
Approach LOS	D		A				F				C	

Intersection Summary

HCM Average Control Delay	55.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	119.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	101.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group



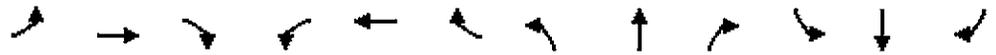
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	837	0	239	0	0	0	0	1826	957	1272	2239	0
Lane Group Flow (vph)	837	0	239	0	0	0	0	2014	769	1272	2239	0
v/c Ratio	0.91		0.15					1.06	1.05	1.03	0.50	
Control Delay	57.7		0.2					79.0	64.1	72.4	9.4	
Queue Delay	0.0		0.0					0.0	0.0	0.0	0.0	
Total Delay	57.7		0.2					79.0	64.1	72.4	9.4	
Queue Length 50th (ft)	322		0					~530	~467	~547	220	
Queue Length 95th (ft)	#432		0					#612	#767	#682	244	
Internal Link Dist (ft)		895			561			981			480	
Turn Bay Length (ft)	775								360	540		
Base Capacity (vph)	934		1615					1896	732	1233	4493	
Starvation Cap Reductn	0		0					0	0	0	0	
Spillback Cap Reductn	0		0					0	0	0	0	
Storage Cap Reductn	0		0					0	0	0	0	
Reduced v/c Ratio	0.90		0.15					1.06	1.05	1.03	0.50	

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 3: Golden Springs & Grand

2037 Alt 2 PM
 8/19/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↔↔	↔↔	↑↑	↔	↔↔	↑↑↔		↔↔	↑↑↑	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91		0.97	0.91	1.00
Flt Protected	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	3433	3912	1750	3794	5557		3433	5085	1583
Satd. Flow (perm)	3433	3539	2787	3433	3912	1750	3794	5557		3433	5085	1583
Volume (vph)	850	940	720	120	630	360	380	1350	110	570	1290	420
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	924	1022	783	130	685	391	413	1467	120	620	1402	457
RTOR Reduction (vph)	0	0	50	0	0	1	0	7	0	0	0	234
Lane Group Flow (vph)	924	1022	733	130	685	390	413	1580	0	620	1402	223
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		Perm
Protected Phases	7	4	5	3	8	1	5	2		1	6	
Permitted Phases			4			8						6
Actuated Green, G (s)	30.6	49.6	64.1	10.3	29.3	49.8	14.5	35.6		20.5	41.6	41.6
Effective Green, g (s)	32.1	51.1	67.1	11.8	30.8	52.8	16.0	37.1		22.0	43.1	43.1
Actuated g/C Ratio	0.24	0.38	0.50	0.09	0.23	0.39	0.12	0.28		0.16	0.32	0.32
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	822	1350	1458	302	899	729	453	1539		564	1636	509
v/s Ratio Prot	c0.27	c0.29	0.06	0.04	0.18	0.09	0.11	c0.28		c0.18	0.28	
v/s Ratio Perm			0.20			0.13						0.14
v/c Ratio	1.12	0.76	0.50	0.43	0.76	0.53	0.91	1.03		1.10	0.86	0.44
Uniform Delay, d1	51.0	36.1	22.3	57.9	48.2	31.2	58.3	48.4		56.0	42.6	35.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	71.4	2.5	0.3	1.0	3.9	0.8	22.4	30.1		67.9	4.7	0.6
Delay (s)	122.3	38.5	22.6	58.9	52.0	31.9	80.7	78.5		123.9	47.2	36.5
Level of Service	F	D	C	E	D	C	F	E		F	D	D
Approach Delay (s)		62.3			46.3			79.0			64.4	
Approach LOS		E			D			E			E	

Intersection Summary

HCM Average Control Delay	64.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	134.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	924	1022	783	130	685	391	413	1467	120	620	1402	457
Lane Group Flow (vph)	924	1022	783	130	685	391	413	1587	0	620	1402	457
v/c Ratio	1.13	0.76	0.52	0.43	0.76	0.53	0.91	1.03		1.10	0.86	0.62
Control Delay	118.0	40.5	19.4	63.1	53.9	32.0	83.4	77.5		118.7	49.4	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	118.0	40.5	19.4	63.1	53.9	32.0	83.4	77.5		118.7	49.4	13.8
Queue Length 50th (ft)	~476	404	213	56	294	250	185	~535		~313	417	73
Queue Length 95th (ft)	#680	502	286	94	362	347	#313	#721		#483	#558	211
Internal Link Dist (ft)		810			954			583			981	
Turn Bay Length (ft)	400		250	145		135	380			380		
Base Capacity (vph)	821	1472	1506	376	1133	731	454	1544		565	1634	743
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.13	0.69	0.52	0.35	0.60	0.53	0.91	1.03		1.10	0.86	0.62

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Grand Crossing & Grand

2037 AM Alt 3
 12/2/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	2000	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	0.95	0.95	0.95	0.76	0.97	0.86	1.00	1.00	0.81	1.00
Frt	1.00	0.98	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1715	1618	1534	1805	1768	3682	3502	6536	1615	1805	7695	1615
Flt Permitted	0.95	0.96	1.00	0.95	0.98	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1715	1618	1534	1805	1768	3682	3502	6536	1615	1805	7695	1615
Volume (vph)	100	0	90	610	250	1150	200	2750	390	110	1835	190
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	100	0	90	610	250	1150	200	2750	390	110	1835	190
RTOR Reduction (vph)	0	6	74	0	0	52	0	0	186	0	0	84
Lane Group Flow (vph)	50	54	6	430	430	1098	200	2750	204	110	1835	106
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split		Perm	Split		pm+ov	Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8	1	5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.8	8.8	8.8	35.7	35.7	46.2	11.7	60.7	60.7	10.5	59.5	59.5
Effective Green, g (s)	10.3	10.3	10.3	37.2	37.2	49.2	13.2	62.2	62.2	12.0	61.0	61.0
Actuated g/C Ratio	0.08	0.08	0.08	0.28	0.28	0.37	0.10	0.47	0.47	0.09	0.46	0.46
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	132	125	118	502	492	1438	346	3041	751	162	3511	737
v/s Ratio Prot	0.03	c0.03		0.24	c0.24	c0.07	0.06	c0.42		0.06	0.24	
v/s Ratio Perm			0.00			0.23			0.13			0.07
v/c Ratio	0.38	0.44	0.05	0.86	0.87	0.76	0.58	0.90	0.27	0.68	0.52	0.14
Uniform Delay, d1	58.7	58.9	57.2	45.7	46.0	37.1	57.6	33.0	21.9	59.0	26.0	21.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	2.4	0.2	13.5	15.7	2.5	2.3	4.3	0.2	10.8	0.1	0.1
Delay (s)	60.5	61.3	57.4	59.2	61.7	39.6	59.9	37.3	22.1	69.7	26.1	21.2
Level of Service	E	E	E	E	E	D	E	D	C	E	C	C
Approach Delay (s)		59.4			48.5			36.9			27.9	
Approach LOS		E			D			D			C	
Intersection Summary												
HCM Average Control Delay			38.0			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			133.7			Sum of lost time (s)			6.0			
Intersection Capacity Utilization			86.4%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

Queues
1: Grand Crossing & Grand

2037 AM Alt 3
12/2/2011



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	100	0	90	610	250	1150	200	2750	390	110	1835	190
Lane Group Flow (vph)	50	60	80	430	430	1150	200	2750	390	110	1835	190
v/c Ratio	0.38	0.46	0.42	0.86	0.88	0.77	0.58	0.90	0.42	0.68	0.52	0.23
Control Delay	68.7	66.4	19.1	63.0	65.5	37.0	65.8	39.2	5.2	81.9	27.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.7	66.4	19.1	63.0	65.5	37.0	65.8	39.2	5.2	81.9	27.6	6.8
Queue Length 50th (ft)	46	51	0	377	380	359	90	680	22	98	302	19
Queue Length 95th (ft)	92	106	55	#525	#552	433	133	743	90	#188	338	68
Internal Link Dist (ft)		848			623			547			251	
Turn Bay Length (ft)	200		200	500		270	150		360	220		180
Base Capacity (vph)	152	149	209	548	536	1470	372	3040	937	163	3511	820
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.40	0.38	0.78	0.80	0.78	0.54	0.90	0.42	0.67	0.52	0.23

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 2: EB Off/On-Ramp & Grand

2037 AM Alt 3
 8/31/2011



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↗		↑↑↑	↑↑↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	1.00		0.86	0.81	0.81
Frt	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3502	1615		6536	6156	1308
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3502	1615		6536	6156	1308
Volume (vph)	1260	280	0	2520	1555	560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1370	304	0	2739	1690	609
RTOR Reduction (vph)	0	4	0	0	0	0
Lane Group Flow (vph)	1370	300	0	2739	1690	609
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type	Perm			Free		
Protected Phases	4			2	6	
Permitted Phases	4				Free	
Actuated Green, G (s)	38.0	38.0		41.5	41.5	88.5
Effective Green, g (s)	39.5	39.5		43.0	43.0	88.5
Actuated g/C Ratio	0.45	0.45		0.49	0.49	1.00
Clearance Time (s)	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1563	721		3176	2991	1308
v/s Ratio Prot	c0.39			c0.42	0.27	
v/s Ratio Perm	0.19				0.47	
v/c Ratio	0.88	0.42		0.86	0.57	0.47
Uniform Delay, d1	22.3	16.7		20.1	16.1	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.9	0.4		2.6	0.2	1.2
Delay (s)	28.1	17.0		22.8	16.4	1.2
Level of Service	C	B		C	B	A
Approach Delay (s)	26.1			22.8	12.3	
Approach LOS	C			C	B	

Intersection Summary

HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	88.5	Sum of lost time (s)	6.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

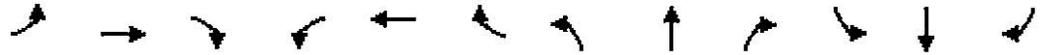


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Adj. Flow (vph)	1370	304	0	2739	1690	609
Lane Group Flow (vph)	1370	304	0	2739	1690	609
v/c Ratio	0.88	0.42		0.86	0.56	0.47
Control Delay	29.1	18.2		24.1	17.3	1.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	29.1	18.2		24.1	17.3	1.2
Queue Length 50th (ft)	346	108		390	204	0
Queue Length 95th (ft)	443	175		446	242	0
Internal Link Dist (ft)	855			640	421	
Turn Bay Length (ft)	675					320
Base Capacity (vph)	1595	740		3179	2994	1308
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.86	0.41		0.86	0.56	0.47

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Golden Springs & Grand

2037 AM Alt 3
8/31/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↔↔	↔↔	↑↑	↔	↔↔	↑↑↔		↔↔	↑↑↑	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	2100	2100	2100	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	0.95	0.88	0.97	0.95	1.00	0.97	0.91		0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	2787	3433	3912	1750	3794	5598		3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	2787	3433	3912	1750	3794	5598		3433	5085	1583
Volume (vph)	300	240	200	160	790	380	580	1840	50	280	1015	540
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	326	261	217	174	859	413	630	2000	54	304	1103	587
RTOR Reduction (vph)	0	0	24	0	0	2	0	2	0	0	0	417
Lane Group Flow (vph)	326	261	193	174	859	411	630	2052	0	304	1103	170
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot			Prot		Over
Protected Phases	7	4	5	3	8	1	5	2		1	6	7
Permitted Phases			4			8						
Actuated Green, G (s)	11.6	33.6	54.2	9.8	31.8	42.4	20.6	48.5		10.6	38.5	11.6
Effective Green, g (s)	13.1	35.1	57.2	11.3	33.3	45.4	22.1	50.0		12.1	40.0	13.1
Actuated g/C Ratio	0.11	0.29	0.47	0.09	0.28	0.38	0.18	0.41		0.10	0.33	0.11
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	373	1031	1392	322	1081	703	696	2323		345	1688	172
v/s Ratio Prot	0.09	0.07	0.03	0.05	c0.22	0.06	c0.17	c0.37		0.09	0.22	c0.37
v/s Ratio Perm			0.05			0.18						
v/c Ratio	0.87	0.25	0.14	0.54	0.79	0.58	0.91	0.88		0.88	0.65	0.99
Uniform Delay, d1	52.9	32.7	17.8	52.1	40.4	30.0	48.2	32.6		53.5	34.3	53.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	19.7	0.1	0.0	1.8	4.1	1.2	15.3	4.4		22.1	0.9	64.4
Delay (s)	72.6	32.8	17.8	54.0	44.5	31.3	63.4	36.9		75.6	35.3	118.0
Level of Service	E	C	B	D	D	C	E	D		E	D	F
Approach Delay (s)		44.9			41.9			43.1			65.8	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	49.6	HCM Level of Service	D
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	120.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	326	261	217	174	859	413	630	2000	54	304	1103	587
Lane Group Flow (vph)	326	261	217	174	859	413	630	2054	0	304	1103	587
v/c Ratio	0.88	0.25	0.15	0.54	0.79	0.59	0.91	0.88		0.88	0.65	1.00
Control Delay	78.1	33.3	13.2	59.2	43.4	31.9	66.8	37.9		81.4	37.0	48.8
Queue Delay	0.0	0.0	0.0	577.6	0.0	0.0	668.6	0.0		0.0	0.0	0.0
Total Delay	78.1	33.3	13.2	636.8	43.4	31.9	735.3	37.9		81.4	37.0	48.8
Queue Length 50th (ft)	133	83	40	68	332	252	255	535		124	268	~106
Queue Length 95th (ft)	#236	120	65	112	406	354	#397	667		#226	348	#372
Internal Link Dist (ft)		746			505			458			640	
Turn Bay Length (ft)	400		250	145		135	380			380		
Base Capacity (vph)	372	1178	1416	341	1265	705	696	2369		344	1733	589
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	264	0	0	473	0		0	0	0
Reduced v/c Ratio	0.88	0.22	0.15	2.26	0.68	0.59	2.83	0.87		0.88	0.64	1.00

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
 1: Grand Crossing & Grand

2037 PM Alt 3
 8/31/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↔	↗	↖	↗	↖↗	↖↗	↑	↗	↖	↑↑↑	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.95	0.91	0.95	0.95	0.95	0.76	0.97	0.86	1.00	1.00	0.81	1.00
Frt	1.00	0.91	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.98	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1715	1546	1534	1715	1754	3682	3502	6536	1615	1805	7695	1615
Flt Permitted	0.95	0.98	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1715	1546	1534	1715	1754	3682	3502	6536	1615	1805	7695	1615
Volume (vph)	300	0	500	360	100	790	350	1510	590	200	3810	320
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	300	0	500	360	100	790	350	1510	590	200	3810	320
RTOR Reduction (vph)	0	50	8	0	0	49	0	0	346	0	0	100
Lane Group Flow (vph)	198	193	351	224	236	741	350	1510	244	200	3810	220
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Split		pm+ov	Split		pm+ov	Prot		Perm	Prot		Perm
Protected Phases	4	4	5	8	8	1	5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	13.7	13.7	24.2	13.5	13.5	27.9	10.5	39.6	39.6	14.4	43.5	43.5
Effective Green, g (s)	15.2	15.2	27.2	15.0	15.0	30.9	12.0	41.1	41.1	15.9	45.0	45.0
Actuated g/C Ratio	0.15	0.15	0.27	0.15	0.15	0.31	0.12	0.41	0.41	0.16	0.45	0.45
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	263	237	467	259	265	1258	424	2708	669	289	3491	733
v/s Ratio Prot	0.12	c0.16	0.09	0.13	c0.13	0.10	0.10	0.23		0.11	c0.50	
v/s Ratio Perm			0.14			0.11			0.37			0.20
v/c Ratio	0.75	0.81	0.75	0.86	0.89	0.59	0.83	0.56	0.37	0.69	1.09	0.30
Uniform Delay, d1	40.2	40.6	32.9	41.1	41.3	28.8	42.6	22.1	20.0	39.3	27.1	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.5	18.9	6.7	24.6	28.8	0.7	12.4	0.3	0.3	7.0	46.6	0.2
Delay (s)	51.7	59.6	39.6	65.7	70.1	29.5	54.9	22.4	20.4	46.3	73.7	17.4
Level of Service	D	E	D	E	E	C	D	C	C	D	E	B
Approach Delay (s)		48.7			43.6			26.5			68.2	
Approach LOS		D			D			C			E	

Intersection Summary

HCM Average Control Delay	51.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	99.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	300	0	500	360	100	790	350	1510	590	200	3810	320
Lane Group Flow (vph)	198	243	359	224	236	790	350	1510	590	200	3810	320
v/c Ratio	0.75	0.85	0.76	0.86	0.89	0.61	0.83	0.56	0.58	0.69	1.09	0.38
Control Delay	56.4	53.5	41.8	72.7	76.2	26.8	60.2	23.5	4.3	50.2	74.2	8.9
Queue Delay	0.4	0.0	5.8	0.0	0.0	0.0	0.0	0.5	0.0	3.4	47.8	0.1
Total Delay	56.8	53.5	47.6	72.7	76.2	26.8	60.2	23.9	4.4	53.6	122.0	9.0
Queue Length 50th (ft)	127	126	208	148	157	162	113	214	0	120	~684	51
Queue Length 95th (ft)	#232	#270	#333	#289	#305	214	#187	251	65	197	#739	114
Internal Link Dist (ft)		848			624			540			254	
Turn Bay Length (ft)	200		200	500		270	150		360	220		180
Base Capacity (vph)	274	297	475	259	265	1288	423	2706	1014	306	3490	832
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	5	0	72	0	0	0	0	642	19	47	314	44
Reduced v/c Ratio	0.74	0.82	0.89	0.86	0.89	0.61	0.83	0.73	0.59	0.77	1.20	0.41

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	0.97	1.00		0.86	0.81	0.81
Frt	1.00	0.85		1.00	0.98	0.85
Flt Protected	0.95	1.00		1.00	1.00	1.00
Satd. Flow (prot)	3502	1615		6536	6048	1308
Flt Permitted	0.95	1.00		1.00	1.00	1.00
Satd. Flow (perm)	3502	1615		6536	6048	1308
Volume (vph)	770	220	0	2560	2060	1170
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	837	239	0	2783	2239	1272
RTOR Reduction (vph)	0	3	0	0	39	0
Lane Group Flow (vph)	837	236	0	2783	2496	976
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Turn Type		Perm				Free
Protected Phases	4			2	6	
Permitted Phases		4				Free
Actuated Green, G (s)	16.3	16.3		28.5	28.5	53.8
Effective Green, g (s)	17.8	17.8		30.0	30.0	53.8
Actuated g/C Ratio	0.33	0.33		0.56	0.56	1.00
Clearance Time (s)	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1159	534		3645	3372	1308
v/s Ratio Prot	0.24			0.43	0.42	
v/s Ratio Perm		0.15				0.75
v/c Ratio	0.72	0.44		0.76	0.74	0.75
Uniform Delay, d1	15.8	14.1		9.2	9.0	0.0
Progression Factor	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.3	0.6		1.0	0.9	3.9
Delay (s)	18.1	14.7		10.2	9.9	3.9
Level of Service	B	B		B	A	A
Approach Delay (s)	17.3			10.2	8.2	
Approach LOS	B			B	A	

Intersection Summary

HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	0.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Adj. Flow (vph)	837	239	0	2783	2239	1272
Lane Group Flow (vph)	837	239	0	2783	2535	976
v/c Ratio	0.72	0.45		0.76	0.74	0.75
Control Delay	19.3	16.6		11.2	10.6	3.9
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	19.3	16.6		11.2	10.6	3.9
Queue Length 50th (ft)	118	57		186	170	0
Queue Length 95th (ft)	172	110		231	216	0
Internal Link Dist (ft)	855			641	421	
Turn Bay Length (ft)	675					320
Base Capacity (vph)	1210	561		3647	3412	1308
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.69	0.43		0.76	0.74	0.75

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Golden Springs & Grand

2037 PM Alt 3
12/2/2011



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑↑	↔↔	↔↔	↑↑	↔	↔↔	↑↑↔		↔↔	↑↑↑	↔
Ideal Flow (vphpl)	2100	2100	1900	2100	2100	2100	2100	2100	2100	2100	2100	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Util. Factor	*0.97	0.95	0.88	*0.97	0.95	1.00	*0.97	0.91		*0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3794	3912	2787	3794	3912	1750	3794	5557		3794	5621	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3794	3912	2787	3794	3912	1750	3794	5557		3794	5621	1583
Volume (vph)	850	940	720	120	630	360	380	1350	110	570	1290	420
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	895	989	758	126	663	379	400	1421	116	600	1358	442
RTOR Reduction (vph)	0	0	28	0	0	175	0	6	0	0	0	17
Lane Group Flow (vph)	895	989	730	126	663	204	400	1531	0	600	1358	425
Turn Type	Prot		pm+ov	Prot		Perm	Prot			Prot		pm+ov
Protected Phases	7	4	5	3	8		5	2		1	6	7
Permitted Phases			4			8						6
Actuated Green, G (s)	29.6	50.3	66.6	9.3	30.0	30.0	16.3	38.1		19.5	41.3	70.9
Effective Green, g (s)	31.1	51.8	69.6	10.8	31.5	31.5	17.8	39.6		21.0	42.8	73.9
Actuated g/C Ratio	0.23	0.38	0.51	0.08	0.23	0.23	0.13	0.29		0.16	0.32	0.55
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	873	1499	1497	303	911	408	500	1628		589	1779	900
v/s Ratio Prot	c0.24	0.25	0.06	0.03	c0.17		0.11	c0.28		c0.16	0.24	0.11
v/s Ratio Perm			0.20			0.12						0.16
v/c Ratio	1.03	0.66	0.49	0.42	0.73	0.50	0.80	0.94		1.02	0.76	0.47
Uniform Delay, d1	52.0	34.4	21.2	59.2	47.9	45.0	57.0	46.6		57.1	41.6	18.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	37.0	1.1	0.3	0.9	2.9	1.0	8.9	11.1		41.9	2.0	0.4
Delay (s)	89.1	35.5	21.5	60.1	50.8	46.0	65.9	57.8		99.0	43.6	19.1
Level of Service	F	D	C	E	D	D	E	E		F	D	B
Approach Delay (s)		49.6			50.3			59.4			53.0	
Approach LOS		D			D			E			D	

Intersection Summary

HCM Average Control Delay	53.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	135.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Adj. Flow (vph)	895	989	758	126	663	379	400	1421	116	600	1358	442
Lane Group Flow (vph)	895	989	758	126	663	379	400	1537	0	600	1358	442
v/c Ratio	1.03	0.66	0.50	0.42	0.73	0.65	0.80	0.94		1.02	0.76	0.48
Control Delay	88.2	36.9	19.3	64.5	52.7	23.2	70.3	58.7		97.1	45.7	18.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	88.2	36.9	19.3	64.5	52.7	23.2	70.3	58.7		97.1	45.7	18.8
Queue Length 50th (ft)	~427	376	213	54	284	118	176	477		~278	391	200
Queue Length 95th (ft)	#626	451	273	93	351	228	#275	#653		#450	500	341
Internal Link Dist (ft)		746			505			458			641	
Turn Bay Length (ft)	400		250	145		135	380			380		
Base Capacity (vph)	872	1646	1512	334	1120	664	505	1634		591	1780	916
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	1.03	0.60	0.50	0.38	0.59	0.57	0.79	0.94		1.02	0.76	0.48

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Appendix D

Freeway Microsimulation Worksheets

SR 60 West Bound

Link #	16	22	147	164	165	3	141	4	143	5	11	12
Type	BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF
Speed	45	19	9	13	13	17	34	36	51	62	61	62
Density	37	81	123	109	106	83	52	45	25	15	13	18

SR 60 East Bound

Link #	163	9	10	150	1	2	146	148	134	15	57
Type	BF	WS	BF	BF	WS	WS	WS	WS	WS	BF	BF
Speed	60	57	60	56	19	18	24	36	53	61	62
Density	25	21	19	26	76	83	58	46	27	23	18

BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 South Bound													
13	67	123	145	152	130	3	141	4	69	143	23	6	66
BF	BF	BF	M/D	BF	BF	WS	WS	WS	WS	WS	BF	BF	BF
10	10	13	12	14	15	17	34	36	39	51	60	60	61
125	106	113	92	108	101	83	52	45	38	25	36	22	26

SR 57 North Bound										
170	7	132	27	1	2	146	148	134	14	122
BF	BF	BF	BF	WS	WS	WS	WS	WS	BF	BF
62	51	27	12	19	18	24	36	53	62	59
17	21	36	120	76	83	58	46	27	22	19

SR 60 East Bound

Link #	8	22	153	154	155	156	157	158	159	160	161	162	163	9	10	150	1	2	146	148	134	15	57	
Type	BF	M/D	BF	WS	BF	BF	WS	WS	WS	WS	WS	WS	BF	BF										
Speed	9	7	9	9	10	9	10	11	13	17	27	23	40	59	59	58	13	11	12	27	55	61	61	
Density	138	146	136	121	136	113	134	99	107	63	51	50	34	20	19	24	106	129	112	60	25	24	23	

SR 60 West Bound

Link #	16	147	164	3	141	4	143	5	11	12
Type	BF	M/D	BF	WS	WS	WS	WS	BF	BF	BF
Speed	60	59	59	25	25	60	61	61	59	60
Density	28	21	27	61	70	25	24	21	17	26

BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 North Bound															
67	167	165	168	166	171	7	132	27	1	2	146	148	134	14	122
BF	M/D	BF	M/D	BF	BF	BF	BF	BF	WS	WS	WS	WS	WS	BF	BF
36	32	22	11	7	6	8	11	10	13	11	12	27	55	62	62
69	69	98	99	132	137	94	65	122	106	129	112	60	25	20	16

SR 57 South Bound													
13	123	145	152	130	3	141	4	143	23	6	66		
BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF		
9	11	12	12	13	25	25	60	61	60	61	60		
138	130	93	128	116	61	70	25	24	31	19	25		

SR 60 West Bound

Link #	16	22	147	164	165	3	141	4	143	5	11	12
Type	BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF
Speed	13	12	7	11	11	14	27	60	61	62	61	61
Density	110	108	137	115	114	95	55	20	18	13	11	17

SR 60 East Bound

Link #	163	9	10	150	1	2	146	148	134	15	57
Type	BF	WS	BF	BF	WS	WS	WS	WS	WS	BF	BF
Speed	58	50	57	52	21	33	35	49	59	60	62
Density	30	30	25	34	78	51	46	37	26	26	20

BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 South Bound													
13	67	123	145	152	130	3	141	4	69	143	23	6	66
BF	BF	BF	M/D	BF	BF	WS	WS	WS	WS	WS	BF	BF	BF
8	8	10	10	11	12	14	27	60	#N/A	61	61	61	61
135	116	127	96	120	110	95	55	20	#N/A	18	28	17	21

SR 57 North Bound										
170	7	132	27	1	2	146	148	134	14	122
BF	BF	BF	BF	WS	WS	WS	WS	WS	BF	BF
9	8	8	11	21	33	35	49	59	62	60
130	121	100	130	78	51	46	37	26	22	19

SR 60 East Bound

Link #	8	22	153	154	155	156	157	158	159	160	161	162	163	9	10	150	1	2	146	148	134	15	57	
Type	BF	M/D	BF	WS	BF	BF	WS	WS	WS	WS	WS	WS	BF	BF										
Speed	9	7	9	8	9	9	10	11	12	16	25	22	39	59	58	59	14	12	12	26	51	61	61	
Density	140	149	139	133	138	115	136	100	109	64	54	52	34	20	20	23	99	126	116	62	27	24	23	

SR 60 West Bound

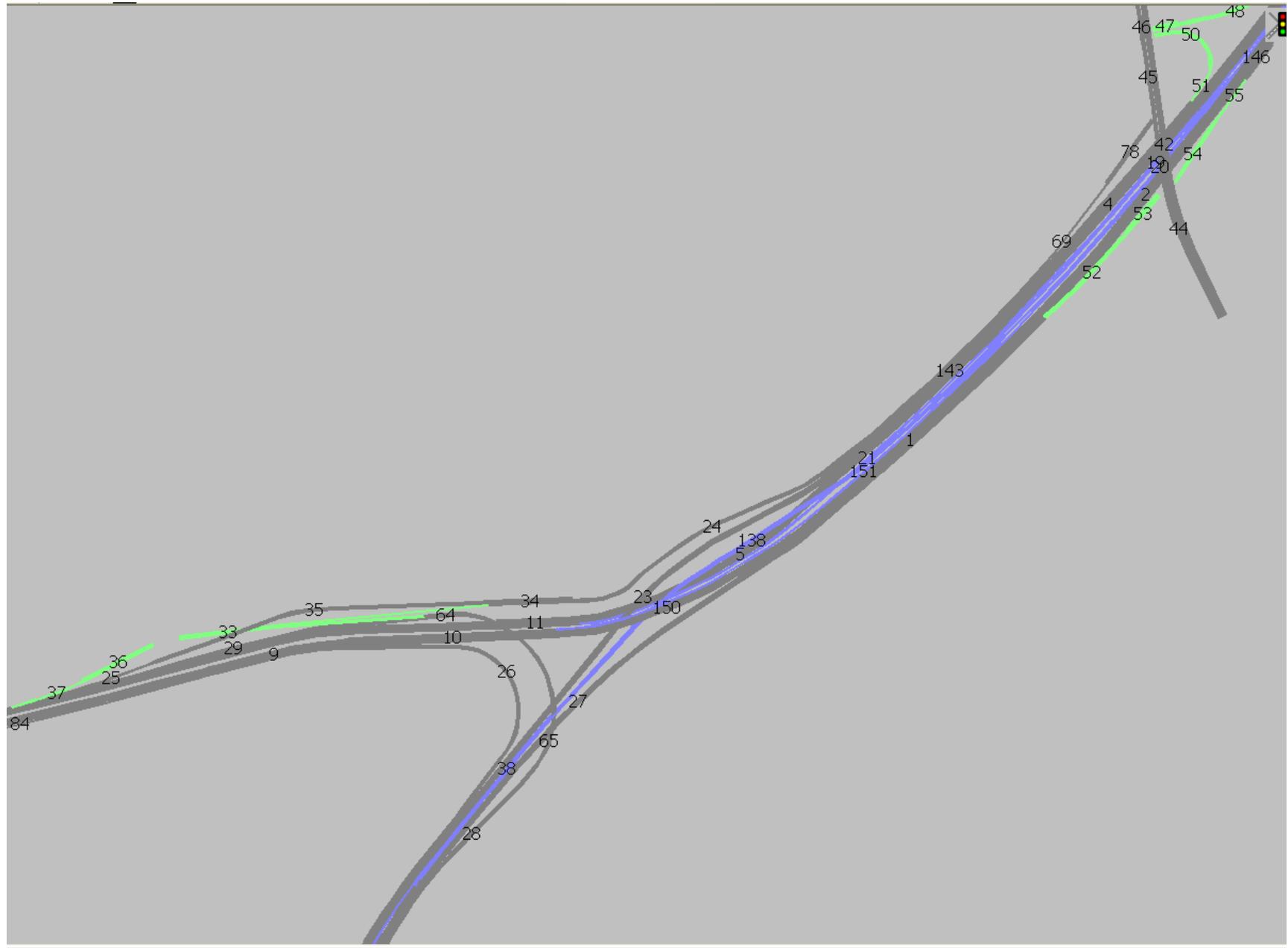
Link #	16	147	164	3	141	4	143	5	11	12
Type	BF	M/D	BF	WS	WS	WS	WS	BF	BF	BF
Speed	60	59	59	26	26	60	61	61	59	59
Density	29	22	27	61	69	26	24	21	17	27

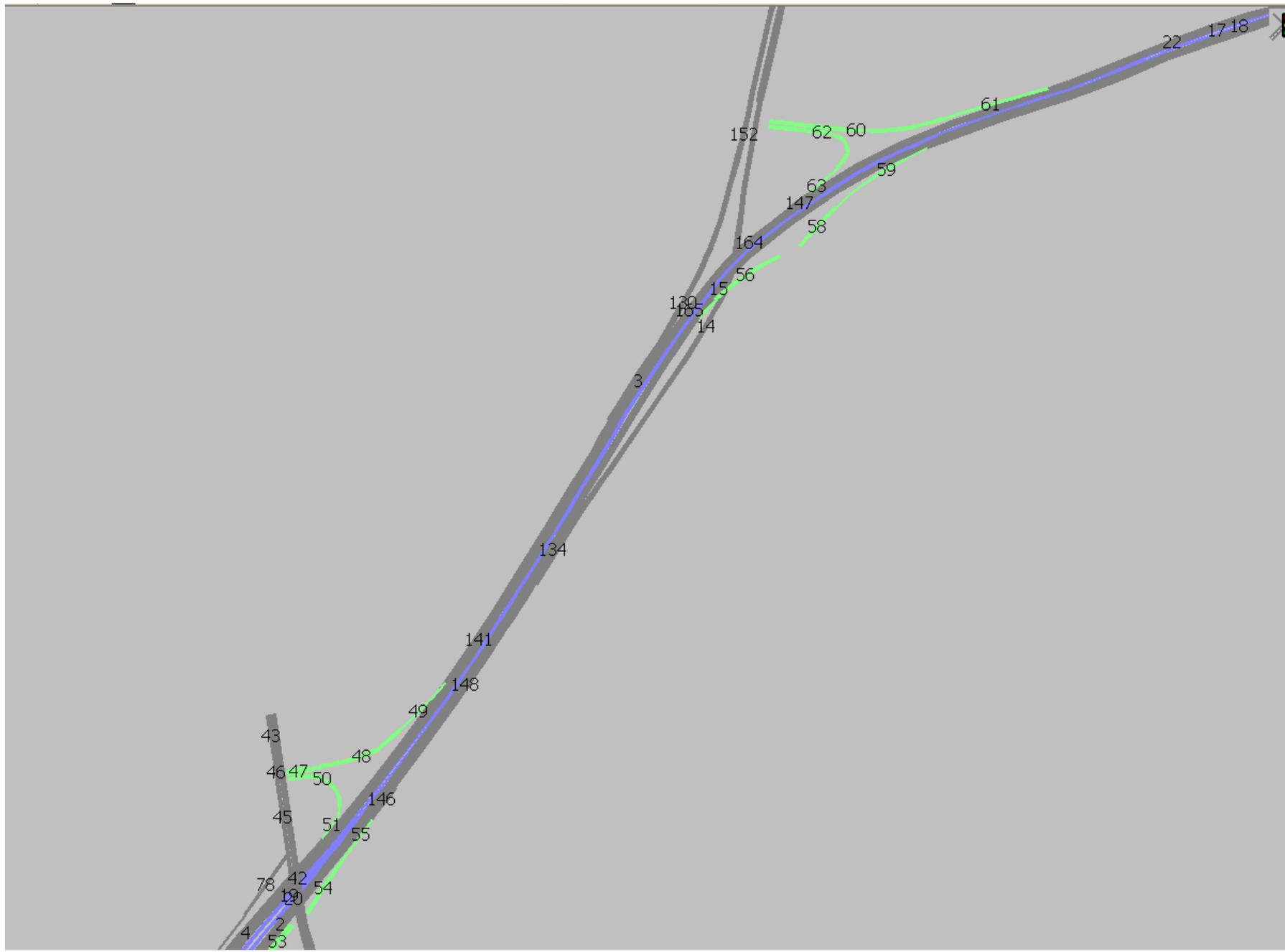
BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 North Bound															
67	167	165	168	166	171	7	132	27	1	2	146	148	134	14	122
BF	M/D	BF	M/D	BF	BF	BF	BF	BF	WS	WS	WS	WS	WS	BF	BF
21	13	9	7	8	7	9	12	12	14	12	12	26	51	62	62
100	95	130	115	131	127	90	62	112	99	126	116	62	27	20	17

SR 57 South Bound													
13	123	145	152	130	3	141	4	143	23	6	66		
BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF		
9	11	12	12	13	26	26	60	61	60	61	60		
138	131	94	129	117	61	69	26	24	31	19	25		

Alt 1 AM and PM Link numbers





SR 60 West Bound

Link #	16	22	147	164	165	20141	4	1	20040	5	11	12
Type	BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF
Speed	62	62	56	59	62	60	61	61	61	64	64	63
Density	22	21	23	22	21	24	23	20	19	13	11	17

SR 60 East Bound

Link #	163	9	10	20150	20001	20002	20146	20148	15	57
Type	BF	WS	BF	BF	WS	WS	WS	WS	BF	BF
Speed	61	61	60	62	62	59	59	61	61	63
Density	28	22	22	23	24	28	26	25	24	19

BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 South Bound

13	67	123	145	152	130	20141	4	1	20040	23	6	66
BF	BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF
63	61	61	61	61	61	60	61	61	61	61	61	62
20	19	25	20	27	27	24	23	20	19	29	19	21

SR 57 North Bound

170	7	132	20027	20001	20002	20146	20148	20014	27	122
BF	BF	BF	BF	WS	WS	WS	WS	WS	BF	BF
63	64	61	62	62	59	59	61	62	62	62
17	15	14	23	24	28	26	25	19	23	18

SR 60 West Bound

Link #	16	22	147	164	165	20141	4	1	20040	5	11	12
Type	BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF
Speed	62	61	55	58	61	58	61	60	60	64	64	62
Density	25	24	27	25	24	29	26	24	22	15	12	19

SR 60 East Bound

Link #	163	9	10	20150	20001	20002	20146	20148	15	57
Type	BF	WS	BF	BF	WS	WS	WS	WS	BF	BF
Speed	57	60	59	61	61	55	57	60	61	62
Density	34	25	25	27	28	34	31	30	28	23

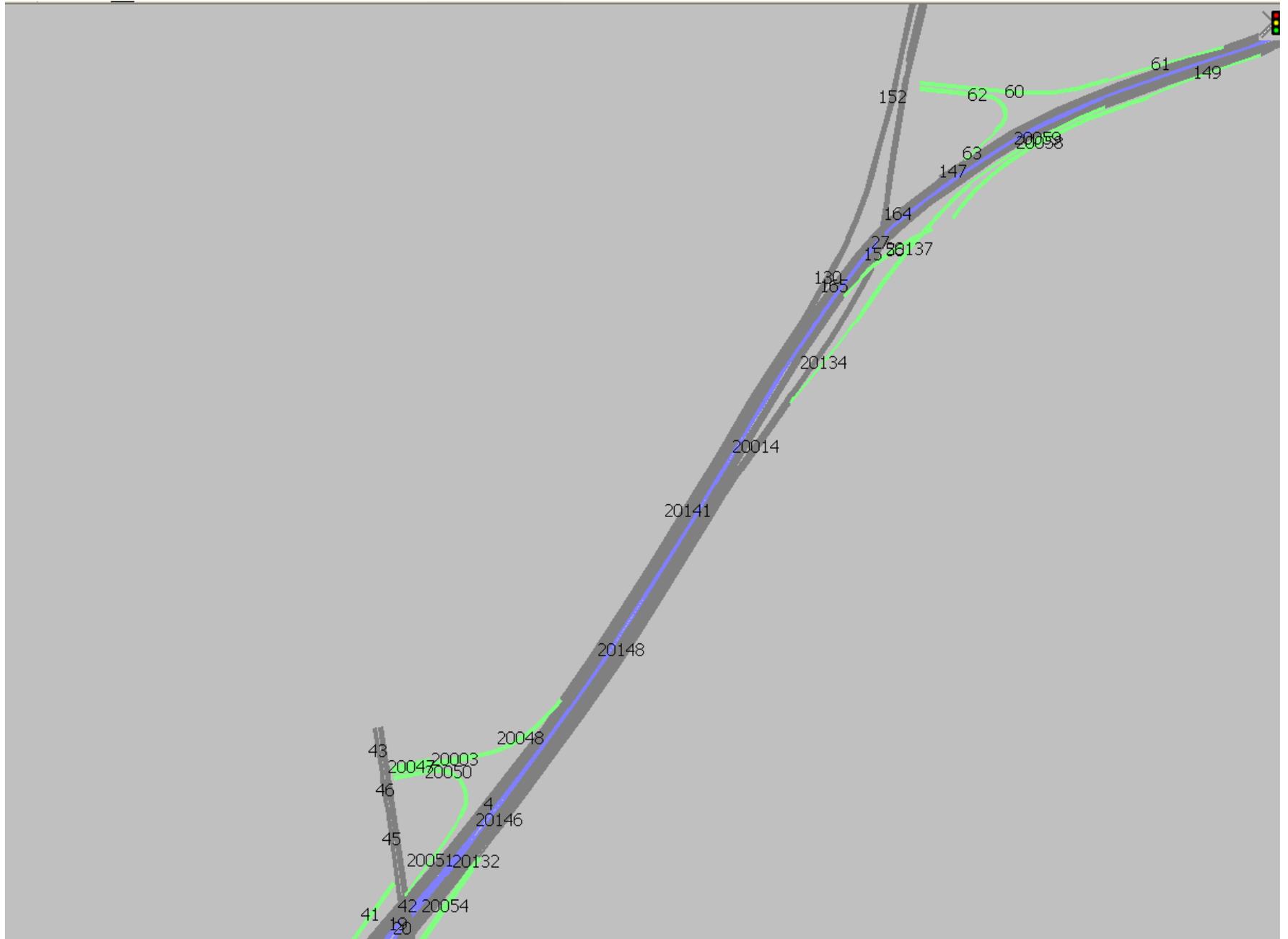
BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 South Bound

13	67	123	145	152	130	20141	4	1	20040	23	6	66
BF	BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF
62	60	60	60	57	57	58	61	60	60	60	59	62
23	23	30	24	34	34	29	26	24	22	34	22	24

SR 57 North Bound

170	7	132	20027	20001	20002	20146	20148	20014	27	122
BF	BF	BF	BF	WS	WS	WS	WS	WS	BF	BF
62	63	60	61	61	55	57	60	62	61	60
20	18	16	27	28	34	31	30	22	27	21



SR 60 East Bound

Link #	8	22	153	154	155	156	157	158	159	160	161	162	163	9	10	20150	20001	20002	20146	20148	15	57
Type	BF	M/D	BF	WS	BF	BF	WS	WS	WS	WS	BF	BF										
Speed	11	10	11	11	11	11	11	12	14	15	24	18	37	57	61	63	62	61	60	62	62	62
Density	131	108	129	103	130	105	129	95	102	73	59	65	37	21	19	21	22	25	26	26	20	22

SR 60 West Bound

Link #	16	147	164	3	20141	1	2	143	5	11	12
Type	BF	M/D	BF	WS	WS	WS	WS	WS	BF	BF	BF
Speed	62	61	62	62	59	60	62	62	63	63	60
Density	22	16	20	23	25	25	23	22	20	16	26

BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 North Bound															
67	167	165	168	166	171	7	132	20027	20001	20002	20146	20148	20014	27	122
BF	M/D	BF	M/D	BF	BF	BF	BF	BF	WS	WS	WS	WS	WS	BF	BF
63	62	62	63	62	61	61	59	61	62	61	60	62	61	61	61
21	18	21	15	19	18	15	15	26	22	25	26	26	24	26	21

SR 57 South Bound													
13	123	145	152	130	3	20141	1	2	143	23	6	66	
BF	BF	M/D	BF	BF	WS	WS	WS	WS	WS	BF	BF	BF	
61	61	61	61	61	62	59	60	62	62	62	63	62	
23	27	22	29	30	23	25	25	23	22	27	17	21	

SR 60 East Bound

Link #	8	22	153	154	155	156	157	158	159	160	161	162	163	9	10	20150	20001	20002	20146	20148	15	57
Type	BF	M/D	BF	WS	BF	BF	WS	WS	WS	WS	BF	BF										
Speed	13	12	13	14	14	13	13	15	19	19	26	22	47	56	54	63	61	60	55	60	61	61
Density	121	102	118	96	118	97	118	89	85	63	62	59	34	24	25	24	27	31	34	31	24	26

SR 60 West Bound

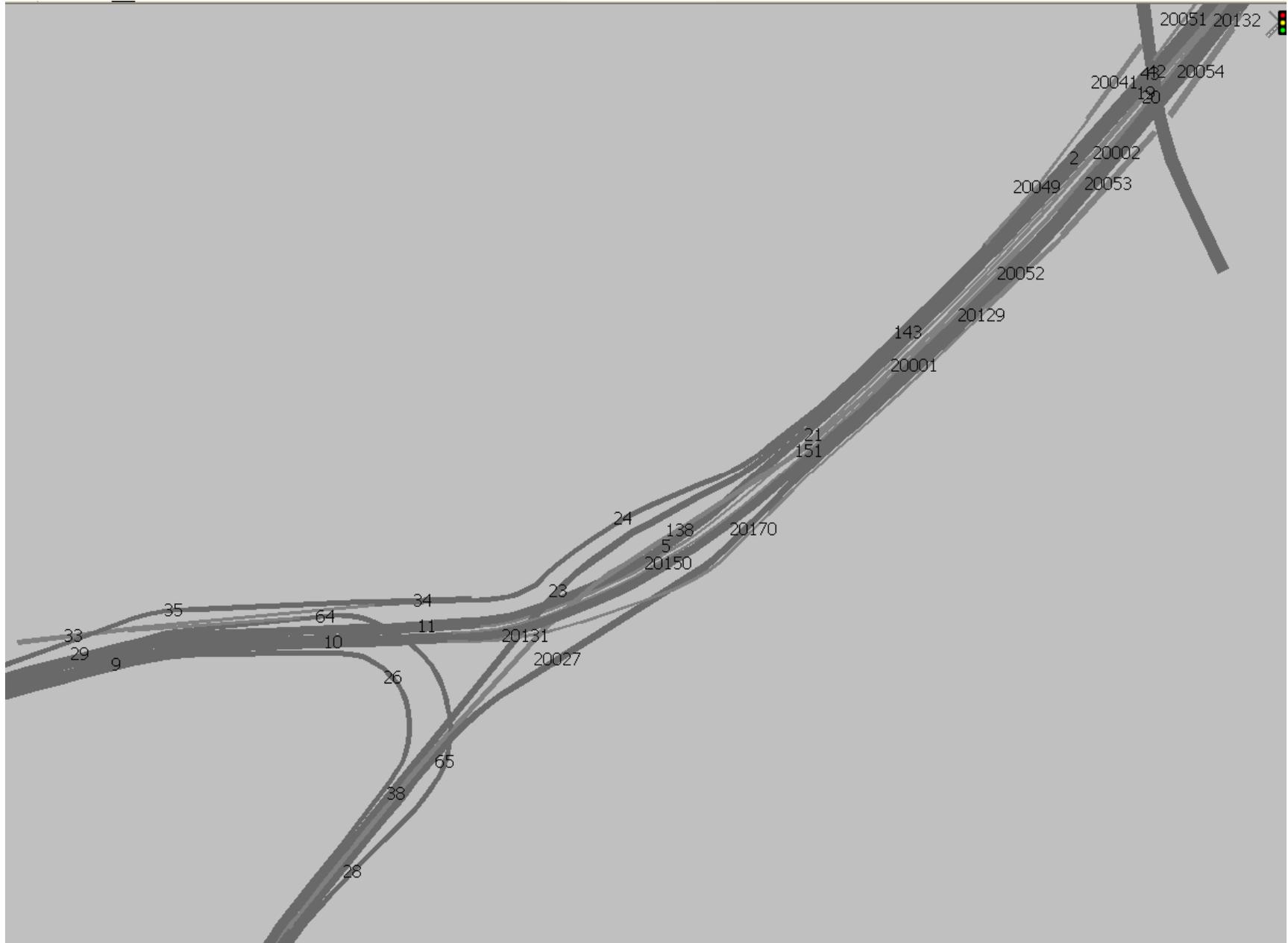
Link #	16	147	164	3	20141	1	2	143	5	11	12
Type	BF	M/D	BF	WS	WS	WS	WS	WS	BF	BF	BF
Speed	61	59	61	61	52	55	60	60	62	62	56
Density	27	20	24	29	34	34	29	28	25	20	33

BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 North Bound															
67	167	165	168	166	171	7	132	20027	20001	20002	20146	20148	20014	27	122
BF	M/D	BF	M/D	BF	BF	BF	BF	BF	WS	WS	WS	WS	WS	BF	BF
61	60	60	62	61	57	57	57	60	61	60	55	60	58	60	59
26	23	26	19	23	23	20	18	33	27	31	34	31	30	33	26

SR 57 South Bound													
13	123	145	152	130	3	20141	1	2	143	23	6	66	
BF	BF	M/D	BF	BF	WS	WS	WS	WS	WS	BF	BF	BF	
60	57	56	59	59	61	52	55	60	60	60	61	61	
29	36	30	37	37	29	34	34	29	28	34	21	27	

Alt 2 PM Link numbers





SR 60 West Bound

Link #	16	22	147	164	165	20141	4	1	20040	5	11	12
Type	BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF
Speed	62	62	56	59	62	60	62	62	61	64	64	63
Density	22	21	22	21	20	24	22	20	18	12	10	16

SR 60 East Bound

Link #	163	9	10	150	40001	40002	148	15	57
Type	BF	WS	BF	BF	WS	WS	WS	BF	BF
Speed	61	60	61	63	61	61	59	62	63
Density	28	22	21	23	24	27	26	24	20

BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 South Bound												
13	67	123	145	152	130	20141	4	1	20040	23	6	66
BF	BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF
63	61	62	61	61	60	60	62	62	61	61	61	62
21	20	26	21	28	28	24	22	20	18	29	19	21

SR 57 North Bound									
170	7	132	40027	40001	40002	148	20014	27	122
BF	BF	BF	BF	WS	WS	WS	BF	BF	BF
63	62	61	62	61	61	59	61	62	61
18	16	14	24	24	27	26	19	23	18

SR 60 West Bound

Link #	16	22	147	164	165	20141	4	1	20040	5	11	12
Type	BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF
Speed	62	61	55	58	62	57	60	60	60	64	63	62
Density	25	24	26	25	23	29	26	23	22	14	12	19

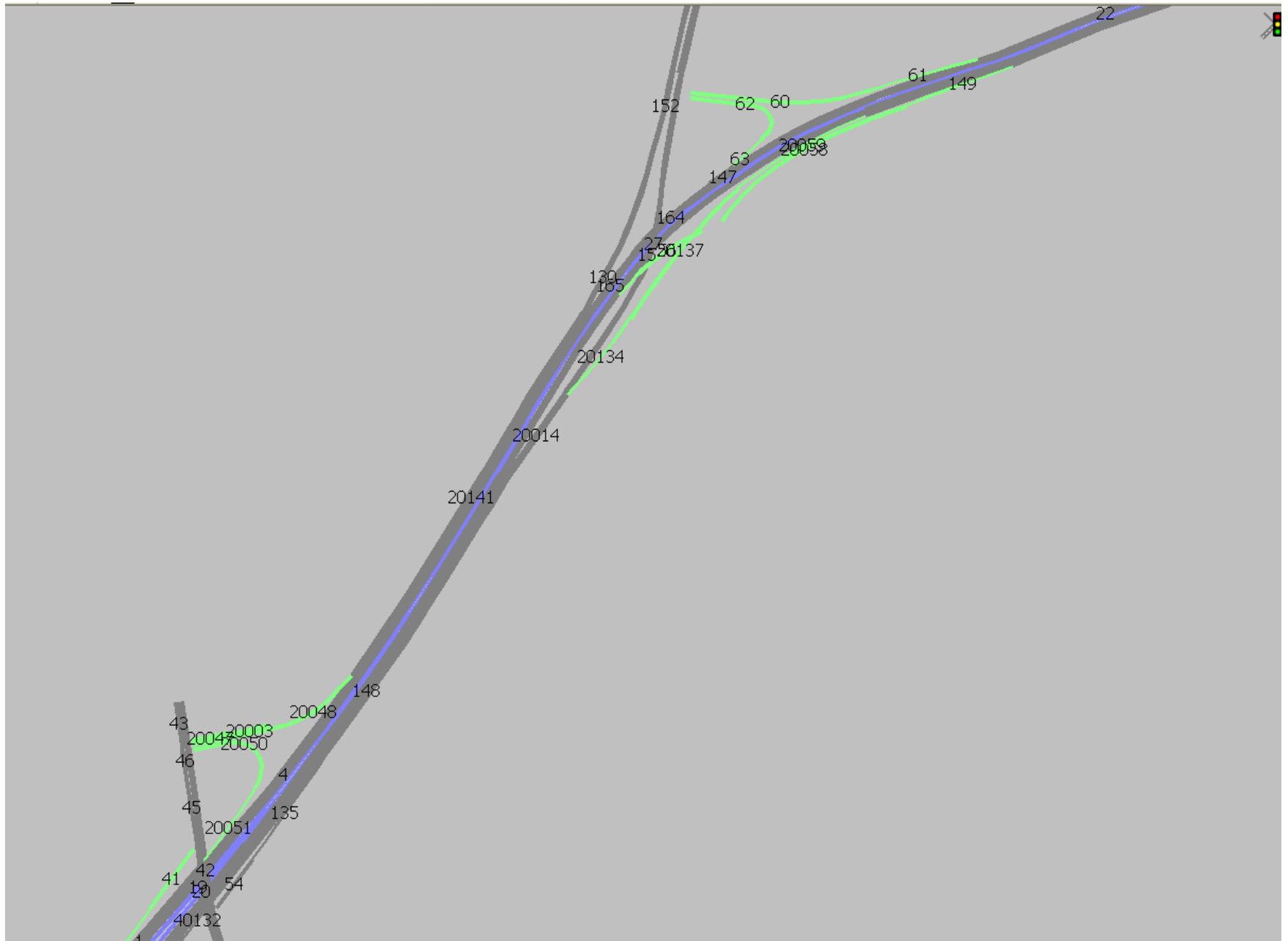
SR 60 East Bound

Link #	163	9	10	150	40001	40002	148	15	57
Type	BF	WS	BF	BF	WS	WS	WS	BF	BF
Speed	58	59	58	62	60	57	56	61	62
Density	33	26	25	27	28	33	31	27	23

BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 South Bound												
13	67	123	145	152	130	20141	4	1	20040	23	6	66
BF	BF	BF	M/D	BF	BF	WS	WS	WS	WS	BF	BF	BF
61	59	60	58	58	58	57	60	60	60	60	59	61
24	23	30	25	33	34	29	26	23	22	33	22	24

SR 57 North Bound									
170	7	132	40027	40001	40002	148	20014	27	122
BF	BF	BF	BF	WS	WS	WS	BF	BF	BF
62	62	61	61	60	57	56	61	61	60
20	18	16	28	28	33	31	22	27	21



SR 60 East Bound

Link #	8	22	153	154	155	156	157	158	159	160	161	162	163	9	10	20150	20001	20002	20148	15	57
Type	BF	M/D	BF	M/D	BF	M/D	BF	M/D	BF	M/D	BF	M/D	BF	WS	BF	BF	WS	WS	WS	BF	BF
Speed	26	14	14	15	14	14	14	16	20	21	27	23	44	59	56	63	61	60	61	61	62
Density	71	95	113	89	113	92	114	85	81	60	59	58	36	23	23	24	24	28	26	24	23

SR 60 West Bound

Link #	16	147	164	3	20141	1	2	143	5	11	12
Type	BF	M/D	BF	WS	WS	WS	WS	WS	BF	BF	BF
Speed	62	61	62	62	61	60	62	62	63	62	60
Density	22	16	19	22	23	24	22	22	19	16	27

BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 North Bound														
67	167	165	168	166	171	7	132	20027	20001	20002	20148	20014	27	122
BF	M/D	BF	M/D	BF	BF	BF	BF	BF	WS	WS	WS	WS	BF	BF
63	62	62	62	62	61	61	60	61	61	60	61	60	61	61
21	18	21	15	19	18	15	14	23	24	28	26	24	28	22

SR 57 South Bound														
13	123	145	152	130	3	20141	1	2	143	23	6	66		
BF	BF	M/D	BF	BF	WS	WS	WS	WS	WS	BF	BF	BF		
62	62	62	61	61	62	61	60	62	62	62	63	63		
20	24	20	27	27	22	23	24	22	22	24	15	18		

SR 60 East Bound

Link #	8	22	153	154	155	156	157	158	159	160	161	162	163	9	10	20150	20001	20002	20148	15	57
Type	BF	M/D	BF	WS	BF	BF	WS	WS	WS	BF	BF										
Speed	13	12	13	14	14	13	13	15	19	20	28	23	44	58	55	63	59	58	61	61	61
Density	120	103	116	95	117	96	116	87	82	62	57	57	36	24	24	24	28	32	30	26	26

SR 60 West Bound

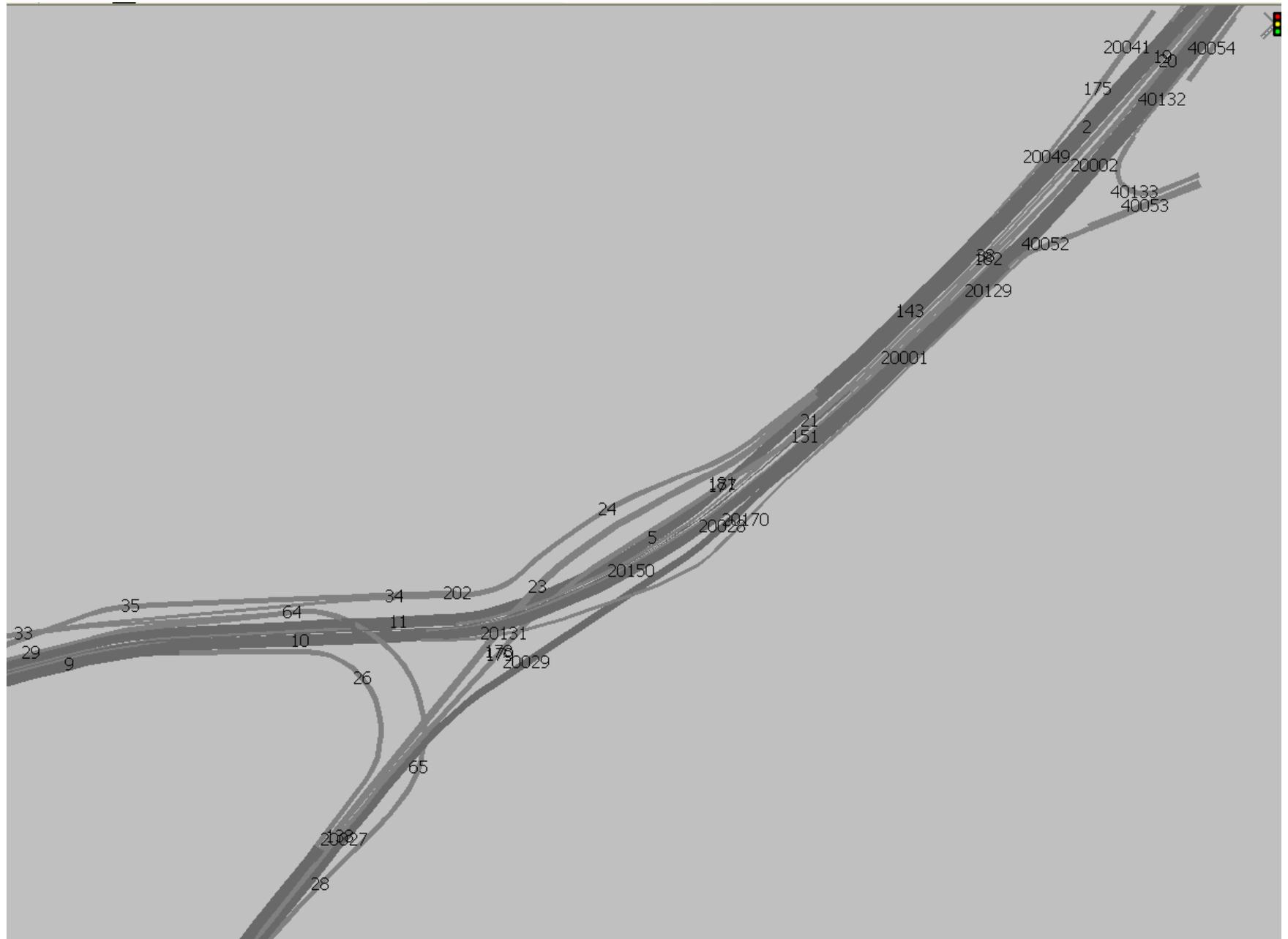
Link #	16	147	164	3	20141	1	2	143	5	11	12
Type	BF	M/D	BF	WS	WS	WS	WS	WS	BF	BF	BF
Speed	60	60	60	61	55	55	59	60	62	60	55
Density	28	20	25	28	32	33	28	26	25	20	35

BF Basic Freeway
 WS Weaving Section
 M/D Merge/Diverge

SR 57 North Bound														
67	167	165	168	166	171	7	132	20027	20001	20002	20148	20014	27	122
BF	M/D	BF	M/D	BF	BF	BF	BF	BF	WS	WS	WS	WS	BF	BF
62	61	60	62	61	60	58	60	60	59	58	61	59	60	58
27	22	26	19	23	22	20	17	29	28	32	30	29	34	28

SR 57 South Bound														
13	123	145	152	130	3	20141	1	2	143	23	6	66		
BF	BF	M/D	BF	BF	WS	WS	WS	WS	WS	BF	BF	BF		
59	59	57	59	60	61	55	55	59	60	61	62	62		
27	32	27	34	34	28	32	33	28	26	30	18	23		

Alt 3 PM Link numbers





Appendix E

Vehicle Miles Traveled

Table E-1

Freeway VMT by Speed Bin - Peak															
Speed Bin Name	VMT Speed Bins Actual	Existing (2009)		2017 No Project		2017 Alternative 2		2017 Alternative 3		2037 No Project		2037 Alternative 2		2037 Alternative 3	
		VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%
5	0.0 - 4.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
10	5.0 - 9.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
15	10.0 - 14.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	20,816	1.6%	0	0.0%	0	0.0%
20	15.0 - 19.99	0	0.0%	109,571	9.9%	0	0.0%	0	0.0%	98,073	7.7%	0	0.0%	0	0.0%
25	20.0 - 24.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	24,456	1.9%	0	0.0%	0	0.0%
30	25.0 - 29.99	0	0.0%	19,907	1.8%	0	0.0%	0	0.0%	52,899	4.2%	0	0.0%	0	0.0%
35	30.0 - 34.99	118,111	11.3%	47,587	4.3%	50,080	4.3%	0	0.0%	130,942	10.3%	0	0.0%	0	0.0%
40	35.0 - 39.99	116,423	11.1%	167,172	15.0%	139,343	11.9%	49,361	4.2%	133,962	10.5%	164,458	12.4%	164,458	12.4%
45	40.0 - 44.99	19,543	1.9%	10,455	0.9%	12,168	1.0%	102,150	8.7%	150,401	11.8%	14,247	1.1%	14,247	1.1%
50	45.0 - 49.99	24,463	2.3%	142,576	12.8%	53,187	4.5%	53,187	4.5%	97,595	7.7%	63,553	4.8%	63,553	4.8%
55	50.0 - 54.99	62,650	6.0%	32,471	2.9%	0	0.0%	0	0.0%	10,695	0.8%	0	0.0%	0	0.0%
60	55.0 - 59.99	45,646	4.4%	7,880	0.7%	9,212	0.8%	0	0.0%	53,008	4.2%	231,840	17.4%	341,243	25.6%
65	60.0 - 64.99	659,186	63.0%	573,658	51.6%	904,983	77.4%	964,275	82.5%	501,568	39.4%	857,489	64.4%	748,087	56.2%
70	65.0 - 69.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
75	70.0 - 74.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total		1,046,022	100.0%	1,111,277	100.0%	1,168,973	100.0%	1,168,973	100.0%	1,274,415	100.0%	1,331,587	100.0%	1,331,588	100.0%

Verify Total 1,046,022 1,111,277 1,168,974 1,168,974 1,274,416 1,331,587 1,331,587

Freeway VMT by Speed Bin - Off Peak															
Speed Bin Name	VMT Speed Bins Actual	Existing (2009)		2017 No Project		2017 Alternative 2		2017 Alternative 3		2037 No Project		2037 Alternative 2		2037 Alternative 3	
		VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%
5	0.0 - 4.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
10	5.0 - 9.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
15	10.0 - 14.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
20	15.0 - 19.99	0	0.0%	140,636	11.7%	0	0.0%	0	0.0%	33,947	2.7%	39,749	3.2%	8,438	0.7%
25	20.0 - 24.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	19,577	1.5%	0	0.0%	54,805	4.5%
30	25.0 - 29.99	0	0.0%	20,675	1.7%	10,576	0.9%	10,576	0.9%	0	0.0%	33,103	2.7%	48,019	3.9%
35	30.0 - 34.99	0	0.0%	46,812	3.9%	0	0.0%	0	0.0%	73,220	5.8%	5,852	0.5%	48,778	4.0%
40	35.0 - 39.99	0	0.0%	157,541	13.1%	61,428	5.3%	0	0.0%	301,379	23.8%	81,337	6.6%	0	0.0%
45	40.0 - 44.99	41,263	3.5%	9,234	0.8%	49,199	4.2%	0	0.0%	33,072	2.6%	0	0.0%	0	0.0%
50	45.0 - 49.99	8,758	0.7%	138,674	11.5%	18,359	1.6%	50,807	4.4%	0	0.0%	0	0.0%	0	0.0%
55	50.0 - 54.99	81,400	6.9%	33,570	2.8%	0	0.0%	32,452	2.8%	82,067	6.5%	0	0.0%	0	0.0%
60	55.0 - 59.99	149,112	12.7%	7,730	0.6%	169,283	14.5%	176,535	15.1%	0	0.0%	94,148	7.7%	254,867	20.8%
65	60.0 - 64.99	895,882	76.1%	646,456	53.8%	857,350	73.5%	895,826	76.8%	720,849	57.0%	970,184	79.2%	809,465	66.1%
70	65.0 - 69.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
75	70.0 - 74.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total		1,176,215	100.0%	1,201,328	100.0%	1,166,195	100.0%	1,166,196	100.0%	1,264,111	100.0%	1,224,373	100.0%	1,224,372	100.0%

Verify Total 1,176,214 1,201,328 1,166,196 1,166,196 1,264,112 1,224,373 1,224,373

Table E-2

Arterial VMT by Speed Bin - Peak															
Speed Bin Name	VMT Speed Bins Actual	Existing (2009)		2017 No Project		2017 Alternative 2		2017 Alternative 3		2037 No Project		2037 Alternative 2		2037 Alternative 3	
		VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%
5	0.0 - 4.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	6,039	0.6%	0	0.0%	0	0.0%
10	5.0 - 9.99	2,814	0.3%	2,522	0.3%	4,747	0.5%	2,511	0.3%	8,747	0.9%	6,203	0.6%	4,521	0.4%
15	10.0 - 14.99	3,232	0.4%	21,568	2.4%	27,623	3.2%	22,489	2.6%	34,638	3.4%	39,115	3.9%	33,509	3.3%
20	15.0 - 19.99	46,377	5.6%	41,316	4.7%	33,557	3.8%	32,010	3.7%	61,572	6.0%	50,525	5.0%	59,534	5.9%
25	20.0 - 24.99	106,642	13.0%	126,771	14.3%	121,544	13.9%	125,782	14.3%	270,608	26.5%	227,367	22.7%	222,194	22.1%
30	25.0 - 29.99	368,227	44.7%	428,455	48.3%	416,178	47.5%	422,302	48.2%	394,728	38.7%	437,396	43.6%	443,609	44.1%
35	30.0 - 34.99	253,036	30.7%	235,894	26.6%	231,124	26.4%	231,124	26.4%	231,705	22.7%	203,107	20.3%	203,107	20.2%
40	35.0 - 39.99	43,044	5.2%	30,763	3.5%	40,504	4.6%	40,504	4.6%	12,237	1.2%	38,536	3.8%	38,536	3.8%
45	40.0 - 44.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
50	45.0 - 49.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
55	50.0 - 54.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
60	55.0 - 59.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
65	60.0 - 64.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
70	65.0 - 69.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
75	70.0 - 74.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total		823,372	100.0%	887,290	100.0%	875,276	100.0%	875,722	100.0%	1,020,273	100.0%	1,002,249	100.0%	1,005,010	100.0%

Verify Total	823,372	887,290	875,276	876,722	1,020,273	1,002,249	1,005,010
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Arterial VMT by Speed Bin - Off Peak															
Speed Bin Name	VMT Speed Bins Actual	Existing (2009)		2017 No Project		2017 Alternative 2		2017 Alternative 3		2037 No Project		2037 Alternative 2		2037 Alternative 3	
		VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%	VMT	%
5	0.0 - 4.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
10	5.0 - 9.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
15	10.0 - 14.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	4,026	0.6%	4,034	0.6%	4,034	0.6%
20	15.0 - 19.99	3,637	0.6%	4,556	0.8%	3,992	0.7%	3,773	0.6%	535	0.1%	1,756	0.3%	1,756	0.3%
25	20.0 - 24.99	21,809	3.9%	25,866	4.3%	24,164	4.1%	24,384	4.1%	32,057	4.8%	30,608	4.6%	30,608	4.6%
30	25.0 - 29.99	61,906	10.9%	67,047	11.2%	62,949	10.7%	62,949	10.6%	74,687	11.1%	70,726	10.6%	71,067	10.6%
35	30.0 - 34.99	152,281	26.9%	148,853	25.0%	149,707	25.4%	150,997	25.5%	191,516	28.5%	195,715	29.4%	199,350	29.8%
40	35.0 - 39.99	233,981	41.4%	252,632	42.4%	251,493	42.6%	251,493	42.5%	273,575	40.7%	264,961	39.8%	264,961	39.6%
45	40.0 - 44.99	91,430	16.2%	97,348	16.3%	98,222	16.6%	98,222	16.8%	95,761	14.2%	98,436	14.8%	97,491	14.6%
50	45.0 - 49.99	680	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
55	50.0 - 54.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
60	55.0 - 59.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
65	60.0 - 64.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
70	65.0 - 69.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
75	70.0 - 74.99	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Total		565,724	100.0%	596,302	100.0%	590,527	100.0%	591,817	100.0%	672,157	100.0%	666,237	100.0%	669,267	100.0%

Verify Total	565,724	596,302	590,527	591,817	672,157	666,237	669,267
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Appendix F

Daily Traffic Volumes

**Table F- 1 - Average Daily Traffic Volumes
Year 2017**

Index	Link	Average Daily Traffic			
		Existing	ALT 1	ALT 2	ALT 3A
Arterial Links					
	Grand Ave SB north of SR-60 WB on/off Ramp	13,700	17,700	19,500	19,500
	Grand Ave SB btwn SR-60 WB Off-Ramp and WB On-Ramp	13,300	20,300	20,300	20,300
	Grand Ave SB btwn SR-60 WB On-Ramp & EB Slip Ramps	13,300	19,000	17,500	17,500
	Grand Ave SB Btwn SR-60 EB Slip On-Ramp & EB Loop On-Ramp	12,900	17,500	17,500	17,500
	Grand Ave SB btwn SR-60 EB Ramps and Golden Springs Rd	12,900	14,100	15,300	15,300
	Grand Ave SB btwn Golden Springs Rd and Chardonay Dr.	12,000	13,200	13,700	13,700
	Grand Ave NB north of SR-60 WB on/off Ramp	16,100	19,900	21,300	21,300
	Grand Ave NB btwn SR-60 EB and WB Ramps	14,800	18,600	19,200	19,200
	Grand Ave NB btwn Golden Springs Rd & SR-60 EB Ramps	14,700	17,700	18,000	18,000
	Grand Ave NB btwn Golden Springs Rd and Chardonay Dr.	13,100	15,300	15,700	15,700
	Golden Springs Rd EB btwn Grand Ave and Lavender Dr.	13,400	14,900	14,300	14,300
	Golden Springs Rd EB btwn Grand Ave and Racquet Club Dr.	8,000	9,000	8,900	8,900
	Golden Springs Rd WB btwn Grand Ave and Lavender Dr.	10,700	12,800	12,500	12,500
	Golden Springs Rd WB btwn Grand Ave and Racquet Club Dr.	8,800	10,400	9,800	9,800
SR-57 Freeway Links					
67	SR-57 NB south of Brea Canyon Rd On-Ramp	56,028	59,000	59,300	59,300
167/165	SR-57 NB btwn Brea Canyon Rd On-Ramp & Diamond Bar Blvd On-Ramp	59,928	62,500	62,600	62,600
168/166/171	SR-57 NB btwn Diamond Bar Blvd On-Ramp & Pathfinder Rd On-Ramp	64,400	65,000	65,100	65,100
7/132	SR-57 NB btwn Pathfinder Rd On-Ramp & SR-60 WB Off-Ramp	60,700	64,000	64,400	64,400
27	SR-57 NB btwn SR-60 WB Off-Ramp & SR-60 EB Merge	52,500	53,400	54,700	54,700
122	SR-57 NB btwn SR-60 EB Split & Temple Ave Off-Ramp	50,500	54,400	57,200	57,200
3	SR-57 SB btwn Temple Ave On-Ramp & SR-60 WB Merge	55,300	57,900	60,300	60,300
23	SR-57 SB btwn SR-60 WB Split & SR-57 SB On-Ramp from SR-60 EB	65,100	67,500	67,600	67,600
6	SR-57 SB btwn SR-57 On-Ramp from SR-60 EB & Pathfinder Rd Off-Ramp	58,800	63,100	63,300	63,300
66	SR-57 SB btwn Pathfinder Rd Off-Ramp & Diamond Bar Off-Ramp	74,646	77,400	76,200	76,200

Note: Freeway Ramp & Arterial ADT = 10 x Peak Hour; Freeway Mainline ADT = 11.9 x Peak Hour

ADT volumes are based on the regional traffic model. Project alternatives are not sufficiently different to result in regional differences in ADT volumes. Changes in link speeds were calculated at the local level based on a microsimulation model.

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Table F - I - Average Daily Traffic Volumes (Cont'd)
Year 2017

Index	Link	Average Daily Traffic			
		Existing	ALT 1	ALT 2	ALT 3A
SR-60 Freeway Links					
8	SR-60 EB west of Fullerton Rd On-Ramp	65,300	67,202	67,202	67,202
22/153	SR-60 EB btwn Fullerton Rd Off-Ramp & On-Ramp	64,100	67,818	68,188	68,188
154/155	SR-60 EB btwn Fullerton Rd On-Ramp & Nogales St Off-Ramp	67,000	71,500	71,676	71,676
156/157	SR-60 EB btwn Nogales St Off-Ramp & On-Ramp	69,900	74,400	74,767	74,767
158/159	SR-60 EB btwn Nogales St On-Ramp & Fairway Dr Off-Ramp	64,800	71,100	71,452	71,452
160/161	SR-60 EB btwn Fairway Dr Off-Ramp & On-Ramp	60,900	67,900	68,227	68,227
162/163	SR-60 EB btwn Fairway Dr On-Ramp & Brea Canyon Rd On-Ramp	65,900	72,500	74,725	74,725
9	SR-60 EB btwn Brea Canyon Rd On-Ramp & SR-57 SB Off-Ramp	67,000	78,500	80,538	80,538
10/150	SR-60 EB btwn SR-57 SB Off-Ramp & SR-57 NB Merge	62,600	67,300	69,000	69,000
1	SR-60 EB btwn SR-57 NB Merge & Grand Ave Off-Ramp	115,100	120,500	123,500	123,500
2	SR-60 EB btwn Grand Ave Off-Ramp & Grand Ave On-Ramp	107,900	112,100	116,100	116,100
146/148/134	SR-60 EB btwn Grand Ave On-Ramp & SR-57 NB Split	116,500	122,600	127,600	127,600
15	SR-60 EB btwn SR-57 NB Split & Diamond Bar Blvd On-Ramp	60,000	64,600	63,800	63,800
57	SR-60 EB btwn Diamond Bar Blvd On-Ramp & Philips Ranch Rd Off-Ramp	69,700	73,400	75,400	75,400
16	SR-60 WB btwn Philips Ranch Rd On-Ramp & Diamond Bar Blvd On-Ramp	60,900	65,700	66,200	66,200
147/164	SR-60 WB btwn Diamond Bar Blvd On-Ramp & SR-57 SB Merge	65,100	67,600	68,300	68,300
141	SR-60 WB btwn SR-57 SB Merge & Grand Ave Off-Ramp	109,500	118,000	121,300	121,300
4/143	SR-60 WB btwn Grand Ave Off-Ramp & Grand Ave On-Ramp	118,900	119,600	121,700	121,700
5/11	SR-60 WB btwn Grand Ave On-Ramp & SR-57 SB Split	53,700	57,400	59,900	59,900
12	SR-60 WB btwn SR-57 SB Split & Brea Canyon Rd Off-Ramp	59,800	63,800	65,500	65,500
SR-60 Ramp Links					
	SR-60 WB Loop On-Ramp at Grand Avenue	7,800	3,800	4,900	4,900
	SR-60 WB Slip On-Ramp at Grand Avenue	N/A	3,700	5,300	5,300
	SR-60 WB Off Ramp at Grand Avenue	9,100	10,400	11,400	11,400
	SR-60 EB Off Ramp at Grand Avenue	6,000	7,100	8,000	8,000
	SR-60 EB Slip On Ramp at Grand Avenue	7,200	8,700	9,700	5,000
	SR-60 EB Loop On Ramp at Grand Avenue	N/A	N/A	N/A	4,800

Note: Freeway Ramp & Arterial ADT = 10 x Peak Hour; Freeway Mainline ADT = 11.9 x Peak Hour

ADT volumes are based on the regional traffic model. Project alternatives are not sufficiently different to result in regional differences in ADT volumes. Changes in link speeds were calculated at the local level based on a microsimulation model.

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**Table F -2 - Average Daily Traffic Volumes
Year 2037**

Index	Link	Average Daily Traffic			
		Existing	ALT 1	ALT 2	ALT 3A
Arterial Links					
	Grand Ave SB north of SR-60 WB on/off Ramp	13,700	26,500	32,300	32,300
	Grand Ave SB btwn SR-60 WB Off-Ramp and WB On-Ramp	13,300	35,800	35,800	35,800
	Grand Ave SB btwn SR-60 WB On-Ramp & EB Slip On-Ramp	13,300	31,500	26,700	26,700
	Grand Ave SB Btwn SR-60 EB Slip On-Ramp & EB Loop On-Ramp	13,300	26,700	18,100	26,700
	Grand Ave SB btwn SR-60 EB Ramps and Golden Springs Rd	12,900	16,700	20,600	20,600
	Grand Ave SB btwn Golden Springs Rd and Chardonay Dr.	12,000	16,000	17,500	17,500
	Grand Ave NB north of SR-60 WB on/off Ramp	16,100	28,500	33,000	33,000
	Grand Ave NB btwn SR-60 EB and WB Ramps	14,800	27,100	29,000	29,000
	Grand Ave NB btwn Golden Springs Rd & SR-60 EB Ramps	14,700	24,300	25,400	25,400
	Grand Ave NB btwn Golden Springs Rd and Chardonay Dr.	13,100	20,300	21,600	21,600
	Golden Springs Rd EB btwn Grand Ave and Lavender Dr.	13,400	18,000	16,300	16,300
	Golden Springs Rd EB btwn Grand Ave and Racquet Club Dr.	8,000	11,400	11,000	11,000
	Golden Springs Rd WB btwn Grand Ave and Lavender Dr.	10,700	17,500	16,700	16,700
	Golden Springs Rd WB btwn Grand Ave and Racquet Club Dr.	8,800	14,100	12,200	12,200
SR-57 Freeway Links					
67	SR-57 NB south of Brea Canyon Rd On-Ramp	56,028	65,500	66,600	66,600
167/165	SR-57 NB btwn Brea Canyon Rd On-Ramp & Diamond Bar Blvd On-Ramp	59,928	68,100	68,400	68,400
168/166/171	SR-57 NB btwn Diamond Bar Blvd On-Ramp & Pathfinder Rd On-Ramp	64,400	66,300	66,600	66,600
7/132	SR-57 NB btwn Pathfinder Rd On-Ramp & SR-60 WB Off-Ramp	60,700	71,400	72,600	72,600
27	SR-57 NB btwn SR-60 WB Off-Ramp & SR-60 EB Merge	52,500	55,300	59,500	59,500
122	SR-57 NB btwn SR-60 EB Split & Temple Ave Off-Ramp	50,500	63,100	72,000	72,000
3	SR-57 SB btwn Temple Ave On-Ramp & SR-60 WB Merge	55,300	63,700	71,200	71,200
23	SR-57 SB btwn SR-60 WB Split & SR-57 SB On-Ramp from SR-60 EB	65,100	72,600	73,200	73,200
6	SR-57 SB btwn SR-57 On-Ramp from SR-60 EB & Pathfinder Rd Off-Ramp	58,800	72,600	73,200	73,200
66	SR-57 SB btwn Pathfinder Rd Off-Ramp & Diamond Bar Off-Ramp	74,646	83,600	79,700	79,700

Note: Freeway Ramp & Arterial ADT = 10 x Peak Hour; Freeway Mainline ADT = 11.9 x Peak Hour

ADT volumes are based on the regional traffic model. Project alternatives are not sufficiently different to result in regional differences in ADT volumes. Changes in link speeds were calculated at the local level based on a microsimulation model.

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Table F - 2 - Average Daily Traffic Volumes (Cont'd)
Year 2037

Index	Link	Average Daily Traffic			
		Existing	ALT 1	ALT 2	ALT 3A
SR-60 Freeway Links					
8	SR-60 EB west of Fullerton Rd On-Ramp	65,300	71,400	71,400	71,400
22/153	SR-60 EB btwn Fullerton Rd Off-Ramp & On-Ramp	64,100	76,200	77,400	77,400
154/155	SR-60 EB btwn Fullerton Rd On-Ramp & Nogales St Off-Ramp	67,000	81,500	82,100	82,100
156/157	SR-60 EB btwn Nogales St Off-Ramp & On-Ramp	69,900	84,500	85,700	85,700
158/159	SR-60 EB btwn Nogales St On-Ramp & Fairway Dr Off-Ramp	64,800	85,100	86,300	86,300
160/161	SR-60 EB btwn Fairway Dr Off-Ramp & On-Ramp	60,900	83,300	84,500	84,500
162/163	SR-60 EB btwn Fairway Dr On-Ramp & Brea Canyon Rd On-Ramp	65,900	87,200	94,400	94,400
9	SR-60 EB btwn Brea Canyon Rd On-Ramp & SR-57 SB Off-Ramp	67,000	104,100	110,700	110,700
10/150	SR-60 EB btwn SR-57 SB Off-Ramp & SR-57 NB Merge	62,600	77,900	83,300	83,300
1	SR-60 EB btwn SR-57 NB Merge & Grand Ave Off-Ramp	115,100	132,700	142,200	142,200
2	SR-60 EB btwn Grand Ave Off-Ramp & Grand Ave On-Ramp	107,900	121,400	134,500	134,500
146/148/134	SR-60 EB btwn Grand Ave On-Ramp & SR-57 NB Split	116,500	136,300	152,300	152,300
15	SR-60 EB btwn SR-57 NB Split & Diamond Bar Blvd On-Ramp	60,000	74,700	72,300	72,300
57	SR-60 EB btwn Diamond Bar Blvd On-Ramp & Philips Ranch Rd Off-Ramp	69,700	81,500	88,100	88,100
16	SR-60 WB btwn Philips Ranch Rd On-Ramp & Diamond Bar Blvd On-Ramp	60,900	76,500	77,900	77,900
147/164	SR-60 WB btwn Diamond Bar Blvd On-Ramp & SR-57 SB Merge	65,100	73,200	75,600	75,600
141	SR-60 WB btwn SR-57 SB Merge & Grand Ave Off-Ramp	109,500	136,900	147,600	147,600
4/143	SR-60 WB btwn Grand Ave Off-Ramp & Grand Ave On-Ramp	118,900	121,400	127,900	127,900
5/11	SR-60 WB btwn Grand Ave On-Ramp & SR-57 SB Split	53,700	65,500	73,800	73,800
12	SR-60 WB btwn SR-57 SB Split & Brea Canyon Rd Off-Ramp	59,800	72,600	77,900	77,900
SR-60 Ramp Links					
	SR-60 WB Loop On-Ramp at Grand Avenue	7,800	4,700	6,700	6,700
	SR-60 WB Slip On-Ramp at Grand Avenue	N/A	9,500	9,100	9,100
	SR-60 WB Off Ramp at Grand Avenue	9,100	13,200	16,300	16,300
	SR-60 EB Off Ramp at Grand Avenue	6,000	9,500	12,700	12,700
	SR-60 EB Slip On Ramp at Grand Avenue	7,200	12,200	15,300	6,600
	SR-60 EB Loop On Ramp at Grand Avenue	N/A	N/A	N/A	8,700

Note: Freeway Ramp & Arterial ADT = 10 x Peak Hour; Freeway Mainline ADT = 11.9 x Peak Hour

ADT volumes are based on the regional traffic model. Project alternatives are not sufficiently different to result in regional differences in ADT volumes. Changes in link speeds were calculated at the local level based on a microsimulation model.

Appendix G

Trip Generation Information

5. Environmental Analysis

TRANSPORTATION AND TRAFFIC

**Table 5.10-9
Project Trip Generation Estimates**

Project Component	Size	Weekday												Sunday								
		Without Game						With Game						With Game								
		AM Peak Hour (peak hour 7- 9 AM)			PM Peak Hour (peak hour 4- 6 PM)			Game PM Arrival (peak hour 4- 6 PM)			Game PM Departure (peak hour 9- 11 PM)			Sunday Game Midday Arrival (peak hour 12- 2 PM)			Sunday Game PM Departure (peak hour 4- 6 PM)					
		Daily	In	Out	Total	In	Out	Total	Daily	In	Out	Total	In	Out	Total	Daily	In	Out	Total	In	Out	Total
NFL Game [a]																						
Game Attendees	75,000 seats																					
(Assuming 75,000 seats sold/occupied for a game)																						
<u>Breakdown by Travel Mode:</u>																						
season ticket/gen admission passenger car (65%) =	48,750 persons																					
club/VIP passenger car (20%) =	15,000 persons																					
charter bus (10%) =	7,500 persons																					
shuttle to/from Metrolink Station (5%) =	3,750 persons																					
other/walk/bike (0%) [b] =	0 persons																					
	75,000 persons																					
<u>Conversion to Number of Vehicles:</u>																						
season tckt/gen adm passenger car (3.0 AVO) [c] =	16,250 vehicles	-	-	-	-	-	-	-	32,500	8,125	nom	8,125	nom	12,188	12,188	32,500	6,500	nom	6,500	nom	9,750	9,750
club/VIP passenger car (3.5 AVO) [c] =	4,286 vehicles	-	-	-	-	-	-	-	8,572	2,143	nom	2,143	nom	3,215	3,215	8,572	1,714	nom	1,714	nom	2,572	2,572
charter bus (40.0 AVO) [d] =	188 buses	-	-	-	-	-	-	-	752	188	nom	188	nom	282	282	752	150	nom	150	nom	226	226
shuttle to/from Metrolink Station (40.0 AVO) [e] =	94 shuttles	-	-	-	-	-	-	-	752	94	94	188	141	141	282	752	75	75	150	113	113	226

5. Environmental Analysis

TRANSPORTATION AND TRAFFIC

**Table 5.10-9
Project Trip Generation Estimates**

Project Component	Size	Weekday												Sunday									
		Without Game						With Game						With Game									
		AM Peak Hour (peak hour 7- 9 AM)			PM Peak Hour (peak hour 4- 6 PM)			Game PM Arrival (peak hour 4- 6 PM)			Game PM Departure (peak hour 9- 11 PM)			Sunday Game Midday Arrival (peak hour 12- 2 PM)			Sunday Game PM Departure (peak hour 4- 6 PM)						
		Daily	In	Out	Total	In	Out	Total	Daily	In	Out	Total	In	Out	Total	Daily	In	Out	Total	In	Out	Total	
Game Employees and Team [a]	1,515 persons																						
game employee/team passenger car (1.2 AVO) =	1,263 vehicles	-	-	-	-	-	-	-	2526	nom	nom	nom	nom	nom	nom	1,584	nom	nom	nom	nom	nom	nom	nom
Football Game Total (A):		-	-	-	-	-	-	-	45,102	10,550	94	10,644	141	15,826	15,967	45,102	8,439	75	8,514	113	12,661	12,774	
Other Phase One Components																							
Stadium Team Administrative Offices	45,000 sf	521	72	9	81	12	66	78	[f]	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
25% daily, 15% AM/PM internal trip/transit/TDM reduction:		-130	-11	-1	-12	-2	-10	-12	[f]	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
Sub-Total (Net Trips):		391	61	8	69	10	56	66	[f]	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
Stadium NFL Hall of Fame	40,000 sf	418	nom	nom	nom	nom	nom	nom	[f]	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
25% daily internal trip reduction:		-105	nom	nom	nom	nom	nom	nom	[f]	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
Subtotal (Net Trips):		313	nom	nom	nom	nom	nom	nom	[f]	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]	

5. Environmental Analysis

TRANSPORTATION AND TRAFFIC

**Table 5.10-9
Project Trip Generation Estimates**

Project Component	Size	Weekday												Sunday								
		Without Game						With Game						With Game								
		Daily	AM Peak Hour (peak hour 7- 9 AM)			PM Peak Hour (peak hour 4- 6 PM)			Daily	Game PM Arrival (peak hour 4- 6 PM)			Game PM Departure (peak hour 9- 11 PM)			Daily	Sunday Game Midday Arrival (peak hour 12- 2 PM)			Sunday Game PM Departure (peak hour 4- 6 PM)		
			In	Out	Total	In	Out	Total		In	Out	Total	In	Out	Total		In	Out	Total			
25% daily, 15% AM/PM internal trip/transit/TDM reduction:	-903	-29	-8	-37	-15	-41	-56	-903	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
Sub-Total (Net Trips):	2,710	167	44	211	85	231	316	2,710	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]	
Retail [h]	400,000 sf	16,722	220	140	360	750	813	1,563	3,344	150	163	313	-	-	-	2,093	123	127	250	87	148	235
25% daily, 15% AM/PM/Sun.midday/Sun. PM internal trip reduction:	-4,181	-33	-21	-54	-113	-122	-235	-836	-23	-24	-47	-	-	-	-523	-18	-19	-37	-13	-22	-35	
10% daily/AM, 26% PM, 30% Sun. midday,28% Sun. PM pass-by reduction:	-1,254	-19	-12	-31	-166	-180	-346	-251	-33	-36	-69	-	-	-	-157	-32	-32	-64	-21	-35	-56	
Subtotal (Net Trips):	11,287	168	107	275	471	511	982	2,257	94	103	197	-	-	-	1,413	73	76	149	53	91	144	
Restaurants (lunch/dinner only)	45,000 sf	4,048	34	2	36	226	111	337	810	[f]	[f]	[f]	-	-	-	649	[f]	[f]	[f]	[f]	[f]	[f]
25% daily, 15% AM/PM internal trip reduction:	-1,012	-5	0	-5	-34	-17	-51	-203	[f]	[f]	[f]	-	-	-	-162	[f]	[f]	[f]	[f]	[f]	[f]	
10% daily/AM, 43% PM pass-by reduction:	-304	-3	0	-3	-83	-40	-123	-61	[f]	[f]	[f]	-	-	-	-49	[f]	[f]	[f]	[f]	[f]	[f]	
Subtotal (Net Trips):	2,732	26	2	28	109	54	163	546	[f]	[f]	[f]	-	-	-	438	[f]	[f]	[f]	[f]	[f]	[f]	
Restaurants (breakfast/lunch/dinner)	5,000 SF	636	30	28	58	34	21	55	127	[f]	[f]	[f]	-	-	-	132	[f]	[f]	[f]	[f]	[f]	[f]
25% daily, 15% AM/PM internal trip reduction:	-159	-5	-4	-9	-5	-3	-8	-32	[f]	[f]	[f]	-	-	-	-33	[f]	[f]	[f]	[f]	[f]	[f]	
10% daily/AM, 43% PM pass-by reduction:	-48	-3	-2	-5	-12	-8	-20	-10	[f]	[f]	[f]	-	-	-	-10	[f]	[f]	[f]	[f]	[f]	[f]	
Subtotal (Net Trips):	429	22	22	44	17	10	27	85	[f]	[f]	[f]	-	-	-	89	[f]	[f]	[f]	[f]	[f]	[f]	
Other Phase One Components Gross Trip Total (B):	31,956	594	244	838	1,327	1,416	2,743	7,894	150	163	313	-	-	-	2,874	123	127	250	87	148	235	

5. Environmental Analysis

TRANSPORTATION AND TRAFFIC

**Table 5.10-9
Project Trip Generation Estimates**

Project Component	Size	Weekday												Sunday								
		Without Game						With Game						With Game								
		Daily	AM Peak Hour (peak hour 7- 9 AM)			PM Peak Hour (peak hour 4- 6 PM)			Daily	Game PM Arrival (peak hour 4- 6 PM)			Game PM Departure (peak hour 9- 11 PM)			Daily	Sunday Game Midday Arrival (peak hour 12- 2 PM)			Sunday Game PM Departure (peak hour 4- 6 PM)		
			In	Out	Total	In	Out	Total		In	Out	Total	In	Out	Total		In	Out	Total			
Other Phase One Components Net Trip Total (C):		22,231	476	193	669	799	935	1,734	5,598	94	103	197	-	-	-	1,940	73	76	149	53	91	144
PHASE ONE GROSS TRIP GENERATION (A + B)		31,956	594	244	838	1,327	1,416	2,743	52,996	10,700	257	10,957	141	15,826	15,967	47,976	8,562	202	8,764	200	12,809	13,009
PHASE ONE NET TRIP GENERATION (A + C)		22,231	476	193	669	799	935	1,734	50,700	10,644	197	10,841	141	15,826	15,967	47,042	8,512	151	8,663	166	12,752	12,918
Phase Two Components																						
Retail [h]	433,000 sf	17,606	230	147	377	791	856	1,647	3,521	158	171	329	-	-	-	2,196	132	138	270	124	130	254
	25% daily, 15% AM/PM/Sun.midday/Sun. PM internal trip reduction:	-4,402	-35	-22	-57	-119	-128	-247	-880	-24	-26	-50	-	-	-	-549	-20	-21	-41	-19	-20	-39
	10% daily/AM, 26% PM, 30% Sun. midday,28% Sun. PM pass-by reduction:	-1,320	-20	-13	-33	-175	-189	-364	-264	-35	-38	-73	-	-	-	-165	-34	-35	-69	-29	-31	-60
	Subtotal (Net Trips):	11,884	175	112	287	497	539	1,036	2,377	99	107	206	-	-	-	1,482	78	82	160	76	79	155
Restaurants (lunch/dinner only)	97,000 sf	8,725	75	4	79	487	240	727	1,745	[f]	[f]	[f]	-	-	-	1,400	[f]	[f]	[f]	[f]	[f]	[f]
	25% daily, 15% AM/PM internal trip reduction:	-2,181	-11	-1	-12	-73	-36	-109	-436	[f]	[f]	[f]	-	-	-	-350	[f]	[f]	[f]	[f]	[f]	[f]
	10% daily/AM, 43% PM pass-by reduction:	-654	-6	0	-6	-178	-88	-266	-131	[f]	[f]	[f]	-	-	-	-105	[f]	[f]	[f]	[f]	[f]	[f]
	Sub-Total (Net Trips):	5,890	58	3	61	236	116	352	1,178	[f]	[f]	[f]	-	-	-	945	[f]	[f]	[f]	[f]	[f]	[f]

5. Environmental Analysis

TRANSPORTATION AND TRAFFIC

**Table 5.10-9
Project Trip Generation Estimates**

Project Component	Size	Weekday												Sunday								
		Without Game						With Game						With Game								
		Daily	AM Peak Hour (peak hour 7-9 AM)			PM Peak Hour (peak hour 4-6 PM)			Daily	Game PM Arrival (peak hour 4-6 PM)			Game PM Departure (peak hour 9-11 PM)			Daily	Sunday Game Midday Arrival (peak hour 12-2 PM)			Sunday Game PM Departure (peak hour 4-6 PM)		
			In	Out	Total	In	Out	Total		In	Out	Total	In	Out	Total		In	Out	Total			
Restaurants (breakfast/lunch/dinner)	15,000 sf	1,907	90	83	173	100	64	164	381	[f]	[f]	[f]	-	-	-	396	[f]	[f]	[f]	[f]	[f]	[f]
25% daily, 15% AM/PM internal trip reduction:		-477	-14	-12	-26	-15	-10	-25	-95	[f]	[f]	[f]	-	-	-	-99	[f]	[f]	[f]	[f]	[f]	[f]
10% daily/AM, 43% PM pass-by reduction:		-143	-8	-7	-15	-37	-23	-60	-29	[f]	[f]	[f]	-	-	-	-30	[f]	[f]	[f]	[f]	[f]	[f]
Subtotal (Net Trips):		1,287	68	64	132	48	31	79	257	[f]	[f]	[f]	-	-	-	267	[f]	[f]	[f]	[f]	[f]	[f]
Live Theater	5,000 seats	3,850	40	10	50	342	108	450	[f]	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]
25% daily, 15% AM/PM internal trip reduction:		-963	-6	-2	-8	-51	-16	-67	[f]	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]
Subtotal (Net Trips):		2,887	34	8	42	291	92	383	[f]	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]
Movie Theater [h]	1,200 seats	2,112	11	1	12	33	51	84	422	7	10	17	-	-	-	444	32	26	58	30	24	54
25% daily, 15% AM/PM/Sun.midday/Sun. PM internal trip reduction:		-528	-2	0	-2	-5	-8	-13	-106	-1	-2	-3	-	-	-	-111	-5	-4	-9	-5	-4	-9
Subtotal (Net Trips):		1,584	9	1	10	28	43	71	316	6	8	14	-	-	-	333	27	22	49	25	20	45
General Office	1,490,000 sf	10,679	1,433	195	1,628	297	1,451	1,748	10,679	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]
25% daily, 15% AM/PM internal trip/transit/TDM reduction:		-2,670	-215	-29	-244	-45	-218	-263	-2,670	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]
Sub-Total (Net Trips):		8,009	1,218	166	1,384	252	1,233	1,485	8,009	[f]	[f]	[f]	-	-	-	[f]	[f]	[f]	[f]	[f]	[f]	[f]
Phase Two Components Gross Trip Total (D):		44,879	1,879	440	2,319	2,050	2,770	4,820	16,748	165	181	346	-	-	-	4,436	164	164	328	154	154	308
Phase Two Components Net Trip Total (E):		31,541	1,562	354	1,916	1,352	2,054	3,406	12,137	105	115	220	-	-	-	3,027	105	104	209	101	99	200

5. Environmental Analysis

TRANSPORTATION AND TRAFFIC

**Table 5.10-9
Project Trip Generation Estimates**

Project Component	Size	Weekday												Sunday								
		Without Game						With Game						With Game								
		AM Peak Hour (peak hour 7- 9 AM)			PM Peak Hour (peak hour 4- 6 PM)			Game PM Arrival (peak hour 4- 6 PM)			Game PM Departure (peak hour 9- 11 PM)			Sunday Game Midday Arrival (peak hour 12- 2 PM)			Sunday Game PM Departure (peak hour 4- 6 PM)					
		Daily	In	Out	Total	In	Out	Total	Daily	In	Out	Total	In	Out	Total	Daily	In	Out	Total	In	Out	Total
BUILDOUT GROSS TRIP GENERATION (A + B + D)		76,835	2,473	684	3,157	3,377	4,186	7,563	69,744	10,865	438	11,303	141	15,826	15,967	2,412	8,726	366	9,092	354	12,963	13,317
BUILDOUT NET TRIP GENERATION (A + C + E)		53,772	2,038	547	2,585	2,151	2,989	5,140	62,837	10,749	312	11,061	141	15,826	15,967	50,069	8,617	255	8,872	267	12,851	13,118
<i>Total Net Project Trips from 2004 EIR Traffic</i>																						
<i>Impact Study:</i>		67,993	4,460	1,086	5,546	2,362	4,965	7,327	67,993	2,362	4,965	7,327	-	-	-	-	-	-	-	-	-	-
<i>Project as Now Proposed minus 2004 EIR Traffic Impact Study:</i>		-14,221	-2,422	-539	-2,961	-211	-1,976	-2,187	-5,156	8,387	-4,653	3,734	-	-	-	-	-	-	-	-	-	-

[a] The NFL's football season occurs over a six-month period (August through January), with a typical year involving two pre-season home games, eight regular season home games, and up to two post-season home games. Most games will be played on Sunday afternoon with an occasional game played on a Saturday afternoon. Up to two games a year may be played on a weeknight, and one or two games may be played on a Sunday night. Weeknight games would typically start at 6:00 PM, and end at 9:30 PM. Sunday afternoon games would typically start between 12:00 and 2:00 PM, and end between 3:30 PM and 5:30 PM. Super Bowl games, if any, would occur periodically. The seating capacity could be expanded to 80,000 seats to accommodate Super Bowl games. Except for the limited use on weekdays (not more than two games/large events a year),

[b] As a conservative measure, all game ticket-holders are presumed to arrive/depart in a vehicle that would add vehicle trips to the project trip generation (i.e., no persons are assumed to walk/bike/use non-motorized mode of transportation).

**Appendix H
HOV Data
Truck Survey**

Freeway HOV Percentage

Location	Time Period	Mainline	HOV	Total	HOV Percentage
EB SR-60 at Grand Ave	AM	8569	402	8971	4.48%
	PM	9415	1851	11266	16.43%
WB SR-60 at Grand Ave	AM	10105	1790	11895	15.05%
	PM	9615	1269	10884	11.66%

Source: Mainline count data "grand ave @ sr 60 sr 57 northbound traffic.xls"

Source: Mainline count data "grand ave @ sr 60 sr 57 southbound traffic.xls"

April 24, 2009

Mr. Wei Koo
Principal Engineer
WKE, Inc., Engineers and Planners
400 N. Tustin Avenue, Suite 285
Santa Ana, CA 92705-3813

Subject: SR-60 Truck Delay and Traffic Analysis Technical Memorandum

Dear Mr. Koo:

This memorandum presents the results of a Truck and Traffic Delay Analysis for State Route 60 (SR-60) from approximately Hacienda Boulevard to SR-71, and State Route 57 (SR-57) from Lambert Road to Temple Avenue. The analysis presents the volume of large trailer trucks and container cargo trucks observed to use SR-60 and SR-57, as well as an estimate of the total peak period delay experienced by trucks and all users. Data for this letter was obtained from:

- Truck traffic count taken at the Grand Avenue overcrossing for KOA Corporation on April 16, 2009
- Speed/delay studies conducted by KOA, April 17-22, 2009
- Data from the Caltrans/UC Berkeley PEMS database for the week of April 20-24, 2009.

The truck traffic count indicated that 1,466 trailer/truck combinations including the type used for overseas shipping passed beneath the Grand Avenue overcrossing eastbound from 3 PM to 6 PM. 2,238 trailer/truck and container/truck combinations also passed beneath the Grand Avenue overcrossing westbound between 6 AM and 9 AM.

The speed and delay study for SR-60 indicated that delay related to congestion resulted in a loss of up to 14.3 minutes per vehicle in the eastbound PM peak period, based upon travel time loss from Hacienda Boulevard to the SR-71 Freeway. On SR-57 the delay was 17.5 minutes per vehicle based upon travel time loss from Lambert Road to Grand Avenue. The delay assumes a free flow speed of 60 mph during non-congested conditions. Hacienda Boulevard was identified as the most likely far (west) end of the queue of vehicles moving toward the 57/60 confluence on SR-60. Traffic was queued further west, but this was attributed to capacity reductions between I-605 and 7th Avenue.

Based upon the volume of trucks and the delay study results, eastbound trailer trucks and container trucks are experiencing about 160 hours of total delay per day on SR-60 and 50 hours of delay per day on SR-57 in the PM peak hours on these freeway segments.

In the AM peak hours, westbound trailer trucks and container trucks are experiencing about 100 hours of total delay per day on SR-60 and 30 hours of delay per day on SR-57, based upon the volume of trucks and the delay study results for these freeway segments.

The hourly volumes for all traffic on SR-60 and SR-57 was obtained from various monitoring stations and averaged using the PEMS data base. The equivalent eastbound hourly volume during the PM peak period was found to be 5,900 vehicles per hour on SR-60 and 5,100 vehicles per hour northbound on SR-57. The delay to all vehicles on both corridors is approximately 5,000 hours per day.

During the AM peak, total hourly volume was found to be about 6,900 vehicles per hour westbound on SR-60 and 4,100 vehicles per hour southbound on SR-57 between 6 AM and 9 AM approaching the confluence. The delay to all vehicles on these corridors is therefore approximately 2,000 hours per day.

The 60/57/Grand confluence project is expected to greatly reduce delays on both SR-60 and SR-57 approaching the confluence during the AM and PM peak hours. It is presumed that all delays noted will be reduced by approximately 70% upon completion of the proposed project.

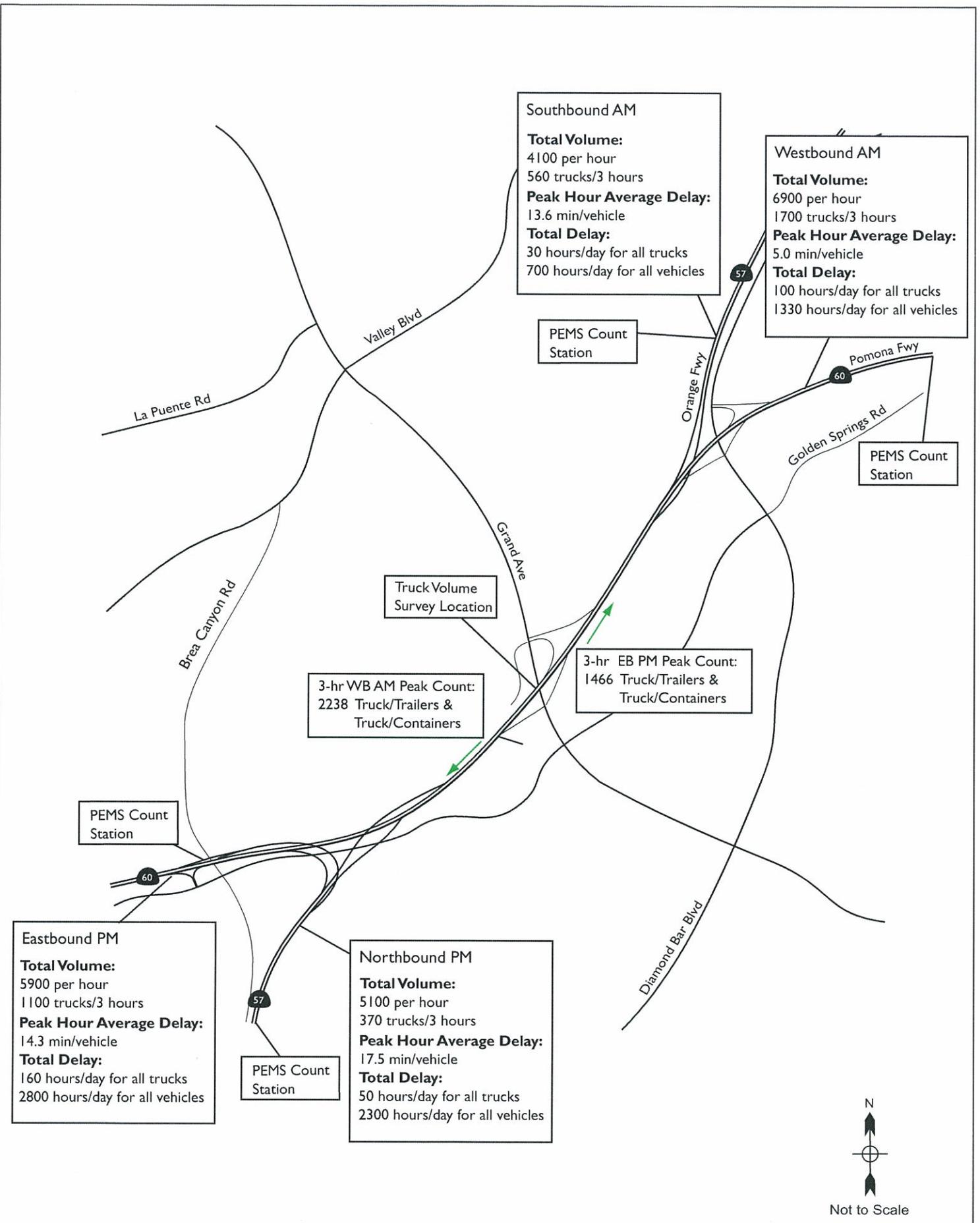
Attached Figure 1 shows the study area, including location and direction of truck volume surveys and PEMS count stations. Tables showing the results of the speed/delay study and the truck counts are also attached. The delay calculation is shown on the truck count tables. The delays presented in this letter are considered to be representative of conditions for the week of the study. Traffic conditions during other weeks could vary from the results shown by 15-20%.

Please contact me if you have any questions or comments regarding the analysis.

Sincerely,



Rock Miller, P.E.
Principal,
KOA Corporation



SR-60 Truck Volume and Delay Survey, Westbound AM Peak Period ¹

SR-60 WB	TRAILER & CONTAINER TRUCK VOLUMES & DELAY		
Time Period Beginning	Truck Volume	Minutes of of Delay	Total Minutes of Delay
6:00 AM	143	2.0	286
6:15 AM	152	2.0	304
6:30 AM	128	2.0	256
6:45 AM	132	2.0	264
7:00 AM	141	5.0	705
7:15 AM	121	5.0	605
7:30 AM	119	5.0	595
7:45 AM	137	5.0	685
8:00 AM	140	5.0	700
8:15 AM	158	5.0	790
8:30 AM	144	2.0	288
8:45 AM	166	2.0	332
Total	1700		5,810
Total Hours			100

Note 1: Survey Location: Grand Avenue Overpass at SR-60

SR-60 Truck Volume and Delay Survey, Eastbound PM Peak Period ¹

SR-60 EB	TRAILER & CONTAINER TRUCK VOLUMES & DELAY		
Time Period Beginning	Truck Volume	Minutes of of Delay	Total Minutes of Delay
3:00 PM	115	2.0	230
3:15 PM	115	2.0	230
3:30 PM	127	5.0	635
3:45 PM	100	5.0	500
4:00 PM	87	10.0	870
4:15 PM	95	10.0	950
4:30 PM	96	14.3	1373
4:45 PM	92	14.3	1316
5:00 PM	70	14.3	1001
5:15 PM	56	14.3	801
5:30 PM	66	10.0	660
5:45 PM	81	10.0	810
Total	1,100		9,375
Total Hours			160

Note 1: Survey Location: Grand Avenue Overpass at SR-60

SR-57 Truck Volume and Delay Survey, Southbound AM Peak Period ¹

SR-57 SB	AM Peak Period		
	TRAILER & CONTAINER TRUCK VOLUMES & DELAY		
Time Period Beginning	Truck Volume	Minutes of of Delay	Total Minutes of Delay
6:00 AM	48	2.0	96
6:15 AM	51	2.0	102
6:30 AM	43	2.0	86
6:45 AM	44	2.0	88
7:00 AM	47	5.0	235
7:15 AM	40	5.0	200
7:30 AM	40	5.0	200
7:45 AM	46	5.0	230
8:00 AM	47	5.0	235
8:15 AM	53	5.0	265
8:30 AM	48	2.0	96
8:45 AM	55	2.0	110
Total	<u>560</u>		<u>1,943</u>
Total Hours			30

Note 1: Survey Location: Grand Avenue Overpass at SR-60

SR-57 Truck Volume and Delay Survey, Northbound PM Peak Period ¹

SR-57 NB	PM Peak Period		
	TRAILER & CONTAINER TRUCK VOLUMES & DELAY		
Time Period Beginning	Truck Volume	Minutes of of Delay	Total Minutes of Delay
3:00 PM	38	2.0	76
3:15 PM	38	2.0	76
3:30 PM	42	5.0	210
3:45 PM	33	5.0	165
4:00 PM	29	10.0	290
4:15 PM	32	10.0	320
4:30 PM	32	14.3	458
4:45 PM	31	14.3	443
5:00 PM	23	14.3	329
5:15 PM	19	14.3	272
5:30 PM	22	10.0	220
5:45 PM	27	10.0	270
Total	<u>370</u>		<u>3,129</u>
Total Hours			50

Note 1: Survey Location: Grand Avenue Overpass at SR-60

SR-60 Total Volume and Delay Survey, Westbound AM Peak Period ¹

SR-60 WB	AM Peak Period		
	TOTAL VEHICLES VOLUME & DELAY		
Time Period Beginning	Total Volume	Minutes of of Delay	Total Minutes of Delay
6:00 AM	6,900	2.0	13,800
7:00 AM	6,800	5.0	34,000
8:00 AM	6,400	5.0	32,000
Total	<u>20,100</u>		<u>79,800</u>
Total Hours			1,330

Note 1: Survey Location: SR-60 at Philips Ranch Road

SR-60 Total Volume and Delay Survey, Eastbound PM Peak Period ¹

SR-60 EB	PM Peak Period		
	TOTAL VEHICLES VOLUME & DELAY		
Time Period Beginning	Total Volume	Minutes of of Delay	Total Minutes of Delay
3:00 PM	5,400	5.0	27,000
4:00 PM	5,800	10.0	58,000
5:00 PM	5,900	14.3	84,370
Total	<u>17,100</u>		<u>169,370</u>
Total Hours			2,800

Note 1: Survey Location: SR-60 at Brea Canyon Road

SR-57 Total Volume and Delay Survey, Southbound AM Peak Period ¹

SR-57 SB	AM Peak Period		
	TOTAL VEHICLES VOLUME & DELAY		
Time Period Beginning	Total Volume	Minutes of of Delay	Total Minutes of Delay
6:00 AM	4,100	2.0	8,200
7:00 AM	3,500	5.0	17,500
8:00 AM	3,550	5.0	17,750
Total	<u>11,150</u>		<u>43,450</u>
Total Hours			700

Note 1: Survey Location: SR-57 at Sunset Crossing

SR-57 Total Volume and Delay Survey, Northbound PM Peak Period ¹

SR-57 NB	PM Peak Period		
	TOTAL VEHICLES VOLUME & DELAY		
Time Period Beginning	Total Volume	Minutes of of Delay	Total Minutes of Delay
3:00 PM	5,100	5.0	25,500
4:00 PM	4,900	10.0	49,000
5:00 PM	4,500	14.3	64,350
Total	<u>14,500</u>		<u>138,850</u>
Total Hours			2,300

Note 1: Survey Location: SR-57 at Pathfinder Road

Truck Percentages

Link (Arterials)	
Grand Ave SB north of SR-60 WB on/off Ramp	10%
Grand Ave SB btwn SR-60 WB Off-Ramp and WB On-Ramp	10%
Grand Ave SB btwn SR-60 WB On-Ramp & EB Ramps	10%
Grand Ave SB Btwn SR-60 EB On-Ramp & EB Loop On-Ramp	10%
Grand Ave SB btwn SR-60 EB Ramps and Golden Springs Rd	2%
Grand Ave SB btwn Golden Springs Rd and Chardonay Dr.	2%
Grand Ave NB north of SR-60 WB on/off Ramp	10%
Grand Ave NB btwn SR-60 EB and WB Ramps	10%
Grand Ave NB btwn Golden Springs Rd & SR-60 EB Ramps	2%
Grand Ave NB btwn Golden Springs Rd and Chardonay Dr.	2%
Golden Springs Rd EB btwn Grand Ave and Lavender Dr.	2%
Golden Springs Rd EB btwn Grand Ave and Racquet Club Dr.	2%
Golden Springs Rd WB btwn Grand Ave and Lavender Dr.	2%
Golden Springs Rd WB btwn Grand Ave and Racquet Club Dr.	2%

Truck Percentages

Link (Freeways)	
SR-57 NB south of Brea Canyon Rd On-Ramp	2.4%
SR-57 NB btwn Brea Canyon Rd On-Ramp & Diamond Bar Blvd On-Ramp	2.4%
SR-57 NB btwn Diamond Bar Blvd On-Ramp & Pathfinder Rd On-Ramp	2.4%
SR-57 NB btwn Pathfinder Rd On-Ramp & SR-60 WB Off-Ramp	2.4%
SR-57 NB btwn SR-60 WB Off-Ramp & SR-60 EB Merge	2.4%
SR-57 NB btwn SR-60 EB Split & Temple Ave Off-Ramp	8%
SR-57 SB btwn Temple Ave On-Ramp & SR-60 WB Merge	4.6%
SR-57 SB btwn SR-60 WB Split & SR-57 SB On-Ramp from SR-60 EB	4.6%
SR-57 SB btwn SR-57 On-Ramp from SR-60 EB & Pathfinder Rd Off-Ramp	8.5%
SR-57 SB btwn Pathfinder Rd Off-Ramp & Diamond Bar Off-Ramp	8.5%
SR-60 EB west of Fullerton Rd On-Ramp	6.2%
SR-60 EB btwn Fullerton Rd Off-Ramp & On-Ramp	6.2%
SR-60 EB btwn Fullerton Rd On-Ramp & Nogales St Off-Ramp	6.2%
SR-60 EB btwn Nogales St Off-Ramp & On-Ramp	6.2%
SR-60 EB btwn Nogales St On-Ramp & Fairway Dr Off-Ramp	6.2%
SR-60 EB btwn Fairway Dr Off-Ramp & On-Ramp	6.2%
SR-60 EB btwn Fairway Dr On-Ramp & Brea Canyon Rd On-Ramp	6.2%
SR-60 EB btwn Brea Canyon Rd On-Ramp & SR-57 SB Off-Ramp	6.2%

SR-60 EB btwn SR-57 SB Off-Ramp & SR-57 NB Merge	6.2%
SR-60 EB btwn SR-57 NB Merge & Grand Ave Off-Ramp	5.2%
SR-60 EB btwn Grand Ave Off-Ramp & Grand Ave On-Ramp	5.2%
SR-60 EB btwn Grand Ave On-Ramp & SR-57 NB Split	5.2%
SR-60 EB btwn SR-57 NB Split & Diamond Bar Blvd On-Ramp	5.2%
SR-60 EB btwn Diamond Bar Blvd On-Ramp & Philips Ranch Rd Off-Ramp	5.2%
SR-60 WB btwn Philips Ranch Rd On-Ramp & Diamond Bar Blvd On-Ramp	8.2%
SR-60 WB btwn Diamond Bar Blvd On-Ramp & SR-57 SB Merge	8.2%
SR-60 WB btwn SR-57 SB Merge & Grand Ave Off-Ramp	8%
SR-60 WB btwn Grand Ave Off-Ramp & Grand Ave On-Ramp	8%
SR-60 WB btwn Grand Ave On-Ramp & SR-57 SB Split	8%
SR-60 WB btwn SR-57 SB Split & Brea Canyon Rd Off-Ramp	8%
SR-60 WB Loop On-Ramp at Grand Avenue	8%
SR-60 WB Slip On-Ramp at Grand Avenue	8%
SR-60 WB Off Ramp at Grand Avenue	8%
SR-60 EB Off Ramp at Grand Avenue	5.2%
SR-60 EB On Ramp at Grand Avenue	5.2%
SR-60 EB Loop On Ramp at Grand Avenue	5.2%

Appendix I

Level of Service Guidelines



D. Travel Forecasting (Transportation Modeling)

The local or regional traffic model should reflect the most current land use and planned improvements (i.e., where programming or funding is secured). When a general plan build-out model is not available, the closest forecast model year to build-out should be used. If a traffic model is not available, historical growth rates and current trends can be used to project future traffic volumes. The TIS should clearly describe any changes made in the model to accommodate the analysis of a proposed project.

V. TRAFFIC IMPACT ANALYSIS METHODOLOGIES

Typically, the traffic analysis methodologies for the facility types indicated below are used by Caltrans and will be accepted without prior consultation. When a State highway has saturated flows, the use of a micro-simulation model is encouraged for the analysis (please note however, the micro-simulation model must be calibrated and validated for reliable results). Other analysis methods may be accepted, however, consultation between the lead agency, Caltrans and those preparing the TIS is recommended to agree on the data necessary for the analysis.

- A. Freeway Segments – Highway Capacity Manual (HCM)*, operational analysis
- B. Weaving Areas – Caltrans Highway Design Manual (HDM)
- C. Ramps and Ramp Junctions – HCM*, operational analysis or Caltrans HDM, Caltrans Ramp Metering Guidelines (most recent edition)
- D. Multi-Lane Highways – HCM*, operational analysis
- E. Two-lane Highways – HCM*, operational analysis
- F. Signalized Intersections⁸ – HCM*, Highway Capacity Software**, operational analysis, TRAFFIX^{TM**}, Synchro**, see footnote 8
- G. Unsignalized Intersections – HCM*, operational analysis, Caltrans Traffic Manual for signal warrants if a signal is being considered
- H. Transit – HCM*, operational analysis
- I. Pedestrians – HCM*
- J. Bicycles – HCM*
- K. Caltrans Criteria/Warrants – Caltrans Traffic Manual (stop signs, traffic signals, freeway lighting, conventional highway lighting, school crossings)
- L. Channelization – Caltrans guidelines for Reconstruction of Intersections, August 1985, Ichiro Fukutome

*The most current edition of the Highway Capacity Manual, Transportation Research Board, National Research Council, should be used.

**NOTE: Caltrans does not officially advocate the use of any special software. However, consistency with the HCM is advocated in most but not all cases. The Caltrans local development review units utilize the software mentioned above. If different software or analytical techniques are used for the TIS then consultation between the lead agency, Caltrans and those preparing the TIS is recommended. Results that are significantly different than those produced with the analytical techniques above should be challenged.

⁸ The procedures in the Highway Capacity Manual "do not explicitly address operations of closely spaced signalized intersections. Under such conditions, several unique characteristics must be considered, including spill-back potential from the downstream intersection to the upstream intersection, effects of downstream queues on upstream saturation flow rate, and unusual platoon dispersion or compression between intersections. An example of such closely spaced operations is signalized ramp terminals at urban interchanges. Queue interactions between closely spaced intersections may seriously distort the procedures in" the HCM.

MEASURES OF EFFECTIVENESS BY FACILITY TYPE

TYPE OF FACILITY	MEASURE OF EFFECTIVENESS (MOE)
Basic Freeway Segments	Density (pc/mi/ln)
Ramps	Density (pc/mi/ln)
Ramp Terminals	Delay (sec/veh)
Multi-Lane Highways	Density (pc/mi/ln)
Two-Lane Highways	Percent-Time-Following Average Travel Speed (mi/hr)
Signalized Intersections	Control Delay per Vehicle (sec/veh)
Unsignalized Intersections	Average Control Delay per Vehicle (sec/veh)
Urban Streets	Average Travel Speed (mi/hr)

Measures of effectiveness for level of service definitions located in the most recent version of the Highway Capacity Manual, Transportation Research Board, National Research Council.

Transition between LOS "C" and LOS "D" Criteria (Reference Highway Capacity Manual)

BASIC FREEWAY SEGMENTS @ 65 mi/hr

LOS	Maximum Density (pc/mi/ln)	Minimum Speed (mph)	Maximum v/c	Maximum Service Flow Rate (pc/hr/ln)
A	11	65.0	0.30	710
B	18	65.0	0.50	1170
C	26	64.6	0.71	1680
D	35	59.7	0.89	2090
E	45	52.2	1.00	2350

SIGNALIZED INTERSECTIONS and RAMP TERMINALS

LOS	Control Delay per Vehicle (sec/veh)
A	≤ 10
B	> 10 - 20
C	> 20 - 35
D	> 35 - 55
E	> 55 - 80
F	> 80

MULTI-LANE HIGHWAYS @ 55 mi/hr

LOS	Maximum Density (pc/mi/ln)	Minimum Speed (mph)	Maximum v/c	Maximum Service Flow Rate (pc/hr/ln)
A	11	55.0	0.29	600
B	18	55.0	0.47	990
C	26	54.9	0.68	1430
D	35	52.9	0.88	1850
E	41	51.2	1.00	2100

..... Dotted line represents the transition between LOS "C" and LOS "D"

TWO-LANE HIGHWAYS

LOS	Percent Time-Spent-Following	Average Travel Speed (mi/hr)
A	≤ 35	> 55
B	> 35 - 50	> 50 - 55
C	> 50 - 65	> 45 - 50
D	> 65 - 80	> 40 - 45
E	> 80	≤ 40

URBAN STREETS

Urban Street Class	I	II	III	IV
Range of FFS	55 to 45 mi/hr	45 to 35 mi/hr	35 to 30 mi/hr	35 to 25 mi/hr
Typical FFS	50 mi/hr	40 mi/hr	35 mi/hr	30 mi/hr
LOS	Average Travel Speed (mi/hr)			
A	> 42	> 35	> 30	> 25
B	> 34 - 42	> 28 - 35	> 24 - 30	> 19 - 25
C	> 27 - 34	> 22 - 28	> 18 - 24	> 13 - 19
D	> 21 - 27	> 17 - 22	> 14 - 18	> 9 - 13
E	> 16 - 21	> 13 - 17	> 10 - 14	> 7 - 9
F	≤ 16	≤ 13	≤ 10	≤ 7

..... Dotted line represents the transition between LOS "C" and LOS "D"



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Recommended Daily Roadway Capacity Values

<i>Type of Roadway</i>	<i>Maximum Average Daily Volumes by Level of Service</i>				
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>
6 Lanes Divided	33,900	39,400	45,000	50,600	56,300
4 Lanes Divided	22,500	26,300	30,000	33,800	37,500
4 Lanes Undivided	15,000	17,500	20,000	22,500	25,000
2 Lanes Undivided	7,500	8,800	10,000	11,300	12,500
Local Residential Road	1,900	2,200	2,500	2,800	3,100

Level of Service Definitions: The level of service of a signalized intersection is based on the sum of the volume-to-capacity ratio (V/C) of the critical intersection movements combined with the clearance interval, resulting in an ICU value. ICU ranges of values are then related to specific level of service (“LOS”) definitions. The relationship of the ICU values to LOS and the City’s definitions of level of service are:



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LOS	ICU Values
A	0.00 - 0.60
B	0.61 - 0.70
C	0.71 - 0.80
D	0.81 - 0.90
E	0.91 - 1.00
F	1.01 +

The following interpretations of level of service have been provided:

Level of Service A - A condition of free flow with low traffic density, where no vehicle waits longer than one signal cycle.

Level of Service B - A stable flow of traffic where only on a rare occasion do drivers wait through more than one signal cycle.

Level of Service C - Still in the zone of stable flow, but intermittently drivers must wait through more than one signal cycle and backups may develop behind left turning vehicles.

Level of Service D - Approaching instability, drivers are restricted in their freedom to change lanes, and delays for approaching vehicles may be substantial during peak hours.

Level of Service E - Traffic volumes are near or at the capacity of the arterial, and long queues of vehicles may create lengthy delays especially for left turning vehicles.

Level of Service F - Congested condition or forced traffic flow, where queued backups from locations downstream restrict or prevent movement of vehicles out of the approach, creating a storage area during part of all of the peak hour.



CITY OF DIAMOND BAR – TIA GUIDELINES

5. **Criteria for Determining Significant Impacts:** The Los Angeles County CMP (their TIA requirements) uses two (2%) of capacity as the Project impact threshold of significance. The City of Diamond Bar has adopted this threshold for use in its TIA reports. For signalized intersections where the ICU analysis is used, a significant traffic impact is indicated if a 0.02 or greater ICU impact is caused by the Project and the intersection is found to operate at an unacceptable level (LOS “E” and “F” or LOS “F” at a CMP location). This same 2% threshold can also be translated to the other analysis methodologies that may be required to be included in the TIA report. As stated earlier however, it must be acknowledged that even if a Project is below an environmental significance level, this does not preclude the City from requiring Fair Share contributions toward impacts locations.

6. **Mitigations and Improvements:** After performing the analysis shown above, appropriate Mitigations to offset Project related impacts must be identified and detailed. These could include;
 - a. Recommended changes in roadway segments.
 - b. Recommended changes in intersection design.
 - c. Recommended engineering design measures to accommodate the assigned travel demand, i.e. analyses of signalization, implementation of signal coordination, etc.
 - d. Fair Share contributions toward long range (“ultimate”) improvements at intersection and/or street segment locations.
 - e. Identification of alternative transportation improvements that would provide the necessary benefits to offset the identified impacts.
 - f. Development of regional traffic and transportation measures that would assist in alleviating freeway and other “bypass” traffic and its associated impacts on the City of Diamond Bar.

In addition to Project mitigation measures required to satisfy environmental requirements there are potentially other impacted locations that may be identified in the TIA report. For any impacted locations, the TIA report shall identify feasible improvement measures to provide acceptable traffic LOS. These improvement measures may be “traditional” improvements such as road widening or could involve



CITY OF DIAMOND BAR – TIA GUIDELINES

innovative solutions that would provide the necessary transportation benefits. As a part of the TIA report, the improvement measures must be clearly identified (i.e., through description, figures and/or other methods) and cost estimates shall be provided for the identified improvements. The TIA report may also need to include the Project's proportionate share of the cost (either to satisfy environmental requirements or participate in needed improvements), which the City considers as follows:

Project's Impact
(per the Analysis Methodology)

X Cost of the Improvement = Project's Proportionate Share

Benefit of the Improvement
(per the Analysis Methodology)

A cost estimate shall be prepared for all mitigation and needed improvement measures. Guidelines for cost estimates shall be as follows:

- Design
- Bid Process
- Construction
- Construction Management
- Inspection
- Contingencies



City of Industry
Traffic Impact Analysis Guidelines

~~analysis, use the established significant impact thresholds for two-lane roadways as shown on page 6.~~

5. Significant Impact Threshold

For intersections, the impact is considered significant if the project related increase in the volume to capacity (v/c) ratio equals or exceeds the threshold shown below.

INTERSECTIONS		
Preproject		Project V/C Increase
LOS	V/C	
C	0.71 to 0.80	0.04 or more
D	0.81 to 0.90	0.02 or more
E/F	0.91 or more	0.01 or more

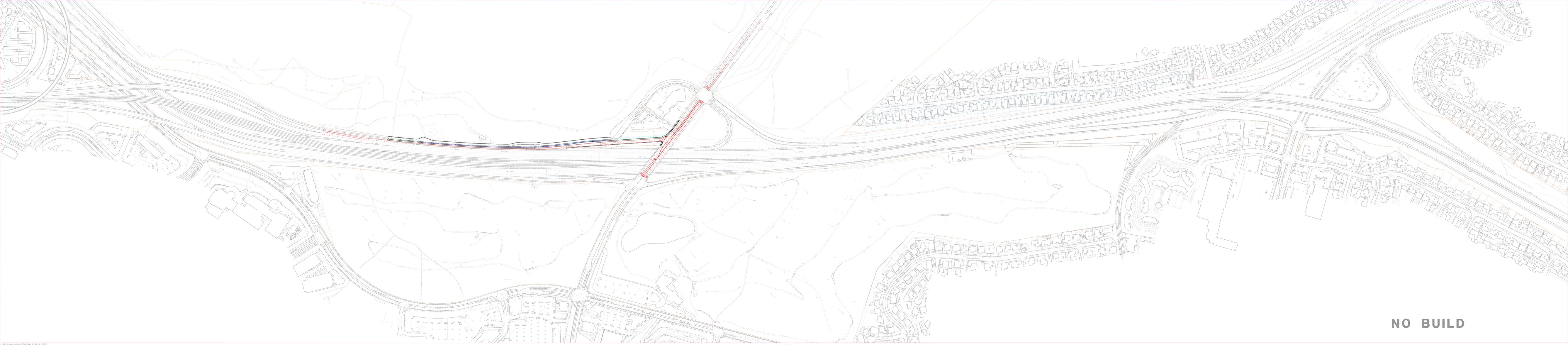
The project is deemed to have a significant impact on two-lane roadways when it adds the following percentages based on LOS of the preproject conditions.

TWO-LANE ROADWAYS				
Directional Split	Total Capacity (PCPH)	Percentages Increase in Passenger Car Per Hour (PCPH) by Project		
		Preproject LOS		
		C	D	E/F
50/50	2,800	4	2	1
60/40	2,650	4	2	1
70/30	2,500	4	2	1
80/20	2,300	4	2	1
90/10	2,100	4	2	1
100/0	2,000	4	2	1

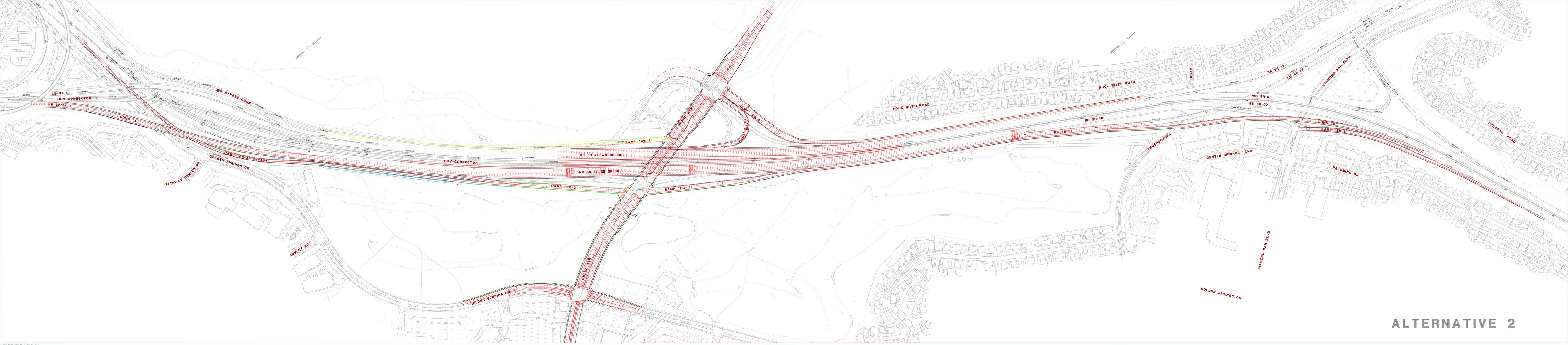
Note: City of Industry uses the above Los Angeles County Guidelines per a contract arrangement between the City of Industry and Los Angeles County.

Appendix J

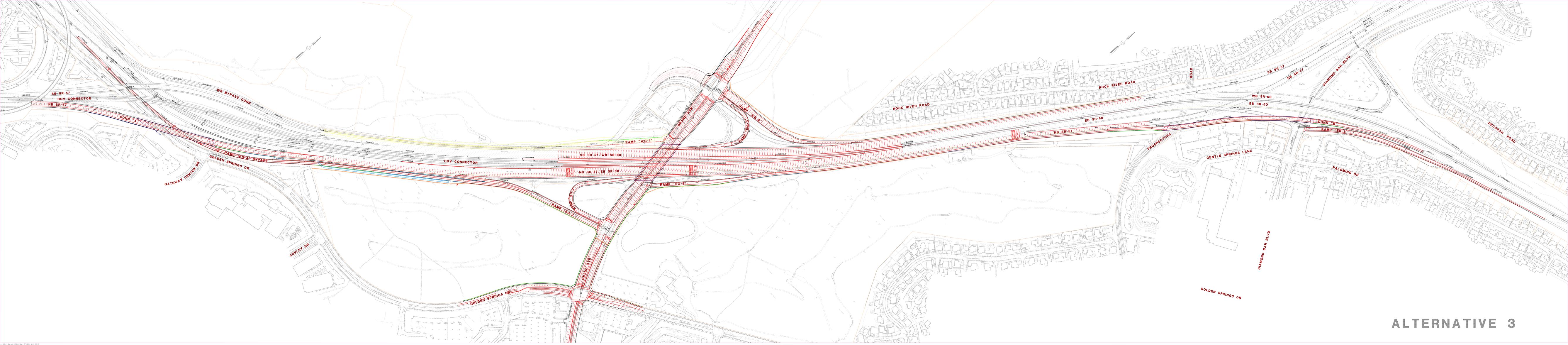
Concept Plans



NO BUILD



ALTERNATIVE 2



ALTERNATIVE 3

Appendix K Accident Data

Accident Data Analysis

Traffic Accident Surveillance and Analysis System (TASAS) data was provided by Caltrans District 7. The data covers the 36-month period from April 1, 2006 through March 31, 2009. The table below provides the actual accident rates for fatal, fatal plus injury, and total accidents to the average rate for mainline per million vehicle miles, and for ramps and connectors per million vehicles.

Accident Summary									
Location (PM to PM)		Post Mile	Total No. of Accidents	Actual Rate (acc/million vehicle)			Average Rate (acc/million vehicle)		
				F	F+I	Tot	F	F+I	Tot
Grand Avenue	Br No. 53-1864	R24.451	Grand Ave would be included as part of the ramp data						
Grand Avenue Ramps	WB Off-Ramp	R24.712	12	0.000	0.29	1.17	0.004	0.42	1.20
	WB On-Ramp	R24.551	7	0.000	0.15	0.51	0.002	0.26	0.80
	EB Off-Ramp	R24.277	35	0.000	0.46	2.68	0.004	0.42	1.20
	EB On-Ramp	R24.552	21	0.000	0.34	1.81	0.002	0.26	0.75
Diamond Bar Blvd. Ramps	WB Off-Ramp	R25.876	21	0.000	0.31	1.64	0.004	0.42	1.20
	WB On-Ramp	R25.659	9	0.000	0.18	1.64	0.002	0.26	0.80
	EB Off-Ramp	R25.440	11	0.000	0.30	1.67	0.004	0.42	1.20
	EB On-Ramp	R25.706	15	0.000	0.37	1.12	0.002	0.26	0.75
Connectors at SR-57/SR-60	NB57 to WB60	R4.160	16	0.000	0.09	0.72	0.005	0.20	0.60
	EB60 to SB57	R23.252	13	0.000	0.16	0.52	0.005	0.15	0.45
	NB57 to EB60	R23.708	14	0.000	.04	0.15	0.003	0.11	0.35
	WB60 to SB57	R23.884	52	0.000	0.10	0.53	0.005	0.20	0.60
	EB60 to NB57	R25.157	16	0.000	0.04	0.23	0.005	0.20	0.60
	SB57 to WB60	R25.372	8	0.000	0.03	0.12	0.003	0.11	0.35
Location (PM to PM)		Post Mile	Total No. of Accidents	Actual Rate (acc/mvm)			Average Rate (acc/mvm)		
				F	F+I	Tot	F	F+I	Tot
SR-60	WB	R23.173- R26.526	977	0.000	0.44	1.83	0.011	0.33	1.14
	EB	R23.173- R26.526	458	0.007	0.22	0.86	0.011	0.33	1.14
SR-57	NB	R4.160- 5.272	135	0.012	0.41	1.62	0.010	0.31	1.01
	SB	R4.160- 5.272	85	0.000	0.24	1.02	0.009	0.29	0.95

Additionally, northbound SR-57 (PMR4.296 to R4.496) is included on Table C for Potential Investigation Locations with the following data:

Table C - Potential Investigation Locations											
Location (PM to PM)		Post Mile	Total No. of Accidents					12 months rate			
								Actual Rate (acc/mvm)		Average Rate (acc/mvm)	
			36 mos	24 mo	12 mo	6 mo	3 mo	F+I	Tot	F+I	Tot
SR-57	NB	4.296- R4.496	72	43	25	15	11	1.11	2.78	0.33	1.08

The actual fatal accident rate is higher than the state wide average rate for the:

- Northbound SR-57

The actual fatal plus injury accident rate and total accidents rate are higher than average for the:

- Eastbound Grand Avenue Off-Ramp
- Eastbound Grand Avenue On-Ramp
- Eastbound Diamond Bar Boulevard On-ramp
- Westbound SR-60
- Connector from eastbound 60 to southbound SR-57
- Northbound SR-57

In addition to the above locations, the total actual accident rates are also higher than average for:

- Westbound Diamond Bar Boulevard Off-Ramp
- Westbound Diamond Bar Boulevard On-Ramp
- Eastbound Diamond Bar Boulevard Off-Ramp
- Connector from Northbound SR-57 to Westbound SR-60
- Southbound SR-57

The predominant collision type accident was rear-end for the:

- Eastbound Grand Avenue Off-Ramp
- All Grand Avenue Westbound Ramps
- All Diamond Bar Boulevard Ramps
- Eastbound and Westbound SR-60
- Northbound 57
- Connector from northbound SR-57 to eastbound SR-60
- Connector from eastbound SR-60 to northbound SR-57
- Connector from southbound SR-57 to westbound SR-60

Rear-end collisions are typically associated with congestion.

Sideswipe accidents were the predominant collision type for:

- Connector from westbound SR-60 to southbound SR-57
- Southbound SR-57

Sideswipe accidents are typically associated with weaving.

Rear-end and sideswipe accidents were equally predominant on the Eastbound Grand Avenue on-ramp.

Hit object accidents were the predominant collision type for:

- Connector from northbound SR-57 to westbound SR-60
- Connector from eastbound SR-60 to southbound SR-57

The primary collision factors for the hit object accidents were speeding and improper turns.