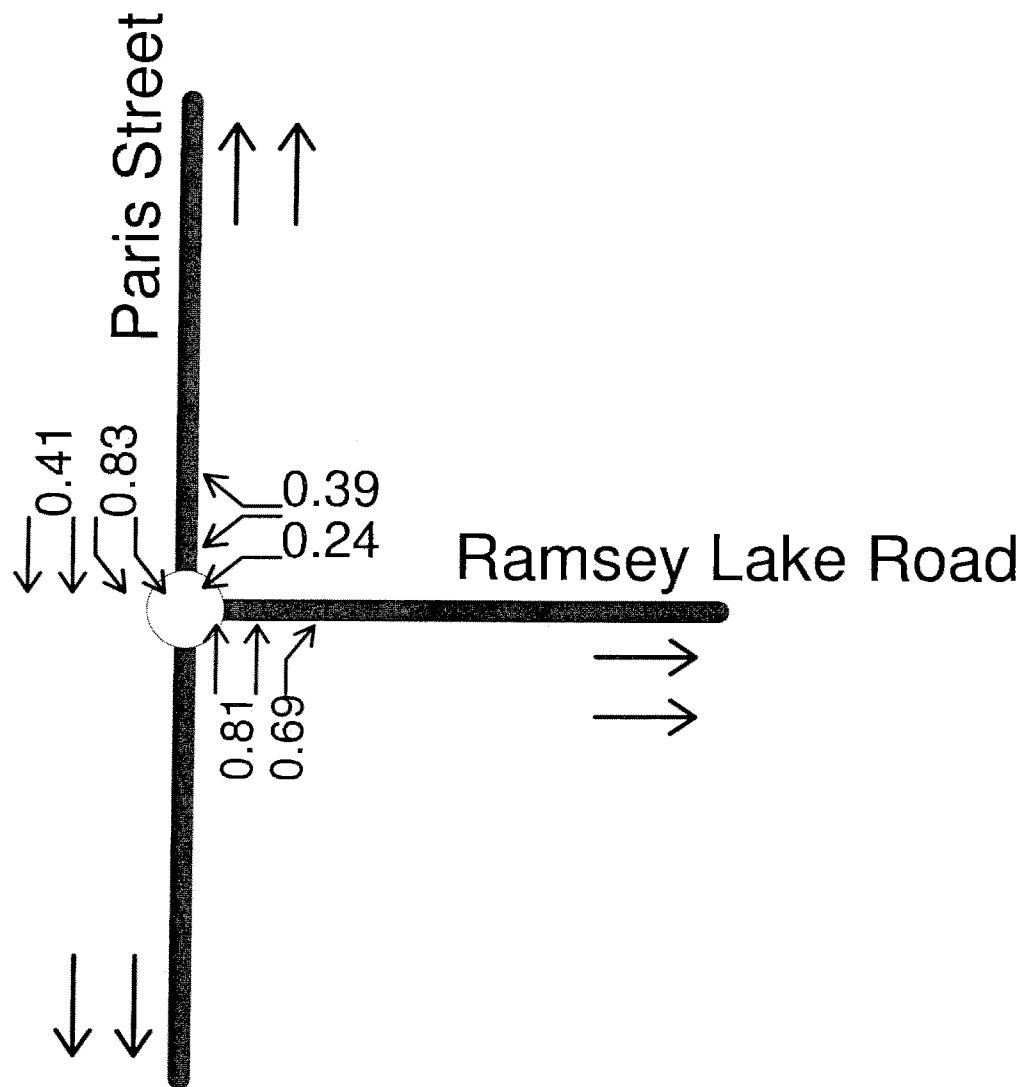




HCM Signalized Intersection Capacity Analysis 3: Ramsey Lake Road & Paris Street

04/06/2003 AM Peak (Existing Counts)
7/27/2005

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3321	1547	3390	1547	3321	3424
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3321	1547	3390	1547	3321	3424
Volume (vph)	133	245	929	477	835	963
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	145	266	1010	518	908	1047
RTOR Reduction (vph)	0	178	0	173	0	0
Lane Group Flow (vph)	145	88	1010	345	908	1047
Heavy Vehicles (%)	1%	0%	2%	0%	1%	1%
Turn Type		Over		Perm	Prot	
Protected Phases	8	1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	16.0	31.0	35.0	35.0	31.0	72.0
Effective Green, g (s)	18.0	33.0	37.0	37.0	33.0	74.0
Actuated g/C Ratio	0.18	0.33	0.37	0.37	0.33	0.74
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	598	511	1254	572	1096	2534
v/s Ratio Prot	c0.04	0.06	c0.30		c0.27	0.31
v/s Ratio Perm				0.22		
v/c Ratio	0.24	0.17	0.81	0.60	0.83	0.41
Uniform Delay, d1	35.2	23.8	28.3	25.5	30.9	4.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.7	5.6	4.7	7.3	0.5
Delay (s)	36.1	24.5	33.9	30.2	38.1	5.4
Level of Service	D	C	C	C	D	A
Approach Delay (s)	28.6		32.6			20.6
Approach LOS	C		C			C
Intersection Summary						
HCM Average Control Delay	26.2		HCM Level of Service		C	
HCM Volume to Capacity ratio	0.70					
Actuated Cycle Length (s)	100.0		Sum of lost time (s)		12.0	
Intersection Capacity Utilization	66.3%		ICU Level of Service		C	
Analysis Period (min)	15					
c Critical Lane Group						

Lanes, Volumes, Timings
3: Ramsey Lake Road & Paris Street

04/06/2003 AM Peak (Existing Counts)
3/9/2005

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	50.0	0.0		30.0	80.0	
Storage Lanes	2	1		1	2	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Fr		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3321	1547	3390	1547	3321	3424
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3321	1547	3390	1547	3321	3424
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		266		275		
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	48		48		48	
Link Distance (m)	291.0		258.0		280.0	
Travel Time (s)	21.8		19.4		21.0	
Volume (vph)	133	245	929	477	835	963
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	2%	0%	1%	1%
Adj. Flow (vph)	145	266	1010	518	908	1047
Lane Group Flow (vph)	145	266	1010	518	908	1047
Turn Type		Over		Perm	Prot	
Protected Phases	8	1	2		1	6
Permitted Phases				2		
Minimum Split (s)	22.0	10.0	22.0	22.0	10.0	22.0
Total Split (s)	22.0	37.0	41.0	41.0	37.0	78.0
Total Split (%)	22.0%	37.0%	41.0%	41.0%	37.0%	78.0%
Maximum Green (s)	16.0	31.0	35.0	35.0	31.0	72.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Walk Time (s)	5.0		5.0	5.0		5.0
Flash Dont Walk (s)	11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	18.0	33.0	37.0	37.0	33.0	74.0
Actuated g/C Ratio	0.18	0.33	0.37	0.37	0.33	0.74
w/c Ratio	0.24	0.39	0.81	0.69	0.83	0.41
Control Delay	36.4	4.9	34.3	17.6	38.7	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	4.9	34.3	17.6	38.7	5.4
LOS	D	A	C	B	D	A
Approach Delay	16.0		28.6			20.9
Approach LOS	B		C			C
Queue Length 50th (m)	12.5	0.0	91.2	38.7	83.0	33.5
Queue Length 95th (m)	21.1	16.5	116.4	77.5	107.0	42.6
Internal Link Dist (m)	267.0		234.0			256.0
Turn Bay Length (m)	50.0			30.0	80.0	
Base Capacity (vph)	598	689	1254	746	1096	2534
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0

Lanes, Volumes, Timings
 3: Ramsey Lake Road & Paris Street

04/06/2003 AM Peak (Existing Counts)
 3/9/2005



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Reduced v/c Ratio	0.24	0.39	0.81	0.69	0.83	0.41

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%) Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 80

Control Type: Pretimed

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 23.4

Intersection LOS: C

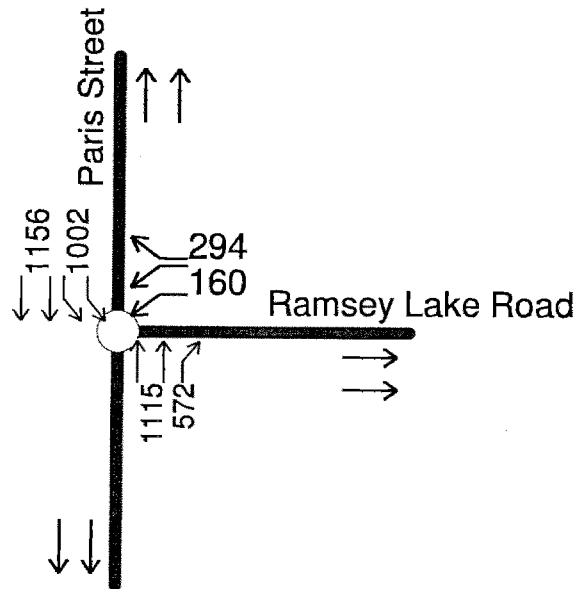
Intersection Capacity Utilization 66.3%

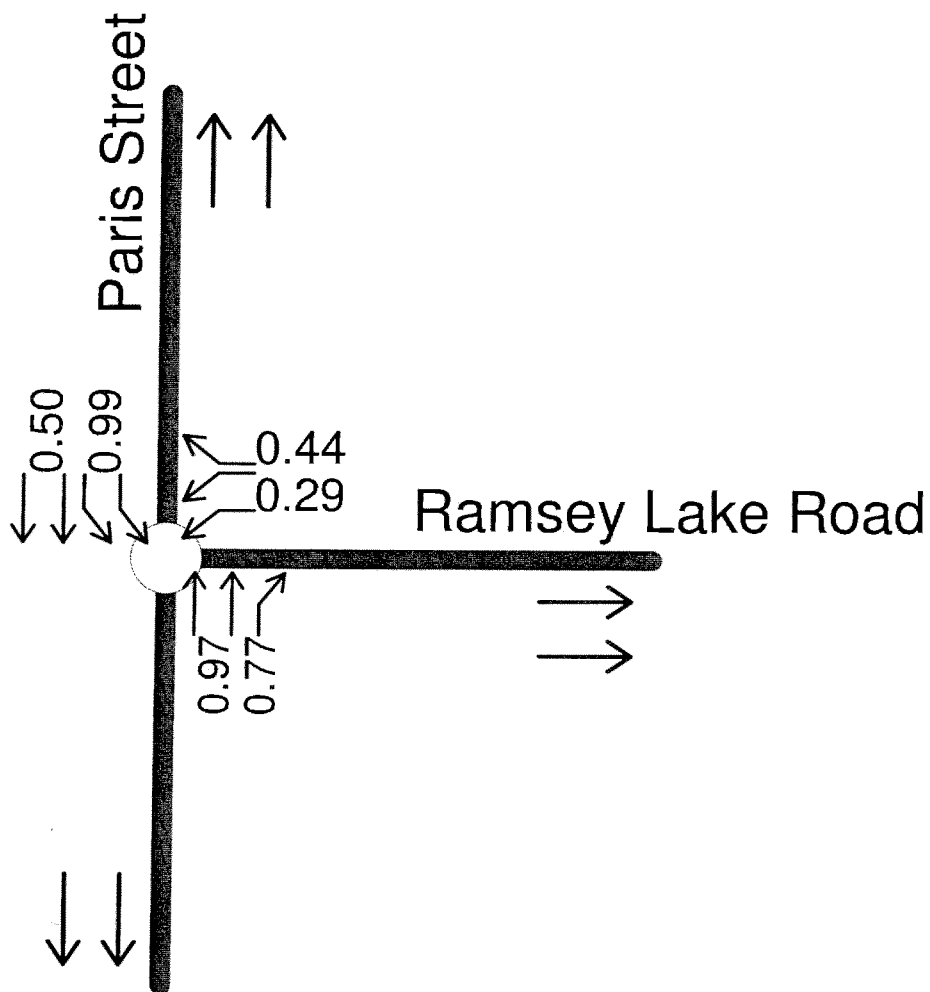
ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Ramsey Lake Road & Paris Street

 01	 02	
37 s	41 s	
 06		 08
78 s		22 s





HCM Signalized Intersection Capacity Analysis 3: Ramsey Lake Road & Paris Street

Future AM Peak 20% inc, future config
7/27/2005

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱	↰	↰↱	↰	↰↱	↰↱
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3321	1547	3390	1547	3321	3424
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3321	1547	3390	1547	3321	3424
Volume (vph)	133	245	929	477	835	963
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	120%	120%	120%	120%	120%	120%
Adj. Flow (vph)	173	320	1212	622	1089	1256
RTOR Reduction (vph)	0	214	0	239	0	0
Lane Group Flow (vph)	173	106	1212	383	1089	1256
Heavy Vehicles (%)	1%	0%	2%	0%	1%	1%
Turn Type	Over		Perm		Prot	
Protected Phases	8	1	2		1	6
Permitted Phases				2		
Actuated Green, G (s)	16.0	31.0	35.0	35.0	31.0	72.0
Effective Green, g (s)	18.0	33.0	37.0	37.0	33.0	74.0
Actuated g/C Ratio	0.18	0.33	0.37	0.37	0.33	0.74
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lane Grp Cap (vph)	598	511	1254	572	1096	2534
v/s Ratio Prot	c0.05	0.07	c0.36		c0.33	0.37
v/s Ratio Perm				0.25		
v/c Ratio	0.29	0.21	0.97	0.67	0.99	0.50
Uniform Delay, d1	35.5	24.1	30.9	26.4	33.4	5.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.9	18.6	6.1	25.7	0.7
Delay (s)	36.7	25.0	49.5	32.5	59.1	6.0
Level of Service	D	C	D	C	E	A
Approach Delay (s)	29.1		43.7			30.7
Approach LOS	C		D			C
Intersection Summary						
HCM Average Control Delay			35.6		HCM Level of Service	D
HCM Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	12.0
Intersection Capacity Utilization			77.5%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
3: Ramsey Lake Road & Paris Street

Future AM Peak 20% inc, future config
3/9/2005

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	80.0	0.0		60.0	80.0	
Storage Lanes	2	1		1	2	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (k/h)	24	14		14	24	
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.95
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3321	1547	3390	1547	3321	3424
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3321	1547	3390	1547	3321	3424
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		320		379		
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)	48		48			48
Link Distance (m)	291.0		258.0			280.0
Travel Time (s)	21.8		19.4			21.0
Volume (vph)	133	245	929	477	835	963
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	120%	120%	120%	120%	120%	120%
Heavy Vehicles (%)	1%	0%	2%	0%	1%	1%
Adj. Flow (vph)	173	320	1212	622	1089	1256
Lane Group Flow (vph)	173	320	1212	622	1089	1256
Turn Type		Over		Perm	Prot	
Protected Phases	8	1	2		1	6
Permitted Phases				2		
Minimum Split (s)	22.0	10.0	22.0	22.0	10.0	22.0
Total Split (s)	22.0	37.0	41.0	41.0	37.0	78.0
Total Split (%)	22.0%	37.0%	41.0%	41.0%	37.0%	78.0%
Maximum Green (s)	16.0	31.0	35.0	35.0	31.0	72.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?						
Walk Time (s)	5.0		5.0	5.0		5.0
Flash Dont Walk (s)	11.0		11.0	11.0		11.0
Pedestrian Calls (#/hr)	0		0	0		0
Act Effect Green (s)	18.0	33.0	37.0	37.0	33.0	74.0
Actuated g/C Ratio	0.18	0.33	0.37	0.37	0.33	0.74
v/c Ratio	0.29	0.44	0.97	0.77	0.99	0.50
Control Delay	37.0	4.9	50.3	17.6	60.0	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.0	4.9	50.3	17.6	60.0	6.1
LOS	D	A	D	B	E	A
Approach Delay	16.2		39.2			31.2
Approach LOS	B		D			C
Queue Length 50th (m)	15.1	0.0	119.5	40.9	107.5	44.1
Queue Length 95th (m)	24.5	17.8	#164.9	88.0	#151.8	55.6
Internal Link Dist (m)	267.0		234.0			256.0
Turn Bay Length (m)	80.0			60.0	80.0	
Base Capacity (vph)	598	725	1254	811	1096	2534
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0

Lanes, Volumes, Timings
3: Ramsey Lake Road & Paris Street

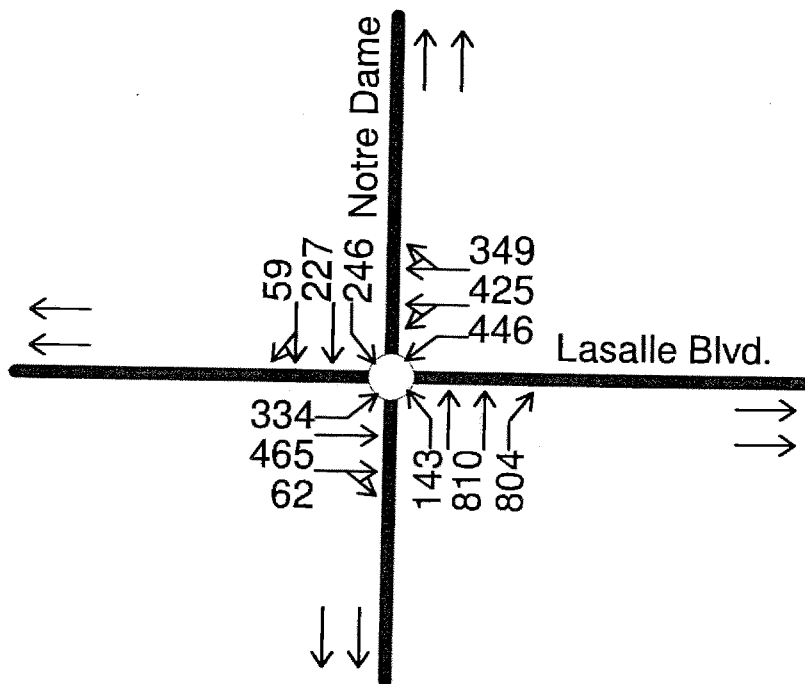
Future AM Peak 20% inc, future config
3/9/2005

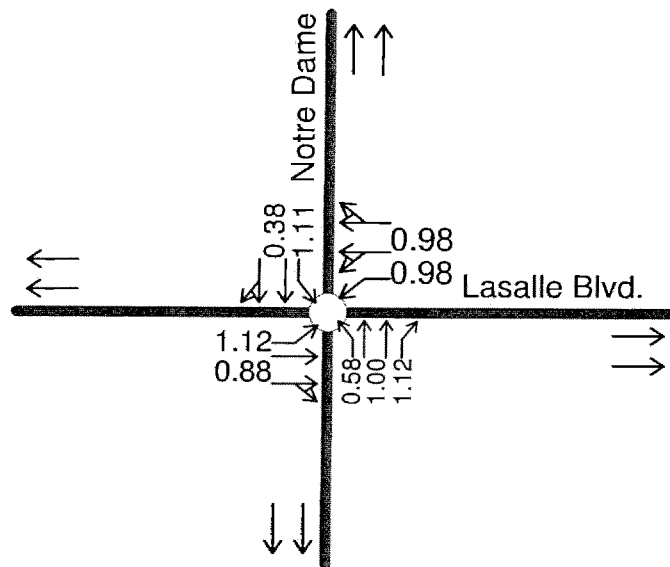
						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.44	0.97	0.77	0.99	0.50
Intersection Summary						
Area Type:	Other					
Cycle Length: 100						
Actuated Cycle Length: 100						
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green						
Natural Cycle: 90						
Control Type: Pretimed						
Maximum v/c Ratio: 0.99						
Intersection Signal Delay: 32.7				Intersection LOS: C		
Intersection Capacity Utilization 77.5%				ICU Level of Service D		
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						
Queue shown is maximum after two cycles.						

Splits and Phases: 3: Ramsey Lake Road & Paris Street

		
37 s	41 s	
		
78 s		22 s

Lasalle Boulevard at Notre Dame Avenue





HCM Signalized Intersection Capacity Analysis 3: Lasalle Blvd. & Notre Dame

June 11/2002 PM Peak Existing Network
4/6/2005

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.91	0.91		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.94		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1695	3331		1543	3033		1695	3390	1517	1695	3286	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1695	3331		1543	3033		1695	3390	1517	1695	3286	
Volume (vph)	334	465	62	446	425	349	143	810	804	246	227	59
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	363	505	67	485	462	379	155	880	874	267	247	64
RTOR Reduction (vph)	0	9	0	0	94	0	0	0	362	0	19	0
Lane Group Flow (vph)	363	563	0	416	816	0	155	880	512	267	292	0
Turn Type	Split			Split			Prot		Over	Prot		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases												
Actuated Green, G (s)	21.0	21.0		31.0	31.0		17.0	29.0	31.0	15.0	27.0	
Effective Green, g (s)	23.0	23.0		33.0	33.0		19.0	31.0	33.0	17.0	29.0	
Actuated g/C Ratio	0.19	0.19		0.28	0.28		0.16	0.26	0.28	0.14	0.24	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	325	638		424	834		268	876	417	240	794	
v/s Ratio Prot	c0.21	0.17		0.27	0.27		0.09	c0.26	c0.34	c0.16	0.09	
v/s Ratio Perm												
v/c Ratio	1.12	0.88		0.98	0.98		0.58	1.00	1.23	1.11	0.37	
Uniform Delay, d1	48.5	47.2		43.2	43.1		46.8	44.5	43.5	51.5	37.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	85.3	16.2		39.3	26.3		8.8	31.5	122.3	91.6	1.3	
Delay (s)	133.8	63.4		82.4	69.4		55.6	76.0	165.8	143.1	39.2	
Level of Service	F	E		F	E		E	E	F	F	D	
Approach Delay (s)	90.7			73.5			115.5			87.2		
Approach LOS	F			E			F			F		
Intersection Summary												
HCM Average Control Delay	95.4			HCM Level of Service			F					
HCM Volume to Capacity ratio	1.08											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			12.0					
Intersection Capacity Utilization	96.5%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

Lanes, Volumes, Timings
3: Lasalle Blvd. & Notre Dame

June 11/2002 PM Peak Existing Network
4/6/2005

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.982			0.938				0.850		0.969	
Flt Protected	0.950			0.950	0.996		0.950			0.950		
Satd. Flow (prot)	1695	3329	0	1543	3034	0	1695	3390	1517	1695	3285	0
Flt Permitted	0.950			0.950	0.996		0.950			0.950		
Satd. Flow (perm)	1695	3329	0	1543	3034	0	1695	3390	1517	1695	3285	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			130				499		25	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		48			48				48		48	
Link Distance (m)		342.9			381.1				280.0		332.0	
Travel Time (s)		25.7			28.6				21.0		24.9	
Volume (vph)	334	465	62	446	425	349	143	810	804	246	227	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	363	505	67	485	462	379	155	880	874	267	247	64
Lane Group Flow (vph)	363	572	0	416	910	0	155	880	874	267	311	0
Turn Type	Split			Split			Prot		Over	Prot		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases												
Minimum Split (s)	22.0	22.0		22.0	22.0		10.0	22.0	22.0	10.0	22.0	
Total Split (s)	27.0	27.0	0.0	37.0	37.0	0.0	23.0	35.0	37.0	21.0	33.0	0.0
Total Split (%)	22.5%	22.5%	0.0%	30.8%	30.8%	0.0%	19.2%	29.2%	30.8%	17.5%	27.5%	0.0%
Maximum Green (s)	21.0	21.0		31.0	31.0		17.0	29.0	31.0	15.0	27.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0		
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0		
Act Effct Green (s)	23.0	23.0		33.0	33.0		19.0	31.0	33.0	17.0	29.0	
Actuated g/C Ratio	0.19	0.19		0.28	0.28		0.16	0.26	0.28	0.14	0.24	
v/c Ratio	1.12	0.88		0.98	0.98		0.58	1.00	1.12	1.11	0.38	
Control Delay	130.0	62.9		83.0	62.3		56.3	76.1	89.7	138.9	36.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	130.0	62.9		83.0	62.3		56.3	76.1	89.7	138.9	36.4	
LOS	F	E		F	E		E	E	F	F	D	
Approach Delay		88.9			68.8			80.7			83.8	
Approach LOS		F			E			F			F	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Lanes, Volumes, Timings
 3: Lasalle Blvd. & Notre Dame

June 11/2002 PM Peak Existing Network
 4/6/2005

Natural Cycle: 120

Control Type: Pretimed

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 79.4

Intersection LOS: E

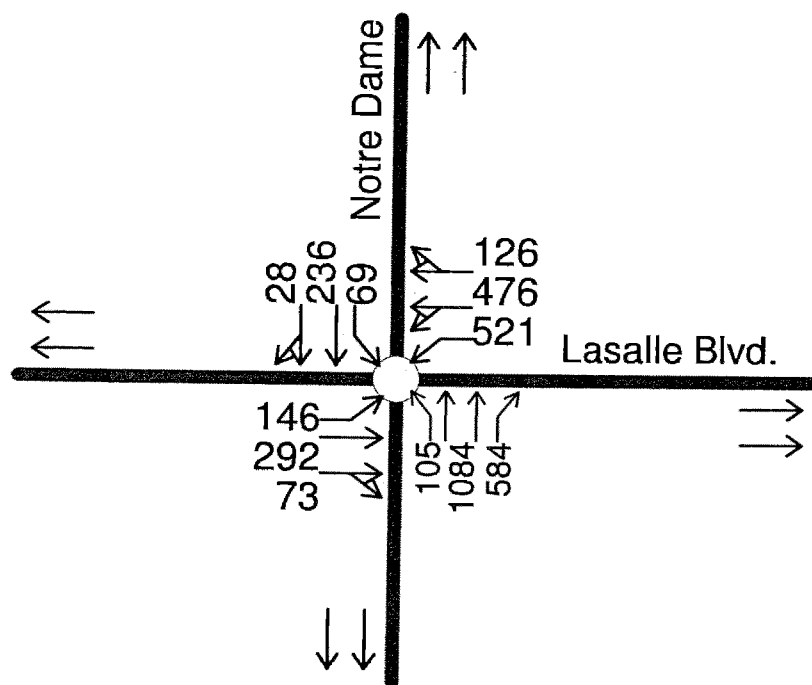
Intersection Capacity Utilization 96.5%

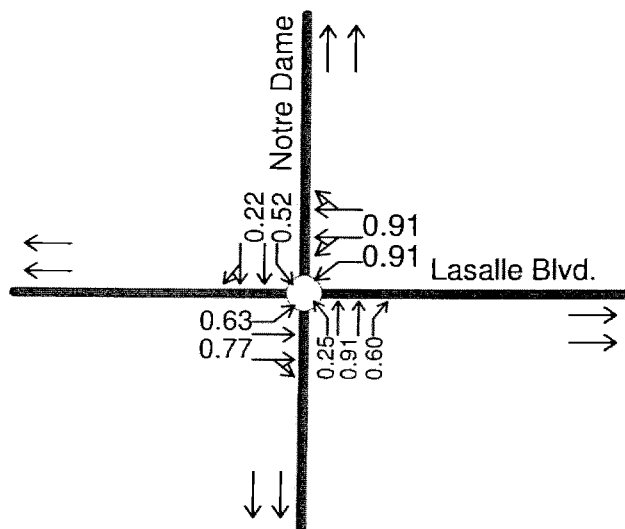
ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 3: Lasalle Blvd. & Notre Dame

 ø1	 ø2	 ø4	 ø8
21 s	35 s	27 s	37 s
 ø5	 ø6		
23 s	33 s		





HCM Signalized Intersection Capacity Analysis 3: Lasalle Blvd. & Notre Dame

Existing PM Peak with Maley Drive
4/6/2005

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		0.91	0.91		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1695	3289		1543	3134		1695	3390	1517	1695	3337	
Flt Permitted	0.95	1.00		0.95	0.99		0.54	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	1695	3289		1543	3134		966	3390	1517	155	3337	
Volume (vph)	146	292	73	521	476	126	105	1084	584	69	236	28
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	317	79	566	517	137	114	1178	635	75	257	30
RTOR Reduction (vph)	0	19	0	0	13	0	0	0	40	0	7	0
Lane Group Flow (vph)	159	377	0	397	810	0	114	1178	595	75	280	0
Turn Type	Split			Split			pm+pt		pm+ov	pm+pt		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases							2		2		6	
Actuated Green, G (s)	16.0	16.0		32.0	32.0		48.0	44.0	76.0	48.0	44.0	
Effective Green, g (s)	18.0	18.0		34.0	34.0		52.0	46.0	80.0	52.0	46.0	
Actuated g/C Ratio	0.15	0.15		0.28	0.28		0.43	0.38	0.67	0.43	0.38	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lane Grp Cap (vph)	254	493		437	888		455	1300	1011	144	1279	
v/s Ratio Prot	0.09	c0.11		0.26	c0.26		0.01	c0.35	0.17	c0.03	0.08	
v/s Ratio Perm							0.10		0.23	0.20		
v/c Ratio	0.63	0.77		0.91	0.91		0.25	0.91	0.59	0.52	0.22	
Uniform Delay, d1	47.8	49.0		41.5	41.6		20.7	35.0	11.0	25.9	24.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.1	10.8		25.3	15.2		1.3	10.7	2.5	12.8	0.4	
Delay (s)	59.0	59.8		66.8	56.8		22.0	45.6	13.5	38.7	25.3	
Level of Service	E	E		E	E		C	D	B	D	C	
Approach Delay (s)		59.5			60.0			33.6			28.1	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM Average Control Delay		44.6					HCM Level of Service		D			
HCM Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		120.0					Sum of lost time (s)		16.0			
Intersection Capacity Utilization		82.7%					ICU Level of Service		E			
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
3: Lasalle Blvd. & Notre Dame

Existing PM Peak with Maley Drive
4/6/2005

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	0.95	0.95	0.91	0.91	0.95	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.970			0.975				0.850		0.984	
Flt Protected	0.950			0.950	0.990		0.950			0.950		
Satd. Flow (prot)	1695	3288	0	1543	3135	0	1695	3390	1517	1695	3336	0
Flt Permitted	0.950			0.950	0.990		0.541			0.087		
Satd. Flow (perm)	1695	3288	0	1543	3135	0	965	3390	1517	155	3336	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			18				121			12
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		48			48				48			48
Link Distance (m)		342.9			381.1				280.0			332.0
Travel Time (s)		25.7			28.6				21.0			24.9
Volume (vph)	146	292	73	521	476	126	105	1084	584	69	236	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	317	79	566	517	137	114	1178	635	75	257	30
Lane Group Flow (vph)	159	396	0	397	823	0	114	1178	635	75	287	0
Turn Type	Split			Split			pm+pt		pm+ov	pm+pt		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases							2		2	6		
Minimum Split (s)	22.0	22.0		22.0	22.0		10.0	22.0	22.0	10.0	22.0	
Total Split (s)	22.0	22.0	0.0	38.0	38.0	0.0	10.0	50.0	38.0	10.0	50.0	0.0
Total Split (%)	18.3%	18.3%	0.0%	31.7%	31.7%	0.0%	8.3%	41.7%	31.7%	8.3%	41.7%	0.0%
Maximum Green (s)	16.0	16.0		32.0	32.0		4.0	44.0	32.0	4.0	44.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0		
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0		
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0		
Act Effct Green (s)	18.0	18.0		34.0	34.0		52.0	46.0	80.0	52.0	46.0	
Actuated g/C Ratio	0.15	0.15		0.28	0.28		0.43	0.38	0.67	0.43	0.38	
v/c Ratio	0.63	0.77		0.91	0.91		0.25	0.91	0.60	0.52	0.22	
Control Delay	59.7	57.5		67.6	56.2		20.2	46.1	7.5	31.2	24.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	59.7	57.5		67.6	56.2		20.2	46.1	7.5	31.2	24.4	
LOS	E	E		E	E		C	D	A	C	C	
Approach Delay		58.1			59.9			31.9			25.8	
Approach LOS		E			E			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Lanes, Volumes, Timings
3: Lasalle Blvd. & Notre Dame

Existing PM Peak with Maley Drive
4/6/2005

Natural Cycle: 100

Control Type: Pretimed

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 43.3

Intersection LOS: D

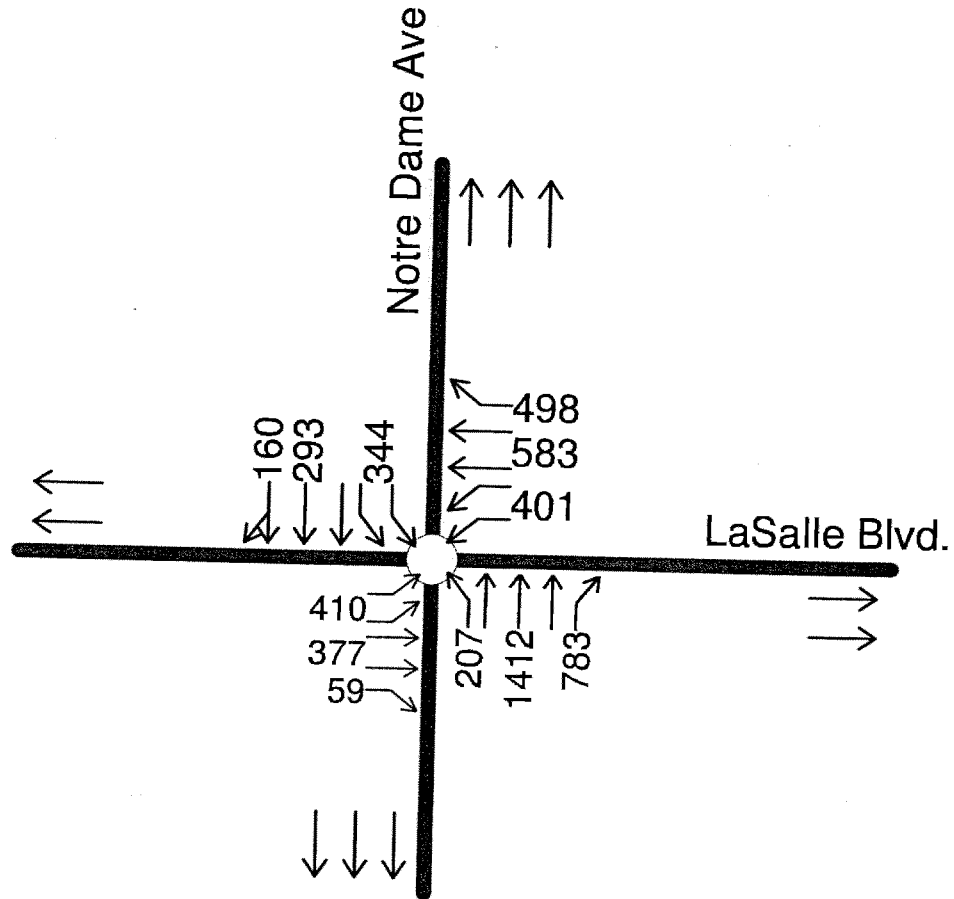
Intersection Capacity Utilization 82.7%

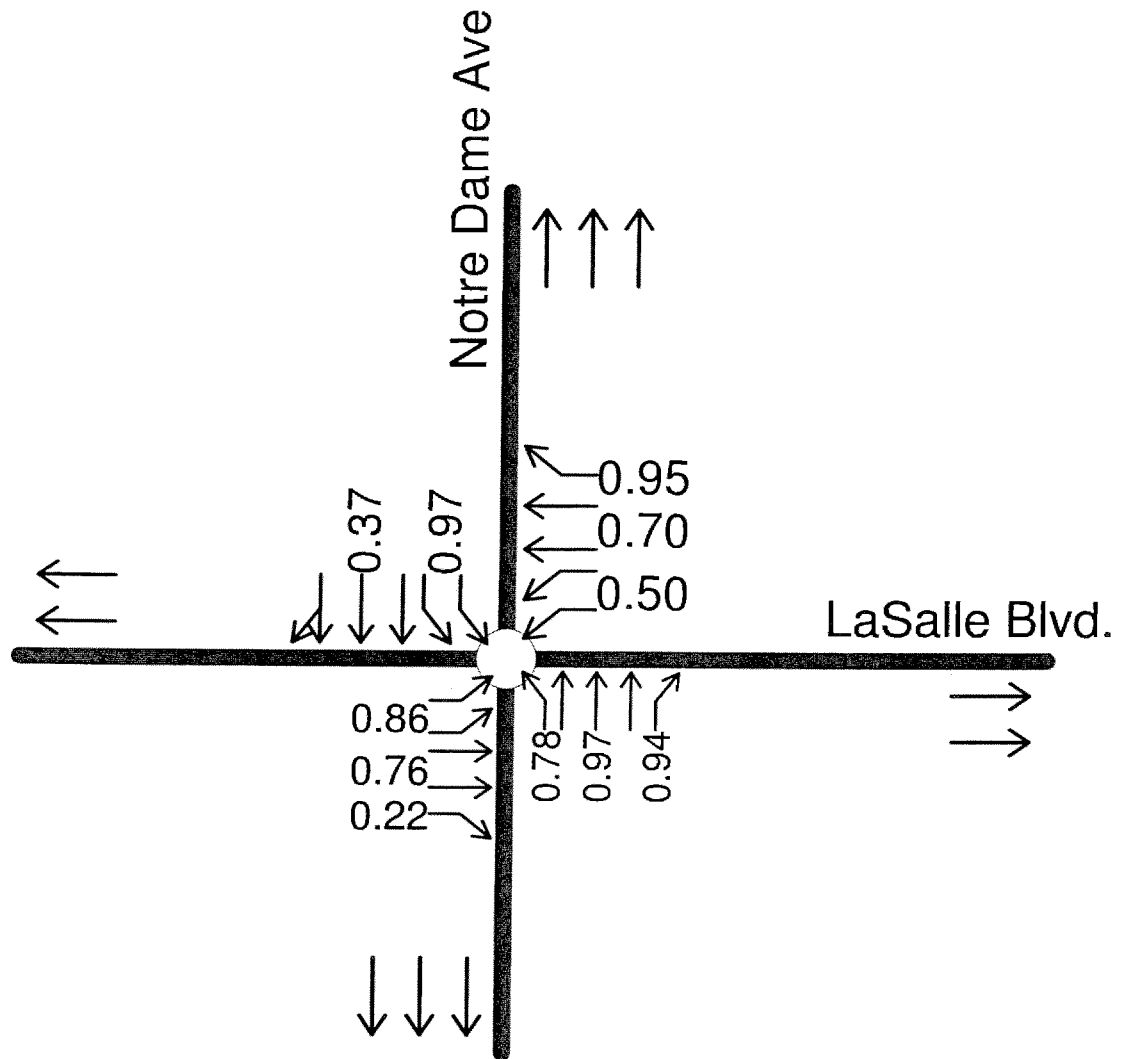
ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 3: Lasalle Blvd. & Notre Dame

 ø1	 ø2	 ø4	 ø8
10 s	50 s	22 s	38 s
 ø5	 ø6		
10 s	50 s		





COGS Road Improvements Final

2021 PM Peak-No Maley (dual lefts EB, WB, SB)

3: LaSalle Blvd. & Notre Dame Ave

6/17/2005

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	0.95
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	1695	4871	1517	3288	4613	4613
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3288	3390	1517	3288	3390	1517	1695	4871	1517	3288	4613	4613
Volume (vph)	410	377	59	401	583	498	207	1412	783	344	293	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	446	410	64	436	634	541	225	1535	851	374	318	174
RTOR Reduction (vph)	0	0	54	0	0	166	0	0	10	0	82	0
Lane Group Flow (vph)	446	410	10	436	634	375	225	1535	841	374	410	0
Turn Type	Split		Perm	Split		Perm	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	17.0	17.0	17.0	30.0	30.0	30.0	18.4	37.0	67.0	12.0	30.6	
Effective Green, g (s)	19.0	19.0	19.0	32.0	32.0	32.0	20.4	39.0	71.0	14.0	32.6	
Actuated g/C Ratio	0.16	0.16	0.16	0.27	0.27	0.27	0.17	0.32	0.59	0.12	0.27	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	521	537	240	877	904	405	288	1583	898	384	1253	
v/s Ratio Prot	c0.14	0.12		0.13	0.19		c0.13	c0.32	c0.25	c0.11	0.09	
v/s Ratio Perm			0.01			0.25			0.30			
v/c Ratio	0.86	0.76	0.04	0.50	0.70	0.93	0.78	0.97	0.94	0.97	0.33	
Uniform Delay, d1	49.2	48.3	42.8	37.2	39.7	42.9	47.7	39.9	22.4	52.8	34.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.0	6.4	0.1	0.4	2.5	26.9	12.9	16.5	16.6	38.8	0.7	
Delay (s)	62.2	54.7	42.9	37.6	42.2	69.8	60.5	56.4	39.0	91.6	35.6	
Level of Service	E	D	D	D	D	E	E	E	D	F	D	
Approach Delay (s)		57.5			50.2			51.1			59.8	
Approach LOS		E			D			D			E	
Intersection Summary												
HCM Average Control Delay			53.1				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			83.7%				ICU Level of Service			E		
Analysis Period (min)			15									
Critical Lane Group												

COGS Road Improvements Final

3: LaSalle Blvd. & Notre Dame Ave

2021 PM Peak-No Maley (dual lefts EB, WB, SB)

6/17/2005

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	80.0		0.0	80.0		0.0	80.0		100.0	80.0		0.0
Storage Lanes	2		1	2		1	1		1	2		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91	0.91
Flt Protected	0.950		0.850	0.950		0.850	0.950		0.850	0.950		0.947
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	1695	4871	1517	3288	4613	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3288	3390	1517	3288	3390	1517	1695	4871	1517	3288	4613	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			64			226			25			112
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		342.9			381.1			280.0			332.0	
Travel Time (s)		25.7			28.6			21.0			24.9	
Volume (vph)	410	377	59	401	583	498	207	1412	783	344	293	160
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	446	410	64	436	634	541	225	1535	851	374	318	174
Lane Group Flow (vph)	446	410	64	436	634	541	225	1535	851	374	492	0
Turn Type	Split		Perm	Split		Perm	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases			4			8			2			
Detector Phases	4	4	4	8	8	8	5	2	8	1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	10.0	22.0	22.0	10.0	22.0	
Total Split (s)	23.0	23.0	23.0	36.0	36.0	36.0	26.0	43.0	36.0	18.0	35.0	0.0
Total Split (%)	19.2%	19.2%	19.2%	30.0%	30.0%	30.0%	21.7%	35.8%	30.0%	15.0%	29.2%	0.0%
Maximum Green (s)	17.0	17.0	17.0	30.0	30.0	30.0	20.0	37.0	30.0	12.0	29.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Max	None	None	C-Max	
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		0	0		0	
Act Effect Green (s)	19.0	19.0	19.0	32.0	32.0	32.0	20.4	39.0	71.0	14.0	32.6	
Actuated g/C Ratio	0.16	0.16	0.16	0.27	0.27	0.27	0.17	0.32	0.59	0.12	0.27	
v/c Ratio	0.86	0.76	0.22	0.50	0.70	0.95	0.78	0.97	0.94	0.97	0.37	
Control Delay	66.0	58.7	12.5	39.5	44.5	52.6	61.5	56.6	31.8	92.9	28.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	66.0	58.7	12.5	39.5	44.5	52.6	61.5	56.6	31.8	92.9	28.2	
LOS	E	E	B	D	D	D	E	E	C	F	C	
Approach Delay		59.0			45.9			49.0			56.2	
Approach LOS		E			D			D			E	
Queue Length 50th (m)	53.3	49.2	0.0	44.8	71.0	80.4	50.4	130.0	82.9	45.9	26.7	
Queue Length 95th (m)	#78.7	66.7	12.1	60.5	91.4	#150.4	#82.6	#162.8	#198.6	#76.0	37.3	
Internal Link Dist (m)		318.9			357.1			256.0			308.0	
Turn Bay Length (m)	80.0			80.0			80.0		100.0	80.0		
Base Capacity (vph)	521	537	294	878	905	570	311	1583	908	384	1334	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.86	0.76	0.22	0.50	0.70	0.95	0.72	0.97	0.94	0.97	0.37	

Intersection Summary

COGS Road Improvements Final

2021 PM Peak-No Maley (dual lefts EB, WB, SB)

3: LaSalle Blvd. & Notre Dame Ave

6/17/2005

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 50.7

Intersection LOS: D

Intersection Capacity Utilization 83.7%

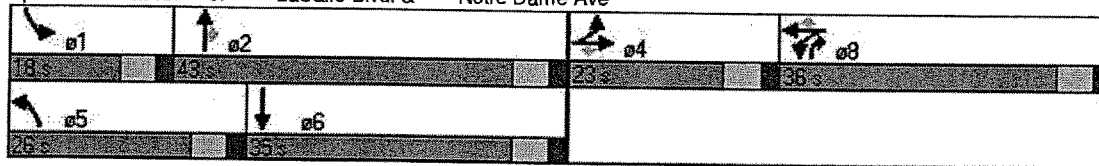
ICU Level of Service E

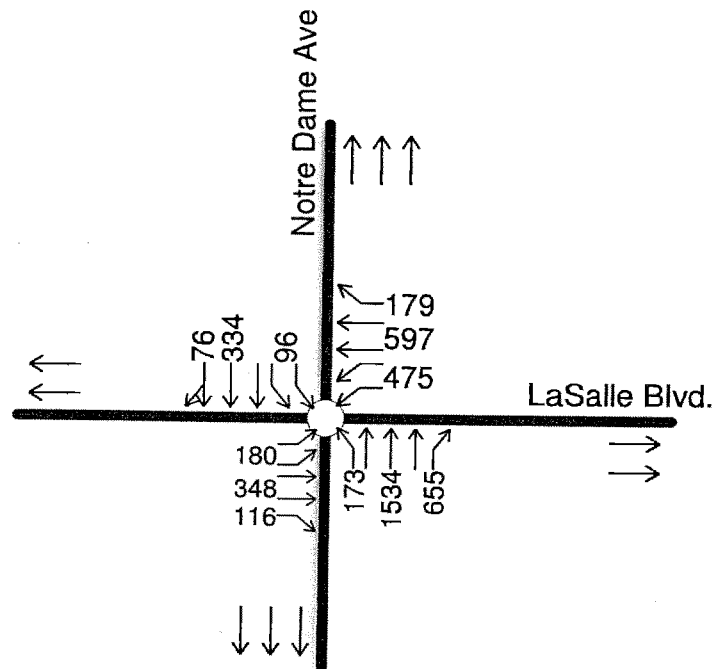
Analysis Period (min) 15

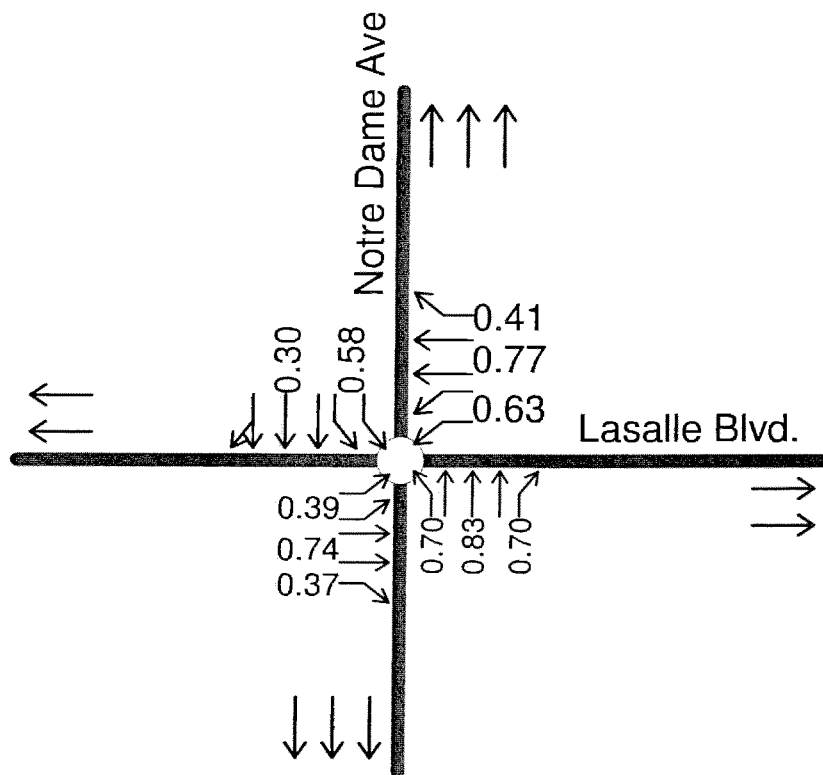
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: LaSalle Blvd. & Notre Dame Ave







3: LaSalle Blvd. & Notre Dame Ave

2021 PM Peak With Maley (4 E/W, 6 lanes N/S, dual left EB/WB/SB)

7/27/2005

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	TT	TT	T	TT	TT	T	TT	TTT	T	TT	TT	TT	
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91		
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	1695	4871	1517	3288	4735		
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (perm)	3288	3390	1517	3288	3390	1517	1695	4871	1517	3288	4735		
Volume (vph)	180	348	116	475	597	179	173	1534	655	96	334	76	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	378	126	516	649	195	188	1667	712	104	363	83	
RTOR Reduction (vph)	0	0	107	0	0	99	0	0	17	0	30	0	
Lane Group Flow (vph)	196	378	19	516	649	96	188	1667	695	104	416	0	
Turn Type	Split		Perm	Split		Perm	Prot		pm+ov	Prot			
Protected Phases	4	4		8	8		5	2	8	1	6		
Permitted Phases			4			8			2				
Actuated Green, G (s)	16.2	16.2	16.2	27.8	27.8	27.8	17.1	47.5	75.3	4.5	34.9		
Effective Green, g (s)	18.2	18.2	18.2	29.8	29.8	29.8	19.1	49.5	79.3	6.5	36.9		
Actuated g/C Ratio	0.15	0.15	0.15	0.25	0.25	0.25	0.16	0.41	0.66	0.05	0.31		
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	499	514	230	817	842	377	270	2009	1002	178	1456		
v/s Ratio Prot	0.06	0.11		0.16	0.19		0.11	0.34	0.17	0.03	0.09		
v/s Ratio Perm			0.01			0.06			0.29				
v/c Ratio	0.39	0.74	0.08	0.63	0.77	0.25	0.70	0.83	0.69	0.58	0.29		
Uniform Delay, d1	45.9	48.6	43.7	40.2	41.9	36.2	47.7	31.5	12.7	55.4	31.5		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.5	5.4	0.2	1.6	4.4	0.4	7.6	4.1	2.1	4.8	0.5		
Delay (s)	46.4	54.0	43.9	41.8	46.3	36.5	55.3	35.6	14.9	60.3	32.0		
Level of Service	D	D	D	D	D	D	E	D	B	E	C		
Approach Delay (s)		50.1			43.2			31.3			37.4		
Approach LOS		D			D			C			D		
Intersection Summary													
HCM Average Control Delay			37.6			HCM Level of Service			D				
HCM Volume to Capacity ratio			0.80										
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.0				
Intersection Capacity Utilization			72.4%			ICU Level of Service			C				
Analysis Period (min)			15										
c Critical Lane Group													

3: LaSalle Blvd. & Notre Dame Ave

2021 PM Peak With Maley (4 E/W, 6 lanes N/S, dual left EB/WB/SB)

7/27/2005

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	80.0		0.0	80.0		0.0	80.0		0.0	80.0		0.0
Storage Lanes	2		1	2		1	1		1	2		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91	0.91
Flt Protected	0.950		0.850	0.950		0.850	0.950		0.850	0.950		0.972
Satd. Flow (prot)	3288	3390	1517	3288	3390	1517	1695	4871	1517	3288	4735	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3288	3390	1517	3288	3390	1517	1695	4871	1517	3288	4735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			126			132			49			43
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		342.9			381.1			280.0			332.0	
Travel Time (s)		25.7			28.6			21.0			24.9	
Volume (vph)	180	348	116	475	597	179	173	1534	655	96	334	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	378	126	516	649	195	188	1667	712	104	363	83
Lane Group Flow (vph)	196	378	126	516	649	195	188	1667	712	104	363	83
Turn Type	Split		Perm	Split		Perm	Prot		pm+ov	Prot		
Protected Phases	4	4		8	8		5	2	8	1	6	
Permitted Phases			4			8						
Detector Phases	4	4		8	8		5	2	8	1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	23.0	23.0	23.0	34.0	34.0	34.0	26.0	53.0	34.0	10.0	37.0	0.0
Total Split (%)	19.2%	19.2%	19.2%	28.3%	28.3%	28.3%	21.7%	44.2%	28.3%	8.3%	30.8%	0.0%
Maximum Green (s)	17.0	17.0	17.0	28.0	28.0	28.0	20.0	47.0	28.0	4.0	31.0	4.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	None	None	C-Max	None
Walk Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	18.2	18.2	18.2	29.8	29.8	29.8	19.1	49.4	79.3	6.5	36.9	0
Actuated g/C Ratio	0.15	0.15	0.15	0.25	0.25	0.25	0.16	0.41	0.66	0.05	0.31	0
v/c Ratio	0.39	0.74	0.37	0.63	0.77	0.41	0.70	0.83	0.70	0.58	0.30	0
Control Delay	48.0	56.3	10.8	44.1	48.7	15.8	55.9	36.2	11.1	69.2	30.0	0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Total Delay	48.0	56.3	10.8	44.1	48.7	15.8	55.9	36.2	11.1	69.2	30.0	0
LOS	D	E	B	D	D	B	E	D	B	E	C	
Approach Delay		45.8			42.2			30.7			37.5	
Approach LOS		D			D			C			D	
Queue Length 50th (m)	21.5	44.9	0.0	55.9	74.9	11.7	41.9	127.4	54.3	12.6	27.0	
Queue Length 95th (m)	32.8	61.6	16.5	73.9	96.2	32.4	65.4	147.6	81.1	23.7	37.4	
Internal Link Dist (m)		318.9			357.1			256.0			308.0	
Turn Bay Length (m)	80.0			80.0			80.0		80.0	80.0		
Base Capacity (vph)	521	537	346	825	851	479	311	2006	1022	179	1485	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.38	0.70	0.36	0.63	0.76	0.41	0.60	0.83	0.70	0.58	0.30	
Intersection Summary												
Area Type:	Other											
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green												
Natural Cycle: 90												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 0.83												
Intersection Signal Delay: 36.5												
Intersection Capacity Utilization 72.4%												
Intersection LOS: D												
ICU Level of Service C												

3:

LaSalle Blvd. & Notre Dame Ave

2021 PM Peak With Maley (4 E/W, 6 lanes N/S, dual left EB/WB/SB)

7/27/2005

Analysis Period (min) 15

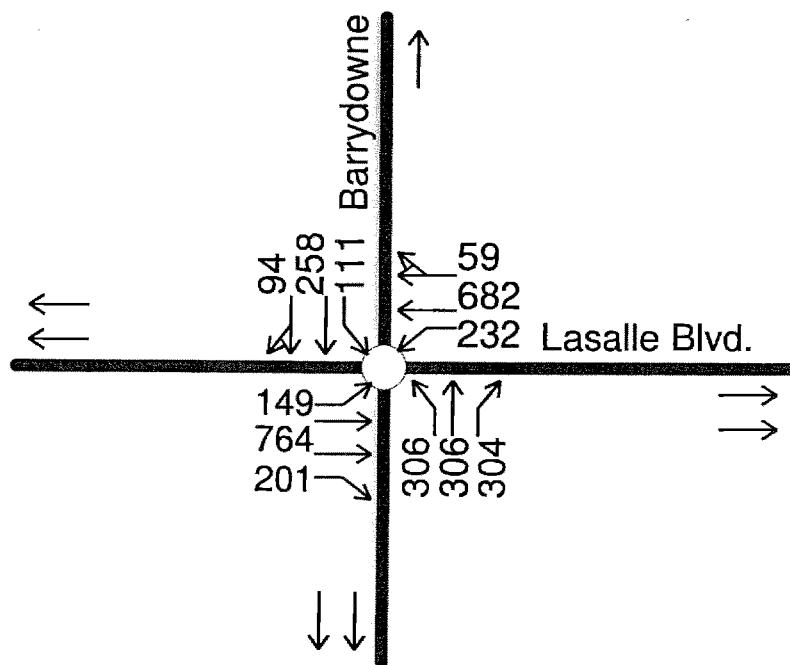
95th percentile volume exceeds capacity, queue may be longer.

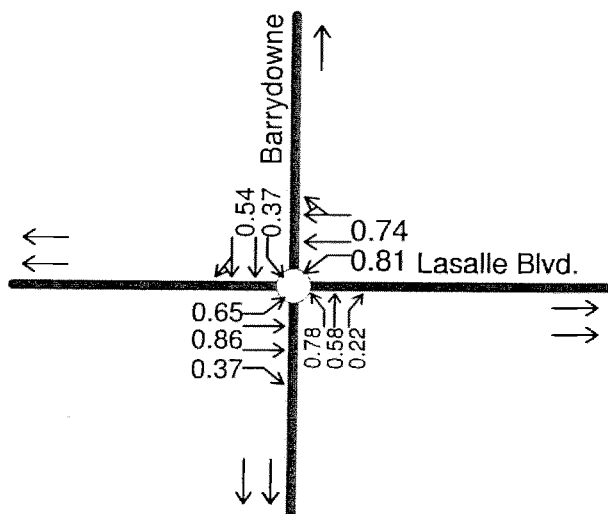
Queue shown is maximum after two cycles.

Splits and Phases: 3: LaSalle Blvd. & Notre Dame Ave

ø1 10 s 53 s	ø2	ø4 23 s 34 s	ø8
ø5 26 s 37 s	ø6		

Lasalle Boulevard at Barrydowne Road





HCM Signalized Intersection Capacity Analysis 3: Lasalle Blvd. & Barrydowne

May 2001 PM Peak (existing configuration)

10/3/2005

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1712	3390	1517	1695	3355		1695	1784	1488	1729	3229	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.31	1.00	1.00	0.55	1.00	
Satd. Flow (perm)	1712	3390	1517	1695	3355		554	1784	1488	999	3229	
Volume (vph)	149	764	201	232	682	59	306	306	304	111	258	94
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	162	830	218	252	741	64	333	333	330	121	280	102
RTOR Reduction (vph)	0	0	156	0	6	0	0	0	0	0	33	0
Lane Group Flow (vph)	162	830	62	252	799	0	333	333	330	121	349	0
Heavy Vehicles (%)	1%	2%	2%	2%	2%	0%	2%	2%	4%	0%	2%	5%
Turn Type	Prot		Perm	Prot			pm+pt		Free	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4				2		Free	6		
Actuated Green, G (s)	14.0	29.2	29.2	18.1	33.3		44.7	33.3	110.0	26.2	20.8	
Effective Green, g (s)	16.0	31.2	31.2	20.1	35.3		46.7	35.3	110.0	30.2	22.8	
Actuated g/C Ratio	0.15	0.28	0.28	0.18	0.32		0.42	0.32	1.00	0.27	0.21	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	249	962	430	310	1077		442	573	1488	323	669	
v/s Ratio Prot	0.09	c0.24		c0.15	0.24		c0.14	0.19		0.03	0.11	
v/s Ratio Perm			0.04				c0.18		0.22	0.08		
v/c Ratio	0.65	0.86	0.14	0.81	0.74		0.75	0.58	0.22	0.37	0.52	
Uniform Delay, d1	44.4	37.4	29.4	43.1	33.3		23.5	31.2	0.0	31.1	38.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.0	8.1	0.2	14.9	2.8		7.1	4.3	0.3	0.7	2.9	
Delay (s)	50.3	45.4	29.6	58.1	36.1		30.6	35.4	0.3	31.9	41.7	
Level of Service	D	D	C	E	D		C	D	A	C	D	
Approach Delay (s)		43.2			41.3			22.2			39.3	
Approach LOS		D			D			C			D	

Intersection Summary

HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

COGS (EB/WB Protected Lefts)
3: Lasalle Blvd. & Barrydowne

May 2001 PM Peak (existing configuration)

7/27/2005

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔↔	↔
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	80.0		70.0	80.0		0.0	80.0		100.0	60.0		0.0
Storage Lanes	1		1	1		0	1		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (m)	15.2	15.2	15.2	15.2	15.2		15.2	15.2	15.2	15.2	15.2	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95
Frt			0.850		0.988				0.850		0.960	
Frt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1712	3390	1517	1695	3355	0	1695	1784	1488	1729	3229	0
Frt Permitted	0.950			0.950			0.278			0.560		
Satd. Flow (perm)	1712	3390	1517	1695	3355	0	496	1784	1488	1019	3229	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218		9				330		41	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		342.9			381.1			280.0			332.0	
Travel Time (s)		25.7			28.6			21.0			24.9	
Volume (vph)	149	764	201	232	682	59	306	306	304	111	258	94
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	2%	2%	2%	0%	2%	2%	4%	0%	2%	5%
Adj. Flow (vph)	162	830	218	252	741	64	333	333	330	121	280	102
Lane Group Flow (vph)	162	830	218	252	805	0	333	333	330	121	382	0
Turn Type	Prot		Perm	Prot			pm+pt		Free	pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4				2		Free	6		
Detector Phases	7	4	4	3	8		5	2		1	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	22.0	36.0	36.0	25.0	39.0	0.0	25.0	38.0	0.0	11.0	24.0	0.0
Total Split (%)	20.0%	32.7%	32.7%	22.7%	35.5%	0.0%	22.7%	34.5%	0.0%	10.0%	21.8%	0.0%
Maximum Green (s)	16.0	30.0	30.0	19.0	33.0		19.0	32.0		5.0	18.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	16.0	31.2	31.2	20.1	35.3		46.7	35.3	110.0	30.2	22.8	
Actuated g/C Ratio	0.15	0.28	0.28	0.18	0.32		0.42	0.32	1.00	0.27	0.21	
v/c Ratio	0.65	0.86	0.37	0.81	0.74		0.78	0.58	0.22	0.37	0.54	
Control Delay	52.7	46.3	5.9	60.3	37.7		36.0	36.6	0.3	26.4	39.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	52.7	46.3	5.9	60.3	37.7		36.0	36.6	0.3	26.4	39.0	
LOS	D	D	A	E	D		D	D	A	C	D	
Approach Delay		39.9			43.1			24.4			36.0	
Approach LOS		D			D			C			D	
Queue Length 50th (m)	32.7	87.9	0.0	51.9	79.6		51.7	60.5	0.0	16.2	35.7	
Queue Length 95th (m)	54.2	#112.9	16.8	#89.2	102.8		#82.0	90.4	0.0	28.6	51.5	
Internal Link Dist (m)		318.9			357.1			256.0			308.0	
Turn Bay Length (m)	80.0		70.0	80.0			80.0		100.0	60.0		
Base Capacity (vph)	280	986	596	324	1095		440	573	1488	327	702	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.58	0.84	0.37	0.78	0.74		0.76	0.58	0.22	0.37	0.54	

COGS (EB/WB Protected Lefts)
3: Lasalle Blvd. & Barrydowne

May 2001 PM Peak (existing configuration)
7/27/2005

Intersection Summary	
Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	100 (91%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	36.2
Intersection Capacity Utilization:	77.8%
Intersection LOS:	D
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: Lasalle Blvd. & Barrydowne

