SALVINI CONSULTING
Transportation Engineering and Planning

119 Roger Street Redevelopment Proposal

Transportation Report

City of Waterloo

Prepared for:
ODC Tooling & Molds

February 2017

Table of Contents

Introduction

This Transportation Study has been prepared in support of Official Plan and Zoning By-law Amendment applications for the redevelopment of the ODC Tooling & Molds site at 119 Roger Street in the City of Waterloo. The study was undertaken as a submission requirement in accordance with the pre-submission consultation comments. The scope was discussed and agreed upon with staff beforehand and confirmed once the traffic data was collected.

The purpose of this study is to understand the traffic generation potential of the proposed development and to assess future traffic operations at the two study area intersections. It is the finding of this study that the proposal will generate about 80 new peak hour trips relative to the existing use and that the Moore/Roger and Union/Moore intersections can accommodate anticipated future traffic volumes at acceptable levels.

Proposal and Site Context

The application proposes a development at the southwest corner of Moore Avenue South and Roger Street that consists of a mix of stacked townhouses and apartment dwellings totalling up to 300 units. A location plan and a concept plan are attached to this report in Appendix A.

Access to the site is proposed from both Roger Street (one) and from Moore Avenue South (two) as shown in the concept plan. The concept plan is provided for context – a more detailed site plan will be developed at a later stage.

The apartment units are proposed in four buildings on the west and south edges of the site with parking below grade. The stacked townhouses are proposed with parking in garages under the rear deck. Additional at-grade parking is proposed throughout the site for a total of over 300 spaces or a minimum of 1.05 spaces per unit.

Moore Avenue South is a two-lane minor collector road under the jurisdiction of the City of Waterloo. In the vicinity of the site, the speed limit is 50 kph and there is parking permitted on both sides of the road. Roger Street is a two-lane local road under the jurisdiction of the City of Waterloo. In the vicinity of the site, the speed limit is 50 kph and there is parking permitted on the south side of the road. Union Street East is a major collector road under the jurisdiction of the City of Waterloo; it is generally four lanes east of the Moore Avenue South intersection and two lanes to the west with a speed limit of 50 kph in the study area.

The Moore/Roger intersection is stop-controlled on the Roger Street approaches with single lane approaches in all directions. The Union/Moore intersection is signalized with a single through lane and left turn lanes on all four approaches. The westbound approach has an exclusive right turn lane, but on the other three approaches, the right turns share the through lane.

Existing Traffic

Traffic analysis for this assessment is focussed in the weekday AM and PM peak hours because these are expected to be the highest generating hours of the proposed development and area traffic. In order to assess existing traffic conditions, traffic counts were undertaken at both the Union/Moore and Moore/Roger intersections on Monday, November 14, 2016 from 7 to 9 AM and from 4 to 6 PM.

Traffic was also counted at the existing ODC driveways on November 14th, from 5:30 to 9 AM and from 2 to 6 PM. The morning peak hour of the site occurred between 5:30 and 6:30 with 30 trips. During the morning peak period of the adjacent streets, the peak hour of traffic generation for the site was between 7:15 and 8:15 with 23 trips. In the weekday afternoon, the peak hour occurred between 4 and 5 PM with 34 trips. The peak hour traffic volumes are attached. The three existing driveways on Moore Avenue are shown as one consolidated driveway.

Analysis of the intersection operations at the study area intersections and the existing driveways was undertaken using Synchro 9 software in accordance with Region of Waterloo standards. The results are summarized in Table 1 and Table 2 below. The Synchro analysis worksheets are attached in Appendix B.

Table 1: Existing Traffic Operations – Union and Moore (signalized)

Peak Hour	MOE		Direction/Movement/Approach								
			EBL	EBTR	WBL	WBT	WBR	NBL	NBTR	SBL	SBTR
AM	LOS		A	A	A	B	A	C	C	C	B
	Delay		7.5	9.3	6.3	11.2	1.8	26.1	23.0	26.5	17.6
	v/c		0.15	0.45	0.06	0.57	0.07	0.12	0.24	0.14	0.27
	Q	95th percentile	7.9	56.3	4.5	80.7	4.0	11.2	22.4	12.5	20.7
		Available	25		30			15		15	
PM	LOS		A	B	A	A	A	C	C	C	C
	Delay		6.7	11.4	6.9	8.5	2.0	29.1	24.8	28.8	25.5
	v/c		0.11	0.59	0.10	0.37	0.05	0.26	0.41	0.26	0.47
	Q	95th percentile	7.9	83.6	5.3	45.0	3.4	17.9	35.0	18.9	39.1
		Available	25		30			15		15	

Table 2: Existing Traffic Operations – Unsignalized Intersections

Peak Hour	Intersection	MOE	Direction/Movement/Approach			
			EB	WB	NB	SB
AM	Moore and Roger	LOS	B	B	A	A
		Delay	10.5	10.8	0.5	0.3
		v/c	0.06	0.03	-	-
		95th percentile Q	1.5	0.8	0.1	0.0
	Roger and Site driveway	LOS	-	A	-	-
		Delay	-	1.0	-	-
		v/c	-	0.0	-	-
		95th percentile Q	-	0.1	-	-
	Moore and Site driveway	LOS	A	-	A	-
		Delay	9.2	-	0.3	-
		v/c	0.01	-	0.0	-
		95th percentile Q	0.1	-	0.0	-
PM	Moore and Roger	LOS	B	B	A	A
		Delay	11.0	10.4	0.4	0.2
		v/c	0.10	0.05	-	-
		95th percentile Q	2.7	1.2	0.1	0.0
	Roger and Site driveway	LOS	-	-	A	-
		Delay	-	-	8.7	-
		v/c	-	-	0.02	-
		95th percentile Q	-	-	0.4	-
	Moore and Site driveway	LOS	A	-	A	-
		Delay	9.4	-	0.1	-
		v/c	0.02	-	0.0	-
		95th percentile Q	0.4	-	0.0	-

Both study area intersections and the site driveways are currently operating acceptably with levels of service C or better on all approaches. The analysis indicates that the 95 percentile queues for the northbound and southbound left turn movements at Union/Moore are extending slightly beyond the available storage in the afternoon peak hour. However, the low turning movement volumes and the good level of service suggests that the queues can clear during each cycle of the signal.

Background Traffic

Background traffic for this study was estimated by including a background growth rate for traffic in the study area based on discussion with City of Waterloo staff. Historical traffic counts were reviewed for the Union/Moore intersection from 2002, 2011 and 2015 alongside the November 2016 count. The review indicates that traffic volumes along Moore Avenue South have been relatively constant over the last 14 years. Traffic along Union Street has fluctuated over the course of the counts and was slightly higher than usual during the study as a result of construction in Uptown Waterloo. Given the foregoing, a low, simple background growth rate of one (1) percent per year over nine years (five years past the full build-out of the site) was applied to traffic in the study area to account for development outside the study area.

Future background traffic volumes are attached. Capacity analysis of the study area intersections and the existing driveways is summarized in Table 3 and Table 4 below. The study area intersections are expected to continue to operate at acceptable levels under future background conditions with all approaches operating at level of service C or better in both the weekday morning and afternoon peak hours. The Synchro analysis worksheets are attached in Appendix C.

Table 3: Future Background Traffic Operations – Union and Moore (signalized)

Peak Hour	MOE		Direction/Movement/Approach								
			EBL	EBTR	WBL	WBT	WBR	NBL	NBTR	SBL	SBTR
AM	LOS		A	A	A	B	A	C	C	C	B
	Delay		8.2	9.8	6.5	12.2	1.8	26.4	23.4	26.8	18.5
	v/c		0.19	0.49	0.07	0.62	0.08	0.13	0.26	0.16	0.30
	Q	95th percentile	8.9	63.4	4.9	92.7	4.2	12.0	24.3	13.4	22.9
		Available	25		30			15		15	
PM	LOS		A	B	A	A	A	C	C	C	C
	Delay		6.9	12.5	7.3	8.8	2.0	30.2	25.9	29.8	26.8
	v/c		0.13	0.64	0.12	0.41	0.06	0.30	0.45	0.30	0.51
	Q	95th percentile	8.6	96.5	5.9	50.2	3.6	19.3	38.3	20.4	42.9
		Available	25		30			15		15	

The analysis indicates that the 95 percentile queues for the northbound and southbound left turn movements at Union/Moore will continue to extend slightly beyond the available storage in the afternoon peak hour. The queues can continue to clear during each cycle of the signal.

Table 4: Future Background Traffic Operations – Unsignalized Intersections

Peak Hour	Intersection	MOE	Direction/Movement/Approach			
			EB	WB	NB	SB
AM	Moore and Roger	LOS	B	B	A	A
		Delay	10.7	10.9	0.5	0.3
		v/c	0.07	0.04	-	-
		95th percentile Q	1.6	0.9	0.1	0.0
	Roger and Site driveway	LOS	-	A	-	-
		Delay	-	0.9	-	-
		v/c	-	0.0	-	-
		95th percentile Q	-	0.1	-	-
	Moore and Site driveway	LOS	A	-	A	-
		Delay	9.2	-	0.3	-
		v/c	0.01	-	0.0	-
		95th percentile Q	0.1	-	0.0	-
PM	Moore and Roger	LOS	B	B	A	A
		Delay	11.2	10.6	0.4	0.2
		v/c	0.12	0.05	-	-
		95th percentile Q	3.0	1.3	0.1	0.0
	Roger and Site driveway	LOS	-	-	A	-
		Delay	-	-	8.7	-
		v/c	-	-	0.02	-
		95th percentile Q	-	-	0.4	-
	Moore and Site driveway	LOS	A	-	A	-
		Delay	9.5	-	0.1	-
		v/c	0.02	-	0.0	-
		95th percentile Q	0.4	-	0.0	-

Site Traffic

The amount of traffic generated by the site was estimated based on a review of rates outlined in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition for High-Rise Residential Condominium/Townhouse (Land Use 232) and compared to existing site traffic. The trip generation data and references are included in Table 5 below.

Table 5: Site Traffic Generation

Description	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
ITE Land Use 232: High-Rise Residential Condominium/Townhouse (t/unit)	0.06	0.28	0.34	0.24	0.14	0.38
Trips (300 units)	18	84	102	72	42	114
Existing Site Traffic	18	5	23	4	30	34
Net Site Traffic	**0**	**79**	**79**	**68**	**12**	**80**

The ITE trip generation rates are conservative as they represent suburban traffic conditions where travel by transit and active modes is low. By contrast, this site is well suited to travel by transit and active modes. The resulting net increase in traffic is about 80 vehicles trips in the weekday morning and afternoon peak hours.

The net site traffic was determined by subtracting existing site traffic and assigning traffic associated with the proposed development concept in accordance with existing traffic patterns through the Moore/Roger and Union/Moore intersections. Net site traffic volumes are attached.

Future Total Traffic

Future total traffic was developed by adding the net site traffic to the future background traffic and is attached. Capacity analysis for future total traffic conditions is summarized in Table 6 and Table 7 below. The Synchro analysis worksheets are attached in Appendix D.

Table 6: Future Total Traffic Operations – Union and Moore (signalized)

Peak Hour	MOE		Direction/Movement/Approach								
			EBL	EBTR	WBL	WBT	WBR	NBL	NBTR	SBL	SBTR
AM	LOS		A	A	A	B	A	C	C	C	B
	Delay		8.2	9.8	6.5	12.2	1.8	26.8	25.1	26.9	18.3
	v/c		0.19	0.49	0.07	0.62	0.08	0.16	0.31	0.16	0.29
	Q	95th percentile	8.9	63.4	4.9	92.7	4.2	13.8	28.7	13.5	22.7
		Available	25		30			15		15	
PM	LOS		A	B	A	A	A	C	C	C	C
	Delay		6.9	12.7	7.6	8.9	2.0	31.0	26.4	30.1	28.6
	v/c		0.13	0.65	0.14	0.41	0.05	0.32	0.47	0.31	0.55
	Q	95th percentile	8.6	98.3	6.6	50.5	3.6	19.9	39.5	20.6	47.1
		Available	25		30			15		15	

Table 7: Future Total Traffic Operations – Unsignalized Intersections

Peak Hour	Intersection	MOE	Direction/Movement/Approach			
			EB	WB	NB	SB
AM	Moore and Roger	LOS	B	B	A	A
		Delay	11.1	11.1	0.6	0.3
		v/c	0.11	0.04	0.01	-
		95th percentile Q	2.7	0.9	0.1	0.0
	Roger and Site driveway	LOS	-	A	A	-
		Delay	-	1.2	8.8	-
		v/c	-	0.0	0.04	-
		95th percentile Q	-	0.1	0.8	-
	Moore and Site driveway	LOS	A	-	A	-
		Delay	9.4	-	0.4	-
		v/c	0.06	-	0.0	-
		95th percentile Q	1.4	-	0.1	-
PM	Moore and Roger	LOS	B	B	A	A
		Delay	12.1	11.5	0.5	0.2
		v/c	0.14	0.08	0.01	-
		95th percentile Q	3.5	1.9	0.1	0.0
	Roger and Site driveway	LOS	-	A	A	-
		Delay	-	3.0	8.8	-
		v/c	-	0.01	0.02	-
		95th percentile Q	-	0.3	0.4	-
	Moore and Site driveway	LOS	A	-	A	-
		Delay	9.7	-	1.2	-
		v/c	0.03	-	0.01	-
		95th percentile Q	0.7	-	0.3	-

The future total traffic analysis indicates that the two intersections and the site driveways will operate at acceptable levels in the weekday morning and afternoon peak hours with level of service C or better on all approaches. The proposal has very little impact on traffic operations in the area. The 95 percentile queues for the northbound and southbound left turn movements at Union/Moore will continue to extend slightly beyond the available storage in the afternoon peak hour. The queues can continue to clear during each cycle of the signal and the incremental impact of site generated traffic is minimal.

Parking

Parking on the site is proposed at a rate of 1.05 spaces per unit in keeping with the new Zoning By-law currently under review. The current Zoning By-law requires 1.25 spaces per unit, including visitor parking. The new Zoning By-law, which is currently under review, requires 1.25 spaces per unit for residents plus 0.25 spaces per unit for visitors for a total of 1.5 spaces per unit; however, there is a provision in the new Zoning By-law to allow for a 30 percent reduction in parking near LRT stations. The site is located about 400 metres (walking distance) from King Street and the future Grand River Hospital LRT Stop. In addition, the neighborhood is walkable and attractive to cycling with easy access to both downtown Kitchener and Uptown Waterloo and the Spur Line Trail nearby, so a 30 percent reduction in parking is appropriate for this site. A 30 percent reduction in parking from 1.5 spaces per unit is 1.05 spaces per unit.

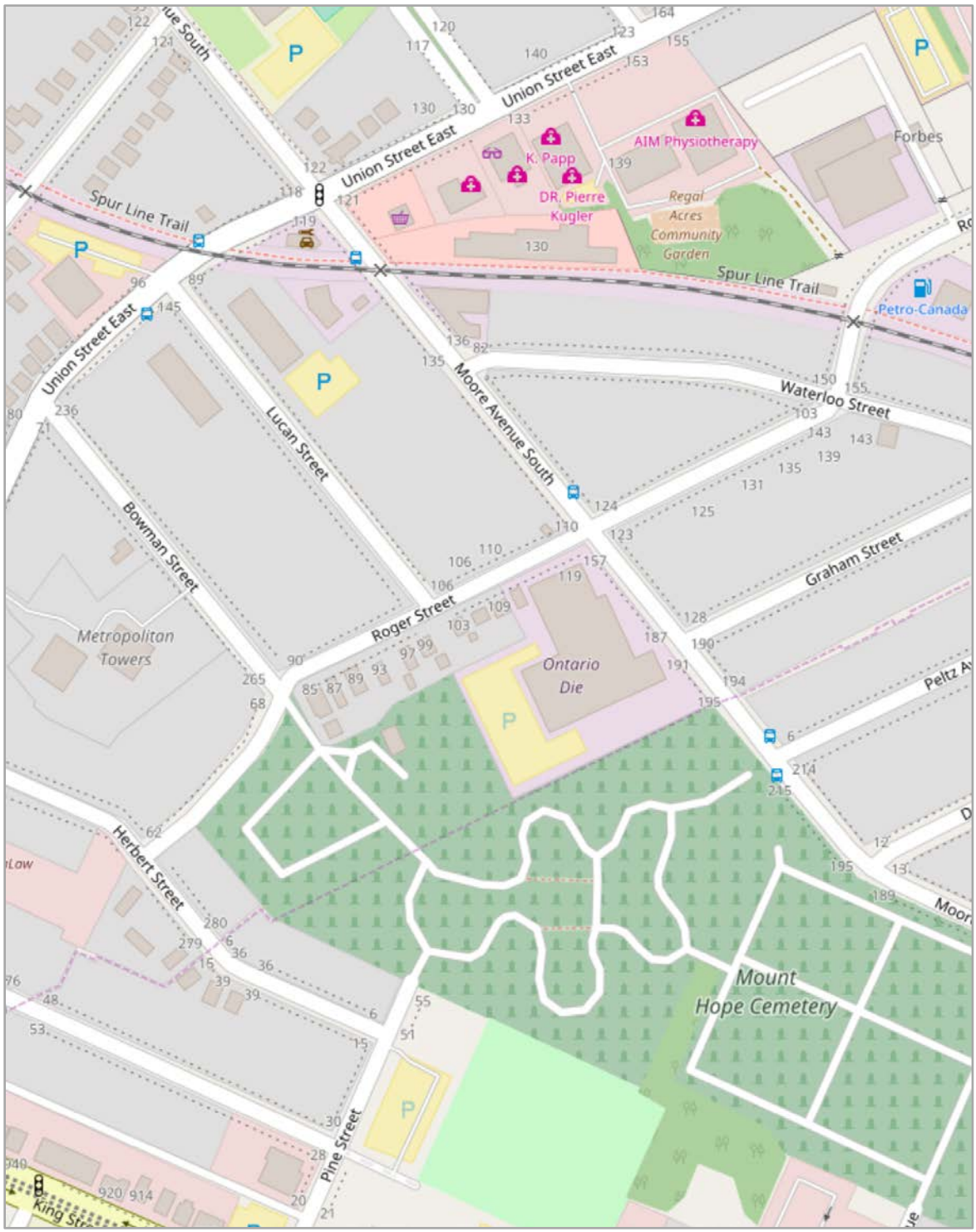
The proposed parking rate is consistent with information reviewed by Paradigm Transportation Solutions Limited for the City of Kitchener in their August 2015 study "Comprehensive Review of Off-Street Parking & Loading Regulations". In the study, parking demand was surveyed at 25 residential sites representing low, medium and high density development in both an urban and suburban context. The recommended parking rate based on the observed demand for residential development across the City was 1.0 space per unit for low density, 0.9 spaces/unit for medium density and 0.8 spaces/unit for high density. The proposed parking rate for the subject site exceeds the recommendations in the Paradigm study.

Conclusions

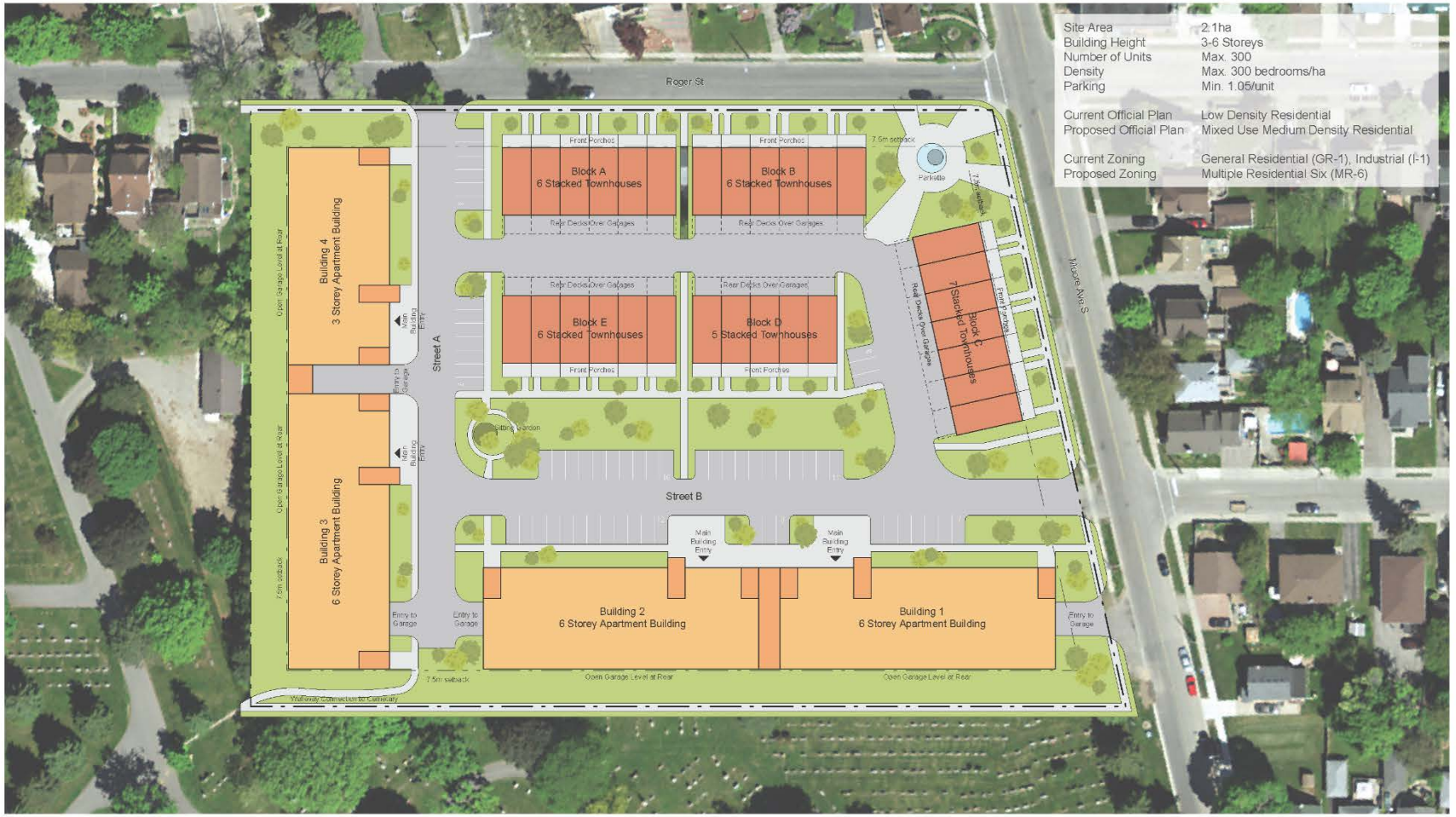
As requested by City staff, we have reviewed the future traffic operations at the Union/Moore and Moore/Roger intersections along with two site driveways (one on Roger Street and one composite Moore Avenue driveway) and found that the intersections are expected to operate at acceptable levels in the weekday morning and afternoon peak hours.

Parking is proposed in accordance with the new Zoning By-law currently under review at 1.05 spaces per unit.

Appendix A: Figures



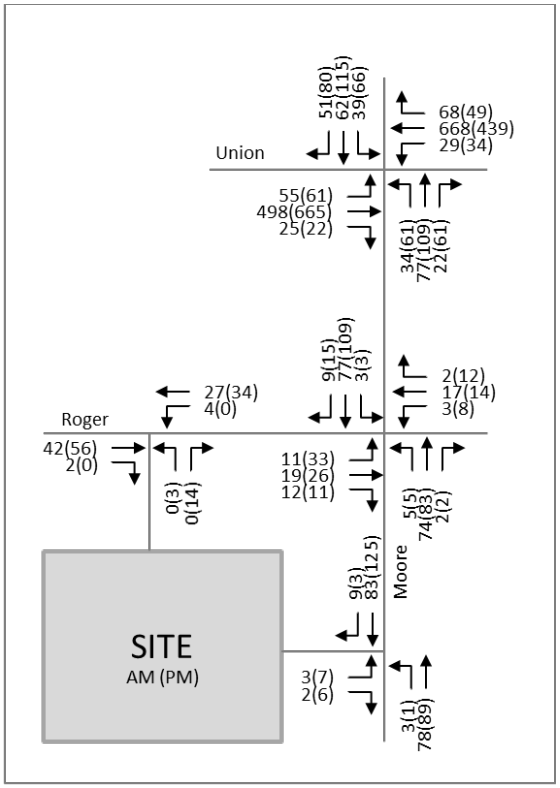
Site Location Plan



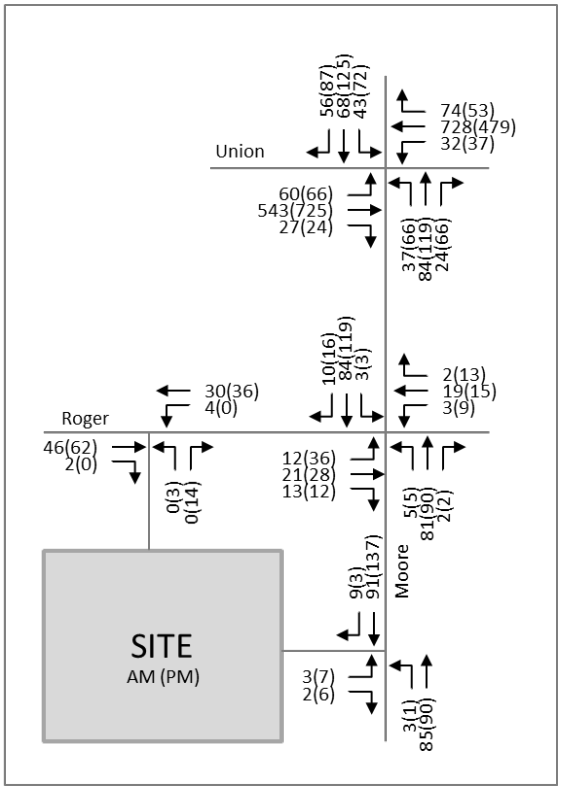
DEVELOPMENT CONCEPT
Roger St and Moore Ave S
ODC Tooling & Molds | February 8, 2017

Source: Robertson Simmons Architects Inc (August 17, 2016)

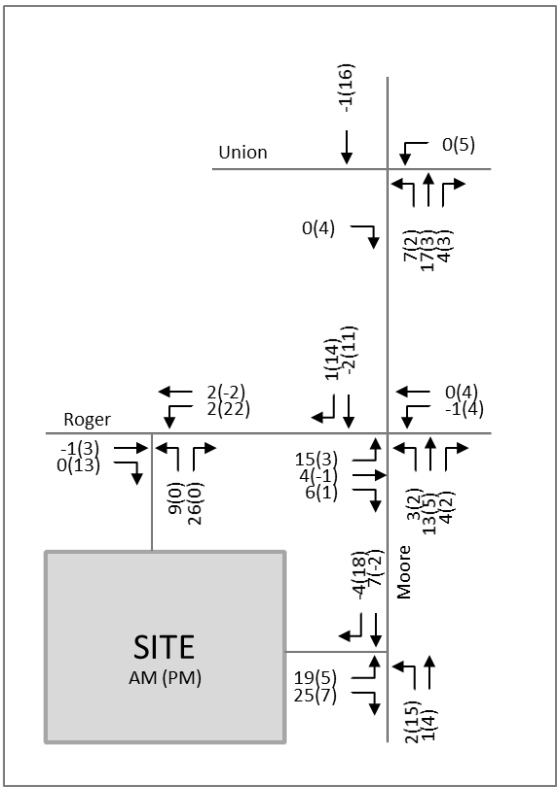
GSP group



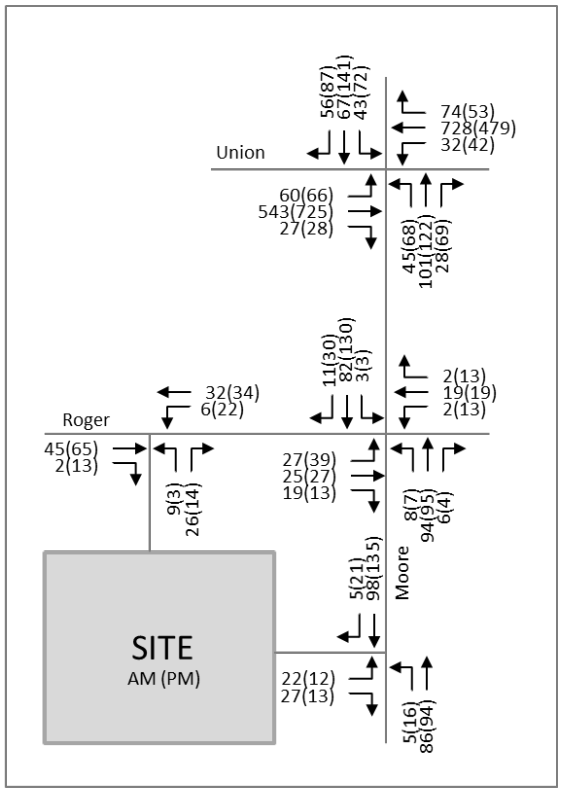
Existing Traffic



Future Background Traffic

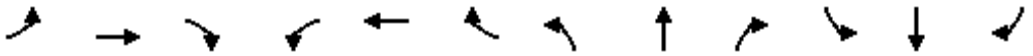


Net Site Traffic



Future Total Traffic

Appendix B: Existing Capacity Analysis



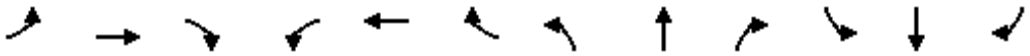
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	498	25	29	668	68	34	77	22	39	62	51
Future Volume (vph)	55	498	25	29	668	68	34	77	22	39	62	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		0.99		0.96	0.98	0.98		0.94	0.98	
Frt		0.993				0.850		0.967			0.932	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1849	0	1772	1865	1585	1772	1769	0	1772	1702	0
Flt Permitted	0.315			0.411			0.684			0.693		
Satd. Flow (perm)	584	1849	0	762	1865	1519	1247	1769	0	1217	1702	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				68		17			48	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		343.5			301.8			250.0			160.8	
Travel Time (s)		25.8			22.6			18.8			12.1	
Confl. Peds. (#/hr)	10		7	7		10	12		30	30		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	55	498	25	29	668	68	34	77	22	39	62	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	523	0	29	668	68	34	99	0	39	113	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
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
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0	56.0	24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%	70.0%	30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	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	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.62	0.62		0.62	0.62	0.62	0.22	0.22		0.22	0.22	
v/c Ratio	0.15	0.45		0.06	0.57	0.07	0.12	0.24		0.14	0.27	
Control Delay	7.5	9.3		6.3	11.2	1.8	26.1	23.0		26.5	17.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	7.5	9.3		6.3	11.2	1.8	26.1	23.0		26.5	17.6	
LOS	A	A		A	B	A	C	C		C	B	
Approach Delay		9.1			10.2			23.8			19.9	
Approach LOS		A			B			C			B	
Queue Length 50th (m)	3.1	36.5		1.5	52.8	0.0	4.1	10.2		4.8	8.0	
Queue Length 95th (m)	7.9	56.3		4.5	80.7	4.0	11.2	22.4		12.5	20.7	
Internal Link Dist (m)		319.5			277.8			226.0			136.8	
Turn Bay Length (m)	25.0			30.0			15.0			15.0		
Base Capacity (vph)	365	1157		476	1165	974	280	411		273	420	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.15	0.45		0.06	0.57	0.07	0.12	0.24		0.14	0.27	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 11.8 Intersection LOS: B
Intersection Capacity Utilization 69.3% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: Moore & Union



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	19	12	3	17	2	5	74	2	3	77	9
Future Volume (Veh/h)	11	19	12	3	17	2	5	74	2	3	77	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	19	12	3	17	2	5	74	2	3	77	9
Pedestrians		13			33			36			34	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			3			3			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											250	
pX, platoon unblocked												
vC, conflicting volume	230	220	130	263	223	142	99			109		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	230	220	130	263	223	142	99			109		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	98	97	99	99	97	100	100			100		
cM capacity (veh/h)	647	641	870	595	638	842	1457			1418		

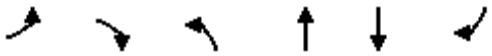
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	42	22	81	89
Volume Left	11	3	5	3
Volume Right	12	2	2	9
cSH	695	646	1457	1418
Volume to Capacity	0.06	0.03	0.00	0.00
Queue Length 95th (m)	1.5	0.8	0.1	0.0
Control Delay (s)	10.5	10.8	0.5	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	10.5	10.8	0.5	0.3
Approach LOS	B	B		

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	27.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	42	2	4	27	0	0
Future Volume (Veh/h)	42	2	4	27	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	42	2	4	27	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			44		78	43
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			44		78	43
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1564		922	1027

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	44	31	0
Volume Left	0	4	0
Volume Right	2	0	0
cSH	1700	1564	1700
Volume to Capacity	0.03	0.00	0.00
Queue Length 95th (m)	0.0	0.1	0.0
Control Delay (s)	0.0	1.0	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	1.0	0.0
Approach LOS			A

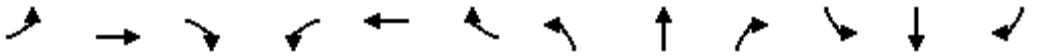
Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		8.1%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	2	3	78	83	9
Future Volume (Veh/h)	3	2	3	78	83	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	2	3	78	83	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					320	
pX, platoon unblocked						
vC, conflicting volume	172	88	92			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	172	88	92			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	817	971	1503			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	5	81	92
Volume Left	3	3	0
Volume Right	2	0	9
cSH	872	1503	1700
Volume to Capacity	0.01	0.00	0.05
Queue Length 95th (m)	0.1	0.0	0.0
Control Delay (s)	9.2	0.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	0.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	16.5%	ICU Level of Service	A
Analysis Period (min)	15		

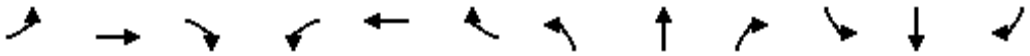


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	665	22	34	439	49	61	109	61	66	115	80
Future Volume (vph)	61	665	22	34	439	49	61	109	61	66	115	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	1.00		0.99		0.94	0.96	0.97		0.95	0.97	
Frt		0.995				0.850		0.946			0.938	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1871	0	1789	1883	1601	1789	1730	0	1789	1710	0
Flt Permitted	0.471			0.303			0.581			0.633		
Satd. Flow (perm)	871	1871	0	566	1883	1510	1046	1730	0	1134	1710	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				49		32			40	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		343.5			301.8			250.0			148.7	
Travel Time (s)		25.8			22.6			18.8			11.2	
Confl. Peds. (#/hr)	17		15	15		17	27		28	28		27
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	61	665	22	34	439	49	61	109	61	66	115	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	687	0	34	439	49	61	170	0	66	195	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
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
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0	56.0	24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%	70.0%	30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	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	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
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 Effct Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	18.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.62	0.62		0.62	0.62	0.62	0.22	0.22		0.22	0.22	
v/c Ratio	0.11	0.59		0.10	0.37	0.05	0.26	0.41		0.26	0.47	
Control Delay	6.7	11.4		6.9	8.5	2.0	29.1	24.8		28.8	25.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.7	11.4		6.9	8.5	2.0	29.1	24.8		28.8	25.5	
LOS	A	B		A	A	A	C	C		C	C	
Approach Delay		11.0			7.8			26.0			26.3	
Approach LOS		B			A			C			C	
Queue Length 50th (m)	3.3	54.8		1.8	29.1	0.0	7.7	17.7		8.3	20.2	
Queue Length 95th (m)	7.9	83.6		5.3	45.0	3.4	17.9	35.0		18.9	39.1	
Internal Link Dist (m)		319.5			277.8			226.0			124.7	
Turn Bay Length (m)	25.0			30.0			15.0			15.0		
Base Capacity (vph)	544	1170		353	1176	962	235	414		255	415	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.11	0.59		0.10	0.37	0.05	0.26	0.41		0.26	0.47	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 14.3		Intersection LOS: B	
Intersection Capacity Utilization 79.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Moore & Union



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	26	11	8	14	12	5	83	2	3	109	15
Future Volume (Veh/h)	33	26	11	8	14	12	5	83	2	3	109	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	33	26	11	8	14	12	5	83	2	3	109	15
Pedestrians		6			19			26			20	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											250	
pX, platoon unblocked												
vC, conflicting volume	262	242	148	286	249	123	130			104		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	262	242	148	286	249	123	130			104		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	95	96	99	99	98	99	100			100		
cM capacity (veh/h)	640	640	871	598	635	894	1447			1461		

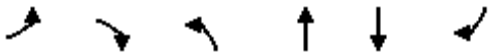
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	70	34	90	127
Volume Left	33	8	5	3
Volume Right	11	12	2	15
cSH	668	696	1447	1461
Volume to Capacity	0.10	0.05	0.00	0.00
Queue Length 95th (m)	2.7	1.2	0.1	0.0
Control Delay (s)	11.0	10.4	0.4	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	11.0	10.4	0.4	0.2
Approach LOS	B	B		

Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	26.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	56	0	0	34	3	14
Future Volume (Veh/h)	56	0	0	34	3	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	56	0	0	34	3	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			56		90	56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			56		90	56
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1549		910	1011

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	56	34	17
Volume Left	0	0	3
Volume Right	0	0	14
cSH	1700	1549	991
Volume to Capacity	0.03	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

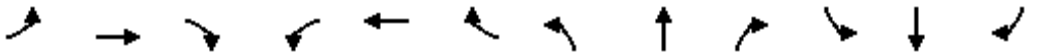


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	6	1	89	125	3
Future Volume (Veh/h)	7	6	1	89	125	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	6	1	89	125	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					320	
pX, platoon unblocked						
vC, conflicting volume	218	126	128			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	218	126	128			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	770	924	1458			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	13	90	128
Volume Left	7	1	0
Volume Right	6	0	3
cSH	834	1458	1700
Volume to Capacity	0.02	0.00	0.08
Queue Length 95th (m)	0.4	0.0	0.0
Control Delay (s)	9.4	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.4	0.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	16.8%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix C: Future Background Capacity Analysis



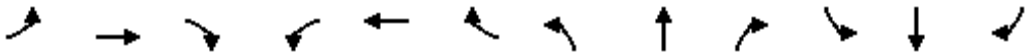
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	543	27	32	728	74	37	84	24	43	68	56
Future Volume (vph)	60	543	27	32	728	74	37	84	24	43	68	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		0.99		0.96	0.98	0.98		0.94	0.98	
Frt		0.993				0.850		0.967			0.932	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1849	0	1772	1865	1585	1772	1769	0	1772	1702	0
Flt Permitted	0.277			0.379			0.677			0.687		
Satd. Flow (perm)	514	1849	0	703	1865	1519	1234	1769	0	1208	1702	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				74		17			48	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		343.5			301.8			250.0			160.8	
Travel Time (s)		25.8			22.6			18.8			12.1	
Confl. Peds. (#/hr)	10		7	7		10	12		30	30		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	60	543	27	32	728	74	37	84	24	43	68	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	570	0	32	728	74	37	108	0	43	124	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
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
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0	56.0	24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%	70.0%	30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	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	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.62	0.62		0.62	0.62	0.62	0.22	0.22		0.22	0.22	
v/c Ratio	0.19	0.49		0.07	0.62	0.08	0.13	0.26		0.16	0.30	
Control Delay	8.2	9.8		6.5	12.2	1.8	26.4	23.4		26.8	18.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.2	9.8		6.5	12.2	1.8	26.4	23.4		26.8	18.5	
LOS	A	A		A	B	A	C	C		C	B	
Approach Delay		9.7			11.1			24.2			20.7	
Approach LOS		A			B			C			C	
Queue Length 50th (m)	3.4	41.3		1.7	60.6	0.0	4.5	11.4		5.3	9.4	
Queue Length 95th (m)	8.9	63.4		4.9	92.7	4.2	12.0	24.3		13.4	22.9	
Internal Link Dist (m)		319.5			277.8			226.0			136.8	
Turn Bay Length (m)	25.0			30.0			15.0			15.0		
Base Capacity (vph)	321	1157		439	1165	977	277	411		271	420	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.19	0.49		0.07	0.62	0.08	0.13	0.26		0.16	0.30	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 12.6 Intersection LOS: B
Intersection Capacity Utilization 81.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Moore & Union



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	21	13	3	19	2	5	81	2	3	84	10
Future Volume (Veh/h)	12	21	13	3	19	2	5	81	2	3	84	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	21	13	3	19	2	5	81	2	3	84	10
Pedestrians		13			33			36			34	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			3			3			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											250	
pX, platoon unblocked												
vC, conflicting volume	246	234	138	280	238	149	107			116		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	246	234	138	280	238	149	107			116		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	98	97	98	99	97	100	100			100		
cM capacity (veh/h)	631	629	861	578	626	835	1448			1409		

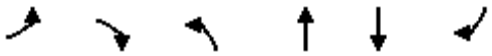
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	46	24	88	97
Volume Left	12	3	5	3
Volume Right	13	2	2	10
cSH	682	633	1448	1409
Volume to Capacity	0.07	0.04	0.00	0.00
Queue Length 95th (m)	1.6	0.9	0.1	0.0
Control Delay (s)	10.7	10.9	0.5	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	10.7	10.9	0.5	0.3
Approach LOS	B	B		

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	27.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	46	2	4	30	0	0
Future Volume (Veh/h)	46	2	4	30	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	46	2	4	30	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			48		85	47
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			48		85	47
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1559		914	1022

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	48	34	0
Volume Left	0	4	0
Volume Right	2	0	0
cSH	1700	1559	1700
Volume to Capacity	0.03	0.00	0.00
Queue Length 95th (m)	0.0	0.1	0.0
Control Delay (s)	0.0	0.9	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.9	0.0
Approach LOS			A

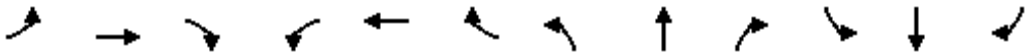
Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		8.3%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	2	3	85	91	9
Future Volume (Veh/h)	3	2	3	85	91	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	2	3	85	91	9
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					320	
pX, platoon unblocked						
vC, conflicting volume	186	96	100			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	186	96	100			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	801	961	1493			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	5	88	100
Volume Left	3	3	0
Volume Right	2	0	9
cSH	858	1493	1700
Volume to Capacity	0.01	0.00	0.06
Queue Length 95th (m)	0.1	0.0	0.0
Control Delay (s)	9.2	0.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	0.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	16.9%	ICU Level of Service	A
Analysis Period (min)	15		

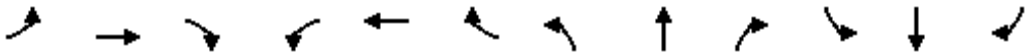


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	725	24	37	479	53	66	119	66	72	125	87
Future Volume (vph)	66	725	24	37	479	53	66	119	66	72	125	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	1.00		0.99		0.94	0.96	0.97		0.95	0.97	
Frt		0.995				0.850		0.946			0.938	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1871	0	1789	1883	1601	1789	1730	0	1789	1710	0
Flt Permitted	0.442			0.264			0.546			0.602		
Satd. Flow (perm)	819	1871	0	494	1883	1510	985	1730	0	1081	1710	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				53		32			40	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		343.5			301.8			250.0			148.7	
Travel Time (s)		25.8			22.6			18.8			11.2	
Confl. Peds. (#/hr)	17		15	15		17	27		28	28		27
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	66	725	24	37	479	53	66	119	66	72	125	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	749	0	37	479	53	66	185	0	72	212	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
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
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0	56.0	24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%	70.0%	30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	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	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
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 Effct Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	18.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.62	0.62		0.62	0.62	0.62	0.22	0.22		0.22	0.22	
v/c Ratio	0.13	0.64		0.12	0.41	0.06	0.30	0.45		0.30	0.51	
Control Delay	6.9	12.5		7.3	8.8	2.0	30.2	25.9		29.8	26.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.9	12.5		7.3	8.8	2.0	30.2	25.9		29.8	26.8	
LOS	A	B		A	A	A	C	C		C	C	
Approach Delay		12.0			8.1			27.1			27.6	
Approach LOS		B			A			C			C	
Queue Length 50th (m)	3.7	62.9		2.0	32.6	0.0	8.4	19.9		9.1	22.7	
Queue Length 95th (m)	8.6	96.5		5.9	50.2	3.6	19.3	38.3		20.4	42.9	
Internal Link Dist (m)		319.5			277.8			226.0			124.7	
Turn Bay Length (m)	25.0			30.0			15.0			15.0		
Base Capacity (vph)	511	1170		308	1176	963	221	414		243	415	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.13	0.64		0.12	0.41	0.06	0.30	0.45		0.30	0.51	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.64			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 83.0%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Moore & Union



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	28	12	9	15	13	5	90	2	3	119	16
Future Volume (Veh/h)	36	28	12	9	15	13	5	90	2	3	119	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	36	28	12	9	15	13	5	90	2	3	119	16
Pedestrians		6			19			26			20	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			2			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											250	
pX, platoon unblocked												
vC, conflicting volume	280	260	159	305	267	130	141			111		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	280	260	159	305	267	130	141			111		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	94	96	99	98	98	99	100			100		
cM capacity (veh/h)	622	628	862	580	622	889	1440			1459		

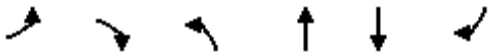
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	37	97	138
Volume Left	36	9	5	3
Volume Right	12	13	2	16
cSH	653	682	1440	1459
Volume to Capacity	0.12	0.05	0.00	0.00
Queue Length 95th (m)	3.0	1.3	0.1	0.0
Control Delay (s)	11.2	10.6	0.4	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	11.2	10.6	0.4	0.2
Approach LOS	B	B		

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	26.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	62	0	0	36	3	14
Future Volume (Veh/h)	62	0	0	36	3	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	62	0	0	36	3	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			62		98	62
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			62		98	62
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1541		901	1003

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	62	36	17
Volume Left	0	0	3
Volume Right	0	0	14
cSH	1700	1541	983
Volume to Capacity	0.04	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

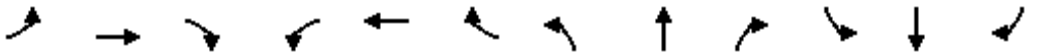


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	6	1	90	137	3
Future Volume (Veh/h)	7	6	1	90	137	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	7	6	1	90	137	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					320	
pX, platoon unblocked						
vC, conflicting volume	230	138	140			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	138	140			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	757	910	1443			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	13	91	140
Volume Left	7	1	0
Volume Right	6	0	3
cSH	821	1443	1700
Volume to Capacity	0.02	0.00	0.08
Queue Length 95th (m)	0.4	0.0	0.0
Control Delay (s)	9.5	0.1	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	0.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	17.4%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D: Future Total Capacity Analysis



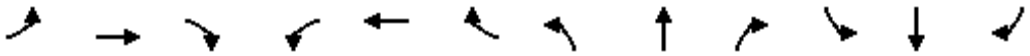
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	543	27	32	728	74	45	101	28	43	67	56
Future Volume (vph)	60	543	27	32	728	74	45	101	28	43	67	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	1.00		0.99		0.96	0.98	0.98		0.94	0.98	
Frt		0.993				0.850		0.967			0.932	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1849	0	1772	1865	1585	1772	1770	0	1772	1702	0
Flt Permitted	0.277			0.379			0.678			0.674		
Satd. Flow (perm)	514	1849	0	703	1865	1519	1236	1770	0	1187	1702	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				74		16			49	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		343.5			301.8			250.0			160.8	
Travel Time (s)		25.8			22.6			18.8			12.1	
Confl. Peds. (#/hr)	10		7	7		10	12		30	30		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	60	543	27	32	728	74	45	101	28	43	67	56
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	570	0	32	728	74	45	129	0	43	123	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
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
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0	56.0	24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%	70.0%	30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	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	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.62	0.62		0.62	0.62	0.62	0.22	0.22		0.22	0.22	
v/c Ratio	0.19	0.49		0.07	0.62	0.08	0.16	0.31		0.16	0.29	
Control Delay	8.2	9.8		6.5	12.2	1.8	26.8	25.1		26.9	18.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.2	9.8		6.5	12.2	1.8	26.8	25.1		26.9	18.3	
LOS	A	A		A	B	A	C	C		C	B	
Approach Delay		9.7			11.1			25.5			20.5	
Approach LOS		A			B			C			C	
Queue Length 50th (m)	3.4	41.3		1.7	60.6	0.0	5.5	14.3		5.3	9.1	
Queue Length 95th (m)	8.9	63.4		4.9	92.7	4.2	13.8	28.7		13.5	22.7	
Internal Link Dist (m)		319.5			277.8			226.0			136.8	
Turn Bay Length (m)	25.0			30.0			15.0			15.0		
Base Capacity (vph)	321	1157		439	1165	977	278	410		267	420	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.19	0.49		0.07	0.62	0.08	0.16	0.31		0.16	0.29	

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 80
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Pretimed
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 12.9 Intersection LOS: B
Intersection Capacity Utilization 81.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 3: Moore & Union



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	25	19	2	19	2	8	94	6	3	82	11
Future Volume (Veh/h)	27	25	19	2	19	2	8	94	6	3	82	11
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	27	25	19	2	19	2	8	94	6	3	82	11
Pedestrians		13			33			36			34	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			3			3			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											250	
pX, platoon unblocked												
vC, conflicting volume	265	256	136	307	258	164	106			133		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	265	256	136	307	258	164	106			133		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	96	96	98	100	97	100	99			100		
cM capacity (veh/h)	611	611	863	546	609	819	1449			1389		

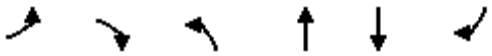
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	71	23	108	96
Volume Left	27	2	8	3
Volume Right	19	2	6	11
cSH	663	617	1449	1389
Volume to Capacity	0.11	0.04	0.01	0.00
Queue Length 95th (m)	2.7	0.9	0.1	0.0
Control Delay (s)	11.1	11.1	0.6	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	11.1	11.1	0.6	0.3
Approach LOS	B	B		

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	30.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	45	2	6	32	9	26
Future Volume (Veh/h)	45	2	6	32	9	26
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	45	2	6	32	9	26
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			47		90	46
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			47		90	46
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	97
cM capacity (veh/h)			1560		907	1023

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	47	38	35
Volume Left	0	6	9
Volume Right	2	0	26
cSH	1700	1560	991
Volume to Capacity	0.03	0.00	0.04
Queue Length 95th (m)	0.0	0.1	0.8
Control Delay (s)	0.0	1.2	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	1.2	8.8
Approach LOS			A

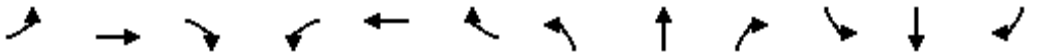
Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	16.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	27	5	86	98	5
Future Volume (Veh/h)	22	27	5	86	98	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	22	27	5	86	98	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					320	
pX, platoon unblocked						
vC, conflicting volume	196	100	103			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	196	100	103			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	97	100			
cM capacity (veh/h)	790	955	1489			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	49	91	103
Volume Left	22	5	0
Volume Right	27	0	5
cSH	873	1489	1700
Volume to Capacity	0.06	0.00	0.06
Queue Length 95th (m)	1.4	0.1	0.0
Control Delay (s)	9.4	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.4	0.4	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	18.6%	ICU Level of Service	A
Analysis Period (min)	15		

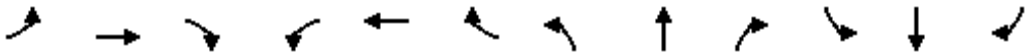


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	725	28	42	479	53	68	122	69	72	141	87
Future Volume (vph)	66	725	28	42	479	53	68	122	69	72	141	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	25.0		0.0	30.0		0.0	15.0		0.0	15.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00		1.00		0.96	0.98	0.97		0.95	0.98	
Frt		0.994				0.850		0.946			0.943	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	1852	0	1772	1865	1585	1772	1710	0	1772	1728	0
Flt Permitted	0.442			0.261			0.514			0.589		
Satd. Flow (perm)	816	1852	0	485	1865	1519	942	1710	0	1045	1728	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				53		33			36	
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		343.5			301.8			250.0			160.8	
Travel Time (s)		25.8			22.6			18.8			12.1	
Confl. Peds. (#/hr)	10		7	7		10	12		30	30		12
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Adj. Flow (vph)	66	725	28	42	479	53	68	122	69	72	141	87
Shared Lane Traffic (%)												
Lane Group Flow (vph)	66	753	0	42	479	53	68	191	0	72	228	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
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
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Minimum Split (s)	24.0	24.0		24.0	24.0	24.0	24.0	24.0		24.0	24.0	
Total Split (s)	56.0	56.0		56.0	56.0	56.0	24.0	24.0		24.0	24.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%	70.0%	30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	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	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0		7.0	7.0	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effct Green (s)	50.0	50.0		50.0	50.0	50.0	18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.62	0.62		0.62	0.62	0.62	0.22	0.22		0.22	0.22	
v/c Ratio	0.13	0.65		0.14	0.41	0.05	0.32	0.47		0.31	0.55	
Control Delay	6.9	12.7		7.6	8.9	2.0	31.0	26.4		30.1	28.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	6.9	12.7		7.6	8.9	2.0	31.0	26.4		30.1	28.6	
LOS	A	B		A	A	A	C	C		C	C	
Approach Delay		12.3			8.2			27.6			29.0	
Approach LOS		B			A			C			C	
Queue Length 50th (m)	3.7	64.0		2.3	32.6	0.0	8.7	20.6		9.2	25.6	
Queue Length 95th (m)	8.6	98.3		6.6	50.5	3.6	19.9	39.5		20.6	47.1	
Internal Link Dist (m)		319.5			277.8			226.0			136.8	
Turn Bay Length (m)	25.0			30.0			15.0			15.0		
Base Capacity (vph)	510	1159		303	1165	969	211	410		235	416	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.13	0.65		0.14	0.41	0.05	0.32	0.47		0.31	0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Pretimed			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 15.7		Intersection LOS: B	
Intersection Capacity Utilization 83.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 3: Moore & Union



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	27	13	13	19	13	7	95	4	3	130	30
Future Volume (Veh/h)	39	27	13	13	19	13	7	95	4	3	130	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	39	27	13	13	19	13	7	95	4	3	130	30
Pedestrians		13			33			36			34	
Lane Width (m)		3.7			3.7			3.7			3.7	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			3			3			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											250	
pX, platoon unblocked												
vC, conflicting volume	332	310	194	358	323	164	173			132		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	332	310	194	358	323	164	173			132		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	93	95	98	97	97	98	99			100		
cM capacity (veh/h)	544	570	802	506	560	819	1369			1390		

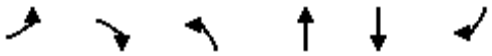
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	79	45	106	163
Volume Left	39	13	7	3
Volume Right	13	13	4	30
cSH	584	596	1369	1390
Volume to Capacity	0.14	0.08	0.01	0.00
Queue Length 95th (m)	3.5	1.9	0.1	0.0
Control Delay (s)	12.1	11.5	0.5	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	12.1	11.5	0.5	0.2
Approach LOS	B	B		

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	28.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	65	13	22	34	3	14
Future Volume (Veh/h)	65	13	22	34	3	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	65	13	22	34	3	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			78		150	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			78		150	72
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	99
cM capacity (veh/h)			1520		830	991

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	78	56	17
Volume Left	0	22	3
Volume Right	13	0	14
cSH	1700	1520	958
Volume to Capacity	0.05	0.01	0.02
Queue Length 95th (m)	0.0	0.3	0.4
Control Delay (s)	0.0	3.0	8.8
Lane LOS		A	A
Approach Delay (s)	0.0	3.0	8.8
Approach LOS			A

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		19.7%	ICU Level of Service A
Analysis Period (min)		15	



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	12	13	16	94	135	21
Future Volume (Veh/h)	12	13	16	94	135	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	13	16	94	135	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					320	
pX, platoon unblocked						
vC, conflicting volume	272	146	156			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	272	146	156			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	99			
cM capacity (veh/h)	710	902	1424			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	25	110	156
Volume Left	12	16	0
Volume Right	13	0	21
cSH	798	1424	1700
Volume to Capacity	0.03	0.01	0.09
Queue Length 95th (m)	0.7	0.3	0.0
Control Delay (s)	9.7	1.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.7	1.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	27.5%	ICU Level of Service	A
Analysis Period (min)	15		