

MACARTHUR TRANSIT VILLAGE PROJECT

Volume 3. Draft Environmental Impact Report
(Appendix F)

SCH No. 2006022075



Prepared for:
City of Oakland

January 2008

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**APPENDIX A:
INTERSECTION TURNING MOVEMENT COUNTS**

MARKS TRAFFIC DATA

Start Time	SHATTUCK AV Southbound						SHATTUCK AV Northbound						52 nd ST CLAREMONT Westbound						52 nd ST CLAREMONT Eastbound						
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total					
08:00	144	204	107	455	126	1054	78	1258	20	125	389	124	889	172	1185	3297		63	7	4	74	19	12	76	107
08:15	68	79	42	189	52	397	30	369	20	81	159	67	256	70	402	1119		6	0	0	6	0	0	0	0
08:30	62	69	37	168	38	309	16	363	15	77	149	60	238	61	342	1073		2	0	0	2	0	0	0	0
08:45	43	52	29	124	30	288	11	329	6	49	31	86	32	200	60	292	831	3	0	0	3	0	0	0	0
Total	246	272	146	664	1166	1149	65	1449	50	259	206	515	170	906	288	3892		87	443	7	537	3	4	2	9
Grand Total	390	476	253	1119	231	2273	143	2707	123	460	331	914	294	1795	460	2549	10	4	10	24	417	167	417	0.3	
Approach %	34.9	42.5	22.6	10.7	84	5.3	37.1	1.7	6.3	4.5	12.5	1.4	24.6	6.3	35		0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.7	
Total %	5.4	6.5	3.5	15.4	4	31.2	2	37.1	1.7	6.3	4.5	12.5	1.4	24.6	6.3	35		0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.7

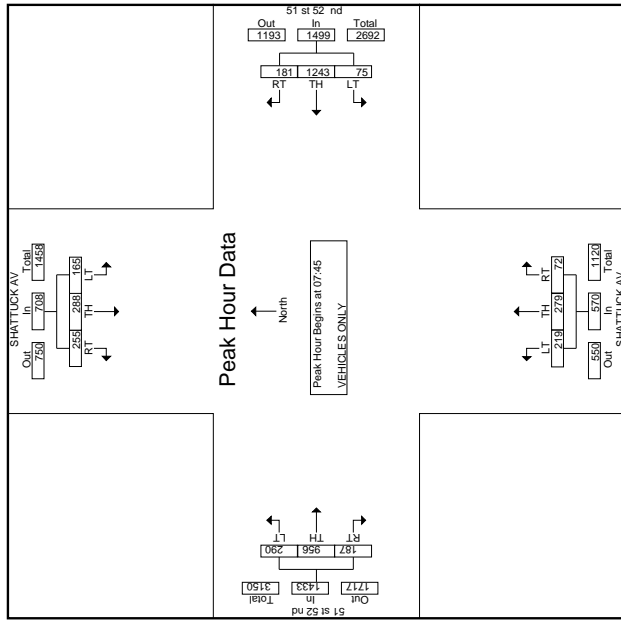
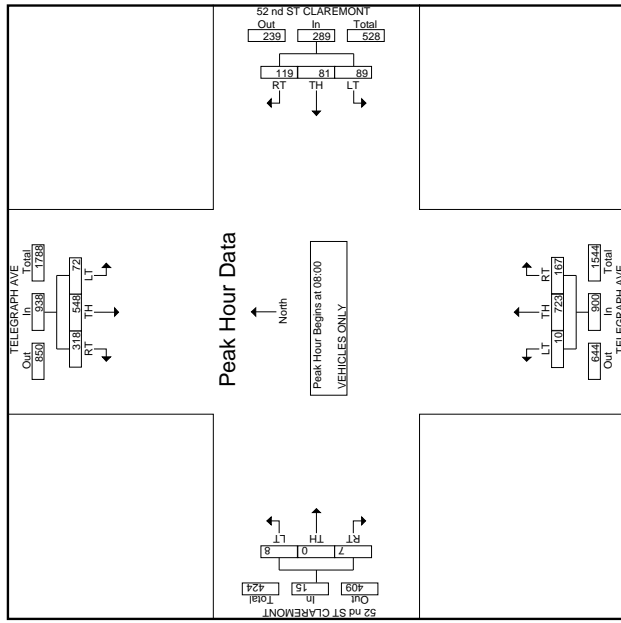
MARKS TRAFFIC DATA

Start Time	SHATTUCK AV Southbound						SHATTUCK AV Northbound						51 st 52 nd Westbound						51 st 52 nd Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
07:45	52	68	48	168	46	312	21	379	28	69	44	141	49	250	62	361	1049							
08:00	71	83	14	168	52	397	20	369	20	81	58	159	67	256	79	402	1119							
08:15	40	47	14	101	38	272	19	329	15	77	68	160	43	238	61	342	1073							
08:30	41	55	31	127	38	272	29	339	16	363	9	52	49	110	28	712	88	328	969					
08:45	52	68	48	168	46	312	21	379	28	69	44	141	49	250	62	361	1049							
Total	144	204	107	455	126	1054	78	1258	20	125	389	124	889	172	1185	3297								
Grand Total	390	476	253	1119	231	2273	143	2707	123	460	331	914	294	1795	460	2549	10	4	10	24				
Approach %	34.9	42.5	22.6	10.7	84	5.3	37.1	1.7	6.3	4.5	12.5	1.4	24.6	6.3	35		0.1	0.1	0.1	0.3				
Total %	5.4	6.5	3.5	15.4	4	31.2	2	37.1	1.7	6.3	4.5	12.5	1.4	24.6	6.3	35		0.1	0.1	0.1	0.3			

Start Time	SHATTUCK AV Southbound						SHATTUCK AV Northbound						51 st 52 nd Westbound						51 st 52 nd Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
07:45	52	68	48	168	46	312	21	379	28	69	44	141	49	250	62	361	1049							
08:00	71	83	14	168	52	397	20	369	20	81	58	159	67	256	79	402	1119							
08:15	40	47	14	101	38	272	19	329	15	77	68	160	43	238	61	342	1073							
08:30	41	55	31	127	38	272	29	339	16	363	9	52	49	110	28	712	88	328	969					
08:45	52	68	48	168	46	312	21	379	28	69	44	141	49	250	62	361	1049							
Total	144	204	107	455	126	1054	78	1258	20	125	389	124	889	172	1185	3297								
Grand Total	390	476	253	1119	231	2273	143	2707	123	460	331	914	294	1795	460	2549	10	4	10	24				
Approach %	34.9	42.5	22.6	10.7	84	5.3	37.1	1.7	6.3	4.5	12.5	1.4	24.6	6.3	35		0.1	0.1	0.1	0.3				
Total %	5.4	6.5	3.5	15.4	4	31.2	2	37.1	1.7	6.3	4.5	12.5	1.4	24.6	6.3	35		0.1	0.1	0.1	0.3			

Start Time	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						52 nd ST CLAREMONT Westbound						52 nd ST CLAREMONT Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
08:00	62	113	18	193	26	24	15	65	22	139	3	164	1	0	1	2	424							
08:15	85	138	19	242	38	24	25	87	42	196	1	239	2	0	3	5	573							
08:30	78	150	14	242	27	20	25	72	53	201	3	257	3	0	3	6	577							
08:45	93	147	21	261	28	13	24	65	50	197	3	240	1	0	1	2	958							
Total	318	548	72	938	119	81	89	289	167	723	10	900	7	0	8	15	2142							
Grand Total	483	884	107	1474	179	124	420	723	254	1166	17	1437	10	4	10	24	3355							
Approach %	32.8	60	7.3	43.9	5.3	3.5	3.7	12.5	7.6	34.8	0.5	42.8	0.3	0.1	0.3	0.7								
Total %	14.4	26.3	3.2	43.9	5.3	3.5	3.7	12.5	7.6	34.8	0.5	42.8	0.3	0.1	0.3	0.7								

Start Time	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						52 nd ST CLAREMONT Westbound						52 nd ST CLAREMONT Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
08:00	62	113	18	193	26	24	15	65	22	139	3	164	1	0	1	2	424							
08:15	85	138	19	242	38	24	25	87	42	196	1	239	2	0	3	5	573							
08:30	78	150	14	242	27	20	25	72	53	201	3	257	3	0	3	6	577							
08:45	93	147	21	261	28	13	24	65	50	197	3	240	1	0	1	2	958							
Total	318	548	72	938	119	81	89	289	167	723	10	900	7	0	8	15	2142							
Grand Total	483	884	107	1474	179	124	420	723	254	1166	17	1437	10	4	10	24	3355							
Approach %	32.8	60	7.3	43.9	5.3	3.5	3.7	12.5	7.6	34.8	0.5	42.8	0.3	0.1	0.3	0.7								
Total %	14.4	26.3	3.2	43.9	5.3	3.5	3.7	12.5	7.6	34.8	0.5	42.8	0.3	0.1	0.3	0.7								



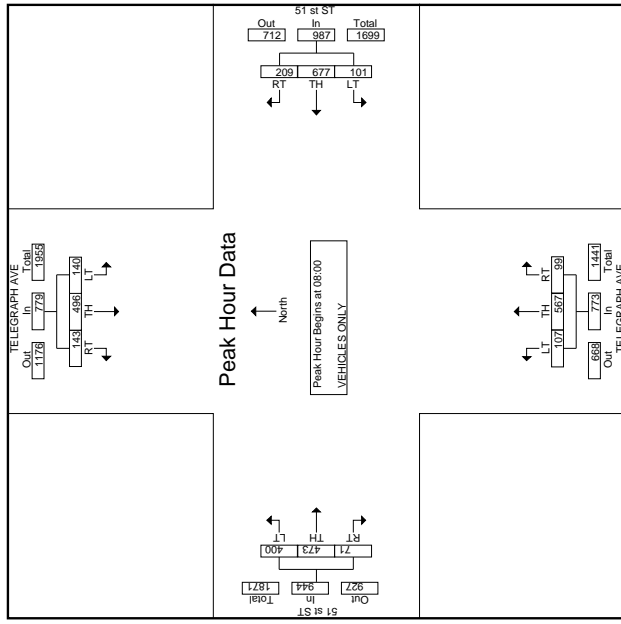
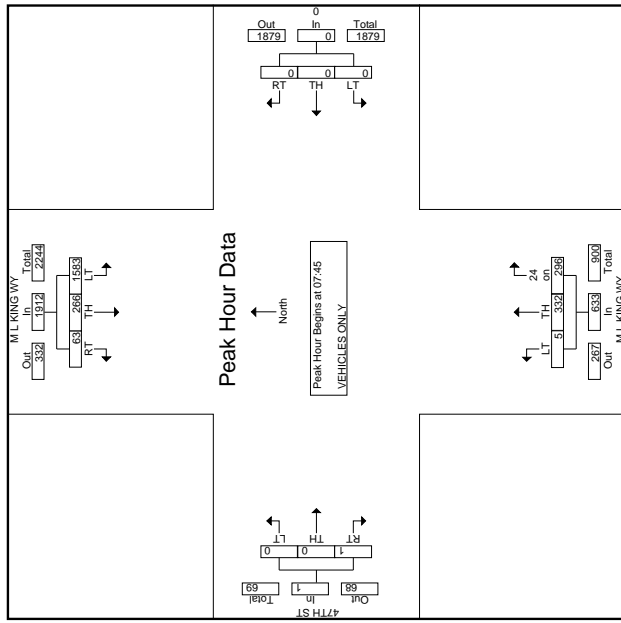
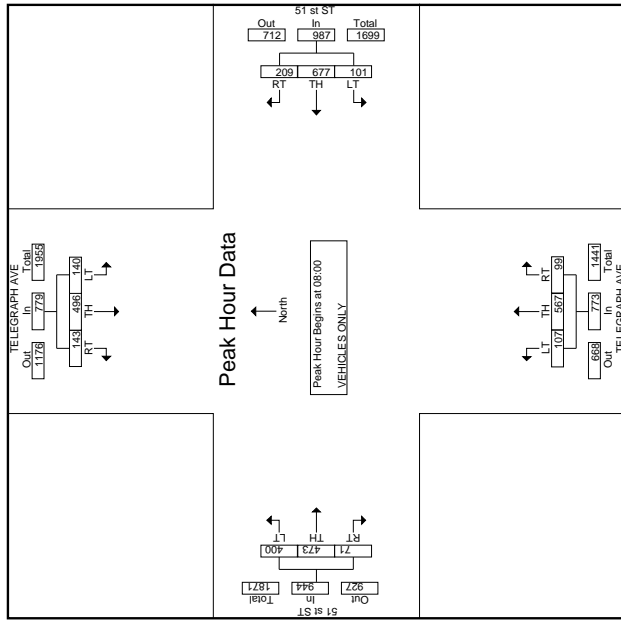
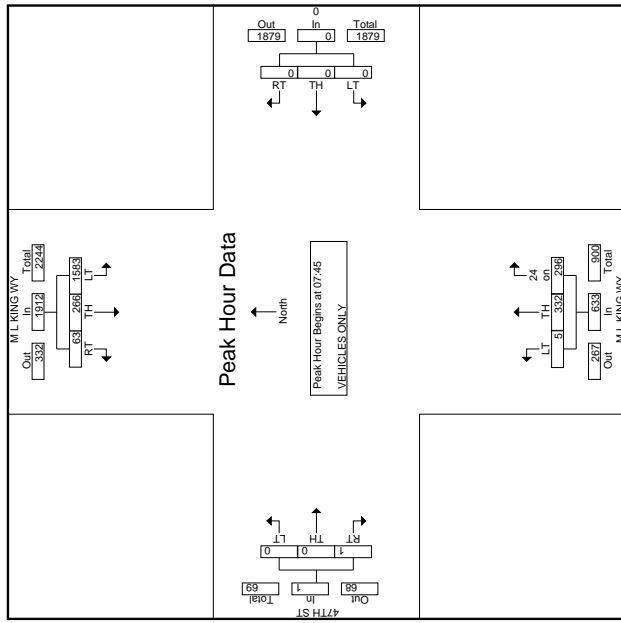
MARKS TRAFFIC DATA

Start Time	ML KING WY Southbound						ML KING WY Northbound						47TH ST Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
08:00	18	63	369	478	0	0	0	0	0	0	0	0	0	0	0	0		
08:15	22	83	403	508	0	0	0	0	0	0	0	0	0	0	0	0		
08:30	11	68	415	494	0	0	0	0	0	0	0	0	0	0	0	0		
08:45	5	52	368	425	0	0	0	0	0	0	0	0	0	0	0	0		
Total	56	265	1585	1906	0	0	0	0	0	0	0	0	0	0	0	0		
Grand Total	80	448	2896	3424	0	0	0	0	0	0	0	0	15	0	0	15		
Approach %	2.3	13.1	84.6	74.9	0	0	0	0	0	0	0	0	100	0	0	0.3		
Total %	1.8	9.8	63.4										24.7	0	0	6		

MARKS TRAFFIC DATA

Start Time	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						51 st ST Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
08:00	11	31	143	185	6	19	93	118	0	0	0	0	0	0	0	0		
08:15	14	39	163	216	9	26	115	150	0	0	0	0	0	0	0	0		
08:30	18	59	156	233	21	113	153	377	11	99	72	182	668	668	668	668		
08:45	29	107	41	177	39	132	29	200	16	129	20	165	13	119	88	220		
Total	72	380	126	578	117	467	59	532	39	389	273	701	2494	2494	2494	2494		
08:00	20	115	44	179	51	161	30	242	22	152	34	208	14	131	100	245		
08:15	39	129	36	204	62	182	31	275	31	130	29	190	19	122	99	240		
08:30	44	131	31	206	52	171	19	242	27	144	23	194	22	111	92	225		
08:45	40	121	29	190	44	153	21	228	19	141	21	181	16	109	109	234		
Total	143	498	140	779	209	677	101	987	99	567	107	773	71	473	400	944		
Grand Total	215	876	266	1357	326	1164	180	1670	156	983	166	1305	110	862	673	1645		
Approach %	15.8	64.6	19.6	45	22.7	19.5	13.6	27.9	12	75.3	12.7	2.8	21.8	1.8	14.4	11.3		
Total %	3.6	14.7	4.5													27.5		

Start Time	ML KING WY Southbound						ML KING WY Northbound						47TH ST Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
07:45	12	49	332	393	0	0	0	0	0	0	0	0	0	0	0	0		
08:00	6	29	186	221	0	0	0	0	0	0	0	0	0	0	0	0		
08:15	2	11	52	65	0	0	0	0	0	0	0	0	0	0	0	0		
08:30	4	49	332	385	0	0	0	0	0	0	0	0	0	0	0	0		
08:45	12	53	366	431	0	0	0	0	0	0	0	0	0	0	0	0		
Total	36	152	1068	1255	0	0	0	0	0	0	0	0	0	0	0	0		
Grand Total	80	448	2896	3424	0	0	0	0	0	0	0	0	15	0	0	15		
Approach %	2.3	13.1	84.6	74.9	0	0	0	0	0	0	0	0	100	0	0	0.3		
Total %	1.8	9.8	63.4										24.7	0	0	6		

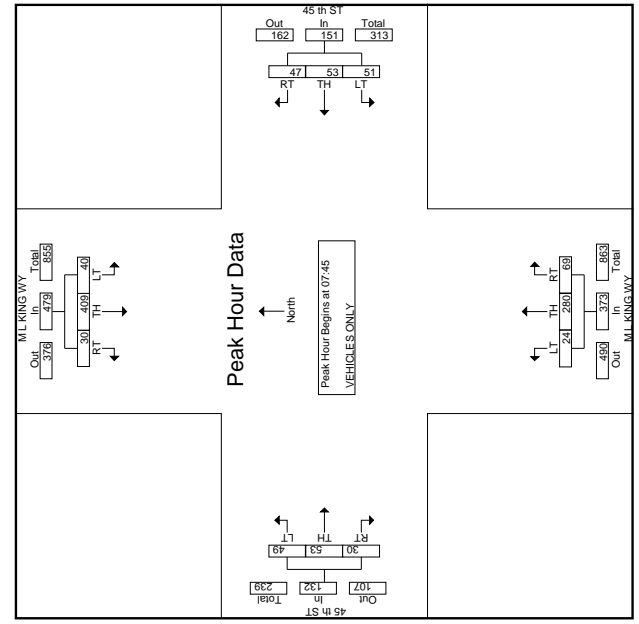


MARKS TRAFFIC DATA

Start Time	M L KING WY Southbound				M L KING WY Northbound				45th ST Westbound				45th ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	7	89	3	79	4	9	21	43	0	6	2	8	151			
07:15	3	71	3	84	2	11	12	23	1	4	6	16	191			
07:30	6	77	1	84	2	8	23	52	5	6	22	208				
07:45	7	89	7	103	9	15	33	59	5	7	13	35	244			
Total	23	316	30	369	22	43	37	102	32	19	32	81	795			
08:00	10	67	11	118	11	17	14	42	18	7	8	100	10	14	11	35
08:15	6	108	12	126	15	12	18	45	23	7	16	15	38	318		
08:30	7	115	10	132	12	9	10	31	19	6	9	11	10	24	278	
08:45	5	99	8	112	9	6	9	24	20	6	8	20	244			
Total	28	419	41	488	47	44	51	142	80	28	50	117	1135			
Grand Total	51	735	71	857	69	87	88	244	112	48	35	631	42	82	74	188
Approach %	6	85.8	8.3	28.3	35.7	36.1	17.7	76.7	5.5	1.8	32.7	2.2	4.2	3.8	10.3	
Total %	2.6	38.1	3.7	44.4	3.6	4.5	4.6	12.6	5.8	25.1	1.8	32.7	2.2	4.2	3.8	10.3

Start Time	M L KING WY Southbound				M L KING WY Northbound				45th ST Westbound				45th ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	10	97	11	118	11	17	14	42	18	7	8	100	10	14	11	35
08:15	6	108	12	126	15	12	18	45	23	7	16	15	38	318		
08:30	7	115	10	132	12	9	10	31	19	6	9	11	10	24	278	
08:45	5	99	8	112	9	6	9	24	20	6	8	20	244			
Total	28	419	41	488	47	44	51	142	80	28	50	117	1135			
Grand Total	51	735	71	857	69	87	88	244	112	48	35	631	42	82	74	188
Approach %	6	85.8	8.3	28.3	35.7	36.1	17.7	76.7	5.5	1.8	32.7	2.2	4.2	3.8	10.3	
Total %	2.6	38.1	3.7	44.4	3.6	4.5	4.6	12.6	5.8	25.1	1.8	32.7	2.2	4.2	3.8	10.3

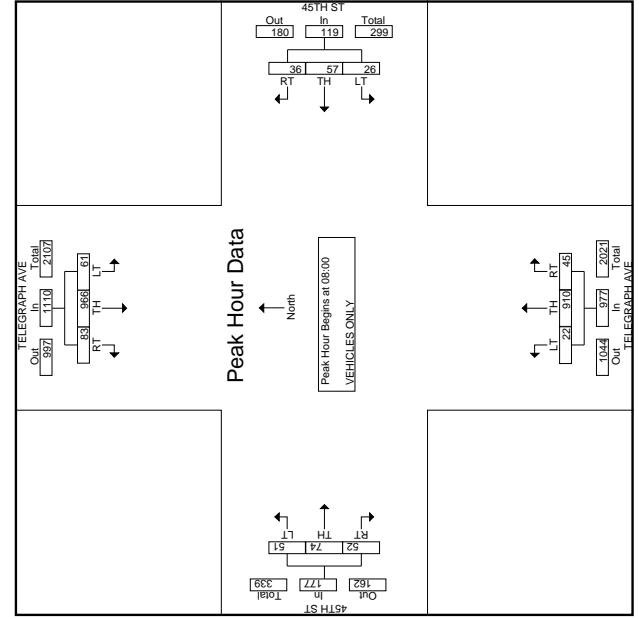
Start Time	M L KING WY Southbound				M L KING WY Northbound				45th ST Westbound				45th ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	10	97	11	118	11	17	14	42	18	7	8	100	10	14	11	35
08:15	6	108	12	126	15	12	18	45	23	7	16	15	38	318		
08:30	7	115	10	132	12	9	10	31	19	6	9	11	10	24	278	
08:45	5	99	8	112	9	6	9	24	20	6	8	20	244			
Total	28	419	41	488	47	44	51	142	80	28	50	117	1135			
Grand Total	51	735	71	857	69	87	88	244	112	48	35	631	42	82	74	188
Approach %	6	85.8	8.3	28.3	35.7	36.1	17.7	76.7	5.5	1.8	32.7	2.2	4.2	3.8	10.3	
Total %	2.6	38.1	3.7	44.4	3.6	4.5	4.6	12.6	5.8	25.1	1.8	32.7	2.2	4.2	3.8	10.3



MARKS TRAFFIC DATA

Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				45TH ST Westbound				45TH ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	8	122	3	147	3	189	2	145	9	3	3	14	591			
07:15	4	152	7	171	6	182	2	174	7	8	7	22	379			
07:30	13	172	3	188	7	182	3	191	11	6	6	23	419			
07:45	8	198	4	210	9	4	22	9	197	5	21	10	8	27	470	
Total	40	654	21	715	25	29	6	62	24	69	14	719	36	26	24	1582
08:00	17	211	7	235	9	11	3	23	12	22	4	237	10	12	12	34
08:15	18	238	3	259	10	14	8	32	15	24	7	263	12	16	9	37
08:30	24	268	50	342	6	17	10	33	8	239	8	255	14	21	15	50
08:45	24	249	1	274	11	15	5	31	10	209	3	222	16	25	15	56
Total	83	968	61	1110	36	57	26	119	45	910	22	977	52	74	51	177
Grand Total	123	1620	82	1825	61	86	34	181	69	1591	36	1686	88	100	75	263
Approach %	6.7	88.8	4.5	46	1.5	2.2	0.9	4.6	1.7	40.1	0.9	42.8	2.2	2.5	1.9	6.6
Total %	3.1	40.9	2.1	46	1.5	2.2	0.9	4.6	1.7	40.1	0.9	42.8	2.2	2.5	1.9	6.6

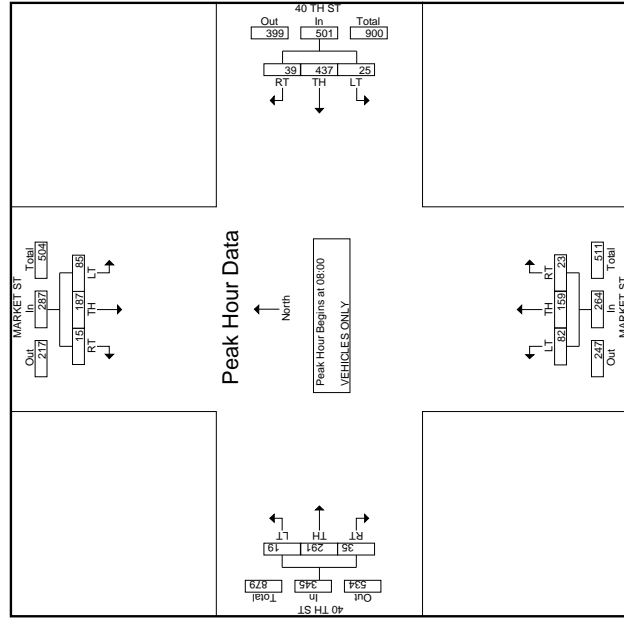
Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				45TH ST Westbound				45TH ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	17	211	7	235	9	11	3	23	12	22	4	237	10	12	12	34
08:15	18	238	3	259	10	14	8	32	15	24	7	263	12	16	9	37
08:30	24	268	50	342	6	17	10	33	8	239	8	255	14	21	15	50
08:45	24	249	1	274	11	15	5	31	10	209	3	222	16	25	15	56
Total	83	968	61	1110	36	57	26	119	45	910	22	977	52	74	51	177
Grand Total	123	1620	82	1825	61	86	34	181	69	1591	36	1686	88	100	75	263
Approach %	6.7	88.8	4.5	46	1.5	2.2	0.9	4.6	1.7	40.1	0.9	42.8	2.2	2.5	1.9	6.6
Total %	3.1	40.9	2.1	46	1.5	2.2	0.9	4.6	1.7	40.1	0.9	42.8	2.2	2.5	1.9	6.6



MARKS TRAFFIC DATA

Start Time	MARKET ST Southbound			MARKET ST Northbound			40 TH ST Westbound			40 TH ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
08:00	30	0	0	5	12	4	3	35	0	0	0	0
07:15	23	20	40	4	14	41	4	14	0	0	0	0
07:30	3	34	13	3	65	1	31	13	45	6	36	7
07:45	2	34	14	50	6	116	2	124	6	38	18	62
Total	10	107	59	175	9	266	6	281	17	122	54	193
Grand Total	3	60	25	78	11	93	8	112	6	37	21	64
Approach %	5.4	63.6	31	63.6	4.8	70.3	31	78.2	40	281	136	457
Total %	1.1	12.8	6.2	20.2	2.1	30.7	1.4	34.1	1.7	12.3	5.9	20

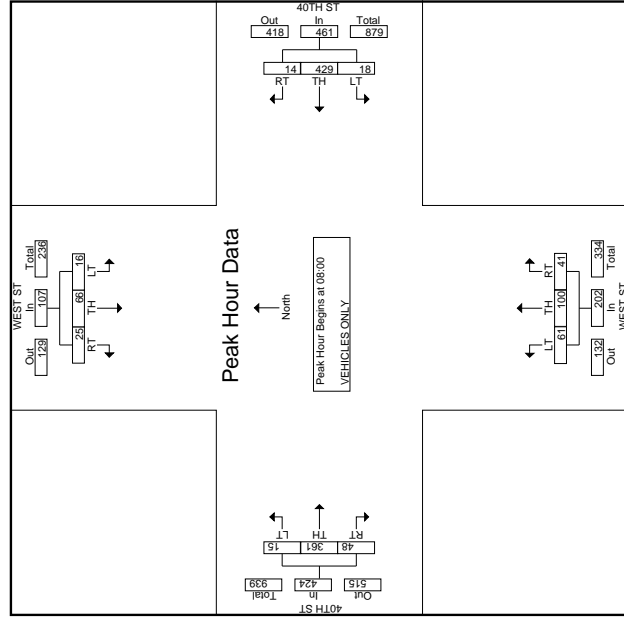
Start Time	MARKET ST Southbound			MARKET ST Northbound			40 TH ST Westbound			40 TH ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
08:00	3	50	25	6	37	21	64	9	72	0	81	335
08:15	4	67	16	10	121	3	48	21	72	10	84	382
08:30	3	35	21	59	12	107	1	120	8	44	24	76
08:45	8	95	23	63	9	133	6	148	6	30	15	52
Total	18	207	85	287	39	437	25	501	23	159	62	264
Grand Total	25	294	143	462	48	703	31	782	40	281	136	457
Approach %	5.4	63.6	31	63.6	4.8	70.3	31	78.2	40	281	136	457
Total %	1.1	12.8	6.2	20.2	2.1	30.7	1.4	34.1	1.7	12.3	5.9	20



MARKS TRAFFIC DATA

Start Time	WEST ST Southbound			WEST ST Northbound			40 TH ST Westbound			40 TH ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
08:00	4	8	3	15	0	0	40	7	4	19	4	62
07:15	4	7	2	17	0	0	47	8	7	8	2	58
07:30	8	12	5	25	2	98	8	16	19	27	7	46
07:45	8	12	5	25	2	98	8	16	19	27	7	46
Total	24	33	13	70	3	240	7	250	26	46	41	113
Grand Total	5	14	5	24	6	83	7	106	11	34	10	55
Approach %	2.6	5.2	1.5	9.2	0.9	34.8	1.3	37	3.5	7.6	5.3	16.4
Total %	1.1	12.8	6.2	20.2	2.1	30.7	1.4	34.1	1.7	12.3	5.9	20

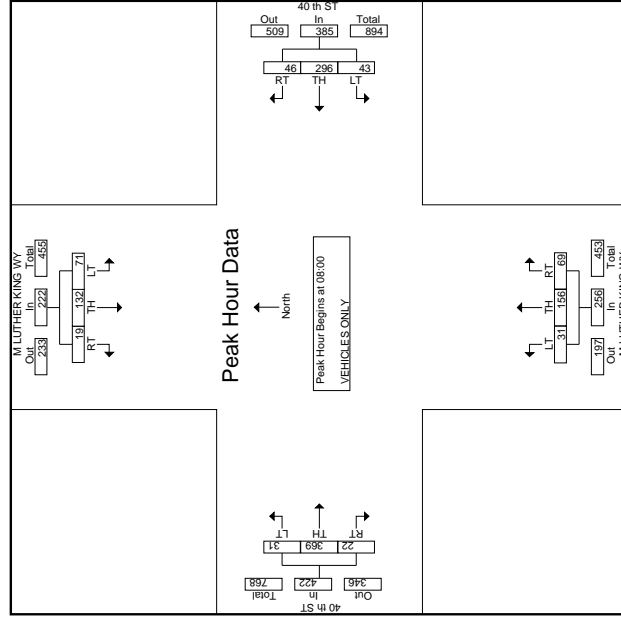
Start Time	WEST ST Southbound			WEST ST Northbound			40 TH ST Westbound			40 TH ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
08:00	5	14	5	24	6	83	7	106	11	34	10	55
08:15	7	23	2	32	2	106	3	111	11	24	15	50
08:30	6	14	6	26	4	104	7	115	7	20	22	49
08:45	7	15	3	25	2	126	1	129	12	22	14	48
Total	25	66	16	107	14	429	18	461	41	100	61	202
Grand Total	49	99	29	177	17	669	25	711	67	146	102	315
Approach %	2.6	5.2	1.5	9.2	0.9	34.8	1.3	37	3.5	7.6	5.3	16.4
Total %	1.1	12.8	6.2	20.2	2.1	30.7	1.4	34.1	1.7	12.3	5.9	20



MARKS TRAFFIC DATA

Start Time	M LUTHER KING WY Southbound						M LUTHER KING WY Northbound						40th ST Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
07:00	0	11	15	26	7	32	10	49	11	17	2	30	0	49	4	53		
07:05	0	3	14	17	2	24	5	29	7	9	7	23	0	62	7	69		
07:30	0	4	18	22	3	21	5	26	5	11	3	19	0	57	2	60		
07:45	3	23	18	44	13	80	4	97	17	38	7	63	5	66	6	77		
Total	9	76	61	146	42	176	22	240	63	117	21	201	11	230	22	263		
08:00	2	25	18	45	7	45	13	65	19	54	9	82	8	77	13	98		
08:05	4	35	24	53	12	106	7	124	9	34	9	52	5	98	6	109		
08:30	9	46	19	74	16	78	6	100	22	33	5	60	2	95	4	101		
08:45	19	132	71	222	46	296	43	385	69	156	31	256	22	369	31	422		
Total	28	208	132	368	86	472	65	625	132	273	62	457	33	659	53	685		
Grand Total	78	595	363	1044	141	755	104	1044	293	6.2	12.8	2.4	21.4	1.5	28.1	2.5	32.1	
App. %	1.3	9.7	6.2	17.2	4.1	22.1	3	29.3	6.2	12.8	2.4	21.4	1.5	28.1	2.5	32.1		
Total %																		

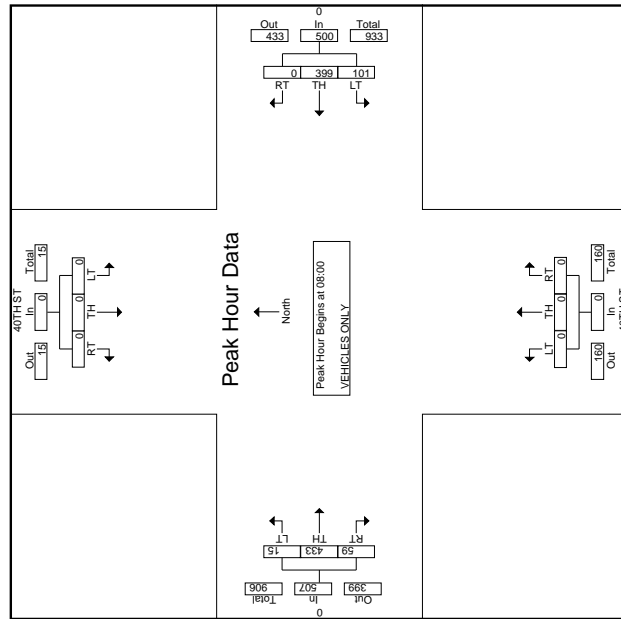
Start Time	M LUTHER KING WY Southbound						M LUTHER KING WY Northbound						40th ST Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
07:00	0	11	15	26	7	32	10	49	11	17	2	30	0	49	4	53		
07:05	0	3	14	17	2	24	5	29	7	9	7	23	0	62	7	69		
07:30	0	4	18	22	3	21	5	26	5	11	3	19	0	57	2	60		
07:45	3	23	18	44	13	80	4	97	17	38	7	63	5	66	6	77		
Total	9	76	61	146	42	176	22	240	63	117	21	201	11	230	22	263		
08:00	2	25	18	45	7	45	13	65	19	54	9	82	8	77	13	98		
08:05	4	35	24	53	12	106	7	124	9	34	9	52	5	98	6	109		
08:30	9	46	19	74	16	78	6	100	22	33	5	60	2	95	4	101		
08:45	19	132	71	222	46	296	43	385	69	156	31	256	22	369	31	422		
Total	28	208	132	368	86	472	65	625	132	273	62	457	33	659	53	685		
Grand Total	78	595	363	1044	141	755	104	1044	293	6.2	12.8	2.4	21.4	1.5	28.1	2.5	32.1	
App. %	1.3	9.7	6.2	17.2	4.1	22.1	3	29.3	6.2	12.8	2.4	21.4	1.5	28.1	2.5	32.1		
Total %																		



MARKS TRAFFIC DATA

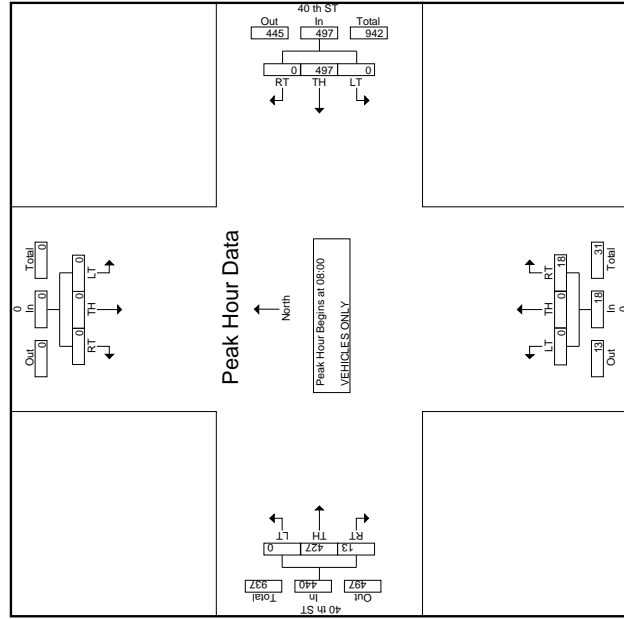
Start Time	40TH ST Southbound						40TH ST Northbound						Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
08:05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
App. %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total %																		

Start Time	40TH ST Southbound						40TH ST Northbound						Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
08:05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
App. %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Total %																		



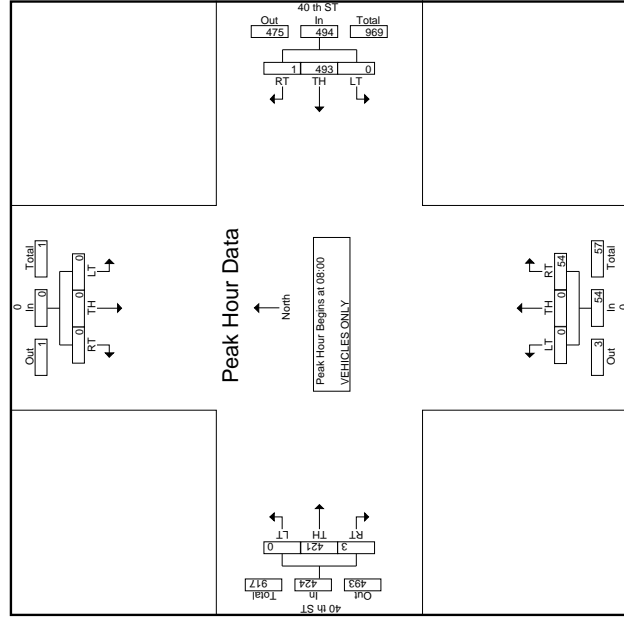
Start Time	0			40 th ST			0			40 th ST			0		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	0			40 th ST			0			40 th ST			0		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Start Time	0			40 th ST			0			40 th ST			0		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

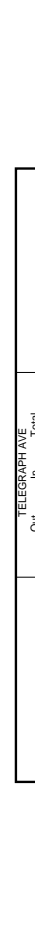
Start Time	0			40 th ST			0			40 th ST			0		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



MARKS TRAFFIC DATA

Start Time	Groups Printed - VEHICLES ONLY											
	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				BART PARKING ACCESS Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
07:00	10	8	8	26	0	0	0	0	0	0	0	0
07:15	8	6	6	20	0	0	0	0	0	0	0	0
07:30	11	8	8	27	0	0	0	0	0	0	0	0
07:45	8	12	0	20	0	0	0	0	0	0	0	0
Total	43	34	0	117	0	0	0	0	0	0	0	0
08:00	11	10	0	21	0	0	0	0	0	0	0	0
08:15	5	15	0	20	0	0	0	0	0	0	0	0
08:30	7	15	0	22	0	0	0	0	0	0	0	0
08:45	4	16	0	20	0	0	0	0	0	0	0	0
Total	27	56	0	83	0	0	0	0	0	0	0	0
Grand Total	70	92	0	162	0	0	0	0	0	0	0	0
Approach %	7	93	0	100	0	0	0	0	0	0	0	0
Total %	3.6	47.2	0	50.8	0	0	0	0	0	0	0	0

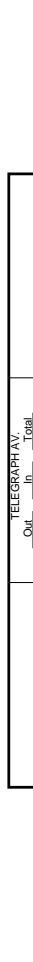
Start Time	Groups Printed - VEHICLES ONLY											
	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				BART PARKING ACCESS Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	11	10	0	21	0	0	0	0	0	0	0	0
08:15	5	15	0	20	0	0	0	0	0	0	0	0
08:30	7	15	0	22	0	0	0	0	0	0	0	0
08:45	4	16	0	20	0	0	0	0	0	0	0	0
Total	27	56	0	83	0	0	0	0	0	0	0	0
Grand Total	70	92	0	162	0	0	0	0	0	0	0	0
Approach %	7	93	0	100	0	0	0	0	0	0	0	0
Total %	3.6	47.2	0	50.8	0	0	0	0	0	0	0	0



MARKS TRAFFIC DATA

Start Time	Groups Printed - Vehicles only											
	TELEGRAPH AV. Southbound				TELEGRAPH AV. Northbound				40th ST. Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
07:00	19	58	9	86	7	58	16	81	11	32	12	55
07:15	17	55	6	78	6	55	19	80	11	32	12	55
07:30	17	55	6	78	6	55	19	80	11	32	12	55
07:45	28	110	21	159	18	67	6	91	11	32	12	55
Total	82	328	52	462	43	209	34	286	47	177	65	289
08:00	30	91	23	144	10	81	12	103	17	63	22	102
08:15	42	138	19	199	19	89	8	116	17	63	22	102
08:30	42	138	19	199	19	89	8	116	17	63	22	102
08:45	41	143	15	199	24	92	8	124	16	70	22	108
Total	144	507	78	729	64	351	43	458	72	303	74	449
Grand Total	226	835	130	1191	107	560	77	744	119	460	139	738
Approach %	19	701	109	829	63	255	18	237	164	65	18	188
Total %	6.5	23.8	3.7	34	1.5	17.9	4.3	23.7	3.4	13.7	4	21.1

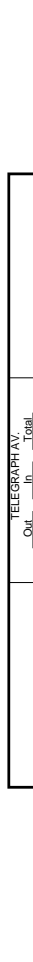
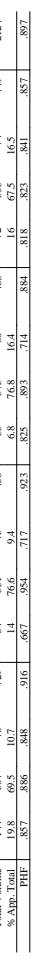
Start Time	Groups Printed - Vehicles only											
	TELEGRAPH AV. Southbound				TELEGRAPH AV. Northbound				40th ST. Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	10	81	12	103	6	83	18	107	17	63	22	102
08:15	31	135	21	187	11	108	7	126	17	78	13	108
08:30	42	138	19	199	19	89	8	116	16	70	22	108
08:45	41	143	15	199	24	92	8	124	16	70	22	108
Total	144	507	78	729	64	351	43	458	72	303	74	449
Grand Total	226	835	130	1191	107	560	77	744	119	460	139	738
Approach %	19	701	109	829	63	255	18	237	164	65	18	188
Total %	6.5	23.8	3.7	34	1.5	17.9	4.3	23.7	3.4	13.7	4	21.1



MARKS TRAFFIC DATA

Start Time	Groups Printed - VEHICLES ONLY											
	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				BART PARKING ACCESS Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
07:00	10	8	8	26	0	0	0	0	0	0	0	0
07:15	8	6	6	20	0	0	0	0	0	0	0	0
07:30	11	8	8	27	0	0	0	0	0	0	0	0
07:45	8	12	0	20	0	0	0	0	0	0	0	0
Total	43	34	0	117	0	0	0	0	0	0	0	0
08:00	11	10	0	21	0	0	0	0	0	0	0	0
08:15	5	15	0	20	0	0	0	0	0	0	0	0
08:30	7	15	0	22	0	0	0	0	0	0	0	0
08:45	4	16	0	20	0	0	0	0	0	0	0	0
Total	27	56	0	83	0	0	0	0	0	0	0	0
Grand Total	70	92	0	162	0	0	0	0	0	0	0	0
Approach %	7	93	0	100	0	0	0	0	0	0	0	0
Total %	3.6	47.2	0	50.8	0	0	0	0	0	0	0	0

Start Time	Groups Printed - VEHICLES ONLY											
	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				BART PARKING ACCESS Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	11	10	0	21	0	0	0	0	0	0	0	0
08:15	5	15	0	20	0	0	0	0	0	0	0	0
08:30	7	15	0	22	0	0	0	0	0	0	0	0
08:45	4	16	0	20	0	0	0	0	0	0	0	0
Total	27	56	0	83	0	0	0	0	0	0	0	0
Grand Total	70	92	0	162	0	0	0	0	0	0	0	0
Approach %	7	93	0	100	0	0	0	0	0	0	0	0
Total %	3.6	47.2	0	50.8	0	0	0	0	0	0	0	0



MARKS TRAFFIC DATA

File Name : west-mcauthera
 Site Code : 00000000
 Start Date : 5/9/2006
 Page No : 1

AM 19
 OKLAND
 FPW B
 TITO [916] 715-4006

Start Time	WEST ST Southbound			MACARTHUR BLVD Westbound			WEST ST Northbound			MACARTHUR BLVD Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
07:00	0	58	2	60	3	0	1	113	0	118	0	0
07:15	0	68	1	69	4	0	1	87	0	87	0	0
07:30	0	91	3	94	11	0	12	96	0	100	0	0
07:45	0	111	4	115	14	0	15	104	0	109	0	0
Total	0	331	12	343	27	0	32	387	0	402	0	0
08:00	0	110	3	113	8	0	1	117	0	117	0	0
08:15	0	154	6	160	12	0	3	151	0	152	0	0
08:30	0	155	2	157	8	0	2	164	0	169	0	0
Total	0	583	15	598	34	0	11	625	0	634	0	0
Grand Total	0	914	27	941	61	0	16	912	0	936	0	0
Approach %	0	97.1	2.9	97.2	3.1	0	0.8	3.9	1.2	46.7	0	0
Total %	0	46.8	1.4	48.2	3.1	0	0.8	3.9	1.2	46.7	0	0

MARKS TRAFFIC DATA

File Name : e-telegraph-38th-a
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

AM 18
 OKLAND
 FPW H
 TITO [916] 715 - 4006

Start Time	TELEGRAPH AV Southbound			38 th ST Westbound			TELEGRAPH AV Northbound			Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
07:00	0	58	2	60	3	0	1	113	0	118	0	0
07:15	0	68	1	69	4	0	1	87	0	87	0	0
07:30	0	91	3	94	11	0	12	96	0	100	0	0
07:45	0	111	4	115	14	0	15	104	0	109	0	0
Total	0	331	12	343	27	0	32	387	0	402	0	0
08:00	0	110	3	113	8	0	1	117	0	117	0	0
08:15	0	154	6	160	12	0	3	151	0	152	0	0
08:30	0	155	2	157	8	0	2	164	0	169	0	0
Total	0	583	15	598	34	0	11	625	0	634	0	0
Grand Total	0	914	27	941	61	0	16	912	0	936	0	0
Approach %	0	97.1	2.9	97.2	3.1	0	0.8	3.9	1.2	46.7	0	0
Total %	0	46.8	1.4	48.2	3.1	0	0.8	3.9	1.2	46.7	0	0

MARKS TRAFFIC DATA

File Name : west-mcauthera
 Site Code : 00000000
 Start Date : 5/9/2006
 Page No : 1

AM 19
 OKLAND
 FPW B
 TITO [916] 715-4006

Start Time	WEST ST Southbound			MACARTHUR BLVD Westbound			WEST ST Northbound			MACARTHUR BLVD Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
07:00	0	58	2	60	3	0	1	113	0	118	0	0
07:15	0	68	1	69	4	0	1	87	0	87	0	0
07:30	0	91	3	94	11	0	12	96	0	100	0	0
07:45	0	111	4	115	14	0	15	104	0	109	0	0
Total	0	331	12	343	27	0	32	387	0	402	0	0
08:00	0	110	3	113	8	0	1	117	0	117	0	0
08:15	0	154	6	160	12	0	3	151	0	152	0	0
08:30	0	155	2	157	8	0	2	164	0	169	0	0
Total	0	583	15	598	34	0	11	625	0	634	0	0
Grand Total	0	914	27	941	61	0	16	912	0	936	0	0
Approach %	0	97.1	2.9	97.2	3.1	0	0.8	3.9	1.2	46.7	0	0
Total %	0	46.8	1.4	48.2	3.1	0	0.8	3.9	1.2	46.7	0	0

MARKS TRAFFIC DATA

File Name : west-mcauthera
 Site Code : 00000000
 Start Date : 5/9/2006
 Page No : 1

AM 19
 OKLAND
 FPW B
 TITO [916] 715-4006

Start Time	WEST ST Southbound			MACARTHUR BLVD Westbound			WEST ST Northbound			MACARTHUR BLVD Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
07:00	0	58	2	60	3	0	1	113	0	118	0	0
07:15	0	68	1	69	4	0	1	87	0	87	0	0
07:30	0	91	3	94	11	0	12	96	0	100	0	0
07:45	0	111	4	115	14	0	15	104	0	109	0	0
Total	0	331	12	343	27	0	32	387	0	402	0	0
08:00	0	110	3	113	8	0	1	117	0	117	0	0
08:15	0	154	6	160	12	0	3	151	0	152	0	0
08:30	0	155	2	157	8	0	2	164	0	169	0	0
Total	0	583	15	598	34	0	11	625	0	634	0	0
Grand Total	0	914	27	941	61	0	16	912	0	936	0	0
Approach %	0	97.1	2.9	97.2	3.1	0	0.8	3.9	1.2	46.7	0	0
Total %	0	46.8	1.4	48.2	3.1	0	0.8	3.9	1.2	46.7	0	0

MARKS TRAFFIC DATA

File Name : west-mcauthera
 Site Code : 00000000
 Start Date : 5/9/2006
 Page No : 1

AM 19
 OKLAND
 FPW B
 TITO [916] 715-4006

Start Time	WEST ST Southbound			MACARTHUR BLVD Westbound			WEST ST Northbound			MACARTHUR BLVD Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
07:00	0	58	2	60	3	0	1	113	0	118	0	0
07:15	0	68	1	69	4	0	1	87	0	87	0	0
07:30	0	91	3	94	11	0	12	96	0	100	0	0
07:45	0	111	4	115	14	0	15	104	0	109	0	0
Total	0	331	12	343	27	0	32	387	0	402	0	0
08:00	0	110	3	113	8	0	1	117	0	117	0	0
08:15	0	154	6	160	12	0	3	151	0	152	0	0
08:30	0	155	2	157	8	0	2	164	0	169	0	0
Total	0	583	15	598	34	0	11	625	0	634	0	0
Grand Total	0	914	27	941	61	0	16	912	0	936	0	0
Approach %	0	97.1	2.9	97.2	3.1	0	0.8	3.9	1.2	46.7	0	0
Total %	0	46.8	1.4	48.2	3.1	0	0.8	3.9	1.2	46.7	0	0

MARKS TRAFFIC DATA

File Name : west-mcauthera
 Site Code : 00000000
 Start Date : 5/9/2006
 Page No : 1

AM 19
 OKLAND
 FPW B
 TITO [916] 715-4006

Start Time	WEST ST Southbound			MACARTHUR BLVD Westbound			WEST ST Northbound			MACARTHUR BLVD Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
07:00	0	58	2	60	3	0	1	113	0	118	0	0
07:15	0	68	1	69	4	0	1	87	0	87	0	0
07:30	0	91	3	94	11	0	12	96	0	100	0	0
07:45	0	111	4	115	14	0	15	104	0	109	0	0
Total	0	331	12	343	27	0	32	387	0	402	0	0
08:00	0	110	3	113	8	0	1	117	0	117	0	0
08:15	0	154	6	160	12	0	3	151	0	152	0	0
08:30	0	155	2	157	8	0	2	164	0	169	0	0
Total	0	583	15	598	34	0	11	625	0	634	0	0
Grand Total	0	914	27	941	61	0	16	912	0	936	0	0
Approach %	0	97.1	2.9	97.2	3.1	0	0.8	3.9	1.2	46.7	0	0
Total %	0	46.8	1.4	48.2	3.1	0	0.8	3.9	1.2	46.7	0	0

MARKS TRAFFIC DATA

File Name : west-mcauthera
 Site Code : 00000000
 Start Date : 5/9/2006
 Page No : 1

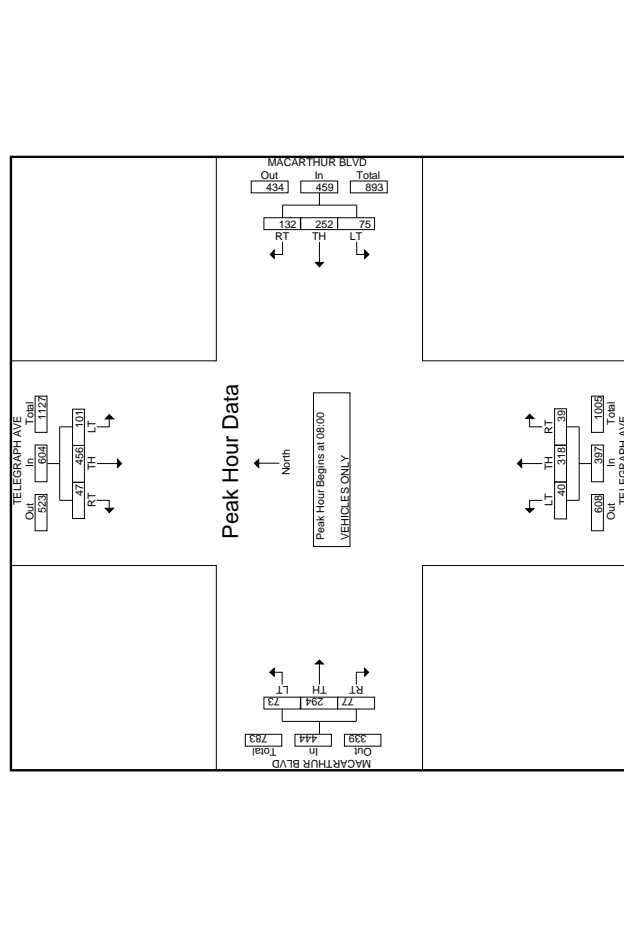
AM 19
 OKLAND
 FPW B
 TITO [916] 715-4006

Start Time	WEST ST Southbound			MACARTHUR BLVD Westbound			WEST ST Northbound			MACARTHUR BLVD Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
07:00	0	58	2	60	3	0	1	113	0	118	0	0
07:15	0	68	1	69	4	0	1	87	0	87	0	0
07:30	0	91	3	94	11	0	12	96	0	100	0	0
07:45	0	111	4	115	14	0	15	104	0	109	0	0
Total	0	331	12	343	27	0	32	387	0	402	0	0
08:00	0	110	3	113	8	0	1	117	0	117	0	0
08:15	0	154	6	160	12	0	3	151	0	152	0	0
08:30	0	155	2	157	8	0	2	164	0	169	0	0
Total	0	583	15	598	34	0	11	625	0	634	0	0
Grand Total	0	914	27	941	61	0	16	912	0	936	0	0
Approach %	0	97.1	2.9	97.2	3.1	0	0.8	3.9	1.2	46.7	0	0
Total %	0	46.8	1.4	48.2	3.1	0	0.8	3.9	1.2	46.7	0	0

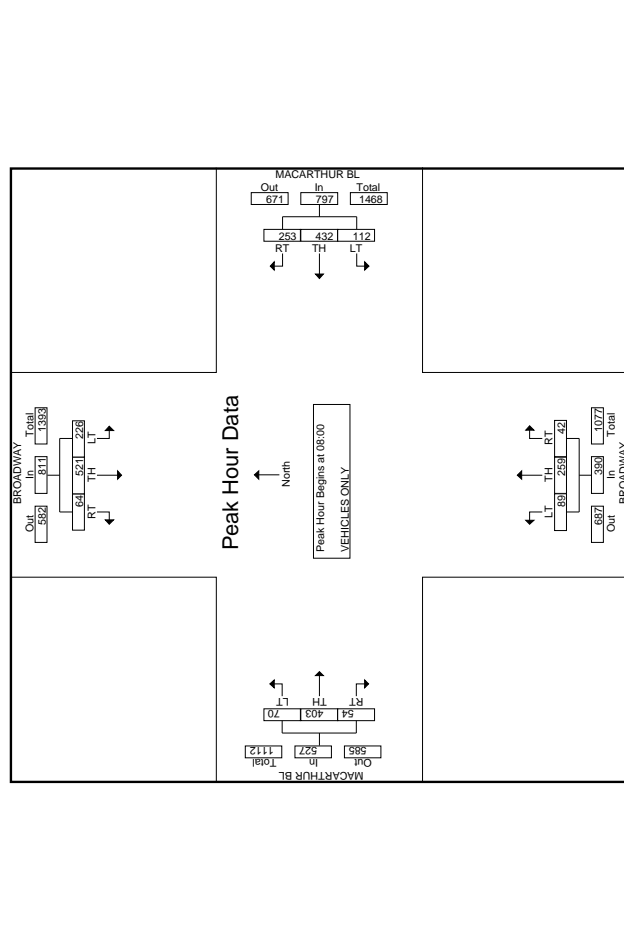
MARKS TRAFFIC DATA

File Name : west-mcauthera
 Site Code : 00000000
 Start Date

Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				MACARTHUR BLVD Westbound				MACARTHUR BLVD Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	4	11	12	27	6	11	10	27	6	16	16	38	7	17	21	55
07:15	1	4	12	17	7	11	10	28	7	16	16	39	8	17	21	56
07:30	7	12	17	36	9	16	16	41	10	19	18	47	11	20	24	55
07:45	8	8	21	37	10	16	16	42	11	19	18	48	12	21	24	55
Total	30	224	65	319	132	482	45	659	28	219	37	284	72	241	75	388
08:00	8	95	20	113	32	61	10	103	10	75	4	89	16	77	19	112
08:15	8	109	30	147	42	60	19	121	6	77	11	94	28	71	17	116
08:30	9	135	33	177	25	61	18	104	8	74	16	98	13	75	23	111
08:45	22	127	18	167	33	70	28	131	15	92	9	116	20	71	14	105
Total	47	456	101	604	132	252	75	459	39	318	40	387	77	294	73	444
Grand Total	77	680	166	923	264	434	120	618	67	537	77	681	149	535	148	832
Approach %	8.3	73.7	18	28.4	8.1	13.3	3.7	25.1	2.1	16.5	2.4	20.9	4.6	16.4	4.5	25.6
Total %	2.4	20.9	5.1													



Start Time	BROADWAY Southbound				MACARTHUR BLVD Westbound				BROADWAY Northbound				MACARTHUR BLVD Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	1	11	12	24	7	17	16	40	7	16	16	39	8	17	21	55
07:15	1	4	12	17	7	11	10	28	7	16	16	39	8	17	21	56
07:30	9	16	22	47	10	16	16	42	10	19	18	47	11	20	24	55
07:45	13	8	24	45	13	16	16	45	13	19	18	50	12	21	24	55
Total	41	265	174	480	177	341	72	590	38	170	41	249	45	271	80	386
08:00	9	118	56	183	57	93	24	174	12	62	28	102	12	92	16	130
08:15	21	146	63	230	95	112	23	230	10	70	23	103	14	121	22	157
08:30	18	141	58	217	43	90	33	166	6	62	24	92	9	107	12	128
08:45	16	116	49	181	58	137	32	227	14	65	14	93	19	83	20	122
Total	64	521	226	811	253	432	112	797	42	259	89	390	54	403	70	527
Grand Total	105	786	400	1291	430	773	184	1387	80	429	130	639	99	674	150	923
Approach %	8.1	60.9	31	30.4	10.1	18.2	4.3	32.7	1.9	10.1	3.1	15.1	2.3	15.9	3.5	21.8
Total %	2.5	18.5	9.4													



MARKS TRAFFIC DATA

File Name : telegraph-27th-a
 Site Code : 00000000
 Start Date : 5/9/2006
 Page No : 1

AM 26
 OKLAND
 FPW A
 TITO [916] 715-4006

Start Time	TELEGRAPH AVE Southbound			TELEGRAPH AVE Westbound			TELEGRAPH AVE Northbound			27th ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	13	10	10	15	15	10	5	4	4	18	10	10
08:05	23	18	10	17	17	10	5	4	4	18	10	10
08:10	22	18	10	17	17	10	5	4	4	18	10	10
08:15	22	18	10	17	17	10	5	4	4	18	10	10
08:20	22	18	10	17	17	10	5	4	4	18	10	10
08:25	22	18	10	17	17	10	5	4	4	18	10	10
08:30	22	18	10	17	17	10	5	4	4	18	10	10
08:35	22	18	10	17	17	10	5	4	4	18	10	10
08:40	22	18	10	17	17	10	5	4	4	18	10	10
08:45	22	18	10	17	17	10	5	4	4	18	10	10
08:50	22	18	10	17	17	10	5	4	4	18	10	10
08:55	22	18	10	17	17	10	5	4	4	18	10	10
09:00	22	18	10	17	17	10	5	4	4	18	10	10
09:05	22	18	10	17	17	10	5	4	4	18	10	10
09:10	22	18	10	17	17	10	5	4	4	18	10	10
09:15	22	18	10	17	17	10	5	4	4	18	10	10
09:20	22	18	10	17	17	10	5	4	4	18	10	10
09:25	22	18	10	17	17	10	5	4	4	18	10	10
09:30	22	18	10	17	17	10	5	4	4	18	10	10
09:35	22	18	10	17	17	10	5	4	4	18	10	10
09:40	22	18	10	17	17	10	5	4	4	18	10	10
09:45	22	18	10	17	17	10	5	4	4	18	10	10
09:50	22	18	10	17	17	10	5	4	4	18	10	10
09:55	22	18	10	17	17	10	5	4	4	18	10	10
10:00	22	18	10	17	17	10	5	4	4	18	10	10
Grand Total	253	532	61	846	165	399	81	645	45	498	97	640
Approach %	29.9	62.9	7.2	25.6	61.9	12.6	18.4	1.4	15	2.9	19.2	4.9
Total %	7.6	16	1.8	25.4	5	12	2.4	18.4	1.4	15	2.9	4.9

MARKS TRAFFIC DATA

File Name : telegraph-34th-a
 Site Code : 00000000
 Start Date : 5/9/2006
 Page No : 1

AM 24
 OKLAND
 FPW T
 TITO [916] 715-4006

Start Time	TELEGRAPH AVE Southbound			TELEGRAPH AVE Westbound			TELEGRAPH AVE Northbound			34th ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	8	38	2	43	2	43	6	33	6	3	10	16
08:05	8	38	2	43	2	43	6	33	6	3	10	16
08:10	8	38	2	43	2	43	6	33	6	3	10	16
08:15	8	38	2	43	2	43	6	33	6	3	10	16
08:20	8	38	2	43	2	43	6	33	6	3	10	16
08:25	8	38	2	43	2	43	6	33	6	3	10	16
08:30	8	38	2	43	2	43	6	33	6	3	10	16
08:35	8	38	2	43	2	43	6	33	6	3	10	16
08:40	8	38	2	43	2	43	6	33	6	3	10	16
08:45	8	38	2	43	2	43	6	33	6	3	10	16
08:50	8	38	2	43	2	43	6	33	6	3	10	16
08:55	8	38	2	43	2	43	6	33	6	3	10	16
09:00	8	38	2	43	2	43	6	33	6	3	10	16
09:05	8	38	2	43	2	43	6	33	6	3	10	16
09:10	8	38	2	43	2	43	6	33	6	3	10	16
09:15	8	38	2	43	2	43	6	33	6	3	10	16
09:20	8	38	2	43	2	43	6	33	6	3	10	16
09:25	8	38	2	43	2	43	6	33	6	3	10	16
09:30	8	38	2	43	2	43	6	33	6	3	10	16
09:35	8	38	2	43	2	43	6	33	6	3	10	16
09:40	8	38	2	43	2	43	6	33	6	3	10	16
09:45	8	38	2	43	2	43	6	33	6	3	10	16
09:50	8	38	2	43	2	43	6	33	6	3	10	16
09:55	8	38	2	43	2	43	6	33	6	3	10	16
10:00	8	38	2	43	2	43	6	33	6	3	10	16
Grand Total	71	542	32	645	54	63	47	164	45	789	92	926
Approach %	11	84	5	32.9	38.4	28.7	4.9	85.2	4.9	41.8	4.9	48.1
Total %	3.8	28.7	1.7	34.2	2.9	3.3	2.5	8.7	2.4	41.8	4.9	48.1

Start Time	TELEGRAPH AVE Southbound			TELEGRAPH AVE Westbound			TELEGRAPH AVE Northbound			27th ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	10	83	7	100	11	9	6	26	5	96	18	119
08:05	10	83	7	100	11	9	6	26	5	96	18	119
08:10	10	83	7	100	11	9	6	26	5	96	18	119
08:15	10	83	7	100	11	9	6	26	5	96	18	119
08:20	10	83	7	100	11	9	6	26	5	96	18	119
08:25	10	83	7	100	11	9	6	26	5	96	18	119
08:30	10	83	7	100	11	9	6	26	5	96	18	119
08:35	10	83	7	100	11	9	6	26	5	96	18	119
08:40	10	83	7	100	11	9	6	26	5	96	18	119
08:45	10	83	7	100	11	9	6	26	5	96	18	119
08:50	10	83	7	100	11	9	6	26	5	96	18	119
08:55	10	83	7	100	11	9	6	26	5	96	18	119
09:00	10	83	7	100	11	9	6	26	5	96	18	119
09:05	10	83	7	100	11	9	6	26	5	96	18	119
09:10	10	83	7	100	11	9	6	26	5	96	18	119
09:15	10	83	7	100	11	9	6	26	5	96	18	119
09:20	10	83	7	100	11	9	6	26	5	96	18	119
09:25	10	83	7	100	11	9	6	26	5	96	18	119
09:30	10	83	7	100	11	9	6	26	5	96	18	119
09:35	10	83	7	100	11	9	6	26	5	96	18	119
09:40	10	83	7	100	11	9	6	26	5	96	18	119
09:45	10	83	7	100	11	9	6	26	5	96	18	119
09:50	10	83	7	100	11	9	6	26	5	96	18	119
09:55	10	83	7	100	11	9	6	26	5	96	18	119
10:00	10	83	7	100	11	9	6	26	5	96	18	119
Grand Total	40	34	84	11	129	15	65	9	89	8	86	18
Approach %	08.15	34	84	11	129	15	65	9	89	8	86	18
Total %	08.15	34	84	11	129	15	65	9	89	8	86	18
%App. Total	08.30	31	81	7	119	25	67	11	103	6	76	12
%App. Total	08.45	36	95	11	142	38	65	22	126	8	64	16
%App. Total	08.60	39	95	11	142	38	65	22	126	8	64	16
%App. Total	08.75	39	95	11	142	38	65	22	126	8	64	16
%App. Total	08.90	39	95	11	142	38	65	22	126	8	64	16
%App. Total	09.05	39	95	11	142	38	65	22	126	8	64	16
%App. Total	09.20	39	95	11	142	38	65	22	126	8	64	16
%App. Total	09.35	39	95	11	142	38	65	22	126	8	64	16
%App. Total	09.50	39	95	11	142	38	65	22	126	8	64	16
%App. Total	09.65	39	95	11	142	38	65	22	126	8	64	16
%App. Total	09.80	39	95	11	142	38	65	22	126	8	64	16
%App. Total	09.95	39	95	11	142	38	65	22	126	8	64	16
%App. Total	10.10	39	95	11	142	38	65	22	126	8	64	16
%App. Total	10.25	39	95	11	142	38	65	22	126	8	64	16
%App. Total	10.40	39	95	11	142	38	65	22	126	8	64	16
%App. Total	10.55	39	95	11	142	38	65	22	126	8	64	16
%App. Total	10.70	39	95	11	142	38	65	22	126	8		

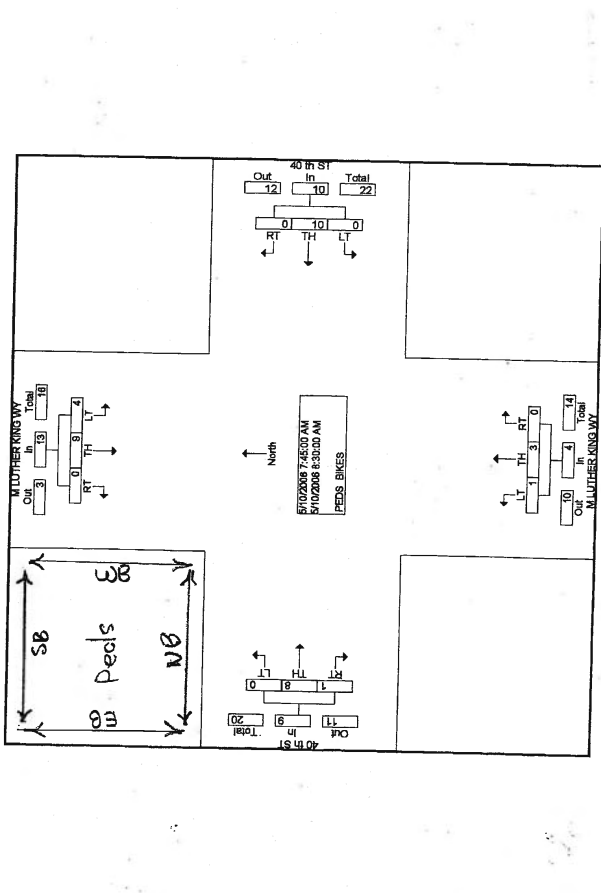
MARKS TRAFFIC DATA

File Name : mlking-40th-a
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

#15 P1B
 An

Start Time	M LUTHER KING WY Southbound				M LUTHER KING WY Northbound				40th St Eastbound				Exclu. Total	Incl. Total	Int. Total			
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED						
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
07:30	1	1	0	4	2	0	0	16	2	0	0	3	5	37	9	46		
07:45	1	4	1	13	4	0	11	2	0	0	14	4	45	10	60			
Total	4	1	1	13	6	0	12	49	2	3	1	67	6	10	122	34	168	
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Apprch %	0.3	0.8	0.8	25.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total %	1.5	16.2	5.9	23.8	0.0	38.2	0.0	38.2	2.9	7.4	4.4	14.7	1.5	22.1	0.0	23.8	80.5	19.5

Start Time	M LUTHER KING WY Southbound				M LUTHER KING WY Northbound				40th St Eastbound				Exclu. Total	Incl. Total	Int. Total		
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED					
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



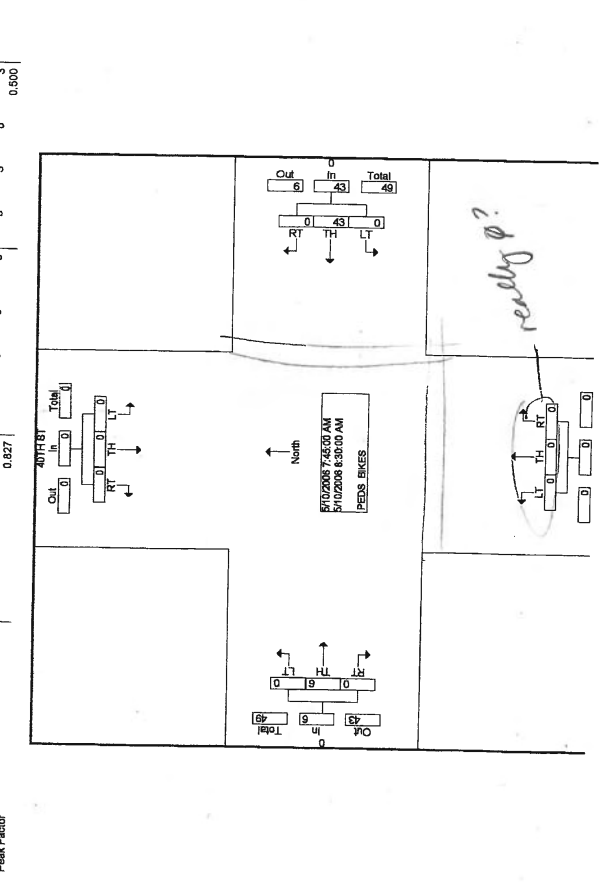
MARKS TRAFFIC DATA

File Name : mw12-40th-a
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

#16 P1B
 An

Start Time	40TH ST Southbound				Westbound				Northbound				Eastbound				Exclu. Total	Incl. Total	Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED			
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Apprch %	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Start Time	40TH ST Southbound				Westbound				Northbound				Eastbound				Exclu. Total	Incl. Total	Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED			
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Apprch %	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

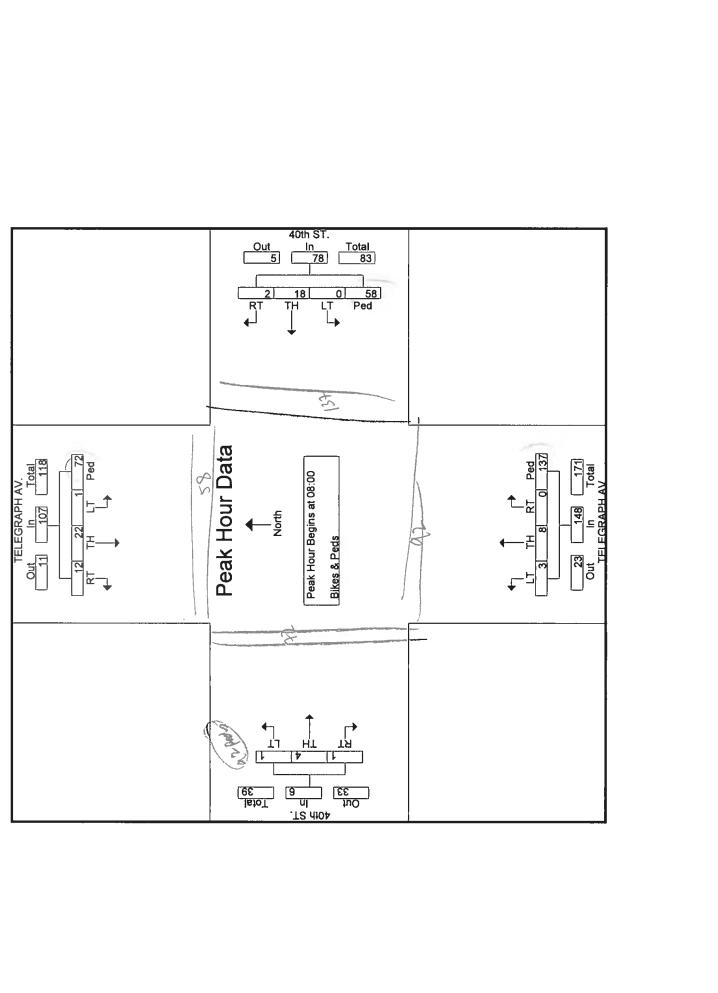
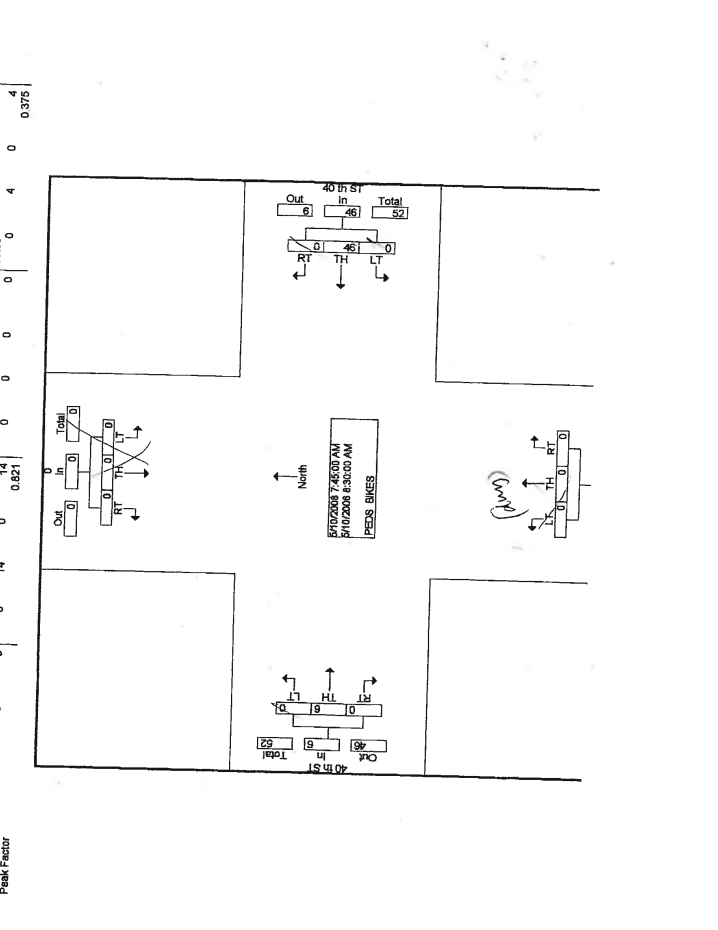


Start Time	40th ST Southbound						40th ST Westbound						40th ST Eastbound						Int. Total
	RT	TH	LT	PEDE	App. Total	Excl. Total	RT	TH	LT	PEDE	App. Total	Excl. Total	RT	TH	LT	PEDE	App. Total	Excl. Total	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	TELEGRAPH AV. Southbound						TELEGRAPH AV. Northbound						40th ST Eastbound						Int. Total
	RT	TH	LT	PEDE	App. Total	Excl. Total	RT	TH	LT	PEDE	App. Total	Excl. Total	RT	TH	LT	PEDE	App. Total	Excl. Total	
07:00	0	3	11	15	0	3	0	0	11	14	0	3	0	0	0	0	0	0	0
07:15	4	4	0	11	19	0	1	0	10	11	0	1	0	0	0	0	0	0	0
07:30	4	4	0	11	19	0	0	0	10	11	0	0	0	0	0	0	0	0	0
07:45	6	3	0	13	22	0	0	4	0	10	0	4	0	0	0	0	0	0	0
Total	13	14	1	44	72	0	10	0	48	58	0	13	0	0	0	0	0	0	0
Grand Total	4	7	0	11	22	0	8	0	10	18	0	4	0	0	0	0	0	0	0
Approach %	14	20	1	64	89	0	1.5	20.6	0	77.9	0	6.5	2.4	89	0.6	3.3	0.6	93.6	
Total %	3.4	4.9	0.3	15.6	24.1	0.3	3.8	0	14.3	18.3	0	2.8	0.8	29.5	33.2	0.1	0.8	0.1	23.3

Start Time	40th ST Southbound						40th ST Westbound						40th ST Eastbound						Int. Total
	RT	TH	LT	PEDE	App. Total	Excl. Total	RT	TH	LT	PEDE	App. Total	Excl. Total	RT	TH	LT	PEDE	App. Total	Excl. Total	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	TELEGRAPH AV. Southbound						TELEGRAPH AV. Northbound						40th ST Eastbound						Int. Total
	RT	TH	LT	PEDE	App. Total	Excl. Total	RT	TH	LT	PEDE	App. Total	Excl. Total	RT	TH	LT	PEDE	App. Total	Excl. Total	
08:00	4	7	0	11	22	0	0	8	0	10	18	0	0	4	2	36	42	0	1
08:15	2	3	0	19	24	1	6	0	20	27	0	1	0	0	1	35	36	1	1
08:30	1	6	0	18	25	0	1	0	18	19	0	2	1	33	36	0	0	0	0
08:45	1	6	0	30	37	0	1	0	18	19	0	2	1	33	36	0	0	0	0
Total	12	22	1	72	107	2	18	0	58	78	0	8	3	137	148	1	4	1	6
Grand Total	25	36	2	116	179	2	38	0	106	136	0	21	6	219	246	1	6	1	173
Approach %	14	20	1	64	89	0	1.5	20.6	0	77.9	0	6.5	2.4	89	0.6	3.3	0.6	93.6	
Total %	3.4	4.9	0.3	15.6	24.1	0.3	3.8	0	14.3	18.3	0	2.8	0.8	29.5	33.2	0.1	0.8	0.1	23.3



AM 20
OAKLAND
FPW P
TITO 0161 715-4006

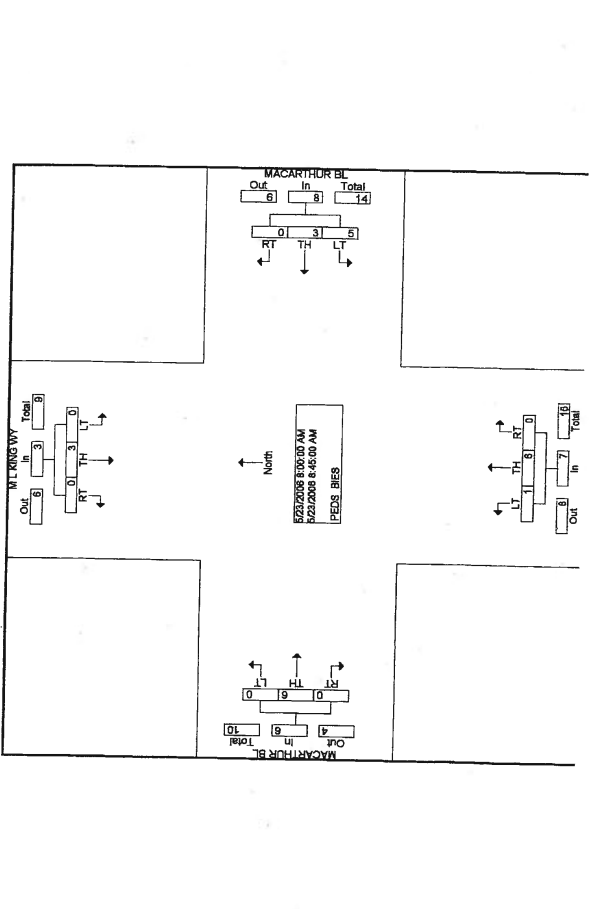
File Name : ml-king-wy-macarthur-a
Site Code : 00000000
Start Date : 5/23/2006
Page No : 1

#25
P1B
AM

MARKS TRAFFIC DATA

Start Time	M L KING WY Southbound				MACARTHUR BL Westbound				M L KING WY Northbound				MACARTHUR BL Eastbound				Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Total %	0.0	162.0	0.0	0.0	18.2	2.7	18.9	13.5	35.1	0.0	18.9	8.1	27.0	0.0	21.8	0.0	21.6

Start Time	M L KING WY Southbound				MACARTHUR BL Westbound				M L KING WY Northbound				MACARTHUR BL Eastbound				Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Total %	0.0	162.0	0.0	0.0	18.2	2.7	18.9	13.5	35.1	0.0	18.9	8.1	27.0	0.0	21.8	0.0	21.6



AM 21
OAKLAND
FPW P
TITO 0161 715-4006

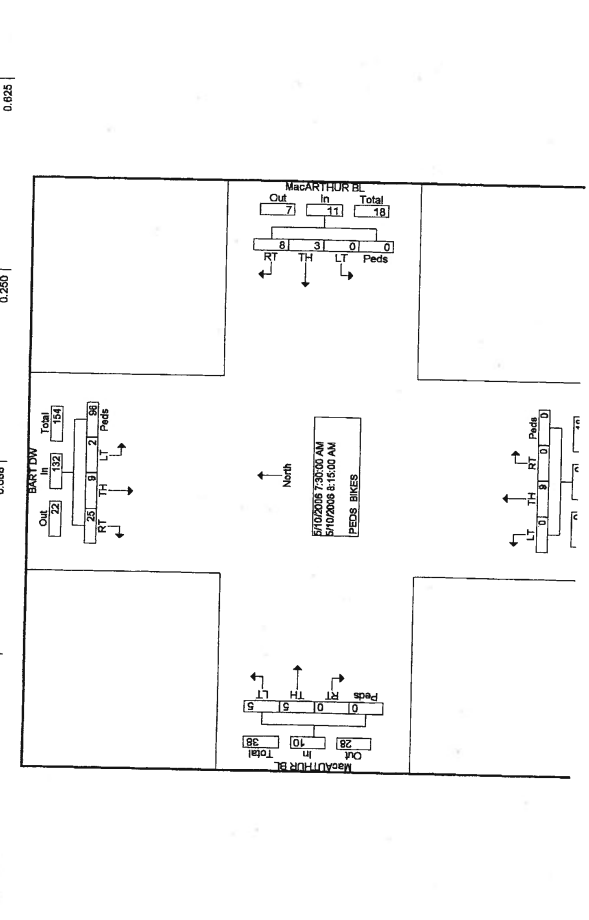
File Name : pd-bart-dw-macarthur-a
Site Code : 00000000
Start Date : 5/10/2006
Page No : 1

#25
P1B
AM

MARKS TRAFFIC DATA

Start Time	BART DW Southbound				MACARTHUR BL Westbound				Northbound				MACARTHUR BL Eastbound				Int. Total	
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED		
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Approach %	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	
Total %	0.0	163.3	0.0	0.0	15.3	3.4	0.8	64.1	83.8	4.6	3.1	0.0	0.0	3.4	0.0	3.1	23.0	5.3

Start Time	BART DW Southbound				MACARTHUR BL Westbound				Northbound				MACARTHUR BL Eastbound				Int. Total	
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED		
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Approach %	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	
Total %	0.0	163.3	0.0	0.0	15.3	3.4	0.8	64.1	83.8	4.6	3.1	0.0	0.0	3.4	0.0	3.1	23.0	5.3



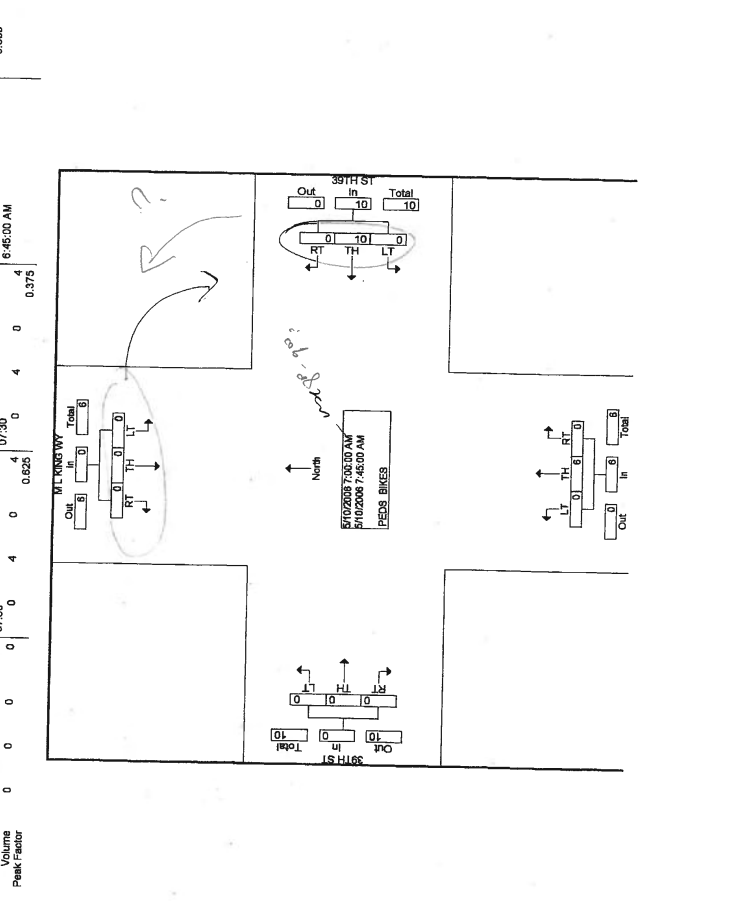
MARKS TRAFFIC DATA

MARKS TRAFFIC DATA

Start Time	SHATTUCK AV Southbound						SHATTUCK AV Northbound						51 ST 52 ND Westbound						51 ST 52 ND Eastbound									
	RT	TH	LT	App. Total	LT	TH	RT	TH	LT	App. Total	LT	TH	RT	TH	LT	App. Total	RT	TH	LT	App. Total	LT	TH						
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
16:30	28	48	162	238	17	241	36	42	150	234	38	44	42	48	174	264	5	6	21	32	34	42	37	42	150	229		
16:45	71	60	30	161	28	211	28	33	119	175	19	24	24	28	100	152	42	48	174	264	5	6	21	32	34	42	150	229
Total	233	194	110	597	91	857	91	857	64	1012	44	169	139	352	175	936	362	1473	3434									
Grand Total	552	450	243	1245	229	1815	144	123	394	821	15	48	37	74	281	426	111	404	3184									
Approach %	44.3	36.1	19.5	10.5	8.3	6.6	16.7	3.1	24.4	1.9	16.7	3.1	24.4	1.9	16.7	3.1	24.4	1.9	16.7	3.1	24.4	1.9	16.7	3.1				

Start Time	M L KING WY Southbound						M L KING WY Northbound						39TH ST Westbound						39TH ST Eastbound							
	RT	TH	LT	App. Total	LT	TH	RT	TH	LT	App. Total	LT	TH	RT	TH	LT	App. Total	RT	TH	LT	App. Total	LT	TH				
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	48.1	0.0	51.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	SHATTUCK AV Southbound						SHATTUCK AV Northbound						51 ST 52 ND Westbound						51 ST 52 ND Eastbound							
	RT	TH	LT	App. Total	LT	TH	RT	TH	LT	App. Total	LT	TH	RT	TH	LT	App. Total	RT	TH	LT	App. Total	LT	TH				
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	69	69	39	177	32	231	32	231	30	293	22	63	44	129	59	322	59	322	59	440	1039	416	416	945		
16:45	79	73	31	183	44	248	44	248	19	311	27	69	56	152	44	315	101	480	1106	1106	480	988	988	1106		
Total	156	151	70	390	76	511	76	511	51	624	73	201	100	331	108	535	160	820	1000	1000	424	1433	1433	2109		
% App. Total	40.9	38.7	20.3	12.5	7.8	7.9	12.5	7.8	7.9	16.4	47.9	35.8	48.9	10.5	69.2	20.3	33.8	17.5	17.5	17.5	21.5	40.66	40.66	92.4		
PHF	0.886	0.908	0.891	0.824	0.933	0.767	0.824	0.933	0.767	0.935	0.741	0.848	0.781	0.804	0.760	0.804	0.837	0.851	0.851	0.851	0.851	0.851	0.851	0.851		



MARKS TRAFFIC DATA

File Name : ml-king-45th-p
 Site Code : 00000000
 Start Date : 5/16/2006
 Page No : 1

PM 07
 OAKLAND
 FFW A
 TITO [916] 715-4006

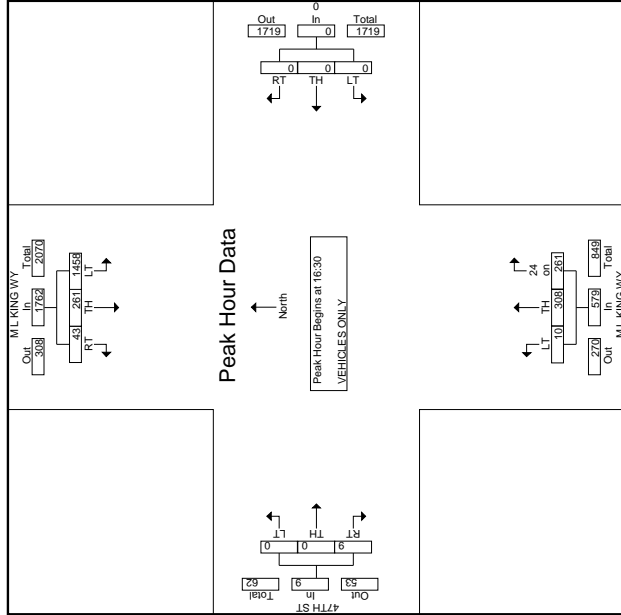
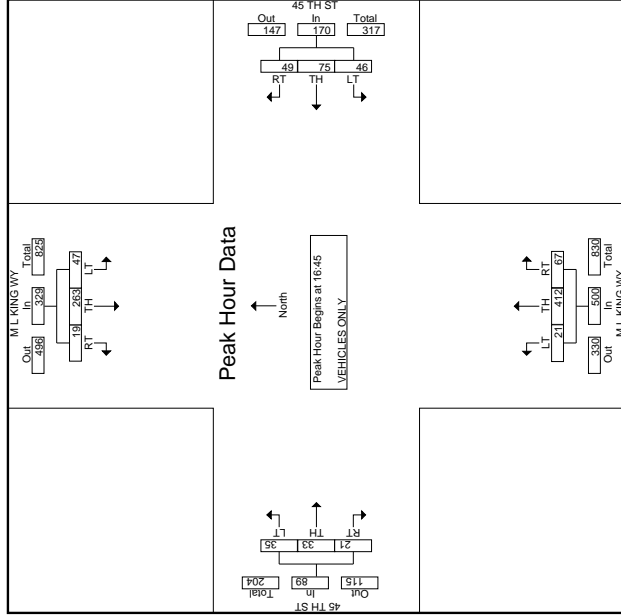
Start Time	M L KING WY Southbound						M L KING WY Northbound						45 TH ST Westbound						45 TH ST Eastbound					
	RT	TH	L	LT	App. Total	Int. Total	RT	TH	L	LT	App. Total	Int. Total	RT	TH	L	LT	App. Total	Int. Total	RT	TH	L	LT	App. Total	Int. Total
16:00	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:05	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:10	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:20	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:35	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:40	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	2	58	11	71	8	12	6	26	11	6	26	11	3	9	6	7	16	3	9	6	7	16	3	9
Total	5	205	40	250	30	41	29	100	38	340	12	390	10	25	27	26	62	10	25	27	26	62	10	25
Grand Total	4	62	13	78	12	20	15	47	18	59	4	121	6	11	10	10	27	6	11	10	10	27	6	11
Approach %	4.4	81.1	14.6	29.6	41.9	26.5	4.2	14.6	5.6	40	1.6	47.2	3.0	5.2	5.3	135	22.2	38.5	39.3	2.8	2.9	7.3		
Total %	1.4	25	4.5	30.9	4.3	6.1	4.2	14.6	5.6	40	1.6	47.2	3.0	5.2	5.3	135	22.2	38.5	39.3	2.8	2.9	7.3		

MARKS TRAFFIC DATA

File Name : ml-king-47th-p
 Site Code : 00000000
 Start Date : 5/11/2006
 Page No : 1

PM 06
 OAKLAND
 FFW C
 TITO [916] 715-4006

Start Time	M L KING WY Southbound						M L KING WY Northbound						47TH ST Westbound						47TH ST Eastbound					
	RT	TH	L	LT	App. Total	Int. Total	RT	TH	L	LT	App. Total	Int. Total	RT	TH	L	LT	App. Total	Int. Total	RT	TH	L	LT	App. Total	Int. Total
16:00	4	82	460	482	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:05	2	82	460	482	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:10	2	82	460	482	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	2	82	460	482	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:20	2	82	460	482	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:25	2	82	460	482	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	5	71	362	438	0	0	5	131	143	0	102	0	0	0	0	0	0	0	0	0	0	0	0	0
16:35	5	71	362	438	0	0	5	131	143	0	102	0	0	0	0	0	0	0	0	0	0	0	0	0
16:40	5	71	362	438	0	0	5	131	143	0	102	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	10	50	331	391	0	0	10	241	258	7	476	11	0	0	0	0	0	0	0	0	0	0	0	0
Total	21	245	1461	1727	0	0	21	531	531	6	2312	0	0	0	0	0	0	0	0	0	0	0	0	
Grand Total	85	526	2891	3502	0	0	85	1007	1007	17	4526	0	0	0	0	0	0	0	0	0	0	0	0	
Approach %	2.4	15	82.6	63.9	77.4	0	0	10	11.9	0.4	22.2	0	0	0	0	0	0	0	0	0	0	0	0	
Total %	1.9	11.6	63.9	77.4	0	0	0	10	11.9	0.4	22.2	0	0	0	0	0	0	0	0	0	0	0	0	



MARKS TRAFFIC DATA

Start Time	MARKET ST Southbound				40TH ST Westbound				MARKET ST Northbound				40TH ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	4	19	18	41	16	16	10	42	3	4	3	10	1	1	1	3
16:05	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
16:10	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
16:15	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
16:20	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
16:25	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
16:30	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
16:35	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
16:40	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
16:45	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
16:50	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
16:55	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:00	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:05	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:10	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:15	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:20	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:25	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:30	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:35	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:40	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:45	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:50	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
17:55	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
18:00	5	19	18	42	16	16	10	42	3	4	3	10	1	1	1	3
Grand Total	37	438	148	623	145	886	65	1096	52	664	210	926	84	1212	55	1351
Approach %	5.9	70.3	23.8	13.2	80.8	5.9	5.6	71.7	22.7	1.3	16.6	5.3	23.2	2.1	30.3	1.4
Total %	0.9	11	3.7	15.6	3.6	22.2	1.6	27.4	1.3	16.6	5.3	23.2	2.1	30.3	1.4	33.8

MARKS TRAFFIC DATA

Start Time	TELEGRAPH AVE Southbound				45th ST Westbound				TELEGRAPH AVE Northbound				45th ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:05	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:10	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:15	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:20	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:25	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:30	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:35	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:40	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:45	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:50	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
16:55	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:00	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:05	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:10	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:15	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:20	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:25	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:30	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:35	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:40	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:45	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:50	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
17:55	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
18:00	8	190	2	198	6	3	14	23	2	239	4	245	5	2	14	21
Grand Total	107	1681	26	1814	44	75	35	154	42	1820	40	1902	68	61	89	218
Approach %	5.9	92.7	1.4	28.6	48.7	22.7	2.2	95.7	2.1	44.5	1	46.5	1.7	1.5	2.2	5.3
Total %	2.6	41.1	0.6	44.4	1.1	1.8	0.9	3.8	1	44.5	1	46.5	1.7	1.5	2.2	5.3

Start Time	MARKET ST Southbound				40TH ST Westbound				MARKET ST Northbound				40TH ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:05	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:10	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:15	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:20	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:25	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:30	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:35	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:40	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:45	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:50	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
16:55	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
17:00	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
17:05	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
17:10	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
17:15	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
17:20	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
17:25	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
17:30	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
17:35	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
17:40	10	170	10	190	10	10	10	30	10	10	10	30	10	10	10	30
17:45	10	170	10	190	10	10	10	30	10	10	10	30	10			

MARKS TRAFFIC DATA

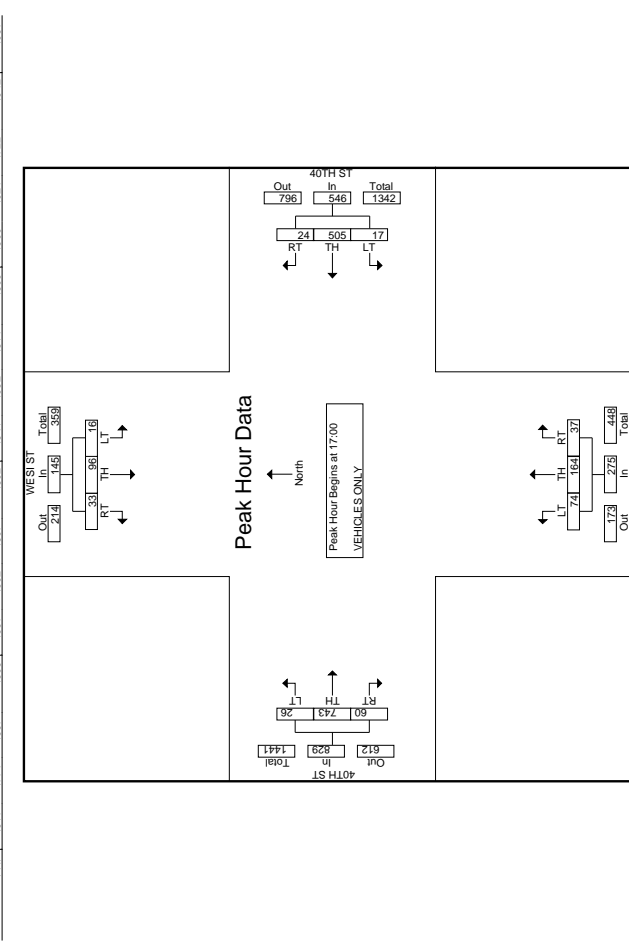
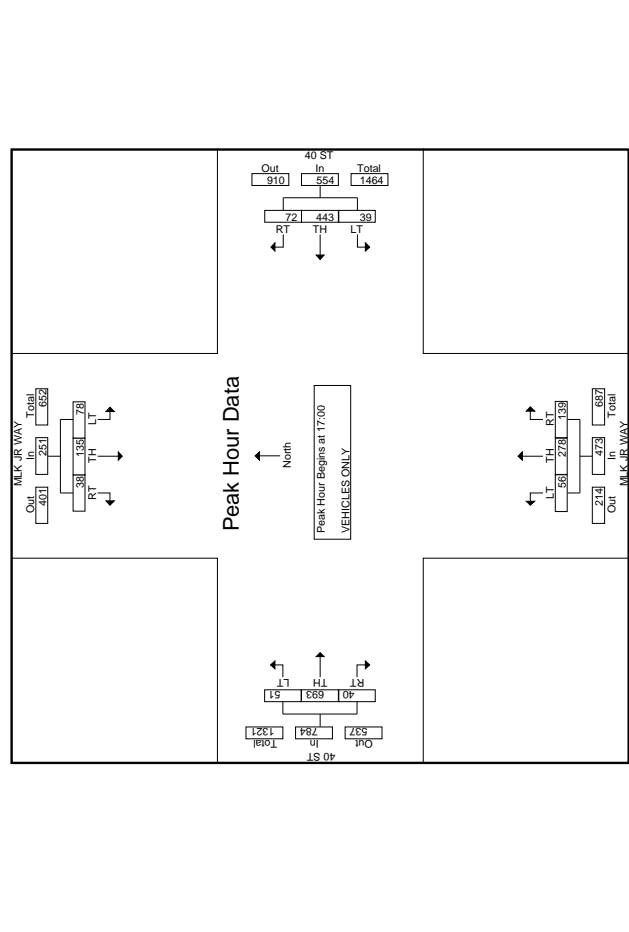
Start Time	40 ST Westbound						40 ST Eastbound						
	RT	TH	LT	PED	App. Total	Int. Total	RT	TH	LT	PED	App. Total	Int. Total	
16:00	9	33	17	0	59	23	121	10	0	154	25	56	10
16:15	10	23	15	0	48	15	108	11	0	134	23	62	0
16:30	10	23	15	0	48	15	108	11	0	134	23	62	0
16:45	2	35	22	0	59	21	101	10	0	132	29	84	0
Total	28	126	72	0	226	79	445	45	0	569	95	260	45
17:00	6	23	11	0	40	28	135	9	0	172	24	80	22
17:15	3	13	6	0	22	16	69	3	0	101	16	42	11
17:30	13	38	20	0	70	13	102	13	0	128	50	69	11
17:45	4	37	20	0	61	13	102	13	0	128	50	69	11
Total	38	135	78	0	251	72	443	39	0	554	139	278	56
Grand Total	66	261	150	0	477	151	888	84	0	1123	234	538	101
Approach %	13	57	33	0	12.3	3.9	23	2.2	29	6	13.9	2.6	22.6
Total %	1.7	6.7	3.9	0									36.1

MARKS TRAFFIC DATA

Start Time	40TH ST Westbound						40TH ST Eastbound						
	RT	TH	LT	PED	App. Total	Int. Total	RT	TH	LT	PED	App. Total	Int. Total	
16:00	8	25	3	0	37	6	140	7	153	8	40	14	62
16:15	6	18	3	0	27	5	123	3	131	10	39	36	85
16:30	7	15	3	0	25	3	107	7	117	6	37	16	55
16:45	4	23	4	0	31	4	117	4	125	4	35	16	55
Total	26	89	18	0	133	18	426	28	472	20	129	81	230
17:00	9	25	3	0	37	6	140	7	153	8	40	14	62
17:15	8	31	6	0	45	5	123	3	131	10	39	36	85
17:30	9	22	3	0	34	4	115	3	122	4	11	63	9
17:45	9	22	3	0	34	4	115	3	122	4	11	63	9
Total	33	96	16	0	145	24	505	17	546	37	164	74	275
Grand Total	59	185	34	0	278	42	931	45	1018	57	293	155	505
Approach %	21.2	66.5	12.2	0	11.3	5.8	30.7	4.4	11.3	5.8	30.7	7.6	89.1
Total %	1.8	5.6	1	0	8.5	1.3	28.4	1.4	31	1.7	8.9	4.7	15.4

MARKS TRAFFIC DATA

Start Time	40TH ST Westbound						40TH ST Eastbound						
	RT	TH	LT	PED	App. Total	Int. Total	RT	TH	LT	PED	App. Total	Int. Total	
16:00	8	25	3	0	37	6	140	7	153	8	40	14	62
16:15	6	18	3	0	27	5	123	3	131	10	39	36	85
16:30	7	15	3	0	25	3	107	7	117	6	37	16	55
16:45	4	23	4	0	31	4	117	4	125	4	35	16	55
Total	26	89	18	0	133	18	426	28	472	20	129	81	230
17:00	9	25	3	0	37	6	140	7	153	8	40	14	62
17:15	8	31	6	0	45	5	123	3	131	10	39	36	85
17:30	9	22	3	0	34	4	115	3	122	4	11	63	9
17:45	9	22	3	0	34	4	115	3	122	4	11	63	9
Total	33	96	16	0	145	24	505	17	546	37	164	74	275
Grand Total	59	185	34	0	278	42	931	45	1018	57	293	155	505
Approach %	21.2	66.5	12.2	0	11.3	5.8	30.7	4.4	11.3	5.8	30.7	7.6	89.1
Total %	1.8	5.6	1	0	8.5	1.3	28.4	1.4	31	1.7	8.9	4.7	15.4



MARKS TRAFFIC DATA

File Name : e:telegraph-38th-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

PM 18
 OAKLAND
 FPW H
 TTTO [916] 715 - 4006

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						38 th ST Westbound						TELEGRAPH AV Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	0	159	2	161	4	0	0	4	7	170	0	177	0	0	0	0	0	0	0	0				
16:15	0	159	1	160	5	0	1	6	4	179	0	183	0	0	0	0	0	0	0	0				
16:30	0	148	3	151	12	0	17	29	11	201	0	212	0	0	0	0	0	0	0	0				
16:45	0	143	9	152	10	0	14	24	11	201	0	212	0	0	0	0	0	0	0	0				
Total	0	622	12	634	30	0	38	68	29	666	0	695	0	0	0	0	0	0	0	0				
Grand Total	0	156	3	159	10	0	11	4	210	0	214	0	0	0	0	0	0	0	0					
Approach %	0	143	6	149	8	0	3	11	10	229	0	239	0	0	0	0	0	0	0	0				
Total %	0	171	2	173	10	0	10	7	265	0	272	0	0	0	0	0	0	0	0					
Total	0	630	15	645	32	0	7	39	31	915	0	946	0	0	0	0	0	0	0	0				
PHF	.000	.915	.708	.929	.825	.000	.500	.977	.700	.906	.000	.908	.000	.000	.000	.000	.000	.000	.000	.000				

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						BART ACCESS WAY Westbound						BART ACCESS WAY Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	1	157	0	158	0	0	0	0	188	4	188	192	9	0	4	13	359	0	0	0				
16:15	0	173	0	173	0	0	0	0	234	4	238	238	18	0	3	21	476	0	0	0				
16:30	0	184	0	184	0	0	0	0	231	4	235	235	11	0	3	14	420	0	0	0				
16:45	4	160	0	164	0	0	0	0	218	2	220	220	15	0	3	18	400	0	0	0				
Total	14	669	0	683	0	0	0	0	826	16	842	842	56	0	11	67	1592	0	0	0				
Grand Total	3	185	0	188	0	0	0	0	250	6	256	256	14	0	3	17	461	0	0	0				
Approach %	2	174	0	176	0	0	0	0	264	4	268	268	18	0	4	22	466	0	0	0				
Total %	5	172	0	177	0	0	0	0	224	7	231	231	17	0	4	21	429	0	0	0				
PHF	.000	.939	.000	.939	.000	.000	.000	.000	.821	.912	.783	.900	.763	.000	.763	.824	.958	.000	.000	.000				

MARKS TRAFFIC DATA

File Name : telegraph-bart-p
 Site Code : 00000000
 Start Date : 6/15/2006
 Page No : 1

PM 17
 OAKLAND
 FPW J
 TTTO [916] 715-4006

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						BART ACCESS WAY Westbound						BART ACCESS WAY Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	0	185	0	185	0	0	0	0	250	6	256	256	14	0	3	17	461	0	0	0				
16:15	0	165	0	165	0	0	0	0	279	6	285	285	23	0	4	27	479	0	0	0				
16:30	4	170	0	174	0	0	0	0	264	4	268	268	18	0	6	24	466	0	0	0				
16:45	5	172	0	177	0	0	0	0	224	7	231	231	17	0	4	21	429	0	0	0				
Total	14	692	0	706	0	0	0	0	1017	23	1040	1040	72	0	17	89	1835	0	0	0				
Grand Total	28	1361	0	1389	0	0	0	0	1845	39	1882	1882	128	0	28	156	3427	0	0	0				
Approach %	2	188	0	190	0	0	0	0	200	7	207	207	17	0	4	21	429	0	0	0				
Total %	0.8	38.7	0	40.5	0	0	0	0	53.8	1.1	54.9	54.9	3.7	0	0.8	4.6	4.6	0	0	0				
PHF	.700	.935	.000	.939	.000	.000	.000	.000	.821	.912	.783	.900	.763	.000	.763	.824	.958	.000	.000	.000				

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						BART ACCESS WAY Westbound						BART ACCESS WAY Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	0	152	27	179	62	0	15	77	60	1721	0	1781	0	0	0	0	0	0	0	0				
16:15	0	156	3	159	10	0	3	13	80.5	19.5	100	100	3.4	96.6	0	100	0	0	0	0				
16:30	0	143	6	149	8	0	10	18	40.8	2	42.8	42.8	1.9	98.1	0	100	0	0	0	0				
16:45	0	143	9	152	10	0	14	24	2.5	97.5	0	100	0	0	0	0	0	0	0	0				
Total	0	630	15	645	32	0	7	39	31	915	0	946	0	0	0	0	0	0	0	0				
Grand Total	0	156	3	159	10	0	11	4	210	0	214	0	0	0	0	0	0	0	0					
Approach %	0	143	6	149	8	0	3	11	10	229	0	239	0	0	0	0	0	0	0	0				
Total %	0	171	2	173	10	0	10	7	265	0	272	0	0	0	0	0	0	0	0					
Total	0	630	15	645	32	0	7	39	31	915	0	946	0	0	0	0	0	0	0	0				
PHF	.000	.915	.708	.929	.825	.000	.500	.977	.700	.906	.000	.908	.000	.000	.000	.000	.000	.000	.000	.000				

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						38 th ST Westbound						TELEGRAPH AV Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	0	156	6	162	9	0	2	11	7	256	0	263	0	0	0	0	0	0	0	0				
16:15	0	156	3	159	10	0	1	11	4	210	0	214	0	0	0	0	0	0	0	0				
16:30	0	143	3	146	8	0	3	11	10	229	0	239	0	0	0	0	0	0	0	0				
16:45	0	143	9	152	10	0	14	24	10	229	0	239	0	0	0	0	0	0	0	0				
Total	0	626	17	643	37	0	6	43	28	960	0	988	0	0	0	0	0	0	0	0				
Grand Total	0	152	27	179	62	0	15	77	60	1721	0	1781	0	0	0	0	0	0	0	0				
Approach %	0	143	6	149	8	0	3	11	10	229	0	239	0	0	0	0	0	0	0	0				
Total %	0	173	3	176	10	0	10	7	265	0	272	0	0	0	0	0	0	0	0					
Total	0	626	17	643	37	0	6	43	28	960	0	988	0	0	0	0	0	0	0	0				
PHF	.000	.914	.26	.974	.86	.0	.14	.972	.28	.972	.0	.988	.0	.0	.0	.0	.0	.0	.0	.0				

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						BART ACCESS WAY Westbound						BART ACCESS WAY Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	0	156	6	162	9	0	2	11	7	256	0	263	0	0	0	0	0	0	0	0				
16:15	0	156	3	159	10	0	1	11	4	210	0	214	0	0	0	0	0	0	0	0				
16:30	0	143	3	146	8	0	3	11	10	229	0	239	0	0	0	0	0	0	0	0				
16:45	0	143	9	152	10	0	14	24	10	229	0	239	0	0	0	0	0	0	0	0				
Total	0	626	17	643	37	0	6	43	28	960	0	988	0	0	0	0	0	0	0	0				
Grand Total	0	152	27	179	62	0	15	77	60	1721	0	1781	0	0	0	0	0	0	0	0				
Approach %	0	143	6	149	8	0	3	11	10	229	0	239	0	0	0	0	0	0	0	0				
Total %	0	173	3	176	10	0	10	7	265	0	272	0	0	0	0	0	0	0	0					
Total	0	626	17	643	37	0	6	43	28	960	0	988	0	0	0	0	0	0	0	0				
PHF	.000	.914	.26	.974	.86	.0	.14	.972	.28	.972	.0	.988	.0	.0	.0	.0	.0	.0	.0	.0				

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						BART ACCESS WAY Westbound						BART ACCESS WAY Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	0	152	27	179	62	0	15	77	60	1721	0	1781	0	0	0	0	0	0	0	0				
16:15	0	156	3	159	10	0	1	11	4	210	0	214	0	0	0	0	0	0	0	0				
16:30	0	143	6	149	8	0	3	11	10	229	0	239	0	0	0	0	0	0	0	0				
16:45	0	143	9	152	10	0	14	24	10	229	0	239	0	0	0	0	0	0	0	0				
Total	0	630	15	645	32	0	7	39	31	915	0	946	0	0	0	0	0	0	0	0				
Grand Total	0	156	3	159	10	0	11	4	210	0	214	0	0	0	0	0	0	0	0					
Approach %	0	143	6	149	8	0	3	11	10	229	0	239	0	0	0	0	0	0	0	0				

MARKS TRAFFIC DATA

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Groups Printed - VEHICLES ONLY

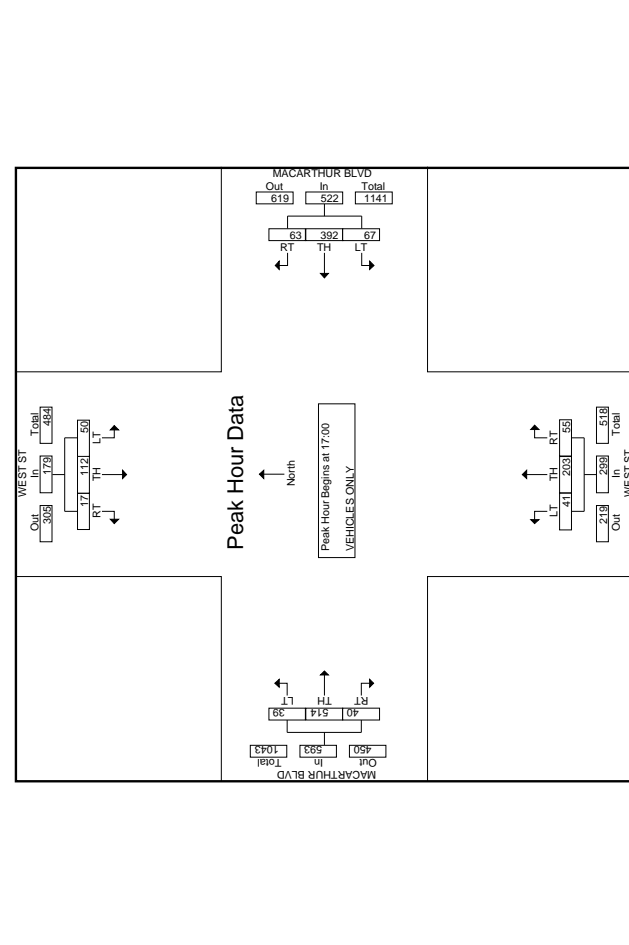
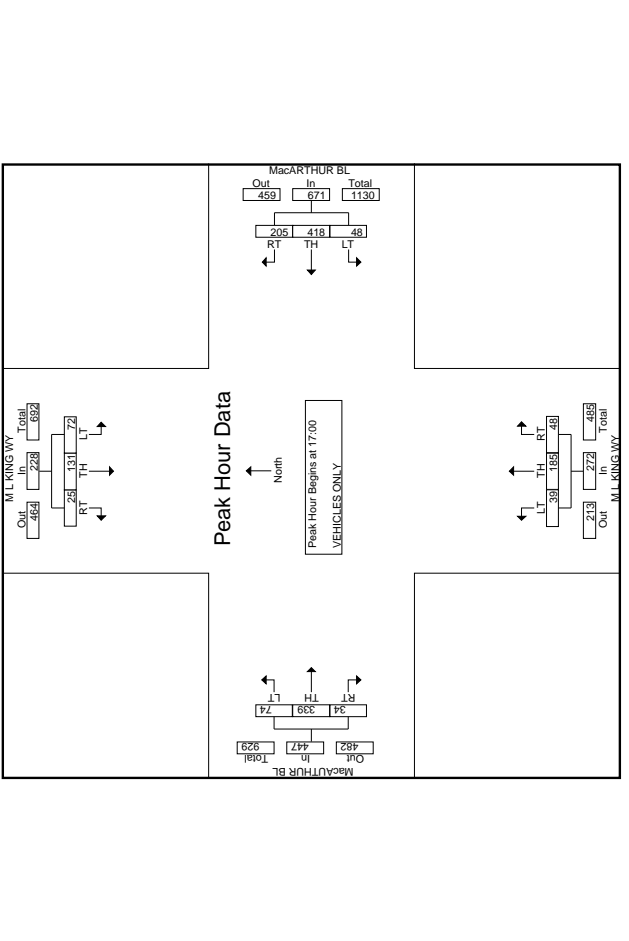
Start Time	M L KING WY Southbound				MacARTHUR BL Westbound				M L KING WY Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	9	35	11	55	38	89	9	137	15	48	4	67	7	79	8	94
16:05	2	15	5	22	12	33	17	52	12	39	9	60	9	30	11	50
16:10	5	35	11	51	20	30	16	66	17	45	9	60	8	30	10	48
16:15	10	27	7	44	54	99	13	166	19	48	11	78	11	76	19	106
16:45	36	127	40	203	152	310	65	517	61	191	33	285	36	322	53	411
17:00	4	34	13	51	57	127	11	195	17	53	9	79	6	65	14	85
17:05	5	35	18	68	56	135	16	209	16	56	15	87	12	93	12	117
17:10	9	35	18	62	56	95	11	162	10	40	7	57	7	93	19	119
17:15	5	33	30	68	54	91	13	158	10	46	8	64	10	86	19	115
17:45	25	131	72	228	205	418	48	671	48	185	39	272	34	339	74	447
Grand Total	61	568	112	431	957	203	103	1168	109	676	72	857	70	651	127	858
Approach %	14.2	59.8	26	14.2	30.7	61.3	9.7	39.2	12.4	12.4	2.4	18.4	8.2	7.7	14.4	28.3
Total %	2	8.5	3.7	14.2	11.3	24	3.4	39.2	3.6	12.4	2.4	18.4	2.3	21.8	4.2	28.3

Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour Analysis From 17:00 to 17:45 - Peak 1 of 1
Peak Hour Analysis From 17:15 to 17:45 - Peak 1 of 1
Total Volume 25 131 72 228 205 418 48 671 48 185 39 272 34 339 74 447
% App. Total 6.94 33.8 27.9 83.8 39.9 82.3 8.60 27.8 8.73 8.60 8.61 7.73 8.92 8.41 8.73 9.87

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Start Time	WEST ST Southbound				MACARTHUR BLVD Westbound				WEST ST Northbound				MACARTHUR BLVD Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	7	32	8	47	6	24	4	34	4	13	4	21	5	21	3	29
16:05	4	18	6	28	5	14	3	22	3	10	2	15	4	14	2	18
16:10	3	17	4	24	4	14	2	18	2	9	1	12	3	11	2	16
16:15	3	17	4	24	4	14	2	18	2	9	1	12	3	11	2	16
16:30	3	17	4	24	4	14	2	18	2	9	1	12	3	11	2	16
16:45	2	9	10	21	10	107	13	130	9	41	7	57	16	92	9	117
Total	16	146	33	195	44	372	78	494	47	177	31	255	37	340	35	412
17:00	7	32	13	52	16	100	14	130	11	49	8	68	8	96	8	112
17:05	3	29	17	49	17	87	25	129	18	61	11	90	9	106	9	124
17:10	3	25	11	39	14	103	9	126	10	44	14	68	11	160	14	185
17:15	4	26	9	39	16	102	19	137	16	49	8	73	12	152	8	172
17:45	17	112	50	179	63	392	67	522	55	203	41	299	40	514	39	593
Grand Total	33	268	83	374	107	764	145	1016	102	380	72	554	77	854	74	1005
Approach %	8.8	6.9	22.2	12.7	10.5	75.2	14.3	18.4	68.6	13	3.5	12.9	2.4	18.8	2.6	29
Total %	1.1	8.7	2.8	12.7	3.6	25.9	4.9	34.5	3.5	12.9	2.4	18.8	2.6	29	2.5	34.1

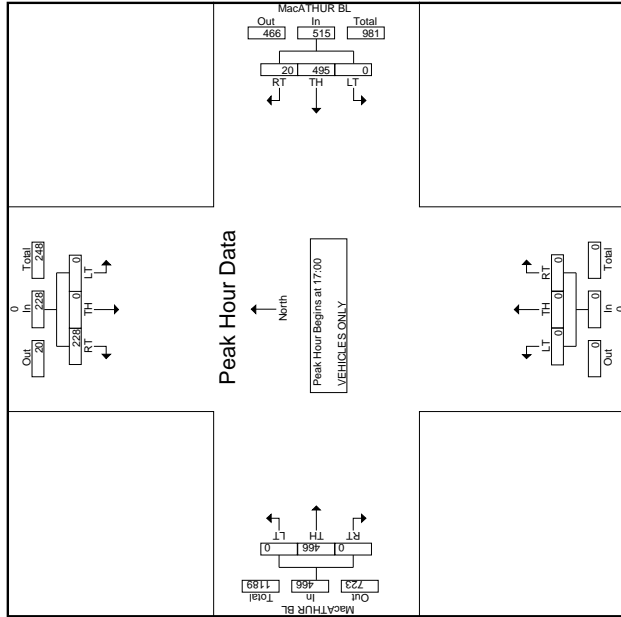
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1
Peak Hour Analysis From 17:00 to 17:45 - Peak 1 of 1
Peak Hour Analysis From 17:15 to 17:45 - Peak 1 of 1
Total Volume 7 32 8 47 16 100 14 130 11 49 8 68 8 96 8 112 362
% App. Total 3.2 29 17 49 17 87 25 129 18 61 11 90 11 106 9 124 392 418



MARKS TRAFFIC DATA

Start Time	TELEGRAPH AV Southbound					MacARTHUR BL Westbound					0 Northbound					MacARTHUR BL Eastbound				
	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total
16:00	28	0	0	28	0	2	116	0	118	0	0	0	0	0	110	0	0	0	110	256
16:05	15	0	0	15	0	3	125	0	128	0	0	0	0	0	127	0	0	0	127	280
16:10	42	0	0	42	0	6	143	0	149	0	0	0	0	139	0	0	0	139	280	
16:45	36	0	0	36	0	6	143	0	149	0	0	0	0	106	0	0	0	106	293	
Total	133	0	0	133	0	19	491	0	510	0	0	0	0	452	0	0	0	452	1095	
Grand Total	46	0	0	46	0	1	158	0	159	0	0	0	0	93	0	0	0	93	298	
App. %	35	0	0	35	0	9	116	0	120	0	0	0	0	129	0	0	0	129	307	
Total %	75	0	0	75	0	6	113	0	119	0	0	0	0	120	0	0	0	120	314	
Total	228	0	0	228	0	20	495	0	515	0	0	0	0	466	0	0	0	466	1209	
Grand Total	91	0	0	91	0	9	985	0	1025	0	0	0	0	916	0	0	0	916	2304	
App. %	100	0	0	100	0	3	982	0	44.5	0	0	0	0	10	0	0	0	39.8	0	
Total %	15.7	0	0	15.7	0	1.7	42.8	0	44.5	0	0	0	0	39.8	0	0	0	39.8	0	

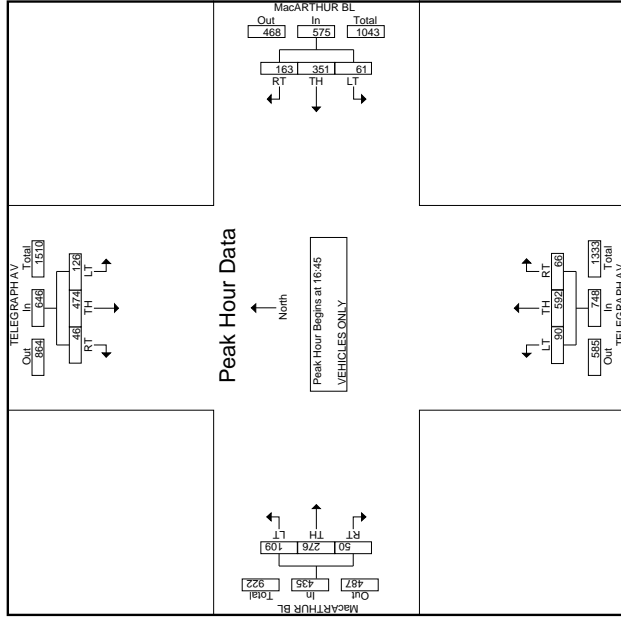
Start Time	TELEGRAPH AV Southbound					MacARTHUR BL Westbound					0 Northbound					MacARTHUR BL Eastbound				
	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total
16:00	46	0	0	46	0	1	158	0	159	0	0	0	0	93	0	0	0	93	298	
16:05	15	0	0	15	0	3	125	0	128	0	0	0	0	124	0	0	0	124	290	
16:10	42	0	0	42	0	6	143	0	149	0	0	0	0	129	0	0	0	129	307	
16:45	36	0	0	36	0	6	143	0	149	0	0	0	0	120	0	0	0	120	314	
Total	228	0	0	228	0	20	495	0	515	0	0	0	0	466	0	0	0	466	1209	
Grand Total	91	0	0	91	0	9	985	0	1025	0	0	0	0	916	0	0	0	916	2304	
App. %	100	0	0	100	0	3	982	0	44.5	0	0	0	0	10	0	0	0	39.8	0	
Total %	15.7	0	0	15.7	0	1.7	42.8	0	44.5	0	0	0	0	39.8	0	0	0	39.8	0	



MARKS TRAFFIC DATA

Start Time	TELEGRAPH AV Southbound					MacARTHUR BL Westbound					TELEGRAPH AV Northbound					MacARTHUR BL Eastbound				
	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total
16:00	14	111	37	162	50	75	15	140	18	128	20	166	15	71	16	102	570			
16:05	15	117	37	169	50	75	15	140	19	134	20	158	12	84	9	95	574			
16:10	16	137	37	190	43	65	13	161	16	151	20	187	12	84	34	100	572			
16:45	16	114	38	168	43	100	28	169	17	113	25	155	9	73	18	100	592			
Total	57	439	142	638	168	325	71	564	60	529	91	700	48	293	87	428	2330			
Grand Total	89	918	270	1288	328	652	113	1093	142	1122	184	1448	89	570	292	871	4700			
App. %	77	71.4	21	77.4	27.4	7	13.9	2.4	23.3	3	23.9	3.9	30.8	2.1	12.1	4.3	18.5			
Total %	2.1	19.6	5.7	27.4	7	13.9	2.4	23.3	3	23.9	3.9	30.8	2.1	12.1	4.3	18.5				

Start Time	TELEGRAPH AV Southbound					MacARTHUR BL Westbound					TELEGRAPH AV Northbound					MacARTHUR BL Eastbound				
	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total	RT	TH	LT	App. Total	Int. Total
16:00	14	111	37	162	50	75	15	140	18	128	20	166	15	71	16	102	570			
16:05	15	117	37	169	50	75	15	140	19	134	20	158	12	84	9	95	574			
16:10	16	137	37	190	43	65	13	161	16	151	20	187	12	84	34	100	572			
16:45	16	114	38	168	43	100	28	169	17	113	25	155	9	73	18	100	592			
Total	57	439	142	638	168	325	71	564	60	529	91	700	48	293	87	428	2330			
Grand Total	89	918	270	1288	328	652	113	1093	142	1122	184	1448	89	570	292	871	4700			
App. %	77	71.4	21	77.4	27.4	7	13.9	2.4	23.3	3	23.9	3.9	30.8	2.1	12.1	4.3	18.5			
Total %	2.1	19.6	5.7	27.4	7	13.9	2.4	23.3	3	23.9	3.9	30.8	2.1	12.1	4.3	18.5				



MARKS TRAFFIC DATA

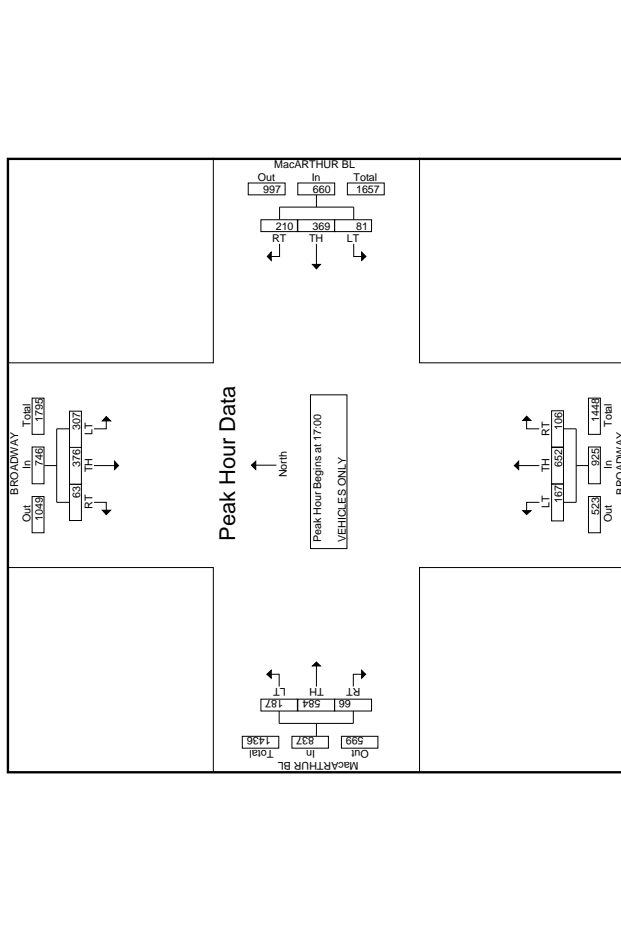
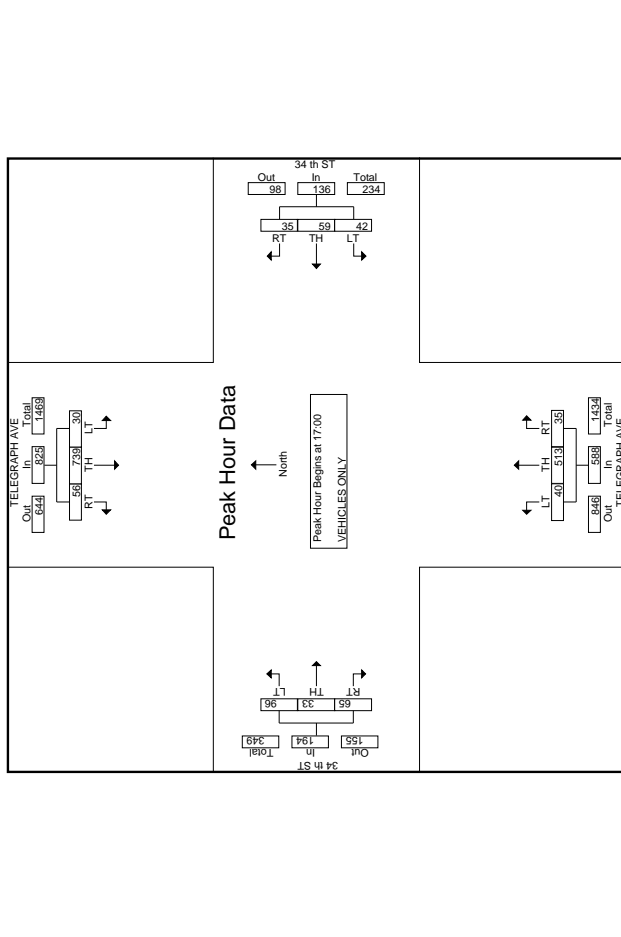
Start Time	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						34 th ST Eastbound						
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total			
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
16:00	11	13	14	38	14	14	32	5	13	14	32	1	1	1	3	1	1	1	3
16:30	12	12	13	37	14	14	32	7	14	14	35	8	14	14	36	11	14	14	39
16:45	13	13	13	39	14	14	32	8	14	14	36	9	14	14	37	11	14	14	39
Total	49	58	54	161	46	42	136	31	41	42	114	49	43	43	135	48	43	43	134
Grand Total	105	132	124	361	66	100	266	61	103	70	234	114	76	174	364	3288			
Approach %	3.2	40.5	1.9	45.6	2	3.1	2.6	7.7	1.9	31.5	2.1	35.6	3.5	2.3	5.3	11.1			

MARKS TRAFFIC DATA

Start Time	BROADWAY Southbound						BROADWAY Northbound						MacARTHUR BL Eastbound						
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total			
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
16:00	16	9	9	34	13	13	26	15	15	15	45	15	15	15	45	15	15	15	45
16:30	16	9	9	34	13	13	26	15	15	15	45	15	15	15	45	15	15	15	45
16:45	16	9	9	34	13	13	26	15	15	15	45	15	15	15	45	15	15	15	45
Total	73	35	27	135	41	41	123	45	45	45	135	45	45	45	135	45	45	45	135
Grand Total	136	73	58	267	203	156	359	1678	127	1063	290	1480	6030						
Approach %	9.4	50.5	40.1	50.1	24	7.9	12.5	3.3	23.6	3.4	19.2	6.3	27.8	2.1	17.6	4.8	24.5		

Start Time	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						34 th ST Eastbound						
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total			
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
17:00	17	20	20	57	12	12	24	11	11	11	33	11	11	11	33	11	11	11	33
17:15	12	20	20	52	12	12	24	11	11	11	33	12	12	12	36	14	14	14	42
17:30	15	17	17	49	6	6	12	8	8	8	24	13	13	13	39	17	17	17	51
17:45	12	15	15	42	5	5	10	4	4	4	12	14	14	14	42	18	18	18	54
Total	56	73	30	159	35	59	42	35	51	40	126	65	33	96	194	1743			
Grand Total	105	132	62	299	66	100	85	251	61	103	70	234	114	76	174	364	3288		
Approach %	7	86.8	4.2	88.2	26.3	39.8	33.9	40.1	5.2	88.7	6	91.1	3.5	2.3	5.3	11.1			

Start Time	BROADWAY Southbound						BROADWAY Northbound						MacARTHUR BL Eastbound						
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total			
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
17:00	14	9	9	32	13	13	26	13	13	13	39	13	13	13	39	13	13	13	39
17:15	13	9	9	31	12	12	24	12	12	12	36	12	12	12	36	12	12	12	36
17:30	13	9	9	31	12	12	24	12	12	12	36	12	12	12	36	12	12	12	36
17:45	15	8	8	31	11	11	22	11	11	11	33	11	11	11	33	11	11	11	33
Total	63	37	30	123	40	40	120	48	48	48	144	48	48	48	144	48	48	48	144
Grand Total	136	73	58	267	203	156	359	1678	127	1063	290	1480	6030						
Approach %	9.4	50.5	40.1	50.1	24	7.9	12.5	3.3	23.6	3.4	19.2	6.3	27.8	2.1	17.6	4.8	24.5		

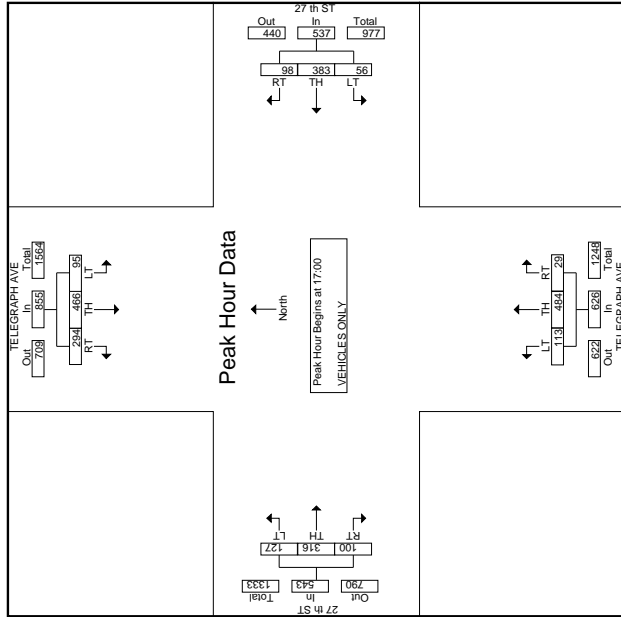


MARKS TRAFFIC DATA

Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				27th St Eastbound				
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
16:00	1	1	1	3	9	108	31	148	11	54	38	103	654
16:15	1	1	1	3	142	3	145	27	52	30	109	624	694
16:30	1	1	1	3	86	12	130	8	66	32	123	585	624
16:45	89	95	35	219	22	91	21	119	25	66	32	123	585
Total	351	430	103	884	104	380	36	520	75	241	139	455	2407
17:00	83	105	18	206	20	104	16	140	9	122	21	152	31
17:15	76	94	21	191	23	119	16	158	11	122	28	161	25
17:30	74	110	24	208	26	85	8	119	5	126	37	168	26
17:45	61	127	32	220	29	75	16	120	4	114	27	145	34
Total	294	466	95	855	98	383	56	537	29	484	113	626	100
Grand Total	645	896	198	1739	202	763	92	1057	174	725	252	1081	4988
Approach %	37.1	51.5	11.4	100	19.1	72.2	8.7	100	17.5	55.8	26.7	100	20.1
Total %	13	18	4	35	4.1	15.4	1.9	21.3	1.2	17.8	4.6	23.6	5.4

Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				27th St Eastbound				
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
17:00	83	105	18	206	20	104	16	140	9	122	21	152	31
17:15	76	94	21	191	23	119	16	158	11	122	28	161	25
17:30	74	110	24	208	26	85	8	119	5	126	37	168	26
17:45	61	127	32	220	29	75	16	120	4	114	27	145	34
Total	294	466	95	855	98	383	56	537	29	484	113	626	100
Grand Total	645	896	198	1739	202	763	92	1057	174	725	252	1081	4988
Approach %	37.1	51.5	11.4	100	19.1	72.2	8.7	100	17.5	55.8	26.7	100	20.1
Total %	13	18	4	35	4.1	15.4	1.9	21.3	1.2	17.8	4.6	23.6	5.4

Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				27th St Eastbound				
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
17:00	83	105	18	206	20	104	16	140	9	122	21	152	31
17:15	76	94	21	191	23	119	16	158	11	122	28	161	25
17:30	74	110	24	208	26	85	8	119	5	126	37	168	26
17:45	61	127	32	220	29	75	16	120	4	114	27	145	34
Total	294	466	95	855	98	383	56	537	29	484	113	626	100
Grand Total	645	896	198	1739	202	763	92	1057	174	725	252	1081	4988
Approach %	37.1	51.5	11.4	100	19.1	72.2	8.7	100	17.5	55.8	26.7	100	20.1
Total %	13	18	4	35	4.1	15.4	1.9	21.3	1.2	17.8	4.6	23.6	5.4



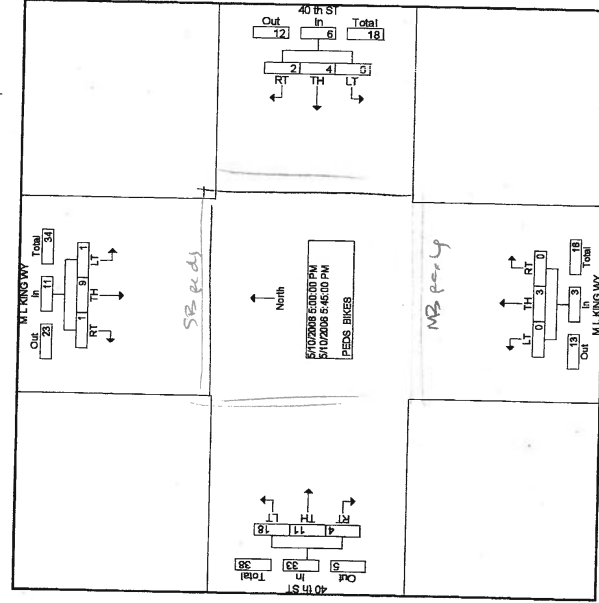
PM 11
OAKLAND
FPWT
TITO [916] 715-4006

MARKS TRAFFIC DATA

6/15 P/B
PM

Start Time	M L KING WY Southbound				M L KING WY Northbound				40th St Westbound				40th St Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0
16:45	1	3	0	4	1	1	0	2	1	1	0	2	0	0	0	0
Total	2	6	2	10	1	1	0	2	1	1	0	2	0	0	0	0
17:00	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
17:30	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
17:45	1	7	0	8	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	16	0	19	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	5	22	2	29	1	1	0	2	1	1	0	2	0	0	0	0
Approach %	11.1	86.7	2.2	100	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
Total %	2.1	12.8	4.3	19.4	4.3	10.6	0.0	14.9	0.0	3.2	0.0	3.2	4.3	23.7	28.8	62.8

Start Time	M L KING WY Southbound				M L KING WY Northbound				40th St Westbound				40th St Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0
16:45	1	3	0	4	1	1	0	2	1	1	0	2	0	0	0	0
Total	2	6	2	10	1	1	0	2	1	1	0	2	0	0	0	0
17:00	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
17:30	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
17:45	1	7	0	8	0	0	0	0	0	0	0	0	0	0	0	0
Total	3	16	0	19	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	5	22	2	29	1	1	0	2	1	1	0	2	0	0	0	0
Approach %	11.1	86.7	2.2	100	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
Total %	2.1	12.8	4.3	19.4	4.3	10.6	0.0	14.9	0.0	3.2	0.0	3.2	4.3	23.7	28.8	62.8



FROM : MJD

FAX NO. : 916 364 7967

Jun. 14 2006 07:58AM P7

File Name : dwt3-40th-p
Site Code : 00000000
Start Date : 5/10/2006
Page No : 1

MARKS TRAFFIC DATA

PM 13
OAKLAND
FPW C
TTTO [9/16] 715-4006

File Name : dwt12-40th-p
Site Code : 00000000
Start Date : 5/10/2006
Page No : 1

MARKS TRAFFIC DATA

PM 12
OAKLAND
FPW I
TTTO [9/16] 715-4006

FROM : MJD

FAX NO. : 916 364 7967

Jun. 14 2006 07:57AM P5

File Name : dwt12-40th-p
Site Code : 00000000
Start Date : 5/10/2006
Page No : 1

MARKS TRAFFIC DATA

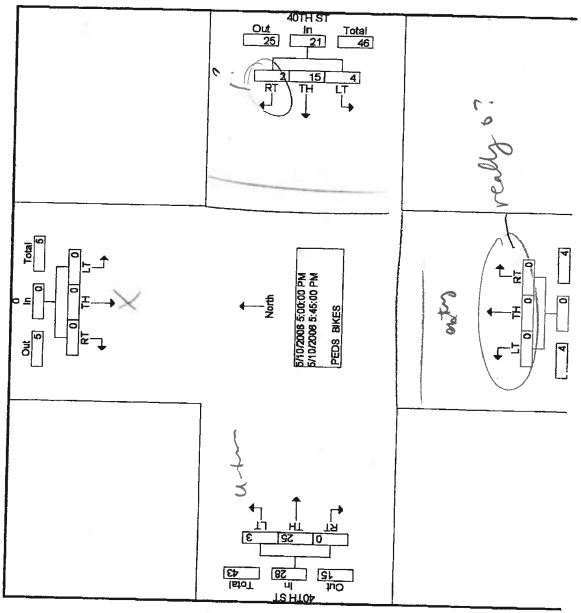
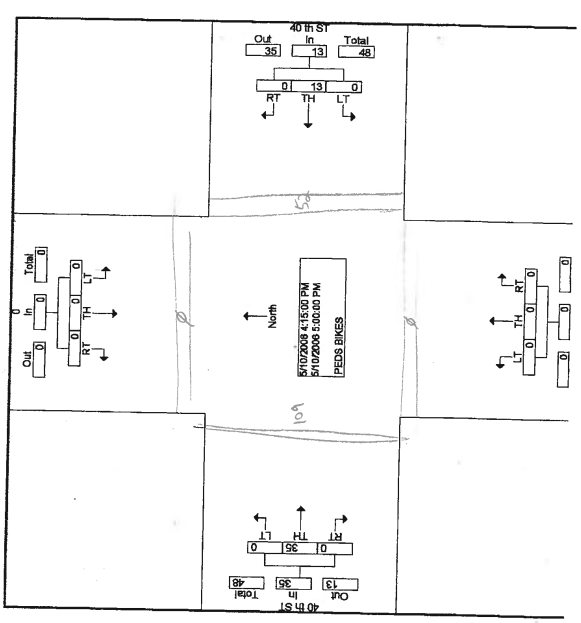
PM 12
OAKLAND
FPW I
TTTO [9/16] 715-4006

Start Time	Southbound				40th ST Westbound				Northbound				40th ST Eastbound				Exclu. Total	Incl. Total	Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED			
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	Southbound				40TH ST Westbound				Northbound				40TH ST Eastbound				Exclu. Total	Incl. Total	Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED			
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	Southbound				40th ST Westbound				Northbound				40th ST Eastbound				App. Total	LT	RT	LT	RT	App. Total	Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED							
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	Southbound				40TH ST Westbound				Northbound				40TH ST Eastbound				App. Total	LT	RT	LT	RT	App. Total	Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED							
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



MARKS TRAFFIC DATA

PM 20
 OAKLAND
 FFW/E
 TTTO [9]16] 715-4006

File Name : ml-king-macarthu-r-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No. : 1

#24
 #19
 #13
 #18
 #20

MARKS TRAFFIC DATA

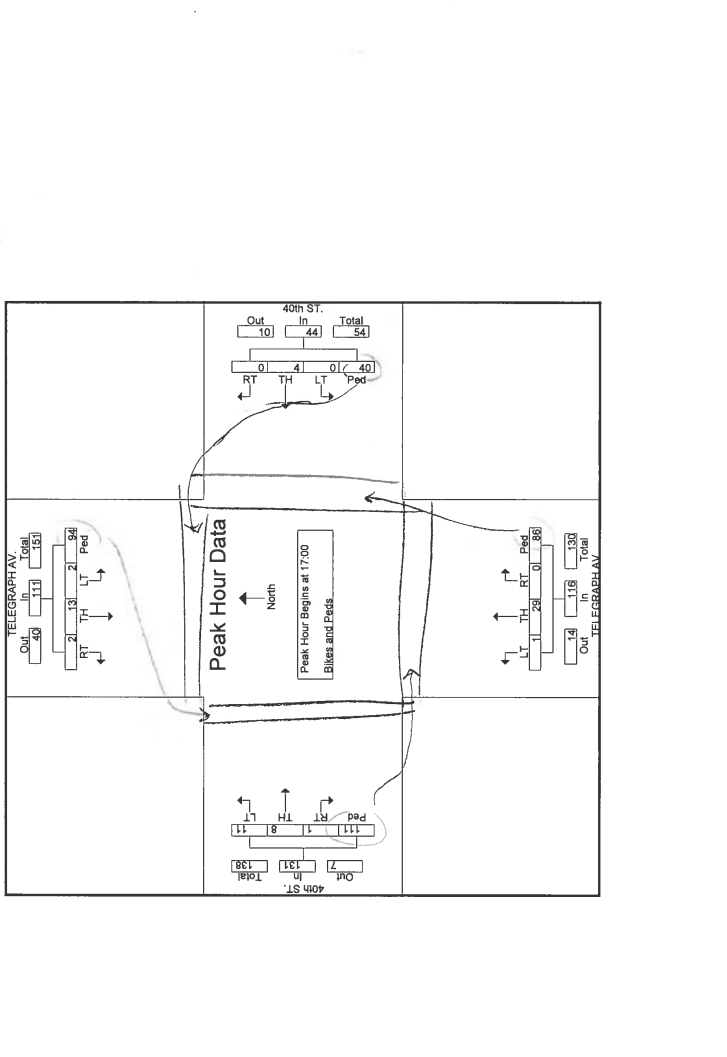
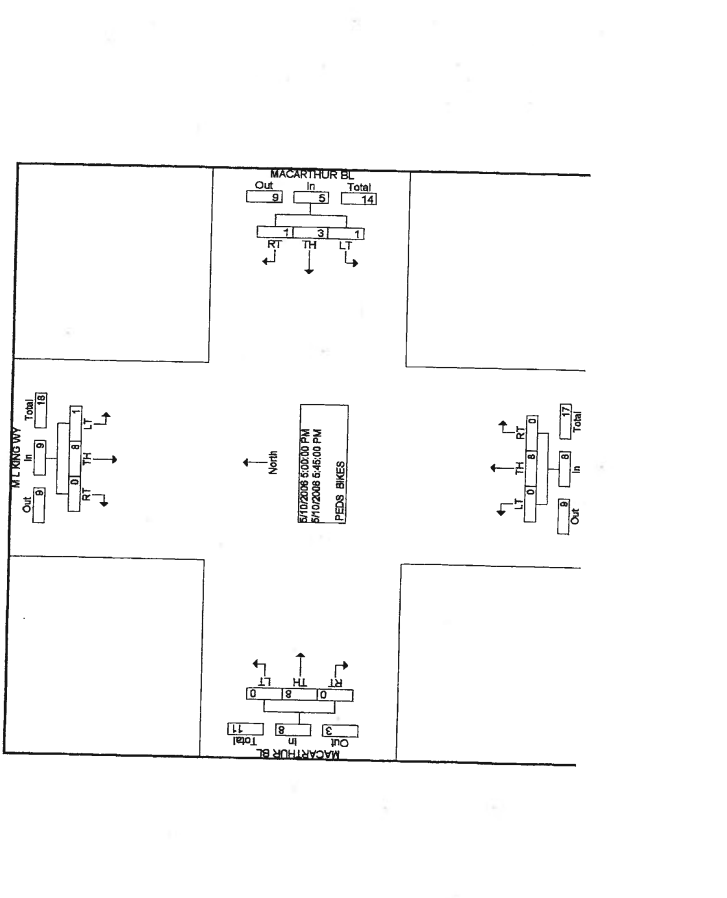
File Name : telegraph-40-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No. : 1

Start Time	M L KING WY Southbound					M L KING WY Northbound					MACARTHUR BL Westbound					MACARTHUR BL Eastbound					
	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	
16:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	M L KING WY Southbound					M L KING WY Northbound					MACARTHUR BL Westbound					MACARTHUR BL Eastbound					
	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	
16:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	M L KING WY Southbound					M L KING WY Northbound					MACARTHUR BL Westbound					MACARTHUR BL Eastbound					
	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	
16:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	M L KING WY Southbound					M L KING WY Northbound					MACARTHUR BL Westbound					MACARTHUR BL Eastbound					
	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	RT	TH	LT	PEDE	App. Total	
16:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	100	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



FROM : MTD
 PM 18
 OAKLAND
 FFW P
 TITO [916] 715-4006

MARKS TRAFFIC DATA

File Name : telegraph-38th-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

MARKS TRAFFIC DATA

File Name : pd-bart-dw-macauther-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

FROM : MTD
 PM 21
 OAKLAND
 FFW P
 TITO [916] 715-4006

MARKS TRAFFIC DATA

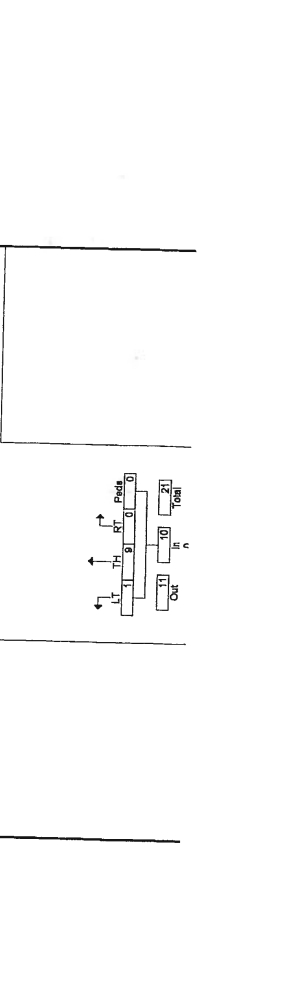
File Name : telegraph-38th-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

Start Time	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						38TH ST Westbound						TELEGRAPH AVE Eastbound					
	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total
16:30	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	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	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
App. Total	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 %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	BART DW Southbound						MacARTHUR BL Westbound						MacARTHUR BL Northbound						MacARTHUR BL Eastbound					
	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total
16:30	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	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	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
App. Total	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 %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						38TH ST Westbound						TELEGRAPH AVE Eastbound					
	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
App. Total	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 %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	BART DW Southbound						MacARTHUR BL Westbound						MacARTHUR BL Northbound						MacARTHUR BL Eastbound					
	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total	RT	TH	LT	Ped	App. Total	Int. Total
16:30	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	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	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0	1.0	1.0	1.0	1.0	4.0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
App. Total	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 %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

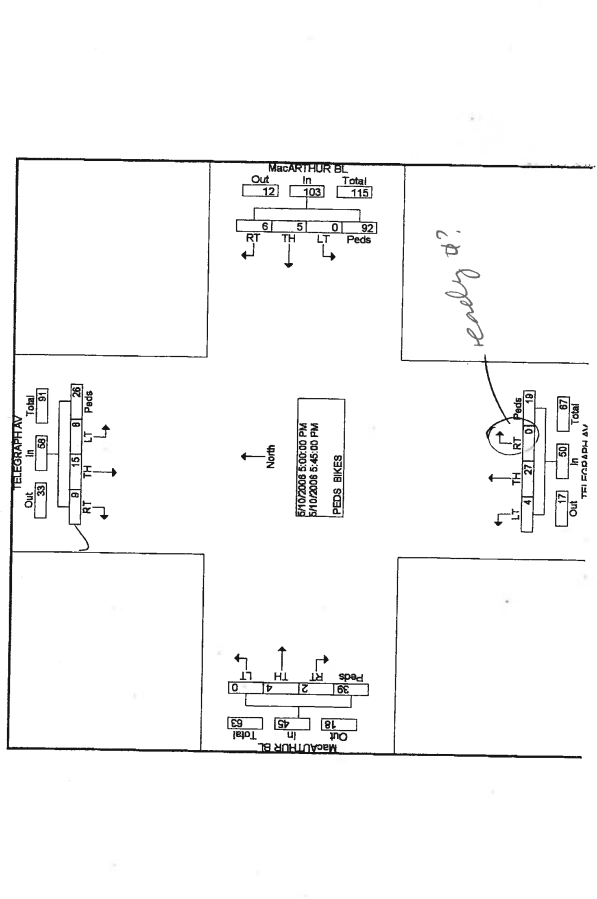


PM 22 OAKLAND FFW B
 MARKS TRAFFIC DATA #28 P1B PM
 TTTO [9/16] 715-4006

File Name : pt:telegraph-macarthu-r
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

Start Time	TELEGRAPH AV Southbound					TELEGRAPH AV Northbound					MacARTHUR BL Eastbound					MacARTHUR BL Westbound					
	RT	TH	LT	Ped	App. Total	RT	TH	LT	Ped	App. Total	RT	TH	LT	Ped	App. Total	RT	TH	LT	Ped	App. Total	
16:00	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	9	10	3	9	31	2	0	0	0	2	0	0	0	0	2	0	0	0	0	0	0
16:30	9	8	1	3	21	2	1	0	0	3	0	0	0	0	3	0	0	0	0	0	0
16:45	8	3	1	2	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	25	24	4	17	73	4	3	0	0	34	41	3	23	0	21	47	3	4	3	35	45
17:00	0	2	4	9	15	0	3	0	16	19	0	1	7	9	0	0	0	0	0	0	0
17:15	9	8	0	5	22	0	0	0	11	11	0	9	1	5	15	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	9	15	8	26	56	8	5	0	32	33	0	27	4	19	50	2	4	0	39	45	265
Grand Total	34	39	15	43	131	10	8	0	128	144	3	50	4	40	97	5	8	3	74	90	462
Approach %	28.2	29.2	13.3	33.5	59.9	5.9	5.9	0.0	87.5	3.1	51.5	4.1	41.2	5.6	6.9	3.3	82.2	6.0	16.0	19.5	
Total %	7.4	8.4	3.2	5.6	28.4	2.2	1.7	0.0	27.3	31.2	0.6	10.8	0.9	8.7	21.0	1.1	1.7	0.6	16.0	19.5	

Start Time	TELEGRAPH AV Southbound					TELEGRAPH AV Northbound					MacARTHUR BL Eastbound										
	RT	TH	LT	Ped	App. Total	RT	TH	LT	Ped	App. Total	RT	TH	LT	Ped	App. Total						
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
17:15	9	15	6	28	58	5	0	92	103	0	27	4	18	50	2	4	0	30	45	256	
17:30	0	0	0	0	0	5.8	4.9	0.0	99.3	0.0	54.0	8.0	38.0	6.0	4.4	8.9	0.0	86.7	17	17	92
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.036
Total	9	15	6	28	58	5.8	4.9	0.0	99.3	0.0	54.0	8.0	38.0	6.0	4.4	8.9	0.0	86.7	17	17	92
Grand Total	9	15	6	28	58	5.8	4.9	0.0	99.3	0.0	54.0	8.0	38.0	6.0	4.4	8.9	0.0	86.7	17	17	92
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.036
Total %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.036

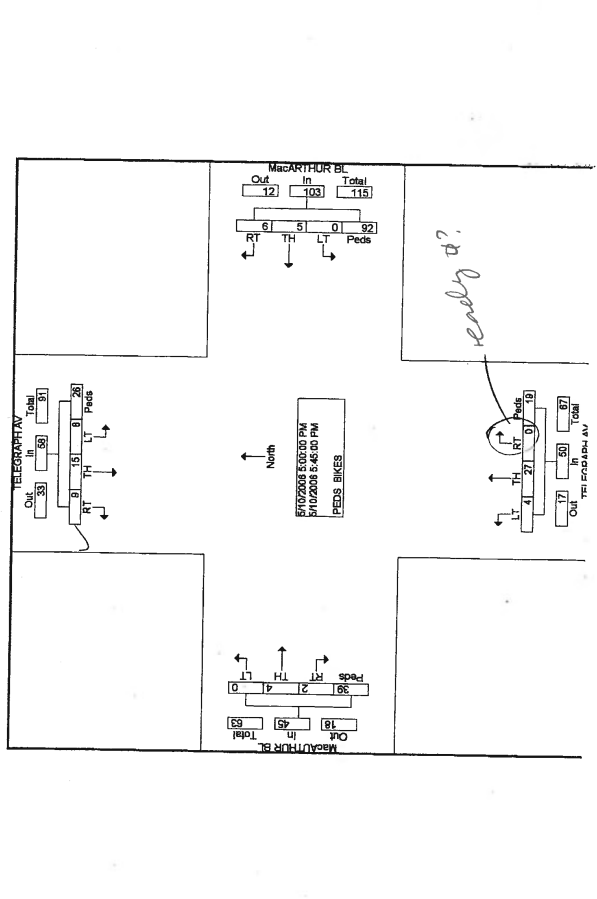


PM 27 OAKLAND FFW B
 MARKS TRAFFIC DATA #50 P1B PM
 TTTO [9/16] 715-4006

File Name : mt:king-39th-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

Start Time	M L KING WY Southbound					M L KING WY Northbound					39TH ST Eastbound					39TH ST Westbound					
	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total	
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	M L KING WY Southbound					M L KING WY Northbound					39TH ST Eastbound				
	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



**APPENDIX B:
EXISTING CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 2: 52nd St & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 1: 52nd St & Shattuck Ave.

Existing AM
 1/11/2008

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.99	0.99	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. 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
Frbp, ped/bikes	1.00	0.94	0.94	1.00	0.92	0.92	1.00	0.97	1.00	0.95	1.00	0.95
Flt	0.95	1.00	0.95	1.00	0.98	0.98	1.00	0.99	1.00	0.95	1.00	0.95
Flt Protected	1699	1681	1607	1681	1607	1607	3406	3406	1770	3200	1770	3200
Satd. Flow (prot)	0.80	0.75	1.00	0.75	1.00	1.00	0.84	0.84	0.95	1.00	0.95	1.00
Flt Permitted	1404	1321	1607	1321	1607	1607	3215	3215	1770	3200	1770	3200
Satd. Flow (perm)	8	0	7	109	95	119	10	966	224	72	654	358
Volume (vph)	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Peak-hour factor, PHF	9	0	8	117	102	128	11	1039	241	77	703	385
Adj. Flow (vph)	0	8	0	0	61	0	0	14	0	0	50	0
RTOR Reduction (vph)	0	9	0	117	169	0	0	1277	0	77	1038	0
Lane Group Flow (vph)	0	9	0	117	169	0	0	1277	0	77	1038	0
Conf. Peds. (#/hr)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Turn Type	7	7	7	8	8	8	2	2	2	1	6	6
Protected Phases	7	7	7	8	8	8	2	2	2	1	6	6
Permitted Phases	3.3	3.3	3.3	13.0	13.0	13.0	48.7	48.7	48.7	7.0	60.2	60.2
Actuated Green, G (s)	3.8	3.8	3.8	13.5	13.5	13.5	49.2	49.2	49.2	7.5	60.7	60.7
Effective Green, g (s)	0.04	0.04	0.04	0.15	0.15	0.15	0.55	0.55	0.55	0.08	0.67	0.67
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance 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
Vehicle Extension (s)	59	59	59	198	241	241	1758	1758	148	2158	148	2158
Lane Grp Cap (vph)	c0.01	c0.01	c0.01	0.09	0.11	0.11	c0.40	c0.40	0.04	c0.32	0.04	c0.32
v/s Ratio Prot	0.16	0.16	0.16	0.59	0.70	0.70	0.73	0.73	0.52	0.48	0.52	0.48
v/c Ratio	41.6	41.6	41.6	35.7	36.3	36.3	15.3	15.3	39.5	7.1	39.5	7.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.06	1.06	1.00	1.00	1.00	1.00
Progression Factor	0.5	0.5	0.5	3.1	7.3	7.3	1.4	1.4	1.5	0.8	1.5	0.8
Incremental Delay, d2	42.0	42.0	42.0	38.8	43.6	43.6	17.7	17.7	41.0	7.8	41.0	7.8
Delay (s)	D	D	D	D	D	D	D	D	D	D	D	D
Level of Service	D	D	D	D	D	D	D	D	D	D	D	D
Approach Delay (s)	42.0	42.0	42.0	42.0	42.0	42.0	17.7	17.7	17.7	10.0	17.7	10.0
Approach LOS	D	D	D	D	D	D	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	17.7 HCM Level of Service B											
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	77.6% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.99	1.00	0.95	1.00	0.95
Lane Util. 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
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	0.98	1.00	0.98	0.98	1.00	0.99	1.00	0.95	1.00	0.95
Flt Protected	1770	4937	4937	1764	4973	4973	2032	2032	1955	1955	1955	1955
Satd. Flow (prot)	0.95	1.00	1.00	0.24	1.00	1.00	0.48	0.48	0.77	0.77	0.77	0.77
Flt Permitted	1770	4937	4937	1764	4973	4973	1254	1254	1529	1529	1529	1529
Satd. Flow (perm)	288	906	170	65	1219	165	206	259	50	146	272	246
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	303	954	179	68	1283	174	217	273	53	154	286	259
Adj. Flow (vph)	0	27	0	0	17	0	0	10	0	0	60	0
RTOR Reduction (vph)	303	1106	0	68	1440	0	0	533	0	0	639	0
Lane Group Flow (vph)	10	10	10	10	10	10	10	10	10	10	10	10
Conf. Peds. (#/hr)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Turn Type	7	4	4	8	8	8	2	2	2	6	6	6
Protected Phases	7	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	21.0	56.0	56.0	31.0	31.0	31.0	37.5	37.5	37.5	37.5	37.5	37.5
Actuated Green, G (s)	0.21	0.56	0.56	0.31	0.31	0.31	0.38	0.38	0.38	0.38	0.38	0.38
Effective Green, g (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
Actuated g/C Ratio	37.2	2765	2765	137	1542	1542	477	477	581	581	581	581
Clearance Time (s)	c0.17	0.22	0.22	0.15	0.29	0.29	c0.43	c0.43	0.42	0.42	0.42	0.42
Vehicle Extension (s)	0.81	0.40	0.40	0.50	0.93	0.93	1.12	1.12	1.10	1.10	1.10	1.10
Lane Grp Cap (vph)	37.6	12.5	12.5	28.1	33.5	33.5	31.0	31.0	31.0	31.0	31.0	31.0
v/s Ratio Prot	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
v/c Ratio	17.6	0.4	0.4	12.3	11.8	11.8	77.4	77.4	67.9	67.9	67.9	67.9
Uniform Delay, d1	55.2	12.9	12.9	40.4	45.3	45.3	108.4	108.4	98.9	98.9	98.9	98.9
Progression Factor	E	B	B	D	D	D	F	F	F	F	F	F
Incremental Delay, d2	21.8	21.8	21.8	45.1	45.1	45.1	108.4	108.4	98.9	98.9	98.9	98.9
Delay (s)	C	C	C	D	D	D	F	F	F	F	F	F
Level of Service	D	D	D	D	D	D	F	F	F	F	F	F
Approach Delay (s)	54.3	54.3	54.3	54.3	54.3	54.3	108.4	108.4	108.4	108.4	108.4	108.4
Approach LOS	D	D	D	D	D	D	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	54.3 HCM Level of Service D											
HCM Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 10.0											
Intersection Capacity Utilization	102.8% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
4: 47th St. & Martin Luther King Jr Way

Existing AM
1/11/2008

Existing AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	1.00	0.97	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3433	1770	3398	1770	3437	1770	3437	1770	3350	1770	3350	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3433	1770	3398	1770	3437	1770	3437	1770	3350	1770	3350	
Volume (vph)	450	533	85	101	677	209	107	567	99	140	496	143	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	469	555	89	105	705	218	111	591	103	146	517	149	
RTOR Reduction (vph)	0	14	0	0	32	0	0	16	0	0	28	0	
Lane Group Flow (vph)	469	630	0	105	891	0	111	678	0	146	638	0	
Confl. Peds. (#/hr)			24			6			28			36	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4		3	8		5	2		1		6	
Permitted Phases													
Actuated Green, G (s)	13.0	30.6		7.9	25.5		8.0	24.4		10.1		26.5	
Effective Green, g (s)	12.5	31.6		7.4	26.5		7.5	25.4		9.6		27.5	
Actuated g/C Ratio	0.14	0.35		0.08	0.29		0.08	0.28		0.11		0.31	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0	
Lane Grp Cap (vph)	477	1205		146	1001		148	970		189		1024	
v/s Ratio Prot	c0.14	0.18		0.06	c0.26		0.06	c0.20		c0.08		0.19	
v/c Ratio Perm	0.98	0.52		0.72	0.89		0.75	0.70		0.77		0.62	
Uniform Delay, d1	38.6	23.2		40.3	30.4		40.3	28.9		39.1		26.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.12		0.82	
Incremental Delay, d2	36.5	0.2		13.2	9.5		17.1	4.2		14.6		2.5	
Delay (s)	75.2	23.4		53.4	39.9		57.4	33.1		58.3		24.6	
Level of Service	E	C		D	D		E	C		E		C	
Approach Delay (s)			45.2			41.3			36.4			30.7	
Approach LOS			D			D			D			C	
Intersection Summary													
HCM Average Control Delay	39.1											HCM Level of Service	D
HCM Volume to Capacity ratio	0.82												
Actuated Cycle Length (s)	90.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.7%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
5: 45th St. & Martin Luther King Jr Way

Existing AM
1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.96	0.96	1.00	1.00	1.00	0.98	0.98	0.98	1.00	1.00	1.00
Flpb, ped/bikes	0.98	0.94	0.94	0.98	0.98	0.98	0.98	0.98	0.98	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1676	1596	1596	3385	3385	3385	3457	3457	3457	3457	3457	3457
Flt Permitted	0.79	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.88
Satd. Flow (perm)	1364	1419	1419	3137	3137	3137	3059	3059	3059	3059	3059	3059
Volume (vph)	69	50	23	51	44	72	23	437	80	41	419	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	77	56	26	57	49	80	26	486	89	46	466	31
RTOR Reduction (vph)	0	15	0	0	53	0	0	31	0	0	10	0
Lane Group Flow (vph)	0	144	0	0	133	0	0	570	0	0	533	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	2	2	2	2	2	6
Permitted Phases	4	8	8	2	2	2	2	2	2	2	2	6
Actuated Green, G (s)	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
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	4.0
Lane Grp Cap (vph)	455	473	473	1534	1534	1534	1496	1496	1496	1496	1496	1496
v/s Ratio Prot	0.11	0.09	0.09	0.18	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.17
v/s Ratio Perm	0.32	0.28	0.28	0.37	0.37	0.37	0.36	0.36	0.36	0.36	0.36	0.36
v/c Ratio	11.2	11.0	11.0	7.2	7.2	7.2	7.1	7.1	7.1	7.1	7.1	7.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.8	1.5	1.5	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Incremental Delay, d2	13.0	12.5	12.5	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8
Delay (s)	B	B	B	A	A	A	A	A	A	A	A	A
Level of Service	B	B	B	A	A	A	A	A	A	A	A	A
Approach Delay (s)	13.0	12.5	12.5	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8
Approach LOS	B	B	B	A	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.0 HCM Level of Service A											
HCM Volume to Capacity ratio	0.35											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	60.5% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

Existing AM
1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.96	0.96	0.96	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1641	1659	1659	3456	3456	3456	4882	4882	4882	4882	4882	4882
Flt Permitted	0.82	0.85	0.85	0.91	0.91	0.91	0.81	0.81	0.81	0.81	0.81	0.81
Satd. Flow (perm)	1371	1422	1422	3135	3135	3135	3987	3987	3987	3987	3987	3987
Volume (vph)	51	74	52	26	26	57	36	22	910	45	61	966
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	82	58	29	29	63	40	24	1011	50	68	1073
RTOR Reduction (vph)	0	24	0	0	26	0	0	2	0	0	0	6
Lane Group Flow (vph)	0	173	0	0	106	0	0	1083	0	0	1227	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	2	6
Permitted Phases	4	4	4	4	4	4	2	2	2	2	2	6
Actuated Green, G (s)	13.1	13.1	13.1	13.1	13.1	13.1	62.9	62.9	62.9	62.9	62.9	62.9
Effective Green, g (s)	13.6	13.6	13.6	13.6	13.6	13.6	63.4	63.4	63.4	63.4	63.4	63.4
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.75	0.75	0.75	0.75	0.75	0.75
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)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	219	228	228	2338	2338	2338	2974	2974	2974	2974	2974	2974
v/s Ratio Prot	0.13	0.07	0.07	0.35	0.35	0.35	0.31	0.31	0.31	0.31	0.31	0.31
v/s Ratio Perm	0.79	0.46	0.46	0.46	0.46	0.46	0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	34.3	32.4	32.4	4.2	4.2	4.2	4.0	4.0	4.0	4.0	4.0	4.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	0.5	0.5	0.5	0.7	0.7	0.7	0.7	0.7	0.7
Incremental Delay, d2	50.1	32.9	32.9	6.9	6.9	6.9	4.4	4.4	4.4	4.4	4.4	4.4
Delay (s)	D	C	C	A	A	A	A	A	A	A	A	A
Level of Service	D	C	C	A	A	A	A	A	A	A	A	A
Approach Delay (s)	50.1	32.9	32.9	6.9	6.9	6.9	4.4	4.4	4.4	4.4	4.4	4.4
Approach LOS	D	C	C	A	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	10.3 HCM Level of Service B											
HCM Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	87.2% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.98	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00
Fltb, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.98	1.00	1.00	0.99	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1730	3474	1756	3474	1766	3474	1766	3474	1733	3474	1841
Flt Permitted	0.33	1.00	0.48	1.00	0.62	1.00	0.63	1.00	0.63	1.00	1.00
Satd. Flow (perm)	606	3474	879	3474	1145	1819	1154	1841	1154	1841	1841
Volume (vph)	19	291	35	25	437	39	82	159	23	85	187
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	21	320	38	27	480	43	90	175	25	93	205
RTOR Reduction (vph)	0	11	0	0	9	0	0	7	0	0	3
Lane Group Flow (vph)	21	347	0	27	514	0	90	183	0	93	218
Confl. Peds. (#/hr)	30	12	12	12	30	6	54	54	54	54	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	174	999	253	999	701	1114	707	1128	707	1128	1128
v/s Ratio Prot	0.10	0.10	0.10	c0.15	c0.15	0.11	0.11	0.11	0.11	0.11	0.12
v/s Ratio Perm	0.03	0.03	0.03	0.03	0.03	0.08	0.08	0.08	0.08	0.08	0.08
v/c Ratio	0.12	0.35	0.11	0.51	0.13	0.17	0.13	0.17	0.13	0.19	0.19
Uniform Delay, d1	21.0	22.6	20.9	23.8	6.5	6.7	6.5	6.8	6.5	6.8	6.8
Progression Factor	1.00	1.00	0.91	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	1.0	0.8	1.9	0.4	0.3	0.4	0.4	0.4	0.4	0.4
Delay (s)	22.5	23.5	20.0	25.3	6.9	7.1	6.9	7.2	6.9	7.2	7.2
Level of Service	C	C	B	C	A	A	A	A	A	A	A
Approach Delay (s)	23.5	23.5	25.1	25.1	7.0	7.0	7.1	7.1	7.1	7.1	7.1
Approach LOS	C	C	C	C	A	A	A	A	A	A	A

Intersection Summary	
HCM Average Control Delay	17.6
HCM Level of Service	B
HCM Volume to Capacity ratio	0.30
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	75.5%
Sum of lost time (s)	8.0
ICU Level of Service	D
Analysis Period (min)	15
Critical Lane Group	15

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	0.98	1.00	0.98	1.00	1.00	1.00	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	0.99	0.99
Satd. Flow (prot)	1759	3457	1736	3519	1736	3519	1736	3519	3361	3374	3374
Flt Permitted	0.45	1.00	0.48	1.00	0.48	1.00	0.85	1.00	0.85	0.91	0.91
Satd. Flow (perm)	839	3457	871	3519	871	3519	2885	3086	2885	3086	3086
Volume (vph)	15	361	48	18	429	14	61	100	41	16	66
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
Adj. Flow (vph)	16	380	51	19	452	15	64	105	43	17	69
RTOR Reduction (vph)	0	13	0	0	3	0	0	25	0	0	15
Lane Group Flow (vph)	16	418	0	19	464	0	0	187	0	0	97
Confl. Peds. (#/hr)	18	54	54	18	4	18	4	18	18	18	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	409	1685	425	1716	425	1716	1190	1190	425	1273	1273
v/s Ratio Prot	0.12	0.12	0.12	c0.13	c0.13	0.12	0.12	0.12	0.12	0.12	0.12
v/s Ratio Perm	0.04	0.25	0.04	0.27	0.04	0.27	0.16	0.16	0.16	0.08	0.08
v/c Ratio	10.7	12.0	10.7	12.1	10.7	12.1	14.8	14.8	14.8	14.3	14.3
Uniform Delay, d1	0.93	1.05	0.93	1.41	0.93	1.46	0.40	0.40	0.40	0.1	0.1
Progression Factor	0.2	0.2	0.2	0.4	0.2	0.4	0.3	0.3	0.3	0.1	0.1
Incremental Delay, d2	10.1	12.9	15.4	18.0	15.4	18.0	6.2	6.2	6.2	14.4	14.4
Delay (s)	10.1	12.9	15.4	18.0	15.4	18.0	6.2	6.2	6.2	14.4	14.4
Level of Service	B	B	B	B	B	B	A	A	A	B	B
Approach Delay (s)	12.8	12.8	17.9	17.9	17.9	17.9	6.2	6.2	6.2	14.4	14.4
Approach LOS	B	B	C	C	C	C	A	A	A	B	B

Intersection Summary	
HCM Average Control Delay	13.8
HCM Level of Service	B
HCM Volume to Capacity ratio	0.22
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	51.8%
Sum of lost time (s)	8.0
ICU Level of Service	A
Analysis Period (min)	15
Critical Lane Group	15

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & Martin Luther King Jr Way

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1758	3499	1727	3453	1727	3453	3395	3434	3395	3434	3395	3434	3395
Flt Permitted	0.47	1.00	0.50	1.00	0.50	1.00	0.91	0.80	0.91	0.80	0.91	0.80	0.91
Satd. Flow (perm)	869	3499	904	3453	869	3453	3093	2788	3093	2788	3093	2788	3093
Volume (vph)	31	369	22	54	373	58	31	248	69	71	212	29	29
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	32	384	23	56	389	60	32	258	72	74	221	30	30
RTOR Reduction (vph)	0	5	0	0	15	0	0	27	0	0	10	0	0
Lane Group Flow (vph)	32	402	0	56	434	0	0	335	0	0	315	0	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	6	6
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	31.0	31.0	31.0	31.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp. Cap (vph)	445	1793	463	1770	463	1770	1199	1080	1199	1080	1080	1080	1080
v/s Ratio Prot	0.11	0.11	0.11	c0.13	c0.13	0.11	0.11	0.11	0.11	c0.11	c0.11	c0.11	c0.11
v/s Ratio Perm	0.07	0.22	0.12	0.25	0.25	0.28	0.28	0.28	0.28	0.29	0.29	0.29	0.29
Uniform Delay, d1	9.9	10.7	10.1	10.9	10.9	16.8	16.8	16.9	16.8	16.9	16.9	16.9	16.9
Progression Factor	1.33	1.43	1.00	1.00	1.00	0.70	0.70	1.00	0.70	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.3	0.3	0.3	0.3	0.6	0.6	0.7	0.6	0.7	0.7	0.7	0.7
Delay (s)	13.4	15.7	10.7	11.2	11.2	12.4	12.4	17.6	12.4	17.6	17.6	17.6	17.6
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	15.5	15.5	11.1	12.4	12.4	12.4	12.4	17.6	12.4	17.6	17.6	17.6	17.6
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	13.9 HCM Level of Service B
HCM Volume to Capacity ratio	0.27
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	100.0% ICU Level of Service F
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

Existing AM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	440	59	101	472	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	484	65	111	519	0	0
Pedestrians					266	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)					None	
Median type					None	
Median storage (veh)					487	
Upstream signal (ft)	673					
pX, platoon unblocked					0.99	
vC, conflicting volume		814			1263	540
vC1, stage 1 cont vol						
vC2, stage 2 cont vol						
vCu, unblocked vol		814			1257	540
IC, single (s)		4.1			6.8	6.9
IC, 2 stage (s)						
IF (s)		2.2			3.5	3.3
p0 queue free %		86			100	100
cM capacity (veh/h)		809			140	486
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	
Volume Total	322	226	111	259	259	
Volume Left	0	0	111	0	0	
Volume Right	0	65	0	0	0	
cSH	1700	1700	809	1700	1700	
Volume to Capacity	0.19	0.13	0.14	0.15	0.15	
Queue Length 95th (ft)	0	0	12	0	0	
Control Delay (s)	0.0	0.0	10.2	0.0	0.0	
Lane LOS			B			
Approach Delay (s)	0.0	0.0	1.8			
Approach LOS			B			

Intersection Summary	
Average Delay	1.0
Intersection Capacity Utilization	27.1% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: 40th St. & BART parking

Existing AM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	427	13	0	573	0	18
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	459	14	0	616	0	19
Pedestrians	123	123	123	123	123	123
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	10	10	10	10	10	10
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	754			406		
pX, platoon unblocked						0.92
VC, conflicting volume	596			596		897
VC1, stage 1 cont vol						483
VC2, stage 2 cont vol						
vCu, unblocked vol	596			801		483
IC, single (s)	4.1			4.1		6.8
IC, 2 stage (s)						6.9
tF (s)	2.2			3.5		3.3
p0 queue free %	100			100		95
cM capacity (veh/h)	876			266		427
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	306	167	308	308	19	19
Volume Left	0	0	0	0	0	0
Volume Right	0	14	0	0	19	19
cSH	1700	1700	1700	1700	427	427
Volume to Capacity	0.18	0.10	0.18	0.18	0.05	0.05
Queue Length 95th (ft)	0	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	13.8	B
Lane LOS					B	B
Approach Delay (s)	0.0	0.0	0.0	13.8		
Approach LOS				B		
Intersection Summary						
Average Delay	0.2					
Intersection Capacity Utilization	35.7%					ICU Level of Service
Analysis Period (min)	15					A

HCM Unsignalized Intersection Capacity Analysis
 12: 40th St. & BART parking

Existing AM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	442	3	0	573	0	54
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	460	3	0	597	0	56
Pedestrians	123	123	123	123	123	123
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	10	10	10	10	10	10
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	971			189		
pX, platoon unblocked						0.90
VC, conflicting volume	587			587		883
VC1, stage 1 cont vol						478
VC2, stage 2 cont vol						
vCu, unblocked vol	587			755		478
IC, single (s)	4.1			4.1		6.8
IC, 2 stage (s)						6.9
tF (s)	2.2			3.5		3.3
p0 queue free %	100			100		87
cM capacity (veh/h)	884			277		430
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	307	157	298	298	56	56
Volume Left	0	0	0	0	0	0
Volume Right	0	3	0	0	56	56
cSH	1700	1700	1700	1700	430	430
Volume to Capacity	0.18	0.09	0.18	0.18	0.13	0.13
Queue Length 95th (ft)	0	0	0	0	0	11
Control Delay (s)	0.0	0.0	0.0	0.0	14.6	B
Lane LOS					B	B
Approach Delay (s)	0.0	0.0	0.0	14.6		
Approach LOS				B		
Intersection Summary						
Average Delay	0.7					
Intersection Capacity Utilization	35.7%					ICU Level of Service
Analysis Period (min)	15					A

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

Existing AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.96	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.95
Hourly flow rate (vph)	0.93	1.00	0.92	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.97	0.90
Pedestrians	100	0.97	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.90
Lane Width (ft)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Walking Speed (ft/s)	1650	3317	1633	3367	1770	3464	1770	3464	1770	3334	1770	3334
Percent Blockage	0.30	1.00	0.30	1.00	0.30	1.00	0.30	1.00	0.30	1.00	0.30	1.00
Right turn flare (veh)	520	3317	517	3367	1770	3464	1770	3464	1770	3334	1770	3334
Median type	82	335	79	43	351	64	80	402	33	78	507	144
Median storage (veh)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Upstream signal (ft)	91	372	88	48	390	71	89	447	37	87	563	160
pX, platoon unblocked	0	28	0	0	20	0	0	5	0	0	21	0
VC, conflicting volume	91	432	0	48	441	0	89	479	0	87	702	0
VC1, stage 1 cont vol	Conf. Ped. (#/hr)	72	137	137	72	72	58	58	58	58	92	92
VC2, stage 2 cont vol	Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
vCu, unblocked vol	Protected Phases	4	8	8	5	2	1	6	1	6	6	6
IC, 2 stage (s)	Permitted Phases	4	8	8	5	2	1	6	1	6	6	6
IF (s)	Actuated Green, G (s)	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
p0 queue free %	Effective Green, g (s)	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1
dM capacity (veh/h)	RTOR Reduction (vph)	0	28	0	0	20	0	5	0	0	21	0
Direction, Lane #	Lane Group Flow (vph)	91	432	0	48	441	0	89	479	0	87	702
Volume Total	Conf. Ped. (#/hr)	72	137	137	72	72	58	58	58	58	92	92
Volume Left	Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Volume Right	Protected Phases	4	8	8	5	2	1	6	1	6	6	6
Volume to Capacity	Actuated Green, G (s)	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
Queue Length 95th (ft)	Effective Green, g (s)	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1
Control Delay (s)	Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Lane LOS	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
Approach LOS	Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Intersection Summary	Lane Grp Cap (vph)	105	667	104	677	165	1960	162	1883	162	1883	1883
Average Delay	v/s Ratio Prot	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14
Intersection Capacity Utilization	v/c Ratio Perm	0.17	0.65	0.46	0.65	0.54	0.24	0.54	0.24	0.54	0.37	0.37
Analysis Period (min)	Uniform Delay, d1	32.8	31.2	29.9	31.2	36.8	9.3	36.9	10.2	36.9	10.2	10.2
	Progression Factor	1.00	1.00	1.00	1.00	0.70	1.49	1.33	0.70	1.33	0.70	0.70
	Incremental Delay, d2	46.8	1.6	1.2	1.7	1.6	0.3	1.6	0.5	1.6	0.5	0.5
	Delay (s)	79.7	32.8	31.1	32.9	27.4	14.1	50.5	7.7	50.5	7.7	7.7
	Level of Service	E	C	C	C	C	B	D	A	D	A	A
	Approach Delay (s)	40.6	32.8	32.8	32.8	16.2	16.2	16.2	16.2	16.2	16.2	16.2
	Approach LOS	D	C	C	C	B	B	B	B	B	B	B

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	23.8	31.2	29.9	31.2	36.8	9.3	36.9	10.2	36.9	10.2	10.2	10.2
HCM Volume to Capacity ratio	0.51	0.65	0.46	0.65	0.54	0.24	0.54	0.24	0.54	0.37	0.37	0.37
Actuated Cycle Length (s)	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0	85.0
Intersection Capacity Utilization	58.5%	58.5%	58.5%	58.5%	58.5%	58.5%	58.5%	58.5%	58.5%	58.5%	58.5%	58.5%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave.

Existing AM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	5	16	41	544	585	27
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	18	46	604	650	30
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	0.97	0.97	0.97	0.97	0.97	0.97
Upstream signal (ft)	1258	540	780	780	780	780
pX, platoon unblocked	1258	540	780	780	780	780
VC, conflicting volume	1258	540	780	780	780	780
VC1, stage 1 cont vol	1258	540	780	780	780	780
VC2, stage 2 cont vol	1258	540	780	780	780	780
vCu, unblocked vol	6.8	6.9	4.1	4.1	4.1	4.1
IC, 2 stage (s)	3.5	3.3	2.2	2.2	2.2	2.2
IF (s)	96	96	94	94	94	94
p0 queue free %	129	425	765	765	765	765
dM capacity (veh/h)	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Direction, Lane #	23	46	302	302	433	247
Volume Total	6	46	0	0	0	0
Volume Left	18	0	0	0	0	30
Volume Right	275	765	1700	1700	1700	1700
cSH	0.08	0.06	0.18	0.18	0.25	0.15
Volume to Capacity	7	5	0	0	0	0
Queue Length 95th (ft)	19.3	10.0	0.0	0.0	0.0	0.0
Control Delay (s)	C	B	C	B	C	B
Lane LOS	C	B	C	B	C	B
Approach Delay (s)	19.3	0.7	0.0	0.0	0.0	0.0
Approach LOS	C	B	C	B	C	B
Intersection Summary						
Average Delay	0.7					
Intersection Capacity Utilization	43.7%					
Analysis Period (min)	15					
ICU Level of Service	A					

Intersection Summary	EBL	EBR	NBL	NBT	SBT	SBR
HCM Average Control Delay	0.7	0.7	0.7	0.7	0.7	0.7
HCM Volume to Capacity ratio	0.08	0.06	0.18	0.18	0.25	0.15
Actuated Cycle Length (s)	15	15	15	15	15	15
Intersection Capacity Utilization	43.7%	43.7%	43.7%	43.7%	43.7%	43.7%
Analysis Period (min)	15	15	15	15	15	15
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

Existing AM
 1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↓	↓
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	11	34	551	9	15	583
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	38	612	10	17	648
Pedestrians	34	33				34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3	3	3	3	3
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)						
Upstream signal (ft)			230			791
pX, platoon unblocked	0.97	0.97				0.97
VC, conflicting volume	1041	379				656
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1015	335				620
IC, single (s)	6.8	6.9				4.1
IC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	94	94				98
cM capacity (veh/h)	212	607				905
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	50	408	214	17	324	324
Volume Left	12	0	0	17	0	0
Volume Right	38	0	10	0	0	0
cSH	417	1700	1700	905	1700	1700
Volume to Capacity	0.12	0.24	0.13	0.02	0.19	0.19
Queue Length 95th (ft)	10	0	0	1	0	0
Control Delay (s)	14.8	0.0	0.0	9.1	0.0	0.0
Lane LOS	B	A	A	A	A	A
Approach Delay (s)	14.8	0.0	0.2			
Approach LOS	B	A	A			

Intersection Summary		
Average Delay	0.7	
Intersection Capacity Utilization	33.4%	ICU Level of Service A
Analysis Period (min)	15	

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

Existing AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	0.99	1.00	1.00	0.97	1.00	0.98	1.00	0.99	1.00	1.00	1.00
Frt	0.99	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.99	1.00	1.00	1.00
Flt Protected	0.99	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	4983	1753	3416	1774	3416	1774	1774	3416	1724	1842	1842	1842
Flt Permitted	0.88	0.53	1.00	0.88	1.00	0.88	0.88	1.00	0.44	1.00	1.00	1.00
Satd. Flow (perm)	4407	985	3416	1586	3416	1586	1586	3416	807	1842	1842	1842
Volume (vph)	34	263	25	50	262	66	58	171	49	64	185	12
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)	37	286	27	54	285	72	63	186	53	70	201	13
RTOR Reduction (vph)	0	10	0	0	26	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	340	0	54	331	0	0	293	0	70	211	0
Conf. Peds. (#/hr)	24	18	18	24	24	24	24	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	2	2	6	6	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6	6	6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	2696	603	2090	466	603	2090	466	603	237	542	542	542
v/s Ratio Prot	0.08	0.05	0.05	c0.10	0.05	c0.10	0.05	c0.18	0.09	0.09	0.09	0.11
v/s Ratio Perm	0.13	0.09	0.16	0.09	0.16	0.09	0.16	0.63	0.30	0.30	0.39	0.39
Uniform Delay, d1	6.9	6.8	7.1	26.0	7.1	26.0	7.1	26.0	23.2	23.9	23.9	23.9
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	0.1	0.3	0.2	6.3	0.2	6.3	0.2	6.3	3.2	2.1	2.1	2.1
Delay (s)	7.0	7.1	7.3	32.3	7.3	32.3	7.3	32.3	26.3	26.0	26.0	26.0
Level of Service	A	A	A	C	A	C	A	C	C	C	C	C
Approach Delay (s)	7.0	7.2	7.2	32.3	7.2	32.3	7.2	32.3	26.1	26.1	26.1	26.1
Approach LOS	A	A	A	C	A	C	A	C	C	C	C	C

Intersection Summary		
HCM Average Control Delay	16.8	HCM Level of Service B
HCM Volume to Capacity ratio	0.31	
Actuated Cycle Length (s)	85.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	92.5%	ICU Level of Service F
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5050	4990	4990	4990	4990	4990	4990	4990	4990	4990	4990	4990
Flt Permitted	0.90	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Satd. Flow (perm)	4563	4418	4418	4418	4418	4418	4418	4418	4418	4418	4418	4418
Volume (vph)	25	367	7	33	323	32	30	166	50	23	105	10
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)	27	399	8	36	351	35	33	180	54	25	114	11
RTOR Reduction (vph)	0	2	0	0	12	0	0	13	0	0	4	0
Lane Group Flow (vph)	0	432	0	0	410	0	33	221	0	25	121	0
Confl. Peds. (#/hr)	18	18	18	18	18	18	18	18	18	18	18	18
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2937	2844	2844	2844	2844	2844	2844	2844	2844	2844	2844	2844
v/s Ratio Prot												
v/s Ratio Perm	c0.09	0.09	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.07
v/c Ratio	0.15	0.14	0.14	0.11	0.48	0.11	0.48	0.11	0.11	0.26	0.26	0.26
Uniform Delay, d1	5.6	5.6	5.6	22.7	25.3	22.8	25.3	22.8	23.7	23.7	23.7	23.7
Progression Factor	1.00	1.00	1.00	0.78	1.00	1.00	1.00	1.00	1.02	1.01	1.01	1.01
Incremental Delay, d2	0.1	0.1	0.1	0.7	3.6	0.7	3.6	0.7	1.0	1.3	1.3	1.3
Delay (s)	5.7	4.5	4.5	23.4	28.9	24.2	28.9	24.2	25.2	25.2	25.2	25.2
Level of Service	A	A	A	C	C	C	C	C	C	C	C	C
Approach Delay (s)	5.7	4.5	4.5	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2	28.2
Approach LOS	A	A	A	C	C	C	C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	12.3 HCM Level of Service B
HCM Volume to Capacity ratio	0.24
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	50.1% ICU Level of Service A
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & Martin Luther King Jr Way

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5002	4827	4827	4827	4827	4827	4827	4827	4827	4827	4827	4827
Flt Permitted	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Satd. Flow (perm)	4253	4193	4193	4193	4193	4193	4193	4193	4193	4193	4193	4193
Volume (vph)	43	378	28	48	369	156	15	154	25	53	198	13
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)	47	411	30	52	401	170	16	167	27	58	215	14
RTOR Reduction (vph)	0	9	0	0	61	0	0	14	0	0	4	0
Lane Group Flow (vph)	0	479	0	0	562	0	0	196	0	0	283	0
Confl. Peds. (#/hr)	17	17	17	17	17	17	17	17	17	17	17	17
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2738	2699	2699	2699	2699	2699	2699	2699	2699	2699	2699	2699
v/s Ratio Prot												
v/s Ratio Perm	0.11	0.17	0.17	0.21	0.21	0.21	0.21	0.24	0.24	0.37	0.37	0.37
Uniform Delay, d1	5.7	5.7	5.7	5.9	5.9	5.9	5.9	23.6	23.6	24.5	24.5	24.5
Progression Factor	0.80	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	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.7	0.7	1.4	1.4	1.4
Delay (s)	4.7	4.7	4.7	6.0	6.0	6.0	6.0	24.3	24.3	11.3	11.3	11.3
Level of Service	A	A	A	A	A	A	A	C	C	B	B	B
Approach Delay (s)	4.7	4.7	4.7	6.0	6.0	6.0	6.0	24.3	24.3	11.3	11.3	11.3
Approach LOS	A	A	A	A	A	A	A	C	C	B	B	B

Intersection Summary	
HCM Average Control Delay	9.0 HCM Level of Service A
HCM Volume to Capacity ratio	0.25
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	84.4% ICU Level of Service E
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

Existing AM
 1/11/2008

Movement	EBL	EBT	WBT	WBR	SBL	SBR					
Lane Configurations	Free	Free	Free	Free	Stop	Stop					
Sign Control	Free	Free	Free	Free	Stop	Stop					
Grade	0%	0%	0%	0%	0%	0%					
Volume (veh/h)	0	469	414	32	0	153					
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90					
Hourly flow rate (vph)	0	521	460	36	0	170					
Pedestrians	98				98						
Lane Width (ft)	12.0				12.0						
Walking Speed (ft/s)	4.0				4.0						
Percent Blockage	8				8						
Right turn flare (veh)					None						
Median type					None						
Median storage (veh)											
Upstream signal (ft)	698	473									
pX, platoon unblocked											
VC, conflicting volume	594				732	349					
VC1, stage 1 cont vol											
VC2, stage 2 cont vol											
VCu, unblocked vol	594				732	349					
IC, single (s)	4.1				6.8	6.9					
IC, 2 stage (s)											
IF (s)	2.2				3.5	3.3					
p0 queue free %	100				100	69					
cM capacity (veh/h)	899				327	545					
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	174	174	174	153	153	153	36	170			
Volume Left	0	0	0	0	0	0	0	0			
Volume Right	0	0	0	0	0	0	36	170			
cSH	1700	1700	1700	1700	1700	1700	1700	545			
Volume to Capacity	0.10	0.10	0.10	0.09	0.09	0.09	0.02	0.31			
Queue Length 95th (ft)	0	0	0	0	0	0	0	0			
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.6			
Lane LOS								B			
Approach Delay (s)	0.0			0.0				14.6			
Approach LOS				B				B			

Intersection Summary		
Average Delay	2.1	
Intersection Capacity Utilization	35.2%	ICU Level of Service
Analysis Period (min)	15	A

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4+1B	4+1B	4+1B	4+1B	4+1B	4+1B	4+1B	4+1B	4+1B	4+1B	4+1B
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4894	4894	4894	4894	4894	4894	4894	4894	4894	4894	4894
Flt Permitted	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Satd. Flow (perm)	3547	3547	3547	3547	3547	3547	3547	3547	3547	3547	3547
Volume (vph)	73	324	77	79	365	143	40	343	39	101	456
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
Adj. Flow (vph)	79	352	84	86	397	155	43	373	42	110	496
RTOR Reduction (vph)	0	50	0	0	118	0	0	5	0	0	4
Lane Group Flow (vph)	0	465	0	0	520	0	43	410	0	110	543
Cont. Peds. (#/hr)	40		9		40	25		31		31	25
Turn Type	Perm	Perm	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2	2	2	2	6	6
Permitted Phases	4	4	3	8	2	2	2	2	2	6	6
Actuated Green, G (s)	18.7	18.7	18.7	18.7	55.8	55.8	55.8	55.8	55.8	55.8	55.8
Effective Green, g (s)	20.2	20.2	20.2	20.2	56.8	56.8	56.8	56.8	56.8	56.8	56.8
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grip Cap (vph)	843	869	869	869	537	2319	622	2324			
v/s Ratio Prot	0.13	0.13	0.13	0.13	0.05	0.12		0.12			0.16
v/s Ratio Perm	0.55	0.55	0.55	0.55	1.00br	1.00br	0.18	0.18	0.18	0.23	0.23
Uniform Delay, d1	28.4	28.4	28.4	28.4	4.9	5.3	5.3	5.3	5.3	5.5	5.5
Progression Factor	1.00	1.00	1.00	1.00	1.24	1.23	1.55	1.60	1.55	1.60	1.60
Incremental Delay, d2	0.4	0.4	0.4	0.4	0.3	0.2	0.6	0.2	0.6	0.2	0.2
Delay (s)	28.9	28.9	28.9	28.9	6.4	6.7	8.8	9.1	8.8	9.1	9.1
Level of Service	C	C	C	C	A	A	A	A	A	A	A
Approach Delay (s)	28.9	28.9	28.9	28.9	6.6	6.6	9.0	9.0	6.6	6.6	9.0
Approach LOS	C	C	C	C	A	A	A	A	A	A	A

Intersection Summary		
HCM Average Control Delay	18.8	HCM Level of Service
HCM Volume to Capacity ratio	0.33	B
Actuated Cycle Length (s)	85.0	Sum of lost time (s)
Intersection Capacity Utilization	69.3%	ICU Level of Service
Analysis Period (min)	15	C

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
 c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

Existing AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5048	4927	4927	1631	1395	1523	1631	1395	1523	1631	1395	1523
Fit Permitted	0.89	0.89	0.89	0.91	0.91	0.86	0.91	0.91	0.86	0.91	0.91	0.86
Satd. Flow (perm)	4497	4497	4495	1420	1395	1349	1420	1395	1349	1420	1395	1349
Volume (vph)	25	460	6	24	565	75	12	1	13	47	1	41
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	505	7	26	621	82	13	1	14	52	1	45
RTOR Reduction (vph)	0	2	0	0	20	0	0	0	10	0	0	32
Lane Group Flow (vph)	0	537	0	0	709	0	0	14	4	0	66	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29
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
Lane Grp Cap (vph)	2726	2726	2725	417	410	396	417	410	396	417	410	396
v/s Ratio Prot	0.12	0.12	0.12	c0.16	c0.16	0.01	0.01	0.00	0.00	c0.05	c0.05	0.17
v/s Ratio Perm	0.20	0.20	0.20	0.26	0.26	0.03	0.03	0.01	0.01	0.17	0.17	0.17
v/c Ratio	7.0	7.4	7.4	7.4	7.4	20.2	20.0	20.0	20.0	21.0	21.0	21.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.0	0.9	0.9	0.9
Incremental Delay, d2	7.2	7.6	7.6	7.6	7.6	20.3	20.1	20.1	20.1	21.9	21.9	21.9
Delay (s)	A	A	A	A	A	C	C	C	C	C	C	C
Level of Service	A	A	A	A	A	C	C	C	C	C	C	C
Approach Delay (s)	7.2	7.6	7.6	7.6	7.6	20.2	20.2	20.2	20.2	21.9	21.9	21.9
Approach LOS	A	A	A	A	A	C	C	C	C	C	C	C

Intersection Summary	8.7		HCM Level of Service		A
HCM Average Control Delay	8.7		HCM Level of Service		A
HCM Volume to Capacity ratio	0.23		Sum of lost time (s)		8.0
Actuated Cycle Length (s)	80.0		ICU Level of Service		D
Intersection Capacity Utilization	81.7%		Analysis Period (min)		15
Analysis Period (min)	15		Critical Lane Group		c

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

Existing AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	0.98	1.00	0.94	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4943	1770	4735	1770	4943	1770	4943	1770	4943	1770	4981
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4943	1770	4735	1770	4943	1770	4943	1770	4943	1770	4981
Volume (vph)	70	403	54	112	432	253	89	259	42	226	521	64
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	448	60	124	480	281	99	288	47	251	579	71
RTOR Reduction (vph)	0	18	0	0	111	0	0	25	0	0	17	0
Lane Group Flow (vph)	78	490	0	124	650	0	99	311	0	251	633	0
Confl. Peds. (#/hr)	66	66	66	23	23	38	38	38	38	38	38	38
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	4	3	4	3	4	1	2	1	2	1	2
Permitted Phases	3	4	3	4	3	4	1	2	1	2	1	2
Actuated Green, G (s)	10.5	26.5	10.5	26.5	10.5	26.5	9.0	26.0	9.0	26.0	9.0	26.0
Effective Green, g (s)	10.5	27.5	10.5	27.5	10.5	27.5	9.0	27.0	9.0	27.0	9.0	27.0
Actuated g/C Ratio	0.12	0.31	0.12	0.31	0.12	0.31	0.10	0.30	0.10	0.30	0.10	0.30
Clearance Time (s)	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Vehicle Extension (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
Lane Grp Cap (vph)	207	1510	207	1447	207	1447	177	1483	177	1494	177	1494
v/s Ratio Prot	0.04	0.10	0.04	0.10	0.04	0.10	0.06	0.06	0.06	0.14	0.13	0.13
v/s Ratio Perm	0.38	0.32	0.38	0.32	0.38	0.32	0.56	0.21	0.56	0.21	0.56	0.21
v/c Ratio	36.7	24.1	37.8	25.2	38.6	23.5	40.5	25.3	40.5	25.3	40.5	25.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.4	0.6	0.4	0.6	0.4	0.6	0.2	0.3	0.2	0.3	0.2	0.3
Incremental Delay, d2	37.1	24.7	39.2	25.5	40.8	23.8	258.4	26.1	258.4	26.1	258.4	26.1
Delay (s)	D	C	D	D	D	D	D	C	D	D	D	C
Level of Service	D	C	D	D	D	D	D	C	D	D	D	C
Approach Delay (s)	26.3	26.3	26.3	49.8	49.8	27.7	27.7	90.9	27.7	90.9	27.7	90.9
Approach LOS	C	C	C	D	D	C	D	F	D	D	F	F

Intersection Summary	54.7		HCM Level of Service		D
HCM Average Control Delay	54.7		HCM Level of Service		D
HCM Volume to Capacity ratio	0.58		Sum of lost time (s)		16.0
Actuated Cycle Length (s)	90.0		ICU Level of Service		C
Intersection Capacity Utilization	72.9%		Analysis Period (min)		15
Analysis Period (min)	15		Critical Lane Group		c

HCM Signalized Intersection Capacity Analysis
 23: 34th St & Telegraph Ave.

Existing AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. 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	
Frbp, ped/bikes	0.93	0.95	0.96	0.91	1.00	0.99	1.00	0.98	1.00	0.95	1.00	0.95	
Ftbp, ped/bikes	0.97	0.95	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.95	1.00	
Flt Protected	0.98	0.99	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1568	1599	1599	1602	3484	1631	3432	1631	3432	1631	3432	1631	
Flt Permitted	0.76	0.90	0.90	0.51	1.00	0.44	1.00	0.44	1.00	0.44	1.00	0.44	
Satd. Flow (perm)	1205	1455	1455	853	3484	762	3432	762	3432	762	3432	762	
Volume (vph)	25	19	26	25	34	38	54	488	24	22	352	35	
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)	27	21	28	27	37	41	59	530	26	24	383	38	
RTOR Reduction (vph)	0	26	0	0	35	0	0	2	0	0	4	0	
Lane Group Flow (vph)	0	50	0	0	70	0	59	554	0	24	417	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6	
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6	6	
Actuated Green, G (s)	7.2	7.2	7.2	7.2	7.2	7.2	70.8	70.8	70.8	70.8	70.8	70.8	
Effective Green, g (s)	6.7	6.7	6.7	6.7	6.7	6.7	70.3	70.3	70.3	70.3	70.3	70.3	
Actuated g/C Ratio	0.08	0.08	0.08	0.08	0.08	0.08	0.83	0.83	0.83	0.83	0.83	0.83	
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Vehicle Extension (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	
Lane Grip Cap (vph)	95	115	115	115	705	2881	630	2838	630	2838	630	2838	
v/s Ratio Prot							c0.16						
v/s Ratio Perm	0.04	0.05	0.07	0.07	0.07	0.07	0.03	0.03	0.03	0.12	0.12	0.12	
v/c Ratio	0.53	0.61	0.61	0.61	0.08	0.19	0.04	0.15	0.04	0.15	0.15	0.15	
Uniform Delay, d1	37.6	37.9	37.9	37.9	1.4	1.5	1.3	1.4	1.3	1.4	1.4	1.4	
Progression Factor	1.00	1.00	1.00	1.00	0.45	0.43	0.40	0.37	0.40	0.37	0.37	0.37	
Incremental Delay, d2	2.4	6.1	6.1	6.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Delay (s)	40.1	44.0	44.0	44.0	0.8	0.8	0.6	0.6	0.6	0.6	0.6	0.6	
Level of Service	D	D	D	D	A	A	A	A	A	A	A	A	
Approach Delay (s)	40.1	44.0	44.0	44.0	44.0	44.0	0.8	0.8	0.8	0.6	0.6	0.6	
Approach LOS	D	D	D	D	D	D	A	A	A	A	A	A	
Intersection Summary													
HCM Average Control Delay	6.8											HCM Level of Service	A
HCM Volume to Capacity ratio	0.23												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.6%											ICU Level of Service	A
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 24: 27th St & Telegraph Ave.

Existing AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.97	1.00	0.94	1.00	0.94	1.00	0.99	1.00	0.95	1.00	0.95	
Ftbp, ped/bikes	1.00	1.00	1.00	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.95	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3330	1770	3213	1770	3213	1642	3461	1673	3195	1673	3195	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.42	1.00	0.51	1.00	0.51	1.00	
Satd. Flow (perm)	1770	3330	1770	3213	1770	3213	732	3461	897	3195	897	3195	
Volume (vph)	255	350	97	50	270	96	58	311	30	35	318	141	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	283	389	108	56	300	107	64	346	33	39	353	157	
RTOR Reduction (vph)	0	28	0	0	47	0	0	7	0	0	48	0	
Lane Group Flow (vph)	283	469	0	56	360	0	64	372	0	39	462	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	7	4	4	3	8	8	2	2	2	6	6	6	
Permitted Phases	7	4	4	3	8	8	2	2	2	6	6	6	
Actuated Green, G (s)	16.5	26.6	26.6	4.9	15.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	
Effective Green, g (s)	17.0	26.1	26.1	5.4	14.5	41.5	41.5	41.5	41.5	41.5	41.5	41.5	
Actuated g/C Ratio	0.20	0.31	0.31	0.06	0.17	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Vehicle Extension (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	
Lane Grip Cap (vph)	354	1023	112	548	357	1690	438	1560	438	1560	438	1560	
v/s Ratio Prot	c0.16	0.14	0.14	0.03	c0.11	0.11	0.09	0.04	0.09	0.04	0.04	0.14	
v/s Ratio Perm	0.80	0.46	0.46	0.50	0.66	0.18	0.22	0.09	0.09	0.30	0.30	0.30	
Uniform Delay, d1	32.4	23.8	23.8	38.5	32.9	12.2	12.5	11.6	11.6	13.0	13.0	13.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.70	0.72	0.72	
Incremental Delay, d2	11.2	0.1	0.1	1.3	2.2	1.1	0.3	0.4	0.4	0.5	0.5	0.5	
Delay (s)	43.6	23.9	23.9	39.8	35.1	13.3	12.8	8.5	8.5	9.8	9.8	9.8	
Level of Service	D	C	C	D	D	B	B	A	A	A	A	A	
Approach Delay (s)	31.0	31.0	31.0	35.7	35.7	12.8	12.8	9.7	9.7	9.7	9.7	9.7	
Approach LOS	C	C	C	D	D	B	B	A	A	A	A	A	
Intersection Summary													
HCM Average Control Delay	23.1											HCM Level of Service	C
HCM Volume to Capacity ratio	0.48												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.2%											ICU Level of Service	C
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 1: 52nd Street & Shattuck Avenue

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	12	12	12	12	16	16	16	16	16	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.98	1.00	1.00	0.98	1.00	0.98	0.98	0.98	0.98	0.98	0.98	
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.98	0.98	0.98	0.98	0.98	0.98	
Satd. Flow (prot)	1770	4938	1751	4971	1751	4971	2007	2007	1943	1943	1943	1943	
Fit Permitted	0.95	1.00	0.29	1.00	0.29	1.00	0.57	0.57	0.80	0.80	0.80	0.80	
Satd. Flow (perm)	1770	4938	527	4971	527	4971	1254	1254	1579	1579	1579	1579	
Volume (vph)	322	1226	163	80	988	138	165	225	79	133	256	259	
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)	339	1291	172	84	1008	145	174	237	83	140	269	273	
RTOR Reduction (vph)	0	24	0	0	27	0	0	10	0	0	52	0	
Lane Group Flow (vph)	339	1439	0	84	1126	0	0	484	0	0	630	0	
Confl. Peds. (#/hr)	32	32	4	12	4	12	24	24	24	24	12	12	
Parking (#/hr)													
Turn Type	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	7	4			8		2				6		
Permitted Phases													
Actuated Green, G (s)	18.0	36.0	14.0	14.0	14.0	27.5	27.5	27.5	27.5	27.5	27.5	27.5	
Effective Green, g (s)	18.0	36.0	14.0	14.0	14.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	
Actuated g/C Ratio	0.26	0.51	0.20	0.20	0.20	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	455	2540	105	994	105	994	502	502	632	632	632	632	
v/s Ratio Prot	c0.19	0.29			c0.23						c0.40		
v/s Ratio Perm	0.75	0.57	0.80	1.13	0.80	1.13	0.96	0.96	1.00	1.00	1.00	1.00	
Uniform Delay, d1	23.9	11.7	26.7	28.0	26.7	28.0	20.5	20.5	21.0	21.0	21.0	21.0	
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	10.6	0.9	45.5	72.4	45.5	72.4	32.4	32.4	35.2	35.2	35.2	35.2	
Delay (s)	34.5	12.6	72.2	100.4	72.2	100.4	52.9	52.9	56.2	56.2	56.2	56.2	
Level of Service	C	B	E	F	E	F	D	D	E	E	E	E	
Approach Delay (s)	16.7		98.5		98.5		52.9	52.9	56.2	56.2	56.2	56.2	
Approach LOS	B		F		F		D	D	E	E	E	E	
Intersection Summary													
HCM Average Control Delay	51.3											HCM Level of Service	D
HCM Volume to Capacity ratio	0.95												
Actuated Cycle Length (s)	70.0											Sum of lost time (s)	10.0
Intersection Capacity Utilization	93.5%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 2: 52nd Street & Telegraph Ave.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	0.99	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt	0.92	1.00	0.92	1.00	0.92	1.00	0.97	0.97	0.97	0.97	0.95	0.95	
Fit Protected	0.98	0.98	0.95	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1670	1681	1573	1681	1573	1681	3373	3373	1770	3190	1770	3190	
Fit Permitted	0.48	0.73	1.00	0.73	1.00	0.73	0.94	0.94	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	814	1296	1573	1296	1573	1296	3176	3176	1770	3190	1770	3190	
Volume (vph)	12	3	21	98	102	118	10	984	279	98	784	388	
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)	13	3	22	103	107	124	11	1036	294	103	825	419	
RTOR Reduction (vph)	0	21	0	0	45	0	0	19	0	0	49	0	
Lane Group Flow (vph)	0	17	0	103	186	0	0	1322	0	103	1195	0	
Confl. Peds. (#/hr)	36			36	48			16	16	16	48	48	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	7			8			2				6		
Permitted Phases													
Actuated Green, G (s)	5.1	15.4	15.4	15.4	15.4	15.4	52.8	52.8	8.7	66.0	8.7	66.0	
Effective Green, g (s)	5.6	15.9	15.9	15.9	15.9	15.9	53.3	53.3	9.2	66.5	9.2	66.5	
Actuated g/C Ratio	0.06	0.16	0.16	0.16	0.16	0.16	0.53	0.53	0.09	0.66	0.09	0.66	
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)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	46	206	250	206	250	206	1693	1693	163	2121	163	2121	
v/s Ratio Prot	c0.02	0.08	0.12	0.08	0.12	0.08	c0.42	c0.42	0.06	c0.37	0.06	c0.37	
v/s Ratio Perm	0.37	0.50	0.74	0.50	0.74	0.50	0.78	0.78	0.63	0.56	0.63	0.56	
Uniform Delay, d1	45.5	38.4	40.1	38.4	40.1	38.4	18.7	18.7	43.8	9.0	43.8	9.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.79	0.79	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.9	0.7	9.9	0.7	9.9	0.7	2.0	2.0	5.8	1.1	5.8	1.1	
Delay (s)	47.4	39.1	50.0	39.1	50.0	39.1	16.9	16.9	49.5	10.1	49.5	10.1	
Level of Service	D	D	D	D	D	D	B	B	D	D	D	B	
Approach Delay (s)	47.4		46.7		46.7		16.9	16.9	13.1	13.1	13.1	13.1	
Approach LOS	D		D		D		B	B	D	D	D	B	
Intersection Summary													
HCM Average Control Delay	18.8											HCM Level of Service	B
HCM Volume to Capacity ratio	0.73												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	98.5%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
3: 51st St & Telegraph Ave.

Existing PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3463	1770	3340	1770	3395	1770	3395	1770	3416	1770	3416
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3463	1770	3340	1770	3395	1770	3395	1770	3416	1770	3416
Volume (vph)	508	822	69	93	468	212	69	575	127	203	654	56
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)	535	865	73	98	493	223	73	605	134	214	688	59
RTOR Reduction (vph)	0	6	0	0	52	0	0	19	0	0	7	0
Lane Group Flow (vph)	535	932	0	98	664	0	73	720	0	214	740	0
Confl. Peds. (#/hr)	15	48	48	15	123	48	48	48	48	48	123	48
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	16.0	30.2	8.0	22.2	7.5	23.2	4.5	33.8	12.0	39.8	11.5	40.8
Effective Green, g (s)	15.5	31.2	7.5	23.2	7.5	23.2	4.5	33.8	11.5	40.8	11.5	40.8
Actuated g/C Ratio	0.16	0.31	0.08	0.23	0.04	0.34	0.04	0.34	0.12	0.41	0.12	0.41
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0
Vehicle Extension (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
Lane Grp Cap (vph)	532	1080	133	775	80	1148	80	1148	204	1394	204	1394
v/s Ratio Prot	c0.16	c0.27	0.06	0.20	0.04	0.21	0.04	0.21	c0.12	0.22	c0.12	0.22
v/c Ratio Perm	1.01	0.86	0.74	0.86	0.91	0.63	0.91	0.63	1.05	0.53	1.05	0.53
Uniform Delay, d1	42.2	32.4	45.3	36.8	47.6	27.8	47.6	27.8	44.2	22.4	44.2	22.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.18	0.77	1.18	0.77
Incremental Delay, d2	40.4	7.0	16.6	8.9	70.5	2.6	71.4	2.6	71.4	1.2	71.4	1.2
Delay (s)	82.7	39.4	61.9	45.7	118.0	30.4	123.5	30.4	123.5	18.5	123.5	18.5
Level of Service	F	D	E	D	F	C	F	C	F	B	F	B
Approach Delay (s)	55.1		47.6		36.3		41.9		41.9		41.9	
Approach LOS	E		D		D		D		D		D	
Intersection Summary												
HCM Average Control Delay	47.1											
HCM Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	79.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

Existing PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frt	0.86			0.93			0.93		0.93		0.97	0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1611			3295			3295		3433		3440	3440
Flt Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1611			3118			3118		3433		3440	3440
Volume (vph)	0	0	6	0	0	0	10	280	241	1430	281	64
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)	0	0	7	0	0	0	11	304	262	1584	305	70
RTOR Reduction (vph)	0	7	0	0	0	0	21	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	556	0	1554	375	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	13.0	0.0	0.0	0.0	13.0	0.0	29.0	50.0	0.0	50.0
Effective Green, g (s)	0.0	0.0	13.0	0.0	0.0	0.0	13.0	0.0	29.0	50.0	0.0	50.0
Actuated g/C Ratio	0.00	0.00	0.26	0.00	0.00	0.00	0.26	0.00	0.58	1.00	0.00	1.00
Clearance Time (s)			4.0				4.0		4.0	2.0		2.0
Lane Grp Cap (vph)	0	0	811	0	0	0	811	0	1991	3440	0	3440
v/s Ratio Prot			c0.18				c0.18		c0.45	0.11		0.11
v/c Ratio Perm	0.00	0.00	0.69	0.00	0.00	0.00	0.69	0.00	0.78	0.11	0.00	0.11
Uniform Delay, d1	25.0	25.0	16.7	25.0	25.0	25.0	16.7	25.0	8.1	0.0	25.0	0.0
Progression Factor	1.00	1.00	0.77	1.00	1.00	1.00	0.77	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.0	4.5	0.0	0.0	0.0	4.5	0.0	3.1	0.1	0.0	0.1
Delay (s)	25.0	25.0	17.3	25.0	25.0	25.0	17.3	25.0	11.2	0.1	25.0	0.1
Level of Service	C	C	B	C	C	C	B	C	B	A	C	A
Approach Delay (s)	25.0		17.3				17.3		8.0		9.0	
Approach LOS	C		B				B		C		A	
Intersection Summary												
HCM Average Control Delay	11.0											
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	50.0											
Intersection Capacity Utilization	69.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

Existing PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	
Lane Configurations	↔ ↕ ↖ ↗ ↘ ↙ ↚ ↛ ↜ ↝ ↞ ↠ ↡ ↢ ↣ ↤ ↥ ↦ ↧ ↨ ↩ ↪ ↫ ↬ ↭ ↮ ↯ ↰ ↱ ↲ ↳ ↴ ↵ ↶ ↷ ↸ ↹ ↺ ↻ ↼ ↽ ↾ ↿ ⇀ ⇁ ⇂ ⇃ ⇄ ⇅ ⇆ ⇇ ⇈ ⇉ ⇊ ⇋ ⇌ ⇍ ⇎ ⇏ ⇐ ⇑ ⇒ ⇓ ⇔ ⇕ ⇖ ⇗ ⇘ ⇙ ⇚ ⇛ ⇜ ⇝ ⇞ ⇟ ⇠ ⇡ ⇢ ⇣ ⇤ ⇥ ⇦ ⇧ ⇨ ⇩ ⇪ ⇫ ⇬ ⇭ ⇮ ⇯ ⇰ ⇱ ⇲ ⇳ ⇴ ⇵ ⇶ ⇷ ⇸ ⇹ ⇺ ⇻ ⇼ ⇽ ⇾ ⇿											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.98	0.99	0.99	0.99	0.99	0.99	0.99	
Frbp, ped/bikes	0.96	0.97	0.96	1.00	0.98	0.99	0.98	0.99	0.99	0.99	0.99	
Frt	0.96	0.96	0.96	0.98	0.98	0.99	0.98	0.99	0.99	0.99	0.99	
Flt Protected	0.98	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1647	1649	1649	3398	3436	3436	3398	3436	3436	3436	3436	
Flt Permitted	0.88	0.91	0.91	0.94	0.86	0.86	0.94	0.86	0.86	0.86	0.86	
Satd. Flow (perm)	1473	1519	1519	3197	2962	2962	3197	2962	2962	2962	2962	
Volume (vph)	26	27	20	48	72	50	17	399	66	43	257	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	29	30	22	53	80	56	19	443	73	48	286	
RTOR Reduction (vph)	0	15	0	0	30	0	0	25	0	0	10	
Lane Group Flow (vph)	0	66	0	0	159	0	0	510	0	0	347	
Conf. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0	
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0	
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50	
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	
Lane Grp Cap (vph)	501	516	516	1599	1599	1481	1481	1599	1481	1481	1481	
v/s Ratio Prot	0.05	0.10	0.10	0.10	0.10	0.16	0.16	0.16	0.16	0.12	0.12	
v/s Ratio Perm	0.13	0.31	0.31	0.32	0.32	0.32	0.32	0.32	0.32	0.23	0.23	
v/c Ratio	11.4	12.2	12.2	1.00	1.00	7.4	7.4	7.4	7.4	7.1	7.1	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	0.5	1.5	1.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	
Incremental Delay, d2	12.0	13.7	13.7	8.0	8.0	7.4	7.4	7.4	7.4	7.4	7.4	
Delay (s)	B	B	B	A	A	A	A	A	A	A	A	
Level of Service	B	B	B	A	A	A	A	A	A	A	A	
Approach Delay (s)	12.0	13.7	13.7	8.0	8.0	7.4	7.4	7.4	7.4	7.4	7.4	
Approach LOS	B	B	B	A	A	A	A	A	A	A	A	
Intersection Summary												
HCM Average Control Delay	9.0 HCM Level of Service A											
HCM Volume to Capacity ratio	0.31											
Actuated Cycle Length (s)	50.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	62.5% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

Existing PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	
Lane Configurations	↔ ↕ ↖ ↗ ↘ ↙ ↚ ↛ ↜ ↝ ↞ ↠ ↡ ↢ ↣ ↤ ↥ ↦ ↧ ↨ ↩ ↪ ↫ ↬ ↭ ↮ ↯ ↰ ↱ ↲ ↳ ↴ ↵ ↶ ↷ ↸ ↹ ↺ ↻ ↼ ↽ ↾ ↿ ⇀ ⇁ ⇂ ⇃ ⇄ ⇅ ⇆ ⇇ ⇈ ⇉ ⇊ ⇋ ⇌ ⇍ ⇎ ⇏ ⇐ ⇑ ⇒ ⇓ ⇔ ⇕ ⇖ ⇗ ⇘ ⇙ ⇚ ⇛ ⇜ ⇝ ⇞ ⇟ ⇠ ⇡ ⇢ ⇣ ⇤ ⇥ ⇦ ⇧ ⇨ ⇩ ⇪ ⇫ ⇬ ⇭ ⇮ ⇯ ⇰ ⇱ ⇲ ⇳ ⇴ ⇵ ⇶ ⇷ ⇸ ⇹ ⇺ ⇻ ⇼ ⇽ ⇾ ⇿											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.98	0.99	0.99	0.99	0.99	0.99	0.99	
Frbp, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.99	0.98	0.99	0.99	0.99	0.99	
Frt	0.96	0.96	0.96	0.98	0.98	0.99	0.98	0.99	0.99	0.99	0.99	
Flt Protected	0.98	0.98	0.98	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1631	1631	1631	1681	1681	3476	3476	3476	3476	3476	3476	
Flt Permitted	0.86	0.86	0.86	0.87	0.87	0.92	0.92	0.91	0.91	0.91	0.91	
Satd. Flow (perm)	1426	1426	1426	1485	1485	3187	3187	3187	3187	3187	3187	
Volume (vph)	46	49	39	17	41	21	24	1018	37	18	873	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	49	52	41	18	44	22	26	1083	39	19	929	
RTOR Reduction (vph)	0	28	0	0	19	0	0	1	0	0	4	
Lane Group Flow (vph)	0	114	0	0	65	0	0	1147	0	0	1015	
Conf. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	2	2	2	2	6	6	
Permitted Phases	4	4	4	4	4	2	2	2	2	6	6	
Actuated Green, G (s)	8.6	8.6	8.6	8.6	8.6	62.4	62.4	62.4	62.4	62.4	62.4	
Effective Green, g (s)	9.1	9.1	9.1	9.1	9.1	62.9	62.9	62.9	62.9	62.9	62.9	
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.79	0.79	0.79	0.79	0.79	0.79	
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)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	162	169	169	2506	2506	3522	3522	3522	3522	3522	3522	
v/s Ratio Prot	0.08	0.08	0.08	0.04	0.04	0.36	0.36	0.36	0.36	0.23	0.23	
v/s Ratio Perm	0.70	0.70	0.70	0.38	0.38	0.46	0.46	0.46	0.46	0.29	0.29	
v/c Ratio	34.1	34.1	34.1	32.8	32.8	2.9	2.9	2.9	2.9	2.4	2.4	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.20	1.20	1.20	1.20	1.00	1.00	
Progression Factor	1.00	1.00	1.00	0.5	0.5	0.5	0.5	0.5	0.5	0.2	0.2	
Incremental Delay, d2	44.8	44.8	44.8	33.4	33.4	3.9	3.9	3.9	3.9	2.6	2.6	
Delay (s)	D	D	D	C	C	A	A	A	A	A	A	
Level of Service	D	D	D	C	C	A	A	A	A	A	A	
Approach Delay (s)	44.8	44.8	44.8	33.4	33.4	3.9	3.9	3.9	3.9	2.6	2.6	
Approach LOS	D	D	D	C	C	A	A	A	A	A	A	
Intersection Summary												
HCM Average Control Delay	6.8 HCM Level of Service A											
HCM Volume to Capacity ratio	0.49											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	80.9% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↓	↑	↑	↓	↓	↓	↓	↓	↓	↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1760	3500	1765	3453	1739	1835	1764	1835	1764	1835	1764
Flt Permitted	0.30	1.00	0.25	1.00	0.56	1.00	0.37	1.00	0.37	1.00	0.37
Satd. Flow (perm)	561	3500	469	3453	1017	1835	695	1835	695	1835	695
Volume (vph)	26	655	45	41	534	81	109	388	38	88	222
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
Adj. Flow (vph)	28	712	49	45	580	88	118	422	41	96	241
RTOR Reduction (vph)	0	6	0	0	15	0	0	5	0	0	4
Lane Group Flow (vph)	28	755	0	45	653	0	118	459	0	96	258
Confl. Peds. (#/hr)	12	12	12	12	42	12	42	12	12	12	42
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	224	1400	188	1381	509	918	348	918	348	918	348
v/s Ratio Prot	c0.22					c0.25					
v/s Ratio Perm	0.05	0.10	0.10	0.12	0.12	0.12	0.14	0.14	0.14	0.14	0.14
v/c Ratio	0.12	0.54	0.24	0.47	0.23	0.50	0.28	0.28	0.28	0.28	0.28
Uniform Delay, d1	15.2	18.4	15.9	17.8	11.3	13.3	11.6	11.6	11.6	11.6	11.6
Progression Factor	1.00	1.00	1.95	2.03	1.83	1.86	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	1.5	2.6	1.0	0.7	1.3	2.0	0.8	2.0	0.8	2.0
Delay (s)	16.3	19.9	33.7	37.1	21.4	26.1	13.6	12.4	13.6	12.4	12.4
Level of Service	B	B	C	D	C	C	B	B	B	B	B
Approach Delay (s)	19.7	19.7	36.9	36.9	25.2	25.2	12.7	12.7	12.7	12.7	12.7
Approach LOS	B	B	C	D	C	C	B	B	B	B	B

Intersection Summary	25.0	HCM Level of Service	C
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↓	↑	↑	↓	↓	↓	↓	↓	↓	↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.97	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	0.99
Satd. Flow (prot)	1754	3474	1737	3509	1737	3509	3412	3509	3412	3387	3387
Flt Permitted	0.26	1.00	0.16	1.00	0.26	1.00	0.84	1.00	0.84	0.92	0.92
Satd. Flow (perm)	489	3474	292	3509	292	3509	2912	3509	2912	3126	3126
Volume (vph)	26	743	60	20	597	28	74	164	37	16	96
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	27	766	62	21	615	29	76	169	38	16	99
RTOR Reduction (vph)	0	8	0	0	4	0	0	8	0	0	14
Lane Group Flow (vph)	27	820	0	21	640	0	0	275	0	0	135
Confl. Peds. (#/hr)	24	78	78	24	8	24	8	6	6	6	8
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	153	1086	91	1097	91	1097	1711	1711	1711	1837	1837
v/s Ratio Prot	c0.24						0.18				
v/s Ratio Perm	0.06	0.76	0.23	0.58	0.23	0.58	0.09	0.09	0.09	0.04	0.04
v/c Ratio	0.18	0.76	0.23	0.58	0.23	0.58	0.16	0.16	0.16	0.07	0.07
Uniform Delay, d1	20.0	24.7	20.4	23.1	20.4	23.1	7.5	7.5	7.5	7.1	7.1
Progression Factor	0.45	0.49	0.91	0.97	0.91	0.97	1.29	1.29	1.29	1.00	1.00
Incremental Delay, d2	2.2	4.3	5.4	2.1	5.4	2.1	0.2	0.2	0.2	0.1	0.1
Delay (s)	11.3	16.3	23.8	24.5	23.8	24.5	9.8	9.8	9.8	7.2	7.2
Level of Service	B	B	C	C	C	C	A	A	A	A	A
Approach Delay (s)	16.2	16.2	24.5	24.5	24.5	24.5	9.8	9.8	9.8	7.2	7.2
Approach LOS	B	B	C	C	C	C	A	A	A	A	A

Intersection Summary	17.4	HCM Level of Service	B
HCM Average Control Delay	0.37		
HCM Volume to Capacity ratio	80.0	Sum of lost time (s)	8.0
Actuated Cycle Length (s)	59.5%	ICU Level of Service	B
Intersection Capacity Utilization	15		
Analysis Period (min)			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.99	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	1764	3505	1756	3446	1756	3446	3326	3427	3326	3427	3326	3427	3326
Fit Permitted	0.31	1.00	0.26	1.00	0.88	1.00	0.88	1.00	0.88	1.00	0.88	1.00	0.88
Satd. Flow (perm)	567	3505	473	3446	2934	2934	2934	2629	2934	2629	2934	2629	2934
Volume (vph)	51	744	40	54	586	101	56	278	150	82	205	38	205
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	752	40	55	592	102	57	281	152	83	207	38	207
RTOR Reduction (vph)	0	5	0	0	17	0	0	47	0	0	13	0	13
Lane Group Flow (vph)	52	788	0	55	677	0	0	443	0	0	315	0	315
Confl. Peds. (#/hr)	8	39	39	8	8	8	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	2	2	6	6	6	6	6	6
Permitted Phases	4	8	8	8	8	2	2	6	6	6	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	37.0	37.0	38.0	38.0	37.0	37.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	37.0	37.0	38.0	38.0	37.0	37.0	38.0	38.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp. Cap (vph)	248	1533	207	1508	1357	1357	1357	1216	1357	1216	1357	1216	1357
v/s Ratio Prot	c0.22	0.20	0.20	0.20	0.20	0.15	0.15	0.12	0.15	0.12	0.15	0.12	0.15
v/s Ratio Perm	0.09	0.12	0.12	0.12	0.12	0.33	0.33	0.26	0.33	0.26	0.33	0.26	0.33
v/c Ratio	0.21	0.51	0.27	0.45	0.45	0.33	0.33	0.26	0.33	0.26	0.33	0.26	0.33
Uniform Delay, d1	13.9	16.3	14.3	15.7	13.6	13.6	13.6	13.1	13.6	13.1	13.6	13.1	13.6
Progression Factor	0.93	1.08	1.75	1.86	0.78	0.78	0.78	1.00	0.78	1.00	0.78	1.00	0.78
Incremental Delay, d2	1.4	0.9	2.6	0.8	0.6	0.6	0.6	0.5	0.6	0.5	0.6	0.5	0.6
Delay (s)	14.3	18.6	27.8	30.2	11.3	11.3	11.3	13.6	11.3	13.6	11.3	13.6	11.3
Level of Service	B	B	C	C	C	B	B	B	B	B	B	B	B
Approach Delay (s)	18.3	30.0	30.0	11.3	11.3	11.3	11.3	13.6	11.3	13.6	11.3	13.6	11.3
Approach LOS	B	B	C	C	C	B	B	B	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	19.9 HCM Level of Service B
HCM Volume to Capacity ratio	0.42
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	84.3% ICU Level of Service E
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

Existing PM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBR
Lane Configurations	4	4	4	4	4	4	4
Sign Control	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	886	77	71	725	0	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	913	79	73	747	0	0	0
Pedestrians					348		
Lane Width (ft)					0.0		
Walking Speed (ft/s)					4.0		
Percent Blockage					0		
Right turn flare (veh)					None		
Median storage (veh)					None		
Upstream signal (ft)	673			487			
pX, platoon unblocked			0.86		0.89	0.86	
vC, conflicting volume		1341			1821	844	
vC1, stage 1 cont vol							
vC2, stage 2 cont vol							
vCu, unblocked vol		1232			1587	654	
IC, single (s)		4.1			6.8	6.9	
IC, 2 stage (s)							
IF (s)		2.2			3.5	3.3	
p0 queue free %		85			100	100	
cM capacity (veh/h)		482			74	351	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3		
Volume Total	609	384	73	374	374		
Volume Left	0	0	73	0	0		
Volume Right	0	79	0	0	0		
cSH	1700	1700	482	1700	1700		
Volume to Capacity	0.36	0.23	0.15	0.22	0.22		
Queue Length 95th (ft)	0	0	13	0	0		
Control Delay (s)	0.0	0.0	13.8	0.0	0.0		
Lane LOS			B				
Approach Delay (s)	0.0	1.2					
Approach LOS							

Intersection Summary	
Average Delay	0.6
Intersection Capacity Utilization	54.3% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: 40th St. & BART parking

Existing PM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	808	78	0	796	0	71
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	869	84	0	856	0	76
Pedestrians	109	109				
Lane Width (ft)	12.0	12.0				
Walking Speed (ft/s)	4.0	4.0				
Percent Blockage				9	9	
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	754			406		
pX, platoon unblocked		0.88		0.94		0.88
VC, conflicting volume		1062		1448		694
VC1, stage 1 cont vol						
VC2, stage 2 cont vol		939		1085		524
vCu, unblocked vol		4.1		6.8		6.9
IC, single (s)						
IC, 2 stage (s)		2.2		3.5		3.3
p0 queue free %		100		100		79
cM capacity (veh/h)		583		180		364
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	579	373	428	428	76	76
Volume Left	0	0	0	0	0	0
Volume Right	0	84	0	0	76	76
cSH	1700	1700	1700	1700	364	364
Volume to Capacity	0.34	0.22	0.25	0.25	0.21	0.21
Queue Length 95th (ft)	0	0	0	0	0	19
Control Delay (s)	0.0	0.0	0.0	0.0	17.5	17.5
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	17.5		
Approach LOS				C		
Intersection Summary						
Average Delay	0.7					
Intersection Capacity Utilization	45.3%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 12: 40th St. & BART parking

Existing PM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	876	3	0	796	0	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	952	3	0	865	0	59
Pedestrians	109	109				
Lane Width (ft)	12.0	12.0				
Walking Speed (ft/s)	4.0	4.0				
Percent Blockage				9	9	
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	971			189		
pX, platoon unblocked		0.94		0.94		0.94
VC, conflicting volume		1064		1495		696
VC1, stage 1 cont vol						
VC2, stage 2 cont vol		1006		1251		614
vCu, unblocked vol		4.1		6.8		6.9
IC, single (s)						
IC, 2 stage (s)		2.2		3.5		3.3
p0 queue free %		100		100		83
cM capacity (veh/h)		586		136		338
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	635	321	433	433	59	59
Volume Left	0	0	0	0	0	0
Volume Right	0	3	0	0	59	59
cSH	1700	1700	1700	1700	338	338
Volume to Capacity	0.37	0.19	0.25	0.25	0.17	0.17
Queue Length 95th (ft)	0	0	0	0	0	15
Control Delay (s)	0.0	0.0	0.0	0.0	17.9	17.9
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	17.9		
Approach LOS				C		
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	44.2%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.97
Frbp, ped/bikes	0.93	1.00	0.98	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.97	1.00
Fltp, ped/bikes	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	1.00	0.97	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1641	3413	1728	3364	1770	3483	1770	3483	1770	3335	1770	3335
Flt Permitted	0.32	1.00	0.17	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	552	3413	306	3364	1770	3483	1770	3483	1770	3335	1770	3335
Volume (vph)	159	665	106	23	463	76	191	810	58	103	559	147
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	162	679	108	23	472	78	195	827	59	105	570	150
RTOR Reduction (vph)	0	17	0	0	18	0	0	6	0	0	0	27
Lane Group Flow (vph)	162	770	0	23	532	0	195	880	0	105	693	0
Confl. Peds. (#/hr)	94	86	86	94	94	94	94	94	40	94	94	111
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	8	8	8	5	2	1	6	1	6	1	6
Actuated Green, G (s)	23.3	23.3	23.3	23.3	11.7	35.3	7.9	31.5	7.9	31.5	7.9	31.5
Effective Green, g (s)	23.8	23.8	23.8	23.8	12.2	35.8	8.4	32.0	8.4	32.0	8.4	32.0
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.15	0.45	0.11	0.40	0.11	0.40	0.11	0.40
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)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	164	1015	91	1001	270	1559	186	1334	186	1334	186	1334
v/s Ratio Prot	0.23	0.16	c0.11	c0.25	0.06	0.21	0.06	0.21	0.06	0.21	0.06	0.21
v/s Ratio Perm	0.29	0.08	0.08	0.08	0.25	0.53	0.72	0.56	0.56	0.52	0.56	0.52
Uniform Delay, d1	28.0	25.5	21.3	23.5	32.3	16.3	34.1	18.2	34.1	18.2	34.1	18.2
Progression Factor	1.18	1.26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02
Incremental Delay, d2	63.8	2.8	0.5	0.3	7.8	1.5	2.3	1.4	2.3	1.4	2.3	1.4
Delay (s)	96.9	34.8	21.9	23.7	40.1	17.8	34.3	19.9	34.3	19.9	34.3	19.9
Level of Service	F	C	C	C	D	B	C	B	C	B	C	B
Approach Delay (s)	45.4	23.7	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
Approach LOS	D	C	C	C	D	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	28.6		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	72.1%		ICU Level of Service		C							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave. Existing PM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W	W	Free	Free	Free	Free
Sign Control	Stop	Stop	0%	0%	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	17	72	23	1017	692	14
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	18	75	24	1059	721	15
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None
Upstream signal (ft)	0.94	0.91	0.91	0.91	0.91	0.91
pX, platoon unblocked	1506	568	835	1506	568	835
VC, conflicting volume	1506	568	835	1506	568	835
VC1, stage 1 cont vol	1506	568	835	1506	568	835
VC2, stage 2 cont vol	1506	568	835	1506	568	835
vCu, unblocked vol	1188	426	720	1188	426	720
IC, single (s)	6.8	6.9	4.1	6.8	6.9	4.1
IC, 2 stage (s)	3.5	3.3	2.2	3.5	3.3	2.2
IF (s)	87	83	97	87	83	97
p0 queue free %	138	441	732	138	441	732
cM capacity (veh/h)	138	441	732	138	441	732
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	93	24	530	530	481	255
Volume Left	18	24	0	0	0	0
Volume Right	75	0	0	0	0	15
cSH	311	732	1700	1700	1700	1700
Volume to Capacity	0.30	0.03	0.31	0.31	0.28	0.15
Queue Length 95th (ft)	30	3	0	0	0	0
Control Delay (s)	21.4	10.1	0.0	0.0	0.0	0.0
Lane LOS	C	B	C	C	B	C
Approach Delay (s)	21.4	0.2	0.0	0.0	0.0	0.0
Approach LOS	C	C	C	C	C	C
Intersection Summary						
Average Delay	1.2		ICU Level of Service		A	
Intersection Capacity Utilization	48.0%					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

Existing PM
 1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↓	↓
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	7	32	1005	31	15	750
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	8	36	1117	34	17	833
Pedestrians	52		52		45	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			791
pX, platoon unblocked	0.88	0.86			0.86	
VC, conflicting volume	1688	673			1203	
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1477	452			1071	
IC, single (s)	6.8	6.9			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	91	92			97	
cM capacity (veh/h)	91	438			531	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	43	744	407	17	417	417
Volume Left	8	0	0	17	0	0
Volume Right	36	0	34	0	0	0
cSH	261	1700	1700	531	1700	1700
Volume to Capacity	0.17	0.44	0.24	0.03	0.25	0.25
Queue Length 95th (ft)	15	0	0	2	0	0
Control Delay (s)	21.6	0.0	0.0	12.0	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	21.6	0.0	0.2			
Approach LOS	C					

Intersection Summary		
Average Delay		0.6
Intersection Capacity Utilization	47.1%	ICU Level of Service
Analysis Period (min)	15	A

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

Existing PM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb	0.99	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.99	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5011	1768	3328	1800	3328	1800	1763	1841				
Fit Permitted	0.80	0.34	1.00	0.82	0.34	1.00	0.82	0.34	1.00			
Satd. Flow (perm)	4019	624	3328	1486	624	3328	1486	624	3328	503	1841	
Volume (vph)	112	609	27	63	316	167	58	359	84	65	285	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	114	621	28	64	322	170	59	366	86	66	291	20
RTOR Reduction (vph)	0	5	0	0	70	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	758	0	64	422	0	0	502	0	66	308	0
Conf. Peds. (#/hr)	24	4	4	24	24	24	12	12	12	12	12	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	2361	367	1955	464	367	1955	464	367	1955	157	575	
v/s Ratio Prot				0.13						0.13		
v/s Ratio Perm	0.19	0.10	0.10	0.17	0.22	0.17	0.08	0.08	0.08	0.42	0.54	
v/c Ratio	0.32	0.17	0.22	0.17	0.22	0.17	0.08	0.08	0.08	0.21	0.27	
Uniform Delay, d1	8.4	7.6	7.8	7.6	7.8	7.6	27.5	27.5	27.5	21.8	22.7	
Progression Factor	1.00	1.47	1.72	1.00	1.00	1.00	0.75	0.75	0.75	0.75	0.75	
Incremental Delay, d2	0.4	1.0	0.3	0.4	0.3	0.4	65.7	65.7	65.7	7.9	3.5	
Delay (s)	8.7	12.2	13.7	8.7	13.7	8.7	93.2	93.2	93.2	24.1	20.4	
Level of Service	A	B	B	A	B	A	F	F	F	C	C	
Approach Delay (s)	8.7	13.5	13.5	93.2	13.5	93.2	21.1	21.1	21.1	21.1	21.1	
Approach LOS	A	B	B	F	B	F	C	C	C	C	C	

Intersection Summary		
HCM Average Control Delay	31.6	HCM Level of Service
HCM Volume to Capacity ratio	0.58	C
Actuated Cycle Length (s)	80.0	Sum of lost time (s)
Intersection Capacity Utilization	137.4%	ICU Level of Service
Analysis Period (min)	15	H
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	0.99	0.99	1.00	0.96	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	1.00	0.99	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	5010	4958	4958	1770	1787	1763	1826	1763	1826	1763	1826
Flt Permitted	0.88	0.80	0.80	0.64	1.00	0.38	1.00	0.38	1.00	0.38	1.00
Satd. Flow (perm)	4433	4012	4012	1196	1787	714	1826	714	1826	714	1826
Volume (vph)	39	549	40	67	392	63	41	203	65	56	112
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
Adj. Flow (vph)	41	578	42	71	413	66	43	214	68	59	118
RTOR Reduction (vph)	0	10	0	0	22	0	0	14	0	0	7
Lane Group Flow (vph)	0	651	0	0	528	0	43	268	0	59	129
Confl. Peds. (#/hr)	12	12	12	12	12	12	12	12	12	12	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26
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
Lane Grp Cap (vph)	2854	2854	2854	2583	306	458	c0.15	183	468	183	468
v/s Ratio Prot	c0.15	0.13	0.13	0.04	0.14	0.68	0.08	0.08	0.32	0.28	0.28
v/c Ratio	0.23	6.0	0.23	0.20	0.14	0.58	0.32	0.32	0.32	0.28	0.28
Uniform Delay, d1	6.0	5.8	6.0	5.8	23.0	26.0	24.1	23.8	24.1	23.8	23.8
Progression Factor	1.25	1.04	1.25	1.04	1.00	1.00	1.19	1.22	1.19	1.22	1.22
Incremental Delay, d2	0.2	0.2	0.2	0.2	1.0	5.4	4.5	1.4	4.5	1.4	1.4
Delay (s)	7.6	7.6	7.6	6.3	23.9	31.4	33.2	30.4	33.2	30.4	30.4
Level of Service	A	A	A	A	C	C	C	C	C	C	C
Approach Delay (s)	7.6	6.3	6.3	6.3	30.4	30.4	31.2	31.2	30.4	31.2	31.2
Approach LOS	A	A	A	A	C	C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	14.1
HCM Level of Service	B
HCM Volume to Capacity ratio	0.33
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%
ICU Level of Service	C
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	0.99	1.00	0.95	0.97	0.99	1.00	0.99	1.00	0.99
Flt Protected	1.00	0.99	0.99	1.00	1.00	0.99	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	5012	4810	4810	3385	3438	3438	3438	3438	3438	3438	3438
Flt Permitted	0.80	0.80	0.80	0.85	0.87	0.79	0.85	0.87	0.79	0.85	0.79
Satd. Flow (perm)	4041	4041	4041	4096	2967	2746	4096	2967	2746	4096	2746
Volume (vph)	74	582	34	52	449	220	39	185	58	77	201
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	75	588	34	53	454	222	39	187	59	78	203
RTOR Reduction (vph)	0	7	0	0	79	0	0	29	0	0	8
Lane Group Flow (vph)	0	690	0	0	650	0	0	256	0	0	298
Confl. Peds. (#/hr)	9	17	17	17	17	17	9	12	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2801	2801	2801	2637	760	760	760	760	760	760	760
v/s Ratio Prot	c0.17	0.16	0.16	0.16	0.16	0.16	0.09	0.09	0.09	0.09	0.09
v/c Ratio	0.27	6.1	0.27	0.25	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Uniform Delay, d1	6.1	6.0	6.1	6.0	24.2	24.2	24.2	24.8	24.2	24.8	24.8
Progression Factor	1.46	1.00	1.46	1.00	1.00	1.00	1.00	0.59	1.00	0.59	0.59
Incremental Delay, d2	0.2	0.2	0.2	0.2	1.2	1.2	1.2	1.8	1.2	1.8	1.8
Delay (s)	9.2	9.2	9.2	6.3	25.4	25.4	25.4	16.5	25.4	16.5	16.5
Level of Service	A	A	A	A	C	C	C	B	C	B	B
Approach Delay (s)	9.2	6.3	6.3	6.3	25.4	25.4	25.4	16.5	25.4	16.5	16.5
Approach LOS	A	A	A	A	C	C	C	B	C	B	B

Intersection Summary	
HCM Average Control Delay	11.5
HCM Level of Service	B
HCM Volume to Capacity ratio	0.31
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.9%
ICU Level of Service	G
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

Existing PM
 1/11/2008

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0	746	485	20	0	228
Volume (veh/h)	0.96	0.96	0.96	0.96	0.96	0.96
Peak Hour Factor	0	777	516	21	0	238
Hourly flow rate (vph)	79				79	
Pedestrians	12.0				12.0	
Lane Width (ft)	4.0				4.0	
Walking Speed (ft/s)	7				7	
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh						
Upstream signal (ft)	698	473				
pX, platoon unblocked						
VC, conflicting volume	615				864	340
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
VCu, unblocked vol	615				864	340
IC, single (s)	4.1				6.8	6.9
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	100				100	58
cM capacity (veh/h)	897				274	572
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3 SB 1
Volume Total	259	259	259	206	206	124 238
Volume Left	0	0	0	0	0	0 0
Volume Right	0	0	0	0	0	21 238
cSH	1700	1700	1700	1700	1700	1700 572
Volume to Capacity	0.15	0.15	0.15	0.12	0.12	0.07 0.42
Queue Length 95th (ft)	0	0	0	0	0	0 51
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0 15.7
Lane LOS	C					C
Approach Delay (s)	0.0			0.0		15.7
Approach LOS				B		C

Intersection Summary		
Average Delay	2.4	
Intersection Capacity Utilization	39.2%	ICU Level of Service A
Analysis Period (min)	15	

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4972	4769	4769	4769	4769	4769	4769	4769	4769	4769	4769
Flt Permitted	0.71	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Satd. Flow (perm)	3575	3716	3716	3716	3716	3716	3716	3716	3716	3716	3716
Volume (vph)	138	566	50	61	351	191	90	709	98	152	569
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	153	629	56	68	390	212	100	788	109	169	632
RTOR Reduction (vph)	0	7	0	0	15	0	0	7	0	0	4
Lane Group Flow (vph)	0	831	0	0	655	0	100	890	0	169	679
Conf. Peds. (#/hr)	26	19			26	39			92	92	39
Turn Type	Perm	Perm	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4		3	8		2			6		6
Permitted Phases	4										
Actuated Green, G (s)	19.3		19.3		19.3		34.2		34.2		34.2
Effective Green, g (s)	20.8		20.8		20.8		35.2		35.2		35.2
Actuated g/C Ratio	0.33		0.33		0.33		0.55		0.55		0.55
Clearance Time (s)	5.5		5.5		5.5		5.0		5.0		5.0
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0
Lane Grp Cap (vph)	1162		1208		361		1892		263		1919
v/s Ratio Prot			0.18		0.15		0.26		0.35		0.19
v/s Ratio Perm	0.23		0.71		9.64dl		0.28		0.47		0.64
v/c Ratio	19.0		17.7		7.6		8.7		10.0		8.0
Uniform Delay, d1	1.00		1.00		1.00		1.00		1.00		1.00
Progression Factor	1.8		0.3		1.9		0.8		11.5		0.5
Incremental Delay, d2	20.8		18.0		9.5		9.6		21.5		8.6
Delay (s)	C		B		A		C		A		A
Level of Service	C		B		A		C		A		A
Approach Delay (s)	20.8		18.0		9.6		9.6		11.1		8.6
Approach LOS	C		B		A		C		A		B

Intersection Summary		
HCM Average Control Delay	14.4	HCM Level of Service B
HCM Volume to Capacity ratio	0.67	
Actuated Cycle Length (s)	64.0	Sum of lost time (s)
Intersection Capacity Utilization	78.7%	ICU Level of Service D
Analysis Period (min)	15	

dl Defacto Left Lane. Recode with 1 through lane as a left lane.
 dr Defacto Right Lane. Recode with 1 through lane as a right lane.
 c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5027	4980	4980	4980	4980	4980	1780	1406	1582	1582	1582	1582
Fit Permitted	0.89	0.77	0.77	0.77	0.77	0.77	0.87	1.00	0.92	0.92	0.92	0.92
Satd. Flow (perm)	4503	3870	3870	3870	3870	3870	1577	1406	1469	1469	1469	1469
Volume (vph)	36	764	26	82	523	28	49	88	191	33	33	68
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	36	772	26	83	528	28	49	89	193	33	33	69
RTOR Reduction (vph)	0	4	0	0	6	0	0	0	94	0	47	0
Lane Group Flow (vph)	0	830	0	0	633	0	0	138	99	0	88	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	49.5	49.5	49.5	49.5	49.5	49.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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 Grp Cap (vph)	2730	2730	2730	2730	2730	2730	463	413	432	432	432	432
v/s Ratio Prot	c0.18	0.16	0.16	0.16	0.16	0.16	c0.09	0.07	0.06	0.06	0.06	0.06
v/s Ratio Perm	0.30	0.27	0.27	0.27	0.27	0.27	0.30	0.24	0.20	0.20	0.20	0.20
v/c Ratio	7.6	7.4	7.4	7.4	7.4	7.4	21.9	21.5	21.2	21.2	21.2	21.2
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.3	0.3	0.3	0.3	0.3	0.3	1.6	1.4	1.1	1.1	1.1	1.1
Incremental Delay, d2	7.9	7.7	7.7	7.7	7.7	7.7	23.5	22.8	22.3	22.3	22.3	22.3
Delay (s)	A	A	A	A	A	A	C	C	C	C	C	C
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	7.9	7.7	7.7	7.7	7.7	7.7	23.1	23.1	22.3	22.3	22.3	22.3
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	11.4 HCM Level of Service B											
HCM Volume to Capacity ratio	0.30											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	96.6% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	0.98	1.00	0.95	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Fit Protected	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	4941	1770	4738	1770	4738	1770	4931	1770	4933	1770	4933
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4941	1770	4738	1770	4738	1770	4931	1770	4933	1770	4933
Volume (vph)	187	684	83	81	369	210	167	652	106	307	376	63
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	205	752	91	89	405	231	184	716	116	337	413	69
RTOR Reduction (vph)	0	15	0	0	101	0	0	22	0	0	23	0
Lane Group Flow (vph)	205	828	0	89	535	0	184	810	0	337	459	0
Confl. Peds. (#/hr)	81	81	81	81	81	81	22	22	50	50	43	43
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	4	4	3	4	4	1	2	1	2	1	2
Permitted Phases	3	4	4	3	4	4	1	2	1	2	1	2
Actuated Green, G (s)	11.0	24.1	11.0	24.1	11.0	24.1	20.9	26.0	20.9	26.0	20.9	26.0
Effective Green, g (s)	11.0	25.1	11.0	25.1	11.0	25.1	20.9	27.0	20.9	27.0	20.9	27.0
Actuated g/C Ratio	0.11	0.25	0.11	0.25	0.11	0.25	0.21	0.27	0.21	0.27	0.21	0.27
Clearance Time (s)	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Vehicle Extension (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
Lane Grp Cap (vph)	195	1240	195	1189	195	1189	370	1331	370	1332	370	1332
v/s Ratio Prot	c0.12	c0.17	c0.12	c0.17	c0.12	c0.17	0.10	c0.16	0.10	c0.16	0.10	c0.16
v/s Ratio Perm	1.05	0.67	1.05	0.67	1.05	0.67	0.50	0.61	0.50	0.61	0.50	0.61
v/c Ratio	44.5	33.7	44.5	33.7	44.5	33.7	34.9	31.9	34.9	31.9	34.9	31.9
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	78.6	2.9	78.6	2.9	78.6	2.9	0.6	1.2	0.4	2.1	25.5	0.7
Delay (s)	123.1	36.6	123.1	36.6	123.1	36.6	42.3	32.9	35.3	34.0	64.1	30.1
Level of Service	F	D	F	D	F	D	D	C	D	C	E	C
Approach Delay (s)	53.5	53.5	53.5	53.5	53.5	53.5	34.0	34.2	34.2	44.1	44.1	44.1
Approach LOS	D	D	D	D	D	D	C	C	C	C	D	D
Intersection Summary												
HCM Average Control Delay	42.0 HCM Level of Service D											
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	81.5% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
23: 34th St & Telegraph Ave.

Existing PM
1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Frpb, ped/bikes	0.94	0.97	1.00	0.95	1.00	0.93	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.96	0.97	1.00	0.97	1.00	0.93	1.00	0.99	1.00	0.99	1.00	0.99
Flt	0.95	0.98	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fit Protected	1562	1661	1684	3464	1638	3455						
Satd. Flow (prot)	0.71	0.84	0.31	1.00	0.43	1.00						
Fit Permitted	1140	1415	556	3464	735	3455						
Satd. Flow (perm)	96	33	65	42	59	35	40	513	35	30	739	56
Volume (vph)	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Peak-hour factor, PHF	102	35	69	45	63	37	43	546	37	32	786	60
Adj. Flow (vph)	0	25	0	0	16	0	0	4	0	0	5	0
RTOR Reduction (vph)	0	181	0	0	129	0	43	579	0	32	841	0
Lane Group Flow (vph)	100	100	100	100	100	100	100	100	100	100	100	100
Confl. Peds. (#/hr)												
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
Effective Green, g (s)	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Vehicle Extension (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
Lane Grp Cap (vph)	207	256	403	2510	533	2504						
v/s Ratio Prot	c0.16	0.09	0.08	0.08	0.17	0.04						
v/s Ratio Perm	0.88	0.50	0.11	0.23	0.06	0.34						
Uniform Delay, d1	33.9	31.3	3.5	3.9	3.4	4.3						
Progression Factor	1.00	1.00	0.93	0.84	1.00	1.00						
Incremental Delay, d2	30.5	0.6	0.5	0.2	0.2	0.4						
Delay (s)	64.4	31.9	3.7	3.5	3.6	4.6						
Level of Service	E	C	A	A	A	A						
Approach Delay (s)	64.4	31.9	3.5	3.5	4.6	4.6						
Approach LOS	E	C	A	A	A	A						
Intersection Summary												
HCM Average Control Delay	13.0											
HCM Volume to Capacity ratio	0.44											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	56.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
24: 27th St & Telegraph Ave.

Existing PM
1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.99	1.00	0.96	1.00	0.93
Flpb, ped/bikes	1.00	0.96	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.96	1.00	0.94
Flt	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fit Protected	1770	3308	1770	3285	1688	3488						
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.30	1.00						
Fit Permitted	1770	3308	1770	3285	535	3488						
Satd. Flow (perm)	127	316	100	56	383	98	113	484	29	95	466	284
Volume (vph)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Peak-hour factor, PHF	130	322	102	57	391	100	115	494	30	97	476	300
Adj. Flow (vph)	0	36	0	0	29	0	0	5	0	0	101	0
RTOR Reduction (vph)	0	181	0	0	129	0	43	579	0	32	841	0
Lane Group Flow (vph)	130	388	0	57	462	0	115	519	0	97	675	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	4	3	8	2	2	2	2	2	2	6
Permitted Phases	7	4	4	3	8	2	2	2	2	2	2	6
Actuated Green, G (s)	9.2	21.6	21.6	5.1	17.5	44.8	44.8	44.8	44.8	44.8	44.8	44.8
Effective Green, g (s)	9.7	21.1	21.1	5.6	17.0	46.3	46.3	46.3	46.3	46.3	46.3	46.3
Actuated g/C Ratio	0.11	0.25	0.25	0.07	0.20	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (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
Lane Grp Cap (vph)	202	821	117	657	291	1900						
v/s Ratio Prot	c0.07	0.12	0.12	0.03	0.14	0.15						
v/s Ratio Perm	0.64	0.47	0.49	0.70	0.40	0.27						
Uniform Delay, d1	36.0	27.2	38.3	31.7	11.2	10.4						
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00						
Incremental Delay, d2	5.2	0.2	0.2	1.2	2.8	4.0						
Delay (s)	41.2	27.4	39.5	34.5	15.2	10.7						
Level of Service	D	C	C	D	C	B						
Approach Delay (s)	30.6	30.6	35.0	35.0	11.5	15.4						
Approach LOS	C	C	C	C	B	B						
Intersection Summary												
HCM Average Control Delay	21.8											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	69.5%											
Analysis Period (min)	15											
c Critical Lane Group												

**APPENDIX C:
PROJECT TRIP GENERATION**



MEMORANDUM

Date: September 5, 2007

To: Lynette Dias and Charity Wagner, RRM Design Group

From: Sam Tabibnia and Emily Johnson

Subject: MacArthur Transit Village Trip Generation

WC06-2279

This memorandum presents the methodology used to estimate trip generation that we propose to use for the MacArthur Transit Village project.

The proposed MacArthur Transit Village is a mixed-use transit-oriented development (TOD) that includes 675 residential units, up to 44,000 square feet of retail, and 5,000 square feet of community space, to be developed on the existing MacArthur BART station surface parking lot and seven adjacent parcels. Approximately half of the existing 600 surface parking spaces would be removed, and the remaining 300 spaces would be replaced in a parking garage.

PROJECT TRIP GENERATION

Trip generation for the project would include trips related to the residential, retail, and community space components, as well as any change in trips related to the loss of 300 BART parking spaces. The trip generation will be adjusted to account for the project's transit-oriented location and other factors as applicable. Each of these project components is described below.

Residential Trips

The proposed MacArthur BART Transit Village includes 675 residential units, which includes a mix of below market rate rental units and market-rate for-sale condominiums. We have estimated the residential trip generation using the ITE regression equation for Condominiums for the entire 675 units. Given the development's location adjacent to the BART station, we have applied a transit-oriented trip reduction factor. To determine an appropriate trip reduction factor, we reviewed data from comparable sites as well as datasets of transit-oriented development travel patterns.

Fehr & Peers TOD Trip Generation Survey

In 2006, Fehr & Peers surveyed two transit-oriented developments (TODs) adjacent to BART stations as well as a two-block neighborhood within ½ mile of the MacArthur BART station to quantify the differences between standard ITE trip generation rates and those for transit-oriented developments. The sites that were surveyed are described below:

- **La Terrazza Apartments** is a 153-unit apartment complex located at 7800 El Camino Real in Colma, CA, 0.1 miles from the Colma BART station in San Mateo County. The apartment complex is positioned to the east of the Colma BART station and sits atop a

- residential parking garage and a 1,095 sq. ft. Subway sandwich shop. Vehicle access to the parking garage is located on El Camino Real and there is direct pedestrian access to the east side of the Colma BART station, via the station transit mall, located on D Street. At the time of the trip generation observations, 110 apartments (72 percent) were occupied.
- **Park Regency Apartments** is an 892-unit apartment complex located at 3128 Oak Road in Walnut Creek, CA, 0.2 miles from the Pleasant Hill BART station in Contra Costa County. The apartment complex is situated to the north of the Pleasant Hill BART station and has both underground and on-street parking available for residents. The apartment complex has three gated vehicle and pedestrian access points. Two of the access points are located on Oak Road and the third access point is located on Las Juntas Road. Pedestrians that use the Las Juntas Road access point can cross the road and enter the northern parking lot at the Pleasant Hill BART station. The two vehicle driveways on Oak Road are shared with a commercial development that is adjacent to the apartment complex. The commercial development includes a Subway sandwich shop, a local deli, a 7-11 convenience store, a dry cleaner, a tanning salon, and a Taco Bell restaurant. Trips to the retail were counted separately from trips to the residential units. At the time of the trip generation observations, 746 apartments (84 percent) were occupied.
 - **36th and 37th Street** is a two-block section of the Mosswood neighborhood located between Telegraph Avenue and Webster Avenue in Oakland, CA, near the MacArthur BART station in Alameda County. This section of Mosswood has 54 single-family dwelling units and 149 multi-family dwelling units (townhouses and condominiums) and is located approximately 0.35 miles away from the MacArthur BART station. There are four vehicle and pedestrian access points at the intersections of 36th and 37th Streets with Telegraph Avenue and Webster Street. At the time of the trip generation observations, all of the residences appeared to be occupied.

Peak period traffic counts (7:00 to 9:00 AM and 4:00 to 6:00 PM) of vehicle, pedestrian, bicycle, and transit use were conducted at the developments' access points during typical weekdays in May 2006, when local schools were in session. The count data is shown in Table 1. The weather was sunny or partly sunny during all survey days. Note that transit trips were not recorded for the 36th and 37th Street neighborhood because there are no AC Transit or BART stops within the neighborhood boundaries. Any transit trips were most likely recorded as pedestrian trips, given there are AC Transit stops located along Telegraph Avenue and the MacArthur BART station is approximately 1/3 of a mile away. Some transit trips were also potentially recorded as vehicle trips that began in the neighborhood and ended in the MacArthur BART station parking lot.

As shown in Table 1, the vehicle mode share for the three projects was fairly consistent in the AM peak hour at between 63 percent and 75 percent of all trips, and varied more widely in the PM peak hour, from 64 to 83 percent of all trips. The transit mode share for the two apartment buildings was fairly consistent at between 20 and 28 percent in the AM peak hour and 10 to 11 percent in the PM peak hour.

TABLE 1 SURVYED SITES: TRIP GENERATION DATA												
Trips	Vehicles			Transit (BART)/Bicycles ¹			Pedestrians			Total		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
La Terraza Apartments												
AM Peak Hour	4	26	30	0	12	12	0	0	0	4	38	42
PM Peak Hour	25	18	43	2	3	5	3	0	3	30	21	51
Trip % of Total												
AM Peak Hour	10%	62%	72%	0%	28%	28%	0%	0%	0%	10%	90%	100%
PM Peak Hour	49%	34%	83%	4%	6%	11%	6%	0%	6%	60%	40%	100%
Park Regency Apartments												
AM Peak Hour	52	193	245	1	70	71	10	7	17	63	270	333
PM Peak Hour	172	85	257	34	1	35	41	40	81	247	126	373
Trip % of Total												
AM Peak Hour	16%	59%	75%	0%	20%	20%	2%	2%	5%	18%	82%	100%
PM Peak Hour	47%	22%	69%	10%	0%	10%	10%	10%	20%	67%	33%	100%
36th & 37th Streets (Single-Family Housing and Condominiums/Townhomes)												
AM Peak Hour	30	49	79	0	4	4	11	32	43	41	85	126
PM Peak Hour	49	56	105	5	3	8	30	22	52	84	81	165
Trip % of Total												
AM Peak Hour	24%	39%	63%	0%	3%	3%	8%	26%	34%	32%	68%	100%
PM Peak Hour	30%	35%	64%	2%	1%	4%	19%	14%	32%	51%	49%	100%
¹ Transit trips for the apartment complexes; bicycle trips for the 36 th & 37 th Street residences. Source: Fehr & Peers, 2006.												

The observed vehicle trips were compared to trips estimated based on trip generation data published in *Trip Generation, 7th Edition* (Institute of Transportation Engineers, 2004), consistent with the method presented in *Trip Generation Handbook 2nd Edition* (ITE, 2004). The ITE trip generation is based on data collected at sites across the country, most of which are in suburban settings with minimal transit access, where all trips are made with private vehicles. As shown in Table 2, the observed vehicle trip generation is between 33 percent and 48 percent lower than the ITE -based vehicle trip generation during the AM peak hour and between 28 percent and 45 percent lower than the ITE -based vehicle trip generation during the PM peak hour. On average, vehicle trips at the surveyed sites are 38 percent lower than the vehicle trips estimated by the ITE method. Considering that the ITE rates are based on typical suburban developments with minimal transit access and that the surveyed sites are well served by transit, it is reasonable to assume that TODs would generate 38 percent fewer trips.

**TABLE 2
 SURVYED SITES TRIP GENERATION VS ITE DATA**

Site	Observed Trip Generation ¹		ITE-Based Estimated Trip Generation ²		Percent Difference ³	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
La Terraza Apartments	30	43	58	78	-48%	-45%
Park Regency Apartments	245	257	371	430	-34%	-40%
36 th & 37 th Streets	79	105	118 ⁴	145 ⁴	-33%	-28%
Average Difference					-38%	-38%

¹ Based on surveys conducted by Fehr & Peers in May 2006 and detailed in Table 1.

² Trip generation estimated based on ITE *Trip Generation Handbook, 2nd Edition* method and *Trip Generation, 7th Edition* data.

³ Calculated as 1-(surveyed trips/ITE-based trip generation).

⁴ Sum of trips based on ITE equations for Single Family Detached Housing (Land Use 210) for 54 units and Residential Condominium/Townhouse (Land Use 230) for 149 units.

Source: Fehr & Peers, 2007.

Dowling Associates TOD Trip Generation Memorandum

Fehr & Peers reviewed the *Recommended Trip Generation Adjustments for Transit-Oriented Developments in Oakland* memorandum prepared by Dowling Associates and dated April 6, 2006. Dowling Associates uses Bay Area Travel Survey (BATS) 2000 data for TODs at the Hayward and Pleasant Hill BART Stations as well as Census Transportation Planning Package (CTPP) data on journey to work mode share for residents adjacent to the El Cerrito del Norte BART station to determine appropriate adjustments to ITE trip generation rates. The El Cerrito del Norte BART station is at or near parking capacity, has basic pedestrian facilities, and is surrounded by typical suburban development with retail uses setback from the street, and surrounded by parking lots.

Based on their research, Dowling recommends using the ITE regression equation for condominiums and reducing the trip generation by 40 percent for a development at a BART station where there is off-street parking available for residents.

BATS 2000 Data

The Bay Area Travel Survey collects data about travel patterns and demographics for nearly 35,000 persons, including those living within 1 mile and ½ mile of various transit operators, and persons not living near transit. Fehr & Peers reviewed the BATS 2000 data on trip patterns for persons living within ½ mile of BART stations. As shown in Table 3, the transit mode share for households living within ½ mile of BART was close to 36 percent. This is consistent with the findings from Fehr & Peers' trip generation surveys and the Dowling memorandum. While the BATS data is not reported separately for households adjacent to BART, it is likely that their transit mode share would be higher than those living ½ mile from BART.

Mode	Share
In-Vehicle Person	48.3%
Vehicle Driver	41.9%
Vehicle Passenger	6.4%
Total Transit	35.5%
BART	22.5%
Other Transit	13.0%
Bicycle	3.5%
Walk	9.8%
Other	3.0%

Source: *Characteristics of Rail and Ferry Station Area Residents in the San Francisco Bay Area: Evidence from the 2000 Bay Area Travel Survey*, Appendix P, Table P2, Metropolitan Transportation Commission, September, 2006.

The analysis completed by Dowling Associates and the BATS 2000 data are consistent with our recommendation to apply a 38 percent reduction to the residential vehicle trip generation (using the ITE Condominium regression equations) for the MacArthur BART Transit Village.

Other Factors

Vehicle Ownership

Based on the latest project description received in June 2007, the proposed project would provide between 700 and 775 residential, retail and community use parking spaces. Research on travel patterns in TODs finds that households with fewer vehicles have higher transit ridership than those with more vehicles. For example, as cited in the Dowling memorandum, Cervero and Duncan found that for residents who live and work within ½ mile of a rail station, the probability of commuting by rail was 85 percent for households with zero vehicles, 44 percent for households with one vehicle, 25 percent for households with two vehicles, and 13 percent for households with three vehicles.

Similarly, the BATS 2000 data for residents living within ¼ mile of the El Cerrito del Norte BART station (summarized in the Dowling memorandum and Table 4 below) shows that the percentage of residents commuting by transit drops from 70 percent for households with zero vehicles, to 33 percent for households with one vehicle, to 21 percent for households with two vehicles, to 13 percent for households with 3 vehicles. Assuming that the number of off-street parking spaces provided for each unit influences vehicle availability, the relatively low ratio of 1.0 parking spaces per unit for the proposed residential units should encourage transit ridership.

TABLE 4 PERCENTAGE COMMUTE BY TRANSIT, HOUSING LOCATION AND VEHICLES AVAILABILITY		
Number of Vehicles Available	Reside within ¼ mile of BART station	Reside between ¼ and ½ mile of BART Station
0	70%	45%
1	33%	21%
2	21%	9%
3	13%	10%
4+	16%	9%

Source: *Recommended Trip Generation Adjustments for Transit-Oriented Developments in Oakland*, Dowling Associates memorandum to Natalie Fay, City of Oakland, April 6, 2006 (provided by Natalie Fay)

Household Income

Lower-income households tend to have higher transit use than higher-income households, generally due to lower vehicle ownership rates. Therefore, residents of the 113 below-market units in the proposed project may have higher transit use (and lower vehicle trip generation) than assumed.

Retail Trips

The proposed MacArthur BART Transit Village includes up to 44,000 square feet of commercial space, which most likely be neighborhood-serving retail space. Although up to 10,000 square-feet of commercial space may be converted to live/work units, this analysis assumes that all commercial space would be used as retail space.

Because the retail space is relatively small and intended to serve primarily BART commuters and nearby residents, we have used the ITE trip generation rates for Specialty Retail, rather than Shopping Center. Based on Oakland’s TIA guidelines, it is appropriate to use Specialty Retail for 25,000 square feet or more of retail, but a pass-by reduction cannot be taken. Because there is no AM data for Specialty Retail, we used the PM rate and reversed the in/out split. This is likely conservative, as the retail may not be open during the AM peak hour.

Literature on mode share for trips to transit-oriented retail locations shows a range from five percent to over twenty percent transit share for shoppers and up to forty percent transit share for retail employees, depending on the size of the retail center, its location, the transit service, and parking availability. Given that the retail proposed for the MacArthur BART Transit Village is relatively small and neighborhood-serving, most of the trips are likely to come from BART patrons and residents of the adjacent housing, who will likely walk or combine the trip with their commute trip. To be conservative, we have applied a five percent transit reduction to the ITE rates. This is consistent with the low end of the TOD research on retail trips.

BART Parking Lot Trips

The proposed MacArthur BART Transit Village project includes removing approximately 300 of the existing 600 parking spaces in the BART lot. This reduction will likely have an effect on peak hour vehicle trips, and travel patterns may change in several ways. Patrons that currently drive to the station and park may shift to a variety of modes, including local bus, walk, or bicycle. Others may carpool or be dropped off at the station. Others may continue to drive and park on-street or in other lots in the area. Others may drive to a different BART station, or drive to their end destination rather than take BART.

As described in the *MacArthur BART Station Access Plan Existing Conditions Report*, the daily fee spaces in the lot currently fill by 7:30 AM. Between half and three-quarters of the 154 monthly reserved spaces are filled by 9:00 AM, leaving between 38 and 77 spaces available. It is likely that with fewer BART parking spaces, the parking lot will fill earlier. Based on recent traffic counts, the AM peak hour for traffic is 8:00 to 9:00 AM. Therefore, any change in vehicle trips to the parking lot in the morning will most likely occur before the peak hour.

Based on recent traffic counts adjacent to the site, the PM peak hour occurs between 5:00 and 6:00 PM. During this hour, approximately 430 vehicles enter and exit the BART parking lot (138 enter, 294 exit). With the reduction in parking spaces, the lot may empty earlier in the evening, if BART patrons who arrive earlier to park would also leave earlier. Therefore, some of the current exits in the PM peak hour may shift to earlier times and reduce the the PM peak hour trip generation. However, to be conservative, we assume that BART patrons currently exiting the lot during the PM peak hour will continue to do so. We assume that patrons entering the lot during the PM peak hour would also continue to do so. We have made no adjustment to the trip generation for additional or reduced trips to and from the BART parking lot during peak hours.

The proposed project may include a Residential Permit Parking (RPP) program for the area within ¼ mile of the BART station. Under the RPP program, residents would receive a permit to park on-street, but non-residents would not be able to park on-street for more than two hours. The RPP program would therefore reduce the amount of on-street parking available to BART commuters. According to the *MacArthur BART Station Neighborhood Street Parking and Transit Analysis* (Nelson\Nygaard, May 2006), approximately 470 vehicles enter the proposed RPP area between 6:30 and 9:00 AM to park. This includes BART commuters as well as local workers and other non-residents. With the RPP program, BART commuters who currently park on-street would either park outside the RPP area and walk to the station, shift to transit, bicycle, or carpool, get dropped off at the station, drive to another BART station, or drive to their end destination instead of taking BART. Depending on the magnitude of these mode shifts, up to 470 fewer vehicles may enter the project area in the morning.

If the program were designed to allow non-residents to purchase a permit, most BART commuters who currently park on-street would likely continue to do so, and some BART commuters who currently park in the BART lot would shift to parking on-street. If the RPP were not implemented, BART commuters who currently park on-street would continue to do so, and some BART commuters who currently park in the BART lot would shift to parking on-street. According to the Nelson\Nygaard analysis, the maximum parking occupancy within a ¼ mile radius of the station is 65 percent, which occurs at 4:00 PM. Therefore, at least 35 percent of the on-street parking (or about 430 spaces) are available during the day. Given the uncertainty of shifts in travel patterns due to the RPP program, we conservatively assume no net change in trip generation.

Trip Generation Summary

Table 5 summarizes the proposed project's vehicle trip generation. Based on the transit reductions and parking lot trip assumptions described above, the project would generate approximately 4,265 new daily vehicle trips, 325 AM peak hour vehicle trips, and 358 PM peak hour vehicle trips.

**TABLE 5
 PROJECT VEHICLE TRIP GENERATION**

Land Use	ITE Code	Amount	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Condominium ¹	230	675 DU	3,254	40	197	237	193	95	288
Residential Transit Reduction ²		Daily 19% Peak Hr. 38%	-618	-15	-75	-90	-73	-36	-109
Total Residential Trips			2,636	25	122	147	120	59	179
Retail ³	814	44 ksf	1,950	67	52	119	52	67	119
Retail Transit Reduction ⁴		5%	-98	-3	-3	-6	-3	-3	-6
Total Retail Trips			1,852	64	49	113	49	64	113
Community Space ⁵	565	5 ksf	396	34	30	64	31	35	66
BART Parking lot ⁶		-300 spaces	0	0	0	0	0	0	0
Total Trip Generation			4,884	123	201	324	200	158	358

Notes: du = dwelling unit; ksf = 1,000 square feet.

¹ Trip generation based on the regression equations for Residential Condominium/Townhouse (Land Use 230) in the Institute of Transportation Engineers' (ITE) *Trip Generation* (7th Edition), as presented below.

Daily Equation: $\ln(T) = 0.85 \ln(X) + 2.55$

AM Equation: $\ln(T) = 0.80 \ln(X) + 0.26$ (inbound = 17%, outbound = 83%)

PM Equation: $\ln(T) = 0.82 \ln(X) + 0.32$ (inbound = 67%, outbound = 33%)

Where: T = trip ends, Ln = natural logarithm, and X = number of dwelling units

² Residential transit reduction based on trip generation surveys at Bay Area TODs adjacent to BART stations; confirmed by data presented in *Recommended Trip Generation Adjustments for Transit-Oriented Developments in Oakland* (Dowling Inc., April 2006) as well as Bay Area Transportation Surveys (BATS) 2000 data for households within ½ mile of BART stations. Transit reduction for daily trip generation is lower to account for lower transit mode share for non-work trips.

³ Daily and PM trip generation based on rates for Specialty Retail (Land Use 814) in the ITE *Trip Generation* (7th Edition) as presented below.

Daily Rate: $(T) = 44.32 (X)$

PM Rate: $(T) = 2.71 (X)$ (inbound = 44%, outbound = 56%)

Where: T = trip ends and X = 1,000 square feet

AM trip generation based on PM trip rate, with reversed inbound/outbound splits.

⁴ Retail transit reduction based on TOD literature on retail trips, including *Travel Characteristics of Transit-Oriented Development in California* (Lund, Cervero, and Wilson, 2004), and *Ridership Impacts of Transit-Focused Development in California* (Cervero, 1993)

⁵ Trip generation based on average rates for Day Care Center (Land Use 565) in the ITE *Trip Generation* (7th Edition) as presented below.

Daily Rate: $(T) = 79.26 (X)$

AM Rate: $(T) = 12.79 (X)$ (inbound = 53%, outbound = 47%)

PM Rate: $(T) = 13.18 (X)$ (inbound = 47%, outbound = 53%)

Where: T = trip ends and X = 1,000 square feet

⁶ The project includes removing approximately 300 of the existing 618 parking spaces in the BART lot. In the AM peak hour, any change in trips to the parking lot will most likely continue to occur before the peak hour. To be conservative, we assume that BART patrons currently entering and exiting the lot in the PM peak hour will continue to do so.

Source: Fehr & Peers, 2007.

ALTERNATE TRIP GENERATION

Table 6 presents an alternate method for estimating trip generation and compares it to the original trip generation presented in Table 5.

The key differences are as follows:

- The residential trip generation reduction is reduced from 38 percent in both the AM and PM peak hours to 33 percent in the AM peak hour and 28 percent in the PM peak hour.
- The retail trip generation is based on the ITE regression equation for Shopping Center rather than Specialty Retail. A pass-by reduction of 56 percent is applied for the PM peak hour. This is based on data in Table 5.4 of the ITE *Trip Generation Handbook*, which shows an average pass-by percentage of 56 percent for shopping centers of 50,000 square feet or less). The daily pass-by rate is assumed to be 28 percent, or about half the PM rate.
- A trip reduction was taken to account for the loss of 300 of the existing 600 spaces in the BART parking lot. No reduction was taken for the AM peak hour because the daily fee spaces fill before the AM peak hour. The PM peak hour and daily reductions are based on the existing number of trips to and from the lot, available on-street parking in the surrounding neighborhood, and estimated shifts to pick-up/drop-off and other modes. The BART parking lot currently generates about 380 trips during the PM peak hour and 1,350 daily trips. There are approximately 140 non-restricted parking spaces available in the neighborhood within walking distance of the station at 9:00 AM that BART parkers could potentially use. Pick-up and drop off trips currently represent about 17 percent of non-drive-alone access to the station. It is estimated that reducing the BART parking supply by 50 percent would result in 50 percent of the current vehicle trips to continue using the BART lot, 23 percent to shift to parking on the surrounding neighborhood streets, 9 percent to shift to pick-up/drop offs, and 18 percent to shift to other modes or not use the MacArthur BART Station. This 18 percent represents the expected reduction in BART parking lot trip generation.

As shown in Table 6, the alternate trip generation is approximately 750 trips higher than the original trip generation on a daily basis, and about six trips lower in the AM peak hour and about 7 trips higher during the PM peak hour. Since the AM and PM peak hour trip generation is about the same as the original trip generation and the traffic analysis will be completed for the AM and PM peak hours, we intend to use the original trip generation for the EIR analysis.

Please contact us with any questions or comments.

**TABLE 6
 ALTERNATIVE PROJECT VEHICLE TRIP GENERATION**

Land Use	ITE Code	Amount	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Condominium ¹	230	675 DU	3,254	40	197	237	193	95	288
Residential Transit Reduction ²		19% Daily, 33% AM, 28% PM	<u>-618</u>	<u>-13</u>	<u>-65</u>	<u>-79</u>	<u>-54</u>	<u>-27</u>	<u>-81</u>
Total Residential Trips			2,638	27	132	159	139	68	207
Retail ³	814	44 ksf	3,983	58	37	96	175	189	364
Retail Pass-By Reduction ⁴		28% Daily 56% PM	-1,115	0	0	0	-8	-06	-04
Total Retail Trips			2868	58	37	96	77	83	160
Community Space ⁵	565	5 ksf	396	34	30	64	31	35	66
BART Parking lot ⁶		-300 spaces	-263	0	0	0	-13	-55	-69
Total Trip Generation			5,636	119	200	319	233	131	365
Total Original Trip Generation			4,884	123	202	325	200	158	358
Difference			752	-3	-3	-6	33	-27	7

Notes: du = dwelling unit; ksf = 1,000 square feet.

¹ Trip generation based on the regression equations for Residential Condominium/Townhouse (Land Use 230) in the Institute of Transportation Engineers' (ITE) *Trip Generation* (7th Edition), as presented below.

Daily Equation: $\ln(T) = 0.85 \ln(X) + 2.55$
 AM Equation: $\ln(T) = 0.80 \ln(X) + 0.26$ (inbound = 17%, outbound = 83%)
 PM Equation: $\ln(T) = 0.82 \ln(X) + 0.32$ (inbound = 67%, outbound = 33%)
 Where: T = trip ends, Ln = natural logarithm, and X = number of dwelling units

² Residential transit reduction based on trip generation surveys at Bay Area TODs adjacent to BART stations; confirmed by data presented in *Recommended Trip Generation Adjustments for Transit-Oriented Developments in Oakland* (Dowling Inc., April 2006) as well as Bay Area Transportation Surveys (BATS) 2000 data for households within 1/2 mile of BART stations.

³ Daily and PM trip generation based on the equation for Shopping Center (Land Use 820) in the Institute of Transportation Engineers' (ITE) *Trip Generation* (7th Edition), as presented below.

Daily Equation: $\ln(T) = 0.65 \ln(X) + 5.83$
 AM Equation: $\ln(T) = 0.60 \ln(X) + 2.29$ (inbound = 61%, outbound = 39%)
 PM Equation: $\ln(T) = 0.66 \ln(X) + 3.4$ (inbound = 48%, outbound = 52%)
 Where: T = trip ends, Ln = natural logarithm, and X = Thousand square feet of retail space

⁴ Pass-By Reduction based on Table 5.4 in the ITE *Trip Generation Handbook*, which shows an average pass-by percentage of 56 percent for shopping centers of 50,000 square feet or less. The daily pass-by rate is assumed to be about half the PM rate.

⁵ Trip generation based on the average rates for Day Care Center (Land Use 565) in the ITE *Trip Generation* (7th Edition), as presented below.

Daily Rate: $(T) = 79.26 (X)$
 AM Rate: $(T) = 12.79 (X)$ (inbound = 53%, outbound = 47%)
 PM Rate: $(T) = 13.18 (X)$ (inbound = 47%, outbound = 53%)
 Where: T = trip ends and X = 1,000 square feet


⁶ The project includes removing approximately 300 of the existing 600 parking spaces in the BART lot. In the AM peak hour, any change in trips to the parking lot will most likely continue to occur before the peak hour. To be conservative, we assume that BART patrons currently entering and exiting the lot in the PM peak hour will continue to do so.

Source: Fehr & Peers, 2007.

**APPENDIX D:
EXISTING PLUS PROJECT CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
1: 52nd Street & Shattuck Ave.


Existing+Project AM
1/21/2008



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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4922		1770	4965		2006	2048		1984	1926	
Flt Permitted	0.95	1.00		0.95	1.00		0.11	1.00		0.46	1.00	
Satd. Flow (perm)	1770	4922		1770	4965		222	2048		968	1926	
Volume (vph)	288	907	175	65	1219	165	206	268	50	146	277	246
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)	303	955	184	68	1283	174	217	282	53	154	292	259
RTOR Reduction (vph)	0	20	0	0	14	0	0	6	0	0	28	0
Lane Group Flow (vph)	303	1119	0	68	1443	0	217	329	0	154	523	0
Confl. Peds. (#/hr)			10	10		10	10		10	10		10
Turn Type	Prot			Prot		pm+pt			Perm			
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	17.0	56.4		8.6	48.0		44.5	44.5		35.5	35.5	
Effective Green, g (s)	17.0	56.4		8.6	48.0		45.0	45.0		36.0	36.0	
Actuated g/C Ratio	0.14	0.47		0.07	0.40		0.38	0.38		0.30	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	2313		127	1986		187	768		290	578	
v/s Ratio Prot	c0.17	0.23		0.04	c0.29		c0.07	0.16		c0.27		
v/s Ratio Perm							0.37			0.16		
v/c Ratio	1.21	0.48		0.54	0.73		1.16	0.43		0.53	0.90	
Uniform Delay, d1	51.5	21.8		53.8	30.5		33.9	27.9		35.0	40.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	124.5	0.7		4.3	2.4		115.7	0.4		1.9	17.6	
Delay (s)	176.0	22.5		58.1	32.8		149.5	28.3		36.8	58.0	
Level of Service	F	C		E	C		F	C		D	E	
Approach Delay (s)		54.8			33.9			76.0			53.4	
Approach LOS		D			C			E			D	
Intersection Summary												
HCM Average Control Delay	49.8		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.88											
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				12.0			
Intersection Capacity Utilization	98.2%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd Street & Telegraph Ave.

Existing+Project AM
1/21/2008



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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		1.00		1.00	0.99			0.99		1.00	0.96	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.94		1.00	0.92			0.97		1.00	0.95	
Flt Protected		0.97		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1696		1681	1607			3406		1770	3203	
Flt Permitted		0.80		0.75	1.00			0.94		0.95	1.00	
Satd. Flow (perm)		1402		1321	1607			3215		1770	3203	
Volume (vph)	8	0	7	113	95	119	10	984	230	72	663	358
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	9	0	8	122	102	128	11	1058	247	77	713	385
RTOR Reduction (vph)	0	8	0	0	61	0	0	15	0	0	49	0
Lane Group Flow (vph)	0	9	0	122	169	0	0	1301	0	77	1049	0
Confl. Peds. (#/hr)	4					4	44		12	12		44
Turn Type	Perm			Perm		Perm			Prot			
Protected Phases		7			8			2		1		6
Permitted Phases	7			8			2					
Actuated Green, G (s)		3.3		13.0	13.0			48.7		7.0		60.2
Effective Green, g (s)		3.8		13.5	13.5			49.2		7.5		60.7
Actuated g/C Ratio		0.04		0.15	0.15			0.55		0.08		0.67
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5		4.5
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0		2.0
Lane Grp Cap (vph)		59		198	241			1758		148		2160
v/s Ratio Prot										0.04		c0.33
v/s Ratio Perm		c0.01		0.09	0.11			c0.40				
v/c Ratio		0.16		0.62	0.70			0.74		0.52		0.49
Uniform Delay, d1		41.6		35.8	36.3			15.5		39.5		7.1
Progression Factor		1.00		1.00	1.00			1.03		1.00		1.00
Incremental Delay, d2		0.5		4.0	7.3			1.5		1.5		0.8
Delay (s)		42.0		39.8	43.6			17.6		41.0		7.9
Level of Service		D		D	D			B		D		A
Approach Delay (s)		42.0			42.3			17.6				10.1
Approach LOS		D			D			B				B
Intersection Summary												
HCM Average Control Delay	17.7		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	90.0				Sum of lost time (s)				16.0			
Intersection Capacity Utilization	77.7%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

Existing+Project AM
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.99	1.00	0.98	1.00	0.98	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3432	1770	3398	1770	3441	1770	3353	1770	3353	1770	3353
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3432	1770	3398	1770	3441	1770	3353	1770	3353	1770	3353
Volume (vph)	450	533	86	101	677	209	107	591	99	140	509	143
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	469	555	90	105	705	218	111	616	103	146	530	149
RTOR Reduction (vph)	0	14	0	0	32	0	0	15	0	0	27	0
Lane Group Flow (vph)	469	631	0	105	891	0	111	704	0	146	652	0
Confl. Peds. (#/hr)	6		24	24		6	36		28	28		36
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	13.0	30.6		7.9	25.5		8.0	24.4		10.1	26.5	
Effective Green, g (s)	12.5	31.6		7.4	26.5		7.5	25.4		9.6	27.5	
Actuated g/C Ratio	0.14	0.35		0.08	0.29		0.08	0.28		0.11	0.31	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	477	1205		146	1001		148	971		189	1025	
v/s Ratio Prot	c0.14	0.18		0.06	c0.26		0.06	c0.20		c0.08	0.19	
v/s Ratio Perm												
v/c Ratio	0.98	0.52		0.72	0.89		0.75	0.72		0.77	0.64	
Uniform Delay, d1	38.6	23.2		40.3	30.4		40.3	29.1		39.1	26.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.11	0.82	
Incremental Delay, d2	36.5	0.2		13.2	9.5		17.1	4.7		14.5	2.7	
Delay (s)	75.2	23.4		53.4	39.9		57.4	33.9		58.1	24.8	
Level of Service	E	C		D	D		E	C		E	C	
Approach Delay (s)		45.2			41.3			37.0			30.7	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM Average Control Delay	39.2		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	90.0				Sum of lost time (s)				16.0			
Intersection Capacity Utilization	79.3%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr Way

Existing+Project AM
1/21/2008

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)		4.0								4.0	4.0	
Lane Util. Factor		1.00								0.95	0.97	0.95
Frt		0.86								0.93	1.00	0.97
Flt Protected		1.00								1.00	0.95	1.00
Satd. Flow (prot)		1611								3285	3433	3447
Flt Permitted		1.00								0.95	0.95	1.00
Satd. Flow (perm)		1611								3116	3433	3447
Volume (vph)	0	0	7	0	0	0	7	322	297	1585	269	56
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)	0	0	8	0	0	0	8	350	323	1723	292	61
RTOR Reduction (vph)	0	8	0	0	0	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	657	0	1723	353	0
Turn Type										Prot		
Protected Phases										2	1	6
Permitted Phases												
Actuated Green, G (s)		0.0						8.0		29.0	45.0	
Effective Green, g (s)		0.0						8.0		29.0	45.0	
Actuated g/C Ratio		0.00						0.18		0.64	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						554		2212	3447	
v/s Ratio Prot										c0.50	0.10	
v/s Ratio Perm												
v/c Ratio		0.00						11.14dr		0.78	0.10	
Uniform Delay, d1		22.5						18.5		5.7	0.0	
Progression Factor		1.00						0.76		1.00	1.00	
Incremental Delay, d2		0.0						100.0		2.8	0.1	
Delay (s)		22.5						114.1		8.5	0.1	
Level of Service		C						F		A	A	
Approach Delay (s)		22.5			0.0			114.1		7.1		
Approach LOS		C			A			F		A		
Intersection Summary												
HCM Average Control Delay	33.5		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	45.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	77.2%		ICU Level of Service				D					
Analysis Period (min)	15											
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr Way

Existing+Project AM
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.97			0.96			0.98			0.99		
Flpb, ped/bikes	0.97			0.96			1.00			1.00		
Frt	0.98			0.94			0.98			0.99		
Flt Protected	0.98			0.98			1.00			1.00		
Satd. Flow (prot)	1674			1596			3393			3459		
Flt Permitted	0.80			0.88			0.92			0.88		
Satd. Flow (perm)	1364			1419			3144			3048		
Volume (vph)	69	50	24	51	44	72	24	468	80	41	423	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	77	56	27	57	49	80	27	520	89	46	470	31
RTOR Reduction (vph)	0	16	0	0	53	0	0	29	0	0	10	0
Lane Group Flow (vph)	0	144	0	0	133	0	0	607	0	0	537	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.0			15.0			22.0			22.0		
Effective Green, g (s)	15.0			15.0			22.0			22.0		
Actuated g/C Ratio	0.33			0.33			0.49			0.49		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Lane Grp Cap (vph)	455			473			1537			1490		
v/s Ratio Prot												
v/s Ratio Perm	c0.11			0.09			c0.19			0.18		
v/c Ratio	0.32			0.28			0.39			0.36		
Uniform Delay, d1	11.2			11.0			7.3			7.1		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	1.8			1.5			0.8			0.7		
Delay (s)	13.0			12.5			8.0			7.8		
Level of Service	B			B			A			A		
Approach Delay (s)	13.0			12.5			8.0			7.8		
Approach LOS	B			B			A			A		
Intersection Summary												
HCM Average Control Delay	9.0			HCM Level of Service		A						
HCM Volume to Capacity ratio	0.36											
Actuated Cycle Length (s)	45.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	60.5%		ICU Level of Service		B							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

Existing+Project AM
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.96			0.96			0.99			0.98		
Flpb, ped/bikes	0.97			0.98			1.00			1.00		
Frt	0.96			0.96			0.99			0.99		
Flt Protected	0.99			0.99			1.00			1.00		
Satd. Flow (prot)	1641			1658			3456			4887		
Flt Permitted	0.82			0.83			0.91			0.81		
Satd. Flow (perm)	1366			1392			3134			3979		
Volume (vph)	51	74	52	29	57	36	22	943	47	61	991	83
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	82	58	32	63	40	24	1048	52	68	1101	92
RTOR Reduction (vph)	0	24	0	0	25	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	173	0	0	110	0	0	1122	0	0	1256	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			6		
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	13.1			13.1			62.9			62.9		
Effective Green, g (s)	13.6			13.6			63.4			63.4		
Actuated g/C Ratio	0.16			0.16			0.75			0.75		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	2.0			2.0			2.0			2.0		
Lane Grp Cap (vph)	219			223			2338			2968		
v/s Ratio Prot												
v/s Ratio Perm	c0.13			0.08			c0.36			0.32		
v/c Ratio	0.79			0.49			0.48			0.42		
Uniform Delay, d1	34.3			32.6			4.3			4.0		
Progression Factor	1.00			1.00			1.18			1.00		
Incremental Delay, d2	15.8			0.6			0.7			0.4		
Delay (s)	50.1			33.2			5.8			4.5		
Level of Service	D			C			A			A		
Approach Delay (s)	50.1			33.2			5.8			4.5		
Approach LOS	D			C			A			A		
Intersection Summary												
HCM Average Control Delay	9.7			HCM Level of Service		A						
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	88.6%		ICU Level of Service		E							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing+Project AM
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1731	3475		1757	3471		1766	1813		1734	1841	
Flt Permitted	0.32	1.00		0.47	1.00		0.62	1.00		0.63	1.00	
Satd. Flow (perm)	574	3475		862	3471		1145	1813		1148	1841	
Volume (vph)	19	300	35	28	454	43	82	160	26	88	187	15
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	21	330	38	31	499	47	90	176	29	97	205	16
RTOR Reduction (vph)	0	11	0	0	9	0	0	7	0	0	3	0
Lane Group Flow (vph)	21	357	0	31	537	0	90	198	0	97	218	0
Confl. Peds. (#/hr)	30		12	12		30	6		54	54		6
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	24.0	24.0		24.0	24.0		49.5	49.5		49.5	49.5	
Effective Green, g (s)	23.0	23.0		23.0	23.0		49.0	49.0		49.0	49.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.61	0.61		0.61	0.61	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	165	999		248	998		701	1110		703	1128	
v/s Ratio Prot	0.10		c0.15		c0.15		0.11		c0.12		c0.12	
v/s Ratio Perm	0.04		0.04		0.08		0.08		0.08		0.03	
v/c Ratio	0.13	0.36		0.12	0.54		0.13	0.18		0.14	0.19	
Uniform Delay, d1	21.1	22.6		21.1	24.0		6.5	6.7		6.6	6.8	
Progression Factor	1.00	1.00		0.91	0.97		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	1.0		1.0	2.0		0.4	0.4		0.4	0.4	
Delay (s)	22.7	23.6		20.1	25.5		6.9	7.1		7.0	7.2	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)	23.6		25.2		25.2		7.0		7.1		7.1	
Approach LOS	C		C		C		A		A		A	

Intersection Summary			
HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing+Project AM
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.99	0.99	
Satd. Flow (prot)	1759	3460		1736	3518		3354	3373		3354	3373	
Flt Permitted	0.44	1.00		0.47	1.00		0.85	0.90		0.85	0.90	
Satd. Flow (perm)	808	3460		852	3518		2882	3055		2882	3055	
Volume (vph)	15	376	48	32	453	16	61	101	45	19	66	25
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)	16	396	51	34	477	17	64	106	47	20	69	26
RTOR Reduction (vph)	0	12	0	0	3	0	0	28	0	0	15	0
Lane Group Flow (vph)	16	435	0	34	491	0	0	189	0	0	100	0
Confl. Peds. (#/hr)	18		54	54		18	4		18	18		4
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	38.0	38.0		38.0	38.0		32.0	32.0		32.0	32.0	
Effective Green, g (s)	39.0	39.0		39.0	39.0		33.0	33.0		33.0	33.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.41	0.41		0.41	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	394	1687		415	1715		1189	1260		1189	1260	
v/s Ratio Prot	0.13		c0.14		c0.14		c0.07		c0.07		0.03	
v/s Ratio Perm	0.02		0.04		0.04		0.07		0.07		0.03	
v/c Ratio	0.04	0.26		0.08	0.29		0.16	0.08		0.16	0.08	
Uniform Delay, d1	10.7	12.0		10.9	12.2		14.8	14.3		14.8	14.3	
Progression Factor	0.91	1.04		1.38	1.43		0.40	1.00		0.40	1.00	
Incremental Delay, d2	0.2	0.4		0.4	0.4		0.3	0.1		0.3	0.1	
Delay (s)	10.0	12.9		15.5	17.9		6.2	14.4		6.2	14.4	
Level of Service	A	B		B	B		A	B		A	B	
Approach Delay (s)	12.8		17.8		17.8		6.2		6.2		14.4	
Approach LOS	B		B		B		A		A		B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr Way

Existing+Project AM
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1759	3496		1729	3402			3396			3435	
Flt Permitted	0.41	1.00		0.48	1.00			0.90			0.81	
Satd. Flow (perm)	759	3496		876	3402			3087			2819	
Volume (vph)	31	389	25	89	414	112	30	226	62	71	217	29
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	32	405	26	93	431	117	31	235	65	74	226	30
RTOR Reduction (vph)	0	6	0	0	31	0	0	27	0	0	9	0
Lane Group Flow (vph)	32	425	0	93	517	0	0	304	0	0	321	0
Confl. Peds. (#/hr)	13		71	71		13	22		22	22		22
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.5	41.5		41.5	41.5			32.0			32.0	
Effective Green, g (s)	41.0	41.0		41.0	41.0			31.0			31.0	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.39			0.39	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	389	1792		449	1744			1196			1092	
v/s Ratio Prot		0.12			c0.15							
v/s Ratio Perm	0.04			0.11				0.10			c0.11	
v/c Ratio	0.08	0.24		0.21	0.30			0.25			0.29	
Uniform Delay, d1	9.9	10.8		10.6	11.2			16.6			16.9	
Progression Factor	1.33	1.43		1.00	1.00			0.70			1.00	
Incremental Delay, d2	0.4	0.3		1.0	0.4			0.5			0.7	
Delay (s)	13.6	15.8		11.7	11.6			12.2			17.6	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		15.6			11.6			12.2			17.6	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM Average Control Delay		13.9										B
HCM Volume to Capacity ratio		0.30										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		101.6%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

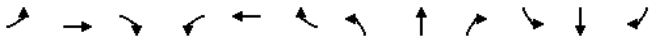
HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

Existing+Project AM
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.91		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.97		1.00	1.00	0.96	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3130		1770	3539	1733	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3130		1770	3539	1733	
Volume (vph)	432	94	73	501	116	41
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	475	103	80	551	127	45
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	578	0	80	551	172	0
Confl. Peds. (#/hr)		146	266			
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	48.0		12.8	64.8	12.2	
Effective Green, g (s)	48.0		12.8	64.8	12.2	
Actuated g/C Ratio	0.56		0.15	0.76	0.14	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1768		267	2698	249	
v/s Ratio Prot	c0.18		c0.05	0.16	c0.10	
v/s Ratio Perm						
v/c Ratio	0.33		0.30	0.20	0.69	
Uniform Delay, d1	9.9		32.1	2.8	34.6	
Progression Factor	1.00		0.89	0.55	1.12	
Incremental Delay, d2	0.5		0.5	0.1	8.0	
Delay (s)	10.4		29.0	1.7	46.8	
Level of Service	B		C	A	D	
Approach Delay (s)	10.4			5.2	46.8	
Approach LOS	B			A	D	
Intersection Summary						
HCM Average Control Delay		12.5				B
HCM Volume to Capacity ratio		0.38				
Actuated Cycle Length (s)		85.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		39.2%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.


Existing+Project AM
1/21/2008



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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.97		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.93	1.00		0.92	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1650	3361		1628	3370		1770	3450		1770	3369	
Flt Permitted	0.33	1.00		0.35	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	577	3361		599	3370		1770	3450		1770	3369	
Volume (vph)	68	343	62	53	357	64	95	451	45	78	555	124
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	76	381	69	59	397	71	106	501	50	87	617	138
RTOR Reduction (vph)	0	19	0	0	19	0	0	7	0	0	17	0
Lane Group Flow (vph)	76	431	0	59	449	0	106	544	0	87	738	0
Confl. Peds. (#/hr)	72		137	137		72			58	58		92
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	19.6	19.6		19.6	19.6		8.3	45.0		6.9	43.6	
Effective Green, g (s)	20.1	20.1		20.1	20.1		8.8	45.5		7.4	44.1	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.10	0.54		0.09	0.52	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	136	795		142	797		183	1847		154	1748	
v/s Ratio Prot		0.13			c0.13		c0.06	0.16		0.05	c0.22	
v/s Ratio Perm	0.13		0.10									
v/c Ratio	0.56	0.54		0.42	0.56		0.58	0.29		0.56	0.42	
Uniform Delay, d1	28.5	28.4		27.5	28.6		36.3	10.9		37.3	12.6	
Progression Factor	0.56	0.60		1.00	1.00		0.73	1.37		1.25	0.77	
Incremental Delay, d2	2.7	0.4		0.7	0.5		2.7	0.4		2.5	0.7	
Delay (s)	18.7	17.6		28.2	29.1		29.2	15.3		49.1	10.3	
Level of Service	B	B		C	C		C	B		D	B	
Approach Delay (s)		17.7			29.0			17.5			14.3	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM Average Control Delay	18.9		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.48											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	59.7%		ICU Level of Service				B					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

Existing+Project AM
1/21/2008



Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	↔	↔	↕	↔	↔	↕	
Sign Control	Stop		Free		Free	Free	
Grade	0%		0%		0%	0%	
Volume (veh/h)	11	35	581	9	15	688	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	12	39	646	10	17	764	
Pedestrians	34		33		34	34	
Lane Width (ft)	12.0		12.0		12.0	12.0	
Walking Speed (ft/s)	4.0		4.0		4.0	4.0	
Percent Blockage	3		3		3	3	
Right turn flare (veh)							
Median type	None						
Median storage (veh)							
Upstream signal (ft)			230			471	
pX, platoon unblocked	0.89	0.97			0.97		
vC, conflicting volume	1133	396			690		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	929	349			651		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	94	93			98		
cM capacity (veh/h)	220	594			879		
Direction, Lane #							
	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3	
Volume Total	51	430	225	17	382	382	
Volume Left	12	0	0	17	0	0	
Volume Right	39	0	10	0	0	0	
cSH	422	1700	1700	879	1700	1700	
Volume to Capacity	0.12	0.25	0.13	0.02	0.22	0.22	
Queue Length 95th (ft)	10	0	0	1	0	0	
Control Delay (s)	14.7	0.0	0.0	9.2	0.0	0.0	
Lane LOS	B			A			
Approach Delay (s)	14.7	0.0		0.2			
Approach LOS	B						
Intersection Summary							
Average Delay	0.6						
Intersection Capacity Utilization	36.3%		ICU Level of Service				A
Analysis Period (min)	15						

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

Existing+Project AM
1/21/2008

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)	4.0		4.0	4.0		4.0		4.0	4.0	4.0		
Lane Util. Factor	0.91		1.00	0.95		1.00		1.00	1.00	1.00		
Frbp, ped/bikes	1.00		1.00	1.00		0.99		1.00	1.00	1.00		
Flpb, ped/bikes	1.00		0.99	1.00		1.00		0.97	1.00	1.00		
Frt	0.99		1.00	0.97		0.98		1.00	0.99	1.00		
Flt Protected	0.99		0.95	1.00		0.99		0.95	1.00	1.00		
Satd. Flow (prot)	4986		1754	3419		1775		1725	1842	1842		
Flt Permitted	0.88		0.53	1.00		0.88		0.44	1.00	1.00		
Satd. Flow (perm)	4407		976	3419		1579		801	1842	1842		
Volume (vph)	34	272	25	51	276	67	58	174	49	64	188	12
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)	37	296	27	55	300	73	63	189	53	70	204	13
RTOR Reduction (vph)	0	10	0	0	25	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	350	0	55	348	0	0	296	0	70	214	0
Confl. Peds. (#/hr)	24		18	18		24		24	48	48		24
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	51.0		51.0		51.0		24.0		24.0		24.0	
Effective Green, g (s)	52.0		52.0		52.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2696		597		2092		464		236		542	
v/s Ratio Prot			c0.10						0.12			
v/s Ratio Perm	0.08		0.06				c0.19		0.09			
v/c Ratio	0.13		0.09		0.17		0.64		0.30		0.40	
Uniform Delay, d1	7.0		6.8		7.1		26.1		23.2		24.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.1		0.3		0.2		6.6		3.2		2.2	
Delay (s)	7.1		7.1		7.3		32.6		26.4		26.1	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	7.1		7.3				32.6		26.2			
Approach LOS	A		A				C		C			
Intersection Summary												
HCM Average Control Delay	16.8		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.32											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	92.5%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

Existing+Project AM
1/21/2008

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)	4.0		4.0	4.0		4.0		4.0	4.0	4.0		4.0
Lane Util. Factor	0.91		1.00	0.91		1.00		1.00	1.00	1.00		1.00
Frbp, ped/bikes	1.00		1.00	1.00		0.99		1.00	1.00	1.00		1.00
Flpb, ped/bikes	1.00		1.00	1.00		0.99		1.00	1.00	0.99		1.00
Frt	1.00		0.99	1.00		0.96		1.00	0.99	1.00		0.99
Flt Protected	1.00		0.95	1.00		0.95		1.00	0.95	1.00		1.00
Satd. Flow (prot)	5050		1750	1782		1746		1837	1837	1837		
Flt Permitted	0.90		0.63	1.00		0.45		1.00	1.00	1.00		
Satd. Flow (perm)	4560		976	3419		1579		801	1842	1842		
Volume (vph)	25	376	7	34	340	33	30	170	53	23	119	10
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)	27	409	8	37	370	36	33	185	58	25	129	11
RTOR Reduction (vph)	0	2	0	0	13	0	0	14	0	0	4	0
Lane Group Flow (vph)	0	442	0	0	430	0	33	229	0	25	136	0
Confl. Peds. (#/hr)	24		18	18		12		18	18	12		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	50.0		50.0		19.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2936		2842		300		457		212		471	
v/s Ratio Prot			c0.13						0.07			
v/s Ratio Perm	0.10		c0.10		0.03		0.03		0.03			
v/c Ratio	0.15		0.15		0.11		0.50		0.12		0.29	
Uniform Delay, d1	5.6		5.6		22.8		25.4		22.8		23.9	
Progression Factor	1.00		0.80		1.00		1.00		0.96		0.96	
Incremental Delay, d2	0.1		0.1		0.7		3.9		1.1		1.5	
Delay (s)	5.7		4.6		23.5		29.3		23.0		24.4	
Level of Service	A		A		C		C		C		C	
Approach Delay (s)	5.7		4.6		28.6		24.2		24.2			
Approach LOS	A		A		C		C		C			
Intersection Summary												
HCM Average Control Delay	12.4		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.25											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	51.3%		ICU Level of Service		A							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr Way

Existing+Project AM
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frbp, ped/bikes	1.00			1.00			1.00			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.97			0.98			0.98		
Flt Protected	1.00			1.00			1.00			0.99		
Satd. Flow (prot)	5003			4863			3426			3421		
Flt Permitted	0.85			0.86			0.92			0.84		
Satd. Flow (perm)	4267			4215			3153			2910		
Volume (vph)	45	389	28	46	363	122	15	156	31	61	209	37
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)	49	423	30	50	395	133	16	170	34	66	227	40
RTOR Reduction (vph)	0	9	0	0	47	0	0	19	0	0	13	0
Lane Group Flow (vph)	0	493	0	0	531	0	0	201	0	0	320	0
Confl. Peds. (#/hr)	17		19	19		17	12		16	16		12
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.0			50.0			19.0			19.0		
Effective Green, g (s)	51.5			51.5			20.5			20.5		
Actuated g/C Ratio	0.64			0.64			0.26			0.26		
Clearance Time (s)	5.5			5.5			5.5			5.5		
Lane Grp Cap (vph)	2747			2713			808			746		
v/s Ratio Prot												
v/s Ratio Perm	0.12			c0.13			0.06			c0.11		
v/c Ratio	0.18			0.20			0.25			0.43		
Uniform Delay, d1	5.7			5.8			23.6			24.9		
Progression Factor	0.80			1.00			1.00			0.53		
Incremental Delay, d2	0.1			0.2			0.7			1.8		
Delay (s)	4.7			6.0			24.4			14.9		
Level of Service	A			A			C			B		
Approach Delay (s)	4.7			6.0			24.4			14.9		
Approach LOS	A			A			C			B		

Intersection Summary

HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

Existing+Project AM
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frbp, ped/bikes	1.00			0.95			1.00			0.95		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	1.00			0.97			0.93			0.93		
Flt Protected	1.00			1.00			0.98			0.98		
Satd. Flow (prot)	5062			4715			1695			1617		
Flt Permitted	0.91			0.93			0.90			0.83		
Satd. Flow (perm)	4638			4391			1556			1372		
Volume (vph)	16	477	10	10	470	100	10	0	10	58	0	55
Peak-hour factor, PHF	0.90	0.90	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.90	0.92	0.90
Adj. Flow (vph)	18	530	11	11	522	111	11	0	11	64	0	61
RTOR Reduction (vph)	0	1	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	558	0	0	644	0	0	12	0	0	125	0
Confl. Peds. (#/hr)						98						98
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	65.5			65.5			11.5			11.5		
Effective Green, g (s)	65.5			65.5			11.5			11.5		
Actuated g/C Ratio	0.77			0.77			0.14			0.14		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	3574			3384			211			186		
v/s Ratio Prot												
v/s Ratio Perm	0.12			c0.15			0.01			c0.09		
v/c Ratio	0.16			0.19			0.06			0.67		
Uniform Delay, d1	2.5			2.6			32.0			35.0		
Progression Factor	1.00			0.87			1.00			1.05		
Incremental Delay, d2	0.1			0.1			0.1			8.9		
Delay (s)	2.6			2.4			32.2			45.5		
Level of Service	A			A			C			D		
Approach Delay (s)	2.6			2.4			32.2			45.5		
Approach LOS	A			A			C			D		

Intersection Summary

HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

Existing+Project AM
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			1.00		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.97			0.97			1.00			0.98		
Flt Protected	0.99			0.99			0.95			1.00		
Satd. Flow (prot)	4869			4823			1753			3471		
Flt Permitted	0.69			0.74			0.38			1.00		
Satd. Flow (perm)	3386			3583			700			3471		
Volume (vph)	109	337	94	79	382	132	60	348	39	100	475	134
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)	118	366	102	86	415	143	65	378	42	109	516	146
RTOR Reduction (vph)	0	55	0	0	108	0	0	5	0	0	15	0
Lane Group Flow (vph)	0	531	0	0	536	0	65	415	0	109	647	0
Confl. Peds. (#/hr)	40		9		40		25		31		31	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	19.2		19.2		55.3		55.3		55.3		55.3	
Effective Green, g (s)	20.7		20.7		56.3		56.3		56.3		56.3	
Actuated g/C Ratio	0.24		0.24		0.66		0.66		0.66		0.66	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	825		873		464		2299		614		2248	
v/s Ratio Prot					0.12		0.19					
v/s Ratio Perm	c0.16		0.15		0.09		0.12		0.12		c0.19	
v/c Ratio	0.64		0.61		0.14		0.18		0.18		0.29	
Uniform Delay, d1	28.8		28.6		5.3		5.5		5.5		6.0	
Progression Factor	0.85		1.00		1.26		1.22		0.24		0.18	
Incremental Delay, d2	1.3		0.9		0.6		0.2		0.6		0.3	
Delay (s)	25.7		29.5		7.4		6.9		1.9		1.4	
Level of Service	C		C		A		A		A		A	
Approach Delay (s)	25.7		29.5		7.0		1.5		1.5		1.5	
Approach LOS	C		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	15.5		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.38											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	70.3%		ICU Level of Service				C					
Analysis Period (min)	15											
c Critical Lane Group												

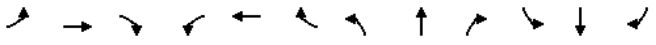
HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

Existing+Project AM
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.93			1.00		
Frt	1.00			0.98			1.00			0.85		
Flt Protected	1.00			1.00			0.96			1.00		
Satd. Flow (prot)	5042			4928			1664			1395		
Flt Permitted	0.89			0.91			0.84			1.00		
Satd. Flow (perm)	4494			4493			1458			1395		
Volume (vph)	25	469	9	24	569	75	14	4	13	47	1	41
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	515	10	26	625	82	15	4	14	52	1	45
RTOR Reduction (vph)	0	2	0	0	20	0	0	0	10	0	32	0
Lane Group Flow (vph)	0	550	0	0	713	0	0	19	4	0	66	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		2		6		6	
Actuated Green, G (s)	48.0		48.0		23.0		23.0		23.0		23.0	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lane Grp Cap (vph)	2724		2724		428		410		395		395	
v/s Ratio Prot					0.01		0.00		c0.05			
v/s Ratio Perm	0.12		c0.16		0.01		0.00		c0.05		c0.19	
v/c Ratio	0.20		0.26		0.04		0.01		0.17		0.17	
Uniform Delay, d1	7.1		7.4		20.2		20.0		21.0		21.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.2		0.2		0.2		0.0		0.9		0.9	
Delay (s)	7.2		7.6		20.4		20.1		21.9		21.9	
Level of Service	A		A		C		C		C		C	
Approach Delay (s)	7.2		7.6		20.3		21.9		21.9		21.9	
Approach LOS	A		A		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	8.7		HCM Level of Service				A					
HCM Volume to Capacity ratio	0.23											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	81.7%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway


Existing+Project AM
1/21/2008



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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.94		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4943		1770	4737		1770	4943		1770	4981	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4943		1770	4737		1770	4943		1770	4981	
Volume (vph)	70	410	55	112	436	253	89	260	42	226	522	64
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	456	61	124	484	281	99	289	47	251	580	71
RTOR Reduction (vph)	0	18	0	0	111	0	0	25	0	0	17	0
Lane Group Flow (vph)	78	499	0	124	654	0	99	312	0	251	634	0
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	4		3	4		1	2		1	2	
Permitted Phases												
Actuated Green, G (s)	10.5	26.5		10.5	26.5		9.0	26.0		9.0	26.0	
Effective Green, g (s)	10.5	27.5		10.5	27.5		9.0	27.0		9.0	27.0	
Actuated g/C Ratio	0.12	0.31		0.12	0.31		0.10	0.30		0.10	0.30	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	207	1510		207	1447		177	1483		177	1494	
v/s Ratio Prot	0.04	0.10		c0.07	c0.14		0.06	0.06		c0.14	c0.13	
v/s Ratio Perm												
v/c Ratio	0.38	0.33		0.60	0.45		0.56	0.21		1.42	0.42	
Uniform Delay, d1	36.7	24.1		37.8	25.2		38.6	23.5		40.5	25.3	
Progression Factor	1.00	1.00		0.97	2.02		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.6		2.4	0.8		2.2	0.3		217.9	0.9	
Delay (s)	37.1	24.7		39.2	51.6		40.8	23.9		258.4	26.2	
Level of Service	D	C		D	D		D	C		F	C	
Approach Delay (s)		26.4			49.8			27.7			90.8	
Approach LOS		C			D			C			F	
Intersection Summary												
HCM Average Control Delay	54.6		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.58											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	72.9%		ICU Level of Service				C					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
23: 34th St & Telegraph Ave.

Existing+Project AM
1/21/2008



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)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		0.95	0.95	
Frpb, ped/bikes		0.93			0.95			1.00		0.99	0.99	
Flpb, ped/bikes		0.97			0.96			0.91		1.00	0.92	
Frt		0.95			0.94			1.00		0.99	0.99	
Flt Protected		0.98			0.99			0.95		1.00	0.95	
Satd. Flow (prot)		1570			1592			1610		3486	1635	
Flt Permitted		0.73			0.90			0.49		1.00	0.43	
Satd. Flow (perm)		1163			1449			828		3486	748	
Volume (vph)		27	19	26	25	34	42	54	507	24	24	384
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
Adj. Flow (vph)		29	21	28	27	37	46	59	551	26	26	417
RTOR Reduction (vph)		0	26	0	0	39	0	0	2	0	0	4
Lane Group Flow (vph)		0	52	0	0	71	0	59	575	0	26	453
Confl. Peds. (#/hr)		100		100	100		100	100		100	100	100
Turn Type		Perm			Perm			Perm			Perm	
Protected Phases		4			4			2		2		6
Permitted Phases		4			4			2		2		6
Actuated Green, G (s)		7.3			7.3			70.7	70.7		70.7	70.7
Effective Green, g (s)		6.8			6.8			70.2	70.2		70.2	70.2
Actuated g/C Ratio		0.08			0.08			0.83	0.83		0.83	0.83
Clearance Time (s)		3.5			3.5			3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		93			116			684	2879		618	2838
v/s Ratio Prot								c0.16				0.13
v/s Ratio Perm		0.04			c0.05			0.07			0.03	
v/c Ratio		0.56			0.62			0.09	0.20		0.04	0.16
Uniform Delay, d1		37.7			37.8			1.4	1.5		1.3	1.5
Progression Factor		1.00			1.00			0.45	0.43		0.65	0.65
Incremental Delay, d2		4.6			6.6			0.2	0.1		0.1	0.1
Delay (s)		42.2			44.5			0.8	0.8		1.0	1.1
Level of Service		D			D			A	A		A	A
Approach Delay (s)		42.2			44.5			0.8			1.1	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM Average Control Delay	7.1		HCM Level of Service				A					
HCM Volume to Capacity ratio	0.24											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	54.6%		ICU Level of Service				A					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
24: 27th St & Telegraph Ave.

Existing+Project AM
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.94		1.00	0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.93	1.00		0.95	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3330		1770	3191		1647	3464		1675	3209	
Flt Permitted	0.95	1.00		0.95	1.00		0.41	1.00		0.50	1.00	
Satd. Flow (perm)	1770	3330		1770	3191		710	3464		883	3209	
Volume (vph)	255	350	97	50	270	105	58	322	30	47	338	141
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	283	389	108	56	300	117	64	358	33	52	376	157
RTOR Reduction (vph)	0	28	0	0	55	0	0	7	0	0	43	0
Lane Group Flow (vph)	283	469	0	56	362	0	64	384	0	52	490	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot		Prot		Perm		Perm		Perm		Perm	
Protected Phases	7	4		3	8			2				6
Permitted Phases								2				6
Actuated Green, G (s)	16.5	26.7		4.9	15.1		39.9	39.9		39.9	39.9	
Effective Green, g (s)	17.0	26.2		5.4	14.6		41.4	41.4		41.4	41.4	
Actuated g/C Ratio	0.20	0.31		0.06	0.17		0.49	0.49		0.49	0.49	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	354	1026		112	548		346	1687		430	1563	
v/s Ratio Prot	c0.16	0.14		0.03	c0.11			0.11			c0.15	
v/s Ratio Perm							0.09			0.06		
v/c Ratio	0.80	0.46		0.50	0.66		0.18	0.23		0.12	0.31	
Uniform Delay, d1	32.4	23.7		38.5	32.9		12.3	12.6		11.9	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.71	0.68	
Incremental Delay, d2	11.2	0.1		1.3	2.3		1.2	0.3		0.6	0.5	
Delay (s)	43.6	23.8		39.8	35.2		13.5	12.9		9.0	9.4	
Level of Service	D	C		D	D		B	B		A	A	
Approach Delay (s)		31.0			35.8			13.0			9.4	
Approach LOS		C			D			B			A	
Intersection Summary												
HCM Average Control Delay		22.9										C
HCM Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		85.0						12.0				12.0
Intersection Capacity Utilization		72.3%										A
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

Existing+Project AM
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.98	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1670		1770	3539	3482	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1670		1770	3539	3482	
Volume (vph)	67	126	58	558	597	73
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	137	63	607	649	79
RTOR Reduction (vph)	81	0	0	0	10	0
Lane Group Flow (vph)	129	0	63	607	718	0
Turn Type	Prot					
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	30.2		7.1	46.8	35.7	
Effective Green, g (s)	30.2		7.1	46.8	35.7	
Actuated g/C Ratio	0.36		0.08	0.55	0.42	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	593		148	1949	1462	
v/s Ratio Prot	c0.08		c0.04	0.17	c0.21	
v/s Ratio Perm						
v/c Ratio	0.22		0.43	0.31	0.49	
Uniform Delay, d1	19.1		37.0	10.4	18.0	
Progression Factor	1.00		1.15	0.47	1.09	
Incremental Delay, d2	0.8		1.9	0.4	1.1	
Delay (s)	20.0		44.4	5.3	20.7	
Level of Service	B		D	A	C	
Approach Delay (s)	20.0			9.0	20.7	
Approach LOS	B			A	C	
Intersection Summary						
HCM Average Control Delay			15.7			HCM Level of Service B
HCM Volume to Capacity ratio			0.37			
Actuated Cycle Length (s)			85.0			Sum of lost time (s) 12.0
Intersection Capacity Utilization			43.6%			ICU Level of Service A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
1: 52nd Street & Shattuck Avenue

Existing PM + Project
1/24/2008

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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.98	
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4930		1770	4971		2006	2001		1956	1917	
Flt Permitted	0.95	1.00		0.95	1.00		0.13	1.00		0.56	1.00	
Satd. Flow (perm)	1770	4930		1770	4971		269	2001		1159	1917	
Volume (vph)	322	1228	174	80	958	138	165	232	79	133	265	259
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)	339	1293	183	84	1008	145	174	244	83	140	279	273
RTOR Reduction (vph)	0	17	0	0	18	0	0	13	0	0	36	0
Lane Group Flow (vph)	339	1459	0	84	1135	0	174	314	0	140	516	0
Confl. Peds. (#/hr)			32	32		4	12		24	24		12
Parking (#/hr)												0
Turn Type	Prot		Prot		pm+pt		Perm					
Protected Phases	7	4	3	8	5	2	6					
Permitted Phases							2					
Actuated Green, G (s)	20.0	40.0	7.7	27.7	41.8	41.8	28.9					
Effective Green, g (s)	20.0	40.0	7.7	27.7	42.3	42.3	29.4					
Actuated g/C Ratio	0.20	0.40	0.08	0.28	0.42	0.42	0.29					
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	2.5	2.5					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0					
Lane Grp Cap (vph)	354	1972	136	1377	303	846	341					
v/s Ratio Prot	c0.19	0.30	0.05	c0.23	c0.06	0.16	c0.27					
v/s Ratio Perm							0.18					
v/c Ratio	0.96	0.74	0.62	0.82	0.57	0.37	0.41					
Uniform Delay, d1	39.6	25.6	44.7	33.9	23.1	19.8	28.3					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
Incremental Delay, d2	36.4	2.5	8.1	5.7	2.6	0.3	0.8					
Delay (s)	75.9	28.1	52.8	39.6	25.7	20.0	29.1					
Level of Service	E	C	D	D	C	C	C					
Approach Delay (s)	37.0		40.5		22.0		48.6					
Approach LOS	D		D		C		D					
Intersection Summary												
HCM Average Control Delay	38.2		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	100.0				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											

HCM Signalized Intersection Capacity Analysis
2: 52nd Street & Telegraph Ave.

Existing PM + Project
1/24/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		0.95		0.95		0.95		1.00		0.95	
Frbp, ped/bikes	1.00		1.00		0.92		0.94		1.00		0.90	
Fipb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	0.92		1.00		0.92		0.97		1.00		0.95	
Flt Protected	0.98		0.95		1.00		1.00		0.95		1.00	
Satd. Flow (prot)	1688		1681		1494		3200		1770		3037	
Flt Permitted	0.48		0.73		1.00		0.94		0.95		1.00	
Satd. Flow (perm)	823		1296		1494		3012		1770		3037	
Volume (vph)	12	3	21	104	102	118	10	997	284	98	802	398
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)	13	3	22	109	107	124	11	1049	299	103	844	419
RTOR Reduction (vph)	0	21	0	0	45	0	0	20	0	0	47	0
Lane Group Flow (vph)	0	17	0	109	186	0	0	1339	0	103	1216	0
Confl. Peds. (#/hr)					100				100			
Turn Type	Perm		Perm		Perm		Prot					
Protected Phases	7		8		8		2		1			
Permitted Phases	7		8		2		6					
Actuated Green, G (s)	5.1		15.8		15.8		52.4		8.7			
Effective Green, g (s)	5.6		16.3		16.3		52.9		9.2			
Actuated g/C Ratio	0.06		0.16		0.16		0.53		0.09			
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5			
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0			
Lane Grp Cap (vph)	46		211		244		1593		163			
v/s Ratio Prot					c0.12				0.06			
v/s Ratio Perm	c0.02		0.08				c0.44					
v/c Ratio	0.37		0.52		0.76		0.84		0.63			
Uniform Delay, d1	45.5		38.2		40.0		20.0		43.8			
Progression Factor	1.00		1.00		1.00		0.80		1.00			
Incremental Delay, d2	1.9		0.9		11.9		3.1		5.8			
Delay (s)	47.4		39.1		51.9		18.9		49.5			
Level of Service	D		D		D		B		D			
Approach Delay (s)	47.4		47.8		18.9		13.9					
Approach LOS	D		D		B		B					
Intersection Summary												
HCM Average Control Delay	20.2		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	100.0				Sum of lost time (s)				16.0			
Intersection Capacity Utilization	102.5%		ICU Level of Service		G							
Analysis Period (min)	15											
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

Existing PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.95		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3429		1770	3221		1770	3357		1770	3434	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3429		1770	3221		1770	3357		1770	3434	
Volume (vph)	508	822	71	93	468	212	69	593	127	203	678	56
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)	535	865	75	98	493	223	73	624	134	214	714	59
RTOR Reduction (vph)	0	6	0	0	52	0	0	18	0	0	6	0
Lane Group Flow (vph)	535	934	0	98	664	0	73	740	0	214	767	0
Confl. Peds. (#/hr)			100			100			100			100
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	16.0	30.5		8.0	22.5		5.0	32.5		12.0	39.5	
Effective Green, g (s)	15.5	31.5		7.5	23.5		4.5	33.5		11.5	40.5	
Actuated g/C Ratio	0.16	0.32		0.08	0.24		0.04	0.34		0.12	0.40	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	532	1080		133	757		80	1125		204	1391	
v/s Ratio Prot	c0.16	c0.27		0.06	0.21		0.04	c0.22		c0.12	0.22	
v/s Ratio Perm												
v/c Ratio	1.01	0.86		0.74	0.88		0.91	0.66		1.05	0.55	
Uniform Delay, d1	42.2	32.2		45.3	36.9		47.6	28.4		44.2	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.17	0.79	
Incremental Delay, d2	40.4	7.1		16.6	10.9		70.5	3.0		70.9	1.3	
Delay (s)	82.7	39.4		61.9	47.7		118.0	31.4		122.7	19.4	
Level of Service	F	D		E	D		F	C		F	B	
Approach Delay (s)		55.1			49.4			39.0			41.8	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM Average Control Delay		47.5										D
HCM Volume to Capacity ratio		0.82										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		82.2%										E
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

Existing PM + Project
1/21/2008

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)		4.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		0.97	0.95	
Frt		0.86						0.93		1.00	0.97	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		1611						3289		3433	3442	
Flt Permitted		1.00						0.95		0.95	1.00	
Satd. Flow (perm)		1611						3112		3433	3442	
Volume (vph)	0	0	6	0	0	0	10	285	258	1430	287	64
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)	0	0	7	0	0	0	11	310	280	1554	312	70
RTOR Reduction (vph)	0	7	0	0	0	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	580	0	1554	382	0
Turn Type								Perm		Prot		
Protected Phases									2		1	6
Permitted Phases												
Actuated Green, G (s)		0.0						13.0		29.0	50.0	
Effective Green, g (s)		0.0						13.0		29.0	50.0	
Actuated g/C Ratio		0.00						0.26		0.58	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						809		1991	3442	
v/s Ratio Prot										c0.45	0.11	
v/s Ratio Perm								c0.19				
v/c Ratio		0.00						0.72		0.78	0.11	
Uniform Delay, d1		25.0						16.8		8.1	0.0	
Progression Factor		1.00						0.75		1.00	1.00	
Incremental Delay, d2		0.0						5.2		3.1	0.1	
Delay (s)		25.0						17.9		11.2	0.1	
Level of Service		C						B		B	A	
Approach Delay (s)		25.0			0.0			17.9			9.0	
Approach LOS		C			A			B			A	
Intersection Summary												
HCM Average Control Delay		11.1										B
HCM Volume to Capacity ratio		0.76										
Actuated Cycle Length (s)		50.0								8.0		
Intersection Capacity Utilization		70.6%										C
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

Existing PM + Project
1/21/2008

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)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.95			0.97			0.98			0.99	
Flpb, ped/bikes		0.98			0.96			1.00			0.99	
Frt		0.96			0.96			0.98			0.99	
Flt Protected		0.98			0.99			1.00			0.99	
Satd. Flow (prot)		1643			1649			3403			3438	
Flt Permitted		0.88			0.91			0.94			0.85	
Satd. Flow (perm)		1471			1519			3200			2957	
Volume (vph)	26	27	21	48	72	50	18	420	66	43	263	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	30	23	53	80	56	20	467	73	48	292	22
RTOR Reduction (vph)	0	15	0	0	30	0	0	24	0	0	10	0
Lane Group Flow (vph)	0	67	0	0	159	0	0	537	0	0	353	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	17.0		17.0		17.0		25.0		25.0		25.0	
Effective Green, g (s)	17.0		17.0		17.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.34		0.34		0.34		0.50		0.50		0.50	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	500		516		1600		1479					
v/s Ratio Prot												
v/s Ratio Perm	0.05		c0.10		c0.17		0.12					
v/c Ratio	0.13		0.31		0.34		0.24					
Uniform Delay, d1	11.4		12.2		7.5		7.1					
Progression Factor	1.00		1.00		1.00		1.00					
Incremental Delay, d2	0.6		1.5		0.6		0.4					
Delay (s)	12.0		13.7		8.1		7.5					
Level of Service	B		B		A		A					
Approach Delay (s)	12.0		13.7		8.1		7.5					
Approach LOS	B		B		A		A					
Intersection Summary												
HCM Average Control Delay	9.1		HCM Level of Service		A							
HCM Volume to Capacity ratio	0.32											
Actuated Cycle Length (s)	50.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	62.8%		ICU Level of Service		B							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

Existing PM + Project
1/21/2008

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)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			0.95			0.91	
Frpb, ped/bikes		0.96			0.96			0.99			0.98	
Flpb, ped/bikes		0.97			0.98			1.00			1.00	
Frt		0.96			0.97			0.99			0.99	
Flt Protected		0.98			0.99			1.00			1.00	
Satd. Flow (prot)		1631			1680			3475			4926	
Flt Permitted		0.86			0.86			0.91			0.91	
Satd. Flow (perm)		1420			1459			3180			4488	
Volume (vph)	46	49	39	19	41	21	24	1042	39	18	919	67
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	49	52	41	20	44	22	26	1109	41	19	978	71
RTOR Reduction (vph)	0	28	0	0	19	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	114	0	0	67	0	0	1175	0	0	1064	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		4		2		6		6	
Actuated Green, G (s)	8.6		8.6		8.6		62.4		62.4		62.4	
Effective Green, g (s)	9.1		9.1		9.1		62.9		62.9		62.9	
Actuated g/C Ratio	0.11		0.11		0.11		0.79		0.79		0.79	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	162		166		2500		3529					
v/s Ratio Prot												
v/s Ratio Perm	c0.08		0.05		c0.37		0.24					
v/c Ratio	0.70		0.40		0.47		0.30					
Uniform Delay, d1	34.1		32.9		2.9		2.4					
Progression Factor	1.00		1.00		1.36		1.00					
Incremental Delay, d2	10.6		0.6		0.5		0.2					
Delay (s)	44.8		33.5		4.5		2.6					
Level of Service	D		C		A		A					
Approach Delay (s)	44.8		33.5		4.5		2.6					
Approach LOS	D		C		A		A					
Intersection Summary												
HCM Average Control Delay	7.0		HCM Level of Service		A							
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	81.6%		ICU Level of Service		D							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing PM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.96	1.00	0.98	1.00	0.96	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1693	3486	1731	3401	1697	1822	1720	1830	1720	1830	1720	1830
Flt Permitted	0.29	1.00	0.24	1.00	0.56	1.00	0.37	1.00	0.37	1.00	0.37	1.00
Satd. Flow (perm)	523	3486	444	3401	992	1822	667	1830	667	1830	667	1830
Volume (vph)	26	671	45	44	546	84	109	389	43	93	222	19
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)	28	729	49	48	593	91	118	423	47	101	241	21
RTOR Reduction (vph)	0	6	0	0	15	0	5	0	0	0	4	0
Lane Group Flow (vph)	28	772	0	48	669	0	118	465	0	101	258	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	209	1394	178	1360	496	911	334	915	334	915	334	915
v/s Ratio Prot	c0.22		0.20		c0.26		0.14		0.15		0.14	
v/s Ratio Perm	0.05		0.11		0.12		0.15		0.15		0.15	
v/c Ratio	0.13	0.55	0.27	0.49	0.24	0.51	0.30	0.28	0.30	0.28	0.30	0.28
Uniform Delay, d1	15.2	18.5	16.1	17.9	11.4	13.4	11.8	11.6	11.8	11.6	11.8	11.6
Progression Factor	1.00	1.00	1.94	2.02	1.81	1.85	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	1.6	3.2	1.1	0.7	1.3	2.3	0.8	2.3	0.8	2.3	0.8
Delay (s)	16.5	20.1	34.4	37.3	21.2	26.1	14.1	12.4	14.1	12.4	14.1	12.4
Level of Service	B	C	C	D	C	C	B	B	B	B	B	B
Approach Delay (s)	20.0		37.1		25.1		12.9		12.9		12.9	
Approach LOS	B		D		C		B		B		B	
Intersection Summary												
HCM Average Control Delay	25.2		HCM Level of Service		C		C		C		C	
HCM Volume to Capacity ratio	0.53		0.53		0.53		0.53		0.53		0.53	
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	81.0%		ICU Level of Service		D		D		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West Street

Existing PM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.97	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1709	3471	1730	3494	1709	3471	3343	3337	3343	3337	3343	3337
Flt Permitted	0.25	1.00	0.16	1.00	0.84	1.00	0.84	0.91	0.84	0.91	0.84	0.91
Satd. Flow (perm)	450	3471	291	3494	2857	3494	2857	3043	2857	3043	2857	3043
Volume (vph)	26	769	60	29	615	31	74	165	44	19	96	33
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	27	793	62	30	634	32	76	170	45	20	99	34
RTOR Reduction (vph)	0	7	0	0	5	0	6	0	0	0	12	0
Lane Group Flow (vph)	27	848	0	30	661	0	285	0	0	141	0	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	24.0	24.0	24.0	24.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	141	1085	91	1092	1678	1678	1678	1788	1678	1788	1678	1788
v/s Ratio Prot	c0.24		0.19		c0.10		0.05		0.17		0.08	
v/s Ratio Perm	0.06		0.10		c0.10		0.05		0.17		0.08	
v/c Ratio	0.19	0.78	0.33	0.61	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Uniform Delay, d1	20.1	25.0	21.1	23.3	7.6	7.1	7.6	7.1	7.6	7.1	7.6	7.1
Progression Factor	0.45	0.50	0.87	0.89	1.25	1.00	1.25	1.00	1.25	1.00	1.25	1.00
Incremental Delay, d2	2.6	4.9	8.5	2.2	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1
Delay (s)	11.7	17.3	26.8	23.1	9.6	7.2	9.6	7.2	9.6	7.2	9.6	7.2
Level of Service	B	B	C	C	A	A	A	A	A	A	A	A
Approach Delay (s)	17.1		23.2		9.6		7.2		7.2		7.2	
Approach LOS	B		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	17.4		HCM Level of Service		B		B		B		B	
HCM Volume to Capacity ratio	0.38		0.38		0.38		0.38		0.38		0.38	
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	60.8%		ICU Level of Service		B		B		B		B	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

Existing PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1765	3482		1757	3431			3354			3433	
Flt Permitted	0.27	1.00		0.24	1.00			0.88			0.78	
Satd. Flow (perm)	510	3482		440	3431			2954			2724	
Volume (vph)	51	751	70	106	619	128	53	273	117	75	219	38
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	759	71	107	625	129	54	276	118	76	221	38
RTOR Reduction (vph)	0	9	0	0	22	0	0	45	0	0	12	0
Lane Group Flow (vph)	52	821	0	107	732	0	0	403	0	0	323	0
Confl. Peds. (#/hr)	8		39	39		8			25	25		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	35.5		35.5	35.5			38.0			38.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0			37.0			37.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.46			0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	223	1523		193	1501			1366			1260	
v/s Ratio Prot		0.24			0.21							
v/s Ratio Perm	0.10			c0.24				c0.14			0.12	
v/c Ratio	0.23	0.54		0.55	0.49			0.29			0.26	
Uniform Delay, d1	14.1	16.6		16.7	16.1			13.4			13.1	
Progression Factor	0.93	1.07		1.00	1.00			0.77			1.00	
Incremental Delay, d2	1.7	0.9		11.0	1.1			0.5			0.5	
Delay (s)	14.8	18.7		27.7	17.2			10.8			13.6	
Level of Service	B	B		C	B			B			B	
Approach Delay (s)		18.5			18.5			10.8			13.6	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM Average Control Delay	16.5		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.42											
Actuated Cycle Length (s)	80.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	87.0%		ICU Level of Service				E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

Existing PM + Project
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	0.94		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3255		1770	3539	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3255		1770	3539	1770	1583
Volume (vph)	840	109	52	737	120	46
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	866	112	54	760	124	47
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	978	0	54	760	124	47
Confl. Peds. (#/hr)		213	348			
Turn Type			Prot		Perm	
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	57.6		5.6	67.2	9.8	9.8
Effective Green, g (s)	57.6		5.6	67.2	9.8	9.8
Actuated g/C Ratio	0.68		0.07	0.79	0.12	0.12
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2206		117	2798	204	183
v/s Ratio Prot	c0.30		c0.03	0.21	c0.07	
v/s Ratio Perm						0.03
v/c Ratio	0.44		0.46	0.27	0.61	0.26
Uniform Delay, d1	6.3		38.2	2.4	35.8	34.3
Progression Factor	1.00		1.00	1.00	0.89	0.87
Incremental Delay, d2	0.6		2.9	0.2	5.0	0.7
Delay (s)	7.0		41.1	2.6	36.7	30.7
Level of Service	A		D	A	D	C
Approach Delay (s)	7.0			5.2	35.0	
Approach LOS	A			A	D	
Intersection Summary						
HCM Average Control Delay	8.7		HCM Level of Service		A	
HCM Volume to Capacity ratio	0.47					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	47.6%		ICU Level of Service		A	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

Existing PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.93	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1644	3419		1727	3367		1770	3466		1770	3362	
Flt Permitted	0.30	1.00		0.18	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	518	3419		323	3367		1770	3466		1770	3362	
Volume (vph)	128	659	99	36	472	76	186	868	82	103	618	136
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	672	101	37	482	78	190	886	84	105	631	139
RTOR Reduction (vph)	0	16	0	0	17	0	0	8	0	0	21	0
Lane Group Flow (vph)	131	757	0	37	543	0	190	962	0	105	749	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases	4		8		5		2		1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	22.0	22.0		22.0	22.0		11.5	36.6		7.9	33.0	
Effective Green, g (s)	22.5	22.5		22.5	22.5		12.0	37.1		8.4	33.5	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.15	0.46		0.11	0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	146	962		91	947		266	1607		186	1408	
v/s Ratio Prot		0.22		0.16			0.11	0.28		0.06	0.22	
v/s Ratio Perm	0.25		0.11									
v/c Ratio	0.90	0.79		0.41	0.57		0.71	0.60		0.56	0.53	
Uniform Delay, d1	27.6	26.5		23.3	24.6		32.4	15.9		34.1	17.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.94	1.03	
Incremental Delay, d2	44.2	4.0		1.1	0.5		7.4	1.7		2.3	1.4	
Delay (s)	71.8	30.5		24.4	25.2		39.7	17.6		34.1	19.2	
Level of Service	E	C		C	C		D	B		C	B	
Approach Delay (s)	36.5		25.1		21.2		21.0		21.0		21.0	
Approach LOS	D		C		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	25.7		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.73											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	72.5%		ICU Level of Service				C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

Existing PM + Project
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Volume (veh/h)	7	33	1070	31	15	806
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	8	37	1189	34	17	896
Pedestrians	52		52		45	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	4.0		4.0		4.0	
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230		503	
pX, platoon unblocked	0.91	0.88			0.88	
vC, conflicting volume	1791	709			1275	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1618	539			1180	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90		91		97	
cM capacity (veh/h)	76	396			497	
Direction, Lane #						
	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	44	793	431	17	448	448
Volume Left	8	0	0	17	0	0
Volume Right	37	0	34	0	0	0
cSH	227	1700	1700	497	1700	1700
Volume to Capacity	0.20	0.47	0.25	0.03	0.26	0.26
Queue Length 95th (ft)	18	0	0	3	0	0
Control Delay (s)	24.6	0.0	0.0	12.5	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	24.6	0.0	0.2		21.0	
Approach LOS	C		C		C	
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	48.9%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

Existing PM + Project
1/21/2008

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)	4.0		4.0	4.0		4.0		4.0	4.0	4.0		
Lane Util. Factor	0.91		1.00	0.95		1.00		1.00	1.00	1.00		
Frbp, ped/bikes	1.00		1.00	0.98		0.98		0.98	0.98	1.00		0.99
Flpb, ped/bikes	1.00		0.97	1.00		0.99		0.99	0.97	1.00		
Frt	0.99		1.00	0.95		0.98		0.98	1.00	0.99		
Flt Protected	0.99		0.95	1.00		0.99		0.99	0.95	1.00		
Satd. Flow (prot)	4984		1719	3287		1766		1714	1832			
Flt Permitted	0.80		0.33	1.00		0.82		0.27	1.00			
Satd. Flow (perm)	3996		591	3287		1449		482	1832			
Volume (vph)	112	629	27	64	326	168	58	364	84	65	288	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	114	642	28	65	333	171	59	371	86	66	294	20
RTOR Reduction (vph)	0	5	0	0	38	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	779	0	65	466	0	0	507	0	66	311	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	46.0		46.0		46.0		24.0		24.0		24.0	
Effective Green, g (s)	47.0		47.0		47.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.59		0.59		0.59		0.31		0.31		0.31	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2348		347		1931		453		151		573	
v/s Ratio Prot			0.14						0.17			
v/s Ratio Perm	c0.19		0.11				c0.35		0.14			
v/c Ratio	0.33		0.19		0.24		1.12		0.44		0.54	
Uniform Delay, d1	8.5		7.6		7.9		27.5		21.9		22.8	
Progression Factor	1.00		1.37		1.44		1.00		0.75		0.75	
Incremental Delay, d2	0.4		1.2		0.3		79.0		8.7		3.6	
Delay (s)	8.8		11.6		11.7		106.5		25.1		20.6	
Level of Service	A		B		B		F		C		C	
Approach Delay (s)	8.8		11.7				106.5		21.4			
Approach LOS	A		B				F		C			
Intersection Summary												
HCM Average Control Delay	34.1		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.61											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	138.5%		ICU Level of Service		H							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West Street

Existing PM + Project
1/21/2008

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)	4.0		4.0	4.0		4.0		4.0	4.0	4.0		4.0
Lane Util. Factor	0.91		1.00	0.91		1.00		1.00	1.00	1.00		1.00
Frbp, ped/bikes	0.99		0.99	0.99		1.00		0.97	1.00	1.00		0.98
Flpb, ped/bikes	1.00		0.99	0.99		0.91		1.00	0.94	1.00		
Frt	0.99		0.98	1.00		0.96		1.00	0.98	1.00		0.98
Flt Protected	1.00		0.99	0.95		1.00		0.95	1.00	1.00		
Satd. Flow (prot)	4969		4882	1605		1733		1658	1799			
Flt Permitted	0.88		0.80	0.63		1.00		0.36	1.00			
Satd. Flow (perm)	4397		3937	1057		1733		628	1799			
Volume (vph)	39	569	40	68	404	64	41	210	72	56	121	17
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)	41	599	42	72	425	67	43	221	76	59	127	18
RTOR Reduction (vph)	0	9	0	0	21	0	0	16	0	0	7	0
Lane Group Flow (vph)	0	673	0	0	543	0	43	281	0	59	138	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	2831		2534		271		444		161		461	
v/s Ratio Prot			c0.16						0.08			
v/s Ratio Perm	c0.15		0.14		0.04		0.09					
v/c Ratio	0.24		0.21		0.16		0.63		0.37		0.30	
Uniform Delay, d1	6.0		5.9		23.1		26.4		24.4		24.0	
Progression Factor	1.25		0.90		1.00		1.00		1.21		1.23	
Incremental Delay, d2	0.2		0.2		1.2		6.7		6.1		1.6	
Delay (s)	7.7		5.5		24.3		33.2		35.6		31.1	
Level of Service	A		A		C		C		D		C	
Approach Delay (s)	7.7		5.5		32.0		32.4					
Approach LOS	A		A		C		C					
Intersection Summary												
HCM Average Control Delay	14.4		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.35											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	87.0%		ICU Level of Service		E							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

Existing PM + Project
1/21/2008

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)	4.0				4.0				4.0			
Lane Util. Factor	0.91		0.91		0.95		0.95		0.95		0.95	
Frbp, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	0.99		0.96		0.96		0.98		0.98		0.98	
Flt Protected	1.00		1.00		0.99		0.99		0.99		0.99	
Satd. Flow (prot)	5019		4819		3363		3377		3377		3377	
Flt Permitted	0.83		0.85		0.86		0.73		0.73		0.73	
Satd. Flow (perm)	4206		4116		2900		2507		2507		2507	
Volume (vph)	61	621	34	48	422	195	39	181	72	121	212	66
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	62	627	34	48	426	197	39	183	73	122	214	67
RTOR Reduction (vph)	0	7	0	0	70	0	0	40	0	0	21	0
Lane Group Flow (vph)	0	716	0	0	601	0	0	255	0	0	382	0
Confl. Peds. (#/hr)	9		17	17		9	12		10	10		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		19.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2708		2650		743		642		642		642	
v/s Ratio Prot												
v/s Ratio Perm	c0.17		0.15		0.09		c0.15		c0.15		c0.15	
v/c Ratio	0.26		0.23		0.34		0.60		0.60		0.60	
Uniform Delay, d1	6.1		5.9		24.3		26.1		26.1		26.1	
Progression Factor	1.49		1.00		1.00		0.73		0.73		0.73	
Incremental Delay, d2	0.2		0.2		1.3		4.0		4.0		4.0	
Delay (s)	9.3		6.1		25.5		23.2		23.2		23.2	
Level of Service	A		A		C		C		C		C	
Approach Delay (s)	9.3		6.1		25.5		23.2		23.2		23.2	
Approach LOS	A		A		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	13.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.36											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	94.1%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

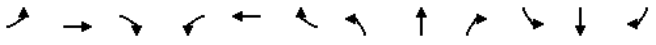
HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

Existing PM + Project
1/21/2008

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)	4.0				4.0				4.0			
Lane Util. Factor	0.91		0.91		1.00		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		0.99		1.00		0.95		0.95	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	1.00		0.98		0.93		0.92		0.92		0.92	
Flt Protected	1.00		1.00		0.98		0.98		0.98		0.98	
Satd. Flow (prot)	5061		4930		1695		1597		1597		1597	
Flt Permitted	0.83		0.92		0.85		0.86		0.86		0.86	
Satd. Flow (perm)	4206		4550		1474		1403		1403		1403	
Volume (vph)	80	763	0	10	475	57	10	0	10	128	0	193
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.96	0.96	0.92	0.92	0.92	0.96	0.92	0.96
Adj. Flow (vph)	83	795	0	11	495	59	11	0	11	133	0	201
RTOR Reduction (vph)	0	0	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	878	0	0	565	0	0	14	0	0	334	0
Confl. Peds. (#/hr)			79								79	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	52.4		52.4		24.6		24.6		24.6		24.6	
Effective Green, g (s)	52.4		52.4		24.6		24.6		24.6		24.6	
Actuated g/C Ratio	0.62		0.62		0.29		0.29		0.29		0.29	
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)	2593		2805		427		406		406		406	
v/s Ratio Prot												
v/s Ratio Perm	c0.21		0.12		0.01		c0.24		c0.24		c0.24	
v/c Ratio	0.34		0.20		0.03		0.82		0.82		0.82	
Uniform Delay, d1	7.9		7.1		21.7		28.2		28.2		28.2	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.4		0.2		0.0		12.5		12.5		12.5	
Delay (s)	8.3		7.3		21.7		40.6		40.6		40.6	
Level of Service	A		A		C		D		D		D	
Approach Delay (s)	8.3		7.3		21.7		40.6		40.6		40.6	
Approach LOS	A		A		C		D		D		D	
Intersection Summary												
HCM Average Control Delay	14.1		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.49											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	64.9%		ICU Level of Service				C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.


Existing PM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.98			1.00		
Frt	0.99			0.95			1.00			0.98		
Flt Protected	0.99			1.00			0.95			1.00		
Satd. Flow (prot)	4925			4748			1740			3426		
Flt Permitted	0.67			0.69			0.36			1.00		
Satd. Flow (perm)	3325			3269			666			3426		
Volume (vph)	224	594	81	61	358	195	100	737	98	134	567	46
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	249	660	90	68	398	217	111	819	109	149	630	51
RTOR Reduction (vph)	0	12	0	0	14	0	0	5	0	0	3	0
Lane Group Flow (vph)	0	987	0	0	669	0	111	923	0	149	678	0
Confl. Peds. (#/hr)	26		19		26		39		92		92	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	26.5		26.5		66.0		66.0		66.0		66.0	
Effective Green, g (s)	28.0		28.0		67.0		67.0		67.0		67.0	
Actuated g/C Ratio	0.27		0.27		0.65		0.65		0.65		0.65	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	904		889		433		2229		312		2266	
v/s Ratio Prot					0.27		0.19					
v/s Ratio Perm	c0.30		0.20		0.17		c0.31		0.19		0.06	
v/c Ratio	1.23dl		0.88dl		0.26		0.41		0.48		0.30	
Uniform Delay, d1	37.5		34.3		7.6		8.6		9.1		7.8	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	58.3		3.2		1.4		0.6		5.2		0.3	
Delay (s)	95.8		37.6		9.0		9.2		14.3		8.1	
Level of Service	F		D		A		A		B		A	
Approach Delay (s)	95.8		37.6		9.2		9.3		9.3		9.3	
Approach LOS	F		D		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	39.0		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	103.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	80.2%		ICU Level of Service		D							
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

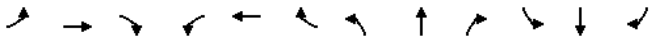
Existing PM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			1.00			0.89		
Flpb, ped/bikes	1.00			1.00			0.97			1.00		
Frt	0.99			0.99			1.00			0.85		
Flt Protected	1.00			0.99			0.98			1.00		
Satd. Flow (prot)	5022			4982			1777			1406		
Flt Permitted	0.89			0.77			0.86			1.00		
Satd. Flow (perm)	4498			3868			1561			1406		
Volume (vph)	36	771	30	82	530	28	53	92	191	33	33	68
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	36	779	30	83	535	28	54	93	193	33	33	69
RTOR Reduction (vph)	0	5	0	0	6	0	0	0	93	0	47	0
Lane Group Flow (vph)	0	840	0	0	640	0	0	147	100	0	88	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		2		6		6	
Actuated Green, G (s)	49.5		49.5		24.5		24.5		24.5		24.5	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	2727		2345		459		413		431		431	
v/s Ratio Prot					c0.09		0.07		0.06			
v/s Ratio Perm	c0.19		0.17		c0.09		0.07		0.06		0.06	
v/c Ratio	0.31		0.27		0.32		0.24		0.20		0.20	
Uniform Delay, d1	7.6		7.4		22.0		21.5		21.2		21.2	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.3		0.3		1.8		1.4		1.1		1.1	
Delay (s)	7.9		7.7		23.9		22.9		22.3		22.3	
Level of Service	A		A		C		C		C		C	
Approach Delay (s)	7.9		7.7		23.3		22.3		22.3		22.3	
Approach LOS	A		A		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	11.5		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.31											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	96.6%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway


Existing PM + Project
1/21/2008



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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0		
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91		
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	0.98		1.00	0.95		1.00	0.98		1.00	0.98		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1770	4940		1770	4742		1770	4932		1770	4933		
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (perm)	1770	4940		1770	4742		1770	4932		1770	4933		
Volume (vph)	187	689	84	81	376	210	167	653	106	307	377	63	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	205	757	92	89	413	231	184	718	116	337	414	69	
RTOR Reduction (vph)	0	15	0	0	100	0	0	22	0	0	23	0	
Lane Group Flow (vph)	205	834	0	89	544	0	184	812	0	337	460	0	
Confl. Peds. (#/hr)			81			22			50			43	
Turn Type	Prot			Prot			Prot			Prot			
Protected Phases	3	4		3	4		1	2		1	2		
Permitted Phases													
Actuated Green, G (s)	11.0	24.1		11.0	24.1		20.9	26.0		20.9	26.0		
Effective Green, g (s)	11.0	25.1		11.0	25.1		20.9	27.0		20.9	27.0		
Actuated g/C Ratio	0.11	0.25		0.11	0.25		0.21	0.27		0.21	0.27		
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		
Lane Grp Cap (vph)	195	1240		195	1190		370	1332		370	1332		
v/s Ratio Prot	c0.12	c0.17		0.05	0.11		0.10	c0.16		c0.19	0.09		
v/s Ratio Perm													
v/c Ratio	1.05	0.67		0.46	0.46		0.50	0.61		0.91	0.35		
Uniform Delay, d1	44.5	33.7		41.7	31.7		34.9	31.9		38.6	29.4		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	78.6	2.9		0.6	1.3		0.4	2.1		25.5	0.7		
Delay (s)	123.1	36.7		42.3	33.0		35.3	34.0		64.1	30.1		
Level of Service	F	D		D	C		D	C		E	C		
Approach Delay (s)		53.5			34.1			34.2			44.1		
Approach LOS		D			C			C			D		
Intersection Summary													
HCM Average Control Delay		42.0		HCM Level of Service				D					
HCM Volume to Capacity ratio		0.76											
Actuated Cycle Length (s)		100.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization		81.5%		ICU Level of Service				D					
Analysis Period (min)		15											

HCM Signalized Intersection Capacity Analysis
23: 34th St & Telegraph Ave.

Existing PM + Project
1/21/2008



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)		4.0			4.0		4.0	4.0		4.0	4.0		
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95		
Frpb, ped/bikes		0.94			0.97		1.00	0.99		1.00	0.99		
Flpb, ped/bikes		0.96			0.97		0.95	1.00		0.93	1.00		
Frt		0.95			0.96		1.00	0.99		1.00	0.99		
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1563			1657		1688	3468		1645	3454		
Flt Permitted		0.71			0.84		0.30	1.00		0.41	1.00		
Satd. Flow (perm)		1132			1418		538	3468		709	3454		
Volume (vph)		97	33	65	42	59	38	40	546	35	32	763	
Peak-hour factor, PHF		0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)		103	35	69	45	63	40	43	581	37	34	812	
RTOR Reduction (vph)		0	24	0	0	18	0	4	0	0	5	0	
Lane Group Flow (vph)		0	183	0	0	130	0	43	614	0	34	870	
Confl. Peds. (#/hr)		100		100	100		100	100		100	100		
Turn Type		Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			6		
Permitted Phases													
Actuated Green, G (s)		16.1			16.1			61.9	61.9		61.9	61.9	
Effective Green, g (s)		15.6			15.6			61.4	61.4		61.4	61.4	
Actuated g/C Ratio		0.18			0.18			0.72	0.72		0.72	0.72	
Clearance Time (s)		3.5			3.5			3.5	3.5		3.5	3.5	
Vehicle Extension (s)		2.0			2.0			2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		208			260			389	2505		512	2495	
v/s Ratio Prot								0.18				c0.25	
v/s Ratio Perm		c0.16			0.09			0.08			0.05		
v/c Ratio		0.88			0.50			0.11	0.25		0.07	0.35	
Uniform Delay, d1		33.8			31.2			3.6	4.0		3.4	4.4	
Progression Factor		1.00			1.00			0.99	0.89		1.00	1.00	
Incremental Delay, d2		30.5			0.6			0.5	0.2		0.2	0.4	
Delay (s)		64.3			31.7			4.1	3.8		3.7	4.8	
Level of Service		E			C			A	A		A	A	
Approach Delay (s)		64.3			31.7			3.8			4.7		
Approach LOS		E			C			A			A		
Intersection Summary													
HCM Average Control Delay		12.9		HCM Level of Service				B					
HCM Volume to Capacity ratio		0.46											
Actuated Cycle Length (s)		85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization		57.6%		ICU Level of Service				B					
Analysis Period (min)		15											

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

Existing PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.93	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.95	1.00		0.96	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3308		1770	3258		1690	3490		1696	3117	
Flt Permitted	0.95	1.00		0.95	1.00		0.29	1.00		0.42	1.00	
Satd. Flow (perm)	1770	3308		1770	3258		522	3490		742	3117	
Volume (vph)	127	316	100	56	383	112	113	504	29	105	480	294
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	130	322	102	57	391	114	115	514	30	107	490	300
RTOR Reduction (vph)	0	36	0	0	34	0	0	4	0	0	95	0
Lane Group Flow (vph)	130	388	0	57	471	0	115	540	0	107	695	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot		Prot		Perm		Perm					
Protected Phases	7	4		3	8			2			6	
Permitted Phases					2		6					
Actuated Green, G (s)	9.2	22.0		5.1	17.9		44.4	44.4		44.4	44.4	
Effective Green, g (s)	9.7	21.5		5.6	17.4		45.9	45.9		45.9	45.9	
Actuated g/C Ratio	0.11	0.25		0.07	0.20		0.54	0.54		0.54	0.54	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	202	837		117	667		282	1885		401	1683	
v/s Ratio Prot	c0.07	0.12		0.03	c0.14			0.15			c0.22	
v/s Ratio Perm					0.22		0.14					
v/c Ratio	0.64	0.46		0.49	0.71		0.41	0.29		0.27	0.41	
Uniform Delay, d1	36.0	26.9		38.3	31.4		11.5	10.6		10.5	11.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.18	1.33	
Incremental Delay, d2	5.2	0.1		1.2	2.8		4.3	0.4		1.5	0.7	
Delay (s)	41.2	27.0		39.5	34.2		15.9	11.0		13.9	16.1	
Level of Service	D	C		D	C		B	B		B	B	
Approach Delay (s)	30.3		34.7		11.9		15.8					
Approach LOS	C		C		B		B					
Intersection Summary												
HCM Average Control Delay	21.8		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	69.8%		ICU Level of Service				C					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

Existing PM + Project
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	0.91		1.00	1.00	0.94	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.91		1.00	1.00	0.98	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1521		1770	3539	3250	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1521		1770	3539	3250	
Volume (vph)	42	92	89	1069	615	118
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	44	96	93	1114	641	123
RTOR Reduction (vph)	87	0	0	0	11	0
Lane Group Flow (vph)	53	0	93	1114	753	0
Confl. Peds. (#/hr)	100	100	100			100
Turn Type			Prot			
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	8.4		8.4	68.6	56.2	
Effective Green, g (s)	8.4		8.4	68.6	56.2	
Actuated g/C Ratio	0.10		0.10	0.81	0.66	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	150		175	2856	2149	
v/s Ratio Prot	c0.04		c0.05	c0.31	0.23	
v/s Ratio Perm						
v/c Ratio	0.36		0.53	0.39	0.35	
Uniform Delay, d1	35.8		36.4	2.3	6.4	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.5		3.1	0.4	0.5	
Delay (s)	37.2		39.5	2.7	6.8	
Level of Service	D		D	A	A	
Approach Delay (s)	37.2		5.5	6.8		
Approach LOS	D		A	A		
Intersection Summary						
HCM Average Control Delay	8.1		HCM Level of Service		A	
HCM Volume to Capacity ratio	0.39					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	54.8%		ICU Level of Service		A	
Analysis Period (min)	15					

c Critical Lane Group

**APPENDIX E:
YEAR 2015 NO PROJECT CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	12	12	12	12	12	12	12	16	16	16	16	16	
Lane Width	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	
Total Lost time (s)	1.00	0.91	1.00	0.91	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.98	
Fltb, ped/bikes	1.00	0.97	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.94	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4910	1770	4953	2006	2041	1984	1955	1984	1955	1984	1955	
Flt Permitted	0.95	1.00	0.95	1.00	0.10	1.00	0.46	1.00	0.46	1.00	0.46	1.00	
Satd. Flow (perm)	1770	4910	1770	4953	201	2041	954	1955	954	1955	954	1955	
Volume (vph)	300	950	200	90	1330	200	200	280	60	160	410	270	
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)	316	1000	211	95	1400	211	211	295	63	168	432	284	
RTOR Reduction (vph)	0	25	0	0	16	0	0	7	0	0	20	0	
Lane Group Flow (vph)	316	1186	0	95	1595	0	211	351	0	168	696	0	
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10	
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	7	4	3	8	8	5	2	2	6	6	6	6	
Permitted Phases	17.0	49.4	11.6	44.0	48.5	48.5	39.5	39.5	40.0	40.0	40.0	39.5	
Actuated Green, G (s)	17.0	49.4	11.6	44.0	49.0	49.0	40.0	40.0	40.0	40.0	40.0	39.5	
Effective Green, g (s)	0.14	0.41	0.10	0.37	0.41	0.41	0.33	0.33	0.33	0.33	0.33	0.33	
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Clearance 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	
Vehicle Extension (s)	251	2021	171	1816	187	833	318	652	318	652	318	652	
Lane Grp Cap (vph)	c0.18	0.24	0.05	c0.32	c0.07	0.17	0.18	0.18	0.18	0.18	0.18	0.18	
v/s Ratio Prot	1.26	0.59	0.56	0.88	1.13	0.42	0.53	1.07	0.53	1.07	0.53	1.07	
v/c Ratio	51.5	27.4	51.7	35.5	58.7	25.4	32.4	40.0	32.4	40.0	32.4	40.0	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	144.6	1.3	3.9	6.4	104.5	0.3	1.6	54.6	1.6	54.6	1.6	54.6	
Incremental Delay, d2	196.1	28.6	55.6	41.9	163.2	25.7	34.0	94.6	34.0	94.6	34.0	94.6	
Delay (s)	F	C	E	D	F	C	C	F	C	F	C	F	
Level of Service	E	C	E	D	E	C	C	F	C	F	C	F	
Approach Delay (s)	63.3	42.7	42.7	43.8	27.1	27.1	18.4	18.4	27.1	27.1	18.4	18.4	
Approach LOS	E	D	D	D	E	C	C	B	C	B	C	B	
Intersection Summary													
HCM Average Control Delay	61.1											HCM Level of Service	E
HCM Volume to Capacity ratio	1.01											Sum of lost time (s)	12.0
Actuated Cycle Length (s)	120.0											ICU Level of Service	H
Intersection Capacity Utilization	109.8%											Analysis Period (min)	15
c Critical Lane Group													

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	0.95	0.95	1.00	0.99	0.99	1.00	0.99	1.00	0.96	1.00	0.96	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	0.96	
Fltb, ped/bikes	1.00	0.95	0.95	1.00	0.91	0.98	1.00	0.98	1.00	0.95	1.00	0.95	
Flt Protected	1748	1681	1596	1681	1596	1681	1770	3266	1770	3266	1770	3266	
Satd. Flow (prot)	0.48	0.74	0.74	0.48	0.74	0.74	0.93	0.93	0.93	0.93	0.93	0.93	
Flt Permitted	846	1302	1596	846	1302	1596	3197	3197	3197	3197	3197	3197	
Satd. Flow (perm)	10	10	10	10	10	10	10	1140	230	100	1140	450	
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Peak-hour factor, PHF	11	11	11	11	11	11	11	1200	242	105	1200	474	
Adj. Flow (vph)	0	10	0	0	68	0	13	0	0	33	0	33	
RTOR Reduction (vph)	0	23	0	179	216	0	0	1440	0	105	1641	0	
Lane Group Flow (vph)	0	23	0	179	216	0	0	1440	0	105	1641	0	
Confl. Peds. (#/hr)	4	4	4	4	4	4	4	44	12	12	44	44	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot	
Protected Phases	7	8	8	8	8	8	2	2	1	1	6	6	
Permitted Phases	5.1	16.0	16.0	16.0	16.0	43.2	43.2	7.7	55.4	55.4	7.7	55.4	
Actuated Green, G (s)	5.6	16.5	16.5	16.5	16.5	43.7	43.7	8.2	55.9	55.9	8.2	55.9	
Effective Green, g (s)	0.06	0.18	0.18	0.18	0.18	0.49	0.49	0.09	0.62	0.62	0.09	0.62	
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Clearance 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	
Vehicle Extension (s)	53	239	293	1552	1552	1552	1552	161	2029	2029	161	2029	
Lane Grp Cap (vph)	c0.03	c0.14	0.14	c0.45	c0.45	c0.45	c0.45	0.06	c0.50	c0.50	0.06	c0.50	
v/s Ratio Prot	0.43	0.75	0.74	0.93	0.93	0.93	0.93	0.85	0.81	0.81	0.85	0.81	
v/c Ratio	40.7	34.8	34.7	21.7	21.7	21.7	21.7	39.5	13.0	13.0	39.5	13.0	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	2.0	10.7	8.1	4.7	4.7	4.7	4.7	7.0	3.6	3.6	7.0	3.6	
Incremental Delay, d2	42.7	45.5	42.8	27.1	27.1	27.1	27.1	46.5	16.6	16.6	46.5	16.6	
Delay (s)	D	D	D	D	D	D	D	D	D	D	D	D	
Level of Service	D	D	D	D	D	D	D	D	D	D	D	D	
Approach Delay (s)	42.7	43.8	43.8	27.1	27.1	27.1	18.4	18.4	27.1	27.1	18.4	18.4	
Approach LOS	D	D	D	D	D	D	C	C	B	B	C	B	
Intersection Summary													
HCM Average Control Delay	25.1											HCM Level of Service	C
HCM Volume to Capacity ratio	0.85											Sum of lost time (s)	16.0
Actuated Cycle Length (s)	90.0											ICU Level of Service	G
Intersection Capacity Utilization	107.3%											Analysis Period (min)	15
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.98	1.00	0.95	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3438	1770	3356	1770	3356	1770	3431	1770	3393	1770	3393
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3438	1770	3356	1770	3356	1770	3431	1770	3393	1770	3393
Volume (vph)	480	590	90	120	700	310	110	640	120	280	870	180
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	615	94	125	729	323	115	667	125	292	906	188
RTOR Reduction (vph)	0	13	0	0	56	0	0	17	0	0	19	0
Lane Group Flow (vph)	479	696	0	125	996	0	115	775	0	292	1075	0
Confl. Peds. (#/hr)	6	24	24	6	6	6	28	28	28	36	36	36
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	13.0	28.9	9.6	25.5	8.1	23.5	11.0	26.4				
Effective Green, g (s)	12.5	29.9	9.1	26.5	7.6	24.5	10.5	27.4				
Actuated g/C Ratio	0.14	0.33	0.10	0.29	0.08	0.27	0.12	0.30				
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	477	1142	179	988	149	934	207	1033				
v/s Ratio Prot	c0.14	c0.20	0.07	c0.30	0.06	0.23	c0.17	c0.32				
v/s Ratio Perm	1.00	0.61	0.70	1.01	0.77	0.83	1.41	1.04				
Uniform Delay, d1	38.8	25.2	39.1	31.8	40.4	30.8	39.8	31.3				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.87				
Incremental Delay, d2	42.2	0.6	9.2	30.7	19.9	8.4	201.2	33.2				
Delay (s)	81.0	25.8	48.3	62.4	60.2	39.2	246.7	60.5				
Level of Service	F	C	D	E	E	D	F	E				
Approach Delay (s)	48.1		60.9		41.9		99.7					
Approach LOS	D		E		D		F					
Intersection Summary												
HCM Average Control Delay	65.5						HCM Level of Service			E		
HCM Volume to Capacity ratio	1.13											
Actuated Cycle Length (s)	90.0						Sum of lost time (s)			20.0		
Intersection Capacity Utilization	93.4%						ICU Level of Service			F		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Lane Util. 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
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1611	1611	1611	3292	3292	3433	3474	3474	3433	3474	3433	3474
Flt Permitted	1.00	1.00	1.00	0.94	0.94	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1611	1611	1611	3100	3100	3433	3474	3474	3433	3474	3433	3474
Volume (vph)	0	0	10	0	0	0	10	340	300	1600	430	60
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)	0	0	11	0	0	0	11	358	316	1684	453	63
RTOR Reduction (vph)	0	11	0	0	0	0	26	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	659	0	1684	516	0	0
Confl. Peds. (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	8.0	0.0	0.0	8.0	29.0	45.0				
Effective Green, g (s)	0.0	0.0	8.0	0.0	0.0	8.0	29.0	45.0				
Actuated g/C Ratio	0.00	0.00	0.18	0.00	0.00	0.18	0.64	1.00				
Clearance Time (s)			4.0			4.0	4.0	2.0				
Lane Grp Cap (vph)	0	0	551	0	0	551	2212	3474				
v/s Ratio Prot			c0.21			c0.21	c0.49	0.15				
v/s Ratio Perm	0.00	0.00	9.88dr	0.00	0.00	9.88dr	0.76	0.15				
Uniform Delay, d1	22.5	22.5	18.5	0.0	0.0	18.5	5.6	0.0				
Progression Factor	1.00	1.00	0.78	1.00	1.00	0.78	1.00	1.00				
Incremental Delay, d2	0.0	0.0	103.8	0.0	0.0	103.8	2.5	0.1				
Delay (s)	22.5	22.5	118.3	0.0	0.0	118.3	8.1	0.1				
Level of Service	C	C	F	A	A	F	A	A				
Approach Delay (s)	22.5	22.5	118.3	0.0	0.0	118.3	6.2	0.1				
Approach LOS	C	C	F	A	A	F	A	A				
Intersection Summary												
HCM Average Control Delay	32.8						HCM Level of Service			C		
HCM Volume to Capacity ratio	0.86											
Actuated Cycle Length (s)	45.0						Sum of lost time (s)			8.0		
Intersection Capacity Utilization	78.3%						ICU Level of Service			D		
Analysis Period (min)	15											
dr Defacto Right Lane. Recode with 1 through lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

2015 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.96	0.97	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flpb, ped/bikes	0.98	0.97	0.98	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Frt	0.98	0.94	0.98	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.99	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1695	1605	1605	3393	3471	3471	3471	3471	3471	3471	3471	3471
Flt Permitted	0.83	0.87	0.87	0.91	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Satd. Flow (perm)	1438	1419	1419	3083	3070	3070	3070	3070	3070	3070	3070	3070
Volume (vph)	70	80	30	60	60	90	30	470	80	50	580	30
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)	74	84	32	63	63	95	32	495	84	53	611	32
RTOR Reduction (vph)	0	16	0	0	60	0	0	28	0	0	8	0
Lane Group Flow (vph)	0	174	0	0	161	0	0	583	0	0	688	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	15.0	22.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49	0.49
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	4.0
Lane Grp Cap (vph)	479	479	473	473	473	1507	1507	1507	1507	1507	1507	1507
v/s Ratio Prot	c0.12	0.11	0.11	0.11	0.11	0.19	0.19	0.19	0.19	0.19	0.22	0.22
v/s Ratio Perm	0.36	0.34	0.34	0.34	0.39	0.39	0.39	0.39	0.39	0.39	0.46	0.46
v/c Ratio	11.4	11.3	11.3	11.3	11.3	7.2	7.2	7.2	7.2	7.2	7.6	7.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.1	2.0	2.0	2.0	2.0	0.8	0.8	0.8	0.8	0.8	1.0	1.0
Incremental Delay, d2	13.5	13.2	13.2	13.2	13.2	8.0	8.0	8.0	8.0	8.0	8.6	8.6
Delay (s)	B	B	B	B	B	A	A	A	A	A	A	A
Level of Service	B	B	B	B	B	A	A	A	A	A	A	A
Approach Delay (s)	13.5	13.2	13.2	13.2	13.2	8.0	8.0	8.0	8.0	8.0	8.6	8.6
Approach LOS	B	B	B	B	B	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.5 HCM Level of Service A											
HCM Volume to Capacity ratio	0.42 HCM Level of Service A											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	63.8% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2015 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.95	0.95	0.95	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flpb, ped/bikes	0.96	0.97	0.98	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Frt	0.96	0.96	0.96	1.00	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1626	1626	1650	3443	3443	3443	3443	3443	3443	3443	3443	3443
Flt Permitted	0.79	0.79	0.83	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Satd. Flow (perm)	1302	1302	1389	2893	2893	2893	2893	2893	2893	2893	2893	2893
Volume (vph)	70	80	70	40	40	70	50	30	1000	60	70	1530
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)	74	84	74	42	42	74	53	32	1053	63	74	1611
RTOR Reduction (vph)	0	6	0	0	0	26	0	0	3	0	0	5
Lane Group Flow (vph)	0	226	0	0	143	0	0	1145	0	0	1785	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	2	6	6
Actuated Green, G (s)	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
Effective Green, g (s)	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
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)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	262	262	279	279	279	2039	2039	2039	2039	2039	2039	2039
v/s Ratio Prot	c0.17	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
v/s Ratio Perm	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
v/c Ratio	32.8	32.8	32.8	30.2	30.2	6.1	6.1	6.1	6.1	6.1	6.6	6.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.1	2.0	2.0	2.0	2.0	0.8	0.8	0.8	0.8	0.8	1.0	1.0
Incremental Delay, d2	23.2	23.2	23.2	0.7	0.7	1.1	1.1	1.1	1.1	1.1	1.0	1.0
Delay (s)	56.0	56.0	56.0	30.9	30.9	7.3	7.3	7.3	7.3	7.3	7.7	7.7
Level of Service	E	E	E	C	C	A	A	A	A	A	A	A
Approach Delay (s)	56.0	56.0	56.0	30.9	30.9	7.3	7.3	7.3	7.3	7.3	7.7	7.7
Approach LOS	E	E	E	C	C	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	12.1 HCM Level of Service B											
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	101.9% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. 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
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	0.97	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1746	3430	1759	3464	1767	1817	1736	1841	1736	1841	1736	1841
Flt Permitted	0.17	1.00	0.37	1.00	0.44	1.00	0.60	1.00	0.60	1.00	0.60	1.00
Satd. Flow (perm)	320	3430	691	3464	810	1817	1092	1841	1092	1841	1092	1841
Volume (vph)	30	370	80	70	670	70	90	200	30	80	400	30
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)	32	389	84	74	705	74	95	211	32	84	421	32
RTOR Reduction (vph)	0	23	0	0	10	0	0	7	0	0	3	0
Lane Group Flow (vph)	32	450	0	74	769	0	95	236	0	84	450	0
Confl. Peds. (#/hr)	30	12	12	12	30	6	54	54	54	54	30	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	6	6	6	6	6	6
Permitted Phases	4	4	8	8	2	2	6	6	6	6	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	92	986	199	986	496	1113	669	1128	669	1128	669	1128
v/s Ratio Prot	0.13	0.13	c0.22	c0.22	0.13	0.13	c0.24	c0.24	c0.24	c0.24	c0.24	c0.24
v/s Ratio Perm	0.10	0.11	0.11	0.11	0.12	0.12	0.08	0.08	0.08	0.08	0.08	0.08
v/c Ratio	0.35	0.46	0.37	0.77	0.19	0.21	0.13	0.40	0.13	0.40	0.13	0.40
Uniform Delay, d1	22.6	23.4	22.7	26.1	6.8	6.9	6.5	7.9	6.5	7.9	6.5	7.9
Progression Factor	1.00	1.00	0.88	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.1	1.5	4.9	5.4	0.9	0.4	0.4	1.1	0.9	0.4	1.1	1.1
Delay (s)	32.7	24.9	24.9	29.4	7.7	7.3	6.9	9.0	6.9	9.0	6.9	9.0
Level of Service	C	C	C	C	A	A	A	A	A	A	A	A
Approach Delay (s)	25.4	25.4	29.0	29.0	7.4	7.4	8.7	8.7	7.4	7.4	8.7	8.7
Approach LOS	C	C	C	C	A	A	A	A	A	A	A	A

Intersection Summary	20.0	HCM Level of Service	C
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. 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
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1763	3424	1739	3514	1739	3514	1739	3514	1739	3514	1739	3514
Flt Permitted	0.29	1.00	0.43	1.00	0.43	1.00	0.79	1.00	0.79	1.00	0.79	1.00
Satd. Flow (perm)	533	3424	786	3514	786	3514	2719	3514	2719	3514	2719	3514
Volume (vph)	30	400	80	50	700	30	70	170	50	60	240	50
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)	32	421	84	53	737	32	74	179	53	63	253	53
RTOR Reduction (vph)	0	21	0	0	4	0	0	22	0	0	17	0
Lane Group Flow (vph)	32	484	0	53	765	0	0	284	0	0	352	0
Confl. Peds. (#/hr)	18	18	54	54	18	4	18	18	18	18	18	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	6	6	6	6	6	6
Permitted Phases	4	4	8	8	2	2	6	6	6	6	6	6
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	260	1669	383	1713	383	1713	1122	1713	1122	1713	1122	1713
v/s Ratio Prot	0.14	0.14	c0.22	c0.22	0.14	0.14	0.10	0.10	0.10	0.10	0.10	0.10
v/s Ratio Perm	0.06	0.12	0.29	0.14	0.14	0.45	0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio	11.2	12.2	11.3	13.4	11.3	13.4	15.4	15.4	15.4	15.4	15.7	15.7
Uniform Delay, d1	0.97	1.04	1.41	1.52	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Progression Factor	0.97	1.04	1.41	1.52	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Incremental Delay, d2	11.7	13.1	16.6	21.2	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Delay (s)	11.7	13.1	16.6	21.2	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Level of Service	B	B	B	C	B	C	B	B	B	B	B	B
Approach Delay (s)	13.0	13.0	20.9	20.9	10.4	10.4	16.3	16.3	10.4	10.4	16.3	16.3
Approach LOS	B	B	C	C	B	B	B	B	B	B	B	B

Intersection Summary	16.4	HCM Level of Service	B
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frtb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	1763	3479	1733	3472	1733	3472	3386	3450	3386	3450	3386	3450	3386
Fit Permitted	0.29	1.00	0.44	1.00	0.44	1.00	0.87	0.74	0.87	0.74	0.87	0.74	0.87
Satd. Flow (perm)	531	3479	799	3472	799	3472	2952	2585	2952	2585	2952	2585	2952
Volume (vph)	40	440	40	70	680	80	40	260	80	120	340	30	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	458	42	73	708	83	42	271	83	125	354	31	31
RTOR Reduction (vph)	0	9	0	0	11	0	0	30	0	0	6	0	0
Lane Group Flow (vph)	42	491	0	73	780	0	0	366	0	0	504	0	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	2	2	2	2	2	2	2
Permitted Phases	4	8	8	2	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	272	1783	409	1779	1779	1144	1002	1002	1002	1002	1002	1002	1002
v/s Ratio Prot	0.14	0.14	0.14	0.22	0.22	0.12	0.19	0.19	0.19	0.19	0.19	0.19	0.19
v/s Ratio Perm	0.08	0.08	0.08	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
v/c Ratio	0.15	0.28	0.18	0.44	0.44	0.32	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Uniform Delay, d1	10.3	11.1	10.5	12.3	12.3	17.1	18.6	18.6	18.6	18.6	18.6	18.6	18.6
Progression Factor	1.27	1.31	1.00	1.00	1.00	0.64	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.4	1.0	0.8	0.8	0.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Delay (s)	14.3	14.9	11.4	13.0	13.0	11.6	20.4	20.4	20.4	20.4	20.4	20.4	20.4
Level of Service	B	B	B	B	B	B	C	C	C	C	C	C	C
Approach Delay (s)	14.8	14.8	12.9	11.6	11.6	11.6	20.4	20.4	20.4	20.4	20.4	20.4	20.4
Approach LOS	B	B	B	B	B	B	C	C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	14.8 HCM Level of Service B
HCM Volume to Capacity ratio	0.47
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	100.5% ICU Level of Service G
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2015 AM
 1/11/2008

Movement	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Frtb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.99
Fit Protected	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3385	1770	3539	1770	3539	1770	3539	1770
Fit Permitted	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3385	1770	3539	1770	3539	1770	3539	1770
Volume (vph)	560	60	100	810	0	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	589	63	105	853	0	0	0	0
RTOR Reduction (vph)	13	0	0	0	0	0	0	0
Lane Group Flow (vph)	639	0	105	853	0	0	0	0
Confl. Peds. (#/hr)	146	266	146	266	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	3	8	8	8	8	8
Permitted Phases	4	3	3	8	8	8	8	8
Actuated Green, G (s)	22.0	30.0	30.0	60.0	60.0	60.0	60.0	60.0
Effective Green, g (s)	22.0	30.0	30.0	60.0	60.0	60.0	60.0	60.0
Actuated g/C Ratio	0.37	0.50	0.50	1.00	1.00	1.00	1.00	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1241	885	3539	885	3539	885	3539	885
v/s Ratio Prot	0.19	0.06	0.24	0.24	0.24	0.24	0.24	0.24
v/s Ratio Perm	0.51	0.12	0.12	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.51	0.12	0.12	0.24	0.24	0.24	0.24	0.24
Uniform Delay, d1	14.8	8.0	8.0	0.0	0.0	0.0	0.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Delay (s)	16.4	8.2	8.2	0.2	0.2	0.2	0.2	0.2
Level of Service	B	A	A	A	A	A	A	A
Approach Delay (s)	16.4	1.0	1.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	A	A	A	A	A	A	A

Intersection Summary	
HCM Average Control Delay	7.2 HCM Level of Service A
HCM Volume to Capacity ratio	0.35
Actuated Cycle Length (s)	60.0 Sum of lost time (s) 4.0
Intersection Capacity Utilization	30.3% ICU Level of Service A
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
11: 40th St. & BART parking

2015 AM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	540	20	0	910	0	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	568	21	0	958	0	21
Pedestrians	123	123	123	123	123	123
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	10	10	10	10	10	10
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	81			406		
pX, platoon unblocked	0.86			0.92		0.86
vC, conflicting volume	712			1181		541
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	498			694		298
IC, single (s)	4.1			6.8		6.9
IC, 2 stage (s)						
tF (s)	2.2			3.5		3.3
p0 queue free %	100			100		96
cM capacity (veh/h)	817			312		482
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 1
Volume Total	379	211	479	479	21	21
Volume Left	0	0	0	0	0	0
Volume Right	0	21	0	0	21	21
cSH	1700	1700	1700	1700	482	482
Volume to Capacity	0.22	0.12	0.28	0.28	0.04	0.04
Queue Length 95th (ft)	0	0	0	0	0	3
Control Delay (s)	0.0	0.0	0.0	0.0	12.8	B
Lane LOS						B
Approach Delay (s)	0.0	0.0	0.0	12.8		
Approach LOS						B
Intersection Summary						
Average Delay	0.2					
Intersection Capacity Utilization	45.0%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
12: 40th St. & BART parking

2015 AM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	550	10	0	910	0	60
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	573	10	0	948	0	62
Pedestrians	123	123	123	123	123	123
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	10	10	10	10	10	10
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	298			189		
pX, platoon unblocked	0.88			0.88		0.88
vC, conflicting volume	706			1175		538
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	531			712		340
IC, single (s)	4.1			6.8		6.9
IC, 2 stage (s)						
tF (s)	2.2			3.5		3.3
p0 queue free %	100			100		87
cM capacity (veh/h)	816			302		466
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 1
Volume Total	382	201	474	474	62	62
Volume Left	0	0	0	0	0	0
Volume Right	0	10	0	0	62	62
cSH	1700	1700	1700	1700	466	466
Volume to Capacity	0.22	0.12	0.28	0.28	0.13	0.13
Queue Length 95th (ft)	0	0	0	0	0	12
Control Delay (s)	0.0	0.0	0.0	0.0	13.9	B
Lane LOS						B
Approach Delay (s)	0.0	0.0	0.0	13.9		
Approach LOS						B
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	45.0%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

2015 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.95	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.95
Hourly flow rate (vph)	0.95	1.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96
Pedestrians	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1681	3245	1637	3406	1770	3477	1770	3477	1770	3319	1770	3319
Fit Permitted	0.27	1.00	0.36	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	479	3245	626	3406	1770	3477	1770	3477	1770	3319	1770	3319
Volume (vph)	140	350	120	80	520	70	110	450	30	140	900	280
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)	147	368	126	84	547	74	116	474	32	147	947	295
RTOR Reduction (vph)	0	40	0	0	12	0	0	5	0	0	31	0
Lane Group Flow (vph)	147	454	0	84	609	0	116	501	0	147	1211	0
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	92	92
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	8	8	5	2	2	1	1	6	6
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	8.2	35.1	35.1	10.9	37.8	37.8	37.8
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	8.7	35.6	35.6	11.4	38.3	38.3	38.3
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.10	0.42	0.42	0.13	0.45	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)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	147	993	191	1042	181	1456	237	1496	c0.08	c0.36	237	1496
v/s Ratio Prot	0.14	0.14	0.14	0.18	0.18	0.07	0.14	0.14	0.08	0.36	0.14	0.14
v/s Ratio Perm	c0.31	c0.31	c0.31	c0.31	c0.31	c0.31	c0.31	c0.31	c0.31	c0.31	c0.31	c0.31
v/c Ratio	1.00	0.46	0.44	0.58	0.64	0.34	0.64	0.34	0.62	0.81	0.62	0.81
Uniform Delay, d1	29.5	23.8	23.7	24.9	36.6	16.8	34.8	20.2	34.8	20.2	34.8	20.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.89	1.30	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	74.2	0.1	0.6	0.5	5.1	0.6	3.6	4.8	3.6	4.8	3.6	4.8
Delay (s)	103.7	23.9	24.2	25.5	37.9	22.3	38.4	25.0	38.4	25.0	38.4	25.0
Level of Service	F	C	C	C	D	C	D	C	D	C	D	C
Approach Delay (s)	42.2	25.3	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2	25.2
Approach LOS	D	D	C	C	C	C	C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	29.0
HCM Volume to Capacity ratio	0.87
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	79.6%
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave.

2015 AM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	20	40	610	1050	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	21	42	642	1105	32
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	0.75	0.75	0.75	0.75	0.75	0.75
Upstream signal (ft)	1726	768	1237	1237	1237	1237
pX, platoon unblocked	0	0	0	0	0	0
vC, conflicting volume	1726	768	1237	1237	1237	1237
VC1, stage 1 cont vol	0	0	0	0	0	0
VC2, stage 2 cont vol	0	0	0	0	0	0
vCu, unblocked vol	1593	355	981	981	981	981
IC, 1 stage (s)	6.8	6.9	4.1	4.1	4.1	4.1
IC, 2 stage (s)	3.5	3.3	2.2	2.2	2.2	2.2
IF (s)	81	95	91	91	91	91
p0 queue free %	57	403	480	480	480	480
cM capacity (veh/h)	32	42	321	321	737	400
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	11	42	0	0	0	0
Volume Left	21	0	0	0	0	32
Volume Right	133	480	1700	1700	1700	1700
cSH	0.24	0.09	0.19	0.19	0.43	0.24
Volume to Capacity	22	7	0	0	0	0
Queue Length 95th (ft)	40.4	13.2	0.0	0.0	0.0	0.0
Control Delay (s)	E	B	E	B	E	B
Lane LOS	E	B	E	B	E	B
Approach Delay (s)	40.4	0.8	0.0	0.0	0.0	0.0
Approach LOS	E	B	E	B	E	B

Intersection Summary	
Average Delay	1.0
Intersection Capacity Utilization	53.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

2015 AM
 1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↓	↓
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	30	620	10	20	1050
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	32	653	11	21	1105
Pedestrians	34	33				34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3	3	3	3	3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			791
pX, platoon unblocked	0.82	0.95				0.95
VC, conflicting volume	1320	400				697
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	997	322				634
IC, single (s)	6.8	6.9				4.1
IC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	94	95				98
cM capacity (veh/h)	181	606				876
Direction, Lane #	WB 1	NB 2	NB 2	SB 1	SB 2	SB 3
Volume Total	42	435	228	21	563	553
Volume Left	11	0	0	21	0	0
Volume Right	32	0	11	0	0	0
cSH	382	1700	1700	876	1700	1700
Volume to Capacity	0.11	0.26	0.13	0.02	0.33	0.33
Queue Length 95th (ft)	9	0	0	2	0	0
Control Delay (s)	15.6	0.0	0.0	9.2	0.0	0.0
Lane LOS	C	A	A	A	A	A
Approach Delay (s)	15.6	0.0	0.2			
Approach LOS	C	A	A			

Intersection Summary		
Average Delay		0.5
Intersection Capacity Utilization	46.2%	ICU Level of Service
Analysis Period (min)	15	A

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2015 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ftp, ped/bikes	1.00	0.99	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	1.00	1.00
Ft	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	1.00	1.00
Fit Protected	1.00	0.95	1.00	1.00	0.99	1.00	0.99	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	4993	1758	3468	1774	3468	1774	3468	1774	1729	3468	1774	1814
Fit Permitted	0.83	0.42	1.00	0.42	1.00	0.55	0.41	1.00	0.55	0.41	1.00	1.00
Satd. Flow (perm)	4178	777	3468	777	3468	984	738	1814	984	738	1814	1814
Volume (vph)	50	460	40	60	610	80	70	200	60	200	310	50
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)	53	484	42	63	642	84	74	211	63	211	326	53
RTOR Reduction (vph)	0	10	0	0	12	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	569	0	63	714	0	0	339	0	211	372	0
Conf. Peds. (#/hr)	18	18	24	24	24	24	24	48	48	48	24	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	2	2	6	6	6	6	6
Permitted Phases	4	4	8	8	8	2	2	6	6	6	6	6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	2556	475	2122	289	289	534	534	534	534	534	534	534
v/s Ratio Prot	0.14	0.08		c0.21		0.29	0.29	0.29	0.29	0.29	0.29	0.29
v/s Ratio Perm	0.22	0.13	0.34			1.17	1.17	1.17	1.17	1.17	1.17	1.17
Uniform Delay, d1	7.4	7.0	8.1			30.0	30.0	30.0	30.0	30.0	30.0	30.0
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	0.2	0.6	0.4			108.0	108.0	108.0	108.0	108.0	108.0	108.0
Delay (s)	7.6	7.6	8.5			138.0	138.0	138.0	138.0	138.0	138.0	138.0
Level of Service	A	A	A			F	F	F	F	F	F	F
Approach Delay (s)	7.6	8.4		8.4		51.9	51.9	51.9	51.9	51.9	51.9	51.9
Approach LOS	A	A		A		D	D	D	D	D	D	D

Intersection Summary		
HCM Average Control Delay	38.9	HCM Level of Service
HCM Volume to Capacity ratio	0.61	D
Actuated Cycle Length (s)	85.0	Sum of lost time (s)
Intersection Capacity Utilization	99.9%	ICU Level of Service
Analysis Period (min)	15	F
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5046	4978	4978	1757	1787	1770	1827					
Flt Permitted	0.88	0.85	0.85	0.34	1.00	0.40	1.00					
Satd. Flow (perm)	4467	4231	4231	637	1787	742	1827					
Volume (vph)	30	690	20	50	650	90	50	190	70	90	260	30
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)	32	726	21	53	684	95	53	200	74	95	274	32
RTOR Reduction (vph)	0	4	0	0	20	0	0	16	0	0	5	0
Lane Group Flow (vph)	0	775	0	0	812	0	53	258	0	95	301	0
Confl. Peds. (#/hr)	18	18	18	12	12	12	12	12	12	12	12	18
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2876	2724	2724	163	458	190	468					
v/s Ratio Prot	0.17	0.19	0.19	0.08	0.14	0.13	0.14					
v/s Ratio Perm	0.27	0.30	0.30	0.33	0.56	0.50	0.64					
v/c Ratio	6.1	6.3	6.3	24.1	25.9	25.4	26.5					
Uniform Delay, d1	1.00	0.67	0.67	1.00	1.00	1.22	1.24					
Progression Factor	0.2	0.3	0.3	5.2	4.9	8.9	6.5					
Incremental Delay, d2	6.4	4.5	4.5	29.4	30.8	39.9	39.3					
Delay (s)	A	A	A	C	C	D	D					
Level of Service	A	A	A	C	C	D	D					
Approach Delay (s)	6.4	4.5	4.5	30.6	30.6	39.4	39.4					
Approach LOS	A	A	A	C	C	D	D					

Intersection Summary	
HCM Average Control Delay	14.7
HCM Level of Service	B
HCM Volume to Capacity ratio	0.40
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.6%
ICU Level of Service	B
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5027	4919	4919	4082	4082	3403	3458					
Flt Permitted	0.83	0.83	0.83	0.83	0.83	0.86	0.79					
Satd. Flow (perm)	4168	4168	4168	2939	2939	2774	2774					
Volume (vph)	50	770	40	60	750	170	30	160	40	100	300	20
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)	53	811	42	63	789	179	32	168	42	105	316	21
RTOR Reduction (vph)	0	6	0	0	41	0	0	22	0	0	4	0
Lane Group Flow (vph)	0	900	0	0	990	0	0	220	0	0	438	0
Confl. Peds. (#/hr)	17	17	17	12	12	12	12	12	12	12	12	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2883	2883	2883	2628	2628	753	753					
v/s Ratio Prot	0.22	0.24	0.24	0.24	0.24	0.07	0.16					
v/s Ratio Perm	0.34	0.34	0.34	0.38	0.38	0.29	0.62					
v/c Ratio	6.5	6.7	6.7	23.9	23.9	26.3	26.3					
Uniform Delay, d1	0.75	1.00	1.00	1.00	1.00	1.00	0.34					
Progression Factor	0.3	0.4	0.4	1.0	1.0	1.0	3.8					
Incremental Delay, d2	5.2	7.1	7.1	24.9	24.9	12.8	12.8					
Delay (s)	A	A	A	A	A	B	B					
Level of Service	A	A	A	A	A	B	B					
Approach Delay (s)	5.2	7.1	7.1	24.9	24.9	12.8	12.8					
Approach LOS	A	A	A	A	A	B	B					

Intersection Summary	
HCM Average Control Delay	9.1
HCM Level of Service	A
HCM Volume to Capacity ratio	0.44
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.5%
ICU Level of Service	G
Analysis Period (min)	15
c Critical Lane Group	

Movement	EBL	EBT	WBT	WBR	SBL	SBR					
Lane Configurations	Free	Free	Free	Free	Stop	Stop					
Sign Control	Free	Free	Free	Free	Stop	Stop					
Grade	0%	0%	0%	0%	0%	0%					
Volume (veh/h)	0	920	830	30	0	150					
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95					
Hourly flow rate (vph)	0	968	874	32	0	158					
Pedestrians	98				98						
Lane Width (ft)	12.0				12.0						
Walking Speed (ft/s)	4.0				4.0						
Percent Blockage	8				8						
Right turn flare (veh)					None						
Median type					None						
Median storage (veh)											
Upstream signal (ft)	698	473									
pX, platoon unblocked	0.94				0.94	0.94					
VC, conflicting volume	1003				1294	487					
VC1, stage 1 cont vol											
VC2, stage 2 cont vol											
VCu, unblocked vol	885				1193	338					
IC, single (s)	4.1				6.8	6.9					
IC, 2 stage (s)											
IF (s)	2.2				3.5	3.3					
p0 queue free %	100				100	70					
cM capacity (veh/h)	659				156	524					
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	323	323	323	291	291	291	32	158			
Volume Left	0	0	0	0	0	0	0	0			
Volume Right	0	0	0	0	0	0	32	158			
cSH	1700	1700	1700	1700	1700	1700	524	524			
Volume to Capacity	0.19	0.19	0.19	0.17	0.17	0.17	0.02	0.30			
Queue Length 95th (ft)	0	0	0	0	0	0	0	32			
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.8			
Lane LOS								B			
Approach Delay (s)	0.0			0.0				14.8			
Approach LOS								B			

Intersection Summary		
Average Delay	1.2	
Intersection Capacity Utilization	37.9%	ICU Level of Service
Analysis Period (min)	15	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	0.99	0.99	0.99	1.00	0.95	1.00	0.95	0.95
Lane Util. Factor	1.00	1.00	1.00	0.99	0.99	0.99	1.00	0.95	1.00	0.95	0.99
Frbp, ped/bikes	1.00	1.00	1.00	0.98	0.98	0.98	1.00	0.98	1.00	0.98	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.97	0.97	0.97	1.00	0.97	1.00	0.98	1.00
Fit	1.00	1.00	1.00	0.99	0.99	0.99	1.00	0.95	1.00	0.95	1.00
Fit Protected	4967	4853	4853	1758	3413	1758	3413	1741	3447	1741	3447
Satd. Flow (prot)	0.72	0.69	0.69	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Fit Permitted	3577	3355	3355	507	3413	507	3413	860	3447	860	3447
Satd. Flow (perm)	80	750	100	110	700	200	200	50	350	80	280
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	84	789	105	116	737	211	53	368	84	295	716
Adj. Flow (vph)	0	21	0	0	78	0	0	16	0	0	10
RTOR Reduction (vph)	0	957	0	0	986	0	53	436	0	295	822
Lane Group Flow (vph)	40			9			40	25		31	31
Confl. Peds. (#/hr)											
Turn Type	Perm	Perm	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2	6	6	6	6	6
Permitted Phases	4	4	3	8	2	2	6	6	6	6	6
Actuated Green, G (s)	29.9	29.9	29.9	29.9	44.6	44.6	44.6	44.6	44.6	44.6	44.6
Effective Green, g (s)	31.4	31.4	31.4	31.4	45.6	45.6	45.6	45.6	45.6	45.6	45.6
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grip Cap (vph)	1321	1239	1239	272	1831	272	1831	461	1849	461	1849
v/s Ratio Prot	0.27	0.27	0.27	0.29	0.10	0.10	0.13	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.72	0.72	0.72	1.72d	0.19	0.24	0.24	0.24	0.24	0.24	0.24
v/c Ratio	23.1	23.1	23.1	23.9	10.2	10.5	10.5	10.5	10.5	10.5	10.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.40	1.39	1.24	1.20	1.20	1.20	1.20
Progression Factor	1.7	1.7	1.7	3.4	1.5	0.3	4.7	0.5	0.5	0.5	0.5
Incremental Delay, d2	24.8	24.8	24.8	27.3	15.8	14.8	21.9	14.9	14.9	14.9	14.9
Delay (s)	C	C	C	C	B	B	C	C	C	C	C
Level of Service	C	C	C	C	B	B	C	C	C	C	C
Approach Delay (s)	24.8			27.3			14.9		16.7		
Approach LOS	C			C			B		B		

Intersection Summary		
HCM Average Control Delay	21.7	HCM Level of Service
HCM Volume to Capacity ratio	0.70	C
Actuated Cycle Length (s)	85.0	Sum of lost time (s)
Intersection Capacity Utilization	89.2%	ICU Level of Service
Analysis Period (min)	15	E

d) Defacto Left Lane. Recode with 1 through lane as a left lane.
 dr Defacto Right Lane. Recode with 1 through lane as a right lane.
 c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2015 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5042	4983	4983	4983	4983	4983	1770	1395	1606	1606	1606	1606
Fit Permitted	0.88	0.88	0.88	0.88	0.88	0.88	1.00	1.00	0.83	0.83	0.83	0.83
Satd. Flow (perm)	4452	4375	4375	4375	4375	4375	1592	1395	1360	1360	1360	1360
Volume (vph)	30	1080	30	30	980	80	20	30	20	80	30	40
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)	32	1137	32	32	1032	84	21	32	21	84	32	42
RTOR Reduction (vph)	0	4	0	0	11	0	0	0	0	15	0	16
Lane Group Flow (vph)	0	1197	0	0	1137	0	0	53	6	0	142	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	2	6	6
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	48.0	23.0	23.0	23.0	23.0	23.0	23.0
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
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
Lane Grp Cap (vph)	2699	2699	2699	2699	2699	2699	468	410	400	400	400	400
v/s Ratio Prot	c0.27	0.44	0.44	0.44	0.44	0.44	0.03	0.00	c0.10	c0.10	c0.10	c0.10
v/s Ratio Perm	0.44	0.44	0.44	0.44	0.44	0.44	0.11	0.02	0.35	0.35	0.35	0.35
v/c Ratio	8.5	8.4	8.4	8.4	8.4	8.4	20.6	20.0	22.3	22.3	22.3	22.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.1	0.1	0.1	0.1	0.1
Incremental Delay, d2	9.0	8.9	8.9	8.9	8.9	8.9	21.1	20.1	24.7	24.7	24.7	24.7
Delay (s)	A	A	A	A	A	A	C	C	C	C	C	C
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	9.0	8.9	8.9	8.9	8.9	8.9	20.8	20.8	24.7	24.7	24.7	24.7
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	10.3
HCM Level of Service	B
HCM Volume to Capacity ratio	0.41
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%
ICU Level of Service	D
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2015 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	0.98	1.00	0.96	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4908	1770	4817	1770	4817	1770	3539	1511	1770	3539	1523
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4908	1770	4817	1770	4817	1770	3539	1511	1770	3539	1523
Volume (vph)	160	890	140	150	750	280	110	300	110	310	1150	150
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)	168	937	147	158	789	295	116	316	116	326	1211	158
RTOR Reduction (vph)	0	17	0	0	56	0	0	0	0	51	0	33
Lane Group Flow (vph)	168	1067	0	158	1028	0	116	316	65	326	1211	125
Confl. Peds. (#/hr)	66	66	66	66	66	66	23	23	38	38	26	26
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	pm+ov	Prot	Prot	pm+ov	pm+ov
Protected Phases	7	4	4	3	8	8	5	2	3	1	6	7
Permitted Phases	7	4	4	3	8	8	5	2	3	1	6	7
Actuated Green, G (s)	12.0	34.0	13.6	35.6	10.4	31.4	45.0	25.0	45.0	25.0	46.0	58.0
Effective Green, g (s)	11.0	35.0	12.6	36.6	9.4	32.4	45.0	24.0	47.0	24.0	47.0	58.0
Actuated g/C Ratio	0.09	0.29	0.10	0.31	0.08	0.27	0.38	0.20	0.39	0.48	0.20	0.39
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0
Vehicle Extension (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
Lane Grp Cap (vph)	162	1432	186	1469	139	956	617	354	1386	787	354	1386
v/s Ratio Prot	c0.09	c0.22	0.09	0.21	0.07	0.09	0.01	c0.18	c0.34	0.01	c0.18	c0.34
v/s Ratio Perm	1.04	0.75	0.85	0.70	0.83	0.33	0.11	0.92	0.87	0.16	0.92	0.87
v/c Ratio	54.5	38.5	52.8	36.8	54.5	35.1	24.4	47.1	33.8	17.3	47.1	33.8
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	80.8	3.6	27.6	2.8	31.8	0.9	0.0	28.3	7.9	0.0	28.3	7.9
Delay (s)	135.3	42.0	80.4	39.6	86.3	36.0	24.4	75.3	41.6	17.4	75.3	41.6
Level of Service	F	D	F	D	F	D	F	D	C	E	D	B
Approach Delay (s)	54.5	54.5	54.5	44.8	44.8	44.8	44.2	44.2	45.9	45.9	45.9	45.9
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D

Intersection Summary	
HCM Average Control Delay	47.7
HCM Level of Service	D
HCM Volume to Capacity ratio	0.83
Actuated Cycle Length (s)	120.0
Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.4%
ICU Level of Service	E
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2015 AM
1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. 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
Frbp, ped/bikes	0.93			0.96			1.00	0.99			1.00	0.99
Ftbp, ped/bikes	0.98			0.96			1.00	0.92			1.00	0.99
Frt	0.95			0.95			1.00	0.99			1.00	0.99
Flt Protected	0.98			0.99			0.95	1.00			0.95	1.00
Satd. Flow (prot)	1578			1610			1658	3453			1635	3468
Flt Permitted	0.74			0.85			0.38	1.00			0.43	1.00
Satd. Flow (perm)	1189			1395			664	3453			746	3468
Volume (vph)	40	30	40	50	60	60	60	510	40	30	620	40
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)	42	32	42	53	63	63	63	537	42	32	653	42
RTOR Reduction (vph)	0	28	0	0	27	0	0	4	0	0	4	0
Lane Group Flow (vph)	0	88	0	0	152	0	63	575	0	32	691	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			4			4		2		6	
Permitted Phases	4			4			4		2		6	
Actuated Green, G (s)	12.6			12.6			65.4		65.4		65.4	
Effective Green, g (s)	12.1			12.1			64.9		64.9		64.9	
Actuated g/C Ratio	0.14			0.14			0.76		0.76		0.76	
Clearance Time (s)	3.5			3.5			3.5		3.5		3.5	
Vehicle Extension (s)	2.0			2.0			2.0		2.0		2.0	
Lane Grp Cap (vph)	169			199			507		2636		570	
v/s Ratio Prot									0.17			
v/s Ratio Perm	0.07			c0.11			0.09		0.17		0.04	
v/c Ratio	0.52			0.76			0.12		0.22		0.06	
Uniform Delay, d1	33.8			35.1			2.6		2.9		2.5	
Progression Factor	1.00			1.00			1.00		1.00		1.00	
Incremental Delay, d2	1.1			14.3			0.5		0.2		0.2	
Delay (s)	34.9			49.3			3.1		3.0		0.9	
Level of Service	C			D			A		A		A	
Approach Delay (s)	34.9			49.3			3.1		3.1		1.0	
Approach LOS	C			D			A		A		A	

Intersection Summary	
HCM Average Control Delay	9.4
HCM Volume to Capacity ratio	0.34
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	54.8%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2015 AM
1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.95	1.00
Ftbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.96	1.00
Frt	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3347		1770	3235		1688	3443		1675	3212	1770
Flt Permitted	0.95	1.00		0.95	1.00		0.28	1.00		0.50	1.00	1.00
Satd. Flow (perm)	1770	3347		1770	3235		503	3443		879	3212	1770
Volume (vph)	260	400		100	70		370	120		70	330	40
Peak-hour factor, PHF	0.95	0.95		0.95	0.95		0.95	0.95		0.95	0.95	0.95
Adj. Flow (vph)	274	421		105	74		389	126		74	347	42
RTOR Reduction (vph)	0	24		0	0		0	0		0	9	0
Lane Group Flow (vph)	274	502		0	74		475	0		74	380	0
Confl. Peds. (#/hr)	100	100		100	100		100	100		100	100	100
Turn Type	Prot	Prot		Prot	Prot		Perm	Perm		Perm	Perm	Perm
Protected Phases	7	4		3	8		2			2	6	
Permitted Phases	7	4		3	8		2			2	6	
Actuated Green, G (s)	16.1	26.4		6.8	17.1		38.3			38.3	38.3	
Effective Green, g (s)	16.6	25.9		7.3	16.6		39.8			39.8	39.8	
Actuated g/C Ratio	0.20	0.30		0.09	0.20		0.47			0.47	0.47	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5			5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0			2.0	2.0	
Lane Grp Cap (vph)	346	1020		152	632		236			1612	412	
v/s Ratio Prot	c0.15	0.15		0.04	c0.15		0.11			0.11	c0.22	
v/s Ratio Perm	0.79	0.49		0.49	0.75		0.31			0.24	0.20	
Uniform Delay, d1	32.6	24.2		37.1	32.3		14.1			13.5	15.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00			1.00	1.00	
Incremental Delay, d2	11.0	0.1		0.9	4.5		3.4			0.3	1.1	
Delay (s)	43.5	24.3		38.0	36.7		17.5			13.9	14.4	
Level of Service	D	C		D	D		B			B	B	
Approach Delay (s)	30.9			36.9			14.4			16.3		
Approach LOS	C			D			B			B		

Intersection Summary	
HCM Average Control Delay	24.8
HCM Volume to Capacity ratio	0.61
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	72.9%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00
Flt	1.00	0.98	1.00	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.93	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4933	1770	4968	2006	1993	1958	1915	1958	1915	1915	1915
Flt Permitted	0.95	1.00	0.95	1.00	1.00	0.12	1.00	0.55	1.00	0.55	1.00	1.00
Satd. Flow (perm)	1770	4933	1770	4968	264	1993	1138	1915	1138	1915	1138	1915
Volume (vph)	340	1230	170	90	1020	150	170	240	90	140	270	270
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)	358	1295	179	95	1074	158	179	253	95	147	284	284
RTOR Reduction (vph)	0	17	0	0	19	0	0	14	0	0	0	37
Lane Group Flow (vph)	358	1457	0	95	1213	0	179	334	0	147	531	0
Confl. Peds. (#/hr)	32	32	32	4	12	4	12	24	24	24	24	12
Parking (#/hr)												0
Turn Type	Prot	4	Prot	3	8	pm+pt	5	2	Perm	6	Perm	6
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	20.0	39.2	7.8	27.0	42.5	42.5	42.5	29.5	29.5	29.5	29.5	29.5
Effective Green, g (s)	20.0	39.2	7.8	27.0	43.0	43.0	43.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio	0.20	0.39	0.08	0.27	0.43	0.43	0.43	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5
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)	354	1934	138	1341	305	857	341	575	341	575	341	575
v/s Ratio Prot	c0.20	0.30	0.05	c0.24	c0.06	0.17	c0.28	c0.28	c0.28	c0.28	c0.28	c0.28
v/s Ratio Perm												
v/c Ratio	1.01	0.75	0.69	0.90	0.59	0.39	0.43	0.92	0.43	0.92	0.43	0.92
Uniform Delay, d1	40.0	26.2	44.9	35.3	43.5	19.5	28.1	33.9	28.1	33.9	28.1	33.9
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	50.7	2.8	13.4	10.3	2.9	0.3	0.9	20.6	0.9	20.6	0.9	20.6
Delay (s)	90.7	29.0	58.3	45.5	46.4	19.8	29.0	54.5	19.8	54.5	19.8	54.5
Level of Service	F	C	E	D	D	B	C	D	B	C	D	D
Approach Delay (s)	41.1		46.4		28.8		49.2		49.2		49.2	
Approach LOS	D		D		C		D		D		D	
Intersection Summary												
HCM Average Control Delay	42.5 HCM Level of Service D											
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	96.0% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	0.98	1.00	0.95	1.00	0.95	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.97	1.00	0.98	1.00	0.95	1.00	0.95	1.00
Fltb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.96	1.00	0.95	1.00	0.95	1.00
Flt	0.93	1.00	0.92	1.00	0.92	1.00	0.96	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.99	0.99	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1705	1681	1578	3315	3315	1770	3188	1770	3188	1770	3188	1770
Flt Permitted	0.36	0.73	1.00	0.94	0.94	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	619	1290	1578	3128	3128	1770	3188	1770	3188	1770	3188	1770
Volume (vph)	10	10	20	110	110	120	10	1120	480	120	800	410
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)	11	11	21	116	116	126	11	1179	505	126	842	432
RTOR Reduction (vph)	0	20	0	0	43	0	0	39	0	0	53	0
Lane Group Flow (vph)	0	23	0	116	199	0	0	1656	0	126	1221	0
Confl. Peds. (#/hr)	36			36	48		16	16	16	16	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Perm	Prot	Perm	Prot	6
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	7	8	8	16.0	16.0	16.0	48.7	10.8	64.0	10.8	64.0	64.0
Effective Green, g (s)	6.5	7.0	7.0	16.5	16.5	16.5	49.2	11.3	64.5	11.3	64.5	64.5
Actuated g/C Ratio	0.07	0.16	0.16	0.16	0.16	0.16	0.49	0.11	0.64	0.11	0.64	0.64
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)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	43	213	260	1539	1539	200	2056	0.07	c0.38	0.07	c0.38	0.07
v/s Ratio Prot	c0.04	0.09	0.13	c0.53	c0.53	0.07	c0.38	0.07	c0.38	0.07	c0.38	0.07
v/s Ratio Perm	0.55	0.54	0.77	1.08	1.08	0.63	0.59	0.63	0.59	0.63	0.59	0.59
Uniform Delay, d1	45.0	38.3	39.9	25.4	25.4	42.4	10.2	42.4	10.2	42.4	10.2	10.2
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	7.4	1.5	11.5	37.9	37.9	4.7	1.3	4.7	1.3	4.7	1.3	1.3
Delay (s)	52.3	39.8	51.4	53.2	53.2	47.0	11.5	47.0	11.5	47.0	11.5	11.5
Level of Service	D	D	D	D	D	D	B	D	B	D	B	B
Approach Delay (s)	52.3		47.7		53.2		14.7		14.7		14.7	
Approach LOS	D		D		D		B		B		B	
Intersection Summary												
HCM Average Control Delay	37.2 HCM Level of Service D											
HCM Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	110.5% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98
Fltb, ped/bikes	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3458	1770	3308	1770	3359	1770	3359	1770	3410	1770	3410
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3458	1770	3308	1770	3359	1770	3359	1770	3410	1770	3410
Volume (vph)	480	880	80	120	510	290	90	880	260	220	660	60
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)	484	926	84	126	537	305	95	926	274	232	695	63
RTOR Reduction (vph)	0	6	0	0	79	0	0	27	0	0	7	0
Lane Group Flow (vph)	484	1004	0	126	763	0	95	1173	0	232	751	0
Confl. Peds. (#/hr)	15	48	48	15	123	48	48	48	48	48	123	123
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	15.7	28.3	10.0	22.6	5.0	32.7	12.0	39.7				
Effective Green, g (s)	15.2	29.3	9.5	23.6	4.5	33.7	11.5	40.7				
Actuated g/C Ratio	0.15	0.29	0.10	0.24	0.04	0.34	0.12	0.41				
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	522	1013	168	781	80	1132	204	1388				
v/s Ratio Prot	c0.14	c0.29	0.07	0.23	0.05	c0.35	c0.13	0.22				
v/c Ratio Perm	0.93	0.99	0.75	0.98	1.19	1.04	1.14	0.54				
Uniform Delay, d1	41.9	35.2	44.1	37.9	47.8	33.1	44.2	22.6				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.74				
Incremental Delay, d2	22.3	25.9	15.3	26.1	159.7	36.5	98.9	1.2				
Delay (s)	64.2	61.1	59.4	64.0	207.4	69.7	153.0	18.0				
Level of Service	E	E	E	E	F	E	F	B				
Approach Delay (s)	62.1		63.4		79.8		49.6					
Approach LOS	E	E	E	E	E	E	D					
Intersection Summary												
HCM Average Control Delay	64.6						HCM Level of Service			E		
HCM Volume to Capacity ratio	1.00											
Actuated Cycle Length (s)	100.0						Sum of lost time (s)			12.0		
Intersection Capacity Utilization	96.1%						ICU Level of Service			F		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	0.86	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.95	1.00	0.98
Fltb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.95	1.00	0.99
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1611			3325			3325		3433		3451	
Flt Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1611			3151			3151		3433		3451	
Volume (vph)	0	0	10	0	0	0	10	410	280	1500	300	60
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)	0	0	11	0	0	0	11	432	295	1579	316	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	718	0	1579	379	0
Confl. Peds. (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	13.0	0.0	0.0	13.0	0.0	29.0	50.0	0.0	50.0	0.0
Effective Green, g (s)	0.0	0.0	13.0	0.0	0.0	13.0	0.0	29.0	50.0	0.0	50.0	0.0
Actuated g/C Ratio	0.00	0.00	0.26	0.00	0.00	0.26	0.00	0.58	1.00	0.00	1.00	0.00
Clearance Time (s)			4.0			4.0		4.0	2.0		2.0	
Lane Grp Cap (vph)	0	0	819	0	0	819	0	1991	3451	0	3451	0
v/s Ratio Prot			c0.23			c0.23		c0.46	0.11		0.11	
v/c Ratio Perm	0.00	0.00	0.88	0.00	0.00	0.88	0.00	0.79	0.11	0.00	0.11	0.00
Uniform Delay, d1	25.0	25.0	17.7	25.0	25.0	17.7	25.0	8.2	0.0	25.0	8.2	0.0
Progression Factor	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.0	12.1	0.0	0.0	12.1	0.0	3.3	0.1	0.0	3.3	0.1
Delay (s)	25.0	25.0	25.3	25.0	25.0	25.3	25.0	11.5	0.1	25.0	11.5	0.1
Level of Service	C	C	C	C	C	C	C	B	A	C	B	A
Approach Delay (s)	25.0	25.0	25.3	25.0	25.0	25.3	25.0	9.3	0.1	25.0	9.3	0.1
Approach LOS	C	C	C	C	C	C	C	B	A	C	B	A
Intersection Summary												
HCM Average Control Delay	13.7						HCM Level of Service			B		
HCM Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	50.0						Sum of lost time (s)			8.0		
Intersection Capacity Utilization	76.7%						ICU Level of Service			D		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	↔ ↕ ↔											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.99	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.97	0.97	0.97	1.00	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Frt	0.97	0.97	0.96	0.98	0.98	0.99	1.00	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	1.00	1.00	1.00	3406	3439	3439	3439	3439	3439
Satd. Flow (prot)	1698	1658	1658	1658	1658	1658	0.92	0.93	0.93	0.93	0.93	0.93
Flt Permitted	0.88	0.88	0.88	0.92	0.92	0.92	3173	2855	2855	2855	2855	2855
Satd. Flow (perm)	1519	1540	1540	1540	1540	1540	3173	2855	2855	2855	2855	2855
Volume (vph)	30	50	20	50	100	70	30	540	80	50	270	20
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)	32	53	21	53	105	74	32	568	84	53	284	21
RTOR Reduction (vph)	0	14	0	0	34	0	0	22	0	0	9	0
Lane Group Flow (vph)	0	92	0	0	198	0	0	662	0	0	349	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	8	2	2	2	6	6	6
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
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	4.0
Lane Grp Cap (vph)	516	524	524	524	524	524	1587	1428	1428	1428	1428	1428
v/s Ratio Prot	0.06	c0.13	c0.13	c0.13	c0.13	c0.13	c0.21	0.12	0.12	0.12	0.12	0.12
v/s Ratio Perm	0.18	0.38	0.38	0.38	0.38	0.38	0.42	0.24	0.24	0.24	0.24	0.24
v/c Ratio	11.6	12.5	12.5	12.5	12.5	12.5	7.9	7.1	7.1	7.1	7.1	7.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.8	2.1	2.1	2.1	2.1	2.1	0.8	0.4	0.4	0.4	0.4	0.4
Incremental Delay, d2	12.4	14.6	14.6	14.6	14.6	14.6	8.7	7.5	7.5	7.5	7.5	7.5
Delay (s)	B	B	B	B	B	B	A	A	A	A	A	A
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	12.4	14.6	14.6	14.6	14.6	14.6	8.7	7.5	7.5	7.5	7.5	7.5
Approach LOS	B	B	B	B	B	B	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.7 HCM Level of Service											
HCM Volume to Capacity ratio	0.40 HCM Level of Service											
Actuated Cycle Length (s)	50.0 Sum of lost time (s)											
Intersection Capacity Utilization	68.5% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	↔ ↕ ↔											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.99	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.95	0.95	0.95	0.97	0.97	0.97	0.99	0.99	0.99	0.99	0.99	0.99
Ftp, ped/bikes	0.95	0.95	0.95	0.97	0.97	0.97	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1618	1681	1681	1681	1681	1681	3467	4923	4923	4923	4923	4923
Flt Permitted	0.80	0.80	0.80	0.83	0.83	0.83	0.87	0.85	0.85	0.85	0.85	0.85
Satd. Flow (perm)	1318	1318	1318	1420	1420	1420	3023	4195	4195	4195	4195	4195
Volume (vph)	60	60	60	30	60	30	50	1480	60	30	930	70
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)	63	63	63	32	63	32	53	1558	63	32	979	74
RTOR Reduction (vph)	0	32	0	0	5	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	157	0	0	122	0	0	1672	0	0	1080	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6	6
Actuated Green, G (s)	11.9	11.9	11.9	11.9	11.9	11.9	59.1	59.1	59.1	59.1	59.1	59.1
Effective Green, g (s)	12.4	12.4	12.4	12.4	12.4	12.4	59.6	59.6	59.6	59.6	59.6	59.6
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.75	0.75	0.75	0.75	0.75	0.75
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)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	204	204	204	220	220	220	2252	3125	3125	3125	3125	3125
v/s Ratio Prot	c0.12	0.09	0.09	0.09	0.09	0.09	c0.55	0.26	0.26	0.26	0.26	0.26
v/s Ratio Perm	0.77	0.55	0.55	0.55	0.55	0.55	0.74	0.35	0.35	0.35	0.35	0.35
v/c Ratio	32.4	31.2	31.2	31.2	31.2	31.2	5.8	3.5	3.5	3.5	3.5	3.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	14.4	1.7	1.7	1.7	1.7	1.7	2.3	0.3	0.3	0.3	0.3	0.3
Delay (s)	46.9	33.0	33.0	33.0	33.0	33.0	8.1	3.8	3.8	3.8	3.8	3.8
Level of Service	D	C	C	C	C	C	A	A	A	A	A	A
Approach Delay (s)	46.9	33.0	33.0	33.0	33.0	33.0	8.1	3.8	3.8	3.8	3.8	3.8
Approach LOS	D	C	C	C	C	C	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	10.0 HCM Level of Service											
HCM Volume to Capacity ratio	0.75 HCM Level of Service											
Actuated Cycle Length (s)	80.0 Sum of lost time (s)											
Intersection Capacity Utilization	102.6% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. 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
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.98	1.00	0.98	1.00	1.00	0.98	1.00
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1761	3486	1766	3440	1738	3440	1738	1821	1764	1817	1764	1817
Flt Permitted	0.29	1.00	0.17	1.00	0.57	1.00	0.57	1.00	0.37	1.00	0.37	1.00
Satd. Flow (perm)	534	3486	309	3440	1050	3440	1050	1821	678	1817	678	1817
Volume (vph)	40	820	80	560	100	130	390	60	100	200	30	30
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)	42	863	84	589	105	137	411	63	105	211	32	32
RTOR Reduction (vph)	0	9	0	0	18	0	0	7	0	0	7	0
Lane Group Flow (vph)	42	938	0	53	676	0	137	467	0	105	236	0
Confl. Peds. (#/hr)	12	12	12	12	42	12	42	12	12	12	42	42
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	6	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	6	6	6	6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	214	1394	124	1376	525	911	339	909	339	909	1394	909
v/s Ratio Prot	c0.27	c0.27	c0.27	0.20	0.20	0.20	c0.26	c0.26	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.08	0.17	0.17	0.13	0.13	0.13	0.26	0.26	0.15	0.15	0.15	0.15
v/c Ratio	0.20	0.67	0.43	0.49	0.26	0.51	0.26	0.51	0.31	0.26	0.26	0.26
Uniform Delay, d1	15.6	19.7	17.4	17.9	11.5	13.4	11.8	11.5	11.8	11.5	11.5	11.5
Progression Factor	1.00	1.00	1.80	1.92	1.73	1.78	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	2.6	8.8	1.1	0.4	0.8	2.4	0.7	2.4	0.7	2.4	0.7
Delay (s)	17.7	22.3	40.0	35.5	20.3	24.6	14.2	12.2	14.2	12.2	14.2	12.2
Level of Service	B	C	D	D	C	C	B	B	B	B	B	B
Approach Delay (s)	22.1	22.1	22.1	35.8	23.7	23.7	12.8	12.8	12.8	12.8	12.8	12.8
Approach LOS	C	C	C	D	C	C	B	B	B	B	B	B

Intersection Summary	25.1	HCM Level of Service	C
HCM Average Control Delay	25.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. 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
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.99	1.00	0.98	1.00	1.00	0.98	1.00
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1756	3469	1749	3489	1749	3489	1749	3429	1749	3429	1749	3429
Flt Permitted	0.23	1.00	0.16	1.00	0.23	1.00	0.16	1.00	0.23	1.00	0.16	1.00
Satd. Flow (perm)	433	3469	295	3489	295	3489	2820	2820	295	3489	2820	2820
Volume (vph)	50	900	80	560	100	130	390	60	100	200	30	30
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	928	82	563	103	137	411	63	103	211	32	32
RTOR Reduction (vph)	0	8	0	0	18	0	0	7	0	0	7	0
Lane Group Flow (vph)	52	1002	0	52	683	0	137	467	0	105	236	0
Confl. Peds. (#/hr)	24	24	24	78	78	24	78	24	78	24	78	78
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	6	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	6	6	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	46.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	135	1084	92	1090	525	911	339	909	339	909	1394	909
v/s Ratio Prot	c0.29	c0.29	c0.29	0.20	0.20	0.20	c0.26	c0.26	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.12	0.18	0.18	0.18	0.18	0.18	0.26	0.26	0.15	0.15	0.15	0.15
v/c Ratio	0.39	0.92	0.57	0.63	0.39	0.51	0.26	0.51	0.31	0.26	0.26	0.26
Uniform Delay, d1	21.5	26.6	23.0	23.5	11.5	13.4	11.8	11.5	11.8	11.5	11.5	11.5
Progression Factor	0.47	0.50	0.90	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.5	11.9	20.3	2.4	0.4	0.8	2.4	0.7	2.4	0.7	2.4	0.7
Delay (s)	16.7	25.2	40.9	23.3	20.3	24.6	14.2	12.2	14.2	12.2	14.2	12.2
Level of Service	B	C	D	C	C	C	B	B	B	B	B	B
Approach Delay (s)	24.7	24.7	24.7	35.8	23.7	23.7	12.8	12.8	12.8	12.8	12.8	12.8
Approach LOS	C	C	C	D	C	C	B	B	B	B	B	B

Intersection Summary	20.0	HCM Level of Service	C
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.98	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1765	3504	1759	3441	1759	3441	3371	3371	3426	3426	3426	3426	3426
Flt Permitted	0.26	1.00	0.26	1.00	0.26	1.00	0.87	0.87	0.70	0.70	0.70	0.70	0.70
Satd. Flow (perm)	488	3504	488	338	488	338	2948	2948	2447	2447	2447	2447	2447
Volume (vph)	70	900	50	60	650	120	70	410	150	90	210	40	40
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	71	909	51	61	657	121	71	414	152	91	212	40	40
RTOR Reduction (vph)	0	5	0	0	19	0	0	28	0	0	13	0	0
Lane Group Flow (vph)	71	955	0	61	759	0	0	609	0	0	330	0	0
Confl. Peds. (#/hr)	8	39	39	8	8	8	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	8	2	2	6	6	6	6	6
Permitted Phases	4	8	8	8	8	8	2	2	6	6	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	214	1533	148	1505	148	1505	1363	1363	1132	1132	1132	1132	1132
v/s Ratio Prot	c0.27	c0.27	c0.27	c0.22	c0.22	c0.22	c0.21	c0.21	0.13	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.33	0.62	0.41	0.50	0.41	0.50	0.45	0.45	0.29	0.29	0.29	0.29	0.29
Uniform Delay, d1	14.8	17.4	15.4	16.2	15.4	16.2	14.6	14.6	13.4	13.4	13.4	13.4	13.4
Progression Factor	0.94	1.04	1.00	1.00	1.00	1.00	1.51	1.51	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	1.0	8.3	1.2	8.3	1.2	0.9	0.9	0.7	0.7	0.7	0.7	0.7
Delay (s)	15.9	19.0	23.7	17.4	23.7	17.4	22.9	22.9	14.0	14.0	14.0	14.0	14.0
Level of Service	B	B	C	B	C	B	C	C	B	B	B	B	B
Approach Delay (s)	18.8	17.9	17.9	18.8	17.9	17.9	22.9	22.9	14.0	14.0	14.0	14.0	14.0
Approach LOS	B	B	B	B	B	B	C	C	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	18.9 HCM Level of Service B
HCM Volume to Capacity ratio	0.53
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	85.2% ICU Level of Service E
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2015 PM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3400	1770	3400	1770	3400	1770	3539	3539	3400	3400
Flt Permitted	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3400	1770	3400	1770	3400	1770	3539	3539	3400	3400
Volume (vph)	1050	80	80	820	0	0	0	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1082	82	82	845	0	0	0	0	0	0
RTOR Reduction (vph)	9	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1155	0	82	845	0	0	0	0	0	0
Confl. Peds. (#/hr)	213	348	348	213	348	348	213	348	213	348
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	3	8	8	8	8	8	8	8
Permitted Phases	4	3	3	8	8	8	8	8	8	8
Actuated Green, G (s)	27.0	25.0	25.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Effective Green, g (s)	27.0	25.0	25.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Actuated g/C Ratio	0.45	0.42	0.42	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1530	738	3539	1530	738	3539	1530	738	3539	1530
v/s Ratio Prot	c0.34	c0.05	c0.24	c0.24	c0.24	c0.24	c0.24	c0.24	c0.24	c0.24
v/s Ratio Perm	0.75	0.11	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Uniform Delay, d1	13.7	10.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	3.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Delay (s)	17.2	11.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Level of Service	B	B	A	A	A	A	A	A	A	A
Approach Delay (s)	17.2	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	B	A	A	A	A	A	A	A	A	A

Intersection Summary	
HCM Average Control Delay	10.1 HCM Level of Service B
HCM Volume to Capacity ratio	0.49
Actuated Cycle Length (s)	60.0 Sum of lost time (s) 4.0
Intersection Capacity Utilization	43.2% ICU Level of Service A
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
11: 40th St. & BART parking

2015 PM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	970	80	0	900	0	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1021	84	0	947	0	74
Pedestrians				109	109	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage				9	9	
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)	81			406		
pX, platoon unblocked	0.72			0.77		0.72
VC, conflicting volume	1214			1646		771
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	904			1117		285
IC, single (s)	4.1			6.8		6.9
IC, 2 stage (s)						
tF (s)	2.2			3.5		3.3
p0 queue free %	100			100		83
cM capacity (veh/h)	488			141		422
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	681	425	474	474	74	74
Volume Left	0	0	0	0	0	0
Volume Right	0	84	0	0	74	74
cSH	1700	1700	1700	1700	422	422
Volume to Capacity	0.40	0.25	0.28	0.28	0.17	0.17
Queue Length 95th (ft)	0	0	0	0	0	16
Control Delay (s)	0.0	0.0	0.0	0.0	15.3	15.3
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	0.0	15.3	15.3
Approach LOS					C	C
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	49.8%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
12: 40th St. & BART parking

2015 PM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1030	10	0	900	0	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1084	11	0	947	0	63
Pedestrians				109	109	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage				9	9	
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)	298			189		
pX, platoon unblocked	0.74			0.74		0.80
VC, conflicting volume	1204			1672		765
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	919			1103		323
IC, single (s)	4.1			6.8		6.9
IC, 2 stage (s)						
tF (s)	2.2			3.5		3.3
p0 queue free %	100			100		85
cM capacity (veh/h)	494			150		409
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	723	372	474	474	63	63
Volume Left	0	0	0	0	0	0
Volume Right	0	11	0	0	63	63
cSH	1700	1700	1700	1700	409	409
Volume to Capacity	0.43	0.22	0.28	0.28	0.15	0.15
Queue Length 95th (ft)	0	0	0	0	0	14
Control Delay (s)	0.0	0.0	0.0	0.0	15.4	15.4
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	0.0	15.4	15.4
Approach LOS					C	C
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	48.8%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2015 PM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.98	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flpb, ped/bikes	0.94	1.00	0.98	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.97	1.00
Flt	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1655	3408	1734	3313	1770	3486	1770	3486	1770	3313	1770	3313
Flt Permitted	0.29	1.00	0.15	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	513	3408	281	3313	1770	3486	1770	3486	1770	3313	1770	3313
Volume (vph)	250	720	120	40	490	110	230	1200	80	110	600	180
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	255	735	122	41	500	112	235	1224	82	112	612	184
RTOR Reduction (vph)	0	17	0	0	24	0	0	5	0	0	34	0
Lane Group Flow (vph)	255	840	0	41	588	0	235	1301	0	112	762	0
Confl. Peds. (#/hr)	94	86	86	94	86	94	86	94	86	94	86	94
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	8	8	5	2	1	6					
Permitted Phases	4	8	8	5	2	1	6					
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	12.6	32.8			8.2	28.4	
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	13.1	33.3			8.7	28.9	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.16	0.42			0.11	0.36	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5			4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0	
Lane Grp Cap (vph)	167	1108	91	1077	290	1451	192	1197		192	1197	
v/s Ratio Prot	0.25	0.18	0.18	c0.13	c0.37	0.06	0.23			0.06	0.23	
v/c Ratio Perm	c0.50	0.15	0.15	0.15	0.15	0.81	0.90			0.58	0.64	
v/c Ratio	1.53	0.76	0.45	0.55	0.55	0.81	0.90			0.58	0.64	
Uniform Delay, d1	27.0	24.2	21.4	22.2	32.3	21.7	33.9	21.2		33.9	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	265.1	2.7	1.3	0.3	14.9	9.0	2.9	2.6		2.9	2.6	
Delay (s)	292.1	26.9	22.6	22.5	47.1	30.7	36.8	23.8		36.8	23.8	
Level of Service	F	C	C	C	D	C	D	C		D	C	
Approach Delay (s)	87.7	22.5	22.5	33.2	33.2	25.4	25.4			25.4	25.4	
Approach LOS	F	C	C	C	D	C	C			D	C	

Intersection Summary	
HCM Average Control Delay	44.2
HCM Volume to Capacity ratio	1.09
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	87.3%
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave. 2015 PM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	80	20	1460	760	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	21	83	21	1521	792	21
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	0.82	0.88	0.88	396	625	
Upstream signal (ft)	1804	606	912			
pX, platoon unblocked						
VC, conflicting volume	1804	606	912			
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1327	417	765			
IC, single (s)	6.8	6.9	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	79	81	97			
cM capacity (veh/h)	98	432	681			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	104	21	760	760	528	285
Volume Left	21	21	0	0	0	0
Volume Right	83	0	0	0	0	21
cSH	258	681	1700	1700	1700	1700
Volume to Capacity	0.40	0.03	0.45	0.45	0.31	0.17
Queue Length 95th (ft)	46	2	0	0	0	0
Control Delay (s)	28.2	10.5	0.0	0.0	0.0	0.0
Lane LOS	D	B	B	B	B	B
Approach Delay (s)	28.2	0.1	0.0	0.0	0.0	0.0
Approach LOS	D	D	D	D	D	D

Intersection Summary	
Average Delay	1.3
Intersection Capacity Utilization	60.3%
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

2015 PM
 1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↓	↓
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	40	1440	30	20	820
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	42	1516	32	21	863
Pedestrians	52	52	52	52	45	45
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4	4	4	4	4	4
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None
Upstream signal (ft)	0.79	0.75	230	0.75	0.75	791
pX, platoon unblocked	2109	871	1599	1599	1599	1599
VC, conflicting volume	2109	871	1599	1599	1599	1599
VC1, stage 1 cont vol	2109	871	1599	1599	1599	1599
VC2, stage 2 cont vol	2109	871	1599	1599	1599	1599
vCu, unblocked vol	1864	499	1468	1468	1468	1468
IC, single (s)	6.8	6.9	4.1	4.1	4.1	4.1
IC, 2 stage (s)	3.5	3.3	2.2	2.2	2.2	2.2
p0 queue free %	52	88	94	94	94	94
cM capacity (veh/h)	43	358	328	328	328	328
Direction, Lane #	WB 1	NB 2	NB 2	SB 1	SB 2	SB 3
Volume Total	63	1011	537	21	432	432
Volume Left	21	0	0	21	0	0
Volume Right	42	0	32	0	0	0
cSH	105	1700	1700	328	1700	1700
Volume to Capacity	0.60	0.59	0.32	0.06	0.25	0.25
Queue Length 95th (ft)	73	0	0	5	0	0
Control Delay (s)	81.3	0.0	0.0	16.7	0.0	0.0
Lane LOS	F	C	C	C	C	C
Approach Delay (s)	81.3	0.0	0.4	0.4	0.4	0.4
Approach LOS	F	F	F	F	F	F

Intersection Summary	WB 1	NB 2	NB 2	SB 1	SB 2	SB 3
Average Delay			2.2			
Intersection Capacity Utilization			59.2%			
Analysis Period (min)			15			
ICU Level of Service			B			

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2015 PM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	0.96	1.00	0.96	1.00	0.96	1.00	0.96	1.00	1.00	1.00
Frt	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Fit Protected	5017	1768	3395	1768	3395	1768	3395	1768	3395	1768	1809	1809
Satd. Flow (prot)	0.74	0.31	1.00	0.74	0.31	1.00	0.74	0.31	1.00	0.74	0.26	1.00
Fit Permitted	3726	569	3395	569	3395	569	3395	569	3395	569	486	1809
Satd. Flow (perm)	110	680	30	90	650	200	80	370	90	70	270	50
Volume (vph)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Peak-hour factor, PHF	112	694	31	92	663	204	82	378	92	71	276	51
Adj. Flow (vph)	0	5	0	0	36	0	0	9	0	0	8	0
RTOR Reduction (vph)	0	832	0	92	831	0	0	543	0	71	319	0
Lane Group Flow (vph)	24	4	4	24	24	24	24	12	12	12	12	24
Conf. Peds. (#/hr)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Turn Type	4	4	4	8	8	2	2	2	2	6	6	6
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	2189	334	1995	334	1995	398	398	398	398	152	565	565
v/s Ratio Prot	0.22	0.16	0.16	0.22	0.16	0.43	0.43	0.43	0.43	0.15	0.18	0.18
v/s Ratio Perm	0.38	0.28	0.42	0.38	0.28	0.42	0.38	0.28	0.42	0.47	0.56	0.56
Uniform Delay, d1	8.8	8.1	9.0	8.8	8.1	9.0	8.8	8.1	9.0	22.1	23.0	23.0
Progression Factor	1.00	1.73	1.81	1.00	0.79	0.79	1.00	0.79	0.79	0.79	0.79	0.79
Incremental Delay, d2	0.5	1.9	0.6	0.5	1.9	0.6	0.5	1.9	0.6	9.6	3.9	3.9
Delay (s)	9.3	16.0	16.9	9.3	16.0	16.9	9.3	16.0	16.9	27.0	21.9	21.9
Level of Service	A	B	B	A	B	B	A	B	B	C	C	C
Approach Delay (s)	9.3	16.8	16.8	9.3	16.8	16.8	9.3	16.8	16.8	22.8	22.8	22.8
Approach LOS	A	B	B	A	B	B	A	B	B	C	C	C

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay												
HCM Volume to Capacity ratio												
Actuated Cycle Length (s)												
Intersection Capacity Utilization												
Analysis Period (min)												
ICU Level of Service												

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. 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
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	0.99	0.99	0.99	1.00	0.96	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Flt	0.99	0.99	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5004	4946	4946	1770	1789	1763	1829	1763	1829	1763	1829	1763
Flt Permitted	0.76	0.81	0.81	0.42	1.00	0.33	1.00	0.33	1.00	0.33	1.00	0.33
Satd. Flow (perm)	3811	4041	4041	773	1789	609	1829	609	1829	609	1829	609
Volume (vph)	80	590	40	80	750	150	60	230	70	70	220	30
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)	84	621	42	84	789	158	63	242	74	74	232	32
RTOR Reduction (vph)	0	8	0	0	32	0	0	14	0	0	6	0
Lane Group Flow (vph)	0	739	0	0	999	0	63	302	0	74	258	0
Confl. Peds. (#/hr)	12	12	12	12	12	12	12	12	12	12	12	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
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	4.0
Lane Grp Cap (vph)	2453	2453	2453	2601	2601	2601	198	458	156	469	156	469
v/s Ratio Prot	0.19	0.25	0.25	0.08	0.08	0.08	c0.17	c0.17	0.12	0.12	0.14	0.14
v/s Ratio Perm	0.30	0.38	0.38	0.32	0.32	0.32	0.66	0.66	0.47	0.47	0.55	0.55
Uniform Delay, d1	6.3	6.7	6.7	24.1	24.1	24.1	26.6	26.6	25.2	25.2	25.8	25.8
Progression Factor	1.27	1.69	1.69	1.00	1.00	1.00	1.12	1.12	1.12	1.12	1.13	1.13
Incremental Delay, d2	0.3	0.4	0.4	4.2	4.2	4.2	7.3	7.3	9.4	9.4	4.3	4.3
Delay (s)	8.3	11.8	11.8	28.3	28.3	28.3	33.9	33.9	37.7	37.7	33.5	33.5
Level of Service	A	B	B	C	C	C	C	C	D	D	C	C
Approach Delay (s)	8.3	11.8	11.8	11.8	11.8	11.8	32.9	32.9	34.4	34.4	34.4	34.4
Approach LOS	A	B	B	B	B	B	C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	17.0
HCM Level of Service	B
HCM Volume to Capacity ratio	0.46
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.8%
ICU Level of Service	D
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. 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
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	0.99	0.99	0.99	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Flt	0.99	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	5009	4893	4893	3423	3423	3423	3423	3423	3423	3423	3415	3415
Flt Permitted	0.74	0.74	0.74	0.86	0.86	0.86	0.85	0.85	0.85	0.85	0.70	0.70
Satd. Flow (perm)	3749	4198	4198	2926	2926	2926	2926	2926	2926	2926	2414	2414
Volume (vph)	80	630	40	80	870	250	60	300	60	80	200	40
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	81	636	40	81	879	253	61	303	61	81	202	40
RTOR Reduction (vph)	0	7	0	0	61	0	0	17	0	0	14	0
Lane Group Flow (vph)	0	750	0	0	1132	0	0	408	0	0	309	0
Confl. Peds. (#/hr)	9	17	17	17	17	17	9	12	10	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2413	2413	2413	2702	2702	2702	750	750	750	750	619	619
v/s Ratio Prot	0.20	0.27	0.27	c0.27	c0.27	c0.27	0.14	0.14	0.14	0.13	0.13	0.13
v/s Ratio Perm	0.31	0.31	0.31	0.42	0.42	0.42	0.54	0.54	0.54	0.50	0.50	0.50
Uniform Delay, d1	6.3	6.3	6.3	7.0	7.0	7.0	25.7	25.7	25.7	25.4	25.4	25.4
Progression Factor	1.48	1.48	1.48	1.00	1.00	1.00	1.00	1.00	1.00	1.28	1.28	1.28
Incremental Delay, d2	0.3	0.3	0.3	0.5	0.5	0.5	2.8	2.8	2.8	2.8	2.8	2.8
Delay (s)	9.7	9.7	9.7	7.4	7.4	7.4	28.5	28.5	28.5	35.2	35.2	35.2
Level of Service	A	A	A	A	A	A	C	C	C	D	D	D
Approach Delay (s)	9.7	9.7	9.7	7.4	7.4	7.4	28.5	28.5	28.5	35.2	35.2	35.2
Approach LOS	A	A	A	A	A	A	C	C	C	D	D	D

Intersection Summary	
HCM Average Control Delay	14.7
HCM Level of Service	B
HCM Volume to Capacity ratio	0.45
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	107.3%
ICU Level of Service	G
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2015 PM
1/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Free	Free	0%	0%
Grade	0	0	0	0	0	0	0	0
Volume (veh/h)	800	950	20	0	230	0	230	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	833	990	21	0	240	79	0
Pedestrians	79	0	0	0	0	0	0	0
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	4.0	4.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	7	7
Percent Blockage	7	0	0	0	0	0	0	0
Right turn flare (veh)	None	None	None	None	None	None	None	None
Median type	None	None	None	None	None	None	None	None
Median storage (veh)	698	473	0	0	0	0	0	0
Upstream signal (ft)	1089	0	0	0	0	0	1357	498
pX, platoon unblocked	1089	0	0	0	0	0	1357	498
VC, conflicting volume	4.1	0	0	0	0	0	6.8	6.9
VC1, stage 1 conf vol	2.2	0	0	0	0	0	3.5	3.3
VC2, stage 2 conf vol	100	0	0	0	0	0	100	47
tC, single (s)	594	0	0	0	0	0	131	452
tC, 2 stage (s)	2.2	0	0	0	0	0	3.5	3.3
p0 queue free %	100	0	0	0	0	0	100	47
cM capacity (veh/h)	594	0	0	0	0	0	131	452
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 1
Volume Total	278	278	278	396	396	219	240	240
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	21	240	240
cSH	1700	1700	1700	1700	1700	1700	1700	452
Volume to Capacity	0.16	0.16	0.16	0.23	0.23	0.13	0.53	0.53
Queue Length 95th (ft)	0	0	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	21.6	21.6
Lane LOS	C	C	C	C	C	C	C	C
Approach Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	21.6	21.6
Approach LOS	C	C	C	C	C	C	C	C
Intersection Summary								
Average Delay	2.5							
Intersection Capacity Utilization	45.1%							
Analysis Period (min)	15							
ICU Level of Service	A							

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2015 PM
1/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0	0	0	0	0	0	0	0	0	0	0	0
Volume (veh/h)	180	570	60	90	780	420	100	870	100	220	570	60
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)	189	600	63	95	821	442	105	916	105	232	600	63
RTOR Reduction (vph)	0	7	0	0	7	0	0	7	0	0	0	7
Lane Group Flow (vph)	0	845	0	0	1351	0	105	1014	0	232	656	0
Conf. Peds. (#/hr)	26	0	19	0	0	26	39	0	92	0	92	39
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	2	2	6	6	6
Actuated Green, G (s)	35.1	35.1	35.1	35.1	34.4	34.4	34.4	34.4	34.4	34.4	34.4	34.4
Effective Green, g (s)	36.6	36.6	36.6	36.6	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Clearance Time (s)	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (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
Lane Grp Cap (vph)	1524	1524	1725	1725	263	1526	131	1537	0	131	1537	0
v/s Ratio Prot	0.25	0.25	0.25	0.36	0.18	0.18	0.29	0.29	0.29	0.78	0.78	0.19
v/s Ratio Perm	1.14dl	1.14dl	1.14dl	0.78	0.40	0.66	0.66	0.66	0.66	1.77	1.77	0.43
Uniform Delay, d1	15.8	15.8	15.8	15.3	15.1	17.6	22.3	15.3	15.3	15.3	15.3	15.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2	0.2	2.2	4.5	2.3	376.1	0.9	0.9	376.1	0.9	0.9
Delay (s)	16.0	16.0	16.0	20.6	19.6	19.9	398.4	16.2	16.2	398.4	16.2	16.2
Level of Service	B	B	B	C	B	B	F	B	B	F	B	B
Approach Delay (s)	16.0	16.0	20.6	20.6	19.9	19.9	115.3	115.3	115.3	115.3	115.3	115.3
Approach LOS	B	B	C	C	B	B	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	39.5											
HCM Volume to Capacity ratio	1.27											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	98.0%											
Analysis Period (min)	15											
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.	F											
c Critical Lane Group	c											

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5031	5031	5031	5031	5031	5031	5031	5031	5031	5031	5031	5031
Flt Permitted	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Satd. Flow (perm)	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236
Volume (vph)	40	850	30	100	1160	40	90	90	200	30	30	80
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	40	859	30	101	1172	40	91	91	202	30	30	81
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	77	0	37	0
Lane Group Flow (vph)	0	925	0	0	1309	0	0	182	125	0	104	0
Confit. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	49.5	49.5	49.5	49.5	49.5	49.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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 Grp Cap (vph)	2568	2568	2568	2568	2568	2568	429	413	413	428	428	428
v/s Ratio Prot	0.22	0.33	0.33	0.33	0.33	0.33	0.12	0.09	0.07	0.07	0.07	0.07
v/s Ratio Perm	0.36	0.55	0.55	0.55	0.55	0.55	0.42	0.30	0.24	0.24	0.24	0.24
v/c Ratio	7.9	9.3	9.3	9.3	9.3	9.3	22.8	21.9	21.5	21.5	21.5	21.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.4	0.9	0.9	0.9	0.9	0.9	3.1	1.9	1.3	1.3	1.3	1.3
Incremental Delay, d2	8.3	10.2	10.2	10.2	10.2	10.2	25.8	23.8	22.8	22.8	22.8	22.8
Delay (s)	A	B	B	B	B	B	C	C	C	C	C	C
Level of Service	A	B	B	B	B	B	C	C	C	C	C	C
Approach Delay (s)	8.3	10.2	10.2	10.2	10.2	10.2	24.8	22.8	22.8	22.8	22.8	22.8
Approach LOS	A	B	B	B	B	B	C	C	C	C	C	C

Intersection Summary	A	B	C
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	108.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	0.94	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.98	0.98	1.00	0.99	0.99	1.00	0.94	0.94	1.00	0.95	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	0.98	1.00	0.97	0.97	1.00	0.85	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4919	4919	1770	4884	4884	1770	3539	1488	1770	3539	1497
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4919	4919	1770	4884	4884	1770	3539	1488	1770	3539	1497
Volume (vph)	200	750	100	110	930	240	230	850	180	380	420	110
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)	211	789	105	116	979	253	242	895	189	400	442	116
RTOR Reduction (vph)	0	14	0	0	38	0	0	0	24	0	0	69
Lane Group Flow (vph)	211	880	0	116	1194	0	242	895	165	400	442	47
Confit. Peds. (#/hr)	81	81	81	81	81	81	81	81	81	81	81	81
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	7	4	4	7	4	4	7	4	4
Permitted Phases	7	4	4	7	4	4	7	4	4	7	4	4
Actuated Green, G (s)	12.0	34.0	34.0	12.0	34.0	34.0	21.0	33.0	45.0	25.0	37.0	49.0
Effective Green, g (s)	11.0	35.0	35.0	11.0	35.0	35.0	20.0	34.0	45.0	24.0	38.0	49.0
Actuated g/C Ratio	0.09	0.29	0.29	0.09	0.29	0.29	0.17	0.28	0.38	0.20	0.32	0.41
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0
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	3.0
Lane Grp Cap (vph)	162	1435	1435	162	1425	1425	295	1003	608	354	1121	661
v/s Ratio Prot	0.12	0.18	0.18	0.07	0.24	0.24	0.14	0.25	0.02	0.23	0.12	0.01
v/s Ratio Perm	1.30	0.61	0.61	0.72	0.84	0.84	0.82	0.89	0.27	1.13	0.39	0.07
v/c Ratio	54.5	36.7	36.7	53.0	39.8	39.8	48.3	41.2	26.1	48.0	32.0	21.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	173.6	2.0	2.0	14.0	6.0	6.0	16.5	11.9	0.2	87.9	1.0	0.0
Delay (s)	228.1	38.6	38.6	67.0	45.9	45.9	64.7	53.2	26.3	135.9	33.1	21.7
Level of Service	F	D	D	E	D	D	E	D	C	F	C	C
Approach Delay (s)	74.8	74.8	74.8	47.7	47.7	47.7	51.5	51.5	74.6	74.6	74.6	74.6
Approach LOS	E	E	E	D	D	D	D	D	D	E	E	E

Intersection Summary	A	B	C
HCM Average Control Delay	60.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2015 PM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	0.94			0.96			1.00	0.99		1.00	0.99	
Ftbp, ped/bikes	0.97			0.97			1.00	0.94		1.00	0.94	
Ft	0.96			0.96			1.00	0.99		1.00	0.99	
Fit Protected	0.98			0.98			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1590			1639			1689	3454		1669	3454	
Fit Permitted	0.67			0.81			0.30	1.00		0.35	1.00	
Satd. Flow (perm)	1094			1355			527	3454		616	3454	
Volume (vph)	110	50	70	60	70	60	140	650	50	40	770	60
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)	116	53	74	63	74	63	147	684	53	42	811	63
RTOR Reduction (vph)	0	20	0	0	21	0	0	6	0	0	6	0
Lane Group Flow (vph)	0	223	0	0	179	0	147	731	0	42	868	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	19.1			19.1			58.9	58.9		58.9	58.9	
Effective Green, g (s)	18.6			18.6			58.4	58.4		58.4	58.4	
Actuated g/C Ratio	0.22			0.22			0.69	0.69		0.69	0.69	
Clearance Time (s)	3.5			3.5			3.5	3.5		3.5	3.5	
Vehicle Extension (s)	2.0			2.0			2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	239			297			362	2373		423	2373	
v/s Ratio Prot							0.21					
v/s Ratio Perm	0.20			0.13			0.28			0.07		
v/c Ratio	0.93			0.60			0.41	0.31		0.10	0.37	
Uniform Delay, d1	32.6			29.9			5.8	5.3		4.5	5.6	
Progression Factor	1.00			1.00			1.00	1.00		1.00	1.00	
Incremental Delay, d2	39.4			2.4			3.4	0.3		0.5	0.4	
Delay (s)	72.0			32.2			9.1	5.6		4.9	6.0	
Level of Service	E			C			A	A		A	A	
Approach Delay (s)	72.0			32.2			6.2	6.2		5.9	5.9	
Approach LOS	E			C			A	A		A	A	

Intersection Summary	
HCM Average Control Delay	15.5
HCM Volume to Capacity ratio	0.53
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	63.8%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2015 PM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97	1.00	0.97	1.00	0.94	1.00	0.99	1.00	0.97	1.00	0.93
Ftbp, ped/bikes	1.00	0.97	1.00	0.97	1.00	0.96	1.00	0.99	1.00	0.97	1.00	0.94
Ft	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Protected	1770	3340	1770	3179	1770	3179	1695	3474	1770	3179	1714	3122
Satd. Flow (prot)	1770	3340	1770	3179	1770	3179	1695	3474	1770	3179	1714	3122
Fit Permitted	1770	3340	1770	3179	1770	3179	1695	3474	1770	3179	1714	3122
Satd. Flow (perm)	1770	3340	1770	3179	1770	3179	1695	3474	1770	3179	1714	3122
Volume (vph)	140	420	110	70	440	180	170	640	50	110	500	300
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	429	112	71	449	184	173	653	51	112	510	306
RTOR Reduction (vph)	0	28	0	0	55	0	0	6	0	0	96	0
Lane Group Flow (vph)	143	513	0	71	578	0	173	698	0	112	720	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	4	3	8	2	2	2	2	2	2	6
Permitted Phases	7	4	4	3	8	2	2	2	2	2	2	6
Actuated Green, G (s)	9.5	22.2	6.7	19.4	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6
Effective Green, g (s)	10.0	21.7	7.2	18.9	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1
Actuated g/C Ratio	0.12	0.26	0.08	0.22	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Clearance Time (s)	4.5	3.5	4.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (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
Lane Grp Cap (vph)	208	853	150	707	255	1802	306	1620	306	1620	1620	306
v/s Ratio Prot	c0.08	c0.15	0.04	c0.18	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.23
v/s Ratio Perm	0.69	0.60	0.47	0.82	0.68	0.39	0.37	0.44	0.37	0.44	0.37	0.44
Uniform Delay, d1	36.0	27.8	37.1	31.4	15.2	12.3	12.1	12.8	12.1	12.8	12.1	12.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	0.8	0.9	6.9	13.6	0.6	3.4	0.9	3.4	0.9	3.4	0.9
Delay (s)	43.3	28.7	38.0	38.3	28.8	12.9	15.5	13.7	12.9	15.5	13.7	13.7
Level of Service	D	C	D	D	D	C	B	B	B	B	B	B
Approach Delay (s)	31.7	31.7	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3
Approach LOS	C	C	D	D	D	D	B	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	23.7
HCM Volume to Capacity ratio	0.75
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	75.8%
Analysis Period (min)	15

c Critical Lane Group

**APPENDIX F:
YEAR 2015 PLUS PROJECT CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2015 AM + Project
1/21/2008

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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4907		1770	4953		2006	2043		1985	1956	
Flt Permitted	0.95	1.00		0.95	1.00		0.10	1.00		0.45	1.00	
Satd. Flow (perm)	1770	4907		1770	4953		201	2043		930	1956	
Volume (vph)	300	951	205	90	1330	200	200	289	60	160	415	270
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)	316	1001	216	95	1400	211	211	304	63	168	437	284
RTOR Reduction (vph)	0	26	0	0	16	0	0	7	0	0	19	0
Lane Group Flow (vph)	316	1191	0	95	1595	0	211	360	0	168	702	0
Confl. Peds. (#/hr)			10	10		10	10		10	10		10
Turn Type	Prot			Prot			pm+pt		Perm			
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	17.0	49.4		11.6	44.0		48.5	48.5		39.5	39.5	
Effective Green, g (s)	17.0	49.4		11.6	44.0		49.0	49.0		40.0	40.0	
Actuated g/C Ratio	0.14	0.41		0.10	0.37		0.41	0.41		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	2020		171	1816		187	834		310	652	
v/s Ratio Prot	c0.18	0.24		0.05	c0.32		c0.07	0.18		c0.36		
v/s Ratio Perm							0.39			0.18		
v/c Ratio	1.26	0.59		0.56	0.88		1.13	0.43		0.54	1.08	
Uniform Delay, d1	51.5	27.4		51.7	35.5		58.7	25.5		32.5	40.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	144.6	1.3		3.9	6.4		104.5	0.4		1.9	57.5	
Delay (s)	196.1	28.7		55.6	41.9		163.2	25.9		34.5	97.5	
Level of Service	F	C		E	D		F	C		C	F	
Approach Delay (s)	63.2			42.7			76.0			85.6		
Approach LOS	E			D			E			F		
Intersection Summary												
HCM Average Control Delay	61.6			HCM Level of Service				E				
HCM Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)				12.0				
Intersection Capacity Utilization	110.0%			ICU Level of Service				H				
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2015 AM + Project
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0		
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95		
Flpb, ped/bikes		1.00		1.00	0.99			0.99		1.00	0.96		
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00		
Frt		0.95		1.00	0.91			0.97		1.00	0.96		
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00		
Satd. Flow (prot)		1748		1681	1596			3420		1770	3268		
Flt Permitted		0.48		0.74	1.00			0.93		0.95	1.00		
Satd. Flow (perm)		846		1302	1596			3197		1770	3268		
Volume (vph)	10	10	10	174	110	160	10	1158	236	100	1149	450	
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)	11	11	11	183	116	168	11	1219	248	105	1209	474	
RTOR Reduction (vph)	0	10	0	0	68	0	0	14	0	0	33	0	
Lane Group Flow (vph)	0	23	0	183	216	0	0	1464	0	105	1650	0	
Confl. Peds. (#/hr)	4					4	44		12			44	
Turn Type	Perm		Perm			Perm			Prot				
Protected Phases	7		8			8			2		1		6
Permitted Phases	7		8			2							
Actuated Green, G (s)	5.1		16.2			16.2			43.0		7.7		55.2
Effective Green, g (s)	5.6		16.7			16.7			43.5		8.2		55.7
Actuated g/C Ratio	0.06		0.19			0.19			0.48		0.09		0.62
Clearance Time (s)	4.5		4.5			4.5			4.5		4.5		4.5
Vehicle Extension (s)	2.0		2.0			2.0			2.0		2.0		2.0
Lane Grp Cap (vph)	53		242			296			1545		161		2023
v/s Ratio Prot									0.06		c0.51		
v/s Ratio Perm	c0.03		c0.14			0.14			c0.46				
v/c Ratio	0.43		0.76			0.73			0.95		0.65		0.82
Uniform Delay, d1	40.7		34.7			34.5			22.2		39.5		13.2
Progression Factor	1.00		1.00			1.00			1.01		1.00		1.00
Incremental Delay, d2	2.0		11.3			7.8			5.8		7.0		3.8
Delay (s)	42.7		46.0			42.3			28.1		46.5		17.0
Level of Service	D		D			D			C		D		B
Approach Delay (s)	42.7		43.8			28.1			18.7				
Approach LOS	D		D			C			B				
Intersection Summary													
HCM Average Control Delay	25.7			HCM Level of Service				C					
HCM Volume to Capacity ratio	0.87												
Actuated Cycle Length (s)	90.0			Sum of lost time (s)				16.0					
Intersection Capacity Utilization	107.6%			ICU Level of Service				G					
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 AM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.95	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3437	1770	3356	1770	3418	1770	3418	1770	3395	1770	3395
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3437	1770	3356	1770	3418	1770	3418	1770	3395	1770	3395
Volume (vph)	460	590	91	120	700	310	110	664	120	280	883	180
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	615	95	125	729	323	115	692	125	292	920	188
RTOR Reduction (vph)	0	13	0	0	56	0	0	17	0	0	18	0
Lane Group Flow (vph)	479	697	0	125	996	0	115	800	0	292	1090	0
Confl. Peds. (#/hr)	6		24	24		6	36		28	28		36
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	13.0	28.9		9.6	25.5		8.1	23.5		11.0	26.4	
Effective Green, g (s)	12.5	29.9		9.1	26.5		7.6	24.5		10.5	27.4	
Actuated g/C Ratio	0.14	0.33		0.10	0.29		0.08	0.27		0.12	0.30	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	477	1142		179	988		149	930		207	1034	
v/s Ratio Prot	c0.14	c0.20		0.07	c0.30		0.06	0.23		c0.17	c0.32	
v/s Ratio Perm												
v/c Ratio	1.00	0.61		0.70	1.01		0.77	0.86		1.41	1.05	
Uniform Delay, d1	38.8	25.2		39.1	31.8		40.4	31.1		39.8	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.14	0.88	
Incremental Delay, d2	42.2	0.7		9.2	30.7		19.9	10.3		201.0	37.4	
Delay (s)	81.0	25.8		48.3	62.4		60.2	41.4		246.5	64.9	
Level of Service	F	C		D	E		E	D		F	E	
Approach Delay (s)		48.1			60.9			43.7			102.8	
Approach LOS		D			E			D			F	
Intersection Summary												
HCM Average Control Delay	66.7		HCM Level of Service				E					
HCM Volume to Capacity ratio	1.14											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)				20.0					
Intersection Capacity Utilization	94.0%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 AM + Project
1/21/2008

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)		4.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		0.97	0.95	
Frt		0.86						0.93		1.00	0.98	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		1611						3283		3433	3475	
Flt Permitted		1.00						0.94		0.95	1.00	
Satd. Flow (perm)		1611						3094		3433	3475	
Volume (vph)	0	0	10	0	0	0	10	346	325	1600	434	60
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)	0	0	11	0	0	0	11	364	342	1684	457	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	691	0	1684	520	0
Turn Type										Prot		
Protected Phases								2		1	6	
Permitted Phases												
Actuated Green, G (s)		0.0						8.0		29.0	45.0	
Effective Green, g (s)		0.0						8.0		29.0	45.0	
Actuated g/C Ratio		0.00						0.18		0.64	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						550		2212	3475	
v/s Ratio Prot										c0.49	0.15	
v/s Ratio Perm								c0.22				
v/c Ratio		0.00						10.69dr		0.76	0.15	
Uniform Delay, d1		22.5						18.5		5.6	0.0	
Progression Factor		1.00						0.76		1.00	1.00	
Incremental Delay, d2		0.0						128.5		2.5	0.1	
Delay (s)		22.5						142.7		8.1	0.1	
Level of Service		C						F		A	A	
Approach Delay (s)		22.5			0.0			142.7		6.2		
Approach LOS		C			A			F		A		
Intersection Summary												
HCM Average Control Delay	39.6		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	45.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	79.3%		ICU Level of Service				D					
Analysis Period (min)	15											
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2015 AM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.97			0.96			0.98			0.99		
Flpb, ped/bikes	0.98			0.97			1.00			1.00		
Frt	0.98			0.94			0.98			0.99		
Flt Protected	0.98			0.99			1.00			1.00		
Satd. Flow (prot)	1693			1605			3400			3472		
Flt Permitted	0.83			0.87			0.91			0.88		
Satd. Flow (perm)	1437			1419			3088			3060		
Volume (vph)	70	80	31	60	60	90	31	501	80	50	584	30
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)	74	84	33	63	63	95	33	527	84	53	615	32
RTOR Reduction (vph)	0	17	0	0	60	0	0	27	0	0	8	0
Lane Group Flow (vph)	0	174	0	0	161	0	0	617	0	0	692	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	15.0		15.0		15.0		22.0		22.0		22.0	
Effective Green, g (s)	15.0		15.0		15.0		22.0		22.0		22.0	
Actuated g/C Ratio	0.33		0.33		0.33		0.49		0.49		0.49	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	479		473		473		1510		1510		1496	
v/s Ratio Prot												
v/s Ratio Perm	c0.12		0.11		0.11		0.20		0.20		c0.23	
v/c Ratio	0.36		0.34		0.34		0.41		0.41		0.46	
Uniform Delay, d1	11.4		11.3		11.3		7.3		7.3		7.6	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	2.1		2.0		2.0		0.8		0.8		1.0	
Delay (s)	13.5		13.2		13.2		8.2		8.2		8.6	
Level of Service	B		B		B		A		A		A	
Approach Delay (s)	13.5		13.2		13.2		8.2		8.2		8.6	
Approach LOS	B		B		B		A		A		A	
Intersection Summary												
HCM Average Control Delay	9.6			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.42											
Actuated Cycle Length (s)	45.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	63.9%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2015 AM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.95			0.96			0.98			0.98		
Flpb, ped/bikes	0.97			0.98			1.00			1.00		
Frt	0.96			0.96			0.99			0.99		
Flt Protected	0.98			0.99			1.00			1.00		
Satd. Flow (prot)	1626			1650			3443			4931		
Flt Permitted	0.79			0.82			0.84			0.82		
Satd. Flow (perm)	1302			1369			2893			4042		
Volume (vph)	70	80	70	43	70	50	30	1033	62	70	1555	100
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)	74	84	74	45	74	53	32	1087	65	74	1637	105
RTOR Reduction (vph)	0	6	0	0	25	0	0	3	0	0	5	0
Lane Group Flow (vph)	0	226	0	0	147	0	0	1181	0	0	1811	0
Confl. Peds. (#/hr)	100		100	100	100	100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		2		6	
Actuated Green, G (s)	16.7		16.7		16.7		59.3		59.3		59.3	
Effective Green, g (s)	17.2		17.2		17.2		59.8		59.8		59.8	
Actuated g/C Ratio	0.20		0.20		0.20		0.70		0.70		0.70	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	263		277		277		2035		2035		2844	
v/s Ratio Prot												
v/s Ratio Perm	c0.17		0.11		0.11		0.41		0.41		c0.45	
v/c Ratio	0.86		0.53		0.53		0.58		0.58		0.64	
Uniform Delay, d1	32.7		30.3		30.3		6.3		6.3		6.8	
Progression Factor	1.00		1.00		1.00		0.79		0.79		1.00	
Incremental Delay, d2	23.1		1.0		1.0		1.0		1.0		1.1	
Delay (s)	55.9		31.3		31.3		6.0		6.0		7.9	
Level of Service	E		C		C		A		A		A	
Approach Delay (s)	55.9		31.3		31.3		6.0		6.0		7.9	
Approach LOS	E		C		C		A		A		A	
Intersection Summary												
HCM Average Control Delay	11.7			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	85.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	103.4%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 AM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	1.00
Frt	1.00	0.97	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1748	3432	1759	3463	1767	1813	1736	1841	1736	1841	1736	1841
Flt Permitted	0.17	1.00	0.37	1.00	0.44	1.00	0.59	1.00	0.59	1.00	0.59	1.00
Satd. Flow (perm)	320	3432	676	3463	810	1813	1086	1841	1086	1841	1086	1841
Volume (vph)	30	379	80	73	687	74	90	201	33	83	400	30
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)	32	399	84	77	723	78	95	212	35	87	421	32
RTOR Reduction (vph)	0	22	0	0	10	0	0	7	0	0	3	0
Lane Group Flow (vph)	32	461	0	77	791	0	95	240	0	87	450	0
Confl. Peds. (#/hr)	30		12	12		30	6		54	54		6
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		49.5	49.5		49.5	49.5	
Effective Green, g (s)	23.0	23.0		23.0	23.0		49.0	49.0		49.0	49.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.61	0.61		0.61	0.61	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	92	987		194	996		496	1110		665	1128	
v/s Ratio Prot		0.13			c0.23			0.13			c0.24	
v/s Ratio Perm	0.10			0.11			0.12			0.08		
v/c Ratio	0.35	0.47		0.40	0.79		0.19	0.22		0.13	0.40	
Uniform Delay, d1	22.6	23.5		22.9	26.3		6.8	6.9		6.5	7.9	
Progression Factor	1.00	1.00		0.87	0.91		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.1	1.6		5.5	6.0		0.9	0.4		0.4	1.1	
Delay (s)	32.7	25.0		25.5	30.0		7.7	7.4		6.9	9.0	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		25.5			29.6			7.4			8.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay	20.4		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	83.3%		ICU Level of Service				E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 AM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.98	1.00	0.98	1.00	1.00	1.00	0.98	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99
Satd. Flow (prot)	1763	3427	1740	3513	1740	3513	3385	3421	1736	1841	1736	1841
Flt Permitted	0.27	1.00	0.42	1.00	0.79	1.00	0.79	1.00	0.79	1.00	0.79	1.00
Satd. Flow (perm)	510	3427	768	3513	2717	3427	2717	3421	768	1841	768	1841
Volume (vph)	30	415	80	64	724	32	70	171	54	63	240	50
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)	32	437	84	67	762	34	74	180	57	66	253	53
RTOR Reduction (vph)	0	20	0	0	4	0	0	24	0	0	16	0
Lane Group Flow (vph)	32	501	0	67	792	0	0	287	0	0	356	0
Confl. Peds. (#/hr)	18		54	54		18	4		18	18		4
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.0	38.0		38.0	38.0		32.0			32.0	32.0	
Effective Green, g (s)	39.0	39.0		39.0	39.0		33.0			33.0	33.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.41			0.41	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0	5.0	
Lane Grp Cap (vph)	249	1671		374	1713		1121			1196	1196	
v/s Ratio Prot		0.15			c0.23						c0.24	
v/s Ratio Perm	0.06			0.09			0.11				c0.12	
v/c Ratio	0.13	0.30		0.18	0.46		0.26			0.30	0.30	
Uniform Delay, d1	11.2	12.3		11.5	13.6		15.4			15.7	15.7	
Progression Factor	0.96	1.03		1.39	1.49		0.64			1.00	1.00	
Incremental Delay, d2	1.0	0.4		0.9	0.8		0.5			0.6	0.6	
Delay (s)	11.8	13.1		16.9	21.0		10.4			16.4	16.4	
Level of Service	B	B		B	C		B			B	B	
Approach Delay (s)		13.1			20.7		10.4			16.4	16.4	
Approach LOS		B			C		B			B	B	
Intersection Summary												
HCM Average Control Delay	16.4		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.39											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	73.5%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2015 AM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.98			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1764	3452		1735	3438			3381			3451	
Flt Permitted	0.24	1.00		0.42	1.00			0.86			0.76	
Satd. Flow (perm)	452	3452		774	3438			2939			2642	
Volume (vph)	40	442	61	105	721	134	39	238	77	119	346	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	460	64	109	751	140	41	248	80	124	360	31
RTOR Reduction (vph)	0	14	0	0	19	0	0	32	0	0	6	0
Lane Group Flow (vph)	42	510	0	109	872	0	0	337	0	0	509	0
Confl. Peds. (#/hr)	13		71	71		13	22		22	22		22
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	41.5	41.5		41.5	41.5			32.0			32.0	
Effective Green, g (s)	41.0	41.0		41.0	41.0			31.0			31.0	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.39			0.39	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	232	1769		397	1762			1139			1024	
v/s Ratio Prot	0.15		c0.25		c0.25		c0.11		c0.19		c0.19	
v/s Ratio Perm	0.09		0.14		0.14		0.11		0.19		0.19	
v/c Ratio	0.18	0.29		0.27	0.49			0.30			0.50	
Uniform Delay, d1	10.5	11.2		11.1	12.7			17.0			18.6	
Progression Factor	1.28	1.31		1.00	1.00			0.65			1.00	
Incremental Delay, d2	1.7	0.4		1.7	1.0			0.6			1.7	
Delay (s)	15.1	15.0		12.8	13.7			11.6			20.3	
Level of Service	B		B		B		B		B		C	
Approach Delay (s)	15.0		13.6		11.6		20.3		20.3		20.3	
Approach LOS	B		B		B		C		C		C	
Intersection Summary												
HCM Average Control Delay	15.1		15.1		13.6		11.6		20.3		20.3	
HCM Volume to Capacity ratio	0.50		0.50		0.50		0.50		0.50		0.50	
Actuated Cycle Length (s)	80.0		80.0		80.0		80.0		80.0		80.0	
Intersection Capacity Utilization	102.5%		102.5%		102.5%		102.5%		102.5%		102.5%	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

2015 AM + Project
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frpb, ped/bikes	0.92	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	1.00	1.00	1.00	0.97	0.97
Flt Protected	1.00	0.95	1.00	0.96	0.96	0.96
Satd. Flow (prot)	3196	1770	3539	1734	1734	1734
Flt Permitted	1.00	0.95	1.00	0.96	0.96	0.96
Satd. Flow (perm)	3196	1770	3539	1734	1734	1734
Volume (vph)	543	95	72	839	121	41
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	572	100	76	883	127	43
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	672	0	76	883	170	0
Confl. Peds. (#/hr)	146		266		266	
Turn Type	Perm		Prot		Prot	
Protected Phases	4	3	8	2	8	2
Permitted Phases	4	3	8	2	8	2
Actuated Green, G (s)	52.8	7.8	64.6	12.4	64.6	12.4
Effective Green, g (s)	52.8	7.8	64.6	12.4	64.6	12.4
Actuated g/C Ratio	0.62	0.09	0.76	0.15	0.76	0.15
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)	1985	162	2690	253	2690	253
v/s Ratio Prot	0.21	c0.04	c0.25	c0.10	c0.25	c0.10
v/s Ratio Perm	0.34	0.47	0.33	0.67	0.33	0.67
v/c Ratio	0.34	0.47	0.33	0.67	0.33	0.67
Uniform Delay, d1	7.7	36.6	3.3	34.4	3.3	34.4
Progression Factor	1.00	1.03	0.73	0.71	0.73	0.71
Incremental Delay, d2	0.5	1.6	0.2	6.7	0.2	6.7
Delay (s)	8.2	39.2	2.6	31.0	2.6	31.0
Level of Service	A	D	A	C	A	C
Approach Delay (s)	8.2		5.5	31.0	5.5	31.0
Approach LOS	A		A	C	A	C
Intersection Summary						
HCM Average Control Delay	8.9		8.9		8.9	
HCM Volume to Capacity ratio	0.39		0.39		0.39	
Actuated Cycle Length (s)	85.0		85.0		85.0	
Intersection Capacity Utilization	42.3%		42.3%		42.3%	
Analysis Period (min)	15		15		15	
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2015 AM + Project
1/24/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.98		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	0.95	1.00		0.92	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1683	3268		1635	3407		1770	3451		1770	3339	
Flt Permitted	0.26	1.00		0.36	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	453	3268		627	3407		1770	3451		1770	3339	
Volume (vph)	126	351	107	90	526	70	125	499	49	140	948	260
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)	133	369	113	95	554	74	132	525	52	147	998	274
RTOR Reduction (vph)	0	35	0	0	13	0	0	8	0	0	26	0
Lane Group Flow (vph)	133	447	0	95	615	0	132	569	0	147	1246	0
Confl. Peds. (#/hr)	72		137	137		72			58	58		92
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	24.4	24.4		24.4	24.4		10.3	36.6		10.5	36.8	
Effective Green, g (s)	24.9	24.9		24.9	24.9		10.8	37.1		11.0	37.3	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.13	0.44		0.13	0.44	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	133	957		184	998		225	1506		229	1465	
v/s Ratio Prot		0.14		0.18			0.07	0.16		c0.08	c0.37	
v/s Ratio Perm	c0.29		0.15									
v/c Ratio	1.00	0.47		0.52	0.62		0.59	0.38		0.64	0.85	
Uniform Delay, d1	30.1	24.6		25.0	25.9		35.0	16.2		35.1	21.4	
Progression Factor	0.74	0.68		1.00	1.00		0.73	1.51		1.28	0.72	
Incremental Delay, d2	76.5	0.1		1.0	0.8		2.5	0.7		3.4	4.9	
Delay (s)	98.7	16.8		26.1	26.7		28.0	25.1		48.6	20.2	
Level of Service	F	B		C	C		C	C		D	C	
Approach Delay (s)		34.5			26.6			25.6			23.2	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay		26.4										
HCM Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		85.0						8.0				
Intersection Capacity Utilization		80.3%										
Analysis Period (min)		15										
c Critical Lane Group												

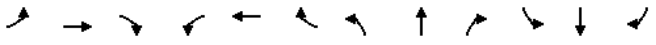
HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2015 AM + Project
1/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	10	31	659	10	20	1119
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	33	694	11	21	1178
Pedestrians	34		33		34	34
Lane Width (ft)	12.0		12.0		12.0	12.0
Walking Speed (ft/s)	4.0		4.0		4.0	4.0
Percent Blockage	3		3		3	3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.87	0.95			0.95	
vC, conflicting volume	1397	420			738	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1140	340			674	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	94			98	
cM capacity (veh/h)	156	589			844	
Direction, Lane #						
	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	43	462	242	21	589	589
Volume Left	11	0	0	21	0	0
Volume Right	33	0	11	0	0	0
cSH	351	1700	1700	844	1700	1700
Volume to Capacity	0.12	0.27	0.14	0.02	0.35	0.35
Queue Length 95th (ft)	10	0	0	2	0	0
Control Delay (s)	16.7	0.0	0.0	9.4	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	16.7	0.0		0.2		
Approach LOS	C					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization		48.2%			ICU Level of Service	A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.


2015 AM + Project
1/21/2008



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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.95		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	1.00		0.99		1.00		1.00		0.98		1.00	
Frt	0.99		1.00		0.98		0.98		1.00		0.98	
Flt Protected	1.00		0.95		1.00		0.99		0.95		1.00	
Satd. Flow (prot)	4994		1758		3469		1774		1729		1815	
Flt Permitted	0.83		0.41		1.00		0.54		0.40		1.00	
Satd. Flow (perm)	4175		768		3469		975		732		1815	
Volume (vph)	50	469	40	61	624	81	70	203	60	200	313	50
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)	53	494	42	64	657	85	74	214	63	211	329	53
RTOR Reduction (vph)	0	10	0	0	12	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	579	0	64	730	0	0	342	0	211	375	0
Confl. Peds. (#/hr)	24		18		18		24		24		48	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.0		51.0		51.0		24.0		24.0		24.0	
Effective Green, g (s)	52.0		52.0		52.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2554		470		2122		287		215		534	
v/s Ratio Prot			c0.21						0.21			
v/s Ratio Perm	0.14		0.08				c0.35		0.29			
v/c Ratio	0.23		0.14		0.34		1.19		0.98		0.70	
Uniform Delay, d1	7.4		7.0		8.1		30.0		29.8		26.7	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.2		0.6		0.4		115.2		56.8		7.5	
Delay (s)	7.6		7.6		8.6		145.2		86.5		34.2	
Level of Service	A		A		A		F		F		C	
Approach Delay (s)	7.6		8.5				145.2		52.8			
Approach LOS	A		A				F		D			
Intersection Summary												
HCM Average Control Delay	40.0		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	100.7%		ICU Level of Service				G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2015 AM + Project
1/21/2008



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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.91		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	1.00		1.00		1.00		0.99		1.00		0.99	
Frt	1.00		0.98		1.00		0.96		1.00		0.98	
Flt Protected	1.00		0.95		1.00		0.95		1.00		0.95	
Satd. Flow (prot)	5046		4979		1757		1770		1749		1830	
Flt Permitted	0.88		0.85		0.32		1.00		0.39		1.00	
Satd. Flow (perm)	4463		4224		595		1770		711		1830	
Volume (vph)	30	699	20	51	667	91	50	194	73	90	274	30
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)	32	736	21	54	702	96	53	204	77	95	288	32
RTOR Reduction (vph)	0	4	0	0	20	0	0	17	0	0	5	0
Lane Group Flow (vph)	0	785	0	0	832	0	53	264	0	95	315	0
Confl. Peds. (#/hr)	24		18		18		12		18		12	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	50.0		50.0		19.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2873		2719		152		454		182		469	
v/s Ratio Prot			c0.20		0.09		0.15		0.13		c0.17	
v/s Ratio Perm	0.18		c0.20		0.09		0.15		0.13			
v/c Ratio	0.27		0.31		0.35		0.58		0.52		0.67	
Uniform Delay, d1	6.2		6.3		24.3		26.0		25.5		26.7	
Progression Factor	1.00		0.67		1.00		1.00		1.19		1.21	
Incremental Delay, d2	0.2		0.3		6.2		5.4		10.1		7.3	
Delay (s)	6.4		4.5		30.5		31.4		40.5		39.6	
Level of Service	A		A		C		C		D		D	
Approach Delay (s)	6.4		4.5		31.2		39.8					
Approach LOS	A		A		C		D					
Intersection Summary												
HCM Average Control Delay	15.0		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	64.0%		ICU Level of Service				C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2015 AM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.98			0.97			0.99		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	5026			4944			3399			3426		
Flt Permitted	0.82			0.83			0.84			0.78		
Satd. Flow (perm)	4152			4101			2857			2691		
Volume (vph)	54	779	40	58	744	136	30	164	44	127	311	44
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)	57	820	42	61	783	143	32	173	46	134	327	46
RTOR Reduction (vph)	0	6	0	0	29	0	0	24	0	0	10	0
Lane Group Flow (vph)	0	913	0	0	958	0	0	227	0	0	497	0
Confl. Peds. (#/hr)	17		19	19		17	12		16	16		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2673		2640		2640		732		690		690	
v/s Ratio Prot												
v/s Ratio Perm	0.22		c0.23		c0.23		0.08		c0.18		c0.18	
v/c Ratio	0.34		0.36		0.36		0.31		0.72		0.72	
Uniform Delay, d1	6.5		6.6		6.6		24.0		27.1		27.1	
Progression Factor	0.75		1.00		1.00		1.00		0.48		0.48	
Incremental Delay, d2	0.3		0.4		0.4		1.1		6.2		6.2	
Delay (s)	5.2		7.0		7.0		25.1		19.3		19.3	
Level of Service	A		A		A		C		B		B	
Approach Delay (s)	5.2		7.0		7.0		25.1		19.3		19.3	
Approach LOS	A		A		A		C		B		B	
Intersection Summary												
HCM Average Control Delay	10.4		10.4		10.4		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.46		0.46		0.46		0.46		0.46		0.46	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	100.3%		100.3%		100.3%		ICU Level of Service		G		G	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

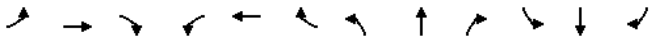
2015 AM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			0.97			1.00		0.94
Flpb, ped/bikes	1.00			1.00			1.00			1.00		1.00
Frt	1.00			0.98			0.93			0.92		0.92
Flt Protected	1.00			1.00			0.98			0.98		0.98
Satd. Flow (prot)	5069			4868			1695			1589		1589
Flt Permitted	0.88			0.93			0.87			0.86		0.86
Satd. Flow (perm)	4471			4517			1510			1404		1404
Volume (vph)	31	928	10	10	865	98	10	0	10	54	0	73
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)	33	977	11	11	911	103	11	0	11	57	0	77
RTOR Reduction (vph)	0	1	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	1020	0	0	1025	0	0	13	0	0	134	0
Confl. Peds. (#/hr)					98							98
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	62.1		62.1		62.1		14.9		14.9		14.9	
Effective Green, g (s)	62.1		62.1		62.1		14.9		14.9		14.9	
Actuated g/C Ratio	0.73		0.73		0.73		0.18		0.18		0.18	
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)	3266		3266		3300		265		246		246	
v/s Ratio Prot												
v/s Ratio Perm	c0.23		0.23		0.23		0.01		c0.10		c0.10	
v/c Ratio	0.31		0.31		0.31		0.05		0.54		0.54	
Uniform Delay, d1	4.0		4.0		4.0		29.2		32.0		32.0	
Progression Factor	1.00		1.55		1.55		1.00		0.98		0.98	
Incremental Delay, d2	0.3		0.2		0.2		0.1		2.3		2.3	
Delay (s)	4.2		6.4		6.4		29.2		33.6		33.6	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	4.2		6.4		6.4		29.2		33.6		33.6	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	7.3		7.3		7.3		HCM Level of Service		A		A	
HCM Volume to Capacity ratio	0.36		0.36		0.36		0.36		0.36		0.36	
Actuated Cycle Length (s)	85.0		85.0		85.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	71.2%		71.2%		71.2%		ICU Level of Service		C		C	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2015 AM + Project
1/21/2008




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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.98			0.97			1.00			0.97		
Flt Protected	0.99			0.99			0.95			1.00		
Satd. Flow (prot)	4954			4866			1760			3415		
Flt Permitted	0.66			0.68			0.23			1.00		
Satd. Flow (perm)	3272			3323			431			3415		
Volume (vph)	127	758	107	110	717	189	70	355	80	284	709	176
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)	134	798	113	116	755	199	74	374	84	299	746	185
RTOR Reduction (vph)	0	21	0	0	67	0	0	15	0	0	17	0
Lane Group Flow (vph)	0	1024	0	0	1003	0	74	443	0	299	914	0
Confl. Peds. (#/hr)	40		9		40		25		31		25	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	30.4		30.4		44.1		44.1		44.1		44.1	
Effective Green, g (s)	31.9		31.9		45.1		45.1		45.1		45.1	
Actuated g/C Ratio	0.38		0.38		0.53		0.53		0.53		0.53	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1228		1247		229		1812		452		1808	
v/s Ratio Prot					0.13		0.27					
v/s Ratio Perm	c0.31		0.30		0.17		c0.35					
v/c Ratio	0.83		0.80		0.32		0.24		0.66		0.51	
Uniform Delay, d1	24.1		23.8		11.3		10.8		14.4		12.8	
Progression Factor	1.42		1.00		1.41		1.38		1.12		1.16	
Incremental Delay, d2	4.6		3.6		3.6		0.3		6.6		0.9	
Delay (s)	39.0		27.4		19.5		15.1		22.7		15.7	
Level of Service	D		C		B		B		C		B	
Approach Delay (s)	39.0		27.4		15.7		17.4					
Approach LOS	D		C		B		B					
Intersection Summary												
HCM Average Control Delay	25.8		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.73											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	90.5%		ICU Level of Service				E					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.


2015 AM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.97			1.00		
Frt	1.00			0.99			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5040			4983			1770			1395		
Flt Permitted	0.88			0.88			0.88			1.00		
Satd. Flow (perm)	4451			4372			1585			1395		
Volume (vph)	30	1089	33	30	984	80	22	33	20	80	30	40
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)	32	1146	35	32	1036	84	23	35	21	84	32	42
RTOR Reduction (vph)	0	4	0	0	11	0	0	0	15	0	16	0
Lane Group Flow (vph)	0	1209	0	0	1141	0	0	58	6	0	142	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		2		2		6		6	
Permitted Phases	4		8		2		2		6		6	
Actuated Green, G (s)	48.0		48.0		23.0		23.0		23.0		23.0	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lane Grp Cap (vph)	2698		2651		466		410		399		399	
v/s Ratio Prot					0.04		0.00		c0.10			
v/s Ratio Perm	c0.27		0.26		0.12		0.02		0.36			
v/c Ratio	0.45		0.43		0.17		0.12		0.36			
Uniform Delay, d1	8.5		8.4		20.7		20.0		22.3			
Progression Factor	1.00		1.00		1.00		1.00		1.00			
Incremental Delay, d2	0.5		0.5		0.5		0.1		2.5			
Delay (s)	9.1		8.9		21.3		20.1		24.7			
Level of Service	A		A		C		C		C			
Approach Delay (s)	9.1		8.9		21.0		24.7					
Approach LOS	A		A		C		C					
Intersection Summary												
HCM Average Control Delay	10.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.42											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	81.7%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

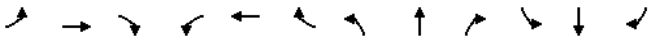
2015 AM + Project
1/21/2008



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)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95	1.00	1.00	*1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.96	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	4908		1770	4832		1770	3539	1513	1770	3725	1523	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	4908		1770	4832		1770	3539	1513	1770	3725	1523	
Volume (vph)	160	897	141	150	754	260	110	261	50	400	1221	150	
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)	168	944	148	158	794	274	116	275	53	421	1285	158	
RTOR Reduction (vph)	0	17	0	0	52	0	0	0	31	0	0	32	
Lane Group Flow (vph)	168	1075	0	158	1016	0	116	275	22	421	1285	126	
Confl. Peds. (#/hr)			66			23			38			26	
Turn Type	Prot			Prot			Prot	pm+ov		Prot	pm+ov		
Protected Phases	7	4		3	8		5	2	3	1	6	7	
Permitted Phases									2			6	
Actuated Green, G (s)	12.0	33.4		13.6	35.0		10.4	28.0	41.6	29.0	46.6	58.6	
Effective Green, g (s)	11.0	34.4		12.6	36.0		9.4	29.0	41.6	28.0	47.6	58.6	
Actuated g/C Ratio	0.09	0.29		0.10	0.30		0.08	0.24	0.35	0.23	0.40	0.49	
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	162	1407		186	1450		139	855	575	413	1478	794	
v/s Ratio Prot	c0.09	c0.22		0.09	0.21		0.07	0.08	0.00	c0.24	c0.34	0.01	
v/s Ratio Perm									0.01			0.07	
v/c Ratio	1.04	0.76		0.85	0.70		0.83	0.32	0.04	1.02	0.87	0.16	
Uniform Delay, d1	54.5	39.1		52.8	37.2		54.5	37.4	26.0	46.0	33.3	17.0	
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	80.8	4.0		27.6	2.8		31.8	1.0	0.0	49.3	7.2	0.0	
Delay (s)	135.3	43.1		80.4	40.1		86.3	38.4	26.0	95.3	40.6	17.1	
Level of Service	F	D		F	D		F	D	C	F	D	B	
Approach Delay (s)		55.4			45.3			49.4			50.9		
Approach LOS		E			D			D			D		
Intersection Summary													
HCM Average Control Delay		50.5		HCM Level of Service					D				
HCM Volume to Capacity ratio		0.87											
Actuated Cycle Length (s)		120.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization		87.0%		ICU Level of Service				E					
Analysis Period (min)		15											

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2015 AM + Project
1/21/2008



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)		4.0			4.0		4.0	4.0		4.0	4.0		
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95		
Frpb, ped/bikes		0.93			0.96		1.00	0.99		1.00	0.99		
Flpb, ped/bikes		0.97			0.96		0.94	1.00		0.93	1.00		
Frt		0.95			0.95		1.00	0.99		1.00	0.99		
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1580			1606		1664	3456		1639	3468		
Flt Permitted		0.72			0.86		0.37	1.00		0.42	1.00		
Satd. Flow (perm)		1164			1395		640	3456		731	3468		
Volume (vph)	42	30	40	50	60	64	60	529	40	32	652	42	
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)	44	32	42	53	63	67	63	557	42	34	686	44	
RTOR Reduction (vph)	0	28	0	0	29	0	0	4	0	0	4	0	
Lane Group Flow (vph)	0	90	0	0	154	0	63	595	0	34	726	0	
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100	
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		4			4			2			6		
Permitted Phases	4				4			2			6		
Actuated Green, G (s)		12.7			12.7		65.3	65.3		65.3	65.3		
Effective Green, g (s)		12.2			12.2		64.8	64.8		64.8	64.8		
Actuated g/C Ratio		0.14			0.14		0.76	0.76		0.76	0.76		
Clearance Time (s)		3.5			3.5		3.5	3.5		3.5	3.5		
Vehicle Extension (s)		2.0			2.0		2.0	2.0		2.0	2.0		
Lane Grp Cap (vph)		167			200		488	2635		557	2644		
v/s Ratio Prot								0.17				c0.21	
v/s Ratio Perm		0.08			c0.11		0.10			0.05			
v/c Ratio		0.54			0.77		0.13	0.23		0.06	0.27		
Uniform Delay, d1		33.8			35.0		2.7	2.9		2.5	3.0		
Progression Factor		1.00			1.00		1.00	1.00		0.55	0.49		
Incremental Delay, d2		1.7			14.7		0.5	0.2		0.2	0.2		
Delay (s)		35.4			49.8		3.2	3.1		1.5	1.7		
Level of Service		D			D		A	A		A	A		
Approach Delay (s)		35.4			49.8			3.1			1.7		
Approach LOS		D			D			A			A		
Intersection Summary													
HCM Average Control Delay		9.6		HCM Level of Service					A				
HCM Volume to Capacity ratio		0.35											
Actuated Cycle Length (s)		85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization		54.8%		ICU Level of Service				A					
Analysis Period (min)		15											

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2015 AM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.95	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3347		1770	3217		1692	3445		1677	3221	
Flt Permitted	0.95	1.00		0.95	1.00		0.27	1.00		0.49	1.00	
Satd. Flow (perm)	1770	3347		1770	3217		484	3445		864	3221	
Volume (vph)	260	400	100	70	370	129	70	341	40	92	530	210
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)	274	421	105	74	389	136	74	359	42	97	558	221
RTOR Reduction (vph)	0	24	0	0	45	0	0	9	0	0	42	0
Lane Group Flow (vph)	274	502	0	74	480	0	74	392	0	97	737	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot		Prot		Perm		Perm		Perm		Perm	
Protected Phases	7	4		3	8			2				6
Permitted Phases								2				6
Actuated Green, G (s)	16.1	26.6		6.8	17.3		38.1	38.1		38.1	38.1	
Effective Green, g (s)	16.6	26.1		7.3	16.8		39.6	39.6		39.6	39.6	
Actuated g/C Ratio	0.20	0.31		0.09	0.20		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	346	1028		152	636		225	1605		403	1501	
v/s Ratio Prot	c0.15	0.15		0.04	c0.15			0.11			c0.23	
v/s Ratio Perm							0.15			0.11		
v/c Ratio	0.79	0.49		0.49	0.75		0.33	0.24		0.24	0.49	
Uniform Delay, d1	32.6	24.0		37.1	32.2		14.3	13.7		13.7	15.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.0	0.1		0.9	4.5		3.9	0.4		1.4	1.2	
Delay (s)	43.5	24.1		38.0	36.7		18.2	14.0		15.1	16.9	
Level of Service	D	C		D	D		B	B		B	B	
Approach Delay (s)	30.8			36.8			14.7			16.7		
Approach LOS	C			D			B			B		
Intersection Summary												
HCM Average Control Delay	24.8		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	73.6%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

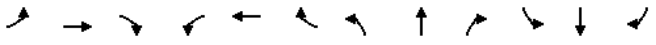
HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

2015 AM + Project
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.99	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1670		1770	3539	3503	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1670		1770	3539	3503	
Volume (vph)	67	126	58	635	1067	78
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	133	61	668	1123	82
RTOR Reduction (vph)	94	0	0	0	3	0
Lane Group Flow (vph)	110	0	61	668	1202	0
Turn Type	Prot					
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	10.5		5.3	66.5	57.2	
Effective Green, g (s)	10.5		5.3	66.5	57.2	
Actuated g/C Ratio	0.12		0.06	0.78	0.67	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	206		110	2769	2357	
v/s Ratio Prot	c0.07		c0.03	0.19	c0.34	
v/s Ratio Perm						
v/c Ratio	0.54		0.55	0.24	0.51	
Uniform Delay, d1	35.0		38.7	2.5	6.9	
Progression Factor	1.00		1.07	0.54	1.10	
Incremental Delay, d2	2.7		5.3	0.2	0.6	
Delay (s)	37.6		46.8	1.5	8.3	
Level of Service	D		D	A	A	
Approach Delay (s)	37.6			5.3	8.3	
Approach LOS	D			A	A	
Intersection Summary						
HCM Average Control Delay	10.1		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.52					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	56.8%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2015 PM + Project
1/21/2008




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	
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16	
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0		
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00		
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.98		1.00	0.98		
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00		
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.93		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1770	4924		1770	4968		2006	1995		1958	1918		
Flt Permitted	0.95	1.00		0.95	1.00		0.12	1.00		0.55	1.00		
Satd. Flow (perm)	1770	4924		1770	4968		261	1995		1131	1918		
Volume (vph)	340	1232	181	90	1020	150	170	247	90	140	279	270	
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)	358	1297	191	95	1074	158	179	260	95	147	294	284	
RTOR Reduction (vph)	0	18	0	0	19	0	0	14	0	0	35	0	
Lane Group Flow (vph)	358	1470	0	95	1213	0	179	341	0	147	543	0	
Confl. Peds. (#/hr)			32	32		4	12		24	24		12	
Parking (#/hr)												0	
Turn Type	Prot		Prot		pm+pt		Perm						
Protected Phases	7	4	3	8	5	2	6						
Permitted Phases							2						
Actuated Green, G (s)	20.0	38.8	7.8	26.6	42.9	42.9	29.9	29.9					
Effective Green, g (s)	20.0	38.8	7.8	26.6	43.4	43.4	30.4	30.4					
Actuated g/C Ratio	0.20	0.39	0.08	0.27	0.43	0.43	0.30	0.30					
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5					
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0					
Lane Grp Cap (vph)	354	1911	138	1321	305	866	344	583					
v/s Ratio Prot	c0.20	0.30	0.05	c0.24	c0.06	0.17	c0.28						
v/s Ratio Perm							0.19						
v/c Ratio	1.01	0.77	0.69	0.92	0.59	0.39	0.43	0.93					
Uniform Delay, d1	40.0	26.7	44.9	35.6	43.5	19.3	27.8	33.8					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00					
Incremental Delay, d2	50.7	3.0	13.4	11.6	2.9	0.3	0.9	21.7					
Delay (s)	90.7	29.7	58.3	47.3	46.4	19.6	28.7	55.5					
Level of Service	F	C	E	D	D	B	C	E					
Approach Delay (s)	41.6		48.1		28.6					50.0			
Approach LOS	D		D		C					D			
Intersection Summary													
HCM Average Control Delay	43.3		HCM Level of Service					D					
HCM Volume to Capacity ratio	0.89												
Actuated Cycle Length (s)	100.0				Sum of lost time (s)				12.0				
Intersection Capacity Utilization	96.5%		ICU Level of Service					F					
Analysis Period (min)	15												

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2015 PM + Project
1/21/2008



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)		4.0		4.0	4.0		4.0		4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95		0.95		0.95		1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.97		0.98		1.00		1.00	0.95	
Fipb, ped/bikes		0.99		1.00	1.00		1.00		1.00		1.00	1.00	
Frt		0.93		1.00	0.92		0.96		1.00		1.00	0.95	
Flt Protected		0.99		0.95	1.00		1.00		0.95		1.00	1.00	
Satd. Flow (prot)		1705		1681	1578		3316		1770		3193		
Flt Permitted		0.36		0.73	1.00		0.94		0.95		1.00		
Satd. Flow (perm)		619		1290	1578		3128		1770		3193		
Volume (vph)	10	10	20	116	110	120	10	1133	485	120	818	410	
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)	11	11	21	122	116	126	11	1193	511	126	861	432	
RTOR Reduction (vph)	0	20	0	0	43	0	0	39	0	0	50	0	
Lane Group Flow (vph)	0	23	0	122	199	0	0	1676	0	126	1243	0	
Confl. Peds. (#/hr)	36				36		48		16		16		
Turn Type	Perm		Perm		Perm		Prot						
Protected Phases	7		8		8		2		1 6				
Permitted Phases	7		8		2								
Actuated Green, G (s)	6.5		16.0		16.0		48.7		10.8 64.0				
Effective Green, g (s)	7.0		16.5		16.5		49.2		11.3 64.5				
Actuated g/C Ratio	0.07		0.16		0.16		0.49		0.11 0.64				
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5 4.5				
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0 2.0				
Lane Grp Cap (vph)	43		213		260		1539		200		2059		
v/s Ratio Prot									0.07 c0.39				
v/s Ratio Perm	c0.04		0.09		0.13		c0.54						
v/c Ratio	0.55		0.57		0.77		1.09		0.63 0.60				
Uniform Delay, d1	45.0		38.5		39.9		25.4		42.4 10.3				
Progression Factor	1.00		1.00		1.00		0.60		1.00 1.00				
Incremental Delay, d2	7.4		2.3		11.5		41.4		4.7 1.3				
Delay (s)	52.3		40.8		51.4		56.6		47.0 11.6				
Level of Service	D		D		D		E		D B				
Approach Delay (s)	52.3		47.9		56.6		14.8						
Approach LOS	D		D		E		B						
Intersection Summary													
HCM Average Control Delay	38.9		HCM Level of Service					D					
HCM Volume to Capacity ratio	0.93												
Actuated Cycle Length (s)	100.0				Sum of lost time (s)				16.0				
Intersection Capacity Utilization	111.6%		ICU Level of Service					H					
Analysis Period (min)	15												

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3456		1770	3308		1770	3322		1770	3414	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3456		1770	3308		1770	3322		1770	3414	
Volume (vph)	460	880	82	120	510	290	90	898	260	220	684	60
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)	484	926	86	126	537	305	95	945	274	232	720	63
RTOR Reduction (vph)	0	7	0	0	79	0	0	27	0	0	7	0
Lane Group Flow (vph)	484	1005	0	126	763	0	95	1192	0	232	776	0
Confl. Peds. (#/hr)	15		48	48		15	123		48	48		123
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.7	28.3		10.0	22.6		5.0	32.7		12.0	39.7	
Effective Green, g (s)	15.2	29.3		9.5	23.6		4.5	33.7		11.5	40.7	
Actuated g/C Ratio	0.15	0.29		0.10	0.24		0.04	0.34		0.12	0.41	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	522	1013		168	781		80	1120		204	1389	
v/s Ratio Prot	c0.14	c0.29		0.07	0.23		0.05	c0.36		c0.13	0.23	
v/s Ratio Perm												
v/c Ratio	0.93	0.99		0.75	0.98		1.19	1.06		1.14	0.56	
Uniform Delay, d1	41.9	35.2		44.1	37.9		47.8	33.1		44.2	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.22	0.74	
Incremental Delay, d2	22.3	26.2		15.3	26.1		159.7	45.9		98.6	1.3	
Delay (s)	64.2	61.4		59.4	64.0		207.4	79.0		152.5	18.2	
Level of Service	E	E		E	E		F	E		F	B	
Approach Delay (s)		62.3			63.4			88.3			48.9	
Approach LOS		E			E			F			D	
Intersection Summary												
HCM Average Control Delay		66.8										
HCM Volume to Capacity ratio		1.01										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		96.6%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 PM + Project
1/21/2008

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)		4.0								4.0	4.0	
Lane Util. Factor		1.00								0.95	0.97	
Frt		0.86								0.94	1.00	
Flt Protected		1.00								1.00	0.95	
Satd. Flow (prot)		1611								3318	3433	3452
Flt Permitted		1.00								0.95	0.95	1.00
Satd. Flow (perm)		1611								3146	3433	3452
Volume (vph)	0	0	10	0	0	0	10	415	297	1500	306	60
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)	0	0	11	0	0	0	11	437	313	1579	322	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	741	0	1579	385	0
Turn Type							Perm			Prot		
Protected Phases								2		1	6	
Permitted Phases												
Actuated Green, G (s)		0.0						13.0		29.0	50.0	
Effective Green, g (s)		0.0						13.0		29.0	50.0	
Actuated g/C Ratio		0.00						0.26		0.58	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						818		1991	3452	
v/s Ratio Prot										c0.46	0.11	
v/s Ratio Perm								c0.24				
v/c Ratio		0.00						0.91		0.79	0.11	
Uniform Delay, d1		25.0						17.9		8.2	0.0	
Progression Factor		1.00						0.74		1.00	1.00	
Incremental Delay, d2		0.0						14.7		3.3	0.1	
Delay (s)		25.0						27.9		11.5	0.1	
Level of Service		C						C		B	A	
Approach Delay (s)		25.0			0.0			27.9			9.3	
Approach LOS		C			A			C			A	
Intersection Summary												
HCM Average Control Delay		14.5								HCM Level of Service		B
HCM Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		50.0								Sum of lost time (s)		8.0
Intersection Capacity Utilization		77.4%								ICU Level of Service		D
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2015 PM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.97			0.97			0.99			0.99		
Flpb, ped/bikes	0.98			0.97			1.00			0.99		
Frt	0.97			0.96			0.98			0.99		
Flt Protected	0.99			0.99			1.00			0.99		
Satd. Flow (prot)	1695			1658			3410			3442		
Flt Permitted	0.88			0.92			0.93			0.82		
Satd. Flow (perm)	1518			1540			3175			2850		
Volume (vph)	30	50	21	50	100	70	31	561	80	50	276	20
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)	32	53	22	53	105	74	33	591	84	53	291	21
RTOR Reduction (vph)	0	15	0	0	34	0	0	21	0	0	9	0
Lane Group Flow (vph)	0	92	0	0	198	0	0	687	0	0	356	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	17.0		17.0		25.0		25.0		25.0		25.0	
Effective Green, g (s)	17.0		17.0		25.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.34		0.34		0.50		0.50		0.50		0.50	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	516		524		1588		1425		1425		1425	
v/s Ratio Prot	0.06		c0.13		c0.22		0.12		0.12		0.12	
v/c Ratio	0.18		0.38		0.43		0.25		0.25		0.25	
Uniform Delay, d1	11.6		12.5		8.0		7.1		7.1		7.1	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.8		2.1		0.9		0.4		0.4		0.4	
Delay (s)	12.4		14.6		8.8		7.6		7.6		7.6	
Level of Service	B		B		A		A		A		A	
Approach Delay (s)	12.4		14.6		8.8		7.6		7.6		7.6	
Approach LOS	B		B		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	9.7			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.41			Sum of lost time (s)			8.0					
Actuated Cycle Length (s)	50.0			ICU Level of Service			C					
Intersection Capacity Utilization	68.6%			Analysis Period (min)			15					
Analysis Period (min)	15			c Critical Lane Group								

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2015 PM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.95			0.97			0.99			0.98		
Flpb, ped/bikes	0.97			0.98			1.00			1.00		
Frt	0.95			0.97			0.99			0.99		
Flt Protected	0.98			0.99			1.00			1.00		
Satd. Flow (prot)	1619			1680			3467			4930		
Flt Permitted	0.80			0.83			0.87			0.85		
Satd. Flow (perm)	1322			1408			3010			4203		
Volume (vph)	60	60	60	32	60	30	50	1504	62	30	976	70
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)	63	63	63	34	63	32	53	1583	65	32	1027	74
RTOR Reduction (vph)	0	28	0	0	5	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	161	0	0	124	0	0	1699	0	0	1128	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		2		6		6		6	
Actuated Green, G (s)	12.1		12.1		58.9		58.9		58.9		58.9	
Effective Green, g (s)	12.6		12.6		59.4		59.4		59.4		59.4	
Actuated g/C Ratio	0.16		0.16		0.74		0.74		0.74		0.74	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	208		222		2235		3121		3121		3121	
v/s Ratio Prot	c0.12		0.09		c0.56		0.27		0.27		0.27	
v/c Ratio	0.77		0.56		0.76		0.36		0.36		0.36	
Uniform Delay, d1	32.3		31.1		6.1		3.6		3.6		3.6	
Progression Factor	1.00		1.00		1.27		1.00		1.00		1.00	
Incremental Delay, d2	15.1		1.7		1.0		0.3		0.3		0.3	
Delay (s)	47.4		32.9		8.7		4.0		4.0		4.0	
Level of Service	D		C		A		A		A		A	
Approach Delay (s)	47.4		32.9		8.7		4.0		4.0		4.0	
Approach LOS	D		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	10.3			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.76			Sum of lost time (s)			8.0					
Actuated Cycle Length (s)	80.0			ICU Level of Service			G					
Intersection Capacity Utilization	104.2%			Analysis Period (min)			15					
Analysis Period (min)	15			c Critical Lane Group								

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 PM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1761	3487	1766	3440	1738	1818	1764	1817	1764	1817	1764	1817
Flt Permitted	0.28	1.00	0.16	1.00	0.57	1.00	0.36	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	518	3487	296	3440	1050	1818	669	1817	669	1817	669	1817
Volume (vph)	40	836	80	53	572	103	130	391	65	105	200	30
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)	42	880	84	56	602	108	137	412	68	111	211	32
RTOR Reduction (vph)	0	9	0	0	18	0	0	8	0	0	7	0
Lane Group Flow (vph)	42	955	0	56	692	0	137	473	0	111	236	0
Confl. Peds. (#/hr)	12		12	12		12	42		12	12		42
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.0	33.0		33.0	33.0		40.5	40.5		40.5	40.5	
Effective Green, g (s)	32.0	32.0		32.0	32.0		40.0	40.0		40.0	40.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.50	0.50		0.50	0.50	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	207	1395		118	1376		525	909		335	909	
v/s Ratio Prot		c0.27			0.20			c0.26			0.13	
v/s Ratio Perm	0.08			0.19			0.13			0.17		
v/c Ratio	0.20	0.68		0.47	0.50		0.26	0.52		0.33	0.26	
Uniform Delay, d1	15.7	19.8		17.8	18.0		11.5	13.5		12.0	11.5	
Progression Factor	1.00	1.00		1.77	1.92		1.73	1.78		1.00	1.00	
Incremental Delay, d2	2.2	2.7		10.8	1.1		0.4	0.7		2.6	0.7	
Delay (s)	17.9	22.6		42.4	35.6		20.2	24.8		14.6	12.2	
Level of Service	B	C		D	D		C	C		B	B	
Approach Delay (s)		22.4			36.1			23.8			12.9	
Approach LOS		C			D			C			B	
Intersection Summary												
HCM Average Control Delay		25.3										C
HCM Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		82.2%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 PM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99
Satd. Flow (prot)	1756	3471	1750	3488	1750	3488	3422	3422	3422	3422	3422	3422
Flt Permitted	0.22	1.00	0.16	1.00	0.81	1.00	0.81	1.00	0.81	1.00	0.87	1.00
Satd. Flow (perm)	409	3471	295	3488	2817	3003	2817	3003	2817	3003	2817	3003
Volume (vph)	50	926	80	59	638	53	100	281	57	33	180	40
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	955	82	61	658	55	103	290	59	34	186	41
RTOR Reduction (vph)	0	8	0	0	8	0	0	3	0	0	17	0
Lane Group Flow (vph)	52	1029	0	61	705	0	0	449	0	0	244	0
Confl. Peds. (#/hr)	24		78	78		24	8		6	6		8
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		46.0	46.0		46.0	46.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		47.0	47.0		47.0	47.0	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.59	0.59		0.59	0.59	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	128	1085		92	1090		1655	1764		1764	1764	
v/s Ratio Prot		c0.30			0.20			0.16			0.08	
v/s Ratio Perm	0.13			0.21			c0.16			0.08		
v/c Ratio	0.41	0.95		0.66	0.65		0.27	0.14		0.14		
Uniform Delay, d1	21.7	26.9		23.8	23.7		8.1	7.4		7.4		
Progression Factor	0.49	0.51		0.81	0.79		1.01	1.00		1.00		
Incremental Delay, d2	7.3	14.6		27.9	2.6		0.3	0.2		0.2		
Delay (s)	18.0	28.3		47.3	21.2		8.5	7.6		7.6		
Level of Service	B	C		D	C		A	A		A		
Approach Delay (s)		27.8			23.2			8.5			7.6	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay		21.0										C
HCM Volume to Capacity ratio		0.51										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		71.9%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2015 PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1765	3482		1760	3426			3398			3433	
Flt Permitted	0.23	1.00		0.17	1.00			0.87			0.75	
Satd. Flow (perm)	432	3482		312	3426			2975			2588	
Volume (vph)	70	903	84	114	685	149	65	403	113	81	226	40
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	71	912	85	115	692	151	66	407	114	82	228	40
RTOR Reduction (vph)	0	8	0	0	23	0	0	26	0	0	12	0
Lane Group Flow (vph)	71	989	0	115	820	0	0	561	0	0	338	0
Confl. Peds. (#/hr)	8		39	39		8			25	25		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	35.5		35.5	35.5			38.0			38.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0			37.0			37.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.46			0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	189	1523		137	1499			1376			1197	
v/s Ratio Prot		0.28			0.24							
v/s Ratio Perm	0.16			c0.37				c0.19			0.13	
v/c Ratio	0.38	0.65		0.84	0.55			0.41			0.28	
Uniform Delay, d1	15.1	17.7		20.0	16.6			14.2			13.3	
Progression Factor	0.96	1.03		0.84	0.84			1.37			1.00	
Incremental Delay, d2	2.7	1.0		41.4	1.4			0.8			0.6	
Delay (s)	17.1	19.3		58.1	15.4			20.3			13.9	
Level of Service	B	B		E	B			C			B	
Approach Delay (s)		19.1			20.5			20.3			13.9	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM Average Control Delay		19.2										B
HCM Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		87.9%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

2015 PM + Project
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.95		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.96	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3305		1770	3539	1732	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3305		1770	3539	1732	
Volume (vph)	996	112	56	833	126	46
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1027	115	58	859	130	47
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1142	0	58	859	177	0
Confl. Peds. (#/hr)		213	348			
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	48.9		5.7	58.6	13.4	
Effective Green, g (s)	48.9		5.7	58.6	13.4	
Actuated g/C Ratio	0.61		0.07	0.73	0.17	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2020		126	2592	290	
v/s Ratio Prot	c0.35		c0.03	0.24	c0.10	
v/s Ratio Perm						
v/c Ratio	0.57		0.46	0.33	0.61	
Uniform Delay, d1	9.2		35.7	3.8	30.9	
Progression Factor	0.49		1.30	0.45	0.98	
Incremental Delay, d2	0.9		2.0	0.3	3.5	
Delay (s)	5.5		48.4	2.0	33.7	
Level of Service	A		D	A	C	
Approach Delay (s)	5.5		4.9	33.7		
Approach LOS	A		A	C		
Intersection Summary						
HCM Average Control Delay		7.5				A
HCM Volume to Capacity ratio		0.57				
Actuated Cycle Length (s)		80.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		55.0%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2015 PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	0.94	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1657	3417		1732	3316		1770	3474		1770	3344	
Flt Permitted	0.29	1.00		0.16	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	505	3417		292	3316		1770	3474		1770	3344	
Volume (vph)	219	714	109	54	498	110	226	1258	104	110	663	165
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	223	729	111	55	508	112	231	1284	106	112	677	168
RTOR Reduction (vph)	0	15	0	0	24	0	0	7	0	0	27	0
Lane Group Flow (vph)	223	825	0	55	596	0	231	1383	0	112	818	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases	4		8		5		2		1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	25.5	25.5		25.5	25.5		12.6	32.8		8.2	28.4	
Effective Green, g (s)	26.0	26.0		26.0	26.0		13.1	33.3		8.7	28.9	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.16	0.42		0.11	0.36	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	164	1111		95	1078		290	1446		192	1208	
v/s Ratio Prot		0.24		0.18			c0.13	c0.40		0.06	0.24	
v/s Ratio Perm	c0.44		0.19									
v/c Ratio	1.36	0.74		0.58	0.55		0.80	0.96		0.58	0.68	
Uniform Delay, d1	27.0	24.0		22.4	22.2		32.2	22.6		33.9	21.6	
Progression Factor	1.65	1.73		1.00	1.00		1.44	0.64		0.89	1.37	
Incremental Delay, d2	191.5	2.0		5.2	0.4		7.9	10.2		2.7	2.8	
Delay (s)	236.1	43.6		27.7	22.6		54.1	24.6		32.9	32.4	
Level of Service	F	D		C	C		D	C		C	C	
Approach Delay (s)	84.0		23.0		28.8		32.5		32.5		32.5	
Approach LOS	F		C		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	42.3		HCM Level of Service		D							
HCM Volume to Capacity ratio	1.05											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	88.2%		ICU Level of Service		E							
Analysis Period (min)	15											
c Critical Lane Group												

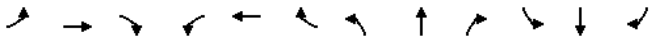
HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2015 PM + Project
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔ ↗		↔ ↗		↔ ↗	
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Volume (veh/h)	20	41	1562	0	20	801
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	43	1644	0	21	843
Pedestrians	52		52		45	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	4.0		4.0		4.0	
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230		471	
pX, platoon unblocked	0.84	0.76			0.76	
vC, conflicting volume	2212	919			1696	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1646	577			1600	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	67	87			93	
cM capacity (veh/h)	65	322			294	
Direction, Lane #						
Volume Total	64	1096	548	21	422	422
Volume Left	21	0	0	21	0	0
Volume Right	43	0	0	0	0	0
cSH	140	1700	1700	294	1700	1700
Volume to Capacity	0.46	0.64	0.32	0.07	0.25	0.25
Queue Length 95th (ft)	52	0	0	6	0	0
Control Delay (s)	51.0	0.0	0.0	18.2	0.0	0.0
Lane LOS	F			C		
Approach Delay (s)	51.0	0.0	0.4			
Approach LOS	F		C			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization	61.6%		ICU Level of Service		B	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.


2015 PM + Project
1/21/2008



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)	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor	0.91		1.00	0.95	1.00		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00		1.00	0.99	1.00		1.00		1.00	0.99	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Frt	0.99		1.00	0.96	0.98		0.98		1.00	0.98	0.98	
Flt Protected	0.99		0.95	1.00	0.99		0.95		1.00	1.00	1.00	
Satd. Flow (prot)	5018		1768	3396	1794		1764		1803	1803	1803	
Flt Permitted	0.74		0.30	1.00	0.70		0.26		1.00	1.00	1.00	
Satd. Flow (perm)	3724		555	3396	1263		480		1803	1803	1803	
Volume (vph)	110	700	30	91	660	201	80	375	90	70	273	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	714	31	93	673	205	82	383	92	71	279	51
RTOR Reduction (vph)	0	5	0	0	36	0	0	9	0	0	8	0
Lane Group Flow (vph)	0	852	0	93	842	0	0	548	0	71	322	0
Confl. Peds. (#/hr)	24		4	4	24		48	12		12	48	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	46.0		46.0		46.0		24.0		24.0		24.0	
Effective Green, g (s)	47.0		47.0		47.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.59		0.59		0.59		0.31		0.31		0.31	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2188		326		1995		395		150		563	
v/s Ratio Prot			c0.25						0.18			
v/s Ratio Perm	0.23		0.17		c0.43		0.15					
v/c Ratio	0.39		0.29		0.42		1.39		0.47		0.57	
Uniform Delay, d1	8.8		8.2		9.1		27.5		22.2		23.0	
Progression Factor	1.00		1.68		1.76		1.00		0.79		0.78	
Incremental Delay, d2	0.5		2.1		0.6		189.4		9.9		4.0	
Delay (s)	9.3		15.8		16.6		216.9		27.3		22.0	
Level of Service	A		B		B		F		C		C	
Approach Delay (s)	9.3		16.5		16.5		216.9		23.0		23.0	
Approach LOS	A		B		B		F		C		C	
Intersection Summary												
HCM Average Control Delay	55.3		HCM Level of Service		E							
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	139.8%		ICU Level of Service		H							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2015 PM + Project
1/21/2008



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)	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor	0.91		1.00	0.91	1.00		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Frt	0.99		0.98	1.00	0.96		0.96		1.00	0.98	0.98	
Flt Protected	0.99		0.95	1.00	0.95		1.00		1.00	1.00	1.00	
Satd. Flow (prot)	5007		1770	1786	1770		1786		1764	1830	1830	
Flt Permitted	0.76		0.81	0.40	1.00		0.31		1.00	1.00	1.00	
Satd. Flow (perm)	3812		4025	745	1786		566		1830	1830	1830	
Volume (vph)	80	610	40	81	762	151	60	237	77	70	229	30
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)	84	642	42	85	802	159	63	249	81	74	241	32
RTOR Reduction (vph)	0	8	0	0	32	0	0	15	0	0	6	0
Lane Group Flow (vph)	0	760	0	0	1014	0	63	315	0	74	267	0
Confl. Peds. (#/hr)			12		12			6		6		
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	2454		2591		191		458		145		469	
v/s Ratio Prot			c0.18				0.15					
v/s Ratio Perm	0.20		c0.25		0.08		0.13					
v/c Ratio	0.31		0.39		0.33		0.69		0.51		0.57	
Uniform Delay, d1	6.3		6.8		24.2		26.9		25.5		25.9	
Progression Factor	1.27		2.02		1.00		1.00		1.13		1.14	
Incremental Delay, d2	0.3		0.4		4.6		8.2		11.4		4.6	
Delay (s)	8.3		14.1		28.7		35.1		40.2		34.1	
Level of Service	A		B		C		D		D		C	
Approach Delay (s)	8.3		14.1		34.0		35.4		35.4		35.4	
Approach LOS	A		B		C		D		D		C	
Intersection Summary												
HCM Average Control Delay	18.3		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.48											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	80.9%		ICU Level of Service		D							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2015 PM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			1.00			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.97			0.97			0.97		
Flt Protected	1.00			1.00			0.99			0.98		
Satd. Flow (prot)	5017			4905			3405			3362		
Flt Permitted	0.78			0.84			0.79			0.65		
Satd. Flow (perm)	3934			4112			2703			2202		
Volume (vph)	64	672	40	69	843	221	60	295	75	130	212	82
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	65	679	40	70	852	223	61	298	76	131	214	83
RTOR Reduction (vph)	0	7	0	0	51	0	0	22	0	0	26	0
Lane Group Flow (vph)	0	777	0	0	1094	0	0	413	0	0	402	0
Confl. Peds. (#/hr)	9		17	17			9	12		10	10	12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2533		2647		2647		693		693		564	
v/s Ratio Prot												
v/s Ratio Perm	0.20		c0.27		c0.27		0.15		0.15		c0.18	
v/c Ratio	0.31		0.41		0.41		0.60		0.60		0.71	
Uniform Delay, d1	6.3		6.9		6.9		26.1		26.1		27.1	
Progression Factor	1.49		0.75		0.75		1.00		1.00		1.13	
Incremental Delay, d2	0.3		0.4		0.4		3.7		3.7		7.4	
Delay (s)	9.7		5.6		5.6		29.9		29.9		37.9	
Level of Service	A		A		A		C		C		D	
Approach Delay (s)	9.7		5.6		5.6		29.9		29.9		37.9	
Approach LOS	A		A		A		C		C		D	
Intersection Summary												
HCM Average Control Delay	15.5		15.5		15.5		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.50		0.50		0.50		0.50		0.50		0.50	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	112.6%		112.6%		112.6%		ICU Level of Service		H		H	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2015 PM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			0.99			1.00		0.96
Flpb, ped/bikes	1.00			1.00			1.00			1.00		1.00
Frt	1.00			0.99			0.93			0.93		0.92
Flt Protected	1.00			1.00			0.98			0.98		0.98
Satd. Flow (prot)	5052			4973			1695			1608		1608
Flt Permitted	0.75			0.93			0.85			0.86		0.86
Satd. Flow (perm)	3828			4620			1482			1404		1404
Volume (vph)	90	817	10	10	931	60	10	0	10	138	0	189
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.96	0.96	0.95	0.95	0.95	0.96	0.95	0.96
Adj. Flow (vph)	94	851	11	11	970	62	11	0	11	144	0	197
RTOR Reduction (vph)	0	1	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	955	0	0	1043	0	0	15	0	0	341	0
Confl. Peds. (#/hr)							79				79	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	45.9		45.9		45.9		26.1		26.1		26.1	
Effective Green, g (s)	45.9		45.9		45.9		26.1		26.1		26.1	
Actuated g/C Ratio	0.57		0.57		0.57		0.33		0.33		0.33	
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)	2196		2651		2651		484		484		458	
v/s Ratio Prot												
v/s Ratio Perm	c0.25		0.23		0.23		0.01		0.01		c0.24	
v/c Ratio	0.43		0.39		0.39		0.03		0.03		0.74	
Uniform Delay, d1	9.7		9.4		9.4		18.3		18.3		24.0	
Progression Factor	0.76		1.00		1.00		1.00		1.00		0.74	
Incremental Delay, d2	0.6		0.4		0.4		0.0		0.0		6.4	
Delay (s)	7.9		9.8		9.8		18.4		18.4		24.1	
Level of Service	A		A		A		B		B		C	
Approach Delay (s)	7.9		9.8		9.8		18.4		18.4		24.1	
Approach LOS	A		A		A		B		B		C	
Intersection Summary												
HCM Average Control Delay	11.2		11.2		11.2		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.55		0.55		0.55		0.55		0.55		0.55	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	73.5%		73.5%		73.5%		ICU Level of Service		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2015 PM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.99			0.95			1.00			0.98		
Flt Protected	0.99			1.00			0.95			1.00		
Satd. Flow (prot)	4925			4756			1747			3451		
Flt Permitted	0.67			0.76			0.31			1.00		
Satd. Flow (perm)	3352			3623			575			3451		
Volume (vph)	269	605	91	90	784	427	110	898	100	195	568	67
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)	283	637	96	95	825	449	116	945	105	205	598	71
RTOR Reduction (vph)	0	9	0	0	6	0	0	7	0	0	7	0
Lane Group Flow (vph)	0	1007	0	0	1363	0	116	1043	0	205	662	0
Confl. Peds. (#/hr)	26		19		26		39		92		92	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	37.9		37.9		34.4		34.4		34.4		34.4	
Effective Green, g (s)	39.4		39.4		35.4		35.4		35.4		35.4	
Actuated g/C Ratio	0.48		0.48		0.43		0.43		0.43		0.43	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1595		1724		246		1475		111		1481	
v/s Ratio Prot					0.30		0.19					
v/s Ratio Perm	0.30		c0.38		0.20		c0.79		0.19		0.19	
v/c Ratio	1.64dl		0.79		0.47		0.71		1.85		0.45	
Uniform Delay, d1	16.3		18.2		17.0		19.4		23.7		16.8	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.6		2.4		6.4		2.9		413.7		1.0	
Delay (s)	16.9		20.6		23.4		22.3		437.4		17.7	
Level of Service	B		C		C		C		F		B	
Approach Delay (s)	16.9		20.6		22.4		116.2					
Approach LOS	B		C		C		F					
Intersection Summary												
HCM Average Control Delay	39.1		HCM Level of Service				D					
HCM Volume to Capacity ratio	1.29											
Actuated Cycle Length (s)	82.8		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	99.4%		ICU Level of Service				F					
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

2015 PM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			1.00			0.89		
Flpb, ped/bikes	1.00			1.00			0.96			1.00		
Frt	0.99			1.00			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5026			5019			1748			1406		
Flt Permitted	0.84			0.78			0.81			1.00		
Satd. Flow (perm)	4232			3937			1453			1406		
Volume (vph)	40	857	34	100	1167	40	94	94	200	30	30	80
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	40	866	34	101	1179	40	95	95	202	30	30	81
RTOR Reduction (vph)	0	5	0	0	4	0	0	0	76	0	37	0
Lane Group Flow (vph)	0	935	0	0	1316	0	0	190	126	0	104	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	49.5		49.5		24.5		24.5		24.5		24.5	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	2566		2387		427		413		427		427	
v/s Ratio Prot					c0.33		c0.13		0.09		0.07	
v/s Ratio Perm	0.22		c0.33		c0.13		0.09		0.07		0.07	
v/c Ratio	0.36		0.55		0.44		0.31		0.24		0.24	
Uniform Delay, d1	8.0		9.3		23.0		21.9		21.5		21.5	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.4		0.9		3.3		1.9		1.4		1.4	
Delay (s)	8.4		10.2		26.3		23.8		22.9		22.9	
Level of Service	A		B		C		C		C		C	
Approach Delay (s)	8.4		10.2		25.0		22.9					
Approach LOS	A		B		C		C					
Intersection Summary												
HCM Average Control Delay	12.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	108.2%		ICU Level of Service				G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

2015 PM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.99	1.00	1.00	0.94	1.00	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	4919	1770	4885	1770	3539	1488	1770	3539	1497	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	4919	1770	4885	1770	3539	1488	1770	3539	1497	1770	3539
Volume (vph)	200	755	101	110	937	240	230	851	180	380	421	110
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)	211	795	106	116	986	253	242	896	189	400	443	116
RTOR Reduction (vph)	0	14	0	0	38	0	0	0	24	0	0	69
Lane Group Flow (vph)	211	887	0	116	1201	0	242	896	165	400	443	47
Confl. Peds. (#/hr)	81		22		50		43		43		43	
Turn Type	Prot		Prot		Prot		pm+ov		Prot		pm+ov	
Protected Phases	7	4	3		8	5		2	3	1	6	7
Permitted Phases	4		4		4		2		6		6	
Actuated Green, G (s)	12.0	34.0	12.0	34.0	21.0	33.0	45.0	25.0	37.0	49.0	49.0	49.0
Effective Green, g (s)	11.0	35.0	11.0	35.0	20.0	34.0	45.0	24.0	38.0	49.0	49.0	49.0
Actuated g/C Ratio	0.09	0.29	0.09	0.29	0.17	0.28	0.38	0.20	0.32	0.41	0.41	0.41
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0	3.0
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	3.0
Lane Grp Cap (vph)	162	1435	162	1425	295	1003	608	354	1121	661	661	661
v/s Ratio Prot	c0.12	0.18	0.07	c0.25	0.14	c0.25	0.02	c0.23	c0.13	0.01	0.01	0.01
v/s Ratio Perm	c0.21		0.13		c0.29		0.07		0.07		0.03	
v/c Ratio	1.30	0.62	0.72	0.84	0.82	0.89	0.27	1.13	0.40	0.07	0.07	0.07
Uniform Delay, d1	54.5	36.7	53.0	39.9	48.3	41.3	26.1	48.0	32.0	21.6	21.6	21.6
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	173.6	2.0	14.0	6.2	16.5	12.0	0.2	87.9	1.0	0.0	0.0	0.0
Delay (s)	228.1	38.7	67.0	46.2	64.7	53.3	26.3	135.9	33.1	21.7	21.7	21.7
Level of Service	F	D	E	D	E	D	C	F	C	C	C	C
Approach Delay (s)	74.7		47.9		51.5		74.6		74.6		74.6	
Approach LOS	E		D		D		E		E		E	
Intersection Summary												
HCM Average Control Delay	60.6		HCM Level of Service				E					
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				20.0					
Intersection Capacity Utilization	92.9%		ICU Level of Service				F					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2015 PM + Project
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		0.95		1.00		0.95	
Frpb, ped/bikes	0.94		0.96		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	0.97		0.97		0.96		1.00		0.95		1.00	
Frt	0.96		0.96		1.00		0.99		1.00		0.99	
Flt Protected	0.98		0.98		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	1590		1636		1693		3458		1675		3453	
Flt Permitted	0.67		0.82		0.29		1.00		0.34		1.00	
Satd. Flow (perm)	1088		1358		509		3458		592		3453	
Volume (vph)	111	50	70	60	70	63	140	683	50	42	794	63
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)	117	53	74	63	74	66	147	719	53	44	836	66
RTOR Reduction (vph)	0	20	0	0	22	0	0	5	0	0	6	0
Lane Group Flow (vph)	0	224	0	0	181	0	147	767	0	44	896	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		6		6	
Actuated Green, G (s)	19.3		19.3		58.7		58.7		58.7		58.7	
Effective Green, g (s)	18.8		18.8		58.2		58.2		58.2		58.2	
Actuated g/C Ratio	0.22		0.22		0.68		0.68		0.68		0.68	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	241		300		349		2368		405		2364	
v/s Ratio Prot	c0.12		0.18		0.07		c0.25		0.14		c0.25	
v/s Ratio Perm	c0.21		0.13		c0.29		0.07		0.07		0.03	
v/c Ratio	0.93		0.60		0.42		0.32		0.11		0.38	
Uniform Delay, d1	32.4		29.8		5.9		5.4		4.6		5.7	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	38.0		2.3		3.7		0.4		0.5		0.5	
Delay (s)	70.5		32.1		9.6		5.8		5.1		6.2	
Level of Service	E		C		A		A		A		A	
Approach Delay (s)	70.5		32.1		6.4		6.1		6.1		6.1	
Approach LOS	E		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	15.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	64.9%		ICU Level of Service				C					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2015 PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.94		1.00	0.99		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.97	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3340		1770	3160		1697	3476		1716	3129	
Flt Permitted	0.95	1.00		0.95	1.00		0.27	1.00		0.32	1.00	
Satd. Flow (perm)	1770	3340		1770	3160		478	3476		571	3129	
Volume (vph)	140	420	110	70	440	194	170	660	50	120	514	300
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	429	112	71	449	198	173	673	51	122	524	306
RTOR Reduction (vph)	0	27	0	0	61	0	0	6	0	0	91	0
Lane Group Flow (vph)	143	514	0	71	586	0	173	718	0	122	739	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	9.5	22.5		6.7	19.7		42.3	42.3		42.3	42.3	
Effective Green, g (s)	10.0	22.0		7.2	19.2		43.8	43.8		43.8	43.8	
Actuated g/C Ratio	0.12	0.26		0.08	0.23		0.52	0.52		0.52	0.52	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	208	864		150	714		246	1791		294	1612	
v/s Ratio Prot	c0.08	c0.15		0.04	c0.19			0.21			0.24	
v/s Ratio Perm							c0.36			0.21		
v/c Ratio	0.69	0.59		0.47	0.82		0.70	0.40		0.41	0.46	
Uniform Delay, d1	36.0	27.6		37.1	31.3		15.7	12.6		12.7	13.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.3	0.7		0.9	7.2		15.5	0.7		4.3	0.9	
Delay (s)	43.3	28.3		38.0	38.4		31.2	13.3		17.0	14.0	
Level of Service	D	C		D	D		C	B		B	B	
Approach Delay (s)		31.5			38.4			16.7			14.4	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM Average Control Delay	23.9		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	85.0				Sum of lost time (s)				16.0			
Intersection Capacity Utilization	76.7%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

2015 PM + Project
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.98	
Flt Protected	0.99		0.95	1.00	1.00	
Satd. Flow (prot)	1662		1770	3539	3459	
Flt Permitted	0.99		0.95	1.00	1.00	
Satd. Flow (perm)	1662		1770	3539	3459	
Volume (vph)	43	98	89	1515	702	124
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	45	103	94	1595	739	131
RTOR Reduction (vph)	67	0	0	0	18	0
Lane Group Flow (vph)	81	0	94	1595	852	0
Turn Type			Prot			
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	27.5		9.0	44.0	30.5	
Effective Green, g (s)	28.0		9.0	44.0	31.0	
Actuated g/C Ratio	0.35		0.11	0.55	0.39	
Clearance Time (s)	4.5		4.0	4.0	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	582		199	1946	1340	
v/s Ratio Prot	c0.05		0.05	c0.45	0.25	
v/s Ratio Perm						
v/c Ratio	0.14		0.47	0.82	0.64	
Uniform Delay, d1	17.8		33.3	14.7	19.9	
Progression Factor	1.00		1.00	1.00	0.50	
Incremental Delay, d2	0.5		7.8	4.0	1.7	
Delay (s)	18.3		41.1	18.8	11.6	
Level of Service	B		D	B	B	
Approach Delay (s)	18.3			20.0	11.6	
Approach LOS	B			B	B	
Intersection Summary						
HCM Average Control Delay	17.2		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.55					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	57.0%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 PM + Project + Mit
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3456		1770	3308		1770	3322		1770	3414	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3456		1770	3308		1770	3322		1770	3414	
Volume (vph)	460	880	82	120	510	290	90	898	260	220	684	60
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)	484	926	86	126	537	305	95	945	274	232	720	63
RTOR Reduction (vph)	0	7	0	0	79	0	0	27	0	0	6	0
Lane Group Flow (vph)	484	1005	0	126	763	0	95	1192	0	232	777	0
Confl. Peds. (#/hr)	15		48	48		15	123		48	48		123
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.5	28.5		9.0	22.0		8.3	33.5		12.0	37.2	
Effective Green, g (s)	15.0	29.5		8.5	23.0		7.8	34.5		11.5	38.2	
Actuated g/C Ratio	0.15	0.29		0.08	0.23		0.08	0.34		0.12	0.38	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	515	1020		150	761		138	1146		204	1304	
v/s Ratio Prot	c0.14	c0.29		0.07	0.23		0.05	c0.36		c0.13	c0.23	
v/s Ratio Perm												
v/c Ratio	0.94	0.99		0.84	1.00		0.69	1.04		1.14	0.60	
Uniform Delay, d1	42.1	35.0		45.1	38.5		44.9	32.8		44.2	24.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.14	0.71	
Incremental Delay, d2	24.9	24.3		30.7	33.2		10.8	37.6		98.6	1.6	
Delay (s)	66.9	59.4		75.7	71.7		55.7	70.4		148.9	19.2	
Level of Service	E	E		E	E		E	E		F	B	
Approach Delay (s)		61.8			72.2			69.3			48.9	
Approach LOS		E			E			E			D	
Intersection Summary												
HCM Average Control Delay		63.2			HCM Level of Service			E				
HCM Volume to Capacity ratio		1.03										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		96.6%			ICU Level of Service			F				
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2015 PM + Project + Mit
1/21/2008

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)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		0.91		1.00	0.95		1.00	0.95		1.00	1.00	1.00
Frbp, ped/bikes		1.00		1.00	0.99		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.99		1.00	0.96		1.00	0.98		1.00	0.98	0.98
Flt Protected		0.99		0.95	1.00		0.99	0.99		0.95	1.00	1.00
Satd. Flow (prot)		5018		1768	3395		1793	1763		1763	1801	1801
Flt Permitted		0.71		0.28	1.00		0.81	0.32		0.32	1.00	1.00
Satd. Flow (perm)		3610		528	3395		1456	599		599	1801	1801
Volume (vph)	110	700	30	91	660	201	80	375	90	70	273	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	714	31	93	673	205	82	383	92	71	279	51
RTOR Reduction (vph)	0	4	0	0	32	0	0	8	0	0	7	0
Lane Group Flow (vph)	0	853	0	93	846	0	0	549	0	71	323	0
Confl. Peds. (#/hr)	24		4	4		24	48		12	12		48
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		46.0		46.0	46.0		34.0		34.0	34.0		34.0
Effective Green, g (s)		47.0		47.0	47.0		35.0		35.0	35.0		35.0
Actuated g/C Ratio		0.52		0.52	0.52		0.39		0.39	0.39		0.39
Clearance Time (s)		5.0		5.0	5.0		5.0		5.0	5.0		5.0
Lane Grp Cap (vph)		1885		276	1773		566		233	700		700
v/s Ratio Prot					c0.25					0.18		
v/s Ratio Perm		0.24		0.18			c0.38		0.12			
v/c Ratio		0.45		0.34	0.48		0.97		0.30	0.46		
Uniform Delay, d1		13.4		12.5	13.7		27.0		19.1	20.5		
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00		
Incremental Delay, d2		0.8		3.3	0.9		31.1		3.3	2.2		
Delay (s)		14.2		15.7	14.6		58.1		22.4	22.7		
Level of Service		B		B	B		E		C	C		
Approach Delay (s)		14.2			14.7		58.1			22.6		
Approach LOS		B			B		E			C		
Intersection Summary												
HCM Average Control Delay		24.4			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		139.8%			ICU Level of Service			H				
Analysis Period (min)		15										

**APPENDIX G:
YEAR 2030 NO PROJECT CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	1.00	1.00	0.99	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.96	
Flt	1.00	0.97	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.94	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4903	1770	4953	2006	2034	1986	1950	1986	1950	1986	1950	
Flt Permitted	0.95	1.00	0.95	1.00	0.10	1.00	0.43	1.00	0.43	1.00	0.43	1.00	
Satd. Flow (perm)	1770	4903	1770	4953	201	2034	899	1950	899	1950	899	1950	
Volume (vph)	310	1000	220	120	1660	250	200	290	70	180	420	290	
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)	326	1053	232	126	1747	263	211	305	74	189	442	305	
RTOR Reduction (vph)	0	28	0	0	16	0	0	7	0	0	21	0	
Lane Group Flow (vph)	326	1257	0	126	1994	0	211	372	0	189	726	0	
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10	
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	7	4	3	8	5	2	6	6	6	6	6	6	
Permitted Phases	17.0	47.9	13.1	44.0	48.5	48.5	39.5	39.5	40.0	40.0	40.0	39.5	
Actuated Green, G (s)	17.0	47.9	13.1	44.0	49.0	49.0	40.0	40.0	40.0	40.0	40.0	39.5	
Effective Green, g (s)	0.14	0.40	0.11	0.37	0.41	0.41	0.33	0.33	0.33	0.33	0.33	0.33	
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Clearance 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	
Vehicle Extension (s)	251	1957	193	1816	187	831	300	650	300	650	300	650	
Lane Grp Cap (vph)	c0.18	c0.26	0.07	c0.40	c0.07	0.18	c0.37	c0.37	0.21	0.21	0.21	0.37	
v/s Ratio Prot	1.30	0.64	0.65	1.10	1.13	0.45	0.63	1.12	0.63	1.12	0.63	1.12	
v/s Ratio Perm	51.5	29.1	51.3	38.0	58.7	25.7	33.8	40.0	33.8	40.0	33.8	40.0	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	160.6	1.6	7.7	53.2	104.5	0.4	4.3	72.1	4.3	72.1	4.3	72.1	
Incremental Delay, d2	212.1	30.8	59.0	91.2	163.2	26.1	38.0	112.1	38.0	112.1	38.0	112.1	
Delay (s)	F	C	E	F	F	C	D	F	D	F	D	F	
Level of Service	E	C	E	F	F	C	D	F	D	F	D	F	
Approach Delay (s)	67.4	89.3	89.3	75.1	75.1	75.1	97.2	97.2	75.1	75.1	97.2	97.2	
Approach LOS	E	F	F	F	F	F	F	F	F	F	F	F	
Intersection Summary													
HCM Average Control Delay	82.4											HCM Level of Service	F
HCM Volume to Capacity ratio	1.15											Sum of lost time (s)	16.0
Actuated Cycle Length (s)	120.0											ICU Level of Service	H
Intersection Capacity Utilization	119.6%											Analysis Period (min)	15
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	1.00	1.00	0.99	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.96	
Flt	1.00	0.95	1.00	0.95	1.00	0.91	1.00	0.97	1.00	0.95	1.00	0.95	
Flt Protected	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1749	4681	1597	1681	1597	3418	1770	3290	1770	3290	1770	3290	
Flt Permitted	0.48	0.74	1.00	0.74	1.00	0.74	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	847	1302	1597	1302	1597	2535	1770	3290	1770	3290	1770	3290	
Volume (vph)	10	10	10	350	330	470	10	1150	240	110	1320	460	
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)	11	11	11	368	347	495	11	1211	253	116	1389	484	
RTOR Reduction (vph)	0	10	0	0	0	57	0	18	0	0	36	0	
Lane Group Flow (vph)	0	23	0	368	785	0	0	1457	0	116	1837	0	
Confl. Peds. (#/hr)	4	4	4	44	44	44	12	12	12	12	12	44	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	7	8	8	8	2	1	6	1	6	1	6	
Permitted Phases	7	7	8	8	8	2	2	2	2	2	2	2	
Actuated Green, G (s)	5.1	26.5	26.5	26.5	26.5	32.5	7.9	44.9	7.9	44.9	7.9	44.9	
Effective Green, g (s)	5.6	27.0	27.0	27.0	27.0	33.0	8.4	45.4	8.4	45.4	8.4	45.4	
Actuated g/C Ratio	0.06	0.30	0.30	0.30	0.30	0.37	0.09	0.50	0.09	0.50	0.09	0.50	
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)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	53	391	479	391	479	930	165	1660	165	1660	165	1660	
v/s Ratio Prot	c0.03	0.28	0.49	0.28	0.49	c0.57	0.07	c0.56	0.07	c0.56	0.07	c0.56	
v/s Ratio Perm	0.43	0.94	1.64	0.94	1.64	1.57	0.70	1.11	0.70	1.11	0.70	1.11	
Uniform Delay, d1	40.7	30.7	31.5	30.7	31.5	28.5	39.6	22.3	39.6	22.3	39.6	22.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	
Incremental Delay, d2	2.0	30.5	296.4	30.5	296.4	256.6	10.5	57.5	10.5	57.5	10.5	57.5	
Delay (s)	42.7	61.2	327.9	61.2	327.9	284.9	50.1	79.8	50.1	79.8	50.1	79.8	
Level of Service	D	E	F	E	F	F	D	E	D	E	D	E	
Approach Delay (s)	42.7	246.8	284.9	246.8	284.9	284.9	78.0	78.0	246.8	284.9	78.0	78.0	
Approach LOS	D	F	F	F	F	F	F	F	F	F	F	F	
Intersection Summary													
HCM Average Control Delay	186.0											HCM Level of Service	F
HCM Volume to Capacity ratio	1.48											Sum of lost time (s)	16.0
Actuated Cycle Length (s)	90.0											ICU Level of Service	H
Intersection Capacity Utilization	137.7%											Analysis Period (min)	15
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.98	1.00	0.96	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3428	1770	3372	1770	3417	1770	3417	1770	3403	1770	3403
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3428	1770	3372	1770	3417	1770	3417	1770	3403	1770	3403
Volume (vph)	480	650	110	140	820	320	120	650	140	320	1150	220
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	677	115	146	854	333	125	677	146	333	1198	229
RTOR Reduction (vph)	0	15	0	0	46	0	0	20	0	0	17	0
Lane Group Flow (vph)	479	777	0	146	1141	0	125	803	0	333	1410	0
Confl. Peds. (#/hr)	6	24	24	6	36	6	36	28	28	28	36	36
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	13.0	28.4	10.1	25.5	9.6	23.5	11.0	24.9				
Effective Green, g (s)	12.5	29.4	9.6	26.5	9.1	24.5	10.5	25.9				
Actuated g/C Ratio	0.14	0.33	0.11	0.29	0.10	0.27	0.12	0.29				
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	477	1120	189	993	179	930	207	979				
v/s Ratio Prot	c0.14	c0.23	0.08	c0.34	0.07	0.23	c0.19	c0.41				
v/c Ratio Perm	1.00	0.69	0.77	1.15	0.70	0.86	1.61	1.44				
Uniform Delay, d1	38.8	26.4	39.1	31.8	39.1	31.2	39.8	32.0				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.19	0.86				
Incremental Delay, d2	42.2	1.5	16.2	79.0	9.2	10.4	276.0	198.6				
Delay (s)	81.0	27.9	55.3	110.7	48.3	41.6	323.2	226.2				
Level of Service	F	C	E	F	D	D	F	F				
Approach Delay (s)	47.9		104.7		42.5		244.5					
Approach LOS	D		F		D		F					
Intersection Summary												
HCM Average Control Delay	126.3 HCM Level of Service F											
HCM Volume to Capacity ratio	1.30											
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	105.5% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Lane Util. 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
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611
Volume (vph)	0	0	10	0	0	0	10	360	320	1600	660	60
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)	0	0	11	0	0	0	11	379	337	1684	695	63
RTOR Reduction (vph)	0	11	0	0	0	0	26	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	701	0	1684	758	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	8.0	0.0	0.0	8.0	29.0	45.0				
Effective Green, g (s)	0.0	0.0	8.0	0.0	0.0	8.0	29.0	45.0				
Actuated g/C Ratio	0.00	0.00	0.18	0.00	0.00	0.18	0.64	1.00				
Clearance Time (s)			4.0			4.0	2.0	4.0				
Lane Grp Cap (vph)	0	0	548	0	0	548	2212	3495				
v/s Ratio Prot			c0.23			c0.49	0.22					
v/c Ratio Perm	0.00	0.00	10.53dr	0.76	0.22	0.76	0.22					
Uniform Delay, d1	22.5	22.5	18.5	5.6	0.0	5.6	0.0					
Progression Factor	1.00	1.00	0.80	1.00	1.00	1.00	1.00					
Incremental Delay, d2	0.0	0.0	138.0	2.5	0.1	2.5	0.1					
Delay (s)	22.5	22.5	152.7	8.1	0.1	8.1	0.1					
Level of Service	C	C	F	A	A	A	A					
Approach Delay (s)	22.5		152.7			5.6						
Approach LOS	C		F			A						
Intersection Summary												
HCM Average Control Delay	39.3 HCM Level of Service D											
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	79.5% ICU Level of Service D											
Analysis Period (min)	15											
dr Defacto Right Lane. Recode with 1 through lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	
Lane Configurations	↔			↔			↔			↔		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Flpb, ped/bikes	0.98	0.98	0.98	1.00	1.00	1.00	0.98	0.98	0.98	0.98	0.98	
Fltb, ped/bikes	0.98	0.98	0.98	0.94	0.94	0.94	0.98	0.98	0.98	0.98	0.98	
Flt Protected	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1712	1606	1606	3382	3475	3475	3382	3475	3475	3475	3475	
Flt Permitted	0.83	0.83	0.83	0.88	0.88	0.88	0.87	0.87	0.88	0.88	0.88	
Satd. Flow (perm)	1456	1427	1427	2941	3066	3066	2941	3066	3066	3066	3066	
Volume (vph)	80	100	30	60	70	110	40	480	90	60	790	
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	
Adj. Flow (vph)	84	105	32	63	74	116	42	505	95	63	832	
RTOR Reduction (vph)	0	13	0	0	68	0	0	31	0	0	8	
Lane Group Flow (vph)	0	208	0	0	185	0	0	611	0	0	929	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.0			15.0			22.0			22.0		
Effective Green, g (s)	15.0			15.0			22.0			22.0		
Actuated g/C Ratio	0.33			0.33			0.49			0.49		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Lane Grp Cap (vph)	485			476			1438			1499		
v/s Ratio Prot	c0.14			0.13			0.21			c0.30		
v/c Ratio	0.43			0.39			0.42			0.62		
Uniform Delay, d1	11.7			11.5			7.4			8.4		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	2.7			2.4			0.9			1.9		
Delay (s)	14.4			13.9			8.3			10.4		
Level of Service	B			B			A			B		
Approach Delay (s)	14.4			13.9			8.3			10.4		
Approach LOS	B			B			A			B		
Intersection Summary												
HCM Average Control Delay	10.6											
HCM Volume to Capacity ratio	0.54											
Actuated Cycle Length (s)	45.0											
Intersection Capacity Utilization	72.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	
Lane Configurations	↔			↔			↔			↔		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Flpb, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Fltb, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1639	1639	1645	3432	3432	3432	4956	4956	4956	4956	4956	
Flt Permitted	0.76	0.76	0.76	0.82	0.82	0.82	0.76	0.76	0.81	0.81	0.81	
Satd. Flow (perm)	1261	1261	1363	2613	2613	2613	4002	4002	4002	4002	4002	
Volume (vph)	80	100	80	50	90	70	40	1030	70	80	1900	
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	
Adj. Flow (vph)	84	105	84	53	95	74	42	1084	74	84	2000	
RTOR Reduction (vph)	0	2	0	0	27	0	0	4	0	0	4	
Lane Group Flow (vph)	0	271	0	0	195	0	0	1196	0	0	2185	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			6		
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	19.4			19.4			56.6			56.6		
Effective Green, g (s)	19.9			19.9			57.1			57.1		
Actuated g/C Ratio	0.23			0.23			0.67			0.67		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	2.0			2.0			2.0			2.0		
Lane Grp Cap (vph)	295			319			1755			2888		
v/s Ratio Prot	c0.22			0.14			0.46			c0.55		
v/c Ratio	0.92			0.61			0.68			0.81		
Uniform Delay, d1	31.8			29.1			8.4			10.1		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	31.9			2.4			2.2			2.8		
Delay (s)	63.7			31.5			10.6			12.9		
Level of Service	E			C			B			B		
Approach Delay (s)	63.7			31.5			10.6			12.9		
Approach LOS	E			C			B			B		
Intersection Summary												
HCM Average Control Delay	16.8											
HCM Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	110.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↓	↑	↑	↓	↓	↓	↓	↓	↓	↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99
Satd. Flow (prot)	1770	3370	1763	3455	1768	1837	1745	1815	1745	1815	1815
Flt Permitted	0.17	1.00	0.19	1.00	0.24	1.00	0.45	1.00	0.45	1.00	0.45
Satd. Flow (perm)	324	3370	353	3455	449	1837	828	1815	828	1815	1815
Volume (vph)	180	500	190	90	920	110	160	380	30	200	600
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
Adj. Flow (vph)	189	526	200	95	968	116	168	400	32	211	632
RTOR Reduction (vph)	0	49	0	0	11	0	0	3	0	0	3
Lane Group Flow (vph)	189	677	0	95	1073	0	168	429	0	211	745
Confl. Peds. (#/hr)	30	12	12	12	30	6	54	54	54	54	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	969	101	983	275	1125	507	1112	507	1112	1112
v/s Ratio Prot	0.20	0.20	0.20	0.31	0.31	0.23	0.23	0.23	0.23	0.41	0.41
v/s Ratio Perm	0.27	0.27	0.27	0.37	0.37	0.61	0.61	0.61	0.61	0.25	0.25
v/c Ratio	0.03	0.70	0.94	1.08	1.08	0.61	0.38	0.42	0.42	0.67	0.67
Uniform Delay, d1	28.5	25.4	27.8	28.5	28.5	9.6	7.8	8.1	8.1	10.2	10.2
Progression Factor	1.00	1.00	0.88	0.90	0.88	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	489.9	4.2	65.2	50.1	65.2	9.7	1.0	2.5	2.5	3.2	3.2
Delay (s)	528.4	29.6	89.8	75.7	89.8	19.3	8.8	10.6	10.6	13.4	13.4
Level of Service	F	C	F	E	E	B	A	B	B	B	B
Approach Delay (s)	132.6	132.6	132.6	76.8	76.8	11.8	11.8	12.8	12.8	12.8	12.8
Approach LOS	F	F	F	E	E	B	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	63.3
HCM Level of Service	E
HCM Volume to Capacity ratio	1.10
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	103.6%
ICU Level of Service	G
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↓	↑	↑	↓	↓	↓	↓	↓	↓	↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99
Satd. Flow (prot)	1766	3407	1748	3496	1748	3496	3403	3427	3403	3427	3427
Flt Permitted	0.17	1.00	0.31	1.00	0.31	1.00	0.65	0.71	0.65	0.71	0.71
Satd. Flow (perm)	314	3407	576	3496	576	3496	2241	2472	2241	2472	2472
Volume (vph)	80	550	130	60	940	70	120	280	70	120	380
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
Adj. Flow (vph)	84	579	137	63	989	74	126	285	74	126	400
RTOR Reduction (vph)	0	26	0	0	7	0	0	18	0	0	14
Lane Group Flow (vph)	84	690	0	63	1056	0	0	477	0	0	586
Confl. Peds. (#/hr)	18	18	54	54	18	4	18	18	18	18	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	39.0	39.0	39.0	39.0	39.0	39.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	153	1661	281	1704	281	1704	924	1020	924	1020	1020
v/s Ratio Prot	0.20	0.20	0.20	0.30	0.30	0.20	0.20	0.20	0.20	0.20	0.20
v/s Ratio Perm	0.27	0.27	0.27	0.11	0.11	0.21	0.21	0.21	0.21	0.24	0.24
v/c Ratio	0.55	0.42	0.22	0.62	0.62	0.52	0.52	0.57	0.57	0.57	0.57
Uniform Delay, d1	14.3	13.2	11.8	15.1	15.1	17.5	17.5	18.1	18.1	18.1	18.1
Progression Factor	0.98	0.91	1.35	1.45	1.45	0.57	0.57	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.0	0.6	1.5	1.4	1.4	1.4	1.4	2.4	2.4	2.4	2.4
Delay (s)	25.0	12.6	17.4	23.2	23.2	11.4	11.4	20.5	20.5	20.5	20.5
Level of Service	C	B	B	C	C	B	B	C	C	C	C
Approach Delay (s)	13.9	13.9	22.9	22.9	22.9	11.4	11.4	20.5	20.5	20.5	20.5
Approach LOS	B	B	C	C	C	B	B	C	C	C	C

Intersection Summary	
HCM Average Control Delay	18.1
HCM Level of Service	B
HCM Volume to Capacity ratio	0.60
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.8%
ICU Level of Service	D
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1765	3498	1745	3481	1745	3481	3390	3390	3424	3424	3424	3424	3424
Flt Permitted	0.19	1.00	0.31	1.00	0.31	1.00	0.80	0.80	0.72	0.80	0.72	0.80	0.72
Satd. Flow (perm)	348	3498	577	3481	577	3481	2722	2722	2504	2504	2504	2504	2504
Volume (vph)	50	660	40	90	910	90	50	270	80	150	470	80	80
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	688	42	94	948	94	52	281	83	156	490	83	83
RTOR Reduction (vph)	0	5	0	0	9	0	0	28	0	0	12	0	0
Lane Group Flow (vph)	52	725	0	94	1033	0	0	388	0	0	717	0	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	2	2	6	6	6	6	6
Permitted Phases	4	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Actuated Green, G (s)	41.5	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Effective Green, g (s)	51	51	51	51	51	39	39	39	39	39	39	39	39
Actuated g/C Ratio	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Clearance Time (s)	178	1793	296	1784	1065	1065	970	970	970	970	970	970	970
Lane Grp Cap (vph)	0.21	0.16	0.16	0.30	0.14	0.14	c0.29	c0.29	c0.29	c0.29	c0.29	c0.29	c0.29
v/s Ratio Prot	0.29	0.40	0.32	0.58	0.37	0.37	0.74	0.74	0.74	0.74	0.74	0.74	0.74
v/c Ratio Perm	11.2	12.0	11.4	13.5	17.5	17.5	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Uniform Delay, d1	1.19	1.20	1.00	1.00	0.66	0.66	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	3.7	0.6	2.8	1.4	0.9	0.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Incremental Delay, d2	17.0	15.0	14.2	14.9	12.6	12.6	26.1	26.1	26.1	26.1	26.1	26.1	26.1
Delay (s)	B	B	B	B	B	B	C	C	C	C	C	C	C
Level of Service	B	B	B	B	B	B	C	C	C	C	C	C	C
Approach Delay (s)	15.2	14.8	14.8	12.6	12.6	12.6	26.1	26.1	26.1	26.1	26.1	26.1	26.1
Approach LOS	B	B	B	B	B	B	C	C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	17.3 HCM Level of Service B
HCM Volume to Capacity ratio	0.65
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	101.7% ICU Level of Service G
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2030 AM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.98
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	3433	3433	1770	3539	1770	3539	3433	3433	3433	3433
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3433	1770	3539	1770	3539	3433	3433	3433	3433
Volume (vph)	810	60	100	1070	0	0	0	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	853	63	105	1126	0	0	0	0	0	0
RTOR Reduction (vph)	9	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	907	0	105	1126	0	0	0	0	0	0
Confl. Peds. (#/hr)	146	266	146	266	146	266	146	266	146	266
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	3	8	8	8	8	8	8	8
Permitted Phases	4	30.0	30.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Actuated Green, G (s)	22.0	22.0	22.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Effective Green, g (s)	22.0	22.0	22.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio	0.37	0.37	0.37	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1259	885	3539	885	3539	885	3539	885	3539	885
v/s Ratio Prot	c0.26	c0.26	c0.26	0.06	0.06	0.06	0.06	0.06	0.06	0.06
v/c Ratio Perm	0.72	0.72	0.72	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Uniform Delay, d1	16.4	16.4	16.4	8.0	8.0	8.0	8.0	8.0	8.0	8.0
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	3.6	3.6	3.6	0.3	0.3	0.3	0.2	0.2	0.2	0.2
Delay (s)	19.9	19.9	19.9	8.2	8.2	8.2	8.2	8.2	8.2	8.2
Level of Service	B	B	B	A	A	A	A	A	A	A
Approach Delay (s)	19.9	19.9	19.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Approach LOS	B	B	B	A	A	A	A	A	A	A

Intersection Summary	
HCM Average Control Delay	9.0 HCM Level of Service A
HCM Volume to Capacity ratio	0.48
Actuated Cycle Length (s)	60.0 Sum of lost time (s) 4.0
Intersection Capacity Utilization	37.0% ICU Level of Service A
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
11: 40th St. & BART parking

2030 AM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	790	20	0	1170	0	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	832	21	0	1232	0	21
Pedestrians				123	123	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				10	10	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	81			406		
pX, platoon unblocked	0.77			0.88		0.77
VC, conflicting volume	976			1581		672
VC1, stage 1 cont vol						
VC2, stage 2 cont vol				677		819
vCu, unblocked vol				4.1		6.8
IC, single (s)				2.2		3.5
IC, 2 stage (s)				100		100
pf queue free %				633		247
cM capacity (veh/h)				298		616
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	554	298	616	616	21	21
Volume Left	0	0	0	0	0	0
Volume Right	0	21	0	0	21	21
cSH	1700	1700	1700	1700	444	444
Volume to Capacity	0.33	0.18	0.36	0.36	0.05	0.05
Queue Length 95th (ft)	0	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	13.5	B
Lane LOS					B	B
Approach Delay (s)	0.0	0.0	0.0	13.5		
Approach LOS				B		
Intersection Summary						
Average Delay	0.1					
Intersection Capacity Utilization	52.2%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
12: 40th St. & BART parking

2030 AM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	800	10	0	1170	0	60
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	833	10	0	1219	0	62
Pedestrians				123	123	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				10	10	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	298			189		
pX, platoon unblocked	0.79			0.89		0.79
VC, conflicting volume	967			1571		668
VC1, stage 1 cont vol						
VC2, stage 2 cont vol				688		803
vCu, unblocked vol				4.1		6.8
IC, single (s)				2.2		3.5
IC, 2 stage (s)				100		100
pf queue free %				638		257
cM capacity (veh/h)				288		609
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	556	288	609	609	62	62
Volume Left	0	0	0	0	0	0
Volume Right	0	10	0	0	62	62
cSH	1700	1700	1700	1700	436	436
Volume to Capacity	0.33	0.17	0.36	0.36	0.14	0.14
Queue Length 95th (ft)	0	0	0	0	0	12
Control Delay (s)	0.0	0.0	0.0	0.0	14.6	B
Lane LOS					B	B
Approach Delay (s)	0.0	0.0	0.0	14.6		
Approach LOS				B		
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	52.2%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.93	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.95
Frlb, ped/bikes	0.97	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.94	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1718	3083	1692	3413	1770	3461	1770	3461	1770	3343	1770	3343
Flt Permitted	0.15	1.00	0.20	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	278	3083	351	3413	1770	3461	1770	3461	1770	3343	1770	3343
Volume (vph)	160	420	280	110	710	90	120	460	40	100	1270	340
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)	168	442	295	116	747	95	126	484	42	105	1337	358
RTOR Reduction (vph)	0	135	0	0	12	0	0	7	0	0	26	0
Lane Group Flow (vph)	168	602	0	116	830	0	126	519	0	105	1669	0
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	92	92
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	8	8	8	5	2	1	1	6	6
Permitted Phases	4	4	4	8	8	8	5	2	1	1	6	6
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	25.5	9.1	37.9	8.1	36.9	8.1	36.9
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	26.0	9.6	38.4	8.6	37.4	8.6	37.4
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.11	0.45	0.10	0.44	0.10	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)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	85	943	107	1044	200	1564	179	1471	179	1471	179	1471
v/s Ratio Prot	0.20	0.20	0.20	0.24	0.24	0.24	c0.07	0.15	0.06	c0.50	0.06	c0.50
v/c Ratio Perm	c0.60	0.64	0.33	0.33	0.33	0.33	0.63	0.33	0.59	1.13	0.59	1.13
v/c Ratio	1.98	0.64	1.08	0.80	0.80	0.80	0.63	0.33	0.59	1.13	0.59	1.13
Uniform Delay, d1	29.5	25.4	29.5	27.1	27.1	27.1	36.0	15.0	36.5	23.8	36.5	23.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.88	1.00	1.00	1.00	1.00
Incremental Delay, d2	478.8	1.1	111.5	4.0	3.9	0.5	3.9	0.5	3.1	69.6	3.1	69.6
Delay (s)	508.3	26.5	141.0	31.0	48.0	13.7	48.0	13.7	39.6	93.4	39.6	93.4
Level of Service	F	C	F	C	D	B	D	B	D	F	D	F
Approach Delay (s)	115.9	20.3	44.3	20.3	20.3	20.3	20.3	20.3	20.3	90.3	20.3	90.3
Approach LOS	F	C	D	D	D	C	D	C	D	F	D	F

Intersection Summary	
HCM Average Control Delay	74.9
HCM Volume to Capacity ratio	1.37
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	99.1%
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave. 2030 AM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	20	40	640	1610	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	21	42	674	1695	32
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None
Upstream signal (ft)	0.63	0.60	0.60	0.60	0.60	0.60
pX, platoon unblocked	2332	1063	1826	2332	1063	1826
vC, conflicting volume	2332	1063	1826	2332	1063	1826
VC1, stage 1 cont vol	2332	1063	1826	2332	1063	1826
VC2, stage 2 cont vol	2332	1063	1826	2332	1063	1826
vCu, unblocked vol	2297	445	1712	2297	445	1712
IC, single (s)	6.8	6.9	4.1	6.8	6.9	4.1
IC, 2 stage (s)	3.5	3.3	2.2	3.5	3.3	2.2
IF (s)	23	93	79	23	93	79
p0 queue free %	14	284	203	14	284	203
cM capacity (veh/h)	32	42	337	337	1130	596
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	32	42	337	337	1130	596
Volume Left	11	42	0	0	0	0
Volume Right	21	0	0	0	0	32
cSH	37	203	1700	1700	1700	1700
Volume to Capacity	0.85	0.21	0.20	0.20	0.66	0.35
Queue Length 95th (ft)	78	19	0	0	0	0
Control Delay (s)	261.9	27.4	0.0	0.0	0.0	0.0
Lane LOS	F	D	D	D	D	D
Approach Delay (s)	261.9	1.6	1.6	1.6	0.0	0.0
Approach LOS	F	D	D	D	F	F

Intersection Summary	
Average Delay	3.8
Intersection Capacity Utilization	65.3%
Analysis Period (min)	15
ICU Level of Service	C

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

2030 AM
 1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↓	↓
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	30	650	20	20	1610
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	32	684	21	21	1695
Pedestrians	34		33			34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3		3			3
Right turn flare (veh)	None					
Median type	None					
Median storage (veh)			230			791
Upstream signal (ft)	0.66	0.92				0.92
pX, platoon unblocked	1651	421				739
VC, conflicting volume						
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1099	279				626
IC, single (s)	6.8	6.9				4.1
IC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	83	95				98
cM capacity (veh/h)	126	622				848
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	53	456	249	21	847	847
Volume Left	21	0	0	21	0	0
Volume Right	32	0	21	0	0	0
cSH	242	1700	1700	848	1700	1700
Volume to Capacity	0.22	0.27	0.15	0.02	0.50	0.50
Queue Length 95th (ft)	20	0	0	2	0	0
Control Delay (s)	24.0	0.0	0.0	9.4	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	24.0	0.0	0.1			
Approach LOS	C			B		

Intersection Summary		
Average Delay	61.7%	ICU Level of Service
Intersection Capacity Utilization	15	B
Analysis Period (min)		

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2030 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.98	1.00	0.99	1.00	0.99
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.96
Frt	0.99	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.95	1.00	0.95	1.00
Fit Protected	4980	1763	3448	1750	1750	1750	1750	1750	1750	1750	1750	1750
Satd. Flow (prot)	3272	459	3448	180	180	180	180	180	180	180	180	180
Satd. Flow (perm)	210	700	50	70	1080	190	100	180	90	200	490	200
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	221	737	53	74	1137	200	105	189	95	211	516	211
Adj. Flow (vph)	0	7	0	0	17	0	0	13	0	0	18	0
RTOR Reduction (vph)	0	1004	0	74	1320	0	0	376	0	211	709	0
Lane Group Flow (vph)	24	18	18	24	24	24	24	48	48	48	24	24
Cont. Peds. (#/hr)												
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	2	2	6	6	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6	6	6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	2002	281	2109	c0.38	53	53	53	53	213	519	519	519
v/s Ratio Prot	0.31	0.16	0.16	c2.08	0.29	0.29	0.29	0.29	0.99	1.37	1.37	1.37
v/s Ratio Perm	1.3661	0.26	0.63	7.09	0.99	0.99	0.99	0.99	29.9	30.0	30.0	30.0
Uniform Delay, d1	9.2	7.6	10.4	30.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	0.9	2.3	1.4	2777.9	59.3	177.1	177.1	177.1	89.2	207.1	207.1	207.1
Delay (s)	10.1	9.9	11.8	2807.9	89.2	207.1	207.1	207.1	89.2	207.1	207.1	207.1
Level of Service	B	A	B	F	F	F	F	F	F	F	F	F
Approach Delay (s)	10.1	11.7	2807.9	180.6	180.6	180.6	180.6	180.6	180.6	180.6	180.6	180.6
Approach LOS	B	B	F	F	F	F	F	F	F	F	F	F

Intersection Summary		
HCM Average Control Delay	343.7	HCM Level of Service
HCM Volume to Capacity ratio	2.73	F
Actuated Cycle Length (s)	85.0	Sum of lost time (s)
Intersection Capacity Utilization	158.4%	ICU Level of Service
Analysis Period (min)	15	H
d1 Defacto Left Lane. Recode with 1 though lane as a left lane.		
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5033	5008	5008	5008	5008	5008	1762	1792	1755	1802	1802
Flt Permitted	0.74	0.81	0.81	0.81	0.81	0.81	0.20	1.00	0.20	1.00	1.00
Satd. Flow (perm)	3730	4071	4071	362	1792	360	1802	360	1802	360	1802
Volume (vph)	80	900	30	70	1170	110	70	300	80	150	350
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
Adj. Flow (vph)	84	947	32	74	1232	116	74	316	84	158	368
RTOR Reduction (vph)	0	4	0	0	13	0	0	12	0	0	10
Lane Group Flow (vph)	0	1059	0	0	1409	0	74	388	0	158	442
Confl. Peds. (#/hr)	18	18	18	18	18	18	18	18	18	18	18
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2401	2401	2401	2621	2621	2621	93	459	92	462	462
v/s Ratio Prot	0.28	0.35	0.20	0.20	0.22	0.22	0.20	0.22	0.20	0.25	0.25
v/s Ratio Perm	0.44	0.44	0.44	0.54	0.54	0.54	0.80	0.85	0.80	0.44	0.44
Uniform Delay, d1	7.1	7.1	7.1	7.8	7.8	7.8	27.8	28.2	29.8	29.3	29.3
Progression Factor	1.00	1.00	1.00	0.56	0.56	0.56	1.00	1.00	1.20	1.20	1.20
Incremental Delay, d2	0.6	0.6	0.6	49.1	49.1	49.1	17.2	17.2	359.8	29.7	29.7
Delay (s)	7.7	7.7	7.7	5.0	5.0	5.0	76.9	45.5	395.3	65.0	65.0
Level of Service	A	A	A	E	E	E	D	D	F	E	E
Approach Delay (s)	7.7	7.7	7.7	5.0	5.0	5.0	50.4	50.4	150.6	150.6	150.6
Approach LOS	A	A	A	A	A	A	D	D	F	F	F

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	36.7	36.7	36.7	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
HCM Volume to Capacity ratio	0.87	0.87	0.87	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Actuated Cycle Length (s)	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Intersection Capacity Utilization	88.9%	88.9%	88.9%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5023	5023	5023	4971	4971	4971	3408	3408	3456	3456	3456
Flt Permitted	0.77	0.77	0.77	0.80	0.80	0.80	0.73	0.73	0.85	0.85	0.85
Satd. Flow (perm)	3880	3880	3880	4004	4004	4004	2491	2491	2959	2959	2959
Volume (vph)	60	1020	60	70	1270	180	40	170	40	80	450
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
Adj. Flow (vph)	63	1074	63	74	1337	189	42	179	42	84	474
RTOR Reduction (vph)	0	7	0	0	21	0	0	19	0	0	9
Lane Group Flow (vph)	0	1193	0	0	1579	0	0	244	0	0	602
Confl. Peds. (#/hr)	17	17	17	19	19	19	12	12	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2498	2498	2498	2578	2578	2578	638	638	758	758	758
v/s Ratio Prot	0.31	0.31	0.31	0.39	0.39	0.39	0.10	0.10	0.10	0.20	0.20
v/s Ratio Perm	0.48	0.48	0.48	0.61	0.61	0.61	0.38	0.38	0.38	0.79	0.79
Uniform Delay, d1	7.3	7.3	7.3	8.4	8.4	8.4	24.5	24.5	27.8	27.8	27.8
Progression Factor	0.66	0.66	0.66	1.00	1.00	1.00	1.00	1.00	1.00	0.34	0.34
Incremental Delay, d2	0.5	0.5	0.5	1.1	1.1	1.1	1.7	1.7	7.8	7.8	7.8
Delay (s)	5.3	5.3	5.3	9.5	9.5	9.5	26.3	26.3	17.3	17.3	17.3
Level of Service	A	A	A	A	A	A	C	C	B	B	B
Approach Delay (s)	5.3	5.3	5.3	9.5	9.5	9.5	26.3	26.3	17.3	17.3	17.3
Approach LOS	A	A	A	A	A	A	C	C	B	B	B

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6	10.6
HCM Volume to Capacity ratio	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Actuated Cycle Length (s)	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Intersection Capacity Utilization	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%	122.1%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2030 AM
1/25/2008



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	1250	1370	30	0	150
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1316	1442	32	0	158
Pedestrians	98				98	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	8				8	
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	698	473				
pX, platoon unblocked	0.86				0.88	0.86
VC, conflicting volume	1572				1979	677
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	1330				1584	283
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	69
cM capacity (veh/h)	404				80	515
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3
Volume Total	439	439	439	481	481	481
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.26	0.26	0.26	0.28	0.28	0.28
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	C	C	C	C	C
Approach Delay (s)	0.0			0.0		
Approach LOS				C		

Intersection Summary	Value
Average Delay	0.8
Intersection Capacity Utilization	48.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 AM
1/25/2008



Movement	EBL	EBT	WBL	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.98	0.98	0.98	0.98	0.98	0.98
Fit Protected	1.00	1.00	0.99	0.95	1.00	1.00
Satd. Flow (prot)	4940	4917	4917	1770	3406	1744
Fit Permitted	0.68	0.64	0.64	0.13	1.00	0.40
Satd. Flow (perm)	3365	3182	3182	242	3406	734
Volume (vph)	100	980	180	200	100	370
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1032	189	211	105	389
RTOR Reduction (vph)	0	23	0	26	0	24
Lane Group Flow (vph)	0	1303	0	1585	0	460
Confl. Peds. (#/hr)	40			40	25	31
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2
Permitted Phases	4	4	8	2	2	6
Actuated Green, G (s)	44.7	44.7	44.7	29.8	29.8	29.8
Effective Green, g (s)	46.2	46.2	46.2	30.8	30.8	30.8
Actuated g/C Ratio	0.54	0.54	0.54	0.36	0.36	0.36
Clearance Time (s)	5.5	5.5	5.5	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1829	1730	1730	88	1234	266
v/s Ratio Prot	0.39	0.39	0.39	0.43	0.14	0.39
v/s Ratio Perm	0.71	0.71	0.71	1.19	0.37	0.52
v/c Ratio	14.4	17.6	17.6	27.1	20.0	14.2
Uniform Delay, d1	1.00	1.00	1.00	1.27	1.29	27.1
Progression Factor	1.1	1.1	1.1	155.4	0.8	193.2
Incremental Delay, d2	15.6	15.6	15.6	189.8	26.6	224.0
Delay (s)	B	B	B	C	C	F
Level of Service	B	B	B	C	C	F
Approach Delay (s)	15.6			25.5		55.7
Approach LOS	B			C		E

Intersection Summary	Value
HCM Average Control Delay	50.2
HCM Level of Service	D
HCM Volume to Capacity ratio	1.12
Actuated Cycle Length (s)	85.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.2%
ICU Level of Service	H
Analysis Period (min)	15
Defacto Left Lane. Recode with 1 through lane as a left lane.	
Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2030 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5060	5005	5005	1769	1395	1602	1769	1395	1602	1769	1395	1602
Fit Permitted	0.83	0.82	0.82	0.84	1.00	0.81	0.84	1.00	0.81	0.84	1.00	0.81
Satd. Flow (perm)	4209	4111	4111	1517	1395	1338	1517	1395	1338	1517	1395	1338
Volume (vph)	40	1400	20	50	1470	90	30	40	30	100	40	60
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)	42	1474	21	53	1547	95	32	42	32	105	42	63
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	0	18	0	16
Lane Group Flow (vph)	0	1535	0	0	1687	0	0	74	14	0	194	0
Conf. Ped. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29
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
Lane Grp Cap (vph)	2552	2492	2492	446	410	393	446	410	393	446	410	393
v/s Ratio Prot	0.36	c0.41	c0.41	0.05	0.01	c0.15	0.05	0.01	c0.15	0.05	0.01	c0.15
v/s Ratio Perm	0.60	0.68	0.68	0.17	0.03	0.49	0.17	0.03	0.49	0.17	0.03	0.49
v/c Ratio	9.8	10.5	10.5	21.0	20.1	23.3	21.0	20.1	23.3	21.0	20.1	23.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.1	1.1	1.1	0.8	0.2	4.4	0.8	0.2	4.4	0.8	0.2	4.4
Incremental Delay, d2	10.8	12.0	12.0	21.8	20.3	27.7	21.8	20.3	27.7	21.8	20.3	27.7
Delay (s)	B	B	B	C	C	C	C	C	C	C	C	C
Level of Service	B	B	B	C	C	C	C	C	C	C	C	C
Approach Delay (s)	10.8	12.0	12.0	21.3	20.3	27.7	21.3	20.3	27.7	21.3	20.3	27.7
Approach LOS	B	B	B	C	C	C	C	C	C	C	C	C

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7
HCM Volume to Capacity ratio	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
Actuated Cycle Length (s)	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Intersection Capacity Utilization	93.9%	93.9%	93.9%	93.9%	93.9%	93.9%	93.9%	93.9%	93.9%	93.9%	93.9%	93.9%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.96	0.96	1.00	0.96	1.00
Frt, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4923	4923	1770	4839	1770	3539	1515	1770	3539	1523	1770
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4923	4923	1770	4839	1770	3539	1515	1770	3539	1523	1770
Volume (vph)	170	1200	170	210	1140	380	120	420	130	390	1440	280
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)	179	1263	179	221	1200	400	126	442	137	411	1516	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	31	0	0	21
Lane Group Flow (vph)	179	1427	0	221	1550	0	126	442	106	411	1516	242
Conf. Ped. (#/hr)	66	66	66	23	23	23	38	38	38	26	26	26
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	pm+ov	Prot	Prot	pm+ov	pm+ov
Protected Phases	7	4	4	3	8	8	5	2	2	3	1	6
Permitted Phases	7	4	4	3	8	8	5	2	2	3	1	6
Actuated Green, G (s)	12.0	32.0	32.0	15.0	35.0	35.0	10.6	28.0	43.0	29.0	46.4	58.4
Effective Green, g (s)	11.0	33.0	33.0	14.0	36.0	36.0	9.6	29.0	43.0	28.0	47.4	58.4
Actuated g/C Ratio	0.09	0.28	0.28	0.12	0.30	0.30	0.08	0.24	0.36	0.23	0.39	0.49
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	3.0	5.0	5.0	3.0
Vehicle Extension (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
Lane Grp Cap (vph)	162	1354	1354	207	1452	1452	142	855	593	413	1398	792
v/s Ratio Prot	0.10	0.29	0.29	c0.12	c0.32	c0.32	0.07	0.12	0.02	c0.23	c0.43	0.03
v/s Ratio Perm	1.10	1.05	1.05	1.07	1.07	1.07	0.89	0.52	0.18	1.00	1.08	0.31
v/c Ratio	54.5	43.5	43.5	53.0	42.0	42.0	54.7	39.4	26.4	45.9	36.3	18.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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	101.6	40.0	40.0	81.6	44.0	44.0	42.6	2.2	0.1	42.7	50.4	0.1
Delay (s)	156.1	83.5	83.5	134.6	86.0	86.0	97.2	41.7	26.5	88.6	86.7	18.7
Level of Service	F	F	F	F	F	F	F	D	C	F	F	B
Approach Delay (s)	91.5	91.9	91.9	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6	48.6
Approach LOS	F	F	F	F	F	F	D	D	D	D	D	E

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5	82.5
HCM Volume to Capacity ratio	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Actuated Cycle Length (s)	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0
Intersection Capacity Utilization	100.3%	100.3%	100.3%	100.3%	100.3%	100.3%	100.3%	100.3%	100.3%	100.3%	100.3%	100.3%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2030 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. 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
Frpb, ped/bikes	0.94	0.96	0.96	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.98	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.98	0.98	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1607	1636	1636	1731	3427	1654	3472	1654	3472	1654	3472	1654
Flt Permitted	0.72	0.78	0.78	0.18	1.00	0.39	1.00	0.39	1.00	0.39	1.00	0.39
Satd. Flow (perm)	1175	1305	1305	320	3427	678	3472	678	3472	678	3472	678
Volume (vph)	60	50	50	70	80	60	60	80	570	60	50	1170
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)	63	53	53	74	84	63	63	84	600	63	53	1232
RTOR Reduction (vph)	0	22	0	0	20	0	0	7	0	0	0	4
Lane Group Flow (vph)	0	147	0	0	201	0	84	656	0	53	1302	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
Effective Green, g (s)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Vehicle Extension (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
Lane Grp Cap (vph)	210	233	233	233	2492	493	2524	493	2524	493	2524	493
v/s Ratio Prot	0.12	0.15	0.15	0.26	0.26	0.19	0.19	0.19	0.19	0.19	0.19	0.19
v/c Ratio Perm	0.70	0.86	0.86	0.36	0.26	0.11	0.52	0.11	0.52	0.11	0.52	0.11
Uniform Delay, d1	32.8	33.9	33.9	4.3	3.9	3.4	5.1	3.4	5.1	3.4	5.1	3.4
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	7.9	25.8	25.8	4.3	0.3	0.0	0.1	0.0	0.1	0.0	0.1	0.0
Delay (s)	40.7	59.7	59.7	8.6	4.2	3.4	4.6	3.4	4.6	3.4	4.6	3.4
Level of Service	D	E	E	A	A	A	A	A	A	A	A	A
Approach Delay (s)	40.7	59.7	59.7	59.7	59.7	4.7	4.5	4.7	4.5	4.7	4.5	4.7
Approach LOS	D	E	E	E	E	A	A	A	A	A	A	A

Intersection Summary	
HCM Average Control Delay	11.9
HCM Volume to Capacity ratio	0.58
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	69.2%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2030 AM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.95	1.00	0.97
Flpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.97	1.00	0.98	1.00	0.95	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3379	1770	3276	1770	3276	1746	3409	1683	3335	1683	3335
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.12	1.00	0.45	1.00	0.45	1.00
Satd. Flow (perm)	1770	3379	1770	3276	1770	3276	216	3409	800	3335	800	3335
Volume (vph)	270	500	100	140	710	190	70	350	60	160	1000	220
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)	284	526	105	147	747	200	74	368	63	168	1053	232
RTOR Reduction (vph)	0	18	0	0	28	0	0	16	0	0	21	0
Lane Group Flow (vph)	284	613	0	147	919	0	74	415	0	168	1264	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	4	3	8	2	2	2	2	2	2	2
Permitted Phases	7	4	4	3	8	2	2	2	2	2	2	2
Actuated Green, G (s)	16.5	28.0	11.0	22.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	17.0	27.5	11.5	22.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.20	0.32	0.14	0.26	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	4.5	3.5	4.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (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
Lane Grp Cap (vph)	354	1093	239	848	86	1364	320	1334	320	1334	320	1334
v/s Ratio Prot	0.16	0.18	0.08	0.28	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
v/c Ratio Perm	0.80	0.56	0.62	1.08	0.86	0.30	0.53	0.95	0.53	0.95	0.53	0.95
Uniform Delay, d1	32.4	23.8	34.7	31.5	23.3	17.4	19.4	24.6	19.4	24.6	19.4	24.6
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	11.7	0.4	3.3	56.1	63.9	0.6	6.0	14.9	6.0	14.9	6.0	14.9
Delay (s)	44.1	24.2	37.9	87.6	87.3	18.0	25.4	39.6	25.4	39.6	25.4	39.6
Level of Service	D	C	D	F	F	B	C	D	C	D	C	D
Approach Delay (s)	30.3	30.3	30.3	80.9	80.9	28.2	37.9	37.9	28.2	37.9	37.9	37.9
Approach LOS	C	C	C	F	F	C	D	D	C	D	D	D

Intersection Summary	
HCM Average Control Delay	46.8
HCM Volume to Capacity ratio	0.95
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	95.2%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

2030 PM
 1/11/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Width	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	4933	1770	4960	2006	1987	1959	1915				
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	4933	1770	4960	259	1987	1118	1915				
Volume (vph)	350	1300	180	120	1070	170	200	250	100	160	280	280
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)	368	1368	189	126	1126	179	211	263	105	168	295	295
RTOR Reduction (vph)	0	18	0	0	21	0	0	15	0	0	37	0
Lane Group Flow (vph)	368	1539	0	126	1284	0	211	353	0	168	553	0
Confl. Peds. (#/hr)	32	32	32	4	12	4	12	24	24	24	12	0
Parking (#/hr)												
Turn Type	Prot	4	Prot	3	8	pm+pt	2	2	2	6	6	6
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	20.0	36.8	9.6	26.4	43.1	43.1	43.1	43.1	30.1	30.1	30.1	30.1
Effective Green, g (s)	20.0	36.8	9.6	26.4	43.6	43.6	43.6	43.6	30.6	30.6	30.6	30.6
Actuated g/C Ratio	0.20	0.37	0.10	0.26	0.44	0.44	0.44	0.44	0.31	0.31	0.31	0.31
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5
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)	354	1815	170	1309	305	866	342	586				
v/s Ratio Prot	c0.21	0.31	0.07	c0.26	c0.08	0.18		c0.29				
v/s Ratio Perm												
v/c Ratio	1.04	0.85	0.74	0.98	0.69	0.41	0.49	0.94				
Uniform Delay, d1	40.0	29.0	44.0	36.5	44.3	19.3	28.3	33.9				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	58.5	5.1	15.9	20.7	6.6	0.3	1.1	24.0				
Delay (s)	98.5	34.2	59.9	57.2	50.9	19.7	29.5	57.9				
Level of Service	F	C	E	E	D	B	C	E				
Approach Delay (s)	46.5		57.4				31.0				51.6	
Approach LOS	D		E				C				D	

Intersection Summary	70.1	HCM Level of Service	E
HCM Average Control Delay	70.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	116.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2030 PM
 1/11/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.97	0.98	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	1.00	0.93	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	1.00	0.93	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Flt	1.00	0.99	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	1.00	0.99	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1705	4933	1705	4960	2006	1987	1959	1915				
Flt Permitted	0.36	0.73	0.36	0.73	1.00	0.94	0.95	1.00				
Satd. Flow (perm)	619	1290	619	1290	1586	3087	1770	3204				
Volume (vph)	10	10	20	120	120	120	10	1100	610	200	880	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)	11	11	21	126	126	126	11	1158	642	211	926	442
RTOR Reduction (vph)	0	20	0	0	39	0	0	65	0	0	47	0
Lane Group Flow (vph)	0	23	0	126	213	0	0	1746	0	211	1321	0
Confl. Peds. (#/hr)	36			36	48		16	16	16	16	48	
Turn Type	Perm	7	Perm	8	8	2	2	2	2	1	6	6
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	6.5	16.7	16.7	17.2	17.2	46.2	45.7	13.1	63.3			
Effective Green, g (s)	7.0	17.2	17.2	17.2	17.2	46.2	46.2	13.6	63.8			
Actuated g/C Ratio	0.07	0.17	0.17	0.17	0.17	0.46	0.46	0.14	0.64			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5			
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
Lane Grp Cap (vph)	43	222	273	241	2044							
v/s Ratio Prot	c0.04	0.10	0.13			c0.57		c0.12	0.41			
v/s Ratio Perm	0.55	0.57	0.78			1.22		0.88	0.65			
v/c Ratio	45.0	38.0	39.6	26.9	26.9	42.4	11.1	1.00	1.00			
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	0.62	1.00	1.00	1.00			
Progression Factor	7.4	2.0	12.5	101.7	101.7	27.1	1.6	69.5	12.7			
Incremental Delay, d2	52.3	40.0	52.1	118.5	118.5	20.3						
Delay (s)	52.3	40.0	52.1	118.5	118.5	20.3						
Level of Service	D	D	D	D	D	F						
Approach Delay (s)	52.3		48.0			118.5					20.3	
Approach LOS	D		D			F					C	

Intersection Summary	70.1	HCM Level of Service	E
HCM Average Control Delay	70.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	116.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Lane Util. Factor	1.00	0.98	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.99	1.00	
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3420	1770	3299	1770	3299	1770	3324	1770	3411	1770	3411	
Volume (vph)	480	930	130	160	580	350	100	930	350	300	670	60	
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)	484	979	137	168	611	368	105	979	368	316	705	63	
RTOR Reduction (vph)	0	11	0	0	90	0	0	39	0	0	7	0	
Lane Group Flow (vph)	484	1105	0	168	889	0	105	1308	0	316	761	0	
Confl. Peds. (#/hr)	15	48	48	15	123	48	48	48	48	48	123	123	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Permitted Phases													
Actuated Green, G (s)	15.7	27.5	10.9	22.7	5.0	32.6	12.0	39.6					
Effective Green, g (s)	15.2	28.5	10.4	23.7	4.5	33.6	11.5	40.6					
Actuated g/C Ratio	0.15	0.28	0.10	0.24	0.04	0.34	0.12	0.41					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	522	975	184	782	80	1117	204	1385					
v/s Ratio Prot	c0.14	c0.32	0.09	0.27	0.06	c0.39	c0.18	0.22					
v/c Ratio Perm	0.93	1.13	0.91	1.14	1.31	1.17	1.55	0.55					
Uniform Delay, d1	41.9	35.8	44.4	38.1	47.8	33.2	44.2	22.7					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.20	0.76					
Incremental Delay, d2	22.3	73.0	41.7	76.9	205.3	86.9	265.0	1.2					
Delay (s)	64.2	108.8	86.0	115.0	253.1	120.1	318.2	18.4					
Level of Service	E	F	F	F	F	F	F	B					
Approach Delay (s)	95.3	110.8	110.8	129.7	129.7	105.8	105.8	F					
Approach LOS	F	F	F	F	F	F	F	F					
Intersection Summary													
HCM Average Control Delay	110.3											HCM Level of Service	F
HCM Volume to Capacity ratio	1.15												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.8%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	
Lane Util. 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	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	
Satd. Flow (perm)	3341	3341	3341	3341	3341	3341	3341	3341	3341	3341	3341	3341	
Volume (vph)	0	0	10	0	0	0	10	550	330	1550	350	60	
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)	0	0	11	0	0	0	11	579	347	1632	368	63	
RTOR Reduction (vph)	0	11	0	0	0	0	18	0	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	919	0	1632	431	0	
Confl. Peds. (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases													
Permitted Phases													
Actuated Green, G (s)	0.0	0.0	13.0	0.0	0.0	13.0	29.0	50.0					
Effective Green, g (s)	0.0	0.0	13.0	0.0	0.0	13.0	29.0	50.0					
Actuated g/C Ratio	0.00	0.00	0.26	0.00	0.00	0.26	0.58	1.00					
Clearance Time (s)			4.0			4.0	4.0	2.0					
Lane Grp Cap (vph)	0	0	824	0	0	824	1991	3462					
v/s Ratio Prot			c0.29			c0.29	0.48	0.12					
v/c Ratio Perm	0.00	0.00	1.12	0.00	0.00	1.12	0.82	0.12					
Uniform Delay, d1	25.0	25.0	18.5	25.0	25.0	18.5	8.4	0.0					
Progression Factor	1.00	1.00	0.72	1.00	1.00	0.72	1.00	1.00					
Incremental Delay, d2	0.0	0.0	66.5	0.0	0.0	66.5	3.9	0.1					
Delay (s)	25.0	25.0	79.8	25.0	25.0	79.8	12.3	0.1					
Level of Service	C	C	E	C	C	E	B	A					
Approach Delay (s)	25.0	25.0	79.8	25.0	25.0	79.8	12.3	0.1					
Approach LOS	C	C	E	C	C	E	B	A					
Intersection Summary													
HCM Average Control Delay	31.6											HCM Level of Service	C
HCM Volume to Capacity ratio	0.91												
Actuated Cycle Length (s)	50.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.6%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.96	0.97	0.97	1.00	1.00	1.00	0.98	0.99	0.99	1.00	1.00
Frt	0.97	0.96	0.96	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00
Flt Protected	0.99	0.99	0.99	1.00	1.00	1.00	3419	3425	3425	2700	2700
Satd. Flow (prot)	1697	1688	1688	0.90	0.92	0.92	3160	3160	2700	2700	2700
Flt Permitted	0.87	0.90	0.90	0.92	0.92	0.92	0.78	0.78	0.78	0.78	0.78
Satd. Flow (perm)	1502	1515	1515	1515	1515	1515	1515	1515	1515	1515	1515
Volume (vph)	40	70	30	70	140	90	40	700	90	60	300
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
Adj. Flow (vph)	42	74	32	74	147	95	42	737	95	63	316
RTOR Reduction (vph)	0	20	0	0	31	0	0	19	0	0	13
Lane Group Flow (vph)	0	128	0	0	285	0	0	856	0	0	399
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm
Protected Phases	4		8		8		2		2		6
Permitted Phases	4		8		8		2		2		6
Actuated Green, G (s)	17.0		17.0		17.0		25.0		25.0		25.0
Effective Green, g (s)	17.0		17.0		17.0		25.0		25.0		25.0
Actuated g/C Ratio	0.34		0.34		0.34		0.50		0.50		0.50
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0
Lane Grp Cap (vph)	511		515		515		1580		1580		1350
v/s Ratio Prot	0.09		c0.19		c0.19		c0.27		c0.27		0.15
v/c Ratio	0.25		0.55		0.55		0.54		0.54		0.30
Uniform Delay, d1	11.9		13.4		13.4		8.6		8.6		7.3
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00
Incremental Delay, d2	1.2		4.2		4.2		1.3		1.3		0.6
Delay (s)	13.1		17.7		17.7		9.9		9.9		7.9
Level of Service	B		B		B		A		A		A
Approach Delay (s)	13.1		17.7		17.7		9.9		9.9		7.9
Approach LOS	B		B		B		A		A		A
Intersection Summary											
HCM Average Control Delay	11.1		11.1		11.1		11.1		11.1		B
HCM Volume to Capacity ratio	0.55		0.55		0.55		0.55		0.55		B
Actuated Cycle Length (s)	50.0		50.0		50.0		50.0		50.0		8.0
Intersection Capacity Utilization	77.5%		77.5%		77.5%		77.5%		77.5%		D
Analysis Period (min)	15		15		15		15		15		D
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.96	0.96	0.96	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.96	0.96	0.96	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.96	0.96	0.96	0.96	0.96	0.99	0.99	0.99	1.00	1.00
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1623	1623	1623	1668	1668	1668	3453	3453	3453	4903	4903
Flt Permitted	0.74	0.74	0.74	0.89	0.89	0.89	0.77	0.77	0.77	0.80	0.80
Satd. Flow (perm)	1222	1222	1222	1494	1494	1494	2667	2667	2667	3920	3920
Volume (vph)	80	70	70	30	80	50	90	1640	80	40	1050
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
Adj. Flow (vph)	84	74	74	32	84	53	95	1726	84	42	1105
RTOR Reduction (vph)	0	21	0	0	3	0	0	2	0	0	7
Lane Group Flow (vph)	0	211	0	0	166	0	0	1903	0	0	1235
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm
Protected Phases	4		4		4		2		2		6
Permitted Phases	4		4		4		2		2		6
Actuated Green, G (s)	15.2		15.2		15.2		55.8		55.8		55.8
Effective Green, g (s)	15.7		15.7		15.7		56.3		56.3		56.3
Actuated g/C Ratio	0.20		0.20		0.20		0.70		0.70		0.70
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0
Lane Grp Cap (vph)	240		293		293		1877		1877		2759
v/s Ratio Prot	c0.17		0.11		0.11		c0.71		c0.71		0.32
v/c Ratio	0.88		0.57		0.57		1.01		1.01		0.45
Uniform Delay, d1	31.2		29.1		29.1		11.9		11.9		5.1
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00
Incremental Delay, d2	27.8		1.5		1.5		24.2		24.2		0.5
Delay (s)	59.0		30.6		30.6		36.1		36.1		5.7
Level of Service	E		C		C		D		D		A
Approach Delay (s)	59.0		30.6		30.6		36.1		36.1		5.7
Approach LOS	E		C		C		D		D		A
Intersection Summary											
HCM Average Control Delay	26.7		26.7		26.7		26.7		26.7		C
HCM Volume to Capacity ratio	0.98		0.98		0.98		0.98		0.98		C
Actuated Cycle Length (s)	80.0		80.0		80.0		80.0		80.0		8.0
Intersection Capacity Utilization	112.1%		112.1%		112.1%		112.1%		112.1%		H
Analysis Period (min)	15		15		15		15		15		H
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	0.98	1.00
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1765	3463	1768	3455	1741	1832	1766	1825	1766	1825	1766
Flt Permitted	0.12	1.00	0.12	1.00	0.52	1.00	0.22	1.00	0.22	1.00	0.22
Satd. Flow (perm)	232	3463	233	3455	960	1832	412	1825	412	1825	412
Volume (vph)	90	1100	160	80	880	130	180	560	60	100	250
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
Adj. Flow (vph)	95	1158	168	84	926	137	189	589	63	105	263
RTOR Reduction (vph)	0	14	0	0	14	0	0	5	0	0	6
Lane Group Flow (vph)	95	1312	0	84	1049	0	189	647	0	105	290
Confl. Peds. (#/hr)	12	12	12	12	42	12	42	12	12	12	42
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	1385	93	1382	480	916	206	913	206	913	206
v/s Ratio Prot	0.38	0.38	0.38	0.30	0.30	0.30	c0.35	c0.35	0.25	0.25	0.16
v/s Ratio Perm	c0.41	0.95	0.95	0.90	0.76	0.76	0.39	0.71	0.51	0.51	0.32
v/c Ratio	1.02	0.95	0.95	0.90	0.76	0.76	0.39	0.71	0.51	0.51	0.32
Uniform Delay, d1	24.0	23.2	23.2	22.5	20.7	20.7	12.5	15.5	13.4	11.9	11.9
Progression Factor	1.00	1.00	1.00	1.73	1.80	1.80	1.64	1.64	1.00	1.00	1.00
Incremental Delay, d2	89.3	14.5	14.5	41.3	1.8	1.8	0.2	0.4	8.7	0.9	0.9
Delay (s)	123.3	37.6	37.6	80.1	39.0	39.0	20.6	25.7	22.2	12.8	12.8
Level of Service	F	D	D	F	D	D	C	C	C	C	B
Approach Delay (s)	43.4	43.4	43.4	42.0	42.0	42.0	24.6	24.6	15.3	15.3	15.3
Approach LOS	D	D	D	D	D	D	C	C	C	C	B

Intersection Summary	35.9	HCM Level of Service	D
HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98	1.00	0.97	1.00
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	0.99	0.99
Satd. Flow (prot)	1764	3456	1770	3501	1770	3501	3442	3442	3395	3395	3395
Flt Permitted	0.16	1.00	0.16	1.00	0.16	1.00	0.84	0.84	0.88	0.88	0.88
Satd. Flow (perm)	297	3456	298	3501	298	3501	2917	2917	2995	2995	2995
Volume (vph)	60	1130	120	60	1000	60	90	330	50	30	160
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	1141	121	61	1010	61	91	333	51	30	162
RTOR Reduction (vph)	0	10	0	0	6	0	0	1	0	0	4
Lane Group Flow (vph)	61	1252	0	61	1066	0	0	474	0	0	239
Confl. Peds. (#/hr)	24	78	78	24	8	24	8	6	6	6	8
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	93	1080	93	1094	93	1094	1714	1714	1760	1760	1760
v/s Ratio Prot	c0.36	c0.36	c0.36	0.20	0.20	0.20	c0.16	c0.16	0.08	0.08	0.14
v/s Ratio Perm	0.66	1.16	1.16	0.66	0.97	0.97	0.28	0.28	0.14	0.14	0.14
v/c Ratio	23.8	27.5	27.5	23.8	27.2	27.2	8.1	8.1	7.4	7.4	7.4
Uniform Delay, d1	0.63	0.56	0.56	0.81	0.84	0.84	1.06	1.06	1.00	1.00	1.00
Progression Factor	14.0	76.2	76.2	20.2	16.1	16.1	0.2	0.2	0.2	0.2	0.2
Incremental Delay, d2	29.0	91.6	91.6	39.4	38.9	38.9	8.8	8.8	7.6	7.6	7.6
Delay (s)	29.0	91.6	91.6	39.4	38.9	38.9	8.8	8.8	7.6	7.6	7.6
Level of Service	C	F	F	D	D	D	A	A	A	A	A
Approach Delay (s)	88.7	88.7	88.7	39.0	39.0	39.0	8.8	8.8	7.6	7.6	7.6
Approach LOS	F	F	F	D	D	D	A	A	A	A	A

Intersection Summary	52.8	HCM Level of Service	D
HCM Average Control Delay	52.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.98	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	1767	3510	1763	3463	1763	3463	3395	3413	3395	3413	3413
Flt Permitted	0.11	1.00	0.11	1.00	0.11	1.00	0.86	0.63	0.86	0.63	0.63
Satd. Flow (perm)	213	3510	212	3463	212	3463	2925	2174	2925	2174	2174
Volume (vph)	90	1110	50	60	1020	140	80	550	160	100	240
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
Adj. Flow (vph)	95	1168	53	63	1074	147	84	579	168	105	253
RTOR Reduction (vph)	0	4	0	0	14	0	0	12	0	0	18
Lane Group Flow (vph)	95	1217	0	63	1208	0	0	819	0	0	403
Confl. Peds. (#/hr)	8	39	39	8	8	8	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	8	2	2	6	6	6
Permitted Phases	4	8	8	8	8	8	2	2	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	93	1536	93	1515	1353	1353	1005	1005	1005	1005	1005
v/s Ratio Prot	0.35	0.35	0.35	0.35	0.35	0.35	0.28	0.19	0.28	0.19	0.19
v/s Ratio Perm	0.45	0.79	0.68	0.80	0.68	0.80	0.61	0.40	0.61	0.40	0.40
Uniform Delay, d1	22.5	19.4	18.0	19.4	18.0	19.4	16.0	14.2	16.0	14.2	14.2
Progression Factor	1.04	1.05	1.00	1.00	1.00	1.31	1.31	1.00	1.31	1.00	1.00
Incremental Delay, d2	33.5	0.4	33.1	4.4	33.5	4.4	1.8	1.2	1.8	1.2	1.2
Delay (s)	56.9	20.6	51.1	23.9	56.9	22.8	15.4	15.4	15.4	15.4	15.4
Level of Service	E	C	D	C	D	C	B	B	C	B	B
Approach Delay (s)	23.3	25.2	25.2	22.8	23.3	22.8	15.4	15.4	22.8	15.4	15.4
Approach LOS	C	C	C	C	C	C	B	B	C	B	B

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	23.0	25.2	25.2	22.8	23.3	22.8	15.4	15.4	22.8	15.4	15.4
HCM Volume to Capacity ratio	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Actuated Cycle Length (s)	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Intersection Capacity Utilization	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2030 PM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Lane Configurations	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.98
Flt Protected	1.00	1.00	0.95	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	3424	3424	1770	3539	1770	3539	1770	3539
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3424	3424	1770	3539	1770	3539	1770	3539
Volume (vph)	1280	80	80	1210	80	1210	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1320	82	82	1247	82	1247	0	0
RTOR Reduction (vph)	8	0	0	0	0	0	0	0
Lane Group Flow (vph)	1394	0	82	1247	0	1247	0	0
Confl. Peds. (#/hr)	213	348	213	348	213	348	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	3	8	3	8	8	8
Permitted Phases	4	3	3	8	3	8	8	8
Actuated Green, G (s)	27.0	25.0	25.0	60.0	25.0	60.0	60.0	60.0
Effective Green, g (s)	27.0	25.0	25.0	60.0	25.0	60.0	60.0	60.0
Actuated g/C Ratio	0.45	0.42	0.42	1.00	0.42	1.00	1.00	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1541	738	3539	1541	738	3539	1541	1541
v/s Ratio Prot	0.41	0.05	0.05	0.35	0.05	0.35	0.35	0.35
v/s Ratio Perm	0.90	0.11	0.11	0.35	0.11	0.35	0.35	0.35
Uniform Delay, d1	15.3	10.7	10.7	0.0	10.7	0.0	0.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Delay (s)	24.5	11.0	11.0	0.3	11.0	0.3	0.3	0.3
Level of Service	C	B	B	A	B	A	A	A
Approach Delay (s)	24.5	0.9	0.9	0.0	0.9	0.0	0.0	0.0
Approach LOS	C	A	A	A	A	A	A	A

Intersection Summary	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
HCM Average Control Delay	13.0	13.0	13.0	0.62	13.0	0.62	0.62	0.62
HCM Volume to Capacity ratio	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62
Actuated Cycle Length (s)	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Intersection Capacity Utilization	49.5%	49.5%	49.5%	49.5%	49.5%	49.5%	49.5%	49.5%
Analysis Period (min)	15	15	15	15	15	15	15	15
c Critical Lane Group								

HCM Unsignalized Intersection Capacity Analysis
11: 40th St. & BART parking

2030 PM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1200	80	0	1290	0	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1263	84	0	1358	0	74
Pedestrians				109		109
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage				9		9
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	81			406		
pX, platoon unblocked	0.62			0.68		0.62
VC, conflicting volume	1456			2093		892
VC1, stage 1 cont vol						
VC2, stage 2 cont vol				1120		1555
vCu, unblocked vol				4.1		6.8
IC, single (s)						6.9
IC, 2 stage (s)						
tF (s)	2.2	3.5	3.5	3.5	3.3	3.3
p0 queue free %	100	100	100	100	100	82
cM capacity (veh/h)	348	348	64	64	409	409
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	842	505	679	679	74	74
Volume Left	0	0	0	0	0	0
Volume Right	0	84	0	0	74	74
cSH	1700	1700	1700	1700	409	409
Volume to Capacity	0.50	0.30	0.40	0.40	0.18	0.18
Queue Length 95th (ft)	0	0	0	0	16	16
Control Delay (s)	0.0	0.0	0.0	0.0	15.7	15.7
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	15.7		
Approach LOS				C		
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	56.0%					
ICU Level of Service	B					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
12: 40th St. & BART parking

2030 PM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1260	10	0	1290	0	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1326	11	0	1358	0	63
Pedestrians				109		109
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage				9		9
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	298			189		
pX, platoon unblocked	0.63			0.70		0.63
VC, conflicting volume	1446			2120		886
VC1, stage 1 cont vol						
VC2, stage 2 cont vol				1119		1527
vCu, unblocked vol				4.1		6.8
IC, single (s)						6.9
IC, 2 stage (s)						
tF (s)	2.2	3.5	3.5	3.5	3.3	3.3
p0 queue free %	100	100	100	100	100	84
cM capacity (veh/h)	355	355	69	69	402	402
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	884	453	679	679	63	63
Volume Left	0	0	0	0	0	0
Volume Right	0	11	0	0	63	63
cSH	1700	1700	1700	1700	402	402
Volume to Capacity	0.52	0.27	0.40	0.40	0.16	0.16
Queue Length 95th (ft)	0	0	0	0	14	14
Control Delay (s)	0.0	0.0	0.0	0.0	15.6	15.6
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	15.6		
Approach LOS				C		
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	55.4%					
ICU Level of Service	B					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

2030 PM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.96
Fpb, ped/bikes	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1669	3433	1770	3334	1770	3482	1770	3482	1770	3247	1770	3247
Flt Permitted	0.26	1.00	0.15	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	449	3433	287	3334	1770	3482	1770	3482	1770	3247	1770	3247
Volume (vph)	280	920	120	60	550	110	470	1390	100	130	630	270
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	286	939	122	61	561	112	480	1418	102	133	643	276
RTOR Reduction (vph)	0	13	0	0	21	0	0	6	0	0	27	0
Lane Group Flow (vph)	286	1048	0	61	652	0	480	1514	0	133	892	0
Confl. Peds. (#/hr)	94	86	86	94	94	94	94	94	40	40	111	111
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	8	8	5	2	2	2	1	1	6	6
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	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	4.5
Vehicle Extension (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
Lane Grp Cap (vph)	146	1116	93	1084	310	1423	206	1136	206	1136	206	1136
v/s Ratio Prot	0.31	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
v/s Ratio Perm	0.64	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
v/c Ratio	1.96	0.94	0.66	0.60	1.55	1.06	0.65	0.79	0.65	0.79	0.65	0.79
Uniform Delay, d1	27.0	26.2	23.2	22.7	33.0	23.6	33.8	23.3	33.8	23.3	33.8	23.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	455.4	14.3	12.0	0.6	262.2	42.9	5.1	5.5	5.1	5.5	5.1	5.5
Delay (s)	482.4	40.5	35.1	23.3	295.2	66.6	38.9	28.8	38.9	28.8	38.9	28.8
Level of Service	F	D	D	C	F	E	D	C	D	C	D	C
Approach Delay (s)	134.3	134.3	24.3	24.3	121.4	121.4	30.1	30.1	30.1	30.1	30.1	30.1
Approach LOS	F	F	C	C	F	F	C	C	C	C	C	C

Intersection Summary			
HCM Average Control Delay	92.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave.

2030 PM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBL	SBR
Lane Configurations	←	←	←	←	←	←
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	80	20	1920	810	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	21	83	21	2000	844	21
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	0.73	0.87	0.87	0.87	0.87	0.87
Upstream signal (ft)	2096	632	965	632	965	632
pX, platoon unblocked	2096	632	965	632	965	632
VC, conflicting volume	2096	632	965	632	965	632
VC1, stage 1 cont vol	1606	431	812	431	812	431
VC2, stage 2 cont vol	6.8	6.9	4.1	6.9	4.1	6.9
vCu, unblocked vol	3.5	3.3	2.2	3.3	2.2	3.3
IC, 2 stage (s)	64	80	97	80	97	64
IF (s)	57	419	647	419	647	57
p0 queue free %	104	21	1000	1000	562	302
cM capacity (veh/h)	21	21	0	0	0	0
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	104	21	1000	1000	562	302
Volume Left	21	21	0	0	0	0
Volume Right	83	0	0	0	0	21
cSH	185	647	1700	1700	1700	1700
Volume to Capacity	0.56	0.03	0.59	0.59	0.33	0.18
Queue Length 95th (ft)	75	2	0	0	0	0
Control Delay (s)	47.0	10.7	0.0	0.0	0.0	0.0
Lane LOS	E	B	E	B	E	B
Approach Delay (s)	47.0	0.1	0.0	0.0	0.0	0.0
Approach LOS	E	E	E	E	E	E

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

2030 PM
 1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↓	↓
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	30	40	1900	40	20	870
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	42	2000	42	21	916
Pedestrians	52	52				45
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4	4	4	4	4	4
Right turn flare (veh)	None	None				
Median type	None	None				
Median storage (veh)						
Upstream signal (ft)			230			791
pX, platoon unblocked	0.69	0.66				0.66
VC, conflicting volume	2625	1118				2094
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	2675	672				2142
IC, single (s)	6.8	6.9				4.1
IC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	0	83				87
cM capacity (veh/h)	10	244				158
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	74	1333	709	21	458	458
Volume Left	32	0	0	21	0	0
Volume Right	42	0	42	0	0	0
cSH	22	1700	1700	158	1700	1700
Volume to Capacity	3.39	0.78	0.42	0.13	0.27	0.27
Queue Length 95th (ft)	Err	0	0	11	0	0
Control Delay (s)	F	0.0	0.0	31.2	0.0	0.0
Lane LOS	F	D	D	D	D	D
Approach Delay (s)	F	0.0	0.7			
Approach LOS	F					

Intersection Summary		
Average Delay	241.6	
Intersection Capacity Utilization	72.3%	ICU Level of Service C
Analysis Period (min)	15	

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2030 PM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Frt, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	1.00	0.98	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98
Flt Protected	0.99	0.95	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	5012	1768	3452	1793	3452	1793	3452	1793	3452	1770	1805	1805
Flt Permitted	0.65	0.23	1.00	0.28	1.00	0.28	1.00	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	3269	427	3452	511	444	1805	511	444	1805	444	1805	1805
Volume (vph)	160	840	40	90	1330	220	190	520	120	80	400	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	857	41	92	1357	224	194	531	122	82	408	71
RTOR Reduction (vph)	0	5	0	0	17	0	0	8	0	0	8	0
Lane Group Flow (vph)	0	1056	0	92	1565	0	0	839	0	82	471	0
Conf. Peds. (#/hr)	24	4	4	24	48	12	12	48	12	12	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	6	6	6	6	6	6
Permitted Phases	4	4	8	8	2	2	6	6	6	6	6	6
Actuated Green, G (s)	46.0	46.0	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	1921	251	2028	160	139	564	160	139	564	139	564	564
v/s Ratio Prot	0.32	0.22	0.22	c0.45	0.18	0.18	c1.64	0.18	0.18	0.18	0.18	0.18
v/s Ratio Perm	1.66d1	0.37	0.77	0.59	5.25	0.59	5.25	0.59	0.84	0.59	0.84	0.84
Uniform Delay, d1	10.1	8.7	12.4	27.5	23.2	25.6	23.2	25.6	25.6	23.2	25.6	25.6
Progression Factor	1.00	1.60	1.65	1.00	0.77	0.79	1.00	0.77	0.79	1.00	0.77	0.79
Incremental Delay, d2	1.1	3.2	2.3	1924.7	14.3	11.6	1924.7	14.3	11.6	14.3	11.6	11.6
Delay (s)	11.2	17.0	22.8	1952.2	32.1	32.0	1952.2	32.1	32.0	32.1	32.0	32.0
Level of Service	B	B	C	F	C	C	F	C	C	C	C	C
Approach Delay (s)	11.2	22.5	22.5	1952.2	32.0	32.0	1952.2	32.0	32.0	32.0	32.0	32.0
Approach LOS	B	C	C	F	C	C	F	C	C	C	C	C

Intersection Summary		
HCM Average Control Delay	415.5	HCM Level of Service F
HCM Volume to Capacity ratio	2.33	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	167.0%	ICU Level of Service H
Analysis Period (min)	15	

d1 Defacto Left Lane. Recode with 1 though lane as a left lane.
 c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4996	5015	5015	1770	1790	1766	1820	1766	1820	1766	1820
Flt Permitted	0.76	0.79	0.79	0.40	1.00	0.20	1.00	0.20	1.00	0.20	1.00
Satd. Flow (perm)	3798	3971	3971	742	1790	363	1820	363	1820	363	1820
Volume (vph)	60	780	70	100	1360	110	140	330	100	90	220
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
Adj. Flow (vph)	63	821	74	105	1432	116	147	347	105	95	232
RTOR Reduction (vph)	0	12	0	0	11	0	0	13	0	0	8
Lane Group Flow (vph)	0	946	0	0	1642	0	147	439	0	95	266
Confl. Peds. (#/hr)	12	12	12	12	12	12	6	6	6	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
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
Lane Grp Cap (vph)	2445	2445	2445	2556	2556	190	459	93	466	93	466
v/s Ratio Prot	0.25	0.25	0.25	0.20	0.25	0.20	0.25	0.20	0.25	0.20	0.25
v/s Ratio Perm	0.39	0.39	0.39	0.64	0.64	0.77	0.96	1.02	0.57	1.02	0.57
v/c Ratio	6.8	6.8	6.8	8.7	8.7	27.6	29.3	29.8	25.9	29.8	25.9
Uniform Delay, d1	1.18	1.18	1.18	2.00	2.00	1.00	1.00	1.19	1.19	1.19	1.19
Progression Factor	0.0	0.0	0.0	1.0	25.8	32.3	32.3	91.7	4.2	91.7	4.2
Incremental Delay, d2	8.0	8.0	8.0	18.2	18.2	53.4	61.6	127.1	35.2	127.1	35.2
Delay (s)	A	A	A	B	B	D	E	F	D	F	D
Level of Service	A	A	A	B	B	D	E	F	D	F	D
Approach Delay (s)	8.0	8.0	8.0	18.2	18.2	59.6	61.6	127.1	35.2	127.1	35.2
Approach LOS	A	A	A	B	B	E	E	F	D	F	D
Intersection Summary											
HCM Average Control Delay	26.6 HCM Level of Service C										
HCM Volume to Capacity ratio	0.75										
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0										
Intersection Capacity Utilization	99.3% ICU Level of Service F										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	5015	5015	5015	4946	4946	3446	3402	3446	3402	3446	3402
Flt Permitted	0.69	0.69	0.69	0.84	0.84	0.80	0.60	0.80	0.60	0.80	0.60
Satd. Flow (perm)	3498	3498	3498	4151	4151	2760	2065	2760	2065	2760	2065
Volume (vph)	90	850	50	70	1430	270	80	430	60	90	210
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	91	859	51	71	1444	273	81	434	61	91	212
RTOR Reduction (vph)	0	7	0	0	32	0	0	11	0	0	17
Lane Group Flow (vph)	0	994	0	0	1756	0	0	565	0	0	337
Confl. Peds. (#/hr)	9	17	17	17	17	9	12	10	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2252	2252	2252	2672	2672	707	707	707	707	707	529
v/s Ratio Prot	0.28	0.28	0.28	0.42	0.42	0.20	0.16	0.20	0.16	0.20	0.16
v/s Ratio Perm	0.44	0.44	0.44	0.66	0.66	0.80	0.64	0.80	0.64	0.80	0.64
v/c Ratio	7.1	7.1	7.1	8.8	8.8	27.8	26.4	27.8	26.4	27.8	26.4
Uniform Delay, d1	1.61	1.61	1.61	1.00	1.00	1.00	1.34	1.00	1.34	1.00	1.34
Progression Factor	0.6	0.6	0.6	1.3	1.3	9.2	5.7	1.3	9.2	1.3	5.7
Incremental Delay, d2	12.0	12.0	12.0	10.1	10.1	37.0	41.3	10.1	37.0	10.1	41.3
Delay (s)	B	B	B	B	B	D	D	D	D	D	D
Level of Service	B	B	B	B	B	D	D	D	D	D	D
Approach Delay (s)	12.0	12.0	12.0	10.1	10.1	37.0	41.3	10.1	37.0	10.1	41.3
Approach LOS	B	B	B	B	B	D	D	D	D	D	D
Intersection Summary											
HCM Average Control Delay	17.7 HCM Level of Service B										
HCM Volume to Capacity ratio	0.70										
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0										
Intersection Capacity Utilization	126.2% ICU Level of Service H										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

2030 PM
 1/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Free	Free	0%	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	1030	1540	20	0	230	0	230
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1073	1604	21	0	240	79	240
Pedestrians		79						
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	7	7
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	7	7	7	7	7	7	7	7
Right turn flare (veh)								
Median type							None	None
Median storage (veh)								
Upstream signal (ft)		698	473					
pX, platoon unblocked	0.84						0.84	0.84
VC, conflicting volume	1704						2051	703
VC1, stage 1 conf vol								
VC2, stage 2 conf vol								
VC, unblocked vol	1453						1849	258
tC, single (s)	4.1						6.8	6.9
tC, 2 stage (s)								
tF (s)	2.2						3.5	3.3
p0 queue free %	100						100	56
cM capacity (veh/h)	361						52	541
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 1
Volume Total	358	358	358	642	642	642	342	240
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0	21	240
cSH	1700	1700	1700	1700	1700	1700	1700	541
Volume to Capacity	0.21	0.21	0.21	0.38	0.38	0.38	0.20	0.44
Queue Length 95th (ft)	0	0	0	0	0	0	0	56
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.8
Lane LOS	C	C	C	C	C	C	C	C
Approach Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	16.8	16.8
Approach LOS	C	C	C	C	C	C	C	C
Intersection Summary								
Average Delay	1.4							
Intersection Capacity Utilization	56.5%							
Analysis Period (min)	15							
ICU Level of Service	B							

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

2030 PM
 1/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4939	4810	4810	1748	3458	1770	3444					
Flt Permitted	0.67	0.73	0.73	0.23	1.00	0.11	1.00					
Satd. Flow (perm)	3358	3541	3541	422	3458	212	3444					
Volume (vph)	300	660	80	110	1170	460	270	1180	110	220	600	90
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)	316	695	84	116	1232	484	284	1242	116	232	632	95
RTOR Reduction (vph)	0	6	0	0	1	0	0	7	0	0	11	0
Lane Group Flow (vph)	0	1089	0	0	1831	0	284	1351	0	232	716	0
Conf. Peds. (#/hr)	26	19	19	26	39	26	39	92	26	39	92	39
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2	2	2	2	2	2	6
Permitted Phases	4	4	8	8	2	2	2	2	2	2	2	6
Actuated Green, G (s)	55.9	55.9	55.9	55.9	34.1	34.1	34.1	34.1	34.1	34.1	34.1	34.1
Effective Green, g (s)	57.4	57.4	57.4	57.4	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Clearance Time (s)	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (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
Lane Grp Cap (vph)	1918	1918	2022	147	1208	74	1203					
v/s Ratio Prot	0.32	0.32	0.32	0.52	0.67	0.67	0.67	0.39	0.39	0.39	0.39	0.21
v/s Ratio Perm	2.01dl	2.01dl	2.01dl	0.91	1.93	1.93	1.93	1.12	1.12	1.12	1.12	0.60
Uniform Delay, d1	13.7	13.7	13.7	19.1	32.7	32.7	32.7	32.7	32.7	32.7	32.7	26.9
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	0.2	0.2	0.2	6.1	443.4	65.0	995.3	2.2	2.2	2.2	2.2	2.2
Delay (s)	13.9	13.9	13.9	25.2	476.1	97.7	1028.0	29.0	29.0	29.0	29.0	29.0
Level of Service	B	B	B	C	F	F	F	F	F	F	F	C
Approach Delay (s)	13.9	13.9	13.9	25.2	25.2	25.2	163.1	163.1	163.1	163.1	270.7	270.7
Approach LOS	B	B	B	C	C	C	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	106.5											
HCM Volume to Capacity ratio	1.75											
Actuated Cycle Length (s)	100.5											
Intersection Capacity Utilization	118.7%											
Analysis Period (min)	15											
ICU Level of Service	H											
Defacto Left Lane. Recode with 1 through lane as a left lane.	c											
Critical Lane Group	c											

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2030 PM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5033	5033	5033	5033	5033	5033	5033	5033	5033	5033	5033	5033
Flt Permitted	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Satd. Flow (perm)	3946	3946	3946	3946	3946	3946	3946	3946	3946	3946	3946	3946
Volume (vph)	50	920	30	110	1590	50	100	100	200	40	40	90
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	51	929	30	111	1606	51	101	101	202	40	40	91
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	66	0	13	0
Lane Group Flow (vph)	0	1006	0	0	1764	0	0	202	136	0	158	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	49.5	49.5	49.5	49.5	49.5	49.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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 Grp Cap (vph)	2392	2392	2392	2384	2384	2384	409	413	423	423	423	423
v/s Ratio Prot	0.25	0.45	0.45	0.45	0.45	0.45	0.14	0.10	0.11	0.11	0.11	0.11
v/s Ratio Perm	0.42	0.74	0.74	0.74	0.74	0.74	0.49	0.33	0.37	0.37	0.37	0.37
v/c Ratio	8.3	11.2	11.2	11.2	11.2	11.2	23.3	22.1	22.4	22.4	22.4	22.4
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	2.1	2.1	2.1	2.1	2.1	4.2	2.1	2.5	2.5	2.5	2.5
Incremental Delay, d2	8.9	13.4	13.4	13.4	13.4	13.4	27.6	24.2	24.9	24.9	24.9	24.9
Delay (s)	A	B	B	B	B	B	C	C	C	C	C	C
Level of Service	A	B	B	B	B	B	C	C	C	C	C	C
Approach Delay (s)	8.9	13.4	13.4	13.4	13.4	13.4	25.9	25.9	24.9	24.9	24.9	24.9
Approach LOS	A	B	B	B	B	B	C	C	C	C	C	C

Intersection Summary	14.1	HCM Level of Service	B
HCM Average Control Delay	0.66		
HCM Volume to Capacity ratio	80.0		8.0
Actuated Cycle Length (s)	111.0%		H
Intersection Capacity Utilization	15		
Analysis Period (min)			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 PM
 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.99	1.00	1.00	0.94	1.00	1.00	0.95
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	1.00	0.97	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4912	1770	4863	1770	4863	1770	3539	1489	1770	3539	1499
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4912	1770	4863	1770	4863	1770	3539	1489	1770	3539	1499
Volume (vph)	230	790	110	130	1230	360	310	1180	290	510	510	180
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)	242	832	116	137	1295	379	326	1242	305	537	537	189
RTOR Reduction (vph)	0	15	0	0	44	0	0	0	11	0	0	45
Lane Group Flow (vph)	242	933	0	137	1630	0	326	1242	294	537	537	144
Confl. Peds. (#/hr)	81	81	81	81	81	81	22	22	50	50	50	43
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	pm+ov
Protected Phases	7	4	4	3	8	8	5	2	2	3	1	6
Permitted Phases	7	4	4	3	8	8	5	2	2	3	1	6
Actuated Green, G (s)	12.0	33.2	12.8	34.0	25.4	33.0	45.8	25.0	32.6	44.6	32.6	44.6
Effective Green, g (s)	11.0	34.2	11.8	35.0	24.4	34.0	45.8	24.0	33.6	44.6	33.6	44.6
Actuated g/C Ratio	0.09	0.29	0.10	0.29	0.20	0.28	0.38	0.20	0.28	0.37	0.28	0.37
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0
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	3.0
Lane Grp Cap (vph)	162	1400	174	1418	360	1003	618	354	991	607	991	607
v/s Ratio Prot	0.14	0.19	0.08	0.34	0.18	0.35	0.05	0.30	0.15	0.02	0.02	0.02
v/s Ratio Perm	1.49	0.67	0.79	1.15	0.91	1.24	0.48	1.52	0.54	0.24	0.24	0.24
v/c Ratio	54.5	37.9	52.9	42.5	46.7	43.0	28.0	48.0	36.7	26.0	26.0	26.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	251.9	2.5	20.6	76.0	25.3	115.9	0.6	246.7	2.1	0.2	0.2	0.2
Incremental Delay, d2	306.4	40.4	73.4	118.5	71.9	158.9	28.6	294.7	38.8	26.2	26.2	26.2
Delay (s)	F	D	E	F	E	F	E	F	C	F	D	C
Level of Service	F	D	E	F	E	F	E	F	C	F	D	C
Approach Delay (s)	94.5	94.5	115.0	115.0	122.5	122.5	145.7	145.7	145.7	145.7	145.7	145.7
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F

Intersection Summary	119.7	HCM Level of Service	F
HCM Average Control Delay	1.21		
HCM Volume to Capacity ratio	119.2%		H
Actuated Cycle Length (s)	15		
Intersection Capacity Utilization			
Analysis Period (min)			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave. 2030 PM 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	0.93			0.96			1.00	0.99		1.00	0.99	
Ftbp, ped/bikes	0.98	0.97	1.00	0.96	1.00	0.98	1.00	0.98	1.00	1.00	1.00	1.00
Frt	0.95	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.94
Flt Protected	0.98	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1584	1618	1702	1618	1702	3486	1726	3447		1726	3447	
Flt Permitted	0.66	0.71	0.26	0.71	0.26	1.00	0.18	1.00		0.18	1.00	
Satd. Flow (perm)	1068	1178	461	1178	461	3486	336	3447		336	3447	
Volume (vph)	130	60	100	120	80	100	50	1070	50	40	830	70
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)	137	63	105	126	84	105	53	1126	53	42	874	74
RTOR Reduction (vph)	0	23	0	0	22	0	0	4	0	0	7	0
Lane Group Flow (vph)	0	282	0	0	293	0	53	1175	0	42	941	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6	6
Actuated Green, G (s)	23.6	23.6	23.1	23.1	23.1	53.9	53.9	53.9	53.9	53.9	53.9	53.9
Effective Green, g (s)	0.27	0.27	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Actuated g/C Ratio	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Clearance 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
Vehicle Extension (s)	290	320	292	2211			213	2186				
Lane Grp Cap (vph)	c0.26	0.97	0.25	0.11	0.11	c0.34	0.13	0.27				
v/s Ratio Prot	0.97	0.92	0.18	0.53	0.53	0.20	0.43	0.27				
v/s Ratio Perm	30.7	30.0	6.4	8.6	8.6	6.5	7.8	7.8				
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Progression Factor	45.2	29.1	1.4	0.9	0.9	2.1	0.6	0.6				
Incremental Delay, d2	75.8	59.1	7.8	9.5	9.5	8.6	8.4	8.4				
Delay (s)	E	E	A	A	A	A	A	A				
Level of Service	E	E	A	A	A	A	A	A				
Approach Delay (s)	75.8	59.1	7.8	9.4	9.4	8.5	8.5	8.5				
Approach LOS	E	E	A	A	A	A	A	A				

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	21.7											
HCM Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	69.9%											
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave. 2030 PM 1/11/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.98	1.00	0.93	1.00	0.93	1.00	0.99	1.00	0.98	1.00	0.94
Ftbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.99	1.00	0.98	1.00	0.94
Frt	0.95	1.00	0.97	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.94	0.94
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3370	1770	3154	1770	3154	1702	3488	1732	3129	1732	3129
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.24	1.00	0.23	1.00	0.23	1.00
Satd. Flow (perm)	1770	3370	1770	3154	1770	3154	427	3488	411	3129	411	3129
Volume (vph)	230	560	120	90	530	240	200	820	50	220	530	310
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	235	571	122	92	541	245	204	837	51	224	541	316
RTOR Reduction (vph)	0	20	0	0	48	0	0	5	0	0	99	0
Lane Group Flow (vph)	235	673	0	92	738	0	204	883	0	224	758	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	4	3	8	8	2	2	2	6	6	6
Permitted Phases	7	4	4	3	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.5	25.8	7.3	22.6	7.3	22.6	38.4	38.4	38.4	38.4	38.4	38.4
Effective Green, g (s)	11.0	25.3	7.8	22.1	7.8	22.1	39.9	39.9	39.9	39.9	39.9	39.9
Actuated g/C Ratio	0.13	0.30	0.09	0.26	0.09	0.26	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	4.5	3.5	4.5	3.5	4.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (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
Lane Grp Cap (vph)	229	1003	162	820	162	820	200	1637	193	1469	193	1469
v/s Ratio Prot	c0.13	c0.20	0.05	c0.23	0.05	c0.23	0.25	0.25	0.25	0.25	0.25	0.25
v/s Ratio Perm	1.03	0.67	0.57	0.90	0.57	0.90	1.02	0.54	1.02	0.54	1.02	0.52
Uniform Delay, d1	37.0	26.2	37.0	30.4	26.2	30.4	22.6	16.0	22.6	16.0	22.6	15.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	66.4	1.4	2.7	12.4	2.7	12.4	68.9	1.3	68.9	1.3	114.7	1.3
Delay (s)	103.4	27.6	39.7	42.8	27.6	42.8	91.5	17.3	91.5	17.3	137.3	17.1
Level of Service	F	C	D	D	D	D	F	B	F	B	F	B
Approach Delay (s)	46.8	46.8	42.5	42.5	42.5	42.5	31.2	42.0	31.2	42.0	42.0	42.0
Approach LOS	D	D	D	D	D	D	C	D	D	D	D	D

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	40.2											
HCM Volume to Capacity ratio	1.10											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	88.1%											
Analysis Period (min)	15											

c Critical Lane Group

**APPENDIX H:
YEAR 2030 PLUS PROJECT CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2030 AM + Project
1/21/2008

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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4900		1770	4953		2006	2036		1986	1951	
Flt Permitted	0.95	1.00		0.95	1.00		0.10	1.00		0.42	1.00	
Satd. Flow (perm)	1770	4900		1770	4953		201	2036		874	1951	
Volume (vph)	310	1001	225	120	1660	250	200	299	70	180	425	290
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)	326	1054	237	126	1747	263	211	315	74	189	447	305
RTOR Reduction (vph)	0	29	0	0	16	0	0	7	0	0	21	0
Lane Group Flow (vph)	326	1262	0	126	1994	0	211	382	0	189	731	0
Confl. Peds. (#/hr)			10	10		10	10		10	10		10
Turn Type	Prot		Prot		pm+pt		Perm		Perm		Prot	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	17.0	47.9		13.1	44.0		48.5	48.5		39.5	39.5	
Effective Green, g (s)	17.0	47.9		13.1	44.0		49.0	49.0		40.0	40.0	
Actuated g/C Ratio	0.14	0.40		0.11	0.37		0.41	0.41		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	1956		193	1816		187	831		291	650	
v/s Ratio Prot	c0.18	c0.26		0.07	c0.40		c0.07	0.19		c0.37		
v/s Ratio Perm							0.39			0.22		
v/c Ratio	1.30	0.65		0.65	1.10		1.13	0.46		0.65	1.13	
Uniform Delay, d1	51.5	29.2		51.3	38.0		58.7	25.9		34.0	40.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	160.6	1.7		7.7	53.2		104.5	0.4		4.9	75.0	
Delay (s)	212.1	30.8		59.0	91.2		163.2	26.3		39.0	115.0	
Level of Service	F	C		E	F		F	C		D	F	
Approach Delay (s)		67.4			89.3			74.4			99.7	
Approach LOS		E			F			E			F	
Intersection Summary												
HCM Average Control Delay	82.8		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.15											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	119.9%		ICU Level of Service				H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 AM + Project
1/21/2008

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)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95		0.95	0.95		0.95	1.00	0.95
Frpb, ped/bikes		1.00		1.00	0.99		0.99	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.96
Frt		0.95		1.00	0.91		0.97	1.00		1.00	0.95	1.00
Flt Protected		0.98		0.95	1.00		1.00	0.95		1.00	0.95	1.00
Satd. Flow (prot)		1749		1681	1597		3417	1770		1770	3291	
Flt Permitted		0.48		0.74	1.00		0.74	0.95		0.95	1.00	
Satd. Flow (perm)		847		1302	1597		2535	1770		3291		
Volume (vph)	10	10	10	354	330	470	10	1168	246	110	1329	460
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)	11	11	11	373	347	495	11	1229	259	116	1399	484
RTOR Reduction (vph)	0	10	0	0	57	0	0	18	0	0	36	0
Lane Group Flow (vph)	0	23	0	373	785	0	0	1481	0	116	1847	0
Confl. Peds. (#/hr)		4					4	44		12	12	44
Turn Type	Perm		Perm		Perm		Prot		Prot		Prot	
Protected Phases		7			8			2		1	6	
Permitted Phases		7			8			2				
Actuated Green, G (s)		5.1			26.5	26.5		32.5		7.9	44.9	
Effective Green, g (s)		5.6			27.0	27.0		33.0		8.4	45.4	
Actuated g/C Ratio		0.06			0.30	0.30		0.37		0.09	0.50	
Clearance Time (s)		4.5			4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0	2.0	
Lane Grp Cap (vph)		53			391	479		930		165	1660	
v/s Ratio Prot										0.07	c0.56	
v/s Ratio Perm		c0.03			0.29	0.49		c0.58				
v/c Ratio		0.43			0.95	1.64		1.59		0.70	1.11	
Uniform Delay, d1		40.7			30.9	31.5		28.5		39.6	22.3	
Progression Factor		1.00			1.00	1.00		0.97		1.00	1.00	
Incremental Delay, d2		2.0			33.3	296.4		268.1		10.5	59.9	
Delay (s)		42.7			64.2	327.9		295.7		50.1	82.2	
Level of Service		D			E	F		F		D	F	
Approach Delay (s)		42.7			247.0			295.7			80.3	
Approach LOS		D			F			F			F	
Intersection Summary												
HCM Average Control Delay	190.8		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.49											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	137.8%		ICU Level of Service				H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 AM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3427		1770	3372		1770	3403		1770	3404	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3427		1770	3372		1770	3403		1770	3404	
Volume (vph)	460	650	111	140	820	320	120	674	140	320	1163	220
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	677	116	146	854	333	125	702	146	333	1211	229
RTOR Reduction (vph)	0	15	0	0	46	0	0	20	0	0	17	0
Lane Group Flow (vph)	479	778	0	146	1141	0	125	828	0	333	1423	0
Confl. Peds. (#/hr)	6		24	24		6	36		28	28		36
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	13.0	28.4		10.1	25.5		9.6	23.5		11.0	24.9	
Effective Green, g (s)	12.5	29.4		9.6	26.5		9.1	24.5		10.5	25.9	
Actuated g/C Ratio	0.14	0.33		0.11	0.29		0.10	0.27		0.12	0.29	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	477	1119		189	993		179	926		207	980	
v/s Ratio Prot	c0.14	c0.23		0.08	c0.34		0.07	0.24		c0.19	c0.42	
v/s Ratio Perm												
v/c Ratio	1.00	0.69		0.77	1.15		0.70	0.89		1.61	1.45	
Uniform Delay, d1	38.8	26.4		39.1	31.8		39.1	31.5		39.8	32.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.19	0.86	
Incremental Delay, d2	42.2	1.5		16.2	79.0		9.2	13.0		276.0	203.9	
Delay (s)	81.0	27.9		55.3	110.7		48.3	44.5		323.2	231.5	
Level of Service	F	C		E	F		D	D		F	F	
Approach Delay (s)		47.9			104.7			45.0			248.7	
Approach LOS		D			F			D			F	
Intersection Summary												
HCM Average Control Delay		128.1										F
HCM Volume to Capacity ratio		1.30										
Actuated Cycle Length (s)		90.0						16.0				
Intersection Capacity Utilization		105.8%										G
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 AM + Project
1/21/2008

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)		4.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		0.97	0.95	
Frt		0.86						0.93		1.00	0.99	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		1611						3283		3433	3495	
Flt Permitted		1.00						0.94		0.95	1.00	
Satd. Flow (perm)		1611						3074		3433	3495	
Volume (vph)	0	0	10	0	0	0	10	366	345	1600	664	60
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)	0	0	11	0	0	0	11	385	363	1684	699	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	733	0	1684	762	0
Turn Type								Prot				
Protected Phases								2		1	6	
Permitted Phases												
Actuated Green, G (s)		0.0						8.0		29.0	45.0	
Effective Green, g (s)		0.0						8.0		29.0	45.0	
Actuated g/C Ratio		0.00						0.18		0.64	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						546		2212	3495	
v/s Ratio Prot										c0.49	0.22	
v/s Ratio Perm								c0.24				
v/c Ratio		0.00						11.34dr		0.76	0.22	
Uniform Delay, d1		22.5						18.5		5.6	0.0	
Progression Factor		1.00						0.78		1.00	1.00	
Incremental Delay, d2		0.0						164.9		2.5	0.1	
Delay (s)		22.5						179.3		8.1	0.1	
Level of Service		C						F		A	A	
Approach Delay (s)		22.5			0.0			179.3		5.6		
Approach LOS		C			A			F		A		
Intersection Summary												
HCM Average Control Delay		46.7								HCM Level of Service		D
HCM Volume to Capacity ratio		0.89										
Actuated Cycle Length (s)		45.0								Sum of lost time (s)		8.0
Intersection Capacity Utilization		80.5%								ICU Level of Service		D
Analysis Period (min)		15										
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2030 AM + Project
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.95		0.95	
Frpb, ped/bikes	0.98		0.95		0.98		0.98		0.99		0.99	
Flpb, ped/bikes	0.98		0.98		1.00		1.00		1.00		1.00	
Frt	0.98		0.94		0.98		0.98		0.99		0.99	
Flt Protected	0.98		0.99		1.00		1.00		1.00		1.00	
Satd. Flow (prot)	1710		1606		3390		3476		3476		3476	
Flt Permitted	0.83		0.88		0.87		0.88		0.88		0.88	
Satd. Flow (perm)	1455		1427		2949		3055		3055		3055	
Volume (vph)	80	100	31	60	70	110	41	511	90	60	794	40
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)	84	105	33	63	74	116	43	538	95	63	836	42
RTOR Reduction (vph)	0	14	0	0	68	0	0	29	0	0	8	0
Lane Group Flow (vph)	0	208	0	0	185	0	0	647	0	0	933	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	15.0		15.0		22.0		22.0		22.0		22.0	
Effective Green, g (s)	15.0		15.0		22.0		22.0		22.0		22.0	
Actuated g/C Ratio	0.33		0.33		0.49		0.49		0.49		0.49	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	485		476		1442		1494		1494		1494	
v/s Ratio Prot												
v/s Ratio Perm	c0.14		0.13		0.22		c0.31		c0.31		c0.31	
v/c Ratio	0.43		0.39		0.45		0.62		0.62		0.62	
Uniform Delay, d1	11.7		11.5		7.5		8.5		8.5		8.5	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	2.8		2.4		1.0		2.0		2.0		2.0	
Delay (s)	14.4		13.9		8.5		10.4		10.4		10.4	
Level of Service	B		B		A		B		B		B	
Approach Delay (s)	14.4		13.9		8.5		10.4		10.4		10.4	
Approach LOS	B		B		A		B		B		B	
Intersection Summary												
HCM Average Control Delay	10.7		HCM Level of Service		B		B		B		B	
HCM Volume to Capacity ratio	0.55		0.55		0.55		0.55		0.55		0.55	
Actuated Cycle Length (s)	45.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	73.6%		ICU Level of Service		D		D		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2030 AM + Project
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.91		0.91	
Frpb, ped/bikes	0.96		0.95		0.98		0.98		0.98		0.98	
Flpb, ped/bikes	0.98		0.98		1.00		1.00		1.00		1.00	
Frt	0.96		0.96		0.99		0.99		0.99		0.99	
Flt Protected	0.98		0.99		1.00		1.00		1.00		1.00	
Satd. Flow (prot)	1639		1645		3432		4958		4958		4958	
Flt Permitted	0.76		0.81		0.76		0.80		0.80		0.80	
Satd. Flow (perm)	1260		1345		2613		3975		3975		3975	
Volume (vph)	80	100	80	53	90	70	40	1063	72	80	1925	100
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)	84	105	84	56	95	74	42	1119	76	84	2026	105
RTOR Reduction (vph)	0	2	0	0	25	0	0	4	0	0	4	0
Lane Group Flow (vph)	0	271	0	0	200	0	0	1233	0	0	2211	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		4		2		6		6	
Actuated Green, G (s)	19.4		19.4		56.6		56.6		56.6		56.6	
Effective Green, g (s)	19.9		19.9		57.1		57.1		57.1		57.1	
Actuated g/C Ratio	0.23		0.23		0.67		0.67		0.67		0.67	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	295		315		1755		2670		2670		2670	
v/s Ratio Prot												
v/s Ratio Perm	c0.22		0.15		0.47		c0.56		c0.56		c0.56	
v/c Ratio	0.92		0.64		0.70		0.83		0.83		0.83	
Uniform Delay, d1	31.8		29.3		8.7		10.3		10.3		10.3	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	31.9		3.1		2.4		3.1		3.1		3.1	
Delay (s)	63.7		32.4		11.1		13.4		13.4		13.4	
Level of Service	E		C		B		B		B		B	
Approach Delay (s)	63.7		32.4		11.1		13.4		13.4		13.4	
Approach LOS	E		C		B		B		B		B	
Intersection Summary												
HCM Average Control Delay	17.2		HCM Level of Service		B		B		B		B	
HCM Volume to Capacity ratio	0.85		0.85		0.85		0.85		0.85		0.85	
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	112.3%		ICU Level of Service		H		H		H		H	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 AM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	
Frt	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3372	1763	3454	1768	1835	1745	1815	1745	1815	1745	1815	
Flt Permitted	0.17	1.00	0.18	1.00	0.24	1.00	0.45	1.00	0.45	1.00	0.45	1.00	
Satd. Flow (perm)	324	3372	341	3454	449	1835	823	1815	823	1815	823	1815	
Volume (vph)	180	509	190	93	937	114	160	381	33	203	600	110	
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)	189	536	200	98	986	120	168	401	35	214	632	116	
RTOR Reduction (vph)	0	48	0	0	11	0	0	4	0	0	3	0	
Lane Group Flow (vph)	189	688	0	98	1095	0	168	432	0	214	745	0	
Confl. Peds. (#/hr)	30	12	12	30	6	54	54	6	54	54	6	6	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Permitted Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Actuated Green, G (s)	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	
Effective Green, g (s)	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	
Clearance Time (s)	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Lane Grp Cap (vph)	93	969	98	993	275	1124	504	1112	504	1112	923	1009	
v/s Ratio Prot	0.20	0.32	0.32	0.32	0.24	0.24	c0.41	c0.41	c0.41	c0.41	c0.41	c0.41	
v/s Ratio Perm	c0.58	0.29	0.29	0.29	0.37	0.37	0.26	0.26	0.26	0.26	0.26	0.26	
v/c Ratio	2.03	0.71	1.00	1.10	0.61	0.38	0.42	0.67	0.42	0.67	0.42	0.67	
Uniform Delay, d1	28.5	25.5	28.5	28.5	9.6	7.9	8.1	10.2	8.1	10.2	8.1	10.2	
Progression Factor	1.00	1.00	0.87	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	499.9	4.4	80.4	58.1	9.7	1.0	2.6	3.2	2.6	3.2	2.6	3.2	
Delay (s)	528.4	29.9	105.2	83.5	19.3	8.9	10.7	13.4	10.7	13.4	10.7	13.4	
Level of Service	F	C	F	F	B	A	B	B	B	B	B	B	
Approach Delay (s)	131.8	85.3	11.8	11.8	11.8	11.8	12.8	12.8	12.8	12.8	12.8	12.8	
Approach LOS	F	F	B	B	B	B	B	B	B	B	B	B	
Intersection Summary													
HCM Average Control Delay	66.0	HCM Level of Service					E						
HCM Volume to Capacity ratio	1.10												
Actuated Cycle Length (s)	80.0	Sum of lost time (s)					8.0						
Intersection Capacity Utilization	104.4%	ICU Level of Service					G						
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 AM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	
Frt	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	
Satd. Flow (prot)	1766	3409	1749	3496	1749	3496	3399	3427	1749	3496	1749	3496	
Flt Permitted	0.16	1.00	0.30	1.00	0.65	1.00	0.65	1.00	0.65	1.00	0.65	1.00	
Satd. Flow (perm)	297	3409	561	3496	2238	2447	2238	2447	2238	2447	2238	2447	
Volume (vph)	80	565	130	74	964	72	120	281	74	123	380	70	
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)	84	595	137	78	1015	76	126	296	78	129	400	74	
RTOR Reduction (vph)	0	25	0	0	7	0	0	19	0	0	14	0	
Lane Group Flow (vph)	84	707	0	78	1084	0	0	481	0	0	589	0	
Confl. Peds. (#/hr)	18	54	54	18	4	18	18	4	18	18	4	4	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Permitted Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Actuated Green, G (s)	38.0	38.0	38.0	38.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	
Effective Green, g (s)	39.0	39.0	39.0	39.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	145	1662	273	1704	923	1009	923	1009	923	1009	923	1009	
v/s Ratio Prot	0.21	0.31	0.31	0.31	0.24	0.24	c0.31	c0.31	c0.31	c0.31	c0.31	c0.31	
v/s Ratio Perm	0.28	0.14	0.14	0.14	0.22	0.22	0.24	0.24	0.24	0.24	0.24	0.24	
v/c Ratio	0.58	0.43	0.29	0.64	0.52	0.58	0.52	0.58	0.52	0.58	0.52	0.58	
Uniform Delay, d1	14.6	13.3	12.2	15.2	17.6	18.2	17.6	18.2	17.6	18.2	17.6	18.2	
Progression Factor	0.97	0.91	1.39	1.44	0.53	1.00	0.53	1.00	0.53	1.00	0.53	1.00	
Incremental Delay, d2	12.8	0.6	2.1	1.5	1.4	2.5	1.4	2.5	1.4	2.5	1.4	2.5	
Delay (s)	27.1	12.7	19.1	23.4	10.8	20.7	10.8	20.7	10.8	20.7	10.8	20.7	
Level of Service	C	B	B	C	B	C	B	C	B	C	B	C	
Approach Delay (s)	14.1	23.2	10.8	10.8	10.8	20.7	10.8	20.7	10.8	20.7	10.8	20.7	
Approach LOS	B	C	B	B	B	C	B	C	B	C	B	C	
Intersection Summary													
HCM Average Control Delay	18.3	HCM Level of Service					B						
HCM Volume to Capacity ratio	0.61												
Actuated Cycle Length (s)	80.0	Sum of lost time (s)					8.0						
Intersection Capacity Utilization	78.0%	ICU Level of Service					D						
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2030 AM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1766	3478		1745	3454			3385			3424	
Flt Permitted	0.15	1.00		0.30	1.00			0.80			0.74	
Satd. Flow (perm)	288	3478		556	3454			2709			2554	
Volume (vph)	50	662	61	125	951	144	49	248	77	149	476	80
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	690	64	130	991	150	51	258	80	155	496	83
RTOR Reduction (vph)	0	9	0	0	15	0	0	29	0	0	12	0
Lane Group Flow (vph)	52	745	0	130	1126	0	0	360	0	0	722	0
Confl. Peds. (#/hr)	13		71	71		13	22		22	22		22
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.5	41.5		41.5	41.5			32.0			32.0	
Effective Green, g (s)	41.0	41.0		41.0	41.0			31.0			31.0	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.39			0.39	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	148	1782		285	1770			1050			990	
v/s Ratio Prot		0.21			c0.33							
v/s Ratio Perm	0.18			0.23				0.13			c0.28	
v/c Ratio	0.35	0.42		0.46	0.64			0.34			0.73	
Uniform Delay, d1	11.6	12.1		12.4	14.1			17.3			20.9	
Progression Factor	1.20	1.20		1.56	1.51			0.61			1.00	
Incremental Delay, d2	5.8	0.7		4.7	1.6			0.9			4.7	
Delay (s)	19.7	15.2		24.1	22.9			11.4			25.6	
Level of Service	B	B		C	C			B			C	
Approach Delay (s)		15.5			23.0			11.4			25.6	
Approach LOS		B			C			B			C	
Intersection Summary												
HCM Average Control Delay	20.3		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	103.6%		ICU Level of Service		G							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

2030 AM + Project
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.96		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.97	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3342		1770	3539	1734	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3342		1770	3539	1734	
Volume (vph)	793	95	72	1099	121	41
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	835	100	76	1157	127	43
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	935	0	76	1157	170	0
Confl. Peds. (#/hr)		146	266			
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	48.1		7.6	59.7	12.3	
Effective Green, g (s)	48.1		7.6	59.7	12.3	
Actuated g/C Ratio	0.60		0.09	0.75	0.15	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2009		168	2641	267	
v/s Ratio Prot	c0.28		0.04	c0.33	c0.10	
v/s Ratio Perm						
v/c Ratio	0.47		0.45	0.44	0.64	
Uniform Delay, d1	8.8		34.2	3.8	31.8	
Progression Factor	1.67		1.00	1.00	0.97	
Incremental Delay, d2	0.7		1.9	0.5	4.6	
Delay (s)	15.5		36.2	4.4	35.6	
Level of Service	B		D	A	D	
Approach Delay (s)	15.5			6.3	35.6	
Approach LOS	B			A	D	
Intersection Summary						
HCM Average Control Delay	12.1		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.50					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	48.9%		ICU Level of Service		A	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 AM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.93		1.00	0.98		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.97	1.00		0.96	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3096		1690	3414		1770	3437		1770	3357	
Flt Permitted	0.15	1.00		0.20	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	278	3096		365	3414		1770	3437		1770	3357	
Volume (vph)	146	421	267	120	716	90	135	509	59	100	1318	320
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)	154	443	281	126	754	95	142	536	62	105	1387	337
RTOR Reduction (vph)	0	119	0	0	11	0	0	9	0	0	23	0
Lane Group Flow (vph)	154	605	0	126	838	0	142	589	0	105	1701	0
Confl. Peds. (#/hr)	72		137	137		72			58	58		92
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	25.5	25.5		25.5	25.5		10.7	37.9		8.1	35.3	
Effective Green, g (s)	26.0	26.0		26.0	26.0		11.2	38.4		8.6	35.8	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.13	0.45		0.10	0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	85	947		112	1044		233	1553		179	1414	
v/s Ratio Prot		0.20			0.25		c0.08	c0.17		0.06	c0.51	
v/s Ratio Perm	c0.55			0.35								
v/c Ratio	1.81	0.64		1.12	0.80		0.61	0.38		0.59	1.20	
Uniform Delay, d1	29.5	25.5		29.5	27.1		34.8	15.4		36.5	24.6	
Progression Factor	1.00	1.00		1.00	1.00		0.96	1.34		1.00	1.00	
Incremental Delay, d2	407.6	1.1		122.6	4.3		3.0	0.7		3.1	98.3	
Delay (s)	437.1	26.5		152.1	31.4		36.3	21.3		39.6	122.9	
Level of Service	F	C		F	C		D	C		D	F	
Approach Delay (s)		98.5			47.0			24.2			118.1	
Approach LOS		F			D			C			F	
Intersection Summary												
HCM Average Control Delay	82.8		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.40											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	99.9%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

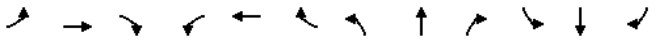
HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2030 AM + Project
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	20	31	689	20	20	1679
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	33	725	21	21	1767
Pedestrians	34		33			34
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	3		3			3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.62	0.92			0.92	
vC, conflicting volume	1729	441			780	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1156	300			670	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	95			97	
cM capacity (veh/h)	108	603			816	
Direction, Lane #						
Volume Total	54	484	263	21	884	884
Volume Left	21	0	0	21	0	0
Volume Right	33	0	21	0	0	0
cSH	215	1700	1700	816	1700	1700
Volume to Capacity	0.25	0.28	0.15	0.03	0.52	0.52
Queue Length 95th (ft)	24	0	0	2	0	0
Control Delay (s)	27.2	0.0	0.0	9.5	0.0	0.0
Lane LOS	D			A		
Approach Delay (s)	27.2	0.0		0.1		
Approach LOS	D					
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	63.7%		ICU Level of Service		B	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 AM + Project
1/21/2008




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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.95		1.00		1.00		1.00	
Frpb, ped/bikes	1.00		1.00		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		0.98		1.00	
Frt	0.99		1.00		0.98		0.97		1.00		0.96	
Flt Protected	0.99		0.95		1.00		0.99		0.95		1.00	
Satd. Flow (prot)	4981		1763		3448		1752		1733		1763	
Flt Permitted	0.65		0.24		1.00		0.10		0.39		1.00	
Satd. Flow (perm)	3273		454		3448		180		718		1763	
Volume (vph)	210	709	50	71	1094	191	100	183	90	200	493	200
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)	221	746	53	75	1152	201	105	193	95	211	519	211
RTOR Reduction (vph)	0	7	0	0	17	0	0	13	0	0	17	0
Lane Group Flow (vph)	0	1013	0	75	1336	0	0	380	0	211	713	0
Confl. Peds. (#/hr)	24		18		18		24		24		48	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.0		51.0		51.0		24.0		24.0		24.0	
Effective Green, g (s)	52.0		52.0		52.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2002		278		2109		53		211		519	
v/s Ratio Prot			c0.39						0.40			
v/s Ratio Perm	0.31		0.17				c2.11		0.29			
v/c Ratio	1.40dl		0.27		0.63		7.16		1.00		1.37	
Uniform Delay, d1	9.3		7.7		10.5		30.0		30.0		30.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.9		2.4		1.5		2811.8		62.0		180.2	
Delay (s)	10.2		10.0		11.9		2841.8		92.0		210.2	
Level of Service	B		B		B		F		F		F	
Approach Delay (s)	10.2		11.8				2841.8		183.7			
Approach LOS	B		B				F		F			

Intersection Summary			
HCM Average Control Delay	348.2	HCM Level of Service	F
HCM Volume to Capacity ratio	2.76		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	158.7%	ICU Level of Service	H
Analysis Period (min)	15		
dl = Defacto Left Lane. Recode with 1 though lane as a left lane.			
c = Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2030 AM + Project
1/21/2008



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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.91		1.00		1.00		1.00	
Frpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		0.99	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	1.00		0.99		1.00		0.97		1.00		0.97	
Flt Protected	1.00		1.00		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	5033		5008		1762		1803		1770		1802	
Flt Permitted	0.74		0.81		0.20		1.00		0.20		1.00	
Satd. Flow (perm)	3725		4061		362		1803		363		1802	
Volume (vph)	80	909	30	71	1187	111	70	304	83	150	364	80
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)	84	957	32	75	1249	117	74	320	87	158	383	84
RTOR Reduction (vph)	0	4	0	0	13	0	0	12	0	0	10	0
Lane Group Flow (vph)	0	1069	0	0	1428	0	74	395	0	158	457	0
Confl. Peds. (#/hr)	24		18		18		12		12		18	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	50.0		50.0		19.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2398		2614		93		462		93		462	
v/s Ratio Prot			c0.35		0.20		c0.43		0.22		0.25	
v/s Ratio Perm	0.29		0.55		0.80		0.86		1.70		0.99	
v/c Ratio	0.45		0.55		0.80		0.86		1.70		0.99	
Uniform Delay, d1	7.1		7.8		27.8		28.3		29.8		29.6	
Progression Factor	1.00		0.27		1.00		1.00		1.17		1.17	
Incremental Delay, d2	0.6		0.7		49.1		18.0		351.3		36.7	
Delay (s)	7.7		2.8		76.9		46.4		386.0		71.4	
Level of Service	A		A		E		D		F		E	
Approach Delay (s)	7.7		2.8		51.1		150.9					
Approach LOS	A		A		D		F					

Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		
c = Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2030 AM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frbp, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.99			0.97			0.98		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	5022			4988			3403			3432		
Flt Permitted	0.77			0.80			0.69			0.81		
Satd. Flow (perm)	3858			4020			2377			2793		
Volume (vph)	64	1029	60	68	1264	146	40	174	44	107	461	74
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)	67	1083	63	72	1331	154	42	183	46	113	485	78
RTOR Reduction (vph)	0	7	0	0	17	0	0	22	0	0	13	0
Lane Group Flow (vph)	0	1206	0	0	1540	0	0	249	0	0	663	0
Confl. Peds. (#/hr)	17		19	19		17	12		16	16		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.0			50.0			19.0			19.0		
Effective Green, g (s)	51.5			51.5			20.5			20.5		
Actuated g/C Ratio	0.64			0.64			0.26			0.26		
Clearance Time (s)	5.5			5.5			5.5			5.5		
Lane Grp Cap (vph)	2484			2588			609			716		
v/s Ratio Prot												
v/s Ratio Perm	0.31			c0.38			0.10			c0.24		
v/c Ratio	0.49			0.60			0.41			0.93		
Uniform Delay, d1	7.4			8.2			24.7			29.0		
Progression Factor	0.66			1.14			1.00			0.48		
Incremental Delay, d2	0.5			0.9			2.0			19.0		
Delay (s)	5.4			10.3			26.8			33.0		
Level of Service	A			B			C			C		
Approach Delay (s)	5.4			10.3			26.8			33.0		
Approach LOS	A			B			C			C		
Intersection Summary												
HCM Average Control Delay	14.0			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	121.4%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2030 AM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frbp, ped/bikes	1.00			1.00			0.98			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	1.00			0.99			0.93			0.92		
Flt Protected	1.00			1.00			0.98			0.98		
Satd. Flow (prot)	5073			4947			1695			1594		
Flt Permitted	0.86			0.93			0.87			0.87		
Satd. Flow (perm)	4368			4590			1510			1409		
Volume (vph)	31	1258	10	10	1405	100	10	0	10	54	0	73
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)	33	1324	11	11	1479	105	11	0	11	57	0	77
RTOR Reduction (vph)	0	1	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	1367	0	0	1595	0	0	13	0	0	134	0
Confl. Peds. (#/hr)					98							98
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	57.7			57.7			14.3			14.3		
Effective Green, g (s)	57.7			57.7			14.3			14.3		
Actuated g/C Ratio	0.72			0.72			0.18			0.18		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	3150			3311			270			252		
v/s Ratio Prot												
v/s Ratio Perm	0.31			c0.35			0.01			c0.10		
v/c Ratio	0.43			0.48			0.05			0.53		
Uniform Delay, d1	4.5			4.8			27.2			29.8		
Progression Factor	1.38			1.00			1.00			1.04		
Incremental Delay, d2	0.4			0.5			0.1			2.0		
Delay (s)	6.6			5.3			27.3			32.9		
Level of Service	A			A			C			C		
Approach Delay (s)	6.6			5.3			27.3			32.9		
Approach LOS	A			A			C			C		
Intersection Summary												
HCM Average Control Delay	7.2			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.49											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	77.2%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 AM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			0.99		
Frt	0.98			0.98			1.00			0.97		
Flt Protected	0.99			0.99			0.95			1.00		
Satd. Flow (prot)	4933			4925			1770			3408		
Flt Permitted	0.64			0.64			0.13			1.00		
Satd. Flow (perm)	3169			3174			244			3408		
Volume (vph)	147	988	187	200	1146	190	120	375	90	364	1139	239
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)	155	1040	197	211	1206	200	126	395	95	383	1199	252
RTOR Reduction (vph)	0	23	0	0	24	0	0	23	0	0	19	0
Lane Group Flow (vph)	0	1369	0	0	1593	0	126	467	0	383	1432	0
Confl. Peds. (#/hr)	40		9		40		25		31		25	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	45.0		45.0		29.5		29.5		29.5		29.5	
Effective Green, g (s)	46.5		46.5		30.5		30.5		30.5		30.5	
Actuated g/C Ratio	0.55		0.55		0.36		0.36		0.36		0.36	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1734		1736		88		1223		259		1229	
v/s Ratio Prot					0.14		0.42					
v/s Ratio Perm	0.43		c0.50		0.52		c0.53					
v/c Ratio	0.98dl		1.55dl		1.43		0.38		1.48		1.16	
Uniform Delay, d1	15.3		17.5		27.2		20.2		27.2		27.2	
Progression Factor	1.00		1.00		1.27		1.29		0.62		0.61	
Incremental Delay, d2	2.3		8.0		245.4		0.9		228.1		80.2	
Delay (s)	17.6		25.5		279.9		26.9		245.0		96.9	
Level of Service	B		C		F		C		F		F	
Approach Delay (s)	17.6		25.5		78.7		127.8					
Approach LOS	B		C		E		F					
Intersection Summary												
HCM Average Control Delay	63.9		HCM Level of Service		E							
HCM Volume to Capacity ratio	1.14											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	116.7%		ICU Level of Service		H							
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

2030 AM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			0.99			1.00			0.88		
Flpb, ped/bikes	1.00			1.00			0.97			1.00		
Frt	1.00			0.99			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5058			5005			1770			1395		
Flt Permitted	0.83			0.82			0.84			1.00		
Satd. Flow (perm)	4208			4107			1512			1395		
Volume (vph)	40	1409	23	50	1474	90	32	43	30	100	40	60
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)	42	1483	24	53	1552	95	34	45	32	105	42	63
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	18	0	15	0
Lane Group Flow (vph)	0	1547	0	0	1692	0	0	79	14	0	195	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	48.0		48.0		23.0		23.0		23.0		23.0	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lane Grp Cap (vph)	2551		2490		444		410		392		392	
v/s Ratio Prot					0.05		0.01		c0.15			
v/s Ratio Perm	0.37		c0.41		0.05		0.01		c0.15			
v/c Ratio	0.61		0.68		0.18		0.03		0.50			
Uniform Delay, d1	9.8		10.5		21.1		20.2		23.4			
Progression Factor	1.00		1.00		1.00		1.00		1.00			
Incremental Delay, d2	1.1		1.5		0.9		0.2		4.5			
Delay (s)	10.9		12.1		21.9		20.3		27.8			
Level of Service	B		B		C		C		C			
Approach Delay (s)	10.9		12.1		21.5		27.8					
Approach LOS	B		B		C		C					
Intersection Summary												
HCM Average Control Delay	12.8		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	94.0%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

2030 AM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.96	1.00	0.96	1.00	0.96	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4923	1770	4839	1770	3539	1515	1770	3539	1515	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4923	1770	4839	1770	3539	1515	1770	3539	1515	1770	3539
Volume (vph)	170	1207	171	210	1144	380	140	421	130	390	1441	250
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)	179	1271	180	221	1204	400	147	443	137	411	1517	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13
Lane Group Flow (vph)	179	1436	0	221	1554	0	147	443	104	411	1517	250
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot			Prot			Prot	pm+ov		Prot		pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases									2			6
Actuated Green, G (s)	12.0	32.0		15.0	35.0		11.0	28.0	43.0	29.0	46.0	58.0
Effective Green, g (s)	11.0	33.0		14.0	36.0		10.0	29.0	43.0	28.0	47.0	58.0
Actuated g/C Ratio	0.09	0.28		0.12	0.30		0.08	0.24	0.36	0.23	0.39	0.48
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1354		207	1452		148	855	593	413	1386	736
v/s Ratio Prot	0.10	0.29		c0.12	c0.32		c0.08	0.13	0.02	0.23	c0.43	0.03
v/s Ratio Perm									0.05			0.13
v/c Ratio	1.10	1.06		1.07	1.07		0.99	0.52	0.18	1.00	1.09	0.34
Uniform Delay, d1	54.5	43.5		53.0	42.0		55.0	39.4	26.4	45.9	36.5	19.2
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	101.6	42.2		81.6	45.0		71.6	2.2	0.1	42.7	54.3	0.1
Delay (s)	156.1	85.7		134.6	87.0		126.5	41.7	26.4	88.6	90.8	19.3
Level of Service	F	F		F	F		F	D	C	F	F	B
Approach Delay (s)		93.4			92.7			56.0			81.8	
Approach LOS		F			F			E			F	
Intersection Summary												
HCM Average Control Delay	85.0		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.09											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	101.5%		ICU Level of Service				G					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2030 AM + Project
1/21/2008

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)		4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95			1.00	0.95
Frpb, ped/bikes		0.94			0.97		1.00	0.98			1.00	0.99
Flpb, ped/bikes		0.98			0.96		0.98	1.00			0.94	1.00
Frt		0.96			0.96		1.00	0.99			1.00	0.99
Flt Protected		0.98			0.98		0.95	1.00			0.95	1.00
Satd. Flow (prot)		1608			1632		1733	3430			1657	3472
Flt Permitted		0.71			0.79		0.17	1.00			0.38	1.00
Satd. Flow (perm)		1159			1311		305	3430			663	3472
Volume (vph)		62	50		50	70	80	64	80	589	60	52
Peak-hour factor, PHF		0.95	0.95		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)		65	53		53	74	84	67	84	620	63	55
RTOR Reduction (vph)		0	22		0	0	20	0	0	7	0	4
Lane Group Flow (vph)		0	149		0	0	205	0	84	676	0	55
Confl. Peds. (#/hr)		100			100	100	100	100		100	100	100
Turn Type		Perm			Perm		Perm			Perm		Perm
Protected Phases		4			4		4			2		6
Permitted Phases		4			4		2			6		6
Actuated Green, G (s)		15.9			15.9		62.1	62.1		62.1		62.1
Effective Green, g (s)		15.4			15.4		61.6	61.6		61.6		61.6
Actuated g/C Ratio		0.18			0.18		0.72	0.72		0.72		0.72
Clearance Time (s)		3.5			3.5		3.5	3.5		3.5		3.5
Vehicle Extension (s)		2.0			2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)		210			238		221	2486		480		2516
v/s Ratio Prot							0.20					c0.39
v/s Ratio Perm		0.13			c0.16		0.28			0.08		
v/c Ratio		0.71			0.86		0.38	0.27		0.11		0.53
Uniform Delay, d1		32.7			33.7		4.4	4.0		3.5		5.2
Progression Factor		1.00			1.00		1.00	1.00		0.95		0.90
Incremental Delay, d2		8.6			24.4		4.9	0.3		0.0		0.1
Delay (s)		41.3			58.1		9.4	4.3		3.4		4.8
Level of Service		D			E		A	A		A		A
Approach Delay (s)		41.3			58.1		4.8			4.7		
Approach LOS		D			E		A			A		
Intersection Summary												
HCM Average Control Delay	11.9		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	70.2%		ICU Level of Service				C					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2030 AM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.95		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.95	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3379		1770	3267		1770	3412		1685	3338	
Flt Permitted	0.95	1.00		0.95	1.00		0.12	1.00		0.44	1.00	
Satd. Flow (perm)	1770	3379		1770	3267		219	3412		786	3338	
Volume (vph)	270	500	100	140	710	199	70	361	60	172	1020	220
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)	284	526	105	147	747	209	74	380	63	181	1074	232
RTOR Reduction (vph)	0	18	0	0	30	0	0	15	0	0	20	0
Lane Group Flow (vph)	284	613	0	147	926	0	74	428	0	181	1286	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot		Prot		Perm		Perm					
Protected Phases	7	4		3	8			2				6
Permitted Phases					2		6					
Actuated Green, G (s)	16.5	28.0		11.0	22.5		32.5	32.5		32.5	32.5	
Effective Green, g (s)	17.0	27.5		11.5	22.0		34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.20	0.32		0.14	0.26		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	354	1093		239	846		88	1365		314	1335	
v/s Ratio Prot	c0.16	0.18		0.08	c0.28			0.13			c0.39	
v/s Ratio Perm					0.34		0.23					
v/c Ratio	0.80	0.56		0.62	1.09		0.84	0.31		0.58	0.96	
Uniform Delay, d1	32.4	23.8		34.7	31.5		23.1	17.5		19.9	24.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.7	0.4		3.3	59.8		59.2	0.6		7.5	17.2	
Delay (s)	44.1	24.2		37.9	91.3		82.2	18.1		27.4	42.1	
Level of Service	D	C		D	F		F	B		C	D	
Approach Delay (s)	30.3				84.2		27.3				40.3	
Approach LOS	C				F		C				D	
Intersection Summary												
HCM Average Control Delay	48.4		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	96.0%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												


HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

2030 AM + Project
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.99	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1670		1770	3539	3514	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1670		1770	3539	3514	
Volume (vph)	67	126	58	665	1627	78
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.95
Adj. Flow (vph)	71	133	61	672	1643	82
RTOR Reduction (vph)	96	0	0	0	3	0
Lane Group Flow (vph)	108	0	61	672	1722	0
Turn Type			Prot			
Protected Phases	2		3		4	
Permitted Phases						
Actuated Green, G (s)	15.7		7.4		61.3	
Effective Green, g (s)	15.7		7.4		61.3	
Actuated g/C Ratio	0.18		0.09		0.72	
Clearance Time (s)	4.0		4.0		4.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	308		154		2552	
v/s Ratio Prot	c0.06		c0.03		0.19	
v/s Ratio Perm						
v/c Ratio	0.35		0.40		0.26	
Uniform Delay, d1	30.2		36.7		4.1	
Progression Factor	1.00		0.99		1.79	
Incremental Delay, d2	0.7		1.4		0.2	
Delay (s)	30.9		37.8		7.5	
Level of Service	C		D		A	
Approach Delay (s)	30.9		10.0		16.0	
Approach LOS	C		B		B	
Intersection Summary						
HCM Average Control Delay	15.5		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.69					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	66.3%		ICU Level of Service		C	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2030 PM + Project
1/21/2008




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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.98		1.00	0.98	
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4925		1770	4960		2006	1990		1960	1918	
Flt Permitted	0.95	1.00		0.95	1.00		0.12	1.00		0.54	1.00	
Satd. Flow (perm)	1770	4925		1770	4960		257	1990		1110	1918	
Volume (vph)	350	1302	191	120	1070	170	200	257	100	160	289	280
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)	368	1371	201	126	1126	179	211	271	105	168	304	295
RTOR Reduction (vph)	0	19	0	0	21	0	0	14	0	0	35	0
Lane Group Flow (vph)	368	1553	0	126	1284	0	211	362	0	168	564	0
Confl. Peds. (#/hr)			32	32		4	12		24	24		12
Parking (#/hr)												0
Turn Type	Prot			Prot		pm+pt			Perm			
Protected Phases	7	4		3	8	5	2				6	
Permitted Phases						2				6		
Actuated Green, G (s)	20.0	36.6		9.6	26.2	43.3	43.3		30.3	30.3		
Effective Green, g (s)	20.0	36.6		9.6	26.2	43.8	43.8		30.8	30.8		
Actuated g/C Ratio	0.20	0.37		0.10	0.26	0.44	0.44		0.31	0.31		
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	2.5		2.5	2.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	354	1803		170	1300	305	872		342	591		
v/s Ratio Prot	c0.21	0.32		0.07	c0.26	c0.08	0.18			c0.29		
v/s Ratio Perm						0.23			0.15			
v/c Ratio	1.04	0.86		0.74	0.99	0.69	0.42		0.49	0.95		
Uniform Delay, d1	40.0	29.4		44.0	36.7	44.3	19.3		28.2	33.9		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	58.5	5.7		15.9	22.1	6.6	0.3		1.1	25.8		
Delay (s)	98.5	35.0		59.9	58.9	50.9	19.6		29.3	59.7		
Level of Service	F	D		E	E	D	B		C	E		
Approach Delay (s)		47.1			59.0		30.9			53.1		
Approach LOS		D			E		C			D		
Intersection Summary												
HCM Average Control Delay		49.6										D
HCM Volume to Capacity ratio		0.94										
Actuated Cycle Length (s)		100.0							12.0			
Intersection Capacity Utilization		101.3%										G
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 PM + Project
1/21/2008



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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.97			0.98		1.00	0.95	
Fipb, ped/bikes		0.99		1.00	1.00			1.00		1.00	1.00	
Frt		0.93		1.00	0.93			0.95		1.00	0.95	
Flt Protected		0.99		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1705		1681	1586			3275		1770	3208	
Flt Permitted		0.36		0.73	1.00			0.94		0.95	1.00	
Satd. Flow (perm)		619		1290	1586			3087		1770	3208	
Volume (vph)	10	10	20	126	120	120	10	1113	615	200	898	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)	11	11	21	133	126	126	11	1172	647	211	945	442
RTOR Reduction (vph)	0	20	0	0	39	0	0	64	0	0	46	0
Lane Group Flow (vph)	0	23	0	133	213	0	0	1766	0	211	1341	0
Confl. Peds. (#/hr)		36				36	48			16	16	48
Turn Type		Perm		Perm		Perm		Prot				
Protected Phases		7			8			2		1		6
Permitted Phases		7			8			2				
Actuated Green, G (s)		6.5			16.7	16.7		45.7		13.1		63.3
Effective Green, g (s)		7.0			17.2	17.2		46.2		13.6		63.8
Actuated g/C Ratio		0.07			0.17	0.17		0.46		0.14		0.64
Clearance Time (s)		4.5			4.5	4.5		4.5		4.5		4.5
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0		2.0
Lane Grp Cap (vph)		43			222	273		1426		241		2047
v/s Ratio Prot										c0.12		0.42
v/s Ratio Perm		c0.04			0.10	0.13		c0.57				
v/c Ratio		0.55			0.60	0.78		1.24		0.88		0.66
Uniform Delay, d1		45.0			38.2	39.6		26.9		42.4		11.3
Progression Factor		1.00			1.00	1.00		0.62		1.00		1.00
Incremental Delay, d2		7.4			2.9	12.5		107.9		27.1		1.7
Delay (s)		52.3			41.1	52.1		124.5		69.5		12.9
Level of Service		D			D	D		F		E		B
Approach Delay (s)		52.3			48.3			124.5				20.4
Approach LOS		D			D			F				C
Intersection Summary												
HCM Average Control Delay		72.9						HCM Level of Service		E		
HCM Volume to Capacity ratio		1.03										
Actuated Cycle Length (s)		100.0						Sum of lost time (s)		16.0		
Intersection Capacity Utilization		118.1%						ICU Level of Service		H		
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.94		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3418		1770	3299		1770	3280		1770	3416	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3418		1770	3299		1770	3280		1770	3416	
Volume (vph)	460	930	132	160	580	350	100	948	350	300	694	60
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)	484	979	139	168	611	368	105	998	368	316	731	63
RTOR Reduction (vph)	0	11	0	0	90	0	0	38	0	0	7	0
Lane Group Flow (vph)	484	1107	0	168	889	0	105	1328	0	316	787	0
Confl. Peds. (#/hr)	15		48	48		15	123		48	48		123
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.7	27.5		10.9	22.7		5.0	32.6		12.0	39.6	
Effective Green, g (s)	15.2	28.5		10.4	23.7		4.5	33.6		11.5	40.6	
Actuated g/C Ratio	0.15	0.28		0.10	0.24		0.04	0.34		0.12	0.41	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	522	974		184	782		80	1102		204	1387	
v/s Ratio Prot	c0.14	c0.32		0.09	0.27		0.06	c0.40		c0.18	0.23	
v/s Ratio Perm												
v/c Ratio	0.93	1.14		0.91	1.14		1.31	1.21		1.55	0.57	
Uniform Delay, d1	41.9	35.8		44.4	38.1		47.8	33.2		44.2	22.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.20	0.76	
Incremental Delay, d2	22.3	74.0		41.7	76.9		205.3	101.1		264.8	1.3	
Delay (s)	64.2	109.8		86.0	115.0		253.1	134.3		317.7	18.8	
Level of Service	E	F		F	F		F	F		F	B	
Approach Delay (s)		96.0			110.8			142.8			103.9	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM Average Control Delay		113.7										F
HCM Volume to Capacity ratio		1.16										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		109.3%										H
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 PM + Project
1/21/2008

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)		4.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		0.97	0.95	
Frt		0.86						0.94		1.00	0.98	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		1611						3335		3433	3463	
Flt Permitted		1.00						0.95		0.95	1.00	
Satd. Flow (perm)		1611						3165		3433	3463	
Volume (vph)	0	0	10	0	0	0	10	555	347	1550	356	60
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)	0	0	11	0	0	0	11	584	365	1632	375	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	942	0	1632	438	0
Turn Type								Perm		Prot		
Protected Phases									2	1	6	
Permitted Phases									2			
Actuated Green, G (s)		0.0						13.0		29.0	50.0	
Effective Green, g (s)		0.0						13.0		29.0	50.0	
Actuated g/C Ratio		0.00						0.26		0.58	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						823		1991	3463	
v/s Ratio Prot										c0.48	0.13	
v/s Ratio Perm								c0.30				
v/c Ratio		0.00						1.14		0.82	0.13	
Uniform Delay, d1		25.0						18.5		8.4	0.0	
Progression Factor		1.00						0.71		1.00	1.00	
Incremental Delay, d2		0.0						77.8		3.9	0.1	
Delay (s)		25.0						90.9		12.3	0.1	
Level of Service		C						F		B	A	
Approach Delay (s)		25.0			0.0			90.9			9.7	
Approach LOS		C			A			F			A	
Intersection Summary												
HCM Average Control Delay		35.4										D
HCM Volume to Capacity ratio		0.92										
Actuated Cycle Length (s)		50.0						Sum of lost time (s)		8.0		
Intersection Capacity Utilization		84.3%										E
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2030 PM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.96			0.97			0.99			0.99		
Flpb, ped/bikes	0.99			0.97			1.00			1.00		
Frt	0.97			0.96			0.98			0.99		
Flt Protected	0.99			0.99			1.00			0.99		
Satd. Flow (prot)	1694			1668			3422			3427		
Flt Permitted	0.87			0.90			0.92			0.78		
Satd. Flow (perm)	1501			1515			3161			2695		
Volume (vph)	40	70	31	70	140	90	41	721	90	60	306	30
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)	42	74	33	74	147	95	43	759	95	63	322	32
RTOR Reduction (vph)	0	20	0	0	31	0	0	18	0	0	13	0
Lane Group Flow (vph)	0	129	0	0	285	0	0	879	0	0	405	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	17.0		17.0		17.0		25.0		25.0		25.0	
Effective Green, g (s)	17.0		17.0		17.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.34		0.34		0.34		0.50		0.50		0.50	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	510		515		515		1581		1581		1348	
v/s Ratio Prot												
v/s Ratio Perm	0.09		c0.19		c0.19		c0.28		c0.28		0.15	
v/c Ratio	0.25		0.55		0.55		0.56		0.56		0.30	
Uniform Delay, d1	11.9		13.4		13.4		8.7		8.7		7.4	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	1.2		4.2		4.2		1.4		1.4		0.6	
Delay (s)	13.1		17.7		17.7		10.1		10.1		7.9	
Level of Service	B		B		B		B		B		A	
Approach Delay (s)	13.1		17.7		17.7		10.1		10.1		7.9	
Approach LOS	B		B		B		B		B		A	
Intersection Summary												
HCM Average Control Delay	11.2		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	50.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	78.1%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2030 PM + Project
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.96			0.96			0.99			0.98		
Flpb, ped/bikes	0.97			0.99			1.00			1.00		
Frt	0.96			0.96			0.99			0.99		
Flt Protected	0.98			0.99			1.00			1.00		
Satd. Flow (prot)	1623			1667			3453			4910		
Flt Permitted	0.74			0.88			0.76			0.80		
Satd. Flow (perm)	1224			1481			2644			3911		
Volume (vph)	80	70	70	32	80	50	90	1664	82	40	1096	90
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)	84	74	74	34	84	53	95	1752	86	42	1154	95
RTOR Reduction (vph)	0	18	0	0	3	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	214	0	0	168	0	0	1931	0	0	1284	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		2		6	
Actuated Green, G (s)	15.3		15.3		15.3		55.7		55.7		55.7	
Effective Green, g (s)	15.8		15.8		15.8		56.2		56.2		56.2	
Actuated g/C Ratio	0.20		0.20		0.20		0.70		0.70		0.70	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	242		292		292		1857		1857		2747	
v/s Ratio Prot												
v/s Ratio Perm	c0.17		0.11		0.11		c0.73		c0.73		0.33	
v/c Ratio	0.88		0.57		0.57		1.04		1.04		0.47	
Uniform Delay, d1	31.2		29.1		29.1		11.9		11.9		5.3	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	28.5		1.7		1.7		32.0		32.0		0.6	
Delay (s)	59.7		30.8		30.8		43.9		43.9		5.8	
Level of Service	E		C		C		D		D		A	
Approach Delay (s)	59.7		30.8		30.8		43.9		43.9		5.8	
Approach LOS	E		C		C		D		D		A	
Intersection Summary												
HCM Average Control Delay	30.7		HCM Level of Service				C					
HCM Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	113.7%		ICU Level of Service				H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 PM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1765	3464	1768	3454	1741	1830	1766	1825	1766	1825	1766	1825
Flt Permitted	0.12	1.00	0.12	1.00	0.52	1.00	0.22	1.00	0.22	1.00	0.22	1.00
Satd. Flow (perm)	232	3464	233	3454	960	1830	402	1825	402	1825	402	1825
Volume (vph)	90	1116	160	83	892	133	180	561	65	105	250	30
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)	95	1175	168	87	939	140	189	591	68	111	263	32
RTOR Reduction (vph)	0	14	0	0	15	0	5	0	0	6	0	0
Lane Group Flow (vph)	95	1329	0	87	1064	0	189	654	0	111	290	0
Confl. Peds. (#/hr)	12		12	12		12	42		12	12		42
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.0	33.0		33.0	33.0		40.5	40.5		40.5	40.5	
Effective Green, g (s)	32.0	32.0		32.0	32.0		40.0	40.0		40.0	40.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.50	0.50		0.50	0.50	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	93	1386		93	1382		480	915		201	913	
v/s Ratio Prot		0.38			0.31			c0.36			0.16	
v/s Ratio Perm	c0.41			0.37			0.20			0.28		
v/c Ratio	1.02	0.96		0.94	0.77		0.39	0.71		0.55	0.32	
Uniform Delay, d1	24.0	23.4		23.0	20.8		12.5	15.6		13.8	11.9	
Progression Factor	1.00	1.00		1.72	1.79		1.64	1.63		1.00	1.00	
Incremental Delay, d2	99.3	16.2		45.2	1.8		0.2	0.4		10.5	0.9	
Delay (s)	123.3	39.5		84.7	39.1		20.6	25.9		24.3	12.8	
Level of Service	F	D		F	D		C	C		C	B	
Approach Delay (s)		45.1			42.5			24.7			15.9	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay		36.7			HCM Level of Service			D				
HCM Volume to Capacity ratio		0.85										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		96.5%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 PM + Project
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1764	3458	1770	3500	1764	3458	3435	3394	1764	3458	1770	3500
Flt Permitted	0.16	1.00	0.16	1.00	0.84	1.00	0.84	0.87	0.16	1.00	0.16	1.00
Satd. Flow (perm)	297	3458	298	3500	2913	3500	2913	2962	297	3458	298	3500
Volume (vph)	60	1156	120	69	1018	63	90	331	57	33	160	50
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	1168	121	70	1028	64	91	334	58	33	162	51
RTOR Reduction (vph)	0	10	0	0	6	0	0	1	0	0	4	0
Lane Group Flow (vph)	61	1279	0	70	1087	0	0	482	0	0	242	0
Confl. Peds. (#/hr)	24		78	78		24	8		6	6		8
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		46.0			46.0		
Effective Green, g (s)	25.0	25.0		25.0	25.0		47.0			47.0		
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.59			0.59		
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0		
Lane Grp Cap (vph)	93	1081		93	1094		1711			1740		
v/s Ratio Prot		c0.37			0.31							
v/s Ratio Perm	0.21			0.23			c0.17			0.08		
v/c Ratio	0.66	1.18		0.75	0.99		0.28			0.14		
Uniform Delay, d1	23.8	27.5		24.7	27.4		8.2			7.4		
Progression Factor	0.64	0.57		0.80	0.83		1.06			1.00		
Incremental Delay, d2	13.2	86.6		26.9	18.9		0.2			0.2		
Delay (s)	28.5	102.3		46.7	41.7		8.8			7.6		
Level of Service	C	F		D	D		A			A		
Approach Delay (s)		99.0			42.0					8.8		7.6
Approach LOS		F			D					A		A
Intersection Summary												
HCM Average Control Delay		58.2			HCM Level of Service			E				
HCM Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		80.4%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2030 PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.98			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1768	3493		1764	3452			3418			3419	
Flt Permitted	0.11	1.00		0.11	1.00			0.86			0.67	
Satd. Flow (perm)	213	3493		212	3452			2948			2305	
Volume (vph)	90	1113	84	114	1055	169	75	543	123	91	256	60
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)	95	1172	88	120	1111	178	79	572	129	96	269	63
RTOR Reduction (vph)	0	7	0	0	16	0	0	12	0	0	18	0
Lane Group Flow (vph)	95	1253	0	120	1273	0	0	768	0	0	410	0
Confl. Peds. (#/hr)	8		39	39		8			25	25		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	35.5		35.5	35.5			38.0			38.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0			37.0			37.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.46			0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	93	1528		93	1510			1363			1066	
v/s Ratio Prot		0.36			0.37							
v/s Ratio Perm	0.45			c0.57				c0.26			0.18	
v/c Ratio	1.02	0.82		1.29	0.84			0.56			0.38	
Uniform Delay, d1	22.5	19.7		22.5	20.1			15.6			14.1	
Progression Factor	1.04	1.04		1.43	1.45			1.29			1.00	
Incremental Delay, d2	33.5	0.5		185.7	5.4			1.4			1.1	
Delay (s)	57.0	21.1		217.8	34.4			21.6			15.1	
Level of Service	E	C		F	C			C			B	
Approach Delay (s)		23.6			50.0			21.6			15.1	
Approach LOS		C			D			C			B	
Intersection Summary												
HCM Average Control Delay	31.7		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	80.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	95.0%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & BART Access

2030 PM + Project
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	0.96		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3344		1770	3539	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3344		1770	3539	1770	1583
Volume (vph)	1226	112	56	1223	126	46
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1264	115	58	1261	130	47
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1379	0	58	1261	130	47
Confl. Peds. (#/hr)		213	348			
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	51.7		7.5	63.2	8.8	8.8
Effective Green, g (s)	51.7		7.5	63.2	8.8	8.8
Actuated g/C Ratio	0.65		0.09	0.79	0.11	0.11
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2161		166	2796	195	174
v/s Ratio Prot	c0.41		0.03	c0.36	c0.07	
v/s Ratio Perm						0.03
v/c Ratio	0.64		0.35	0.45	0.67	0.27
Uniform Delay, d1	8.5		34.0	2.7	34.2	32.7
Progression Factor	1.45		0.97	0.60	0.70	0.68
Incremental Delay, d2	0.9		0.3	0.1	7.2	0.7
Delay (s)	13.3		33.4	1.8	31.0	22.8
Level of Service	B		C	A	C	C
Approach Delay (s)	13.3			3.2	28.8	
Approach LOS	B			A	C	
Intersection Summary						
HCM Average Control Delay	9.6		HCM Level of Service		A	
HCM Volume to Capacity ratio	0.63					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	58.4%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97		1.00	0.99		1.00	0.96	
Flpb, ped/bikes	0.94	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1671	3441		1748	3336		1770	3472		1770	3277	
Flt Permitted	0.25	1.00		0.15	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	440	3441		283	3336		1770	3472		1770	3277	
Volume (vph)	249	914	109	74	558	110	466	1448	124	130	693	255
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	254	933	111	76	569	112	476	1478	127	133	707	260
RTOR Reduction (vph)	0	11	0	0	20	0	0	7	0	0	26	0
Lane Group Flow (vph)	254	1033	0	76	661	0	476	1598	0	133	941	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	25.5	25.5		25.5	25.5		13.5	32.2		8.8	27.5	
Effective Green, g (s)	26.0	26.0		26.0	26.0		14.0	32.7		9.3	28.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.18	0.41		0.12	0.35	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	143	1118		92	1084		310	1419		206	1147	
v/s Ratio Prot		0.30		0.20			c0.27	c0.46		0.08	0.29	
v/s Ratio Perm	c0.58			0.27								
v/c Ratio	1.78	0.92		0.83	0.61		1.54	1.13		0.65	0.82	
Uniform Delay, d1	27.0	26.0		24.9	22.7		33.0	23.6		33.8	23.7	
Progression Factor	1.33	1.34		1.00	1.00		0.96	0.92		1.00	1.00	
Incremental Delay, d2	371.1	10.3		41.2	0.7		249.4	62.2		5.1	6.6	
Delay (s)	407.0	45.2		66.1	23.4		281.0	84.0		38.9	30.3	
Level of Service	F	D		E	C		F	F		D	C	
Approach Delay (s)		116.0			27.7			129.0			31.4	
Approach LOS		F			C			F			C	
Intersection Summary												
HCM Average Control Delay		90.6										F
HCM Volume to Capacity ratio		1.42										
Actuated Cycle Length (s)		80.0						8.0				
Intersection Capacity Utilization		101.8%										G
Analysis Period (min)		15										

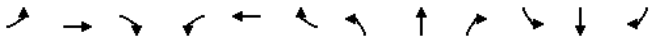
HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2030 PM + Project
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	30	41	2023	40	20	860
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	43	2129	42	21	905
Pedestrians	52		52			45
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	4		4			4
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.73	0.66			0.66	
vC, conflicting volume	2749	1183			2224	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2467	763			2338	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	80			84	
cM capacity (veh/h)	14	211			132	
Direction, Lane #						
Volume Total	75	1420	752	21	453	453
Volume Left	32	0	0	21	0	0
Volume Right	43	0	42	0	0	0
cSH	30	1700	1700	132	1700	1700
Volume to Capacity	2.46	0.84	0.44	0.16	0.27	0.27
Queue Length 95th (ft)	219	0	0	14	0	0
Control Delay (s)	942.2	0.0	0.0	37.5	0.0	0.0
Lane LOS	F			E		
Approach Delay (s)	942.2	0.0		0.9		
Approach LOS	F					
Intersection Summary						
Average Delay			22.4			
Intersection Capacity Utilization			75.7%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 PM + Project
1/21/2008




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)	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor	0.91		1.00	0.95	1.00		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00		1.00	1.00	1.00		1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Frt	0.99		1.00	0.98	0.98		0.98		1.00	0.98	0.98	
Flt Protected	0.99		0.95	1.00	0.99		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	5013		1768	3452	1793		1770		1806	1770	1806	
Flt Permitted	0.65		0.22	1.00	0.28		0.24		1.00	0.24	1.00	
Satd. Flow (perm)	3268		416	3452	501		442		1806	442	1806	
Volume (vph)	160	860	40	91	1340	221	190	525	120	80	403	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	878	41	93	1367	226	194	536	122	82	411	71
RTOR Reduction (vph)	0	5	0	0	17	0	0	8	0	0	8	0
Lane Group Flow (vph)	0	1077	0	93	1577	0	0	844	0	82	474	0
Confl. Peds. (#/hr)	24		4	4	24		48		12	12	48	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	46.0		46.0		46.0		24.0		24.0		24.0	
Effective Green, g (s)	47.0		47.0		47.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.59		0.59		0.59		0.31		0.31		0.31	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	1920		244		2028		157		138		564	
v/s Ratio Prot			c0.46								0.26	
v/s Ratio Perm	0.33		0.22				c1.69		0.19			
v/c Ratio	1.66dl		0.38		0.78		5.38		0.59		0.84	
Uniform Delay, d1	10.2		8.8		12.5		27.5		23.2		25.6	
Progression Factor	1.00		1.58		1.63		1.00		0.77		0.79	
Incremental Delay, d2	1.2		3.4		2.3		1984.3		14.5		11.9	
Delay (s)	11.3		17.3		22.8		2011.8		32.3		32.2	
Level of Service	B		B		C		F		C		C	
Approach Delay (s)	11.3		22.5				2011.8		32.3			
Approach LOS	B		C				F		C			

Intersection Summary			
HCM Average Control Delay	426.0	HCM Level of Service	F
HCM Volume to Capacity ratio	2.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	167.7%	ICU Level of Service	H
Analysis Period (min)	15		
dl = Defacto Left Lane. Recode with 1 though lane as a left lane.			
c = Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2030 PM + Project
1/21/2008



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)	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor	0.91		1.00	0.91	1.00		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Frt	0.99		0.99	1.00	0.96		1.00		0.96	1.00	0.98	
Flt Protected	1.00		1.00	0.95	1.00		0.95		1.00	0.95	1.00	
Satd. Flow (prot)	4998		5015	1770	1787		1766		1821	1766	1821	
Flt Permitted	0.76		0.79	0.38	1.00		0.20		1.00	0.20	1.00	
Satd. Flow (perm)	3800		3953	714	1787		363		1821	363	1821	
Volume (vph)	60	800	70	101	1372	111	140	337	107	90	229	40
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)	63	842	74	106	1444	117	147	355	113	95	241	42
RTOR Reduction (vph)	0	12	0	0	11	0	0	14	0	0	8	0
Lane Group Flow (vph)	0	967	0	0	1656	0	147	454	0	95	275	0
Confl. Peds. (#/hr)			12		12		6		6			
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	2446		2545		183		458		93		467	
v/s Ratio Prot			c0.42		0.21		c0.26				0.15	
v/s Ratio Perm	0.25		c0.42		0.21		c0.26					
v/c Ratio	0.40		0.65		0.80		0.99		1.02		0.59	
Uniform Delay, d1	6.8		8.7		27.9		29.7		29.8		26.1	
Progression Factor	1.17		2.04		1.00		1.00		1.20		1.20	
Incremental Delay, d2	0.0		1.0		30.0		39.9		90.4		4.4	
Delay (s)	8.0		18.8		57.9		69.5		126.1		35.7	
Level of Service	A		B		E		E		F		D	
Approach Delay (s)	8.0		18.8		66.7		58.4					
Approach LOS	A		B		E		E					

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		
c = Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2030 PM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.98			0.98			0.97		
Flt Protected	1.00			1.00			0.99			0.98		
Satd. Flow (prot)	5021			4955			3433			3357		
Flt Permitted	0.73			0.82			0.73			0.57		
Satd. Flow (perm)	3659			4065			2529			1942		
Volume (vph)	74	892	50	79	1403	241	80	425	75	140	222	92
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	75	901	51	80	1417	243	81	429	76	141	224	93
RTOR Reduction (vph)	0	7	0	0	28	0	0	15	0	0	28	0
Lane Group Flow (vph)	0	1020	0	0	1712	0	0	571	0	0	430	0
Confl. Peds. (#/hr)	9		17	17		9	12		10	10		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2355		2617		2617		648		498		498	
v/s Ratio Prot												
v/s Ratio Perm	0.28		c0.42		c0.42		c0.23		c0.23		0.22	
v/c Ratio	0.43		0.65		0.65		0.88		0.88		0.94dl	
Uniform Delay, d1	7.0		8.8		8.8		28.6		28.6		28.4	
Progression Factor	1.60		2.10		2.10		1.00		1.00		1.18	
Incremental Delay, d2	0.5		1.0		1.0		15.9		15.9		17.6	
Delay (s)	11.8		19.4		19.4		44.5		44.5		51.1	
Level of Service	B		B		B		D		D		D	
Approach Delay (s)	11.8		19.4		19.4		44.5		44.5		51.1	
Approach LOS	B		B		B		D		D		D	

Intersection Summary

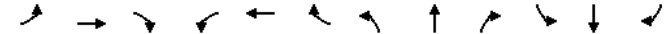
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	126.7%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & BART Access

2030 PM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			1.00			0.96		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	1.00			0.99			0.95			0.92		
Flt Protected	1.00			1.00			0.98			0.98		
Satd. Flow (prot)	5058			5031			1750			1608		
Flt Permitted	0.70			0.93			0.89			0.85		
Satd. Flow (perm)	3561			4679			1580			1394		
Volume (vph)	90	1047	10	10	1521	60	10	10	10	138	0	189
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.96	0.96	0.95	0.95	0.95	0.96	0.95	0.96
Adj. Flow (vph)	94	1091	11	11	1584	62	11	11	11	144	0	197
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	8	0	0	0
Lane Group Flow (vph)	0	1195	0	0	1657	0	0	25	0	0	341	0
Confl. Peds. (#/hr)						79						79
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	47.2		47.2		47.2		24.8		24.8		24.8	
Effective Green, g (s)	47.2		47.2		47.2		24.8		24.8		24.8	
Actuated g/C Ratio	0.59		0.59		0.59		0.31		0.31		0.31	
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)	2101		2761		2761		490		432		432	
v/s Ratio Prot												
v/s Ratio Perm	0.34		c0.35		c0.35		0.02		c0.24		c0.24	
v/c Ratio	0.57		0.60		0.60		0.05		0.79		0.79	
Uniform Delay, d1	10.1		10.4		10.4		19.4		25.2		25.2	
Progression Factor	1.47		1.00		1.00		1.00		1.28		1.28	
Incremental Delay, d2	1.0		1.0		1.0		0.0		9.1		9.1	
Delay (s)	15.9		11.4		11.4		19.4		41.3		41.3	
Level of Service	B		B		B		B		D		D	
Approach Delay (s)	15.9		11.4		11.4		19.4		41.3		41.3	
Approach LOS	B		B		B		B		D		D	

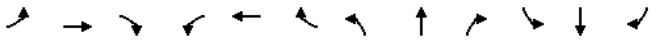
Intersection Summary

HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.


2030 PM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.99			0.96			1.00			0.99		
Flt Protected	0.98			1.00			0.95			1.00		
Satd. Flow (prot)	4915			4807			1748			3459		
Flt Permitted	0.68			0.71			0.22			1.00		
Satd. Flow (perm)	3380			3420			413			3459		
Volume (vph)	389	695	111	110	1174	467	280	1208	110	195	598	97
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)	409	732	117	116	1236	492	295	1272	116	205	629	102
RTOR Reduction (vph)	0	7	0	0	1	0	0	7	0	0	12	0
Lane Group Flow (vph)	0	1251	0	0	1843	0	295	1381	0	205	719	0
Confl. Peds. (#/hr)	26		19		26		39		92		39	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	56.6		56.6		34.0		34.0		34.0		34.0	
Effective Green, g (s)	58.1		58.1		35.0		35.0		35.0		35.0	
Actuated g/C Ratio	0.57		0.57		0.35		0.35		0.35		0.35	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1942		1965		143		1197		74		1190	
v/s Ratio Prot					0.40		0.21					
v/s Ratio Perm	0.37		c0.54		0.71		c0.96					
v/c Ratio	2.56dl		0.94		2.06		1.15		2.77		0.60	
Uniform Delay, d1	14.5		19.8		33.0		33.0		33.0		27.3	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.6		9.1		501.6		79.2		833.0		2.3	
Delay (s)	15.1		28.9		534.7		112.3		866.1		29.6	
Level of Service	B		C		F		F		F		C	
Approach Delay (s)	15.1		28.9		186.3		212.8					
Approach LOS	B		C		F		F					
Intersection Summary												
HCM Average Control Delay	102.3		HCM Level of Service		F							
HCM Volume to Capacity ratio	1.63											
Actuated Cycle Length (s)	101.1		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	121.5%		ICU Level of Service		H							
Analysis Period (min)	15											
dl	Defacto Left Lane. Recode with 1 though lane as a left lane.											
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

2030 PM + Project
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			1.00			0.89		
Flpb, ped/bikes	1.00			1.00			0.96			1.00		
Frt	1.00			1.00			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5029			5027			1753			1406		
Flt Permitted	0.78			0.78			0.77			1.00		
Satd. Flow (perm)	3943			3928			1384			1406		
Volume (vph)	50	927	34	110	1597	50	104	104	200	40	40	90
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	51	936	34	111	1613	51	105	105	202	40	40	91
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	64	0	13	0
Lane Group Flow (vph)	0	1017	0	0	1771	0	0	210	138	0	158	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	49.5		49.5		24.5		24.5		24.5		24.5	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	2390		2381		407		413		422		422	
v/s Ratio Prot					c0.15		0.10		0.11			
v/s Ratio Perm	0.26		c0.45		c0.15		0.10		0.11			
v/c Ratio	0.43		0.74		0.52		0.33		0.37			
Uniform Delay, d1	8.4		11.3		23.5		22.1		22.4			
Progression Factor	1.00		1.00		1.00		1.00		1.00			
Incremental Delay, d2	0.6		2.2		4.6		2.2		2.5			
Delay (s)	8.9		13.4		28.1		24.3		24.9			
Level of Service	A		B		C		C		C			
Approach Delay (s)	8.9		13.4		26.2		24.9					
Approach LOS	A		B		C		C					
Intersection Summary												
HCM Average Control Delay	14.2		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.67											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	111.8%		ICU Level of Service		H							
Analysis Period (min)	15											
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

2030 PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00	0.94	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4912		1770	4864		1770	3539	1489	1770	3539	1499
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4912		1770	4864		1770	3539	1489	1770	3539	1499
Volume (vph)	230	795	111	130	1237	360	310	1181	290	510	511	180
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)	242	837	117	137	1302	379	326	1243	305	537	538	189
RTOR Reduction (vph)	0	15	0	0	44	0	0	0	11	0	0	45
Lane Group Flow (vph)	242	939	0	137	1637	0	326	1243	294	537	538	144
Confl. Peds. (#/hr)	81		22		50		43		43		43	
Turn Type	Prot		Prot		Prot		pm+ov		Prot		pm+ov	
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases	6		6		6		6		6		6	
Actuated Green, G (s)	12.0	33.2		12.8	34.0		25.4	33.0	45.8	25.0	32.6	44.6
Effective Green, g (s)	11.0	34.2		11.8	35.0		24.4	34.0	45.8	24.0	33.6	44.6
Actuated g/C Ratio	0.09	0.29		0.10	0.29		0.20	0.28	0.38	0.20	0.28	0.37
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
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)	162	1400		174	1419		360	1003	618	354	991	607
v/s Ratio Prot	c0.14	0.19		0.08	c0.34		0.18	c0.35	0.05	c0.30	0.15	0.02
v/s Ratio Perm	0.07		0.07		0.07		0.07		0.07		0.07	
v/c Ratio	1.49	0.67		0.79	1.15		0.91	1.24	0.48	1.52	0.54	0.24
Uniform Delay, d1	54.5	37.9		52.9	42.5		46.7	43.0	28.0	48.0	36.7	26.0
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	251.9	2.6		20.6	77.6		25.3	116.3	0.6	246.7	2.1	0.2
Delay (s)	306.4	40.5		73.4	120.1		71.9	159.3	28.6	294.7	38.8	26.2
Level of Service	F	D		E	F		E	F	C	F	D	C
Approach Delay (s)	94.3		116.6		122.8		145.6		145.6		145.6	
Approach LOS	F		F		F		F		F		F	
Intersection Summary												
HCM Average Control Delay	120.1		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.21											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	119.4%		ICU Level of Service				H					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2030 PM + Project
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		1.00		0.95		1.00	
Frpb, ped/bikes	0.93		0.96		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	0.98		0.97		0.96		1.00		0.98		1.00	
Frt	0.95		0.95		1.00		0.99		1.00		0.99	
Flt Protected	0.98		0.98		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	1585		1616		1705		3487		1729		3446	
Flt Permitted	0.66		0.72		0.25		1.00		0.17		1.00	
Satd. Flow (perm)	1063		1181		444		3487		318		3446	
Volume (vph)	131	60	100	120	80	103	50	1103	50	42	854	73
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)	138	63	105	126	84	108	53	1161	53	44	899	77
RTOR Reduction (vph)	0	23	0	0	22	0	0	4	0	0	7	0
Lane Group Flow (vph)	0	283	0	0	296	0	53	1210	0	44	969	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		2		6	
Actuated Green, G (s)	23.7		23.7		54.3		54.3		54.3		54.3	
Effective Green, g (s)	23.2		23.2		53.8		53.8		53.8		53.8	
Actuated g/C Ratio	0.27		0.27		0.63		0.63		0.63		0.63	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	290		322		281		2207		201		2181	
v/s Ratio Prot	c0.27		0.25		0.12		0.14		0.14		0.28	
v/s Ratio Perm	0.98		0.92		0.19		0.55		0.22		0.44	
Uniform Delay, d1	30.6		30.0		6.5		8.8		6.6		8.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	46.0		29.5		1.5		1.0		2.5		0.7	
Delay (s)	76.6		59.5		8.0		9.8		9.1		8.6	
Level of Service	E		E		A		A		A		A	
Approach Delay (s)	76.6		59.5		9.7		8.6		8.6		8.6	
Approach LOS	E		E		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	21.8		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	71.0%		ICU Level of Service				C					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2030 PM + Project
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.93		1.00	0.99		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.98	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3370		1770	3139		1704	3489		1733	3135	
Flt Permitted	0.95	1.00		0.95	1.00		0.23	1.00		0.22	1.00	
Satd. Flow (perm)	1770	3370		1770	3139		415	3489		394	3135	
Volume (vph)	230	560	120	90	530	254	200	840	50	230	544	310
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	235	571	122	92	541	259	204	857	51	235	555	316
RTOR Reduction (vph)	0	20	0	0	46	0	0	5	0	0	95	0
Lane Group Flow (vph)	235	673	0	92	754	0	204	903	0	235	776	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	10.5	26.0		7.3	22.8		38.2	38.2		38.2	38.2	
Effective Green, g (s)	11.0	25.5		7.8	22.3		39.7	39.7		39.7	39.7	
Actuated g/C Ratio	0.13	0.30		0.09	0.26		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	229	1011		162	824		194	1630		184	1464	
v/s Ratio Prot	c0.13	c0.20		0.05	c0.24			0.26			0.25	
v/s Ratio Perm							0.49			c0.60		
v/c Ratio	1.03	0.67		0.57	0.92		1.05	0.55		1.28	0.53	
Uniform Delay, d1	37.0	26.0		37.0	30.4		22.6	16.3		22.6	16.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	66.4	1.3		2.7	14.4		78.9	1.4		159.9	1.4	
Delay (s)	103.4	27.3		39.7	44.8		101.5	17.6		182.5	17.4	
Level of Service	F	C		D	D		F	B		F	B	
Approach Delay (s)		46.6			44.3			33.0			52.5	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM Average Control Delay		44.0										D
HCM Volume to Capacity ratio		1.18										
Actuated Cycle Length (s)		85.0						16.0				
Intersection Capacity Utilization		89.0%										E
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Transit Village Driveway & Telegraph Ave.

2030 PM + Project
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	3539	3464	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	3539	3464	
Volume (vph)	43	98	89	1975	752	124
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	45	103	94	2079	792	131
RTOR Reduction (vph)	0	80	0	0	13	0
Lane Group Flow (vph)	45	23	94	2079	910	0
Turn Type		Perm		Prot		
Protected Phases		2		3		4
Permitted Phases				2		
Actuated Green, G (s)		17.7		7.2		53.8
Effective Green, g (s)		18.2		7.2		53.8
Actuated g/C Ratio		0.23		0.23		0.67
Clearance Time (s)		4.5		4.0		4.5
Vehicle Extension (s)		3.0		3.0		3.0
Lane Grp Cap (vph)		403		360		159
v/s Ratio Prot		c0.03		0.05		c0.59
v/s Ratio Perm				0.01		
v/c Ratio		0.11		0.07		0.59
Uniform Delay, d1		24.5		24.2		35.0
Progression Factor		1.00		1.00		1.00
Incremental Delay, d2		0.1		0.1		5.8
Delay (s)		24.6		24.3		40.8
Level of Service		C		C		D
Approach Delay (s)		24.4				16.3
Approach LOS		C				B
Intersection Summary						
HCM Average Control Delay				16.9		HCM Level of Service
HCM Volume to Capacity ratio				0.68		
Actuated Cycle Length (s)				80.0		Sum of lost time (s)
Intersection Capacity Utilization				64.6%		ICU Level of Service
Analysis Period (min)				15		
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 AM + Project + Mitigations
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.99			0.99		1.00	0.97	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.95		1.00	0.91			0.97		1.00	0.96	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1749		1681	1597			3417		1770	3291	
Flt Permitted		0.53		0.74	1.00			0.75		0.95	1.00	
Satd. Flow (perm)		948		1302	1597			2556		1770	3291	
Volume (vph)	10	10	10	354	330	470	10	1168	246	110	1329	460
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)	11	11	11	373	347	495	11	1229	259	116	1399	484
RTOR Reduction (vph)	0	10	0	0	57	0	0	18	0	0	36	0
Lane Group Flow (vph)	0	23	0	373	785	0	0	1481	0	116	1847	0
Confl. Peds. (#/hr)	4					4	44		12	12		44
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases	7			8		8		2		1		6
Permitted Phases	7			8			2					
Actuated Green, G (s)		4.5		26.5	26.5			36.0		5.0		45.5
Effective Green, g (s)		5.0		27.0	27.0			36.5		5.5		46.0
Actuated g/C Ratio		0.06		0.30	0.30			0.41		0.06		0.51
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5		4.5
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0		2.0
Lane Grp Cap (vph)		53		391	479			1037		108		1682
v/s Ratio Prot										0.07		0.56
v/s Ratio Perm		c0.02		0.29	0.49			c0.58				
v/c Ratio		0.43		0.95	1.64			1.43		1.07		1.10
Uniform Delay, d1		41.1		30.9	31.5			26.8		42.2		22.0
Progression Factor		1.00		1.00	1.00			1.02		1.00		1.00
Incremental Delay, d2		2.0		33.3	296.4			194.0		108.0		54.0
Delay (s)		43.1		64.2	327.9			221.3		150.2		76.0
Level of Service		D		E	F			F		F		E
Approach Delay (s)		43.1		247.0				221.3		80.3		
Approach LOS		D		F				F		F		F
Intersection Summary												
HCM Average Control Delay		167.3						HCM Level of Service		F		
HCM Volume to Capacity ratio		1.43										
Actuated Cycle Length (s)		90.0						Sum of lost time (s)		16.0		
Intersection Capacity Utilization		137.8%						ICU Level of Service		H		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 AM + Project + Mitigations
1/21/2008

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)		4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95
Frbp, ped/bikes		1.00	0.90		1.00	0.97		1.00	0.98		1.00	0.97
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00
Frt		1.00	0.94		1.00	0.98		1.00	0.98		1.00	0.97
Flt Protected		0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)		1770	3005		1770	3390		1770	3421		1736	3328
Flt Permitted		0.13	1.00		0.13	1.00		0.06	1.00		0.37	1.00
Satd. Flow (perm)		248	3005		248	3390		120	3421		674	3328
Volume (vph)	146	421	267	120	716	90	135	509	59	100	1318	320
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)	154	443	281	126	754	95	142	536	62	105	1387	337
RTOR Reduction (vph)	0	82	0	0	8	0	0	7	0	0	18	0
Lane Group Flow (vph)	154	642	0	126	841	0	142	591	0	105	1706	0
Confl. Peds. (#/hr)	72		137	137		72		58	58		92	
Turn Type		pm+pt			pm+pt		pm+pt			pm+pt		pm+pt
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	29.5		35.5	29.5		67.0	61.5		67.0		61.5
Effective Green, g (s)	36.0	30.0		36.0	30.0		68.0	62.0		68.0		62.0
Actuated g/C Ratio	0.30	0.25		0.30	0.25		0.57	0.52		0.57		0.52
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5		4.5
Vehicle Extension (s)	3.0	2.0		3.0	2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	151	751		151	848		151	1768		435		1719
v/s Ratio Prot	c0.05	0.21		0.04	0.25		c0.05	0.17		0.01		c0.51
v/s Ratio Perm	c0.26			0.21			0.49			0.12		
v/c Ratio	1.02	0.86		0.83	0.99		0.94	0.33		0.24		0.99
Uniform Delay, d1	39.8	42.9		34.9	44.9		31.2	16.9		12.3		28.8
Progression Factor	1.08	1.12		1.00	1.00		1.57	1.12		1.00		1.00
Incremental Delay, d2	74.2	8.1		30.9	28.6		54.1	0.5		0.1		20.0
Delay (s)	117.4	56.2		65.8	73.5		103.2	19.4		12.4		48.8
Level of Service	F	E		E	E		F	B		B		D
Approach Delay (s)		66.9			72.5		35.5			46.7		
Approach LOS		E			E		D			D		D
Intersection Summary												
HCM Average Control Delay		54.5						HCM Level of Service		D		
HCM Volume to Capacity ratio		1.00										
Actuated Cycle Length (s)		120.0						Sum of lost time (s)		16.0		
Intersection Capacity Utilization		99.9%						ICU Level of Service		F		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 AM + Project + Mitigations
1/21/2008

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)	4.0		4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	0.91		1.00	0.95	1.00		1.00	1.00	1.00		1.00	
Frbp, ped/bikes	1.00		1.00	1.00	1.00		1.00	0.97	1.00		0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00		1.00	1.00	0.96		1.00	
Frt	0.99		1.00	0.98	1.00		0.95	1.00	0.96		0.96	
Flt Protected	0.99		0.95	1.00	0.95		1.00	0.95	1.00		1.00	
Satd. Flow (prot)	4980		1762	3446	1770		1726	1703	1759			
Flt Permitted	0.66		0.21	1.00	0.10		1.00	0.50	1.00			
Satd. Flow (perm)	3327		391	3446	189		1726	891	1759			
Volume (vph)	210	709	50	71	1094	191	100	183	90	200	493	200
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)	221	746	53	75	1152	201	105	193	95	211	519	211
RTOR Reduction (vph)	0	5	0	0	13	0	0	16	0	0	13	0
Lane Group Flow (vph)	0	1015	0	75	1340	0	105	272	0	211	717	0
Confl. Peds. (#/hr)	24		18	18	24		24	48	48		24	
Turn Type	Perm		Perm		Perm		Perm		Perm			
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	51.0		51.0		51.0		49.0		49.0		49.0	49.0
Effective Green, g (s)	52.0		52.0		52.0		50.0		50.0		50.0	50.0
Actuated g/C Ratio	0.47		0.47		0.47		0.45		0.45		0.45	0.45
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	5.0
Lane Grp Cap (vph)	1573		185		1629		86		785		405	800
v/s Ratio Prot	c0.39		c0.39		c0.39		c0.39		c0.39		0.41	0.41
v/s Ratio Perm	0.31		0.19		0.19		c0.56		c0.56		0.24	0.24
v/c Ratio	3.03dl		0.41		0.82		1.22		0.35		0.52	0.90
Uniform Delay, d1	22.0		18.9		25.0		30.0		19.4		21.4	27.6
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	1.00
Incremental Delay, d2	2.1		6.5		4.8		167.9		1.2		4.7	14.8
Delay (s)	24.1		25.4		29.9		197.9		20.6		26.2	42.4
Level of Service	C		C		C		F		C		C	D
Approach Delay (s)	24.1		29.6		29.6		68.0		38.7			
Approach LOS	C		C		C		E		D			

Intersection Summary			
HCM Average Control Delay	34.4	HCM Level of Service	C
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	142.6%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 AM + Project + Mitigations
1/21/2008

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)	3.4		3.4	3.4	3.4		3.4	3.4	3.4		3.4	
Lane Util. Factor	0.91		1.00	0.91	1.00		0.95	1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00		1.00	0.99	1.00		0.99	1.00	0.99		1.00	0.99
Flpb, ped/bikes	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	0.98		1.00	0.98	1.00		0.97	1.00	0.97		1.00	0.97
Flt Protected	0.99		0.99	0.95	1.00		0.95	1.00	0.95		1.00	1.00
Satd. Flow (prot)	4932		4914	1770	3402		1763	3421	1763		3421	
Flt Permitted	0.64		0.64	0.12	1.00		0.29	1.00	0.29		1.00	
Satd. Flow (perm)	3163		3150	224	3402		530	3421	530		3421	
Volume (vph)	147	988	187	200	1146	190	120	375	90	364	1139	239
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)	155	1040	197	211	1206	200	126	395	95	383	1199	252
RTOR Reduction (vph)	0	15	0	0	15	0	0	17	0	0	14	0
Lane Group Flow (vph)	0	1377	0	0	1602	0	126	473	0	383	1437	0
Confl. Peds. (#/hr)	40		9	40	25		31	31	31		25	
Turn Type	Perm		pm+pt		pm+pt		pm+pt		pm+pt			
Protected Phases	4		3		8		5		2		1	6
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	56.0		56.0		36.1		31.6		54.0		46.0	46.0
Effective Green, g (s)	57.6		57.6		37.8		33.2		55.6		47.6	47.6
Actuated g/C Ratio	0.48		0.48		0.31		0.28		0.46		0.40	0.40
Clearance Time (s)	5.0		5.0		3.5		5.0		3.5		5.0	5.0
Vehicle Extension (s)	2.0		2.0		3.0		2.0		3.0		2.0	2.0
Lane Grp Cap (vph)	1518		1512		130		941		441		1357	
v/s Ratio Prot	0.44		c0.51		0.27		0.04		0.14		c0.14	c0.42
v/s Ratio Perm	1.42dl		2.22dl		0.97		0.50		0.87		1.06	
Uniform Delay, d1	28.7		31.2		40.9		36.5		23.6		36.2	
Progression Factor	0.87		1.00		1.09		1.07		0.62		0.60	
Incremental Delay, d2	7.3		40.7		66.7		1.8		12.7		38.5	
Delay (s)	32.3		71.9		111.3		40.9		27.3		60.4	
Level of Service	C		E		F		D		C		E	
Approach Delay (s)	32.3		71.9		55.3		53.5		53.5			
Approach LOS	C		E		E		D		D			

Intersection Summary			
HCM Average Control Delay	53.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 AM + Project + Mitigations
 1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95	1.00	1.00	0.95	1.00
Frb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4923		1770	4839		1770	3539	1515	1770	3539	1523
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4923		1770	4839		1770	3539	1515	1770	3539	1523
Volume (vph)	170	1207	171	210	1144	380	140	421	130	390	1441	250
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)	179	1271	180	221	1204	400	147	443	137	411	1517	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13
Lane Group Flow (vph)	179	1436	0	221	1554	0	147	443	104	411	1517	250
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot			Prot			Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases									2			6
Actuated Green, G (s)	12.0	32.0		15.0	35.0		11.0	28.0	43.0	29.0	46.0	58.0
Effective Green, g (s)	11.0	33.0		14.0	36.0		10.0	29.0	43.0	28.0	47.0	58.0
Actuated g/C Ratio	0.09	0.28		0.12	0.30		0.08	0.24	0.36	0.23	0.39	0.48
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1354		207	1452		148	855	593	413	1386	736
v/s Ratio Prot	0.10	0.29		c0.12	c0.32		c0.08	0.13	0.02	0.23	c0.43	0.03
v/s Ratio Perm									0.05			0.13
v/c Ratio	1.10	1.06		1.07	1.07		0.99	0.52	0.18	1.00	1.09	0.34
Uniform Delay, d1	54.5	43.5		53.0	42.0		55.0	39.4	26.4	45.9	36.5	19.2
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	101.6	42.2		81.6	45.0		71.6	2.2	0.1	42.7	54.3	0.1
Delay (s)	156.1	85.7		134.6	87.0		126.5	41.7	26.4	88.6	90.8	19.3
Level of Service	F	F		F	F		F	D	C	F	F	B
Approach Delay (s)		93.4			92.7			56.0			81.8	
Approach LOS		F			F			E			F	
Intersection Summary												
HCM Average Control Delay			85.0			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			101.5%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 PM + Project + Mitigations
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.97			0.98		1.00	0.95	
Flpb, ped/bikes		0.99		1.00	1.00			1.00		1.00	1.00	
Frt		0.93		1.00	0.93			0.95		1.00	0.95	
Flt Protected		0.99		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1704		1681	1586			3275		1770	3208	
Flt Permitted		0.56		0.73	1.00			1.00		0.95	1.00	
Satd. Flow (perm)		963		1290	1586			3275		1770	3208	
Volume (vph)	10	10	20	126	120	120	0	1113	615	200	898	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)	11	11	21	133	126	126	0	1172	647	211	945	442
RTOR Reduction (vph)	0	20	0	0	38	0	0	67	0	0	48	0
Lane Group Flow (vph)	0	23	0	133	214	0	0	1752	0	211	1339	0
Confl. Peds. (#/hr)	36					36	48		16	16		48
Turn Type	Perm			Perm				Prot				
Protected Phases	7			8				2		1	6	
Permitted Phases	7			8								
Actuated Green, G (s)		4.0		16.5	16.5			52.0		9.5	66.0	
Effective Green, g (s)		4.5		17.0	17.0			52.5		10.0	66.5	
Actuated g/C Ratio		0.04		0.17	0.17			0.52		0.10	0.66	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		43		219	270			1719		177	2133	
v/s Ratio Prot								c0.53		c0.12	0.42	
v/s Ratio Perm		c0.02		0.10	0.13							
v/c Ratio		0.53		0.61	0.79			1.02		1.19	0.63	
Uniform Delay, d1		46.7		38.4	39.8			23.8		45.0	9.6	
Progression Factor		1.00		1.00	1.00			0.61		1.00	1.00	
Incremental Delay, d2		6.2		3.2	13.7			12.1		128.8	1.4	
Delay (s)		53.0		41.7	53.5			26.5		173.8	11.0	
Level of Service		D		D	D			C		F	B	
Approach Delay (s)		53.0			49.4			26.5			32.5	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM Average Control Delay				31.6				HCM Level of Service			C	
HCM Volume to Capacity ratio				0.97								
Actuated Cycle Length (s)				100.0				Sum of lost time (s)		16.0		
Intersection Capacity Utilization				89.4%				ICU Level of Service		E		
Analysis Period (min)				15								
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 PM + Project + Mitigations
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		0.97		0.95	0.95			1.00		0.95	0.95	
Frbp, ped/bikes		1.00		0.98	0.99			1.00		0.99	0.97	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		1.00		0.98	0.94			1.00		0.96	0.99	
Flt Protected		0.95		1.00	1.00			0.95		1.00	0.95	
Satd. Flow (prot)		3433		3418	1770	3299		1770		3280	1770	3416
Flt Permitted		0.95		1.00	0.95	1.00		0.95		1.00	0.95	1.00
Satd. Flow (perm)		3433		3418	1770	3299		1770		3280	1770	3416
Volume (vph)	460	930		132	160	580	350	100	948	350	300	694
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
Adj. Flow (vph)	484	979		139	168	611	368	105	998	368	316	731
RTOR Reduction (vph)	0	11		0	0	90	0	0	38	0	0	6
Lane Group Flow (vph)	484	1107		0	168	889	0	105	1328	0	316	788
Confl. Peds. (#/hr)	15			48	48			15	123		48	48
Turn Type	Prot			Prot				Prot			Prot	
Protected Phases	7	4		3	8			5	2		1	6
Permitted Phases												
Actuated Green, G (s)	15.5	29.0		8.5	22.0			8.6	32.0		13.5	36.9
Effective Green, g (s)	15.0	30.0		8.0	23.0			8.1	33.0		13.0	37.9
Actuated g/C Ratio	0.15	0.30		0.08	0.23			0.08	0.33		0.13	0.38
Clearance Time (s)	3.5	5.0		3.5	5.0			3.5	5.0		3.5	5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	515	1025		142	759			143	1082		230	1295
v/s Ratio Prot	c0.14	c0.32		c0.09	0.27			0.06	c0.41		c0.18	0.23
v/s Ratio Perm												
v/c Ratio	0.94	1.08		1.18	1.17			0.73	1.23		1.37	0.61
Uniform Delay, d1	42.1	35.0		46.0	38.5			44.9	33.5		43.5	25.1
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.21	0.73
Incremental Delay, d2	24.9	52.2		133.1	90.8			15.4	110.8		188.4	1.7
Delay (s)	66.9	87.2		179.1	129.3			60.3	144.3		241.2	20.1
Level of Service	E	F		F	F			E	F		F	C
Approach Delay (s)		81.1			136.6				138.3			83.0
Approach LOS		F			F				F			F
Intersection Summary												
HCM Average Control Delay				109.2				HCM Level of Service			F	
HCM Volume to Capacity ratio				1.14								
Actuated Cycle Length (s)				100.0				Sum of lost time (s)		12.0		
Intersection Capacity Utilization				109.3%				ICU Level of Service		H		
Analysis Period (min)				15								
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 PM + Project + Mitigations
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1762	3458		1752	3500			3431			3390	
Flt Permitted	0.21	1.00		0.16	1.00			0.83			0.85	
Satd. Flow (perm)	394	3458		291	3500			2874			2908	
Volume (vph)	60	1156	120	69	1018	63	90	331	57	33	160	50
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	1168	121	70	1028	64	91	334	58	33	162	51
RTOR Reduction (vph)	0	10	0	0	6	0	0	13	0	0	30	0
Lane Group Flow (vph)	61	1279	0	70	1086	0	0	470	0	0	217	0
Confl. Peds. (#/hr)	24		78	78		24	8		6	6		8
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.0	50.0		50.0	50.0			20.0			20.0	
Effective Green, g (s)	51.0	51.0		51.0	51.0			21.0			21.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.26			0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	251	2204		186	2231			754			763	
v/s Ratio Prot		c0.37			0.31							
v/s Ratio Perm	0.15			0.24				c0.16			0.07	
v/c Ratio	0.24	0.58		0.38	0.49			0.62			0.28	
Uniform Delay, d1	6.2	8.3		6.9	7.6			26.0			23.5	
Progression Factor	0.55	0.44		0.38	0.25			0.73			1.00	
Incremental Delay, d2	0.9	0.4		3.3	0.4			2.0			0.9	
Delay (s)	4.3	4.1		5.9	2.4			21.1			24.4	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		4.1			2.6			21.1			24.4	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM Average Control Delay			7.6					HCM Level of Service				A
HCM Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			80.0					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			80.4%					ICU Level of Service			D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 PM + Project + Mitigations
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	0.95		1.00	0.95
Frbp, ped/bikes	1.00	0.98		1.00	0.96			1.00	0.99		1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	0.98		1.00	0.98			1.00	0.99		1.00	0.96
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.95	1.00
Satd. Flow (prot)	1770	3429		1766	3303			1770	3466		1770	3243
Flt Permitted	0.15	1.00		0.17	1.00			0.12	1.00		0.13	1.00
Satd. Flow (perm)	274	3429		320	3303			220	3466		250	3243
Volume (vph)	249	914	109	74	558	110	466	1448	124	130	693	255
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	254	933	111	76	569	112	476	1478	127	133	707	260
RTOR Reduction (vph)	0	8	0	0	16	0	0	6	0	0	36	0
Lane Group Flow (vph)	254	1036	0	76	665	0	476	1599	0	133	931	0
Confl. Peds. (#/hr)	94		86	86		94		40				111
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	39.2	32.1		26.8	23.2		57.8	47.8		35.8	29.8	
Effective Green, g (s)	39.2	32.1		26.3	23.2		57.8	47.8		35.8	29.8	
Actuated g/C Ratio	0.37	0.31		0.25	0.22		0.55	0.46		0.34	0.28	
Clearance Time (s)	3.5	4.0		3.5	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	2.0		3.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	273	1048		123	730		475	1578		172	920	
v/s Ratio Prot	c0.11	c0.30		0.02	0.20		c0.23	c0.46		0.04	0.29	
v/s Ratio Perm	0.24			0.14			0.32			0.22		
v/c Ratio	0.93	0.99		0.62	0.91		1.00	1.01		0.77	1.01	
Uniform Delay, d1	26.6	36.3		34.5	39.9		31.3	28.6		28.6	37.6	
Progression Factor	0.97	0.76		1.00	1.00		1.22	0.66		1.00	1.00	
Incremental Delay, d2	31.9	22.1		8.9	15.4		33.4	21.4		17.6	32.7	
Delay (s)	57.6	49.7		43.4	55.3		71.7	40.3		46.3	70.3	
Level of Service	E	D		D	E		E	D		D	E	
Approach Delay (s)		51.2			54.1			47.5			67.4	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM Average Control Delay			53.5					HCM Level of Service				D
HCM Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			105.0					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			101.8%					ICU Level of Service			G	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2030 PM + Project + Mitigations
 1/21/2008

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)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.91		1.00	0.95		1.00	1.00		1.00	1.00	
Frb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00		1.00	1.00		0.98	1.00		1.00	1.00	
Frt		0.99		1.00	0.98		1.00	0.97		1.00	0.98	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		5013		1768	3451		1737	1802		1770	1804	
Flt Permitted		0.65		0.21	1.00		0.25	1.00		0.12	1.00	
Satd. Flow (perm)		3298		392	3451		460	1802		219	1804	
Volume (vph)	160	860	40	91	1340	221	190	525	120	80	403	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	878	41	93	1367	226	194	536	122	82	411	71
RTOR Reduction (vph)	0	5	0	0	15	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	1077	0	93	1578	0	194	649	0	82	475	0
Confl. Peds. (#/hr)	24		4	4		24	48		12	12		48
Turn Type	Perm		Perm			Perm			Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		47.0		47.0	47.0		33.0	33.0		33.0	33.0	
Effective Green, g (s)		48.0		48.0	48.0		34.0	34.0		34.0	34.0	
Actuated g/C Ratio		0.53		0.53	0.53		0.38	0.38		0.38	0.38	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		1759		209	1841		174	681		83	682	
v/s Ratio Prot					c0.46			0.36			0.26	
v/s Ratio Perm		0.33		0.24			c0.42			0.37		
v/c Ratio		1.87dl		0.44	0.86		1.11	0.95		0.99	0.70	
Uniform Delay, d1		14.6		12.8	18.1		28.0	27.2		27.8	23.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.6		6.7	5.4		102.4	24.6		95.5	5.8	
Delay (s)		16.2		19.6	23.5		130.4	51.8		123.3	29.5	
Level of Service		B		B	C		F	D		F	C	
Approach Delay (s)		16.2			23.3			69.7			43.1	
Approach LOS		B			C			E			D	
Intersection Summary												
HCM Average Control Delay				33.6			HCM Level of Service				C	
HCM Volume to Capacity ratio				0.96								
Actuated Cycle Length (s)				90.0			Sum of lost time (s)				8.0	
Intersection Capacity Utilization				135.7%			ICU Level of Service				H	
Analysis Period (min)				15								
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

**APPENDIX I:
CMA ANALYSIS CALCULATIONS**

**Appendix I - 1
MTS Roadway System Analysis Summary - 2015 AM**

Link Location	Segment Limits	# Lanes	No Project Volume	Project Volume	With Project Volume	% Increase	V/C Ratio - No Project	V/C Ratio - With Project	No Project LOS	With Project LOS	Change in V/C >3%	Change in LOS
Freeway Segments												
I-80												
Between	I-580	Powell Street	5	5,955	10	5,965	0%	0.60	0.60	C	C	No no change
Between	Powell Street	I-580	5	9,404	4	9,408	0%	0.94	0.94	E	E	No no change
I-880												
Between	Madison St	5th Ave	4	6,322	0	6,322	0%	0.79	0.79	D	D	No no change
Between	5th Ave	Madison St	4	7,157	0	7,157	0%	0.89	0.89	D	D	No no change
I-980												
Between	I-880	Grand Ave	3	2,733	4	2,737	0%	0.46	0.46	B	B	No no change
Between	Grand Ave.	SR 24 @ 580	5	2,816	4	2,820	0%	0.28	0.28	A	A	No no change
Between	SR 24 @ 580	Grand Ave	5	5,272	7	5,279	0%	0.53	0.53	B	B	No no change
Between	Grand Ave	I-880	3	4,439	7	4,446	0%	0.74	0.74	C	C	No no change
I-580												
Between	I-80	SR 24	5	5,481	2	5,483	0%	0.55	0.55	B	B	No no change
Between	SR 24	Oakland Ave	5	5,098	20	5,118	0%	0.51	0.51	B	B	No no change
Between	Oakland Ave	SR 24	5	8,412	6	8,418	0%	0.84	0.84	D	D	No no change
Between	SR 24	I-80	5	8,864	12	8,876	0%	0.89	0.89	D	D	No no change
SR 24												
Between	I-580 Ramps	Caldecott Tunnel	4	2,666	11	2,677	0%	0.33	0.33	A	A	No no change
Between	Caldecott Tunnel	I-580 Ramps	4	7,568	5	7,573	0%	0.95	0.95	E	E	No no change
Arterials												
Martin Luther King Jr. Way												
Between	I-580	MacArthur Blvd	2	14	7	21	50%	0.01	0.01	A	A	No no change
Between	MacArthur Blvd	40th Street	2	1	12	13	1200%	0	0.01	A	A	No no change
Between	40th Street	45th Street	2	9	32	41	356%	0.01	0.03	A	A	No no change
Between	45th Street	40th Street	2	52	5	57	10%	0.03	0.04	A	A	No no change
Between	40th Street	MacArthur Blvd	2	-	9	9	0%	0	0.01	A	A	No no change
Between	MacArthur Blvd	I-580	2	8	6	14	75%	0.01	0.01	A	A	No no change
Telegraph Ave												
Between	I-580	MacArthur Blvd	2	116	25	141	22%	0.07	0.09	A	A	No no change
Between	MacArthur Blvd	40th Street	2	440	35	475	8%	0.28	0.3	A	A	No no change
Between	40th Street	45th Street	2	466	35	501	8%	0.29	0.31	A	A	No no change
Between	45th Street	51st Street	2	325	33	358	10%	0.2	0.22	A	A	No no change
Between	51st Street	SR 24	2	1,419	18	1,437	1%	0.89	0.9	D	D	No no change
Between	SR 24	51st Street	2	1,626	6	1,632	0%	1.02	1.02	F	F	No no change
Between	51st Street	45th Street	2	1,116	25	1,141	2%	0.7	0.71	C	C	No no change
Between	45th Street	40th Street	2	1,592	28	1,620	2%	1.00	1.01	F	F	No no change
Between	40th Street	MacArthur Blvd	2	1,076	32	1,108	3%	0.67	0.69	C	C	No no change
Between	MacArthur Blvd	I-580	2	790	36	826	5%	0.49	0.52	B	B	No no change
Adeline Street												
Between	San Pablo Avenue	Stanford Avenue	2	93	0	93	0%	0.06	0.06	A	A	No no change
Between	Stanford Avenue	San Pablo Avenue	2	386	0	386	0%	0.24	0.24	A	A	No no change
Shattuck Avenue												
Between	Telegraph Avenue	52nd Street	2	126	6	132	5%	0.08	0.08	A	A	No no change
Between	52nd Street	Alcatraz Avenue	1	727	6	733	1%	0.91	0.92	E	E	No no change
Between	Alcatraz Avenue	52nd Street	1	884	5	889	1%	1.11	1.11	F	F	No no change
Between	52nd Street	Telegraph Avenue	2	436	11	447	3%	0.27	0.28	A	A	No no change
West MacArthur Blvd.												
Between	San Pablo Avenue	MLK Jr. Way	3	701	13	714	2%	0.29	0.3	A	A	No no change
Between	MLK Jr. Way	Telegraph Avenue	3	707	8	715	1%	0.29	0.3	A	A	No no change
Between	Telegraph Avenue	Broadway	3	1,079	12	1,091	1%	0.45	0.45	B	B	No no change
Between	Broadway	Telegraph Avenue	3	938	6	944	1%	0.39	0.39	B	B	No no change
Between	Telegraph Avenue	MLK Jr. Way	3	554	21	575	4%	0.23	0.24	A	A	No no change
Between	MLK Jr. Way	San Pablo Avenue	3	572	18	590	3%	0.24	0.25	A	A	No no change
51st Street												
Between	Telegraph Avenue	Broadway	2	607	0	607	0%	0.38	0.38	B	B	No no change
Between	Broadway	Telegraph Avenue	2	1,045	0	1,045	0%	0.65	0.65	C	C	No no change
Claremont Avenue												
Between	Telegraph Avenue	College Avenue	2	913	6	919	1%	0.57	0.57	B	B	No no change
Between	College Avenue	Telegraph Avenue	2	1,333	4	1,337	0%	0.83	0.84	D	D	No no change

**Appendix I - 2
MTS Roadway System Analysis Summary - 2015 PM**

Link Location	Segment Limits	# Lanes	No Project Volume	Project Volume	With Project Volume	% Increase	V/C Ratio - No Project	V/C Ratio - With Project	No Project LOS	With Project LOS	Change in V/C >3%	Change in LOS
Freeway Segments												
I-80												
Between	I-580	Powell Street	5	8,575	6	8,581	0%	0.86	0.86	D	D	No no change
Between	Powell Street	I-580	5	6,724	9	6,733	0%	0.67	0.67	C	C	No no change
I-880												
Between	Madison St	5th Ave	4	7,417	0	7,417	0%	0.93	0.93	E	E	No no change
Between	5th Ave	Madison St	4	6,544	0	6,544	0%	0.82	0.82	D	D	No no change
I-980												
Between	I-880	Grand Ave	3	3,914	7	3,921	0%	0.65	0.65	C	C	No no change
Between	Grand Ave.	SR 24 @ 580	5	5,674	7	5,681	0%	0.57	0.57	B	B	No no change
Between	SR 24 @ 580	Grand Ave	5	2,653	5	2,658	0%	0.27	0.27	A	A	No no change
Between	Grand Ave	I-880	3	2,557	5	2,562	0%	0.43	0.43	B	B	No no change
I-580												
Between	I-80	SR 24	5	8,127	6	8,133	0%	0.81	0.81	D	D	No no change
Between	SR 24	Oakland Ave	4.5	8,599	13	8,612	0%	0.96	0.96	E	E	No no change
Between	Oakland Ave	SR 24	4.5	6,161	19	6,180	0%	0.68	0.69	C	C	No no change
Between	SR 24	I-80	5	6,366	7	6,373	0%	0.64	0.64	C	C	No no change
SR 24												
Between	I-580 Ramps	Caldecott Tunnel	4	8,254	7	8,261	0%	1.03	1.03	F	F	No no change
Between	Caldecott Tunnel	I-580 Ramps	4	3,124	11	3,135	0%	0.39	0.39	B	B	No no change
Arterials												
Martin Luther King Jr. Way												
Between	I-580	MacArthur Blvd	2	12	0	12	0%	0.01	0.01	A	A	No no change
Between	MacArthur Blvd	40th Street	2	1	20	21	2000%	0	0.01	A	A	No no change
Between	40th Street	45th Street	2	9	22	31	244%	0.01	0.02	A	A	No no change
Between	45th Street	40th Street	2	13	7	20	54%	0.01	0.01	A	A	No no change
Between	40th Street	MacArthur Blvd	2	-	5	5	0%	0	0	A	A	No no change
Between	MacArthur Blvd	I-580	2	11	7	18	64%	0.01	0.01	A	A	No no change
Telegraph Ave												
Between	I-580	MacArthur Blvd	2	628	38	666	6%	0.39	0.42	B	B	No no change
Between	MacArthur Blvd	40th Street	2	1,140	27	1,167	2%	0.71	0.73	C	C	No no change
Between	40th Street	45th Street	2	1,529	27	1,556	2%	0.96	0.97	E	E	No no change
Between	45th Street	51st Street	2	1,115	18	1,133	2%	0.7	0.71	C	C	No no change
Between	51st Street	SR 24	2	1,857	9	1,866	0%	1.16	1.17	F	F	No no change
Between	SR 24	51st Street	2	1,202	18	1,220	1%	0.75	0.76	C	D	No change
Between	51st Street	45th Street	2	366	26	392	7%	0.23	0.25	A	A	No no change
Between	45th Street	40th Street	2	507	48	555	9%	0.32	0.35	A	B	No change
Between	40th Street	MacArthur Blvd	2	502	51	553	10%	0.31	0.35	A	B	Yes change
Between	MacArthur Blvd	I-580	2	213	29	242	14%	0.13	0.15	A	A	No no change
Adeline Street												
Between	San Pablo Avenue	Stanford Avenue	2	453	0	453	0%	0.28	0.28	A	A	No no change
Between	Stanford Avenue	San Pablo Avenue	2	99	0	99	0%	0.06	0.06	A	A	No no change
Shattuck Avenue												
Between	Telegraph Avenue	52nd Street	2	332	7	339	2%	0.21	0.21	A	A	No no change
Between	52nd Street	Alcatraz Avenue	1	878	7	885	1%	1.1	1.11	F	F	No no change
Between	Alcatraz Avenue	52nd Street	1	887	6	893	1%	1.11	1.12	F	F	No no change
Between	52nd Street	Telegraph Avenue	2	98	20	118	20%	0.06	0.07	A	A	No no change
West MacArthur Blvd.												
Between	San Pablo Avenue	MLK Jr. Way	3	1,065	20	1,085	2%	0.44	0.45	B	B	No no change
Between	MLK Jr. Way	Telegraph Avenue	3	1,041	17	1,058	2%	0.43	0.44	B	B	No no change
Between	Telegraph Avenue	Broadway	3	1,398	7	1,405	1%	0.58	0.59	B	C	No change
Between	Broadway	Telegraph Avenue	3	1,519	7	1,526	0%	0.63	0.64	C	C	No no change
Between	Telegraph Avenue	MLK Jr. Way	3	904	16	920	2%	0.38	0.38	B	B	No no change
Between	MLK Jr. Way	San Pablo Avenue	3	897	12	909	1%	0.37	0.38	B	B	No no change
51st Street												
Between	Telegraph Avenue	Broadway	2	1,126	0	1,126	0%	0.7	0.7	C	C	No no change
Between	Broadway	Telegraph Avenue	2	1,009	0	1,009	0%	0.63	0.63	C	C	No no change
Claremont Avenue												
Between	Telegraph Avenue	College Avenue	2	1,368	5	1,373	0%	0.86	0.86	D	D	No no change
Between	College Avenue	Telegraph Avenue	2	1,168	9	1,177	1%	0.73	0.74	C	C	No no change

**Appendix I - 3
MTS Roadway System Analysis Summary - 2030 AM**

Link Location	Segment Limits	# Lanes	No Project Volume	Project Volume	With Project Volume	% Increase	V/C Ratio - No Project	V/C Ratio - With Project	No Project LOS	With Project LOS	Change in V/C >3%	Change in LOS
Freeway Segments												
I-80												
Between	I-580	Powell Street	5	6,523	10	6,533	0%	0.65	0.65	C	C	No no change
Between	Powell Street	I-580	5	12,514	4	12,518	0%	1.25	1.25	F	F	No no change
I-880												
Between	Madison St	5th Ave	4	7,221	0	7,221	0%	0.90	0.90	D	D	No no change
Between	5th Ave	Madison St	4	7,903	0	7,903	0%	0.99	0.99	E	E	No no change
I-980												
Between	I-880	Grand Ave	3	2,864	4	2,868	0%	0.48	0.48	B	B	No no change
Between	Grand Ave.	SR 24 @ 580	5	3,037	4	3,041	0%	0.30	0.30	A	A	No no change
Between	SR 24 @ 580	Grand Ave	5	6,284	7	6,291	0%	0.63	0.63	C	C	No no change
Between	Grand Ave	I-880	3	4,706	7	4,713	0%	0.78	0.79	D	D	No no change
I-580												
Between	I-80	SR 24	5	6,091	2	6,093	0%	0.61	0.61	C	C	No no change
Between	SR 24	Oakland Ave	4.5	6,131	20	6,151	0%	0.68	0.68	C	C	No no change
Between	Oakland Ave	SR 24	4.5	8,712	6	8,718	0%	0.97	0.97	E	E	No no change
Between	SR 24	I-80	5	9,211	12	9,223	0%	0.92	0.92	E	E	No no change
SR 24												
Between	I-580 Ramps	Caldecott Tunnel	4	3,508	11	3,519	0%	0.44	0.44	B	B	No no change
Between	Caldecott Tunnel	I-580 Ramps	4	9,465	5	9,470	0%	1.18	1.18	F	F	No no change
Arterials												
Martin Luther King Jr. Way												
Between	I-580	MacArthur Blvd	2	14	7	21	50%	0.01	0.01	A	A	No no change
Between	MacArthur Blvd	40th Street	2	1	12	13	1200%	0	0.01	A	A	No no change
Between	40th Street	45th Street	2	18	32	50	178%	0.01	0.03	A	A	No no change
Between	45th Street	40th Street	2	175	5	180	3%	0.11	0.11	A	A	No no change
Between	40th Street	MacArthur Blvd	2	138	9	147	7%	0.09	0.09	A	A	No no change
Between	MacArthur Blvd	I-580	2	14	6	20	43%	0.01	0.01	A	A	No no change
Telegraph Ave												
Between	I-580	MacArthur Blvd	2	253	25	278	10%	0.16	0.17	A	A	No no change
Between	MacArthur Blvd	40th Street	2	596	35	631	6%	0.37	0.39	B	B	No no change
Between	40th Street	45th Street	2	586	35	621	6%	0.37	0.39	B	B	No no change
Between	45th Street	51st Street	2	441	33	474	7%	0.28	0.3	A	A	No no change
Between	51st Street	SR 24	2	1,764	18	1,782	1%	1.1	1.11	F	F	No no change
Between	SR 24	51st Street	2	2,044	6	2,050	0%	1.28	1.28	F	F	No no change
Between	51st Street	45th Street	2	1,669	25	1,694	1%	1.04	1.06	F	F	No no change
Between	45th Street	40th Street	2	2,011	28	2,039	1%	1.26	1.27	F	F	No no change
Between	40th Street	MacArthur Blvd	2	1,780	32	1,812	2%	1.11	1.13	F	F	No no change
Between	MacArthur Blvd	I-580	2	1,445	36	1,481	2%	0.9	0.93	D	E	No change
Adeline Street												
Between	San Pablo Avenue	Stanford Avenue	2	125	0	125	0%	0.08	0.08	A	A	No no change
Between	Stanford Avenue	San Pablo Avenue	2	1,086	0	1,086	0%	0.68	0.68	C	C	No no change
Shattuck Avenue												
Between	Telegraph Avenue	52nd Street	2	120	6	126	5%	0.08	0.08	A	A	No no change
Between	52nd Street	Alcatraz Avenue	1	811	6	817	1%	1.01	1.02	F	F	No no change
Between	Alcatraz Avenue	52nd Street	1	1,172	5	1,177	0%	1.47	1.47	F	F	No no change
Between	52nd Street	Telegraph Avenue	2	304	11	315	4%	0.19	0.2	A	A	No no change
West MacArthur Blvd.												
Between	San Pablo Avenue	MLK Jr. Way	3	930	13	943	1%	0.39	0.39	B	B	No no change
Between	MLK Jr. Way	Telegraph Avenue	3	1,058	8	1,066	1%	0.44	0.44	B	B	No no change
Between	Telegraph Avenue	Broadway	3	1,514	12	1,526	1%	0.63	0.64	C	C	No no change
Between	Broadway	Telegraph Avenue	3	1,741	6	1,747	0%	0.73	0.73	C	C	No no change
Between	Telegraph Avenue	MLK Jr. Way	3	1,401	21	1,422	1%	0.58	0.59	B	C	No change
Between	MLK Jr. Way	San Pablo Avenue	3	1,435	18	1,453	1%	0.6	0.61	C	C	No no change
51st Street												
Between	Telegraph Avenue	Broadway	2	1,269	0	1,269	0%	0.79	0.79	D	D	No no change
Between	Broadway	Telegraph Avenue	2	1,070	0	1,070	0%	0.67	0.67	C	C	No no change
Claremont Avenue												
Between	Telegraph Avenue	College Avenue	2	1,272	6	1,278	0%	0.8	0.8	D	D	No no change
Between	College Avenue	Telegraph Avenue	2	1,735	4	1,739	0%	1.08	1.09	F	F	No no change

**Appendix I - 4
MTS Roadway System Analysis Summary - 2030 PM**

Link Location	Segment Limits	# Lanes	No Project Volume	Project Volume	With Project Volume	% Increase	V/C Ratio - No Project	V/C Ratio - With Project	No Project LOS	With Project LOS	Change in V/C >3%	Change in LOS
Freeway Segments												
I-80												
Between	I-580	Powell Street	5	9,870	6	9,876	0%	0.99	0.99	E	E	No no change
Between	Powell Street	I-580	5	6,668	9	6,677	0%	0.67	0.67	C	C	No no change
I-880												
Between	Madison St	5th Ave	4	7,953	0	7,953	0%	0.99	0.99	E	E	No no change
Between	5th Ave	Madison St	4	7,281	0	7,281	0%	0.91	0.91	E	E	No no change
I-980												
Between	I-880	Grand Ave	3	3,744	7	3,751	0%	0.62	0.63	C	C	No no change
Between	Grand Ave.	SR 24 @ 580	5	6,341	7	6,348	0%	0.63	0.63	C	C	No no change
Between	SR 24 @ 580	Grand Ave	5	3,030	5	3,035	0%	0.30	0.30	A	A	No no change
Between	Grand Ave	I-880	3	2,892	5	2,897	0%	0.48	0.48	B	B	No no change
I-580												
Between	I-80	SR 24	5	9,078	6	9,084	0%	0.91	0.91	E	E	No no change
Between	SR 24	Oakland Ave	4.5	8,973	13	8,986	0%	1.00	1.00	F	F	No no change
Between	Oakland Ave	SR 24	4.5	6,328	19	6,347	0%	0.70	0.71	C	C	No no change
Between	SR 24	I-80	5	6,871	7	6,878	0%	0.69	0.69	C	C	No no change
SR 24												
Between	I-580 Ramps	Caldecott Tunnel	4	9,881	7	9,888	0%	1.24	1.24	F	F	No no change
Between	Caldecott Tunnel	I-580 Ramps	4	3,991	11	4,002	0%	0.50	0.50	B	B	No no change
Arterials												
Martin Luther King Jr. Way												
Between	I-580	MacArthur Blvd	2	16	0	16	0%	0.01	0.01	A	A	No no change
Between	MacArthur Blvd	40th Street	2	11	20	31	182%	0.01	0.02	A	A	No no change
Between	40th Street	45th Street	2	74	22	96	30%	0.05	0.06	A	A	No no change
Between	45th Street	40th Street	2	25	7	32	28%	0.02	0.02	A	A	No no change
Between	40th Street	MacArthur Blvd	2	1	5	6	500%	0	0	A	A	No no change
Between	MacArthur Blvd	I-580	2	14	7	21	50%	0.01	0.01	A	A	No no change
Telegraph Ave												
Between	I-580	MacArthur Blvd	2	1,446	38	1,484	3%	0.9	0.93	D	E	No change
Between	MacArthur Blvd	40th Street	2	2,013	27	2,040	1%	1.26	1.28	F	F	No no change
Between	40th Street	45th Street	2	2,082	27	2,109	1%	1.3	1.32	F	F	No no change
Between	45th Street	51st Street	2	1,646	18	1,664	1%	1.03	1.04	F	F	No no change
Between	51st Street	SR 24	2	2,202	9	2,211	0%	1.38	1.38	F	F	No no change
Between	SR 24	51st Street	2	1,376	18	1,394	1%	0.86	0.87	D	D	No no change
Between	51st Street	45th Street	2	578	26	604	4%	0.36	0.38	B	B	No no change
Between	45th Street	40th Street	2	742	48	790	6%	0.46	0.49	B	B	No no change
Between	40th Street	MacArthur Blvd	2	815	51	866	6%	0.51	0.54	B	B	No no change
Between	MacArthur Blvd	I-580	2	328	29	357	9%	0.21	0.22	A	A	No no change
Adeline Street												
Between	San Pablo Avenue	Stanford Avenue	2	1,088	0	1,088	0%	0.68	0.68	C	C	No no change
Between	Stanford Avenue	San Pablo Avenue	2	247	0	247	0%	0.15	0.15	A	A	No no change
Shattuck Avenue												
Between	Telegraph Avenue	52nd Street	2	357	7	364	2%	0.22	0.23	A	A	No no change
Between	52nd Street	Alcatraz Avenue	1	1,018	7	1,025	1%	1.27	1.28	F	F	No no change
Between	Alcatraz Avenue	52nd Street	1	896	6	902	1%	1.12	1.13	F	F	No no change
Between	52nd Street	Telegraph Avenue	2	107	20	127	19%	0.07	0.08	A	A	No no change
West MacArthur Blvd.												
Between	San Pablo Avenue	MLK Jr. Way	3	1,313	20	1,333	2%	0.55	0.56	B	B	No no change
Between	MLK Jr. Way	Telegraph Avenue	3	1,287	17	1,304	1%	0.54	0.54	B	B	No no change
Between	Telegraph Avenue	Broadway	3	1,656	7	1,663	0%	0.69	0.69	C	C	No no change
Between	Broadway	Telegraph Avenue	3	2,196	7	2,203	0%	0.92	0.92	E	E	No no change
Between	Telegraph Avenue	MLK Jr. Way	3	1,716	16	1,732	1%	0.72	0.72	C	C	No no change
Between	MLK Jr. Way	San Pablo Avenue	3	1,718	12	1,730	1%	0.72	0.72	C	C	No no change
51st Street												
Between	Telegraph Avenue	Broadway	2	1,136	0	1,136	0%	0.71	0.71	C	C	No no change
Between	Broadway	Telegraph Avenue	2	1,171	0	1,171	0%	0.73	0.73	C	C	No no change
Claremont Avenue												
Between	Telegraph Avenue	College Avenue	2	1,849	5	1,854	0%	1.16	1.16	F	F	No no change
Between	College Avenue	Telegraph Avenue	2	1,491	9	1,500	1%	0.93	0.94	E	E	No no change

**APPENDIX J:
TELEGRAPH AVENUE BUS RAPID TRANSIT ANALYSIS**

APPENDIX J TELEGRAPH AVENUE BUS RAPID TRANSIT

In May of 2007, AC Transit published a Draft Environmental Impact Statement / Environmental Impact Report (EIS/EIR) to implement Bus Rapid Transit (BRT) on Telegraph Avenue and International Boulevard connecting Berkeley, Oakland, and San Leandro. The proposed system would dedicate one travel lane in each direction to bus operations only, allowing buses to provide a quicker and more reliable service than regular bus service today. In the vicinity of the project, the proposed BRT project would generally eliminate one through lane in each direction and narrow Telegraph Avenue to one through lane in each direction.

Currently, there are no finalized design plans, an assurance of full funding for the BRT project, or approvals from AC Transit, the City of Oakland and other public agencies. Although proposed (but not approved) transit improvements are not typically considered as part of the projected baseline conditions, this EIR nevertheless (conservatively) provides a non-CEQA discussion of the potential effects on project impacts caused by proposed modifications to the traffic circulation network by the proposed BRT.

On Telegraph Avenue, within the study area, the BRT project would eliminate one northbound and one southbound travel lanes on Telegraph Avenue. This configuration would result in a single travel lane in northbound and southbound directions on Telegraph Avenue. In addition, the BRT project would eliminate left-turn lanes and prohibit left-turns at most intersections along its route. Left-turns would be allowed at the following locations along Telegraph Avenue within the study area: 51st Street (southbound only), 52st Street (southbound only), 40th Street, MacArthur Boulevard, and 27th Street. The BRT project would include new traffic signals and improvements to existing traffic signals (interconnection) to improve traffic flow.

By eliminating one travel lane in each direction, the BRT project would reduce the vehicular capacity on Telegraph Avenue. As previously shown in the project analysis, many of the study intersections on Telegraph Avenue would operate at poor levels of service under Cumulative Year 2030 Baseline Plus Project conditions. Thus, it is likely that the increased vehicular congestion on Telegraph Avenue would result in some vehicles diverting to other north-south arterials, such as Martin Luther King Jr. Way and Broadway.

Traffic operations Analysis

This section analyzes the effects of implementing the Telegraph Avenue BRT project on both Telegraph Avenue and on parallel roadways. The intersection LOS operations compares intersection LOS under Cumulative Year 2030 Baseline Plus Project (i.e., MacArthur Transit Village) conditions as previously presented in Chapter IV.C with intersection LOS under Cumulative Year 2030 Baseline Plus Project Plus BRT conditions. The Cumulative Year 2030 Baseline Plus Project Plus BRT conditions was developed by adjusting the Cumulative Year 2030 Baseline plus Project Condition of the MacArthur Transit Village EIR to account for geometric and volume changes related to the BRT project. These adjustments were based on the traffic

analysis completed for the BRT EIR.¹ Thus, this analysis is limited to the following intersections only, which are analyzed in both EIRs:

- #2 Telegraph Avenue/52nd Street/Claremont Avenue (a.m. peak hour only)
- #3 Telegraph Avenue/51st Street (a.m. peak hour only)
- #6 Telegraph Avenue/45th Street (p.m. peak hour only)
- #13 Telegraph Avenue/40th Street (a.m. and p.m. peak hours)
- #18 Martin Luther King Jr. Way/MacArthur Boulevard (p.m. peak hour only)
- #20 Telegraph Avenue/West MacArthur Boulevard (p.m. peak hour only)
- #24 Telegraph Avenue/27th Street (p.m. peak hour only)

Based on the traffic volumes developed for the BRT EIR, the BRT project would reduce peak hour traffic volumes on Telegraph Avenue by about 250 vehicles in each direction. However, the BRT EIR does not provide traffic volumes on all parallel roadways that diverted traffic would use.

Table 1 summarizes intersection LOS for seven intersections under both Cumulative Year 2030 Baseline Plus Project No BRT (i.e., the Cumulative Year 2030 Baseline Plus Project conditions analyzed in the MacArthur Transit Village Project EIR) and Cumulative Year 2030 Baseline Plus Project Plus BRT conditions. Table 1 shows intersection LOS for Cumulative Year 2030 Baseline Plus Project No BRT conditions with and without Mitigation Measures TRANS-1 through TRANS-9 as identified in the EIR. In addition, the Cumulative Year 2030 Baseline Plus Project Plus BRT conditions analysis also accounts for implementation of the mitigation measures TRANS 1 through TRANS 9 at the study intersections. Thus, comparison of the Cumulative Year 2030 Baseline Plus Project Plus BRT conditions to Cumulative Year 2030 Baseline Plus Project No BRT (Mitigated) conditions shows the impacts of the BRT project assuming the completion of the MacArthur Transit Village project and implementation of mitigation measures TRANS-1 through TRANS-9.

As shown in Table 1, the implementation of the BRT would increase delay and degrade LOS at the seven studied intersections during both a.m. and p.m. peak hours, The following intersections would operate at unacceptable LOS E or LOS F regardless of the BRT project:

- #2 Telegraph Avenue/52st Street and Claremont Avenue intersection
- #3 Telegraph Avenue/51st Street intersection
- #13 Telegraph Avenue/40th Street intersection

¹ AC Transit East Bay Bus Rapid Transit Traffic Analysis Report (Cambridge Systematics, April 2007)

**Table 1
Cumulative Year 2030 Intersection Level of Service Summary**

No.	Intersection	Traffic Control	Time Period	Cumulative Year 2030 Baseline Plus Project No BRT (Not Mitigated)		Cumulative Year 2030 Baseline Plus Project No BRT (Mitigated)		Cumulative Year 2030 Baseline Plus Project Plus BRT	
				LOS	Delay	LOS	Delay	LOS	Delay
2	Telegraph Avenue/52 nd Street/Claremont Avenue	Signal	AM PM	F E	>120 72.9	F C	>120 31.6	F N/A	>120 N/A
3	Telegraph Avenue/51 st Street	Signal	AM PM	F F	>120 113.7	F F	>120 109.2	F N/A	>120 N/A
6	Telegraph Avenue/45 th Street	Signal	AM PM	B C	17.2 30.7	B C	17.2 30.7	N/A D	N/A 54.8
13	Telegraph Avenue/40 th Street	Signal	AM PM	F F	82.8 0.5	D D	54.5 53.5	F F	>120 >120
18	Martin Luther King Jr. Way/ West MacArthur Boulevard	Signal	AM PM	B C	14.0 25.0	B C	13.5 20.8	N/A D	N/A 38.0
20	Telegraph Avenue/ West MacArthur Boulevard	Signal	AM PM	E F	63.9 102.3	D E	53.8 68.5	N/A F	N/A 113.7
24	Telegraph Avenue/27 th Street	Signal	AM PM	D D	48.4 44.0	D D	48.4 44.0	N/A D	N/A 48.8

Notes: N/A = Intersection was not analyzed in the BRT EIR during the AM peak hour.
Bold indicates significant impacts.
Source: Fehr & Peers, 2007.

The MacArthur Transit Village EIR identifies project impacts at four of the seven study intersections and proposes improvements to mitigate project impacts. Project Impacts at three of the four intersections can be mitigated to a less than significant level. However, the MacArthur Transit Village project impact at the Telegraph Avenue/51st Street intersection would be significant and unavoidable.

The BRT EIR identified the following impacts and mitigation measures in the study area:

- #13 Telegraph Avenue/40th Street – Modify traffic signal to provide protected/permitted left-turns in the east/west approaches and provide either a second northbound and eastbound through lane or provide an exclusive right-turn lane in the southbound direction.
- #20 Telegraph Avenue/MacArthur Boulevard – Either provide a second left-turn lane on northbound Telegraph Avenue or provide a second through lane on northbound Telegraph Avenue, and changes the lane configuration of eastbound

and westbound MacArthur Boulevard to two through lanes, one left-turn lane, and one right-turn lane. This second strategy includes the implementation of protected-permitted phasing for left turn lanes on MacArthur Boulevard

Table 2 summarizes intersection LOS at the four intersections that would operate at LOS E or LOS F under Cumulative Year 2030 Baseline Plus Project Plus BRT conditions with implementation of the mitigation measures identified in the BRT EIR. Although these improvements would improve intersection operations at the Telegraph Avenue/40th Street and Telegraph Avenue/MacArthur Boulevard intersections, both intersections would continue to operate at deficient LOS E or LOS F under Cumulative Year 2030 Baseline Plus Project Plus BRT conditions.

Table 2 Cumulative Year 2030 Mitigated Intersection Level of Service Summary							
No.	Intersection	Traffic Control	Time Period	Cumulative Year 2030 Baseline Plus Project Plus BRT		Cumulative Year 2030 Baseline Plus Project Plus BRT (Mitigated)	
				LOS	Delay	LOS	Delay
2	Telegraph Avenue/52 nd Street/Claremont Avenue	Signal	AM PM	F N/A	>120 N/A	F N/A	>120 N/A
3	Telegraph Avenue/51 st Street	Signal	AM PM	F N/A	>120 N/A	F N/A	>120 N/A
13	Telegraph Avenue/40 th Street	Signal	AM PM	F F	>120 >120	F F	>120 82.1
20	Telegraph Avenue/ West MacArthur Boulevard	Signal	AM PM	N/A F	N/A 113.7	N/A E	N/A 73.7
Notes: N/A = Intersection was not analyzed in the BRT EIR during the AM or PM peak hour. Bold indicates significant impacts. Source: Fehr & Peers, 2007.							

These four intersections on Telegraph Avenue would continue to operate at deficient levels after implementation of feasible improvements identified in both BRT EIR and MacArthur Transit Village EIR under the Cumulative Year 2030 Baseline Plus Project Plus BRT conditions. Thus, the additional impacts of the BRT project on these intersections would be significant and unavoidable.

**APPENDIX K:
BART RIDERSHIP ESTIMATES**



APPENDIX K BART RIDERSHIP ESTIMATES

This section presents estimates of BART ridership changes due to the proposed MacArthur BART Transit Village project.

BACKGROUND

In order to develop the proposed Transit Village land uses, the development will replace the existing 618 surface parking spaces, dedicated for BART patron use, with 300 structured parking spaces. A residential parking permit (RPP) program is also planned for the neighborhoods within ¼ mile buffer of the station. The RPP would restrict parking in the neighborhood and would affect an estimated 216 BART patrons currently parked in the surrounding neighborhoods. The estimate of BART patrons parking in the neighborhood is based on license plate survey data collected in May 2006.

While the loss of BART patron parking spaces will result in a decrease in BART ridership and access mode shifts, the new land uses will result in an increase in ridership.

RIDERSHIP ESTIMATION TECHNIQUES

In order to quantify the change in BART ridership, three methodologies were considered:

The **ITE methodology** uses project-specific, land use-based ITE trip generation rates and transit reduction information collected at similar Bay Area transit-oriented developments. Review of the project land use program, Census data, Bay Area Transportation Survey data, field-collected transit-oriented development trip generation surveys and other transit-oriented development trip generation studies were conducted to develop trip generation rates for the transit village. These rates included an estimation of transit trips, which represent 19% of the total trips. See *MacArthur Transit Village Trip Generation* (Fehr & Peers, 2007) for more detail.

The **Willson methodology** uses BART's project-specific replacement parking for joint development methodology developed by Richard Willson, PhD (UCLA) and BART staff. Willson and BART developed this estimation technique to specifically address ridership loss at a station due to the removal of parking by accounting for the project land use program, the number of existing and proposed parking spaces, and information on non-personal vehicle-based station access modes. See *Replacement Parking for Joint Development: An Access Policy Methodology* (BART, 2005) for more detail.

The **Direct Ridership Model methodology** uses BART's station-area direct ridership models (DRM) developed by Fehr & Peers, ARUP, Nelson/Nygaard, Strategic Economics, and BART staff. The DRM are empirical-based, regression models that account for station characteristics including: surrounding population, surrounding employment, feeder transit service, parking levels, and access information by mode (walk, bicycle, transit, drive alone, carpool, and drop-off). See *Access BART* (BART, 2006) for more detail.

After reviewing the data inputs and assumptions of the three methodologies, the Willson methodology was selected for use by the City of Oakland and BART staff because it was developed by BART specifically for replacement parking and joint development applications. The total BART ridership was estimated by separating the ridership increase due to the transit village from the ridership decrease due to the on-site (and off-site) BART patron parking reduction. The following sections present the transit village and parking reduction BART ridership estimates.

TRANSIT VILLAGE BART RIDERSHIP ESTIMATES

As shown in Table 1, the estimated change in BART ridership due to the transit village will result in an increase of 855 daily, 115 AM peak hour, and 137 PM peak hour BART trips.

TABLE 1 BART RIDERSHIP CHANGES DUE TO TRANSIT VILLAGE								
Type of Development	Amount	Total Trips	Trip Split	Disaggregated Trips	Percent BART Capture	Daily Trips	AM Peak Hour Trips ⁶	PM Peak Hour Trips ⁶
Residential (Dwelling Units)	675	3,254 ¹						
Work Trips			25%	814	55.5% ⁴	452	66	80
Non-Work Trips			75%	2,441	11.7% ⁴	286	42	50
Retail (ksf)	44	1,950 ²	100%	1,950	5.00% ⁵	98	6	6
Childcare (ksf)	5	396 ³	100%	396	5.00% ⁵	20	1	1
Total BART Ridership Increase						855	115	137
Notes:								
1 - Residential trip generation from ITE 7th Edition equation for Residential Condominium/Townhouse (Land Use 230). Daily Equation: $\ln(T) = 0.85 \ln(X) + 2.55$								
2 - Retail trip generation from ITE 7th Edition equation for Specialty Retail (Land Use 814). Daily Rate: $(T) = 44.32 (X)$								
3 - Child care trip generation from ITE 7th Edition equation for Child Care (Land Use 565). Daily Rate: $(T) = 79.26 (X)$								
4 - Residential work and non-work BART trip shares based on average of rail shares for developments in Pleasant Hill and S. Alameda County are 40.5% and 8.55 percent respectively (Tables 5-8 on page 46 and Table 5-11 on page 51, CA TOD Report). These developments are suburban with an average of parking supply of 1.3 spaces per dwelling unit and located between 0.1 and 0.5 miles away from a BART Station. The proposed MacArthur Transit Village is in a more urban area, provides only one parking space per dwelling unit, and is immediately adjacent to a BART station. Based on data presented in Table 5-22 of the CA TOD report, the BART trip share capture is increased to account for the amount of parking provided at the site.								
5 - Retail rail share based on rail shares for El Cerrito Plaza, Table 7-7, page 109 CA TOD Report.								
6 - AM and PM peak hour transit trips based on AM/daily (Res = 14.6%, Non-Res = 6%) and PM/daily Res = 17.6%, Non-Res = 6%) ratios from EIR transit trip generation estimates.								
Source: Fehr & Peers, 2007.								

CHANGES IN PARKING SUPPLY BART RIDERSHIP ESTIMATES

As shown in Table 2, the estimated change in BART ridership due to the change in parking supply on-site will result in a decrease of 524 daily, 58 AM peak hour, and 63 PM peak hour BART trips. This analysis is conservative as it assumes that the BART riders who currently park at the BART Station parking lot would not shift to parking in the surrounding neighborhoods and those riders would be lost at the MacArthur Station.

TABLE 2 BART RIDERSHIP CHANGES DUE TO BART ON-SITE PARKING REDUCTION			
Analysis Step	Daily	AM Peak Hour	PM Peak Hour
Number of Spaces Reduced	318		
Space Turnover (cars parked per day)	1		
Number of people per car	1.1		
Number of daily BART trips per person	2		
Number of auto access boardings and alightings reduced	700		
Percent that find another access mode and continue to use BART	25% ¹		
BART ridership retained, change to another access mode	175		
Total BART Ridership Decrease	525	58²	63²
Notes:			
1 - Analysis assumes that 25 percent of riders switch to another BART access mode when their space is removed, and are therefore retained as BART riders. This assumption is based on BART direct ridership model data presented in the <i>Access BART</i> (BART, 2006) report for the MacArthur BART station.			
2 - AM and PM peak hour transit trips based on January 207 boarding and alighting data at the MacArthur BART Station provided by BART (AM = 11% of daily and PM = 12% of daily).			
Source: Fehr & Peers, 2007.			

As shown in Table 3, the estimated change in BART ridership due to the change in parking supply on-site and implementation of the RPP will result in a decrease of 844 daily, 270 AM peak hour, and 84 PM peak hour BART trips.

SUMMARY OF BART RIDERSHIP ESTIMATES

As shown in Table 4, development of the Transit Village and the accompanying change in parking supply on-site will result in an increase of 331 daily, 57 AM peak hour, and 74 PM peak hour BART trips. Development of the Transit Village, the accompanying change in parking supply on-site, and the implementation of the RPP will result in an increase of 11 daily, 22 AM peak hour, and 36 PM peak hour BART trips.

Given the scale of existing BART ridership at the MacArthur BART station, development of the Transit Village will result in a small increase in daily, AM peak hour, and PM peak hour BART ridership levels. BART service from the MacArthur station is currently constrained by the capacity

of arriving trains, which are typically full, during the AM and PM peak hours. The estimated additional amount of peak hour trips would not be noticeable as it would be distributed throughout the peak hour.

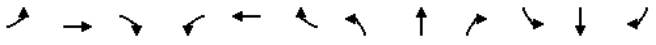
TABLE 3 BART RIDERSHIP CHANGES DUE TO BART ON-SITE AND RPP PARKING REDUCTION			
Analysis Step	Daily	AM Peak Hour	PM Peak Hour
Number of Spaces Reduced	512		
Space Turnover (cars parked per day)	1		
Number of people per car	1.1		
Number of daily BART trips per person	2		
Number of auto access boardings and alightings reduced	1126		
Percent that find another access mode and continue to use BART	25% ¹		
BART boardings retained, change to another access mode	282		
Total BART Ridership Decrease	844	93²	101³
Notes:			
1 - Analysis assumes that 25 percent of riders switch to another BART access mode when their space is removed, and are therefore retained as BART riders. This assumption is based on BART direct ridership model data presented in the <i>Access BART</i> (BART, 2006) report for the MacArthur BART station.			
2 - AM and PM peak hour transit trips based on January 207 boarding and alighting data at the MacArthur BART Station provided by BART (AM = 11% of daily and PM = 12% of daily).			
Source: Fehr & Peers, 2007.			

TABLE 4 SUMMARY OF BART RIDERSHIP CHANGES			
Change Due To	Daily	AM Peak Hour	PM Peak Hour
Transit Village	855	115	137
On-Site Parking Reduction	-525	-58	-63
Total	331	57	74
Transit Village	855	115	137
On-Site and RPP Parking Reduction	-844	-93	-101
Total	11	22	36
Source: Fehr & Peers, 2007.			

**APPENDIX L:
EXISTING PLUS COMMERCIAL ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.


Existing+Commercial AM
1/21/2008



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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4917		1770	4965		2006	2048		1983	1929	
Flt Permitted	0.95	1.00		0.95	1.00		0.10	1.00		0.47	1.00	
Satd. Flow (perm)	1770	4917		1770	4965		219	2048		977	1929	
Volume (vph)	288	909	182	65	1219	165	206	267	50	146	284	246
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)	303	957	192	68	1283	174	217	281	53	154	299	259
RTOR Reduction (vph)	0	21	0	0	14	0	0	6	0	0	27	0
Lane Group Flow (vph)	303	1128	0	68	1443	0	217	328	0	154	531	0
Confl. Peds. (#/hr)			10	10		10	10		10	10		10
Turn Type	Prot			Prot		pm+pt			Perm			
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	17.0	55.9		8.6	47.5		45.0	45.0		36.0	36.0	
Effective Green, g (s)	17.0	55.9		8.6	47.5		45.5	45.5		36.5	36.5	
Actuated g/C Ratio	0.14	0.47		0.07	0.40		0.38	0.38		0.30	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	2291		127	1965		187	777		297	587	
v/s Ratio Prot	c0.17	0.23		0.04	c0.29		c0.07	0.16		c0.28		
v/s Ratio Perm							0.37			0.16		
v/c Ratio	1.21	0.49		0.54	0.73		1.16	0.42		0.52	0.90	
Uniform Delay, d1	51.5	22.2		53.8	30.9		33.5	27.5		34.5	40.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	124.5	0.8		4.3	2.5		115.7	0.4		1.5	17.4	
Delay (s)	176.0	23.0		58.1	33.4		149.2	27.9		36.0	57.4	
Level of Service	F	C		E	C		F	C		D	E	
Approach Delay (s)		54.9			34.5			75.7			52.8	
Approach LOS		D			C			E			D	
Intersection Summary												
HCM Average Control Delay	49.9		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.88											
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				12.0			
Intersection Capacity Utilization	98.5%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

Existing+Commercial AM
1/21/2008



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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Flpb, ped/bikes		1.00		1.00	0.99			0.99		1.00	0.96	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.94		1.00	0.92			0.97		1.00	0.95	
Flt Protected		0.97		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1696		1681	1607			3406		1770	3207	
Flt Permitted		0.80		0.75	1.00			0.94		0.95	1.00	
Satd. Flow (perm)		1402		1321	1607			3214		1770	3207	
Volume (vph)	8	0	7	118	95	119	10	981	229	72	675	358
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	9	0	8	127	102	128	11	1055	246	77	726	385
RTOR Reduction (vph)	0	8	0	0	61	0	0	15	0	0	47	0
Lane Group Flow (vph)	0	9	0	127	169	0	0	1297	0	77	1064	0
Confl. Peds. (#/hr)	4					4	44		12	12		44
Turn Type	Perm			Perm		Perm			Prot			
Protected Phases		7			8			2		1	6	
Permitted Phases	7						2					
Actuated Green, G (s)		3.3		13.1	13.1			48.6		7.0	60.1	
Effective Green, g (s)		3.8		13.6	13.6			49.1		7.5	60.6	
Actuated g/C Ratio		0.04		0.15	0.15			0.55		0.08	0.67	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		59		200	243			1753		148	2159	
v/s Ratio Prot										0.04	c0.33	
v/s Ratio Perm		c0.01		0.10	0.11			c0.40				
v/c Ratio		0.16		0.64	0.69			0.74		0.52	0.49	
Uniform Delay, d1		41.6		35.9	36.2			15.6		39.5	7.2	
Progression Factor		1.00		1.00	1.00			1.04		1.00	1.00	
Incremental Delay, d2		0.5		4.8	6.8			1.5		1.5	0.8	
Delay (s)		42.0		40.6	43.0			17.7		41.0	8.0	
Level of Service		D		D	D			B		D	A	
Approach Delay (s)		42.0			42.2			17.7			10.1	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM Average Control Delay	17.8		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	90.0				Sum of lost time (s)				16.0			
Intersection Capacity Utilization	77.9%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

Existing+Commercial AM
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3430		1770	3398		1770	3440		1770	3358	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3430		1770	3398		1770	3440		1770	3358	
Volume (vph)	450	533	88	101	677	209	107	588	99	140	526	143
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	469	555	92	105	705	218	111	612	103	146	548	149
RTOR Reduction (vph)	0	14	0	0	32	0	0	15	0	0	26	0
Lane Group Flow (vph)	469	633	0	105	891	0	111	700	0	146	671	0
Confl. Peds. (#/hr)	6		24	24		6	36		28	28		36
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	13.0	30.6		7.9	25.5		8.0	24.4		10.1	26.5	
Effective Green, g (s)	12.5	31.6		7.4	26.5		7.5	25.4		9.6	27.5	
Actuated g/C Ratio	0.14	0.35		0.08	0.29		0.08	0.28		0.11	0.31	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	477	1204		146	1001		148	971		189	1026	
v/s Ratio Prot	c0.14	0.18		0.06	c0.26		0.06	c0.20		c0.08	0.20	
v/s Ratio Perm												
v/c Ratio	0.98	0.53		0.72	0.89		0.75	0.72		0.77	0.65	
Uniform Delay, d1	38.6	23.2		40.3	30.4		40.3	29.1		39.1	27.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.11	0.82	
Incremental Delay, d2	36.5	0.2		13.2	9.5		17.1	4.6		14.4	2.8	
Delay (s)	75.2	23.4		53.4	39.9		57.4	33.7		58.0	25.2	
Level of Service	E	C		D	D		E	C		E	C	
Approach Delay (s)		45.2			41.3			36.9			30.9	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM Average Control Delay		39.2										D
HCM Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		90.0						16.0				
Intersection Capacity Utilization		79.2%										D
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

Existing+Commercial AM
1/21/2008

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)		4.0								4.0	4.0	
Lane Util. Factor		1.00								0.95	0.97	0.95
Frt		0.86								0.93	1.00	0.97
Flt Protected		1.00								1.00	0.95	1.00
Satd. Flow (prot)		1611								3287	3433	3449
Flt Permitted		1.00								0.95	0.95	1.00
Satd. Flow (perm)		1611								3117	3433	3449
Volume (vph)	0	0	7	0	0	0	0	7	321	293	1585	274
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)	0	0	8	0	0	0	0	8	349	318	1723	298
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	24	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	651	0	1723	359
Turn Type										Prot		
Protected Phases										2	1	6
Permitted Phases												
Actuated Green, G (s)		0.0								8.0	29.0	45.0
Effective Green, g (s)		0.0								8.0	29.0	45.0
Actuated g/C Ratio		0.00								0.18	0.64	1.00
Clearance Time (s)										4.0	4.0	2.0
Lane Grp Cap (vph)		0								554	2212	3449
v/s Ratio Prot											c0.50	0.10
v/s Ratio Perm										c0.21		
v/c Ratio		0.00								10.97dr	0.78	0.10
Uniform Delay, d1		22.5								18.5	5.7	0.0
Progression Factor		1.00								0.76	1.00	1.00
Incremental Delay, d2		0.0								95.8	2.8	0.1
Delay (s)		22.5								109.8	8.5	0.1
Level of Service		C								F	A	A
Approach Delay (s)		22.5			0.0					109.8		7.0
Approach LOS		C			A					F		A
Intersection Summary												
HCM Average Control Delay		32.2										C
HCM Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		45.0								Sum of lost time (s)	8.0	
Intersection Capacity Utilization		77.0%										D
Analysis Period (min)		15										
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

Existing+Commercial AM
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.97			0.96			0.98			0.99		
Flpb, ped/bikes	0.97			0.97			1.00			1.00		
Frt	0.98			0.94			0.98			0.99		
Flt Protected	0.98			0.98			1.00			1.00		
Satd. Flow (prot)	1668			1596			3391			3459		
Flt Permitted	0.80			0.88			0.92			0.88		
Satd. Flow (perm)	1363			1418			3141			3053		
Volume (vph)	69	50	27	51	44	72	24	463	80	41	428	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	77	56	30	57	49	80	27	514	89	46	476	31
RTOR Reduction (vph)	0	18	0	0	53	0	0	29	0	0	10	0
Lane Group Flow (vph)	0	145	0	0	133	0	0	601	0	0	543	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.0			15.0			22.0			22.0		
Effective Green, g (s)	15.0			15.0			22.0			22.0		
Actuated g/C Ratio	0.33			0.33			0.49			0.49		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Lane Grp Cap (vph)	454			473			1536			1493		
v/s Ratio Prot												
v/s Ratio Perm	c0.11			0.09			c0.19			0.18		
v/c Ratio	0.32			0.28			0.39			0.36		
Uniform Delay, d1	11.2			11.0			7.3			7.1		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	1.8			1.5			0.8			0.7		
Delay (s)	13.0			12.5			8.0			7.8		
Level of Service	B			B			A			A		
Approach Delay (s)	13.0			12.5			8.0			7.8		
Approach LOS	B			B			A			A		
Intersection Summary												
HCM Average Control Delay	9.0			HCM Level of Service		A						
HCM Volume to Capacity ratio	0.36											
Actuated Cycle Length (s)	45.0			Sum of lost time (s)		8.0						
Intersection Capacity Utilization	60.8%			ICU Level of Service		B						
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

Existing+Commercial AM
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.96			0.96			0.99			0.98		
Flpb, ped/bikes	0.97			0.98			1.00			1.00		
Frt	0.96			0.96			0.99			0.99		
Flt Protected	0.99			0.99			1.00			1.00		
Satd. Flow (prot)	1642			1657			3456			4892		
Flt Permitted	0.82			0.80			0.90			0.81		
Satd. Flow (perm)	1359			1335			3127			3994		
Volume (vph)	51	74	52	34	57	36	22	939	47	61	1023	83
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	82	58	38	63	40	24	1043	52	68	1137	92
RTOR Reduction (vph)	0	24	0	0	24	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	173	0	0	117	0	0	1117	0	0	1292	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			6		
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	13.1			13.1			62.9			62.9		
Effective Green, g (s)	13.6			13.6			63.4			63.4		
Actuated g/C Ratio	0.16			0.16			0.75			0.75		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	2.0			2.0			2.0			2.0		
Lane Grp Cap (vph)	217			214			2332			2979		
v/s Ratio Prot												
v/s Ratio Perm	c0.13			0.09			c0.36			0.32		
v/c Ratio	0.80			0.55			0.48			0.43		
Uniform Delay, d1	34.4			32.9			4.3			4.1		
Progression Factor	1.00			1.00			1.52			1.00		
Incremental Delay, d2	16.9			1.5			0.7			0.5		
Delay (s)	51.3			34.4			7.2			4.5		
Level of Service	D			C			A			A		
Approach Delay (s)	51.3			34.4			7.2			4.5		
Approach LOS	D			C			A			A		
Intersection Summary												
HCM Average Control Delay	10.5			HCM Level of Service		B						
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	85.0			Sum of lost time (s)		8.0						
Intersection Capacity Utilization	89.1%			ICU Level of Service		E						
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing+Commercial AM
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00	0.99	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1731	3478	1757	3471	1766	1805	1734	1841	1734	1841	1734	1841
Flt Permitted	0.32	1.00	0.45	1.00	0.62	1.00	0.62	1.00	0.62	1.00	0.62	1.00
Satd. Flow (perm)	578	3478	840	3471	1145	1805	1140	1841	1140	1841	1140	1841
Volume (vph)	19	312	35	28	451	43	82	160	32	91	187	15
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	21	343	38	31	496	47	90	176	35	100	205	16
RTOR Reduction (vph)	0	11	0	0	9	0	0	9	0	0	3	0
Lane Group Flow (vph)	21	370	0	31	534	0	90	202	0	100	218	0
Confl. Peds. (#/hr)	30		12	12		30	6		54	54		6
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		49.5	49.5		49.5	49.5	
Effective Green, g (s)	23.0	23.0		23.0	23.0		49.0	49.0		49.0	49.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.61	0.61		0.61	0.61	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	166	1000		242	998		701	1106		698	1128	
v/s Ratio Prot		0.11			c0.15			0.11			c0.12	
v/s Ratio Perm	0.04			0.04			0.08			0.09		
v/c Ratio	0.13	0.37		0.13	0.54		0.13	0.18		0.14	0.19	
Uniform Delay, d1	21.1	22.7		21.1	24.0		6.5	6.8		6.6	6.8	
Progression Factor	1.00	1.00		0.91	0.98		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	1.1		1.1	2.0		0.4	0.4		0.4	0.4	
Delay (s)	22.6	23.8		20.3	25.5		6.9	7.1		7.0	7.2	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		23.7			25.2			7.1			7.1	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay		17.8										B
HCM Volume to Capacity ratio		0.30										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		78.3%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing+Commercial AM
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Frt	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	0.99
Satd. Flow (prot)	1759	3464	1738	3517	1738	3517	1738	3517	1738	3517	1738	3517
Flt Permitted	0.44	1.00	0.45	1.00	0.45	1.00	0.45	1.00	0.45	1.00	0.85	0.88
Satd. Flow (perm)	810	3464	826	3517	826	3517	826	3517	826	3517	2872	2985
Volume (vph)	15	397	48	29	450	17	61	101	50	26	66	25
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)	16	418	51	31	474	18	64	106	53	27	69	26
RTOR Reduction (vph)	0	12	0	0	4	0	0	31	0	0	15	0
Lane Group Flow (vph)	16	457	0	31	488	0	0	192	0	0	107	0
Confl. Peds. (#/hr)	18		54	54		18	4		18	18		4
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.0	38.0		38.0	38.0		32.0			32.0		32.0
Effective Green, g (s)	39.0	39.0		39.0	39.0		33.0			33.0		33.0
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.41			0.41		0.41
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0		5.0
Lane Grp Cap (vph)	395	1689		403	1715		1185			1231		1231
v/s Ratio Prot		0.13			c0.14							
v/s Ratio Perm	0.02			0.04			c0.07			0.04		
v/c Ratio	0.04	0.27		0.08	0.28		0.16			0.09		
Uniform Delay, d1	10.7	12.1		10.9	12.2		14.8			14.3		14.3
Progression Factor	0.92	1.04		1.38	1.44		0.38			1.00		1.00
Incremental Delay, d2	0.2	0.4		0.4	0.4		0.3			0.1		0.1
Delay (s)	10.0	13.0		15.4	17.9		5.9			14.5		14.5
Level of Service	B	B		B	B		A			B		B
Approach Delay (s)		12.9			17.8			5.9			14.5	
Approach LOS		B			B			A				B
Intersection Summary												
HCM Average Control Delay		13.8										B
HCM Volume to Capacity ratio		0.23										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		59.3%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

Existing+Commercial AM
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1759	3499		1731	3406			3375			3432	
Flt Permitted	0.42	1.00		0.46	1.00			0.91			0.79	
Satd. Flow (perm)	770	3499		839	3406			3071			2760	
Volume (vph)	31	420	25	89	409	107	30	226	77	79	217	29
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	32	438	26	93	426	111	31	235	80	82	226	30
RTOR Reduction (vph)	0	5	0	0	29	0	0	36	0	0	9	0
Lane Group Flow (vph)	32	459	0	93	508	0	0	310	0	0	329	0
Confl. Peds. (#/hr)	13		71	71		13	22		22	22		22
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.5	41.5		41.5	41.5			32.0			32.0	
Effective Green, g (s)	41.0	41.0		41.0	41.0			31.0			31.0	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.39			0.39	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	395	1793		430	1746			1190			1070	
v/s Ratio Prot		0.13			c0.15							
v/s Ratio Perm	0.04			0.11				0.10			c0.12	
v/c Ratio	0.08	0.26		0.22	0.29			0.26			0.31	
Uniform Delay, d1	9.9	10.9		10.7	11.2			16.7			17.0	
Progression Factor	1.31	1.42		1.00	1.00			0.70			1.00	
Incremental Delay, d2	0.4	0.3		1.2	0.4			0.5			0.7	
Delay (s)	13.4	15.8		11.8	11.6			12.1			17.8	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		15.7			11.6			12.1			17.8	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM Average Control Delay		14.0										B
HCM Volume to Capacity ratio		0.30										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		101.6%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

Existing+Commercial AM
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.90		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.96		1.00	1.00	0.96	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3051		1770	3539	1731	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3051		1770	3539	1731	
Volume (vph)	432	150	89	501	106	40
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	475	165	98	551	116	44
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	640	0	98	551	160	0
Confl. Peds. (#/hr)		146	266			
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	51.7		8.9	64.6	12.4	
Effective Green, g (s)	51.7		8.9	64.6	12.4	
Actuated g/C Ratio	0.61		0.10	0.76	0.15	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1856		185	2690	253	
v/s Ratio Prot	c0.21		c0.06	0.16	c0.09	
v/s Ratio Perm						
v/c Ratio	0.34		0.53	0.20	0.63	
Uniform Delay, d1	8.3		36.1	2.9	34.2	
Progression Factor	1.00		1.44	0.43	1.24	
Incremental Delay, d2	0.5		2.2	0.1	5.1	
Delay (s)	8.8		54.2	1.4	47.6	
Level of Service	A		D	A	D	
Approach Delay (s)	8.8			9.4	47.6	
Approach LOS	A			A	D	
Intersection Summary						
HCM Average Control Delay		13.3				B
HCM Volume to Capacity ratio		0.42				
Actuated Cycle Length (s)		85.0			Sum of lost time (s)	12.0
Intersection Capacity Utilization		41.8%			ICU Level of Service	A
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

Existing+Commercial AM
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.98		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.94	1.00		0.92	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1657	3360		1630	3375		1770	3449		1770	3377	
Flt Permitted	0.27	1.00		0.31	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	473	3360		530	3375		1770	3449		1770	3377	
Volume (vph)	68	342	62	61	373	64	95	447	45	78	591	124
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	76	380	69	68	414	71	106	497	50	87	657	138
RTOR Reduction (vph)	0	20	0	0	19	0	0	6	0	0	15	0
Lane Grp Flow (vph)	76	429	0	68	466	0	106	541	0	87	780	0
Confl. Peds. (#/hr)	72		137	137		72			58	58		92
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	16.4	16.4		16.4	16.4		8.2	47.7		7.4	46.9	
Effective Green, g (s)	16.9	16.9		16.9	16.9		8.7	48.2		7.9	47.4	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.10	0.57		0.09	0.56	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	94	668		105	671		181	1956		165	1883	
v/s Ratio Prot		0.13			0.14		c0.06	0.16		0.05	c0.23	
v/s Ratio Perm	c0.16			0.13								
v/c Ratio	0.81	0.64		0.65	0.69		0.59	0.28		0.53	0.41	
Uniform Delay, d1	32.5	31.3		31.3	31.6		36.4	9.4		36.8	10.8	
Progression Factor	1.68	1.57		1.00	1.00		0.85	1.34		1.35	0.72	
Incremental Delay, d2	35.0	1.5		9.8	2.5		3.0	0.3		1.3	0.6	
Delay (s)	89.4	50.8		41.2	34.2		34.0	13.0		51.0	8.4	
Level of Service	F	D		D	C		C	B		D	A	
Approach Delay (s)		56.4			35.0			16.4			12.6	
Approach LOS		E			D			B			B	
Intersection Summary												
HCM Average Control Delay		27.1										
HCM Volume to Capacity ratio		0.53										
Actuated Cycle Length (s)		85.0						12.0				
Intersection Capacity Utilization		60.7%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

Existing+Commercial AM
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	11	37	635	9	15	681
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	41	706	10	17	757
Pedestrians	34		33			34
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	3		3			3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.96	0.96			0.96	
vC, conflicting volume	1189	426			750	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1038	366			702	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	93			98	
cM capacity (veh/h)	201	574			834	
Direction, Lane #						
Volume Total	53	470	245	17	378	378
Volume Left	12	0	0	17	0	0
Volume Right	41	0	10	0	0	0
cSH	402	1700	1700	834	1700	1700
Volume to Capacity	0.13	0.28	0.14	0.02	0.22	0.22
Queue Length 95th (ft)	11	0	0	2	0	0
Control Delay (s)	15.3	0.0	0.0	9.4	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	15.3	0.0		0.2		
Approach LOS	C					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			36.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

Existing+Commercial AM
1/21/2008

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)	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor	0.91		1.00	0.95	1.00		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00		1.00	1.00	1.00		0.99		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.99	1.00	1.00		1.00		0.97	1.00	1.00	
Frt	0.99		1.00	0.97	0.98		1.00		0.99	0.99	0.99	
Flt Protected	1.00		0.95	1.00	0.99		0.95		1.00	1.00	1.00	
Satd. Flow (prot)	4989		1754	3419	1777		1725		1842	1842	1842	
Flt Permitted	0.88		0.52	1.00	0.88		0.43		1.00	1.00	1.00	
Satd. Flow (perm)	4417		964	3419	1584		787		1842	1842	1842	
Volume (vph)	34	283	25	51	274	67	58	180	49	64	188	12
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)	37	308	27	55	298	73	63	196	53	70	204	13
RTOR Reduction (vph)	0	10	0	0	25	0	0	8	0	0	3	0
Lane Group Flow (vph)	0	362	0	55	346	0	0	304	0	70	214	0
Confl. Peds. (#/hr)	24		18	18	24		24		48	48	24	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.0		51.0		51.0		24.0		24.0		24.0	
Effective Green, g (s)	52.0		52.0		52.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2702		590		2092		466		231		542	
v/s Ratio Prot	c0.10		c0.10		c0.10		c0.10		c0.10		c0.12	
v/s Ratio Perm	0.08		0.06		0.06		c0.19		0.09		0.09	
v/c Ratio	0.13		0.09		0.17		0.65		0.30		0.40	
Uniform Delay, d1	7.0		6.8		7.1		26.2		23.2		24.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.1		0.3		0.2		6.9		3.4		2.2	
Delay (s)	7.1		7.1		7.3		33.1		26.6		26.1	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	7.1		7.3		7.3		33.1		26.2		26.2	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	16.9		16.9		16.9		16.9		16.9		16.9	
HCM Volume to Capacity ratio	0.32		0.32		0.32		0.32		0.32		0.32	
Actuated Cycle Length (s)	85.0		85.0		85.0		85.0		85.0		85.0	
Intersection Capacity Utilization	92.5%		92.5%		92.5%		92.5%		92.5%		92.5%	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

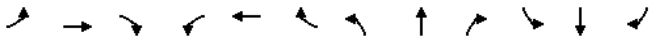
HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

Existing+Commercial AM
1/21/2008

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)	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor	0.91		1.00	0.91	1.00		1.00		1.00	1.00	1.00	
Frbp, ped/bikes	1.00		1.00	1.00	1.00		0.99		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		0.99	1.00	1.00		1.00		0.99	1.00	1.00	
Frt	1.00		0.99	1.00	0.99		1.00		0.96	0.99	0.99	
Flt Protected	1.00		0.95	1.00	0.95		1.00		0.95	1.00	1.00	
Satd. Flow (prot)	5051		1750	1780	4992		1750		1780	1747	1837	
Flt Permitted	0.90		0.64	1.00	0.88		0.64		1.00	0.44	1.00	
Satd. Flow (perm)	4566		964	3419	1584		787		1842	1842	1842	
Volume (vph)	25	387	7	34	337	33	30	175	57	23	116	10
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)	27	421	8	37	366	36	33	190	62	25	126	11
RTOR Reduction (vph)	0	2	0	0	13	0	0	15	0	0	4	0
Lane Group Flow (vph)	0	454	0	0	426	0	33	237	0	25	133	0
Confl. Peds. (#/hr)	18		18	18	12		12		18	18	12	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2939		2837		2837		302		456		471	
v/s Ratio Prot	c0.10		c0.10		c0.10		c0.13		c0.13		c0.07	
v/s Ratio Perm	0.08		0.06		0.06		c0.19		0.09		0.09	
v/c Ratio	0.15		0.15		0.15		0.11		0.52		0.28	
Uniform Delay, d1	5.6		5.6		5.6		22.8		25.5		23.9	
Progression Factor	1.00		1.00		1.00		1.00		1.00		0.97	
Incremental Delay, d2	0.1		0.1		0.1		0.7		4.2		1.5	
Delay (s)	5.7		5.7		5.7		23.5		29.7		24.5	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	5.7		5.7		5.7		29.0		29.0		24.4	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	12.6		12.6		12.6		12.6		12.6		12.6	
HCM Volume to Capacity ratio	0.26		0.26		0.26		0.26		0.26		0.26	
Actuated Cycle Length (s)	80.0		80.0		80.0		80.0		80.0		80.0	
Intersection Capacity Utilization	51.3%		51.3%		51.3%		51.3%		51.3%		51.3%	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

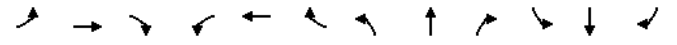
Existing+Commercial AM
1/21/2008



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)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.91			0.91			0.95			0.95	
Frbp, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.98			0.98	
Flt Protected		0.99			1.00			1.00			0.99	
Satd. Flow (prot)		5001			4862			3426			3422	
Flt Permitted		0.84			0.86			0.92			0.84	
Satd. Flow (perm)		4200			4213			3158			2901	
Volume (vph)	52	396	28	45	361	122	15	165	33	61	209	37
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)	57	430	30	49	392	133	16	179	36	66	227	40
RTOR Reduction (vph)	0	9	0	0	47	0	0	19	0	0	13	0
Lane Group Flow (vph)	0	508	0	0	527	0	0	212	0	0	320	0
Confl. Peds. (#/hr)	17		19	19		17	12		16	16		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		50.0			50.0			19.0			19.0	
Effective Green, g (s)		51.5			51.5			20.5			20.5	
Actuated g/C Ratio		0.64			0.64			0.26			0.26	
Clearance Time (s)		5.5			5.5			5.5			5.5	
Lane Grp Cap (vph)		2704			2712			809			743	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.13			0.07			c0.11	
v/c Ratio		0.19			0.19			0.26			0.43	
Uniform Delay, d1		5.8			5.8			23.7			24.9	
Progression Factor		0.79			1.00			1.00			0.53	
Incremental Delay, d2		0.2			0.2			0.8			1.8	
Delay (s)		4.7			6.0			24.5			14.9	
Level of Service		A			A			C			B	
Approach Delay (s)		4.7			6.0			24.5			14.9	
Approach LOS		A			A			C			B	
Intersection Summary												
HCM Average Control Delay		10.0										A
HCM Volume to Capacity ratio		0.26										
Actuated Cycle Length (s)		80.0						Sum of lost time (s)		8.0		
Intersection Capacity Utilization		82.6%						ICU Level of Service		E		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

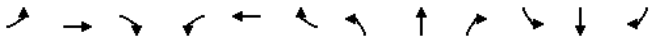
Existing+Commercial AM
1/21/2008



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)		4.0			4.0			4.0			4.0	
Lane Util. Factor		0.91			0.91			1.00			1.00	
Frbp, ped/bikes		1.00			1.00			1.00			0.95	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.97			0.93			0.93	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		5063			4583			1695			1617	
Flt Permitted		0.92			0.93			0.87			0.83	
Satd. Flow (perm)		4641			4267			1512			1372	
Volume (vph)	16	487	10	10	468	100	10	0	10	58	0	55
Peak-hour factor, PHF	0.90	0.90	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.90	0.92	0.90
Adj. Flow (vph)	18	541	11	11	520	111	11	0	11	64	0	61
RTOR Reduction (vph)	0	1	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	569	0	0	642	0	0	12	0	0	125	0
Confl. Peds. (#/hr)							98					98
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		6			
Actuated Green, G (s)		67.1			67.1			9.9			9.9	
Effective Green, g (s)		67.1			67.1			9.9			9.9	
Actuated g/C Ratio		0.79			0.79			0.12			0.12	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		3664			3368			176			160	
v/s Ratio Prot												
v/s Ratio Perm		0.12			c0.15			0.01			c0.09	
v/c Ratio		0.16			0.19			0.07			0.78	
Uniform Delay, d1		2.1			2.2			33.4			36.5	
Progression Factor		1.00			0.34			1.00			0.74	
Incremental Delay, d2		0.1			0.1			0.2			20.4	
Delay (s)		2.2			0.9			33.6			47.3	
Level of Service		A			A			C			D	
Approach Delay (s)		2.2			0.9			33.6			47.3	
Approach LOS		A			A			C			D	
Intersection Summary												
HCM Average Control Delay		6.2										A
HCM Volume to Capacity ratio		0.27										
Actuated Cycle Length (s)		85.0						Sum of lost time (s)		8.0		
Intersection Capacity Utilization		51.7%						ICU Level of Service		A		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.


Existing+Commercial AM
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			1.00		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.97			0.97			1.00			0.99		
Flt Protected	0.99			0.99			0.95			1.00		
Satd. Flow (prot)	4867			4813			1753			3477		
Flt Permitted	0.68			0.74			0.38			1.00		
Satd. Flow (perm)	3365			3583			703			3477		
Volume (vph)	119	337	94	79	382	140	60	383	39	99	472	132
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)	129	366	102	86	415	152	65	416	42	108	513	143
RTOR Reduction (vph)	0	53	0	0	108	0	0	4	0	0	15	0
Lane Group Flow (vph)	0	544	0	0	545	0	65	454	0	108	641	0
Confl. Peds. (#/hr)	40		9		40		25		31		31	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	19.8		19.8		54.7		54.7		54.7		54.7	
Effective Green, g (s)	21.3		21.3		55.7		55.7		55.7		55.7	
Actuated g/C Ratio	0.25		0.25		0.66		0.66		0.66		0.66	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	843		898		461		2278		581		2225	
v/s Ratio Prot					0.13		c0.19					
v/s Ratio Perm	c0.16		0.15		0.09		0.12		0.19		0.29	
v/c Ratio	0.65		0.61		0.14		0.20		0.19		0.29	
Uniform Delay, d1	28.5		28.2		5.6		5.8		5.8		6.2	
Progression Factor	0.84		1.00		1.20		1.13		0.61		0.74	
Incremental Delay, d2	1.3		0.8		0.6		0.2		0.7		0.3	
Delay (s)	25.3		29.0		7.3		6.7		4.2		4.9	
Level of Service	C		C		A		A		A		A	
Approach Delay (s)	25.3		29.0		6.8		4.8		4.8		4.8	
Approach LOS	C		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	16.2		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.39											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	70.4%		ICU Level of Service		C							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

Existing+Commercial AM
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.94			1.00		
Frt	1.00			0.98			1.00			0.85		
Flt Protected	1.00			1.00			0.97			1.00		
Satd. Flow (prot)	5042			4929			1685			1395		
Flt Permitted	0.89			0.91			0.84			1.00		
Satd. Flow (perm)	4492			4495			1472			1395		
Volume (vph)	25	468	9	24	574	75	17	7	13	47	1	41
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	514	10	26	631	82	19	8	14	52	1	45
RTOR Reduction (vph)	0	2	0	0	20	0	0	0	10	0	32	0
Lane Group Flow (vph)	0	549	0	0	719	0	0	27	4	0	66	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		2		6		6	
Actuated Green, G (s)	48.0		48.0		23.0		23.0		23.0		23.0	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lane Grp Cap (vph)	2723		2725		432		410		394		394	
v/s Ratio Prot					c0.16		0.02		0.00		c0.05	
v/s Ratio Perm	0.12		c0.16		0.02		0.00		c0.05		c0.05	
v/c Ratio	0.20		0.26		0.06		0.01		0.17		0.17	
Uniform Delay, d1	7.1		7.4		20.3		20.0		21.0		21.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.2		0.2		0.3		0.0		0.9		0.9	
Delay (s)	7.2		7.6		20.6		20.1		21.9		21.9	
Level of Service	A		A		C		C		C		C	
Approach Delay (s)	7.2		7.6		20.4		21.9		21.9		21.9	
Approach LOS	A		A		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	8.8		HCM Level of Service		A							
HCM Volume to Capacity ratio	0.23											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	81.7%		ICU Level of Service		D							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

Existing+Commercial AM
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.95	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4943	1770	4740	1770	4944	1770	4944	1770	4981	1770	4981
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4943	1770	4740	1770	4944	1770	4981	1770	4981	1770	4981
Volume (vph)	70	409	55	112	441	253	89	261	42	226	522	64
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	454	61	124	490	281	99	290	47	251	580	71
RTOR Reduction (vph)	0	18	0	0	108	0	0	25	0	0	17	0
Lane Group Flow (vph)	78	497	0	124	663	0	99	313	0	251	634	0
Confl. Peds. (#/hr)	66		23		38		26		26		26	
Turn Type	Prot		Prot		Prot		Prot		Prot		Prot	
Protected Phases	3	4	3	4	1	2	1	2	1	2	1	2
Permitted Phases												
Actuated Green, G (s)	10.5	26.5	10.5	26.5	9.0	26.0	9.0	26.0	9.0	26.0	9.0	26.0
Effective Green, g (s)	10.5	27.5	10.5	27.5	9.0	27.0	9.0	27.0	9.0	27.0	9.0	27.0
Actuated g/C Ratio	0.12	0.31	0.12	0.31	0.10	0.30	0.10	0.30	0.10	0.30	0.10	0.30
Clearance Time (s)	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Vehicle Extension (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
Lane Grp Cap (vph)	207	1510	207	1448	177	1483	177	1494	177	1494	177	1494
v/s Ratio Prot	0.04	0.10	c0.07	c0.14	0.06	0.06	c0.14	c0.13	c0.14	c0.13	c0.14	c0.13
v/s Ratio Perm	c0.05		0.05		0.07		0.04		0.04		0.16	
v/c Ratio	0.38	0.33	0.60	0.46	0.56	0.21	1.42	0.42	0.61	0.09	0.21	0.04
Uniform Delay, d1	36.7	24.1	37.8	25.2	38.6	23.5	40.5	25.3	37.8	25.2	38.6	23.5
Progression Factor	1.00	1.00	0.97	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.6	2.4	0.8	2.2	0.3	217.9	0.9	0.4	0.6	2.4	0.8
Delay (s)	37.1	24.7	39.2	51.4	40.8	23.9	258.4	26.2	37.1	24.7	39.2	51.4
Level of Service	D	C	D	D	D	C	F	C	D	C	D	D
Approach Delay (s)	26.3		49.7		27.7		90.8		26.3		49.7	
Approach LOS	C		D		C		F		C		D	
Intersection Summary												
HCM Average Control Delay	54.5		HCM Level of Service		D		D		54.5		HCM Level of Service	
HCM Volume to Capacity ratio	0.58		0.58		0.58		0.58		0.58		0.58	
Actuated Cycle Length (s)	90.0		Sum of lost time (s)		16.0		16.0		90.0		Sum of lost time (s)	
Intersection Capacity Utilization	72.9%		ICU Level of Service		C		C		72.9%		ICU Level of Service	
Analysis Period (min)	15		15		15		15		15		15	

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

Existing+Commercial AM
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		0.95		1.00		0.95	
Frpb, ped/bikes	0.93		0.95		1.00		0.99		1.00		0.98	
Flpb, ped/bikes	0.97		0.97		0.91		1.00		0.93		1.00	
Frt	0.95		0.94		1.00		0.99		1.00		0.99	
Flt Protected	0.98		0.99		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	1574		1584		1609		3488		1640		3435	
Flt Permitted	0.69		0.90		0.49		1.00		0.42		1.00	
Satd. Flow (perm)	1106		1442		831		3488		730		3435	
Volume (vph)	29	19	26	25	34	48	54	534	24	24	380	37
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)	32	21	28	27	37	52	59	580	26	26	413	40
RTOR Reduction (vph)	0	26	0	0	44	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	55	0	0	72	0	59	604	0	26	449	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		2		6	
Actuated Green, G (s)	7.4		7.4		70.6		70.6		70.6		70.6	
Effective Green, g (s)	6.9		6.9		70.1		70.1		70.1		70.1	
Actuated g/C Ratio	0.08		0.08		0.82		0.82		0.82		0.82	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	90		117		685		2877		602		2833	
v/s Ratio Prot	c0.05		0.05		0.07		0.04		0.04		0.13	
v/s Ratio Perm	c0.05		0.05		0.07		0.04		0.04		0.16	
v/c Ratio	0.61		0.61		0.09		0.21		0.04		0.16	
Uniform Delay, d1	37.8		37.8		1.4		1.6		1.4		1.5	
Progression Factor	1.00		1.00		1.00		1.00		0.67		0.62	
Incremental Delay, d2	8.4		6.6		0.2		0.2		0.1		0.1	
Delay (s)	46.2		44.3		1.7		1.7		1.0		1.1	
Level of Service	D		D		A		A		A		A	
Approach Delay (s)	46.2		44.3		1.7		1.7		1.0		1.1	
Approach LOS	D		D		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	7.9		HCM Level of Service		A		A		7.9		HCM Level of Service	
HCM Volume to Capacity ratio	0.25		0.25		0.25		0.25		0.25		0.25	
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0		8.0		85.0		Sum of lost time (s)	
Intersection Capacity Utilization	54.6%		ICU Level of Service		A		A		54.6%		ICU Level of Service	
Analysis Period (min)	15		15		15		15		15		15	

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

Existing+Commercial AM
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.94		1.00	0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.93	1.00		0.95	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3330		1770	3163		1646	3466		1678	3207	
Flt Permitted	0.95	1.00		0.95	1.00		0.41	1.00		0.49	1.00	
Satd. Flow (perm)	1770	3330		1770	3163		712	3466		866	3207	
Volume (vph)	255	350	97	50	270	118	58	335	30	46	335	141
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	283	389	108	56	300	131	64	372	33	51	372	157
RTOR Reduction (vph)	0	28	0	0	64	0	0	6	0	0	45	0
Lane Group Flow (vph)	283	469	0	56	367	0	64	399	0	51	484	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot		Prot		Perm		Perm		Perm		Perm	
Protected Phases	7	4		3	8			2			6	
Permitted Phases								2			6	
Actuated Green, G (s)	16.5	26.9		4.9	15.3		39.7	39.7		39.7	39.7	
Effective Green, g (s)	17.0	26.4		5.4	14.8		41.2	41.2		41.2	41.2	
Actuated g/C Ratio	0.20	0.31		0.06	0.17		0.48	0.48		0.48	0.48	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	354	1034		112	551		345	1680		420	1554	
v/s Ratio Prot	c0.16	0.14		0.03	c0.12			0.12			c0.15	
v/s Ratio Perm							0.09			0.06		
v/c Ratio	0.80	0.45		0.50	0.67		0.19	0.24		0.12	0.31	
Uniform Delay, d1	32.4	23.5		38.5	32.8		12.4	12.8		12.0	13.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.2	0.1		1.3	2.4		1.2	0.3		0.6	0.5	
Delay (s)	43.6	23.6		39.8	35.1		13.6	13.1		12.6	13.8	
Level of Service	D	C		D	D		B	B		B	B	
Approach Delay (s)	30.9			35.7			13.2			13.7		
Approach LOS	C			D			B			B		
Intersection Summary												
HCM Average Control Delay	24.0		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	72.3%		ICU Level of Service				C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

Existing+Commercial AM
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↕	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.98	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1669		1770	3539	3452	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1669		1770	3539	3452	
Volume (vph)	63	119	114	558	597	117
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	129	124	607	649	127
RTOR Reduction (vph)	108	0	0	0	11	0
Lane Group Flow (vph)	89	0	124	607	765	0
Turn Type	Prot					
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	9.5		9.7	67.5	53.8	
Effective Green, g (s)	9.5		9.7	67.5	53.8	
Actuated g/C Ratio	0.11		0.11	0.79	0.63	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	187		202	2810	2185	
v/s Ratio Prot	c0.05		c0.07	0.17	c0.22	
v/s Ratio Perm						
v/c Ratio	0.47		0.61	0.22	0.35	
Uniform Delay, d1	35.4		35.9	2.2	7.4	
Progression Factor	1.00		1.12	0.59	0.82	
Incremental Delay, d2	1.9		5.2	0.2	0.4	
Delay (s)	37.3		45.4	1.5	6.5	
Level of Service	D		D	A	A	
Approach Delay (s)	37.3			8.9	6.5	
Approach LOS	D			A	A	
Intersection Summary						
HCM Average Control Delay	11.1		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.40					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	47.4%		ICU Level of Service		A	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

Existing PM + Commercial
1/21/2008

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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.98	
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4934		1770	4971		2005	2004		1960	1918	
Flt Permitted	0.95	1.00		0.95	1.00		0.13	1.00		0.56	1.00	
Satd. Flow (perm)	1770	4934		1770	4971		279	2004		1156	1918	
Volume (vph)	322	1228	173	80	958	138	165	237	79	133	264	259
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)	339	1293	182	84	1008	145	174	249	83	140	278	273
RTOR Reduction (vph)	0	18	0	0	19	0	0	14	0	0	40	0
Lane Group Flow (vph)	339	1457	0	84	1134	0	174	318	0	140	511	0
Confl. Peds. (#/hr)			32	32		4	12		24	24		12
Parking (#/hr)												0
Turn Type	Prot			Prot		pm+pt			Perm			
Protected Phases	7	4		3	8	5	2				6	
Permitted Phases						2			6			
Actuated Green, G (s)	18.0	38.3		5.9	26.2	38.8	38.8		27.8	27.8		
Effective Green, g (s)	18.0	38.3		5.9	26.2	39.3	39.3		28.3	28.3		
Actuated g/C Ratio	0.19	0.41		0.06	0.28	0.42	0.42		0.30	0.30		
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	2.5		2.5	2.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	341	2021		112	1393	283	842		350	581		
v/s Ratio Prot	c0.19	0.30		0.05	c0.23	c0.06	0.16			c0.27		
v/s Ratio Perm						0.20			0.12			
v/c Ratio	0.99	0.72		0.75	0.81	0.61	0.38		0.40	0.88		
Uniform Delay, d1	37.7	23.1		43.1	31.4	21.8	18.7		25.9	31.0		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	46.9	2.3		24.2	5.3	3.9	0.3		0.8	14.2		
Delay (s)	84.6	25.4		67.3	36.7	25.7	19.0		26.6	45.2		
Level of Service	F	C		E	D	C	B		C	D		
Approach Delay (s)		36.4			38.8		21.3			41.5		
Approach LOS		D			D		C			D		
Intersection Summary												
HCM Average Control Delay		36.1								D		
HCM Volume to Capacity ratio		0.85										
Actuated Cycle Length (s)		93.5						12.0				
Intersection Capacity Utilization		92.3%								F		
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

Existing PM + Commercial
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.92			0.94		1.00	0.90	
Fipb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.92		1.00	0.92			0.97		1.00	0.95	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1688		1681	1494			3199		1770	3036	
Flt Permitted		0.48		0.73	1.00			0.94		0.95	1.00	
Satd. Flow (perm)		823		1296	1494			3012		1770	3036	
Volume (vph)	12	3	21	104	102	118	10	1006	288	98	800	398
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)	13	3	22	109	107	124	11	1059	303	103	842	419
RTOR Reduction (vph)	0	21	0	0	45	0	0	20	0	0	47	0
Lane Group Flow (vph)	0	17	0	109	186	0	0	1353	0	103	1214	0
Confl. Peds. (#/hr)						100	100		100			100
Turn Type		Perm		Perm		Perm		Prot				
Protected Phases		7		8		8		2		1	6	
Permitted Phases		7		8		2						
Actuated Green, G (s)		5.1		15.8	15.8			52.4		8.7	65.6	
Effective Green, g (s)		5.6		16.3	16.3			52.9		9.2	66.1	
Actuated g/C Ratio		0.06		0.16	0.16			0.53		0.09	0.66	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		46		211	244			1593		163	2007	
v/s Ratio Prot										0.06	c0.40	
v/s Ratio Perm		c0.02		0.08	0.12			c0.45				
v/c Ratio		0.37		0.52	0.76			0.85		0.63	0.60	
Uniform Delay, d1		45.5		38.2	40.0			20.1		43.8	9.6	
Progression Factor		1.00		1.00	1.00			0.79		1.00	1.00	
Incremental Delay, d2		1.9		0.9	11.9			3.2		5.8	1.4	
Delay (s)		47.4		39.1	51.9			19.0		49.5	10.9	
Level of Service		D		D	D			B		D	B	
Approach Delay (s)		47.4			47.8			19.0			13.8	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM Average Control Delay		20.2						HCM Level of Service		C		
HCM Volume to Capacity ratio		0.78										
Actuated Cycle Length (s)		100.0						Sum of lost time (s)		16.0		
Intersection Capacity Utilization		102.8%						ICU Level of Service		G		
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

Existing PM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.95		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3429		1770	3221		1770	3360		1770	3434	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3429		1770	3221		1770	3360		1770	3434	
Volume (vph)	508	822	71	93	468	212	69	606	127	203	676	56
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)	535	865	75	98	493	223	73	638	134	214	712	59
RTOR Reduction (vph)	0	6	0	0	52	0	0	18	0	0	6	0
Lane Group Flow (vph)	535	934	0	98	664	0	73	754	0	214	765	0
Confl. Peds. (#/hr)			100			100			100			100
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	16.0	30.5		8.0	22.5		5.0	32.5		12.0	39.5	
Effective Green, g (s)	15.5	31.5		7.5	23.5		4.5	33.5		11.5	40.5	
Actuated g/C Ratio	0.16	0.32		0.08	0.24		0.04	0.34		0.12	0.40	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	532	1080		133	757		80	1126		204	1391	
v/s Ratio Prot	c0.16	c0.27		0.06	0.21		0.04	c0.22		c0.12	0.22	
v/s Ratio Perm												
v/c Ratio	1.01	0.86		0.74	0.88		0.91	0.67		1.05	0.55	
Uniform Delay, d1	42.2	32.2		45.3	36.9		47.6	28.5		44.2	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.16	0.79	
Incremental Delay, d2	40.4	7.1		16.6	10.9		70.5	3.2		70.4	1.3	
Delay (s)	82.7	39.4		61.9	47.7		118.0	31.7		121.9	19.3	
Level of Service	F	D		E	D		F	C		F	B	
Approach Delay (s)		55.1			49.4			39.1			41.6	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM Average Control Delay		47.5										D
HCM Volume to Capacity ratio		0.82										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		82.5%										E
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

Existing PM + Commercial
1/21/2008

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)		4.0								4.0	4.0	
Lane Util. Factor		1.00								0.95	0.97	
Frt		0.86								0.93	1.00	
Flt Protected		1.00								1.00	0.95	
Satd. Flow (prot)		1611								3286	3433	3442
Flt Permitted		1.00								0.95	0.95	1.00
Satd. Flow (perm)		1611								3110	3433	3442
Volume (vph)	0	0	6	0	0	0	10	289	267	1430	287	64
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)	0	0	7	0	0	0	11	314	290	1554	312	70
RTOR Reduction (vph)	0	7	0	0	0	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	594	0	1554	382	0
Turn Type							Perm		Prot			
Protected Phases								2		1	6	
Permitted Phases												
Actuated Green, G (s)		0.0						13.0		29.0	50.0	
Effective Green, g (s)		0.0						13.0		29.0	50.0	
Actuated g/C Ratio		0.00						0.26		0.58	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						809		1991	3442	
v/s Ratio Prot										c0.45	0.11	
v/s Ratio Perm								c0.19				
v/c Ratio		0.00						0.73		0.78	0.11	
Uniform Delay, d1		25.0						16.9		8.1	0.0	
Progression Factor		1.00						0.75		1.00	1.00	
Incremental Delay, d2		0.0						5.6		3.1	0.1	
Delay (s)		25.0						18.2		11.2	0.1	
Level of Service		C						B		B	A	
Approach Delay (s)		25.0			0.0			18.2			9.0	
Approach LOS		C			A			B			A	
Intersection Summary												
HCM Average Control Delay		11.3										B
HCM Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		50.0								8.0		
Intersection Capacity Utilization		71.0%										C
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

Existing PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.95			0.97			0.99			0.99		
Flpb, ped/bikes	0.98			0.96			1.00			0.99		
Frt	0.96			0.96			0.98			0.99		
Flt Protected	0.98			0.99			1.00			0.99		
Satd. Flow (prot)	1643			1649			3406			3439		
Flt Permitted	0.88			0.91			0.94			0.85		
Satd. Flow (perm)	1471			1519			3197			2949		
Volume (vph)	26	27	21	48	72	50	20	434	66	43	263	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	30	23	53	80	56	22	482	73	48	292	22
RTOR Reduction (vph)	0	15	0	0	30	0	0	23	0	0	10	0
Lane Group Flow (vph)	0	67	0	0	159	0	0	554	0	0	353	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	17.0		17.0		17.0		25.0		25.0		25.0	
Effective Green, g (s)	17.0		17.0		17.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.34		0.34		0.34		0.50		0.50		0.50	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	500		516		516		1599		1475		1475	
v/s Ratio Prot												
v/s Ratio Perm	0.05		c0.10		c0.10		c0.17		0.12		0.12	
v/c Ratio	0.13		0.31		0.31		0.35		0.24		0.24	
Uniform Delay, d1	11.4		12.2		12.2		7.6		7.1		7.1	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.6		1.5		1.5		0.6		0.4		0.4	
Delay (s)	12.0		13.7		13.7		8.2		7.5		7.5	
Level of Service	B		B		B		A		A		A	
Approach Delay (s)	12.0		13.7		13.7		8.2		7.5		7.5	
Approach LOS	B		B		B		A		A		A	
Intersection Summary												
HCM Average Control Delay	9.1			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.33											
Actuated Cycle Length (s)	50.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	62.8%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

Existing PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.96			0.97			0.99			0.98		
Flpb, ped/bikes	0.97			0.98			1.00			1.00		
Frt	0.96			0.97			0.99			0.99		
Flt Protected	0.98			0.99			1.00			1.00		
Satd. Flow (prot)	1631			1679			3471			4925		
Flt Permitted	0.85			0.85			0.92			0.91		
Satd. Flow (perm)	1417			1446			3180			4483		
Volume (vph)	46	49	39	20	41	21	24	1061	42	18	914	67
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	49	52	41	21	44	22	26	1129	45	19	972	71
RTOR Reduction (vph)	0	28	0	0	19	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	114	0	0	68	0	0	1199	0	0	1058	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		4		2		6		6	
Actuated Green, G (s)	8.6		8.6		8.6		62.4		62.4		62.4	
Effective Green, g (s)	9.1		9.1		9.1		62.9		62.9		62.9	
Actuated g/C Ratio	0.11		0.11		0.11		0.79		0.79		0.79	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	161		164		164		2500		3525		3525	
v/s Ratio Prot												
v/s Ratio Perm	c0.08		0.05		0.05		c0.38		0.24		0.24	
v/c Ratio	0.71		0.41		0.41		0.48		0.30		0.30	
Uniform Delay, d1	34.2		33.0		33.0		2.9		2.4		2.4	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	10.9		0.6		0.6		0.7		0.2		0.2	
Delay (s)	45.1		33.6		33.6		3.6		2.6		2.6	
Level of Service	D		C		C		A		A		A	
Approach Delay (s)	45.1		33.6		33.6		3.6		2.6		2.6	
Approach LOS	D		C		C		A		A		A	
Intersection Summary												
HCM Average Control Delay	6.6			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	82.2%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	
Flpb, ped/bikes	0.96	1.00	0.98	1.00	0.96	1.00	0.97	1.00	0.97	1.00	0.97	1.00	
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1694	3486	1731	3401	1697	1822	1720	1830	1720	1830	1720	1830	
Flt Permitted	0.29	1.00	0.24	1.00	0.56	1.00	0.37	1.00	0.37	1.00	0.29	1.00	
Satd. Flow (perm)	511	3486	445	3401	992	1822	667	1830	667	1830	511	3486	
Volume (vph)	26	670	45	47	556	86	109	389	43	93	222	19	
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)	28	728	49	51	604	93	118	423	47	101	241	21	
RTOR Reduction (vph)	0	6	0	0	15	0	5	0	0	0	4	0	
Lane Group Flow (vph)	28	771	0	51	682	0	118	465	0	101	258	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Permitted Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Actuated Green, G (s)	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5	
Effective Green, g (s)	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
Clearance Time (s)	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Lane Grp Cap (vph)	204	1394	178	1360	496	911	334	915	334	915	204	1394	
v/s Ratio Prot	c0.22	0.20	c0.26	0.14	0.15	0.14	0.15	0.14	0.15	0.14	0.15	0.14	
v/s Ratio Perm	0.05	0.11	0.12	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
v/c Ratio	0.14	0.55	0.29	0.50	0.24	0.51	0.30	0.28	0.30	0.28	0.30	0.28	
Uniform Delay, d1	15.2	18.5	16.3	18.0	11.4	13.4	11.8	11.6	11.8	11.6	15.2	18.5	
Progression Factor	1.00	1.00	1.93	2.01	1.80	1.84	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	1.6	3.4	1.1	0.7	1.3	2.3	0.8	2.3	0.8	1.4	1.6	
Delay (s)	16.6	20.1	34.8	37.3	21.2	26.0	14.1	12.4	14.1	12.4	16.6	20.1	
Level of Service	B	C	C	D	C	C	B	B	B	B	B	B	
Approach Delay (s)	20.0	37.1	25.0	12.9	20.0	37.1	25.0	12.9	20.0	37.1	25.0	12.9	
Approach LOS	B	D	C	B	B	B	B	B	B	B	B	B	
Intersection Summary													
HCM Average Control Delay	25.3	HCM Level of Service					C						
HCM Volume to Capacity ratio	0.53												
Actuated Cycle Length (s)	80.0	Sum of lost time (s)					8.0						
Intersection Capacity Utilization	81.0%	ICU Level of Service					D						
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	
Flpb, ped/bikes	0.97	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.97	1.00	
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1712	3470	1730	3488	3345	3337	3345	3337	3345	3337	1712	3470	
Flt Permitted	0.24	1.00	0.16	1.00	0.84	0.91	0.24	1.00	0.24	1.00	0.24	1.00	
Satd. Flow (perm)	428	3470	291	3488	2860	3042	428	3470	428	3470	428	3470	
Volume (vph)	26	767	60	34	630	36	74	167	44	19	96	33	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	27	791	62	35	649	37	76	172	45	20	99	34	
RTOR Reduction (vph)	0	7	0	0	5	0	6	0	0	0	11	0	
Lane Group Flow (vph)	27	846	0	35	681	0	287	0	0	142	0	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Permitted Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Actuated Green, G (s)	24.0	24.0	24.0	24.0	46.0	46.0	24.0	24.0	46.0	46.0	24.0	24.0	
Effective Green, g (s)	25.0	25.0	25.0	25.0	47.0	47.0	25.0	25.0	47.0	47.0	25.0	25.0	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.59	0.59	0.31	0.31	0.59	0.59	0.31	0.31	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	134	1084	91	1090	1680	1787	134	1084	1680	1787	134	1084	
v/s Ratio Prot	c0.24	0.20	c0.24	0.20	0.10	0.05	0.06	0.12	0.10	0.05	0.06	0.12	
v/s Ratio Perm	0.06	0.12	0.12	0.10	0.10	0.05	0.06	0.12	0.10	0.05	0.06	0.12	
v/c Ratio	0.20	0.78	0.38	0.62	0.17	0.08	0.20	0.78	0.38	0.62	0.20	0.78	
Uniform Delay, d1	20.2	25.0	21.5	23.5	7.6	7.1	20.2	25.0	21.5	23.5	20.2	25.0	
Progression Factor	0.45	0.50	0.91	0.95	1.26	1.00	0.45	0.50	0.91	0.95	0.45	0.50	
Incremental Delay, d2	2.9	4.9	10.5	2.4	0.2	0.1	2.9	4.9	10.5	2.4	2.9	4.9	
Delay (s)	12.1	17.2	30.1	24.7	9.7	7.2	12.1	17.2	30.1	24.7	12.1	17.2	
Level of Service	B	B	C	C	A	A	B	B	C	C	B	B	
Approach Delay (s)	17.1	24.9	9.7	7.2	17.1	24.9	17.1	24.9	9.7	7.2	17.1	24.9	
Approach LOS	B	C	A	A	B	B	B	B	C	C	B	B	
Intersection Summary													
HCM Average Control Delay	18.1	HCM Level of Service					B						
HCM Volume to Capacity ratio	0.38												
Actuated Cycle Length (s)	80.0	Sum of lost time (s)					8.0						
Intersection Capacity Utilization	64.9%	ICU Level of Service					C						
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

Existing PM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1765	3482		1757	3424			3356			3433	
Flt Permitted	0.25	1.00		0.24	1.00			0.88			0.79	
Satd. Flow (perm)	472	3482		443	3424			2955			2726	
Volume (vph)	51	748	70	111	644	144	53	273	115	75	219	38
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	756	71	112	651	145	54	276	116	76	221	38
RTOR Reduction (vph)	0	9	0	0	24	0	0	44	0	0	12	0
Lane Group Flow (vph)	52	818	0	112	772	0	0	402	0	0	323	0
Confl. Peds. (#/hr)	8		39	39		8			25	25		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	35.5		35.5	35.5			38.0			38.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0			37.0			37.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.46			0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	207	1523		194	1498			1367			1261	
v/s Ratio Prot		0.23			0.23							
v/s Ratio Perm	0.11			c0.25				c0.14			0.12	
v/c Ratio	0.25	0.54		0.58	0.52			0.29			0.26	
Uniform Delay, d1	14.2	16.5		16.9	16.3			13.4			13.1	
Progression Factor	0.95	1.07		1.29	1.35			0.82			1.00	
Incremental Delay, d2	2.0	0.9		11.4	1.2			0.5			0.5	
Delay (s)	15.5	18.7		33.3	23.2			11.5			13.6	
Level of Service	B	B		C	C			B			B	
Approach Delay (s)		18.5			24.5			11.5			13.6	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM Average Control Delay		18.8										B
HCM Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		80.0				Sum of lost time (s)		8.0				
Intersection Capacity Utilization		87.3%				ICU Level of Service		E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

Existing PM + Commercial
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↔	↔	↔	↕	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00	
Frpb, ped/bikes	0.94		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00	
Frt	0.98		1.00	1.00	1.00	0.85	
Flt Protected	1.00		0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3268		1770	3539	1770	1583	
Flt Permitted	1.00		0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3268		1770	3539	1770	1583	
Volume (vph)	840	105	51	737	165	66	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	866	108	53	760	170	68	
RTOR Reduction (vph)	0	0	0	0	0	0	
Lane Group Flow (vph)	974	0	53	760	170	68	
Confl. Peds. (#/hr)		213	348				
Turn Type			Prot		Perm		
Protected Phases	4		3	8	2		
Permitted Phases					2		
Actuated Green, G (s)	50.0		5.4	59.4	12.6	12.6	
Effective Green, g (s)	50.0		5.4	59.4	12.6	12.6	
Actuated g/C Ratio	0.62		0.07	0.74	0.16	0.16	
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	2043		119	2628	279	249	
v/s Ratio Prot	c0.30		c0.03	0.21	c0.10		
v/s Ratio Perm						0.04	
v/c Ratio	0.48		0.45	0.29	0.61	0.27	
Uniform Delay, d1	8.0		35.9	3.4	31.4	29.7	
Progression Factor	0.38		0.99	0.89	0.91	0.90	
Incremental Delay, d2	0.7		2.2	0.2	3.7	0.6	
Delay (s)	3.7		37.7	3.2	32.3	27.4	
Level of Service	A		D	A	C	C	
Approach Delay (s)	3.7			5.5	30.9		
Approach LOS	A			A	C		
Intersection Summary							
HCM Average Control Delay			7.6			HCM Level of Service	A
HCM Volume to Capacity ratio			0.50				
Actuated Cycle Length (s)			80.0			Sum of lost time (s)	12.0
Intersection Capacity Utilization			49.9%			ICU Level of Service	A
Analysis Period (min)			15				
c Critical Lane Group							

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

Existing PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flpb, ped/bikes	0.93	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1642	3422	1728	3366	1770	3467	1770	3467	1770	3361	1770	3361
Flt Permitted	0.33	1.00	0.18	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	564	3422	324	3366	1770	3467	1770	3467	1770	3361	1770	3361
Volume (vph)	128	679	99	37	471	76	186	890	82	103	614	136
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	693	101	38	481	78	190	908	84	105	627	139
RTOR Reduction (vph)	0	14	0	0	16	0	0	7	0	0	22	0
Lane Group Flow (vph)	131	780	0	38	543	0	190	985	0	105	744	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases	4		8		5		2		1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	24.9	24.9	24.9	24.9	10.8	33.7	7.9	30.8				
Effective Green, g (s)	25.4	25.4	25.4	25.4	11.3	34.2	8.4	31.3				
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.14	0.43	0.11	0.39				
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	179	1086	103	1069	250	1482	186	1315				
v/s Ratio Prot		0.23		0.16	c0.11	c0.28	0.06	0.22				
v/s Ratio Perm	c0.23		0.12									
v/c Ratio	0.73	0.72	0.37	0.51	0.76	0.66	0.56	0.57				
Uniform Delay, d1	24.3	24.1	21.1	22.2	33.0	18.3	34.1	19.0				
Progression Factor	0.69	0.64	1.00	1.00	0.99	0.53	1.00	1.00				
Incremental Delay, d2	11.4	1.7	0.8	0.1	10.1	2.0	2.3	1.8				
Delay (s)	28.2	17.3	21.9	22.4	42.8	11.7	36.4	20.8				
Level of Service	C	B	C	C	D	B	D	C				
Approach Delay (s)	18.8		22.3		16.7		22.7					
Approach LOS	B		C		B		C					
Intersection Summary												
HCM Average Control Delay	19.6		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.72											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	73.3%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

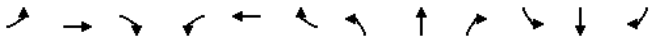
HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

Existing PM + Commercial
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔		↔	
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Volume (veh/h)	7	33	1118	31	15	783
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	8	37	1242	34	17	870
Pedestrians	52		52		45	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	4.0		4.0		4.0	
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230		503	
pX, platoon unblocked	0.94	0.88			0.88	
vC, conflicting volume	1832	735			1329	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1453	564			1238	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92		90		96	
cM capacity (veh/h)	100	380			471	
Direction, Lane #						
Volume Total	44	828	449	17	435	435
Volume Left	8	0	0	17	0	0
Volume Right	37	0	34	0	0	0
cSH	255	1700	1700	471	1700	1700
Volume to Capacity	0.17	0.49	0.26	0.04	0.26	0.26
Queue Length 95th (ft)	15	0	0	3	0	0
Control Delay (s)	22.0	0.0	0.0	12.9	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	22.0	0.0	0.2			
Approach LOS	C					
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	50.2%		ICU Level of Service		A	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.


Existing PM + Commercial
1/21/2008



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)	4.0		4.0	4.0		4.0		4.0	4.0	4.0		4.0
Lane Util. Factor	0.91		1.00	0.95		1.00		1.00	1.00	1.00		1.00
Frbp, ped/bikes	1.00		1.00	0.98		0.98		0.98	0.98	1.00		0.99
Flpb, ped/bikes	1.00		0.97	1.00		0.99		0.99	0.97	1.00		1.00
Frt	0.99		1.00	0.95		0.98		0.98	1.00	0.99		0.99
Flt Protected	0.99		0.95	1.00		0.99		0.99	0.95	1.00		1.00
Satd. Flow (prot)	4984		1719	3291		1766		1714	1832	1714		1832
Flt Permitted	0.79		0.33	1.00		0.81		0.27	1.00	0.27		1.00
Satd. Flow (perm)	3989		592	3291		1440		482	1832	482		1832
Volume (vph)	112	627	27	66	333	168	58	364	84	65	291	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	114	640	28	67	340	171	59	371	86	66	297	20
RTOR Reduction (vph)	0	5	0	0	38	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	777	0	67	473	0	0	507	0	66	314	0
Confl. Peds. (#/hr)	100		100	100		100	100	100	100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	46.0		46.0		46.0		24.0		24.0		24.0	
Effective Green, g (s)	47.0		47.0		47.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.59		0.59		0.59		0.31		0.31		0.31	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2344		348		1933		450		151		573	
v/s Ratio Prot			0.14		0.14				0.17		0.17	
v/s Ratio Perm	c0.19		0.11		0.11		c0.35		0.14		0.14	
v/c Ratio	0.33		0.19		0.24		1.13		0.44		0.55	
Uniform Delay, d1	8.5		7.7		7.9		27.5		21.9		22.8	
Progression Factor	1.00		1.36		1.38		1.00		0.75		0.75	
Incremental Delay, d2	0.4		1.2		0.3		81.8		8.7		3.6	
Delay (s)	8.8		11.7		11.2		109.3		25.2		20.8	
Level of Service	A		B		B		F		C		C	
Approach Delay (s)	8.8		11.3		11.3		109.3		21.5		21.5	
Approach LOS	A		B		B		F		C		C	
Intersection Summary												
HCM Average Control Delay	34.6		34.6		34.6		HCM Level of Service		C		C	
HCM Volume to Capacity ratio	0.61		0.61		0.61		0.61		0.61		0.61	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	138.5%		138.5%		138.5%		ICU Level of Service		H		H	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

Existing PM + Commercial
1/21/2008



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)	4.0		4.0	4.0		4.0		4.0	4.0	4.0		4.0
Lane Util. Factor	0.91		1.00	0.91		1.00		1.00	1.00	1.00		1.00
Frbp, ped/bikes	0.99		0.99	0.99		0.99		0.99	0.97	1.00		0.98
Flpb, ped/bikes	1.00		0.99	1.00		0.99		0.91	1.00	0.94		1.00
Frt	0.99		0.98	1.00		0.96		1.00	0.96	1.00		0.98
Flt Protected	1.00		0.99	0.95		1.00		0.95	1.00	0.95		1.00
Satd. Flow (prot)	4969		1608	1734		1608		1734	1658	1802		1802
Flt Permitted	0.88		0.80	0.61		1.00		0.36	1.00	0.36		1.00
Satd. Flow (perm)	4391		3928	1040		1734		631	1802	631		1802
Volume (vph)	39	567	40	70	412	66	41	210	71	56	126	17
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)	41	597	42	74	434	69	43	221	75	59	133	18
RTOR Reduction (vph)	0	9	0	0	22	0	0	16	0	0	6	0
Lane Group Flow (vph)	0	671	0	0	555	0	43	280	0	59	145	0
Confl. Peds. (#/hr)	100		100	100		100	100	100	100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	2827		2529		267		444		162		462	
v/s Ratio Prot			c0.16		c0.16				0.08		0.08	
v/s Ratio Perm	c0.15		0.14		0.14		0.04		0.09		0.09	
v/c Ratio	0.24		0.22		0.22		0.16		0.63		0.36	
Uniform Delay, d1	6.0		5.9		23.1		26.4		24.4		24.1	
Progression Factor	1.25		1.20		1.00		1.00		1.21		1.23	
Incremental Delay, d2	0.2		0.2		1.3		6.7		6.0		1.7	
Delay (s)	7.7		7.3		24.4		33.1		35.5		31.3	
Level of Service	A		A		C		C		D		C	
Approach Delay (s)	7.7		7.3		32.0		32.5		32.5		32.5	
Approach LOS	A		A		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	15.0		15.0		15.0		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.35		0.35		0.35		0.35		0.35		0.35	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	86.9%		86.9%		86.9%		ICU Level of Service		E		E	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

Existing PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.96			0.96			0.98		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	5019			4824			3363			3379		
Flt Permitted	0.83			0.85			0.86			0.73		
Satd. Flow (perm)	4205			4098			2899			2510		
Volume (vph)	60	620	34	50	434	195	39	182	72	121	217	66
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	626	34	51	438	197	39	184	73	122	219	67
RTOR Reduction (vph)	0	7	0	0	70	0	0	39	0	0	20	0
Lane Group Flow (vph)	0	714	0	0	616	0	0	257	0	0	388	0
Confl. Peds. (#/hr)	9		17	17		9	12		10	10		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2707		2638		2638		743		743		643	
v/s Ratio Prot												
v/s Ratio Perm	c0.17		0.15		0.15		0.09		0.09		c0.15	
v/c Ratio	0.26		0.23		0.23		0.35		0.35		0.60	
Uniform Delay, d1	6.1		6.0		6.0		24.3		24.3		26.2	
Progression Factor	1.49		1.16		1.16		1.00		1.00		0.77	
Incremental Delay, d2	0.2		0.2		0.2		1.3		1.3		4.1	
Delay (s)	9.3		7.1		7.1		25.5		25.5		24.2	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	9.3		7.1		7.1		25.5		25.5		24.2	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	13.8		13.8		13.8		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.36		0.36		0.36		0.36		0.36		0.36	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	93.7%		93.7%		93.7%		ICU Level of Service		F		F	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

Existing PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	1.00			0.98			0.93			0.92		
Flt Protected	1.00			1.00			0.98			0.98		
Satd. Flow (prot)	5052			4964			1695			1601		
Flt Permitted	0.83			0.92			0.85			0.86		
Satd. Flow (perm)	4203			4584			1476			1408		
Volume (vph)	80	761	10	10	489	57	10	0	10	128	0	193
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.96	0.96	0.92	0.92	0.92	0.96	0.92	0.96
Adj. Flow (vph)	83	793	11	11	509	59	11	0	11	133	0	201
RTOR Reduction (vph)	0	1	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	886	0	0	579	0	0	14	0	0	334	0
Confl. Peds. (#/hr)					79						79	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	48.2		48.2		48.2		23.8		23.8		23.8	
Effective Green, g (s)	48.2		48.2		48.2		23.8		23.8		23.8	
Actuated g/C Ratio	0.60		0.60		0.60		0.30		0.30		0.30	
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)	2532		2762		2762		439		439		419	
v/s Ratio Prot												
v/s Ratio Perm	c0.21		0.13		0.13		0.01		0.01		c0.24	
v/c Ratio	0.35		0.21		0.21		0.03		0.03		0.80	
Uniform Delay, d1	8.0		7.2		7.2		19.9		19.9		25.9	
Progression Factor	0.65		1.00		1.00		1.00		1.00		0.81	
Incremental Delay, d2	0.4		0.2		0.2		0.0		0.0		10.0	
Delay (s)	5.5		7.4		7.4		20.0		20.0		30.9	
Level of Service	A		A		A		B		B		C	
Approach Delay (s)	5.5		7.4		7.4		20.0		20.0		30.9	
Approach LOS	A		A		A		B		B		C	
Intersection Summary												
HCM Average Control Delay	11.0		11.0		11.0		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.50		0.50		0.50		0.50		0.50		0.50	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	75.9%		75.9%		75.9%		ICU Level of Service		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

Existing PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.98			1.00		
Frt	0.99			0.95			1.00			0.98		
Flt Protected	0.99			1.00			0.95			1.00		
Satd. Flow (prot)	4925			4749			1742			3426		
Flt Permitted	0.67			0.69			0.34			1.00		
Satd. Flow (perm)	3327			3271			631			3426		
Volume (vph)	222	594	81	61	358	194	100	735	98	145	595	58
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	247	660	90	68	398	216	111	817	109	161	661	64
RTOR Reduction (vph)	0	12	0	0	14	0	0	5	0	0	4	0
Lane Group Flow (vph)	0	985	0	0	668	0	111	921	0	161	721	0
Confl. Peds. (#/hr)	26		19		26		39		92		92	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	26.5		26.5		66.0		66.0		66.0		66.0	
Effective Green, g (s)	28.0		28.0		67.0		67.0		67.0		67.0	
Actuated g/C Ratio	0.27		0.27		0.65		0.65		0.65		0.65	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	904		889		410		2229		314		2260	
v/s Ratio Prot					0.27		0.21					
v/s Ratio Perm	c0.30		0.20		0.18		c0.33					
v/c Ratio	1.22dl		0.88dl		0.27		0.41		0.51		0.32	
Uniform Delay, d1	37.5		34.3		7.6		8.6		9.4		7.9	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	57.5		3.2		1.6		0.6		5.9		0.4	
Delay (s)	95.0		37.5		9.3		9.2		15.3		8.3	
Level of Service	F		D		A		A		B		A	
Approach Delay (s)	95.0		37.5		9.2		9.6					
Approach LOS	F		D		A		A					
Intersection Summary												
HCM Average Control Delay	38.4		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	103.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	80.7%		ICU Level of Service				D					
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

Existing PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			1.00			0.89		
Flpb, ped/bikes	1.00			1.00			0.97			1.00		
Frt	0.99			0.99			1.00			0.85		
Flt Protected	1.00			0.99			0.98			1.00		
Satd. Flow (prot)	5015			4982			1778			1406		
Flt Permitted	0.89			0.77			0.87			1.00		
Satd. Flow (perm)	4494			3862			1566			1406		
Volume (vph)	36	776	35	82	530	28	52	92	191	33	33	68
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	36	784	35	83	535	28	53	93	193	33	33	69
RTOR Reduction (vph)	0	6	0	0	6	0	0	0	91	0	47	0
Lane Group Flow (vph)	0	849	0	0	640	0	0	146	102	0	88	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		2		6		6	
Actuated Green, G (s)	49.5		49.5		24.5		24.5		24.5		24.5	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	2724		2341		460		413		431		431	
v/s Ratio Prot					c0.09		0.07		0.06			
v/s Ratio Perm	c0.19		0.17		c0.09		0.07		0.06			
v/c Ratio	0.31		0.27		0.32		0.25		0.20			
Uniform Delay, d1	7.6		7.4		22.0		21.5		21.2			
Progression Factor	1.00		1.00		1.00		1.00		1.00			
Incremental Delay, d2	0.3		0.3		1.8		1.4		1.1			
Delay (s)	7.9		7.7		23.8		22.9		22.3			
Level of Service	A		A		C		C		C			
Approach Delay (s)	7.9		7.7		23.3		22.3					
Approach LOS	A		A		C		C					
Intersection Summary												
HCM Average Control Delay	11.5		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.31											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	96.6%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

Existing PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.95	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4937	1770	4742	1770	4932	1770	4932	1770	4934	1770	4934
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4937	1770	4742	1770	4932	1770	4932	1770	4934	1770	4934
Volume (vph)	187	693	86	81	376	210	167	653	106	307	379	63
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	205	762	95	89	413	231	184	718	116	337	416	69
RTOR Reduction (vph)	0	16	0	0	100	0	0	22	0	0	23	0
Lane Group Flow (vph)	205	841	0	89	544	0	184	812	0	337	462	0
Confl. Peds. (#/hr)	81		22		50		43		43		43	
Turn Type	Prot		Prot		Prot		Prot		Prot		Prot	
Protected Phases	3	4	3	4	1	2	1	2	1	2	1	2
Permitted Phases												
Actuated Green, G (s)	11.0	24.1	11.0	24.1	20.9	26.0	20.9	26.0	20.9	26.0	20.9	26.0
Effective Green, g (s)	11.0	25.1	11.0	25.1	20.9	27.0	20.9	27.0	20.9	27.0	20.9	27.0
Actuated g/C Ratio	0.11	0.25	0.11	0.25	0.21	0.27	0.21	0.27	0.21	0.27	0.21	0.27
Clearance Time (s)	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Vehicle Extension (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
Lane Grp Cap (vph)	195	1239	195	1190	370	1332	370	1332	370	1332	370	1332
v/s Ratio Prot	c0.12	c0.17	0.05	0.11	0.10	c0.16	c0.19	0.09				
v/s Ratio Perm												
v/c Ratio	1.05	0.68	0.46	0.46	0.50	0.61	0.91	0.35				
Uniform Delay, d1	44.5	33.8	41.7	31.7	34.9	31.9	38.6	29.4				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	78.6	3.0	0.6	1.3	0.4	2.1	25.5	0.7				
Delay (s)	123.1	36.8	42.3	33.0	35.3	34.0	64.1	30.1				
Level of Service	F	D	D	C	D	C	E	C				
Approach Delay (s)	53.5		34.1		34.2		44.1		44.1		44.1	
Approach LOS	D		C		C		D		D		D	
Intersection Summary												
HCM Average Control Delay	42.0		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	100.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	81.5%		ICU Level of Service				D					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

Existing PM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		1.00		0.95		1.00	
Frpb, ped/bikes	0.94		0.97		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	0.96		0.97		0.96		1.00		0.93		1.00	
Frt	0.96		0.96		1.00		0.99		1.00		0.99	
Flt Protected	0.98		0.99		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	1564		1655		1691		3468		1645		3451	
Flt Permitted	0.70		0.84		0.29		1.00		0.41		1.00	
Satd. Flow (perm)	1129		1419		523		3468		710		3451	
Volume (vph)	98	33	65	42	59	39	40	544	35	36	782	63
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	104	35	69	45	63	41	43	579	37	38	832	67
RTOR Reduction (vph)	0	24	0	0	18	0	0	4	0	0	5	0
Lane Group Flow (vph)	0	184	0	0	131	0	43	612	0	38	894	0
Confl. Peds. (#/hr)	100		100	100	100	100	100	100	100	100	100	100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		2		6	
Actuated Green, G (s)	16.2		16.2		61.8		61.8		61.8		61.8	
Effective Green, g (s)	15.7		15.7		61.3		61.3		61.3		61.3	
Actuated g/C Ratio	0.18		0.18		0.72		0.72		0.72		0.72	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	209		262		377		2501		512		2489	
v/s Ratio Prot					0.18		0.18		0.18		0.26	
v/s Ratio Perm	c0.16		0.09		0.08		0.05		0.05		0.35	
v/c Ratio	0.88		0.50		0.11		0.24		0.07		0.36	
Uniform Delay, d1	33.7		31.1		3.6		4.0		3.5		4.5	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	31.6		0.5		0.6		0.2		0.3		0.4	
Delay (s)	65.4		31.7		4.2		4.2		3.8		4.9	
Level of Service	E		C		A		A		A		A	
Approach Delay (s)	65.4		31.7		4.2		4.2		4.8		4.8	
Approach LOS	E		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	13.1		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.47											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	58.2%		ICU Level of Service				B					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

Existing PM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.93	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.96	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3308		1770	3260		1691	3490		1696	3122	
Flt Permitted	0.95	1.00		0.95	1.00		0.29	1.00		0.42	1.00	
Satd. Flow (perm)	1770	3308		1770	3260		514	3490		745	3122	
Volume (vph)	127	316	100	56	383	111	113	502	29	113	491	294
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	130	322	102	57	391	113	115	512	30	115	501	300
RTOR Reduction (vph)	0	36	0	0	33	0	0	4	0	0	90	0
Lane Group Flow (vph)	130	388	0	57	471	0	115	538	0	115	711	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Prot		Prot		Perm		Perm		Perm		Perm	
Protected Phases	7	4		3	8			2			6	
Permitted Phases					2		6					
Actuated Green, G (s)	9.2	21.9		5.1	17.8		44.5	44.5		44.5	44.5	
Effective Green, g (s)	9.7	21.4		5.6	17.3		46.0	46.0		46.0	46.0	
Actuated g/C Ratio	0.11	0.25		0.07	0.20		0.54	0.54		0.54	0.54	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	202	833		117	664		278	1889		403	1690	
v/s Ratio Prot	c0.07	0.12		0.03	c0.14			0.15			c0.23	
v/s Ratio Perm					0.22		0.15					
v/c Ratio	0.64	0.47		0.49	0.71		0.41	0.28		0.29	0.42	
Uniform Delay, d1	36.0	27.0		38.3	31.5		11.5	10.6		10.6	11.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.2	0.2		1.2	2.8		4.5	0.4		1.8	0.8	
Delay (s)	41.2	27.1		39.5	34.3		16.0	11.0		12.4	12.4	
Level of Service	D	C		D	C		B	B		B	B	
Approach Delay (s)	30.4		34.9		11.8		12.4					
Approach LOS	C		C		B		B					
Intersection Summary												
HCM Average Control Delay	20.6		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	70.1%		ICU Level of Service		C							
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

Existing PM + Commercial
1/21/2008

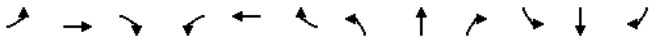
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔ ↗		↔ ↗		↔ ↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	0.92		1.00	1.00	0.95	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.91		1.00	1.00	0.98	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1527		1770	3539	3267	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1527		1770	3539	3267	
Volume (vph)	64	144	85	1069	615	115
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	67	150	89	1114	641	120
RTOR Reduction (vph)	103	0	0	0	17	0
Lane Group Flow (vph)	114	0	89	1114	744	0
Confl. Peds. (#/hr)	100	100	100		100	
Turn Type			Prot			
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	24.2		8.1	47.8	35.7	
Effective Green, g (s)	24.2		8.1	47.8	35.7	
Actuated g/C Ratio	0.30		0.10	0.60	0.45	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	462		179	2115	1458	
v/s Ratio Prot	c0.07		0.05	c0.31	0.23	
v/s Ratio Perm						
v/c Ratio	0.25		0.50	0.53	0.51	
Uniform Delay, d1	21.0		34.0	9.5	15.9	
Progression Factor	1.00		1.00	1.00	0.66	
Incremental Delay, d2	1.3		2.2	0.2	1.0	
Delay (s)	22.3		36.2	9.7	11.6	
Level of Service	C		D	A	B	
Approach Delay (s)	22.3		11.7	11.6		
Approach LOS	C		B	B		
Intersection Summary						
HCM Average Control Delay	12.7		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.43					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	54.7%		ICU Level of Service		A	
Analysis Period (min)	15					

c Critical Lane Group

**APPENDIX M:
YEAR 2015 PLUS COMMERCIAL ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.


2015 AM + Commercial
1/21/2008



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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4902		1770	4953		2006	2043		1985	1957	
Flt Permitted	0.95	1.00		0.95	1.00		0.09	1.00		0.45	1.00	
Satd. Flow (perm)	1770	4902		1770	4953		196	2043		945	1957	
Volume (vph)	300	953	212	90	1330	200	200	288	60	160	422	270
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)	316	1003	223	95	1400	211	211	303	63	168	444	284
RTOR Reduction (vph)	0	27	0	0	17	0	0	6	0	0	19	0
Lane Group Flow (vph)	316	1199	0	95	1594	0	211	360	0	168	709	0
Confl. Peds. (#/hr)			10	10		10	10		10	10		10
Turn Type	Prot			Prot		pm+pt			Perm			
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	17.0	48.4		11.6	43.0		49.5	49.5		40.5	40.5	
Effective Green, g (s)	17.0	48.4		11.6	43.0		50.0	50.0		41.0	41.0	
Actuated g/C Ratio	0.14	0.40		0.10	0.36		0.42	0.42		0.34	0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	1977		171	1775		187	851		323	669	
v/s Ratio Prot	c0.18	0.24		0.05	c0.32		c0.07	0.18		c0.36		
v/s Ratio Perm							0.40			0.18		
v/c Ratio	1.26	0.61		0.56	0.90		1.13	0.42		0.52	1.06	
Uniform Delay, d1	51.5	28.3		51.7	36.4		58.7	24.8		31.6	39.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	144.6	1.4		3.9	7.7		104.5	0.3		1.5	51.7	
Delay (s)	196.1	29.7		55.6	44.1		163.2	25.1		33.1	91.2	
Level of Service	F	C		E	D		F	C		C	F	
Approach Delay (s)		63.8			44.7			75.6			80.3	
Approach LOS		E			D			E			F	
Intersection Summary												
HCM Average Control Delay	61.5		HCM Level of Service				E					
HCM Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	120.0				Sum of lost time (s)				12.0			
Intersection Capacity Utilization	110.4%		ICU Level of Service				H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2015 AM + Commercial
1/21/2008



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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Flpb, ped/bikes		1.00		1.00	0.99			0.99		1.00	0.96	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.95		1.00	0.91			0.97		1.00	0.96	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1748		1681	1596			3420		1770	3270	
Flt Permitted		0.48		0.74	1.00			0.93		0.95	1.00	
Satd. Flow (perm)		846		1302	1596			3196		1770	3270	
Volume (vph)	10	10	10	179	110	160	10	1155	235	100	1161	450
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)	11	11	11	188	116	168	11	1216	247	105	1222	474
RTOR Reduction (vph)	0	10	0	0	67	0	0	14	0	0	33	0
Lane Group Flow (vph)	0	23	0	188	217	0	0	1460	0	105	1663	0
Confl. Peds. (#/hr)		4				4	44		12			44
Turn Type		Perm			Perm		Perm			Prot		
Protected Phases		7			8		8		2		1	6
Permitted Phases		7			8		2					
Actuated Green, G (s)		5.1			16.6	16.6		42.6		7.7	54.8	
Effective Green, g (s)		5.6			17.1	17.1		43.1		8.2	55.3	
Actuated g/C Ratio		0.06			0.19	0.19		0.48		0.09	0.61	
Clearance Time (s)		4.5			4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0	2.0	
Lane Grp Cap (vph)		53			247	303		1531		161	2009	
v/s Ratio Prot										0.06	c0.51	
v/s Ratio Perm		c0.03			c0.14	0.14		c0.46				
v/c Ratio		0.43			0.76	0.72		0.95		0.65	0.83	
Uniform Delay, d1		40.7			34.5	34.2		22.5		39.5	13.6	
Progression Factor		1.00			1.00	1.00		1.01		1.00	1.00	
Incremental Delay, d2		2.0			11.7	6.5		6.4		7.0	4.1	
Delay (s)		42.7			46.2	40.7		29.1		46.5	17.7	
Level of Service		D			D	D		C		D	B	
Approach Delay (s)		42.7			42.9			29.1			19.4	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay	26.3		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	90.0				Sum of lost time (s)				16.0			
Intersection Capacity Utilization	107.9%		ICU Level of Service				G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 AM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3435		1770	3356		1770	3417		1770	3397	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3435		1770	3356		1770	3417		1770	3397	
Volume (vph)	460	590	93	120	700	310	110	661	120	280	900	180
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	615	97	125	729	323	115	689	125	292	938	188
RTOR Reduction (vph)	0	13	0	0	56	0	0	17	0	0	18	0
Lane Group Flow (vph)	479	699	0	125	996	0	115	797	0	292	1108	0
Confl. Peds. (#/hr)	6		24	24		6	36		28	28		36
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	13.0	28.9		9.6	25.5		8.1	23.5		11.0	26.4	
Effective Green, g (s)	12.5	29.9		9.1	26.5		7.6	24.5		10.5	27.4	
Actuated g/C Ratio	0.14	0.33		0.10	0.29		0.08	0.27		0.12	0.30	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	477	1141		179	988		149	930		207	1034	
v/s Ratio Prot	c0.14	c0.20		0.07	c0.30		0.06	0.23		c0.17	c0.33	
v/s Ratio Perm												
v/c Ratio	1.00	0.61		0.70	1.01		0.77	0.86		1.41	1.07	
Uniform Delay, d1	38.8	25.2		39.1	31.8		40.4	31.1		39.8	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.14	0.89	
Incremental Delay, d2	42.2	0.7		9.2	30.7		19.9	10.1		200.6	43.3	
Delay (s)	81.0	25.9		48.3	62.4		60.2	41.1		246.1	71.1	
Level of Service	F	C		D	E		E	D		F	E	
Approach Delay (s)		48.0			60.9			43.5			107.1	
Approach LOS		D			E			D			F	
Intersection Summary												
HCM Average Control Delay		68.1										E
HCM Volume to Capacity ratio		1.14										
Actuated Cycle Length (s)		90.0						20.0				
Intersection Capacity Utilization		93.9%										F
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 AM + Commercial
1/21/2008

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)		4.0								4.0	4.0	
Lane Util. Factor		1.00								0.95	0.97	0.95
Frt		0.86								0.93	1.00	0.98
Flt Protected		1.00								1.00	0.95	1.00
Satd. Flow (prot)		1611								3285	3433	3476
Flt Permitted		1.00								0.94	0.95	1.00
Satd. Flow (perm)		1611								3094	3433	3476
Volume (vph)	0	0	10	0	0	0	10	345	321	1600	439	60
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)	0	0	11	0	0	0	11	363	338	1684	462	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	686	0	1684	525	0
Turn Type										Prot		
Protected Phases										2	1	6
Permitted Phases												
Actuated Green, G (s)		0.0								8.0	29.0	45.0
Effective Green, g (s)		0.0								8.0	29.0	45.0
Actuated g/C Ratio		0.00								0.18	0.64	1.00
Clearance Time (s)										4.0	4.0	2.0
Lane Grp Cap (vph)		0								550	2212	3476
v/s Ratio Prot											c0.49	0.15
v/s Ratio Perm										c0.22		
v/c Ratio		0.00								10.56dr	0.76	0.15
Uniform Delay, d1		22.5								18.5	5.6	0.0
Progression Factor		1.00								0.77	1.00	1.00
Incremental Delay, d2		0.0								124.7	2.5	0.1
Delay (s)		22.5								138.9	8.1	0.1
Level of Service		C								F	A	A
Approach Delay (s)		22.5			0.0					138.9	6.2	
Approach LOS		C			A					F	A	
Intersection Summary												
HCM Average Control Delay		38.5										D
HCM Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		45.0								Sum of lost time (s)	8.0	
Intersection Capacity Utilization		79.1%										D
Analysis Period (min)		15										
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2015 AM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.95		0.95	
Frpb, ped/bikes	0.97		0.96		0.98		0.98		0.99		0.99	
Flpb, ped/bikes	0.98		0.97		1.00		1.00		1.00		1.00	
Frt	0.97		0.94		0.98		0.98		0.99		0.99	
Flt Protected	0.98		0.99		1.00		1.00		1.00		1.00	
Satd. Flow (prot)	1688		1606		3399		3472		3472		3472	
Flt Permitted	0.83		0.87		0.91		0.88		0.88		0.88	
Satd. Flow (perm)	1436		1418		3085		3064		3064		3064	
Volume (vph)	70	80	34	60	60	90	31	496	80	50	589	30
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)	74	84	36	63	63	95	33	522	84	53	620	32
RTOR Reduction (vph)	0	18	0	0	60	0	0	27	0	0	8	0
Lane Group Flow (vph)	0	176	0	0	161	0	0	612	0	0	697	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	15.0		15.0		22.0		22.0		22.0		22.0	
Effective Green, g (s)	15.0		15.0		22.0		22.0		22.0		22.0	
Actuated g/C Ratio	0.33		0.33		0.49		0.49		0.49		0.49	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	479		473		1508		1498		1498		1498	
v/s Ratio Prot												
v/s Ratio Perm	c0.12		0.11		0.20		c0.23		c0.23		c0.23	
v/c Ratio	0.37		0.34		0.41		0.47		0.47		0.47	
Uniform Delay, d1	11.4		11.3		7.3		7.6		7.6		7.6	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	2.2		2.0		0.8		1.0		1.0		1.0	
Delay (s)	13.6		13.2		8.1		8.6		8.6		8.6	
Level of Service	B		B		A		A		A		A	
Approach Delay (s)	13.6		13.2		8.1		8.6		8.6		8.6	
Approach LOS	B		B		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	9.6		HCM Level of Service		A		A		A		A	
HCM Volume to Capacity ratio	0.43		0.43		0.43		0.43		0.43		0.43	
Actuated Cycle Length (s)	45.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	64.1%		ICU Level of Service		C		C		C		C	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2015 AM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.91		0.91	
Frpb, ped/bikes	0.95		0.96		0.98		0.98		0.98		0.98	
Flpb, ped/bikes	0.97		0.98		1.00		1.00		1.00		1.00	
Frt	0.96		0.96		0.99		0.99		0.99		0.99	
Flt Protected	0.98		0.99		1.00		1.00		1.00		1.00	
Satd. Flow (prot)	1627		1649		3443		4933		4933		4933	
Flt Permitted	0.79		0.79		0.84		0.82		0.82		0.82	
Satd. Flow (perm)	1298		1328		2882		4053		4053		4053	
Volume (vph)	70	80	70	48	70	50	30	1029	62	70	1587	100
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)	74	84	74	51	74	53	32	1083	65	74	1671	105
RTOR Reduction (vph)	0	6	0	0	24	0	0	3	0	0	5	0
Lane Group Flow (vph)	0	226	0	0	154	0	0	1177	0	0	1845	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		2		6		6		6	
Actuated Green, G (s)	16.7		16.7		59.3		59.3		59.3		59.3	
Effective Green, g (s)	17.2		17.2		59.8		59.8		59.8		59.8	
Actuated g/C Ratio	0.20		0.20		0.70		0.70		0.70		0.70	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	263		269		2028		2851		2851		2851	
v/s Ratio Prot												
v/s Ratio Perm	c0.17		0.12		0.41		c0.46		c0.46		c0.46	
v/c Ratio	0.86		0.57		0.58		0.65		0.65		0.65	
Uniform Delay, d1	32.7		30.6		6.3		6.9		6.9		6.9	
Progression Factor	1.00		1.00		0.75		1.00		1.00		1.00	
Incremental Delay, d2	23.1		1.8		1.0		1.2		1.2		1.2	
Delay (s)	55.9		32.4		5.8		8.0		8.0		8.0	
Level of Service	E		C		A		A		A		A	
Approach Delay (s)	55.9		32.4		5.8		8.0		8.0		8.0	
Approach LOS	E		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	11.7		HCM Level of Service		B		B		B		B	
HCM Volume to Capacity ratio	0.70		0.70		0.70		0.70		0.70		0.70	
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	103.9%		ICU Level of Service		G		G		G		G	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 AM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00
Frt	1.00	0.97	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1747	3435	1759	3462	1767	1806	1736	1841	1736	1841	1736	1841
Flt Permitted	0.17	1.00	0.35	1.00	0.44	1.00	0.59	1.00	0.59	1.00	0.59	1.00
Satd. Flow (perm)	320	3435	657	3462	810	1806	1077	1841	1077	1841	1077	1841
Volume (vph)	30	391	80	73	684	74	90	201	39	86	400	30
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)	32	412	84	77	720	78	95	212	41	91	421	32
RTOR Reduction (vph)	0	21	0	0	10	0	0	9	0	0	3	0
Lane Group Flow (vph)	32	475	0	77	788	0	95	244	0	91	450	0
Confl. Peds. (#/hr)	30		12	12		30	6		54	54		6
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		49.5	49.5		49.5	49.5	
Effective Green, g (s)	23.0	23.0		23.0	23.0		49.0	49.0		49.0	49.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.61	0.61		0.61	0.61	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	92	988		189	995		496	1106		660	1128	
v/s Ratio Prot		0.14			c0.23			0.14			c0.24	
v/s Ratio Perm	0.10			0.12			0.12			0.08		
v/c Ratio	0.35	0.48		0.41	0.79		0.19	0.22		0.14	0.40	
Uniform Delay, d1	22.6	23.6		23.0	26.3		6.8	6.9		6.6	7.9	
Progression Factor	1.00	1.00		0.88	0.91		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.1	1.7		5.9	5.9		0.9	0.5		0.4	1.1	
Delay (s)	32.7	25.2		26.0	30.0		7.7	7.4		7.0	9.0	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		25.7			29.6			7.5			8.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay	20.4		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	83.2%		ICU Level of Service				E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 AM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99
Satd. Flow (prot)	1763	3432	1741	3512	1741	3512	3377	3419	1763	3432	1741	3512
Flt Permitted	0.28	1.00	0.41	1.00	0.41	1.00	0.79	0.83	0.28	1.00	0.41	1.00
Satd. Flow (perm)	512	3432	745	3512	745	3512	2709	2850	512	3432	745	3512
Volume (vph)	30	436	80	61	721	33	70	171	59	70	240	50
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)	32	459	84	64	759	35	74	180	62	74	253	53
RTOR Reduction (vph)	0	19	0	0	4	0	0	27	0	0	16	0
Lane Group Flow (vph)	32	524	0	64	790	0	0	289	0	0	364	0
Confl. Peds. (#/hr)	18		54	54		18	4		18	18		4
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.0	38.0		38.0	38.0		32.0			32.0	32.0	
Effective Green, g (s)	39.0	39.0		39.0	39.0		33.0			33.0	33.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.41			0.41	0.41	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0	5.0	
Lane Grp Cap (vph)	250	1673		363	1712		1117			1176	1176	
v/s Ratio Prot		0.15			c0.22						c0.24	
v/s Ratio Perm	0.06			0.09			0.11			0.11		c0.13
v/c Ratio	0.13	0.31		0.18	0.46		0.26			0.26	0.31	
Uniform Delay, d1	11.2	12.4		11.5	13.6		15.5			15.8	15.8	
Progression Factor	0.95	1.03		1.25	1.39		0.61			1.00	1.00	
Incremental Delay, d2	1.0	0.5		1.0	0.8		0.5			0.7	0.7	
Delay (s)	11.6	13.2		15.3	19.7		9.9			16.5	16.5	
Level of Service	B	B		B	B		A			B	B	
Approach Delay (s)		13.1			19.4		9.9			16.5	16.5	
Approach LOS		B			B		A			B	B	
Intersection Summary												
HCM Average Control Delay	15.8		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.39											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	73.4%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2015 AM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.98			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1764	3457		1736	3441			3361			3449	
Flt Permitted	0.25	1.00		0.40	1.00			0.87			0.74	
Satd. Flow (perm)	460	3457		739	3441			2928			2568	
Volume (vph)	40	473	61	105	716	129	39	238	92	127	346	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	493	64	109	746	134	41	248	96	132	360	31
RTOR Reduction (vph)	0	13	0	0	19	0	0	40	0	0	6	0
Lane Group Flow (vph)	42	544	0	109	861	0	0	345	0	0	517	0
Confl. Peds. (#/hr)	13		71	71		13	22		22	22		22
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	41.5	41.5		41.5	41.5			32.0			32.0	
Effective Green, g (s)	41.0	41.0		41.0	41.0			31.0			31.0	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.39			0.39	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	236	1772		379	1764			1135			995	
v/s Ratio Prot	0.16		c0.25		c0.25		c0.25		c0.25		c0.25	
v/s Ratio Perm	0.09		0.15		0.12		c0.20		c0.20		c0.20	
v/c Ratio	0.18	0.31		0.29	0.49			0.30			0.52	
Uniform Delay, d1	10.5	11.3		11.1	12.7			17.0			18.8	
Progression Factor	1.25	1.30		0.84	0.82			0.59			1.00	
Incremental Delay, d2	1.6	0.4		1.8	0.9			0.7			1.9	
Delay (s)	14.7	15.1		11.1	11.3			10.7			20.7	
Level of Service	B		B		B		B		C		C	
Approach Delay (s)	15.1		11.2		10.7		20.7		20.7		20.7	
Approach LOS	B		B		B		C		C		C	
Intersection Summary												
HCM Average Control Delay	14.1		HCM Level of Service		B		B		B		B	
HCM Volume to Capacity ratio	0.50		0.50		0.50		0.50		0.50		0.50	
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	102.5%		ICU Level of Service		G		G		G		G	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

2015 AM + Commercial
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frpb, ped/bikes	0.92	0.92	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	0.97	1.00	1.00	0.96	0.96
Flt Protected	1.00	1.00	0.95	1.00	0.96	0.96
Satd. Flow (prot)	3142	3142	1770	3539	1733	1733
Flt Permitted	1.00	1.00	0.95	1.00	0.96	0.96
Satd. Flow (perm)	3142	3142	1770	3539	1733	1733
Volume (vph)	543	151	88	839	111	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	572	159	93	883	117	42
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	731	0	93	883	159	0
Confl. Peds. (#/hr)	146		266		266	
Turn Type	Perm		Prot		Prot	
Protected Phases	4	3	8	2	8	2
Permitted Phases	4	3	8	2	8	2
Actuated Green, G (s)	48.4	8.2	60.6	11.4	60.6	11.4
Effective Green, g (s)	48.4	8.2	60.6	11.4	60.6	11.4
Actuated g/C Ratio	0.60	0.10	0.76	0.14	0.76	0.14
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)	1901	181	2681	247	2681	247
v/s Ratio Prot	c0.23	c0.05	0.25	c0.09	0.25	c0.09
v/s Ratio Perm	0.38	0.51	0.33	0.64	0.33	0.64
Uniform Delay, d1	8.1	34.0	3.1	32.4	3.1	32.4
Progression Factor	1.07	1.00	1.00	1.27	1.00	1.27
Incremental Delay, d2	0.6	2.5	0.3	5.5	0.3	5.5
Delay (s)	9.3	36.5	3.5	46.8	3.5	46.8
Level of Service	A	D	A	D	A	D
Approach Delay (s)	9.3		6.6	46.8	6.6	46.8
Approach LOS	A		A	D	A	D
Intersection Summary						
HCM Average Control Delay	11.1		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.44		0.44		0.44	
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	44.8%		ICU Level of Service		A	
Analysis Period (min)	15		15		15	
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2015 AM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0	4.0	4.0		
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95	1.00	0.95		
Frpb, ped/bikes	1.00	0.96		1.00	0.98			0.99	1.00	0.98		
Flpb, ped/bikes	0.95	1.00		0.92	1.00			1.00	1.00	1.00		
Frt	1.00	0.96		1.00	0.98			0.99	1.00	0.97		
Flt Protected	0.95	1.00		0.95	1.00			0.99	0.95	1.00		
Satd. Flow (prot)	1686	3268		1634	3410			3434	1770	3345		
Flt Permitted	0.25	1.00		0.37	1.00			0.58	0.95	1.00		
Satd. Flow (perm)	449	3268		640	3410			1993	1770	3345		
Volume (vph)	126	350	107	98	542	70	125	495	49	140	984	260
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)	133	368	113	103	571	74	132	521	52	147	1036	274
RTOR Reduction (vph)	0	34	0	0	12	0	0	9	0	0	18	0
Lane Group Flow (vph)	133	447	0	103	633	0	0	696	0	147	1292	0
Confl. Peds. (#/hr)	72		137	137		72			58	58		92
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases	4		8		5		2		1		6	
Permitted Phases	4		8		5		2		1		6	
Actuated Green, G (s)	25.3	25.3		25.3	25.3			35.7	10.5	50.7		
Effective Green, g (s)	25.8	25.8		25.8	25.8			36.2	11.0	51.2		
Actuated g/C Ratio	0.30	0.30		0.30	0.30			0.43	0.13	0.60		
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5	4.5		
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0	2.0	2.0		
Lane Grp Cap (vph)	136	992		194	1035			849	229	2015		
v/s Ratio Prot		0.14		0.19					0.08	0.39		
v/s Ratio Perm	c0.30		0.16		c0.35							
v/c Ratio	0.98	0.45		0.53	0.61			8.80dl	0.64	0.64		
Uniform Delay, d1	29.3	23.9		24.6	25.3			21.5	35.1	10.9		
Progression Factor	1.00	1.00		1.00	1.00			1.40	1.27	0.55		
Incremental Delay, d2	69.4	0.1		1.4	0.8			5.9	3.3	1.1		
Delay (s)	98.7	24.0		26.0	26.1			36.0	47.9	7.2		
Level of Service	F	C		C	C			D	D	A		
Approach Delay (s)	40.2		26.1		36.0		11.3					
Approach LOS	D		C		D		B					

Intersection Summary			
HCM Average Control Delay	24.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2015 AM + Commercial
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	10	33	715	10	20	1143
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	35	753	11	21	1203
Pedestrians	34		33		34	34
Lane Width (ft)	12.0		12.0		12.0	12.0
Walking Speed (ft/s)	4.0		4.0		4.0	4.0
Percent Blockage	3		3		3	3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	230				471	
pX, platoon unblocked	0.77	0.95			0.95	
vC, conflicting volume	1469	450			797	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1092	360			728	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	94			97	
cM capacity (veh/h)	147	568			801	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	45	502	261	21	602	602
Volume Left	11	0	0	21	0	0
Volume Right	35	0	11	0	0	0
cSH	341	1700	1700	801	1700	1700
Volume to Capacity	0.13	0.30	0.15	0.03	0.35	0.35
Queue Length 95th (ft)	11	0	0	2	0	0
Control Delay (s)	17.2	0.0	0.0	9.6	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	17.2	0.0		0.2		
Approach LOS	C					

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2015 AM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.95		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	1.00		0.99		1.00		1.00		0.98		1.00	
Frt	0.99		1.00		0.98		0.98		1.00		0.98	
Flt Protected	1.00		0.95		1.00		0.99		0.95		1.00	
Satd. Flow (prot)	4996		1758		3469		1776		1730		1815	
Flt Permitted	0.83		0.41		1.00		0.55		0.40		1.00	
Satd. Flow (perm)	4183		758		3469		978		721		1815	
Volume (vph)	50	480	40	61	622	81	70	209	60	200	313	50
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)	53	505	42	64	655	85	74	220	63	211	329	53
RTOR Reduction (vph)	0	10	0	0	12	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	590	0	64	728	0	0	348	0	211	375	0
Confl. Peds. (#/hr)	24		18		18		24		24		48	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.0		51.0		51.0		24.0		24.0		24.0	
Effective Green, g (s)	52.0		52.0		52.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2559		464		2122		288		212		534	
v/s Ratio Prot			c0.21						0.21			
v/s Ratio Perm	0.14		0.08				c0.36		0.29			
v/c Ratio	0.23		0.14		0.34		1.21		1.00		0.70	
Uniform Delay, d1	7.5		7.0		8.1		30.0		29.9		26.7	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.2		0.6		0.4		121.4		60.6		7.5	
Delay (s)	7.7		7.6		8.5		151.4		90.6		34.2	
Level of Service	A		A		A		F		F		C	
Approach Delay (s)	7.7		8.5				151.4		54.3			
Approach LOS	A		A				F		D			
Intersection Summary												
HCM Average Control Delay	41.5		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	100.7%		ICU Level of Service		G							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2015 AM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.95		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	1.00		0.99		1.00		1.00		0.99		1.00	
Frt	0.99		1.00		0.98		0.98		1.00		0.98	
Flt Protected	1.00		0.95		1.00		0.95		1.00		0.95	
Satd. Flow (prot)	5047		1757		3469		1776		1730		1815	
Flt Permitted	0.88		0.44		1.00		0.55		0.40		1.00	
Satd. Flow (perm)	4467		758		3469		978		721		1815	
Volume (vph)	30	710	20	51	664	91	50	199	77	90	271	30
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)	32	747	21	54	699	96	53	209	81	95	285	32
RTOR Reduction (vph)	0	4	0	0	20	0	0	17	0	0	5	0
Lane Group Flow (vph)	0	796	0	0	829	0	53	273	0	95	312	0
Confl. Peds. (#/hr)	18		18		12		18		18		12	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2876		2715		155		453		175		469	
v/s Ratio Prot			c0.20		0.09		0.15		0.14		c0.17	
v/s Ratio Perm	0.18		c0.20		0.09		0.14		0.14			
v/c Ratio	0.28		0.31		0.34		0.60		0.54		0.66	
Uniform Delay, d1	6.2		6.3		24.3		26.2		25.7		26.7	
Progression Factor	1.00		0.43		1.00		1.00		1.20		1.21	
Incremental Delay, d2	0.2		0.3		5.9		5.8		11.3		7.1	
Delay (s)	6.4		3.0		30.2		32.0		42.0		39.5	
Level of Service	A		A		C		C		D		D	
Approach Delay (s)	6.4		3.0		31.7		40.0		40.0			
Approach LOS	A		A		C		D		D			
Intersection Summary												
HCM Average Control Delay	14.6		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	64.7%		ICU Level of Service		C							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2015 AM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frbp, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.98			0.97			0.99		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	5025			4944			3400			3426		
Flt Permitted	0.81			0.83			0.84			0.77		
Satd. Flow (perm)	4087			4102			2867			2666		
Volume (vph)	61	786	40	57	742	136	30	173	46	127	311	44
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)	64	827	42	60	781	143	32	182	48	134	327	46
RTOR Reduction (vph)	0	6	0	0	30	0	0	24	0	0	10	0
Lane Group Flow (vph)	0	927	0	0	954	0	0	238	0	0	497	0
Confl. Peds. (#/hr)	17		19	19		17	12		16	16		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2631		2641		2641		735		683		683	
v/s Ratio Prot												
v/s Ratio Perm	0.23		c0.23		c0.23		0.08		c0.19		c0.19	
v/c Ratio	0.35		0.36		0.36		0.32		0.73		0.73	
Uniform Delay, d1	6.6		6.6		6.6		24.1		27.2		27.2	
Progression Factor	0.74		1.26		1.26		1.00		0.47		0.47	
Incremental Delay, d2	0.4		0.4		0.4		1.2		6.5		6.5	
Delay (s)	5.2		8.7		8.7		25.3		19.4		19.4	
Level of Service	A		A		A		C		B		B	
Approach Delay (s)	5.2		8.7		8.7		25.3		19.4		19.4	
Approach LOS	A		A		A		C		B		B	
Intersection Summary												
HCM Average Control Delay	11.1		11.1		11.1		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.47		0.47		0.47		0.47		0.47		0.47	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	100.5%		100.5%		100.5%		ICU Level of Service		G		G	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

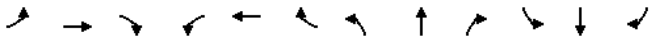
HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2015 AM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frbp, ped/bikes	1.00			1.00			0.97			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	1.00			0.98			0.93			0.92		
Flt Protected	1.00			1.00			0.98			0.98		
Satd. Flow (prot)	5069			4875			1695			1594		
Flt Permitted	0.88			0.93			0.89			0.85		
Satd. Flow (perm)	4484			4525			1546			1388		
Volume (vph)	31	938	10	10	863	98	10	0	10	54	0	73
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)	33	987	11	11	908	103	11	0	11	57	0	77
RTOR Reduction (vph)	0	1	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	1030	0	0	1022	0	0	12	0	0	134	0
Confl. Peds. (#/hr)						98						98
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	61.1		61.1		61.1		10.9		10.9		10.9	
Effective Green, g (s)	61.1		61.1		61.1		10.9		10.9		10.9	
Actuated g/C Ratio	0.76		0.76		0.76		0.14		0.14		0.14	
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)	3425		3456		3456		211		189		189	
v/s Ratio Prot												
v/s Ratio Perm	c0.23		0.23		0.23		0.01		c0.10		c0.10	
v/c Ratio	0.30		0.30		0.30		0.06		0.71		0.71	
Uniform Delay, d1	2.9		2.9		2.9		30.1		33.0		33.0	
Progression Factor	1.02		1.00		1.00		1.00		0.56		0.56	
Incremental Delay, d2	0.2		0.2		0.2		0.1		10.8		10.8	
Delay (s)	3.2		3.1		3.1		30.2		29.3		29.3	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	3.2		3.1		3.1		30.2		29.3		29.3	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	5.0		5.0		5.0		HCM Level of Service		A		A	
HCM Volume to Capacity ratio	0.36		0.36		0.36		0.36		0.36		0.36	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	71.4%		71.4%		71.4%		ICU Level of Service		C		C	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.


2015 AM + Commercial
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.98			0.97			1.00			0.97		
Flt Protected	0.99			0.99			0.95			1.00		
Satd. Flow (prot)	4953			4860			1760			3424		
Flt Permitted	0.65			0.67			0.24			1.00		
Satd. Flow (perm)	3255			3287			445			3424		
Volume (vph)	137	758	107	110	717	197	70	390	80	283	706	174
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)	144	798	113	116	755	207	74	411	84	298	743	183
RTOR Reduction (vph)	0	21	0	0	74	0	0	13	0	0	17	0
Lane Group Flow (vph)	0	1034	0	0	1004	0	74	482	0	298	909	0
Confl. Peds. (#/hr)	40		9		40		25		31		25	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	29.0		29.0		45.5		45.5		45.5		45.5	
Effective Green, g (s)	30.5		30.5		46.5		46.5		46.5		46.5	
Actuated g/C Ratio	0.36		0.36		0.55		0.55		0.55		0.55	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1168		1179		243		1873		447		1865	
v/s Ratio Prot					0.14		0.27					
v/s Ratio Perm	c0.32		0.31		0.17		c0.36					
v/c Ratio	0.89		0.85		0.30		0.26		0.67		0.49	
Uniform Delay, d1	25.6		25.2		10.5		10.1		13.7		11.9	
Progression Factor	1.00		1.00		1.42		1.39		1.30		1.45	
Incremental Delay, d2	8.1		5.9		3.1		0.3		5.7		0.7	
Delay (s)	33.7		31.0		17.9		14.5		23.6		17.9	
Level of Service	C		C		B		B		C		B	
Approach Delay (s)	33.7		31.0		14.9		19.3		19.3		19.3	
Approach LOS	C		C		B		B		C		B	
Intersection Summary												
HCM Average Control Delay	25.7		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	90.9%		ICU Level of Service				E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.


2015 AM + Commercial
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.97			1.00		
Frt	1.00			0.99			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5040			4984			1768			1395		
Flt Permitted	0.88			0.88			0.87			1.00		
Satd. Flow (perm)	4449			4374			1571			1395		
Volume (vph)	30	1088	33	30	989	80	25	36	20	80	30	40
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)	32	1145	35	32	1041	84	26	38	21	84	32	42
RTOR Reduction (vph)	0	4	0	0	11	0	0	0	15	0	16	0
Lane Group Flow (vph)	0	1208	0	0	1146	0	0	64	6	0	142	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	48.0		48.0		23.0		23.0		23.0		23.0	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lane Grp Cap (vph)	2697		2652		461		410		397		397	
v/s Ratio Prot					0.04		0.00		c0.10			
v/s Ratio Perm	c0.27		0.26		0.04		0.00		c0.10			
v/c Ratio	0.45		0.43		0.14		0.02		0.36			
Uniform Delay, d1	8.5		8.4		20.8		20.0		22.3			
Progression Factor	1.00		1.00		1.00		1.00		1.00			
Incremental Delay, d2	0.5		0.5		0.6		0.1		2.5			
Delay (s)	9.1		8.9		21.4		20.1		24.8			
Level of Service	A		A		C		C		C			
Approach Delay (s)	9.1		8.9		21.1		24.8		24.8			
Approach LOS	A		A		C		C		C			
Intersection Summary												
HCM Average Control Delay	10.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.42											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	81.7%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway


2015 AM + Commercial
1/21/2008



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)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.95	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4908		1770	4819		1770	3539	1511	1770	3539	1523
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4908		1770	4819		1770	3539	1511	1770	3539	1523
Volume (vph)	160	896	141	150	759	280	110	302	110	310	1151	150
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)	168	943	148	158	799	295	116	318	116	326	1212	158
RTOR Reduction (vph)	0	17	0	0	56	0	0	0	51	0	0	33
Lane Group Flow (vph)	168	1074	0	158	1038	0	116	318	65	326	1212	125
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot			Prot			Prot	pm+ov		Prot	pm+ov	
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases									2			6
Actuated Green, G (s)	12.0	34.0		13.6	35.6		10.4	31.4	45.0	25.0	46.0	58.0
Effective Green, g (s)	11.0	35.0		12.6	36.6		9.4	32.4	45.0	24.0	47.0	58.0
Actuated g/C Ratio	0.09	0.29		0.10	0.31		0.08	0.27	0.38	0.20	0.39	0.48
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1432		186	1470		139	956	617	354	1386	787
v/s Ratio Prot	c0.09	c0.22		0.09	0.22		0.07	0.09	0.01	c0.18	c0.34	0.01
v/s Ratio Perm									0.03			0.07
v/c Ratio	1.04	0.75		0.85	0.71		0.83	0.33	0.11	0.92	0.87	0.16
Uniform Delay, d1	54.5	38.5		52.8	36.9		54.5	35.1	24.4	47.1	33.8	17.4
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	80.8	3.7		27.6	2.9		31.8	0.9	0.0	28.3	7.9	0.0
Delay (s)	135.3	42.2		80.4	39.8		86.3	36.1	24.4	75.3	41.7	17.4
Level of Service	F	D		F	D		F	D	C	E	D	B
Approach Delay (s)		54.6			44.9			44.2			45.9	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay	47.8		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	82.5%		ICU Level of Service				E					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2015 AM + Commercial
1/21/2008



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)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	0.95
Frpb, ped/bikes		0.93			0.95			1.00			0.99	0.99
Flpb, ped/bikes		0.97			0.96			0.94			1.00	0.93
Frt		0.95			0.95			1.00			0.99	0.99
Flt Protected		0.98			0.99			0.95			1.00	0.95
Satd. Flow (prot)		1582			1600			1663			3460	1645
Flt Permitted		0.70			0.86			0.37			1.00	0.41
Satd. Flow (perm)		1133			1398			643			3460	711
Volume (vph)		44	30	40	50	60	70	60	556	40	32	648
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
Adj. Flow (vph)		46	32	42	53	63	74	63	585	42	34	682
RTOR Reduction (vph)		0	27	0	0	32	0	0	4	0	0	4
Lane Group Flow (vph)		0	93	0	0	158	0	63	623	0	34	722
Confl. Peds. (#/hr)		100		100	100		100	100		100	100	100
Turn Type		Perm			Perm			Perm			Perm	
Protected Phases		4			4			4			2	6
Permitted Phases		4			4			2			6	
Actuated Green, G (s)		12.9			12.9			65.1	65.1		65.1	65.1
Effective Green, g (s)		12.4			12.4			64.6	64.6		64.6	64.6
Actuated g/C Ratio		0.15			0.15			0.76	0.76		0.76	0.76
Clearance Time (s)		3.5			3.5			3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		165			204			489	2630		540	2635
v/s Ratio Prot								0.18				c0.21
v/s Ratio Perm		0.08			c0.11			0.10			0.05	
v/c Ratio		0.56			0.77			0.13	0.24		0.06	0.27
Uniform Delay, d1		33.8			34.9			2.7	3.0		2.6	3.1
Progression Factor		1.00			1.00			1.00	1.00		0.81	0.68
Incremental Delay, d2		2.6			15.1			0.5	0.2		0.2	0.2
Delay (s)		36.4			50.1			3.3	3.2		2.3	2.3
Level of Service		D			D			A	A		A	A
Approach Delay (s)		36.4			50.1			3.2			2.3	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM Average Control Delay	10.1		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.35											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	54.8%		ICU Level of Service				A					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2015 AM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.94		1.00	0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.95	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3347		1770	3196		1691	3449		1680	3220	
Flt Permitted	0.95	1.00		0.95	1.00		0.27	1.00		0.48	1.00	
Satd. Flow (perm)	1770	3347		1770	3196		484	3449		847	3220	
Volume (vph)	260	400	100	70	370	142	70	354	40	91	527	210
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)	274	421	105	74	389	149	74	373	42	96	555	221
RTOR Reduction (vph)	0	24	0	0	51	0	0	9	0	0	42	0
Lane Group Flow (vph)	274	502	0	74	487	0	74	406	0	96	734	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot		Prot		Perm		Perm		Perm		Perm	
Protected Phases	7	4		3	8			2				6
Permitted Phases					2		6					
Actuated Green, G (s)	16.1	26.9		6.8	17.6		37.8	37.8		37.8	37.8	
Effective Green, g (s)	16.6	26.4		7.3	17.1		39.3	39.3		39.3	39.3	
Actuated g/C Ratio	0.20	0.31		0.09	0.20		0.46	0.46		0.46	0.46	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	346	1040		152	643		224	1595		392	1489	
v/s Ratio Prot	c0.15	0.15		0.04	c0.15			0.12			c0.23	
v/s Ratio Perm					0.15		0.11					
v/c Ratio	0.79	0.48		0.49	0.76		0.33	0.25		0.24	0.49	
Uniform Delay, d1	32.6	23.8		37.1	32.0		14.5	13.9		13.9	15.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.0	0.1		0.9	4.5		3.9	0.4		1.5	1.2	
Delay (s)	43.5	23.9		38.0	36.5		18.4	14.3		15.3	17.1	
Level of Service	D	C		D	D		B	B		B	B	
Approach Delay (s)	30.6		36.7		14.9		16.9					
Approach LOS	C		D		B		B					
Intersection Summary												
HCM Average Control Delay	24.9		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	73.5%		ICU Level of Service		D							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

2015 AM + Commercial
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔ ↗		↔ ↗		↔ ↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.98	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1669		1770	3539	3485	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1669		1770	3539	3485	
Volume (vph)	63	119	114	635	1067	122
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	66	125	120	668	1123	128
RTOR Reduction (vph)	81	0	0	0	7	0
Lane Group Flow (vph)	110	0	120	668	1244	0
Turn Type			Prot			
Protected Phases	2		3		4	
Permitted Phases						
Actuated Green, G (s)	21.2		9.1		55.8	
Effective Green, g (s)	21.2		9.1		55.8	
Actuated g/C Ratio	0.25		0.11		0.66	
Clearance Time (s)	4.0		4.0		4.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	416		189		2323	
v/s Ratio Prot	c0.07		c0.07		0.19	
v/s Ratio Perm						
v/c Ratio	0.26		0.63		0.71	
Uniform Delay, d1	25.6		36.4		6.2	
Progression Factor	1.00		1.01		0.83	
Incremental Delay, d2	1.5		6.0		0.3	
Delay (s)	27.2		42.8		5.4	
Level of Service	C		D		A	
Approach Delay (s)	27.2		11.1		17.0	
Approach LOS	C		B		B	
Intersection Summary						
HCM Average Control Delay	15.8		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.57					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	60.5%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2015 PM + Commercial
1/21/2008

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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.98	
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4929		1770	4969		2005	1998		1962	1919	
Flt Permitted	0.95	1.00		0.95	1.00		0.13	1.00		0.54	1.00	
Satd. Flow (perm)	1770	4929		1770	4969		271	1998		1114	1919	
Volume (vph)	340	1232	180	90	1020	150	170	252	90	140	278	270
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)	358	1297	189	95	1074	158	179	265	95	147	293	284
RTOR Reduction (vph)	0	20	0	0	20	0	0	14	0	0	39	0
Lane Group Flow (vph)	358	1466	0	95	1212	0	179	346	0	147	538	0
Confl. Peds. (#/hr)			32	32		4	12		24	24		12
Parking (#/hr)												0
Turn Type	Prot			Prot			pm+pt			Perm		
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	18.0	35.9		7.5	25.4		39.6	39.6		28.6	28.6	
Effective Green, g (s)	18.0	35.9		7.5	25.4		40.1	40.1		29.1	29.1	
Actuated g/C Ratio	0.19	0.38		0.08	0.27		0.43	0.43		0.31	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	341	1893		142	1350		283	857		347	597	
v/s Ratio Prot	c0.20	0.30		0.05	c0.24		c0.06	0.17		c0.28		
v/s Ratio Perm							0.21			0.13		
v/c Ratio	1.05	0.77		0.67	0.90		0.63	0.40		0.42	0.90	
Uniform Delay, d1	37.8	25.3		41.8	32.8		21.8	18.4		25.5	30.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	62.4	3.2		11.3	9.7		4.6	0.3		0.8	16.9	
Delay (s)	100.1	28.4		53.1	42.4		26.3	18.8		26.4	47.7	
Level of Service	F	C		D	D		C	B		C	D	
Approach Delay (s)		42.3			43.2			21.3			43.4	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM Average Control Delay	40.2		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	93.5				Sum of lost time (s)				12.0			
Intersection Capacity Utilization	96.4%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2015 PM + Commercial
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.97			0.98		1.00	0.95	
Fipb, ped/bikes		0.99		1.00	1.00			1.00		1.00	1.00	
Frt		0.93		1.00	0.92			0.96		1.00	0.95	
Flt Protected		0.99		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1705		1681	1578			3315		1770	3192	
Flt Permitted		0.36		0.73	1.00			0.94		0.95	1.00	
Satd. Flow (perm)		619		1290	1578			3128		1770	3192	
Volume (vph)	10	10	20	116	110	120	10	1142	489	120	816	410
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)	11	11	21	122	116	126	11	1202	515	126	859	432
RTOR Reduction (vph)	0	20	0	0	43	0	0	39	0	0	51	0
Lane Group Flow (vph)	0	23	0	122	199	0	0	1689	0	126	1240	0
Confl. Peds. (#/hr)		36				36	48		16	16		48
Turn Type		Perm			Perm			Perm			Prot	
Protected Phases		7			8			2			1	6
Permitted Phases		7			8			2				
Actuated Green, G (s)		6.5			16.0	16.0		48.7		10.8	64.0	
Effective Green, g (s)		7.0			16.5	16.5		49.2		11.3	64.5	
Actuated g/C Ratio		0.07			0.16	0.16		0.49		0.11	0.64	
Clearance Time (s)		4.5			4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0	2.0	
Lane Grp Cap (vph)		43			213	260		1539		200	2059	
v/s Ratio Prot										0.07	c0.39	
v/s Ratio Perm		c0.04			0.09	0.13		c0.54				
v/c Ratio		0.55			0.57	0.77		1.10		0.63	0.60	
Uniform Delay, d1		45.0			38.5	39.9		25.4		42.4	10.3	
Progression Factor		1.00			1.00	1.00		0.59		1.00	1.00	
Incremental Delay, d2		7.4			2.3	11.5		45.1		4.7	1.3	
Delay (s)		52.3			40.8	51.4		60.2		47.0	11.6	
Level of Service		D			D	D		E		D	B	
Approach Delay (s)		52.3			47.9			60.2			14.8	
Approach LOS		D			D			E			B	
Intersection Summary												
HCM Average Control Delay	40.7		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.93											
Actuated Cycle Length (s)	100.0				Sum of lost time (s)				16.0			
Intersection Capacity Utilization	111.9%		ICU Level of Service				H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 PM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3456		1770	3308		1770	3325		1770	3413	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3456		1770	3308		1770	3325		1770	3413	
Volume (vph)	460	880	82	120	510	290	90	911	260	220	682	60
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)	484	926	86	126	537	305	95	959	274	232	718	63
RTOR Reduction (vph)	0	7	0	0	79	0	0	27	0	0	7	0
Lane Group Flow (vph)	484	1005	0	126	763	0	95	1206	0	232	774	0
Confl. Peds. (#/hr)	15		48	48		15	123		48	48		123
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.7	28.3		10.0	22.6		5.0	32.7		12.0	39.7	
Effective Green, g (s)	15.2	29.3		9.5	23.6		4.5	33.7		11.5	40.7	
Actuated g/C Ratio	0.15	0.29		0.10	0.24		0.04	0.34		0.12	0.41	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	522	1013		168	781		80	1121		204	1389	
v/s Ratio Prot	c0.14	c0.29		0.07	0.23		0.05	c0.36		c0.13	0.23	
v/s Ratio Perm												
v/c Ratio	0.93	0.99		0.75	0.98		1.19	1.08		1.14	0.56	
Uniform Delay, d1	41.9	35.2		44.1	37.9		47.8	33.1		44.2	22.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.22	0.74	
Incremental Delay, d2	22.3	26.2		15.3	26.1		159.7	49.9		98.6	1.3	
Delay (s)	64.2	61.4		59.4	64.0		207.4	83.0		152.5	18.2	
Level of Service	E	E		E	E		F	F		F	B	
Approach Delay (s)		62.3			63.4			91.9			49.0	
Approach LOS		E			E			F			D	
Intersection Summary												
HCM Average Control Delay		67.9										
HCM Volume to Capacity ratio		1.02										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		96.9%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 PM + Commercial
1/21/2008

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)		4.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		0.97	0.95	
Frt		0.86						0.94		1.00	0.98	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		1611						3316		3433	3452	
Flt Permitted		1.00						0.95		0.95	1.00	
Satd. Flow (perm)		1611						3144		3433	3452	
Volume (vph)	0	0	10	0	0	0	10	419	306	1500	306	60
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)	0	0	11	0	0	0	11	441	322	1579	322	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	754	0	1579	385	0
Turn Type								Perm		Prot		
Protected Phases									2		1	6
Permitted Phases									2			
Actuated Green, G (s)		0.0						13.0		29.0	50.0	
Effective Green, g (s)		0.0						13.0		29.0	50.0	
Actuated g/C Ratio		0.00						0.26		0.58	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						817		1991	3452	
v/s Ratio Prot										c0.46	0.11	
v/s Ratio Perm								c0.24				
v/c Ratio		0.00						0.92		0.79	0.11	
Uniform Delay, d1		25.0						18.0		8.2	0.0	
Progression Factor		1.00						0.73		1.00	1.00	
Incremental Delay, d2		0.0						16.6		3.3	0.1	
Delay (s)		25.0						29.8		11.5	0.1	
Level of Service		C						C		B	A	
Approach Delay (s)		25.0			0.0			29.8			9.3	
Approach LOS		C			A			C			A	
Intersection Summary												
HCM Average Control Delay		15.1								HCM Level of Service		B
HCM Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		50.0								Sum of lost time (s)		8.0
Intersection Capacity Utilization		77.8%								ICU Level of Service		D
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2015 PM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.95		0.95	
Frpb, ped/bikes	0.97		0.97		0.99		0.99		0.99		0.99	
Flpb, ped/bikes	0.98		0.97		1.00		0.99		0.99		0.99	
Frt	0.97		0.96		0.98		0.98		0.99		0.99	
Flt Protected	0.99		0.99		1.00		0.99		0.99		0.99	
Satd. Flow (prot)	1695		1658		3412		3442		3442		3442	
Flt Permitted	0.88		0.92		0.93		0.82		0.82		0.82	
Satd. Flow (perm)	1518		1540		3171		2843		2843		2843	
Volume (vph)	30	50	21	50	100	70	33	575	80	50	276	20
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)	32	53	22	53	105	74	35	605	84	53	291	21
RTOR Reduction (vph)	0	15	0	0	34	0	0	21	0	0	9	0
Lane Group Flow (vph)	0	92	0	0	198	0	0	704	0	0	356	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	17.0		17.0		25.0		25.0		25.0		25.0	
Effective Green, g (s)	17.0		17.0		25.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.34		0.34		0.50		0.50		0.50		0.50	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	516		524		1586		1422		1422		1422	
v/s Ratio Prot												
v/s Ratio Perm	0.06		c0.13		c0.22		0.13		0.13		0.13	
v/c Ratio	0.18		0.38		0.44		0.25		0.25		0.25	
Uniform Delay, d1	11.6		12.5		8.0		7.1		7.1		7.1	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.8		2.1		0.9		0.4		0.4		0.4	
Delay (s)	12.4		14.6		8.9		7.6		7.6		7.6	
Level of Service	B		B		A		A		A		A	
Approach Delay (s)	12.4		14.6		8.9		7.6		7.6		7.6	
Approach LOS	B		B		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	9.8		HCM Level of Service		A		A		A		A	
HCM Volume to Capacity ratio	0.42		0.42		0.42		0.42		0.42		0.42	
Actuated Cycle Length (s)	50.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	68.6%		ICU Level of Service		C		C		C		C	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2015 PM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.91		0.91	
Frpb, ped/bikes	0.95		0.97		0.99		0.99		0.98		0.98	
Flpb, ped/bikes	0.97		0.98		1.00		0.99		1.00		1.00	
Frt	0.95		0.97		0.99		0.99		0.99		0.99	
Flt Protected	0.98		0.99		1.00		1.00		1.00		1.00	
Satd. Flow (prot)	1619		1680		3465		4929		4929		4929	
Flt Permitted	0.80		0.82		0.87		0.85		0.85		0.85	
Satd. Flow (perm)	1320		1399		3013		4195		4195		4195	
Volume (vph)	60	60	60	33	60	30	50	1523	65	30	971	70
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)	63	63	63	35	63	32	53	1603	68	32	1022	74
RTOR Reduction (vph)	0	29	0	0	5	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	160	0	0	125	0	0	1722	0	0	1123	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		2		6		6		6	
Actuated Green, G (s)	12.1		12.1		58.9		58.9		58.9		58.9	
Effective Green, g (s)	12.6		12.6		59.4		59.4		59.4		59.4	
Actuated g/C Ratio	0.16		0.16		0.74		0.74		0.74		0.74	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	208		220		2237		3115		3115		3115	
v/s Ratio Prot												
v/s Ratio Perm	c0.12		0.09		c0.57		0.27		0.27		0.27	
v/c Ratio	0.77		0.57		0.77		0.36		0.36		0.36	
Uniform Delay, d1	32.3		31.2		6.2		3.6		3.6		3.6	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	14.8		2.0		2.6		0.3		0.3		0.3	
Delay (s)	47.1		33.2		8.8		3.9		3.9		3.9	
Level of Service	D		C		A		A		A		A	
Approach Delay (s)	47.1		33.2		8.8		3.9		3.9		3.9	
Approach LOS	D		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	10.4		HCM Level of Service		B		B		B		B	
HCM Volume to Capacity ratio	0.77		0.77		0.77		0.77		0.77		0.77	
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	104.7%		ICU Level of Service		G		G		G		G	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1761	3486	1766	3439	1738	1818	1764	1817	1764	1817	1764	1817
Flt Permitted	0.27	1.00	0.16	1.00	0.57	1.00	0.36	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	504	3486	297	3439	1050	1818	669	1817	669	1817	669	1817
Volume (vph)	40	835	80	56	582	105	130	391	65	105	200	30
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)	42	879	84	59	613	111	137	412	68	111	211	32
RTOR Reduction (vph)	0	9	0	0	19	0	8	0	0	0	7	0
Lane Group Flow (vph)	42	954	0	59	705	0	137	473	0	111	236	0
Confl. Peds. (#/hr)	12		12	12		12	42		12	12		42
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.0	33.0		33.0	33.0		40.5	40.5		40.5	40.5	
Effective Green, g (s)	32.0	32.0		32.0	32.0		40.0	40.0		40.0	40.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.50	0.50		0.50	0.50	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	202	1394		119	1376		525	909		335	909	
v/s Ratio Prot		c0.27			0.21			c0.26			0.13	
v/s Ratio Perm	0.08			0.20			0.13			0.17		
v/c Ratio	0.21	0.68		0.50	0.51		0.26	0.52		0.33	0.26	
Uniform Delay, d1	15.7	19.8		18.0	18.1		11.5	13.5		12.0	11.5	
Progression Factor	1.00	1.00		1.77	1.91		1.72	1.78		1.00	1.00	
Incremental Delay, d2	2.3	2.7		11.5	1.1		0.4	0.7		2.6	0.7	
Delay (s)	18.0	22.6		43.2	35.7		20.2	24.7		14.6	12.2	
Level of Service	B	C		D	D		C	C		B	B	
Approach Delay (s)		22.4			36.3			23.7			12.9	
Approach LOS		C			D			C			B	
Intersection Summary												
HCM Average Control Delay		25.4										C
HCM Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		82.2%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99
Satd. Flow (prot)	1757	3471	1750	3485	1750	3485	3422	3424	3422	3424	3422	3424
Flt Permitted	0.21	1.00	0.16	1.00	0.81	1.00	0.81	1.00	0.81	1.00	0.87	1.00
Satd. Flow (perm)	386	3471	295	3485	2819	3485	2819	3003	2819	3003	2819	3003
Volume (vph)	50	924	80	64	653	58	100	283	57	33	180	40
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	953	82	66	673	60	103	292	59	34	186	41
RTOR Reduction (vph)	0	8	0	0	8	0	0	3	0	0	17	0
Lane Group Flow (vph)	52	1027	0	66	725	0	0	451	0	0	244	0
Confl. Peds. (#/hr)	24		78	78		24	8		6	6		8
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		46.0			46.0	46.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		47.0			47.0	47.0	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.59			0.59	0.59	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0	5.0	
Lane Grp Cap (vph)	121	1085		92	1089		1656			1764	1764	
v/s Ratio Prot		c0.30			0.21			c0.16			0.08	
v/s Ratio Perm	0.13			0.22			c0.16			0.08		
v/c Ratio	0.43	0.95		0.72	0.67		0.27			0.14		
Uniform Delay, d1	21.8	26.8		24.4	23.9		8.1			7.4		
Progression Factor	0.49	0.51		0.88	0.86		1.01			1.00		
Incremental Delay, d2	8.5	14.4		33.1	2.7		0.3			0.2		
Delay (s)	19.2	28.1		54.5	23.3		8.5			7.6		
Level of Service	B	C		D	C		A			A		
Approach Delay (s)		27.6			25.9					8.5		7.6
Approach LOS		C			C					A		A
Intersection Summary												
HCM Average Control Delay		21.7										C
HCM Volume to Capacity ratio		0.51										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		72.1%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2015 PM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	1.00		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1766	3482		1760	3420			3400			3433	
Flt Permitted	0.21	1.00		0.17	1.00			0.87			0.75	
Satd. Flow (perm)	398	3482		314	3420			2976			2589	
Volume (vph)	70	900	84	119	710	165	65	403	111	81	226	40
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	71	909	85	120	717	167	66	407	112	82	228	40
RTOR Reduction (vph)	0	9	0	0	25	0	0	26	0	0	12	0
Lane Group Flow (vph)	71	985	0	120	859	0	0	559	0	0	338	0
Confl. Peds. (#/hr)	8		39	39		8			25	25		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	35.5		35.5	35.5			38.0			38.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0			37.0			37.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.46			0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	174	1523		137	1496			1376			1197	
v/s Ratio Prot		0.28			0.25							
v/s Ratio Perm	0.18			c0.38				c0.19			0.13	
v/c Ratio	0.41	0.65		0.88	0.57			0.41			0.28	
Uniform Delay, d1	15.4	17.7		20.5	16.9			14.2			13.3	
Progression Factor	0.97	1.03		1.00	1.00			1.36			1.00	
Incremental Delay, d2	3.3	1.0		49.3	1.6			0.8			0.6	
Delay (s)	18.2	19.2		69.8	18.5			20.1			13.9	
Level of Service	B	B		E	B			C			B	
Approach Delay (s)		19.2			24.6			20.1			13.9	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM Average Control Delay	20.6		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	80.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	88.1%		ICU Level of Service				E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

2015 PM + Commercial
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frbp, ped/bikes	0.95		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.96	
Flt Protected	1.00		0.95	1.00	0.97	
Satd. Flow (prot)	3312		1770	3539	1730	
Flt Permitted	1.00		0.95	1.00	0.97	
Satd. Flow (perm)	3312		1770	3539	1730	
Volume (vph)	996	108	55	833	171	66
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1027	111	57	859	176	68
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1138	0	57	859	244	0
Confl. Peds. (#/hr)		213	348			
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	30.2		4.8	39.0	13.0	
Effective Green, g (s)	30.2		4.8	39.0	13.0	
Actuated g/C Ratio	0.50		0.08	0.65	0.22	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)	1667		142	2300	375	
v/s Ratio Prot	c0.34		0.03	c0.24	c0.14	
v/s Ratio Perm						
v/c Ratio	0.68		0.40	0.37	0.65	
Uniform Delay, d1	11.3		26.2	4.9	21.4	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	2.3		1.9	0.5	4.0	
Delay (s)	13.6		28.1	5.3	25.4	
Level of Service	B		C	A	C	
Approach Delay (s)	13.6			6.7	25.4	
Approach LOS	B			A	C	
Intersection Summary						
HCM Average Control Delay	12.1		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.65					
Actuated Cycle Length (s)	60.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	58.6%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2015 PM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	0.94	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1657	3420		1734	3316		1770	3475		1770	3343	
Flt Permitted	0.29	1.00		0.15	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	506	3420		281	3316		1770	3475		1770	3343	
Volume (vph)	219	734	109	55	497	110	226	1280	104	110	659	165
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	223	749	111	56	507	112	231	1306	106	112	672	168
RTOR Reduction (vph)	0	15	0	0	24	0	0	7	0	0	27	0
Lane Group Flow (vph)	223	845	0	56	595	0	231	1405	0	112	813	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases	4		8		5		2		1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	25.5	25.5		25.5	25.5		12.6	32.8		8.2	28.4	
Effective Green, g (s)	26.0	26.0		26.0	26.0		13.1	33.3		8.7	28.9	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.16	0.42		0.11	0.36	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	164	1112		91	1078		290	1446		192	1208	
v/s Ratio Prot		0.25		0.18			0.13	0.40		0.06	0.24	
v/s Ratio Perm	0.44		0.20									
v/c Ratio	1.36	0.76		0.62	0.55		0.80	0.97		0.58	0.67	
Uniform Delay, d1	27.0	24.2		22.8	22.2		32.2	22.9		33.9	21.6	
Progression Factor	1.00	1.00		1.00	1.00		1.04	1.12		1.00	1.00	
Incremental Delay, d2	196.1	2.8		8.4	0.3		10.4	15.1		2.9	3.0	
Delay (s)	223.1	27.0		31.2	22.6		44.0	40.7		36.8	24.6	
Level of Service	F	C		C	C		D	D		D	C	
Approach Delay (s)	67.4		23.3		41.1		26.0					
Approach LOS	E		C		D		C					
Intersection Summary												
HCM Average Control Delay	41.6		HCM Level of Service		D							
HCM Volume to Capacity ratio	1.06											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	88.8%		ICU Level of Service		E							
Analysis Period (min)	15											

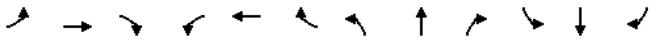
HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2015 PM + Commercial
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔ ↗		↔ ↗		↔ ↗	
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Volume (veh/h)	20	41	1559	30	20	853
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	43	1641	32	21	898
Pedestrians	52		52		45	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	4.0		4.0		4.0	
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230		471	
pX, platoon unblocked	0.81	0.76			0.76	
vC, conflicting volume	2252	933			1725	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1911	593			1637	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	49	86			93	
cM capacity (veh/h)	41	313			284	
Direction, Lane #						
Volume Total	64	1094	579	21	449	449
Volume Left	21	0	0	21	0	0
Volume Right	43	0	32	0	0	0
cSH	99	1700	1700	284	1700	1700
Volume to Capacity	0.65	0.64	0.34	0.07	0.26	0.26
Queue Length 95th (ft)	80	0	0	6	0	0
Control Delay (s)	92.1	0.0	0.0	18.7	0.0	0.0
Lane LOS	F			C		
Approach Delay (s)	92.1	0.0	0.4			
Approach LOS	F		D			
Intersection Summary						
Average Delay	2.4					
Intersection Capacity Utilization	62.5%		ICU Level of Service		B	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.


2015 PM + Commercial
1/21/2008



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)	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor	0.91		1.00	0.95	1.00		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00		1.00	0.99	1.00		1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Frt	0.99		1.00	0.97	0.98		1.00		0.98	1.00	0.98	
Flt Protected	0.99		0.95	1.00	0.99		0.95		1.00	1.00	1.00	
Satd. Flow (prot)	5018		1768	3397	1794		1764		1803	1803	1803	
Flt Permitted	0.74		0.30	1.00	0.69		0.26		1.00	1.00	1.00	
Satd. Flow (perm)	3716		556	3397	1254		480		1803	1803	1803	
Volume (vph)	110	698	30	93	667	201	80	375	90	70	276	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	712	31	95	681	205	82	383	92	71	282	51
RTOR Reduction (vph)	0	5	0	0	35	0	0	9	0	0	8	0
Lane Group Flow (vph)	0	850	0	95	851	0	0	548	0	71	325	0
Confl. Peds. (#/hr)	24		4	4	24		48		12	12	48	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	46.0		46.0	46.0	24.0		24.0		24.0	24.0	24.0	
Effective Green, g (s)	47.0		47.0	47.0	25.0		25.0		25.0	25.0	25.0	
Actuated g/C Ratio	0.59		0.59	0.59	0.31		0.31		0.31	0.31	0.31	
Clearance Time (s)	5.0		5.0	5.0	5.0		5.0		5.0	5.0	5.0	
Lane Grp Cap (vph)	2183		327	1996	392		150		563	563	563	
v/s Ratio Prot	0.23		0.17	c0.25	c0.44		0.15		0.18	0.18	0.18	
v/s Ratio Perm	0.39		0.29	0.43	1.40		0.47		0.58	0.58	0.58	
v/c Ratio	8.8		8.2	9.1	27.5		22.2		23.1	23.1	23.1	
Uniform Delay, d1	1.00		1.69	1.77	1.00		0.79		0.79	0.79	0.79	
Progression Factor	0.5		2.1	0.6	194.0		9.9		4.1	4.1	4.1	
Incremental Delay, d2	9.4		16.0	16.7	221.5		27.4		22.2	22.2	22.2	
Delay (s)	A		B	B	F		C		C	C	C	
Level of Service	9.4		16.6	221.5	23.1		35.7		35.7	35.7	35.7	
Approach Delay (s)	A		B	F	C		D		D	D	D	
Approach LOS	A		B	F	C		D		D	D	D	
Intersection Summary												
HCM Average Control Delay	56.2		HCM Level of Service		E							
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	139.8%		ICU Level of Service		H							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2015 PM + Commercial
1/21/2008



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)	4.0		4.0	4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor	0.91		1.00	0.91	1.00		1.00		1.00	1.00	1.00	
Frpb, ped/bikes	1.00		1.00	0.99	1.00		1.00		1.00	1.00	0.99	
Flpb, ped/bikes	1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00	
Frt	0.99		1.00	0.98	0.98		1.00		0.98	1.00	0.98	
Flt Protected	0.99		0.95	1.00	0.99		0.95		1.00	1.00	1.00	
Satd. Flow (prot)	5006		1770	1787	1770		1787		1764	1831	1831	
Flt Permitted	0.76		0.81	0.39	1.00		0.31		1.00	1.00	1.00	
Satd. Flow (perm)	3804		4016	729	1787		570		1831	1831	1831	
Volume (vph)	80	608	40	83	770	153	60	237	76	70	234	30
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)	84	640	42	87	811	161	63	249	80	74	246	32
RTOR Reduction (vph)	0	8	0	0	32	0	0	14	0	0	6	0
Lane Group Flow (vph)	0	758	0	0	1027	0	63	315	0	74	272	0
Confl. Peds. (#/hr)	12		12	6		6		6		6		6
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	51.5		51.5	20.5	20.5	20.5		20.5		20.5	20.5	
Effective Green, g (s)	51.5		51.5	20.5	20.5	20.5		20.5		20.5	20.5	
Actuated g/C Ratio	0.64		0.64	0.26	0.26	0.26		0.26		0.26	0.26	
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0		4.0		4.0	4.0	
Lane Grp Cap (vph)	2449		2585	187	458	146		469		469	469	
v/s Ratio Prot	0.20		c0.26	0.09	0.13	0.13		0.13		0.13	0.13	
v/s Ratio Perm	0.31		0.40	0.34	0.69	0.51		0.58		0.58	0.58	
v/c Ratio	6.3		6.8	24.2	26.9	25.4		26.0		26.0	26.0	
Uniform Delay, d1	1.27		2.01	1.00	1.00	1.14		1.14		1.14	1.14	
Progression Factor	0.3		0.4	4.8	8.2	11.1		4.7		4.7	4.7	
Incremental Delay, d2	8.3		14.1	29.0	35.0	40.0		34.5		34.5	34.5	
Delay (s)	A		B	C	D	D		C		C	C	
Level of Service	8.3		14.1	34.1	35.7	35.7		35.7		35.7	35.7	
Approach Delay (s)	A		B	C	D	D		C		C	C	
Approach LOS	A		B	C	D	D		C		C	C	
Intersection Summary												
HCM Average Control Delay	18.4		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.48											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	81.1%		ICU Level of Service		D							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2015 PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frbp, ped/bikes	1.00			1.00			1.00			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.97			0.97			0.97		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	5017			4906			3405			3364		
Flt Permitted	0.78			0.83			0.79			0.65		
Satd. Flow (perm)	3937			4103			2693			2205		
Volume (vph)	63	671	40	71	855	221	60	296	75	130	217	82
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	64	678	40	72	864	223	61	299	76	131	219	83
RTOR Reduction (vph)	0	7	0	0	50	0	0	22	0	0	26	0
Lane Group Flow (vph)	0	775	0	0	1109	0	0	414	0	0	407	0
Confl. Peds. (#/hr)	9		17	17			9	12	10	10		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2534		2641		2641		690		690		565	
v/s Ratio Prot												
v/s Ratio Perm	0.20		c0.27		c0.27		0.15		0.15		c0.18	
v/c Ratio	0.31		0.42		0.42		0.60		0.60		0.72	
Uniform Delay, d1	6.3		7.0		7.0		26.1		26.1		27.1	
Progression Factor	1.49		0.95		0.95		1.00		1.00		1.13	
Incremental Delay, d2	0.3		0.4		0.4		3.8		3.8		7.7	
Delay (s)	9.7		7.0		7.0		30.0		30.0		38.2	
Level of Service	A		A		A		C		C		D	
Approach Delay (s)	9.7		7.0		7.0		30.0		30.0		38.2	
Approach LOS	A		A		A		C		C		D	
Intersection Summary												
HCM Average Control Delay	16.1		16.1		16.1		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.51		0.51		0.51		0.51		0.51		0.51	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	114.4%		114.4%		114.4%		ICU Level of Service		H		H	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2015 PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frbp, ped/bikes	1.00			1.00			0.99			1.00		0.96
Flpb, ped/bikes	1.00			1.00			1.00			1.00		1.00
Frt	1.00			0.99			0.93			0.93		0.92
Flt Protected	1.00			1.00			0.98			0.98		0.98
Satd. Flow (prot)	5052			4975			1695			1695		1608
Flt Permitted	0.75			0.93			0.86			0.86		0.85
Satd. Flow (perm)	3825			4623			1493			1493		1401
Volume (vph)	90	815	10	10	945	60	10	0	10	138	0	189
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.96	0.96	0.95	0.95	0.95	0.96	0.95	0.96
Adj. Flow (vph)	94	849	11	11	984	62	11	0	11	144	0	197
RTOR Reduction (vph)	0	1	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	953	0	0	1057	0	0	14	0	0	341	0
Confl. Peds. (#/hr)							79					79
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	49.3		49.3		49.3		22.7		22.7		22.7	
Effective Green, g (s)	49.3		49.3		49.3		22.7		22.7		22.7	
Actuated g/C Ratio	0.62		0.62		0.62		0.28		0.28		0.28	
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)	2357		2849		2849		424		424		398	
v/s Ratio Prot												
v/s Ratio Perm	c0.25		0.23		0.23		0.01		0.01		c0.24	
v/c Ratio	0.40		0.37		0.37		0.03		0.03		0.86	
Uniform Delay, d1	7.8		7.6		7.6		20.7		20.7		27.1	
Progression Factor	0.79		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.5		0.4		0.4		0.0		0.0		16.4	
Delay (s)	6.7		8.0		8.0		20.7		20.7		43.5	
Level of Service	A		A		A		C		C		D	
Approach Delay (s)	6.7		8.0		8.0		20.7		20.7		43.5	
Approach LOS	A		A		A		C		C		D	
Intersection Summary												
HCM Average Control Delay	12.7		12.7		12.7		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.55		0.55		0.55		0.55		0.55		0.55	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	73.7%		73.7%		73.7%		ICU Level of Service		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2015 PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.99			0.95			1.00			0.98		
Flt Protected	0.99			1.00			0.95			1.00		
Satd. Flow (prot)	4925			4756			1748			3451		
Flt Permitted	0.67			0.76			0.29			1.00		
Satd. Flow (perm)	3351			3625			534			3451		
Volume (vph)	267	605	91	90	784	426	110	896	100	206	596	81
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)	281	637	96	95	825	448	116	943	105	217	627	85
RTOR Reduction (vph)	0	9	0	0	6	0	0	7	0	0	9	0
Lane Group Flow (vph)	0	1005	0	0	1362	0	116	1041	0	217	703	0
Confl. Peds. (#/hr)	26		19		26		39		92		92	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	37.8		37.8		34.4		34.4		34.4		34.4	
Effective Green, g (s)	39.3		39.3		35.4		35.4		35.4		35.4	
Actuated g/C Ratio	0.48		0.48		0.43		0.43		0.43		0.43	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1592		1723		229		1477		112		1479	
v/s Ratio Prot					0.30		0.20					
v/s Ratio Perm	0.30		c0.38		0.22		c0.83		0.20		0.20	
v/c Ratio	1.62dl		0.79		0.51		0.70		1.94		0.48	
Uniform Delay, d1	16.3		18.2		17.3		19.4		23.7		17.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.6		2.4		7.8		2.8		452.8		1.1	
Delay (s)	16.9		20.6		25.1		22.2		476.5		18.1	
Level of Service	B		C		C		C		F		B	
Approach Delay (s)	16.9		20.6		22.5		125.2					
Approach LOS	B		C		C		F					
Intersection Summary												
HCM Average Control Delay	42.0		HCM Level of Service				D					
HCM Volume to Capacity ratio	1.33											
Actuated Cycle Length (s)	82.7		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	99.9%		ICU Level of Service				F					
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

2015 PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			1.00			0.89		
Flpb, ped/bikes	1.00			1.00			0.96			1.00		
Frt	0.99			1.00			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5020			5019			1748			1406		
Flt Permitted	0.84			0.78			0.81			1.00		
Satd. Flow (perm)	4230			3930			1457			1406		
Volume (vph)	40	862	39	100	1167	40	93	94	200	30	30	80
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	40	871	39	101	1179	40	94	95	202	30	30	81
RTOR Reduction (vph)	0	6	0	0	4	0	0	0	75	0	37	0
Lane Group Flow (vph)	0	944	0	0	1316	0	0	189	127	0	104	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		2		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	49.5		49.5		24.5		24.5		24.5		24.5	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	2564		2383		428		413		427		427	
v/s Ratio Prot					c0.13		0.09		0.07			
v/s Ratio Perm	0.22		c0.33		0.44		0.31		0.24		0.24	
v/c Ratio	0.37		0.55		22.9		21.9		21.5		21.5	
Uniform Delay, d1	8.0		9.3		1.00		1.00		1.00		1.00	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.4		0.9		3.3		1.9		1.4		1.4	
Delay (s)	8.4		10.3		26.2		23.9		22.9		22.9	
Level of Service	A		B		C		C		C		C	
Approach Delay (s)	8.4		10.3		25.0		22.9					
Approach LOS	A		B		C		C					
Intersection Summary												
HCM Average Control Delay	12.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	108.2%		ICU Level of Service				G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

2015 PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.99	1.00	1.00	0.94	1.00	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	4917	1770	4885	1770	3539	1488	1770	3539	1497	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	4917	1770	4885	1770	3539	1488	1770	3539	1497	1770	3539
Volume (vph)	200	759	103	110	937	240	230	851	180	380	423	110
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)	211	799	108	116	986	253	242	896	189	400	445	116
RTOR Reduction (vph)	0	14	0	0	38	0	0	0	24	0	0	69
Lane Group Flow (vph)	211	893	0	116	1201	0	242	896	165	400	445	47
Confl. Peds. (#/hr)	81		22		50		43		50		43	
Turn Type	Prot		Prot		Prot		pm+ov		Prot		pm+ov	
Protected Phases	7	4	3	8	5	2	3	1	6	7	6	6
Permitted Phases	4		4		4		2		4		2	
Actuated Green, G (s)	12.0	34.0	12.0	34.0	21.0	33.0	45.0	25.0	37.0	49.0	37.0	49.0
Effective Green, g (s)	11.0	35.0	11.0	35.0	20.0	34.0	45.0	24.0	38.0	49.0	37.0	49.0
Actuated g/C Ratio	0.09	0.29	0.09	0.29	0.17	0.28	0.38	0.20	0.32	0.41	0.32	0.41
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0	3.0
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	3.0
Lane Grp Cap (vph)	162	1434	162	1425	295	1003	608	354	1121	661	162	1434
v/s Ratio Prot	c0.12	0.18	0.07	c0.25	0.14	c0.25	0.02	c0.23	c0.13	0.01	c0.12	0.18
v/s Ratio Perm	c0.20		0.13		c0.30		0.08		0.03		0.03	
v/c Ratio	1.30	0.62	0.72	0.84	0.82	0.89	0.27	1.13	0.40	0.07	1.30	0.62
Uniform Delay, d1	54.5	36.8	53.0	39.9	48.3	41.3	26.1	48.0	32.0	21.6	54.5	36.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	173.6	2.0	14.0	6.2	16.5	12.0	0.2	87.9	1.1	0.0	173.6	2.0
Delay (s)	228.1	38.8	67.0	46.2	64.7	53.3	26.3	135.9	33.1	21.7	228.1	38.8
Level of Service	F	D	E	D	E	D	C	F	C	C	F	D
Approach Delay (s)	74.6		47.9		51.5		74.5		74.5		74.6	
Approach LOS	E		D		D		E		E		E	
Intersection Summary												
HCM Average Control Delay	60.6		HCM Level of Service		E		E		E		E	
HCM Volume to Capacity ratio	0.99		HCM Level of Service		B		B		B		B	
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		20.0		20.0		20.0		20.0	
Intersection Capacity Utilization	92.9%		ICU Level of Service		F		F		F		F	
Analysis Period (min)	15		Analysis Period (min)		15		15		15		15	

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2015 PM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Frpb, ped/bikes	0.94		0.96		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	0.97		0.97		0.96		1.00		0.95		1.00	
Frt	0.96		0.96		1.00		0.99		1.00		0.99	
Flt Protected	0.98		0.98		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	1598		1641		1700		3460		1679		3451	
Flt Permitted	0.67		0.82		0.28		1.00		0.34		1.00	
Satd. Flow (perm)	1095		1365		496		3460		597		3451	
Volume (vph)	112	50	70	60	70	64	140	681	50	46	813	67
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)	118	53	74	63	74	67	147	717	53	48	856	71
RTOR Reduction (vph)	0	23	0	0	26	0	0	5	0	0	6	0
Lane Group Flow (vph)	0	222	0	0	178	0	147	765	0	48	921	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		2		6		6		6	
Actuated Green, G (s)	17.9		17.9		55.1		55.1		55.1		55.1	
Effective Green, g (s)	17.4		17.4		54.6		54.6		54.6		54.6	
Actuated g/C Ratio	0.22		0.22		0.68		0.68		0.68		0.68	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	238		297		339		2361		407		2355	
v/s Ratio Prot	c0.20		0.13		c0.30		0.08		0.03		0.03	
v/s Ratio Perm	c0.20		0.13		c0.30		0.08		0.03		0.03	
v/c Ratio	0.93		0.60		0.43		0.32		0.12		0.39	
Uniform Delay, d1	30.7		28.2		5.7		5.2		4.4		5.5	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	39.9		2.2		4.0		0.4		0.6		0.5	
Delay (s)	70.7		30.3		9.7		5.5		5.0		6.0	
Level of Service	E		C		A		A		A		A	
Approach Delay (s)	70.7		30.3		6.2		5.9		5.9		70.7	
Approach LOS	E		C		A		A		A		E	
Intersection Summary												
HCM Average Control Delay	14.9		HCM Level of Service		B		B		B		B	
HCM Volume to Capacity ratio	0.55		HCM Level of Service		C		C		C		C	
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	65.8%		ICU Level of Service		C		C		C		C	
Analysis Period (min)	15		Analysis Period (min)		15		15		15		15	

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2015 PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.97	1.00	0.94	1.00	0.99	1.00	0.99	1.00	0.94	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.96	1.00	0.96	1.00	0.97	1.00	1.00	1.00
Frt	1.00	0.97	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3340	1770	3162	1698	3476	1716	3134	1716	3134	1716	3134
Flt Permitted	0.95	1.00	0.95	1.00	0.26	1.00	0.32	1.00	0.32	1.00	0.32	1.00
Satd. Flow (perm)	1770	3340	1770	3162	471	3476	573	3134	573	3134	573	3134
Volume (vph)	140	420	110	70	440	193	170	658	50	128	525	300
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	429	112	71	449	197	173	671	51	131	536	306
RTOR Reduction (vph)	0	27	0	0	61	0	0	6	0	0	87	0
Lane Group Flow (vph)	143	514	0	71	585	0	173	716	0	131	755	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Prot		Prot		Perm		Perm		Perm		Perm	
Protected Phases	7	4	3	8	2		2		6		6	
Permitted Phases	2		2		6		6		6		6	
Actuated Green, G (s)	9.5	22.4	6.7	19.6	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4
Effective Green, g (s)	10.0	21.9	7.2	19.1	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9
Actuated g/C Ratio	0.12	0.26	0.08	0.22	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Clearance Time (s)	4.5	3.5	4.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (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
Lane Grp Cap (vph)	208	861	150	711	243	1795	296	1619	296	1619	296	1619
v/s Ratio Prot	c0.08	c0.15	0.04	c0.18	0.21		0.24		0.24		0.24	
v/s Ratio Perm	c0.37		c0.37		0.23		0.23		0.23		0.23	
v/c Ratio	0.69	0.60	0.47	0.82	0.71	0.40	0.44	0.47	0.44	0.47	0.44	0.47
Uniform Delay, d1	36.0	27.7	37.1	31.3	15.7	12.5	12.9	13.1	12.9	13.1	12.9	13.1
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	7.3	0.7	0.9	7.3	16.3	0.7	4.7	1.0	4.7	1.0	4.7	1.0
Delay (s)	43.3	28.4	38.0	38.6	32.0	13.2	17.6	14.1	17.6	14.1	17.6	14.1
Level of Service	D	C	D	D	C	B	B	B	B	B	B	B
Approach Delay (s)	31.5		38.5		16.8		14.5		14.5		14.5	
Approach LOS	C		D		B		B		B		B	
Intersection Summary												
HCM Average Control Delay	24.0		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	77.0%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

2015 PM + Commercial
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗		↖ ↗		↖ ↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	0.95	0.95
Frt	0.91	1.00	1.00	0.98	1.00	0.98
Flt Protected	0.99	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1662	1770	3539	3461	3461	3461
Flt Permitted	0.99	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1662	1770	3539	3461	3461	3461
Volume (vph)	65	150	85	1515	702	121
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	158	89	1595	739	127
RTOR Reduction (vph)	127	0	0	0	12	0
Lane Group Flow (vph)	99	0	89	1595	854	0
Turn Type	Prot					
Protected Phases	2	3		8	4	
Permitted Phases	2					
Actuated Green, G (s)	15.5	7.3		56.5	45.2	
Effective Green, g (s)	15.5	7.3		56.5	45.2	
Actuated g/C Ratio	0.19	0.09		0.71	0.57	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	162	2499	1955	1955	
v/s Ratio Prot	c0.06	0.05		c0.45	0.25	
v/s Ratio Perm	0.31					
v/c Ratio	0.31	0.55		0.64	0.44	
Uniform Delay, d1	27.6	34.8		6.3	10.0	
Progression Factor	1.00	1.00		1.00	0.65	
Incremental Delay, d2	0.5	3.8		1.3	0.5	
Delay (s)	28.2	38.6		7.5	7.1	
Level of Service	C	D		A	A	
Approach Delay (s)	28.2	9.2		7.1	7.1	
Approach LOS	C	A		A	A	
Intersection Summary						
HCM Average Control Delay	10.1		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.57					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	61.4%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 PM + Commercial + Mit
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3456		1770	3308		1770	3325		1770	3413	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3456		1770	3308		1770	3325		1770	3413	
Volume (vph)	460	880	82	120	510	290	90	911	260	220	682	60
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)	484	926	86	126	537	305	95	959	274	232	718	63
RTOR Reduction (vph)	0	7	0	0	79	0	0	26	0	0	6	0
Lane Group Flow (vph)	484	1005	0	126	763	0	95	1207	0	232	775	0
Confl. Peds. (#/hr)	15		48	48		15	123		48	48		123
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.4	28.0		9.4	22.0		5.0	33.6		12.0	40.6	
Effective Green, g (s)	14.9	29.0		8.9	23.0		4.5	34.6		11.5	41.6	
Actuated g/C Ratio	0.15	0.29		0.09	0.23		0.04	0.35		0.12	0.42	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	512	1002		158	761		80	1150		204	1420	
v/s Ratio Prot	c0.14	c0.29		0.07	0.23		0.05	c0.36		c0.13	0.23	
v/s Ratio Perm												
v/c Ratio	0.95	1.00		0.80	1.00		1.19	1.05		1.14	0.55	
Uniform Delay, d1	42.1	35.5		44.7	38.5		47.8	32.7		44.2	22.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.21	0.74	
Incremental Delay, d2	26.2	29.1		22.3	33.2		159.7	40.5		98.6	1.2	
Delay (s)	68.4	64.6		67.0	71.7		207.4	73.2		152.2	17.6	
Level of Service	E	E		E	E		F	E		F	B	
Approach Delay (s)		65.8			71.1			82.8			48.5	
Approach LOS		E			E			F			D	
Intersection Summary												
HCM Average Control Delay		67.9			HCM Level of Service			E				
HCM Volume to Capacity ratio		1.01										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		96.9%			ICU Level of Service			F				
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2015 PM + Commercial + Mit
1/21/2008

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)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		0.91		1.00	0.95		1.00	0.95		1.00	1.00	1.00
Frbp, ped/bikes		1.00		1.00	0.99		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.99		1.00	0.97		1.00	0.97		1.00	0.98	0.98
Flt Protected		0.99		0.95	1.00		0.99	0.99		0.95	1.00	1.00
Satd. Flow (prot)		5018		1768	3396		1793	1763		1763	1802	1802
Flt Permitted		0.71		0.28	1.00		0.80	0.32		0.32	1.00	1.00
Satd. Flow (perm)		3603		529	3396		1449	599		599	1802	1802
Volume (vph)	110	698	30	93	667	201	80	375	90	70	276	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	712	31	95	681	205	82	383	92	71	282	51
RTOR Reduction (vph)	0	4	0	0	32	0	0	8	0	0	7	0
Lane Group Flow (vph)	0	851	0	95	854	0	0	549	0	71	326	0
Confl. Peds. (#/hr)	24		4	4		24	48		12	12		48
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			8		2		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		46.0		46.0	46.0		34.0	34.0		34.0	34.0	34.0
Effective Green, g (s)		47.0		47.0	47.0		35.0	35.0		35.0	35.0	35.0
Actuated g/C Ratio		0.52		0.52	0.52		0.39	0.39		0.39	0.39	0.39
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)		1882		276	1773		564	233		701		701
v/s Ratio Prot					c0.25							0.18
v/s Ratio Perm		0.24		0.18			c0.38	0.12				
v/c Ratio		0.45		0.34	0.48		0.97	0.30		0.46		
Uniform Delay, d1		13.4		12.5	13.7		27.0	19.1		20.5		
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.8		3.4	0.9		31.9	3.3		2.2		
Delay (s)		14.2		15.9	14.7		58.9	22.4		22.7		
Level of Service		B		B	B		E	C		C		C
Approach Delay (s)		14.2			14.8		58.9			22.7		
Approach LOS		B			B		E			C		
Intersection Summary												
HCM Average Control Delay		24.5			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		139.8%			ICU Level of Service			H				
Analysis Period (min)		15										

**APPENDIX N:
YEAR 2030 PLUS COMMERCIAL ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2030 AM + Commercial
1/21/2008

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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4896		1770	4953		2006	2035		1986	1953	
Flt Permitted	0.95	1.00		0.95	1.00		0.10	1.00		0.42	1.00	
Satd. Flow (perm)	1770	4896		1770	4953		201	2035		876	1953	
Volume (vph)	310	1003	232	120	1660	250	200	298	70	180	432	290
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)	326	1056	244	126	1747	263	211	314	74	189	455	305
RTOR Reduction (vph)	0	30	0	0	16	0	0	7	0	0	20	0
Lane Group Flow (vph)	326	1270	0	126	1994	0	211	381	0	189	740	0
Confl. Peds. (#/hr)			10	10		10	10		10	10		10
Turn Type	Prot		Prot		pm+pt		Perm		Perm		Prot	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	17.0	47.9		13.1	44.0		48.5	48.5		39.5	39.5	
Effective Green, g (s)	17.0	47.9		13.1	44.0		49.0	49.0		40.0	40.0	
Actuated g/C Ratio	0.14	0.40		0.11	0.37		0.41	0.41		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	1954		193	1816		187	831		292	651	
v/s Ratio Prot	c0.18	c0.26		0.07	c0.40		c0.07	0.19		c0.38		
v/s Ratio Perm							0.39			0.22		
v/c Ratio	1.30	0.65		0.65	1.10		1.13	0.46		0.65	1.14	
Uniform Delay, d1	51.5	29.2		51.3	38.0		58.7	25.8		34.0	40.0	
Progression Factor	1.00	1.00		0.89	1.32		1.00	1.00		1.00	1.00	
Incremental Delay, d2	160.6	1.7		0.7	45.0		104.5	0.4		4.9	79.3	
Delay (s)	212.1	30.9		46.5	95.0		163.2	26.2		38.9	119.3	
Level of Service	F	C		D	F		F	C		D	F	
Approach Delay (s)	67.3		92.1		74.5		103.3					
Approach LOS	E		F		E		F					
Intersection Summary												
HCM Average Control Delay	84.5		HCM Level of Service		F							
HCM Volume to Capacity ratio	1.16											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	120.2%		ICU Level of Service		H							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 AM + Commercial
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Flpb, ped/bikes		1.00		1.00	0.99			0.99		1.00	0.96	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.95		1.00	0.91			0.97		1.00	0.96	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1749		1681	1596			3411		1770	3261	
Flt Permitted		0.59		0.74	1.00			0.74		0.95	1.00	
Satd. Flow (perm)		1054		1302	1596			2517		1770	3261	
Volume (vph)		10	10	10	359	330	470	10	1165	245	110	1341
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)		11	11	11	378	347	495	11	1226	258	116	1412
RTOR Reduction (vph)		0	11	0	0	43	0	0	14	0	0	28
Lane Group Flow (vph)		0	22	0	378	799	0	0	1481	0	116	1868
Confl. Peds. (#/hr)		4				4	44			12	12	44
Turn Type	Perm		Perm		Perm		Prot		Prot		Prot	
Protected Phases	7		8		8		2		1		6	
Permitted Phases	7		8		2							
Actuated Green, G (s)	4.0		41.5		41.5		50.0		6.5		61.0	
Effective Green, g (s)	4.5		42.0		42.0		50.5		7.0		61.5	
Actuated g/C Ratio	0.04		0.35		0.35		0.42		0.06		0.51	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	40		456		559		1059		103		1671	
v/s Ratio Prot									0.07		c0.57	
v/s Ratio Perm	c0.02		0.29		0.50		c0.59					
v/c Ratio	0.56		0.83		1.43		1.40		1.13		1.12	
Uniform Delay, d1	56.8		35.7		39.0		34.8		56.5		29.2	
Progression Factor	1.00		1.00		1.00		0.98		1.00		1.00	
Incremental Delay, d2	10.2		11.3		203.5		179.7		126.7		61.9	
Delay (s)	67.0		47.0		242.5		213.7		183.2		91.1	
Level of Service	E		D		F		F		F		F	
Approach Delay (s)	67.0		181.9		213.7		213.7		96.4			
Approach LOS	E		F		F		F		F			
Intersection Summary												
HCM Average Control Delay	155.0		HCM Level of Service		F							
HCM Volume to Capacity ratio	1.37											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	137.9%		ICU Level of Service		H							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 AM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3417		1770	3370		1770	3391		1770	3393	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3417		1770	3370		1770	3391		1770	3393	
Volume (vph)	460	650	113	140	820	320	120	671	140	320	1180	220
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	677	118	146	854	333	125	699	146	333	1229	229
RTOR Reduction (vph)	0	12	0	0	34	0	0	15	0	0	13	0
Lane Group Flow (vph)	479	783	0	146	1153	0	125	830	0	333	1445	0
Confl. Peds. (#/hr)	6		24	24		6	36		28	28		36
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.5	36.8		12.7	34.0		8.5	30.6		22.9	45.0	
Effective Green, g (s)	15.0	37.8		12.2	35.0		8.0	31.6		22.4	46.0	
Actuated g/C Ratio	0.12	0.31		0.10	0.29		0.07	0.26		0.19	0.38	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	429	1076		180	983		118	893		330	1301	
v/s Ratio Prot	c0.14	c0.23		0.08	c0.34		0.07	0.24		c0.19	c0.43	
v/s Ratio Perm												
v/c Ratio	1.12	0.73		0.81	1.17		1.06	0.93		1.01	1.11	
Uniform Delay, d1	52.5	36.5		52.8	42.5		56.0	43.1		48.8	37.0	
Progression Factor	0.82	0.82		1.00	1.00		1.00	1.00		1.25	0.80	
Incremental Delay, d2	74.5	1.7		22.4	88.7		99.7	17.3		17.1	51.0	
Delay (s)	117.5	31.5		75.1	131.2		155.7	60.4		78.1	80.8	
Level of Service	F	C		E	F		F	E		E	F	
Approach Delay (s)		63.9			125.1			72.7			80.3	
Approach LOS		E			F			E			F	
Intersection Summary												
HCM Average Control Delay		86.1										
HCM Volume to Capacity ratio		1.17										
Actuated Cycle Length (s)		120.0						20.0				
Intersection Capacity Utilization		106.3%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 AM + Commercial
1/21/2008

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)		4.0								4.0	4.0	
Lane Util. Factor		1.00								0.95	0.97	
Frt		0.86								0.93	1.00	
Flt Protected		1.00								1.00	0.95	
Satd. Flow (prot)		1611								3284	3433	
Flt Permitted		1.00								0.94	0.95	
Satd. Flow (perm)		1611								3075	3433	
Volume (vph)	0	0	10	0	0	0	10	365	341	1600	669	60
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)	0	0	11	0	0	0	11	384	359	1684	704	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	728	0	1684	767	0
Turn Type										Prot		
Protected Phases										2	1	6
Permitted Phases												
Actuated Green, G (s)		0.0						8.0		29.0	45.0	
Effective Green, g (s)		0.0						8.0		29.0	45.0	
Actuated g/C Ratio		0.00						0.18		0.64	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						547		2212	3496	
v/s Ratio Prot										c0.49	0.22	
v/s Ratio Perm										c0.24		
v/c Ratio		0.00						11.22dr		0.76	0.22	
Uniform Delay, d1		22.5						18.5		5.6	0.0	
Progression Factor		1.00						0.78		1.00	1.00	
Incremental Delay, d2		0.0						159.9		2.5	0.1	
Delay (s)		22.5						174.3		8.1	0.1	
Level of Service		C						F		A	A	
Approach Delay (s)		22.5			0.0			174.3		5.6		
Approach LOS		C			A			F		A		
Intersection Summary												
HCM Average Control Delay		45.2								HCM Level of Service		D
HCM Volume to Capacity ratio		0.88										
Actuated Cycle Length (s)		45.0								Sum of lost time (s)		8.0
Intersection Capacity Utilization		80.3%								ICU Level of Service		D
Analysis Period (min)		15										
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2030 AM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.95		0.95	
Frpb, ped/bikes	0.97		0.95		0.98		0.98		0.99		0.99	
Flpb, ped/bikes	0.98		0.98		1.00		1.00		1.00		1.00	
Frt	0.98		0.94		0.98		0.98		0.99		0.99	
Flt Protected	0.98		0.99		1.00		1.00		1.00		1.00	
Satd. Flow (prot)	1705		1606		3389		3476		3476		3476	
Flt Permitted	0.84		0.88		0.87		0.88		0.88		0.88	
Satd. Flow (perm)	1453		1426		2945		3058		3058		3058	
Volume (vph)	80	100	34	60	70	110	41	506	90	60	799	40
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)	84	105	36	63	74	116	43	533	95	63	841	42
RTOR Reduction (vph)	0	15	0	0	68	0	0	30	0	0	7	0
Lane Group Flow (vph)	0	210	0	0	185	0	0	641	0	0	939	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	15.0		15.0		22.0		22.0		22.0		22.0	
Effective Green, g (s)	15.0		15.0		22.0		22.0		22.0		22.0	
Actuated g/C Ratio	0.33		0.33		0.49		0.49		0.49		0.49	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	484		475		1440		1495		1495		1495	
v/s Ratio Prot												
v/s Ratio Perm	c0.14		0.13		0.22		c0.31		c0.31		c0.31	
v/c Ratio	0.43		0.39		0.45		0.63		0.63		0.63	
Uniform Delay, d1	11.7		11.5		7.5		8.5		8.5		8.5	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	2.8		2.4		1.0		2.0		2.0		2.0	
Delay (s)	14.5		13.9		8.5		10.5		10.5		10.5	
Level of Service	B		B		A		B		B		B	
Approach Delay (s)	14.5		13.9		8.5		10.5		10.5		10.5	
Approach LOS	B		B		A		B		B		B	
Intersection Summary												
HCM Average Control Delay	10.7		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	45.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	73.8%		ICU Level of Service		D							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2030 AM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.91		0.91	
Frpb, ped/bikes	0.96		0.95		0.98		0.98		0.99		0.99	
Flpb, ped/bikes	0.98		0.98		1.00		1.00		1.00		1.00	
Frt	0.96		0.96		0.99		0.99		0.99		0.99	
Flt Protected	0.98		0.99		1.00		1.00		1.00		1.00	
Satd. Flow (prot)	1639		1645		3432		4960		4960		4960	
Flt Permitted	0.76		0.79		0.76		0.80		0.80		0.80	
Satd. Flow (perm)	1259		1317		2600		3985		3985		3985	
Volume (vph)	80	100	80	58	90	70	40	1059	72	80	1957	100
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)	84	105	84	61	95	74	42	1115	76	84	2060	105
RTOR Reduction (vph)	0	2	0	0	25	0	0	4	0	0	4	0
Lane Group Flow (vph)	0	271	0	0	205	0	0	1229	0	0	2245	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		4		2		6		6	
Actuated Green, G (s)	19.4		19.4		56.6		56.6		56.6		56.6	
Effective Green, g (s)	19.9		19.9		57.1		57.1		57.1		57.1	
Actuated g/C Ratio	0.23		0.23		0.67		0.67		0.67		0.67	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	295		308		1747		2677		2677		2677	
v/s Ratio Prot												
v/s Ratio Perm	c0.22		0.16		0.47		c0.56		c0.56		c0.56	
v/c Ratio	0.92		0.67		0.70		0.84		0.84		0.84	
Uniform Delay, d1	31.8		29.5		8.7		10.5		10.5		10.5	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	31.9		4.2		2.4		3.3		3.3		3.3	
Delay (s)	63.7		33.7		11.1		13.8		13.8		13.8	
Level of Service	E		C		B		B		B		B	
Approach Delay (s)	63.7		33.7		11.1		13.8		13.8		13.8	
Approach LOS	E		C		B		B		B		B	
Intersection Summary												
HCM Average Control Delay	17.5		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.86											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	112.8%		ICU Level of Service		H							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 AM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Frt	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3375	1764	3454	1768	1830	1745	1815	1745	1815	1745	1815
Flt Permitted	0.17	1.00	0.18	1.00	0.24	1.00	0.44	1.00	0.44	1.00	0.44	1.00
Satd. Flow (perm)	324	3375	328	3454	449	1830	815	1815	815	1815	815	1815
Volume (vph)	180	521	190	93	934	114	160	381	39	206	600	110
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)	189	548	200	98	983	120	168	401	41	217	632	116
RTOR Reduction (vph)	0	46	0	0	11	0	5	0	0	3	0	0
Lane Group Flow (vph)	189	702	0	98	1092	0	168	437	0	217	745	0
Confl. Peds. (#/hr)	30	12	12	30	6	54	54	6	54	54	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	6	6	6	6	6	6	6
Permitted Phases	4	8	8	2	2	6	6	6	6	6	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	970	94	993	275	1121	499	1112	499	1112	499	1112
v/s Ratio Prot	0.21	0.32	0.21	0.32	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
v/s Ratio Perm	c0.58	0.30	0.30	0.37	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
v/c Ratio	2.03	0.72	1.04	1.10	0.61	0.39	0.43	0.67	0.43	0.67	0.43	0.67
Uniform Delay, d1	28.5	25.6	28.5	28.5	9.6	7.9	8.2	10.2	8.2	10.2	8.2	10.2
Progression Factor	1.00	1.00	0.88	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	499.9	4.7	93.8	57.0	9.7	1.0	2.7	3.2	2.7	3.2	2.7	3.2
Delay (s)	528.4	30.3	118.9	82.4	19.3	8.9	10.9	13.4	10.9	13.4	10.9	13.4
Level of Service	F	C	F	F	B	A	B	B	B	B	B	B
Approach Delay (s)	130.8	85.3	11.8	12.9	11.8	12.9	12.9	12.9	11.8	12.9	11.8	12.9
Approach LOS	F	F	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	65.9		HCM Level of Service				E					
HCM Volume to Capacity ratio	1.10											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	104.5%		ICU Level of Service				G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 AM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Frt	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1766	3413	1750	3496	1766	3496	3395	3426	3395	3426	3395	3426
Flt Permitted	0.16	1.00	0.29	1.00	0.65	1.00	0.65	1.00	0.65	1.00	0.69	1.00
Satd. Flow (perm)	298	3413	542	3496	2228	3496	2228	2397	2228	2397	2228	2397
Volume (vph)	80	586	130	71	961	73	120	281	79	130	380	70
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)	84	617	137	75	1012	77	126	296	83	137	400	74
RTOR Reduction (vph)	0	24	0	0	7	0	0	21	0	0	14	0
Lane Group Flow (vph)	84	730	0	75	1082	0	0	484	0	0	597	0
Confl. Peds. (#/hr)	18	54	54	18	4	18	18	4	18	18	4	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	6	6	6	6	6	6	6
Permitted Phases	4	8	8	2	2	6	6	6	6	6	6	6
Actuated Green, G (s)	38.0	38.0	38.0	38.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	145	1664	264	1704	919	989	919	989	919	989	919	989
v/s Ratio Prot	0.21	0.31	0.21	0.31	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
v/s Ratio Perm	0.28	0.14	0.14	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
v/c Ratio	0.58	0.44	0.28	0.63	0.53	0.60	0.53	0.60	0.53	0.60	0.53	0.60
Uniform Delay, d1	14.6	13.4	12.2	15.2	17.6	18.4	17.6	18.4	17.6	18.4	17.6	18.4
Progression Factor	0.97	0.90	1.33	1.42	0.56	1.00	0.56	1.00	0.56	1.00	0.56	1.00
Incremental Delay, d2	12.7	0.7	2.1	1.5	1.4	2.7	1.4	2.7	1.4	2.7	1.4	2.7
Delay (s)	26.9	12.8	18.4	23.1	11.3	21.1	11.3	21.1	11.3	21.1	11.3	21.1
Level of Service	C	B	B	C	B	C	B	C	B	C	B	C
Approach Delay (s)	14.2	22.8	11.3	21.1	11.3	21.1	11.3	21.1	11.3	21.1	11.3	21.1
Approach LOS	B	C	B	C	B	C	B	C	B	C	B	C
Intersection Summary												
HCM Average Control Delay	18.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	78.4%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2030 AM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1766	3481		1747	3457			3366			3423	
Flt Permitted	0.16	1.00		0.29	1.00			0.79			0.73	
Satd. Flow (perm)	294	3481		530	3457			2693			2511	
Volume (vph)	50	693	61	125	946	139	49	248	92	157	476	80
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	722	64	130	985	145	51	258	96	164	496	83
RTOR Reduction (vph)	0	8	0	0	15	0	0	37	0	0	12	0
Lane Group Flow (vph)	52	778	0	130	1115	0	0	368	0	0	731	0
Confl. Peds. (#/hr)	13		71	71		13	22		22	22		22
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	41.5	41.5		41.5	41.5			32.0			32.0	
Effective Green, g (s)	41.0	41.0		41.0	41.0			31.0			31.0	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.39			0.39	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	151	1784		272	1772			1044			973	
v/s Ratio Prot	0.22		c0.32		c0.32		c0.32		c0.32		c0.32	
v/s Ratio Perm	0.18		0.25				0.14				c0.29	
v/c Ratio	0.34	0.44		0.48	0.63			0.35			0.75	
Uniform Delay, d1	11.5	12.2		12.6	14.0			17.4			21.2	
Progression Factor	1.21	1.20		1.00	1.00			0.64			1.00	
Incremental Delay, d2	5.5	0.7		5.9	1.7			0.9			5.3	
Delay (s)	19.4	15.4		18.5	15.7			11.9			26.5	
Level of Service	B	B		B	B			B			C	
Approach Delay (s)	15.7		16.0		11.9		26.5		26.5		26.5	
Approach LOS	B		B		B		C		C		C	
Intersection Summary												
HCM Average Control Delay	17.8		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	103.6%		ICU Level of Service		G							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

2030 AM + Commercial
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frpb, ped/bikes	0.94	0.94	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	1.00	1.00	0.96	0.96
Flt Protected	1.00	1.00	0.95	1.00	0.96	0.96
Satd. Flow (prot)	3233	3233	1770	3539	1733	1733
Flt Permitted	1.00	1.00	0.95	1.00	0.96	0.96
Satd. Flow (perm)	3233	3233	1770	3539	1733	1733
Volume (vph)	793	151	88	1099	111	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	835	159	93	1157	117	42
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	994	0	93	1157	159	0
Confl. Peds. (#/hr)	146		266		266	
Turn Type	Perm		Prot		Prot	
Protected Phases	4		3	8	2	
Permitted Phases	4		3	8	2	
Actuated Green, G (s)	52.9		8.6	65.5	11.5	
Effective Green, g (s)	52.9		8.6	65.5	11.5	
Actuated g/C Ratio	0.62		0.10	0.77	0.14	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2012		179	2727	234	
v/s Ratio Prot	c0.31		c0.05	0.33	c0.09	
v/s Ratio Perm						
v/c Ratio	0.49		0.52	0.42	0.68	
Uniform Delay, d1	8.8		36.2	3.3	35.0	
Progression Factor	1.00		0.85	1.80	0.88	
Incremental Delay, d2	0.9		1.0	0.2	7.2	
Delay (s)	9.6		31.9	6.2	37.8	
Level of Service	A		C	A	D	
Approach Delay (s)	9.6		8.1	37.8		
Approach LOS	A		A	D		
Intersection Summary						
HCM Average Control Delay	10.7		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.53					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	51.3%		ICU Level of Service		A	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 AM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.93		1.00	0.98		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.97	1.00		0.95	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1721	3096		1690	3416		1770	3437		1770	3361	
Flt Permitted	0.15	1.00		0.21	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	279	3096		366	3416		1770	3437		1770	3361	
Volume (vph)	146	420	267	128	732	90	135	505	59	100	1354	320
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)	154	442	281	135	771	95	142	532	62	105	1425	337
RTOR Reduction (vph)	0	119	0	0	11	0	0	9	0	0	23	0
Lane Group Flow (vph)	154	604	0	135	855	0	142	585	0	105	1739	0
Confl. Peds. (#/hr)	72		137	137		72			58	58		92
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases	4		8		8		5		2		1	
Permitted Phases	4		8		8		5		2		1	
Actuated Green, G (s)	25.5	25.5		25.5	25.5		10.7	37.9		8.1	35.3	
Effective Green, g (s)	26.0	26.0		26.0	26.0		11.2	38.4		8.6	35.8	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.13	0.45		0.10	0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	85	947		112	1045		233	1553		179	1416	
v/s Ratio Prot		0.20		0.25			c0.08	c0.17		0.06	c0.52	
v/s Ratio Perm	c0.55			0.37								
v/c Ratio	1.81	0.64		1.21	0.82		0.61	0.38		0.59	1.23	
Uniform Delay, d1	29.5	25.4		29.5	27.3		34.8	15.4		36.5	24.6	
Progression Factor	0.71	0.56		1.00	1.00		0.95	1.32		1.00	1.00	
Incremental Delay, d2	403.1	0.9		150.4	4.8		3.0	0.7		3.1	109.2	
Delay (s)	424.1	15.2		179.9	32.1		36.1	21.0		39.6	133.8	
Level of Service	F	B		F	C		D	C		D	F	
Approach Delay (s)		87.0			52.1			24.0			128.5	
Approach LOS		F			D			C			F	
Intersection Summary												
HCM Average Control Delay	86.1		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.41											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	101.3%		ICU Level of Service				G					
Analysis Period (min)	15											
c Critical Lane Group												

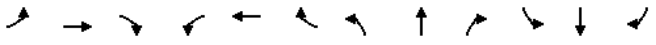
HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2030 AM + Commercial
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	20	33	746	20	20	1706
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	35	785	21	21	1796
Pedestrians	34		33		34	34
Lane Width (ft)	12.0		12.0		12.0	12.0
Walking Speed (ft/s)	4.0		4.0		4.0	4.0
Percent Blockage	3		3		3	3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.56	0.90			0.90	
vC, conflicting volume	1803	471			840	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1130	310			718	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	79	94			97	
cM capacity (veh/h)	101	586			773	
Direction, Lane #						
	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	56	524	283	21	898	898
Volume Left	21	0	0	21	0	0
Volume Right	35	0	21	0	0	0
cSH	208	1700	1700	773	1700	1700
Volume to Capacity	0.27	0.31	0.17	0.03	0.53	0.53
Queue Length 95th (ft)	26	0	0	2	0	0
Control Delay (s)	28.5	0.0	0.0	9.8	0.0	0.0
Lane LOS	D			A		
Approach Delay (s)	28.5	0.0		0.1		
Approach LOS	D					
Intersection Summary						
Average Delay	0.7					
Intersection Capacity Utilization	64.5%		ICU Level of Service		C	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 AM + Commercial
1/21/2008




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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		0.91		1.00	0.95			1.00		1.00	1.00	
Frbp, ped/bikes		1.00		1.00	1.00			0.99		1.00	0.99	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		0.98	1.00	
Frt		0.99		1.00	0.98			0.97		1.00	0.96	
Flt Protected		0.99		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)		4982		1764	3448			1753		1734	1763	
Flt Permitted		0.65		0.24	1.00			0.10		0.39	1.00	
Satd. Flow (perm)		3271		447	3448			179		708	1763	
Volume (vph)	210	720	50	71	1092	191	100	189	90	200	493	200
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)	221	758	53	75	1149	201	105	199	95	211	519	211
RTOR Reduction (vph)	0	7	0	0	17	0	0	13	0	0	17	0
Lane Group Flow (vph)	0	1025	0	75	1333	0	0	386	0	211	713	0
Confl. Peds. (#/hr)	24		18	18		24	24		48	48		24
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	51.0		51.0		51.0		24.0		24.0		24.0	
Effective Green, g (s)	52.0		52.0		52.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2001		273		2109		53		208		519	
v/s Ratio Prot			c0.39						0.40			
v/s Ratio Perm	0.31		0.17				c2.15		0.30			
v/c Ratio	1.39dl		0.27		0.63		7.28		1.01		1.37	
Uniform Delay, d1	9.3		7.7		10.4		30.0		30.0		30.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.9		2.5		1.5		2862.7		66.2		180.2	
Delay (s)	10.3		10.2		11.9		2892.7		96.2		210.2	
Level of Service	B		B		B		F		F		F	
Approach Delay (s)	10.3				11.8		2892.7				184.6	
Approach LOS	B				B		F				F	

Intersection Summary			
HCM Average Control Delay	356.9	HCM Level of Service	F
HCM Volume to Capacity ratio	2.80		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	159.0%	ICU Level of Service	H
Analysis Period (min)	15		

dl - Defacto Left Lane. Recode with 1 though lane as a left lane.
c - Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2030 AM + Commercial
1/21/2008



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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		0.91		1.00	0.91			1.00		1.00	1.00	
Frbp, ped/bikes		1.00		1.00	1.00			1.00		1.00	0.99	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		1.00		0.99	1.00			0.97		1.00	0.97	
Flt Protected		1.00		1.00	0.95			0.95		1.00	1.00	
Satd. Flow (prot)		5034		5008	1762			1801		1770	1801	
Flt Permitted		0.74		0.81	0.20			1.00		0.20	1.00	
Satd. Flow (perm)		3729		4054	362			1801		363	1801	
Volume (vph)	80	920	30	71	1184	111	70	309	87	150	361	80
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)	84	968	32	75	1246	117	74	325	92	158	380	84
RTOR Reduction (vph)	0	4	0	0	13	0	0	13	0	0	10	0
Lane Group Flow (vph)	0	1080	0	0	1425	0	74	404	0	158	454	0
Confl. Peds. (#/hr)			18	18			12					18
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2401		2610		93		462		93		462	
v/s Ratio Prot			c0.35		0.20		c0.43				0.25	
v/s Ratio Perm	0.29		0.55		0.80		0.88		1.70		0.98	
v/c Ratio	0.45		0.55		0.80		0.88		1.70		0.98	
Uniform Delay, d1	7.1		7.8		27.8		28.5		29.8		29.6	
Progression Factor	1.00		0.56		1.00		1.00		1.17		1.18	
Incremental Delay, d2	0.6		0.7		49.1		20.1		350.9		35.0	
Delay (s)	7.8		5.0		76.9		48.6		385.8		69.9	
Level of Service	A		A		E		D		F		E	
Approach Delay (s)	7.8				5.0		52.9				150.1	
Approach LOS	A				A		D				F	

Intersection Summary			
HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		

c - Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

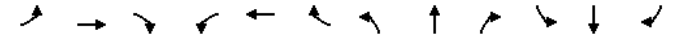
2030 AM + Commercial
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.99			0.97			0.98		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	5022			4988			3404			3432		
Flt Permitted	0.75			0.80			0.70			0.80		
Satd. Flow (perm)	3784			4020			2386			2766		
Volume (vph)	71	1036	60	67	1262	146	40	183	46	107	461	74
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)	75	1091	63	71	1328	154	42	193	48	113	485	78
RTOR Reduction (vph)	0	7	0	0	17	0	0	22	0	0	13	0
Lane Group Flow (vph)	0	1222	0	0	1536	0	0	261	0	0	663	0
Confl. Peds. (#/hr)	17		19		19		17		12		16	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2436		2588		2588		611		611		709	
v/s Ratio Prot												
v/s Ratio Perm	0.32		c0.38		c0.38		0.11		0.11		c0.24	
v/c Ratio	0.50		0.59		0.59		0.43		0.43		0.94	
Uniform Delay, d1	7.5		8.2		8.2		24.9		24.9		29.1	
Progression Factor	0.65		1.00		1.00		1.00		1.00		0.48	
Incremental Delay, d2	0.6		1.0		1.0		2.2		2.2		20.4	
Delay (s)	5.5		9.2		9.2		27.0		27.0		34.3	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	5.5		9.2		9.2		27.0		27.0		34.3	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	13.9		13.9		13.9		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.69		0.69		0.69		0.69		0.69		0.69	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	120.6%		120.6%		120.6%		ICU Level of Service		H		H	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2030 AM + Commercial
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			0.98			1.00		0.94
Flpb, ped/bikes	1.00			1.00			1.00			1.00		1.00
Frt	1.00			0.99			0.93			0.92		0.92
Flt Protected	1.00			1.00			0.98			0.98		0.98
Satd. Flow (prot)	5073			4942			1695			1589		1589
Flt Permitted	0.86			0.93			0.88			0.86		0.86
Satd. Flow (perm)	4359			4583			1530			1399		1399
Volume (vph)	31	1268	10	10	1403	100	10	0	10	54	0	73
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)	33	1335	11	11	1477	105	11	0	11	57	0	77
RTOR Reduction (vph)	0	1	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	1378	0	0	1593	0	0	13	0	0	134	0
Confl. Peds. (#/hr)	17		19		19		17		12		16	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	63.1		63.1		63.1		13.9		13.9		13.9	
Effective Green, g (s)	63.1		63.1		63.1		13.9		13.9		13.9	
Actuated g/C Ratio	0.74		0.74		0.74		0.16		0.16		0.16	
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)	3236		3402		3402		250		250		229	
v/s Ratio Prot												
v/s Ratio Perm	0.32		c0.35		c0.35		0.01		0.01		c0.10	
v/c Ratio	0.43		0.47		0.47		0.05		0.05		0.59	
Uniform Delay, d1	4.1		4.3		4.3		30.0		30.0		32.9	
Progression Factor	1.00		1.04		1.04		1.00		1.00		1.07	
Incremental Delay, d2	0.4		0.1		0.1		0.1		0.1		3.4	
Delay (s)	4.5		4.6		4.6		30.1		30.1		38.5	
Level of Service	A		A		A		C		C		D	
Approach Delay (s)	4.5		4.6		4.6		30.1		30.1		38.5	
Approach LOS	A		A		A		C		C		D	
Intersection Summary												
HCM Average Control Delay	6.2		6.2		6.2		HCM Level of Service		A		A	
HCM Volume to Capacity ratio	0.49		0.49		0.49		0.49		0.49		0.49	
Actuated Cycle Length (s)	85.0		85.0		85.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	77.3%		77.3%		77.3%		ICU Level of Service		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 AM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			0.99		
Frt	0.98			0.98			1.00			0.97		
Flt Protected	0.99			0.99			0.95			1.00		
Satd. Flow (prot)	4932			4920			1770			3417		
Flt Permitted	0.64			0.64			0.13			1.00		
Satd. Flow (perm)	3179			3171			246			3417		
Volume (vph)	157	988	187	200	1146	198	120	410	90	363	1136	237
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)	165	1040	197	211	1206	208	126	432	95	382	1196	249
RTOR Reduction (vph)	0	23	0	0	25	0	0	21	0	0	19	0
Lane Group Flow (vph)	0	1379	0	0	1600	0	126	506	0	382	1426	0
Confl. Peds. (#/hr)	40		9		40		25		31		31	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	45.2		45.2		29.3		29.3		29.3		29.3	
Effective Green, g (s)	46.7		46.7		30.3		30.3		30.3		30.3	
Actuated g/C Ratio	0.55		0.55		0.36		0.36		0.36		0.36	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1747		1742		88		1218		240		1221	
v/s Ratio Prot					0.15		0.42					
v/s Ratio Perm	0.43		c0.50		0.51		c0.57					
v/c Ratio	1.06dl		1.55dl		1.43		0.42		1.59		1.17	
Uniform Delay, d1	15.2		17.4		27.3		20.7		27.3		27.3	
Progression Factor	1.34		1.00		1.26		1.28		0.51		0.49	
Incremental Delay, d2	2.1		8.0		245.2		1.0		275.4		80.0	
Delay (s)	22.5		25.4		279.7		27.4		289.5		93.5	
Level of Service	C		C		F		C		F		F	
Approach Delay (s)	22.5		25.4		76.1		134.5					
Approach LOS	C		C		E		F					
Intersection Summary												
HCM Average Control Delay	66.9		HCM Level of Service		E							
HCM Volume to Capacity ratio	1.18											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	117.0%		ICU Level of Service		H							
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

2030 AM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			0.99			1.00			0.88		
Flpb, ped/bikes	1.00			1.00			0.97			1.00		
Frt	1.00			0.99			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5058			5005			1769			1395		
Flt Permitted	0.83			0.82			0.84			1.00		
Satd. Flow (perm)	4206			4109			1519			1395		
Volume (vph)	40	1408	23	50	1479	90	35	46	30	100	40	60
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)	42	1482	24	53	1557	95	37	48	32	105	42	63
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	18	0	15	0
Lane Group Flow (vph)	0	1546	0	0	1697	0	0	85	14	0	195	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		2		6		6	
Actuated Green, G (s)	48.0		48.0		23.0		23.0		23.0		23.0	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lane Grp Cap (vph)	2550		2491		446		410		391		391	
v/s Ratio Prot					0.06		0.01		c0.15			
v/s Ratio Perm	0.37		c0.41		0.19		0.03		0.50			
v/c Ratio	0.61		0.68		21.1		20.2		23.4			
Uniform Delay, d1	9.8		10.6		1.00		1.00		1.00			
Progression Factor	1.00		1.00		0.9		0.2		4.5			
Incremental Delay, d2	1.1		1.5		22.1		20.3		27.9			
Delay (s)	10.9		12.1		22.1		20.3		27.9			
Level of Service	B		B		C		C		C			
Approach Delay (s)	10.9		12.1		21.6		27.9					
Approach LOS	B		B		C		C					
Intersection Summary												
HCM Average Control Delay	12.8		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	94.1%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

2030 AM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	4922	1770	4839	1770	3539	1515	1770	3539	1523	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	4922	1770	4839	1770	3539	1515	1770	3539	1523	1770	3539
Volume (vph)	170	1200	171	210	1141	380	140	422	130	390	1441	250
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)	179	1263	180	221	1201	400	147	444	137	411	1517	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13
Lane Group Flow (vph)	179	1428	0	221	1551	0	147	444	104	411	1517	250
Confl. Peds. (#/hr)	66		23		38		26		26		26	
Turn Type	Prot		Prot		Prot		pm+ov		Prot		pm+ov	
Protected Phases	7	4	3	8	5	2	3	1	6	7	6	6
Permitted Phases	2		6		2		6		2		6	
Actuated Green, G (s)	12.0	32.0	15.0	35.0	11.0	28.0	43.0	29.0	46.0	58.0	12.0	32.0
Effective Green, g (s)	11.0	33.0	14.0	36.0	10.0	29.0	43.0	28.0	47.0	58.0	11.0	33.0
Actuated g/C Ratio	0.09	0.28	0.12	0.30	0.08	0.24	0.36	0.23	0.39	0.48	0.09	0.28
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0	5.0
Vehicle Extension (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
Lane Grp Cap (vph)	162	1354	207	1452	148	855	593	413	1386	736	162	1354
v/s Ratio Prot	0.10	0.29	c0.12	c0.32	c0.08	0.13	0.02	0.23	c0.43	0.03	0.10	0.29
v/s Ratio Perm	0.13		0.13		0.05		0.13		0.13		0.13	
v/c Ratio	1.10	1.05	1.07	1.07	0.99	0.52	0.18	1.00	1.09	0.34	1.10	1.05
Uniform Delay, d1	54.5	43.5	53.0	42.0	55.0	39.5	26.4	45.9	36.5	19.2	54.5	43.5
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	101.6	40.2	81.6	44.2	71.6	2.3	0.1	42.7	54.3	0.1	101.6	40.2
Delay (s)	156.1	83.7	134.6	86.2	126.5	41.7	26.4	88.6	90.8	19.3	156.1	83.7
Level of Service	F	F	F	F	F	D	C	F	F	B	F	F
Approach Delay (s)	91.7		92.1		56.0		81.8		81.8		91.7	
Approach LOS	F		F		E		F		F		F	
Intersection Summary												
HCM Average Control Delay	84.3		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.09											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	101.4%		ICU Level of Service				G					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2030 AM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		0.95		1.00		0.95	
Frpb, ped/bikes	0.94		0.96		1.00		0.98		1.00		0.99	
Flpb, ped/bikes	0.98		0.96		0.98		1.00		0.94		1.00	
Frt	0.96		0.96		1.00		0.99		1.00		0.99	
Flt Protected	0.98		0.98		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	1610		1626		1733		3434		1663		3472	
Flt Permitted	0.69		0.80		0.17		1.00		0.37		1.00	
Satd. Flow (perm)	1140		1319		305		3434		643		3472	
Volume (vph)	64	50	50	70	80	70	80	616	60	52	1198	72
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)	67	53	53	74	84	74	84	648	63	55	1261	76
RTOR Reduction (vph)	0	21	0	0	23	0	0	6	0	0	4	0
Lane Group Flow (vph)	0	152	0	0	209	0	84	705	0	55	1333	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		2		6		4		6	
Actuated Green, G (s)	16.2		16.2		61.8		61.8		61.8		61.8	
Effective Green, g (s)	15.7		15.7		61.3		61.3		61.3		61.3	
Actuated g/C Ratio	0.18		0.18		0.72		0.72		0.72		0.72	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	211		244		220		2477		464		2504	
v/s Ratio Prot	0.13		c0.16		0.28		0.09		c0.38		0.13	
v/s Ratio Perm	0.13		c0.16		0.28		0.09		c0.38		0.13	
v/c Ratio	0.72		0.86		0.38		0.28		0.12		0.53	
Uniform Delay, d1	32.6		33.6		4.6		4.2		3.6		5.4	
Progression Factor	1.00		1.00		1.00		1.00		0.94		0.89	
Incremental Delay, d2	9.4		23.6		5.0		0.3		0.0		0.1	
Delay (s)	41.9		57.2		9.5		4.4		3.5		4.8	
Level of Service	D		E		A		A		A		A	
Approach Delay (s)	41.9		57.2		5.0		4.8		4.8		4.8	
Approach LOS	D		E		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	12.0		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	70.1%		ICU Level of Service				C					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2030 AM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.95		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.95	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3379		1770	3253		1770	3416		1687	3338	
Flt Permitted	0.95	1.00		0.95	1.00		0.12	1.00		0.43	1.00	
Satd. Flow (perm)	1770	3379		1770	3253		219	3416		769	3338	
Volume (vph)	270	500	100	140	710	212	70	374	60	171	1017	220
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)	284	526	105	147	747	223	74	394	63	180	1071	232
RTOR Reduction (vph)	0	18	0	0	33	0	0	14	0	0	20	0
Lane Group Flow (vph)	284	613	0	147	937	0	74	443	0	180	1283	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot		Prot		Perm		Perm		Perm		Perm	
Protected Phases	7	4		3	8			2				6
Permitted Phases					2		6					
Actuated Green, G (s)	16.5	28.0		11.0	22.5		32.5	32.5		32.5	32.5	
Effective Green, g (s)	17.0	27.5		11.5	22.0		34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.20	0.32		0.14	0.26		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	354	1093		239	842		88	1366		308	1335	
v/s Ratio Prot	c0.16	0.18		0.08	c0.29			0.13			c0.38	
v/s Ratio Perm					0.34		0.23					
v/c Ratio	0.80	0.56		0.62	1.11		0.84	0.32		0.58	0.96	
Uniform Delay, d1	32.4	23.8		34.7	31.5		23.1	17.6		20.0	24.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.7	0.4		3.3	67.0		59.2	0.6		7.9	16.9	
Delay (s)	44.1	24.2		37.9	98.5		82.2	18.2		27.9	41.7	
Level of Service	D	C		D	F		F	B		C	D	
Approach Delay (s)	30.3				90.5		27.1				40.0	
Approach LOS	C				F		C				D	
Intersection Summary												
HCM Average Control Delay	50.1		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	96.4%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

2030 AM + Commercial
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.99	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1669		1770	3539	3501	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1669		1770	3539	3501	
Volume (vph)	63	119	114	665	1627	122
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.95
Adj. Flow (vph)	66	125	120	672	1643	128
RTOR Reduction (vph)	98	0	0	0	6	0
Lane Group Flow (vph)	93	0	120	672	1765	0
Turn Type			Prot			
Protected Phases	2		3		4	
Permitted Phases						
Actuated Green, G (s)	15.6		11.7		61.4	
Effective Green, g (s)	15.6		11.7		61.4	
Actuated g/C Ratio	0.18		0.14		0.72	
Clearance Time (s)	4.0		4.0		4.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	306		244		2556	
v/s Ratio Prot	c0.06		c0.07		0.19	
v/s Ratio Perm					c0.50	
v/c Ratio	0.30		0.49		0.26	
Uniform Delay, d1	30.0		33.9		4.0	
Progression Factor	1.00		0.99		1.82	
Incremental Delay, d2	0.6		1.3		0.2	
Delay (s)	30.6		34.8		7.6	
Level of Service	C		C		A	
Approach Delay (s)	30.6		11.7		22.3	
Approach LOS	C		B		C	
Intersection Summary						
HCM Average Control Delay	19.8		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.73					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	76.0%		ICU Level of Service		D	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2030 PM + Commercial
1/21/2008

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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.98		1.00	0.98	
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4926		1770	4960		2006	1992		1960	1917	
Flt Permitted	0.95	1.00		0.95	1.00		0.12	1.00		0.53	1.00	
Satd. Flow (perm)	1770	4926		1770	4960		258	1992		1101	1917	
Volume (vph)	350	1302	190	120	1070	170	200	262	100	160	288	280
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)	368	1371	200	126	1126	179	211	276	105	168	303	295
RTOR Reduction (vph)	0	19	0	0	21	0	0	14	0	0	35	0
Lane Group Flow (vph)	368	1552	0	126	1284	0	211	367	0	168	563	0
Confl. Peds. (#/hr)			32	32		4	12		24	24		12
Parking (#/hr)												0
Turn Type	Prot		Prot		pm+pt		Perm					
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2				6	
Actuated Green, G (s)	20.0	36.7		9.6	26.3		43.2	43.2		30.2	30.2	
Effective Green, g (s)	20.0	36.7		9.6	26.3		43.7	43.7		30.7	30.7	
Actuated g/C Ratio	0.20	0.37		0.10	0.26		0.44	0.44		0.31	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	354	1808		170	1304		305	871		338	589	
v/s Ratio Prot	c0.21	0.32		0.07	c0.26		c0.08	0.18			c0.29	
v/s Ratio Perm							0.23			0.15		
v/c Ratio	1.04	0.86		0.74	0.98		0.69	0.42		0.50	0.96	
Uniform Delay, d1	40.0	29.2		44.0	36.6		44.3	19.4		28.3	34.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	58.5	5.6		15.9	21.5		6.6	0.3		1.2	26.1	
Delay (s)	98.5	34.8		59.9	58.1		50.9	19.8		29.5	60.1	
Level of Service	F	C		E	E		D	B		C	E	
Approach Delay (s)		46.9			58.3			30.9			53.4	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM Average Control Delay		49.4										D
HCM Volume to Capacity ratio		0.94										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		101.2%									G	
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 PM + Commercial
1/21/2008

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)		4.0		4.0	4.0		4.0			4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95		0.95			0.95	1.00	0.95
Frbp, ped/bikes		1.00		1.00	0.97		0.98			1.00	1.00	0.95
Fipb, ped/bikes		0.99		1.00	1.00		1.00			1.00	1.00	1.00
Frt		0.93		1.00	0.93		0.95			1.00	0.95	0.95
Flt Protected		0.99		0.95	1.00		1.00			0.95	1.00	1.00
Satd. Flow (prot)		1705		1681	1586		3275			1770	3208	
Flt Permitted		0.36		0.73	1.00		0.94			0.95	1.00	
Satd. Flow (perm)		619		1290	1586		3087			1770	3208	
Volume (vph)	10	10	20	126	120	120	10	1122	619	200	896	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)	11	11	21	133	126	126	11	1181	652	211	943	442
RTOR Reduction (vph)	0	20	0	0	39	0	0	64	0	0	46	0
Lane Group Flow (vph)	0	23	0	133	213	0	0	1780	0	211	1339	0
Confl. Peds. (#/hr)		36					36	48		16	16	48
Turn Type	Perm		Perm		Perm		Prot					
Protected Phases		7			8			2		1	6	
Permitted Phases		7			8			2				
Actuated Green, G (s)		6.5			16.7	16.7		45.7		13.1	63.3	
Effective Green, g (s)		7.0			17.2	17.2		46.2		13.6	63.8	
Actuated g/C Ratio		0.07			0.17	0.17		0.46		0.14	0.64	
Clearance Time (s)		4.5			4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0	2.0	
Lane Grp Cap (vph)		43			222	273		1426		241	2047	
v/s Ratio Prot										c0.12	0.42	
v/s Ratio Perm		c0.04			0.10	0.13		c0.58				
v/c Ratio		0.55			0.60	0.78		1.25		0.88	0.65	
Uniform Delay, d1		45.0			38.2	39.6		26.9		42.4	11.2	
Progression Factor		1.00			1.00	1.00		0.61		1.00	1.00	
Incremental Delay, d2		7.4			2.9	12.5		112.3		27.1	1.6	
Delay (s)		52.3			41.1	52.1		128.7		69.5	12.9	
Level of Service		D			D	D		F		E	B	
Approach Delay (s)		52.3			48.3			128.7			20.4	
Approach LOS		D			D			F			C	
Intersection Summary												
HCM Average Control Delay		75.2										E
HCM Volume to Capacity ratio		1.03										
Actuated Cycle Length (s)		100.0						16.0				
Intersection Capacity Utilization		118.4%								H		
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 PM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.94		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3418		1770	3299		1770	3283		1770	3415	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3418		1770	3299		1770	3283		1770	3415	
Volume (vph)	460	930	132	160	580	350	100	961	350	300	692	60
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)	484	979	139	168	611	368	105	1012	368	316	728	63
RTOR Reduction (vph)	0	11	0	0	90	0	0	37	0	0	7	0
Lane Group Flow (vph)	484	1107	0	168	889	0	105	1343	0	316	784	0
Confl. Peds. (#/hr)	15		48	48		15	123		48	48		123
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.7	27.5		10.9	22.7		5.0	32.6		12.0	39.6	
Effective Green, g (s)	15.2	28.5		10.4	23.7		4.5	33.6		11.5	40.6	
Actuated g/C Ratio	0.15	0.28		0.10	0.24		0.04	0.34		0.12	0.41	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	522	974		184	782		80	1103		204	1386	
v/s Ratio Prot	c0.14	c0.32		0.09	0.27		0.06	c0.41		c0.18	0.23	
v/s Ratio Perm												
v/c Ratio	0.93	1.14		0.91	1.14		1.31	1.22		1.55	0.57	
Uniform Delay, d1	41.9	35.8		44.4	38.1		47.8	33.2		44.2	22.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.20	0.76	
Incremental Delay, d2	22.3	74.0		41.7	76.9		205.3	106.3		264.8	1.3	
Delay (s)	64.2	109.8		86.0	115.0		253.1	139.5		317.8	18.8	
Level of Service	E	F		F	F		F	F		F	B	
Approach Delay (s)		96.0			110.8			147.5			104.1	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM Average Control Delay		115.2										F
HCM Volume to Capacity ratio		1.17										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		109.7%										H
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 PM + Commercial
1/21/2008

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)		4.0								4.0	4.0	
Lane Util. Factor		1.00								0.95	0.97	0.95
Frt		0.86								0.94	1.00	0.98
Flt Protected		1.00								1.00	0.95	1.00
Satd. Flow (prot)		1611								3333	3433	3463
Flt Permitted		1.00								0.95	0.95	1.00
Satd. Flow (perm)		1611								3162	3433	3463
Volume (vph)	0	0	10	0	0	0	10	559	356	1550	356	60
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)	0	0	11	0	0	0	11	588	375	1632	375	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	956	0	1632	438	0
Turn Type							Perm			Prot		
Protected Phases								2		1	6	
Permitted Phases												
Actuated Green, G (s)		0.0						13.0		29.0	50.0	
Effective Green, g (s)		0.0						13.0		29.0	50.0	
Actuated g/C Ratio		0.00						0.26		0.58	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						822		1991	3463	
v/s Ratio Prot										c0.48	0.13	
v/s Ratio Perm								c0.30				
v/c Ratio		0.00						1.16		0.82	0.13	
Uniform Delay, d1		25.0						18.5		8.4	0.0	
Progression Factor		1.00						0.70		1.00	1.00	
Incremental Delay, d2		0.0						85.1		3.9	0.1	
Delay (s)		25.0						98.1		12.3	0.1	
Level of Service		C						F		B	A	
Approach Delay (s)		25.0			0.0			98.1			9.7	
Approach LOS		C			A			F			A	
Intersection Summary												
HCM Average Control Delay		38.0								HCM Level of Service		D
HCM Volume to Capacity ratio		0.93										
Actuated Cycle Length (s)		50.0								Sum of lost time (s)		8.0
Intersection Capacity Utilization		84.7%								ICU Level of Service		E
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2030 PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.96			0.97			0.99			0.99		
Flpb, ped/bikes	0.99			0.97			1.00			1.00		
Frt	0.97			0.96			0.98			0.99		
Flt Protected	0.99			0.99			1.00			0.99		
Satd. Flow (prot)	1694			1668			3423			3428		
Flt Permitted	0.87			0.90			0.92			0.78		
Satd. Flow (perm)	1501			1515			3157			2687		
Volume (vph)	40	70	31	70	140	90	43	735	90	60	306	30
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)	42	74	33	74	147	95	45	774	95	63	322	32
RTOR Reduction (vph)	0	20	0	0	31	0	0	18	0	0	13	0
Lane Group Flow (vph)	0	129	0	0	285	0	0	897	0	0	405	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0			17.0			25.0			25.0		
Effective Green, g (s)	17.0			17.0			25.0			25.0		
Actuated g/C Ratio	0.34			0.34			0.50			0.50		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Lane Grp Cap (vph)	510			515			1579			1344		
v/s Ratio Prot												
v/s Ratio Perm	0.09			c0.19			c0.28			0.15		
v/c Ratio	0.25			0.55			0.57			0.30		
Uniform Delay, d1	11.9			13.4			8.7			7.4		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	1.2			4.2			1.5			0.6		
Delay (s)	13.1			17.7			10.2			7.9		
Level of Service	B			B			B			A		
Approach Delay (s)	13.1			17.7			10.2			7.9		
Approach LOS	B			B			B			A		
Intersection Summary												
HCM Average Control Delay	11.2			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.56											
Actuated Cycle Length (s)	50.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	78.6%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2030 PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.96			0.96			0.99			0.98		
Flpb, ped/bikes	0.97			0.98			1.00			1.00		
Frt	0.96			0.96			0.99			0.99		
Flt Protected	0.98			0.99			1.00			1.00		
Satd. Flow (prot)	1623			1667			3452			4909		
Flt Permitted	0.74			0.88			0.77			0.79		
Satd. Flow (perm)	1223			1474			2650			3894		
Volume (vph)	80	70	70	33	80	50	90	1683	85	40	1091	90
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)	84	74	74	35	84	53	95	1772	89	42	1148	95
RTOR Reduction (vph)	0	18	0	0	2	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	214	0	0	170	0	0	1954	0	0	1278	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			6		
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	15.3			15.3			55.7			55.7		
Effective Green, g (s)	15.8			15.8			56.2			56.2		
Actuated g/C Ratio	0.20			0.20			0.70			0.70		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	2.0			2.0			2.0			2.0		
Lane Grp Cap (vph)	242			291			1862			2736		
v/s Ratio Prot												
v/s Ratio Perm	c0.17			0.12			c0.74			0.33		
v/c Ratio	0.88			0.58			1.05			0.47		
Uniform Delay, d1	31.2			29.1			11.9			5.3		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	28.5			1.9			35.1			0.6		
Delay (s)	59.7			31.0			47.0			5.8		
Level of Service	E			C			D			A		
Approach Delay (s)	59.7			31.0			47.0			5.8		
Approach LOS	E			C			D			A		
Intersection Summary												
HCM Average Control Delay	32.6			HCM Level of Service			C					
HCM Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	114.2%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1765	3464	1768	3454	1741	1830	1766	1825	1766	1825	1766	1825
Flt Permitted	0.12	1.00	0.12	1.00	0.52	1.00	0.22	1.00	0.22	1.00	0.22	1.00
Satd. Flow (perm)	232	3464	233	3454	960	1830	402	1825	402	1825	402	1825
Volume (vph)	90	1115	160	86	902	135	180	561	65	105	250	30
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)	95	1174	168	91	949	142	189	591	68	111	263	32
RTOR Reduction (vph)	0	14	0	0	15	0	5	0	0	6	0	0
Lane Group Flow (vph)	95	1328	0	91	1076	0	189	654	0	111	290	0
Confl. Peds. (#/hr)	12		12	12		12	42		12	12		42
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.0	33.0		33.0	33.0		40.5	40.5		40.5	40.5	
Effective Green, g (s)	32.0	32.0		32.0	32.0		40.0	40.0		40.0	40.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.50	0.50		0.50	0.50	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	93	1386		93	1382		480	915		201	913	
v/s Ratio Prot		0.38			0.31			c0.36			0.16	
v/s Ratio Perm	c0.41			0.39			0.20			0.28		
v/c Ratio	1.02	0.96		0.98	0.78		0.39	0.71		0.55	0.32	
Uniform Delay, d1	24.0	23.4		23.7	20.9		12.5	15.6		13.8	11.9	
Progression Factor	1.00	1.00		1.72	1.79		1.64	1.63		1.00	1.00	
Incremental Delay, d2	99.3	16.1		52.5	1.7		0.2	0.4		10.5	0.9	
Delay (s)	123.3	39.4		93.1	39.1		20.6	25.8		24.3	12.8	
Level of Service	F	D		F	D		C	C		C	B	
Approach Delay (s)		45.0			43.3			24.7			15.9	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay		37.0										D
HCM Volume to Capacity ratio		0.85										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		96.6%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99
Satd. Flow (prot)	1770	3458	1770	3458	1770	3498	3435	3394	3435	3394	3435	3394
Flt Permitted	0.16	1.00	0.16	1.00	0.84	1.00	0.84	1.00	0.84	1.00	0.87	1.00
Satd. Flow (perm)	298	3458	298	3498	2914	3498	2914	2962	2914	3498	2962	2914
Volume (vph)	60	1154	120	74	1033	68	90	333	57	33	160	50
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	1166	121	75	1043	69	91	336	58	33	162	51
RTOR Reduction (vph)	0	10	0	0	6	0	0	1	0	0	4	0
Lane Group Flow (vph)	61	1277	0	75	1106	0	0	484	0	0	242	0
Confl. Peds. (#/hr)	24		78	78		24	8		6	6		8
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		46.0			46.0	46.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		47.0			47.0	47.0	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.59			0.59	0.59	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0	5.0	
Lane Grp Cap (vph)	93	1081		93	1093		1712			1740	1740	
v/s Ratio Prot		c0.37			0.32							
v/s Ratio Perm	0.20			0.25			c0.17			0.08		
v/c Ratio	0.66	1.18		0.81	1.01		0.28			0.14		
Uniform Delay, d1	23.8	27.5		25.3	27.5		8.2			7.4		
Progression Factor	0.64	0.57		0.79	0.82		1.06			1.00		
Incremental Delay, d2	13.3	85.8		31.3	22.7		0.2			0.2		
Delay (s)	28.5	101.5		51.3	45.3		8.8			7.6		
Level of Service	C	F		D	D		A			A		
Approach Delay (s)		98.2			45.7		8.8			7.6		
Approach LOS		F			D		A			A		
Intersection Summary												
HCM Average Control Delay		59.0										E
HCM Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		80.7%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2030 PM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0		
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95		
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00		
Frt	1.00	0.99		1.00	0.98			0.98			0.98		
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99		
Satd. Flow (prot)	1768	3492		1764	3447			3419			3419		
Flt Permitted	0.11	1.00		0.11	1.00			0.86			0.67		
Satd. Flow (perm)	213	3492		212	3447			2949			2307		
Volume (vph)	90	1110	84	119	1080	185	75	543	121	91	256	60	
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)	95	1168	88	125	1137	195	79	572	127	96	269	63	
RTOR Reduction (vph)	0	7	0	0	17	0	0	12	0	0	17	0	
Lane Group Flow (vph)	95	1249	0	125	1315	0	0	766	0	0	411	0	
Confl. Peds. (#/hr)	8		39	39		8			25	25			
Turn Type	Perm			Perm			Perm			Perm			
Protected Phases		4			8			2			6		
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	35.5	35.5		35.5	35.5			38.0			38.0		
Effective Green, g (s)	35.0	35.0		35.0	35.0			37.0			37.0		
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.46			0.46		
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0		
Lane Grp Cap (vph)	93	1528		93	1508			1364			1067		
v/s Ratio Prot		0.36			0.38								
v/s Ratio Perm	0.45			c0.59				c0.26			0.18		
v/c Ratio	1.02	0.82		1.34	0.87			0.56			0.39		
Uniform Delay, d1	22.5	19.7		22.5	20.5			15.6			14.1		
Progression Factor	1.04	1.04		1.13	1.14			1.32			1.00		
Incremental Delay, d2	33.5	0.5		203.8	6.2			1.4			1.1		
Delay (s)	56.9	21.0		229.2	29.6			22.0			15.1		
Level of Service	E	C		F	C			C			B		
Approach Delay (s)		23.5			46.7			22.0			15.1		
Approach LOS		C			D			C			B		
Intersection Summary													
HCM Average Control Delay	30.8			HCM Level of Service				C					
HCM Volume to Capacity ratio	0.94												
Actuated Cycle Length (s)	80.0			Sum of lost time (s)				8.0					
Intersection Capacity Utilization	95.8%			ICU Level of Service				F					
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
10: 40th St. & BART Access

2030 PM + Commercial
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	0.96		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3351		1770	3539	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3351		1770	3539	1770	1583
Volume (vph)	1226	108	55	1223	171	66
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1264	111	57	1261	176	68
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1375	0	57	1261	176	68
Confl. Peds. (#/hr)		213	348			
Turn Type			Prot		Perm	
Protected Phases	4		3	8	2	
Permitted Phases					2	
Actuated Green, G (s)	41.0		5.0	50.0	22.0	22.0
Effective Green, g (s)	41.0		5.0	50.0	22.0	22.0
Actuated g/C Ratio	0.51		0.06	0.62	0.28	0.28
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1717		111	2212	487	435
v/s Ratio Prot	c0.41		0.03	c0.36	c0.10	
v/s Ratio Perm						0.04
v/c Ratio	0.80		0.51	0.57	0.36	0.16
Uniform Delay, d1	16.1		36.3	8.7	23.3	22.0
Progression Factor	0.87		0.85	0.98	1.51	1.53
Incremental Delay, d2	2.5		4.4	0.3	1.9	0.7
Delay (s)	16.5		35.3	8.8	37.0	34.3
Level of Service	B		D	A	D	C
Approach Delay (s)	16.5			10.0	36.3	
Approach LOS	B			A	D	
Intersection Summary						
HCM Average Control Delay	15.2		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.65					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	60.8%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 PM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97		1.00	0.99		1.00	0.96	
Flpb, ped/bikes	0.94	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1671	3443		1770	3336		1770	3473		1770	3276	
Flt Permitted	0.25	1.00		0.15	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	441	3443		287	3336		1770	3473		1770	3276	
Volume (vph)	249	934	109	75	557	110	466	1470	124	130	689	255
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	254	953	111	77	568	112	476	1500	127	133	703	260
RTOR Reduction (vph)	0	11	0	0	20	0	0	7	0	0	26	0
Lane Group Flow (vph)	254	1053	0	77	660	0	476	1620	0	133	937	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases	4		8		5		2		1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	25.5	25.5		25.5	25.5		13.5	32.2		8.8	27.5	
Effective Green, g (s)	26.0	26.0		26.0	26.0		14.0	32.7		9.3	28.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.18	0.41		0.12	0.35	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	143	1119		93	1084		310	1420		206	1147	
v/s Ratio Prot		0.31		0.20			c0.27	c0.47		0.08	0.29	
v/s Ratio Perm	c0.58		0.27									
v/c Ratio	1.78	0.94		0.83	0.61		1.54	1.14		0.65	0.82	
Uniform Delay, d1	27.0	26.3		24.9	22.7		33.0	23.6		33.8	23.7	
Progression Factor	0.85	0.84		1.00	1.00		0.94	0.97		1.00	1.00	
Incremental Delay, d2	366.3	10.2		41.1	0.7		248.4	67.8		5.1	6.5	
Delay (s)	389.1	32.3		66.1	23.4		279.6	90.8		38.9	30.2	
Level of Service	F	C		E	C		F	F		D	C	
Approach Delay (s)	101.0		27.7		133.5		31.2					
Approach LOS	F		C		F		C					
Intersection Summary												
HCM Average Control Delay	89.0		HCM Level of Service		F							
HCM Volume to Capacity ratio	1.42											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	102.1%		ICU Level of Service		G							
Analysis Period (min)	15											
c Critical Lane Group												

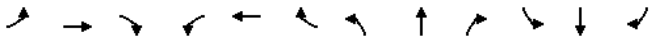
HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2030 PM + Commercial
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔ ↗		↔ ↗		↔ ↗	
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Volume (veh/h)	30	41	1941	40	20	998
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	43	2043	42	21	1051
Pedestrians	52		52		45	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	4.0		4.0		4.0	
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230		471	
pX, platoon unblocked	0.73	0.66			0.66	
vC, conflicting volume	2736	1140			2137	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2424	698			2208	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	81			86	
cM capacity (veh/h)	15	233			148	
Direction, Lane #						
	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	75	1362	723	21	525	525
Volume Left	32	0	0	21	0	0
Volume Right	43	0	42	0	0	0
cSH	33	1700	1700	148	1700	1700
Volume to Capacity	2.24	0.80	0.43	0.14	0.31	0.31
Queue Length 95th (ft)	212	0	0	12	0	0
Control Delay (s)	824.5	0.0	0.0	33.3	0.0	0.0
Lane LOS	F			D		
Approach Delay (s)	824.5	0.0	0.7			
Approach LOS	F		D			
Intersection Summary						
Average Delay	19.3					
Intersection Capacity Utilization	73.4%		ICU Level of Service		D	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 PM + Commercial
1/21/2008




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)	4.0		4.0	4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	0.91		1.00	0.95		1.00		1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00		1.00	1.00		1.00		1.00	1.00		0.99	1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00		1.00	1.00		1.00	1.00
Frt	0.99		1.00	0.98		0.98		0.98	1.00		0.98	0.98
Flt Protected	0.99		0.95	1.00		0.99		0.95	1.00		0.95	1.00
Satd. Flow (prot)	5013		1768	3452		1793		1770	1806		1766	1822
Flt Permitted	0.65		0.22	1.00		0.27		0.24	1.00		0.20	1.00
Satd. Flow (perm)	3269		417	3452		491		442	1806		363	1822
Volume (vph)	160	858	40	93	1347	221	190	525	120	80	406	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	876	41	95	1374	226	194	536	122	82	414	71
RTOR Reduction (vph)	0	5	0	0	17	0	0	8	0	0	8	0
Lane Group Flow (vph)	0	1075	0	95	1584	0	0	844	0	82	477	0
Confl. Peds. (#/hr)	24		4	4		24		48	12		12	48
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	46.0		46.0		46.0		24.0		24.0		24.0	
Effective Green, g (s)	47.0		47.0		47.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.59		0.59		0.59		0.31		0.31		0.31	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	1921		245		2028		153		138		564	
v/s Ratio Prot			c0.46						0.26			
v/s Ratio Perm	0.33		0.23		c1.72		0.19					
v/c Ratio	1.66dl		0.39		0.78		5.52		0.59		0.85	
Uniform Delay, d1	10.1		8.8		12.6		27.5		23.2		25.7	
Progression Factor	1.00		1.57		1.63		1.00		0.77		0.79	
Incremental Delay, d2	1.2		3.5		2.3		2047.9		14.4		12.1	
Delay (s)	11.3		17.3		22.8		2075.4		32.2		32.6	
Level of Service	B		B		C		F		C		C	
Approach Delay (s)	11.3		22.5		2075.4		32.5		58.6		58.6	
Approach LOS	B		C		F		C		E		E	

Intersection Summary			
HCM Average Control Delay	438.0	HCM Level of Service	F
HCM Volume to Capacity ratio	2.42		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	168.1%	ICU Level of Service	H
Analysis Period (min)	15		
dl = Defacto Left Lane. Recode with 1 though lane as a left lane.			
c = Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2030 PM + Commercial
1/21/2008



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)	4.0		4.0	4.0		4.0		4.0	4.0		4.0	4.0
Lane Util. Factor	0.91		1.00	0.91		1.00		1.00	1.00		1.00	1.00
Frbp, ped/bikes	1.00		1.00	1.00		1.00		1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00		1.00	1.00		1.00	1.00
Frt	0.99		0.99	1.00		0.96		1.00	0.98		1.00	0.98
Flt Protected	1.00		1.00	0.95		1.00		0.95	1.00		0.95	1.00
Satd. Flow (prot)	4998		5014	1770		1788		1766	1822		1766	1822
Flt Permitted	0.76		0.78	0.37		1.00		0.20	1.00		0.20	1.00
Satd. Flow (perm)	3795		3944	698		1788		363	1822		363	1822
Volume (vph)	60	798	70	103	1380	113	140	337	106	90	234	40
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)	63	840	74	108	1453	119	147	355	112	95	246	42
RTOR Reduction (vph)	0	12	0	0	11	0	0	14	0	0	7	0
Lane Group Flow (vph)	0	965	0	0	1669	0	147	453	0	95	281	0
Confl. Peds. (#/hr)			12		12		6		6		6	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	2443		2539		179		458		93		467	
v/s Ratio Prot			c0.42		0.21		c0.26		0.15			
v/s Ratio Perm	0.25		c0.42		0.21		c0.26					
v/c Ratio	0.40		0.66		0.82		0.99		1.02		0.60	
Uniform Delay, d1	6.8		8.8		28.0		29.6		29.8		26.2	
Progression Factor	1.17		1.71		1.00		1.00		1.19		1.22	
Incremental Delay, d2	0.0		1.0		32.8		39.4		89.9		4.6	
Delay (s)	8.0		16.0		60.8		69.0		125.4		36.5	
Level of Service	A		B		E		E		F		D	
Approach Delay (s)	8.0		16.0		67.1		58.6		58.6		58.6	
Approach LOS	A		B		E		E		F		D	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c = Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2030 PM + Commercial
1/21/2008

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)	4.0				4.0		4.0				4.0	
Lane Util. Factor	0.91				0.91		0.95				0.95	
Frbp, ped/bikes	1.00				1.00		1.00				0.99	
Flpb, ped/bikes	1.00				1.00		1.00				1.00	
Frt	0.99				0.98		0.98				0.97	
Flt Protected	1.00				1.00		0.99				0.99	
Satd. Flow (prot)	5021				4956		3433				3359	
Flt Permitted	0.73				0.82		0.73				0.57	
Satd. Flow (perm)	3663				4055		2519				1943	
Volume (vph)	73	891	50	81	1415	241	80	426	75	140	227	92
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	74	900	51	82	1429	243	81	430	76	141	229	93
RTOR Reduction (vph)	0	7	0	0	27	0	0	15	0	0	28	0
Lane Group Flow (vph)	0	1018	0	0	1727	0	0	572	0	0	435	0
Confl. Peds. (#/hr)	9		17	17			9	12		10	10	12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2358		2610		2610		645		645		498	
v/s Ratio Prot												
v/s Ratio Perm	0.28		c0.43		c0.43		c0.23		c0.23		0.22	
v/c Ratio	0.43		0.66		0.66		0.89		0.89		0.95dl	
Uniform Delay, d1	7.0		8.8		8.8		28.6		28.6		28.5	
Progression Factor	1.60		2.08		2.08		1.00		1.00		1.17	
Incremental Delay, d2	0.5		1.0		1.0		16.5		16.5		18.8	
Delay (s)	11.7		19.4		19.4		45.2		45.2		52.2	
Level of Service	B		B		B		D		D		D	
Approach Delay (s)	11.7		19.4		19.4		45.2		45.2		52.2	
Approach LOS	B		B		B		D		D		D	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	126.8%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & BART Access

2030 PM + Commercial
1/21/2008

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)	4.0				4.0		4.0				4.0	
Lane Util. Factor	0.91				0.91		0.95				0.95	
Frbp, ped/bikes	1.00				1.00		1.00				0.96	
Flpb, ped/bikes	1.00				1.00		1.00				1.00	
Frt	1.00				0.99		0.99				0.92	
Flt Protected	1.00				1.00		1.00				0.98	
Satd. Flow (prot)	5065				5033		5033				1608	
Flt Permitted	0.68				1.00		1.00				0.87	
Satd. Flow (perm)	3456				5033		5033				1428	
Volume (vph)	90	1045	0	0	1535	60	0	0	0	138	0	189
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.96	0.96	0.95	0.95	0.95	0.96	0.95	0.96
Adj. Flow (vph)	94	1089	0	0	1599	62	0	0	0	144	0	197
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1183	0	0	1661	0	0	0	0	0	341	0
Confl. Peds. (#/hr)						79						79
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	38.0		38.0		38.0		34.0		34.0		34.0	
Effective Green, g (s)	38.0		38.0		38.0		34.0		34.0		34.0	
Actuated g/C Ratio	0.48		0.48		0.48		0.42		0.42		0.42	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	1642		2391		2391		607		607		607	
v/s Ratio Prot												
v/s Ratio Perm	c0.34		c0.34		c0.34		c0.24		c0.24		c0.24	
v/c Ratio	1.01dl		1.01dl		0.69		0.56		0.56		0.56	
Uniform Delay, d1	16.8		16.5		16.5		17.4		17.4		17.4	
Progression Factor	0.99		1.00		1.00		0.92		0.92		0.92	
Incremental Delay, d2	2.5		1.7		1.7		3.6		3.6		3.6	
Delay (s)	19.1		18.1		18.1		19.6		19.6		19.6	
Level of Service	B		B		B		B		B		B	
Approach Delay (s)	19.1		18.1		18.1		0.0		0.0		19.6	
Approach LOS	B		B		B		A		A		B	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.99			0.96			1.00			0.99		
Flt Protected	0.98			1.00			0.95			1.00		
Satd. Flow (prot)	4915			4808			1750			3459		
Flt Permitted	0.68			0.71			0.20			1.00		
Satd. Flow (perm)	3379			3422			369			3459		
Volume (vph)	387	695	111	110	1174	466	280	1206	110	206	626	111
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)	407	732	117	116	1236	491	295	1269	116	217	659	117
RTOR Reduction (vph)	0	7	0	0	1	0	0	7	0	0	14	0
Lane Group Flow (vph)	0	1249	0	0	1842	0	295	1378	0	217	762	0
Confl. Peds. (#/hr)	26		19		26		39		92		39	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	56.6		56.6		34.0		34.0		34.0		34.0	
Effective Green, g (s)	58.1		58.1		35.0		35.0		35.0		35.0	
Actuated g/C Ratio	0.57		0.57		0.35		0.35		0.35		0.35	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1942		1967		128		1197		74		1187	
v/s Ratio Prot					0.40		0.22					
v/s Ratio Perm	0.37		c0.54		0.80		c1.02					
v/c Ratio	2.54dl		0.94		2.30		1.15		2.93		0.64	
Uniform Delay, d1	14.5		19.8		33.0		33.0		33.0		27.8	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.6		9.0		611.0		78.2		905.1		2.7	
Delay (s)	15.1		28.8		644.0		111.2		938.1		30.5	
Level of Service	B		C		F		F		F		C	
Approach Delay (s)	15.1		28.8		204.8		228.8					
Approach LOS	B		C		F		F					
Intersection Summary												
HCM Average Control Delay	111.4		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.69											
Actuated Cycle Length (s)	101.1		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	122.0%		ICU Level of Service				H					
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

2030 PM + Commercial
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			1.00			0.89		
Flpb, ped/bikes	1.00			1.00			0.96			1.00		
Frt	0.99			1.00			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5023			5027			1753			1406		
Flt Permitted	0.78			0.78			0.77			1.00		
Satd. Flow (perm)	3941			3921			1388			1406		
Volume (vph)	50	932	39	110	1597	50	103	104	200	40	40	90
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	51	941	39	111	1613	51	104	105	202	40	40	91
RTOR Reduction (vph)	0	5	0	0	4	0	0	0	64	0	13	0
Lane Group Flow (vph)	0	1026	0	0	1771	0	0	209	138	0	158	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	49.5		49.5		24.5		24.5		24.5		24.5	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	2389		2377		408		413		422		422	
v/s Ratio Prot					c0.15		0.10		0.11			
v/s Ratio Perm	0.26		c0.45		0.51		0.34		0.37			
v/c Ratio	0.43		0.75		23.5		22.1		22.4			
Uniform Delay, d1	8.4		11.3		1.00		1.00		1.00			
Progression Factor	1.00		1.00		1.00		1.00		1.00			
Incremental Delay, d2	0.6		2.2		4.5		2.2		2.5			
Delay (s)	9.0		13.5		28.0		24.3		24.9			
Level of Service	A		B		C		C		C			
Approach Delay (s)	9.0		13.5		26.2		24.9					
Approach LOS	A		B		C		C					
Intersection Summary												
HCM Average Control Delay	14.2		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.67											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	111.7%		ICU Level of Service				H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

2030 PM + Commercial
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.99	1.00	1.00	0.94	1.00	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	4910	1770	4864	1770	3539	1489	1770	3539	1489	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	4910	1770	4864	1770	3539	1489	1770	3539	1489	1770	3539
Volume (vph)	230	799	113	130	1237	360	310	1181	290	510	513	180
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)	242	841	119	137	1302	379	326	1243	305	537	540	189
RTOR Reduction (vph)	0	15	0	0	44	0	0	0	10	0	0	45
Lane Group Flow (vph)	242	945	0	137	1637	0	326	1243	295	537	540	144
Confl. Peds. (#/hr)	81		22		22		50		43		43	
Turn Type	Prot		Prot		Prot		pm+ov		Prot		pm+ov	
Protected Phases	7	4	3	8	5	2	3	1	6	7	6	6
Permitted Phases	4		4		4		2		6		6	
Actuated Green, G (s)	12.0	33.2	12.8	34.0	25.4	33.0	45.8	25.0	32.6	44.6	44.6	44.6
Effective Green, g (s)	11.0	34.2	11.8	35.0	24.4	34.0	45.8	24.0	33.6	44.6	44.6	44.6
Actuated g/C Ratio	0.09	0.29	0.10	0.29	0.20	0.28	0.38	0.20	0.28	0.37	0.37	0.37
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0	3.0
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	3.0
Lane Grp Cap (vph)	162	1399	174	1419	360	1003	618	354	991	607	607	607
v/s Ratio Prot	c0.14	0.19	0.08	c0.34	0.18	c0.35	0.05	c0.30	0.15	0.02	0.02	0.02
v/s Ratio Perm	c0.27		0.25		0.12		0.15		0.15		0.15	
v/c Ratio	1.49	0.68	0.79	1.15	0.91	1.24	0.48	1.52	0.54	0.24	0.24	0.24
Uniform Delay, d1	54.5	38.0	52.9	42.5	46.7	43.0	28.1	48.0	36.7	26.0	26.0	26.0
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	251.9	2.6	20.6	77.6	25.3	116.3	0.6	246.7	2.2	0.2	0.2	0.2
Delay (s)	306.4	40.6	73.4	120.1	71.9	159.3	28.6	294.7	38.9	26.2	26.2	26.2
Level of Service	F	D	E	F	E	F	C	F	D	C	C	C
Approach Delay (s)	94.1		116.6		122.8		145.5		145.5		145.5	
Approach LOS	F		F		F		F		F		F	
Intersection Summary												
HCM Average Control Delay	120.1		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.21											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	119.4%		ICU Level of Service				H					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2030 PM + Commercial
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Frpb, ped/bikes	0.93		0.96		1.00		0.99		1.00		0.98	
Flpb, ped/bikes	0.98		0.97		0.97		1.00		0.98		1.00	
Frt	0.95		0.95		1.00		0.99		1.00		0.99	
Flt Protected	0.98		0.98		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	1585		1616		1708		3487		1728		3443	
Flt Permitted	0.65		0.72		0.24		1.00		0.17		1.00	
Satd. Flow (perm)	1061		1182		430		3487		318		3443	
Volume (vph)	132	60	100	120	80	104	50	1101	50	46	873	77
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)	139	63	105	126	84	109	53	1159	53	48	919	81
RTOR Reduction (vph)	0	23	0	0	23	0	0	4	0	0	7	0
Lane Group Flow (vph)	0	284	0	0	296	0	53	1208	0	48	993	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		4		2		6		6	
Actuated Green, G (s)	23.8		23.8		54.2		54.2		54.2		54.2	
Effective Green, g (s)	23.3		23.3		53.7		53.7		53.7		53.7	
Actuated g/C Ratio	0.27		0.27		0.63		0.63		0.63		0.63	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	291		324		272		2203		201		2175	
v/s Ratio Prot	c0.27		0.25		0.12		0.15		0.15		0.15	
v/c Ratio	0.98		0.92		0.19		0.55		0.24		0.46	
Uniform Delay, d1	30.6		29.9		6.6		8.8		6.8		8.1	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	46.0		28.7		1.6		1.0		2.8		0.7	
Delay (s)	76.6		58.6		8.2		9.8		9.6		8.8	
Level of Service	E		E		A		A		A		A	
Approach Delay (s)	76.6		58.6		9.7		8.8		8.8		8.8	
Approach LOS	E		E		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	21.7		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	71.1%		ICU Level of Service				C					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2030 PM + Commercial
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.93		1.00	0.99		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.98	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3370		1770	3140		1706	3489		1733	3140	
Flt Permitted	0.95	1.00		0.95	1.00		0.23	1.00		0.22	1.00	
Satd. Flow (perm)	1770	3370		1770	3140		407	3489		396	3140	
Volume (vph)	230	560	120	90	530	253	200	838	50	238	555	310
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	235	571	122	92	541	258	204	855	51	243	566	316
RTOR Reduction (vph)	0	20	0	0	46	0	0	5	0	0	91	0
Lane Group Flow (vph)	235	673	0	92	753	0	204	901	0	243	791	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Prot		Prot		Perm		Perm		Perm		Perm	
Protected Phases	7	4	3	8			2	2			6	6
Permitted Phases					2		6					
Actuated Green, G (s)	10.5	26.0	7.3	22.8	38.2	38.2	38.2	38.2			38.2	38.2
Effective Green, g (s)	11.0	25.5	7.8	22.3	39.7	39.7	39.7	39.7			39.7	39.7
Actuated g/C Ratio	0.13	0.30	0.09	0.26	0.47	0.47	0.47	0.47			0.47	0.47
Clearance Time (s)	4.5	3.5	4.5	3.5	5.5	5.5	5.5	5.5			5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	229	1011	162	824	190	1630	185	1467			185	1467
v/s Ratio Prot	c0.13	c0.20	0.05	c0.24			0.26				0.25	
v/s Ratio Perm					0.50					c0.61		
v/c Ratio	1.03	0.67	0.57	0.91	1.07	0.55	1.31	0.54			1.31	0.54
Uniform Delay, d1	37.0	26.0	37.0	30.4	22.6	16.3	22.6	16.1			22.6	16.1
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	66.4	1.3	2.7	14.1	86.2	1.4	174.1	1.4			174.1	1.4
Delay (s)	103.4	27.3	39.7	44.6	108.9	17.6	196.8	17.6			196.8	17.6
Level of Service	F	C	D	D	F	B	F	B			F	B
Approach Delay (s)	46.6		44.1		34.4		56.3				56.3	
Approach LOS	D		D		C		E				E	
Intersection Summary												
HCM Average Control Delay	45.4		HCM Level of Service		D							
HCM Volume to Capacity ratio	1.20											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	89.2%		ICU Level of Service		E							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Transit Village Driveway & Telegraph Ave.

2030 PM + Commercial
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗		↖ ↗		↖ ↗	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	3539	3466	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	3539	3466	
Volume (vph)	65	150	85	1975	752	121
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	158	89	2079	792	127
RTOR Reduction (vph)	0	119	0	0	13	0
Lane Group Flow (vph)	68	39	89	2079	906	0
Turn Type	Perm		Prot		Prot	
Protected Phases	2		3	8	4	
Permitted Phases	2					
Actuated Green, G (s)	19.0	19.0	7.0	52.5	41.0	
Effective Green, g (s)	19.5	19.5	7.0	52.5	41.5	
Actuated g/C Ratio	0.24	0.24	0.09	0.66	0.52	
Clearance Time (s)	4.5	4.5	4.0	4.0	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	431	386	155	2322	1798	
v/s Ratio Prot	c0.04		0.05	c0.59	0.26	
v/s Ratio Perm	0.02					
v/c Ratio	0.16	0.10	0.57	0.90	0.50	
Uniform Delay, d1	23.8	23.4	35.1	11.5	12.5	
Progression Factor	1.00	1.00	1.00	1.00	1.94	
Incremental Delay, d2	0.2	0.1	5.1	5.9	0.6	
Delay (s)	24.0	23.6	40.1	17.4	25.0	
Level of Service	C	C	D	B	C	
Approach Delay (s)	23.7		18.3		25.0	
Approach LOS	C		B		C	
Intersection Summary						
HCM Average Control Delay	20.5		HCM Level of Service		C	
HCM Volume to Capacity ratio	0.70					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	64.9%		ICU Level of Service		C	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 AM + Commercial + Mit
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		0.95		0.95		0.95		1.00		0.95	
Frbp, ped/bikes	1.00		1.00		0.99		0.99		1.00		0.96	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	0.95		1.00		0.91		0.97		1.00		0.96	
Flt Protected	0.98		0.95		1.00		1.00		0.95		1.00	
Satd. Flow (prot)	1750		1681		1596		3411		1770		3261	
Flt Permitted	0.55		0.74		1.00		1.00		0.95		1.00	
Satd. Flow (perm)	978		1302		1596		3411		1770		3261	
Volume (vph)	10	10	10	359	330	470	0	1165	245	110	1341	460
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)	11	11	11	378	347	495	0	1226	258	116	1412	484
RTOR Reduction (vph)	0	6	0	0	43	0	0	15	0	0	28	0
Lane Group Flow (vph)	0	27	0	378	799	0	0	1469	0	116	1868	0
Confl. Peds. (#/hr)	4				4		44		12		12	
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases	4		8		2		1		6			
Permitted Phases	4		8									
Actuated Green, G (s)	51.5		51.5		48.5		6.5		59.5			
Effective Green, g (s)	52.0		52.0		49.0		7.0		60.0			
Actuated g/C Ratio	0.43		0.43		0.41		0.06		0.50			
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5			
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0			
Lane Grp Cap (vph)	424		564		692		1393		103		1631	
v/s Ratio Prot	0.03		0.29		0.50		0.43		0.07		c0.57	
v/s Ratio Perm	0.06		0.67		1.15		1.05		1.13		1.15	
Uniform Delay, d1	19.8		27.2		34.0		35.5		56.5		30.0	
Progression Factor	1.00		1.00		1.00		0.87		1.00		1.00	
Incremental Delay, d2	0.0		2.5		85.4		29.3		126.7		73.2	
Delay (s)	19.8		29.6		119.4		60.1		183.2		103.2	
Level of Service	B		C		F		E		F		F	
Approach Delay (s)	19.8		91.6		60.1		107.8					
Approach LOS	B		F		E		F					
Intersection Summary												
HCM Average Control Delay	88.1		HCM Level of Service		F							
HCM Volume to Capacity ratio	1.15											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	99.2%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 AM + Commercial + Mit
1/21/2008

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		0.95		1.00		0.95		1.00		0.95	
Frbp, ped/bikes	1.00		0.99		1.00		0.99		1.00		0.98	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	1.00		0.98		1.00		0.96		1.00		0.97	
Flt Protected	0.95		1.00		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	3433		3417		1770		3370		1770		3391	
Flt Permitted	0.95		1.00		0.95		1.00		0.95		1.00	
Satd. Flow (perm)	3433		3417		1770		3370		1770		3391	
Volume (vph)	460	650	113	140	820	320	120	671	140	320	1180	220
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	677	118	146	854	333	125	699	146	333	1229	229
RTOR Reduction (vph)	0	11	0	0	34	0	0	15	0	0	13	0
Lane Group Flow (vph)	479	784	0	146	1153	0	125	830	0	333	1445	0
Confl. Peds. (#/hr)	6		24		24		6		36		28	
Turn Type	Prot		Prot		Prot		Prot		Prot		Prot	
Protected Phases	7		4		3		8		5		2	
Permitted Phases	7		4		3		8		5		2	
Actuated Green, G (s)	15.5		36.9		12.6		34.0		8.5		30.6	
Effective Green, g (s)	16.0		38.9		13.1		36.0		9.0		32.6	
Actuated g/C Ratio	0.13		0.32		0.11		0.30		0.08		0.27	
Clearance Time (s)	3.5		5.0		3.5		5.0		3.5		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	458		1108		193		1011		133		921	
v/s Ratio Prot	c0.14		0.23		0.08		c0.34		0.07		0.24	
v/s Ratio Perm	1.05		0.71		0.76		1.14		0.94		0.90	
Uniform Delay, d1	52.0		35.6		51.9		42.0		55.2		42.2	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	54.5		1.7		13.9		75.2		58.5		13.7	
Delay (s)	106.5		37.3		65.8		117.2		113.7		55.8	
Level of Service	F		D		E		F		F		E	
Approach Delay (s)	63.3		111.6		63.3		69.2					
Approach LOS	E		F		E		F					
Intersection Summary												
HCM Average Control Delay	77.3		HCM Level of Service		E							
HCM Volume to Capacity ratio	1.07											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		9.0							
Intersection Capacity Utilization	106.3%		ICU Level of Service		G							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 AM + Commercial + Mit
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Frt	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1758	3377	1764	3457	1768	1831	1750	1815	1750	1815	1750	1815
Flt Permitted	0.16	1.00	0.27	1.00	0.14	1.00	0.40	1.00	0.40	1.00	0.37	1.00
Satd. Flow (perm)	291	3377	494	3457	264	1831	729	1815	729	1815	681	3333
Volume (vph)	180	521	190	93	934	114	160	381	39	206	600	110
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)	189	548	200	98	983	120	168	401	41	217	632	116
RTOR Reduction (vph)	0	41	0	0	10	0	6	0	5	0	17	0
Lane Group Flow (vph)	189	707	0	98	1093	0	168	436	0	217	743	0
Confl. Peds. (#/hr)	30	12	12	30	6	54	54	6	54	54	6	92
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	6	6	6	6	6	6
Permitted Phases	4	8	2	2	6	6	6	6	6	6	6	6
Actuated Green, G (s)	26.4	26.4	26.4	26.4	31.9	31.9	31.9	31.9	31.9	31.9	31.9	31.9
Effective Green, g (s)	25.4	25.4	25.4	25.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4	31.4
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Clearance Time (s)	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
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)	114	1324	194	1355	128	887	353	879	353	879	444	1739
v/s Ratio Prot	0.21	0.21	0.21	0.21	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
v/s Ratio Perm	c0.65	0.20	0.20	0.20	c0.64	0.30	0.30	0.30	0.30	0.30	0.30	0.30
v/c Ratio	1.66	0.53	0.51	0.81	1.31	0.49	0.61	0.85	0.61	0.85	0.24	1.00
Uniform Delay, d1	19.7	15.2	14.9	17.5	16.7	11.3	12.3	14.6	12.3	14.6	12.0	28.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	331.6	1.5	9.1	5.2	185.4	0.4	3.2	7.5	3.2	7.5	0.1	22.4
Delay (s)	351.3	16.7	24.0	22.7	202.1	11.7	15.4	22.1	15.4	22.1	12.1	51.1
Level of Service	F	B	C	C	F	B	B	C	B	C	B	D
Approach Delay (s)	84.2	22.8	64.2	20.6	48.9	31.5	48.9	31.5	48.9	31.5	48.9	31.5
Approach LOS	F	C	E	C	D	C	D	C	D	C	D	D
Intersection Summary												
HCM Average Control Delay	44.5			HCM Level of Service			D					
HCM Volume to Capacity ratio	1.47											
Actuated Cycle Length (s)	64.8			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	101.6%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 AM + Commercial + Mit
1/21/2008

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)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.90	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00
Frt	1.00	0.94	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3004	1770	3393	1770	3420	1736	3333	1770	3420	1736	3333
Flt Permitted	0.13	1.00	0.13	1.00	0.06	1.00	0.37	1.00	0.37	1.00	0.37	1.00
Satd. Flow (perm)	243	3004	243	3393	118	3420	681	3333	681	3333	681	3333
Volume (vph)	146	420	267	128	732	90	135	505	59	100	1354	320
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)	154	442	281	135	771	95	142	532	62	105	1425	337
RTOR Reduction (vph)	0	80	0	0	8	0	8	0	8	0	17	0
Lane Group Flow (vph)	154	643	0	135	858	0	142	586	0	105	1745	0
Confl. Peds. (#/hr)	72	137	137	72	58	58	92	58	92	58	92	58
Turn Type	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt
Protected Phases	7	4	3	8	5	2	1	6	5	2	1	6
Permitted Phases	4	8	2	2	6	6	6	6	6	6	6	6
Actuated Green, G (s)	36.0	30.0	36.0	30.0	68.5	62.5	67.5	62.0	68.5	62.5	67.5	62.0
Effective Green, g (s)	37.2	30.6	37.2	30.6	69.7	63.1	68.7	62.6	69.7	63.1	68.7	62.6
Actuated g/C Ratio	0.31	0.26	0.31	0.26	0.58	0.53	0.57	0.52	0.58	0.53	0.57	0.52
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	4.0
Vehicle Extension (s)	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	159	766	159	865	159	1798	444	1739	159	1798	444	1739
v/s Ratio Prot	c0.05	0.21	0.05	c0.25	c0.05	0.17	0.01	c0.52	c0.05	0.17	0.01	c0.52
v/s Ratio Perm	0.25	0.22	0.22	0.22	0.47	0.12	0.12	0.12	0.47	0.12	0.12	0.12
v/c Ratio	0.97	0.84	0.85	0.99	0.89	0.33	0.24	1.00	0.89	0.33	0.24	1.00
Uniform Delay, d1	37.8	42.4	33.7	44.6	31.8	16.3	12.0	28.7	31.8	16.3	12.0	28.7
Progression Factor	1.16	0.76	1.00	1.00	1.50	1.08	1.00	1.00	1.50	1.08	1.00	1.00
Incremental Delay, d2	56.0	6.6	32.2	28.4	40.3	0.5	0.1	22.4	40.3	0.5	0.1	22.4
Delay (s)	99.9	38.8	65.8	73.0	87.9	18.0	12.1	51.1	87.9	18.0	12.1	51.1
Level of Service	F	D	E	E	F	B	B	D	F	B	B	D
Approach Delay (s)	49.6	72.0	31.5	48.9	31.5	48.9	31.5	48.9	31.5	48.9	31.5	48.9
Approach LOS	D	E	C	D	C	D	C	D	C	D	C	D
Intersection Summary												
HCM Average Control Delay	51.3			HCM Level of Service			D					
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			13.6					
Intersection Capacity Utilization	101.3%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 AM + Commercial + Mit
1/21/2008

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)	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	0.91		1.00	0.95		1.00	1.00		1.00	1.00		1.00
Frbp, ped/bikes	1.00		1.00	1.00		1.00	0.98		1.00	0.99		0.99
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00		0.96	1.00		1.00
Frt	0.99		1.00	0.98		1.00	0.95		1.00	0.96		0.96
Flt Protected	0.99		0.95	1.00		0.95	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4981		1762	3446		1770	1729		1704	1759		1759
Flt Permitted	0.66		0.21	1.00		0.10	1.00		0.49	1.00		1.00
Satd. Flow (perm)	3324		384	3446		189	1729		880	1759		1759
Volume (vph)	210	720	50	71	1092	191	100	189	90	200	493	200
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)	221	758	53	75	1149	201	105	199	95	211	519	211
RTOR Reduction (vph)	0	5	0	0	13	0	0	16	0	0	13	0
Lane Group Flow (vph)	0	1027	0	75	1337	0	105	278	0	211	717	0
Confl. Peds. (#/hr)	24		18	18		24	24		48	48		24
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.0		51.0		51.0		49.0		49.0		49.0	
Effective Green, g (s)	52.0		52.0		52.0		50.0		50.0		50.0	
Actuated g/C Ratio	0.47		0.47		0.47		0.45		0.45		0.45	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	1571		182		1629		86		786		400	
v/s Ratio Prot	c0.39		c0.39		c0.39		c0.56		c0.56		c0.41	
v/s Ratio Perm	0.31		0.20		0.20		c0.56		c0.56		0.24	
v/c Ratio	3.03dl		0.41		0.82		1.22		0.35		0.90	
Uniform Delay, d1	22.1		19.0		25.0		30.0		19.5		21.5	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	2.1		6.8		4.8		167.9		1.2		4.9	
Delay (s)	24.3		25.7		29.8		197.9		20.7		26.4	
Level of Service	C		C		C		F		C		D	
Approach Delay (s)	24.3		29.6		29.6		67.4		67.4		38.8	
Approach LOS	C		C		C		E		E		D	

Intersection Summary			
HCM Average Control Delay	34.4	HCM Level of Service	C
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	142.6%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 AM + Commercial + Mit
1/21/2008

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)	3.4		3.4	3.4		3.4	3.4		3.4	3.4		3.4
Lane Util. Factor	0.91		1.00	0.91		1.00	0.95		1.00	0.95		0.95
Frbp, ped/bikes	1.00		1.00	0.99		1.00	0.99		1.00	0.99		0.99
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00		0.96	1.00		1.00
Frt	0.98		1.00	0.98		1.00	0.97		1.00	0.97		0.97
Flt Protected	0.99		0.99	0.99		0.95	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4931		1762	4909		1770	3409		1765	3420		3420
Flt Permitted	0.64		0.21	1.00		0.13	1.00		0.24	1.00		1.00
Satd. Flow (perm)	3166		384	3446		189	1729		880	1759		1759
Volume (vph)	157	988	187	200	1146	198	120	410	90	363	1136	237
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)	165	1040	197	211	1206	208	126	432	95	382	1196	249
RTOR Reduction (vph)	0	16	0	0	16	0	0	16	0	0	15	0
Lane Group Flow (vph)	0	1386	0	0	1609	0	126	511	0	382	1430	0
Confl. Peds. (#/hr)	40		9	40		25	31		31	31		25
Turn Type	Perm		pm+pt		pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	4		3		8		5		2		1	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	58.0		58.0		58.0		34.4		29.9		54.0	
Effective Green, g (s)	58.6		58.6		58.6		35.1		30.5		54.6	
Actuated g/C Ratio	0.49		0.49		0.49		0.29		0.25		0.46	
Clearance Time (s)	4.0		4.0		4.0		3.5		4.0		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		3.0		2.0		3.0	
Lane Grp Cap (vph)	1546		1535		1535		130		866		429	
v/s Ratio Prot	0.44		c0.51		c0.51		0.25		0.15		c0.42	
v/s Ratio Perm	1.67dl		2.34dl		2.34dl		0.97		0.59		0.89	
Uniform Delay, d1	27.9		30.7		30.7		42.3		39.3		24.8	
Progression Factor	0.93		1.00		0.99		0.82		0.82		0.76	
Incremental Delay, d2	6.5		36.7		66.5		2.8		14.6		44.6	
Delay (s)	32.3		67.4		108.6		35.1		33.4		65.4	
Level of Service	C		E		F		D		C		E	
Approach Delay (s)	32.3		67.4		67.4		49.3		49.3		58.7	
Approach LOS	C		E		E		D		D		E	

Intersection Summary			
HCM Average Control Delay	53.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	117.0%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 AM + Commercial + Mit
 1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95	1.00	1.00	0.95	1.00
Frb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	0.96	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4922		1770	4839		1770	3539	1515	1770	3539	1523
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4922		1770	4839		1770	3539	1515	1770	3539	1523
Volume (vph)	170	1200	171	210	1141	380	140	422	130	390	1441	250
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)	179	1263	180	221	1201	400	147	444	137	411	1517	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13
Lane Group Flow (vph)	179	1428	0	221	1551	0	147	444	104	411	1517	250
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot			Prot			Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases									2			6
Actuated Green, G (s)	12.0	32.0		15.0	35.0		11.0	28.0	43.0	29.0	46.0	58.0
Effective Green, g (s)	11.0	33.0		14.0	36.0		10.0	29.0	43.0	28.0	47.0	58.0
Actuated g/C Ratio	0.09	0.28		0.12	0.30		0.08	0.24	0.36	0.23	0.39	0.48
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1354		207	1452		148	855	593	413	1386	736
v/s Ratio Prot	0.10	0.29		c0.12	c0.32		c0.08	0.13	0.02	0.23	c0.43	0.03
v/s Ratio Perm									0.05			0.13
v/c Ratio	1.10	1.05		1.07	1.07		0.99	0.52	0.18	1.00	1.09	0.34
Uniform Delay, d1	54.5	43.5		53.0	42.0		55.0	39.5	26.4	45.9	36.5	19.2
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	101.6	40.2		81.6	44.2		71.6	2.3	0.1	42.7	54.3	0.1
Delay (s)	156.1	83.7		134.6	86.2		126.5	41.7	26.4	88.6	90.8	19.3
Level of Service	F	F		F	F		F	D	C	F	F	B
Approach Delay (s)		91.7			92.1			56.0			81.8	
Approach LOS		F			F			E			F	
Intersection Summary												
HCM Average Control Delay			84.3				HCM Level of Service			F		
HCM Volume to Capacity ratio			1.09									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			101.4%			ICU Level of Service		G				
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 PM + Commercial + Mit
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		0.95		0.95		0.95		1.00		0.95	
Frbp, ped/bikes	1.00		1.00		0.97		0.98		1.00		0.95	
Flpb, ped/bikes	0.99		1.00		1.00		1.00		1.00		1.00	
Frt	0.93		1.00		0.93		0.95		1.00		0.95	
Flt Protected	0.99		0.95		1.00		1.00		0.95		1.00	
Satd. Flow (prot)	1704		1681		1586		3275		1770		3208	
Flt Permitted	0.56		0.73		1.00		1.00		0.95		1.00	
Satd. Flow (perm)	963		1290		1586		3275		1770		3208	
Volume (vph)	10	10	20	126	120	120	0	1122	619	200	896	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)	11	11	21	133	126	126	0	1181	652	211	943	442
RTOR Reduction (vph)	0	20	0	0	38	0	0	67	0	0	48	0
Lane Group Flow (vph)	0	23	0	133	214	0	0	1766	0	211	1337	0
Confl. Peds. (#/hr)	36				36		48		16		48	
Turn Type	Perm		Perm		Perm		Prot		Prot		Prot	
Protected Phases	7		8		8		2		1		6	
Permitted Phases	7		8		8							
Actuated Green, G (s)	4.0		16.5		16.5		52.0		9.5		66.0	
Effective Green, g (s)	4.5		17.0		17.0		52.5		10.0		66.5	
Actuated g/C Ratio	0.04		0.17		0.17		0.52		0.10		0.66	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	43		219		270		1719		177		2133	
v/s Ratio Prot							c0.54		c0.12		0.42	
v/s Ratio Perm	c0.02		0.10		0.13							
v/c Ratio	0.53		0.61		0.79		1.03		1.19		0.63	
Uniform Delay, d1	46.7		38.4		39.8		23.8		45.0		9.6	
Progression Factor	1.00		1.00		1.00		0.71		1.00		1.00	
Incremental Delay, d2	6.2		3.2		13.7		15.2		128.8		1.4	
Delay (s)	53.0		41.7		53.5		32.0		173.8		11.0	
Level of Service	D		D		D		C		F		B	
Approach Delay (s)	53.0		49.4		32.0		32.5		32.5		81.8	
Approach LOS	D		D		C		C		F		F	
Intersection Summary												
HCM Average Control Delay	34.2		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	100.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	89.7%		ICU Level of Service		E							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 PM + Commercial + Mit
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.97		0.95		1.00		0.95		1.00		0.95	
Frbp, ped/bikes	1.00		0.98		1.00		0.99		1.00		0.97	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	1.00		0.98		1.00		0.94		1.00		0.96	
Flt Protected	0.95		1.00		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	3433		3418		1770		3299		1770		3283	
Flt Permitted	0.95		1.00		0.95		1.00		0.95		1.00	
Satd. Flow (perm)	3433		3418		1770		3299		1770		3283	
Volume (vph)	460	930	132	160	580	350	100	961	350	300	692	60
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)	484	979	139	168	611	368	105	1012	368	316	728	63
RTOR Reduction (vph)	0	11	0	0	90	0	0	37	0	0	6	0
Lane Group Flow (vph)	484	1107	0	168	889	0	105	1343	0	316	785	0
Confl. Peds. (#/hr)	15		48		48		15		123		48	
Turn Type	Prot		Prot		Prot		Prot		Prot		Prot	
Protected Phases	7		4		3		8		5		2	
Permitted Phases	7		4		3		8		5		2	
Actuated Green, G (s)	11.5		27.0		8.5		24.0		8.7		34.0	
Effective Green, g (s)	11.0		28.0		8.0		25.0		8.2		35.0	
Actuated g/C Ratio	0.11		0.28		0.08		0.25		0.08		0.35	
Clearance Time (s)	3.5		5.0		3.5		5.0		3.5		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	378		957		142		825		145		1149	
v/s Ratio Prot	c0.14		c0.32		0.09		0.27		0.06		c0.41	
v/s Ratio Perm												
v/c Ratio	1.28		1.16		1.18		1.08		0.72		1.17	
Uniform Delay, d1	44.5		36.0		46.0		37.5		44.8		32.5	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	145.1		82.5		133.1		54.4		14.1		85.6	
Delay (s)	189.6		118.5		179.1		91.9		58.8		118.1	
Level of Service	F		F		F		F		E		F	
Approach Delay (s)	140.0		104.6		113.9		81.8		81.8		81.8	
Approach LOS	F		F		F		F		F		F	
Intersection Summary												
HCM Average Control Delay	113.1		HCM Level of Service		F							
HCM Volume to Capacity ratio	1.23											
Actuated Cycle Length (s)	100.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	109.7%		ICU Level of Service		H							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 PM + Commercial + Mit
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1762	3458		1752	3498			3432			3390	
Flt Permitted	0.21	1.00		0.16	1.00			0.83			0.85	
Satd. Flow (perm)	382	3458		292	3498			2875			2907	
Volume (vph)	60	1154	120	74	1033	68	90	333	57	33	160	50
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	1166	121	75	1043	69	91	336	58	33	162	51
RTOR Reduction (vph)	0	10	0	0	6	0	0	13	0	0	30	0
Lane Group Flow (vph)	61	1277	0	75	1106	0	0	472	0	0	217	0
Confl. Peds. (#/hr)	24		78	78		24	8		6	6		8
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.0	50.0		50.0	50.0			20.0			20.0	
Effective Green, g (s)	51.0	51.0		51.0	51.0			21.0			21.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.26			0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	244	2204		186	2230			755			763	
v/s Ratio Prot		c0.37			0.32							
v/s Ratio Perm	0.16			0.26			c0.16				0.07	
v/c Ratio	0.25	0.58		0.40	0.50			0.62			0.28	
Uniform Delay, d1	6.3	8.3		7.1	7.7			26.0			23.5	
Progression Factor	0.55	0.44		0.40	0.26			0.74			1.00	
Incremental Delay, d2	1.0	0.4		3.4	0.4			2.0			0.9	
Delay (s)	4.4	4.1		6.3	2.4			21.2			24.4	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		4.1			2.7			21.2			24.4	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM Average Control Delay			7.6									A
HCM Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			80.0					Sum of lost time (s)			8.0	
Intersection Capacity Utilization			80.7%					ICU Level of Service			D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 PM + Commercial + Mit
1/21/2008

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)	3.4	3.4		3.4	3.4			3.4			3.4	3.4
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			0.95	0.95
Frbp, ped/bikes	1.00	0.98		1.00	0.95			1.00			0.99	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.98		1.00	0.98			1.00			0.99	0.96
Flt Protected	0.95	1.00		0.95	1.00			0.95			1.00	1.00
Satd. Flow (prot)	1770	3429		1770	3296			1770			3466	3235
Flt Permitted	0.14	1.00		0.16	1.00			0.11			1.00	1.00
Satd. Flow (perm)	258	3429		292	3296			206			3466	3235
Volume (vph)	249	934	109	75	557	110	466	1470	124	130	689	255
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	254	953	111	77	568	112	476	1500	127	133	703	260
RTOR Reduction (vph)	0	8	0	0	15	0	0	6	0	0	34	0
Lane Group Flow (vph)	254	1056	0	77	665	0	476	1621	0	133	929	0
Confl. Peds. (#/hr)	94		86	86		94		40				111
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	40.9	33.7		28.1	24.9		61.1	51.6		37.6	32.1	
Effective Green, g (s)	41.5	34.3		29.3	25.5		61.7	52.2		38.8	32.7	
Actuated g/C Ratio	0.38	0.31		0.27	0.23		0.56	0.47		0.35	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	2.0		3.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	271	1069		129	764		480	1645		166	962	
v/s Ratio Prot	c0.11	c0.31		0.02	0.20		c0.23	0.47		0.04	0.29	
v/s Ratio Perm	0.25			0.14			c0.33			0.24		
v/c Ratio	0.94	0.99		0.60	0.87		0.99	0.99		0.80	0.97	
Uniform Delay, d1	27.6	37.6		33.2	40.7		33.0	28.5		29.1	38.1	
Progression Factor	0.79	0.79		1.00	1.00		1.12	0.83		1.00	1.00	
Incremental Delay, d2	33.3	21.7		7.2	10.3		30.1	14.4		22.4	21.7	
Delay (s)	55.1	51.3		40.5	51.0		67.1	37.9		51.5	59.8	
Level of Service	E	D		D	D		E	D		D	E	
Approach Delay (s)		52.1			49.9			44.5			58.8	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM Average Control Delay			50.2									D
HCM Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			110.0					Sum of lost time (s)			6.8	
Intersection Capacity Utilization			102.1%					ICU Level of Service			G	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 PM + Commercial + Mit
1/21/2008

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)	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	0.91		1.00	0.95		1.00	1.00		1.00	1.00		1.00
Frbp, ped/bikes	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.99
Flpb, ped/bikes	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Frt	0.99		1.00	0.98		1.00	0.97		1.00	0.98		0.98
Flt Protected	0.99		0.95	1.00		0.95	1.00		0.95	1.00		1.00
Satd. Flow (prot)	5013		1768	3452		1737	1802		1770	1805		1805
Flt Permitted	0.66		0.21	1.00		0.26	1.00		0.11	1.00		1.00
Satd. Flow (perm)	3311		389	3452		476	1802		213	1805		1805
Volume (vph)	160	858	40	93	1347	221	190	525	120	80	406	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	876	41	95	1374	226	194	536	122	82	414	71
RTOR Reduction (vph)	0	5	0	0	15	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	1075	0	95	1585	0	194	649	0	82	478	0
Confl. Peds. (#/hr)	24		4	4		24	48		12	12		48
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	46.0		46.0		46.0		34.0		34.0		34.0	
Effective Green, g (s)	47.0		47.0		47.0		35.0		35.0		35.0	
Actuated g/C Ratio	0.52		0.52		0.52		0.39		0.39		0.39	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	1729		203		1803		185		701		83	
v/s Ratio Prot			c0.46				0.36				0.27	
v/s Ratio Perm	0.32		0.24		0.41		c0.41		0.39		0.39	
v/c Ratio	1.87dl		0.47		0.88		1.05		0.93		0.99	
Uniform Delay, d1	15.2		13.6		19.0		27.5		26.3		27.3	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	1.7		7.6		6.5		79.6		18.1		93.9	
Delay (s)	16.9		21.2		25.5		107.1		44.3		121.2	
Level of Service	B		C		C		F		D		F	
Approach Delay (s)	16.9		25.2		58.6		39.4					
Approach LOS	B		C		E		D					
Intersection Summary												
HCM Average Control Delay	31.8		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	135.8%		ICU Level of Service		H							
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 PM + Commercial + Mit
1/21/2008

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)	3.4		3.4	3.4		3.4	3.4		3.4	3.4		3.4
Lane Util. Factor	0.91		1.00	0.91		1.00	0.95		1.00	0.95		1.00
Frbp, ped/bikes	1.00		1.00	0.99		1.00	0.99		1.00	0.99		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Frt	0.99		1.00	0.96		1.00	0.99		1.00	0.98		0.98
Flt Protected	0.98		1.00	1.00		0.95	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4916		4804	1768		3456	1770		1805	3427		3427
Flt Permitted	0.69		0.13	1.00		0.12	1.00		0.12	1.00		1.00
Satd. Flow (perm)	3461		3313	249		3456	227		3427	3427		3427
Volume (vph)	387	695	111	110	1174	466	280	1206	110	206	626	111
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)	407	732	117	116	1236	491	295	1269	116	217	659	117
RTOR Reduction (vph)	0	10	0	0	59	0	0	6	0	0	13	0
Lane Group Flow (vph)	0	1246	0	0	1784	0	295	1379	0	217	763	0
Confl. Peds. (#/hr)	26		19	26		39	92		92	39		39
Turn Type	Perm		pm+pt		pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	4		3		8		5		2		1	
Permitted Phases	4		8		2		6		1		6	
Actuated Green, G (s)	51.0		51.0		51.0		40.0		39.7		32.2	
Effective Green, g (s)	51.6		51.6		51.6		40.6		40.4		32.8	
Actuated g/C Ratio	0.47		0.47		0.37		0.37		0.37		0.30	
Clearance Time (s)	4.0		4.0		3.5		4.0		3.5		4.0	
Vehicle Extension (s)	2.0		2.0		3.0		2.0		3.0		2.0	
Lane Grp Cap (vph)	1624		1554		329		1276		190		1022	
v/s Ratio Prot			c0.13		c0.40		c0.08		c0.22		0.22	
v/s Ratio Perm	0.36		c0.54		0.29		0.34		0.34		0.34	
v/c Ratio	4.33dl		1.15		0.90		1.08		1.14		0.75	
Uniform Delay, d1	24.2		29.2		26.3		34.7		31.4		34.8	
Progression Factor	1.14		1.00		0.85		0.92		1.44		1.17	
Incremental Delay, d2	1.5		74.5		22.9		48.6		107.2		4.7	
Delay (s)	29.0		103.7		45.2		80.5		152.4		45.6	
Level of Service	C		F		D		F		F		D	
Approach Delay (s)	29.0		103.7		74.3		68.9					
Approach LOS	C		F		E		E					
Intersection Summary												
HCM Average Control Delay	72.9		HCM Level of Service		E							
HCM Volume to Capacity ratio	1.09											
Actuated Cycle Length (s)	110.0		Sum of lost time (s)		6.8							
Intersection Capacity Utilization	122.0%		ICU Level of Service		H							
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

**APPENDIX O:
EXISTING PLUS TOWER ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

Existing+Tower AM
1/21/2008

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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4922		1770	4965		2006	2049		1984	1927	
Flt Permitted	0.95	1.00		0.95	1.00		0.11	1.00		0.46	1.00	
Satd. Flow (perm)	1770	4922		1770	4965		222	2049		962	1927	
Volume (vph)	288	907	176	65	1219	165	206	270	50	146	278	246
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)	303	955	185	68	1283	174	217	284	53	154	293	259
RTOR Reduction (vph)	0	20	0	0	14	0	0	6	0	0	28	0
Lane Group Flow (vph)	303	1120	0	68	1443	0	217	331	0	154	524	0
Confl. Peds. (#/hr)			10	10		10	10		10	10		10
Turn Type	Prot			Prot		pm+pt			Perm			
Protected Phases	7	4		3	8		5	2		6	6	
Permitted Phases							2			6		
Actuated Green, G (s)	17.0	56.4		8.6	48.0		44.5	44.5		35.5	35.5	
Effective Green, g (s)	17.0	56.4		8.6	48.0		45.0	45.0		36.0	36.0	
Actuated g/C Ratio	0.14	0.47		0.07	0.40		0.38	0.38		0.30	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	2313		127	1986		187	768		289	578	
v/s Ratio Prot	c0.17	0.23		0.04	c0.29		c0.07	0.16		c0.27		
v/s Ratio Perm							0.37			0.16		
v/c Ratio	1.21	0.48		0.54	0.73		1.16	0.43		0.53	0.91	
Uniform Delay, d1	51.5	21.8		53.8	30.5		33.9	28.0		35.0	40.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	124.5	0.7		4.3	2.4		115.7	0.4		1.9	17.8	
Delay (s)	176.0	22.5		58.1	32.8		149.5	28.4		36.9	58.2	
Level of Service	F	C		E	C		F	C		D	E	
Approach Delay (s)		54.8			33.9			75.8			53.6	
Approach LOS		D			C			E			D	

Intersection Summary			
HCM Average Control Delay	49.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

Existing+Tower AM
1/21/2008

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)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95					0.95	1.00	0.95
Flpb, ped/bikes		1.00		1.00	0.99					0.99	1.00	0.96
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	1.00
Frt		0.94		1.00	0.92					0.97	1.00	0.95
Flt Protected		0.97		0.95	1.00					1.00	0.95	1.00
Satd. Flow (prot)		1696		1681	1607					3405	1770	3203
Flt Permitted		0.80		0.75	1.00					0.94	0.95	1.00
Satd. Flow (perm)		1402		1321	1607					3215	1770	3203
Volume (vph)		8	0	7	113	95	119	10	987	231	72	664
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)		9	0	8	122	102	128	11	1061	248	77	714
RTOR Reduction (vph)		0	8	0	0	61	0	0	15	0	0	49
Lane Group Flow (vph)		0	9	0	122	169	0	0	1305	0	77	1050
Confl. Peds. (#/hr)		4				4	44			12	12	44
Turn Type		Perm			Perm		Perm			Prot		
Protected Phases		7			8		8			2		1
Permitted Phases		7			8		2				6	
Actuated Green, G (s)		3.3			13.0	13.0				48.7	7.0	60.2
Effective Green, g (s)		3.8			13.5	13.5				49.2	7.5	60.7
Actuated g/C Ratio		0.04			0.15	0.15				0.55	0.08	0.67
Clearance Time (s)		4.5			4.5	4.5				4.5	4.5	4.5
Vehicle Extension (s)		2.0			2.0	2.0				2.0	2.0	2.0
Lane Grp Cap (vph)		59			198	241			1758	148	2160	
v/s Ratio Prot										0.04	c0.33	
v/s Ratio Perm		c0.01			0.09	0.11				c0.41		
v/c Ratio		0.16			0.62	0.70				0.74	0.52	0.49
Uniform Delay, d1		41.6			35.8	36.3				15.6	39.5	7.1
Progression Factor		1.00			1.00	1.00				1.03	1.00	1.00
Incremental Delay, d2		0.5			4.0	7.3				1.5	1.5	0.8
Delay (s)		42.0			39.8	43.6				17.5	41.0	7.9
Level of Service		D			D	D				B	D	A
Approach Delay (s)		42.0			42.3					17.5		10.1
Approach LOS		D			D					B		B

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

Existing+Tower AM
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3432		1770	3398		1770	3441		1770	3354	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3432		1770	3398		1770	3441		1770	3354	
Volume (vph)	450	533	86	101	677	209	107	595	99	140	510	143
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	469	555	90	105	705	218	111	620	103	146	531	149
RTOR Reduction (vph)	0	14	0	0	32	0	0	14	0	0	27	0
Lane Group Flow (vph)	469	631	0	105	891	0	111	709	0	146	653	0
Confl. Peds. (#/hr)	6		24	24		6	36		28	28		36
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	13.0	30.6		7.9	25.5		8.0	24.4		10.1	26.5	
Effective Green, g (s)	12.5	31.6		7.4	26.5		7.5	25.4		9.6	27.5	
Actuated g/C Ratio	0.14	0.35		0.08	0.29		0.08	0.28		0.11	0.31	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	477	1205		146	1001		148	971		189	1025	
v/s Ratio Prot	c0.14	0.18		0.06	c0.26		0.06	c0.21		c0.08	0.19	
v/s Ratio Perm												
v/c Ratio	0.98	0.52		0.72	0.89		0.75	0.73		0.77	0.64	
Uniform Delay, d1	38.6	23.2		40.3	30.4		40.3	29.2		39.1	26.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.12	0.82	
Incremental Delay, d2	36.5	0.2		13.2	9.5		17.1	4.8		14.5	2.7	
Delay (s)	75.2	23.4		53.4	39.9		57.4	34.0		58.2	24.9	
Level of Service	E	C		D	D		E	C		E	C	
Approach Delay (s)		45.2			41.3			37.1			30.8	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM Average Control Delay		39.2										D
HCM Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		90.0						16.0				
Intersection Capacity Utilization		79.4%										D
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

Existing+Tower AM
1/21/2008

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)		4.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		0.97	0.95	
Frt		0.86						0.93		1.00	0.97	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		1611						3284		3433	3447	
Flt Permitted		1.00						0.95		0.95	1.00	
Satd. Flow (perm)		1611						3115		3433	3447	
Volume (vph)	0	0	7	0	0	0	0	7	323	302	1585	269
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)	0	0	8	0	0	0	0	8	351	328	1723	292
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	24	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	663	0	1723	353
Turn Type										Prot		
Protected Phases										2	1	6
Permitted Phases												
Actuated Green, G (s)		0.0						8.0		29.0	45.0	
Effective Green, g (s)		0.0						8.0		29.0	45.0	
Actuated g/C Ratio		0.00						0.18		0.64	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						554		2212	3447	
v/s Ratio Prot										c0.50	0.10	
v/s Ratio Perm												
v/c Ratio		0.00						11.31dr		0.78	0.10	
Uniform Delay, d1		22.5						18.5		5.7	0.0	
Progression Factor		1.00						0.75		1.00	1.00	
Incremental Delay, d2		0.0						104.4		2.8	0.1	
Delay (s)		22.5						118.3		8.5	0.1	
Level of Service		C						F		A	A	
Approach Delay (s)		22.5			0.0			118.3		7.1		
Approach LOS		C			A			F		A		
Intersection Summary												
HCM Average Control Delay		34.7										C
HCM Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		45.0								8.0		
Intersection Capacity Utilization		77.4%										D
Analysis Period (min)		15										
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

Existing+Tower AM
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.97			0.96			0.98			0.99		
Flpb, ped/bikes	0.97			0.97			1.00			1.00		
Frt	0.98			0.94			0.98			0.99		
Flt Protected	0.98			0.98			1.00			1.00		
Satd. Flow (prot)	1672			1596			3394			3459		
Flt Permitted	0.80			0.88			0.92			0.88		
Satd. Flow (perm)	1363			1419			3146			3046		
Volume (vph)	69	50	25	51	44	72	24	474	80	41	423	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	77	56	28	57	49	80	27	527	89	46	470	31
RTOR Reduction (vph)	0	17	0	0	53	0	0	29	0	0	10	0
Lane Group Flow (vph)	0	144	0	0	133	0	0	614	0	0	537	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.0			15.0			22.0			22.0		
Effective Green, g (s)	15.0			15.0			22.0			22.0		
Actuated g/C Ratio	0.33			0.33			0.49			0.49		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Lane Grp Cap (vph)	454			473			1538			1489		
v/s Ratio Prot												
v/s Ratio Perm	c0.11			0.09			c0.20			0.18		
v/c Ratio	0.32			0.28			0.40			0.36		
Uniform Delay, d1	11.2			11.0			7.3			7.1		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	1.8			1.5			0.8			0.7		
Delay (s)	13.0			12.5			8.1			7.8		
Level of Service	B			B			A			A		
Approach Delay (s)	13.0			12.5			8.1			7.8		
Approach LOS	B			B			A			A		
Intersection Summary												
HCM Average Control Delay	9.0			HCM Level of Service		A						
HCM Volume to Capacity ratio	0.37											
Actuated Cycle Length (s)	45.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	60.6%		ICU Level of Service		B							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

Existing+Tower AM
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.96			0.96			0.99			0.98		
Flpb, ped/bikes	0.97			0.98			1.00			1.00		
Frt	0.96			0.96			0.99			0.99		
Flt Protected	0.99			0.99			1.00			1.00		
Satd. Flow (prot)	1641			1658			3456			4887		
Flt Permitted	0.82			0.83			0.91			0.81		
Satd. Flow (perm)	1366			1392			3135			3976		
Volume (vph)	51	74	52	29	57	36	22	949	47	61	992	83
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	82	58	32	63	40	24	1054	52	68	1102	92
RTOR Reduction (vph)	0	24	0	0	25	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	173	0	0	110	0	0	1128	0	0	1257	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			6		
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	13.1			13.1			62.9			62.9		
Effective Green, g (s)	13.6			13.6			63.4			63.4		
Actuated g/C Ratio	0.16			0.16			0.75			0.75		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	2.0			2.0			2.0			2.0		
Lane Grp Cap (vph)	219			223			2338			2966		
v/s Ratio Prot												
v/s Ratio Perm	c0.13			0.08			c0.36			0.32		
v/c Ratio	0.79			0.49			0.48			0.42		
Uniform Delay, d1	34.3			32.6			4.3			4.0		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	15.8			0.6			0.7			0.4		
Delay (s)	50.1			33.2			5.0			4.5		
Level of Service	D			C			A			A		
Approach Delay (s)	50.1			33.2			5.0			4.5		
Approach LOS	D			C			A			A		
Intersection Summary												
HCM Average Control Delay	9.4			HCM Level of Service		A						
HCM Volume to Capacity ratio	0.54											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	88.8%		ICU Level of Service		E							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing+Tower AM
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1732	3476	1757	3470	1766	1812	1734	1841	1734	1841	1734	1841
Flt Permitted	0.31	1.00	0.47	1.00	0.62	1.00	0.63	1.00	0.63	1.00	0.63	1.00
Satd. Flow (perm)	570	3476	860	3470	1145	1812	1147	1841	1147	1841	1147	1841
Volume (vph)	19	301	35	29	456	44	82	160	27	88	187	15
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	21	331	38	32	501	48	90	176	30	97	205	16
RTOR Reduction (vph)	0	11	0	0	9	0	0	8	0	0	3	0
Lane Group Flow (vph)	21	358	0	32	540	0	90	198	0	97	218	0
Confl. Peds. (#/hr)	30		12	12		30	6		54	54		6
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		49.5	49.5		49.5	49.5	
Effective Green, g (s)	23.0	23.0		23.0	23.0		49.0	49.0		49.0	49.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.61	0.61		0.61	0.61	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	164	999		247	998		701	1110		703	1128	
v/s Ratio Prot		0.10			c0.16			0.11			c0.12	
v/s Ratio Perm	0.04			0.04			0.08			0.08		
v/c Ratio	0.13	0.36		0.13	0.54		0.13	0.18		0.14	0.19	
Uniform Delay, d1	21.1	22.6		21.1	24.0		6.5	6.7		6.6	6.8	
Progression Factor	1.00	1.00		0.91	0.97		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	1.0		1.1	2.1		0.4	0.4		0.4	0.4	
Delay (s)	22.7	23.6		20.2	25.5		6.9	7.1		7.0	7.2	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		23.6			25.2			7.0			7.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing+Tower AM
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99
Satd. Flow (prot)	1759	3460	1736	3517	1759	3460	1736	3517	1759	3460	1736	3517
Flt Permitted	0.43	1.00	0.47	1.00	0.43	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Satd. Flow (perm)	802	3460	851	3517	802	3460	851	3517	802	3460	851	3517
Volume (vph)	15	377	48	34	457	17	61	101	45	20	66	25
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)	16	397	51	36	481	18	64	106	47	21	69	26
RTOR Reduction (vph)	0	12	0	0	3	0	0	28	0	0	15	0
Lane Group Flow (vph)	16	436	0	36	496	0	0	189	0	0	101	0
Confl. Peds. (#/hr)	18		54	54		18	4		18	18		4
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.0	38.0		38.0	38.0		32.0			32.0		
Effective Green, g (s)	39.0	39.0		39.0	39.0		33.0			33.0		
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.41			0.41		
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0		
Lane Grp Cap (vph)	391	1687		415	1715		1188			1256		
v/s Ratio Prot		0.13			c0.14							
v/s Ratio Perm	0.02			0.04			c0.07			0.03		
v/c Ratio	0.04	0.26		0.09	0.29		0.16			0.08		
Uniform Delay, d1	10.7	12.0		11.0	12.2		14.8			14.3		
Progression Factor	0.91	1.04		1.38	1.43		0.40			1.00		
Incremental Delay, d2	0.2	0.4		0.4	0.4		0.3			0.1		
Delay (s)	10.0	12.9		15.5	18.0		6.2			14.4		
Level of Service	A	B		B	B		A			B		
Approach Delay (s)		12.8			17.8		6.2			14.4		
Approach LOS		B			B		A			B		

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

Existing+Tower AM
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	0.99	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.99	
Satd. Flow (prot)	1760	3496		1729	3399			3396			3435	
Flt Permitted	0.40	1.00		0.48	1.00			0.90			0.81	
Satd. Flow (perm)	745	3496		875	3399			3087			2819	
Volume (vph)	31	390	25	90	421	117	30	226	62	71	217	29
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	32	406	26	94	439	122	31	235	65	74	226	30
RTOR Reduction (vph)	0	6	0	0	32	0	0	27	0	0	9	0
Lane Group Flow (vph)	32	426	0	94	529	0	0	304	0	0	321	0
Confl. Peds. (#/hr)	13		71	71		13	22		22	22		22
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.5	41.5		41.5	41.5			32.0			32.0	
Effective Green, g (s)	41.0	41.0		41.0	41.0			31.0			31.0	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.39			0.39	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	382	1792		448	1742			1196			1092	
v/s Ratio Prot		0.12			c0.16							
v/s Ratio Perm	0.04			0.11				0.10			c0.11	
v/c Ratio	0.08	0.24		0.21	0.30			0.25			0.29	
Uniform Delay, d1	9.9	10.8		10.7	11.3			16.6			16.9	
Progression Factor	1.33	1.43		1.00	1.00			0.70			1.00	
Incremental Delay, d2	0.4	0.3		1.1	0.5			0.5			0.7	
Delay (s)	13.6	15.7		11.7	11.7			12.2			17.6	
Level of Service	B	B		B	B			B			B	
Approach Delay (s)		15.6			11.7			12.2			17.6	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM Average Control Delay		13.9										B
HCM Volume to Capacity ratio		0.30										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		101.7%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

Existing+Tower AM
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.91		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.97		1.00	1.00	0.97	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3117		1770	3539	1734	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3117		1770	3539	1734	
Volume (vph)	432	97	73	501	129	44
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	475	107	80	551	142	48
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	582	0	80	551	190	0
Confl. Peds. (#/hr)		146	266			
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	50.4		8.1	62.5	14.5	
Effective Green, g (s)	50.4		8.1	62.5	14.5	
Actuated g/C Ratio	0.59		0.10	0.74	0.17	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1848		169	2602	296	
v/s Ratio Prot	c0.19		c0.05	0.16	c0.11	
v/s Ratio Perm						
v/c Ratio	0.31		0.47	0.21	0.64	
Uniform Delay, d1	8.7		36.4	3.5	32.8	
Progression Factor	1.00		1.21	0.71	0.97	
Incremental Delay, d2	0.4		1.7	0.2	4.7	
Delay (s)	9.1		45.7	2.7	36.5	
Level of Service	A		D	A	D	
Approach Delay (s)	9.1			8.1	36.5	
Approach LOS	A			A	D	
Intersection Summary						
HCM Average Control Delay		12.4				B
HCM Volume to Capacity ratio		0.40				
Actuated Cycle Length (s)		85.0		Sum of lost time (s)		12.0
Intersection Capacity Utilization		40.2%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

Existing+Tower AM
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.97		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.93	1.00		0.92	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3362		1630	3370		1770	3451		1770	3369	
Flt Permitted	0.31	1.00		0.33	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	541	3362		560	3370		1770	3451		1770	3369	
Volume (vph)	68	346	62	53	357	64	95	457	45	78	556	124
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	76	384	69	59	397	71	106	508	50	87	618	138
RTOR Reduction (vph)	0	20	0	0	20	0	0	6	0	0	17	0
Lane Group Flow (vph)	76	433	0	59	448	0	106	552	0	87	739	0
Confl. Peds. (#/hr)	72		137	137		72			58	58		92
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	17.9	17.9		17.9	17.9		8.4	46.2		7.4	45.2	
Effective Green, g (s)	18.4	18.4		18.4	18.4		8.9	46.7		7.9	45.7	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.10	0.55		0.09	0.54	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	117	728		121	730		185	1896		165	1811	
v/s Ratio Prot		0.13		0.13			0.06	0.16		0.05	0.22	
v/s Ratio Perm	0.14			0.11								
v/c Ratio	0.65	0.60		0.49	0.61		0.57	0.29		0.53	0.41	
Uniform Delay, d1	30.4	30.0		29.2	30.1		36.2	10.3		36.8	11.6	
Progression Factor	0.90	0.88		1.00	1.00		1.25	1.09		1.00	1.00	
Incremental Delay, d2	8.6	0.8		1.1	1.1		2.6	0.4		1.4	0.7	
Delay (s)	36.1	27.3		30.3	31.2		47.8	11.5		38.2	12.3	
Level of Service	D	C		C	C		D	B		D	B	
Approach Delay (s)		28.6			31.1			17.3			15.0	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay		21.7										
HCM Volume to Capacity ratio		0.49										
Actuated Cycle Length (s)		85.0						12.0				
Intersection Capacity Utilization		59.8%										
Analysis Period (min)		15										
c Critical Lane Group												

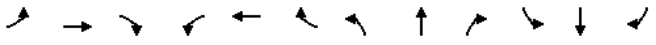
HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

Existing+Tower AM
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	11	35	583	9	15	698
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	39	648	10	17	776
Pedestrians	34		33			34
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	3		3			3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.95	0.97			0.97	
vC, conflicting volume	1141	397			692	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1011	350			653	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	93			98	
cM capacity (veh/h)	209	593			877	
Direction, Lane #						
	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	51	432	226	17	388	388
Volume Left	12	0	0	17	0	0
Volume Right	39	0	10	0	0	0
cSH	412	1700	1700	877	1700	1700
Volume to Capacity	0.12	0.25	0.13	0.02	0.23	0.23
Queue Length 95th (ft)	11	0	0	1	0	0
Control Delay (s)	15.0	0.0	0.0	9.2	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	15.0	0.0		0.2		
Approach LOS	B					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization		36.6%			ICU Level of Service	A
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.


Existing+Tower AM
1/21/2008



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)	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	0.91		1.00	0.95		1.00	1.00		1.00	1.00		1.00
Frbp, ped/bikes	1.00		1.00	1.00		1.00	0.99		1.00	1.00		1.00
Flpb, ped/bikes	1.00		0.99	1.00		1.00	0.97		1.00	1.00		1.00
Frt	0.99		1.00	0.97		0.98	1.00		0.99	1.00		0.99
Flt Protected	0.99		0.95	1.00		0.99	0.95		1.00	0.95		1.00
Satd. Flow (prot)	4986		1754	3420		1775	1725		1842	1725		1842
Flt Permitted	0.88		0.53	1.00		0.88	0.44		1.00	0.44		1.00
Satd. Flow (perm)	4406		975	3420		1577	799		1842	799		1842
Volume (vph)	34	273	25	52	279	67	58	175	49	64	189	12
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)	37	297	27	57	303	73	63	190	53	70	205	13
RTOR Reduction (vph)	0	10	0	0	25	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	351	0	57	351	0	0	297	0	70	215	0
Confl. Peds. (#/hr)	24		18	18		24	24		48	48		24
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.0		51.0		51.0		24.0		24.0		24.0	
Effective Green, g (s)	52.0		52.0		52.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2695		596		2092		464		235		542	
v/s Ratio Prot	0.08		0.06		c0.10		c0.19		0.09		0.12	
v/s Ratio Perm	0.13		0.10		0.17		0.64		0.30		0.40	
v/c Ratio	7.0		6.8		7.1		26.1		23.2		24.0	
Uniform Delay, d1	1.00		1.00		1.00		1.00		1.00		1.00	
Progression Factor	0.1		0.3		0.2		6.6		3.2		2.2	
Incremental Delay, d2	7.1		7.1		7.3		32.7		26.4		26.1	
Delay (s)	A		A		A		C		C		C	
Level of Service	7.1		7.3		7.3		32.7		26.2		26.2	
Approach Delay (s)	A		A		A		C		C		C	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	16.8		16.8		16.8		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.32		0.32		0.32		0.32		0.32		0.32	
Actuated Cycle Length (s)	85.0		85.0		85.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	93.2%		93.2%		93.2%		ICU Level of Service		F		F	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

Existing+Tower AM
1/21/2008



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)	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	0.91		1.00	0.91		1.00	1.00		1.00	1.00		1.00
Frbp, ped/bikes	1.00		1.00	1.00		1.00	0.99		1.00	1.00		1.00
Flpb, ped/bikes	1.00		0.99	1.00		1.00	0.99		1.00	0.99		1.00
Frt	1.00		0.99	1.00		0.99	1.00		0.96	1.00		0.99
Flt Protected	1.00		0.95	1.00		0.95	1.00		0.95	1.00		1.00
Satd. Flow (prot)	5050		1750	4993		1750	1782		1746	1838		1838
Flt Permitted	0.90		0.63	1.00		0.63	1.00		0.45	1.00		1.00
Satd. Flow (perm)	4560		975	4416		1158	1782		829	1838		1838
Volume (vph)	25	377	7	34	342	33	30	170	53	23	121	10
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)	27	410	8	37	372	36	33	185	58	25	132	11
RTOR Reduction (vph)	0	2	0	0	13	0	0	14	0	0	4	0
Lane Group Flow (vph)	0	443	0	0	432	0	33	229	0	25	139	0
Confl. Peds. (#/hr)	18		18	18		18	12		18	18		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2936		2843		2843		297		457		212	
v/s Ratio Prot	0.10		c0.10		c0.10		0.03		c0.13		0.08	
v/s Ratio Perm	0.15		0.15		0.15		0.11		0.50		0.12	
v/c Ratio	5.6		5.6		5.6		22.8		25.4		22.8	
Uniform Delay, d1	1.00		1.00		1.00		1.00		1.00		0.95	
Progression Factor	0.1		0.1		0.1		0.8		3.9		1.1	
Incremental Delay, d2	5.7		4.6		4.6		23.5		29.3		22.9	
Delay (s)	A		A		A		C		C		C	
Level of Service	5.7		4.6		4.6		28.6		28.6		24.2	
Approach Delay (s)	A		A		A		C		C		C	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	12.4		12.4		12.4		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.25		0.25		0.25		0.25		0.25		0.25	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	51.4%		51.4%		51.4%		ICU Level of Service		A		A	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

Existing+Tower AM
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		0.91		0.95		0.95		0.95		0.95	
Frpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	0.99		0.97		0.98		0.98		0.98		0.98	
Flt Protected	1.00		1.00		1.00		0.99		0.99		0.99	
Satd. Flow (prot)	5003		4864		3426		3422		3422		3422	
Flt Permitted	0.85		0.86		0.92		0.84		0.84		0.84	
Satd. Flow (perm)	4265		4217		3153		2911		2911		2911	
Volume (vph)	45	389	28	46	366	122	15	156	31	61	210	37
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)	49	423	30	50	398	133	16	170	34	66	228	40
RTOR Reduction (vph)	0	9	0	0	47	0	0	19	0	0	13	0
Lane Group Flow (vph)	0	493	0	0	534	0	0	201	0	0	321	0
Confl. Peds. (#/hr)	17		19	19		17	12		16	16		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	50.0		50.0		19.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2746		2715		808		746		746		746	
v/s Ratio Prot												
v/s Ratio Perm	0.12		c0.13		0.06		c0.11		c0.11		c0.11	
v/c Ratio	0.18		0.20		0.25		0.43		0.43		0.43	
Uniform Delay, d1	5.7		5.8		23.6		24.9		24.9		24.9	
Progression Factor	0.80		1.00		1.00		0.53		0.53		0.53	
Incremental Delay, d2	0.1		0.2		0.7		1.8		1.8		1.8	
Delay (s)	4.7		6.0		24.4		15.0		15.0		15.0	
Level of Service	A		A		C		B		B		B	
Approach Delay (s)	4.7		6.0		24.4		15.0		15.0		15.0	
Approach LOS	A		A		C		B		B		B	
Intersection Summary												
HCM Average Control Delay	9.9		HCM Level of Service		A		A		A		A	
HCM Volume to Capacity ratio	0.26		0.26		0.26		0.26		0.26		0.26	
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	81.1%		ICU Level of Service		D		D		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

Existing+Tower AM
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		0.91		1.00		1.00		1.00		1.00	
Frpb, ped/bikes	1.00		1.00		0.95		1.00		0.95		0.95	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	1.00		0.97		0.93		0.93		0.93		0.93	
Flt Protected	1.00		1.00		0.98		0.98		0.98		0.98	
Satd. Flow (prot)	5062		4717		1695		1617		1617		1617	
Flt Permitted	0.91		0.93		0.89		0.83		0.83		0.83	
Satd. Flow (perm)	4637		4393		1548		1372		1372		1372	
Volume (vph)	16	478	10	10	473	100	10	0	10	58	0	55
Peak-hour factor, PHF	0.90	0.90	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.90	0.92	0.90
Adj. Flow (vph)	18	531	11	11	526	111	11	0	11	64	0	61
RTOR Reduction (vph)	0	1	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	559	0	0	648	0	0	12	0	0	125	0
Confl. Peds. (#/hr)					98						98	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	65.9		65.9		11.1		11.1		11.1		11.1	
Effective Green, g (s)	65.9		65.9		11.1		11.1		11.1		11.1	
Actuated g/C Ratio	0.78		0.78		0.13		0.13		0.13		0.13	
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)	3595		3406		202		179		179		179	
v/s Ratio Prot												
v/s Ratio Perm	0.12		c0.15		0.01		c0.09		c0.09		c0.09	
v/c Ratio	0.16		0.19		0.06		0.70		0.70		0.70	
Uniform Delay, d1	2.4		2.5		32.4		35.3		35.3		35.3	
Progression Factor	1.00		1.09		1.00		0.71		0.71		0.71	
Incremental Delay, d2	0.1		0.1		0.1		10.8		10.8		10.8	
Delay (s)	2.5		2.9		32.5		35.9		35.9		35.9	
Level of Service	A		A		C		D		D		D	
Approach Delay (s)	2.5		2.9		32.5		35.9		35.9		35.9	
Approach LOS	A		A		C		D		D		D	
Intersection Summary												
HCM Average Control Delay	6.2		HCM Level of Service		A		A		A		A	
HCM Volume to Capacity ratio	0.26		0.26		0.26		0.26		0.26		0.26	
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	51.5%		ICU Level of Service		A		A		A		A	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

Existing+Tower AM
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			1.00		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.97			0.97			1.00			0.99		
Flt Protected	0.99			0.99			0.95			1.00		
Satd. Flow (prot)	4869			4821			1753			3471		
Flt Permitted	0.69			0.74			0.38			1.00		
Satd. Flow (perm)	3381			3580			693			3471		
Volume (vph)	110	337	94	79	382	133	60	349	39	101	480	137
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)	120	366	102	86	415	145	65	379	42	110	522	149
RTOR Reduction (vph)	0	55	0	0	110	0	0	5	0	0	15	0
Lane Group Flow (vph)	0	533	0	0	536	0	65	416	0	110	656	0
Confl. Peds. (#/hr)	40		9		40		25		31		31	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	19.2		19.2		55.3		55.3		55.3		55.3	
Effective Green, g (s)	20.7		20.7		56.3		56.3		56.3		56.3	
Actuated g/C Ratio	0.24		0.24		0.66		0.66		0.66		0.66	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	823		872		459		2299		613		2247	
v/s Ratio Prot					0.12		c0.19					
v/s Ratio Perm	c0.16		0.15		0.09		0.12		0.12		c0.05	
v/c Ratio	0.65		0.62		0.14		0.18		0.18		0.29	
Uniform Delay, d1	28.9		28.6		5.3		5.5		5.5		6.0	
Progression Factor	0.91		1.00		1.22		1.12		1.23		1.32	
Incremental Delay, d2	1.3		0.9		0.6		0.2		0.6		0.3	
Delay (s)	27.5		29.5		7.1		6.4		7.4		8.2	
Level of Service	C		C		A		A		A		A	
Approach Delay (s)	27.5		29.5		6.5		8.1		8.1		8.1	
Approach LOS	C		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	17.9		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.39											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	70.3%		ICU Level of Service		C							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

Existing+Tower AM
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			0.99			1.00			0.88		
Flpb, ped/bikes	1.00			1.00			0.93			1.00		
Frt	1.00			0.98			1.00			0.85		
Flt Protected	1.00			1.00			0.96			1.00		
Satd. Flow (prot)	5043			4928			1664			1395		
Flt Permitted	0.89			0.91			0.84			1.00		
Satd. Flow (perm)	4495			4493			1458			1395		
Volume (vph)	25	470	9	24	569	75	14	4	13	47	1	41
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	516	10	26	625	82	15	4	14	52	1	45
RTOR Reduction (vph)	0	2	0	0	20	0	0	0	10	0	32	0
Lane Group Flow (vph)	0	551	0	0	713	0	0	19	4	0	66	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		2		6		6	
Actuated Green, G (s)	48.0		48.0		23.0		23.0		23.0		23.0	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lane Grp Cap (vph)	2725		2724		428		410		395		395	
v/s Ratio Prot					0.01		0.00		c0.05			
v/s Ratio Perm	0.12		c0.16		0.04		0.01		0.17		0.17	
v/c Ratio	0.20		0.26		0.04		0.01		0.17		0.17	
Uniform Delay, d1	7.1		7.4		20.2		20.0		21.0		21.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.2		0.2		0.2		0.0		0.9		0.9	
Delay (s)	7.2		7.6		20.4		20.1		21.9		21.9	
Level of Service	A		A		C		C		C		C	
Approach Delay (s)	7.2		7.6		20.3		21.9		21.9		21.9	
Approach LOS	A		A		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	8.7		HCM Level of Service		A							
HCM Volume to Capacity ratio	0.23											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	81.7%		ICU Level of Service		D							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

Existing+Tower AM
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.94		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4942		1770	4737		1770	4943		1770	4981	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4942		1770	4737		1770	4943		1770	4981	
Volume (vph)	70	412	56	112	436	253	89	260	42	226	523	64
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	458	62	124	484	281	99	289	47	251	581	71
RTOR Reduction (vph)	0	18	0	0	111	0	0	25	0	0	17	0
Lane Group Flow (vph)	78	502	0	124	654	0	99	312	0	251	635	0
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	4		3	4		1	2		1	2	
Permitted Phases												
Actuated Green, G (s)	10.5	26.5		10.5	26.5		9.0	26.0		9.0	26.0	
Effective Green, g (s)	10.5	27.5		10.5	27.5		9.0	27.0		9.0	27.0	
Actuated g/C Ratio	0.12	0.31		0.12	0.31		0.10	0.30		0.10	0.30	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	207	1510		207	1447		177	1483		177	1494	
v/s Ratio Prot	0.04	0.10		c0.07	c0.14		0.06	0.06		c0.14	c0.13	
v/s Ratio Perm												
v/c Ratio	0.38	0.33		0.60	0.45		0.56	0.21		1.42	0.43	
Uniform Delay, d1	36.7	24.2		37.8	25.2		38.6	23.5		40.5	25.3	
Progression Factor	1.00	1.00		0.97	2.02		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.6		2.4	0.8		2.2	0.3		217.9	0.9	
Delay (s)	37.1	24.7		39.2	51.6		40.8	23.9		258.4	26.2	
Level of Service	D	C		D	D		D	C		F	C	
Approach Delay (s)		26.4			49.8			27.7			90.7	
Approach LOS		C			D			C			F	
Intersection Summary												
HCM Average Control Delay		54.5		HCM Level of Service				D				
HCM Volume to Capacity ratio		0.58										
Actuated Cycle Length (s)		90.0		Sum of lost time (s)				16.0				
Intersection Capacity Utilization		72.9%		ICU Level of Service				C				
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

Existing+Tower AM
1/21/2008

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)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			0.95	0.95
Frpb, ped/bikes		0.93			0.95			1.00			0.99	0.98
Flpb, ped/bikes		0.97			0.96			0.91			1.00	1.00
Frt		0.95			0.94			1.00			0.99	0.99
Flt Protected		0.98			0.99			0.95			1.00	1.00
Satd. Flow (prot)		1570			1592			1611			3486	3437
Flt Permitted		0.73			0.90			0.49			1.00	1.00
Satd. Flow (perm)		1163			1449			824			3486	3437
Volume (vph)		27	19	26	25	34	42	54	509	24	24	389
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
Adj. Flow (vph)		29	21	28	27	37	46	59	553	26	26	423
RTOR Reduction (vph)		0	26	0	0	39	0	0	2	0	0	4
Lane Group Flow (vph)		0	52	0	0	71	0	59	577	0	26	459
Confl. Peds. (#/hr)		100		100	100		100	100		100	100	100
Turn Type		Perm			Perm			Perm			Perm	
Protected Phases		4			4			2			2	6
Permitted Phases		4			4			2			2	6
Actuated Green, G (s)		7.3			7.3			70.7	70.7		70.7	70.7
Effective Green, g (s)		6.8			6.8			70.2	70.2		70.2	70.2
Actuated g/C Ratio		0.08			0.08			0.83	0.83		0.83	0.83
Clearance Time (s)		3.5			3.5			3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		93			116			681	2879		617	2839
v/s Ratio Prot											c0.17	0.13
v/s Ratio Perm		0.04			c0.05			0.07			0.03	
v/c Ratio		0.56			0.62			0.09	0.20		0.04	0.16
Uniform Delay, d1		37.7			37.8			1.4	1.5		1.3	1.5
Progression Factor		1.00			1.00			1.00	1.00		0.45	0.42
Incremental Delay, d2		4.6			6.6			0.3	0.2		0.1	0.1
Delay (s)		42.2			44.5			1.6	1.7		0.7	0.7
Level of Service		D			D			A	A		A	A
Approach Delay (s)		42.2			44.5			1.7			0.7	0.7
Approach LOS		D			D			A			A	A
Intersection Summary												
HCM Average Control Delay		7.3		HCM Level of Service				A				
HCM Volume to Capacity ratio		0.24										
Actuated Cycle Length (s)		85.0		Sum of lost time (s)				8.0				
Intersection Capacity Utilization		54.6%		ICU Level of Service				A				
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

Existing+Tower AM
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.94		1.00	0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.93	1.00		0.95	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3330		1770	3191		1647	3464		1675	3211	
Flt Permitted	0.95	1.00		0.95	1.00		0.41	1.00		0.50	1.00	
Satd. Flow (perm)	1770	3330		1770	3191		707	3464		883	3211	
Volume (vph)	255	350	97	50	270	105	58	322	30	49	341	141
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	283	389	108	56	300	117	64	358	33	54	379	157
RTOR Reduction (vph)	0	28	0	0	55	0	0	7	0	0	43	0
Lane Group Flow (vph)	283	469	0	56	362	0	64	384	0	54	493	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot		Prot		Perm		Perm		Perm		Perm	
Protected Phases	7	4		3	8			2			6	
Permitted Phases								2			6	
Actuated Green, G (s)	16.5	26.7		4.9	15.1		39.9	39.9		39.9	39.9	
Effective Green, g (s)	17.0	26.2		5.4	14.6		41.4	41.4		41.4	41.4	
Actuated g/C Ratio	0.20	0.31		0.06	0.17		0.49	0.49		0.49	0.49	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	354	1026		112	548		344	1687		430	1564	
v/s Ratio Prot	c0.16	0.14		0.03	c0.11			0.11			c0.15	
v/s Ratio Perm							0.09			0.06		
v/c Ratio	0.80	0.46		0.50	0.66		0.19	0.23		0.13	0.32	
Uniform Delay, d1	32.4	23.7		38.5	32.9		12.3	12.6		11.9	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.2	0.1		1.3	2.3		1.2	0.3		0.6	0.5	
Delay (s)	43.6	23.8		39.8	35.2		13.5	12.9		12.5	13.7	
Level of Service	D	C		D	D		B	B		B	B	
Approach Delay (s)		31.0			35.8			13.0			13.6	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM Average Control Delay		23.9										
HCM Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		85.0						12.0				
Intersection Capacity Utilization		72.3%										
Analysis Period (min)		15										
c Critical Lane Group												

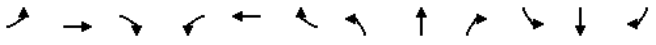
HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

Existing+Tower AM
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.98	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1670		1770	3539	3481	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1670		1770	3539	3481	
Volume (vph)	73	136	61	558	597	74
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	148	66	607	649	80
RTOR Reduction (vph)	108	0	0	0	6	0
Lane Group Flow (vph)	119	0	66	607	723	0
Turn Type	Prot					
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	10.7		7.4	66.3	54.9	
Effective Green, g (s)	10.7		7.4	66.3	54.9	
Actuated g/C Ratio	0.13		0.09	0.78	0.65	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	210		154	2760	2248	
v/s Ratio Prot	c0.07		c0.04	0.17	c0.21	
v/s Ratio Perm						
v/c Ratio	0.57		0.43	0.22	0.32	
Uniform Delay, d1	35.0		36.8	2.5	6.7	
Progression Factor	1.00		1.00	1.77	0.33	
Incremental Delay, d2	3.5		1.8	0.2	0.3	
Delay (s)	38.5		38.6	4.6	2.6	
Level of Service	D		D	A	A	
Approach Delay (s)	38.5			7.9	2.6	
Approach LOS	D			A	A	
Intersection Summary						
HCM Average Control Delay			9.8			HCM Level of Service A
HCM Volume to Capacity ratio			0.37			
Actuated Cycle Length (s)			85.0			Sum of lost time (s) 12.0
Intersection Capacity Utilization			44.6%			ICU Level of Service A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

Existing PM + Tower
1/21/2008




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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.98	
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4932		1770	4971		2005	2002		1960	1919	
Flt Permitted	0.95	1.00		0.95	1.00		0.13	1.00		0.56	1.00	
Satd. Flow (perm)	1770	4932		1770	4971		278	2002		1160	1919	
Volume (vph)	322	1229	176	80	958	138	165	233	79	133	267	259
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)	339	1294	185	84	1008	145	174	245	83	140	281	273
RTOR Reduction (vph)	0	18	0	0	19	0	0	14	0	0	39	0
Lane Group Flow (vph)	339	1461	0	84	1134	0	174	314	0	140	515	0
Confl. Peds. (#/hr)			32	32		4	12		24	24		12
Parking (#/hr)												0
Turn Type	Prot		Prot		pm+pt		Perm					
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2				6	
Actuated Green, G (s)	18.0	38.2		5.9	26.1		38.9	38.9		27.9	27.9	
Effective Green, g (s)	18.0	38.2		5.9	26.1		39.4	39.4		28.4	28.4	
Actuated g/C Ratio	0.19	0.41		0.06	0.28		0.42	0.42		0.30	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	341	2015		112	1388		283	844		352	583	
v/s Ratio Prot	c0.19	0.30		0.05	c0.23		c0.06	0.16		c0.27		
v/s Ratio Perm							0.20			0.12		
v/c Ratio	0.99	0.72		0.75	0.82		0.61	0.37		0.40	0.88	
Uniform Delay, d1	37.7	23.2		43.1	31.5		21.8	18.6		25.8	31.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	46.9	2.3		24.2	5.4		3.9	0.3		0.7	14.8	
Delay (s)	84.6	25.5		67.3	36.9		25.7	18.8		26.5	45.7	
Level of Service	F	C		E	D		C	B		C	D	
Approach Delay (s)		36.6			39.0			21.2			41.9	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM Average Control Delay		36.3										D
HCM Volume to Capacity ratio		0.85										
Actuated Cycle Length (s)		93.5			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		92.4%			ICU Level of Service			F				
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

Existing PM + Tower
1/21/2008



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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.92			0.94		1.00	0.90	
Fipb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.92		1.00	0.92			0.97		1.00	0.95	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1688		1681	1494			3200		1770	3038	
Flt Permitted		0.48		0.73	1.00			0.94		0.95	1.00	
Satd. Flow (perm)		823		1296	1494			3012		1770	3038	
Volume (vph)	12	3	21	105	102	118	10	998	284	98	805	398
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)	13	3	22	111	107	124	11	1051	299	103	847	419
RTOR Reduction (vph)	0	21	0	0	45	0	0	20	0	0	47	0
Lane Group Flow (vph)	0	17	0	111	186	0	0	1341	0	103	1219	0
Confl. Peds. (#/hr)						100	100		100			100
Turn Type		Perm		Perm		Perm		Prot				
Protected Phases		7		8		8		2		1	6	
Permitted Phases		7		8		8		2				
Actuated Green, G (s)		5.1		15.8		15.8		52.4		8.7	65.6	
Effective Green, g (s)		5.6		16.3		16.3		52.9		9.2	66.1	
Actuated g/C Ratio		0.06		0.16		0.16		0.53		0.09	0.66	
Clearance Time (s)		4.5		4.5		4.5		4.5		4.5	4.5	
Vehicle Extension (s)		2.0		2.0		2.0		2.0		2.0	2.0	
Lane Grp Cap (vph)		46		211		244		1593		163	2008	
v/s Ratio Prot										0.06	c0.40	
v/s Ratio Perm		c0.02		0.09		0.12		c0.45				
v/c Ratio		0.37		0.53		0.76		0.84		0.63	0.61	
Uniform Delay, d1		45.5		38.3		40.0		20.0		43.8	9.6	
Progression Factor		1.00		1.00		1.00		0.79		1.00	1.00	
Incremental Delay, d2		1.9		1.1		11.9		3.1		5.8	1.4	
Delay (s)		47.4		39.4		51.9		19.0		49.5	11.0	
Level of Service		D		D		D		B		D	B	
Approach Delay (s)		47.4				47.8		19.0			13.9	
Approach LOS		D				D		B			B	
Intersection Summary												
HCM Average Control Delay		20.2						HCM Level of Service		C		
HCM Volume to Capacity ratio		0.78										
Actuated Cycle Length (s)		100.0						Sum of lost time (s)		16.0		
Intersection Capacity Utilization		102.6%						ICU Level of Service		G		
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

Existing PM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.98	1.00	0.95	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.95	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3428	1770	3221	1770	3357	1770	3357	1770	3434	1770	3434
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3428	1770	3221	1770	3357	1770	3357	1770	3434	1770	3434
Volume (vph)	508	822	72	93	468	212	69	594	127	203	682	56
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)	535	865	76	98	493	223	73	625	134	214	718	59
RTOR Reduction (vph)	0	6	0	0	52	0	0	18	0	0	6	0
Lane Group Flow (vph)	535	935	0	98	664	0	73	741	0	214	771	0
Confl. Peds. (#/hr)			100			100			100			100
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	16.0	30.5		8.0	22.5		5.0	32.5		12.0	39.5	
Effective Green, g (s)	15.5	31.5		7.5	23.5		4.5	33.5		11.5	40.5	
Actuated g/C Ratio	0.16	0.32		0.08	0.24		0.04	0.34		0.12	0.40	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	532	1080		133	757		80	1125		204	1391	
v/s Ratio Prot	c0.16	c0.27		0.06	0.21		0.04	c0.22		c0.12	0.22	
v/s Ratio Perm												
v/c Ratio	1.01	0.87		0.74	0.88		0.91	0.66		1.05	0.55	
Uniform Delay, d1	42.2	32.3		45.3	36.9		47.6	28.4		44.2	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.16	0.79	
Incremental Delay, d2	40.4	7.2		16.6	10.9		70.5	3.0		70.3	1.3	
Delay (s)	82.7	39.4		61.9	47.7		118.0	31.4		121.8	19.4	
Level of Service	F	D		E	D		F	C		F	B	
Approach Delay (s)		55.1			49.4			39.0			41.5	
Approach LOS		E			D			D			D	
Intersection Summary												
HCM Average Control Delay		47.4										D
HCM Volume to Capacity ratio		0.82										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		82.2%										E
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

Existing PM + Tower
1/21/2008

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)		4.0						4.0			4.0	
Lane Util. Factor		1.00						0.95			0.97	
Frt		0.86						0.93			1.00	
Flt Protected		1.00						1.00			0.95	
Satd. Flow (prot)		1611						3287			3433	
Flt Permitted		1.00						0.95			0.95	
Satd. Flow (perm)		1611						3111			3433	
Volume (vph)	0	0	6	0	0	0	10	285	260	1430	288	64
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)	0	0	7	0	0	0	11	310	283	1554	313	70
RTOR Reduction (vph)	0	7	0	0	0	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	583	0	1554	383	0
Turn Type								Perm			Prot	
Protected Phases									2		1	6
Permitted Phases									2			
Actuated Green, G (s)		0.0						13.0			29.0	50.0
Effective Green, g (s)		0.0						13.0			29.0	50.0
Actuated g/C Ratio		0.00						0.26			0.58	1.00
Clearance Time (s)								4.0			4.0	2.0
Lane Grp Cap (vph)		0						809			1991	3442
v/s Ratio Prot											c0.45	0.11
v/s Ratio Perm								c0.19				
v/c Ratio		0.00						0.72			0.78	0.11
Uniform Delay, d1		25.0						16.8			8.1	0.0
Progression Factor		1.00						0.75			1.00	1.00
Incremental Delay, d2		0.0						5.3			3.1	0.1
Delay (s)		25.0						18.0			11.2	0.1
Level of Service		C						B			B	A
Approach Delay (s)		25.0			0.0			18.0			9.0	
Approach LOS		C			A			B			A	
Intersection Summary												
HCM Average Control Delay		11.2										B
HCM Volume to Capacity ratio		0.76										
Actuated Cycle Length (s)		50.0						Sum of lost time (s)			8.0	
Intersection Capacity Utilization		70.6%						ICU Level of Service				C
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

Existing PM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.95		0.95	
Frpb, ped/bikes	0.95		0.97		0.98		0.98		0.99		0.99	
Flpb, ped/bikes	0.98		0.96		1.00		0.99		0.99		0.99	
Frt	0.96		0.96		0.98		0.98		0.99		0.99	
Flt Protected	0.98		0.99		1.00		0.99		0.99		0.99	
Satd. Flow (prot)	1643		1649		3404		3439		3439		3439	
Flt Permitted	0.88		0.91		0.94		0.85		0.85		0.85	
Satd. Flow (perm)	1471		1519		3201		2956		2956		2956	
Volume (vph)	26	27	21	48	72	50	18	423	66	43	264	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	30	23	53	80	56	20	470	73	48	293	22
RTOR Reduction (vph)	0	15	0	0	30	0	0	24	0	0	10	0
Lane Group Flow (vph)	0	67	0	0	159	0	0	540	0	0	354	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	17.0		17.0		17.0		25.0		25.0		25.0	
Effective Green, g (s)	17.0		17.0		17.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.34		0.34		0.34		0.50		0.50		0.50	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	500		516		1601		1478		1478		1478	
v/s Ratio Prot												
v/s Ratio Perm	0.05		c0.10		c0.17		0.12		0.12		0.12	
v/c Ratio	0.13		0.31		0.34		0.24		0.24		0.24	
Uniform Delay, d1	11.4		12.2		7.5		7.1		7.1		7.1	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.6		1.5		0.6		0.4		0.4		0.4	
Delay (s)	12.0		13.7		8.1		7.5		7.5		7.5	
Level of Service	B		B		A		A		A		A	
Approach Delay (s)	12.0		13.7		8.1		7.5		7.5		7.5	
Approach LOS	B		B		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	9.1		HCM Level of Service		A		A		A		A	
HCM Volume to Capacity ratio	0.32		0.32		0.32		0.32		0.32		0.32	
Actuated Cycle Length (s)	50.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	62.8%		ICU Level of Service		B		B		B		B	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

Existing PM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.91		0.91	
Frpb, ped/bikes	0.96		0.96		0.96		0.99		0.99		0.98	
Flpb, ped/bikes	0.97		0.98		1.00		0.99		0.99		1.00	
Frt	0.96		0.97		0.99		0.99		0.99		0.99	
Flt Protected	0.98		0.99		1.00		0.99		0.99		1.00	
Satd. Flow (prot)	1631		1680		3475		4927		4927		4927	
Flt Permitted	0.86		0.86		0.91		0.91		0.91		0.91	
Satd. Flow (perm)	1420		1459		3180		4490		4490		4490	
Volume (vph)	46	49	39	19	41	21	24	1045	39	18	927	67
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	49	52	41	20	44	22	26	1112	41	19	986	71
RTOR Reduction (vph)	0	28	0	0	19	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	114	0	0	67	0	0	1178	0	0	1072	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		4		2		6		6	
Actuated Green, G (s)	8.6		8.6		8.6		62.4		62.4		62.4	
Effective Green, g (s)	9.1		9.1		9.1		62.9		62.9		62.9	
Actuated g/C Ratio	0.11		0.11		0.11		0.79		0.79		0.79	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	162		166		2500		3530		3530		3530	
v/s Ratio Prot												
v/s Ratio Perm	c0.08		0.05		c0.37		0.24		0.24		0.24	
v/c Ratio	0.70		0.40		0.47		0.30		0.30		0.30	
Uniform Delay, d1	34.1		32.9		2.9		2.4		2.4		2.4	
Progression Factor	1.00		1.00		2.25		1.00		1.00		1.00	
Incremental Delay, d2	10.6		0.6		0.5		0.2		0.2		0.2	
Delay (s)	44.8		33.5		7.0		2.6		2.6		2.6	
Level of Service	D		C		A		A		A		A	
Approach Delay (s)	44.8		33.5		7.0		2.6		2.6		2.6	
Approach LOS	D		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	8.2		HCM Level of Service		A		A		A		A	
HCM Volume to Capacity ratio	0.50		0.50		0.50		0.50		0.50		0.50	
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	81.6%		ICU Level of Service		D		D		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing PM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.96	1.00	0.98	1.00	0.96	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1693	3487	1731	3402	1697	1822	1720	1830	1720	1830	1720	1830
Flt Permitted	0.29	1.00	0.24	1.00	0.56	1.00	0.37	1.00	0.37	1.00	0.29	1.00
Satd. Flow (perm)	520	3487	441	3402	992	1822	667	1830	667	1830	520	3487
Volume (vph)	26	674	45	44	548	84	109	389	43	94	222	19
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)	28	733	49	48	596	91	118	423	47	102	241	21
RTOR Reduction (vph)	0	6	0	0	15	0	5	0	0	4	0	0
Lane Group Flow (vph)	28	776	0	48	672	0	118	465	0	102	258	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	6	6					
Permitted Phases	4	8	8	2	2	6	6					
Actuated Green, G (s)	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	208	1395	176	1361	496	911	334	915	334	915	208	1395
v/s Ratio Prot	c0.22		0.20		c0.26		0.14		c0.26		0.14	
v/s Ratio Perm	0.05		0.11		0.12		0.15		0.15		0.05	
v/c Ratio	0.13	0.56	0.27	0.49	0.24	0.51	0.31	0.28	0.31	0.28	0.13	0.56
Uniform Delay, d1	15.2	18.5	16.2	17.9	11.4	13.4	11.8	11.6	11.8	11.6	15.2	18.5
Progression Factor	1.00	1.00	1.94	2.02	1.80	1.84	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	1.6	3.2	1.1	0.7	1.3	2.4	0.8	2.4	0.8	1.3	1.6
Delay (s)	16.6	20.1	34.6	37.3	21.2	26.0	14.2	12.4	14.2	12.4	16.6	20.1
Level of Service	B	C	C	D	C	C	B	B	B	B	B	C
Approach Delay (s)	20.0		37.1		25.0		12.9		25.0		20.0	
Approach LOS	C		D		C		B		C		C	
Intersection Summary												
HCM Average Control Delay	25.2		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	81.0%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing PM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.97	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.97	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00
Satd. Flow (prot)	1709	3471	1730	3494	1709	3471	3340	3337	3340	3337	1709	3471
Flt Permitted	0.25	1.00	0.16	1.00	0.84	1.00	0.84	0.91	0.84	0.91	0.25	1.00
Satd. Flow (perm)	448	3471	291	3494	2855	3494	2855	3042	2855	3042	448	3471
Volume (vph)	26	774	60	30	617	31	74	165	46	19	96	33
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	27	798	62	31	636	32	76	170	47	20	99	34
RTOR Reduction (vph)	0	7	0	0	5	0	0	5	0	0	12	0
Lane Group Flow (vph)	27	853	0	31	663	0	0	288	0	0	141	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	6	6					
Permitted Phases	4	8	8	2	2	6	6					
Actuated Green, G (s)	24.0	24.0	24.0	24.0	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	140	1085	91	1092	1677	1677	1677	1787	1677	1677	140	1085
v/s Ratio Prot	c0.25		0.19		c0.10		0.05		c0.10		0.05	
v/s Ratio Perm	0.06		0.11		0.17		0.08		0.17		0.06	
v/c Ratio	0.19	0.79	0.34	0.61	0.17	0.17	0.17	0.17	0.17	0.17	0.19	0.79
Uniform Delay, d1	20.1	25.1	21.2	23.3	7.6	7.6	7.6	7.6	7.6	7.6	20.1	25.1
Progression Factor	0.45	0.49	0.92	0.95	1.26	1.26	1.26	1.26	1.26	1.26	0.45	0.49
Incremental Delay, d2	2.6	5.0	8.9	2.3	0.2	0.2	0.2	0.2	0.2	0.2	2.6	5.0
Delay (s)	11.8	17.4	28.3	24.5	9.7	9.7	9.7	9.7	9.7	9.7	11.8	17.4
Level of Service	B	B	C	C	A	A	A	A	A	A	B	B
Approach Delay (s)	17.2		24.6		9.7		7.2		9.7		17.2	
Approach LOS	B		C		A		B		A		B	
Intersection Summary												
HCM Average Control Delay	18.0		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.39											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	61.6%		ICU Level of Service				B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

Existing PM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1765	3482		1757	3430			3351			3433	
Flt Permitted	0.27	1.00		0.24	1.00			0.88			0.78	
Satd. Flow (perm)	504	3482		436	3430			2953			2716	
Volume (vph)	51	756	70	107	622	131	53	273	120	76	219	38
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	764	71	108	628	132	54	276	121	77	221	38
RTOR Reduction (vph)	0	8	0	0	22	0	0	46	0	0	12	0
Lane Group Flow (vph)	52	827	0	108	738	0	0	405	0	0	324	0
Confl. Peds. (#/hr)	8		39	39		8			25	25		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	35.5		35.5	35.5			38.0			38.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0			37.0			37.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.46			0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	221	1523		191	1501			1366			1256	
v/s Ratio Prot		0.24			0.22							
v/s Ratio Perm	0.10			c0.25				c0.14			0.12	
v/c Ratio	0.24	0.54		0.57	0.49			0.30			0.26	
Uniform Delay, d1	14.1	16.6		16.8	16.1			13.4			13.1	
Progression Factor	0.93	1.07		1.31	1.41			0.83			1.00	
Incremental Delay, d2	1.7	0.9		11.2	1.1			0.5			0.5	
Delay (s)	14.8	18.7		33.3	23.8			11.6			13.6	
Level of Service	B	B		C	C			B			B	
Approach Delay (s)		18.5			25.0			11.6			13.6	
Approach LOS		B			C			B			B	
Intersection Summary												
HCM Average Control Delay		18.8										B
HCM Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		80.0				Sum of lost time (s)		8.0				
Intersection Capacity Utilization		87.1%				ICU Level of Service		E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

Existing PM + Tower
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	0.93		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3235		1770	3539	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3235		1770	3539	1770	1583
Volume (vph)	840	119	55	737	126	47
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	866	123	57	760	130	48
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	989	0	57	760	130	48
Confl. Peds. (#/hr)		213	348			
Turn Type			Prot		Perm	
Protected Phases	4		3	8	2	
Permitted Phases					2	
Actuated Green, G (s)	54.0		5.5	63.5	8.5	8.5
Effective Green, g (s)	54.0		5.5	63.5	8.5	8.5
Actuated g/C Ratio	0.68		0.07	0.79	0.11	0.11
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2184		122	2809	188	168
v/s Ratio Prot	c0.31		c0.03	0.21	c0.07	
v/s Ratio Perm					0.03	
v/c Ratio	0.45		0.47	0.27	0.69	0.29
Uniform Delay, d1	6.1		35.8	2.2	34.5	33.0
Progression Factor	0.53		0.87	1.56	0.95	0.92
Incremental Delay, d2	0.6		2.3	0.2	10.3	0.9
Delay (s)	3.8		33.5	3.6	43.1	31.4
Level of Service	A		C	A	D	C
Approach Delay (s)	3.8			5.7	40.0	
Approach LOS	A			A	D	
Intersection Summary						
HCM Average Control Delay		7.8				HCM Level of Service
HCM Volume to Capacity ratio		0.48				A
Actuated Cycle Length (s)		80.0			Sum of lost time (s)	12.0
Intersection Capacity Utilization		48.3%			ICU Level of Service	A
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

Existing PM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.93	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1643	3419		1726	3368		1770	3466		1770	3364	
Flt Permitted	0.33	1.00		0.20	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	567	3419		356	3368		1770	3466		1770	3364	
Volume (vph)	128	660	99	37	475	76	186	870	82	103	626	136
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	673	101	38	485	78	190	888	84	105	639	139
RTOR Reduction (vph)	0	15	0	0	16	0	0	8	0	0	22	0
Lane Group Flow (vph)	131	759	0	38	547	0	190	964	0	105	756	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	25.5	25.5		25.5	25.5		10.8	33.1		7.9	30.2	
Effective Green, g (s)	26.0	26.0		26.0	26.0		11.3	33.6		8.4	30.7	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.14	0.42		0.11	0.38	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	184	1111		116	1095		250	1456		186	1291	
v/s Ratio Prot		0.22		0.16			0.11	0.28		0.06	0.22	
v/s Ratio Perm	0.23			0.11								
v/c Ratio	0.71	0.68		0.33	0.50		0.76	0.66		0.56	0.59	
Uniform Delay, d1	23.7	23.4		20.4	21.8		33.0	18.6		34.1	19.6	
Progression Factor	0.58	0.54		1.00	1.00		0.90	0.52		0.98	0.87	
Incremental Delay, d2	9.6	1.3		0.6	0.1		10.1	2.1		2.3	1.9	
Delay (s)	23.3	13.9		21.0	21.9		39.7	11.7		35.5	18.9	
Level of Service	C	B		C	C		D	B		D	B	
Approach Delay (s)		15.3			21.8			16.3			20.9	
Approach LOS		B			C			B			C	
Intersection Summary												
HCM Average Control Delay		18.1										B
HCM Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		80.0					Sum of lost time (s)	12.0				
Intersection Capacity Utilization		72.7%					ICU Level of Service	C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

Existing PM + Tower
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	7	33	1133	31	15	735
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	8	37	1259	34	17	817
Pedestrians	52		52			45
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	4		4			4
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			503
pX, platoon unblocked	0.94	0.88			0.88	
vC, conflicting volume	1822	744			1345	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1438	571			1255	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	90			96	
cM capacity (veh/h)	103	376			462	
Direction, Lane #						
	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	44	839	454	17	408	408
Volume Left	8	0	0	17	0	0
Volume Right	37	0	34	0	0	0
cSH	256	1700	1700	462	1700	1700
Volume to Capacity	0.17	0.49	0.27	0.04	0.24	0.24
Queue Length 95th (ft)	15	0	0	3	0	0
Control Delay (s)	22.0	0.0	0.0	13.1	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	22.0	0.0		0.3		
Approach LOS	C					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization		50.7%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

Existing PM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.95		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		0.98		0.98		1.00		0.99	
Flpb, ped/bikes	1.00		0.97		1.00		0.99		0.97		1.00	
Frt	0.99		1.00		0.95		0.98		1.00		0.99	
Flt Protected	0.99		0.95		1.00		0.99		0.95		1.00	
Satd. Flow (prot)	4985		1719		3288		1766		1714		1832	
Flt Permitted	0.80		0.32		1.00		0.82		0.27		1.00	
Satd. Flow (perm)	3998		588		3288		1449		482		1832	
Volume (vph)	112	633	27	64	327	168	58	364	84	65	288	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	114	646	28	65	334	171	59	371	86	66	294	20
RTOR Reduction (vph)	0	5	0	0	38	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	783	0	65	467	0	0	507	0	66	311	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	46.0		46.0		46.0		24.0		24.0		24.0	
Effective Green, g (s)	47.0		47.0		47.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.59		0.59		0.59		0.31		0.31		0.31	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2349		345		1932		453		151		573	
v/s Ratio Prot			0.14						0.17			
v/s Ratio Perm	c0.20		0.11				c0.35		0.14			
v/c Ratio	0.33		0.19		0.24		1.12		0.44		0.54	
Uniform Delay, d1	8.5		7.7		7.9		27.5		21.9		22.8	
Progression Factor	1.00		1.34		1.35		1.00		0.75		0.75	
Incremental Delay, d2	0.4		1.2		0.3		79.0		8.7		3.6	
Delay (s)	8.8		11.4		11.0		106.5		25.1		20.6	
Level of Service	A		B		B		F		C		C	
Approach Delay (s)	8.8		11.1		11.1		106.5		21.4		21.4	
Approach LOS	A		B		B		F		C		C	
Intersection Summary												
HCM Average Control Delay	33.9		33.9		33.9		33.9		33.9		33.9	
HCM Volume to Capacity ratio	0.61		0.61		0.61		0.61		0.61		0.61	
Actuated Cycle Length (s)	80.0		80.0		80.0		80.0		80.0		80.0	
Intersection Capacity Utilization	138.5%		138.5%		138.5%		138.5%		138.5%		138.5%	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

Existing PM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.95		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		0.99		0.99		1.00		0.98	
Flpb, ped/bikes	1.00		0.99		1.00		0.99		0.94		1.00	
Frt	0.99		1.00		0.96		0.98		1.00		0.98	
Flt Protected	1.00		0.99		1.00		0.95		1.00		0.95	
Satd. Flow (prot)	4970		4883		1606		1733		1659		1800	
Flt Permitted	0.88		0.80		1.00		0.62		1.00		0.35	
Satd. Flow (perm)	4398		3935		1054		1733		619		1800	
Volume (vph)	39	573	40	68	405	64	41	212	73	56	122	17
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)	41	603	42	72	426	67	43	223	77	59	128	18
RTOR Reduction (vph)	0	9	0	0	21	0	0	16	0	0	7	0
Lane Group Flow (vph)	0	677	0	0	544	0	43	284	0	59	139	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	2831		2533		270		444		159		461	
v/s Ratio Prot			c0.16						0.08			
v/s Ratio Perm	c0.15		0.14		0.04		0.10		0.10			
v/c Ratio	0.24		0.21		0.16		0.64		0.37		0.30	
Uniform Delay, d1	6.0		5.9		23.1		26.5		24.5		24.0	
Progression Factor	1.25		1.16		1.00		1.00		1.21		1.23	
Incremental Delay, d2	0.2		0.2		1.3		6.9		6.3		1.6	
Delay (s)	7.7		7.0		24.3		33.4		36.0		31.1	
Level of Service	A		A		C		C		D		C	
Approach Delay (s)	7.7		7.0		32.3		32.5		32.5		32.5	
Approach LOS	A		A		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	15.0		15.0		15.0		15.0		15.0		15.0	
HCM Volume to Capacity ratio	0.35		0.35		0.35		0.35		0.35		0.35	
Actuated Cycle Length (s)	80.0		80.0		80.0		80.0		80.0		80.0	
Intersection Capacity Utilization	87.1%		87.1%		87.1%		87.1%		87.1%		87.1%	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

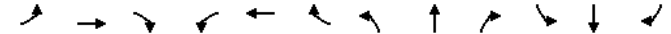
Existing PM + Tower
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frbp, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.96			0.96			0.98		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	5019			4820			3363			3378		
Flt Permitted	0.83			0.85			0.86			0.73		
Satd. Flow (perm)	4181			4114			2901			2505		
Volume (vph)	64	624	34	48	423	195	39	182	72	121	213	66
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	65	630	34	48	427	197	39	184	73	122	215	67
RTOR Reduction (vph)	0	6	0	0	70	0	0	39	0	0	21	0
Lane Group Flow (vph)	0	723	0	0	602	0	0	257	0	0	383	0
Confl. Peds. (#/hr)	9		17	17		9	12		10	10		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2692		2648		2648		743		743		642	
v/s Ratio Prot												
v/s Ratio Perm	c0.17		0.15		0.15		0.09		0.09		c0.15	
v/c Ratio	0.27		0.23		0.23		0.35		0.35		0.60	
Uniform Delay, d1	6.1		5.9		5.9		24.3		24.3		26.1	
Progression Factor	1.49		1.25		1.25		1.00		1.00		0.76	
Incremental Delay, d2	0.2		0.2		0.2		1.3		1.3		4.0	
Delay (s)	9.4		7.6		7.6		25.5		25.5		23.8	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	9.4		7.6		7.6		25.5		25.5		23.8	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	13.9		13.9		13.9		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.36		0.36		0.36		0.36		0.36		0.36	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	94.8%		94.8%		94.8%		ICU Level of Service		F		F	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

Existing PM + Tower
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frbp, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	1.00			0.98			0.93			0.92		
Flt Protected	1.00			1.00			0.98			0.98		
Satd. Flow (prot)	5052			4934			1695			1601		
Flt Permitted	0.83			0.92			0.85			0.86		
Satd. Flow (perm)	4214			4555			1473			1407		
Volume (vph)	80	766	10	10	477	57	10	0	10	128	0	193
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.96	0.96	0.92	0.92	0.92	0.96	0.92	0.96
Adj. Flow (vph)	83	798	11	11	497	59	11	0	11	133	0	201
RTOR Reduction (vph)	0	1	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	891	0	0	567	0	0	14	0	0	334	0
Confl. Peds. (#/hr)						79						79
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	49.0		49.0		49.0		23.0		23.0		23.0	
Effective Green, g (s)	49.0		49.0		49.0		23.0		23.0		23.0	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
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)	2581		2790		2790		423		423		405	
v/s Ratio Prot												
v/s Ratio Perm	c0.21		0.12		0.12		0.01		0.01		c0.24	
v/c Ratio	0.35		0.20		0.20		0.03		0.03		0.82	
Uniform Delay, d1	7.6		6.9		6.9		20.5		20.5		26.6	
Progression Factor	0.67		1.00		1.00		1.00		1.00		0.95	
Incremental Delay, d2	0.4		0.2		0.2		0.0		0.0		12.7	
Delay (s)	5.5		7.0		7.0		20.5		20.5		38.1	
Level of Service	A		A		A		C		C		D	
Approach Delay (s)	5.5		7.0		7.0		20.5		20.5		38.1	
Approach LOS	A		A		A		C		C		D	
Intersection Summary												
HCM Average Control Delay	12.1		12.1		12.1		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.50		0.50		0.50		0.50		0.50		0.50	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	65.2%		65.2%		65.2%		ICU Level of Service		C		C	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

Existing PM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.98			1.00		
Frt	0.99			0.95			1.00			0.98		
Flt Protected	0.99			1.00			0.95			1.00		
Satd. Flow (prot)	4924			4746			1740			3427		
Flt Permitted	0.67			0.68			0.36			1.00		
Satd. Flow (perm)	3326			3266			664			3427		
Volume (vph)	227	594	81	61	358	197	100	742	98	135	570	46
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	252	660	90	68	398	219	111	824	109	150	633	51
RTOR Reduction (vph)	0	12	0	0	14	0	0	5	0	0	3	0
Lane Group Flow (vph)	0	990	0	0	671	0	111	928	0	150	681	0
Confl. Peds. (#/hr)	26		19		26		39		92		92	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	26.5		26.5		66.0		66.0		66.0		66.0	
Effective Green, g (s)	28.0		28.0		67.0		67.0		67.0		67.0	
Actuated g/C Ratio	0.27		0.27		0.65		0.65		0.65		0.65	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	904		888		432		2229		310		2266	
v/s Ratio Prot					0.27		0.20					
v/s Ratio Perm	c0.30		0.21		0.17		c0.31		0.20		0.06	
v/c Ratio	1.25dl		0.88dl		0.26		0.42		0.48		0.30	
Uniform Delay, d1	37.5		34.4		7.6		8.6		9.2		7.8	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	59.5		3.3		1.4		0.6		5.3		0.3	
Delay (s)	97.0		37.7		9.0		9.2		14.5		8.2	
Level of Service	F		D		A		A		B		A	
Approach Delay (s)	97.0		37.7		9.2		9.3		9.3		9.3	
Approach LOS	F		D		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	39.4		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	103.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	80.4%		ICU Level of Service		D							
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

Existing PM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			1.00			0.89		
Flpb, ped/bikes	1.00			1.00			0.97			1.00		
Frt	0.99			0.99			1.00			0.85		
Flt Protected	1.00			0.99			0.98			1.00		
Satd. Flow (prot)	5022			4982			1777			1406		
Flt Permitted	0.89			0.77			0.86			1.00		
Satd. Flow (perm)	4498			3869			1561			1406		
Volume (vph)	36	771	30	82	531	28	53	92	191	33	33	68
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	36	779	30	83	536	28	54	93	193	33	33	69
RTOR Reduction (vph)	0	5	0	0	6	0	0	0	93	0	47	0
Lane Group Flow (vph)	0	840	0	0	641	0	0	147	100	0	88	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		2		6		6	
Actuated Green, G (s)	49.5		49.5		24.5		24.5		24.5		24.5	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	2727		2346		459		413		431		431	
v/s Ratio Prot					c0.09		0.07		0.06		0.06	
v/s Ratio Perm	c0.19		0.17		c0.09		0.07		0.06		0.06	
v/c Ratio	0.31		0.27		0.32		0.24		0.20		0.20	
Uniform Delay, d1	7.6		7.4		22.0		21.5		21.2		21.2	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.3		0.3		1.8		1.4		1.1		1.1	
Delay (s)	7.9		7.7		23.9		22.9		22.3		22.3	
Level of Service	A		A		C		C		C		C	
Approach Delay (s)	7.9		7.7		23.3		22.3		22.3		22.3	
Approach LOS	A		A		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	11.5		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.31											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	96.6%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

Existing PM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.95	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4940	1770	4743	1770	4932	1770	4933	1770	4933	1770	4933
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4940	1770	4743	1770	4932	1770	4933	1770	4933	1770	4933
Volume (vph)	187	690	84	81	377	210	167	653	106	307	377	63
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	205	758	92	89	414	231	184	718	116	337	414	69
RTOR Reduction (vph)	0	15	0	0	100	0	0	22	0	0	23	0
Lane Group Flow (vph)	205	835	0	89	545	0	184	812	0	337	460	0
Confl. Peds. (#/hr)	81		22		50		43		43		43	
Turn Type	Prot		Prot		Prot		Prot		Prot		Prot	
Protected Phases	3	4	3	4	1	2	1	2	1	2	1	2
Permitted Phases	4		4		4		4		4		4	
Actuated Green, G (s)	11.0	24.1	11.0	24.1	20.9	26.0	20.9	26.0	20.9	26.0	20.9	26.0
Effective Green, g (s)	11.0	25.1	11.0	25.1	20.9	27.0	20.9	27.0	20.9	27.0	20.9	27.0
Actuated g/C Ratio	0.11	0.25	0.11	0.25	0.21	0.27	0.21	0.27	0.21	0.27	0.21	0.27
Clearance Time (s)	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Vehicle Extension (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
Lane Grp Cap (vph)	195	1240	195	1190	370	1332	370	1332	370	1332	370	1332
v/s Ratio Prot	c0.12	c0.17	0.05	0.11	0.10	c0.16	c0.19	0.09				
v/s Ratio Perm												
v/c Ratio	1.05	0.67	0.46	0.46	0.50	0.61	0.91	0.35				
Uniform Delay, d1	44.5	33.8	41.7	31.7	34.9	31.9	38.6	29.4				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	78.6	2.9	0.6	1.3	0.4	2.1	25.5	0.7				
Delay (s)	123.1	36.7	42.3	33.0	35.3	34.0	64.1	30.1				
Level of Service	F	D	D	C	D	C	E	C				
Approach Delay (s)	53.5		34.1		34.2		44.1		44.1		44.1	
Approach LOS	D		C		C		D		D		D	
Intersection Summary												
HCM Average Control Delay	42.0		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	100.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	81.5%		ICU Level of Service				D					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

Existing PM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		0.95		1.00		0.95		1.00		0.95	
Frpb, ped/bikes	0.94		0.97		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	0.96		0.97		0.95		1.00		0.93		1.00	
Frt	0.95		0.96		1.00		0.99		1.00		0.99	
Flt Protected	0.98		0.99		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	1563		1657		1688		3469		1646		3454	
Flt Permitted	0.71		0.84		0.30		1.00		0.41		1.00	
Satd. Flow (perm)	1132		1418		537		3469		705		3454	
Volume (vph)	97	33	65	42	59	38	40	552	35	32	765	59
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	103	35	69	45	63	40	43	587	37	34	814	63
RTOR Reduction (vph)	0	24	0	0	18	0	0	4	0	0	5	0
Lane Group Flow (vph)	0	183	0	0	130	0	43	620	0	34	872	0
Confl. Peds. (#/hr)	100		100	100	100	100	100	100	100	100	100	100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		2		6	
Actuated Green, G (s)	16.1		16.1		61.9		61.9		61.9		61.9	
Effective Green, g (s)	15.6		15.6		61.4		61.4		61.4		61.4	
Actuated g/C Ratio	0.18		0.18		0.72		0.72		0.72		0.72	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	208		260		388		2506		509		2495	
v/s Ratio Prot					0.18							
v/s Ratio Perm	c0.16		0.09		0.08		0.05					
v/c Ratio	0.88		0.50		0.11		0.25		0.07		0.35	
Uniform Delay, d1	33.8		31.2		3.6		4.0		3.4		4.4	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	30.5		0.6		0.6		0.2		0.3		0.4	
Delay (s)	64.3		31.7		4.1		4.2		3.7		4.8	
Level of Service	E		C		A		A		A		A	
Approach Delay (s)	64.3		31.7		4.2		4.7		4.7		4.7	
Approach LOS	E		C		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	13.0		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.46											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	57.6%		ICU Level of Service				B					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

Existing PM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.93	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.96	1.00	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3308		1770	3254		1690	3490		1696	3118	
Flt Permitted	0.95	1.00		0.95	1.00		0.29	1.00		0.41	1.00	
Satd. Flow (perm)	1770	3308		1770	3254		520	3490		739	3118	
Volume (vph)	127	316	100	56	383	114	113	507	29	105	482	294
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	130	322	102	57	391	116	115	517	30	107	492	300
RTOR Reduction (vph)	0	36	0	0	35	0	0	4	0	0	94	0
Lane Group Flow (vph)	130	388	0	57	472	0	115	543	0	107	698	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot		Prot		Perm		Perm					
Protected Phases	7	4		3	8		2	2			6	
Permitted Phases							2				6	
Actuated Green, G (s)	9.2	22.0		5.1	17.9		44.4	44.4		44.4	44.4	
Effective Green, g (s)	9.7	21.5		5.6	17.4		45.9	45.9		45.9	45.9	
Actuated g/C Ratio	0.11	0.25		0.07	0.20		0.54	0.54		0.54	0.54	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	202	837		117	666		281	1885		399	1684	
v/s Ratio Prot	c0.07	0.12		0.03	c0.15			0.16			c0.22	
v/s Ratio Perm							0.22				0.14	
v/c Ratio	0.64	0.46		0.49	0.71		0.41	0.29		0.27	0.41	
Uniform Delay, d1	36.0	26.9		38.3	31.4		11.5	10.6		10.5	11.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.2	0.1		1.2	2.8		4.4	0.4		1.6	0.8	
Delay (s)	41.2	27.0		39.5	34.3		15.9	11.0		12.2	12.3	
Level of Service	D	C		D	C		B	B		B	B	
Approach Delay (s)	30.3				34.8		11.9				12.3	
Approach LOS	C				C		B				B	
Intersection Summary												
HCM Average Control Delay	20.7		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	69.9%		ICU Level of Service				C					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

Existing PM + Tower
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frpb, ped/bikes	0.92		1.00	1.00	0.94	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.91		1.00	1.00	0.97	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1529		1770	3539	3244	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1529		1770	3539	3244	
Volume (vph)	44	96	100	1069	615	127
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	46	100	104	1114	641	132
RTOR Reduction (vph)	70	0	0	0	20	0
Lane Group Flow (vph)	76	0	104	1114	753	0
Confl. Peds. (#/hr)	100	100	100			100
Turn Type			Prot			
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	24.2		8.5	47.8	35.3	
Effective Green, g (s)	24.2		8.5	47.8	35.3	
Actuated g/C Ratio	0.30		0.11	0.60	0.44	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	463		188	2115	1431	
v/s Ratio Prot	c0.05		0.06	c0.31	0.23	
v/s Ratio Perm						
v/c Ratio	0.16		0.55	0.53	0.53	
Uniform Delay, d1	20.5		33.9	9.5	16.3	
Progression Factor	1.00		1.00	1.00	0.81	
Incremental Delay, d2	0.8		3.5	0.2	1.1	
Delay (s)	21.2		37.4	9.7	14.3	
Level of Service	C		D	A	B	
Approach Delay (s)	21.2		12.1	14.3		
Approach LOS	C		B	B		
Intersection Summary						
HCM Average Control Delay	13.5		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.41					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	55.9%		ICU Level of Service		B	
Analysis Period (min)	15					

c Critical Lane Group

**APPENDIX P:
YEAR 2015 PLUS TOWER ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2015 AM + Tower
1/21/2008

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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4906		1770	4953		2006	2043		1985	1956	
Flt Permitted	0.95	1.00		0.95	1.00		0.10	1.00		0.44	1.00	
Satd. Flow (perm)	1770	4906		1770	4953		201	2043		925	1956	
Volume (vph)	300	951	206	90	1330	200	200	291	60	160	416	270
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)	316	1001	217	95	1400	211	211	306	63	168	438	284
RTOR Reduction (vph)	0	26	0	0	16	0	0	6	0	0	19	0
Lane Group Flow (vph)	316	1192	0	95	1595	0	211	363	0	168	703	0
Confl. Peds. (#/hr)			10	10		10	10		10	10		10
Turn Type	Prot		Prot		pm+pt		Perm		Perm		Prot	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	17.0	49.4		11.6	44.0		48.5	48.5		39.5	39.5	
Effective Green, g (s)	17.0	49.4		11.6	44.0		49.0	49.0		40.0	40.0	
Actuated g/C Ratio	0.14	0.41		0.10	0.37		0.41	0.41		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	2020		171	1816		187	834		308	652	
v/s Ratio Prot	c0.18	0.24		0.05	c0.32		c0.07	0.18		c0.36		
v/s Ratio Perm							0.39			0.18		
v/c Ratio	1.26	0.59		0.56	0.88		1.13	0.44		0.55	1.08	
Uniform Delay, d1	51.5	27.4		51.7	35.5		58.7	25.5		32.6	40.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	144.6	1.3		3.9	6.4		104.5	0.4		2.0	58.0	
Delay (s)	196.1	28.7		55.6	41.9		163.2	25.9		34.6	98.0	
Level of Service	F	C		E	D		F	C		C	F	
Approach Delay (s)	63.2		42.7		75.9		86.1					
Approach LOS	E		D		E		F					
Intersection Summary												
HCM Average Control Delay	61.6		HCM Level of Service		E							
HCM Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	110.1%		ICU Level of Service		H							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2015 AM + Tower
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Flpb, ped/bikes		1.00		1.00	0.99			0.99		1.00	0.96	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.95		1.00	0.91			0.97		1.00	0.96	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1748		1681	1596			3420		1770	3268	
Flt Permitted		0.48		0.74	1.00			0.93		0.95	1.00	
Satd. Flow (perm)		846		1302	1596			3197		1770	3268	
Volume (vph)	10	10	10	174	110	160	10	1161	237	100	1150	450
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)	11	11	11	183	116	168	11	1222	249	105	1211	474
RTOR Reduction (vph)	0	10	0	0	68	0	0	14	0	0	33	0
Lane Group Flow (vph)	0	23	0	183	216	0	0	1468	0	105	1652	0
Confl. Peds. (#/hr)	4					4	44		12			44
Turn Type	Perm		Perm		Perm		Prot		Prot		Prot	
Protected Phases	7		8		8		2		1		6	
Permitted Phases	7		8		2							
Actuated Green, G (s)	5.1		16.2		16.2		43.0		7.7		55.2	
Effective Green, g (s)	5.6		16.7		16.7		43.5		8.2		55.7	
Actuated g/C Ratio	0.06		0.19		0.19		0.48		0.09		0.62	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	53		242		296		1545		161		2023	
v/s Ratio Prot							0.06		c0.51			
v/s Ratio Perm	c0.03		c0.14		0.14		c0.46					
v/c Ratio	0.43		0.76		0.73		0.95		0.65		0.82	
Uniform Delay, d1	40.7		34.7		34.5		22.2		39.5		13.2	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	2.0		11.3		7.8		6.0		7.0		3.8	
Delay (s)	42.7		46.0		42.3		28.2		46.5		17.0	
Level of Service	D		D		D		C		D		B	
Approach Delay (s)	42.7		43.8		28.2		18.7					
Approach LOS	D		D		C		B					
Intersection Summary												
HCM Average Control Delay	25.8		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	90.0		Sum of lost time (s)		16.0							
Intersection Capacity Utilization	107.6%		ICU Level of Service		G							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 AM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3437		1770	3356		1770	3418		1770	3395	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3437		1770	3356		1770	3418		1770	3395	
Volume (vph)	460	590	91	120	700	310	110	668	120	280	884	180
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	615	95	125	729	323	115	696	125	292	921	188
RTOR Reduction (vph)	0	13	0	0	56	0	0	16	0	0	18	0
Lane Group Flow (vph)	479	697	0	125	996	0	115	805	0	292	1091	0
Confl. Peds. (#/hr)	6		24	24		6	36		28	28		36
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	13.0	28.9		9.6	25.5		8.1	23.5		11.0	26.4	
Effective Green, g (s)	12.5	29.9		9.1	26.5		7.6	24.5		10.5	27.4	
Actuated g/C Ratio	0.14	0.33		0.10	0.29		0.08	0.27		0.12	0.30	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	477	1142		179	988		149	930		207	1034	
v/s Ratio Prot	c0.14	c0.20		0.07	c0.30		0.06	0.24		c0.17	c0.32	
v/s Ratio Perm												
v/c Ratio	1.00	0.61		0.70	1.01		0.77	0.87		1.41	1.06	
Uniform Delay, d1	38.8	25.2		39.1	31.8		40.4	31.2		39.8	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.14	0.88	
Incremental Delay, d2	42.2	0.7		9.2	30.7		19.9	10.6		201.0	37.7	
Delay (s)	81.0	25.8		48.3	62.4		60.2	41.8		246.5	65.3	
Level of Service	F	C		D	E		E	D		F	E	
Approach Delay (s)		48.1			60.9			44.0			103.0	
Approach LOS		D			E			D			F	
Intersection Summary												
HCM Average Control Delay		66.9										E
HCM Volume to Capacity ratio		1.14										
Actuated Cycle Length (s)		90.0						20.0				
Intersection Capacity Utilization		94.1%										F
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 AM + Tower
1/21/2008

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)		4.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		0.97	0.95	
Frt		0.86						0.93		1.00	0.98	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		1611						3282		3433	3475	
Flt Permitted		1.00						0.94		0.95	1.00	
Satd. Flow (perm)		1611						3092		3433	3475	
Volume (vph)	0	0	10	0	0	0	10	347	330	1600	434	60
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)	0	0	11	0	0	0	11	365	347	1684	457	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	697	0	1684	520	0
Turn Type										Prot		
Protected Phases								2		1	6	
Permitted Phases												
Actuated Green, G (s)		0.0						8.0		29.0	45.0	
Effective Green, g (s)		0.0						8.0		29.0	45.0	
Actuated g/C Ratio		0.00						0.18		0.64	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						550		2212	3475	
v/s Ratio Prot										c0.49	0.15	
v/s Ratio Perm								c0.23				
v/c Ratio		0.00						10.84dr		0.76	0.15	
Uniform Delay, d1		22.5						18.5		5.6	0.0	
Progression Factor		1.00						0.76		1.00	1.00	
Incremental Delay, d2		0.0						133.1		2.5	0.1	
Delay (s)		22.5						147.1		8.1	0.1	
Level of Service		C						F		A	A	
Approach Delay (s)		22.5			0.0			147.1		6.2		
Approach LOS		C			A			F		A		
Intersection Summary												
HCM Average Control Delay		41.0								HCM Level of Service		D
HCM Volume to Capacity ratio		0.87										
Actuated Cycle Length (s)		45.0								Sum of lost time (s)		8.0
Intersection Capacity Utilization		79.5%								ICU Level of Service		D
Analysis Period (min)		15										
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2015 AM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.97			0.96			0.98			0.99		
Flpb, ped/bikes	0.98			0.97			1.00			1.00		
Frt	0.98			0.94			0.98			0.99		
Flt Protected	0.98			0.99			1.00			1.00		
Satd. Flow (prot)	1691			1605			3402			3472		
Flt Permitted	0.83			0.87			0.91			0.88		
Satd. Flow (perm)	1437			1418			3091			3058		
Volume (vph)	70	80	32	60	60	90	31	507	80	50	584	30
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)	74	84	34	63	63	95	33	534	84	53	615	32
RTOR Reduction (vph)	0	17	0	0	60	0	0	26	0	0	8	0
Lane Group Flow (vph)	0	175	0	0	161	0	0	625	0	0	692	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	15.0		15.0		15.0		22.0		22.0		22.0	
Effective Green, g (s)	15.0		15.0		15.0		22.0		22.0		22.0	
Actuated g/C Ratio	0.33		0.33		0.33		0.49		0.49		0.49	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	479		473		473		1511		1511		1495	
v/s Ratio Prot												
v/s Ratio Perm	c0.12		0.11		0.11		0.20		0.20		c0.23	
v/c Ratio	0.36		0.34		0.34		0.41		0.41		0.46	
Uniform Delay, d1	11.4		11.3		11.3		7.4		7.4		7.6	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	2.1		2.0		2.0		0.8		0.8		1.0	
Delay (s)	13.5		13.2		13.2		8.2		8.2		8.6	
Level of Service	B		B		B		A		A		A	
Approach Delay (s)	13.5		13.2		13.2		8.2		8.2		8.6	
Approach LOS	B		B		B		A		A		A	
Intersection Summary												
HCM Average Control Delay	9.6			9.6			HCM Level of Service			A		
HCM Volume to Capacity ratio	0.42			0.42			0.42			0.42		
Actuated Cycle Length (s)	45.0			45.0			Sum of lost time (s)			8.0		
Intersection Capacity Utilization	63.9%			63.9%			ICU Level of Service			B		
Analysis Period (min)	15			15			15			15		
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2015 AM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.95			0.96			0.98			0.98		
Flpb, ped/bikes	0.97			0.98			1.00			1.00		
Frt	0.96			0.96			0.99			0.99		
Flt Protected	0.98			0.99			1.00			1.00		
Satd. Flow (prot)	1626			1650			3443			4931		
Flt Permitted	0.79			0.82			0.84			0.82		
Satd. Flow (perm)	1302			1369			2895			4039		
Volume (vph)	70	80	70	43	70	50	30	1039	62	70	1556	100
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)	74	84	74	45	74	53	32	1094	65	74	1638	105
RTOR Reduction (vph)	0	6	0	0	25	0	0	3	0	0	5	0
Lane Group Flow (vph)	0	226	0	0	147	0	0	1188	0	0	1812	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		2		6	
Actuated Green, G (s)	16.7		16.7		16.7		59.3		59.3		59.3	
Effective Green, g (s)	17.2		17.2		17.2		59.8		59.8		59.8	
Actuated g/C Ratio	0.20		0.20		0.20		0.70		0.70		0.70	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	263		277		277		2037		2037		2842	
v/s Ratio Prot												
v/s Ratio Perm	c0.17		0.11		0.11		0.41		0.41		c0.45	
v/c Ratio	0.86		0.53		0.53		0.58		0.58		0.64	
Uniform Delay, d1	32.7		30.3		30.3		6.3		6.3		6.8	
Progression Factor	1.00		1.00		1.00		0.79		0.79		1.00	
Incremental Delay, d2	23.1		1.0		1.0		1.0		1.0		1.1	
Delay (s)	55.9		31.3		31.3		6.1		6.1		7.9	
Level of Service	E		C		C		A		A		A	
Approach Delay (s)	55.9		31.3		31.3		6.1		6.1		7.9	
Approach LOS	E		C		C		A		A		A	
Intersection Summary												
HCM Average Control Delay	11.7			11.7			HCM Level of Service			B		
HCM Volume to Capacity ratio	0.69			0.69			0.69			0.69		
Actuated Cycle Length (s)	85.0			85.0			Sum of lost time (s)			8.0		
Intersection Capacity Utilization	103.6%			103.6%			ICU Level of Service			G		
Analysis Period (min)	15			15			15			15		
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 AM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	3432		1759	3462		1767	1812		1736	1841	
Flt Permitted	0.17	1.00		0.36	1.00		0.44	1.00		0.59	1.00	
Satd. Flow (perm)	320	3432		675	3462		810	1812		1084	1841	
Volume (vph)	30	380	80	74	689	75	90	201	34	83	400	30
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)	32	400	84	78	725	79	95	212	36	87	421	32
RTOR Reduction (vph)	0	22	0	0	11	0	0	8	0	0	3	0
Lane Group Flow (vph)	32	462	0	78	793	0	95	240	0	87	450	0
Confl. Peds. (#/hr)	30		12	12		30	6		54	54		6
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		49.5	49.5		49.5	49.5	
Effective Green, g (s)	23.0	23.0		23.0	23.0		49.0	49.0		49.0	49.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.61	0.61		0.61	0.61	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	92	987		194	995		496	1110		664	1128	
v/s Ratio Prot		0.13			c0.23			0.13			c0.24	
v/s Ratio Perm	0.10			0.12			0.12			0.08		
v/c Ratio	0.35	0.47		0.40	0.80		0.19	0.22		0.13	0.40	
Uniform Delay, d1	22.6	23.5		23.0	26.3		6.8	6.9		6.5	7.9	
Progression Factor	1.00	1.00		0.87	0.91		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.1	1.6		5.6	6.1		0.9	0.4		0.4	1.1	
Delay (s)	32.7	25.1		25.6	30.1		7.7	7.4		6.9	9.0	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		25.5			29.7			7.5			8.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM Average Control Delay	20.4			HCM Level of Service				C				
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)				8.0				
Intersection Capacity Utilization	83.4%			ICU Level of Service				E				
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 AM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.98	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.99	0.99	
Satd. Flow (prot)	1763	3428		1740	3512		3385	3421		3421	3421	
Flt Permitted	0.27	1.00		0.42	1.00		0.79	1.00		0.84	0.84	
Satd. Flow (perm)	506	3428		767	3512		2716	2893		2893	2893	
Volume (vph)	30	416	80	66	728	33	70	171	54	64	240	50
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)	32	438	84	69	766	35	74	180	57	67	253	53
RTOR Reduction (vph)	0	20	0	0	4	0	0	24	0	0	16	0
Lane Group Flow (vph)	32	502	0	69	797	0	0	287	0	0	357	0
Confl. Peds. (#/hr)	18		54	54		18	4		18	18		4
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	38.0	38.0		38.0	38.0		32.0			32.0		
Effective Green, g (s)	39.0	39.0		39.0	39.0		33.0			33.0		
Actuated g/C Ratio	0.49	0.49		0.49	0.49		0.41			0.41		
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0		
Lane Grp Cap (vph)	247	1671		374	1712		1120			1193		
v/s Ratio Prot		0.15			c0.23							
v/s Ratio Perm	0.06			0.09			0.11				c0.12	
v/c Ratio	0.13	0.30		0.18	0.47		0.26			0.30		
Uniform Delay, d1	11.2	12.3		11.5	13.6		15.4			15.7		
Progression Factor	0.96	1.03		1.38	1.48		0.64			1.00		
Incremental Delay, d2	1.0	0.4		1.0	0.8		0.5			0.6		
Delay (s)	11.7	13.1		16.9	21.0		10.4			16.4		
Level of Service	B	B		B	C		B			B		
Approach Delay (s)		13.1			20.7		10.4			16.4		
Approach LOS		B			C		B			B		
Intersection Summary												
HCM Average Control Delay	16.4			HCM Level of Service				B				
HCM Volume to Capacity ratio	0.39											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)				8.0				
Intersection Capacity Utilization	73.7%			ICU Level of Service				D				
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2015 AM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.98	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.98			0.97			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1764	3452		1735	3436			3381			3451	
Flt Permitted	0.24	1.00		0.42	1.00			0.86			0.76	
Satd. Flow (perm)	443	3452		773	3436			2939			2642	
Volume (vph)	40	443	61	106	728	139	39	238	77	119	346	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	461	64	110	758	145	41	248	80	124	360	31
RTOR Reduction (vph)	0	14	0	0	20	0	0	32	0	0	6	0
Lane Group Flow (vph)	42	511	0	110	883	0	0	337	0	0	509	0
Confl. Peds. (#/hr)	13		71	71		13	22		22	22		22
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.5	41.5		41.5	41.5			32.0			32.0	
Effective Green, g (s)	41.0	41.0		41.0	41.0			31.0			31.0	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.39			0.39	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	227	1769		396	1761			1139			1024	
v/s Ratio Prot		0.15			c0.26							
v/s Ratio Perm	0.09			0.14				0.11			c0.19	
v/c Ratio	0.19	0.29		0.28	0.50			0.30			0.50	
Uniform Delay, d1	10.5	11.2		11.1	12.8			17.0			18.6	
Progression Factor	1.28	1.31		1.00	1.00			0.65			1.00	
Incremental Delay, d2	1.7	0.4		1.7	1.0			0.6			1.7	
Delay (s)	15.2	15.0		12.8	13.8			11.6			20.3	
Level of Service	B	B		B	B			B			C	
Approach Delay (s)		15.0			13.7			11.6			20.3	
Approach LOS		B			B			B			C	
Intersection Summary												
HCM Average Control Delay		15.1										B
HCM Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		80.0						8.0				
Intersection Capacity Utilization		102.5%										G
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

2015 AM + Tower
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.94		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.97	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3247		1770	3539	1735	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3247		1770	3539	1735	
Volume (vph)	543	98	72	839	134	44
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	572	103	76	883	141	46
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	675	0	76	883	187	0
Confl. Peds. (#/hr)		146	266			
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	52.0		7.8	63.8	13.2	
Effective Green, g (s)	52.0		7.8	63.8	13.2	
Actuated g/C Ratio	0.61		0.09	0.75	0.16	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)			3.0	3.0	3.0	
Lane Grp Cap (vph)	1986		162	2656	269	
v/s Ratio Prot	0.21		c0.04	c0.25	c0.11	
v/s Ratio Perm						
v/c Ratio	0.34		0.47	0.33	0.70	
Uniform Delay, d1	8.1		36.6	3.5	34.0	
Progression Factor	1.00		1.03	0.72	0.72	
Incremental Delay, d2	0.5		1.6	0.2	7.5	
Delay (s)	8.6		39.3	2.8	32.0	
Level of Service	A		D	A	C	
Approach Delay (s)	8.6			5.7	32.0	
Approach LOS	A			A	C	
Intersection Summary						
HCM Average Control Delay		9.4				A
HCM Volume to Capacity ratio		0.40				
Actuated Cycle Length (s)		85.0				8.0
Intersection Capacity Utilization		43.3%				A
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2015 AM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.98			0.99		1.00	0.97	
Flpb, ped/bikes	0.95	1.00		0.92	1.00			1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98			0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1683	3270		1636	3407			3436		1770	3339	
Flt Permitted	0.26	1.00		0.36	1.00			0.59		0.95	1.00	
Satd. Flow (perm)	453	3270		622	3407			2037		1770	3339	
Volume (vph)	126	354	107	90	526	70	125	505	49	140	949	260
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)	133	373	113	95	554	74	132	532	52	147	999	274
RTOR Reduction (vph)	0	34	0	0	13	0	0	8	0	0	18	0
Lane Grp Flow (vph)	133	452	0	95	615	0	0	708	0	147	1255	0
Confl. Peds. (#/hr)	72		137	137		72			58	58		92
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	24.4	24.4		24.4	24.4			36.6		10.5	51.6	
Effective Green, g (s)	24.9	24.9		24.9	24.9			37.1		11.0	52.1	
Actuated g/C Ratio	0.29	0.29		0.29	0.29			0.44		0.13	0.61	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)	133	958		182	998			889		229	2047	
v/s Ratio Prot		0.14			0.18					0.08	0.38	
v/s Ratio Perm	c0.29			0.15			c0.35					
v/c Ratio	1.00	0.47		0.52	0.62		8.80dl			0.64	0.61	
Uniform Delay, d1	30.1	24.7		25.1	25.9		20.7			35.1	10.2	
Progression Factor	0.73	0.67		1.00	1.00		1.38			1.28	0.53	
Incremental Delay, d2	76.0	0.1		1.2	0.8		4.5			3.3	1.0	
Delay (s)	98.1	16.7		26.3	26.7		33.2			48.4	6.4	
Level of Service	F	B		C	C		C			D	A	
Approach Delay (s)		34.2			26.7		33.2				10.8	
Approach LOS		C			C		C				B	

Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2015 AM + Tower
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	10	31	663	10	20	1160
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	33	698	11	21	1221
Pedestrians	34		33		34	34
Lane Width (ft)	12.0		12.0		12.0	12.0
Walking Speed (ft/s)	4.0		4.0		4.0	4.0
Percent Blockage	3		3		3	3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.80	0.95			0.95	
vC, conflicting volume	1423	422			742	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1097	342			678	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	94			97	
cM capacity (veh/h)	153	588			841	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	43	465	243	21	611	611
Volume Left	11	0	0	21	0	0
Volume Right	33	0	11	0	0	0
cSH	347	1700	1700	841	1700	1700
Volume to Capacity	0.12	0.27	0.14	0.03	0.36	0.36
Queue Length 95th (ft)	11	0	0	2	0	0
Control Delay (s)	16.8	0.0	0.0	9.4	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	16.8	0.0		0.2		
Approach LOS	C					

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2015 AM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.95		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	1.00		0.99		1.00		1.00		0.98		1.00	
Frt	0.99		1.00		0.98		0.98		1.00		0.98	
Flt Protected	1.00		0.95		1.00		0.99		0.95		1.00	
Satd. Flow (prot)	4994		1758		3469		1775		1729		1815	
Flt Permitted	0.83		0.41		1.00		0.54		0.40		1.00	
Satd. Flow (perm)	4174		767		3469		969		730		1815	
Volume (vph)	50	470	40	62	627	81	70	204	60	200	314	50
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)	53	495	42	65	660	85	74	215	63	211	331	53
RTOR Reduction (vph)	0	10	0	0	12	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	580	0	65	733	0	0	343	0	211	377	0
Confl. Peds. (#/hr)	24		18		18		24		24		48	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.0		51.0		51.0		24.0		24.0		24.0	
Effective Green, g (s)	52.0		52.0		52.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2554		469		2122		285		215		534	
v/s Ratio Prot			c0.21						0.21			
v/s Ratio Perm	0.14		0.08				c0.35		0.29			
v/c Ratio	0.23		0.14		0.35		1.20		0.98		0.71	
Uniform Delay, d1	7.4		7.0		8.1		30.0		29.8		26.7	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.2		0.6		0.4		119.8		56.8		7.6	
Delay (s)	7.6		7.6		8.6		149.8		86.5		34.4	
Level of Service	A		A		A		F		F		C	
Approach Delay (s)	7.6		8.5				149.8				52.9	
Approach LOS	A		A				F				D	
Intersection Summary												
HCM Average Control Delay	40.7		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	101.5%		ICU Level of Service		G							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2015 AM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.95		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	1.00		0.99		1.00		1.00		0.99		1.00	
Frt	1.00		0.98		1.00		0.96		1.00		0.99	
Flt Protected	1.00		0.95		1.00		0.95		1.00		0.95	
Satd. Flow (prot)	5046		1757		4979		1775		1729		1815	
Flt Permitted	0.88		0.85		0.32		1.00		0.39		1.00	
Satd. Flow (perm)	4463		4224		586		1770		711		1830	
Volume (vph)	30	700	20	51	669	91	50	194	73	90	276	30
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)	32	737	21	54	704	96	53	204	77	95	291	32
RTOR Reduction (vph)	0	4	0	0	20	0	0	17	0	0	5	0
Lane Group Flow (vph)	0	786	0	0	834	0	53	264	0	95	318	0
Confl. Peds. (#/hr)	18		18		12		18		18		12	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	50.0		50.0		19.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2873		2719		150		454		182		469	
v/s Ratio Prot			c0.20		0.09		0.15		0.13		c0.17	
v/s Ratio Perm	0.18		c0.20		0.09		0.13		0.13			
v/c Ratio	0.27		0.31		0.35		0.58		0.52		0.68	
Uniform Delay, d1	6.2		6.3		24.3		26.0		25.5		26.8	
Progression Factor	1.00		0.67		1.00		1.00		1.19		1.20	
Incremental Delay, d2	0.2		0.3		6.4		5.4		10.1		7.5	
Delay (s)	6.4		4.5		30.7		31.4		40.4		39.7	
Level of Service	A		A		C		C		D		D	
Approach Delay (s)	6.4		4.5		31.3		31.3		39.9		39.9	
Approach LOS	A		A		C		C		D		D	
Intersection Summary												
HCM Average Control Delay	15.0		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	64.1%		ICU Level of Service		C							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2015 AM + Tower
1/21/2008



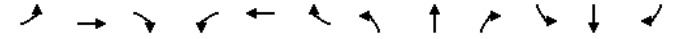
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕↕↕			↕↕↕			↕↕			↕↕		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frbp, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.98			0.97			0.99		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	5026			4944			3399			3426		
Flt Permitted	0.82			0.83			0.83			0.78		
Satd. Flow (perm)	4150			4102			2855			2692		
Volume (vph)	54	779	40	58	747	136	30	164	44	127	312	44
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)	57	820	42	61	786	143	32	173	46	134	328	46
RTOR Reduction (vph)	0	6	0	0	29	0	0	24	0	0	10	0
Lane Group Flow (vph)	0	913	0	0	961	0	0	227	0	0	498	0
Confl. Peds. (#/hr)	17		19	19		17	12		16	16		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2672		2641		2641		732		690		690	
v/s Ratio Prot												
v/s Ratio Perm	0.22		c0.23		c0.23		0.08		c0.19		c0.19	
v/c Ratio	0.34		0.36		0.36		0.31		0.72		0.72	
Uniform Delay, d1	6.5		6.6		6.6		24.0		27.2		27.2	
Progression Factor	0.75		1.00		1.00		1.00		0.49		0.49	
Incremental Delay, d2	0.3		0.4		0.4		1.1		6.2		6.2	
Delay (s)	5.2		7.0		7.0		25.1		19.5		19.5	
Level of Service	A		A		A		C		B		B	
Approach Delay (s)	5.2		7.0		7.0		25.1		19.5		19.5	
Approach LOS	A		A		A		C		B		B	

Intersection Summary

HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2015 AM + Tower
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frbp, ped/bikes	1.00			1.00			0.97			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	1.00			0.98			0.93			0.92		
Flt Protected	1.00			1.00			0.98			0.98		
Satd. Flow (prot)	5069			4868			1695			1589		
Flt Permitted	0.88			0.93			0.88			0.87		
Satd. Flow (perm)	4469			4518			1523			1411		
Volume (vph)	31	929	10	10	868	98	10	0	10	54	0	73
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)	33	978	11	11	914	103	11	0	11	57	0	77
RTOR Reduction (vph)	0	1	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	1021	0	0	1028	0	0	13	0	0	134	0
Confl. Peds. (#/hr)					98							98
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	60.1		60.1		60.1		16.9		16.9		16.9	
Effective Green, g (s)	60.1		60.1		60.1		16.9		16.9		16.9	
Actuated g/C Ratio	0.71		0.71		0.71		0.20		0.20		0.20	
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)	3160		3194		3194		303		281		281	
v/s Ratio Prot												
v/s Ratio Perm	c0.23		0.23		0.23		0.01		c0.09		c0.09	
v/c Ratio	0.32		0.32		0.32		0.04		0.48		0.48	
Uniform Delay, d1	4.7		4.7		4.7		27.5		30.1		30.1	
Progression Factor	1.00		1.59		1.59		1.00		0.99		0.99	
Incremental Delay, d2	0.3		0.2		0.2		0.1		1.2		1.2	
Delay (s)	5.0		7.7		7.7		27.6		31.0		31.0	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	5.0		7.7		7.7		27.6		31.0		31.0	
Approach LOS	A		A		A		C		C		C	

Intersection Summary

HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2015 AM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.98			0.97			1.00			0.97		
Flt Protected	0.99			0.99			0.95			1.00		
Satd. Flow (prot)	4954			4865			1760			3415		
Flt Permitted	0.66			0.68			0.23			1.00		
Satd. Flow (perm)	3267			3322			425			3415		
Volume (vph)	128	758	107	110	717	190	70	356	80	285	714	179
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)	135	798	113	116	755	200	74	375	84	300	752	188
RTOR Reduction (vph)	0	21	0	0	68	0	0	15	0	0	18	0
Lane Group Flow (vph)	0	1025	0	0	1003	0	74	444	0	300	922	0
Confl. Peds. (#/hr)	40		9		40		25		31		25	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	30.4		30.4		44.1		44.1		44.1		44.1	
Effective Green, g (s)	31.9		31.9		45.1		45.1		45.1		45.1	
Actuated g/C Ratio	0.38		0.38		0.53		0.53		0.53		0.53	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1226		1247		226		1812		452		1808	
v/s Ratio Prot					0.13		0.27					
v/s Ratio Perm	c0.31		0.30		0.17		c0.35		0.27		c0.10	
v/c Ratio	0.84		0.80		0.33		0.24		0.66		0.51	
Uniform Delay, d1	24.2		23.8		11.3		10.8		14.5		12.8	
Progression Factor	1.49		1.00		1.41		1.38		1.13		1.24	
Incremental Delay, d2	4.7		3.6		3.7		0.3		6.1		0.8	
Delay (s)	40.8		27.4		19.7		15.2		22.5		16.8	
Level of Service	D		C		B		B		C		B	
Approach Delay (s)	40.8		27.4		15.8		18.2		18.2		18.2	
Approach LOS	D		C		B		B		C		B	
Intersection Summary												
HCM Average Control Delay	26.5		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.74											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	90.6%		ICU Level of Service				E					
Analysis Period (min)	15											
c Critical Lane Group												


HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

2015 AM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			0.99			1.00			0.88		
Flpb, ped/bikes	1.00			1.00			0.97			1.00		
Frt	1.00			0.99			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5040			4983			1770			1395		
Flt Permitted	0.88			0.88			0.88			1.00		
Satd. Flow (perm)	4451			4372			1585			1395		
Volume (vph)	30	1090	33	30	984	80	22	33	20	80	30	40
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)	32	1147	35	32	1036	84	23	35	21	84	32	42
RTOR Reduction (vph)	0	4	0	0	11	0	0	0	15	0	16	0
Lane Group Flow (vph)	0	1210	0	0	1141	0	0	58	6	0	142	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		2		6		6	
Actuated Green, G (s)	48.0		48.0		23.0		23.0		23.0		23.0	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lane Grp Cap (vph)	2698		2651		466		410		399		399	
v/s Ratio Prot					0.04		0.00		c0.10			
v/s Ratio Perm	c0.27		0.26		0.04		0.00		c0.10		c0.10	
v/c Ratio	0.45		0.43		0.12		0.02		0.36		0.36	
Uniform Delay, d1	8.5		8.4		20.7		20.0		22.3		22.3	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.5		0.5		0.5		0.1		2.5		2.5	
Delay (s)	9.1		8.9		21.3		20.1		24.7		24.7	
Level of Service	A		A		C		C		C		C	
Approach Delay (s)	9.1		8.9		21.0		24.7		24.7		24.7	
Approach LOS	A		A		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	10.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.42											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	81.7%		ICU Level of Service				D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway


2015 AM + Tower
1/21/2008



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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.95	1.00	1.00	0.96	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	4908	1770	4818	1770	3539	1511	1770	3539	1523	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	4908	1770	4818	1770	3539	1511	1770	3539	1523	1770	3539
Volume (vph)	160	899	142	150	754	280	110	301	110	310	1152	150
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)	168	946	149	158	794	295	116	317	116	326	1213	158
RTOR Reduction (vph)	0	17	0	0	56	0	0	0	51	0	0	33
Lane Group Flow (vph)	168	1078	0	158	1033	0	116	317	65	326	1213	125
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot			Prot			Prot	pm+ov		Prot		pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases									2			6
Actuated Green, G (s)	12.0	34.0		13.6	35.6		10.4	31.4	45.0	25.0	46.0	58.0
Effective Green, g (s)	11.0	35.0		12.6	36.6		9.4	32.4	45.0	24.0	47.0	58.0
Actuated g/C Ratio	0.09	0.29		0.10	0.31		0.08	0.27	0.38	0.20	0.39	0.48
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1432		186	1469		139	956	617	354	1386	787
v/s Ratio Prot	c0.09	c0.22		0.09	0.21		0.07	0.09	0.01	c0.18	c0.34	0.01
v/s Ratio Perm									0.03			0.07
v/c Ratio	1.04	0.75		0.85	0.70		0.83	0.33	0.11	0.92	0.88	0.16
Uniform Delay, d1	54.5	38.6		52.8	36.9		54.5	35.1	24.4	47.1	33.8	17.4
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	80.8	3.7		27.6	2.8		31.8	0.9	0.0	28.3	8.0	0.0
Delay (s)	135.3	42.3		80.4	39.7		86.3	36.0	24.4	75.3	41.8	17.4
Level of Service	F	D		F	D		F	D	C	E	D	B
Approach Delay (s)		54.7			44.9			44.2			45.9	
Approach LOS		D			D			D			D	
Intersection Summary												
HCM Average Control Delay	47.8		HCM Level of Service				D					
HCM Volume to Capacity ratio	0.84											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				12.0					
Intersection Capacity Utilization	82.5%		ICU Level of Service				E					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2015 AM + Tower
1/21/2008



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)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	0.95
Frpb, ped/bikes		0.93			0.96			1.00			0.99	0.99
Flpb, ped/bikes		0.97			0.96			0.94			1.00	0.93
Frt		0.95			0.95			1.00			0.99	0.99
Flt Protected		0.98			0.99			0.95			1.00	0.95
Satd. Flow (prot)		1580			1606			1665			3456	1640
Flt Permitted		0.72			0.86			0.36			1.00	0.42
Satd. Flow (perm)		1164			1395			637			3456	730
Volume (vph)		42	30	40	50	60	64	60	531	40	32	657
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
Adj. Flow (vph)		44	32	42	53	63	67	63	559	42	34	692
RTOR Reduction (vph)		0	28	0	0	29	0	0	4	0	0	3
Lane Group Flow (vph)		0	90	0	0	154	0	63	597	0	34	733
Confl. Peds. (#/hr)		100		100	100		100	100		100	100	100
Turn Type		Perm			Perm			Perm			Perm	
Protected Phases		4			4			4			2	6
Permitted Phases		4			4			2			6	
Actuated Green, G (s)		12.7			12.7			65.3	65.3		65.3	65.3
Effective Green, g (s)		12.2			12.2			64.8	64.8		64.8	64.8
Actuated g/C Ratio		0.14			0.14			0.76	0.76		0.76	0.76
Clearance Time (s)		3.5			3.5			3.5	3.5		3.5	3.5
Vehicle Extension (s)		2.0			2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)		167			200			486	2635		557	2644
v/s Ratio Prot								0.17				c0.21
v/s Ratio Perm		0.08			c0.11			0.10			0.05	
v/c Ratio		0.54			0.77			0.13	0.23		0.06	0.28
Uniform Delay, d1		33.8			35.0			2.7	2.9		2.5	3.0
Progression Factor		1.00			1.00			1.00	1.00		0.73	0.64
Incremental Delay, d2		1.7			14.7			0.6	0.2		0.2	0.2
Delay (s)		35.4			49.8			3.2	3.1		2.0	2.2
Level of Service		D			D			A	A		A	A
Approach Delay (s)		35.4			49.8			3.1			2.2	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM Average Control Delay	9.8		HCM Level of Service				A					
HCM Volume to Capacity ratio	0.35											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	54.8%		ICU Level of Service				A					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2015 AM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.95	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3347		1770	3217		1692	3445		1677	3222	
Flt Permitted	0.95	1.00		0.95	1.00		0.27	1.00		0.49	1.00	
Satd. Flow (perm)	1770	3347		1770	3217		482	3445		864	3222	
Volume (vph)	260	400	100	70	370	129	70	341	40	94	533	210
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)	274	421	105	74	389	136	74	359	42	99	561	221
RTOR Reduction (vph)	0	24	0	0	45	0	0	9	0	0	41	0
Lane Group Flow (vph)	274	502	0	74	480	0	74	392	0	99	741	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	16.1	26.6		6.8	17.3		38.1	38.1		38.1	38.1	
Effective Green, g (s)	16.6	26.1		7.3	16.8		39.6	39.6		39.6	39.6	
Actuated g/C Ratio	0.20	0.31		0.09	0.20		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	346	1028		152	636		225	1605		403	1501	
v/s Ratio Prot	c0.15	0.15		0.04	c0.15			0.11			c0.23	
v/s Ratio Perm							0.15			0.11		
v/c Ratio	0.79	0.49		0.49	0.75		0.33	0.24		0.25	0.49	
Uniform Delay, d1	32.6	24.0		37.1	32.2		14.3	13.7		13.7	15.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.0	0.1		0.9	4.5		3.9	0.4		1.4	1.2	
Delay (s)	43.5	24.1		38.0	36.7		18.2	14.0		15.1	16.9	
Level of Service	D	C		D	D		B	B		B	B	
Approach Delay (s)		30.8			36.8			14.7			16.7	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM Average Control Delay		24.8										
HCM Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		85.0						12.0				
Intersection Capacity Utilization		73.7%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

2015 AM + Tower
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.99	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1670		1770	3539	3503	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1670		1770	3539	3503	
Volume (vph)	73	136	61	635	1067	79
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	143	64	668	1123	83
RTOR Reduction (vph)	81	0	0	0	4	0
Lane Group Flow (vph)	139	0	64	668	1202	0
Turn Type			Prot			
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	20.4		5.5	56.6	47.1	
Effective Green, g (s)	20.4		5.5	56.6	47.1	
Actuated g/C Ratio	0.24		0.06	0.67	0.55	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	401		115	2357	1941	
v/s Ratio Prot	c0.08		c0.04	0.19	c0.34	
v/s Ratio Perm						
v/c Ratio	0.35		0.56	0.28	0.62	
Uniform Delay, d1	26.8		38.6	5.8	12.9	
Progression Factor	1.00		0.97	0.85	0.97	
Incremental Delay, d2	2.4		5.1	0.3	1.2	
Delay (s)	29.2		42.6	5.3	13.6	
Level of Service	C		D	A	B	
Approach Delay (s)	29.2			8.5	13.6	
Approach LOS	C			A	B	
Intersection Summary						
HCM Average Control Delay		13.5				HCM Level of Service B
HCM Volume to Capacity ratio		0.54				
Actuated Cycle Length (s)		85.0				Sum of lost time (s) 12.0
Intersection Capacity Utilization		57.8%				ICU Level of Service B
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2015 PM + Tower
1/21/2008

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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.98	
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4926		1770	4969		2005	1997		1961	1920	
Flt Permitted	0.95	1.00		0.95	1.00		0.13	1.00		0.55	1.00	
Satd. Flow (perm)	1770	4926		1770	4969		271	1997		1126	1920	
Volume (vph)	340	1233	183	90	1020	150	170	248	90	140	281	270
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)	358	1298	193	95	1074	158	179	261	95	147	296	284
RTOR Reduction (vph)	0	20	0	0	20	0	0	15	0	0	39	0
Lane Group Flow (vph)	358	1471	0	95	1212	0	179	341	0	147	541	0
Confl. Peds. (#/hr)			32	32		4	12		24	24		12
Parking (#/hr)												0
Turn Type	Prot			Prot		pm+pt			Perm			
Protected Phases	7	4		3	8	5	2			6		
Permitted Phases						2				6		
Actuated Green, G (s)	18.0	35.8		7.5	25.3	39.7	39.7		28.7	28.7		
Effective Green, g (s)	18.0	35.8		7.5	25.3	40.2	40.2		29.2	29.2		
Actuated g/C Ratio	0.19	0.38		0.08	0.27	0.43	0.43		0.31	0.31		
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	2.5		2.5	2.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	341	1886		142	1345	283	859		352	600		
v/s Ratio Prot	c0.20	0.30		0.05	c0.24	c0.06	0.17			c0.28		
v/s Ratio Perm						0.21				0.13		
v/c Ratio	1.05	0.78		0.67	0.90	0.63	0.40		0.42	0.90		
Uniform Delay, d1	37.8	25.4		41.8	32.9	21.7	18.3		25.4	30.8		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	62.4	3.3		11.3	9.9	4.6	0.3		0.8	16.9		
Delay (s)	100.1	28.7		53.1	42.8	26.3	18.6		26.2	47.6		
Level of Service	F	C		D	D	C	B		C	D		
Approach Delay (s)		42.5			43.6		21.2			43.3		
Approach LOS		D			D		C			D		
Intersection Summary												
HCM Average Control Delay		40.4										D
HCM Volume to Capacity ratio		0.90										
Actuated Cycle Length (s)		93.5					12.0					
Intersection Capacity Utilization		96.6%								F		
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2015 PM + Tower
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.97			0.98		1.00	0.95	
Fipb, ped/bikes		0.99		1.00	1.00			1.00		1.00	1.00	
Frt		0.93		1.00	0.92			0.96		1.00	0.95	
Flt Protected		0.99		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1705		1681	1578			3316		1770	3193	
Flt Permitted		0.36		0.73	1.00			0.94		0.95	1.00	
Satd. Flow (perm)		619		1290	1578			3128		1770	3193	
Volume (vph)	10	10	20	117	110	120	10	1134	485	120	821	410
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)	11	11	21	123	116	126	11	1194	511	126	864	432
RTOR Reduction (vph)	0	20	0	0	43	0	0	39	0	0	50	0
Lane Group Flow (vph)	0	23	0	123	199	0	0	1677	0	126	1246	0
Confl. Peds. (#/hr)		36				36	48			16	16	48
Turn Type	Perm			Perm		Perm		Prot				
Protected Phases		7			8			2		1		6
Permitted Phases		7			8			2				
Actuated Green, G (s)		6.5			16.0	16.0		48.7		10.8		64.0
Effective Green, g (s)		7.0			16.5	16.5		49.2		11.3		64.5
Actuated g/C Ratio		0.07			0.16	0.16		0.49		0.11		0.64
Clearance Time (s)		4.5			4.5	4.5		4.5		4.5		4.5
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0		2.0
Lane Grp Cap (vph)		43			213	260		1539		200		2059
v/s Ratio Prot										0.07		c0.39
v/s Ratio Perm		c0.04			0.10	0.13		c0.54				
v/c Ratio		0.55			0.58	0.77		1.09		0.63		0.61
Uniform Delay, d1		45.0			38.5	39.9		25.4		42.4		10.3
Progression Factor		1.00			1.00	1.00		0.60		1.00		1.00
Incremental Delay, d2		7.4			2.4	11.5		41.7		4.7		1.3
Delay (s)		52.3			40.9	51.4		56.9		47.0		11.7
Level of Service		D			D	D		E		D		B
Approach Delay (s)		52.3			47.9			56.9				14.8
Approach LOS		D			D			E				B
Intersection Summary												
HCM Average Control Delay		39.0						HCM Level of Service		D		
HCM Volume to Capacity ratio		0.93										
Actuated Cycle Length (s)		100.0						Sum of lost time (s)		16.0		
Intersection Capacity Utilization		111.7%						ICU Level of Service		H		
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 PM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3456		1770	3308		1770	3323		1770	3414	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3456		1770	3308		1770	3323		1770	3414	
Volume (vph)	460	880	83	120	510	290	90	899	260	220	688	60
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)	484	926	87	126	537	305	95	946	274	232	724	63
RTOR Reduction (vph)	0	7	0	0	79	0	0	27	0	0	7	0
Lane Group Flow (vph)	484	1006	0	126	763	0	95	1193	0	232	780	0
Confl. Peds. (#/hr)	15		48	48		15	123		48	48		123
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.7	28.3		10.0	22.6		5.0	32.7		12.0	39.7	
Effective Green, g (s)	15.2	29.3		9.5	23.6		4.5	33.7		11.5	40.7	
Actuated g/C Ratio	0.15	0.29		0.10	0.24		0.04	0.34		0.12	0.41	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	522	1013		168	781		80	1120		204	1389	
v/s Ratio Prot	c0.14	c0.29		0.07	0.23		0.05	c0.36		c0.13	0.23	
v/s Ratio Perm												
v/c Ratio	0.93	0.99		0.75	0.98		1.19	1.07		1.14	0.56	
Uniform Delay, d1	41.9	35.2		44.1	37.9		47.8	33.1		44.2	22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.22	0.74	
Incremental Delay, d2	22.3	26.4		15.3	26.1		159.7	46.2		98.6	1.3	
Delay (s)	64.2	61.6		59.4	64.0		207.4	79.4		152.5	18.3	
Level of Service	E	E		E	E		F	E		F	B	
Approach Delay (s)		62.5			63.4			88.6			48.8	
Approach LOS		E			E			F			D	
Intersection Summary												
HCM Average Control Delay		66.9										E
HCM Volume to Capacity ratio		1.01										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		96.6%										F
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 PM + Tower
1/21/2008

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)		4.0								4.0	4.0	
Lane Util. Factor		1.00								0.95	0.97	0.95
Frt		0.86								0.94	1.00	0.98
Flt Protected		1.00								1.00	0.95	1.00
Satd. Flow (prot)		1611								3318	3433	3453
Flt Permitted		1.00								0.95	0.95	1.00
Satd. Flow (perm)		1611								3145	3433	3453
Volume (vph)	0	0	10	0	0	0	10	415	299	1500	307	60
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)	0	0	11	0	0	0	11	437	315	1579	323	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	743	0	1579	386	0
Turn Type								Perm		Prot		
Protected Phases									2		1	6
Permitted Phases									2			
Actuated Green, G (s)		0.0								13.0	29.0	50.0
Effective Green, g (s)		0.0								13.0	29.0	50.0
Actuated g/C Ratio		0.00								0.26	0.58	1.00
Clearance Time (s)										4.0	4.0	2.0
Lane Grp Cap (vph)		0								818	1991	3453
v/s Ratio Prot											c0.46	0.11
v/s Ratio Perm										c0.24		
v/c Ratio		0.00								0.91	0.79	0.11
Uniform Delay, d1		25.0								17.9	8.2	0.0
Progression Factor		1.00								0.74	1.00	1.00
Incremental Delay, d2		0.0								15.0	3.3	0.1
Delay (s)		25.0								28.2	11.5	0.1
Level of Service		C								C	B	A
Approach Delay (s)		25.0			0.0					28.2		9.3
Approach LOS		C			A					C		A
Intersection Summary												
HCM Average Control Delay		14.6										B
HCM Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		50.0						Sum of lost time (s)			8.0	
Intersection Capacity Utilization		77.5%										D
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2015 PM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.97			0.97			0.99			0.99		
Flpb, ped/bikes	0.98			0.97			1.00			0.99		
Frt	0.97			0.96			0.98			0.99		
Flt Protected	0.99			0.99			1.00			0.99		
Satd. Flow (prot)	1695			1658			3411			3442		
Flt Permitted	0.88			0.92			0.93			0.82		
Satd. Flow (perm)	1518			1540			3175			2850		
Volume (vph)	30	50	21	50	100	70	31	564	80	50	277	20
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)	32	53	22	53	105	74	33	594	84	53	292	21
RTOR Reduction (vph)	0	15	0	0	34	0	0	21	0	0	9	0
Lane Group Flow (vph)	0	92	0	0	198	0	0	690	0	0	357	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0			17.0			25.0			25.0		
Effective Green, g (s)	17.0			17.0			25.0			25.0		
Actuated g/C Ratio	0.34			0.34			0.50			0.50		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Lane Grp Cap (vph)	516			524			1588			1425		
v/s Ratio Prot												
v/s Ratio Perm	0.06			c0.13			c0.22			0.13		
v/c Ratio	0.18			0.38			0.43			0.25		
Uniform Delay, d1	11.6			12.5			8.0			7.1		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	0.8			2.1			0.9			0.4		
Delay (s)	12.4			14.6			8.9			7.6		
Level of Service	B			B			A			A		
Approach Delay (s)	12.4			14.6			8.9			7.6		
Approach LOS	B			B			A			A		
Intersection Summary												
HCM Average Control Delay	9.7			HCM Level of Service			A					
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	50.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	68.6%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2015 PM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.95			0.97			0.99			0.98		
Flpb, ped/bikes	0.97			0.98			1.00			1.00		
Frt	0.95			0.97			0.99			0.99		
Flt Protected	0.98			0.99			1.00			1.00		
Satd. Flow (prot)	1619			1680			3467			4931		
Flt Permitted	0.81			0.83			0.87			0.85		
Satd. Flow (perm)	1325			1412			3007			4205		
Volume (vph)	60	60	60	32	60	30	50	1507	62	30	984	70
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)	63	63	63	34	63	32	53	1586	65	32	1036	74
RTOR Reduction (vph)	0	27	0	0	5	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	162	0	0	124	0	0	1702	0	0	1137	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			6		
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	12.2			12.2			58.8			58.8		
Effective Green, g (s)	12.7			12.7			59.3			59.3		
Actuated g/C Ratio	0.16			0.16			0.74			0.74		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	2.0			2.0			2.0			2.0		
Lane Grp Cap (vph)	210			224			2229			3117		
v/s Ratio Prot												
v/s Ratio Perm	c0.12			0.09			c0.57			0.27		
v/c Ratio	0.77			0.55			0.76			0.36		
Uniform Delay, d1	32.3			31.0			6.2			3.7		
Progression Factor	1.00			1.00			1.81			1.00		
Incremental Delay, d2	14.7			1.7			1.0			0.3		
Delay (s)	47.0			32.7			12.2			4.0		
Level of Service	D			C			B			A		
Approach Delay (s)	47.0			32.7			12.2			4.0		
Approach LOS	D			C			B			A		
Intersection Summary												
HCM Average Control Delay	12.1			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	104.4%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 PM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1761	3487	1766	3440	1738	1818	1764	1817	1764	1817	1764	1817
Flt Permitted	0.28	1.00	0.16	1.00	0.57	1.00	0.36	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	516	3487	294	3440	1050	1818	669	1817	669	1817	669	1817
Volume (vph)	40	839	80	53	574	103	130	391	65	106	200	30
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)	42	883	84	56	604	108	137	412	68	112	211	32
RTOR Reduction (vph)	0	9	0	0	18	0	0	8	0	0	7	0
Lane Group Flow (vph)	42	958	0	56	694	0	137	473	0	112	236	0
Confl. Peds. (#/hr)	12		12	12		12	42		12	12		42
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.0	33.0		33.0	33.0		40.5	40.5		40.5	40.5	
Effective Green, g (s)	32.0	32.0		32.0	32.0		40.0	40.0		40.0	40.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.50	0.50		0.50	0.50	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	206	1395		118	1376		525	909		335	909	
v/s Ratio Prot		c0.27			0.20			c0.26			0.13	
v/s Ratio Perm	0.08			0.19			0.13			0.17		
v/c Ratio	0.20	0.69		0.47	0.50		0.26	0.52		0.33	0.26	
Uniform Delay, d1	15.7	19.9		17.8	18.0		11.5	13.5		12.0	11.5	
Progression Factor	1.00	1.00		1.77	1.92		1.72	1.78		1.00	1.00	
Incremental Delay, d2	2.2	2.8		10.8	1.1		0.4	0.7		2.7	0.7	
Delay (s)	17.9	22.6		42.3	35.6		20.2	24.8		14.7	12.2	
Level of Service	B	C		D	D		C	C		B	B	
Approach Delay (s)		22.4			36.1			23.8			13.0	
Approach LOS		C			D			C			B	
Intersection Summary												
HCM Average Control Delay		25.3										C
HCM Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		82.2%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 PM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99
Satd. Flow (prot)	1757	3471	1750	3488	1750	3488	3420	3424	3420	3424	3420	3424
Flt Permitted	0.22	1.00	0.16	1.00	0.81	1.00	0.81	1.00	0.81	1.00	0.87	1.00
Satd. Flow (perm)	406	3471	295	3488	2817	3488	2817	3003	2817	3003	2817	3003
Volume (vph)	50	931	80	60	640	53	100	281	59	33	180	40
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	960	82	62	660	55	103	290	61	34	186	41
RTOR Reduction (vph)	0	8	0	0	8	0	0	3	0	0	17	0
Lane Group Flow (vph)	52	1034	0	62	707	0	0	451	0	0	244	0
Confl. Peds. (#/hr)	24		78	78		24	8		6	6		8
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		46.0			46.0	46.0	
Effective Green, g (s)	25.0	25.0		25.0	25.0		47.0			47.0	47.0	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.59			0.59	0.59	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0	5.0	
Lane Grp Cap (vph)	127	1085		92	1090		1655			1764	1764	
v/s Ratio Prot		c0.30			0.20							
v/s Ratio Perm	0.13			0.21			c0.16			0.08		
v/c Ratio	0.41	0.95		0.67	0.65		0.27			0.14		
Uniform Delay, d1	21.7	26.9		24.0	23.7		8.1			7.4		
Progression Factor	0.49	0.51		0.92	0.93		1.01			1.00		
Incremental Delay, d2	7.5	15.2		28.9	2.6		0.3			0.2		
Delay (s)	18.2	29.0		51.1	24.5		8.5			7.6		
Level of Service	B	C		D	C		A			A		
Approach Delay (s)		28.5			26.7					8.5		7.6
Approach LOS		C			C					A		A
Intersection Summary												
HCM Average Control Delay		22.3										C
HCM Volume to Capacity ratio		0.51										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		72.0%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2015 PM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.97			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1765	3483		1760	3425			3396			3433	
Flt Permitted	0.23	1.00		0.17	1.00			0.87			0.74	
Satd. Flow (perm)	427	3483		308	3425			2973			2579	
Volume (vph)	70	908	84	115	688	152	65	403	116	82	226	40
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	71	917	85	116	695	154	66	407	117	83	228	40
RTOR Reduction (vph)	0	8	0	0	24	0	0	27	0	0	12	0
Lane Group Flow (vph)	71	994	0	116	825	0	0	563	0	0	339	0
Confl. Peds. (#/hr)	8		39	39		8			25	25		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	35.5		35.5	35.5			38.0			38.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0			37.0			37.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.46			0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	187	1524		135	1498			1375			1193	
v/s Ratio Prot		0.29			0.24							
v/s Ratio Perm	0.17			c0.38				c0.19			0.13	
v/c Ratio	0.38	0.65		0.86	0.55			0.41			0.28	
Uniform Delay, d1	15.2	17.7		20.3	16.7			14.3			13.3	
Progression Factor	0.95	1.03		1.53	1.64			1.36			1.00	
Incremental Delay, d2	2.7	1.0		44.9	1.4			0.8			0.6	
Delay (s)	17.1	19.3		75.9	28.7			20.2			13.9	
Level of Service	B	B		E	C			C			B	
Approach Delay (s)		19.1			34.4			20.2			13.9	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM Average Control Delay	23.7		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	80.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	87.9%		ICU Level of Service				E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

2015 PM + Tower
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗	↘	↘	↗	↘	↘
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	0.95		1.00	0.95	1.00	
Frpb, ped/bikes	0.94		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.98		1.00	1.00	0.96	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	3272		1770	3539	1733	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	3272		1770	3539	1733	
Volume (vph)	996	122	59	833	132	47
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1027	126	61	859	136	48
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1153	0	61	859	184	0
Confl. Peds. (#/hr)		213	348			
Turn Type			Prot			
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	50.2		5.8	60.0	12.0	
Effective Green, g (s)	50.2		5.8	60.0	12.0	
Actuated g/C Ratio	0.63		0.07	0.75	0.15	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	2053		128	2654	260	
v/s Ratio Prot	c0.35		c0.03	0.24	c0.11	
v/s Ratio Perm						
v/c Ratio	0.56		0.48	0.32	0.71	
Uniform Delay, d1	8.6		35.6	3.3	32.3	
Progression Factor	0.77		0.83	0.79	0.84	
Incremental Delay, d2	0.9		2.1	0.2	8.2	
Delay (s)	7.5		31.8	2.9	35.3	
Level of Service	A		C	A	D	
Approach Delay (s)	7.5		4.8	35.3		
Approach LOS	A		A	D		
Intersection Summary						
HCM Average Control Delay	8.6		HCM Level of Service		A	
HCM Volume to Capacity ratio	0.58					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	55.8%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2015 PM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flpb, ped/bikes	0.94	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1658	3417	1732	3317	1770	3474	1770	3474	1770	3346	1770	3346
Flt Permitted	0.29	1.00	0.16	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	501	3417	292	3317	1770	3474	1770	3474	1770	3346	1770	3346
Volume (vph)	219	715	109	55	501	110	226	1260	104	110	671	165
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	223	730	111	56	511	112	231	1286	106	112	685	168
RTOR Reduction (vph)	0	15	0	0	24	0	0	7	0	0	26	0
Lane Group Flow (vph)	223	826	0	56	599	0	231	1385	0	112	827	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm		Perm		Prot		Prot		Prot		Prot	
Protected Phases	4		8		5		2		1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	25.5	25.5	25.5	25.5	12.6	32.8	8.2	28.4				
Effective Green, g (s)	26.0	26.0	26.0	26.0	13.1	33.3	8.7	28.9				
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.16	0.42	0.11	0.36				
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	163	1111	95	1078	290	1446	192	1209				
v/s Ratio Prot		0.24		0.18	c0.13	c0.40	0.06	0.25				
v/s Ratio Perm	c0.44		0.19									
v/c Ratio	1.37	0.74	0.59	0.56	0.80	0.96	0.58	0.68				
Uniform Delay, d1	27.0	24.0	22.5	22.2	32.2	22.7	33.9	21.7				
Progression Factor	1.03	1.04	1.00	1.00	1.04	1.12	0.91	1.20				
Incremental Delay, d2	195.0	2.0	5.9	0.4	10.5	13.0	2.7	2.9				
Delay (s)	222.9	27.1	28.4	22.6	44.1	38.5	33.6	28.9				
Level of Service	F	C	C	C	D	D	C	C				
Approach Delay (s)	68.1		23.1		39.3		29.5					
Approach LOS	E		C		D		C					
Intersection Summary												
HCM Average Control Delay	41.6		HCM Level of Service				D					
HCM Volume to Capacity ratio	1.06											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	88.4%		ICU Level of Service				E					
Analysis Period (min)	15											

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2015 PM + Tower
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔ ↗		↔ ↗		↔ ↗	
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Volume (veh/h)	20	41	1574	30	20	805
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	43	1657	32	21	847
Pedestrians	52		52		45	
Lane Width (ft)	12.0		12.0		12.0	
Walking Speed (ft/s)	4.0		4.0		4.0	
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230		471	
pX, platoon unblocked	0.81	0.75			0.75	
vC, conflicting volume	2242	941			1740	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1892	598			1656	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	50		86		92	
cM capacity (veh/h)	42	310			278	
Direction, Lane #						
Volume Total	64	1105	584	21	424	424
Volume Left	21	0	0	21	0	0
Volume Right	43	0	32	0	0	0
cSH	101	1700	1700	278	1700	1700
Volume to Capacity	0.64	0.65	0.34	0.08	0.25	0.25
Queue Length 95th (ft)	78	0	0	6	0	0
Control Delay (s)	89.1	0.0	0.0	19.0	0.0	0.0
Lane LOS	F			C		
Approach Delay (s)	89.1	0.0	0.5			
Approach LOS	F		D			
Intersection Summary						
Average Delay	2.3					
Intersection Capacity Utilization	62.9%		ICU Level of Service		B	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2015 PM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.95		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		0.99		1.00		1.00		0.99	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	0.99		1.00		0.97		0.98		1.00		0.98	
Flt Protected	0.99		0.95		1.00		0.99		0.95		1.00	
Satd. Flow (prot)	5019		1768		3396		1794		1764		1803	
Flt Permitted	0.74		0.30		1.00		0.70		0.26		1.00	
Satd. Flow (perm)	3725		552		3396		1263		480		1803	
Volume (vph)	110	704	30	91	661	201	80	375	90	70	273	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	718	31	93	674	205	82	383	92	71	279	51
RTOR Reduction (vph)	0	5	0	0	36	0	0	9	0	0	8	0
Lane Group Flow (vph)	0	856	0	93	843	0	0	548	0	71	322	0
Confl. Peds. (#/hr)	24		4		4		24		48		12	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	46.0		46.0		46.0		24.0		24.0		24.0	
Effective Green, g (s)	47.0		47.0		47.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.59		0.59		0.59		0.31		0.31		0.31	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2188		324		1995		395		150		563	
v/s Ratio Prot			c0.25						0.18			
v/s Ratio Perm	0.23		0.17				c0.43		0.15			
v/c Ratio	0.39		0.29		0.42		1.39		0.47		0.57	
Uniform Delay, d1	8.8		8.2		9.1		27.5		22.2		23.0	
Progression Factor	1.00		1.69		1.77		1.00		0.79		0.78	
Incremental Delay, d2	0.5		2.1		0.6		189.4		9.9		4.0	
Delay (s)	9.4		15.9		16.6		216.9		27.3		22.0	
Level of Service	A		B		B		F		C		C	
Approach Delay (s)	9.4		16.6				216.9		23.0			
Approach LOS	A		B				F		C			
Intersection Summary												
HCM Average Control Delay	55.2		HCM Level of Service		E							
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	139.8%		ICU Level of Service		H							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2015 PM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.91		1.00		1.00		1.00	
Frbp, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	0.99		1.00		0.98		1.00		0.96		1.00	
Flt Protected	0.99		1.00		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	5007		4947		1770		1786		1764		1830	
Flt Permitted	0.76		0.81		0.40		1.00		0.30		1.00	
Satd. Flow (perm)	3814		4023		742		1786		554		1830	
Volume (vph)	80	614	40	81	763	151	60	239	78	70	230	30
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)	84	646	42	85	803	159	63	252	82	74	242	32
RTOR Reduction (vph)	0	8	0	0	32	0	0	15	0	0	6	0
Lane Group Flow (vph)	0	764	0	0	1015	0	63	319	0	74	268	0
Confl. Peds. (#/hr)			12		12		6		6		6	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	2455		2590		190		458		142		469	
v/s Ratio Prot			c0.18				c0.18		0.15			
v/s Ratio Perm	0.20		c0.25		0.08		0.13		0.13			
v/c Ratio	0.31		0.39		0.33		0.70		0.52		0.57	
Uniform Delay, d1	6.3		6.8		24.2		26.9		25.5		25.9	
Progression Factor	1.27		1.99		1.00		1.00		1.13		1.14	
Incremental Delay, d2	0.3		0.4		4.6		8.5		12.1		4.6	
Delay (s)	8.3		13.9		28.8		35.4		40.9		34.1	
Level of Service	A		B		C		D		D		C	
Approach Delay (s)	8.3		13.9		34.4		35.6					
Approach LOS	A		B		C		D					
Intersection Summary												
HCM Average Control Delay	18.4		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.48											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	81.1%		ICU Level of Service		D							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2015 PM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			1.00			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.97			0.97			0.97		
Flt Protected	1.00			1.00			0.99			0.98		
Satd. Flow (prot)	5016			4905			3405			3362		
Flt Permitted	0.78			0.84			0.79			0.64		
Satd. Flow (perm)	3906			4109			2701			2201		
Volume (vph)	67	675	40	69	844	221	60	296	75	130	213	82
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	68	682	40	70	853	223	61	299	76	131	215	83
RTOR Reduction (vph)	0	7	0	0	51	0	0	22	0	0	26	0
Lane Group Flow (vph)	0	783	0	0	1095	0	0	414	0	0	403	0
Confl. Peds. (#/hr)	9		17	17			9	12	10	10		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2514		2645		2645		692		692		564	
v/s Ratio Prot												
v/s Ratio Perm	0.20		c0.27		c0.27		0.15		0.15		c0.18	
v/c Ratio	0.31		0.41		0.41		0.60		0.60		0.71	
Uniform Delay, d1	6.3		6.9		6.9		26.1		26.1		27.1	
Progression Factor	1.50		0.93		0.93		1.00		1.00		1.13	
Incremental Delay, d2	0.3		0.4		0.4		3.8		3.8		7.5	
Delay (s)	9.8		6.8		6.8		29.9		29.9		38.1	
Level of Service	A		A		A		C		C		D	
Approach Delay (s)	9.8		6.8		6.8		29.9		29.9		38.1	
Approach LOS	A		A		A		C		C		D	
Intersection Summary												
HCM Average Control Delay	16.1		16.1		16.1		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.50		0.50		0.50		0.50		0.50		0.50	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	112.6%		112.6%		112.6%		ICU Level of Service		H		H	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

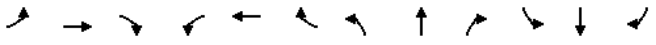
HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2015 PM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			0.99			1.00		0.96
Flpb, ped/bikes	1.00			1.00			1.00			1.00		1.00
Frt	1.00			0.99			0.93			0.93		0.92
Flt Protected	1.00			1.00			0.98			0.98		0.98
Satd. Flow (prot)	5052			4974			1695			1608		1608
Flt Permitted	0.76			0.93			0.85			0.85		0.85
Satd. Flow (perm)	3833			4621			1471			1401		1401
Volume (vph)	90	820	10	10	933	60	10	0	10	138	0	189
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.96	0.96	0.95	0.95	0.95	0.96	0.95	0.96
Adj. Flow (vph)	94	854	11	11	972	62	11	0	11	144	0	197
RTOR Reduction (vph)	0	1	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	958	0	0	1045	0	0	14	0	0	341	0
Confl. Peds. (#/hr)							79				79	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	48.9		48.9		48.9		23.1		23.1		23.1	
Effective Green, g (s)	48.9		48.9		48.9		23.1		23.1		23.1	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
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)	2343		2825		2825		425		425		405	
v/s Ratio Prot												
v/s Ratio Perm	c0.25		0.23		0.23		0.01		0.01		c0.24	
v/c Ratio	0.41		0.37		0.37		0.03		0.03		0.84	
Uniform Delay, d1	8.1		7.8		7.8		20.4		20.4		26.7	
Progression Factor	0.81		1.00		1.00		1.00		1.00		0.96	
Incremental Delay, d2	0.5		0.4		0.4		0.0		0.0		14.3	
Delay (s)	7.0		8.2		8.2		20.5		20.5		40.0	
Level of Service	A		A		A		C		C		D	
Approach Delay (s)	7.0		8.2		8.2		20.5		20.5		40.0	
Approach LOS	A		A		A		C		C		D	
Intersection Summary												
HCM Average Control Delay	12.4		12.4		12.4		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.55		0.55		0.55		0.55		0.55		0.55	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	73.6%		73.6%		73.6%		ICU Level of Service		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.


2015 PM + Tower
1/21/2008



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)	4.0			4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.91			0.91			1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00			0.99			1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00			1.00			0.99	1.00		0.99	1.00	
Frt	0.99			0.95			1.00	0.99		1.00	0.98	
Flt Protected	0.99			1.00			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	4925			4755			1747	3451		1745	3463	
Flt Permitted	0.67			0.76			0.31	1.00		0.14	1.00	
Satd. Flow (perm)	3353			3620			570	3451		256	3463	
Volume (vph)	272	605	91	90	784	429	110	903	100	196	571	69
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)	286	637	96	95	825	452	116	951	105	206	601	73
RTOR Reduction (vph)	0	9	0	0	6	0	0	7	0	0	8	0
Lane Group Flow (vph)	0	1010	0	0	1366	0	116	1049	0	206	666	0
Confl. Peds. (#/hr)	26		19		26		39		92		92	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	38.0		38.0		34.4		34.4		34.4		34.4	
Effective Green, g (s)	39.5		39.5		35.4		35.4		35.4		35.4	
Actuated g/C Ratio	0.48		0.48		0.43		0.43		0.43		0.43	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1598		1725		243		1474		109		1479	
v/s Ratio Prot					0.30		0.30		0.19		0.19	
v/s Ratio Perm	0.30		c0.38		0.20		c0.81		0.19		0.19	
v/c Ratio	1.65dl		0.79		0.48		0.71		1.89		0.45	
Uniform Delay, d1	16.3		18.2		17.1		19.6		23.8		16.8	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.6		2.4		6.6		2.9		432.9		1.0	
Delay (s)	16.9		20.6		23.7		22.5		456.7		17.8	
Level of Service	B		C		C		C		F		B	
Approach Delay (s)	16.9		20.6		22.6		120.6		120.6		120.6	
Approach LOS	B		C		C		F		F		F	
Intersection Summary												
HCM Average Control Delay	40.1		HCM Level of Service				D					
HCM Volume to Capacity ratio	1.31											
Actuated Cycle Length (s)	82.9		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	99.7%		ICU Level of Service				F					
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 through lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.


2015 PM + Tower
1/21/2008



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)	4.0			4.0			4.0	4.0		4.0	4.0	
Lane Util. Factor	0.91			0.91			1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00			1.00			1.00	0.89		1.00	0.89	
Flpb, ped/bikes	1.00			1.00			0.96	1.00		0.96	1.00	
Frt	0.99			1.00			1.00	0.85		1.00	0.92	
Flt Protected	1.00			1.00			0.98	1.00		0.98	1.00	
Satd. Flow (prot)	5026			5019			1748	1406		1748	1406	
Flt Permitted	0.84			0.78			0.81	1.00		0.81	1.00	
Satd. Flow (perm)	4232			3937			1453	1406		1453	1406	
Volume (vph)	40	857	34	100	1168	40	94	94	200	30	30	80
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	40	866	34	101	1180	40	95	95	202	30	30	81
RTOR Reduction (vph)	0	5	0	0	4	0	0	0	76	0	37	0
Lane Group Flow (vph)	0	935	0	0	1317	0	0	190	126	0	104	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	49.5		49.5		24.5		24.5		24.5		24.5	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	2566		2387		427		413		427		427	
v/s Ratio Prot					c0.33		c0.13		0.09		0.07	
v/s Ratio Perm	0.22		c0.33		c0.13		0.09		0.07		0.07	
v/c Ratio	0.36		0.55		0.44		0.31		0.24		0.24	
Uniform Delay, d1	8.0		9.3		23.0		21.9		21.5		21.5	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.4		0.9		3.3		1.9		1.4		1.4	
Delay (s)	8.4		10.2		26.3		23.8		22.9		22.9	
Level of Service	A		B		C		C		C		C	
Approach Delay (s)	8.4		10.2		25.0		22.9		22.9		22.9	
Approach LOS	A		B		C		C		C		C	
Intersection Summary												
HCM Average Control Delay	12.3		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	108.2%		ICU Level of Service				G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway


2015 PM + Tower
1/21/2008



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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.98	1.00	0.99	1.00	1.00	0.94	1.00	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	4919	1770	4885	1770	3539	1488	1770	3539	1488	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	4919	1770	4885	1770	3539	1488	1770	3539	1488	1770	3539
Volume (vph)	200	756	101	110	938	240	230	851	180	380	421	110
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)	211	796	106	116	987	253	242	896	189	400	443	116
RTOR Reduction (vph)	0	14	0	0	38	0	0	0	24	0	0	69
Lane Group Flow (vph)	211	888	0	116	1202	0	242	896	165	400	443	47
Confl. Peds. (#/hr)			81			22			50			43
Turn Type	Prot			Prot			Prot	pm+ov		Prot		pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases									2			6
Actuated Green, G (s)	12.0	34.0		12.0	34.0		21.0	33.0	45.0	25.0	37.0	49.0
Effective Green, g (s)	11.0	35.0		11.0	35.0		20.0	34.0	45.0	24.0	38.0	49.0
Actuated g/C Ratio	0.09	0.29		0.09	0.29		0.17	0.28	0.38	0.20	0.32	0.41
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
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)	162	1435		162	1425		295	1003	608	354	1121	661
v/s Ratio Prot	c0.12	0.18		0.07	c0.25		0.14	c0.25	0.02	c0.23	c0.13	0.01
v/s Ratio Perm									0.09			0.03
v/c Ratio	1.30	0.62		0.72	0.84		0.82	0.89	0.27	1.13	0.40	0.07
Uniform Delay, d1	54.5	36.7		53.0	39.9		48.3	41.3	26.1	48.0	32.0	21.6
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	173.6	2.0		14.0	6.3		16.5	12.0	0.2	87.9	1.0	0.0
Delay (s)	228.1	38.7		67.0	46.2		64.7	53.3	26.3	135.9	33.1	21.7
Level of Service	F	D		E	D		E	D	C	F	C	C
Approach Delay (s)		74.6			48.0			51.5			74.6	
Approach LOS		E			D			D			E	
Intersection Summary												
HCM Average Control Delay	60.6		HCM Level of Service				E					
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				20.0					
Intersection Capacity Utilization	92.9%		ICU Level of Service				F					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2015 PM + Tower
1/21/2008



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)		4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95			1.00	0.95
Frpb, ped/bikes		0.94			0.96		1.00	0.99			1.00	0.99
Flpb, ped/bikes		0.97			0.97		0.96	1.00			0.95	1.00
Frt		0.96			0.96		1.00	0.99			1.00	0.99
Flt Protected		0.98			0.98		0.95	1.00			0.95	1.00
Satd. Flow (prot)		1598			1642		1696	3461			1679	3455
Flt Permitted		0.66			0.81		0.29	1.00			0.34	1.00
Satd. Flow (perm)		1075			1345		517	3461			597	3455
Volume (vph)	111	50	70	60	70	63	140	689	50	42	796	63
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)	117	53	74	63	74	66	147	725	53	44	838	66
RTOR Reduction (vph)	0	28	0	0	31	0	0	4	0	0	4	0
Lane Group Flow (vph)	0	216	0	0	172	0	147	774	0	44	900	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			4			2			2	6
Permitted Phases	4				4			2			6	
Actuated Green, G (s)		16.3			16.3		56.7	56.7			56.7	56.7
Effective Green, g (s)		15.8			15.8		56.2	56.2			56.2	56.2
Actuated g/C Ratio		0.20			0.20		0.70	0.70			0.70	0.70
Clearance Time (s)		3.5			3.5		3.5	3.5			3.5	3.5
Vehicle Extension (s)		2.0			2.0		2.0	2.0			2.0	2.0
Lane Grp Cap (vph)		212			266		363	2431		419	2427	
v/s Ratio Prot								0.22				0.26
v/s Ratio Perm	c0.20				0.13		c0.28				0.07	
v/c Ratio	1.02				0.65		0.40	0.32			0.11	0.37
Uniform Delay, d1	32.1				29.5		4.9	4.6			3.8	4.8
Progression Factor	1.00				1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	66.7				4.0		3.3	0.3			0.5	0.4
Delay (s)	98.8				33.5		8.3	4.9			4.3	5.2
Level of Service	F				C		A	A			A	A
Approach Delay (s)	98.8				33.5		5.4				5.2	
Approach LOS	F				C		A				A	
Intersection Summary												
HCM Average Control Delay	17.6		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.54											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	65.0%		ICU Level of Service				C					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2015 PM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.94		1.00	0.99		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.97	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3340		1770	3158		1697	3476		1717	3130	
Flt Permitted	0.95	1.00		0.95	1.00		0.27	1.00		0.31	1.00	
Satd. Flow (perm)	1770	3340		1770	3158		476	3476		567	3130	
Volume (vph)	140	420	110	70	440	196	170	663	50	120	516	300
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	429	112	71	449	200	173	677	51	122	527	306
RTOR Reduction (vph)	0	27	0	0	62	0	6	0	0	0	90	0
Lane Group Flow (vph)	143	514	0	71	587	0	173	722	0	122	743	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	9.5	22.5		6.7	19.7		42.3	42.3		42.3	42.3	
Effective Green, g (s)	10.0	22.0		7.2	19.2		43.8	43.8		43.8	43.8	
Actuated g/C Ratio	0.12	0.26		0.08	0.23		0.52	0.52		0.52	0.52	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	208	864		150	713		245	1791		292	1613	
v/s Ratio Prot	c0.08	c0.15		0.04	c0.19			0.21			0.24	
v/s Ratio Perm							c0.36			0.22		
v/c Ratio	0.69	0.59		0.47	0.82		0.71	0.40		0.42	0.46	
Uniform Delay, d1	36.0	27.6		37.1	31.3		15.7	12.6		12.7	13.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.3	0.7		0.9	7.3		15.8	0.7		4.4	1.0	
Delay (s)	43.3	28.3		38.0	38.6		31.5	13.3		17.1	14.0	
Level of Service	D	C		D	D		C	B		B	B	
Approach Delay (s)		31.5			38.5			16.8			14.4	
Approach LOS		C			D			B			B	
Intersection Summary												
HCM Average Control Delay		24.0										
HCM Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		85.0					16.0					
Intersection Capacity Utilization		76.9%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

2015 PM + Tower
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↗	↔	↕	↕	↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.98	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1663		1770	3539	3455	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1663		1770	3539	3455	
Volume (vph)	45	102	100	1515	702	133
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	107	105	1595	739	140
RTOR Reduction (vph)	86	0	0	0	14	0
Lane Group Flow (vph)	68	0	105	1595	865	0
Turn Type			Prot			
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	15.4		7.8	56.6	44.8	
Effective Green, g (s)	15.4		7.8	56.6	44.8	
Actuated g/C Ratio	0.19		0.10	0.71	0.56	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	320		173	2504	1935	
v/s Ratio Prot	c0.04		0.06	c0.45	0.25	
v/s Ratio Perm						
v/c Ratio	0.21		0.61	0.64	0.45	
Uniform Delay, d1	27.2		34.6	6.2	10.3	
Progression Factor	1.00		1.00	1.00	0.66	
Incremental Delay, d2	0.3		5.9	1.3	0.6	
Delay (s)	27.5		40.5	7.5	7.4	
Level of Service	C		D	A	A	
Approach Delay (s)	27.5			9.5	7.4	
Approach LOS	C			A	A	
Intersection Summary						
HCM Average Control Delay		9.9				HCM Level of Service A
HCM Volume to Capacity ratio		0.55				
Actuated Cycle Length (s)		80.0				Sum of lost time (s) 8.0
Intersection Capacity Utilization		57.3%				ICU Level of Service B
Analysis Period (min)		15				
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 PM + Tower + Mit
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3456		1770	3308		1770	3323		1770	3414	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3456		1770	3308		1770	3323		1770	3414	
Volume (vph)	460	880	83	120	510	290	90	899	260	220	688	60
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)	484	926	87	126	537	305	95	946	274	232	724	63
RTOR Reduction (vph)	0	7	0	0	79	0	0	27	0	0	6	0
Lane Group Flow (vph)	484	1006	0	126	763	0	95	1193	0	232	781	0
Confl. Peds. (#/hr)	15		48	48		15	123		48	48		123
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.6	28.5		9.1	22.0		8.3	33.2		12.2	37.1	
Effective Green, g (s)	15.1	29.5		8.6	23.0		7.8	34.2		11.7	38.1	
Actuated g/C Ratio	0.15	0.29		0.09	0.23		0.08	0.34		0.12	0.38	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	518	1020		152	761		138	1136		207	1301	
v/s Ratio Prot	c0.14	c0.29		0.07	0.23		0.05	c0.36		c0.13	c0.23	
v/s Ratio Perm												
v/c Ratio	0.93	0.99		0.83	1.00		0.69	1.05		1.12	0.60	
Uniform Delay, d1	42.0	35.0		45.0	38.5		44.9	32.9		44.1	24.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.21	0.74	
Incremental Delay, d2	23.9	24.6		28.4	33.2		10.8	40.9		92.5	1.7	
Delay (s)	65.9	59.6		73.3	71.7		55.7	73.8		146.1	20.1	
Level of Service	E	E		E	E		E	E		F	C	
Approach Delay (s)		61.6			71.9			72.5			48.8	
Approach LOS		E			E			E			D	
Intersection Summary												
HCM Average Control Delay		63.9			HCM Level of Service			E				
HCM Volume to Capacity ratio		1.03										
Actuated Cycle Length (s)		100.0			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		96.6%			ICU Level of Service			F				
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.


2015 PM + Tower + Mit
1/21/2008

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)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		0.91		1.00	0.95		1.00	0.95		1.00	1.00	1.00
Frbp, ped/bikes		1.00		1.00	0.99		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.99		1.00	0.97		1.00	0.97		0.98	1.00	0.98
Flt Protected		0.99		0.95	1.00		0.99	1.00		0.95	1.00	1.00
Satd. Flow (prot)		5018		1768	3395		1793	3395		1763	1801	1801
Flt Permitted		0.71		0.28	1.00		0.81	1.00		0.32	1.00	1.00
Satd. Flow (perm)		3611		525	3395		1456	3395		599	1801	1801
Volume (vph)	110	704	30	91	661	201	80	375	90	70	273	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	718	31	93	674	205	82	383	92	71	279	51
RTOR Reduction (vph)	0	4	0	0	32	0	0	8	0	0	7	0
Lane Group Flow (vph)	0	857	0	93	847	0	0	549	0	71	323	0
Confl. Peds. (#/hr)	24		4	4		24	48		12	12		48
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		4			8			8		2		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		46.0		46.0	46.0		34.0	34.0		34.0		34.0
Effective Green, g (s)		47.0		47.0	47.0		35.0	35.0		35.0		35.0
Actuated g/C Ratio		0.52		0.52	0.52		0.39	0.39		0.39		0.39
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0		5.0
Lane Grp Cap (vph)		1886		274	1773		566	1773		233		700
v/s Ratio Prot					c0.25							0.18
v/s Ratio Perm		0.24		0.18			c0.38			0.12		
v/c Ratio		0.45		0.34	0.48		0.97			0.30		0.46
Uniform Delay, d1		13.5		12.5	13.7		27.0	27.0		19.1		20.5
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2		0.8		3.3	0.9		31.1	31.1		3.3		2.2
Delay (s)		14.3		15.8	14.6		58.1	58.1		22.4		22.7
Level of Service		B		B	B		E	E		C		C
Approach Delay (s)		14.3			14.7		58.1	58.1				22.6
Approach LOS		B			B		E	E				C
Intersection Summary												
HCM Average Control Delay		24.4			HCM Level of Service			C				
HCM Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		139.8%			ICU Level of Service			H				
Analysis Period (min)		15										

**APPENDIX Q:
YEAR 2030 PLUS TOWER ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2030 AM + Tower
1/21/2008

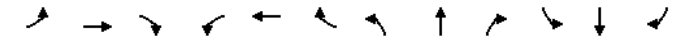


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.97		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4900		1770	4953		2006	2036		1986	1952	
Flt Permitted	0.95	1.00		0.95	1.00		0.10	1.00		0.42	1.00	
Satd. Flow (perm)	1770	4900		1770	4953		201	2036		868	1952	
Volume (vph)	310	1001	226	120	1660	250	200	301	70	180	426	290
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)	326	1054	238	126	1747	263	211	317	74	189	448	305
RTOR Reduction (vph)	0	29	0	0	16	0	0	7	0	0	21	0
Lane Group Flow (vph)	326	1263	0	126	1994	0	211	384	0	189	732	0
Confl. Peds. (#/hr)			10	10		10	10		10	10		10
Turn Type	Prot			Prot			pm+pt			Perm		
Protected Phases	7	4		3	8		5	2		6		6
Permitted Phases							2			6		
Actuated Green, G (s)	17.0	47.9		13.1	44.0		48.5	48.5		39.5	39.5	
Effective Green, g (s)	17.0	47.9		13.1	44.0		49.0	49.0		40.0	40.0	
Actuated g/C Ratio	0.14	0.40		0.11	0.37		0.41	0.41		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	1956		193	1816		187	831		289	651	
v/s Ratio Prot	c0.18	c0.26		0.07	c0.40		c0.07	0.19		c0.38		
v/s Ratio Perm							0.39			0.22		
v/c Ratio	1.30	0.65		0.65	1.10		1.13	0.46		0.65	1.12	
Uniform Delay, d1	51.5	29.2		51.3	38.0		58.7	25.9		34.1	40.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	160.6	1.7		7.7	53.2		104.5	0.4		5.2	74.9	
Delay (s)	212.1	30.8		59.0	91.2		163.2	26.3		39.3	114.9	
Level of Service	F	C		E	F		F	C		D	F	
Approach Delay (s)		67.4			89.3			74.3			99.7	
Approach LOS		E			F			E			F	

Intersection Summary			
HCM Average Control Delay	82.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 AM + Tower
1/21/2008



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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Flpb, ped/bikes		1.00		1.00	0.99			0.99		1.00	0.97	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.95		1.00	0.91			0.97		1.00	0.96	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1749		1681	1597			3417		1770	3291	
Flt Permitted		0.48		0.74	1.00			0.74		0.95	1.00	
Satd. Flow (perm)		847		1302	1597			2535		1770	3291	
Volume (vph)	10	10	10	354	330	470	10	1171	247	110	1330	460
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)	11	11	11	373	347	495	11	1233	260	116	1400	484
RTOR Reduction (vph)	0	10	0	0	57	0	0	18	0	0	35	0
Lane Group Flow (vph)	0	23	0	373	785	0	0	1486	0	116	1849	0
Confl. Peds. (#/hr)		4					4	44		12	12	44
Turn Type		Perm			Perm			Perm			Prot	
Protected Phases		7			8			2			1	6
Permitted Phases		7			8			2				
Actuated Green, G (s)		5.1			26.5	26.5		32.5		7.9	44.9	
Effective Green, g (s)		5.6			27.0	27.0		33.0		8.4	45.4	
Actuated g/C Ratio		0.06			0.30	0.30		0.37		0.09	0.50	
Clearance Time (s)		4.5			4.5	4.5		4.5		4.5	4.5	
Vehicle Extension (s)		2.0			2.0	2.0		2.0		2.0	2.0	
Lane Grp Cap (vph)		53			391	479		930		165	1660	
v/s Ratio Prot										0.07	c0.56	
v/s Ratio Perm		c0.03			0.29	0.49		c0.59				
v/c Ratio		0.43			0.95	1.64		1.60		0.70	1.11	
Uniform Delay, d1		40.7			30.9	31.5		28.5		39.6	22.3	
Progression Factor		1.00			1.00	1.00		0.97		1.00	1.00	
Incremental Delay, d2		2.0			33.3	296.4		270.5		10.5	60.2	
Delay (s)		42.7			64.2	327.9		298.1		50.1	82.5	
Level of Service		D			E	F		F		D	F	
Approach Delay (s)		42.7			247.0			298.1			80.6	
Approach LOS		D			F			F			F	

Intersection Summary			
HCM Average Control Delay	191.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	137.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 AM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3427		1770	3372		1770	3403		1770	3404	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3427		1770	3372		1770	3403		1770	3404	
Volume (vph)	460	650	111	140	820	320	120	678	140	320	1164	220
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	677	116	146	854	333	125	706	146	333	1212	229
RTOR Reduction (vph)	0	15	0	0	46	0	0	20	0	0	17	0
Lane Group Flow (vph)	479	778	0	146	1141	0	125	832	0	333	1424	0
Confl. Peds. (#/hr)	6		24	24		6	36		28	28		36
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	13.0	28.4		10.1	25.5		9.6	23.5		11.0	24.9	
Effective Green, g (s)	12.5	29.4		9.6	26.5		9.1	24.5		10.5	25.9	
Actuated g/C Ratio	0.14	0.33		0.11	0.29		0.10	0.27		0.12	0.29	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	477	1119		189	993		179	926		207	980	
v/s Ratio Prot	c0.14	c0.23		0.08	c0.34		0.07	0.24		c0.19	c0.42	
v/s Ratio Perm												
v/c Ratio	1.00	0.69		0.77	1.15		0.70	0.90		1.61	1.45	
Uniform Delay, d1	38.8	26.4		39.1	31.8		39.1	31.6		39.8	32.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.19	0.86	
Incremental Delay, d2	42.2	1.5		16.2	79.0		9.2	13.4		276.0	204.4	
Delay (s)	81.0	27.9		55.3	110.7		48.3	44.9		323.2	232.0	
Level of Service	F	C		E	F		D	D		F	F	
Approach Delay (s)		47.9			104.7			45.3			249.1	
Approach LOS		D			F			D			F	
Intersection Summary												
HCM Average Control Delay		128.2										F
HCM Volume to Capacity ratio		1.30										
Actuated Cycle Length (s)		90.0						16.0				
Intersection Capacity Utilization		105.9%										G
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 AM + Tower
1/21/2008

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)		4.0						4.0		4.0	4.0	
Lane Util. Factor		1.00						0.95		0.97	0.95	
Frt		0.86						0.93		1.00	0.99	
Flt Protected		1.00						1.00		0.95	1.00	
Satd. Flow (prot)		1611						3281		3433	3495	
Flt Permitted		1.00						0.94		0.95	1.00	
Satd. Flow (perm)		1611						3074		3433	3495	
Volume (vph)	0	0	10	0	0	0	10	367	350	1600	664	60
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)	0	0	11	0	0	0	11	386	368	1684	699	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	739	0	1684	762	0
Turn Type									Prot			
Protected Phases								2		1	6	
Permitted Phases												
Actuated Green, G (s)		0.0						8.0		29.0	45.0	
Effective Green, g (s)		0.0						8.0		29.0	45.0	
Actuated g/C Ratio		0.00						0.18		0.64	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						546		2212	3495	
v/s Ratio Prot										c0.49	0.22	
v/s Ratio Perm												
v/c Ratio		0.00						11.50dr		0.76	0.22	
Uniform Delay, d1		22.5						18.5		5.6	0.0	
Progression Factor		1.00						0.78		1.00	1.00	
Incremental Delay, d2		0.0						169.6		2.5	0.1	
Delay (s)		22.5						183.9		8.1	0.1	
Level of Service		C						F		A	A	
Approach Delay (s)		22.5			0.0			183.9		5.6		
Approach LOS		C			A			F		A		
Intersection Summary												
HCM Average Control Delay		48.0							HCM Level of Service			D
HCM Volume to Capacity ratio		0.89										
Actuated Cycle Length (s)		45.0							Sum of lost time (s)		8.0	
Intersection Capacity Utilization		80.7%							ICU Level of Service			D
Analysis Period (min)		15										
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2030 AM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.95		0.95	
Frpb, ped/bikes	0.97		0.95		0.98		0.98		0.99		0.99	
Flpb, ped/bikes	0.98		0.98		1.00		1.00		1.00		1.00	
Frt	0.98		0.94		0.98		0.98		0.99		0.99	
Flt Protected	0.98		0.99		1.00		1.00		1.00		1.00	
Satd. Flow (prot)	1709		1606		3391		3476		3476		3476	
Flt Permitted	0.84		0.88		0.87		0.88		0.88		0.88	
Satd. Flow (perm)	1455		1427		2952		3053		3053		3053	
Volume (vph)	80	100	32	60	70	110	41	517	90	60	794	40
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)	84	105	34	63	74	116	43	544	95	63	836	42
RTOR Reduction (vph)	0	15	0	0	68	0	0	29	0	0	8	0
Lane Group Flow (vph)	0	208	0	0	185	0	0	653	0	0	933	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	15.0		15.0		22.0		22.0		22.0		22.0	
Effective Green, g (s)	15.0		15.0		22.0		22.0		22.0		22.0	
Actuated g/C Ratio	0.33		0.33		0.49		0.49		0.49		0.49	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	485		476		1443		1493		1493		1493	
v/s Ratio Prot												
v/s Ratio Perm	c0.14		0.13		0.22		c0.31		c0.31		c0.31	
v/c Ratio	0.43		0.39		0.45		0.63		0.63		0.63	
Uniform Delay, d1	11.7		11.5		7.5		8.5		8.5		8.5	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	2.8		2.4		1.0		2.0		2.0		2.0	
Delay (s)	14.4		13.9		8.6		10.4		10.4		10.4	
Level of Service	B		B		A		B		B		B	
Approach Delay (s)	14.4		13.9		8.6		10.4		10.4		10.4	
Approach LOS	B		B		A		B		B		B	
Intersection Summary												
HCM Average Control Delay	10.7		HCM Level of Service		B		B		B		B	
HCM Volume to Capacity ratio	0.55		0.55		0.55		0.55		0.55		0.55	
Actuated Cycle Length (s)	45.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	73.8%		ICU Level of Service		D		D		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2030 AM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		0.95		0.95		0.91		0.91	
Frpb, ped/bikes	0.96		0.95		0.98		0.98		0.98		0.98	
Flpb, ped/bikes	0.98		0.98		1.00		1.00		1.00		1.00	
Frt	0.96		0.96		0.99		0.99		0.99		0.99	
Flt Protected	0.98		0.99		1.00		1.00		1.00		1.00	
Satd. Flow (prot)	1639		1645		3433		4958		4958		4958	
Flt Permitted	0.76		0.81		0.76		0.80		0.80		0.80	
Satd. Flow (perm)	1260		1345		2614		3970		3970		3970	
Volume (vph)	80	100	80	53	90	70	40	1069	72	80	1926	100
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)	84	105	84	56	95	74	42	1125	76	84	2027	105
RTOR Reduction (vph)	0	2	0	0	24	0	0	4	0	0	4	0
Lane Group Flow (vph)	0	271	0	0	201	0	0	1239	0	0	2212	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		6		6	
Permitted Phases	4		4		2		6		6		6	
Actuated Green, G (s)	19.4		19.4		56.6		56.6		56.6		56.6	
Effective Green, g (s)	19.9		19.9		57.1		57.1		57.1		57.1	
Actuated g/C Ratio	0.23		0.23		0.67		0.67		0.67		0.67	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	295		315		1756		2667		2667		2667	
v/s Ratio Prot												
v/s Ratio Perm	c0.22		0.15		0.47		c0.56		c0.56		c0.56	
v/c Ratio	0.92		0.64		0.71		0.83		0.83		0.83	
Uniform Delay, d1	31.8		29.3		8.7		10.3		10.3		10.3	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	31.9		3.1		2.4		3.1		3.1		3.1	
Delay (s)	63.7		32.4		11.1		13.5		13.5		13.5	
Level of Service	E		C		B		B		B		B	
Approach Delay (s)	63.7		32.4		11.1		13.5		13.5		13.5	
Approach LOS	E		C		B		B		B		B	
Intersection Summary												
HCM Average Control Delay	17.3		HCM Level of Service		B		B		B		B	
HCM Volume to Capacity ratio	0.85		0.85		0.85		0.85		0.85		0.85	
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0		8.0		8.0		8.0	
Intersection Capacity Utilization	112.5%		ICU Level of Service		H		H		H		H	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 AM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	
Frt	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3372	1763	3453	1768	1834	1745	1815	1745	1815	1745	1815	
Flt Permitted	0.17	1.00	0.18	1.00	0.24	1.00	0.45	1.00	0.45	1.00	0.45	1.00	
Satd. Flow (perm)	324	3372	340	3453	449	1834	822	1815	822	1815	822	1815	
Volume (vph)	180	510	190	94	939	115	160	381	34	203	600	110	
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)	189	537	200	99	988	121	168	401	36	214	632	116	
RTOR Reduction (vph)	0	48	0	0	12	0	0	4	0	0	3	0	
Lane Group Flow (vph)	189	689	0	99	1097	0	168	433	0	214	745	0	
Confl. Peds. (#/hr)	30	12	12	30	6	54	54	6	54	54	6	6	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Permitted Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Actuated Green, G (s)	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	
Effective Green, g (s)	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	
Clearance Time (s)	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Lane Grp Cap (vph)	93	969	98	993	275	1123	503	1112	503	1112	503	1112	
v/s Ratio Prot	0.20	0.32	0.32	0.32	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
v/s Ratio Perm	c0.58	0.29	0.29	0.29	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	
v/c Ratio	2.03	0.71	1.01	1.10	0.61	0.39	0.43	0.67	0.43	0.67	0.43	0.67	
Uniform Delay, d1	28.5	25.5	28.5	28.5	9.6	7.9	8.1	10.2	8.1	10.2	8.1	10.2	
Progression Factor	1.00	1.00	0.87	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	499.9	4.4	82.9	59.0	9.7	1.0	2.6	3.2	2.6	3.2	2.6	3.2	
Delay (s)	528.4	30.0	107.8	84.3	19.3	8.9	10.7	13.4	10.7	13.4	10.7	13.4	
Level of Service	F	C	F	F	B	A	B	B	B	B	B	B	
Approach Delay (s)	131.7	86.2	11.8	12.8	11.8	11.8	12.8	12.8	11.8	12.8	12.8	12.8	
Approach LOS	F	F	B	B	B	B	B	B	B	B	B	B	
Intersection Summary													
HCM Average Control Delay	66.3	HCM Level of Service					E						
HCM Volume to Capacity ratio	1.10												
Actuated Cycle Length (s)	80.0	Sum of lost time (s)					8.0						
Intersection Capacity Utilization	104.5%	ICU Level of Service					G						
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 AM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	
Frt	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	
Satd. Flow (prot)	1766	3410	1749	3496	1749	3496	3399	3426	3399	3426	3399	3426	
Flt Permitted	0.16	1.00	0.30	1.00	0.65	1.00	0.65	1.00	0.65	1.00	0.65	1.00	
Satd. Flow (perm)	294	3410	560	3496	2235	3496	2235	3496	2235	3496	2235	3496	
Volume (vph)	80	566	130	76	968	73	120	281	74	124	380	70	
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)	84	596	137	80	1019	77	126	296	78	131	400	74	
RTOR Reduction (vph)	0	25	0	0	7	0	0	19	0	0	14	0	
Lane Group Flow (vph)	84	708	0	80	1089	0	0	481	0	0	591	0	
Confl. Peds. (#/hr)	18	54	54	18	4	18	18	4	18	18	4	4	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Permitted Phases	4	8	8	2	2	6	6	6	6	6	6	6	
Actuated Green, G (s)	38.0	38.0	38.0	38.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	
Effective Green, g (s)	39.0	39.0	39.0	39.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	143	1662	273	1704	922	1704	922	1704	922	1704	922	1704	
v/s Ratio Prot	0.21	0.31	0.31	0.31	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	
v/s Ratio Perm	0.29	0.14	0.14	0.14	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	
v/c Ratio	0.59	0.43	0.29	0.64	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	
Uniform Delay, d1	14.7	13.3	12.3	15.3	17.6	17.6	17.6	18.2	17.6	18.2	17.6	18.2	
Progression Factor	0.97	0.90	1.33	1.41	0.57	0.57	0.57	1.00	0.57	0.57	0.57	1.00	
Incremental Delay, d2	13.3	0.6	2.1	1.5	1.4	2.5	1.4	2.5	1.4	2.5	1.4	2.5	
Delay (s)	27.7	12.6	18.4	23.0	11.4	20.8	11.4	20.8	11.4	20.8	11.4	20.8	
Level of Service	C	B	B	C	B	C	B	C	B	C	B	C	
Approach Delay (s)	14.2	22.7	11.4	20.8	11.4	20.8	11.4	20.8	11.4	20.8	11.4	20.8	
Approach LOS	B	C	B	C	B	C	B	C	B	C	B	C	
Intersection Summary													
HCM Average Control Delay	18.3	HCM Level of Service					B						
HCM Volume to Capacity ratio	0.62												
Actuated Cycle Length (s)	80.0	Sum of lost time (s)					8.0						
Intersection Capacity Utilization	78.0%	ICU Level of Service					D						
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2030 AM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1766	3478		1746	3453			3371			3420	
Flt Permitted	0.15	1.00		0.30	1.00			0.80			0.74	
Satd. Flow (perm)	281	3478		556	3453			2698			2551	
Volume (vph)	50	663	61	126	958	149	49	248	77	149	476	80
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	691	64	131	998	155	51	258	80	155	496	83
RTOR Reduction (vph)	0	9	0	0	16	0	0	29	0	0	12	0
Lane Group Flow (vph)	52	746	0	131	1137	0	0	360	0	0	722	0
Confl. Peds. (#/hr)	13		71	71		13	22		22	22		22
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	41.5	41.5		41.5	41.5			32.0			32.0	
Effective Green, g (s)	41.0	41.0		41.0	41.0			31.0			31.0	
Actuated g/C Ratio	0.51	0.51		0.51	0.51			0.39			0.39	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	144	1782		285	1770			1045			989	
v/s Ratio Prot		0.21			c0.33							
v/s Ratio Perm	0.19			0.24				0.13			c0.28	
v/c Ratio	0.36	0.42		0.46	0.64			0.34			0.73	
Uniform Delay, d1	11.7	12.1		12.4	14.2			17.3			20.9	
Progression Factor	1.20	1.20		1.00	1.00			0.64			1.00	
Incremental Delay, d2	6.2	0.7		5.3	1.8			0.9			4.7	
Delay (s)	20.3	15.2		17.7	16.0			12.0			25.7	
Level of Service	C	B		B	B			B			C	
Approach Delay (s)		15.6			16.2			12.0			25.7	
Approach LOS		B			B			B			C	
Intersection Summary												
HCM Average Control Delay	17.7		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	103.6%		ICU Level of Service		G							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & Frontage Road

2030 AM + Tower
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	1.00	
Frpb, ped/bikes	0.96		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.99		1.00	1.00	0.97	
Flt Protected	1.00		0.95	1.00	0.96	
Satd. Flow (prot)	1755		1770	3539	1735	
Flt Permitted	1.00		0.95	1.00	0.96	
Satd. Flow (perm)	1755		1770	3539	1735	
Volume (vph)	793	98	72	1099	134	44
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	835	103	76	1157	141	46
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	938	0	76	1157	187	0
Confl. Peds. (#/hr)	146		266			
Turn Type	Perm		Prot		Prot	
Protected Phases	4		3	8	2	
Permitted Phases						
Actuated Green, G (s)	50.2		9.2	63.4	13.6	
Effective Green, g (s)	50.2		9.2	63.4	13.6	
Actuated g/C Ratio	0.59		0.11	0.75	0.16	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	1036		192	2640	278	
v/s Ratio Prot	c0.53		0.04	c0.33	c0.11	
v/s Ratio Perm						
v/c Ratio	0.91		0.40	0.44	0.67	
Uniform Delay, d1	15.3		35.3	4.1	33.6	
Progression Factor	1.00		1.16	0.36	0.91	
Incremental Delay, d2	12.8		0.6	0.2	6.0	
Delay (s)	28.1		41.4	1.7	36.7	
Level of Service	C		D	A	D	
Approach Delay (s)	28.1			4.1	36.7	
Approach LOS	C			A	D	
Intersection Summary						
HCM Average Control Delay	16.3		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.81					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	72.6%		ICU Level of Service		C	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 AM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.93		1.00	0.98		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.97	1.00		0.96	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3098		1691	3414		1770	3438		1770	3357	
Flt Permitted	0.15	1.00		0.20	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	278	3098		362	3414		1770	3438		1770	3357	
Volume (vph)	146	424	267	120	716	90	135	515	59	100	1319	320
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)	154	446	281	126	754	95	142	542	62	105	1388	337
RTOR Reduction (vph)	0	117	0	0	11	0	0	9	0	0	23	0
Lane Group Flow (vph)	154	610	0	126	838	0	142	595	0	105	1702	0
Confl. Peds. (#/hr)	72		137	137		72			58	58		92
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	25.5	25.5		25.5	25.5		10.7	37.9		8.1	35.3	
Effective Green, g (s)	26.0	26.0		26.0	26.0		11.2	38.4		8.6	35.8	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.13	0.45		0.10	0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	85	948		111	1044		233	1553		179	1414	
v/s Ratio Prot		0.20			0.25		c0.08	c0.17		0.06	c0.51	
v/s Ratio Perm	c0.55			0.35								
v/c Ratio	1.81	0.64		1.14	0.80		0.61	0.38		0.59	1.20	
Uniform Delay, d1	29.5	25.5		29.5	27.1		34.8	15.4		36.5	24.6	
Progression Factor	1.09	1.18		1.00	1.00		1.04	1.51		1.00	1.00	
Incremental Delay, d2	384.5	0.5		126.4	4.3		3.0	0.7		3.1	98.6	
Delay (s)	416.7	30.5		155.9	31.4		39.1	24.1		39.6	123.2	
Level of Service	F	C		F	C		D	C		D	F	
Approach Delay (s)		98.0			47.5			26.9			118.4	
Approach LOS		F			D			C			F	
Intersection Summary												
HCM Average Control Delay	83.4		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.40											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	99.9%		ICU Level of Service				F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2030 AM + Tower
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free		Free	Free
Grade	0%		0%		0%	0%
Volume (veh/h)	20	31	694	20	20	1723
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	33	731	21	21	1814
Pedestrians	34		33		34	34
Lane Width (ft)	12.0		12.0		12.0	12.0
Walking Speed (ft/s)	4.0		4.0		4.0	4.0
Percent Blockage	3		3		3	3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	230			471		
pX, platoon unblocked	0.61	0.92			0.92	
vC, conflicting volume	1757	444			786	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1192	302			675	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	79	95			97	
cM capacity (veh/h)	101	601			812	
Direction, Lane #						
Volume Total	54	487	265	21	907	907
Volume Left	21	0	0	21	0	0
Volume Right	33	0	21	0	0	0
cSH	205	1700	1700	812	1700	1700
Volume to Capacity	0.26	0.29	0.16	0.03	0.53	0.53
Queue Length 95th (ft)	25	0	0	2	0	0
Control Delay (s)	28.7	0.0	0.0	9.5	0.0	0.0
Lane LOS	D			A		
Approach Delay (s)	28.7	0.0		0.1		
Approach LOS	D					
Intersection Summary						
Average Delay	0.7					
Intersection Capacity Utilization	64.9%		ICU Level of Service		C	
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 AM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.95		1.00		1.00		1.00	
Frpb, ped/bikes	1.00		1.00		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		0.98		1.00	
Frt	0.99		1.00		0.98		0.97		1.00		0.96	
Flt Protected	0.99		0.95		1.00		0.99		0.95		1.00	
Satd. Flow (prot)	4981		1763		3448		1752		1733		1763	
Flt Permitted	0.65		0.24		1.00		0.10		0.39		1.00	
Satd. Flow (perm)	3273		454		3448		180		717		1763	
Volume (vph)	210	710	50	72	1097	191	100	184	90	200	494	200
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)	221	747	53	76	1155	201	105	194	95	211	520	211
RTOR Reduction (vph)	0	7	0	0	17	0	0	13	0	0	17	0
Lane Group Flow (vph)	0	1014	0	76	1339	0	0	381	0	211	714	0
Confl. Peds. (#/hr)	24		18		18		24		24		48	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	51.0		51.0		51.0		24.0		24.0		24.0	
Effective Green, g (s)	52.0		52.0		52.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	2002		278		2109		53		211		519	
v/s Ratio Prot			c0.39								0.41	
v/s Ratio Perm	0.31		0.17				c2.12		0.29			
v/c Ratio	1.41dl		0.27		0.64		7.18		1.00		1.38	
Uniform Delay, d1	9.3		7.7		10.5		30.0		30.0		30.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.9		2.4		1.5		2820.3		62.0		181.0	
Delay (s)	10.2		10.1		11.9		2850.3		92.0		211.0	
Level of Service	B		B		B		F		F		F	
Approach Delay (s)	10.2		11.9				2850.3		184.3			
Approach LOS	B		B				F		F			

Intersection Summary			
HCM Average Control Delay	349.4	HCM Level of Service	F
HCM Volume to Capacity ratio	2.76		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	158.8%	ICU Level of Service	H
Analysis Period (min)	15		
dl = Defacto Left Lane. Recode with 1 though lane as a left lane.			
c = Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2030 AM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	0.91		1.00		0.91		1.00		1.00		1.00	
Frpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		0.99	
Flpb, ped/bikes	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	1.00		0.99		1.00		0.97		1.00		0.97	
Flt Protected	1.00		1.00		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	5033		5008		1762		1803		1770		1802	
Flt Permitted	0.74		0.81		0.20		1.00		0.20		1.00	
Satd. Flow (perm)	3724		4061		362		1803		363		1802	
Volume (vph)	80	910	30	71	1189	111	70	304	83	150	366	80
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)	84	958	32	75	1252	117	74	320	87	158	385	84
RTOR Reduction (vph)	0	4	0	0	13	0	0	12	0	0	10	0
Lane Group Flow (vph)	0	1070	0	0	1431	0	74	395	0	158	459	0
Confl. Peds. (#/hr)	18		18		12		12		18		18	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	50.0		50.0		19.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		20.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.26		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2397		2614		93		462		93		462	
v/s Ratio Prot			c0.35		0.20		c0.43				0.25	
v/s Ratio Perm	0.29		0.55		0.80		0.86		1.70		0.99	
v/c Ratio	0.45		0.55		0.80		0.86		1.70		0.99	
Uniform Delay, d1	7.1		7.8		27.8		28.3		29.8		29.7	
Progression Factor	1.00		0.56		1.00		1.00		1.16		1.17	
Incremental Delay, d2	0.6		0.7		49.1		18.0		351.2		37.7	
Delay (s)	7.7		5.0		76.9		46.4		385.9		72.4	
Level of Service	A		A		E		D		F		E	
Approach Delay (s)	7.7		5.0		51.1		151.4					
Approach LOS	A		A		D		D		F		E	

Intersection Summary			
HCM Average Control Delay	37.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		
c = Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2030 AM + Tower
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frbp, ped/bikes	1.00			1.00			0.99			1.00		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.99			0.97			0.98		
Flt Protected	1.00			1.00			0.99			0.99		
Satd. Flow (prot)	5022			4988			3403			3432		
Flt Permitted	0.77			0.80			0.69			0.81		
Satd. Flow (perm)	3856			4021			2375			2794		
Volume (vph)	64	1029	60	68	1267	146	40	174	44	107	462	74
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)	67	1083	63	72	1334	154	42	183	46	113	486	78
RTOR Reduction (vph)	0	7	0	0	17	0	0	22	0	0	13	0
Lane Group Flow (vph)	0	1206	0	0	1543	0	0	249	0	0	664	0
Confl. Peds. (#/hr)	17		19	19		17	12		16	16		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2482		2589		2589		609		609		716	
v/s Ratio Prot												
v/s Ratio Perm	0.31		c0.38		c0.38		0.11		0.11		c0.24	
v/c Ratio	0.49		0.60		0.60		0.41		0.41		0.93	
Uniform Delay, d1	7.4		8.2		8.2		24.7		24.7		29.0	
Progression Factor	0.66		1.00		1.00		1.00		1.00		0.47	
Incremental Delay, d2	0.5		1.0		1.0		2.0		2.0		19.2	
Delay (s)	5.4		9.3		9.3		26.8		26.8		32.9	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	5.4		9.3		9.3		26.8		26.8		32.9	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	13.6		13.6		13.6		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.69		0.69		0.69		0.69		0.69		0.69	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	121.5%		121.5%		121.5%		ICU Level of Service		H		H	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2030 AM + Tower
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frbp, ped/bikes	1.00			1.00			0.98			1.00		0.94
Flpb, ped/bikes	1.00			1.00			1.00			1.00		1.00
Frt	1.00			0.99			0.93			0.92		0.92
Flt Protected	1.00			1.00			0.98			0.98		0.98
Satd. Flow (prot)	5073			4942			1695			1589		1589
Flt Permitted	0.86			0.93			0.90			0.86		0.86
Satd. Flow (perm)	4356			4585			1560			1395		1395
Volume (vph)	31	1259	10	10	1408	100	10	0	10	54	0	73
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)	33	1325	11	11	1482	105	11	0	11	57	0	77
RTOR Reduction (vph)	0	0	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	1369	0	0	1598	0	0	13	0	0	134	0
Confl. Peds. (#/hr)						98						98
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	63.9		63.9		63.9		13.1		13.1		13.1	
Effective Green, g (s)	63.9		63.9		63.9		13.1		13.1		13.1	
Actuated g/C Ratio	0.75		0.75		0.75		0.15		0.15		0.15	
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)	3275		3447		3447		240		240		215	
v/s Ratio Prot												
v/s Ratio Perm	0.31		c0.35		c0.35		0.01		0.01		c0.10	
v/c Ratio	0.42		0.46		0.46		0.05		0.05		0.62	
Uniform Delay, d1	3.8		4.0		4.0		30.7		30.7		33.6	
Progression Factor	1.00		1.40		1.40		1.00		1.00		0.87	
Incremental Delay, d2	0.4		0.1		0.1		0.1		0.1		4.0	
Delay (s)	4.2		5.7		5.7		30.8		30.8		33.1	
Level of Service	A		A		A		C		C		C	
Approach Delay (s)	4.2		5.7		5.7		30.8		30.8		33.1	
Approach LOS	A		A		A		C		C		C	
Intersection Summary												
HCM Average Control Delay	6.4		6.4		6.4		HCM Level of Service		A		A	
HCM Volume to Capacity ratio	0.49		0.49		0.49		0.49		0.49		0.49	
Actuated Cycle Length (s)	85.0		85.0		85.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	77.2%		77.2%		77.2%		ICU Level of Service		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 AM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			0.99		
Frt	0.98			0.98			1.00			0.97		
Flt Protected	0.99			0.99			0.95			1.00		
Satd. Flow (prot)	4933			4924			1770			3408		
Flt Permitted	0.64			0.64			0.13			1.00		
Satd. Flow (perm)	3170			3174			244			3408		
Volume (vph)	148	988	187	200	1146	191	120	376	90	365	1144	242
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)	156	1040	197	211	1206	201	126	396	95	384	1204	255
RTOR Reduction (vph)	0	23	0	0	24	0	0	23	0	0	20	0
Lane Group Flow (vph)	0	1370	0	0	1594	0	126	468	0	384	1439	0
Confl. Peds. (#/hr)	40		9		40		25		31		25	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	45.0		45.0		29.5		29.5		29.5		29.5	
Effective Green, g (s)	46.5		46.5		30.5		30.5		30.5		30.5	
Actuated g/C Ratio	0.55		0.55		0.36		0.36		0.36		0.36	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1734		1736		88		1223		259		1229	
v/s Ratio Prot					0.14		0.42					
v/s Ratio Perm	0.43		c0.50		0.52		c0.53					
v/c Ratio	0.99dl		1.54dl		1.43		0.38		1.48		1.17	
Uniform Delay, d1	15.4		17.5		27.2		20.3		27.2		27.2	
Progression Factor	1.17		1.00		1.27		1.29		0.71		0.70	
Incremental Delay, d2	2.2		8.0		245.4		0.9		229.6		82.7	
Delay (s)	20.1		25.5		280.0		27.0		248.8		101.7	
Level of Service	C		C		F		C		F		F	
Approach Delay (s)	20.1		25.5		78.6		132.4					
Approach LOS	C		C		E		F					
Intersection Summary												
HCM Average Control Delay	66.1		HCM Level of Service		E							
HCM Volume to Capacity ratio	1.14											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	117.0%		ICU Level of Service		H							
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

2030 AM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			0.99			1.00			0.88		
Flpb, ped/bikes	1.00			1.00			0.97			1.00		
Frt	1.00			0.99			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5058			5005			1770			1395		
Flt Permitted	0.83			0.82			0.84			1.00		
Satd. Flow (perm)	4208			4107			1512			1395		
Volume (vph)	40	1410	23	50	1474	90	32	43	30	100	40	60
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)	42	1484	24	53	1552	95	34	45	32	105	42	63
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	18	0	15	0
Lane Group Flow (vph)	0	1548	0	0	1692	0	0	79	14	0	195	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	48.0		48.0		23.0		23.0		23.0		23.0	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Lane Grp Cap (vph)	2551		2490		444		410		392		392	
v/s Ratio Prot					0.05		0.01		c0.15			
v/s Ratio Perm	0.37		c0.41		0.18		0.03		0.50			
v/c Ratio	0.61		0.68		21.1		20.2		23.4			
Uniform Delay, d1	9.8		10.5		1.00		1.00		1.00			
Progression Factor	1.00		1.00		0.9		0.2		4.5			
Incremental Delay, d2	1.1		1.5		21.9		20.3		27.8			
Delay (s)	10.9		12.1		21.9		20.3		27.8			
Level of Service	B		B		C		C		C			
Approach Delay (s)	10.9		12.1		21.5		27.8					
Approach LOS	B		B		C		C					
Intersection Summary												
HCM Average Control Delay	12.8		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	94.0%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

2030 AM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	4923	1770	4839	1770	3539	1515	1770	3539	1523	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	4923	1770	4839	1770	3539	1515	1770	3539	1523	1770	3539
Volume (vph)	170	1209	172	210	1144	380	140	421	130	390	1442	250
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)	179	1273	181	221	1204	400	147	443	137	411	1518	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13
Lane Group Flow (vph)	179	1439	0	221	1554	0	147	443	104	411	1518	250
Confl. Peds. (#/hr)	66		23		38		26		26		26	
Turn Type	Prot		Prot		Prot		pm+ov		Prot		pm+ov	
Protected Phases	7	4	3		8	5		2	3	1	6	7
Permitted Phases	4		2		6		2		6		6	
Actuated Green, G (s)	12.0	32.0	15.0	35.0	11.0	28.0	43.0	29.0	46.0	58.0	58.0	58.0
Effective Green, g (s)	11.0	33.0	14.0	36.0	10.0	29.0	43.0	28.0	47.0	58.0	58.0	58.0
Actuated g/C Ratio	0.09	0.28	0.12	0.30	0.08	0.24	0.36	0.23	0.39	0.48	0.48	0.48
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0	3.0
Vehicle Extension (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
Lane Grp Cap (vph)	162	1354	207	1452	148	855	593	413	1386	736	1386	736
v/s Ratio Prot	0.10	0.29	c0.12	c0.32	c0.08	0.13	0.02	0.23	c0.43	0.03	0.03	0.03
v/s Ratio Perm	0.13		0.05		0.13		0.05		0.13		0.13	
v/c Ratio	1.10	1.06	1.07	1.07	0.99	0.52	0.18	1.00	1.10	0.34	1.10	0.34
Uniform Delay, d1	54.5	43.5	53.0	42.0	55.0	39.4	26.4	45.9	36.5	19.2	36.5	19.2
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	101.6	43.0	81.6	45.0	71.6	2.2	0.1	42.7	54.6	0.1	54.6	0.1
Delay (s)	156.1	86.5	134.6	87.0	126.5	41.7	26.4	88.6	91.1	19.3	91.1	19.3
Level of Service	F	F	F	F	F	D	C	F	F	B	F	B
Approach Delay (s)	94.1		92.7		56.0		82.0		82.0		82.0	
Approach LOS	F		F		E		F		F		F	
Intersection Summary												
HCM Average Control Delay	85.2		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.09											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				16.0					
Intersection Capacity Utilization	101.5%		ICU Level of Service				G					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2030 AM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		1.00		0.95		1.00	
Frpb, ped/bikes	0.94		0.97		1.00		0.98		1.00		0.99	
Flpb, ped/bikes	0.98		0.96		0.98		1.00		0.94		1.00	
Frt	0.96		0.96		1.00		0.99		1.00		0.99	
Flt Protected	0.98		0.98		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	1608		1632		1734		3430		1658		3472	
Flt Permitted	0.71		0.79		0.17		1.00		0.38		1.00	
Satd. Flow (perm)	1159		1311		302		3430		662		3472	
Volume (vph)	62	50	50	70	80	64	80	591	60	52	1207	72
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)	65	53	53	74	84	67	84	622	63	55	1271	76
RTOR Reduction (vph)	0	22	0	0	20	0	0	7	0	0	4	0
Lane Group Flow (vph)	0	149	0	0	205	0	84	678	0	55	1343	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		2		6	
Actuated Green, G (s)	15.9		15.9		62.1		62.1		62.1		62.1	
Effective Green, g (s)	15.4		15.4		61.6		61.6		61.6		61.6	
Actuated g/C Ratio	0.18		0.18		0.72		0.72		0.72		0.72	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	210		238		219		2486		480		2516	
v/s Ratio Prot	0.13		c0.16		0.28		0.08		c0.39		c0.39	
v/s Ratio Perm	0.13		c0.16		0.28		0.08		c0.39		c0.39	
v/c Ratio	0.71		0.86		0.38		0.27		0.11		0.53	
Uniform Delay, d1	32.7		33.7		4.5		4.0		3.5		5.3	
Progression Factor	1.00		1.00		1.00		1.00		0.96		0.90	
Incremental Delay, d2	8.6		24.4		5.0		0.3		0.0		0.1	
Delay (s)	41.3		58.1		9.5		4.3		3.4		4.8	
Level of Service	D		E		A		A		A		A	
Approach Delay (s)	41.3		58.1		4.9		4.7		4.7		4.7	
Approach LOS	D		E		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	11.9		HCM Level of Service				B					
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	70.3%		ICU Level of Service				C					
Analysis Period (min)	15											

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2030 AM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.95		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.95	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3379		1770	3267		1770	3412		1685	3339	
Flt Permitted	0.95	1.00		0.95	1.00		0.12	1.00		0.44	1.00	
Satd. Flow (perm)	1770	3379		1770	3267		219	3412		786	3339	
Volume (vph)	270	500	100	140	710	199	70	361	60	174	1023	220
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)	284	526	105	147	747	209	74	380	63	183	1077	232
RTOR Reduction (vph)	0	18	0	0	30	0	0	15	0	0	20	0
Lane Group Flow (vph)	284	613	0	147	926	0	74	428	0	183	1289	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot		Prot		Perm		Perm		Perm		Perm	
Protected Phases	7	4		3	8			2				6
Permitted Phases					2		6					
Actuated Green, G (s)	16.5	28.0		11.0	22.5		32.5	32.5		32.5	32.5	
Effective Green, g (s)	17.0	27.5		11.5	22.0		34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.20	0.32		0.14	0.26		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	354	1093		239	846		88	1365		314	1336	
v/s Ratio Prot	c0.16	0.18		0.08	c0.28			0.13			c0.39	
v/s Ratio Perm					0.34		0.23					
v/c Ratio	0.80	0.56		0.62	1.09		0.84	0.31		0.58	0.96	
Uniform Delay, d1	32.4	23.8		34.7	31.5		23.1	17.5		20.0	24.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.7	0.4		3.3	59.8		59.2	0.6		7.7	17.5	
Delay (s)	44.1	24.2		37.9	91.3		82.2	18.1		27.6	42.4	
Level of Service	D	C		D	F		F	B		C	D	
Approach Delay (s)	30.3				84.2		27.3				40.6	
Approach LOS	C				F		C				D	
Intersection Summary												
HCM Average Control Delay	48.5		HCM Level of Service		D							
HCM Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	96.1%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

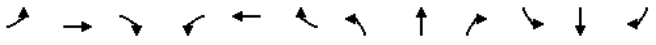
HCM Signalized Intersection Capacity Analysis
25: Village Drive & Telegraph Ave.

2030 AM + Tower
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	
Lane Util. Factor	1.00		1.00	0.95	0.95	
Frt	0.91		1.00	1.00	0.99	
Flt Protected	0.98		0.95	1.00	1.00	
Satd. Flow (prot)	1670		1770	3539	3514	
Flt Permitted	0.98		0.95	1.00	1.00	
Satd. Flow (perm)	1670		1770	3539	3514	
Volume (vph)	73	136	61	665	1627	79
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.95
Adj. Flow (vph)	77	143	64	672	1643	83
RTOR Reduction (vph)	95	0	0	0	3	0
Lane Group Flow (vph)	125	0	64	672	1723	0
Turn Type			Prot			
Protected Phases	2		3		4	
Permitted Phases						
Actuated Green, G (s)	15.9		7.6		61.1	
Effective Green, g (s)	15.9		7.6		61.1	
Actuated g/C Ratio	0.19		0.09		0.72	
Clearance Time (s)	4.0		4.0		4.0	
Vehicle Extension (s)	3.0		3.0		3.0	
Lane Grp Cap (vph)	312		158		2544	
v/s Ratio Prot	c0.07		c0.04		0.19	
v/s Ratio Perm						
v/c Ratio	0.40		0.41		0.26	
Uniform Delay, d1	30.4		36.6		4.1	
Progression Factor	1.00		1.03		1.14	
Incremental Delay, d2	0.8		1.4		0.2	
Delay (s)	31.2		39.0		5.0	
Level of Service	C		D		A	
Approach Delay (s)	31.2		7.9		24.1	
Approach LOS	C		A		C	
Intersection Summary						
HCM Average Control Delay	20.2		HCM Level of Service		C	
HCM Volume to Capacity ratio	0.70					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	69.8%		ICU Level of Service		C	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2030 PM + Tower
1/21/2008




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
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0		4.0	4.0		2.0	2.0		2.0	2.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.98		1.00	0.98	
Fipb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.96		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4924		1770	4960		2006	1990		1960	1918	
Flt Permitted	0.95	1.00		0.95	1.00		0.12	1.00		0.54	1.00	
Satd. Flow (perm)	1770	4924		1770	4960		257	1990		1109	1918	
Volume (vph)	350	1303	193	120	1070	170	200	258	100	160	291	280
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)	368	1372	203	126	1126	179	211	272	105	168	306	295
RTOR Reduction (vph)	0	19	0	0	21	0	0	14	0	0	35	0
Lane Group Flow (vph)	368	1556	0	126	1284	0	211	363	0	168	566	0
Confl. Peds. (#/hr)			32	32		4	12		24	24		12
Parking (#/hr)												0
Turn Type	Prot			Prot		pm+pt			Perm			
Protected Phases	7	4		3	8	5	2			6		
Permitted Phases						2				6		
Actuated Green, G (s)	20.0	36.6		9.6	26.2	43.3	43.3		30.3	30.3		
Effective Green, g (s)	20.0	36.6		9.6	26.2	43.8	43.8		30.8	30.8		
Actuated g/C Ratio	0.20	0.37		0.10	0.26	0.44	0.44		0.31	0.31		
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	2.5		2.5	2.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	354	1802		170	1300	305	872		342	591		
v/s Ratio Prot	c0.21	0.32		0.07	c0.26	c0.08	0.18			c0.29		
v/s Ratio Perm						0.23				0.15		
v/c Ratio	1.04	0.86		0.74	0.99	0.69	0.42		0.49	0.96		
Uniform Delay, d1	40.0	29.4		44.0	36.7	44.3	19.3		28.2	34.0		
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	58.5	5.8		15.9	22.1	6.6	0.3		1.1	26.4		
Delay (s)	98.5	35.2		59.9	58.9	50.9	19.6		29.3	60.4		
Level of Service	F	D		E	E	D	B		C	E		
Approach Delay (s)		47.2			59.0		30.9			53.6		
Approach LOS		D			E		C			D		
Intersection Summary												
HCM Average Control Delay		49.7										D
HCM Volume to Capacity ratio		0.94										
Actuated Cycle Length (s)		100.0							12.0			
Intersection Capacity Utilization		101.4%										G
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 PM + Tower
1/21/2008



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)		4.0		4.0	4.0		4.0		4.0	4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95		0.95		0.95	1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.97		0.98		1.00	1.00	0.95	
Fipb, ped/bikes		0.99		1.00	1.00		1.00		1.00	1.00	1.00	
Frt		0.93		1.00	0.93		0.95		1.00	1.00	0.95	
Flt Protected		0.99		0.95	1.00		1.00		0.95	1.00	1.00	
Satd. Flow (prot)		1705		1681	1586		3275		1770	3209	3209	
Flt Permitted		0.36		0.73	1.00		0.94		0.95	1.00	1.00	
Satd. Flow (perm)		619		1290	1586		3087		1770	3209	3209	
Volume (vph)	10	10	20	127	120	120	10	1114	615	200	901	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)	11	11	21	134	126	126	11	1173	647	211	948	442
RTOR Reduction (vph)	0	20	0	0	39	0	0	64	0	0	45	0
Lane Group Flow (vph)	0	23	0	134	213	0	0	1767	0	211	1345	0
Confl. Peds. (#/hr)		36					36	48		16	16	48
Turn Type		Perm		Perm		Perm		Prot		Prot		
Protected Phases		7		8		8		2		1		6
Permitted Phases		7		8		2						
Actuated Green, G (s)		6.5		16.7	16.7		45.7		13.1	63.3		
Effective Green, g (s)		7.0		17.2	17.2		46.2		13.6	63.8		
Actuated g/C Ratio		0.07		0.17	0.17		0.46		0.14	0.64		
Clearance Time (s)		4.5		4.5	4.5		4.5		4.5	4.5		
Vehicle Extension (s)		2.0		2.0	2.0		2.0		2.0	2.0		
Lane Grp Cap (vph)		43		222	273		1426		241	2047		
v/s Ratio Prot									c0.12	0.42		
v/s Ratio Perm		c0.04		0.10	0.13		c0.57					
v/c Ratio		0.55		0.60	0.78		1.24		0.88	0.66		
Uniform Delay, d1		45.0		38.3	39.6		26.9		42.4	11.3		
Progression Factor		1.00		1.00	1.00		0.62		1.00	1.00		
Incremental Delay, d2		7.4		3.2	12.5		108.2		27.1	1.7		
Delay (s)		52.3		41.4	52.1		124.8		69.5	12.9		
Level of Service		D		D	D		F		E	B		
Approach Delay (s)		52.3		48.4			124.8			20.4		
Approach LOS		D		D			F			C		
Intersection Summary												
HCM Average Control Delay		73.0					HCM Level of Service			E		
HCM Volume to Capacity ratio		1.03										
Actuated Cycle Length (s)		100.0					Sum of lost time (s)		16.0			
Intersection Capacity Utilization		118.2%					ICU Level of Service		H			
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 PM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.94		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3418		1770	3299		1770	3280		1770	3416	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3418		1770	3299		1770	3280		1770	3416	
Volume (vph)	460	930	133	160	580	350	100	949	350	300	698	60
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)	484	979	140	168	611	368	105	999	368	316	735	63
RTOR Reduction (vph)	0	11	0	0	90	0	0	38	0	0	7	0
Lane Group Flow (vph)	484	1108	0	168	889	0	105	1329	0	316	791	0
Confl. Peds. (#/hr)	15		48	48		15	123		48	48		123
Turn Type	Prot		Prot		Prot		Prot		Prot		Prot	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	15.7	27.5		10.9	22.7		5.0	32.6		12.0	39.6	
Effective Green, g (s)	15.2	28.5		10.4	23.7		4.5	33.6		11.5	40.6	
Actuated g/C Ratio	0.15	0.28		0.10	0.24		0.04	0.34		0.12	0.41	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	522	974		184	782		80	1102		204	1387	
v/s Ratio Prot	c0.14	c0.32		0.09	0.27		0.06	c0.41		c0.18	0.23	
v/s Ratio Perm												
v/c Ratio	0.93	1.14		0.91	1.14		1.31	1.21		1.55	0.57	
Uniform Delay, d1	41.9	35.8		44.4	38.1		47.8	33.2		44.2	23.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.19	0.77	
Incremental Delay, d2	22.3	74.4		41.7	76.9		205.3	101.5		264.7	1.3	
Delay (s)	64.2	110.2		86.0	115.0		253.1	134.7		317.6	18.9	
Level of Service	E	F		F	F		F	F		F	B	
Approach Delay (s)		96.3			110.8			143.1			103.6	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM Average Control Delay		113.9										F
HCM Volume to Capacity ratio		1.16										
Actuated Cycle Length (s)		100.0						12.0				
Intersection Capacity Utilization		109.3%										H
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 PM + Tower
1/21/2008

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)		4.0								4.0	4.0	
Lane Util. Factor		1.00								0.95	0.97	0.95
Frt		0.86								0.94	1.00	0.98
Flt Protected		1.00								1.00	0.95	1.00
Satd. Flow (prot)		1611								3335	3433	3463
Flt Permitted		1.00								0.95	0.95	1.00
Satd. Flow (perm)		1611								3164	3433	3463
Volume (vph)	0	0	10	0	0	0	10	555	349	1550	357	60
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)	0	0	11	0	0	0	11	584	367	1632	376	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	18	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	944	0	1632	439	0
Turn Type							Perm			Prot		
Protected Phases								2		1	6	
Permitted Phases												
Actuated Green, G (s)		0.0						13.0		29.0	50.0	
Effective Green, g (s)		0.0						13.0		29.0	50.0	
Actuated g/C Ratio		0.00						0.26		0.58	1.00	
Clearance Time (s)								4.0		4.0	2.0	
Lane Grp Cap (vph)		0						823		1991	3463	
v/s Ratio Prot										c0.48	0.13	
v/s Ratio Perm								c0.30				
v/c Ratio		0.00						1.15		0.82	0.13	
Uniform Delay, d1		25.0						18.5		8.4	0.0	
Progression Factor		1.00						0.71		1.00	1.00	
Incremental Delay, d2		0.0						78.7		3.9	0.1	
Delay (s)		25.0						91.8		12.3	0.1	
Level of Service		C						F		B	A	
Approach Delay (s)		25.0			0.0			91.8		9.7		
Approach LOS		C			A			F		A		
Intersection Summary												
HCM Average Control Delay		35.7								HCM Level of Service		D
HCM Volume to Capacity ratio		0.92										
Actuated Cycle Length (s)		50.0								Sum of lost time (s)		8.0
Intersection Capacity Utilization		84.4%								ICU Level of Service		E
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2030 PM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.95		
Frpb, ped/bikes	0.96			0.97			0.99			0.99		
Flpb, ped/bikes	0.99			0.97			1.00			1.00		
Frt	0.97			0.96			0.98			0.99		
Flt Protected	0.99			0.99			1.00			0.99		
Satd. Flow (prot)	1694			1668			3422			3428		
Flt Permitted	0.87			0.90			0.92			0.78		
Satd. Flow (perm)	1501			1515			3161			2694		
Volume (vph)	40	70	31	70	140	90	41	724	90	60	307	30
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)	42	74	33	74	147	95	43	762	95	63	323	32
RTOR Reduction (vph)	0	20	0	0	31	0	0	18	0	0	13	0
Lane Group Flow (vph)	0	129	0	0	285	0	0	882	0	0	406	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	17.0		17.0		17.0		25.0		25.0		25.0	
Effective Green, g (s)	17.0		17.0		17.0		25.0		25.0		25.0	
Actuated g/C Ratio	0.34		0.34		0.34		0.50		0.50		0.50	
Clearance Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Grp Cap (vph)	510		515		515		1581		1581		1347	
v/s Ratio Prot												
v/s Ratio Perm	0.09		c0.19		c0.19		c0.28		c0.28		0.15	
v/c Ratio	0.25		0.55		0.55		0.56		0.56		0.30	
Uniform Delay, d1	11.9		13.4		13.4		8.7		8.7		7.4	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	1.2		4.2		4.2		1.4		1.4		0.6	
Delay (s)	13.1		17.7		17.7		10.1		10.1		7.9	
Level of Service	B		B		B		B		B		A	
Approach Delay (s)	13.1		17.7		17.7		10.1		10.1		7.9	
Approach LOS	B		B		B		B		B		A	
Intersection Summary												
HCM Average Control Delay	11.2		11.2		11.2		HCM Level of Service		B		B	
HCM Volume to Capacity ratio	0.56		0.56		0.56		0.56		0.56		0.56	
Actuated Cycle Length (s)	50.0		50.0		50.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	78.2%		78.2%		78.2%		ICU Level of Service		D		D	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2030 PM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			0.95			0.91		
Frpb, ped/bikes	0.96			0.96			0.99			0.98		
Flpb, ped/bikes	0.97			0.99			1.00			1.00		
Frt	0.96			0.96			0.99			0.99		
Flt Protected	0.98			0.99			1.00			1.00		
Satd. Flow (prot)	1623			1667			3454			4911		
Flt Permitted	0.74			0.88			0.76			0.79		
Satd. Flow (perm)	1227			1483			2640			3909		
Volume (vph)	80	70	70	32	80	50	90	1667	82	40	1104	90
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)	84	74	74	34	84	53	95	1755	86	42	1162	95
RTOR Reduction (vph)	0	18	0	0	2	0	0	2	0	0	6	0
Lane Group Flow (vph)	0	214	0	0	169	0	0	1934	0	0	1293	0
Confl. Peds. (#/hr)	100		100	100		100	100		100	100		100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		2		6	
Actuated Green, G (s)	15.4		15.4		15.4		55.6		55.6		55.6	
Effective Green, g (s)	15.9		15.9		15.9		56.1		56.1		56.1	
Actuated g/C Ratio	0.20		0.20		0.20		0.70		0.70		0.70	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	244		295		295		1851		1851		2741	
v/s Ratio Prot												
v/s Ratio Perm	c0.17		0.11		0.11		c0.73		c0.73		0.33	
v/c Ratio	0.88		0.57		0.57		1.04		1.04		0.47	
Uniform Delay, d1	31.1		29.0		29.0		11.9		11.9		5.3	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	27.3		1.7		1.7		33.7		33.7		0.6	
Delay (s)	58.4		30.6		30.6		45.6		45.6		5.9	
Level of Service	E		C		C		D		D		A	
Approach Delay (s)	58.4		30.6		30.6		45.6		45.6		5.9	
Approach LOS	E		C		C		D		D		A	
Intersection Summary												
HCM Average Control Delay	31.6		31.6		31.6		HCM Level of Service		C		C	
HCM Volume to Capacity ratio	1.01		1.01		1.01		1.01		1.01		1.01	
Actuated Cycle Length (s)	80.0		80.0		80.0		Sum of lost time (s)		8.0		8.0	
Intersection Capacity Utilization	113.9%		113.9%		113.9%		ICU Level of Service		H		H	
Analysis Period (min)	15		15		15		15		15		15	
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 PM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1765	3464	1768	3455	1741	1830	1766	1825	1766	1825	1766	1825
Flt Permitted	0.12	1.00	0.12	1.00	0.52	1.00	0.22	1.00	0.22	1.00	0.22	1.00
Satd. Flow (perm)	232	3464	233	3455	960	1830	402	1825	402	1825	402	1825
Volume (vph)	90	1119	160	83	894	133	180	561	65	106	250	30
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)	95	1178	168	87	941	140	189	591	68	112	263	32
RTOR Reduction (vph)	0	14	0	0	14	0	5	0	0	6	0	0
Lane Group Flow (vph)	95	1332	0	87	1067	0	189	654	0	112	290	0
Confl. Peds. (#/hr)	12		12	12		12	42		12	12		42
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.0	33.0		33.0	33.0		40.5	40.5		40.5	40.5	
Effective Green, g (s)	32.0	32.0		32.0	32.0		40.0	40.0		40.0	40.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.50	0.50		0.50	0.50	
Clearance Time (s)	3.0	3.0		3.0	3.0		3.5	3.5		3.5	3.5	
Lane Grp Cap (vph)	93	1386		93	1382		480	915		201	913	
v/s Ratio Prot		0.38			0.31			c0.36			0.16	
v/s Ratio Perm	c0.41			0.37			0.20			0.28		
v/c Ratio	1.02	0.96		0.94	0.77		0.39	0.71		0.56	0.32	
Uniform Delay, d1	24.0	23.4		23.0	20.8		12.5	15.6		13.9	11.9	
Progression Factor	1.00	1.00		1.71	1.79		1.64	1.63		1.00	1.00	
Incremental Delay, d2	99.3	16.5		45.0	1.8		0.2	0.4		10.7	0.9	
Delay (s)	123.3	39.9		84.4	39.1		20.6	25.8		24.6	12.8	
Level of Service	F	D		F	D		C	C		C	B	
Approach Delay (s)		45.4			42.5			24.7			16.0	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay		36.9										D
HCM Volume to Capacity ratio		0.85										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		96.6%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 PM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99
Satd. Flow (prot)	1765	3458	1770	3500	1765	3433	3433	3394	1765	3458	1770	3500
Flt Permitted	0.16	1.00	0.16	1.00	0.84	1.00	0.84	1.00	0.16	1.00	0.16	1.00
Satd. Flow (perm)	297	3458	298	3500	2912	2962	2912	2962	297	3458	298	3500
Volume (vph)	60	1161	120	70	1020	63	90	331	59	33	160	50
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	1173	121	71	1030	64	91	334	60	33	162	51
RTOR Reduction (vph)	0	10	0	0	6	0	0	1	0	0	4	0
Lane Group Flow (vph)	61	1284	0	71	1089	0	0	484	0	0	242	0
Confl. Peds. (#/hr)	24		78	78		24	8		6	6		8
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.0	24.0		24.0	24.0		46.0			46.0		
Effective Green, g (s)	25.0	25.0		25.0	25.0		47.0			47.0		
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.59			0.59		
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0			5.0		
Lane Grp Cap (vph)	93	1081		93	1094		1711			1740		
v/s Ratio Prot		c0.37			0.31							
v/s Ratio Perm	0.21			0.24			c0.17			0.08		
v/c Ratio	0.66	1.19		0.76	0.99		0.28			0.14		
Uniform Delay, d1	23.8	27.5		24.8	27.4		8.2			7.4		
Progression Factor	0.64	0.57		0.79	0.83		1.06			1.00		
Incremental Delay, d2	13.1	88.5		27.8	19.2		0.2			0.2		
Delay (s)	28.4	104.3		47.5	41.9		8.9			7.6		
Level of Service	C	F		D	D		A			A		
Approach Delay (s)		100.9			42.3					8.9		7.6
Approach LOS		F			D					A		A
Intersection Summary												
HCM Average Control Delay		59.1										E
HCM Volume to Capacity ratio		0.60										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		80.7%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
9: 40th St. & MLK Jr. Way

2030 PM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.98			0.97			0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1768	3493		1764	3451			3415			3419	
Flt Permitted	0.11	1.00		0.11	1.00			0.86			0.66	
Satd. Flow (perm)	213	3493		212	3451			2946			2293	
Volume (vph)	90	1118	84	115	1058	172	75	543	126	92	256	60
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)	95	1177	88	121	1114	181	79	572	133	97	269	63
RTOR Reduction (vph)	0	7	0	0	16	0	0	12	0	0	17	0
Lane Group Flow (vph)	95	1258	0	121	1279	0	0	772	0	0	412	0
Confl. Peds. (#/hr)	8		39	39		8			25	25		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	35.5		35.5	35.5			38.0			38.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0			37.0			37.0	
Actuated g/C Ratio	0.44	0.44		0.44	0.44			0.46			0.46	
Clearance Time (s)	3.5	3.5		3.5	3.5			3.0			3.0	
Lane Grp Cap (vph)	93	1528		93	1510			1363			1061	
v/s Ratio Prot		0.36			0.37							
v/s Ratio Perm	0.45			c0.57				c0.26			0.18	
v/c Ratio	1.02	0.82		1.30	0.85			0.57			0.39	
Uniform Delay, d1	22.5	19.8		22.5	20.1			15.7			14.1	
Progression Factor	1.03	1.04		1.29	1.32			1.43			1.00	
Incremental Delay, d2	33.5	0.5		189.7	5.5			1.5			1.1	
Delay (s)	56.8	21.1		218.7	32.1			23.8			15.2	
Level of Service	E	C		F	C			C			B	
Approach Delay (s)		23.6			48.0			23.8			15.2	
Approach LOS		C			D			C			B	
Intersection Summary												
HCM Average Control Delay	31.4		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.93											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	95.2%		ICU Level of Service		F							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
10: 40th St. & BART Access

2030 PM + Tower
1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕	↕	↔	↕	↔	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	0.95		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3328		1770	3539	1770	1583
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	3328		1770	3539	1770	1583
Volume (vph)	1226	122	59	1223	132	47
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1264	126	61	1261	136	48
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1390	0	61	1261	136	48
Confl. Peds. (#/hr)		213	348			
Turn Type			Prot			Perm
Protected Phases	4		3	8	2	
Permitted Phases						2
Actuated Green, G (s)	51.1		7.3	62.4	9.6	9.6
Effective Green, g (s)	51.1		7.3	62.4	9.6	9.6
Actuated g/C Ratio	0.64		0.09	0.78	0.12	0.12
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2126		162	2760	212	190
v/s Ratio Prot	c0.42		0.03	c0.36	c0.08	
v/s Ratio Perm						0.03
v/c Ratio	0.65		0.38	0.46	0.64	0.25
Uniform Delay, d1	9.0		34.2	3.0	33.6	31.9
Progression Factor	0.81		1.21	0.49	0.67	0.61
Incremental Delay, d2	1.0		0.4	0.1	5.8	0.6
Delay (s)	8.2		41.6	1.6	28.2	20.2
Level of Service	A		D	A	C	C
Approach Delay (s)	8.2			3.5	26.1	
Approach LOS	A			A	C	
Intersection Summary						
HCM Average Control Delay	7.2		HCM Level of Service		A	
HCM Volume to Capacity ratio	0.64					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	59.1%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 PM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97		1.00	0.99		1.00	0.97	
Flpb, ped/bikes	0.94	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1672	3441		1748	3337		1770	3472		1770	3279	
Flt Permitted	0.25	1.00		0.15	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	437	3441		283	3337		1770	3472		1770	3279	
Volume (vph)	249	915	109	75	561	110	466	1450	124	130	701	255
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	254	934	111	77	572	112	476	1480	127	133	715	260
RTOR Reduction (vph)	0	11	0	0	20	0	0	7	0	0	26	0
Lane Group Flow (vph)	254	1034	0	77	664	0	476	1600	0	133	949	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	25.5	25.5		25.5	25.5		13.5	32.2		8.8	27.5	
Effective Green, g (s)	26.0	26.0		26.0	26.0		14.0	32.7		9.3	28.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.18	0.41		0.12	0.35	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	142	1118		92	1085		310	1419		206	1148	
v/s Ratio Prot		0.30		0.20			c0.27	c0.46		0.08	0.29	
v/s Ratio Perm	c0.58			0.27								
v/c Ratio	1.79	0.92		0.84	0.61		1.54	1.13		0.65	0.83	
Uniform Delay, d1	27.0	26.1		25.0	22.7		33.0	23.6		33.8	23.8	
Progression Factor	1.55	1.59		1.00	1.00		0.94	0.96		1.00	1.00	
Incremental Delay, d2	376.4	10.3		43.7	0.7		249.4	62.8		5.1	6.9	
Delay (s)	418.2	51.6		68.7	23.5		280.5	85.4		38.9	30.7	
Level of Service	F	D		E	C		F	F		D	C	
Approach Delay (s)		123.3			28.1			130.0			31.6	
Approach LOS		F			C			F			C	
Intersection Summary												
HCM Average Control Delay		92.8										F
HCM Volume to Capacity ratio		1.42										
Actuated Cycle Length (s)		80.0						8.0				
Intersection Capacity Utilization		102.1%										G
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2030 PM + Tower
1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↔	↔	↕
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	30	41	1956	40	20	950
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	43	2059	42	21	1000
Pedestrians	52		52			45
Lane Width (ft)	12.0		12.0			12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	4		4			4
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.73	0.66			0.66	
vC, conflicting volume	2726	1148			2153	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2417	710			2232	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	81			85	
cM capacity (veh/h)	15	229			145	
Direction, Lane #						
	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	75	1373	728	21	500	500
Volume Left	32	0	0	21	0	0
Volume Right	43	0	42	0	0	0
cSH	33	1700	1700	145	1700	1700
Volume to Capacity	2.23	0.81	0.43	0.15	0.29	0.29
Queue Length 95th (ft)	212	0	0	12	0	0
Control Delay (s)	819.7	0.0	0.0	34.0	0.0	0.0
Lane LOS	F			D		
Approach Delay (s)	819.7	0.0		0.7		
Approach LOS	F					
Intersection Summary						
Average Delay			19.4			
Intersection Capacity Utilization		73.9%			ICU Level of Service	D
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 PM + Tower
1/21/2008

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)	4.0		4.0	4.0	4.0			4.0	4.0	4.0		
Lane Util. Factor	0.91		1.00	0.95	1.00			1.00	1.00	1.00		
Frbp, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	0.99		
Flpb, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00		
Frt	0.99		1.00	0.98	0.98			0.98	1.00	0.98		
Flt Protected	0.99		0.95	1.00	0.99			0.95	1.00			
Satd. Flow (prot)	5014		1768	3452	1793			1770	1806			
Flt Permitted	0.65		0.22	1.00	0.28			0.24	1.00			
Satd. Flow (perm)	3268		414	3452	501			442	1806			
Volume (vph)	160	864	40	91	1341	221	190	525	120	80	403	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	882	41	93	1368	226	194	536	122	82	411	71
RTOR Reduction (vph)	0	5	0	0	17	0	0	8	0	0	8	0
Lane Group Flow (vph)	0	1081	0	93	1578	0	0	844	0	82	474	0
Confl. Peds. (#/hr)	24		4	4	24		48	12		12	48	
Turn Type	Perm		Perm		Perm			Perm				
Protected Phases	4		8		8			2		6		
Permitted Phases	4		8		2			6				
Actuated Green, G (s)	46.0		46.0		46.0			24.0		24.0		
Effective Green, g (s)	47.0		47.0		47.0			25.0		25.0		
Actuated g/C Ratio	0.59		0.59		0.59			0.31		0.31		
Clearance Time (s)	5.0		5.0		5.0			5.0		5.0		
Lane Grp Cap (vph)	1920		243		2028			157		138		
v/s Ratio Prot			c0.46							0.26		
v/s Ratio Perm	0.33		0.22		c1.69			0.19				
v/c Ratio	1.66dl		0.38		0.78			5.38		0.59		
Uniform Delay, d1	10.2		8.8		12.5			27.5		23.2		
Progression Factor	1.00		1.58		1.63			1.00		0.77		
Incremental Delay, d2	1.2		3.4		2.3			1984.3		14.5		
Delay (s)	11.4		17.3		22.8			2011.8		32.3		
Level of Service	B		B		C			F		C		
Approach Delay (s)	11.4		22.5		2011.8			32.2				
Approach LOS	B		C		F			C				

Intersection Summary			
HCM Average Control Delay	425.5	HCM Level of Service	F
HCM Volume to Capacity ratio	2.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	167.7%	ICU Level of Service	H
Analysis Period (min)	15		
dl = Defacto Left Lane. Recode with 1 though lane as a left lane.			
c = Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2030 PM + Tower
1/21/2008

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)	4.0		4.0	4.0	4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91		1.00	0.91	1.00			1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	0.99		0.99	1.00	0.96			1.00	0.96	1.00	0.98	0.98
Flt Protected	1.00		1.00	0.95	1.00			0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4999		5015	1770	1787			1766	1821			
Flt Permitted	0.76		0.79	0.38	1.00			0.20	1.00			
Satd. Flow (perm)	3800		3951	710	1787			363	1821			
Volume (vph)	60	804	70	101	1373	111	140	339	108	90	230	40
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)	63	846	74	106	1445	117	147	357	114	95	242	42
RTOR Reduction (vph)	0	12	0	0	11	0	0	14	0	0	8	0
Lane Group Flow (vph)	0	971	0	0	1657	0	147	457	0	95	276	0
Confl. Peds. (#/hr)			12		12		6		6			
Turn Type	Perm		Perm		Perm			Perm				
Protected Phases	4		8		8			2		6		
Permitted Phases	4		8		2			6				
Actuated Green, G (s)	51.5		51.5		20.5			20.5		20.5		
Effective Green, g (s)	51.5		51.5		20.5			20.5		20.5		
Actuated g/C Ratio	0.64		0.64		0.26			0.26		0.26		
Clearance Time (s)	4.0		4.0		4.0			4.0		4.0		
Lane Grp Cap (vph)	2446		2543		182			458		93		
v/s Ratio Prot			c0.42		0.21			c0.26		0.15		
v/s Ratio Perm	0.26		c0.42		0.21			c0.26				
v/c Ratio	0.40		0.65		0.81			1.00		1.02		
Uniform Delay, d1	6.8		8.7		27.9			29.7		29.8		
Progression Factor	1.17		1.57		1.00			1.00		1.20		
Incremental Delay, d2	0.0		1.0		30.7			41.5		90.3		
Delay (s)	8.0		14.7		58.6			71.2		125.8		
Level of Service	A		B		E			E		F		
Approach Delay (s)	8.0		14.7		68.2			58.4				
Approach LOS	A		B		E			E				

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c = Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2030 PM + Tower
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			0.95			0.95		
Frpb, ped/bikes	1.00			1.00			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.99			0.98			0.98			0.97		
Flt Protected	1.00			1.00			0.99			0.98		
Satd. Flow (prot)	5020			4955			3433			3358		
Flt Permitted	0.72			0.82			0.73			0.57		
Satd. Flow (perm)	3630			4062			2528			1941		
Volume (vph)	77	895	50	79	1404	241	80	426	75	140	223	92
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	78	904	51	80	1418	243	81	430	76	141	225	93
RTOR Reduction (vph)	0	7	0	0	28	0	0	15	0	0	28	0
Lane Group Flow (vph)	0	1026	0	0	1713	0	0	572	0	0	431	0
Confl. Peds. (#/hr)	9		17	17		9	12		10	10		12
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		50.0		19.0		19.0		19.0	
Effective Green, g (s)	51.5		51.5		51.5		20.5		20.5		20.5	
Actuated g/C Ratio	0.64		0.64		0.64		0.26		0.26		0.26	
Clearance Time (s)	5.5		5.5		5.5		5.5		5.5		5.5	
Lane Grp Cap (vph)	2337		2615		2615		648		497		497	
v/s Ratio Prot												
v/s Ratio Perm	0.28		c0.42		c0.42		c0.23		c0.23		0.22	
v/c Ratio	0.44		0.66		0.66		0.88		0.88		0.94dl	
Uniform Delay, d1	7.1		8.8		8.8		28.6		28.6		28.4	
Progression Factor	1.61		1.20		1.20		1.00		1.00		1.18	
Incremental Delay, d2	0.5		1.0		1.0		16.1		16.1		18.0	
Delay (s)	11.9		11.5		11.5		44.7		44.7		51.6	
Level of Service	B		B		B		D		D		D	
Approach Delay (s)	11.9		11.5		11.5		44.7		44.7		51.6	
Approach LOS	B		B		B		D		D		D	

Intersection Summary

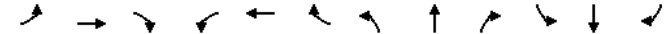
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	126.7%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & BART Access

2030 PM + Tower
1/21/2008



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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			1.00			0.96		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	1.00			0.99			0.95			0.92		
Flt Protected	1.00			1.00			0.98			0.98		
Satd. Flow (prot)	5058			5031			1750			1608		
Flt Permitted	0.70			0.93			0.89			0.85		
Satd. Flow (perm)	3573			4679			1577			1392		
Volume (vph)	90	1050	10	10	1523	60	10	10	10	138	0	189
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.96	0.96	0.95	0.95	0.95	0.96	0.95	0.96
Adj. Flow (vph)	94	1094	11	11	1586	62	11	11	11	144	0	197
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	8	0	0	0
Lane Group Flow (vph)	0	1198	0	0	1659	0	0	25	0	0	341	0
Confl. Peds. (#/hr)						79						79
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		6		6	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	48.5		48.5		48.5		23.5		23.5		23.5	
Effective Green, g (s)	48.5		48.5		48.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29	
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)	2166		2837		2837		463		409		409	
v/s Ratio Prot												
v/s Ratio Perm	0.34		c0.35		c0.35		0.02		c0.24		c0.24	
v/c Ratio	0.55		0.58		0.58		0.05		0.83		0.83	
Uniform Delay, d1	9.3		9.6		9.6		20.3		26.4		26.4	
Progression Factor	0.86		1.00		1.00		1.00		1.10		1.10	
Incremental Delay, d2	0.9		0.9		0.9		0.0		13.3		13.3	
Delay (s)	9.0		10.5		10.5		20.3		42.3		42.3	
Level of Service	A		B		B		C		D		D	
Approach Delay (s)	9.0		10.5		10.5		20.3		42.3		42.3	
Approach LOS	A		B		B		C		D		D	

Intersection Summary

HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 PM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			0.95		
Frpb, ped/bikes	1.00			0.99			1.00			0.99		
Flpb, ped/bikes	1.00			1.00			0.99			1.00		
Frt	0.99			0.96			1.00			0.99		
Flt Protected	0.98			1.00			0.95			1.00		
Satd. Flow (prot)	4915			4806			1748			3460		
Flt Permitted	0.68			0.71			0.22			1.00		
Satd. Flow (perm)	3382			3417			407			3460		
Volume (vph)	392	695	111	110	1174	469	280	1213	110	196	601	99
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)	413	732	117	116	1236	494	295	1277	116	206	633	104
RTOR Reduction (vph)	0	7	0	0	1	0	0	7	0	0	12	0
Lane Group Flow (vph)	0	1255	0	0	1845	0	295	1386	0	206	725	0
Confl. Peds. (#/hr)	26		19		26		39		92		39	
Turn Type	Perm		pm+pt		Perm		Perm		Perm		Perm	
Protected Phases	4		3		8		2		2		6	
Permitted Phases	4		8		2		6		6		6	
Actuated Green, G (s)	56.7		56.7		34.0		34.0		34.0		34.0	
Effective Green, g (s)	58.2		58.2		35.0		35.0		35.0		35.0	
Actuated g/C Ratio	0.58		0.58		0.35		0.35		0.35		0.35	
Clearance Time (s)	5.5		5.5		5.0		5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	1945		1965		141		1197		74		1188	
v/s Ratio Prot					0.40		0.21					
v/s Ratio Perm	0.37		c0.54		0.73		c0.97					
v/c Ratio	2.58dl		0.94		2.09		1.16		2.78		0.61	
Uniform Delay, d1	14.5		19.9		33.1		33.1		33.1		27.4	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	0.6		9.2		514.8		80.9		839.0		2.3	
Delay (s)	15.1		29.1		547.9		114.0		872.1		29.8	
Level of Service	B		C		F		F		F		C	
Approach Delay (s)	15.1		29.1		189.8		213.8					
Approach LOS	B		C		F		F					
Intersection Summary												
HCM Average Control Delay	103.6		HCM Level of Service		F							
HCM Volume to Capacity ratio	1.64											
Actuated Cycle Length (s)	101.2		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	121.8%		ICU Level of Service		H							
Analysis Period (min)	15											
dl	Defacto Left Lane. Recode with 1 though lane as a left lane.											
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

2030 PM + Tower
1/21/2008

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)	4.0			4.0			4.0			4.0		
Lane Util. Factor	0.91			0.91			1.00			1.00		
Frpb, ped/bikes	1.00			1.00			1.00			0.89		
Flpb, ped/bikes	1.00			1.00			0.96			1.00		
Frt	1.00			1.00			1.00			0.85		
Flt Protected	1.00			1.00			0.98			1.00		
Satd. Flow (prot)	5029			5027			1753			1406		
Flt Permitted	0.78			0.78			0.77			1.00		
Satd. Flow (perm)	3943			3928			1384			1406		
Volume (vph)	50	927	34	110	1598	50	104	104	200	40	40	90
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	51	936	34	111	1614	51	105	105	202	40	40	91
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	64	0	13	0
Lane Group Flow (vph)	0	1017	0	0	1772	0	0	210	138	0	158	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		2		2		6		6	
Actuated Green, G (s)	49.5		49.5		24.5		24.5		24.5		24.5	
Effective Green, g (s)	48.5		48.5		23.5		23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.29		0.29		0.29		0.29	
Clearance Time (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	2390		2381		407		413		422		422	
v/s Ratio Prot					c0.15		0.10		0.11			
v/s Ratio Perm	0.26		c0.45		c0.15		0.10		0.11			
v/c Ratio	0.43		0.74		0.52		0.33		0.37			
Uniform Delay, d1	8.4		11.3		23.5		22.1		22.4			
Progression Factor	1.00		1.00		1.00		1.00		1.00			
Incremental Delay, d2	0.6		2.2		4.6		2.2		2.5			
Delay (s)	8.9		13.5		28.1		24.3		24.9			
Level of Service	A		B		C		C		C			
Approach Delay (s)	8.9		13.5		26.2		24.9					
Approach LOS	A		B		C		C					
Intersection Summary												
HCM Average Control Delay	14.2		HCM Level of Service		B							
HCM Volume to Capacity ratio	0.67											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	111.8%		ICU Level of Service		H							
Analysis Period (min)	15											
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

2030 PM + Tower
1/21/2008

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)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.99	1.00	1.00	0.94	1.00	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	4912	1770	4864	1770	3539	1489	1770	3539	1489	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1770	4912	1770	4864	1770	3539	1489	1770	3539	1489	1770	3539
Volume (vph)	230	796	111	130	1238	360	310	1181	290	510	511	180
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)	242	838	117	137	1303	379	326	1243	305	537	538	189
RTOR Reduction (vph)	0	15	0	0	44	0	0	0	11	0	0	45
Lane Group Flow (vph)	242	940	0	137	1638	0	326	1243	294	537	538	144
Confl. Peds. (#/hr)	81		22		22		50		43		43	
Turn Type	Prot		Prot		Prot		pm+ov		Prot		pm+ov	
Protected Phases	7	4	3		8	5		2	3	1	6	7
Permitted Phases	4		2		6		2		6		6	
Actuated Green, G (s)	12.0	33.2	12.8	34.0	25.4	33.0	45.8	25.0	32.6	44.6	44.6	44.6
Effective Green, g (s)	11.0	34.2	11.8	35.0	24.4	34.0	45.8	24.0	33.6	44.6	44.6	44.6
Actuated g/C Ratio	0.09	0.29	0.10	0.29	0.20	0.28	0.38	0.20	0.28	0.37	0.37	0.37
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0	3.0	3.0
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	3.0
Lane Grp Cap (vph)	162	1400	174	1419	360	1003	618	354	991	607	607	607
v/s Ratio Prot	c0.14	0.19	0.08	c0.34	0.18	c0.35	0.05	c0.30	0.15	0.02	0.02	0.02
v/s Ratio Perm	c0.27		0.15		0.15		0.15		0.07		0.07	
v/c Ratio	1.49	0.67	0.79	1.15	0.91	1.24	0.48	1.52	0.54	0.24	0.24	0.24
Uniform Delay, d1	54.5	37.9	52.9	42.5	46.7	43.0	28.0	48.0	36.7	26.0	26.0	26.0
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	251.9	2.6	20.6	77.9	25.3	116.3	0.6	246.7	2.1	0.2	0.2	0.2
Delay (s)	306.4	40.5	73.4	120.4	71.9	159.3	28.6	294.7	38.8	26.2	26.2	26.2
Level of Service	F	D	E	F	E	F	C	F	D	C	C	C
Approach Delay (s)	94.3		116.9		122.8		145.6		145.6		145.6	
Approach LOS	F		F		F		F		F		F	
Intersection Summary												
HCM Average Control Delay	120.2		HCM Level of Service				F					
HCM Volume to Capacity ratio	1.21											
Actuated Cycle Length (s)	120.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	119.4%		ICU Level of Service				H					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

2030 PM + Tower
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		1.00		1.00		1.00		0.95		1.00	
Frpb, ped/bikes	0.93		0.96		1.00		0.99		1.00		0.99	
Flpb, ped/bikes	0.98		0.97		0.96		1.00		0.98		1.00	
Frt	0.95		0.95		1.00		0.99		1.00		0.99	
Flt Protected	0.98		0.98		0.95		1.00		0.95		1.00	
Satd. Flow (prot)	1585		1616		1705		3488		1729		3446	
Flt Permitted	0.66		0.72		0.25		1.00		0.17		1.00	
Satd. Flow (perm)	1063		1181		443		3488		315		3446	
Volume (vph)	131	60	100	120	80	103	50	1109	50	42	856	73
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)	138	63	105	126	84	108	53	1167	53	44	901	77
RTOR Reduction (vph)	0	23	0	0	22	0	0	4	0	0	7	0
Lane Group Flow (vph)	0	283	0	0	296	0	53	1216	0	44	971	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		4		4		2		2		6	
Permitted Phases	4		4		4		2		2		6	
Actuated Green, G (s)	23.7		23.7		54.3		54.3		54.3		54.3	
Effective Green, g (s)	23.2		23.2		53.8		53.8		53.8		53.8	
Actuated g/C Ratio	0.27		0.27		0.63		0.63		0.63		0.63	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	290		322		280		2208		199		2181	
v/s Ratio Prot	c0.14		c0.14		c0.35		c0.35		0.15		0.28	
v/s Ratio Perm	c0.27		0.25		0.12		0.14		0.14		0.14	
v/c Ratio	0.98		0.92		0.19		0.55		0.22		0.45	
Uniform Delay, d1	30.6		30.0		6.5		8.8		6.7		8.0	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	46.0		29.5		1.5		1.0		2.5		0.7	
Delay (s)	76.6		59.5		8.0		9.8		9.2		8.6	
Level of Service	E		E		A		A		A		A	
Approach Delay (s)	76.6		59.5		9.7		8.7		8.7		8.7	
Approach LOS	E		E		A		A		A		A	
Intersection Summary												
HCM Average Control Delay	21.8		HCM Level of Service				C					
HCM Volume to Capacity ratio	0.68											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)				8.0					
Intersection Capacity Utilization	71.2%		ICU Level of Service				C					
Analysis Period (min)	15											

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave.

2030 PM + Tower
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.93		1.00	0.99		1.00	0.94	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.96	1.00		0.98	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3370		1770	3137		1704	3489		1733	3136	
Flt Permitted	0.95	1.00		0.95	1.00		0.23	1.00		0.21	1.00	
Satd. Flow (perm)	1770	3370		1770	3137		413	3489		391	3136	
Volume (vph)	230	560	120	90	530	256	200	843	50	230	546	310
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	235	571	122	92	541	261	204	860	51	235	557	316
RTOR Reduction (vph)	0	20	0	0	46	0	0	5	0	0	95	0
Lane Group Flow (vph)	235	673	0	92	756	0	204	906	0	235	778	0
Confl. Peds. (#/hr)			100			100	100		100	100		100
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Actuated Green, G (s)	10.5	26.1		7.3	22.9		38.1	38.1		38.1	38.1	
Effective Green, g (s)	11.0	25.6		7.8	22.4		39.6	39.6		39.6	39.6	
Actuated g/C Ratio	0.13	0.30		0.09	0.26		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	229	1015		162	827		192	1625		182	1461	
v/s Ratio Prot	c0.13	c0.20		0.05	c0.24			0.26			0.25	
v/s Ratio Perm							0.49			c0.60		
v/c Ratio	1.03	0.66		0.57	0.91		1.06	0.56		1.29	0.53	
Uniform Delay, d1	37.0	25.9		37.0	30.4		22.7	16.4		22.7	16.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	66.4	1.3		2.7	14.2		82.5	1.4		165.7	1.4	
Delay (s)	103.4	27.2		39.7	44.6		105.2	17.8		188.4	17.5	
Level of Service	F	C		D	D		F	B		F	B	
Approach Delay (s)		46.5			44.1			33.8			53.8	
Approach LOS		D			D			C			D	
Intersection Summary												
HCM Average Control Delay		44.5										D
HCM Volume to Capacity ratio		1.18										
Actuated Cycle Length (s)		85.0					16.0					
Intersection Capacity Utilization		89.1%										E
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
25: Transit Village Driveway & Telegraph Ave.

2030 PM + Tower
1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	3539	3459	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	3539	3459	
Volume (vph)	45	102	100	1975	752	133
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	107	105	2079	792	140
RTOR Reduction (vph)	0	83	0	0	14	0
Lane Group Flow (vph)	47	24	105	2079	918	0
Turn Type		Perm	Prot			
Protected Phases		2		3	8	4
Permitted Phases			2			
Actuated Green, G (s)		17.8		7.7	53.7	41.5
Effective Green, g (s)		18.3		7.7	53.7	42.0
Actuated g/C Ratio		0.23		0.10	0.67	0.52
Clearance Time (s)		4.5		4.0	4.0	4.5
Vehicle Extension (s)		3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		405		362	170	2376
v/s Ratio Prot		c0.03		0.06	c0.59	0.27
v/s Ratio Perm				0.02		
v/c Ratio		0.12		0.07	0.62	0.88
Uniform Delay, d1		24.4		24.2	34.7	10.5
Progression Factor		1.00		1.00	1.00	1.93
Incremental Delay, d2		0.1		0.1	6.5	4.9
Delay (s)		24.6		24.2	41.3	15.4
Level of Service		C		C	D	B
Approach Delay (s)		24.3			16.6	24.3
Approach LOS		C			B	C
Intersection Summary						
HCM Average Control Delay				19.2		HCM Level of Service
HCM Volume to Capacity ratio				0.68		
Actuated Cycle Length (s)				80.0		Sum of lost time (s)
Intersection Capacity Utilization				64.6%		ICU Level of Service
Analysis Period (min)				15		
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 AM + Tower + Mit
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.99			0.99		1.00	0.97	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.95		1.00	0.91			0.97		1.00	0.96	
Flt Protected		0.98		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1747		1681	1599			3417		1770	3291	
Flt Permitted		0.70		0.74	1.00			1.00		0.95	1.00	
Satd. Flow (perm)		1247		1302	1599			3417		1770	3291	
Volume (vph)	10	10	10	354	330	470	0	1171	247	110	1330	460
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)	11	11	11	373	347	495	0	1233	260	116	1400	484
RTOR Reduction (vph)	0	11	0	0	57	0	0	19	0	0	37	0
Lane Group Flow (vph)	0	22	0	373	785	0	0	1474	0	116	1848	0
Confl. Peds. (#/hr)	4					4	44		12	12		44
Turn Type	Perm			Perm				Prot				
Protected Phases	7			8				2		1	6	
Permitted Phases	7			8								
Actuated Green, G (s)		3.3		27.5	27.5			35.7		5.5	45.7	
Effective Green, g (s)		3.8		28.0	28.0			36.2		6.0	46.2	
Actuated g/C Ratio		0.04		0.31	0.31			0.40		0.07	0.51	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		53		405	497			1374		118	1689	
v/s Ratio Prot								0.43		0.07	0.56	
v/s Ratio Perm		c0.02		0.29	0.49							
v/c Ratio		0.42		0.92	1.58			1.07		0.98	1.09	
Uniform Delay, d1		42.0		29.9	31.0			26.9		41.9	21.9	
Progression Factor		1.00		1.00	1.00			1.07		1.00	1.00	
Incremental Delay, d2		2.0		25.7	270.1			36.6		76.9	52.3	
Delay (s)		44.0		55.7	301.1			65.4		118.9	74.2	
Level of Service		D		E	F			E		F	E	
Approach Delay (s)		44.0			225.8			65.4			76.8	
Approach LOS		D			F			E			E	
Intersection Summary												
HCM Average Control Delay			111.1			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.23									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			98.8%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 AM + Tower + Mit
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		0.97		0.95	0.95			1.00		0.95	0.95	
Frbp, ped/bikes		1.00		0.99	0.99			1.00		0.99	0.99	
Flpb, ped/bikes		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		1.00		0.98	0.96			1.00		0.96	0.97	
Flt Protected		0.95		1.00	1.00			0.95		1.00	1.00	
Satd. Flow (prot)		3433		3427	1770	3372		1770		3403	1770	3404
Flt Permitted		0.95		1.00	0.95	1.00		0.95		1.00	0.95	1.00
Satd. Flow (perm)		3433		3427	1770	3372		1770		3403	1770	3404
Volume (vph)	460	650	111	140	820	320	120	678	140	320	1164	220
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	677	116	146	854	333	125	706	146	333	1212	229
RTOR Reduction (vph)	0	15	0	0	46	0	0	19	0	0	18	0
Lane Group Flow (vph)	479	778	0	146	1141	0	125	833	0	333	1423	0
Confl. Peds. (#/hr)	6		24	24		6	36		28	28		36
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	14.0	27.4		11.1	24.5		6.5	22.0		12.5	28.0	
Effective Green, g (s)	13.5	28.4		10.6	25.5		6.0	23.0		12.0	29.0	
Actuated g/C Ratio	0.15	0.32		0.12	0.28		0.07	0.26		0.13	0.32	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	515	1081		208	955		118	870		236	1097	
v/s Ratio Prot	c0.14	c0.23		0.08	c0.34		0.07	0.24		c0.19	c0.42	
v/s Ratio Perm												
v/c Ratio	0.93	0.72		0.70	1.19		1.06	0.96		1.41	1.30	
Uniform Delay, d1	37.8	27.3		38.2	32.2		42.0	33.0		39.0	30.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.07	0.72	
Incremental Delay, d2	23.3	1.9		8.4	98.0		99.7	21.7		187.3	134.5	
Delay (s)	61.1	29.2		46.6	130.3		141.7	54.7		228.9	156.5	
Level of Service	E	C		D	F		F	D		F	F	
Approach Delay (s)		41.2			121.1			65.8			170.1	
Approach LOS		D			F			E			F	
Intersection Summary												
HCM Average Control Delay			108.3			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.24									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			105.9%			ICU Level of Service				G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 AM + Tower + Mit
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.90		1.00	0.97		1.00	0.98		1.00	0.97	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.94		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3007		1762	3390		1770	3422		1736	3328	
Flt Permitted	0.13	1.00		0.14	1.00		0.06	1.00		0.37	1.00	
Satd. Flow (perm)	246	3007		253	3390		120	3422		678	3328	
Volume (vph)	146	424	267	120	716	90	135	515	59	100	1319	320
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)	154	446	281	126	754	95	142	542	62	105	1388	337
RTOR Reduction (vph)	0	78	0	0	8	0	0	7	0	0	18	0
Lane Group Flow (vph)	154	649	0	126	841	0	142	597	0	105	1707	0
Confl. Peds. (#/hr)	72		137	137		72			58	58		92
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	36.8	29.8		34.8	28.8		67.6	61.5		65.8	60.6	
Effective Green, g (s)	37.3	30.3		35.3	29.3		68.6	62.0		66.8	61.1	
Actuated g/C Ratio	0.31	0.25		0.29	0.24		0.57	0.52		0.56	0.51	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	2.0		3.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	165	759		150	828		159	1768		428	1695	
v/s Ratio Prot	c0.05	0.22		0.04	c0.25		c0.05	0.17		0.01	c0.51	
v/s Ratio Perm	0.24			0.21			0.46			0.12		
v/c Ratio	0.93	0.85		0.84	1.02		0.89	0.34		0.25	1.01	
Uniform Delay, d1	36.7	42.7		35.4	45.4		31.3	17.0		12.8	29.4	
Progression Factor	1.14	0.75		1.00	1.00		0.92	0.84		1.00	1.00	
Incremental Delay, d2	46.6	8.0		31.8	35.2		40.2	0.5		0.1	23.6	
Delay (s)	88.6	40.1		67.2	80.5		68.8	14.7		12.9	53.1	
Level of Service	F	D		E	F		E	B		B	D	
Approach Delay (s)		48.6			78.8			25.0			50.8	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	99.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 AM + Tower + Mit
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.91			1.00	0.95		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00			1.00	1.00		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00		1.00	1.00		0.96	1.00	
Frt	0.99			1.00	0.98		1.00	0.95		1.00	0.96	
Flt Protected	0.99			0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	4980			1762	3447		1770	1726		1704	1759	
Flt Permitted	0.66			0.21	1.00		0.10	1.00		0.50	1.00	
Satd. Flow (perm)	3328			391	3447		187	1726		889	1759	
Volume (vph)	210	710	50	72	1097	191	100	184	90	200	494	200
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)	221	747	53	76	1155	201	105	194	95	211	520	211
RTOR Reduction (vph)	0	5	0	0	13	0	0	16	0	0	13	0
Lane Group Flow (vph)	0	1016	0	76	1343	0	105	273	0	211	718	0
Confl. Peds. (#/hr)	24		18	18		24	24		48	48		24
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8		8	2		2		6	
Permitted Phases	4			8		8	2		2		6	
Actuated Green, G (s)		51.0		51.0	51.0		49.0	49.0		49.0	49.0	
Effective Green, g (s)		52.0		52.0	52.0		50.0	50.0		50.0	50.0	
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.45	0.45		0.45	0.45	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		1573		185	1629		85	785		404	800	
v/s Ratio Prot					c0.39			0.16			0.41	
v/s Ratio Perm	0.31			0.19			c0.56			0.24		
v/c Ratio	3.03dl			0.41	0.82		1.24	0.35		0.52	0.90	
Uniform Delay, d1	22.0			19.0	25.1		30.0	19.4		21.5	27.6	
Progression Factor	1.00			1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1			6.6	4.9		173.7	1.2		4.8	14.9	
Delay (s)	24.1			25.6	30.0		203.7	20.7		26.2	42.5	
Level of Service	C			C	C		F	C		C	D	
Approach Delay (s)		24.1			29.7			69.4			38.9	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM Average Control Delay	34.6	HCM Level of Service	C
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	142.7%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 AM + Tower + Mit
1/21/2008

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)	3.4			3.4			3.4			3.4		
Lane Util. Factor	0.91			0.91			1.00		0.95	1.00		0.95
Frbp, ped/bikes	1.00			0.99			1.00		0.99	1.00		0.99
Flpb, ped/bikes	1.00			1.00			1.00		1.00	1.00		1.00
Frt	0.98			0.98			1.00		0.97	1.00		0.97
Flt Protected	0.99			0.99			0.95		1.00	0.95		1.00
Satd. Flow (prot)	4932			4913			1770		3399	1763		3418
Flt Permitted	0.64			0.64			0.13		1.00	0.26		1.00
Satd. Flow (perm)	3161			3148			244		3399	489		3418
Volume (vph)	148	988	187	200	1146	191	120	376	90	365	1144	242
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)	156	1040	197	211	1206	201	126	396	95	384	1204	255
RTOR Reduction (vph)	0	16	0	0	15	0	0	17	0	0	15	0
Lane Group Flow (vph)	0	1377	0	0	1603	0	126	474	0	384	1444	0
Confl. Peds. (#/hr)	40		9		40		25		31		31	
Turn Type	Perm		pm+pt		pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	4		3		8		5		2		1	
Permitted Phases	4		8		2		6		1		6	
Actuated Green, G (s)	57.7		57.7		34.4		29.9		54.3		46.3	
Effective Green, g (s)	58.3		58.3		35.1		30.5		54.9		46.9	
Actuated g/C Ratio	0.49		0.49		0.29		0.25		0.46		0.39	
Clearance Time (s)	4.0		4.0		3.5		4.0		3.5		4.0	
Vehicle Extension (s)	2.0		2.0		3.0		2.0		3.0		2.0	
Lane Grp Cap (vph)	1536		1529		130		864		447		1336	
v/s Ratio Prot					0.04		0.14		c0.15		c0.42	
v/s Ratio Perm	0.44		c0.51		0.25		0.24					
v/c Ratio	1.54dl		2.34dl		0.97		0.55		0.86		1.08	
Uniform Delay, d1	28.1		30.9		42.3		38.8		24.2		36.5	
Progression Factor	0.91		1.00		0.92		0.83		0.79		0.59	
Incremental Delay, d2	6.5		36.8		66.7		2.4		11.4		46.6	
Delay (s)	32.1		67.6		105.8		34.6		30.7		68.4	
Level of Service	C		E		F		C		C		E	
Approach Delay (s)	32.1		67.6		49.2		60.5					
Approach LOS	C		E		D		E					

Intersection Summary			
HCM Average Control Delay	54.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	117.0%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

2030 AM + Tower + Mit
1/21/2008

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)	4.0		4.0		4.0		4.0		4.0		4.0	
Lane Util. Factor	1.00		0.91	1.00		0.91	1.00		0.95	1.00		0.95
Frbp, ped/bikes	1.00		0.99	1.00		0.99	1.00		1.00	1.00		0.96
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Frt	1.00		0.98	1.00		0.96	1.00		1.00	0.85		1.00
Flt Protected	0.95		1.00	0.95		1.00	0.95		1.00	0.95		1.00
Satd. Flow (prot)	1770		4923	1770		4839	1770		3539	1515		1770
Flt Permitted	0.95		1.00	0.95		1.00	0.95		1.00	0.95		1.00
Satd. Flow (perm)	1770		4923	1770		4839	1770		3539	1515		1770
Volume (vph)	170	1209	172	210	1144	380	140	421	130	390	1442	250
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)	179	1273	181	221	1204	400	147	443	137	411	1518	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13
Lane Group Flow (vph)	179	1439	0	221	1554	0	147	443	104	411	1518	250
Confl. Peds. (#/hr)			66		23		38		26		26	
Turn Type	Prot		Prot		Prot		pm+ov		Prot		pm+ov	
Protected Phases	7		4		3		8		5		2	
Permitted Phases	6		2		2		6		1		7	
Actuated Green, G (s)	12.0		32.0		15.0		35.0		11.0		28.0	
Effective Green, g (s)	11.0		33.0		14.0		36.0		10.0		29.0	
Actuated g/C Ratio	0.09		0.28		0.12		0.30		0.08		0.24	
Clearance Time (s)	3.0		5.0		3.0		5.0		3.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	162		1354		207		1452		148		855	
v/s Ratio Prot	0.10		0.29		c0.12		c0.32		c0.08		0.13	
v/s Ratio Perm									0.05		0.13	
v/c Ratio	1.10		1.06		1.07		1.07		0.99		0.52	
Uniform Delay, d1	54.5		43.5		53.0		42.0		55.0		39.4	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	101.6		43.0		81.6		45.0		71.6		2.2	
Delay (s)	156.1		86.5		134.6		87.0		126.5		41.7	
Level of Service	F		F		F		F		F		D	
Approach Delay (s)	94.1		92.7		56.0		82.0					
Approach LOS	F		F		E		F					

Intersection Summary			
HCM Average Control Delay	85.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 PM + Tower + Mit
1/21/2008

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)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95		1.00	0.95	
Frbp, ped/bikes		1.00		1.00	0.97			0.98		1.00	0.95	
Flpb, ped/bikes		0.99		1.00	1.00			1.00		1.00	1.00	
Frt		0.93		1.00	0.93			0.95		1.00	0.95	
Flt Protected		0.99		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1704		1681	1586			3275		1770	3209	
Flt Permitted		0.56		0.73	1.00			1.00		0.95	1.00	
Satd. Flow (perm)		963		1290	1586			3275		1770	3209	
Volume (vph)	10	10	20	127	120	120	0	1114	615	200	901	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)	11	11	21	134	126	126	0	1173	647	211	948	442
RTOR Reduction (vph)	0	20	0	0	38	0	0	67	0	0	47	0
Lane Group Flow (vph)	0	23	0	134	214	0	0	1753	0	211	1343	0
Confl. Peds. (#/hr)	36					36	48		16	16		48
Turn Type	Perm			Perm				Prot				
Protected Phases	7			8				2		1	6	
Permitted Phases	7			8								
Actuated Green, G (s)		4.0		16.5	16.5			52.0		9.5	66.0	
Effective Green, g (s)		4.5		17.0	17.0			52.5		10.0	66.5	
Actuated g/C Ratio		0.04		0.17	0.17			0.52		0.10	0.66	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		2.0		2.0	2.0			2.0		2.0	2.0	
Lane Grp Cap (vph)		43		219	270			1719		177	2134	
v/s Ratio Prot								c0.54		c0.12	0.42	
v/s Ratio Perm		c0.02		0.10	0.13							
v/c Ratio		0.53		0.61	0.79			1.02		1.19	0.63	
Uniform Delay, d1		46.7		38.4	39.8			23.8		45.0	9.6	
Progression Factor		1.00		1.00	1.00			0.72		1.00	1.00	
Incremental Delay, d2		6.2		3.5	13.7			12.4		128.8	1.4	
Delay (s)		53.0		42.0	53.5			29.4		173.8	11.1	
Level of Service		D		D	D			C		F	B	
Approach Delay (s)		53.0			49.5			29.4			32.5	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	33.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 PM + Tower + Mit
1/21/2008

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)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frbp, ped/bikes	1.00	0.98		1.00	0.99		1.00	0.97		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.94		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433	3418		1770	3299		1770	3280		1770	3416	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	3433	3418		1770	3299		1770	3280		1770	3416	
Volume (vph)	460	930		133	160		580	350		100	949	
Peak-hour factor, PHF	0.95	0.95		0.95	0.95		0.95	0.95		0.95	0.95	
Adj. Flow (vph)	484	979		140	168		611	368		105	999	
RTOR Reduction (vph)	0	12		0	0		90	0		38	0	
Lane Group Flow (vph)	484	1107		168	889		105	1329		316	792	
Confl. Peds. (#/hr)	15			48	48		15	123		48	48	
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	11.5	27.0		8.5	24.0		8.7	34.0		13.5	38.8	
Effective Green, g (s)	11.0	28.0		8.0	25.0		8.2	35.0		13.0	39.8	
Actuated g/C Ratio	0.11	0.28		0.08	0.25		0.08	0.35		0.13	0.40	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	378	957		142	825		145	1148		230	1360	
v/s Ratio Prot	c0.14	c0.32		0.09	0.27		0.06	c0.41		c0.18	0.23	
v/s Ratio Perm												
v/c Ratio	1.28	1.16		1.18	1.08		0.72	1.16		1.37	0.58	
Uniform Delay, d1	44.5	36.0		46.0	37.5		44.8	32.5		43.5	23.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.21	0.71	
Incremental Delay, d2	145.1	82.6		133.1	54.4		14.1	81.1		188.4	1.4	
Delay (s)	189.6	118.6		179.1	91.9		58.8	113.6		241.1	18.3	
Level of Service	F	F		F	F		E	F		F	B	
Approach Delay (s)		140.0			104.6			109.7			81.5	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	111.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	109.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 PM + Tower + Mit
1/21/2008

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)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			0.95			0.95	
Frbp, ped/bikes	1.00	0.99		1.00	1.00			1.00			1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.98			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1762	3458		1752	3500			3429			3390	
Flt Permitted	0.21	1.00		0.16	1.00			0.83			0.85	
Satd. Flow (perm)	392	3458		288	3500			2873			2907	
Volume (vph)	60	1161	120	70	1020	63	90	331	59	33	160	50
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	1173	121	71	1030	64	91	334	60	33	162	51
RTOR Reduction (vph)	0	10	0	0	6	0	0	14	0	0	30	0
Lane Group Flow (vph)	61	1284	0	71	1088	0	0	471	0	0	217	0
Confl. Peds. (#/hr)	24		78	78		24	8		6	6		8
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.0	50.0		50.0	50.0			20.0			20.0	
Effective Green, g (s)	51.0	51.0		51.0	51.0			21.0			21.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.26			0.26	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Grp Cap (vph)	250	2204		184	2231			754			763	
v/s Ratio Prot		c0.37			0.31							
v/s Ratio Perm	0.16			0.25				c0.16			0.07	
v/c Ratio	0.24	0.58		0.39	0.49			0.62			0.28	
Uniform Delay, d1	6.2	8.4		7.0	7.6			26.0			23.5	
Progression Factor	0.55	0.44		0.38	0.27			0.73			1.00	
Incremental Delay, d2	0.9	0.4		3.4	0.4			1.9			0.9	
Delay (s)	4.3	4.1		6.1	2.5			21.0			24.4	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		4.1			2.7			21.0			24.4	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM Average Control Delay		7.7			HCM Level of Service			A				
HCM Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		80.7%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
13: 40th St. & Telegraph Ave.

2030 PM + Tower + Mit
1/21/2008

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)	3.4	3.4		3.4	3.4			3.4			3.4	3.4
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			0.95	0.95
Frbp, ped/bikes	1.00	0.98		1.00	0.96			1.00			0.99	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	1.00
Frt	1.00	0.98		1.00	0.98			1.00			0.99	0.96
Flt Protected	0.95	1.00		0.95	1.00			0.95			1.00	1.00
Satd. Flow (prot)	1770	3427		1770	3298			1770			3465	3239
Flt Permitted	0.14	1.00		0.16	1.00			0.11			1.00	1.00
Satd. Flow (perm)	266	3427		303	3298			203			3465	3239
Volume (vph)	249	915	109	75	561	110	466	1450	124	130	701	255
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	254	934	111	77	572	112	476	1480	127	133	715	260
RTOR Reduction (vph)	0	8	0	0	15	0	0	6	0	0	33	0
Lane Group Flow (vph)	254	1037	0	77	669	0	476	1601	0	133	942	0
Confl. Peds. (#/hr)	94		86	86		94		40				111
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	39.8	32.6		27.2	24.0		61.7	52.2		38.2	32.7	
Effective Green, g (s)	40.9	33.7		28.4	24.6		62.3	52.8		39.4	33.3	
Actuated g/C Ratio	0.37	0.31		0.26	0.22		0.57	0.48		0.36	0.30	
Clearance Time (s)	3.5	4.5		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	2.0		3.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	275	1050		129	738		480	1663		166	981	
v/s Ratio Prot	c0.11	c0.30		0.02	0.20		c0.23	0.46		0.04	0.29	
v/s Ratio Perm	0.23			0.13			c0.33			0.24		
v/c Ratio	0.92	0.99		0.60	0.91		0.99	0.96		0.80	0.96	
Uniform Delay, d1	28.0	37.9		33.7	41.6		33.1	27.7		28.4	37.7	
Progression Factor	0.95	0.76		1.00	1.00		1.26	0.56		1.00	1.00	
Incremental Delay, d2	30.0	21.8		7.2	14.5		30.0	10.6		22.4	20.5	
Delay (s)	56.8	50.6		41.0	56.1		71.7	26.1		50.8	58.2	
Level of Service	E	D		D	E		E	C		D	E	
Approach Delay (s)		51.8			54.5			36.5			57.3	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM Average Control Delay		47.3			HCM Level of Service			D				
HCM Volume to Capacity ratio		0.97										
Actuated Cycle Length (s)		110.0			Sum of lost time (s)			6.8				
Intersection Capacity Utilization		102.1%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 PM + Tower + Mit
1/21/2008

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)	4.0		4.0	4.0		4.0	4.0		4.0	4.0		4.0
Lane Util. Factor	0.91		1.00	0.95		1.00	1.00		1.00	1.00		1.00
Frbp, ped/bikes	1.00		1.00	1.00		1.00	0.99		1.00	0.99		1.00
Flpb, ped/bikes	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Frt	0.99		1.00	0.98		1.00	0.97		1.00	0.98		0.98
Flt Protected	0.99		0.95	1.00		0.95	1.00		0.95	1.00		1.00
Satd. Flow (prot)	5013		1768	3450		1734	1801		1770	1801		1801
Flt Permitted	0.66		0.20	1.00		0.29	1.00		0.13	1.00		1.00
Satd. Flow (perm)	3309		368	3450		530	1801		242	1801		1801
Volume (vph)	160	864	40	91	1341	221	190	525	120	80	403	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	882	41	93	1368	226	194	536	122	82	411	71
RTOR Reduction (vph)	0	4	0	0	12	0	0	7	0	0	6	0
Lane Group Flow (vph)	0	1082	0	93	1582	0	194	651	0	82	476	0
Confl. Peds. (#/hr)	24		4	4		24	48		12	12		48
Turn Type	Perm		Perm		Perm		Perm		Perm		Perm	
Protected Phases	4		8		8		2		2		6	
Permitted Phases	4		8		8		2		2		6	
Actuated Green, G (s)	54.0		54.0		54.0		46.0		46.0		46.0	
Effective Green, g (s)	55.0		55.0		55.0		47.0		47.0		47.0	
Actuated g/C Ratio	0.50		0.50		0.50		0.43		0.43		0.43	
Clearance Time (s)	5.0		5.0		5.0		5.0		5.0		5.0	
Lane Grp Cap (vph)	1655		184		1725		226		770		103	
v/s Ratio Prot	c0.46		c0.46		c0.46		c0.36		c0.36		c0.26	
v/s Ratio Perm	0.33		0.25		0.37		0.34		0.34		0.34	
v/c Ratio	2.26dl		0.51		0.92		0.86		0.84		0.80	
Uniform Delay, d1	20.4		18.4		25.4		28.5		28.2		27.3	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	2.0		9.6		9.3		32.1		11.0		45.6	
Delay (s)	22.5		28.0		34.6		60.6		39.2		72.9	
Level of Service	C		C		C		E		D		E	
Approach Delay (s)	22.5		34.3		34.3		44.1		44.1		34.7	
Approach LOS	C		C		C		D		D		C	

Intersection Summary			
HCM Average Control Delay	33.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	135.7%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 PM + Tower + Mit
1/21/2008

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)	3.4		3.4	3.4		3.4	3.4		3.4	3.4		3.4
Lane Util. Factor	0.91		1.00	0.91		1.00	0.95		1.00	0.95		1.00
Frbp, ped/bikes	1.00		1.00	0.99		1.00	0.99		1.00	0.99		1.00
Flpb, ped/bikes	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Frt	0.99		1.00	0.96		1.00	0.99		1.00	0.99		0.98
Flt Protected	0.98		1.00	1.00		0.95	1.00		0.95	1.00		1.00
Satd. Flow (prot)	4916		4803	1768		3457	1770		1770	3434		3434
Flt Permitted	0.70		0.68	0.15		1.00	0.12		1.00	0.12		1.00
Satd. Flow (perm)	3477		3299	278		3457	231		3434	231		3434
Volume (vph)	392	695	111	110	1174	469	280	1213	110	196	601	99
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)	413	732	117	116	1236	494	295	1277	116	206	633	104
RTOR Reduction (vph)	0	10	0	0	60	0	0	6	0	0	12	0
Lane Group Flow (vph)	0	1252	0	0	1786	0	295	1387	0	206	725	0
Confl. Peds. (#/hr)	26		19	26		39	92		92	39		39
Turn Type	Perm		pm+pt		pm+pt		pm+pt		pm+pt		pm+pt	
Protected Phases	4		3		8		5		2		1	
Permitted Phases	4		8		8		2		6		6	
Actuated Green, G (s)	50.0		50.0		52.0		41.0		39.2		31.7	
Effective Green, g (s)	50.6		50.6		52.6		41.6		39.9		32.3	
Actuated g/C Ratio	0.46		0.46		0.48		0.38		0.36		0.29	
Clearance Time (s)	4.0		4.0		3.5		4.0		3.5		4.0	
Vehicle Extension (s)	2.0		2.0		3.0		2.0		3.0		2.0	
Lane Grp Cap (vph)	1599		1518		362		1307		190		1008	
v/s Ratio Prot	0.36		c0.54		0.26		0.13		c0.40		c0.07	
v/s Ratio Perm	0.36		0.26		0.26		0.26		0.32		0.32	
v/c Ratio	4.39dl		1.18		0.81		1.06		1.08		0.72	
Uniform Delay, d1	25.1		29.7		22.9		34.2		31.8		34.8	
Progression Factor	1.19		1.00		1.23		0.90		1.35		1.28	
Incremental Delay, d2	1.8		86.7		11.4		41.1		87.9		4.2	
Delay (s)	31.6		116.4		39.5		71.7		130.7		48.7	
Level of Service	C		F		D		E		F		D	
Approach Delay (s)	31.6		116.4		66.1		66.6		66.6		66.6	
Approach LOS	C		F		E		E		E		E	

Intersection Summary			
HCM Average Control Delay	74.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.2
Intersection Capacity Utilization	121.8%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 though lane as a left lane.			
c Critical Lane Group			