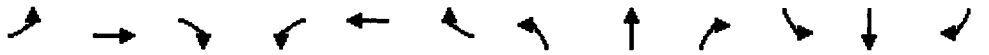
M1-AM

HCM Signalized Intersection Capacity Analysis
11: DeSmet Rd & Montana St (WB RAMPS) 6/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	21	4	258	84	503	0	0	479	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Total Lost time (s)					4.0		4.0	4.0			4.0	
Lane Util. Factor					0.95		1.00	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					0.86		1.00	1.00			0.99	
Flt Protected					1.00		0.95	1.00			1.00	
Satd. Flow (prot)					3044		1703	3421			3504	
Flt Permitted					1.00		0.43	1.00			1.00	
Satd. Flow (perm)					3044		769	3421			3504	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	0	0	24	5	300	98	585	0	0	557	34
RTOR Reduction (vph)	0	0	0	0	245	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	84	0	98	585	0	0	589	0
Confl. Peds. (#/hr)							6		4	4		6
Turn Type				Perm			Perm					
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)					7.9		72.1	72.1			72.1	
Effective Green, g (s)					8.9		73.1	73.1			73.1	
Actuated g/C Ratio					0.10		0.81	0.81			0.81	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					301		625	2779			2846	
v/s Ratio Prot								c0.17			0.17	
v/s Ratio Perm					0.03		0.13					
v/c Ratio					0.28		0.16	0.21			0.21	
Uniform Delay, d1					37.6		1.8	1.9			1.9	
Progression Factor					1.00		1.17	1.27			1.00	
Incremental Delay, d2					0.5		0.5	0.2			0.2	
Delay (s)					38.1		2.6	2.6			2.1	
Level of Service					D		A	A			A	
Approach Delay (s)		0.0			38.1			2.6			2.1	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	3	93	0	0	0	0	588	29	146	361	0
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	11	11	11
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.95		1.00	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		0.90						0.99		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		3126						3511		1709	3421	
Flt Permitted		0.99						1.00		0.37	1.00	
Satd. Flow (perm)		3126						3511		657	3421	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	44	3	107	0	0	0	0	676	33	168	415	0
RTOR Reduction (vph)	0	97	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	57	0	0	0	0	0	707	0	168	415	0
Confl. Peds. (#/hr)									4	4		
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		7.1						62.4		72.9	72.9	
Effective Green, g (s)		8.1						63.4		73.9	73.9	
Actuated g/C Ratio		0.09						0.70		0.82	0.82	
Clearance Time (s)		5.0						5.0		5.0	5.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		281						2473		615	2809	
v/s Ratio Prot								c0.20		c0.02	0.12	
v/s Ratio Perm		0.02								0.20		
v/c Ratio		0.20						0.29		0.27	0.15	
Uniform Delay, d1		38.0						4.9		2.7	1.6	
Progression Factor		1.00						0.85		1.15	0.99	
Incremental Delay, d2		0.4						0.3		0.2	0.1	
Delay (s)		38.3						4.4		3.3	1.7	
Level of Service		D						A		A	A	
Approach Delay (s)		38.3			0.0			4.4			2.2	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

M1-AM

HCM Signalized Intersection Capacity Analysis
15: Josette Ave & Montana St /ROWE

6/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	8	0	0	5	380	0	190	0	330	138	9
Ideal Flow (vphpl)	1900	1900	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	1.00	
Frpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		1.00			0.87			1.00		1.00	0.99	
Flt Protected		0.97			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1806			1615			1863		1770	1846	
Flt Permitted		0.97			1.00			1.00		0.54	1.00	
Satd. Flow (perm)		1806			1615			1863		1014	1846	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	15	9	0	0	6	437	0	218	0	379	159	10
RTOR Reduction (vph)	0	0	0	0	387	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	24	0	0	56	0	0	218	0	379	168	0
Confl. Peds. (#/hr)			1						1			
Turn Type	Split						Perm			pm+pt		
Protected Phases	4	4			8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		3.2			9.3			44.4		62.5	62.5	
Effective Green, g (s)		4.2			10.3			45.4		63.5	63.5	
Actuated g/C Ratio		0.05			0.11			0.50		0.71	0.71	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		84			185			940		834	1302	
v/s Ratio Prot		c0.01			c0.03			0.12		c0.07	0.09	
v/s Ratio Perm										c0.25		
v/c Ratio		0.29			0.30			0.23		0.45	0.13	
Uniform Delay, d1		41.5			36.6			12.5		5.3	4.3	
Progression Factor		1.00			1.00			1.00		1.34	1.11	
Incremental Delay, d2		1.9			0.9			0.6		0.4	0.2	
Delay (s)		43.3			37.5			13.1		7.5	5.0	
Level of Service		D			D			B		A	A	
Approach Delay (s)		43.3			37.5			13.1			6.7	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

M1 - NOON

HCM Signalized Intersection Capacity Analysis
11: DeSmet Rd & Montana St (WB RAMPS) 6/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	30	0	171	69	534	0	0	608	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Total Lost time (s)					4.0		4.0	4.0			4.0	
Lane Util. Factor					0.95		1.00	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					0.87		1.00	1.00			0.99	
Flt Protected					0.99		0.95	1.00			1.00	
Satd. Flow (prot)					3065		1705	3421			3498	
Flt Permitted					0.99		0.36	1.00			1.00	
Satd. Flow (perm)					3065		648	3421			3498	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	0	0	35	0	199	80	621	0	0	707	51
RTOR Reduction (vph)	0	0	0	0	181	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	53	0	80	621	0	0	756	0
Confl. Peds. (#/hr)							6		4	4		6
Turn Type				Perm			Perm					
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)					7.2		72.8	72.8			72.8	
Effective Green, g (s)					8.2		73.8	73.8			73.8	
Actuated g/C Ratio					0.09		0.82	0.82			0.82	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					279		531	2805			2868	
v/s Ratio Prot								0.18			c0.22	
v/s Ratio Perm					0.02		0.12					
v/c Ratio					0.19		0.15	0.22			0.26	
Uniform Delay, d1					37.8		1.7	1.8			1.9	
Progression Factor					1.00		1.22	1.10			1.00	
Incremental Delay, d2					0.3		0.6	0.2			0.2	
Delay (s)					38.2		2.6	2.1			2.1	
Level of Service					D		A	A			A	
Approach Delay (s)		0.0			38.2			2.2			2.1	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

M1 - NOON

HCM Signalized Intersection Capacity Analysis
12: LaSalle Rd & Montana St (WB RAMPS) 6/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	8	85	0	0	0	0	673	30	146	543	0
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	11	11	11
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.95		1.00	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		0.89						0.99		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		3125						3514		1710	3421	
Flt Permitted		0.99						1.00		0.33	1.00	
Satd. Flow (perm)		3125						3514		585	3421	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	30	9	98	0	0	0	0	774	34	168	624	0
RTOR Reduction (vph)	0	89	0	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	48	0	0	0	0	0	807	0	168	624	0
Confl. Peds. (#/hr)									4	4		
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		6.9						62.6		73.1	73.1	
Effective Green, g (s)		7.9						63.6		74.1	74.1	
Actuated g/C Ratio		0.09						0.71		0.82	0.82	
Clearance Time (s)		5.0						5.0		5.0	5.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		274						2483		563	2817	
v/s Ratio Prot								c0.23		c0.02	0.18	
v/s Ratio Perm		0.02								0.22		
v/c Ratio		0.17						0.32		0.30	0.22	
Uniform Delay, d1		38.0						5.0		3.1	1.7	
Progression Factor		1.00						0.86		1.10	0.99	
Incremental Delay, d2		0.3						0.3		0.3	0.2	
Delay (s)		38.3						4.6		3.7	1.9	
Level of Service		D						A		A	A	
Approach Delay (s)		38.3			0.0			4.6			2.3	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

M1 - NOON

HCM Signalized Intersection Capacity Analysis
15: Josette Ave & Montana St / ROWE

6/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	18	10	8	0	18	498	1	174	0	476	153	16
Ideal Flow (vphpl)	1900	1900	1900	1900	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		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		0.97			0.87		1.00	1.00		1.00	0.99	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1754			1620		1770	1863		1770	1837	
Flt Permitted		0.98			1.00		0.64	1.00		0.49	1.00	
Satd. Flow (perm)		1754			1620		1184	1863		921	1837	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	21	11	9	0	21	572	1	200	0	547	176	18
RTOR Reduction (vph)	0	8	0	0	493	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	33	0	0	100	0	1	200	0	547	192	0
Confl. Peds. (#/hr)			1						1			
Turn Type	Split						Perm			pm+pt		
Protected Phases	4	4			8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		5.0			11.4		29.3	29.3		58.6	58.6	
Effective Green, g (s)		6.0			12.4		30.3	30.3		59.6	59.6	
Actuated g/C Ratio		0.07			0.14		0.34	0.34		0.66	0.66	
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)		117			223		399	627		849	1217	
v/s Ratio Prot		c0.02			c0.06			0.11		c0.18	0.10	
v/s Ratio Perm							0.00			c0.25		
v/c Ratio		0.28			0.45		0.00	0.32		0.64	0.16	
Uniform Delay, d1		39.9			35.7		19.8	22.2		8.0	5.7	
Progression Factor		1.00			1.00		1.00	1.00		1.37	1.07	
Incremental Delay, d2		1.3			1.4		0.0	1.3		1.7	0.3	
Delay (s)		41.2			37.1		19.8	23.5		12.7	6.4	
Level of Service		D			D		B	C		B	A	
Approach Delay (s)		41.2			37.1			23.5			11.0	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

M1 - PM

HCM Signalized Intersection Capacity Analysis
11: DeSmet Rd & Montana St (WB RAMPS)

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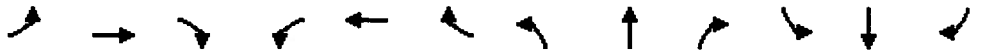
3/28/2008

Movement	EBL	EBT	EBR	WBL	WBT	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	11	11	11	12	12	12
Total Lost time (s)					4.0		4.0	4.0			4.0	
Lane Util. Factor					0.95		1.00	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					0.86		1.00	1.00			0.99	
Flt Protected					1.00		0.95	1.00			1.00	
Satd. Flow (prot)					3044		1707	3421			3496	
Flt Permitted					1.00		0.28	1.00			1.00	
Satd. Flow (perm)					3044		494	3421			3496	
Volume (vph)	0	0	0	14	1	141	43	442	0	0	643	49
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	0	0	0	20	1	205	62	642	0	0	935	71
RTOR Reduction (vph)	0	0	0	0	187	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	0	0	0	39	0	62	642	0	0	1004	0
Confl. Peds. (#/hr)							6		4	4		6
Turn Type				Perm			Perm					
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)					6.7		73.3	73.3			73.3	
Effective Green, g (s)					7.7		74.3	74.3			74.3	
Actuated g/C Ratio					0.09		0.83	0.83			0.83	
Clearance Time (s)					5.0		5.0	5.0			5.0	
Vehicle Extension (s)					3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)					260		408	2824			2886	
v/s Ratio Prot								0.19			c0.29	
v/s Ratio Perm					0.01		0.13					
v/c Ratio					0.15		0.15	0.23			0.35	
Uniform Delay, d1					38.1		1.6	1.7			1.9	
Progression Factor					1.00		1.01	0.92			1.00	
Incremental Delay, d2					0.3		0.8	0.2			0.3	
Delay (s)					38.4		2.3	1.7			2.3	
Level of Service					D		A	A			A	
Approach Delay (s)		0.0			38.4			1.8			2.3	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

M1 - PM



Movement	EBL	EBT	EBR	WBL	WBT	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	12	12	12	11	11	11
Total Lost time (s)		4.0						4.0		4.0	4.0	
Lane Util. Factor		0.95						0.95		1.00	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		0.90						0.99		1.00	1.00	
Flt Protected		0.99						1.00		0.95	1.00	
Satd. Flow (prot)		3146						3512		1709	3421	
Flt Permitted		0.99						1.00		0.35	1.00	
Satd. Flow (perm)		3146						3512		628	3421	
Volume (vph)	27	11	78	0	0	0	0	491	24	209	548	0
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	39	16	112	0	0	0	0	705	34	300	787	0
RTOR Reduction (vph)	0	102	0	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	65	0	0	0	0	0	737	0	300	787	0
Confl. Peds. (#/hr)									4	4		
Turn Type	Perm									pm+pt		
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Actuated Green, G (s)		7.2						60.3		72.8	72.8	
Effective Green, g (s)		8.2						61.3		73.8	73.8	
Actuated g/C Ratio		0.09						0.68		0.82	0.82	
Clearance Time (s)		5.0						5.0		5.0	5.0	
Vehicle Extension (s)		3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)		287						2392		617	2805	
v/s Ratio Prot								0.21		c0.05	0.23	
v/s Ratio Perm		0.02								c0.35		
v/c Ratio		0.23						0.31		0.49	0.28	
Uniform Delay, d1		38.0						5.8		4.1	1.9	
Progression Factor		1.00						0.93		0.94	0.99	
Incremental Delay, d2		0.4						0.3		0.6	0.2	
Delay (s)		38.4						5.7		4.4	2.1	
Level of Service		D						A		A	A	
Approach Delay (s)		38.4			0.0			5.7			2.8	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

M1 - PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	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		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			0.87		1.00	1.00		1.00	0.99	
Flt Protected		0.96			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1786			1621		1770	1863		1770	1845	
Flt Permitted		0.96			1.00		0.55	1.00		0.42	1.00	
Satd. Flow (perm)		1786			1621		1022	1863		786	1845	
Volume (vph)	18	5	1	0	13	334	3	145	0	407	232	15
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	26	7	1	0	19	480	4	208	0	585	333	22
RTOR Reduction (vph)	0	1	0	0	419	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	33	0	0	80	0	4	208	0	585	353	0
Confl. Peds. (#/hr)			1						1			
Turn Type	Split						Perm			pm+pt		
Protected Phases	4	4			8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		3.4			10.4		21.8	21.8		61.2	61.2	
Effective Green, g (s)		4.4			11.4		22.8	22.8		62.2	62.2	
Actuated g/C Ratio		0.05			0.13		0.25	0.25		0.69	0.69	
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)		87			205		259	472		930	1275	
v/s Ratio Prot		c0.02			c0.05			0.11		c0.25	0.19	
v/s Ratio Perm							0.00			c0.19		
v/c Ratio		0.38			0.39		0.02	0.44		0.63	0.28	
Uniform Delay, d1		41.5			36.1		25.2	28.2		7.3	5.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	0.88	
Incremental Delay, d2		2.8			1.2		0.1	3.0		1.3	0.5	
Delay (s)		44.2			37.3		25.3	31.2		8.6	5.2	
Level of Service		D			D		C	C		A	A	
Approach Delay (s)		44.2			37.3			31.1			7.3	
Approach LOS		D			D			C			A	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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MZ - AM

4:3:08 MONTANA STREET WB RAMP 7

E	(m)	4.26	4.26	4.26	4.26
L'	(m)	10.00	10.00	10.00	10.00
V	(m)	3.66	3.66	3.66	3.66
RAD	(m)	20.00	20.00	20.00	20.00
PHI	(d)	30.00	30.00	30.00	30.00
DIA	(m)	53.00	53.00	53.00	53.00
GRAD SEP		0	1	0	0

TIME PERIOD	min		60
TIME SLICE	min		05
RESULTS PERIOD	min	00	60
TIME COST	$/hr		15.00
FLOW PERIOD	min	00	60
FLOW TYPE	pcu/veh		VEH
FLOW PEAK	am/op/pm		AM

LEG NAME	PCU	FLOWS (1st exit	2nd	etc...U)	FLOF	CL	FLOW RATIO	FLOW TIME
NB	1.05	000	503	084 0	1.00	50	0.75 1.125 0.75	00 30 60
WB	1.05	258	004	021 0	1.00	50	0.75 1.125 0.75	00 30 60
SB	1.05	029	479	000 0	1.00	50	0.75 1.125 0.75	00 30 60
EB	1.05	000	000	000 0	1.00	50	0.75 1.125 0.75	00 30 60

FLOW	veh	587	283	508	0		
CAPACITY	veh	1201	912	1146	945	AVDEL s	5.7
AVE DELAY	mins	0.10	0.10	0.09	0.00	L O S	A
MAX DELAY	mins	0.12	0.12	0.11	0.00	VEH HRS	2.2
AVE QUEUE	veh	1	0	1	0	COST $	32.7
MAX QUEUE	veh	1	1	1	0		

M2-AM

4:3:08 MONTANA STREET EB RAMP 17

E	(m)	4.57	4.57	4.57	4.57
L'	(m)	10.00	10.00	10.00	10.00
V	(m)	3.66	3.66	3.66	3.66
RAD	(m)	20.00	20.00	20.00	20.00
PHI	(d)	30.00	30.00	30.00	30.00
DIA	(m)	53.00	53.00	53.00	53.00
GRAD SEP		0	0	0	1

TIME PERIOD	min	60
TIME SLICE	min	05
RESULTS PERIOD	min	00 60
TIME COST	$/hr	15.00
FLOW PERIOD	min	00 60
FLOW TYPE	pcu/veh	VEH
FLOW PEAK	am/op/pm	AM

LEG NAME	PCU	FLOWS (1st exit	2nd	etc...U)	FLOF	CL	FLOW RATIO	FLOW TIME
NB	1.05	029	588	000 0	1.00	50	0.75 1.125 0.75	00 30 60
WB	1.05	000	000	000 0	1.00	50	0.75 1.125 0.75	00 30 60
SB	1.05	000	361	146 0	1.00	50	0.75 1.125 0.75	00 30 60
EB	1.05	093	003	038 0	1.00	50	0.75 1.125 0.75	00 30 60

FLOW	veh	617	0	507	134
CAPACITY	veh	1162	931	1260	1026
AVE DELAY	mins	0.11	0.00	0.08	0.07
MAX DELAY	mins	0.14	0.00	0.09	0.08
AVE QUEUE	veh	1	0	1	0
MAX QUEUE	veh	2	0	1	0

AVDEL	s	5.6
L O S		A
VEH HRS		1.9
COST	$	29.1

MZ-NOON

4:3:08 MONTANA STREET WB RAMP 10

E	(m)	4.26	4.26	4.26	4.26
L'	(m)	10.00	10.00	10.00	10.00
V	(m)	3.66	3.66	3.66	3.66
RAD	(m)	20.00	20.00	20.00	20.00
PHI	(d)	30.00	30.00	30.00	30.00
DIA	(m)	53.00	53.00	53.00	53.00
GRAD SEP		0	1	0	0

TIME PERIOD	min		60
TIME SLICE	min		05
RESULTS PERIOD	min	00	60
TIME COST	$/hr		15.00
FLOW PERIOD	min	00	60
FLOW TYPE	pcu/veh		VEH
FLOW PEAK	am/op/pm		OP

LEG NAME	PCU	FLOWS (1st exit	2nd	etc...U)		FLOF	CL	FLOW RATIO	FLOW TIME
NB	1.05	000	534	069	0	1.00	50	0.75 1.125 0.75	00 30 60
WB	1.05	171	000	030	0	1.00	50	0.75 1.125 0.75	00 30 60
SB	1.05	044	608	000	0	1.00	50	0.75 1.125 0.75	00 30 60
EB	1.05	000	000	000	0	1.00	50	0.75 1.125 0.75	00 30 60

FLOW	veh	603	201	652	0
CAPACITY	veh	1201	901	1151	874
AVE DELAY	mins	0.10	0.08	0.12	0.00
MAX DELAY	mins	0.12	0.10	0.15	0.00
AVE QUEUE	veh	1	0	1	0
MAX QUEUE	veh	1	0	2	0

AVDEL	s	6.4
L O S		A
VEH HRS		2.6
COST	$	38.9

M2 - NOON

4:3:08 MONTANA STREET EB RAMP 20

E	(m)	4.57	4.57	4.57	4.57
L'	(m)	10.00	10.00	10.00	10.00
V	(m)	3.66	3.66	3.66	3.66
RAD	(m)	20.00	20.00	20.00	20.00
PHI	(d)	30.00	30.00	30.00	30.00
DIA	(m)	53.00	53.00	53.00	53.00
GRAD SEP		0	0	0	1

TIME PERIOD min	60
TIME SLICE min	05
RESULTS PERIOD min	00 60
TIME COST $/hr	15.00
FLOW PERIOD min	00 60
FLOW TYPE pcu/veh	VEH
FLOW PEAK am/op/pm	OP

LEG	NAME	*PCU	*FLOWS (1st	exit	2nd	etc...U)*	*FLOF*	*CL*	FLOW RATIO	*FLOW TIME*
NB		*1.05*	030	673	000	0	*1.00*	50*	0.75 1.125 0.75*	00 30 60
WB		*1.05*	000	000	000	0	*1.00*	50*	0.75 1.125 0.75*	00 30 60
SB		*1.05*	000	543	146	0	*1.00*	50*	0.75 1.125 0.75*	00 30 60
EB		*1.05*	085	008	026	0	*1.00*	50*	0.75 1.125 0.75*	00 30 60

FLOW	veh	703	0	689	119
CAPACITY	veh	1165	893	1260	893
AVE DELAY	mins	0.13	0.00	0.10	0.08
MAX DELAY	mins	0.17	0.00	0.13	0.09
AVE QUEUE	veh	2	0	1	0
MAX QUEUE	veh	2	0	2	0

AVDEL s	6.9
L O S	A
VEH HRS	2.9
COST $	43.5

PM
M2-

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*****************************************************************************
*                                                                           *
*   4:3:08                    MONTANA STREET WB RAMP                      9  *
*                                                                           *
*****************************************************************************
*                                                *                          *
* E     (m)    4.26   4.26   4.26   4.26         * TIME PERIOD    min     60  *
* L'    (m)   10.00  10.00  10.00  10.00         * TIME SLICE     min     05  *
* V     (m)    3.66   3.66   3.66   3.66         * RESULTS PERIOD min  00 60  *
* RAD   (m)   20.00  20.00  20.00  20.00         * TIME COST     $/hr  15.00  *
* PHI   (d)   30.00  30.00  30.00  30.00         * FLOW PERIOD    min  00 60  *
* DIA   (m)   53.00  53.00  53.00  53.00         * FLOW TYPE  pcu/veh    VEH  *
* GRAD SEP       0      1      0      0         * FLOW PEAK am/op/pm     PM  *
*                                                *                          *
*****************************************************************************
* LEG NAME *PCU *FLOWS (1st exit 2nd etc...U)*FLOF*CL*  FLOW RATIO   *FLOW TIME*
*          *    *                            *    *  *               *         *
* NB       *1.05*  000  553  054  0           *1.00*50*0.75 1.125 0.75*15 45 60 *
* WB       *1.05*  176  001  018  0           *1.00*50*0.75 1.125 0.75*15 45 60 *
* SB       *1.05*  061  804  000  0           *1.00*50*0.75 1.125 0.75*15 45 60 *
* EB       *1.05*  000  000  000  0           *1.00*50*0.75 1.125 0.75*15 45 60 *
*          *    *                            *    *  *               *         *
*          *    *                            *    *  *               *         *
*          *    *                            *    *  *               *         *
*****************************************************************************
*                                                          *                  *
* FLOW          veh     607    195    865      0          *                  *
* CAPACITY      veh    1201    898   1164    780          * AVDEL s     10.1 *
* AVE DELAY    mins    0.10   0.08   0.24   0.00          * L  O  S        B *
* MAX DELAY    mins    0.14   0.11   0.43   0.00          * VEH HRS      4.7 *
* AVE QUEUE     veh       1      0      3      0          * COST  $     70.4 *
* MAX QUEUE     veh       2      0      7      0          *                  *
*                                                          *                  *
*****************************************************************************
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1172-PM

4:3:08 MONTANA STREET EB RAMP 19

E	(m)	4.57	4.57	4.57	4.57
L'	(m)	10.00	10.00	10.00	10.00
V	(m)	3.66	3.66	3.66	3.66
RAD	(m)	20.00	20.00	20.00	20.00
PHI	(d)	30.00	30.00	30.00	30.00
DIA	(m)	53.00	53.00	53.00	53.00
GRAD SEP		0	0	0	1

TIME PERIOD	min 60
TIME SLICE	min 05
RESULTS PERIOD	min 00 60
TIME COST	$/hr 15.00
FLOW PERIOD	min 00 60
FLOW TYPE	pcu/veh VEH
FLOW PEAK	am/op/pm PM

LEG	NAME	*PCU	*FLOWS (1st	exit	2nd	etc...U)*	*FLOF	*CL*	FLOW RATIO	*FLOW TIME*
	NB	*1.05*	030	614	000	0	*1.00	*50	*0.75 1.125 0.75	*00 30 60
	WB	*1.05*	000	000	000	0	*1.00	*50	*0.75 1.125 0.75	*00 30 60
	SB	*1.05*	000	685	261	0	*1.00	*50	*0.75 1.125 0.75	*00 30 60
	EB	*1.05*	098	014	034	0	*1.00	*50	*0.75 1.125 0.75	*00 30 60

FLOW	veh	644	0	946	146		
CAPACITY	veh	1098	920	1260	704	AVDEL s	10.3
AVE DELAY	mins	0.13	0.00	0.21	0.11	L O S	B
MAX DELAY	mins	0.18	0.00	0.30	0.14	VEH HRS	5.0
AVE QUEUE	veh	1	0	3	0	COST $	74.5
MAX QUEUE	veh	2	0	5	0		

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H1-AM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	243	0	78	0	0	0	76	540	0	0	788	256
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	11	11
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				1.00	0.86			0.91	
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	1.00	0.85				1.00	1.00			0.96	
Flt Protected	0.95	0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1681	1681	1583				1769	6408			4702	
Flt Permitted	0.95	0.95	1.00				0.21	1.00			1.00	
Satd. Flow (perm)	1681	1681	1583				399	6408			4702	
Peak-hour factor, PHF	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Adj. Flow (vph)	248	0	80	0	0	0	78	551	0	0	804	261
RTOR Reduction (vph)	0	0	60	0	0	0	0	0	0	0	65	0
Lane Group Flow (vph)	124	124	20	0	0	0	78	551	0	0	1000	0
Confl. Peds. (#/hr)							3					3
Turn Type	Split		Perm				pm+pt					
Protected Phases	3	3					5	2			6	
Permitted Phases			3				2					
Actuated Green, G (s)	21.0	21.0	21.0				59.0	59.0			45.0	
Effective Green, g (s)	22.0	22.0	22.0				60.0	60.0			46.0	
Actuated g/C Ratio	0.24	0.24	0.24				0.67	0.67			0.51	
Clearance Time (s)	5.0	5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)	411	411	387				418	4272			2403	
v/s Ratio Prot	c0.07	0.07					c0.02	0.09			c0.21	
v/s Ratio Perm			0.01				0.10					
v/c Ratio	0.30	0.30	0.05				0.19	0.13			0.42	
Uniform Delay, d1	27.7	27.7	26.0				9.7	5.5			13.7	
Progression Factor	1.00	1.00	1.00				1.00	1.00			0.26	
Incremental Delay, d2	1.9	1.9	0.2				1.0	0.1			0.5	
Delay (s)	29.6	29.6	26.3				10.7	5.5			4.1	
Level of Service	C	C	C				B	A			A	
Approach Delay (s)		28.8			0.0			6.2			4.1	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

H1-AM

HCM Unsignalized Intersection Capacity Analysis
19: WB on-ramp & Harrison Ave

7/24/2008

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations										
Volume (veh/h)	0	0	0	863	0	0	848	109	0	44
Sign Control	Stop			Free			Free		Yield	
Grade	0%			0%			0%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	899	0	0	883	114	0	46
Pedestrians	8								9	
Lane Width (ft)	0.0								15.0	
Walking Speed (ft/s)	4.0								4.0	
Percent Blockage	0								1	
Right turn flare (veh)										
Median type				None			None			
Median storage veh)										
Upstream signal (ft)				307			405			
pX, platoon unblocked	0.88	0.88				0.88			0.88	0.88
vC, conflicting volume	1294	1856	1005			908			1913	309
vC1, stage 1 conf vol										
vC2, stage 2 conf vol										
vCu, unblocked vol	874	1510	1005			438			1575	0
tC, single (s)	7.5	6.5	4.1			4.1			6.5	6.9
tC, 2 stage (s)										
tF (s)	3.5	4.0	2.2			2.2			4.0	3.3
p0 queue free %	100	100	100			100			100	95
cM capacity (veh/h)	204	104	685			979			95	950

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	NW 1
Volume Total	300	300	300	353	353	290	46
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	114	46
cSH	1700	1700	1700	1700	1700	1700	950
Volume to Capacity	0.18	0.18	0.18	0.21	0.21	0.17	0.05
Queue Length 95th (ft)	0	0	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	9.0
Lane LOS							A
Approach Delay (s)	0.0			0.0			9.0
Approach LOS							A

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	26.7%	ICU Level of Service		A
Analysis Period (min)	15			

H1-AM

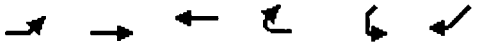
HCM Signalized Intersection Capacity Analysis
1: Harrison Ave & WB on-ramp

7/24/2008

Movement	NBL	NBT	SBL	SBT	NEL	SWL
Lane Configurations						
Volume (vph)	89	855	98	848	80	40
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	0.97	0.91	1.00	0.91	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (prot)	3433	5085	1770	5085	1770	1770
Flt Permitted	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (perm)	3433	5085	1770	5085	1770	1770
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	929	107	922	87	43
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	97	929	107	922	87	43
Turn Type	Prot		Prot		custom	custom
Protected Phases	5	2	1	6		
Permitted Phases					4	8
Actuated Green, G (s)	8.0	36.0	18.0	46.0	21.0	21.0
Effective Green, g (s)	9.0	37.0	19.0	47.0	22.0	22.0
Actuated g/C Ratio	0.10	0.41	0.21	0.52	0.24	0.24
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	343	2091	374	2656	433	433
v/s Ratio Prot	0.03	c0.18	c0.06	c0.18		
v/s Ratio Perm					c0.05	0.02
v/c Ratio	0.28	0.44	0.29	0.35	0.20	0.10
Uniform Delay, d1	37.5	19.1	29.8	12.5	27.0	26.3
Progression Factor	1.09	0.88	0.92	1.29	1.00	1.00
Incremental Delay, d2	2.0	0.7	1.8	0.3	1.0	0.5
Delay (s)	43.0	17.5	29.2	16.6	28.1	26.8
Level of Service	D	B	C	B	C	C
Approach Delay (s)		19.9		17.9		
Approach LOS		B		B		

Intersection Summary				
HCM Average Control Delay	19.4	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.33			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	36.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations			↑↑			↱
Volume (veh/h)	0	0	89	0	0	109
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	97	0	0	118
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			270			
pX, platoon unblocked						
vC, conflicting volume	97				97	48
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	97				97	48
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	88
cM capacity (veh/h)	1495				892	1010

Direction, Lane #	WB 1	WB 2	SW 1
Volume Total	48	48	118
Volume Left	0	0	0
Volume Right	0	0	118
cSH	1700	1700	1010
Volume to Capacity	0.03	0.03	0.12
Queue Length 95th (ft)	0	0	10
Control Delay (s)	0.0	0.0	9.0
Lane LOS			A
Approach Delay (s)	0.0		9.0
Approach LOS			A

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	16.7%	ICU Level of Service	A
Analysis Period (min)	15		

H1-AM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/24/2008

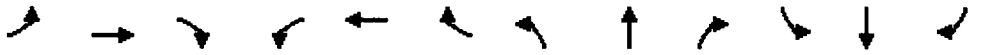
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	31	645	123	0	1081
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	701	134	0	1175
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			554			158
pX, platoon unblocked	0.93	0.88			0.88	
vC, conflicting volume	1293	355			839	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	686	2			551	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	354	951			893	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	34	351	351	134	588	588
Volume Left	0	0	0	0	0	0
Volume Right	34	0	0	134	0	0
cSH	951	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.21	0.21	0.08	0.35	0.35
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	8.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	8.9	0.0			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

H1-AM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave 7/24/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	455	0	124	10	575	69	85	625	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.98		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		0.86		1.00	0.93			0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.97			1.00		0.95	1.00	
Satd. Flow (prot)		1583		1416	1608			3357		1769	3418	
Flt Permitted		1.00		0.95	0.97			0.94		0.33	1.00	
Satd. Flow (perm)		1583		1416	1608			3173		617	3418	
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)	0	0	1	464	0	127	10	587	70	87	638	4
RTOR Reduction (vph)	0	1	0	0	31	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	302	258	0	0	659	0	87	642	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.2		24.9	24.9			40.7		48.9	48.9	
Effective Green, g (s)		2.2		25.9	25.9			41.7		49.9	49.9	
Actuated g/C Ratio		0.02		0.29	0.29			0.46		0.55	0.55	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		39		407	463			1470		396	1895	
v/s Ratio Prot		c0.00		c0.21	0.16					0.01	c0.19	
v/s Ratio Perm								c0.21		0.11		
v/c Ratio		0.00		0.74	0.56			0.45		0.22	0.34	
Uniform Delay, d1		42.8		29.0	27.2			16.4		14.4	11.0	
Progression Factor		1.00		1.00	1.00			0.49		1.00	1.00	
Incremental Delay, d2		0.0		7.1	1.5			0.9		0.3	0.5	
Delay (s)		42.8		36.2	28.7			8.9		14.7	11.5	
Level of Service		D		D	C			A		B	B	
Approach Delay (s)		42.8			32.5			8.9			11.9	
Approach LOS		D			C			A			B	

Intersection Summary			
HCM Average Control Delay	17.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

H1 - NOON

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave 7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	418	0	170	0	0	0	174	1080	0	0	1519	181
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	11	11
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				1.00	0.86			0.91	
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	1.00	0.85				1.00	1.00			0.98	
Flt Protected	0.95	0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1681	1681	1583				1770	6408			4823	
Flt Permitted	0.95	0.95	1.00				0.08	1.00			1.00	
Satd. Flow (perm)	1681	1681	1583				152	6408			4823	
Peak-hour factor, PHF	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Adj. Flow (vph)	427	0	173	0	0	0	178	1102	0	0	1550	185
RTOR Reduction (vph)	0	0	135	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	213	214	38	0	0	0	178	1102	0	0	1719	0
Confl. Peds. (#/hr)							3					3
Turn Type	Split		Perm				pm+pt					
Protected Phases	3	3					5	2			6	
Permitted Phases			3				2					
Actuated Green, G (s)	19.0	19.0	19.0				61.0	61.0			44.0	
Effective Green, g (s)	20.0	20.0	20.0				62.0	62.0			45.0	
Actuated g/C Ratio	0.22	0.22	0.22				0.69	0.69			0.50	
Clearance Time (s)	5.0	5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)	374	374	352				338	4414			2412	
v/s Ratio Prot	0.13	c0.13					c0.08	0.17			c0.36	
v/s Ratio Perm			0.02				0.29					
v/c Ratio	0.57	0.57	0.11				0.53	0.25			0.71	
Uniform Delay, d1	31.2	31.2	27.9				21.7	5.3			17.5	
Progression Factor	1.00	1.00	1.00				1.00	1.00			0.66	
Incremental Delay, d2	6.2	6.2	0.6				5.8	0.1			1.7	
Delay (s)	37.3	37.4	28.5				27.5	5.4			13.2	
Level of Service	D	D	C				C	A			B	
Approach Delay (s)		34.8			0.0			8.5			13.2	
Approach LOS		C			A			A			B	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

H1-Noon

HCM Unsignalized Intersection Capacity Analysis
19: WB on-ramp & Harrison Ave

7/24/2008

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations				↑↑↑			↑↑↑↱			↱
Volume (veh/h)	0	0	0	1628	0	0	1411	219	0	135
Sign Control	Stop			Free			Free		Yield	
Grade	0%			0%			0%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	1696	0	0	1470	228	0	141
Pedestrians	8								9	
Lane Width (ft)	0.0								15.0	
Walking Speed (ft/s)	4.0								4.0	
Percent Blockage	0								1	
Right turn flare (veh)										
Median type				None			None			
Median storage veh)										
Upstream signal (ft)				307			405			
pX, platoon unblocked	0.85	0.85	0.82			0.76			0.85	0.76
vC, conflicting volume	2298	3297	1706			1705			3411	574
vC1, stage 1 conf vol										
vC2, stage 2 conf vol										
vCu, unblocked vol	489	1661	1093			830			1795	0
tC, single (s)	7.5	6.5	4.1			4.1			6.5	6.9
tC, 2 stage (s)										
tF (s)	3.5	4.0	2.2			2.2			4.0	3.3
p0 queue free %	100	100	100			100			100	83
cM capacity (veh/h)	324	81	520			602			67	818

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	NW 1
Volume Total	565	565	565	588	588	522	141
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	228	141
cSH	1700	1700	1700	1700	1700	1700	818
Volume to Capacity	0.33	0.33	0.33	0.35	0.35	0.31	0.17
Queue Length 95th (ft)	0	0	0	0	0	0	15
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	10.3
Lane LOS							B
Approach Delay (s)	0.0			0.0			10.3
Approach LOS							B

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	46.5%	ICU Level of Service		A
Analysis Period (min)	15			

H1-NO

HCM Signalized Intersection Capacity Analysis
1: Harrison Ave & WB on-ramp

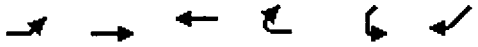
7/24/2008

Movement	NBL	NBT	SBL	SBT	NEL	SWL
Lane Configurations						
Volume (vph)	138	1568	105	1306	60	66
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	0.97	0.91	1.00	0.91	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (prot)	3433	5085	1770	5085	1770	1770
Flt Permitted	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (perm)	3433	5085	1770	5085	1770	1770
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	150	1704	114	1420	65	72
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	150	1704	114	1420	65	72
Turn Type	Prot		Prot		custom	custom
Protected Phases	5	2	1	6		
Permitted Phases					4	8
Actuated Green, G (s)	8.0	46.0	13.0	51.0	16.0	16.0
Effective Green, g (s)	9.0	47.0	14.0	52.0	17.0	17.0
Actuated g/C Ratio	0.10	0.52	0.16	0.58	0.19	0.19
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	343	2656	275	2938	334	334
v/s Ratio Prot	0.04	c0.34	c0.06	c0.28		
v/s Ratio Perm					0.04	c0.04
v/c Ratio	0.44	0.64	0.41	0.48	0.19	0.22
Uniform Delay, d1	38.1	15.4	34.3	11.1	30.7	30.9
Progression Factor	1.02	0.79	0.84	0.91	1.00	1.00
Incremental Delay, d2	3.9	1.2	3.8	0.5	1.3	1.5
Delay (s)	42.9	13.3	32.7	10.6	32.0	32.3
Level of Service	D	B	C	B	C	C
Approach Delay (s)		15.7		12.2		
Approach LOS		B		B		

Intersection Summary				
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

H1 - NN



Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations			↑↑			↱
Volume (veh/h)	0	0	138	0	0	219
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	150	0	0	238
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)			270			
pX, platoon unblocked						
vC, conflicting volume	150				150	75
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	150				150	75
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	75
cM capacity (veh/h)	1429				827	971

Direction, Lane #	WB 1	WB 2	SW 1
Volume Total	75	75	238
Volume Left	0	0	0
Volume Right	0	0	238
cSH	1700	1700	971
Volume to Capacity	0.04	0.04	0.25
Queue Length 95th (ft)	0	0	24
Control Delay (s)	0.0	0.0	9.9
Lane LOS			A
Approach Delay (s)	0.0		9.9
Approach LOS			A

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	24.0%	ICU Level of Service	A
Analysis Period (min)	15		

H1-NN

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	15	1288	354	0	1570
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	1400	385	0	1707
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			554			158
pX, platoon unblocked	0.87	0.74			0.74	
vC, conflicting volume	2257	704			1789	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	844	0			1365	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	261	801			369	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	16	700	700	385	853	853
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	385	0	0
cSH	801	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.41	0.41	0.23	0.50	0.50
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	9.6	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.6	0.0			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

H1 - NN

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1	4	478	3	150	9	1235	70	208	1093	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.95		1.00	0.93			0.99		1.00	1.00	
Flt Protected		0.98		0.95	0.98			1.00		0.95	1.00	
Satd. Flow (prot)		1707		1416	1599			3389		1770	3419	
Flt Permitted		0.98		0.95	0.98			0.95		0.10	1.00	
Satd. Flow (perm)		1707		1416	1599			3205		191	3419	
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)	5	1	4	488	3	153	9	1260	71	212	1115	5
RTOR Reduction (vph)	0	4	0	0	32	0	0	4	0	0	1	0
Lane Group Flow (vph)	0	6	0	332	280	0	0	1336	0	212	1119	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.3		30.6	30.6			34.1		43.1	43.1	
Effective Green, g (s)		2.3		31.6	31.6			35.1		44.1	44.1	
Actuated g/C Ratio		0.03		0.35	0.35			0.39		0.49	0.49	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		44		497	561			1250		181	1675	
v/s Ratio Prot		c0.00		c0.23	0.18					c0.06	0.33	
v/s Ratio Perm								0.42		c0.51		
v/c Ratio		0.14		0.67	0.50			1.07		1.17	0.67	
Uniform Delay, d1		42.9		24.8	23.0			27.4		37.7	17.4	
Progression Factor		1.00		1.00	1.00			0.37		1.00	1.00	
Incremental Delay, d2		1.1		3.4	0.7			43.9		120.6	2.1	
Delay (s)		43.9		28.1	23.7			54.1		158.3	19.5	
Level of Service		D		C	C			D		F	B	
Approach Delay (s)		43.9			26.0			54.1			41.6	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	43.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

H1- PM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave 4/1/2008

Movement	EBL	EBT	EBR	WBL	WBT	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	12	12	12	12	11	11
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				1.00	0.86			0.91	
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	1.00	0.85				1.00	1.00			0.96	
Flt Protected	0.95	0.95	1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1681	1688	1583				1770	6408			4707	
Flt Permitted	0.95	0.95	1.00				0.09	1.00			1.00	
Satd. Flow (perm)	1681	1688	1583				169	6408			4707	
Volume (vph)	298	5	127	0	0	0	149	727	0	0	977	308
Peak-hour factor, PHF	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	380	7	162	0	0	0	190	927	0	0	1246	393
RTOR Reduction (vph)	0	0	124	0	0	0	0	0	0	0	63	0
Lane Group Flow (vph)	190	197	38	0	0	0	190	927	0	0	1576	0
Confl. Peds. (#/hr)							3					3
Turn Type	Split		Perm				pm+pt					
Protected Phases	3	3					5	2			6	
Permitted Phases			3				2					
Actuated Green, G (s)	20.0	20.0	20.0				60.0	60.0			39.0	
Effective Green, g (s)	21.0	21.0	21.0				61.0	61.0			40.0	
Actuated g/C Ratio	0.23	0.23	0.23				0.68	0.68			0.44	
Clearance Time (s)	5.0	5.0	5.0				5.0	5.0			5.0	
Lane Grp Cap (vph)	392	394	369				417	4343			2092	
v/s Ratio Prot	0.11	c0.12					c0.09	0.14			c0.33	
v/s Ratio Perm			0.02				0.22					
v/c Ratio	0.48	0.50	0.10				0.46	0.21			0.75	
Uniform Delay, d1	29.8	29.9	27.1				21.2	5.5			20.9	
Progression Factor	1.00	1.00	1.00				1.00	1.00			0.15	
Incremental Delay, d2	4.2	4.5	0.6				3.6	0.1			2.2	
Delay (s)	34.1	34.4	27.7				24.7	5.6			5.4	
Level of Service	C	C	C				C	A			A	
Approach Delay (s)		32.3			0.0			8.8			5.4	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

H1-PM

HCM Unsignalized Intersection Capacity Analysis
19: WB on-ramp & Harrison Ave 4/1/2008

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations				↑↑↑			↑↑↑			↱
Sign Control	Stop			Free			Free		Yield	
Grade	0%			0%			0%		0%	
Volume (veh/h)	0	0	0	906	0	0	1111	105	0	50
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	0	0	1180	0	0	1447	137	0	65
Pedestrians	8								9	
Lane Width (ft)	0.0								15.0	
Walking Speed (ft/s)	4.0								4.0	
Percent Blockage	0								1	
Right turn flare (veh)										
Median type	None								None	
Median storage veh)										
Upstream signal (ft)				307			405			
pX, platoon unblocked	0.94	0.94	0.89			0.90			0.94	0.90
vC, conflicting volume	1981	2712	1591			1189			2780	402
vC1, stage 1 conf vol										
vC2, stage 2 conf vol										
vCu, unblocked vol	1433	2206	1422			982			2279	106
tC, single (s)	7.5	6.5	4.1			4.1			6.5	6.9
tC, 2 stage (s)										
tF (s)	3.5	4.0	2.2			2.2			4.0	3.3
p0 queue free %	100	100	100			100			100	92
cM capacity (veh/h)	82	41	424			621			37	825

Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	NW 1
Volume Total	393	393	393	579	579	426	65
Volume Left	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	137	65
cSH	1700	1700	1700	1700	1700	1700	825
Volume to Capacity	0.23	0.23	0.23	0.34	0.34	0.25	0.08
Queue Length 95th (ft)	0	0	0	0	0	0	6
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	9.7
Lane LOS							A
Approach Delay (s)	0.0			0.0			9.7
Approach LOS							A

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	33.2%	ICU Level of Service		A
Analysis Period (min)	15			

H1-PM

HCM Signalized Intersection Capacity Analysis
1: Harrison Ave & WB on-ramp 4/1/2008

Movement	NBL	NBT	SBL	SBT	NEL	SWL
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	0.97	0.91	1.00	0.91	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (prot)	3433	5085	1770	5085	1770	1770
Flt Permitted	0.95	1.00	0.95	1.00	0.95	0.95
Satd. Flow (perm)	3433	5085	1770	5085	1770	1770
Volume (vph)	388	656	76	1035	116	70
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	527	891	103	1406	158	95
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	527	891	103	1406	158	95
Turn Type	Prot		Prot		custom	custom
Protected Phases	5	2	1	6		
Permitted Phases					4	8
Actuated Green, G (s)	22.0	43.0	13.0	34.0	19.0	19.0
Effective Green, g (s)	23.0	44.0	14.0	35.0	20.0	20.0
Actuated g/C Ratio	0.26	0.49	0.16	0.39	0.22	0.22
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	877	2486	275	1978	393	393
v/s Ratio Prot	c0.15	0.18	0.06	c0.28		
v/s Ratio Perm					c0.09	0.05
v/c Ratio	0.60	0.36	0.37	0.71	0.40	0.24
Uniform Delay, d1	29.5	14.3	34.1	23.2	29.9	28.8
Progression Factor	1.12	0.83	1.01	0.95	1.00	1.00
Incremental Delay, d2	3.0	0.4	3.4	1.9	3.0	1.5
Delay (s)	35.9	12.2	37.7	23.9	32.9	30.2
Level of Service	D	B	D	C	C	C
Approach Delay (s)		21.0		24.9		
Approach LOS		C		C		

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

H1-PM

HCM Unsignalized Intersection Capacity Analysis
3: WB on-ramp & 4/1/2008

Movement	EBL	EBT	WBT	WBR	SWL	SWR
Lane Configurations			↑↑			↱
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	0	0	388	0	0	105
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	527	0	0	143
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)			270			
pX, platoon unblocked						
vC, conflicting volume	527				527	264
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	527				527	264
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	81
cM capacity (veh/h)	1036				481	735

Direction, Lane #	WB 1	WB 2	SW 1
Volume Total	264	264	143
Volume Left	0	0	0
Volume Right	0	0	143
cSH	1700	1700	735
Volume to Capacity	0.16	0.16	0.19
Queue Length 95th (ft)	0	0	18
Control Delay (s)	0.0	0.0	11.1
Lane LOS			B
Approach Delay (s)	0.0		11.1
Approach LOS			B

Intersection Summary			
Average Delay		2.4	
Intersection Capacity Utilization		28.2%	ICU Level of Service A
Analysis Period (min)		15	

H1-PM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave 4/1/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	10	666	310	0	1207
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	905	421	0	1640
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			554			158
pX, platoon unblocked	0.86	0.90			0.90	
vC, conflicting volume	1729	456			1330	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1349	291			1258	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	122	636			494	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	14	452	452	421	820	820
Volume Left	0	0	0	0	0	0
Volume Right	14	0	0	421	0	0
cSH	636	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.27	0.27	0.25	0.48	0.48
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	10.8	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.8	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

H1-PM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave 4/1/2008

Movement	EBL	EBT	EBR	WBL	WBT	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	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.94		1.00	0.97			0.98		1.00	1.00	
Flt Protected		0.97		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1688		1416	1650			3361		1770	3421	
Flt Permitted		0.97		0.95	0.96			0.95		0.13	1.00	
Satd. Flow (perm)		1688		1416	1650			3193		249	3421	
Volume (vph)	5	0	4	482	2	58	4	595	67	137	725	0
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	6	0	5	615	3	74	5	759	85	175	925	0
RTOR Reduction (vph)	0	5	0	0	9	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	6	0	330	353	0	0	840	0	175	925	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.3		29.7	29.7			28.4		44.0	44.0	
Effective Green, g (s)		2.3		30.7	30.7			29.4		45.0	45.0	
Actuated g/C Ratio		0.03		0.34	0.34			0.33		0.50	0.50	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		43		483	563			1043		321	1711	
v/s Ratio Prot		c0.00		c0.23	0.21					0.07	c0.27	
v/s Ratio Perm								c0.26		0.20		
v/c Ratio		0.14		0.68	0.63			0.81		0.55	0.54	
Uniform Delay, d1		42.9		25.5	24.8			27.7		15.6	15.4	
Progression Factor		1.00		1.00	1.00			0.53		1.00	1.00	
Incremental Delay, d2		1.1		4.0	2.2			6.5		1.9	1.2	
Delay (s)		44.0		29.4	27.0			21.0		17.5	16.6	
Level of Service		D		C	C			C		B	B	
Approach Delay (s)		44.0			28.2			21.0			16.8	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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H2-AM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/24/2008

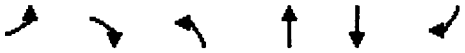
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	243	0	78	0	0	0	76	540	54	98	788	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	11	11
Total Lost time (s)	4.0		4.0				4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97		1.00				1.00	0.86		1.00	0.91	
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		0.85				1.00	0.99		1.00	0.96	
Flt Protected	0.95		1.00				0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583				1769	6315		1770	4705	
Flt Permitted	0.95		1.00				0.22	1.00		0.40	1.00	
Satd. Flow (perm)	3433		1583				412	6315		737	4705	
Peak-hour factor, PHF	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Adj. Flow (vph)	248	0	80	0	0	0	78	551	59	107	804	261
RTOR Reduction (vph)	0	0	69	0	0	0	0	11	0	0	41	0
Lane Group Flow (vph)	248	0	11	0	0	0	78	599	0	107	1024	0
Confl. Peds. (#/hr)							3					3
Turn Type	Prot		custom				pm+pt			Perm		
Protected Phases	4						5	2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	11.8		11.8				68.2	68.2		57.8	57.8	
Effective Green, g (s)	12.8		12.8				69.2	69.2		58.8	58.8	
Actuated g/C Ratio	0.14		0.14				0.77	0.77		0.65	0.65	
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)	488		225				413	4856		482	3074	
v/s Ratio Prot	c0.07						c0.01	0.09			c0.22	
v/s Ratio Perm			0.01				0.13			0.15		
v/c Ratio	0.51		0.05				0.19	0.12		0.22	0.33	
Uniform Delay, d1	35.7		33.4				3.0	2.7		6.3	6.9	
Progression Factor	1.00		1.00				1.00	1.00		0.49	0.48	
Incremental Delay, d2	0.8		0.1				0.2	0.1		1.1	0.3	
Delay (s)	36.5		33.4				3.2	2.7		4.1	3.6	
Level of Service	D		C				A	A		A	A	
Approach Delay (s)		35.8			0.0			2.8			3.7	
Approach LOS		D			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	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			

1/12 - PM

HCM Signalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave

7/24/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	80	128	0	855	966	0
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		0.86	0.86	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		6408	6408	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		6408	6408	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	83	133	0	891	1006	0
RTOR Reduction (vph)	0	70	0	0	0	0
Lane Group Flow (vph)	83	63	0	891	1006	0
Confl. Peds. (#/hr)						11
Turn Type		Perm				
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	9.8	9.8		70.2	70.2	
Effective Green, g (s)	10.8	10.8		71.2	71.2	
Actuated g/C Ratio	0.12	0.12		0.79	0.79	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	212	190		5069	5069	
v/s Ratio Prot	c0.05			0.14	c0.16	
v/s Ratio Perm		0.04				
v/c Ratio	0.39	0.33		0.18	0.20	
Uniform Delay, d1	36.6	36.3		2.3	2.3	
Progression Factor	1.00	1.00		1.27	0.68	
Incremental Delay, d2	1.2	1.0		0.1	0.1	
Delay (s)	37.8	37.3		3.0	1.7	
Level of Service	D	D		A	A	
Approach Delay (s)	37.5			3.0	1.7	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HZ-AM

HCM Signalized Intersection Capacity Analysis
19: WB on-ramp & Harrison Ave 7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	40	3	44	89	719	0	0	848	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	15	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	0.97	0.91			0.91	
Frpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
Frt					1.00	0.85	1.00	1.00			0.98	
Flt Protected					0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1780	1742	3319	4916			4823	
Flt Permitted					0.96	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1780	1742	870	4916			4823	
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)	0	0	0	42	3	46	93	749	0	0	883	114
RTOR Reduction (vph)	0	0	0	0	0	42	0	0	0	0	10	0
Lane Group Flow (vph)	0	0	0	0	45	4	93	749	0	0	987	0
Confl. Peds. (#/hr)									9			8
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.7	6.7	73.3	73.3			63.5	
Effective Green, g (s)					7.7	7.7	74.3	74.3			64.5	
Actuated g/C Ratio					0.09	0.09	0.83	0.83			0.72	
Clearance Time (s)					5.0	5.0	5.0	5.0			5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					152	149	876	4058			3456	
v/s Ratio Prot							0.01	c0.15			c0.20	
v/s Ratio Perm					0.03	0.00	0.08					
v/c Ratio					0.30	0.03	0.11	0.18			0.29	
Uniform Delay, d1					38.6	37.7	1.7	1.6			4.5	
Progression Factor					1.00	1.00	0.78	0.80			0.83	
Incremental Delay, d2					1.1	0.1	0.1	0.1			0.2	
Delay (s)					39.7	37.8	1.4	1.4			4.0	
Level of Service					D	D	A	A			A	
Approach Delay (s)		0.0			38.7			1.4			4.0	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	4.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H/2-PM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	31	646	123	0	1081
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	702	134	0	1175
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.91	0.98			0.98	
vC, conflicting volume	1294	355			840	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1010	289			786	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	215	688			806	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	34	351	351	134	588	588
Volume Left	0	0	0	0	0	0
Volume Right	34	0	0	134	0	0
cSH	688	1700	1700	1700	1700	1700
Volume to Capacity	0.05	0.21	0.21	0.08	0.35	0.35
Queue Length 95th (ft)	4	0	0	0	0	0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.5	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

HZ-PM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	455	0	124	10	575	69	85	625	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.98		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		0.86		1.00	0.93			0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.97			1.00		0.95	1.00	
Satd. Flow (prot)		1583		1416	1608			3357		1769	3418	
Flt Permitted		1.00		0.95	0.97			0.94		0.28	1.00	
Satd. Flow (perm)		1583		1416	1608			3173		530	3418	
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)	0	0	1	464	0	127	10	587	70	87	638	4
RTOR Reduction (vph)	0	1	0	0	31	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	302	258	0	0	659	0	87	642	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.2		24.9	24.9			38.2		48.9	48.9	
Effective Green, g (s)		2.2		25.9	25.9			39.2		49.9	49.9	
Actuated g/C Ratio		0.02		0.29	0.29			0.44		0.55	0.55	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		39		407	463			1382		386	1895	
v/s Ratio Prot		c0.00		c0.21	0.16					0.02	c0 19	
v/s Ratio Perm								c0.21		0.11		
v/c Ratio		0.00		0.74	0.56			0.48		0.23	0.34	
Uniform Delay, d1		42.8		29.0	27.2			18.1		10.3	11.0	
Progression Factor		1.00		1.00	1.00			0.79		1.00	1.00	
Incremental Delay, d2		0.0		7.1	1.5			1.2		0.3	0.5	
Delay (s)		42.8		36.2	28.7			15.5		10.6	11.5	
Level of Service		D		D	C			B		B	B	
Approach Delay (s)		42.8			32.5			15.5			11.4	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

42-NOON

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave 7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	418	0	170	0	0	0	174	1080	49	105	1519	181
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	11	11
Total Lost time (s)	4.0		4.0				4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97		1.00				1.00	0.86		1.00	0.91	
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		0.85				1.00	0.99		1.00	0.98	
Flt Protected	0.95		1.00				0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583				1770	6364		1770	4824	
Flt Permitted	0.95		1.00				0.07	1.00		0.22	1.00	
Satd. Flow (perm)	3433		1583				140	6364		405	4824	
Peak-hour factor, PHF	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Adj. Flow (vph)	427	0	173	0	0	0	178	1102	53	114	1550	185
RTOR Reduction (vph)	0	0	132	0	0	0	0	6	0	0	14	0
Lane Group Flow (vph)	427	0	41	0	0	0	178	1149	0	114	1721	0
Confl. Peds. (#/hr)							3					3
Turn Type	Prot		custom				pm+pt			Perm		
Protected Phases	4						5	2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	16.9		16.9				63.1	63.1		48.4	48.4	
Effective Green, g (s)	17.9		17.9				64.1	64.1		49.4	49.4	
Actuated g/C Ratio	0.20		0.20				0.71	0.71		0.55	0.55	
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)	683		315				294	4533		222	2648	
v/s Ratio Prot	c0.12						c0.07	0.18			c0.36	
v/s Ratio Perm			0.03				0.36			0.28		
v/c Ratio	0.63		0.13				0.61	0.25		0.51	0.65	
Uniform Delay, d1	33.0		29.6				16.5	4.5		12.8	14.2	
Progression Factor	1.00		1.00				1.00	1.00		0.63	0.58	
Incremental Delay, d2	1.8		0.2				3.5	0.1		8.0	1.2	
Delay (s)	34.8		29.8				20.0	4.7		15.9	9.5	
Level of Service	C		C				B	A		B	A	
Approach Delay (s)		33.3			0.0			6.7			9.9	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HZ-NN

HCM Signalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave 7/24/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	60	165	0	1568	1521	0
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		0.86	0.86	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		6408	6408	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		6408	6408	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	172	0	1633	1584	0
RTOR Reduction (vph)	0	21	0	0	0	0
Lane Group Flow (vph)	62	151	0	1633	1584	0
Confl. Peds. (#/hr)						11
Turn Type		Perm				
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	13.8	13.8		66.2	66.2	
Effective Green, g (s)	14.8	14.8		67.2	67.2	
Actuated g/C Ratio	0.16	0.16		0.75	0.75	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	291	260		4785	4785	
v/s Ratio Prot	0.04			c0.25	0.25	
v/s Ratio Perm		c0.10				
v/c Ratio	0.21	0.58		0.34	0.33	
Uniform Delay, d1	32.6	34.7		3.9	3.8	
Progression Factor	1.00	1.00		1.45	0.27	
Incremental Delay, d2	0.4	3.3		0.2	0.2	
Delay (s)	32.9	38.0		5.8	1.2	
Level of Service	C	D		A	A	
Approach Delay (s)	36.7			5.8	1.2	
Approach LOS	D			A	A	

Intersection Summary				
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HZ-NN

HCM Signalized Intersection Capacity Analysis
19: WB on-ramp & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	66	0	135	138	1505	0	0	1306	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	15	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	0.97	0.91			0.91	
Frpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
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	1742	3319	4916			4799	
Flt Permitted					0.95	1.00	0.11	1.00			1.00	
Satd. Flow (perm)					1770	1742	392	4916			4799	
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)	0	0	0	69	0	141	144	1568	0	0	1360	228
RTOR Reduction (vph)	0	0	0	0	0	29	0	0	0	0	18	0
Lane Group Flow (vph)	0	0	0	0	69	112	144	1568	0	0	1570	0
Confl. Peds. (#/hr)									9			8
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.0	11.0	69.0	69.0			57.6	
Effective Green, g (s)					12.0	12.0	70.0	70.0			58.6	
Actuated g/C Ratio					0.13	0.13	0.78	0.78			0.65	
Clearance Time (s)					5.0	5.0	5.0	5.0			5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					236	232	546	3824			3125	
v/s Ratio Prot							0.02	c0.32			c0.33	
v/s Ratio Perm					0.04	c0.06	0.18					
v/c Ratio					0.29	0.48	0.26	0.41			0.50	
Uniform Delay, d1					35.2	36.1	4.1	3.3			8.1	
Progression Factor					1.00	1.00	1.69	0.86			0.63	
Incremental Delay, d2					0.7	1.6	0.2	0.3			0.5	
Delay (s)					35.9	37.7	7.1	3.1			5.6	
Level of Service					D	D	A	A			A	
Approach Delay (s)		0.0			37.1			3.5			5.6	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H2-NN

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	15	1288	354	0	1570
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	1400	385	0	1707
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.81	0.88			0.88	
vC, conflicting volume	2257	704			1789	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1429	399			1628	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	101	529			348	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	16	700	700	385	853	853
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	385	0	0
cSH	529	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.41	0.41	0.23	0.50	0.50
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	12.0	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

HZ-NN

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave 7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1	4	478	3	150	9	1235	70	208	1093	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.95		1.00	0.93			0.99		1.00	1.00	
Flt Protected		0.98		0.95	0.98			1.00		0.95	1.00	
Satd. Flow (prot)		1707		1416	1599			3389		1770	3419	
Flt Permitted		0.98		0.95	0.98			0.94		0.13	1.00	
Satd. Flow (perm)		1707		1416	1599			3201		251	3419	
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)	5	1	4	488	3	153	9	1260	71	212	1115	5
RTOR Reduction (vph)	0	4	0	0	32	0	0	5	0	0	1	0
Lane Group Flow (vph)	0	6	0	332	280	0	0	1335	0	212	1119	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.3		30.6	30.6			24.7		43.1	43.1	
Effective Green, g (s)		2.3		31.6	31.6			25.7		44.1	44.1	
Actuated g/C Ratio		0.03		0.35	0.35			0.29		0.49	0.49	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		44		497	561			914		366	1675	
v/s Ratio Prot		c0.00		c0.23	0.18					0.09	c0.33	
v/s Ratio Perm								c0.42		0.19		
v/c Ratio		0.14		0.67	0.50			1.46		0.58	0.67	
Uniform Delay, d1		42.9		24.8	23.0			32.2		18.2	17.4	
Progression Factor		1.00		1.00	1.00			0.77		1.00	1.00	
Incremental Delay, d2		1.1		3.4	0.7			213.0		2.2	2.1	
Delay (s)		43.9		28.1	23.7			237.8		20.4	19.5	
Level of Service		D		C	C			F		C	B	
Approach Delay (s)		43.9			26.0			237.8			19.7	
Approach LOS		D			C			F			B	

Intersection Summary			
HCM Average Control Delay	108.9	HCM Level of Service	F
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

H2 - PM

Movement	EBL	EBT	EBR	WBL	WBT	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	12	12	12	12	11	11
Total Lost time (s)	4.0		4.0				4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97		1.00				1.00	0.86		1.00	0.91	
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		0.85				1.00	0.99		1.00	0.96	
Flt Protected	0.95		1.00				0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3433		1583				1770	6316		1770	4710	
Flt Permitted	0.95		1.00				0.09	1.00		0.21	1.00	
Satd. Flow (perm)	3433		1583				168	6316		390	4710	
Volume (vph)	298	0	127	0	0	0	149	843	84	76	977	308
Peak-hour factor, PHF	0.98	0.92	0.98	0.92	0.92	0.92	0.98	0.98	0.92	0.92	0.98	0.98
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	380	0	162	0	0	0	190	1075	114	103	1246	393
RTOR Reduction (vph)	0	0	133	0	0	0	0	14	0	0	50	0
Lane Group Flow (vph)	380	0	29	0	0	0	190	1175	0	103	1589	0
Confl. Peds. (#/hr)							3					3
Turn Type	Prot		custom				pm+pt			Perm		
Protected Phases	4						5	2			6	
Permitted Phases			4				2			6		
Actuated Green, G (s)	14.9		14.9				65.1	65.1		50.0	50.0	
Effective Green, g (s)	15.9		15.9				66.1	66.1		51.0	51.0	
Actuated g/C Ratio	0.18		0.18				0.73	0.73		0.57	0.57	
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)	606		280				321	4639		221	2669	
v/s Ratio Prot	c0.11						c0.07	0.19			0.34	
v/s Ratio Perm			0.02				c0.36			0.26		
v/c Ratio	0.63		0.10				0.59	0.25		0.47	0.60	
Uniform Delay, d1	34.3		31.1				12.7	3.9		11.5	12.8	
Progression Factor	1.00		1.00				1.00	1.00		0.44	0.43	
Incremental Delay, d2	2.0		0.2				2.9	0.1		6.5	0.9	
Delay (s)	36.3		31.2				15.6	4.0		11.5	6.4	
Level of Service	D		C				B	A		B	A	
Approach Delay (s)		34.8			0.0			5.6			6.7	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

H2-PM

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		0.86	0.86	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		6408	6408	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		6408	6408	
Volume (vph)	116	208	0	1160	1093	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	151	271	0	1510	1423	0
RTOR Reduction (vph)	0	11	0	0	0	0
Lane Group Flow (vph)	151	260	0	1510	1423	0
Confl. Peds. (#/hr)						11
Turn Type		Perm				
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	18.4	18.4		61.6	61.6	
Effective Green, g (s)	19.4	19.4		62.6	62.6	
Actuated g/C Ratio	0.22	0.22		0.70	0.70	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	382	341		4457	4457	
v/s Ratio Prot	0.09			c0.24	0.22	
v/s Ratio Perm		c0.16				
v/c Ratio	0.40	0.76		0.34	0.32	
Uniform Delay, d1	30.3	33.1		5.5	5.4	
Progression Factor	1.00	1.00		1.34	0.25	
Incremental Delay, d2	0.7	9.7		0.2	0.2	
Delay (s)	30.9	42.8		7.5	1.5	
Level of Service	C	D		A	A	
Approach Delay (s)	38.6			7.5	1.5	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

H2-PM

Movement	EBL	EBT	EBR	WBL	WBT	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	11	12	15	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	0.97	0.91			0.91	
Frpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
Frt					1.00	0.85	1.00	1.00			0.99	
Flt Protected					0.95	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1770	1742	3319	4916			4845	
Flt Permitted					0.95	1.00	0.10	1.00			1.00	
Satd. Flow (perm)					1770	1742	363	4916			4845	
Volume (vph)	0	0	0	70	0	50	388	906	0	0	1111	105
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	0	0	0	91	0	65	505	1180	0	0	1447	137
RTOR Reduction (vph)	0	0	0	0	0	58	0	0	0	0	8	0
Lane Group Flow (vph)	0	0	0	0	91	7	505	1180	0	0	1576	0
Confl. Peds. (#/hr)									9			8
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.3	8.3	71.7	71.7			52.7	
Effective Green, g (s)					9.3	9.3	72.7	72.7			53.7	
Actuated g/C Ratio					0.10	0.10	0.81	0.81			0.60	
Clearance Time (s)					5.0	5.0	5.0	5.0			5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					183	180	786	3971			2891	
v/s Ratio Prot							c0.11	0.24			0.33	
v/s Ratio Perm					0.05	0.00	c0.41					
v/c Ratio					0.50	0.04	0.64	0.30			0.54	
Uniform Delay, d1					38.1	36.3	15.1	2.2			10.8	
Progression Factor					1.00	1.00	1.72	0.61			0.78	
Incremental Delay, d2					2.1	0.1	1.7	0.2			0.6	
Delay (s)					40.3	36.4	27.7	1.5			9.1	
Level of Service					D	D	C	A			A	
Approach Delay (s)		0.0			38.7			9.4			9.1	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

H2-PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑	↱		↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	10	666	310	0	1207
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	905	421	0	1640
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.84	0.95			0.95	
vC, conflicting volume	1729	456			1330	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1495	373			1294	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	95	590			503	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	14	452	452	421	820	820
Volume Left	0	0	0	0	0	0
Volume Right	14	0	0	421	0	0
cSH	590	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.27	0.27	0.25	0.48	0.48
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	11.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.2	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

HZ-PM

Movement	EBL	EBT	EBR	WBL	WBT	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	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.94		1.00	0.97			0.98		1.00	1.00	
Flt Protected		0.97		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1688		1416	1650			3361		1770	3421	
Flt Permitted		0.97		0.95	0.96			0.95		0.13	1.00	
Satd. Flow (perm)		1688		1416	1650			3193		249	3421	
Volume (vph)	5	0	4	482	2	58	4	595	67	137	725	0
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	6	0	5	615	3	74	5	759	85	175	925	0
RTOR Reduction (vph)	0	5	0	0	9	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	6	0	330	353	0	0	840	0	175	925	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.3		29.7	29.7			28.4		44.0	44.0	
Effective Green, g (s)		2.3		30.7	30.7			29.4		45.0	45.0	
Actuated g/C Ratio		0.03		0.34	0.34			0.33		0.50	0.50	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		43		483	563			1043		321	1711	
v/s Ratio Prot		c0.00		c0.23	0.21					0.07	c0.27	
v/s Ratio Perm								c0.26		0.20		
v/c Ratio		0.14		0.68	0.63			0.81		0.55	0.54	
Uniform Delay, d1		42.9		25.5	24.8			27.7		15.6	15.4	
Progression Factor		1.00		1.00	1.00			0.71		1.00	1.00	
Incremental Delay, d2		1.1		4.0	2.2			6.5		1.9	1.2	
Delay (s)		44.0		29.4	27.0			26.1		17.5	16.6	
Level of Service		D		C	C			C		B	B	
Approach Delay (s)		44.0			28.2			26.1			16.8	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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H20- AM

HCM Signalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave (EB ON/OFF - RAMPS) 6/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	129	1	80	0	620	54	98	828	0
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	11	12	12	11
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			0.91		1.00	0.91	
Frt		0.86		1.00	0.85			0.99		1.00	1.00	
Flt Protected		1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1611		1770	1587			5024		1770	5085	
Flt Permitted		1.00		0.76	1.00			1.00		0.38	1.00	
Satd. Flow (perm)		1611		1410	1587			5024		705	5085	
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)	0	0	1	132	1	82	0	633	55	100	845	0
RTOR Reduction (vph)	0	1	0	0	69	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	0	0	132	14	0	0	681	0	100	845	0
Turn Type	Perm			Perm						Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)		13.7		13.7	13.7			66.3		66.3	66.3	
Effective Green, g (s)		14.7		14.7	14.7			67.3		67.3	67.3	
Actuated g/C Ratio		0.16		0.16	0.16			0.75		0.75	0.75	
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)		263		230	259			3757		527	3802	
v/s Ratio Prot		0.00			0.01			0.14			c0.17	
v/s Ratio Perm				c0.09						0.14		
v/c Ratio		0.00		0.57	0.06			0.18		0.19	0.22	
Uniform Delay, d1		31.5		34.8	31.8			3.3		3.3	3.4	
Progression Factor		1.00		1.00	1.00			1.00		1.15	1.07	
Incremental Delay, d2		0.0		3.4	0.1			0.1		0.8	0.1	
Delay (s)		31.5		38.2	31.9			3.4		4.6	3.8	
Level of Service		C		D	C			A		A	A	
Approach Delay (s)		31.5			35.8			3.4			3.9	
Approach LOS		C			D			A			A	

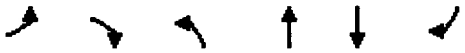
Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

H20-AM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

6/24/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	243	78	76	540	788	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1769	5085	4705	
Flt Permitted	0.95	1.00	0.22	1.00	1.00	
Satd. Flow (perm)	3433	1583	412	5085	4705	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	248	80	78	551	804	261
RTOR Reduction (vph)	0	69	0	0	38	0
Lane Group Flow (vph)	248	11	78	551	1027	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.8	11.8	68.2	68.2	57.8	
Effective Green, g (s)	12.8	12.8	69.2	69.2	58.8	
Actuated g/C Ratio	0.14	0.14	0.77	0.77	0.65	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	488	225	413	3910	3074	
v/s Ratio Prot	c0.07		c0.01	0.11	c0.22	
v/s Ratio Perm		0.01	0.13			
v/c Ratio	0.51	0.05	0.19	0.14	0.33	
Uniform Delay, d1	35.7	33.4	3.0	2.7	6.9	
Progression Factor	1.00	1.00	1.72	1.63	0.67	
Incremental Delay, d2	0.8	0.1	0.2	0.1	0.3	
Delay (s)	36.5	33.4	5.4	4.5	4.9	
Level of Service	D	C	A	A	A	
Approach Delay (s)	35.8			4.6	4.9	
Approach LOS	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)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H20-Am

HCM Signalized Intersection Capacity Analysis
19: WB on & off-ramps & Harrison Ave

6/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	40	44	719	89	109	848
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	1742	4820		1711	4916
Flt Permitted	0.95	1.00	1.00		0.31	1.00
Satd. Flow (perm)	1711	1742	4820		566	4916
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	46	749	93	114	883
RTOR Reduction (vph)	0	42	10	0	0	0
Lane Group Flow (vph)	42	4	832	0	114	883
Confl. Peds. (#/hr)				9		
Turn Type		custom			pm+pt	
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	6.6	6.6	61.2		73.4	73.4
Effective Green, g (s)	7.6	7.6	62.2		74.4	74.4
Actuated g/C Ratio	0.08	0.08	0.69		0.83	0.83
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	144	147	3331		572	4064
v/s Ratio Prot			c0.17		0.02	c0.18
v/s Ratio Perm	c0.02	0.00			0.15	
v/c Ratio	0.29	0.03	0.25		0.20	0.22
Uniform Delay, d1	38.7	37.8	5.2		2.1	1.6
Progression Factor	1.00	1.00	0.91		1.27	1.24
Incremental Delay, d2	1.1	0.1	0.2		0.2	0.1
Delay (s)	39.8	37.9	4.9		2.8	2.1
Level of Service	D	D	A		A	A
Approach Delay (s)	38.8		4.9			2.2
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	5.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H20 - AM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

6/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	31	645	123	0	1081
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	701	134	0	1175
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.93	0.94			0.94	
vC, conflicting volume	1293	355			839	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	870	185			700	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	269	774			836	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	34	351	351	134	588	588
Volume Left	0	0	0	0	0	0
Volume Right	34	0	0	134	0	0
cSH	774	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.21	0.21	0.08	0.35	0.35
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.9	0.0			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

H20-AM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave 6/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	455	0	124	10	575	69	85	625	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.98		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		0.86		1.00	0.93			0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.97			1.00		0.95	1.00	
Satd. Flow (prot)		1583		1416	1608			3357		1769	3418	
Flt Permitted		1.00		0.95	0.97			0.94		0.28	1.00	
Satd. Flow (perm)		1583		1416	1608			3173		528	3418	
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)	0	0	1	464	0	127	10	587	70	87	638	4
RTOR Reduction (vph)	0	1	0	0	30	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	302	259	0	0	659	0	87	642	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.2		25.4	25.4			38.0		48.4	48.4	
Effective Green, g (s)		2.2		26.4	26.4			39.0		49.4	49.4	
Actuated g/C Ratio		0.02		0.29	0.29			0.43		0.55	0.55	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		39		415	472			1375		378	1876	
v/s Ratio Prot		c0.00		c0.21	0.16					0.02	c0.19	
v/s Ratio Perm								c0.21		0.11		
v/c Ratio		0.00		0.73	0.55			0.48		0.23	0.34	
Uniform Delay, d1		42.8		28.6	26.8			18.2		10.6	11.3	
Progression Factor		1.00		1.00	1.00			0.54		1.00	1.00	
Incremental Delay, d2		0.0		6.3	1.3			1.2		0.3	0.5	
Delay (s)		42.8		34.8	28.1			11.0		10.9	11.8	
Level of Service		D		C	C			B		B	B	
Approach Delay (s)		42.8			31.5			11.0			11.7	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

H20 - NOON

HCM Signalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave (EB ON/OFF RAMPS) 6/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	165	0	60	0	1291	49	105	1548	0
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	11	12	12	11
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			0.91		1.00	0.91	
Frt				1.00	0.85			0.99		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1770	1583			5057		1770	5085	
Flt Permitted				0.76	1.00			1.00		0.17	1.00	
Satd. Flow (perm)				1410	1583			5057		318	5085	
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)	0	0	0	168	0	61	0	1317	50	107	1580	0
RTOR Reduction (vph)	0	0	0	0	47	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	168	14	0	0	1364	0	107	1580	0
Turn Type	Perm			Perm						Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)				16.0	16.0			64.0		64.0	64.0	
Effective Green, g (s)				17.0	17.0			65.0		65.0	65.0	
Actuated g/C Ratio				0.19	0.19			0.72		0.72	0.72	
Clearance Time (s)				5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)				3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)				266	299			3652		230	3673	
v/s Ratio Prot					0.01			0.27			0.31	
v/s Ratio Perm				c0.12						c0.34		
v/c Ratio				0.63	0.05			0.37		0.47	0.43	
Uniform Delay, d1				33.6	29.9			4.8		5.2	5.0	
Progression Factor				1.00	1.00			1.00		1.09	0.70	
Incremental Delay, d2				4.8	0.1			0.3		5.2	0.3	
Delay (s)				38.4	29.9			5.0		10.9	3.8	
Level of Service				D	C			A		B	A	
Approach Delay (s)		0.0			36.2			5.0			4.3	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

H20-NOON

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

6/24/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	418	170	174	1080	1519	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
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)	3433	1583	1770	5085	4824	
Flt Permitted	0.95	1.00	0.08	1.00	1.00	
Satd. Flow (perm)	3433	1583	141	5085	4824	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	427	173	178	1102	1550	185
RTOR Reduction (vph)	0	139	0	0	13	0
Lane Group Flow (vph)	427	34	178	1102	1722	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	16.9	16.9	63.1	63.1	47.8	
Effective Green, g (s)	17.9	17.9	64.1	64.1	48.8	
Actuated g/C Ratio	0.20	0.20	0.71	0.71	0.54	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	683	315	305	3622	2616	
v/s Ratio Prot	c0.12		c0.07	0.22	c0.36	
v/s Ratio Perm		0.02	0.34			
v/c Ratio	0.63	0.11	0.58	0.30	0.66	
Uniform Delay, d1	33.0	29.5	16.2	4.8	14.7	
Progression Factor	1.00	1.00	1.29	0.85	0.77	
Incremental Delay, d2	1.8	0.2	2.7	0.2	1.3	
Delay (s)	34.8	29.7	23.5	4.3	12.6	
Level of Service	C	C	C	A	B	
Approach Delay (s)	33.3			6.9	12.6	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

4/20-Noon

HCM Signalized Intersection Capacity Analysis
19: WB on & off-ramps & Harrison Ave

6/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	66	135	1505	138	219	1306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	1742	4843		1711	4916
Flt Permitted	0.95	1.00	1.00		0.10	1.00
Satd. Flow (perm)	1711	1742	4843		184	4916
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	69	141	1568	144	228	1360
RTOR Reduction (vph)	0	125	8	0	0	0
Lane Group Flow (vph)	69	16	1704	0	228	1360
Confl. Peds. (#/hr)				9		
Turn Type		custom			pm+pt	
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	9.0	9.0	57.0		71.0	71.0
Effective Green, g (s)	10.0	10.0	58.0		72.0	72.0
Actuated g/C Ratio	0.11	0.11	0.64		0.80	0.80
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	190	194	3121		317	3933
v/s Ratio Prot			0.35		c0.08	0.28
v/s Ratio Perm	c0.04	0.01			c0.50	
v/c Ratio	0.36	0.08	0.55		0.72	0.35
Uniform Delay, d1	37.1	35.9	8.8		14.9	2.5
Progression Factor	1.00	1.00	0.76		1.00	0.73
Incremental Delay, d2	1.2	0.2	0.7		6.3	0.2
Delay (s)	38.2	36.1	7.3		21.2	2.0
Level of Service	D	D	A		C	A
Approach Delay (s)	36.8		7.3			4.8
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

H20 - Noon

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

6/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	15	1288	354	0	1570
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	1400	385	0	1707
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.86	0.80			0.80	
vC, conflicting volume	2257	704			1789	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1095	127			1484	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	179	717			358	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	16	700	700	385	853	853
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	385	0	0
cSH	717	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.41	0.41	0.23	0.50	0.50
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.1	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

H20 - NOON

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

6/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↰	↔			↕		↰	↑↕	
Volume (vph)	5	1	4	478	3	150	9	1235	70	208	1093	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.95		1.00	0.93			0.99		1.00	1.00	
Flt Protected		0.98		0.95	0.98			1.00		0.95	1.00	
Satd. Flow (prot)		1707		1416	1599			3389		1770	3419	
Flt Permitted		0.98		0.95	0.98			0.94		0.13	1.00	
Satd. Flow (perm)		1707		1416	1599			3202		239	3419	
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)	5	1	4	488	3	153	9	1260	71	212	1115	5
RTOR Reduction (vph)	0	4	0	0	35	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	6	0	332	277	0	0	1336	0	212	1120	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.3		28.1	28.1			26.2		45.6	45.6	
Effective Green, g (s)		2.3		29.1	29.1			27.2		46.6	46.6	
Actuated g/C Ratio		0.03		0.32	0.32			0.30		0.52	0.52	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		44		458	517			968		386	1770	
v/s Ratio Prot		c0.00		c0.23	0.17					0.09	c0.33	
v/s Ratio Perm								c0.42		0.19		
v/c Ratio		0.14		0.72	0.54			1.38		0.55	0.63	
Uniform Delay, d1		42.9		26.9	24.9			31.4		17.3	15.6	
Progression Factor		1.00		1.00	1.00			0.66		1.00	1.00	
Incremental Delay, d2		1.1		5.6	1.1			176.8		1.6	1.7	
Delay (s)		43.9		32.5	26.0			197.6		18.9	17.3	
Level of Service		D		C	C			F		B	B	
Approach Delay (s)		43.9			29.4			197.6			17.5	
Approach LOS		D			C			F			B	

Intersection Summary			
HCM Average Control Delay	92.5	HCM Level of Service	F
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

H20 - PM

HCM Signalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave (EB ON/OFF - RAMP) 7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	208	0	116	0	920	84	76	872	0
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	11	12	12	11
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			0.91		1.00	0.91	
Frt				1.00	0.85			0.99		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1770	1583			5022		1770	5085	
Flt Permitted				0.76	1.00			1.00		0.18	1.00	
Satd. Flow (perm)				1410	1583			5022		338	5085	
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	0	0	0	265	0	148	0	1173	107	97	1112	0
RTOR Reduction (vph)	0	0	0	0	61	0	0	10	0	0	0	0
Lane Group Flow (vph)	0	0	0	265	87	0	0	1270	0	97	1112	0
Turn Type	Perm			Perm						Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8						6		
Actuated Green, G (s)				21.4	21.4			58.6		58.6	58.6	
Effective Green, g (s)				22.4	22.4			59.6		59.6	59.6	
Actuated g/C Ratio				0.25	0.25			0.66		0.66	0.66	
Clearance Time (s)				5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)				3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)				351	394			3326		224	3367	
v/s Ratio Prot					0.06			0.25			0.22	
v/s Ratio Perm				c0.19						c0.29		
v/c Ratio				0.75	0.22			0.38		0.43	0.33	
Uniform Delay, d1				31.3	26.9			6.9		7.2	6.6	
Progression Factor				1.00	1.00			1.00		0.50	0.58	
Incremental Delay, d2				8.9	0.3			0.3		5.3	0.2	
Delay (s)				40.2	27.2			7.2		8.8	4.1	
Level of Service				D	C			A		A	A	
Approach Delay (s)		0.0			35.5			7.2			4.4	
Approach LOS		A			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)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H20-PM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/24/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	298	127	149	843	845	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1770	5085	4687	
Flt Permitted	0.95	1.00	0.12	1.00	1.00	
Satd. Flow (perm)	3433	1583	217	5085	4687	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	380	162	190	1075	1078	393
RTOR Reduction (vph)	0	132	0	0	54	0
Lane Group Flow (vph)	380	30	190	1075	1417	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	15.6	15.6	64.4	64.4	50.0	
Effective Green, g (s)	16.6	16.6	65.4	65.4	51.0	
Actuated g/C Ratio	0.18	0.18	0.73	0.73	0.57	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	633	292	337	3695	2656	
v/s Ratio Prot	c0.11		c0.07	0.21	0.30	
v/s Ratio Perm		0.02	c0.34			
v/c Ratio	0.60	0.10	0.56	0.29	0.53	
Uniform Delay, d1	33.7	30.5	7.7	4.3	12.1	
Progression Factor	1.00	1.00	1.80	0.93	0.64	
Incremental Delay, d2	1.6	0.2	2.0	0.2	0.7	
Delay (s)	35.3	30.7	16.0	4.2	8.5	
Level of Service	D	C	B	A	A	
Approach Delay (s)	33.9			5.9	8.5	
Approach LOS	C			A	A	

Intersection Summary				
HCM Average Control Delay	11.7	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	60.0%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

H20-PM

HCM Signalized Intersection Capacity Analysis
19: WB on & off-ramps & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	70	50	906	388	105	1111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	1742	4657		1711	4916
Flt Permitted	0.95	1.00	1.00		0.11	1.00
Satd. Flow (perm)	1711	1742	4657		191	4916
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	91	65	1180	505	137	1447
RTOR Reduction (vph)	0	58	56	0	0	0
Lane Group Flow (vph)	91	7	1629	0	137	1447
Confl. Peds. (#/hr)				9		
Turn Type		custom			pm+pt	
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	8.9	8.9	57.1		71.1	71.1
Effective Green, g (s)	9.9	9.9	58.1		72.1	72.1
Actuated g/C Ratio	0.11	0.11	0.65		0.80	0.80
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	188	192	3006		322	3938
v/s Ratio Prot			c0.35		0.05	c0.29
/s Ratio Perm	c0.05	0.00			0.29	
v/c Ratio	0.48	0.04	0.54		0.43	0.37
Uniform Delay, d1	37.6	35.8	8.7		12.1	2.5
Progression Factor	1.00	1.00	0.72		1.16	1.04
Incremental Delay, d2	2.0	0.1	0.7		0.8	0.2
Delay (s)	39.6	35.9	7.0		14.9	2.9
Level of Service	D	D	A		B	A
Approach Delay (s)	38.1		7.0			3.9
Approach LOS	D		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)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

H20 - PM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	10	666	310	0	1207
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	905	421	0	1640
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.88	0.86			0.86	
vC, conflicting volume	1729	456			1330	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	853	46			1061	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	262	870			560	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	14	452	452	421	820	820
Volume Left	0	0	0	0	0	0
Volume Right	14	0	0	421	0	0
cSH	870	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.27	0.27	0.25	0.48	0.48
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.2	0.0			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

H20-PM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	4	482	2	58	4	595	67	137	725	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.94		1.00	0.97			0.98		1.00	1.00	
Flt Protected		0.97		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1688		1416	1648			3361		1770	3421	
Flt Permitted		0.97		0.95	0.96			0.95		0.13	1.00	
Satd. Flow (perm)		1688		1416	1648			3193		243	3421	
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	6	0	5	615	3	74	5	759	85	175	925	0
RTOR Reduction (vph)	0	5	0	0	10	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	6	0	351	331	0	0	840	0	175	925	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.3		30.0	30.0			28.1		43.7	43.7	
Effective Green, g (s)		2.3		31.0	31.0			29.1		44.7	44.7	
Actuated g/C Ratio		0.03		0.34	0.34			0.32		0.50	0.50	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		43		488	568			1032		318	1699	
v/s Ratio Prot		c0.00		c0.25	0.20					0.07	c0.27	
v/s Ratio Perm								c0.26		0.20		
v/c Ratio		0.14		0.72	0.58			0.81		0.55	0.54	
Uniform Delay, d1		42.9		25.7	24.2			28.0		15.8	15.6	
Progression Factor		1.00		1.00	1.00			0.65		1.00	1.00	
Incremental Delay, d2		1.1		5.0	1.5			6.3		2.1	1.3	
Delay (s)		44.0		30.7	25.7			24.6		17.8	16.9	
Level of Service		D		C	C			C		B	B	
Approach Delay (s)		44.0			28.3			24.6			17.0	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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H21-AM

HCM Unsignalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave

7/7/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	1	0	0	0	0	620	54	98	828	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	1	0	0	0	0	633	55	100	845	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											398	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	1256	1733	282	1143	1705	238	845			688		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1214	1697	228	1100	1669	238	798			688		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			89		
cM capacity (veh/h	124	80	765	150	84	763	810			902		

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	1	253	253	182	100	338	338	169
Volume Left	0	0	0	0	100	0	0	0
Volume Right	1	0	0	55	0	0	0	0
cSH	765	1700	1700	1700	902	1700	1700	1700
Volume to Capacity	0.00	0.15	0.15	0.11	0.11	0.20	0.20	0.10
Queue Length 95th (ft)	0	0	0	0	9	0	0	0
Control Delay (s)	9.7	0.0	0.0	0.0	9.5	0.0	0.0	0.0
Lane LOS	A				A			
Approach Delay (s)	9.7	0.0			1.0			
Approach LOS	A							

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	26.0%	ICU Level of Service	A	
Analysis Period (min)	15			

H21-AM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/7/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	243	78	76	540	788	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1769	5085	4701	
Flt Permitted	0.95	1.00	0.21	1.00	1.00	
Satd. Flow (perm)	3433	1583	389	5085	4701	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	248	80	78	551	804	261
RTOR Reduction (vph)	0	68	0	0	47	0
Lane Group Flow (vph)	248	12	78	551	1018	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	3		5	2	6 4	
Permitted Phases		3	2			
Actuated Green, G (s)	14.2	14.2	57.8	57.8	64.4	
Effective Green, g (s)	15.2	15.2	58.8	58.8	65.4	
Actuated g/C Ratio	0.15	0.15	0.59	0.59	0.65	
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	522	241	331	2990	3074	
v/s Ratio Prot	c0.07		c0.02	0.11	c0.22	
v/s Ratio Perm		0.01	0.12			
v/c Ratio	0.48	0.05	0.24	0.18	0.33	
Uniform Delay, d1	38.8	36.2	9.4	9.5	7.6	
Progression Factor	1.00	1.00	1.00	1.00	0.02	
Incremental Delay, d2	0.7	0.1	0.4	0.1	0.1	
Delay (s)	39.4	36.3	9.8	9.7	0.2	
Level of Service	D	D	A	A	A	
Approach Delay (s)	38.7			9.7	0.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H21-AM

HCM Signalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave

7/7/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	80	128	0	855	966	0
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		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		5085	5085	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		5085	5085	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	83	133	0	891	1006	0
RTOR Reduction (vph)	0	114	0	0	0	0
Lane Group Flow (vph)	83	19	0	891	1006	0
Confl. Peds. (#/hr)						11
Turn Type		Perm				
Protected Phases	4			2 3	6	
Permitted Phases		4				
Actuated Green, G (s)	13.0	13.0		77.0	46.4	
Effective Green, g (s)	14.0	14.0		78.0	47.4	
Actuated g/C Ratio	0.14	0.14		0.78	0.47	
Clearance Time (s)	5.0	5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0	
Lane Grp Cap (vph)	248	222		3966	2410	
v/s Ratio Prot	c0.05			c0.18	c0.20	
v/s Ratio Perm		0.01				
v/c Ratio	0.33	0.08		0.22	0.42	
Uniform Delay, d1	38.8	37.4		2.9	17.2	
Progression Factor	1.00	1.00		0.18	1.00	
Incremental Delay, d2	0.8	0.2		0.0	0.5	
Delay (s)	39.6	37.6		0.6	17.8	
Level of Service	D	D		A	B	
Approach Delay (s)	38.4			0.6	17.8	
Approach LOS	D			A	B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

H21-AM

HCM Signalized Intersection Capacity Analysis
19: WB off & on-ramps & Harrison Ave

7/7/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	40	44	719	89	109	848
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	1742	4820		1711	4916
Flt Permitted	0.95	1.00	1.00		0.31	1.00
Satd. Flow (perm)	1711	1742	4820		566	4916
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	46	749	93	114	883
RTOR Reduction (vph)	0	42	10	0	0	0
Lane Group Flow (vph)	42	4	832	0	114	883
Confl. Peds. (#/hr)				9		
Turn Type		custom			pm+pt	
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	6 6	6.6	61.2		73.4	73.4
Effective Green, g (s)	7.6	7.6	62.2		74.4	74.4
Actuated g/C Ratio	0.08	0.08	0.69		0.83	0.83
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	144	147	3331		572	4064
v/s Ratio Prot			c0.17		0.02	c0.18
v/s Ratio Perm	c0.02	0.00			0.15	
v/c Ratio	0.29	0.03	0.25		0.20	0.22
Uniform Delay, d1	38.7	37.8	5.2		2.1	1.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.1	0.1	0.2		0.2	0.1
Delay (s)	39.8	37.9	5.4		2.3	1.8
Level of Service	D	D	A		A	A
Approach Delay (s)	38.8		5.4			1.8
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	5.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H21-AM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/7/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	31	645	123	0	1081
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	701	134	0	1175
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.93	0.94			0.94	
vC, conflicting volume	1293	355			839	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	883	185			700	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	266	774			836	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	34	351	351	134	588	588
Volume Left	0	0	0	0	0	0
Volume Right	34	0	0	134	0	0
cSH	774	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.21	0.21	0.08	0.35	0.35
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.9	0.0			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

H21- AM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/7/2008

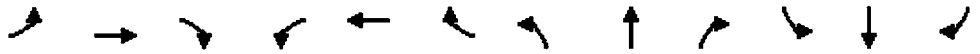
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	455	0	124	10	575	69	85	625	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.98		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		0.86		1.00	0.93			0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.97			1.00		0.95	1.00	
Satd. Flow (prot)		1582		1416	1608			3357		1769	3418	
Flt Permitted		1.00		0.95	0.97			0.94		0.30	1.00	
Satd. Flow (perm)		1582		1416	1608			3172		550	3418	
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)	0	0	1	464	0	127	10	587	70	87	638	4
RTOR Reduction (vph)	0	1	0	0	27	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	0	0	302	262	0	0	660	0	87	642	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.2		27.3	27.3			45.3		56.5	56.5	
Effective Green, g (s)		2.2		28.3	28.3			46.3		57.5	57.5	
Actuated g/C Ratio		0.02		0.28	0.28			0.46		0.57	0.57	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		35		401	455			1469		404	1965	
v/s Ratio Prot		c0.00		c0.21	0.16					0.02	c0.19	
v/s Ratio Perm								c0.21		0.11		
v/c Ratio		0.00		0.75	0.58			0.45		0.22	0.33	
Uniform Delay, d1		47.8		32.7	30.7			18.2		10.5	11.1	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0		7.8	1.8			1.0		0.3	0.4	
Delay (s)		47.8		40.5	32.5			19.2		10.7	11.6	
Level of Service		D		D	C			B		B	B	
Approach Delay (s)		47.8			36.6			19.2			11.5	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

H21- NOON

HCM Unsignalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave

7/7/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	1291	49	105	1548	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	0	0	0	0	0	1317	50	107	1580	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											398	
pX, platoon unblocked	0.80	0.80	0.80	0.80	0.80		0.80					
vC, conflicting volume	2233	3161	527	2083	3136	464	1580			1367		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1654	2819	0	1466	2788	464	834			1367		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			78		
cM capacity (veh/h)	43	11	864	59	12	545	633			498		

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	0	527	527	313	107	632	632	316
Volume Left	0	0	0	0	107	0	0	0
Volume Right	0	0	0	50	0	0	0	0
cSH	1700	1700	1700	1700	498	1700	1700	1700
Volume to Capacity	0.00	0.31	0.31	0.18	0.22	0.37	0.37	0.19
Queue Length 95th (ft)	0	0	0	0	20	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	14.2	0.0	0.0	0.0
Lane LOS	A				B			
Approach Delay (s)	0.0	0.0			0.9			
Approach LOS	A							

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	38.5%	ICU Level of Service	A	
Analysis Period (min)	15			

H21- NN

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/7/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	418	170	174	1080	1519	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
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)	3433	1583	1770	5085	4822	
Flt Permitted	0.95	1.00	0.09	1.00	1.00	
Satd. Flow (perm)	3433	1583	176	5085	4822	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	427	173	178	1102	1550	185
RTOR Reduction (vph)	0	142	0	0	14	0
Lane Group Flow (vph)	427	31	178	1102	1721	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	3		5	2	6 4	
Permitted Phases		3	2			
Actuated Green, G (s)	16.7	16.7	53.0	53.0	57.6	
Effective Green, g (s)	17.7	17.7	54.0	54.0	58.6	
Actuated g/C Ratio	0.18	0.18	0.54	0.54	0.59	
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	608	280	282	2746	2826	
v/s Ratio Prot	c0.12		c0.07	0.22	c0.36	
v/s Ratio Perm		0.02	c0.27			
v/c Ratio	0.70	0.11	0.63	0.40	0.61	
Uniform Delay, d1	38.7	34.5	16.8	13.5	13.3	
Progression Factor	1.00	1.00	1.00	1.00	0.12	
Incremental Delay, d2	3.7	0.2	4.6	0.4	0.2	
Delay (s)	42.3	34.7	21.4	13.9	1.8	
Level of Service	D	C	C	B	A	
Approach Dela (s)	40.1			15.0	1.8	
Approach LOS	D			B	A	

Intersection Summary				
HCM Average Control Delay	12.9	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	65.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

H21-NN

HCM Signalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave

7/7/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	60	165	0	1568	1521	0
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		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		5085	5085	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		5085	5085	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	172	0	1633	1584	0
RTOR Reduction (vph)	0	144	0	0	0	0
Lane Group Flow (vph)	62	28	0	1633	1584	0
Confl. Peds. (#/hr)						11
Turn Type		Perm				
Protected Phases	4			2 3	6	
Permitted Phases		4				
Actuated Green, G (s)	15.3	15.3		74.7	37.3	
Effective Green, g (s)	16.3	16.3		75.7	38.3	
Actuated g/C Ratio	0.16	0.16		0.76	0.38	
Clearance Time (s)	5.0	5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0	
Lane Grp Cap (vph)	289	258		3849	1948	
v/s Ratio Prot	c0.04			c0.32	c0.31	
v/s Ratio Perm		0.02				
v/c Ratio	0.21	0.11		0.42	0.81	
Uniform Delay, d1	36.3	35.7		4.3	27.6	
Progression Factor	1.00	1.00		0.14	1.00	
Incremental Delay, d2	0.4	0.2		0.1	3.8	
Delay (s)	36.7	35.8		0.7	31.5	
Level of Service	D	D		A	C	
Approach Delay (s)	36.1			0.7	31.5	
Approach LOS	D			A	C	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

H21-NN

HCM Signalized Intersection Capacity Analysis
19: WB off & on-ramps & Harrison Ave

7/7/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	66	135	1505	138	219	1306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	1742	4843		1711	4916
Flt Permitted	0.95	1.00	1.00		0.10	1.00
Satd. Flow (perm)	1711	1742	4843		184	4916
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	69	141	1568	144	228	1360
RTOR Reduction (vph)	0	125	8	0	0	0
Lane Group Flow (vph)	69	16	1704	0	228	1360
Confl. Peds. (#/hr)				9		
Turn Type		custom			pm+pt	
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	9.0	9.0	57.0		71.0	71.0
Effective Green, g (s)	10.0	10.0	58.0		72.0	72.0
Actuated g/C Ratio	0.11	0.11	0.64		0.80	0.80
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	190	194	3121		317	3933
v/s Ratio Prot			0.35		c0.08	0.28
v/s Ratio Perm	c0.04	0.01			c0.50	
v/c Ratio	0.36	0.08	0.55		0.72	0.35
Uniform Delay, d1	37.1	35.9	8.8		14.9	2.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.2	0.2	0.7		7.6	0.2
Delay (s)	38.2	36.1	9.5		22.5	2.7
Level of Service	D	D	A		C	A
Approach Delay (s)	36.8		9.5			5.6
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Ca acity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

H21-NN

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/7/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	15	1288	354	0	1570
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	1400	385	0	1707
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.88	0.80			0.80	
vC, conflicting volume	2257	704			1789	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1124	127			1484	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	174	717			358	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	16	700	700	385	853	853
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	385	0	0
cSH	717	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.41	0.41	0.23	0.50	0.50
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.1	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

H21-NN

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/7/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1	4	478	3	150	9	1235	70	208	1093	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.95		1.00	0.93			0.99		1.00	1.00	
Flt Protected		0.98		0.95	0.98			1.00		0.95	1.00	
Satd. Flow (prot)		1707		1416	1599			3389		1770	3419	
Flt Permitted		0.98		0.95	0.98			0.94		0.10	1.00	
Satd. Flow (perm)		1707		1416	1599			3203		188	3419	
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)	5	1	4	488	3	153	9	1260	71	212	1115	5
RTOR Reduction (vph)	0	4	0	0	32	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	6	0	332	280	0	0	1336	0	212	1120	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.3		30.2	30.2			34.6		53.5	53.5	
Effective Green, g (s)		2.3		31.2	31.2			35.6		54.5	54.5	
Actuated g/C Ratio		0.02		0.31	0.31			0.36		0.55	0.55	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		39		442	499			1140		338	1863	
v/s Ratio Prot		c0.00		c0.23	0.17					0.09	c0.33	
v/s Ratio Perm								c0.42		0.25		
v/c Ratio		0.16		0.75	0.56			1.17		0.63	0.60	
Uniform Delay, d1		47.9		30.9	28.7			32.2		41.1	15.4	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.4		7.1	1.4			87.0		3.6	1.4	
Delay (s)		49.3		38.0	30.1			119.2		44.8	16.8	
Level of Service		D		D	C			F		D	B	
Approach Delay (s)		49.3			34.2			119.2			21.3	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM Average Control Delay	63.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

H21- PM

HCM Unsignalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	920	84	76	1080	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	0	0	0	0	0	1173	107	97	1378	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											398	
pX, platoon unblocked	0.83	0.83	0.83	0.83	0.83		0.83					
vC, conflicting volume	1963	2852	459	1880	2798	445	1378			1281		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1428	2505	0	1328	2440	445	719			1281		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			82		
cM capacity (veh/h)	68	19	896	81	21	561	725			538		

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	0	469	469	342	97	551	551	276
Volume Left	0	0	0	0	97	0	0	0
Volume Right	0	0	0	107	0	0	0	0
cSH	1700	1700	1700	1700	538	1700	1700	1700
Volume to Capacity	0.00	0.28	0.28	0.20	0.18	0.32	0.32	0.16
Queue Length 95th (ft)	0	0	0	0	16	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	13.2	0.0	0.0	0.0
Lane LOS	A				B			
Approach Delay (s)	0.0	0.0			0.9			
Approach LOS	A							

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	36.5%	ICU Level of Service		A
Analysis Period (min)	15			

H21-PM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave 7/24/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	298	127	149	727	1053	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1770	5085	4717	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	3433	1583	177	5085	4717	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	380	162	190	927	1343	393
RTOR Reduction (vph)	0	134	0	0	50	0
Lane Group Flow (vph)	380	28	190	927	1686	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	3		5	2	6 4	
Permitted Phases		3	2			
Actuated Green, G (s)	16.1	16.1	53.0	53.0	58.0	
Effective Green, g (s)	17.1	17.1	54.0	54.0	59.0	
Actuated g/C Ratio	0.17	0.17	0.54	0.54	0.59	
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	587	271	285	2746	2783	
v/s Ratio Prot	c0.11		c0.08	0.18	c0.36	
v/s Ratio Perm		0.02	c0.28			
v/c Ratio	0.65	0.10	0.67	0.34	0.61	
Uniform Delay, d1	38.6	35.0	18.3	12.9	13.1	
Progression Factor	1.00	1.00	1.00	1.00	0.18	
Incremental Delay, d2	2.5	0.2	5.8	0.3	0.3	
Delay (s)	41.1	35.1	24.1	13.3	2.6	
Level of Service	D	D	C	B	A	
Approach Delay (s)	39.3			15.1	2.6	
Approach LOS	D			B	A	

Intersection Summary				
HCM Average Control Delay	12.6	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	65.0%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HZ1-PM

HCM Signalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave

7/24/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	116	208	0	1044	1093	0
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		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		5085	5085	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		5085	5085	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	151	271	0	1359	1423	0
RTOR Reduction (vph)	0	225	0	0	0	0
Lane Group Flow (vph)	151	46	0	1359	1423	0
Confl. Peds. (#/hr)						11
Turn Type		Perm				
Protected Phases	4			2 3	6	
Permitted Phases		4				
Actuated Green, G (s)	15.9	15.9		74.1	37.1	
Effective Green, g (s)	16.9	16.9		75.1	38.1	
Actuated g/C Ratio	0.17	0.17		0.75	0.38	
Clearance Time (s)	5.0	5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0	
Lane Grp Cap (vph)	299	268		3819	1937	
v/s Ratio Prot	c0.09			c0.27	c0.28	
v/s Ratio Perm		0.03				
v/c Ratio	0.51	0.17		0.36	0.73	
Uniform Delay, d1	37.7	35.6		4.2	26.6	
Progression Factor	1.00	1.00		0.12	1.00	
Incremental Delay, d2	1.3	0.3		0.1	2.5	
Delay (s)	39.1	35.9		0.6	29.1	
Level of Service	D	D		A	C	
Approach Delay (s)	37.0			0.6	29.1	
Approach LOS	D			A	C	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HZ1-PM

HCM Signalized Intersection Capacity Analysis
19: WB off & on-ramps & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	70	50	906	388	105	1111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	1742	4657		1711	4916
Flt Permitted	0.95	1.00	1.00		0.11	1.00
Satd. Flow (perm)	1711	1742	4657		191	4916
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	91	65	1180	505	137	1447
RTOR Reduction (vph)	0	58	56	0	0	0
Lane Group Flow (vph)	91	7	1629	0	137	1447
Confl. Peds. (#/hr)				9		
Turn Type		custom			pm+pt	
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	8.9	8.9	57.1		71.1	71.1
Effective Green, g (s)	9.9	9.9	58.1		72.1	72.1
Actuated g/C Ratio	0.11	0.11	0.65		0.80	0.80
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	188	192	3006		322	3938
v/s Ratio Prot			c0.35		0.05	c0.29
v/s Ratio Perm	c0.05	0.00			0.29	
v/c Ratio	0.48	0.04	0.54		0.43	0.37
Uniform Delay, d1	37.6	35.8	8.7		12.1	2.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.0	0.1	0.7		0.9	0.3
Delay (s)	39.6	35.9	9.4		13.0	2.8
Level of Service	D	D	A		B	A
Approach Delay (s)	38.1		9.4			3.7
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

H21-PM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	10	666	310	0	1207
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	905	421	0	1640
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.89	0.86			0.86	
vC, conflicti g volume	1729	456			1330	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	879	46			1061	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	256	870			560	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	14	452	452	421	820	820
Volume Left	0	0	0	0	0	0
Volume Right	14	0	0	421	0	0
cSH	870	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.27	0.27	0.25	0.48	0.48
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.2	0.0			0.0	
Approach LOS	A					

Intersection Summary				
Average Delay	0.0			
ntersection Capacity Utilization	45.0%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	4	482	2	58	4	595	67	137	725	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.94		1.00	0.97			0.98		1.00	1.00	
Flt Protected		0.97		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1688		1416	1648			3361		1770	3421	
Flt Permitted		0.97		0.95	0.96			0.95		0.17	1.00	
Satd. Flow (perm)		1688		1416	1648			3194		321	3421	
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	6	0	5	615	3	74	5	759	85	175	925	0
RTOR Reduction (vph)	0	5	0	0	9	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	6	0	351	332	0	0	842	0	175	925	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.4		32.1	32.1			37.3		51.5	51.5	
Effective Green, g (s)		2.4		33.1	33.1			38.3		52.5	52.5	
Actuated g/C Ratio		0.02		0.33	0.33			0.38		0.52	0.52	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		41		469	545			1223		316	1796	
v/s Ratio Prot		c0.00		c0.25	0.20					0.06	c0.27	
v/s Ratio Perm								c0.26		0.23		
v/c Ratio		0.15		0.75	0.61			0.69		0.55	0.52	
Uniform Delay, d1		47.8		29.7	28.0			25.8		15.4	15.5	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.2		6.4	1.9			3.2		2.1	1.1	
Delay (s)		49.0		36.2	30.0			29.0		17.5	16.5	
Level of Service		D		D	C			C		B	B	
Approach Delay (s)		49.0			33.1			29.0			16.7	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	25.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

H22 - AM

HCM Signalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave (EB ON/OFF RAMPS) 7/3/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	129	1	80	0	620	54	98	828	0
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	11	12	12	11
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			0.91		1.00	0.91	
Frt			0.86	1.00	0.85			0.99		1.00	1.00	
Flt Protected			1.00	0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)			1611	1770	1587			5024		1770	5085	
Flt Permitted			1.00	0.95	1.00			1.00		0.38	1.00	
Satd. Flow (perm)			1611	1770	1587			5024		705	5085	
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)	0	0	1	132	1	82	0	633	55	100	845	0
RTOR Reduction (vph)	0	0	1	0	70	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	0	0	132	13	0	0	681	0	100	845	0
Turn Type			custom	Perm						Perm		
Protected Phases					8			2			6	
Permitted Phases			4	8						6		
Actuated Green, G (s)			12.0	12.0	12.0			68.0		68.0	68.0	
Effective Green, g (s)			13.0	13.0	13.0			69.0		69.0	69.0	
Actuated g/C Ratio			0.14	0.14	0.14			0.77		0.77	0.77	
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)			233	256	229			3852		541	3899	
v/s Ratio Prot					0.01			0.14			c0.17	
v/s Ratio Perm			0.00	c0.07						0.14		
v/c Ratio			0.00	0.52	0.06			0.18		0.18	0.22	
Uniform Delay, d1			32.9	35.6	33.2			2.8		2.9	2.9	
Progression Factor			1.00	1.00	1.00			1.00		1.31	1.25	
Incremental Delay, d2			0.0	1.8	0.1			0.1		0.7	0.1	
Delay (s)			32.9	37.3	33.3			2.9		4.5	3.8	
Level of Service			C	D	C			A		A	A	
Approach Delay (s)		32.9			35.8			2.9			3.9	
Approach LOS		C			D			A			A	

Intersection Summary				
HCM Average Control Delay	7.2	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.26			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	36.5%	ICU Level of Service	A	
Analysis Period (min	15			

c Critical Lane Group

H22-AM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/3/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	243	78	76	540	788	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1769	5085	4705	
Flt Permitted	0.95	1.00	0.23	1.00	1.00	
Satd. Flow (perm)	3433	1583	425	5085	4705	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	248	80	78	551	804	261
RTOR Reduction (vph)	0	69	0	0	46	0
Lane Group Flow (vph)	248	11	78	551	1019	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.8	11.8	68.2	68.2	52.0	
Effective Green, g (s)	12.8	12.8	69.2	69.2	53.0	
Actuated g/C Ratio	0.14	0.14	0.77	0.77	0.59	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	488	225	509	3910	2771	
v/s Ratio Prot	c0.07		0.02	c0.11	c0.22	
v/s Ratio Perm		0.01	0.10			
v/c Ratio	0.51	0.05	0.15	0.14	0.37	
Uniform Delay, d1	35.7	33.4	4.9	2.7	9.7	
Progression Factor	1.00	1.00	0.95	0.97	0.14	
Incremental Delay, d2	0.8	0.1	0.1	0.1	0.4	
Delay (s)	36.5	33.4	4.8	2.7	1.7	
Level of Service	D	C	A	A	A	
Ap roach Delay (s)	35.8			3.0	1.7	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HZZ-AM

HCM Signalized Intersection Capacity Analysis
19: WB on-ramp & Harrison Ave

7/3/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	40	3	44	89	719	0	0	848	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	15	11	11	11	11	11	1
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	0.91			0.91	
Frpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
Frt					1.00	0.85	1.00	1.00			0.98	
Flt Protected					0.96	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1780	1742	1711	4916			4817	
Flt Permitted					0.96	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1780	1742	447	4916			4817	
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)	0	0	0	42	3	46	93	749	0	0	883	114
RTOR Reduction (vph)	0	0	0	0	0	42	0	0	0	0	11	0
Lane Group Flow (vph)	0	0	0	0	45	4	93	749	0	0	986	0
Confl. Peds. (#/hr)									9			8
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.7	6.7	73.3	73.3			51.5	
Effective Green, g (s)					7.7	7.7	74.3	74.3			52.5	
Actuated g/C Ratio					0.09	0.09	0.83	0.83			0.58	
Clearance Time (s)					5.0	5.0	5.0	5.0			5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					152	149	619	4058			2810	
v/s Ratio Prot							0.03	c0.15			c0.20	
v/s Ratio Perm					0.03	0.00	0.09					
v/c Ratio					0.30	0.03	0.15	0.18			0.35	
Uniform Delay, d1					38.6	37.7	3.1	1.6			9.8	
Progression Factor					1.00	1.00	1.59	1.18			0.85	
Incremental Delay, d2					1.1	0.1	0.1	0.1			0.3	
Delay (s)					39.7	37.8	5.0	2.0			8.7	
Level of Service					D	D	A	A			A	
Approach Delay (s)		0.0			38.7			2.3			8.7	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Hz2-AM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave 7/3/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	31	645	123	0	1081
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	701	134	0	1175
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.91	0.98			0.98	
vC, conflicting volume	1293	355			839	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1006	289			785	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	216	688			807	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	34	351	351	134	588	588
Volume Left	0	0	0	0	0	0
Volume Right	34	0	0	134	0	0
cSH	688	1700	1700	1700	1700	1700
Volume to Capacity	0.05	0.21	0.21	0.08	0.35	0.35
Queue Length 95th (ft)	4	0	0	0	0	0
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.5	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

H22-Am

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/3/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	455	0	124	10	575	69	85	625	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.98		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		0.86		1.00	0.93			0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.97			1.00		0.95	1.00	
Satd. Flow (prot)		1583		1416	1608			3357		1769	3418	
Flt Permitted		1.00		0.95	0.97			0.94		0.28	1.00	
Satd. Flow (perm)		1583		1416	1608			3173		528	3418	
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)	0	0	1	464	0	127	10	587	70	87	638	4
RTOR Reduction (vph)	0	1	0	0	30	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	0	0	302	259	0	0	659	0	87	642	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.2		25.4	25.4			38.0		48.4	48.4	
Effective Green, g (s)		2.2		26.4	26.4			39.0		49.4	49.4	
Actuated g/C Ratio		0.02		0.29	0.29			0.43		0.55	0.55	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		39		415	472			1375		378	1876	
v/s Ratio Prot		c0.00		c0.21	0.16					0.02	c0.19	
v/s Ratio Perm								c0.21		0.11		
v/c Ratio		0.00		0.73	0.55			0.48		0.23	0.34	
Uniform Delay, d1		42.8		28.6	26.8			18.2		10.6	11.3	
Progression Factor		1.00		1.00	1.00			0.62		1.00	1.00	
Incremental Delay, d2		0.0		6.3	1.3			1.2		0.3	0.5	
Delay (s)		42.8		34.8	28.1			12.5		10.9	11.8	
Level of Service		D		C	C			B		B	B	
Approach Delay (s)		42.8			31.5			12.5			11.7	
Approach LOS		D			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1/22 - NOON

HCM Signalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave (EB ON/OFF RAMPS) 7/3/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	165	0	60	0	1291	49	105	1548	0
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	11	12	12	11
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			0.91		1.00	0.91	
Frt				1.00	0.85			0.99		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1770	1583			5057		1770	5085	
Flt Permitted				0.95	1.00			1.00		0.17	1.00	
Satd. Flow (perm)				1770	1583			5057		323	5085	
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)	0	0	0	168	0	61	0	1317	50	107	1580	0
RTOR Reduction (vph)	0	0	0	0	51	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	0	0	168	10	0	0	1364	0	107	1580	0
Turn Type			custom	Perm						Perm		
Protected Phases					8			2			6	
Permitted Phases			4	8						6		
Actuated Green, G (s)				13.9	13.9			66.1		66.1	66.1	
Effective Green, g (s)				14.9	14.9			67.1		67.1	67.1	
Actuated g/C Ratio				0.17	0.17			0.75		0.75	0.75	
Clearance Time (s)				5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)				3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)				293	262			3770		241	3791	
v/s Ratio Prot					0.01			0.27			0.31	
v/s Ratio Perm				c0.09						c0.33		
v/c Ratio				0.57	0.04			0.36		0.44	0.42	
Uniform Delay, d1				34.6	31.5			4.0		4.4	4.2	
Progression Factor				1.00	1.00			1.00		0.83	0.63	
Incremental Delay, d2				2.7	0.1			0.3		4.3	0.2	
Delay (s)				37.3	31.6			4.3		7.9	2.9	
Level of Service				D	C			A		A	A	
Approach Delay (s)		0.0			35.8			4.3			3.2	
Approach LOS		A			D			A			A	

Intersection Summary				
HCM Average Control Delay	5.9	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	51.0%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HZZ-NN

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/3/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	418	170	174	1080	1519	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
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)	3433	1583	1770	5085	4824	
Flt Permitted	0.95	1.00	0.08	1.00	1.00	
Satd. Flow (perm)	3433	1583	152	5085	4824	
Peak-hour fac or, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	427	173	178	1102	1550	185
RTOR Reduction (vph)	0	139	0	0	14	0
Lane Group Flow (vph)	427	34	178	1102	1721	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	16.9	16.9	63.1	63.1	44.1	
Effective Green, g (s)	17.9	17.9	64.1	64.1	45.1	
Actuated g/C Ratio	0.20	0.20	0.71	0.71	0.50	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	683	315	378	3622	2417	
v/s Ratio Prot	c0.12		c0.08	0.22	c0.36	
v/s Ratio Perm		0.02	0.26			
v/c Ratio	0.63	0.11	0.47	0.30	0.71	
Uniform Delay, d1	33.0	29.5	20.2	4.8	17.4	
Progression Factor	1.00	1.00	1.11	1.03	0.25	
Incremental Delay, d2	1.8	0.2	0.9	0.2	1.6	
Delay (s)	34.8	29.7	23.2	5.1	5.9	
Level of Service	C	C	C	A	A	
Approach Delay (s)	33.3			7.6	5.9	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HZZ-NN

HCM Signalized Intersection Capacity Analysis
19: WB on-ramp & Harrison Ave

7/3/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	66	0	135	138	1505	0	0	1306	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	15	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	0.91			0.91	
Frpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
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	1742	1711	4916			4791	
Flt Permitted					0.95	1.00	0.09	1.00			1.00	
Satd. Flow (perm)					1770	1742	166	4916			4791	
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)	0	0	0	69	0	141	144	1568	0	0	1360	228
RTOR Reduction (vph)	0	0	0	0	0	29	0	0	0	0	19	0
Lane Group Flow (vph)	0	0	0	0	69	112	144	1568	0	0	1569	0
Confl. Peds. (#/hr)									9			8
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.0	11.0	69.0	69.0			43.0	
Effective Green, g (s)					12.0	12.0	70.0	70.0			44.0	
Actuated g/C Ratio					0.13	0.13	0.78	0.78			0.49	
Clearance Time (s)					5.0	5.0	5.0	5.0			5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					236	232	507	3824			2342	
v/s Ratio Prot							0.07	c0.32			c0.33	
v/s Ratio Perm					0.04	c0.06	0.15					
v/c Ratio					0.29	0.48	0.28	0.41			0.67	
Uniform Delay, d1					35.2	36.1	14.6	3.3			17.5	
Progression Factor					1.00	1.00	1.03	0.74			0.83	
Incremental Delay, d2					0.7	1.6	0.3	0.3			1.3	
Delay (s)					35.9	37.7	15.3	2.7			15.7	
Level of Service					D	D	B	A			B	
Approach Delay (s)		0.0			37.1			3.8			15.7	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	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			

HZZ-NN

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/3/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	15	1288	354	0	1570
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	1400	385	0	1707
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.82	0.88			0.88	
vC, conflicting volume	2257	704			1789	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1455	399			1628	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	99	529			348	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	16	700	700	385	853	853
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	385	0	0
cSH	529	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.41	0.41	0.23	0.50	0.50
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	12.0	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

H22-NN

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/3/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1	4	478	3	150	9	1235	70	208	1093	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.95		1.00	0.93			0.99		1.00	1.00	
Flt Protected		0.98		0.95	0.98			1.00		0.95	1.00	
Satd. Flow (prot)		1707		1416	1599			3389		1770	3419	
Flt Permitted		0.98		0.95	0.98			0.94		0.13	1.00	
Satd. Flow (perm)		1707		1416	1599			3202		239	3419	
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)	5	1	4	488	3	153	9	1260	71	212	1115	5
RTOR Reduction (vph)	0	4	0	0	35	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	6	0	332	277	0	0	1336	0	212	1120	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.3		28.1	28.1			26.2		45.6	45.6	
Effective Green, g (s)		2.3		29.1	29.1			27.2		46.6	46.6	
Actuated g/C Ratio		0.03		0.32	0.32			0.30		0.52	0.52	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		44		458	517			968		386	1770	
v/s Ratio Prot		c0.00		c0.23	0.17					0.09	c0.33	
v/s Ratio Perm								c0.42		0.19		
v/c Ratio		0.14		0.72	0.54			1.38		0.55	0.63	
Uniform Delay, d1		42.9		26.9	24.9			31.4		17.3	15.6	
Progression Factor		1.00		1.00	1.00			0.67		1.00	1.00	
Incremental Delay, d2		1.1		5.6	1.1			177.1		1.6	1.7	
Delay (s)		43.9		32.5	26.0			198.2		18.9	17.3	
Level of Service		D		C	C			F		B	B	
Approach Delay (s)		43.9			29.4			198.2			17.5	
Approach LOS		D			C			F			B	

Intersection Summary				
HCM Average Control Delay	92.7	HCM Level of Service	F	
HCM Volume to Capacity ratio	0.94			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	101.6%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

H22 - PM

Movement	EBL	EBT	EBR	WBL	WBT	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	12	12	11	12	12	11
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			0.91		1.00	0.91	
Frt				1.00	0.85			0.99		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1770	1583			5022		1770	5085	
Flt Permitted				0.95	1.00			1.00		0.19	1.00	
Satd. Flow (perm)				1770	1583			5022		347	5085	
Volume (vph)	0	0	0	208	0	116	0	920	84	76	872	0
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	0	0	0	265	0	148	0	1173	107	97	1112	0
RTOR Reduction (vph)	0	0	0	0	67	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	0	0	265	81	0	0	1271	0	97	1112	0
Turn Type			custom	Perm						Perm		
Protected Phases					8			2			6	
Permitted Phases			4	8						6		
Actuated Green, G (s)				18.2	18.2			61.8		61.8	61.8	
Effective Green, g (s)				19.2	19.2			62.8		62.8	62.8	
Actuated g/C Ratio				0.21	0.21			0.70		0.70	0.70	
Clearance Time (s)				5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)				3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)				378	338			3504		242	3548	
v/s Ratio Prot					0.05			0.25			0.22	
v/s Ratio Perm				c0.15						c0.28		
v/c Ratio				0.70	0.24			0.36		0.40	0.31	
Uniform Delay, d1				32.7	29.4			5.5		5.7	5.3	
Progression Factor				1.00	1.00			1.00		0.32	0.32	
Incremental Delay, d2				5.8	0.4			0.3		4.1	0.2	
Delay (s)				38.5	29.7			5.8		5.9	1.9	
Level of Service				D	C			A		A	A	
Approach Delay (s)		0.0			35.4			5.8			2.2	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H22-PM

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰↰	↱	↰	↑↑↑	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1770	5085	4687	
Flt Permitted	0.95	1.00	0.12	1.00	1.00	
Satd. Flow (perm)	3433	1583	224	5085	4687	
Volume (vph)	298	127	149	843	845	308
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	380	162	190	1075	1078	393
RTOR Reduction (vph)	0	133	0	0	59	0
Lane Group Flow (vph)	380	29	190	1075	1412	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	14.9	14.9	65.1	65.1	46.1	
Effective Green, g (s)	15.9	15.9	66.1	66.1	47.1	
Actuated g/C Ratio	0.18	0.18	0.73	0.73	0.52	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	606	280	422	3735	2453	
v/s Ratio Prot	c0.11		c0.08	0.21	c0.30	
v/s Ratio Perm		0.02	0.26			
v/c Ratio	0.63	0.10	0.45	0.29	0.58	
Uniform Delay, d1	34.3	31.1	16.3	4.0	14.6	
Progression Factor	1.00	1.00	1.10	0.98	0.11	
Incremental Delay, d2	2.0	0.2	0.7	0.2	0.8	
Delay (s)	36.3	31.2	18.6	4.1	2.4	
Level of Service	D	C	B	A	A	
Approach Delay (s)	34.8			6.3	2.4	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

H22-PM

Movement	EBL	EBT	EBR	WBL	WBT	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	11	12	15	11	11	11	11	11	11
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					1.00	1.00	1.00	0.91			0.91	
Frpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
Flpb, ped/bikes					1.00	1.00	1.00	1.00			1.00	
Frt					1.00	0.85	1.00	1.00			0.99	
Flt Protected					0.95	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1770	1742	1711	4916			4840	
Flt Permitted					0.95	1.00	0.10	1.00			1.00	
Satd. Flow (perm)					1770	1742	180	4916			4840	
Volume (vph)	0	0	0	70	0	50	388	906	0	0	1111	105
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	0	0	0	91	0	65	505	1180	0	0	1447	137
RTOR Reduction (vph)	0	0	0	0	0	58	0	0	0	0	9	0
Lane Group Flow (vph)	0	0	0	0	91	7	505	1180	0	0	1575	0
Confl. Peds. (#/hr)									9			8
Turn Type				Perm		Perm	pm+pt					
Protected Phases					8		5	2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.3	8.3	71.7	71.7			45.7	
Effective Green, g (s)					9.3	9.3	72.7	72.7			46.7	
Actuated g/C Ratio					0.10	0.10	0.81	0.81			0.52	
Clearance Time (s)					5.0	5.0	5.0	5.0			5.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					183	180	520	3971			2511	
v/s Ratio Prot							c0.24	0.24			0.33	
v/s Ratio Perm					0.05	0.00	c0.55					
v/c Ratio					0.50	0.04	0.97	0.30			0.63	
Uniform Delay, d1					38.1	36.3	18.8	2.2			15.4	
Progression Factor					1.00	1.00	1.08	0.52			0.85	
Incremental Delay, d2					2.1	0.1	31.3	0.2			1.0	
Delay (s)					40.3	36.4	51.5	1.3			14.1	
Level of Service					D	D	D	A			B	
Approach Delay (s)		0.0			38.7			16.4			14.1	
Approach LOS		A			D			B			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

H22-PM

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	10	666	310	0	1207
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	905	421	0	1640
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.84	0.95			0.95	
vC, conflicting volume	1729	456			1330	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1495	373			1294	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	95	590			503	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	14	452	452	421	820	820
Volume Left	0	0	0	0	0	0
Volume Right	14	0	0	421	0	0
cSH	590	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.27	0.27	0.25	0.48	0.48
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	11.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.2	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

H22-PM

Movement	EBL	EBT	EBR	WBL	WBT	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	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.94		1.00	0.97			0.98		1.00	1.00	
Flt Protected		0.97		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1688		1416	1650			3361		1770	3421	
Flt Permitted		0.97		0.95	0.96			0.95		0.13	1.00	
Satd. Flow (perm)		1688		1416	1650			3193		249	3421	
Volume (vph)	5	0	4	482	2	58	4	595	67	137	725	0
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	6	0	5	615	3	74	5	759	85	175	925	0
RTOR Reduction (vph)	0	5	0	0	9	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	6	0	330	353	0	0	840	0	175	925	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.3		29.7	29.7			28.4		44.0	44.0	
Effective Green, g (s)		2.3		30.7	30.7			29.4		45.0	45.0	
Actuated g/C Ratio		0.03		0.34	0.34			0.33		0.50	0.50	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		43		483	563			1043		321	1711	
v/s Ratio Prot		c0.00		c0.23	0.21					0.07	c0.27	
v/s Ratio Perm								c0.26		0.20		
v/c Ratio		0.14		0.68	0.63			0.81		0.55	0.54	
Uniform Delay, d1		42.9		25.5	24.8			27.7		15.6	15.4	
Progression Factor		1.00		1.00	1.00			0.76		1.00	1.00	
Incremental Delay, d2		1.1		4.0	2.2			6.5		1.9	1.2	
Delay (s)		44.0		29.4	27.0			27.6		17.5	16.6	
Level of Service		D		C	C			C		B	B	
Approach Delay (s)		44.0			28.2			27.6			16.8	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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H23-AM

HCM Unsignalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave

7/7/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	1	0	0	0	0	620	54	98	828	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	1	0	0	0	0	633	55	100	845	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											398	
pX, platoon unblocked	0.99	0.99	0.99	0.99	0.99		0.99					
vC, conflicting volume	1256	1733	282	1143	1705	238	845			688		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1214	1697	228	1100	1669	238	798			688		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			89		
cM capacity (veh/h)	124	80	765	150	84	763	810			902		

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	1	253	253	182	100	338	338	169
Volume Left	0	0	0	0	100	0	0	0
Volume Right	1	0	0	55	0	0	0	0
cSH	765	1700	1700	1700	902	1700	1700	1700
Volume to Capacity	0.00	0.15	0.15	0.11	0.11	0.20	0.20	0.10
Queue Length 95th (ft)	0	0	0	0	9	0	0	0
Control Delay (s)	9.7	0.0	0.0	0.0	9.5	0.0	0.0	0.0
Lane LOS	A				A			
Approach Delay (s)	9.7	0.0			1.0			
Approach LOS	A							

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	26.0%	ICU Level of Service	A	
Analysis Period (min)	15			

H23-AM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/7/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	243	78	76	540	788	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1769	5085	4701	
Flt Permitted	0.95	1.00	0.21	1.00	1.00	
Satd. Flow (perm)	3433	1583	389	5085	4701	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	248	80	78	551	804	261
RTOR Reduction (vph)	0	68	0	0	47	0
Lane Group Flow (vph)	248	12	78	551	1018	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	3		5	2	6 4	
Permitted Phases		3	2			
Actuated Green, G (s)	14.2	14.2	57.8	57.8	64.4	
Effective Green, g (s)	15.2	15.2	58.8	58.8	65.4	
Actuated g/C Ratio	0.15	0.15	0.59	0.59	0.65	
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	522	241	331	2990	3074	
v/s Ratio Prot	c0.07		c0.02	0.11	c0.22	
v/s Ratio Perm		0.01	0.12			
v/c Ratio	0.48	0.05	0.24	0.18	0.33	
Uniform Delay, d1	38.8	36.2	9.4	9.5	7.6	
Progression Factor	1.00	1.00	1.00	1.00	0.02	
Incremental Delay, d2	0.7	0.1	0.4	0.1	0.1	
Delay (s)	39.4	36.3	9.8	9.7	0.2	
Level of Service	D	D	A	A	A	
Approach Delay (s)	38.7			9.7	0.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H23-AM

HCM Signalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave

7/7/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	80	128	0	855	966	0
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		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		5085	5085	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		5085	5085	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	83	133	0	891	1006	0
RTOR Reduction (vph)	0	114	0	0	0	0
Lane Group Flow (vph)	83	19	0	891	1006	0
Confl. Peds. (#/hr)						11
Turn Type		Perm				
Protected Phases	4			2 3	6	
Permitted Phases		4				
Actuated Green, G (s)	13.0	13.0		77.0	46.4	
Effective Green, g (s)	14.0	14.0		78.0	47.4	
Actuated g/C Ratio	0.14	0.14		0.78	0.47	
Clearance Time (s)	5.0	5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0	
Lane Grp Cap (vph)	248	222		3966	2410	
v/s Ratio Prot	c0.05			c0.18	c0.20	
v/s Ratio Perm		0.01				
v/c Ratio	0.33	0.08		0.22	0.42	
Uniform Delay, d1	38.8	37.4		2.9	17.2	
Progression Factor	1.00	1.00		0.18	1.00	
Incremental Delay, d2	0.8	0.2		0.0	0.5	
Delay (s)	39.6	37.6		0.6	17.8	
Level of Service	D	D		A	B	
Approach Delay (s)	38.4			0.6	17.8	
Approach LOS	D			A	B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

H23-AM

HCM Signalized Intersection Capacity Analysis
19: WB off & on-ramps & Harrison Ave

7/7/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	40	44	719	89	109	848
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	1742	4820		1711	4916
Flt Permitted	0.95	1.00	1.00		0.31	1.00
Satd. Flow (perm)	1711	1742	4820		566	4916
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	46	749	93	114	883
RTOR Reduction (vph)	0	42	10	0	0	0
Lane Group Flow (vph)	42	4	832	0	114	883
Confl. Peds. (#/hr)				9		
Turn Type		custom			pm+pt	
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	6.6	6.6	61.2		73.4	73.4
Effective Green, g (s)	7.6	7.6	62.2		74.4	74.4
Actuated g/C Ratio	0.08	0.08	0.69		0.83	0.83
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	144	147	3331		572	4064
v/s Ratio Prot			c0.17		0.02	c0.18
v/s Ratio Perm	c0.02	0.00			0.15	
v/c Ratio	0.29	0.03	0.25		0.20	0.22
Uniform Delay, d1	38.7	37.8	5.2		2.1	1.6
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.1	0.1	0.2		0.2	0.1
Delay (s)	39.8	37.9	5.4		2.3	1.8
Level of Service	D	D	A		A	A
Approach Delay (s)	38.8		5.4			1.8
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	5.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HZ3-AM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/7/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	31	645	123	0	1081
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	701	134	0	1175
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.93	0.94			0.94	
vC, conflicting volume	1293	355			839	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	883	185			700	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	266	774			836	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	34	351	351	134	588	588
Volume Left	0	0	0	0	0	0
Volume Right	34	0	0	134	0	0
cSH	774	1700	1700	1700	1700	1700
Volume to Capacity	0.04	0.21	0.21	0.08	0.35	0.35
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.9	0.0			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

H23-AM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/7/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	455	0	124	10	575	69	85	625	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.98		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		0.86		1.00	0.93			0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.97			1.00		0.95	1.00	
Satd. Flow (prot)		1582		1416	1608			3357		1769	3418	
Flt Permitted		1.00		0.95	0.97			0.94		0.30	1.00	
Satd. Flow (perm)		1582		1416	1608			3172		550	3418	
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)	0	0	1	464	0	127	10	587	70	87	638	4
RTOR Reduction (vph)	0	1	0	0	27	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	0	0	302	262	0	0	660	0	87	642	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.2		27.3	27.3			45.3		56.5	56.5	
Effective Green, g (s)		2.2		28.3	28.3			46.3		57.5	57.5	
Actuated g/C Ratio		0.02		0.28	0.28			0.46		0.57	0.57	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		35		401	455			1469		404	1965	
v/s Ratio Prot		c0.00		c0.21	0.16					0.02	c0.19	
v/s Ratio Perm								c0.21		0.11		
v/c Ratio		0.00		0.75	0.58			0.45		0.22	0.33	
Uniform Delay, d1		47.8		32.7	30.7			18.2		10.5	11.1	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.0		7.8	1.8			1.0		0.3	0.4	
Delay (s)		47.8		40.5	32.5			19.2		10.7	11.6	
Level of Service		D		D	C			B		B	B	
Approach Delay (s)		47.8			36.6			19.2			11.5	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM Average Control Delay	21.5	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	68.9%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

H23 - NOON

HCM Unsignalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave

7/7/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	1291	49	105	1548	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	0	0	0	0	0	1317	50	107	1580	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											398	
pX, platoon unblocked	0.80	0.80	0.80	0.80	0.80		0.80					
vC, conflicting volume	2233	3161	527	2083	3136	464	1580			1367		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1654	2819	0	1466	2788	464	834			1367		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			78		
cM capacity (veh/h)	43	11	864	59	12	545	633			498		

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	0	527	527	313	107	632	632	316
Volume Left	0	0	0	0	107	0	0	0
Volume Right	0	0	0	50	0	0	0	0
cSH	1700	1700	1700	1700	498	1700	1700	1700
Volume to Capacity	0.00	0.31	0.31	0.18	0.22	0.37	0.37	0.19
Queue Length 95th (ft)	0	0	0	0	20	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	14.2	0.0	0.0	0.0
Lane LOS	A				B			
Approach Delay (s)	0.0	0.0			0.9			
Approach LOS	A							

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	38.5%	ICU Level of Service	A	
Analysis Period (min)	15			

H23-NN

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/7/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	418	170	174	1080	1519	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
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)	3433	1583	1770	5085	4822	
Flt Permitted	0.95	1.00	0.09	1.00	1.00	
Satd. Flow (perm)	3433	1583	176	5085	4822	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	427	173	178	1102	1550	185
RTOR Reduction (vph)	0	142	0	0	14	0
Lane Group Flow (vph)	427	31	178	1102	1721	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	3		5	2	6 4	
Permitted Phases		3	2			
Actuated Green, G (s)	16.7	16.7	53 0	53.0	57.6	
Effective Green, g (s)	17.7	17.7	54.0	54.0	58.6	
Actuated g/C Ratio	0.18	0.18	0.54	0.54	0.59	
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	608	280	282	2746	2826	
v/s Ratio Prot	c0.12		c0.07	0.22	c0.36	
v/s Ratio Perm		0.02	c0.27			
v/c Ratio	0.70	0.11	0.63	0.40	0.61	
Uniform Delay, d1	38.7	34.5	16.8	13.5	13.3	
Progression Factor	1.00	1.00	1.00	1.00	0.12	
Incremental Delay, d2	3.7	0.2	4.6	0.4	0.2	
Delay (s)	42.3	34.7	21.4	13.9	1.8	
Level of Service	D	C	C	B	A	
Approach Delay (s)	40.1			15.0	1.8	
Approach LOS	D			B	A	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

H23-NN

HCM Signalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave

7/7/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	60	165	0	1568	1521	0
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		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		5085	5085	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		5085	5085	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	62	172	0	1633	1584	0
RTOR Reduction (vph)	0	144	0	0	0	0
Lane Group Flow (vph)	62	28	0	1633	1584	0
Confl. Peds. (#/hr)						11
Turn Type		Perm				
Protected Phases	4			2 3	6	
Permitted Phases		4				
Actuated Green, G (s)	15.3	15.3		74.7	37.3	
Effective Green, g (s)	16.3	16.3		75.7	38.3	
Actuated g/C Ratio	0.16	0.16		0.76	0.38	
Clearance Time (s)	5.0	5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0	
Lane Grp Cap (vph)	289	258		3849	1948	
v/s Ratio Prot	c0.04			c0.32	c0.31	
v/s Ratio Perm		0.02				
v/c Ratio	0.21	0.11		0.42	0.81	
Uniform Delay, d1	36.3	35.7		4.3	27.6	
Progression Factor	1.00	1.00		0.14	1.00	
Incremental Delay, d2	0.4	0.2		0.1	3.8	
Delay (s)	36.7	35.8		0.7	31.5	
Level of Service	D	D		A	C	
Approach Delay (s)	36.1			0.7	31.5	
Approach LOS	D			A	C	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

H23-NN

HCM Signalized Intersection Capacity Analysis
19: WB off & on-ramps & Harrison Ave

7/7/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	66	135	1505	138	219	1306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	1742	4843		1711	4916
Flt Permitted	0.95	1.00	1.00		0.10	1.00
Satd. Flow (perm)	1711	1742	4843		184	4916
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	69	141	1568	144	228	1360
RTOR Reduction (vph)	0	125	8	0	0	0
Lane Group Flow (vph)	69	16	1704	0	228	1360
Confl. Peds. (#/hr)				9		
Turn Type		custom			pm+pt	
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	9.0	9.0	57.0		71.0	71.0
Effective Green, g (s)	10.0	10.0	58.0		72.0	72.0
Actuated g/C Ratio	0.11	0.11	0.64		0.80	0.80
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	190	194	3121		317	3933
v/s Ratio Prot			0.35		c0.08	0.28
v/s Ratio Perm	c0.04	0.01			c0.50	
v/c Ratio	0.36	0.08	0.55		0.72	0.35
Uniform Delay, d1	37.1	35.9	8.8		14.9	2.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.2	0.2	0.7		7.6	0.2
Delay (s)	38.2	36.1	9.5		22.5	2.7
Level of Service	D	D	A		C	A
Approach Delay (s)	36.8		9.5			5.6
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

H123-NN

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/7/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	15	1288	354	0	1570
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	1400	385	0	1707
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.88	0.80			0.80	
vC, conflicting volume	2257	704			1789	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1124	127			1484	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	174	717			358	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	16	700	700	385	853	853
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	385	0	0
cSH	717	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.41	0.41	0.23	0.50	0.50
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.1	0.0			0.0	
Approach LOS	B					

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	46.7%	ICU Level of Service	A	
Analysis Period (min)	15			

1125-NN

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/7/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1	4	478	3	150	9	1235	70	208	1093	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.95		1.00	0.93			0.99		1.00	1.00	
Flt Protected		0.98		0.95	0.98			1.00		0.95	1.00	
Satd. Flow (prot)		1707		1416	1599			3389		1770	3419	
Flt Permitted		0.98		0.95	0.98			0.94		0.10	1.00	
Satd. Flow (perm)		1707		1416	1599			3203		188	3419	
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)	5	1	4	488	3	153	9	1260	71	212	1115	5
RTOR Reduction (vph)	0	4	0	0	32	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	6	0	332	280	0	0	1336	0	212	1120	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.3		30.2	30.2			34.6		53.5	53.5	
Effective Green, g (s)		2.3		31.2	31.2			35.6		54.5	54.5	
Actuated g/C Ratio		0.02		0.31	0.31			0.36		0.55	0.55	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		39		442	499			1140		338	1863	
v/s Ratio Prot		c0.00		c0.23	0.17					0.09	c0.33	
v/s Ratio Perm								c0.42		0.25		
v/c Ratio		0.16		0.75	0.56			1.17		0.63	0.60	
Uniform Delay, d1		47.9		30.9	28.7			32.2		41.1	15.4	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.4		7.1	1.4			87.0		3.6	1.4	
Delay (s)		49.3		38.0	30.1			119.2		44.8	16.8	
Level of Service		D		D	C			F		D	B	
Approach Delay (s)		49.3			34.2			119.2			21.3	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM Average Control Delay	63.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

H23 - PM

HCM Unsignalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	0	0	920	84	76	1080	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	0	0	0	0	0	1173	107	97	1378	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											398	
pX, platoon unblocked	0.83	0.83	0.83	0.83	0.83		0.83					
vC, conflicting volume	1963	2852	459	1880	2798	445	1378			1281		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1428	2505	0	1328	2440	445	719			1281		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			82		
cM capacity (veh/h)	68	19	896	81	21	561	725			538		

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3	SB 4
Volume Total	0	469	469	342	97	551	551	276
Volume Left	0	0	0	0	97	0	0	0
Volume Right	0	0	0	107	0	0	0	0
cSH	1700	1700	1700	1700	538	1700	1700	1700
Volume to Capacity	0.00	0.28	0.28	0.20	0.18	0.32	0.32	0.16
Queue Length 95th (ft)	0	0	0	0	16	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	13.2	0.0	0.0	0.0
Lane LOS	A				B			
Approach Delay (s)	0.0	0.0			0.9			
Approach LOS	A							

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	36.5%	ICU Level of Service		A
Analysis Period (min)	15			

1/23 - PM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/24/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	298	127	149	727	1053	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1770	5085	4717	
Flt Permitted	0.95	1.00	0.10	1.00	1.00	
Satd. Flow (perm)	3433	1583	177	5085	4717	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	380	162	190	927	1343	393
RTOR Reduction (vph)	0	134	0	0	50	0
Lane Group Flow (vph)	380	28	190	927	1686	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	3		5	2	6 4	
Permitted Phases		3	2			
Actuated Green, G (s)	16.1	16.1	53.0	53.0	58.0	
Effective Green, g (s)	17.1	17.1	54.0	54.0	59.0	
Actuated g/C Ratio	0.17	0.17	0.54	0.54	0.59	
Clearance Time (s)	5.0	5.0	5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	587	271	285	2746	2783	
v/s Ratio Prot	c0.11		c0.08	0.18	c0.36	
v/s Ratio Perm		0.02	c0.28			
v/c Ratio	0.65	0.10	0.67	0.34	0.61	
Uniform Delay, d1	38.6	35.0	18.3	12.9	13.1	
Progression Factor	1.00	1.00	1.00	1.00	0.18	
Incremental Delay, d2	2.5	0.2	5.8	0.3	0.3	
Delay (s)	41.1	35.1	24.1	13.3	2.6	
Level of Service	D	D	C	B	A	
Approach Delay (s)	39.3			15.1	2.6	
Approach LOS	D			B	A	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HZ3-PM

HCM Signalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave

7/24/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	116	208	0	1044	1093	0
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		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1770	1583		5085	5085	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1770	1583		5085	5085	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	151	271	0	1359	1423	0
RTOR Reduction (vph)	0	225	0	0	0	0
Lane Group Flow (vph)	151	46	0	1359	1423	0
Confl. Peds. (#/hr)						11
Turn Type		Perm				
Protected Phases	4			2 3	6	
Permitted Phases		4				
Actuated Green, G (s)	15.9	15.9		74.1	37.1	
Effective Green, g (s)	16.9	16.9		75.1	38.1	
Actuated g/C Ratio	0.17	0.17		0.75	0.38	
Clearance Time (s)	5.0	5.0			5.0	
Vehicle Extension (s)	3.0	3.0			3.0	
Lane Grp Cap (vph)	299	268		3819	1937	
v/s Ratio Prot	c0.09			c0.27	c0.28	
v/s Ratio Perm		0.03				
v/c Ratio	0.51	0.17		0.36	0.73	
Uniform Delay, d1	37.7	35.6		4.2	26.6	
Progression Factor	1.00	1.00		0.12	1.00	
Incremental Delay, d2	1.3	0.3		0.1	2.5	
Delay (s)	39.1	35.9		0.6	29.1	
Level of Service	D	D		A	C	
Approach Delay (s)	37.0			0.6	29.1	
Approach LOS	D			A	C	

Intersection Summary				
HCM Average Control Delay	18.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	49.2%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HZ3-PM

HCM Signalized Intersection Capacity Analysis
19: WB off & on-ramps & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	70	50	906	388	105	1111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	15	11	11	11	11
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.96		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	1742	4657		1711	4916
Flt Permitted	0.95	1.00	1.00		0.11	1.00
Satd. Flow (perm)	1711	1742	4657		191	4916
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	91	65	1180	505	137	1447
RTOR Reduction (vph)	0	58	56	0	0	0
Lane Group Flow (vph)	91	7	1629	0	137	1447
Confl. Peds. (#/hr)				9		
Turn Type		custom			pm+pt	
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	8.9	8.9	57.1		71.1	71.1
Effective Green, g (s)	9.9	9.9	58.1		72.1	72.1
Actuated g/C Ratio	0.11	0.11	0.65		0.80	0.80
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	188	192	3006		322	3938
v/s Ratio Prot			c0.35		0.05	c0.29
v/s Ratio Perm	c0.05	0.00			0.29	
v/c Ratio	0.48	0.04	0.54		0.43	0.37
Uniform Delay, d1	37.6	35.8	8.7		12.1	2.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.0	0.1	0.7		0.9	0.3
Delay (s)	39.6	35.9	9.4		13.0	2.8
Level of Service	D	D	A		B	A
Approach Delay (s)	38.1		9.4			3.7
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

H23-PM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	10	666	310	0	1207
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	905	421	0	1640
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.89	0.86			0.86	
vC, conflicting volume	1729	456			1330	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	879	46			1061	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	256	870			560	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	14	452	452	421	820	820
Volume Left	0	0	0	0	0	0
Volume Right	14	0	0	421	0	0
cSH	870	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.27	0.27	0.25	0.48	0.48
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	9.2	0.0	0.0	0.0	0.0	0.0
Lane LOS	A					
Approach Delay (s)	9.2	0.0			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

1123-PM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave 7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	4	482	2	58	4	595	67	137	725	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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		0.94		1.00	0.97			0.98		1.00	1.00	
Flt Protected		0.97		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1688		1416	1648			3361		1770	3421	
Flt Permitted		0.97		0.95	0.96			0.95		0.17	1.00	
Satd. Flow (perm)		1688		1416	1648			3194		321	3421	
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	6	0	5	615	3	74	5	759	85	175	925	0
RTOR Reduction (vph)	0	5	0	0	9	0	0	7	0	0	0	0
Lane Group Flow (vph)	0	6	0	351	332	0	0	842	0	175	925	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Split			Perm			pm+pt		
Protected Phases	4	4		8	8			2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		1.4		32.1	32.1			37.3		51.5	51.5	
Effective Green, g (s)		2.4		33.1	33.1			38.3		52.5	52.5	
Actuated g/C Ratio		0.02		0.33	0.33			0.38		0.52	0.52	
Clearance Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		41		469	545			1223		316	1796	
v/s Ratio Prot		c0.00		c0.25	0.20					0.06	c0.27	
v/s Ratio Perm								c0.26		0.23		
v/c Ratio		0.15		0.75	0.61			0.69		0.55	0.52	
Uniform Delay, d1		47.8		29.7	28.0			25.8		15.4	15.5	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.2		6.4	1.9			3.2		2.1	1.1	
Delay (s)		49.0		36.2	30.0			29.0		17.5	16.5	
Level of Service		D		D	C			C		B	B	
Approach Delay (s)		49.0			33.1			29.0			16.7	
Approach LOS		D			C			C			B	

Intersection Summary				
HCM Average Control Delay	25.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	84.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

H30 -AM

HCM Unsignalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	1	1	80	0	620	54	98	828	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	0	1	1	82	0	633	55	100	845	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											398	
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91		0.91					
vC, conflicting volume	1443	1733	422	1283	1705	344	845			688		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1286	1605	163	1110	1575	344	628			688		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	99	99	87	100			89		
cM capacity (veh/h)	88	84	775	136	88	652	863			902		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	84	422	266	100	563	282
Volume Left	0	1	0	0	100	0	0
Volume Right	0	82	0	55	0	0	0
cSH	1700	580	1700	1700	902	1700	1700
Volume to Capacity	0.00	0.14	0.25	0.16	0.11	0.33	0.17
Queue Length 95th (ft)	0	13	0	0	9	0	0
Control Delay (s)	0.0	12.3	0.0	0.0	9.5	0.0	0.0
Lane LOS	A	B			A		
Approach Delay (s)	0.0	12.3	0.0		1.0		
Approach LOS	A	B					

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	39.3%	ICU Level of Service	A	
Analysis Period (min)	15			

I-90 -AM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave 7/24/2008

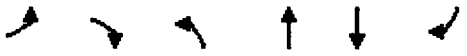
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	243	78	76	540	788	256
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1769	3539	3275	
Flt Permitted	0.95	1.00	0.21	1.00	1.00	
Satd. Flow (perm)	3433	1583	386	3539	3275	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	248	80	78	551	804	261
RTOR Reduction (vph)	0	68	0	0	25	0
Lane Group Flow (vph)	248	12	78	551	1040	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.8	11.8	67.2	67.2	57.8	
Effective Green, g (s)	13.8	13.8	67.2	68.2	58.8	
Actuated g/C Ratio	0.15	0.15	0.75	0.76	0.65	
Clearance Time (s)	6.0	6.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	526	243	371	2682	2140	
v/s Ratio Prot	c0.07		0.01	c0.16	c0.32	
v/s Ratio Perm		0.01	0.14			
v/c Ratio	0.47	0.05	0.21	0.21	0.49	
Uniform Delay, d1	34.8	32.5	4.3	3.1	7.9	
Progression Factor	1.00	1.00	1.00	1.00	0.79	
Incremental Delay, d2	0.7	0.1	0.3	0.2	0.8	
Delay (s)	35.4	32.6	4.6	3.3	7.0	
Level of Service	D	C	A	A	A	
Approach Delay (s)	34.7			3.5	7.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H30 -AM

HCM Unsignalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave

7/24/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	128	0	855	966	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	133	0	891	1006	0
Pedestrians	11					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				114	442	
pX, platoon unblocked	0.97	0.95	0.95			
vC, conflicting volume	1463	514	1017			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1224	390	919			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	77	100			
cM capacity (veh/h)	165	574	697			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	133	445	445	503	503
Volume Left	0	0	0	0	0
Volume Right	133	0	0	0	0
cSH	574	1700	1700	1700	1700
Volume to Capacity	0.23	0.26	0.26	0.30	0.30
Queue Length 95th (ft)	22	0	0	0	0
Control Delay (s)	13.2	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	13.2	0.0		0.0	
Approach LOS	B				

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	41.3%	ICU Level of Service		A
Analysis Period (min)	15			

H30-AM

HCM Signalized Intersection Capacity Analysis
19: WB on-ramp & Harrison Ave 7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	40	3	44	0	719	89	0	848	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	15	11	11	11	11	11	11
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					1.00	1.00		1.00			1.00	
Flpb, ped/bikes					1.00	1.00		1.00			1.00	
Frt					1.00	0.85		0.98			0.98	
Flt Protected					0.96	1.00		1.00			1.00	
Satd. Flow (prot)					1780	1742		3355			3353	
Flt Permitted					0.96	1.00		1.00			1.00	
Satd. Flow (perm)					1780	1742		3355			3353	
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)	0	0	0	42	3	46	0	749	93	0	883	114
RTOR Reduction (vph)	0	0	0	0	0	42	0	5	0	0	5	0
Lane Group Flow (vph)	0	0	0	0	45	4	0	837	0	0	992	0
Confl. Peds. (#/hr)									9			8
Turn Type				Perm		Perm						
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)					6.7	6.7		72.7			72.7	
Effective Green, g (s)					7.7	7.7		74.3			74.3	
Actuated g/C Ratio					0.09	0.09		0.83			0.83	
Clearance Time (s)					5.0	5.0		5.6			5.6	
Vehicle Extension (s)					3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)					152	149		2770			2768	
v/s Ratio Prot								0.25			c0.30	
v/s Ratio Perm					0.03	0.00						
v/c Ratio					0.30	0.03		0.30			0.36	
Uniform Delay, d1					38.6	37.7		1.8			1.9	
Progression Factor					1.00	1.00		0.67			0.83	
Incremental Delay, d2					1.1	0.1		0.3			0.3	
Delay (s)					39.7	37.8		1.5			1.9	
Level of Service					D	D		A			A	
Approach Delay (s)		0.0			38.7			1.5			1.9	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	3.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H30 - AM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	31	645	123	0	1081
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	34	701	134	0	1175
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.89	0.99			0.99	
vC, conflicting volume	1293	355			839	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1009	315			806	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	210	669			800	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	34	351	351	134	588	588
Volume Left	0	0	0	0	0	0
Volume Right	34	0	0	134	0	0
cSH	669	1700	1700	1700	1700	1700
Volume to Capacity	0.05	0.21	0.21	0.08	0.35	0.35
Queue Length 95th (ft)	4	0	0	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.7	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

1430 - AM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	455	0	124	10	575	69	85	625	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.98		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	
Frt		0.86		1.00	0.93			0.98		1.00	1.00	
Flt Protected		1.00		0.95	0.97			1.00		0.95	1.00	
Satd. Flow (prot)		1583		1408	1603			3357		1769	3418	
Flt Permitted		1.00		0.76	0.83			0.94		0.25	1.00	
Satd. Flow (perm)		1583		1122	1361			3170		466	3418	
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)	0	0	1	464	0	127	10	587	70	87	638	4
RTOR Reduction (vph)	0	1	0	0	28	0	0	9	0	0	1	0
Lane Group Flow (vph)	0	0	0	302	261	0	0	658	0	87	641	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Perm			Perm			pm+pt		
Protected Phases	4	4			8			2		1	6	
Permitted Phases				8			2			6		
Actuated Green, G (s)		1.2		31.3	31.3			32.5		41.9	41.9	
Effective Green, g (s)		2.2		32.3	32.3			34.1		41.9	43.5	
Actuated g/C Ratio		0.02		0.36	0.36			0.38		0.47	0.48	
Clearance Time (s)		5.0		5.0	5.0			5.6		4.0	5.6	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		39		403	488			1201		295	1652	
v/s Ratio Prot		c0.00								0.02	c0.19	
v/s Ratio Perm				c0.27	0.19			c0.21		0.12		
v/c Ratio		0.00		0.75	0.53			0.55		0.29	0.39	
Uniform Delay, d1		42.8		25.3	22.9			21.9		14.7	14.8	
Progression Factor		1.00		1.00	1.00			0.84		1.00	1.00	
Incremental Delay, d2		0.0		7.5	1.1			1.8		0.6	0.7	
Delay (s)		42.8		32.8	24.0			20.2		15.2	15.5	
Level of Service		D		C	C			C		B	B	
Approach Delay (s)		42.8			28.5			20.2			15.4	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

H30 - NOON

HCM Unsignalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	60	0	1291	49	105	1548	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	0	0	0	61	0	1317	50	107	1580	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											398	
pX, platoon unblocked	0.53	0.53	0.53	0.53	0.53		0.53					
vC, conflicting volume	2514	3161	790	2346	3136	684	1580			1367		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2084	3304	0	1769	3257	684	325			1367		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	84	100			78		
cM capacity (veh/h)	11	3	576	23	4	391	654			498		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	61	878	489	107	1053	527
Volume Left	0	0	0	0	107	0	0
Volume Right	0	61	0	50	0	0	0
cSH	1700	391	1700	1700	498	1700	1700
Volume to Capacity	0.00	0.16	0.52	0.29	0.22	0.62	0.31
Queue Length 95th (ft)	0	14	0	0	20	0	0
Control Delay (s)	0.0	15.9	0.0	0.0	14.2	0.0	0.0
Lane LOS	A	C			B		
Approach Delay (s)	0.0	15.9	0.0		0.9		
Approach LOS	A	C					

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	56.8%	ICU Level of Service	B	
Analysis Period (min)	15			

1130 -NN

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/24/2008

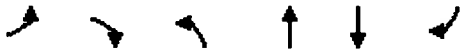
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	418	170	174	1080	1519	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
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)	3433	1583	1770	3539	3357	
Flt Permitted	0.95	1.00	0.08	1.00	1.00	
Satd. Flow (perm)	3433	1583	143	3539	3357	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	427	173	178	1102	1550	185
RTOR Reduction (vph)	0	113	0	0	10	0
Lane Group Flow (vph)	427	60	178	1102	1725	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	16.9	16.9	62.1	62.1	48.2	
Effective Green, g (s)	18.9	18.9	62.1	63.1	49.2	
Actuated g/C Ratio	0.21	0.21	0.69	0.70	0.55	
Clearance Time (s)	6.0	6.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	721	332	278	2481	1835	
v/s Ratio Prot	c0.12		c0.07	0.31	c0.51	
v/s Ratio Perm		0.04	0.37			
v/c Ratio	0.59	0.18	0.64	0.44	0.94	
Uniform Delay, d1	32.1	29.2	21.2	5.8	19.0	
Progression Factor	1.00	1.00	1.00	1.00	0.87	
Incremental Delay, d2	1.3	0.3	5.0	0.6	10.0	
Delay (s)	33.4	29.5	26.2	6.4	26.6	
Level of Service	C	C	C	A	C	
Approach Delay (s)	32.3			9.2	26.6	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

H30-NN

HCM Unsignalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave

7/24/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	165	0	1568	1521	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	172	0	1633	1584	0
Pedestrians	11					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				114	442	
pX, platoon unblocked	0.88	0.81	0.81			
vC, conflicting volume	2412	803	1595			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1630	293	1269			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	70	100			
cM capacity (veh/h)	81	566	437			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	172	817	817	792	792
Volume Left	0	0	0	0	0
Volume Right	172	0	0	0	0
cSH	566	1700	1700	1700	1700
Volume to Capacity	0.30	0.48	0.48	0.47	0.47
Queue Length 95th (ft)	32	0	0	0	0
Control Delay (s)	14.1	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	14.1	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

H30 -NN

HCM Signalized Intersection Capacity Analysis
19: WB on-ramp & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	66	0	135	0	1505	138	0	1306	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	15	11	11	11	11	11	11
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					1.00	1.00		1.00			1.00	
Flpb, ped/bikes					1.00	1.00		1.00			1.00	
Frt					1.00	0.85		0.99			0.98	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1742		3371			3336	
Flt Permitted					0.95	1.00		1.00			1.00	
Satd. Flow (perm)					1770	1742		3371			3336	
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)	0	0	0	69	0	141	0	1568	144	0	1360	228
RTOR Reduction (vph)	0	0	0	0	0	29	0	4	0	0	9	0
Lane Group Flow (vph)	0	0	0	0	69	112	0	1708	0	0	1579	0
Confl. Peds. (#/hr)									9			8
Turn Type				Perm		Perm						
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)					11.0	11.0		68.4			68.4	
Effective Green, g (s)					12.0	12.0		70.0			70.0	
Actuated g/C Ratio					0.13	0.13		0.78			0.78	
Clearance Time (s)					5.0	5.0		5.6			5.6	
Vehicle Extension (s)					3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)					236	232		2622			2595	
v/s Ratio Prot								c0.51			0.47	
v/s Ratio Perm					0.04	c0.06						
v/c Ratio					0.29	0.48		0.65			0.61	
Uniform Delay, d1					35.2	36.1		4.5			4.2	
Progression Factor					1.00	1.00		0.70			1.00	
Incremental Delay, d2					0.7	1.6		1.2			1.1	
Delay (s)					35.9	37.7		4.4			5.3	
Level of Service					D	D		A			A	
Approach Delay (s)		0.0			37.1			4.4			5.3	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

H30-NN

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	15	1288	354	0	1570
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	16	1400	385	0	1707
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.83	0.81			0.81	
vC, conflicting volume	2257	704			1789	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1070	162			1503	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h	179	689			356	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	16	700	700	385	853	853
Volume Left	0	0	0	0	0	0
Volume Right	16	0	0	385	0	0
cSH	689	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.41	0.41	0.23	0.50	0.50
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	10.4	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	10.4	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

H30 - NN

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/24/2008

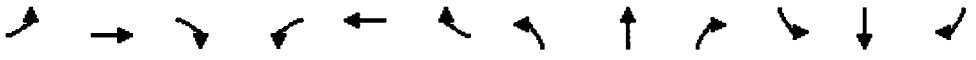
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1	4	478	3	150	9	1235	70	208	1093	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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	
Frt		0.95		1.00	0.93			0.99		1.00	1.00	
Flt Protected		0.98		0.95	0.98			1.00		0.95	1.00	
Satd. Flow (prot)		1706		1405	1593			3389		1770	3419	
Flt Permitted		0.98		0.75	0.84			0.94		0.08	1.00	
Satd. Flow (perm)		1706		1111	1369			3201		157	3419	
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)	5	1	4	488	3	153	9	1260	71	212	1115	5
RTOR Reduction (vph)	0	4	0	0	22	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	6	0	332	290	0	0	1336	0	212	1120	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Perm			Perm			pm+pt		
Protected Phases	4	4			8			2		1	6	
Permitted Phases				8			2			6		
Actuated Green, G (s)		1.4		49.7	49.7			43.4		53.3	53.3	
Effective Green, g (s)		2.4		50.7	50.7			45.0		53.3	54.9	
Actuated g/C Ratio		0.02		0.42	0.42			0.38		0.44	0.46	
Clearance Time (s)		5.0		5.0	5.0			5.6		4.0	5.6	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		34		469	578			1200		149	1564	
v/s Ratio Prot		c0.00								c0.07	0.33	
v/s Ratio Perm				c0.30	0.21			0.42		c0.56		
v/c Ratio		0.18		0.71	0.50			1.11		1.42	0.72	
Uniform Delay, d1		57.8		28.5	25.4			37.5		59.2	26.3	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.8		4.8	0.7			63.0		224.7	2.8	
Delay (s)		59.7		33.4	26.1			100.5		283.9	29.1	
Level of Service		E		C	C			F		F	C	
Approach Delay (s)		59.7			29.9			100.5			69.7	
Approach LOS		E			C			F			E	

Intersection Summary			
HCM Average Control Delay	74.4	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	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

H30-PM

HCM Unsignalized Intersection Capacity Analysis
16: Sampson Ave & Harrison Ave

7/24/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	0	0	0	116	0	920	84	76	1080	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	0	0	0	0	0	148	0	1173	107	97	1378	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											398	
pX, platoon unblocked	0.54	0.54	0.54	0.54	0.54		0.54					
vC, conflicting volume	2306	2852	689	2110	2798	640	1378			1281		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1726	2728	0	1365	2630	640	21			1281		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	65	100			82		
cM capacity (veh/h)	17	9	591	50	10	418	868			538		

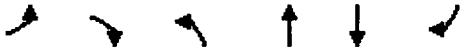
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	0	148	782	498	97	918	459
Volume Left	0	0	0	0	97	0	0
Volume Right	0	148	0	107	0	0	0
cSH	1700	418	1700	1700	538	1700	1700
Volume to Capacity	0.00	0.35	0.46	0.29	0.18	0.54	0.27
Queue Length 95th (ft)	0	39	0	0	16	0	0
Control Delay (s)	0.0	18.3	0.0	0.0	13.2	0.0	0.0
Lane LOS	A	C			B		
Approach Delay (s)	0.0	18.3	0.0		0.9		
Approach LOS	A	C					

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	59.4%	ICU Level of Service	B	
Analysis Period (min)	15			

H30 -PM

HCM Signalized Intersection Capacity Analysis
17: Dewey Blvd & Harrison Ave

7/24/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	298	127	149	843	1053	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	11	11
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3433	1583	1770	3539	3286	
Flt Permitted	0.95	1.00	0.08	1.00	1.00	
Satd. Flow (perm)	3433	1583	143	3539	3286	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Growth Factor (vph)	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	380	162	190	1075	1343	393
RTOR Reduction (vph)	0	125	0	0	28	0
Lane Group Flow (vph)	380	37	190	1075	1708	0
Confl. Peds. (#/hr)			3			3
Turn Type		Perm	pm+pt			
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	15.5	15.5	63.5	63.5	48.0	
Effective Green, g (s)	17.5	17.5	63.5	64.5	49.0	
Actuated g/C Ratio	0.19	0.19	0.71	0.72	0.54	
Clearance Time (s)	6.0	6.0	4.0	5.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	668	308	309	2536	1789	
v/s Ratio Prot	c0.11		c0.08	0.30	c0.52	
v/s Ratio Perm		0.02	0.35			
v/c Ratio	0.57	0.12	0.61	0.42	0.95	
Uniform Delay, d1	32.8	29.9	21.6	5.2	19.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.2	3.6	0.5	12.9	
Delay (s)	34.0	30.1	25.2	5.7	32.4	
Level of Service	C	C	C	A	C	
Approach Delay (s)	32.8			8.6	32.4	
Approach LOS	C			A	C	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

H30-PM

HCM Unsignalized Intersection Capacity Analysis
18: EB off-ramp & Harrison Ave

7/24/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	208	0	1160	1093	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	271	0	1510	1423	0
Pedestrians	11					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	1					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				114	442	
pX, platoon unblocked	0.89	0.83	0.83			
vC, conflicting volume	2189	723	1434			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1451	240	1102			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	56	100			
cM capacity (veh/h)	107	622	514			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	271	755	755	712	712
Volume Left	0	0	0	0	0
Volume Right	271	0	0	0	0
cSH	622	1700	1700	1700	1700
Volume to Capacity	0.44	0.44	0.44	0.42	0.42
Queue Length 95th (ft)	55	0	0	0	0
Control Delay (s)	15.2	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	15.2	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

H30 - PM

HCM Signalized Intersection Capacity Analysis
19: WB on-ramp & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	70	0	50	0	906	388	0	1111	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	12	15	11	11	11	11	11	11
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					1.00	1.00		0.99			1.00	
Flpb, ped/bikes					1.00	1.00		1.00			1.00	
Frt					1.00	0.85		0.96			0.99	
Flt Protected					0.95	1.00		1.00			1.00	
Satd. Flow (prot)					1770	1742		3242			3370	
Flt Permitted					0.95	1.00		1.00			1.00	
Satd. Flow (perm)					1770	1742		3242			3370	
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	0	0	0	91	0	65	0	1180	505	0	1447	137
RTOR Reduction (vph)	0	0	0	0	0	56	0	29	0	0	4	0
Lane Group Flow (vph)	0	0	0	0	91	9	0	1656	0	0	1580	0
Confl. Peds. (#/hr)									9			8
urn Type				Perm		Perm						
Protected Phases					8			2			6	
Permitted Phases				8		8						
Actuated Green, G (s)					8.3	8.3		61.1			61.1	
Effective Green, g (s)					9.3	9.3		62.7			62.7	
Actuated g/C Ratio					0.12	0.12		0.78			0.78	
Clearance Time (s)					5.0	5.0		5.6			5.6	
Vehicle Extension (s)					3.0	3.0		3.0			3.0	
ane Grp Cap (vph)					206	203		2541			2641	
v/s Ratio Prot								c0.51			0.47	
v/s Ratio Perm					0.05	0.01						
v/c Ratio					0.44	0.05		0.65			0.60	
Uniform Delay, d1					32.9	31.4		3.8			3.5	
Progression Factor					1.00	1.00		1.00			1.00	
Incremental Delay, d2					1.5	0.1		1.3			1.0	
Delay (s)					34.4	31.5		5.1			4.5	
Level of Service					C	C		A			A	
Approach Delay (s)		0.0			33.2			5.1			4.5	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

H30 -PM

HCM Unsignalized Intersection Capacity Analysis
20: Cornell Ave & Harrison Ave

7/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	10	666	310	0	1207
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	14	905	421	0	1640
Pedestrians	4					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			334			158
pX, platoon unblocked	0.79					
vC, conflicting volume	1729	456			1330	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1400	456			1330	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	104	549			513	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	14	452	452	421	820	820
Volume Left	0	0	0	0	0	0
Volume Right	14	0	0	421	0	0
cSH	549	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.27	0.27	0.25	0.48	0.48
Queue Length 95th (ft)	2	0	0	0	0	0
Control Delay (s)	11.7	0.0	0.0	0.0	0.0	0.0
Lane LOS	B					
Approach Delay (s)	11.7	0.0			0.0	
Approach LOS	B					

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

H30 -PM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	0	4	482	2	58	4	595	67	137	725	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)		4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00		*0.80	0.95			0.95		1.00	0.95	
Frpb, ped/bikes		0.99		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	
Frt		0.94		1.00	0.97			0.98		1.00	1.00	
Flt Protected		0.97		0.95	0.96			1.00		0.95	1.00	
Satd. Flow (prot)		1688		1407	1640			3361		1770	3421	
Flt Permitted		0.97		0.75	0.77			0.95		0.14	1.00	
Satd. Flow (perm)		1688		1111	1308			3190		254	3421	
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	6	0	5	615	3	74	5	759	85	175	925	0
RTOR Reduction (vph)	0	5	0	0	8	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	6	0	351	333	0	0	840	0	175	925	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type	Split			Perm			Perm			pm+pt		
Protected Phases	4	4			8			2		1	6	
Permitted Phases				8			2			6		
Actuated Green, G (s)		1.4		40.2	40.2			25.3		42.8	42.8	
Effective Green, g (s)		2.4		41.2	41.2			26.9		42.8	44.4	
Actuated g/C Ratio		0.02		0.41	0.41			0.27		0.43	0.44	
Clearance Time (s)		5.0		5.0	5.0			5.6		4.0	5.6	
Vehicle Extension (s)		2.5		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		41		458	539			858		313	1519	
v/s Ratio Prot		c0.00								0.08	c0.27	
v/s Ratio Perm				c0.32	0.25			c0.26		0.16		
v/c Ratio		0.15		0.77	0.62			0.98		0.56	0.61	
Uniform Delay, d1		47.8		25.3	23.2			36.3		21.5	21.2	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		1.2		7.5	2.1			26.1		2.2	1.8	
Delay (s)		49.0		32.8	25.3			62.4		23.6	23.0	
Level of Service		D		C	C			E		C	C	
Approach Delay (s)		49.0			29.1			62.4			23.1	
Approach LOS		D			C			E			C	

Intersection Summary			
HCM Average Control Delay	37.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

H31-AM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	1	455	0	124	0	585	69	85	625	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)			4.0	4.0	4.0			4.0	5.6	4.0	4.0	
Lane Util. Factor			1.00	*0.80	0.95			0.95	1.00	1.00	0.95	
Frpb, ped/bikes			0.99	1.00	1.00			1.00	0.98	1.00	1.00	
Flpb, ped/bikes			1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt			0.86	1.00	0.93			1.00	0.85	1.00	1.00	
Flt Protected			1.00	0.95	0.97			1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1590	1410	1604			3421	1498	1769	3418	
Flt Permitted			1.00	0.95	0.97			1.00	1.00	0.32	1.00	
Satd. Flow (perm)			1590	1410	1604			3421	1498	597	3418	
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)	0	0	1	464	0	127	0	597	70	87	638	4
RTOR Reduction (vph)	0	0	0	0	51	0	0	0	41	0	0	0
Lane Group Flow (vph)	0	0	1	302	238	0	0	597	29	87	642	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type			Free	Perm					Perm	pm+pt		
Protected Phases					8			2		1	6	
Permitted Phases			Free	8					2	6		
Actuated Green, G (s)			60.0	16.7	16.7			24.7	24.7	32.7	32.7	
Effective Green, g (s)			60.0	17.7	17.7			26.3	24.7	32.7	34.3	
Actuated g/C Ratio			1.00	0.30	0.30			0.44	0.41	0.55	0.57	
Clearance Time (s)				5.0	5.0			5.6	5.6	4.0	5.6	
Vehicle Extension (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)			1590	416	473			1500	617	403	1954	
v/s Ratio Prot								c0.17		0.01	c0.19	
v/s Ratio Perm			0.00	c0.21	0.15				0.02	0.10		
v/c Ratio			0.00	0.73	0.50			0.40	0.05	0.22	0.33	
Uniform Delay, d1			0.0	19.0	17.5			11.5	10.6	7.0	6.8	
Progression Factor			1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2			0.0	6.2	0.8			0.8	0.1	0.3	0.4	
Delay (s)			0.0	25.2	18.4			12.3	10.7	7.3	7.2	
Level of Service			A	C	B			B	B	A	A	
Approach Delay (s)		0.0			21.8			12.1			7.2	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

H31 - NN

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave 7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	10	478	3	150	0	1244	70	208	1093	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)			4.0	4.0	4.0			4.0	5.6	4.0	4.0	
Lane Util. Factor			1.00	*0.80	0.95			0.95	1.00	1.00	0.95	
Frpb, ped/bikes			0.99	1.00	1.00			1.00	0.98	1.00	1.00	
Flpb, ped/bikes			1.00	0.99	1.00			1.00	1.00	1.00	1.00	
Frt			0.86	1.00	0.93			1.00	0.85	1.00	1.00	
Flt Protected			1.00	0.95	0.98			1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1590	1408	1595			3421	1496	1770	3419	
Flt Permitted			1.00	0.95	0.98			1.00	1.00	0.09	1.00	
Satd. Flow (perm)			1590	1408	1595			3421	1496	171	3419	
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)	0	0	10	488	3	153	0	1269	71	212	1115	5
RTOR Reduction (vph)	0	0	0	0	40	0	0	0	37	0	0	0
Lane Group Flow (vph)	0	0	10	332	272	0	0	1269	34	212	1120	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type			Free	Perm					Perm	pm+pt		
Protected Phases					8			2		1	6	
Permitted Phases			Free	8					2	6		
Actuated Green, G (s)			90.0	23.8	23.8			42.6	42.6	55.6	55.6	
Effective Green, g (s)			90.0	24.8	24.8			44.2	42.6	55.6	57.2	
Actuated g/C Ratio			1.00	0.28	0.28			0.49	0.47	0.62	0.64	
Clearance Time (s)				5.0	5.0			5.6	5.6	4.0	5.6	
Vehicle Extension (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)			1590	388	440			1680	708	266	2173	
v/s Ratio Prot								0.37		c0.08	0.33	
v/s Ratio Perm			0.01	c0.24	0.17				0.02	c0.41		
v/c Ratio			0.01	0.86	0.62			0.76	0.05	0.80	0.52	
Uniform Delay, d1			0.0	30.9	28.5			18.5	12.8	19.4	8.9	
Progression Factor			1.00	1.00	1.00			0.92	0.75	1.00	1.00	
Incremental Delay, d2			0.0	16.6	2.6			2.6	0.1	15.2	0.9	
Delay (s)			0.0	47.5	31.1			19.6	9.7	34.5	9.8	
Level of Service			A	D	C			B	A	C	A	
Approach Delay (s)		0.0			39.6			19.1			13.7	
Approach LOS		A			D			B			B	

Intersection Summary				
HCM Average Control Delay	20.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	80.5%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

H31 - PM

HCM Signalized Intersection Capacity Analysis
21: Amherst Ave & Harrison Ave

7/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	9	482	2	58	0	599	67	137	725	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	12	11	11
Total Lost time (s)			4.0	4.0	4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor			1.00	*0.80	0.95			0.95	1.00	1.00	0.95	
Frpb, ped/bikes			0.99	1.00	1.00			1.00	0.98	1.00	1.00	
Flpb, ped/bikes			1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt			0.86	1.00	0.97			1.00	0.85	1.00	1.00	
Flt Protected			1.00	0.95	0.96			1.00	1.00	0.95	1.00	
Satd. Flow (prot)			1590	1410	1643			3421	1498	1769	3421	
Flt Permitted			1.00	0.95	0.96			1.00	1.00	0.23	1.00	
Satd. Flow (perm)			1590	1410	1643			3421	1498	430	3421	
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
Growth Factor (vph)	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%	125%
Adj. Flow (vph)	0	0	11	615	3	74	0	764	85	175	925	0
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	49	0	0	0
Lane Group Flow (vph)	0	0	11	351	324	0	0	764	36	175	925	0
Confl. Peds. (#/hr)			4	4					1	1		
Turn Type			Free	Perm					Perm	pm+pt		
Protected Phases					8			2		1	6	
Permitted Phases			Free	8					2	6		
Actuated Green, G (s)			60.0	17.5	17.5			23.6	23.6	31.9	31.9	
Effective Green, g (s)			60.0	18.5	18.5			25.2	25.2	31.9	33.5	
Actuated g/C Ratio			1.00	0.31	0.31			0.42	0.42	0.53	0.56	
Clearance Time (s)				5.0	5.0			5.6	5.6	4.0	5.6	
Vehicle Extension (s)				3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)			1590	435	507			1437	629	325	1910	
v/s Ratio Prot								0.22		0.04	c0.27	
v/s Ratio Perm			0.01	c0.25	0.20				0.02	c0.25		
v/c Ratio			0.01	0.81	0.64			0.53	0.06	0.54	0.48	
Uniform Delay, d1			0.0	19.1	17.9			13.0	10.3	8.4	8.0	
Progression Factor			1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2			0.0	10.5	2.6			1.4	0.2	1.7	0.9	
Delay (s)			0.0	29.6	20.5			14.4	10.5	10.1	8.9	
Level of Service			A	C	C			B	B	B	A	
Approach Delay (s)		0.0			25.1			14.0			9.1	
Approach LOS		A			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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