6349 Regional Road 25 (West Site), Milton Transportation Impact, Parking and Travel Demand Management Study

Paradigm Transportation Solutions Limited

July 2020

Project 190334

ptsl.com

Project Summary

Project Number
190334

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6349 Regional Road 25 (West Site), Milton Transportation Impact, Parking & Travel Demand Management Study

Signatures

Signature

Disclaimer

Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) has been requested to undertake a Transportation Impact, Parking and Travel Demand Management Study for proposed residential development at 6349 Regional Road 25 in the Town of Milton.

The subject site is located in the northeast corner of the intersection of Regional Road 25 and Louis Saint Laurent Avenue. The proposed development consists of three (3) six-storey apartment buildings with a total of 276 units. Vehicular access to the development is proposed via two right-in/right-out driveways to Regional Road 25 and Louis Saint Laurent Avenue. A total of 404 spaces (383 spaces plus 21 tandem spaces) are provided.

Conclusions

Transportation Impact Study

This study evaluated the impacts associated within the construction of 276 residential units in three 6-storey buildings on a parcel of land bounded by Regional Road 25 north of Louis Saint Laurent. Access to the site is proposed via two right-in/right-out driveway to Regional Road 25 and Louis Saint Laurent Avenue. Overall the proposed development is projected to generate approximately 99 new vehicle trips during the weekday AM peak hour and 119 new vehicle trips during the weekday PM peak hour.

Detailed traffic analysis was conducted for each of the study area intersections under Base conditions, 2024, and 2029 Background and Total conditions.

The new traffic forecast to be added by full-build out of the development to the study area roadways results in relatively small impacts at the various study intersections. The analysis has further determined that the proposed driveways to Regional Road 25 and Louis Saint Laurent Avenue will operate at LOS C or better during the weekday peak periods under the 2024 and 2029 Total conditions.

With the proposed development having access through a right in/out driveway to Regional Road 25, it is suggested that a northbound right turn taper be constructed to allow right-turning traffic to safely slow down before making the turn from the higher speed roadway, without interfering with through traffic on Regional Road 25.

It is acknowledged that deficiencies currently exist at the Regional Road 25 and Louis Saint Laurent intersection and they can be expected to persist in the future with anticipated growth in traffic, independent of the development. As outlined in the capacity analysis summary tables, impacts to peak hour

operations at the intersection of Regional Road 25 at Louis Saint Laurent Avenue between future background and total traffic conditions are expected to be relatively minor as a result of the proposed development. As a result, there are no recommended improvements at Regional Road 25 and Louis Saint Laurent Avenue necessary to accommodate the proposed development.

Parking Study

The proposed site provides for a total of 404 parking spaces (383 spaces plus 21 tandem spaces); equating to a parking rate of 1.39 parking spaces per unit (resident and visitor). The parking requirement under Zoning By-Law 2009-189 stipulates a parking supply of 483 spaces; equating to a parking rate of 1.75 spaces per unit (resident and visitor). The proposed parking supply of 404 parking spaces (383 spaces plus 21 tandem spaces) does not meet the Zoning requirements as a shortfall of 100 spaces is noted, however, the 1.75 spaces per unit is much higher than many comparable municipalities.

To provide further support that the proposed supply of 1.39 spaces per unit will not result in a shortfall of parking, projected peak parking demand for the site has been estimated based on compiled parking surveys as well as industry standard rates contained within the ITE Parking Generation. Based on these methodologies, forecast parking demand for the proposed development is projected to be 362 parking spaces (1.31 spaces per unit).

Many existing Zoning By-Law parking requirements are antiquated and require updating to conform and reflect current polices and best practices. Many municipalities recognize the oversupply of parking and are updating the zoning requirement to reflect. Key municipalities that have recognized this include Town of Oakville, City of Burlington, and City of Kitchener. These municipalities have undertaken a comprehensive review of parking requirements and recognized that changes are required to meet policy objectives.

The Town of Milton requires on average 23% more parking to be provided for this development than would be required by the City of Burlington or Town of Oakville that have adopted new parking requirements. Through the incorporation of unbundled parking spaces, the proposed supply of 404 parking spaces (383 spaces plus 21 tandem spaces) is sufficient.

The transition from an automobile-dependent environment to one that is transit-supportive will require strategies to assist in shifting modal split and enabling the emergence of a more pedestrian-friendly transit-supportive environment. The over provision of free or low-cost parking creates areas that are dominated by parking infrastructure can have a negative impact on ridership and the pedestrian environment as well as providing an incentive for single-occupant vehicle use.

Based upon the recent research and best practices being implemented by municipalities, a reduced Parking Supply is one of the most effective TDM

measure available to reduce vehicle travel. The role of parking management is a key element to helping Milton meet its trip reduction goals. If free and unregulated parking is provided, there is little incentive for many residents and visitors to use alternative modes of transportation.

Overall, the forecasted demand provides a statistically valid justification that the proposed parking supply of 404 parking spaces (383 spaces plus 21 tandem spaces) is sufficient for the proposed development program.

Travel Demand Management

The site plan proposes several TDM measures that include:

- Sidewalk connections linking the building's primary entrance to the municipal roadway along Louis Saint Laurent Avenue and Regional Road 25 are proposed;
- Minimum bicycle parking spaces are provided based on the Town's Zoning requirement; and
- Convenient access to the existing transit network is provided with transit stops located at the intersection of Regional Road 25 and Louis Saint Laurent Avenue.

Additional measures that are currently not included on the site plan that could be considered to further help promote and encourage TDM include:

- Milton Transit to upgrade the existing transit stops with concrete landing pads and shelters.
- The applicant consider providing preloaded presto passes to residents.
- The site operator monitor the on-site bicycle parking supply to ensure and appropriate amount of bicycle parking is provided.
- The site operator monitor the long-term desire lines, if any, created by the erosion caused by pedestrians crossing the site's landscaped areas. Should desire lines form there may be an opportunity to adjust the site's landscaping to encourage use of the designated on-site pedestrian sidewalks.
- Based on the City of Kitchener's TDM Checklist, a potential reduction of 53 parking spaces could be realized with the additional measures incorporated.

Recommendations

Based on the findings of this study, it is recommended that:

- That the Region of Halton and Town of Milton monitor the future traffic volumes at the intersection of Regional Road 25 and Louis Saint Laurent Avenue when they Boyne Secondary Plan area is built out to confirm the lane geometry and signal timing phases; and
- A northbound right turn taper be provided along Regional Road 25 at the proposed driveway to provide a safe right-turn maneuver based on the potential for higher speeds on Regional Road 25.
- Flexible delineators (to act as a median) be installed by the Applicant on Regional Road 25 extending from the Louis Saint Laurent Avenue intersection to 45 metres north of the proposed Site Driveway to prohibit left-turns in and out of the site.

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Appendices

Figures

Tables

1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been requested to undertake a Transportation Impact, Parking and Travel Demand Management Study for proposed residential development at 6349 Regional Road 25 in the Town of Milton.

The subject site is located in the northeast corner of the intersection of Regional Road 25 and Louis Saint Laurent Avenue as shown in **Figure 1.1**. The proposed development consists of three (3) six-storey apartment buildings with a total of 276 units. Vehicular access to the development is proposed via two right-in/right-out driveways to Regional Road 25 and Louis Saint Laurent Avenue. A total of 404 parking spaces (383 spaces plus 21 tandem spaces) are provided.

Pre-study consultation was undertaken with Halton Region and the Town of Milton via email in June 2019. **Appendix A** contains the pre-study correspondence and the comments received from the Region of Halton.

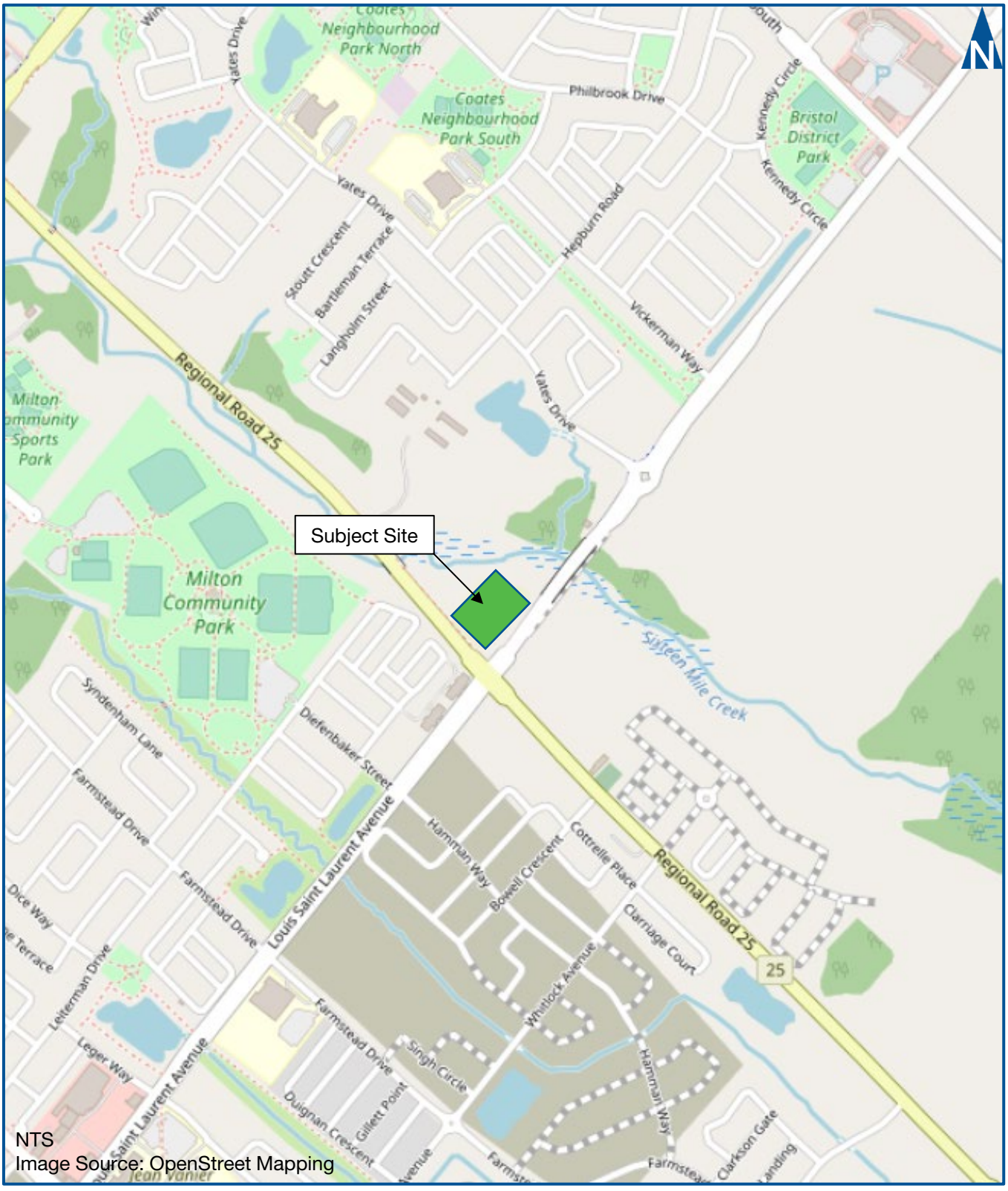

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Image Source: OpenStreet Mapping

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Study Area

Figure 1.1

1.2 Purpose and Scope

This study determines the impacts of the additional traffic generated by the expansion on the surrounding road network and the remedial measures necessary, if any, to accommodate future traffic in a satisfactory manner. The scope of this study includes:

- Assessments of the current traffic and site conditions within the study area;
- Estimates of background traffic growth;
- Estimates of the additional traffic generated by the planned expansion;
- Analyses of the impact(s) of the future traffic on the surrounding road network for the 2024 horizon year (five years from date of study is commissioned) and 2029 horizon year (ten-year horizon);
- Recommendations necessary to mitigate the site generated traffic in a satisfactory manner;
- An estimate of the parking demand generated by the expansion and establishment of the number of on-site parking spaces that should be provided to support the demand; and
- Identification and recommendation of Transportation Demand Management (TDM) measures specific to this site.

The study has been completed using Halton Region Transportation Impact Study Guidelines[1].

1.3 Study Area Intersections

The intersections that have been identified for assessment in this study and approved by the Town of Milton and Halton Region staff are as follows:

- Regional Road 25 and Louis Saint Laurent Avenue (signalized); and
- Up to two (2) site driveways (assumed to be unsignalized).

[1] Transportation Impact Study Guidelines, Halton Region, January 2015

2 Existing Conditions

2.1 Roadway Network

Regional Road 25 and Louis Saint Laurent Avenue are the roadways in the study area that will be most impacted by the proposed development. The general characteristics of each roadway are described as follows:

- **Regional Road 25** is a major north-south undivided arterial roadway within the study area under the jurisdiction of Halton Region. It has a four-lane urban cross-section with auxiliary turning lanes at its signalized intersection with Louis Saint Laurent Avenue. The posted speed limit is 70 kilometres per hour. Regional Road 25 is scheduled for widening to a six-lane cross section in 2027.
- **Louis Saint Laurent Avenue** is an east-west arterial roadway within the study area under the jurisdiction of the Town of Milton. It has a four-lane urban cross-section with auxiliary left-turn lanes at its signalized intersection with Regional Road 25. There is a raised centre median from Regional Road 25 to the Sixteen Mile Creek bridge. The posted speed limit is 60 kilometres per hour.

The existing lane configurations and traffic control are shown in **Figure 2.1**.

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Existing Lane Configuration & Traffic Control

Figure 2.1

2.2 Transit Service

Milton Transit operates one route adjacent to the site. Details of the transit route are as follows:

- **Route 9 Ontario South:** runs in a north-south direction from the Milton GO Station to the residential area at the intersection of Regional Road 25 and Britannia Road West. Service runs from 05:20 AM to 10:11 PM with headways generally from 20 to 60 minute headways Monday through Friday. Saturday service is provided from 7:10 AM to 7:40 PM with headways generally every 60 minutes.

The closest transit stops are located on both sides of Regional Road 25 at the Louis Saint Laurent Avenue intersection. The transit stops are identified by signage. There are no passenger facilities such as landing pads, benches or shelters at the two transit stops.

Figure 2.2 shows the location of the transit routes within the study area.

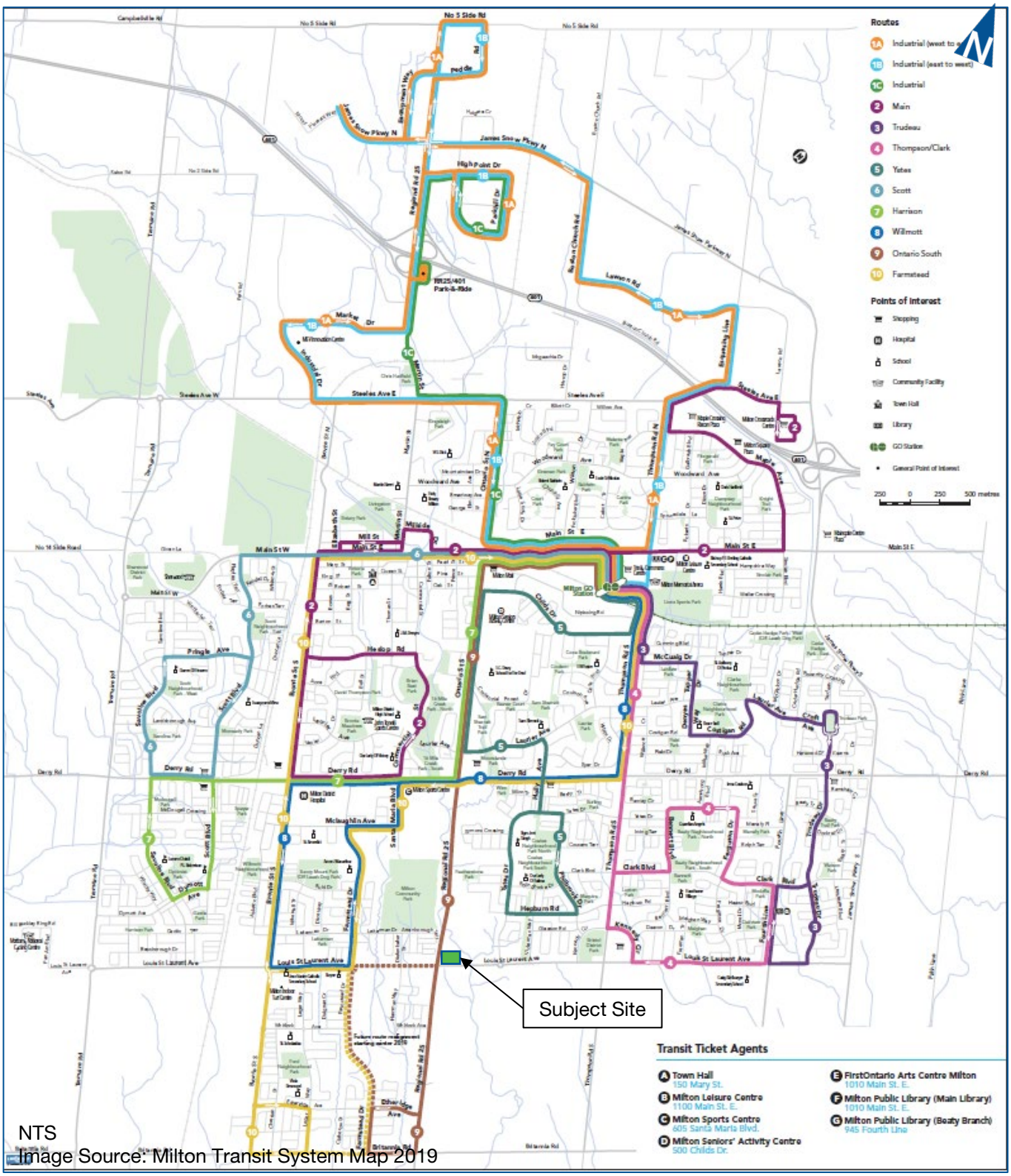

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Image Source: Milton Transit System Map 2019

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Existing Transit Network

Figure 2.2

2.3 Pedestrian and Cycling Environment

2.3.1 Pedestrian

There are asphalt multi-use trails on either side of Regional Road 25 north of Louis Saint Laurent Avenue. The west side multi-use trail veers away from Regional Road 25 to access the Milton Community Sports Park. South of Louis Saint Laurent Avenue there is a sidewalk on the east side of Regional Road 25. Asphalt multi-use trails are on both sides of Louis Saint Laurent Avenue west of Regional Road 25. The multi-use trail continues on the north side of Louis Saint Laurent Avenue east of Regional Road 25.

At the signalized intersection of Regional Road 25 and Louis Saint Laurent Avenue there are pedestrian signal heads with push buttons and crosswalk markings on all approaches.

Walk Score is an online tool that assigns a numerical walkability score between 0 and 100. Walk Score ranks communities nationwide based on how many businesses, parks, theatres, schools, and other common destinations are within walking distance. The subject site is noted to score a Walk Score[2] of 34 and is considered "Car Dependent," which means that most errands require a vehicle.

2.3.2 Cycling

On-street cycling lanes are provided on Louis Saint Laurent Avenue within the study area. No on-street cycling lanes are provided on Regional Road 25.

2.4 Traffic Volumes

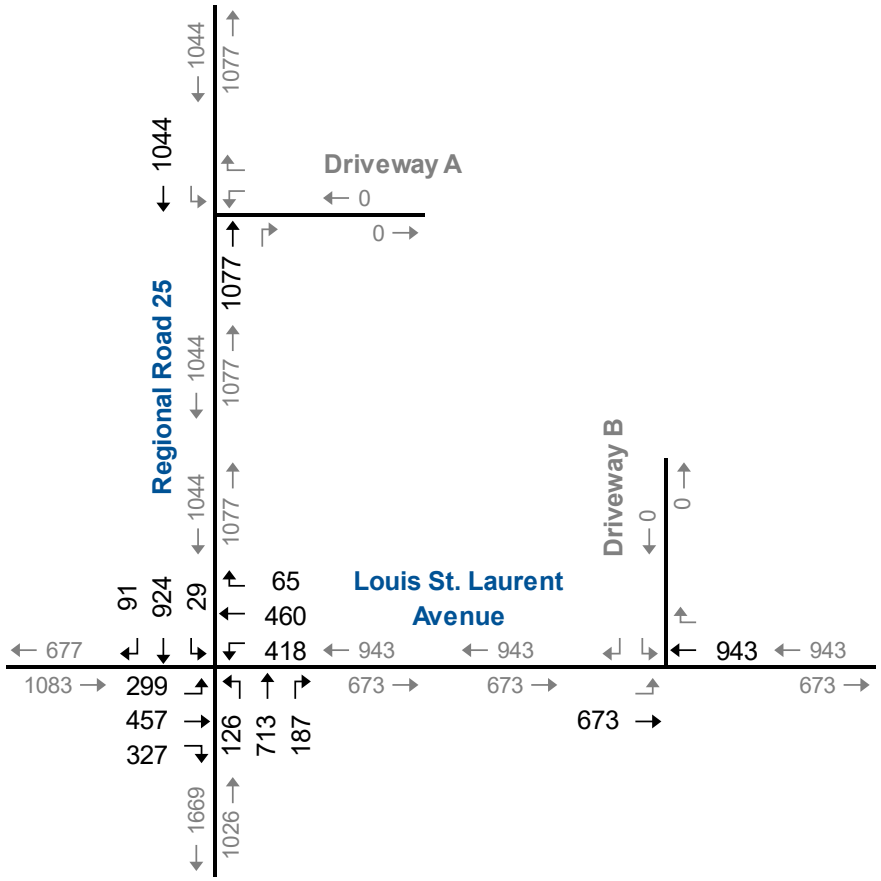
To assess intersection operations, turning movement counts (TMC) are used to quantify the movement of vehicles. Existing traffic counts at an intersection or on a road section forms the foundation for analysis. The traffic counts are usually collected during peak periods at an intersection for use in level of service analysis.

Paradigm conducted an 8-hour TMC on June 6, 2019 at the study area intersection. **Figure 2.3** illustrates existing weekday AM and PM peak hour traffic volumes at the study area intersections.

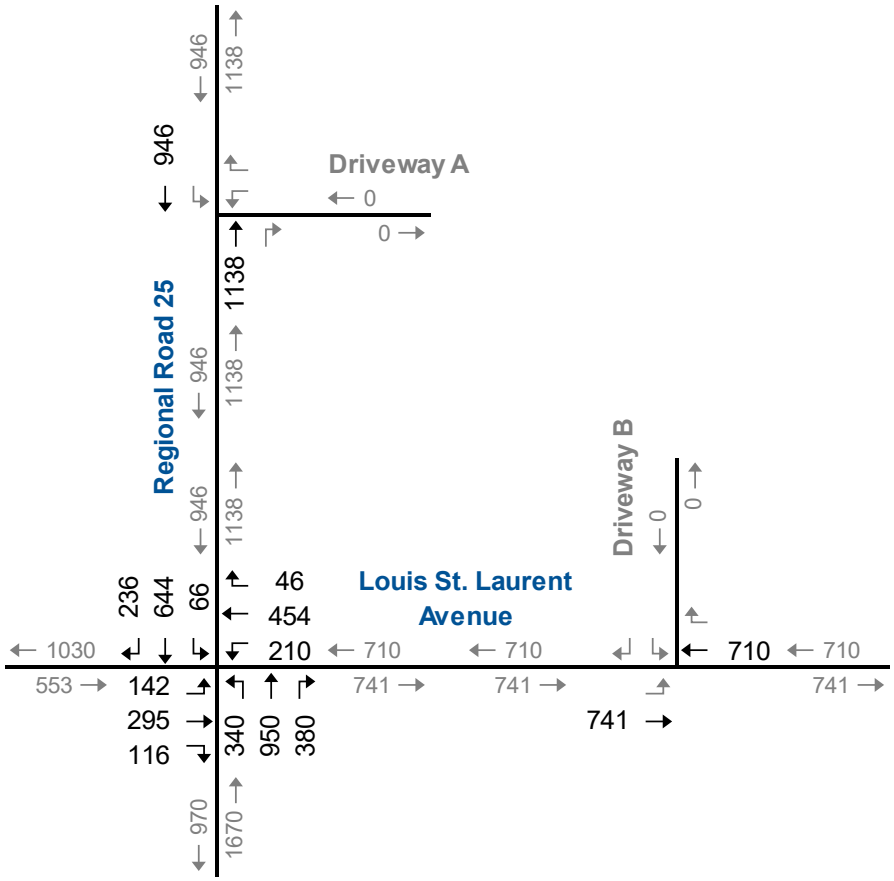
Appendix B contains the turning movement count data.

[2] https://www.walkscore.com/score/6349-regional-rd-25-milton-on-canada

AM Peak Hour



PM Peak Hour



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Existing Traffic Volumes

2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay related to the number of vehicles desiring to make a movement, compared to the estimated capacity for that movement.

The capacity is based on several criteria including but not limited to, vehicle headways, intersection geometry, vehicle composition, opposing traffic flows, and for signalized intersections, signal timing. Capacity is evaluated in terms of the ratio of demand flow to capacity with a at capacity condition represented by a volume-to-capacity ratio of 1.00 (i.e. volume demand equals capacity).

Table 2.1 summarizes the level of service criteria for signalized and stop controlled intersections. The highest possible rating is LOS A, under which the average delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections, 50 seconds at unsignalized intersections or when the v/c ratio is greater than 1.00, the movement is classed as LOS F and remedial measures are usually implemented if feasible. LOS E is generally used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on capacity and safety considerations. It is also recognized that the guidelines for determining when improvements are necessary can vary in different municipalities.

TABLE 2.1: VEHICLE LEVEL OF SERVICE DEFINITIONS

LOS	Signalized Intersections Average Total Delay (sec/veh)	Unsignalized Intersections Average Total Delay (sec/veh)
A	<= 10	<= 10
B	>10 & <= 20	>10 & <= 15
C	>20 & <= 35	>15 & <= 25
D	>35 & <= 55	>25 & <= 35
E	>55 & <= 80	>35 & <= 50
F	>80	>50

The operations of the study area intersections were evaluated under existing traffic volumes using Synchro 9 / SimTraffic 9 and HCM 2000 procedures. The intersection analysis considered the following measures of performance:

- The LOS for each turning movement. LOS is based on the average control delay per vehicle;
- The volume to capacity ratio for each intersection; and

- 95th percentile queue length (m).

The Halton Region TIS Guidelines identify the following thresholds for critical movements at intersections:

- Volume to capacity ratios for overall intersection operations, through movements or shared through/turning movements that operate at 0.85 or greater for signalized intersections;
- Volume to capacity ratios for exclusive turning movements that operate at 0.95 or greater for signalized intersections;
- Level of service based on average delay per vehicle or individual movement is LOS D or greater for unsignalized intersections; and
- Estimated 95th percentile queue lengths exceed available turning lane storage at both signalized and unsignalized intersections.

Table 2.2 summarizes the results of the analysis for the existing weekday AM and PM peak hour intersection operations. The results of the analyses indicate that the intersection of Regional Road 25 and Louis Saint Laurent Avenue is currently operating with acceptable overall level of service during the AM and PM peak hours with the following critical movements:

- The eastbound through movement is operating with LOS E and volume capacity ratio of 1.02 during the AM peak hour;
- The westbound left-turn movement is operating with LOS F and volume to capacity ratio of 1.09 during the AM peak hour;
- The southbound through movement is operating at LOS D with volume to capacity ratio of 0.99 during the AM peak hour; and
- The northbound through movement is operating at LOS D with volume to capacity ratio of 0.95 during the PM peak hour.

Appendix B contains the detailed Synchro output.

TABLE 2.2: EXISTING INTERSECTION OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Regional Road 25 & Louis Saint Laurent Avenue	TCS	LOS	D	E	>	**E**	F	D	>	**E**	C	C	C	**C**	B	D	C	**D**	**D**
			Delay	38	75	>	**65**	95	41	>	**65**	29	32	23	**30**	18	51	22	**48**	**52**
			V/C	0.81	1.02	>		1.09	0.77	>		0.57	0.73	0.13		0.12	0.97	0.07		
			Q	76	110	>		133	70	>		25	87	15		8	137	7		
			Ex	50		>		50		>		50		50		50		50		
			Avail.	-26		>		-83		>		25		35		42		43		
PM Peak Hour	Regional Road 25 & Louis Saint Laurent Avenue	TCS	LOS	C	C	>	**C**	C	C	>	**C**	E	D	C	**D**	B	C	C	**C**	**C**
			Delay	23	27	>	**26**	25	28	>	**27**	56	43	21	**41**	19	31	22	**28**	**33**
			V/C	0.47	0.48	>		0.60	0.60	>		0.97	0.95	0.26		0.25	0.76	0.16		
			Q	26	39	>		37	53	>		84	119	19		12	70	17		
			Ex	50		>		50		>		50		50		50		50		
			Avail.	24		>		13		>		-34		31		38		33		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Second
Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
< - Shared Left-Turn
> - Shared Right-Turn

3 Development Concept

3.1 Development Description

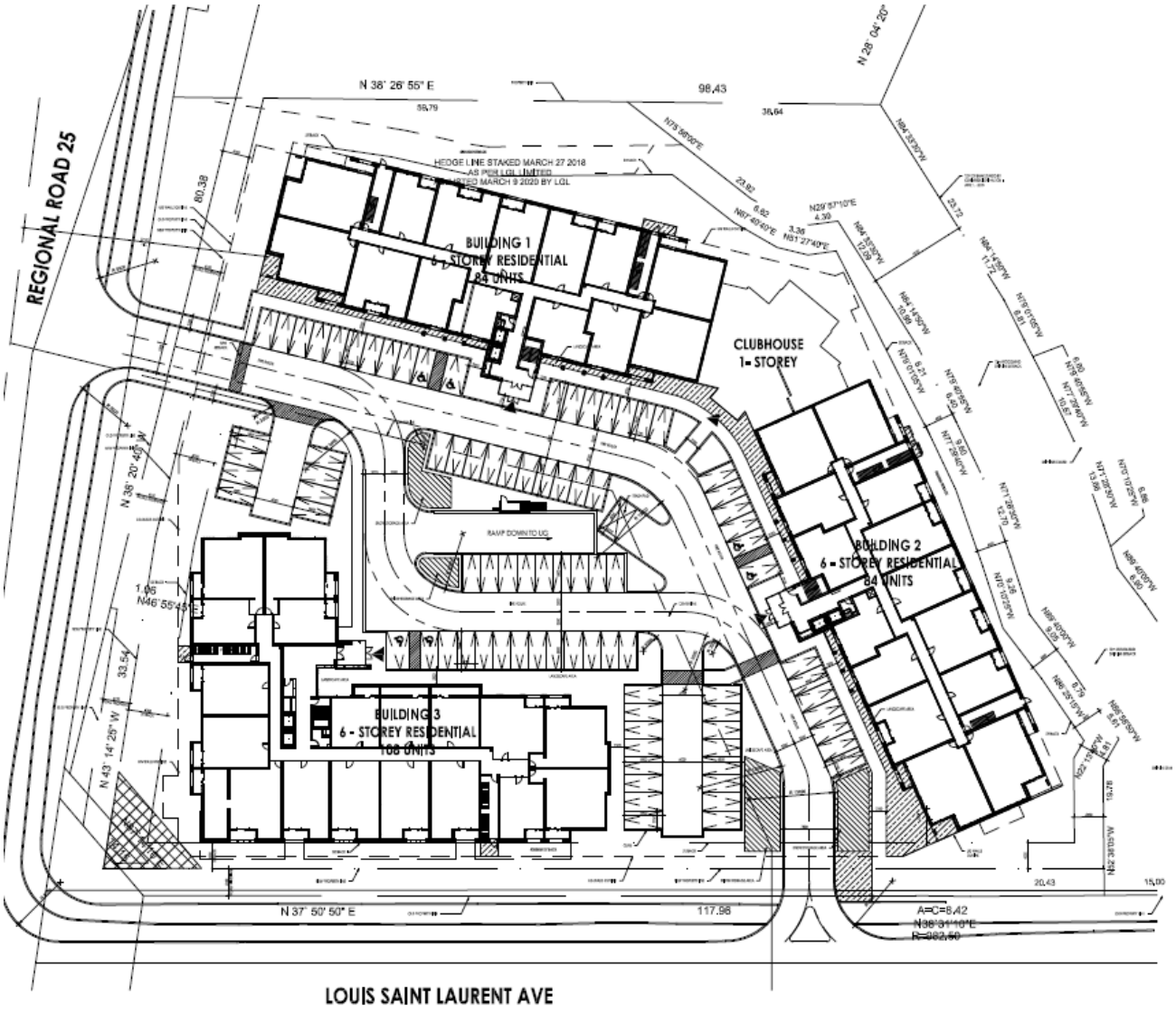
The subject site is located in the northeast corner of the intersection of Regional Road 25 and Louis Saint Laurent Avenue. The proposed development is to consist of three six-storey apartment buildings with a total of 276 units.

Vehicular access to the development is via two right -in/right-out driveways, one to Regional Road 25 and one to Louis Saint Laurent Avenue. In the pre-study consultation with the Region of Halton (**Appendix A**), the Region specified access to Regional Road 25 would not be permitted to operate as a full -moves driveway. It would have to operate as a right-in/right-out only with a raised centre median on Regional Road 25 to prohibit left-turns in and out of the driveway. With an already existing raised centre median on Louis Saint Laurent Avenue, both driveways would have to operate as right-in/right-out only. Future residents of the development would have to adjust their trips to/from the site accordingly.

To prohibit cut-through traffic, traffic calming measures such as speed humps could be placed on the internal drive aisles. In addition, an enhanced pedestrian realm (brightly lit and visible sidewalks, raised crosswalks) will also reduce vehicle speeds on site and limit the potential for cut-through traffic.

A total of 404 parking spaces (383 spaces plus 21 tandem spaces) are to be provided on site.

Figure 3.1 illustrates the site concept plan.



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Site Plan

6349 Regional Road 25 (West Site), Milton TIS, PS & TDM
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Figure 3.1

3.1.1 Sight Distance

Both Regional Road 25 and Louis Saint Laurent Avenue are relatively flat and straight with no horizontal or vertical sightline issues.

Based on the Transportation Association of Canada (TAC) guidelines, the minimum stopping sight distance for a road with a design speed of 80 kilometres per hour is 130 metres[3], the minimum sight distance for a left-turn from stop is 170 metres[4], and the minimum sight distance for a right-turn from stop is 145 metres[5]. The minimum stopping sight distance for a road with a design speed of 70 kilometres per hour is 105 metres, the minimum sight distance for a left-turn from stop is 150 metres, and the minimum sight distance for a right-turn from stop is 130 metres.

Sight distance from both proposed driveways exceed 150 metres in all directions. Sight distance should not be a concern at the proposed connections to the subject site. Appropriate daylight triangles should be provided at the site driveways.

3.2 Site Generated Traffic

The Institute of Transportation Engineers (ITE) Trip Generation[6] methods predict the site trip generation. Land Use Code 221 (Multifamily Housing [Mid-Rise]) was used to estimate the site's trip generation. **Table 3.1** summarizes the estimated trip generation of the subject site. It is estimated to generate approximately 99 AM peak hour trips and 119 PM peak hour trips. No reductions were made to account for modal split (transit and active transportation). As such, the estimated trip generation is expected to be conservative.

TABLE 3.1: ESTIMATED TRIP GENERATION

ITE Land Use	Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
221 Multifamily Housing (Mid-Rise)	276	0.36	25	74	99	0.44	74	47	119

[3] TAC Table 2.5.2. Stopping Sight Distance on level roadways for Automobiles
[4] TAC Table 9.9.4. Design Intersection Sight Distance – Case B1, Left-Turn from Stop
[5] TAC Table 9.9.6. Design Intersection Sight Distance – Case B2, Right-Turn from Stop
[6] Trip Generation Manual 10th Edition Institute of Transportation Engineers Washington DC – LUC 222 Fitted Curve Equations – AM | T = 0.28(X) + 12.86 / PM | T = 0.34(X) + 8.56

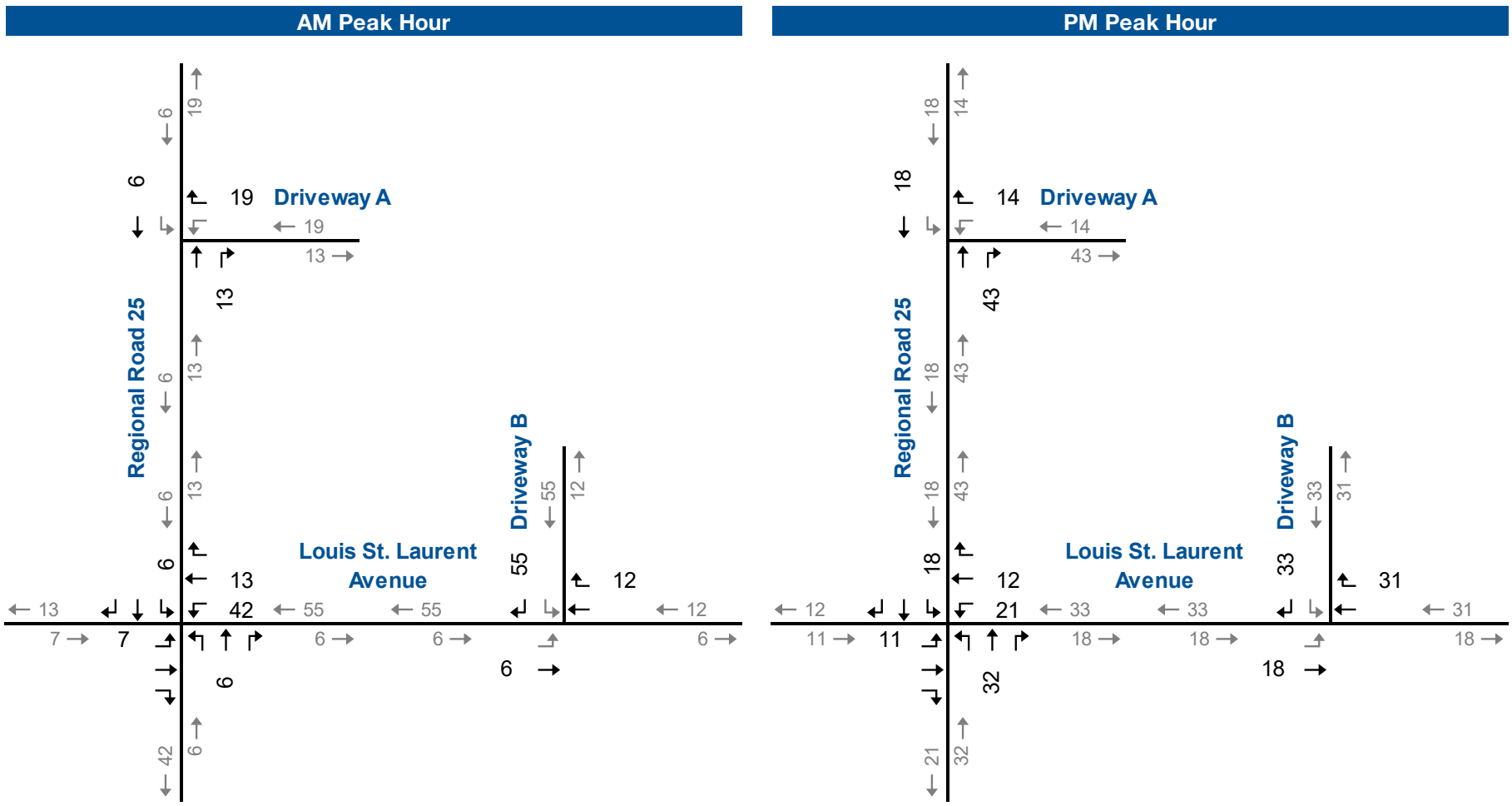
3.3 Trip Distribution and Assignment

The site generated trips were assigned to the road network based on the existing distribution of traffic at the study area intersections. **Table 3.2** summarizes the estimated site trip distribution.

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

Direction	Route	AM Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound
North	Regional Road	25%	26%	24%	29%
South	25	25%	41%	43%	25%
East	Louis Saint	24%	16%	18%	19%
West	Laurent Avenue	26%	17%	15%	27%
Total		**100%**	**100%**	**100%**	**100%**

Figure 3.2 illustrates the trip assignment to be generated by the development.



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Site Generated Traffic Volumes

4 Evaluation of Future Traffic Conditions

The assessment of future conditions in this section includes the following components necessary to assess the traffic implications on the adjacent road network:

- Future background traffic estimates;
- Level of service analysis for background traffic (pre-development);
- Future total traffic estimates; and
- Level of service analysis for total traffic (post-development).

4.1 Forecast Forecasts

4.1.1 2024 Background Forecasts

The future background traffic volumes have been estimated by applying site traffic from near by developments. The developments include the Boyne Secondary Plan. The PM peak hour Boyne Secondary area site traffic was provided by the Region with the request that the volumes be reversed for the AM peak hour.

Weekday AM and PM peak hour site generated traffic from the east side of the 6349 Regional Road 25[7] development is included in the background traffic forecasts as well.

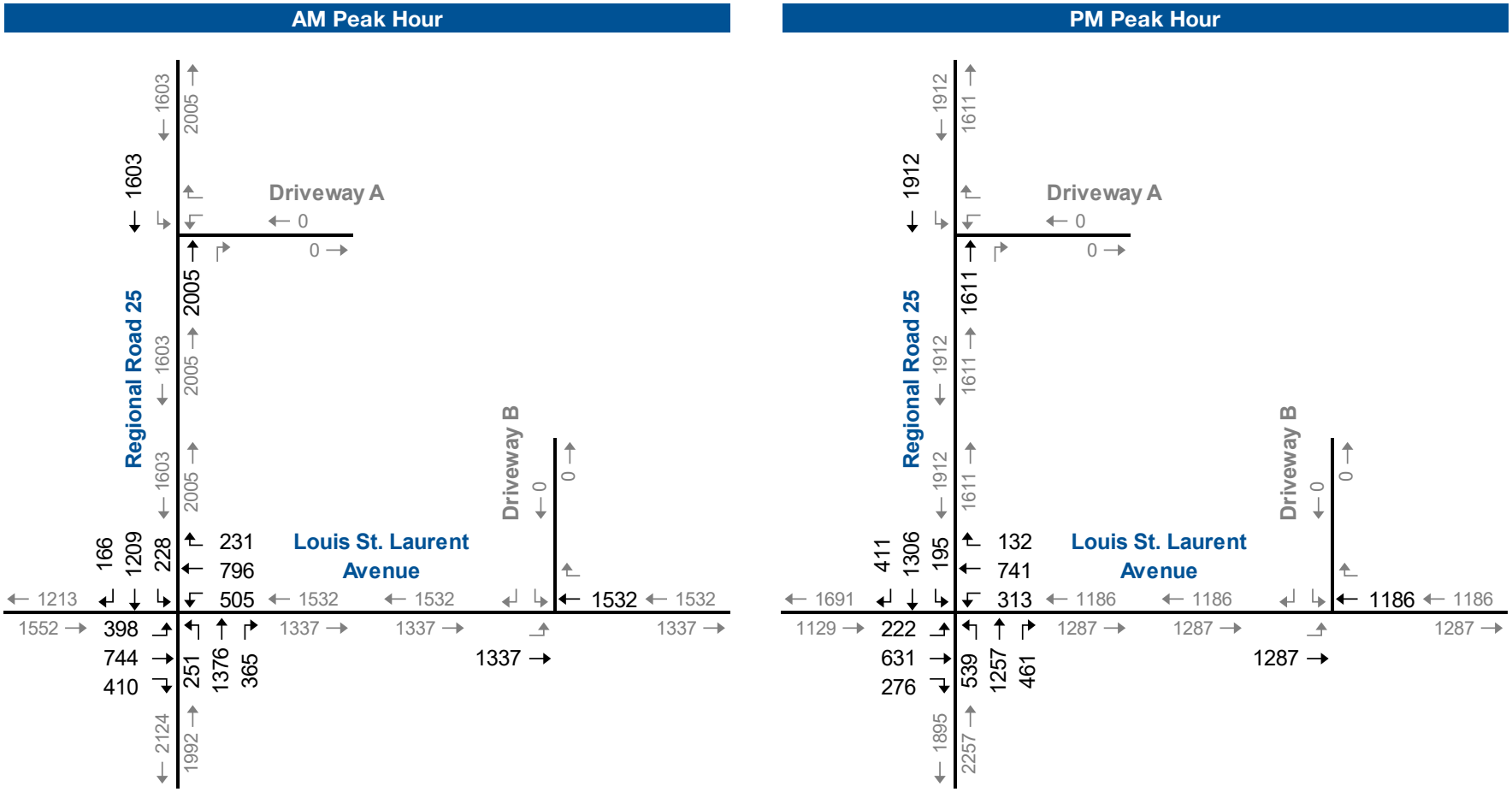
All background development traffic assignments are provided in **Appendix D**. **Figure 4.1** illustrates the forecast year 2024 background traffic volumes for the weekday AM and PM peak hours.

4.1.2 2024 Total Forecasts

The 2024 future total traffic volumes forecast to occur includes the future background traffic volumes and the site generated traffic volumes.

Figure 4.2 illustrates the forecast year 2024 total traffic volumes for the weekday AM and PM peak hour.

[7]190335 - 6349 Regional Road 25 (East Side) Transportation Impact, Parking & TDM Study, September 2019



2024 Background Traffic Volumes

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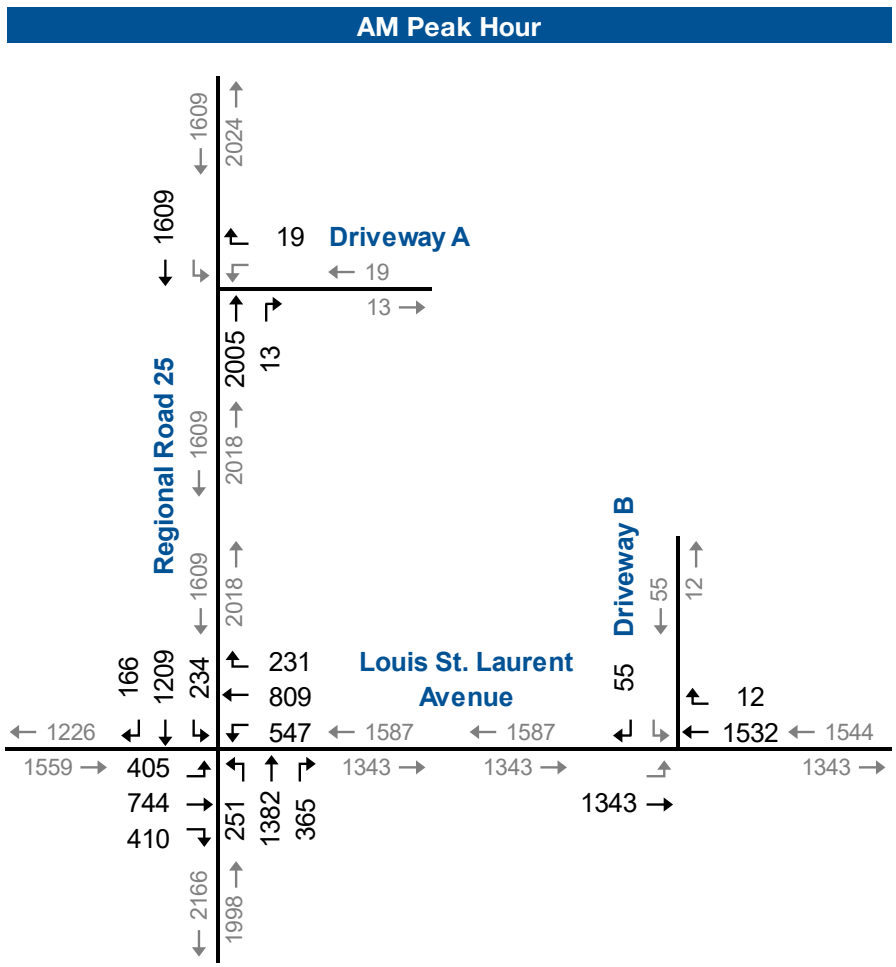
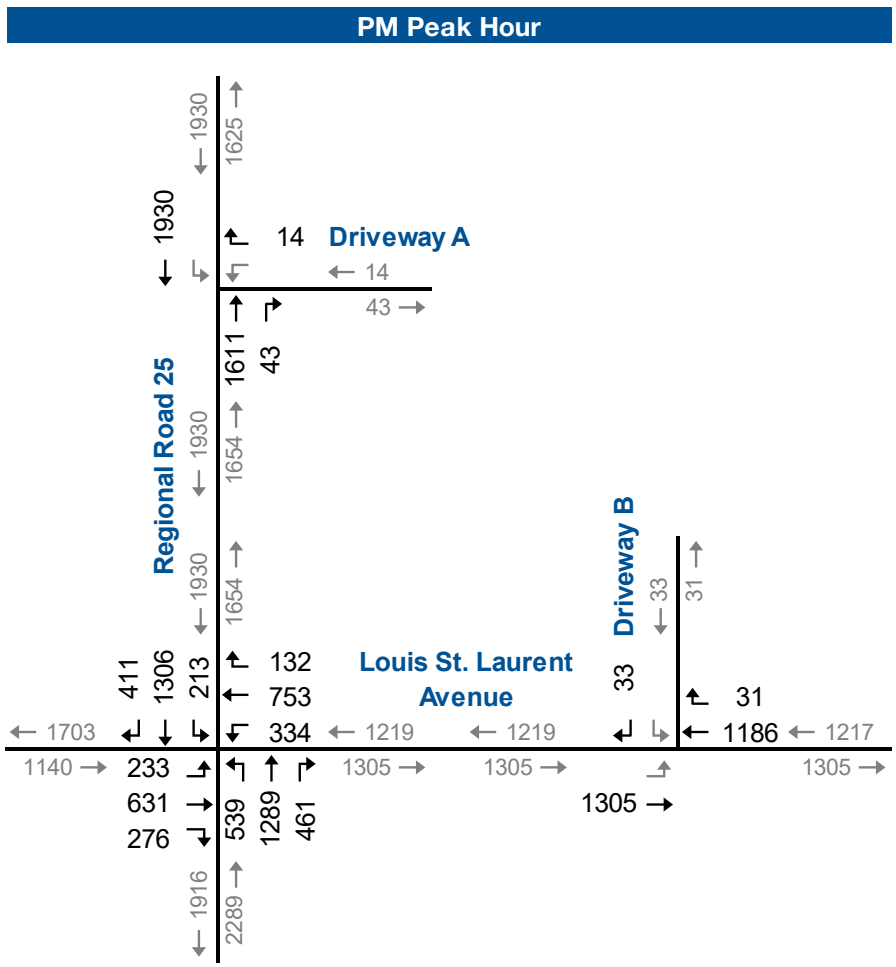
Figure 4.1





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2024 Total Traffic Volumes

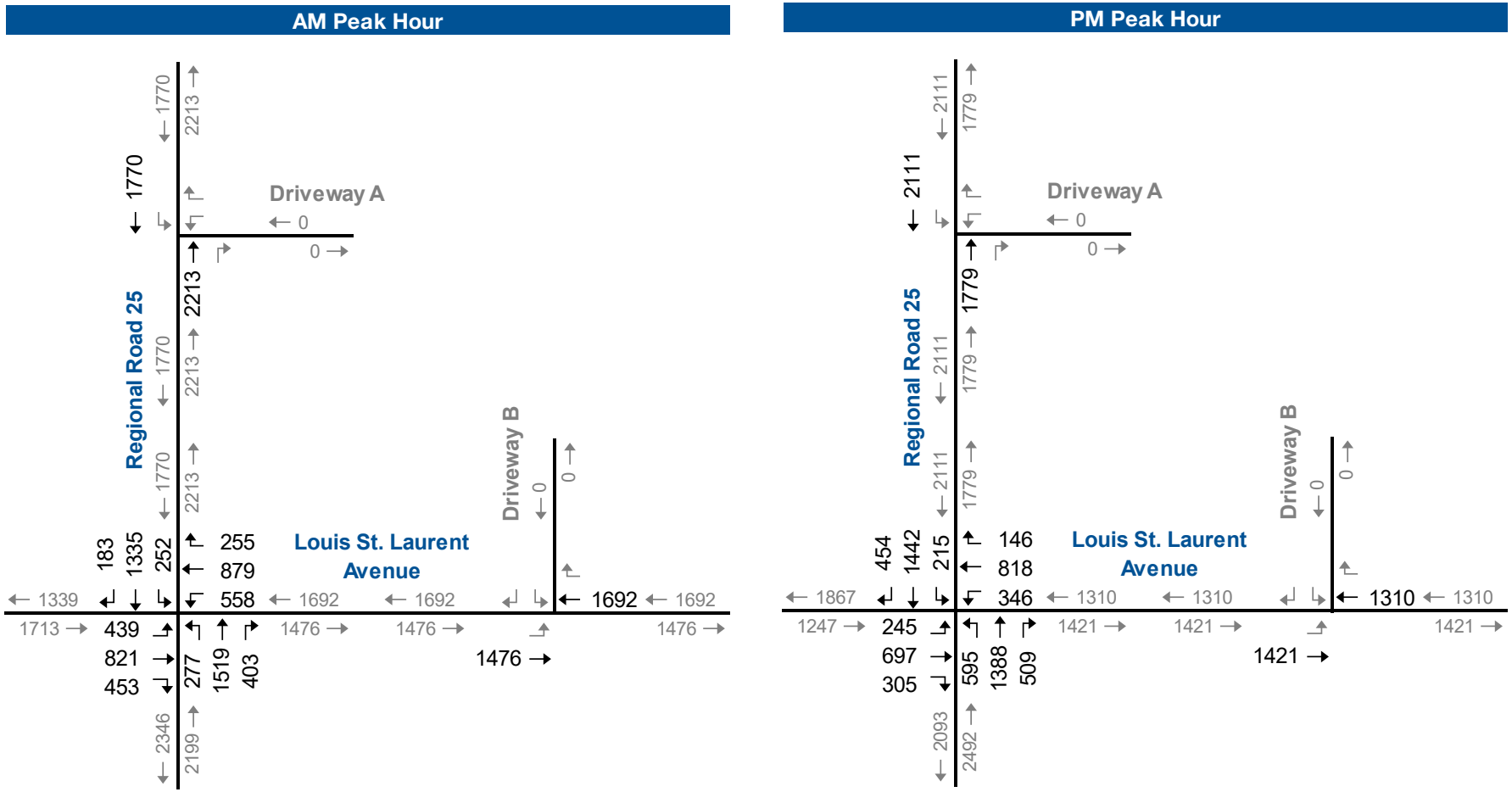
4.1.3 2029 Background Forecasts

The future background traffic volumes have been estimated by applying a growth rate of 2% compounded per annum to the 2024 background traffic volumes. **Figure 4.3** illustrates the forecast year 2029 background traffic volumes for the weekday AM and PM peak hours.

4.1.4 2029 Total Forecasts

The 2029 future total traffic volumes forecast to occur includes the future background traffic volumes and the site generated traffic volumes.

Figure 4.4 illustrates the forecast year 2029 total traffic volumes for the weekday AM and PM peak hour.



2029 Background Traffic Volumes

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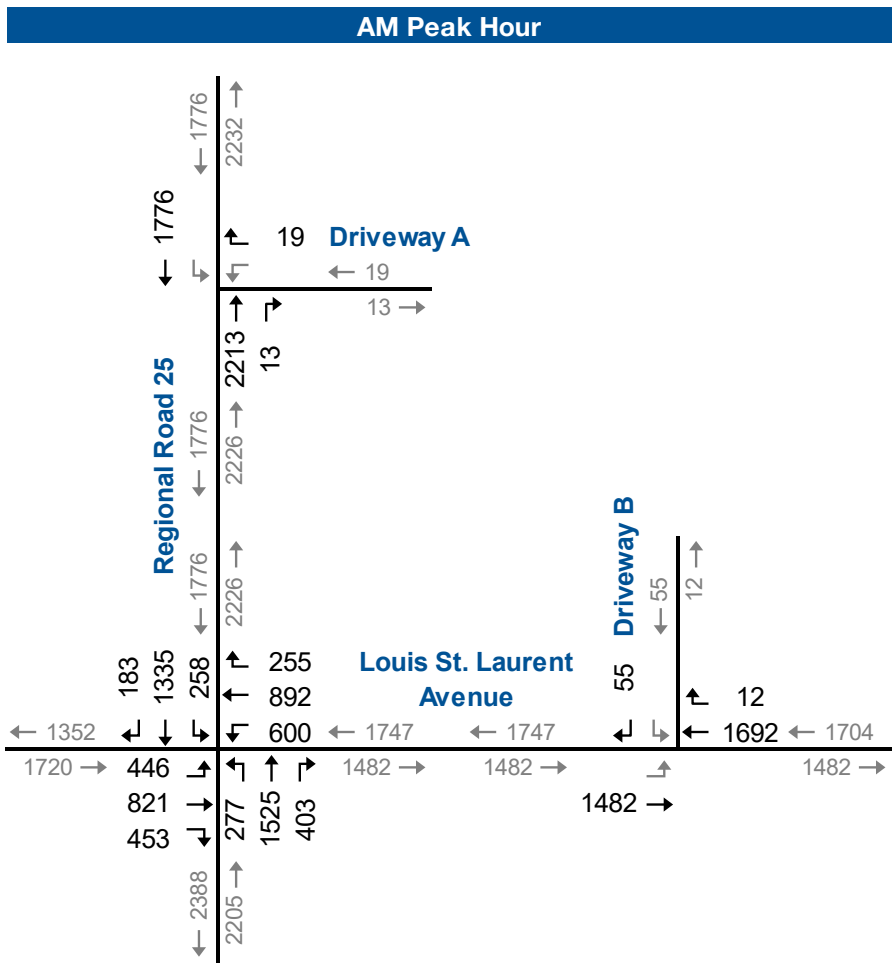
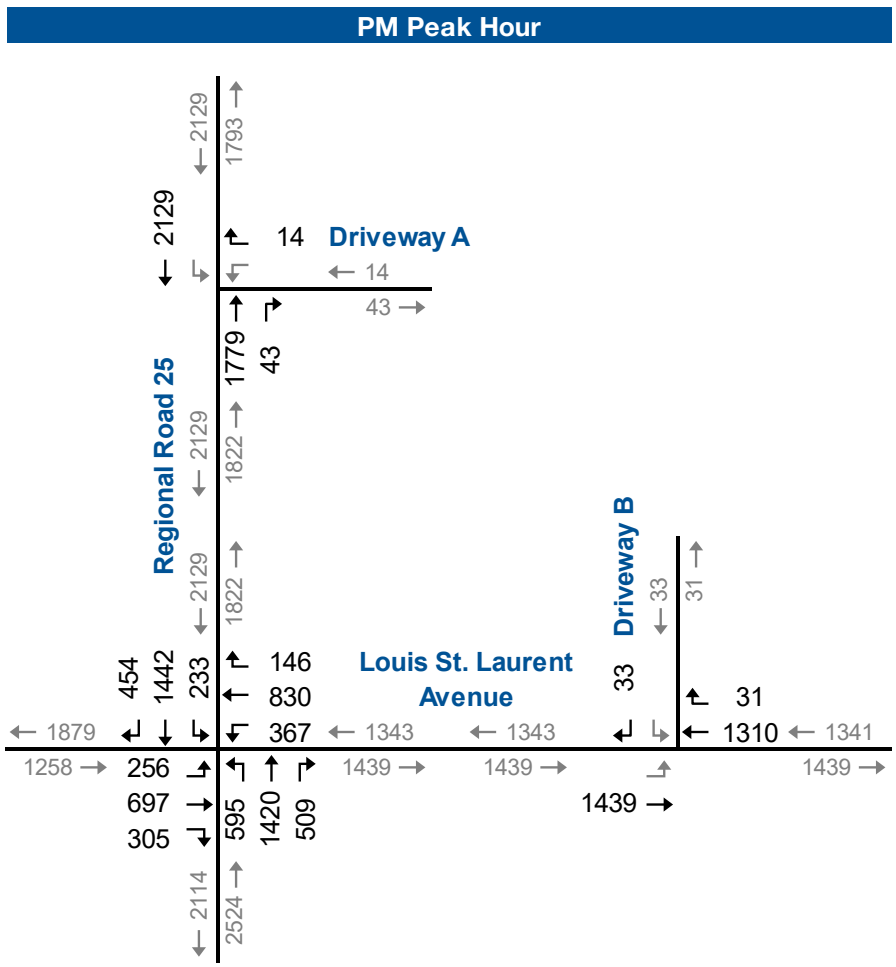
Figure 4.3





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2029 Total Traffic Volumes

4.2 Operational Analysis

Level of service analyses were conducted using Synchro 9 with HCM 2000 procedures for the weekday AM and PM peak hour conditions at the study area intersections using the total background traffic forecasts with existing signal timings splits and cycle lengths. Under the 2029 horizon, it is assumed that the planned widening on Regional Road 25 from four-lane to six-lanes will be completed.

Table 4.1 and **Table 4.2** summarizes the capacity analyses for the study area intersections for the AM and PM peak hours, respectively. The capacity analyses results are included in **Appendix E**.

The analyses indicate that the introduction of the site generated traffic will not impact the study area intersections. The following sub-sections outlines the operations of the study area intersections.

4.2.1 Regional Road 25 at Louis Saint Laurent Avenue

The results of the analyses indicate that the intersection of Regional Road 25 at Louis Saint Laurent Avenue is forecast to operate with poor level of service under 2024 Background and Total Traffic conditions during the AM and PM peak hours. Several individual turning movements are forecast to operate at LOS E/F and volume to capacity ratios exceeding capacity.

Under 2029 Background and Total Traffic conditions, with the proposed widening of Regional Road 25 assumed, operations do improve slightly, although the intersection is still considered at-capacity. The Town and Region should consider further improvement options to assist in mitigating the capacity constraints.

4.2.2 Regional Road 25 at Site Driveway

The right-in/right-out only intersection of Regional Road 25 and the Site Driveway is forecast to operate at acceptable level of service during the AM and PM peak hours.

4.2.3 Louis Saint Laurent Avenue at Site Driveway

The right-in/right-out only intersection of Louis Saint Laurent Avenue and the Site Driveway is forecast to operate at acceptable level of service during the AM and PM peak hours.

TABLE 4.1: FUTURE INTERSECTION OPERATIONS – AM PEAK HOUR

Analysis Period	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																
					Eastbound				Westbound				Northbound				Southbound				Overall
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Regional Road 25 & Louis Saint Laurent Avenue	Background 2024	TCS	LOS	F	F	>	**F**	F	F	>	**F**	F	F	C	**F**	F	F	C	**F**	**F**
				Delay	108	344	>	**284**	182	281	>	**248**	124	222	28	**174**	94	157	24	**135**	**207**
				V/C	1.12	1.67	>		1.32	1.53	>		1.14	1.41	0.47		1.05	1.26	0.20		
				Q	132	210	>		174	190	>		89	237	52		78	202	23		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	-82		>		-124		>		-39		-2		-28		27		
		Total 2024	TCS	LOS	F	F	>	**F**	F	F	>	**F**	F	F	C	**F**	F	F	C	**F**	**F**
				Delay	115	344	>	**285**	229	290	>	**269**	124	225	28	**176**	102	157	24	**136**	**213**
				V/C	1.14	1.67	>		1.43	1.55	>		1.14	1.42	0.47		1.07	1.26	0.20		
				Q	135	210	>		194	193	>		89	239	52		80	202	23		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	-85		>		-144		>		-39		-2		-30		27		
		Background 2029	TCS	LOS	F	F	>	**F**	F	F	>	**F**	F	F	C	**F**	F	E	C	**F**	**F**
				Delay	291	227	>	**243**	286	94	>	**158**	187	86	31	**89**	238	71	28	**91**	**141**
				V/C	1.55	1.41	>		1.54	1.10	>		1.29	1.09	0.45		1.40	1.04	0.23		
				Q	183	235	>		226	192	>		113	170	51		107	148	28		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	-133		>		-176		>		-63		-1		-57		22		
		Total 2029	TCS	LOS	F	F	>	**F**	F	F	>	**F**	F	F	C	**F**	F	F	C	**F**	**F**
				Delay	302	227	>	**246**	306	86	>	**162**	188	120	33	**112**	201	85	29	**96**	**151**
				V/C	1.58	1.41	>		1.59	1.08	>		1.29	1.17	0.48		1.31	1.08	0.24		
				Q	186	235	>		243	191	>		113	179	56		107	152	29		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	-136		>		-193		>		-63		-6		-57		21		
	Regional Road 25 & Driveway A	Total 2024	TWSC	LOS							B	**B**		A	A	**A**		A		**A**	**0**
				Delay							13	**13**		0	0	**0**		0		**0**	
				V/C							0.04			0.85	0.44			0.51			
				Q							1			0	0			0			
		Total 2029	TWSC	LOS							A	**A**		A	A	**A**		A		**A**	**0**
				Delay							10	**10**		0	0	**0**		0		**0**	
				V/C							0.03			0.57	0.29			0.38			
				Q							1			0	0			0			
	Louis Saint Laurent Avenue & Driveway B	Total 2024	TWSC	LOS		A		**A**		A	A	**A**							C	**C**	**0**
				Delay		0		**0**		0	0	**0**							19	**19**	
				V/C		0.43				0.65	0.33								0.19		
				Q		0				0	0								6		
		Total 2029	TWSC	LOS		A		**A**		A	A	**A**							C	**C**	**0**
				Delay		0		**0**		0	0	**0**							22	**22**	
				V/C		0.47				0.72	0.37								0.22		
				Q		0				0	0								7		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

< - Shared Left-Turn
> - Shared Right-Turn

TABLE 4.2: FUTURE INTERSECTION OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Horizon	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
PM Peak Hour	Regional Road 25 & Louis Saint Laurent Avenue	Background 2024	TCS	LOS	D	F	>	**F**	F	E	>	**F**	F	F	C	**F**	C	F	C	**F**	**F**
				Delay	54	102	>	**93**	130	74	>	**89**	304	150	28	**162**	34	274	31	**197**	**147**
				V/C	0.89	1.13	>		1.17	1.05	>		1.61	1.26	0.60		0.74	1.54	0.63		
				Q	53	124	>		90	119	>		170	177	61		40	200	65		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	-3		>		-40		>		-120		-11		10		-15		
		Total 2024	TCS	LOS	E	F	>	**F**	F	E	>	**F**	F	F	C	**F**	D	F	C	**F**	**F**
				Delay	62	102	>	**94**	160	79	>	**101**	304	164	28	**169**	40	274	31	**196**	**152**
				V/C	0.93	1.13	>		1.25	1.07	>		1.61	1.29	0.61		0.81	1.54	0.63		
				Q	58	124	>		99	121	>		170	183	63		48	200	65		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	-8		>		-49		>		-120		-13		2		-15		
		Background 2029	TCS	LOS	F	F	>	**F**	F	F	>	**F**	F	C	C	**E**	C	F	D	**E**	**F**
				Delay	97	212	>	**189**	200	153	>	**166**	242	27	25	**78**	33	84	36	**68**	**111**
				V/C	1.04	1.37	>		1.33	1.24	>		1.45	0.76	0.56		0.74	1.09	0.68		
				Q	78	175	>		125	166	>		212	104	67		54	149	86		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	-28		>		-75		>		-162		-17		-4		-36		
		Total 2029	TCS	LOS	F	F	>	**F**	F	F	>	**F**	F	C	C	**F**	E	F	D	**E**	**F**
				Delay	175	156	>	**160**	232	82	>	**123**	305	30	30	**95**	75	84	39	**73**	**105**
				V/C	1.25	1.25	>		1.41	1.07	>		1.60	0.83	0.66		0.98	1.09	0.74		
				Q	92	167	>		136	153	>		220	112	86		74	149	101		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	-42		>		-86		>		-170		-36		-24		-51		
	Regional Road 25 & Driveway A	Total 2024	TWSC	LOS							A	**A**		A	A	**A**		A		**A**	**0**
				Delay							10	**10**		0	0	**0**		0		**0**	
				V/C							0.02			0.69	0.37			0.62			
				Q							1			0	0			0			
		Total 2029	TWSC	LOS							A	**A**		A	>	**A**		A		**A**	**0**
				Delay							10	**10**		0	>	**0**		0		**0**	
				V/C							0.02			0.46	>			0.45			
				Q							1			0	>			0			
	Louis Saint Laurent Avenue & Driveway B	Total 2024	TWSC	LOS		A		**A**		A	A	**A**							B	**B**	**0**
				Delay		0		**0**		0	0	**0**							15	**15**	
				V/C		0.42				0.51	0.27								0.09		
				Q		0				0	0								2		
		Total 2029	TWSC	LOS		A		**A**		A	A	**A**							C	**C**	**0**
				Delay		0		**0**		0	0	**0**							16	**16**	
				V/C		0.46				0.56	0.30								0.10		
				Q		0				0	0								3		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

< - Shared Left-Turn
> - Shared Right-Turn

4.4 Remedial Measures

It is acknowledged that deficiencies currently exist at the Regional Road 25 and Louis Saint Laurent intersection and they can be expected to persist in the future with anticipated growth in traffic, independent of the development. As outlined in the capacity analysis summary tables, impacts to peak hour operations at the intersection of Regional Road 25 at Louis Saint Laurent Avenue between future background and total traffic conditions are expected to relatively minor as a result of the proposed development.

As a result, there are no recommended improvements at Regional Road 25 and Louis Saint Laurent Avenue necessary to accommodate the proposed development.

4.4.1 Right Turn Lanes

The proposed driveway connections to Regional Road 25 and Louis Saint Laurent Avenue was assessed to determine if the projected traffic volumes warrant installation of a right turn lane along the two roadways.

Although right turns are generally made more efficiently than left turn movements, exclusive right turn lanes are often provided, for many of the same reasons that left turn lanes are provided.

MTO guidelines (Geometric Design Standards for Ontario Highways) note that right turn lanes or tapers may be considered where right turn volumes exceed 60 vehicles per hour (vph) and where right turning vehicles create a hazard or reduce capacity at the intersection. The forecast right turn movement at Regional Road 25 and the Site Driveway indicates a right turn movement of 43 vehicles per hour is projected. At the Louis Saint Laurent Avenue and the Site Driveway, the forecast right-turn movement of 31 vehicles per hour is projected.

With Regional Road 25 having potential for higher vehicle speeds, it is suggested that a northbound right turn taper be constructed to allow right-turning traffic to safely slow down before making the turn, without interfering with through traffic. The right turn taper should conform to the design guidelines outlined in the Transportation of Canada Geometric Design Guide for Canadian Roads[8]. Based on a review of these standards, the northbound right turn taper along Regional Road 25 at the proposed driveway should consist of a 75-metre taper with 30 metre recover taper.

As road capital projects are proposed along Regional Road 25, it is recommended that flexible delineators (to act as a median) be installed by the Applicant on Regional Road 25 extending from the Louis Saint Laurent Avenue intersection to 45 metres north of the proposed Site Driveway to prohibit left-turns in and out of the site.

[8] Transportation Association of Canada, Geometric Design Guide for Canadian Roads, 2017

4.5 Access and Circulation Review

As requested by the Town of Milton, a swept path analysis was conducted for the proposed internal driveway network.

The vehicle movements were examined using a CAD base file of the development plan dated 17 April 2020. The swept path analysis was conducted to examine the on-site maneuverability of typical design vehicles expected to utilize the site; Heavy Single Unit (HSU), Halton Front End and, Halton White Goods Vehicle. **Appendix F** provides the vehicle manoeuvring analysis, as well as the profile and dimensions of the design vehicles.

The AutoTURN analyses indicate that the design vehicles do not have any difficulty entering the development through the proposed driveway connections Louis St. Laurent Avenue and Regional Road 25 nor any difficultly circumnavigating the internal roadway. The AutoTURN swept path analysis confirms the large design vehicles will function adequately.

5 Parking

5.1 Purpose and Scope

The purpose of this study is to determine if the proposed number of on-site parking spaces will adequately accommodate the expansion; thereby supporting a reduction in the number of parking spaces required under the current Zoning By-law parking requirements.

Information collected as part of an on-site parking survey will be used in determining the anticipated parking demands of the site as this is expected to be the best predictor of the current and future parking demands for the site.

The proposed on-site parking consists of 87 parking spaces on surface and 296 spaces plus 21 tandem spaces underground on one level for a total of 404 spaces (1.39 spaces per unit).

5.2 Zoning By-Law

The Town of Milton Zoning By-law 016-2014 was referenced to determine the parking requirements for the proposed development. The following parking provisions are required under the current By-law for residential land uses:

- Apartment Buildings: 1.50 parking spaces per unit plus 0.25 parking spaces for visitor parking in a designated visitor parking area.

Based on the above, the total By-Law parking requirement for the site is 483 spaces. With a proposed parking supply of 404 spaces (383 spaces plus 21 tandem spaces), there will be a deficiency of 100 parking spaces (or about 20%) as shown in **Table 5.1**.

TABLE 5.1: ZONING BY-LAW PARKING REQUIREMENTS

Use	Units	Parking Rate	Spaces Required
Apartment Buildings	276	1.50 per unit	414
Visitor	276	0.25 per unit	69
Total Parking Required		**1.75 per unit**	**483**

5.3 Other Jurisdictions

Parking standards are increasingly seen as an instrument of planning policy, and parking ratios are now looked at as having a main role in determining car use.

Parking ratios have existed in most cities since at least the 1950's and have often been amended incrementally by various means over time. Consequently, it is not surprising to find that municipalities are often unable to trace the justification or reasoning behind some of the older parking ratios found in their current Zoning By-laws.

Given that parking standards reflect an "average" condition, they will rarely prescribe the number of parking spaces to match the parking demands of any individual development project exactly. The empirical challenge is to develop some understanding of the range over which parking demand for a given use may vary, and the policy question is where in that range should the parking standard or ratio be set.

Other municipalities with Halton Region are recognizing the advantages of parking rations in support of broader Official Plan objectives. For example, if this project were to be located within the North Oakville, a parking rate of 1.45 parking spaces per unit would be the maximum ratio accepted. In contrast to generic minimum parking requirements, North Oakville provides maximum limits to restrict the total number of spaces that can be

constructed rather than establish a minimum number. The City of Burlington has recently undertaken a parking standard review that determined lower parking rates for apartment buildings should be applied. If the project were to be located within the City of Burlington, a parking rate of 1.40 parking spaces per unit would be accepted.

Parking regulations under Zoning By-law 016-2014 are on average 23% higher than neighbouring municipalities within Halton Region that have adopted new standards based on broader Official Plan objectives that recognizes the correlation between supportive land uses and lower automobile ownership. In addition, attitudes towards automobile ownership and the role it plays in an urban lifestyle are changing in the eyes of both consumers and policy makers, and lower parking regulations reflect this. As parking regulations are an attempt to provide supply to meet demand,

regulations which require lower supply for future buildings are an indication that future demand is likely to be lower.

Table 5.2 summarizes the minimum parking standard calculations.

TABLE 5.2: OTHER JURISDICTIONS

Municipality	Land Use	Number of Units	Parking Rate	Parking Required	Town of Milton Requirements	Difference in Parking Requirements
Town of Oakville (North Oakville)	Apartment Buildings					
	4 Storey Plus	276	Up to 1.25 spaces per unit (maximum permitted)	345.0	414.0	-69
	Visitor	276	0.20 spaces per unit	55.2	69.0	-14
	Total	**-**	**1.45 spaces per unit**	**400.2**	**483.0**	**-83**
City of Burlington (City Wide Parking Standards Review)	Apartment Buildings					
	One Bedroom	133	1.00 space per unit	133.0		
	Two Bedroom	137	1.25 spaces per unit	171.3	414.0	-100.8
	Three Bedroom	6	1.50 spaces per unit	9.0		
	Visitor	276	0.25 spaces per unit	69.0	69.0	0
	Total	**-**	**1.38 spaces per unit**	**382.3**	**483.0**	**-101**

5.4 Proxy Parking Demand

To better understand actual parking demand that is being generated by apartment buildings in the Town of Milton, and to provide further support that the proposed supply of 1.39 spaces per unit will not result in a shortfall of parking, parking data for residential buildings was compiled from parking utilization surveys competed for a typical multi-family building. It is noted that a comparable site could not be located within the immediate study area given the low-density of the surrounding uses, thus a broader area within the Town was utilized.

Available information about each site, such as the number of units, walking distance to the nearest GO Station, peak parking demand and demand rates is outlined in **Table 5.3**. Parking surveys are provided in **Appendix G**.

TABLE 5.3: RESIDENTIAL PARKING SURVEY RESULTS

Municipality	Address	Distance to Rail Station	Number of Storeys	Number of Units	Type	Demand	
						Peak Parking Demand	Rater Per Unit
Milton	33 Whitmer Street	3.0 Km (GO Milton)	6	148	Resident	125	0.84
					Visitor	29	0.20
					Total	**154**	**1.04**
Milton	640-650 Sauve Street	4.0 km (GO Milton)	5	350	Resident	-	-
					Visitor	-	-
					Total	**497**	**1.42**

It should be noted that the proposed development is located within 5.2 km of the Milton GO Station and is within a similar distance as the residential sites surveyed.

Parking demand rates ranged from 1.04 to 1.42 spaces per unit with an average of 1.23 spaces per unit. The proxy data indicates the developments generate well less than 1.75 parking space per unit as stipulated by the Zoning requirements.

5.5 ITE Parking Generation

The Institute of Transportation Engineers (ITE) produces a periodic report titled Parking Generation, which is the prevailing national standard in determining parking demand for a development. ITE standards are based on parking demand studies submitted to ITE by a variety of parties, including public agencies, developers and consulting firms. The most recent parking generation manual available is the 5th edition[9] and is a comparative starting point to determine baseline assumptions.

This study includes ITE peak period parking demand rates as guidelines to benchmark how the proposed supply compares to Multi-Family (High-Rise) developments. The following ITE Land Use Code (LUC) was reviewed:

- LUC 221 – Multi-family Housing (Mid-Rise): Mid-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and with between three and 10 levels (floors) of residence. The weekday peak parking demand ratio is 1.31 per unit.

5.6 Projected Demand

A summary of the peak parking demand expected for the proposed development based on the varied methodologies is provided in **Table 5.3**. The following summarizes the parking demand rates utilized:

- The surveyed parking demand suggested that mid-rise sites within the Town of Milton observed a peak parking demand of 1.23 spaces per unit.
- The ITE parking demand rates suggest that mid-rise sites were observed with a peak parking demand of 1.31 spaces per unit.

The projected demand is forecast to be in the order of 362 spaces.

TABLE 5.4: PROJECTED PARKING DEMAND

Methodology	Units	Parking Rate	Projected Demand
Proxy Parking Demand	276	1.23 spaces per unit	339.5
ITE Parking Demand	276	1.31 spaces per unit	361.6

[9] ITE Parking Generation 5th Edition, Washington DC, 2019.

5.7 Bicycle Parking

The site plan statistics indicates a total of 55 bicycle parking spaces are to be provided. A review of the Town's Zoning By-law stipulates that the development be required to provide bicycle parking at a rate of 0.20 spaces per dwelling unit. Based on these requirements, the proposed development meets the Town's zoning requirement.

While the location of the bicycle parking is not shown in the site plan at this time, bicycle parking for residents (long term) should be located in the underground parking garage or the main level. Space should also be considered for bicycle repairs and cleaning, if feasible.

6 Transportation Demand Management

The goal of a Transportation Demand Management (TDM) plan is to reduce the development's overall traffic and parking impacts through the implementation of strategies that are aimed at affecting the demand side of the transportation equation, rather than the supply side. By their very nature, TDM programs attempt to change people's behavior, and to be successful, they must rely on incentives or disincentives to makeshifts in behavior attractive to the commuter.

TDM strategies include financial incentives, time incentives, the provision of new or enhanced commuter services, dissemination of information, and marketing alternative services. TDM strategies include all the incentives and disincentives that increase the likelihood for people to change their existing travel behavior.

The TDM plan has been formulated to extent reasonable and practical strategies that encourage residents and visitors to take alternative modes of transportation. The strategies identified are expected to improve transportation access and connectivity within the development, as well as to the reset of the study area. For each strategy, an explanation of the is provided, as well as a description of what the applicant is proposing to provide.

6.1 Mode Split

The use and reliance on non-auto modes is an important consideration in assessing appropriate TDM strategies. Details on an area's mode split can help provide insight on how and what to improve to shift reliance from personal vehicles. To determine the area surrounding the subject site's existing mode split, information on primary modes of transportation for all home to work based trips was extracted from the 2016 Transportation Tomorrow Survey (TTS). Traffic zones within the study area have been included to determine a representative mode split for the immediate area. The detailed mode of travel summary is provided in **Table 6.1.**

TABLE 6.1: 2016 TTS MODAL SPLIT (TZ 4104,4107)

Modes of Travel	Study Area
Walk	0.0%
Vehicle (Driver)	70.8%
Vehicle (Passenger)	13.5%
Transit	15.8%
Cycle	0.0%
Total	100.0%
Sustainable Modal Split (Transit/Walk/Cycle)	**15.8%**

Sustainable modes of travel within the immediate area based on 2016 TTS data suggests that 16% of trips are completed by non-automotive means. Transit is noted to make up all of these trips, with 43% of transit users utilizing GO Rail without any joint connection through Milton Transit. This indicates that a portion of transit users are using their automobile to complete the first and last mile of their trip in Milton.

A major contributing factor to the high number of trips made by vehicles within Milton as opposed to walking and cycling is due to the suburban nature of land use and low-density residential uses of the immediate area.

6.2 Through Design

Supporting land-use/infrastructure that encourage people to choose travel modes other than driving alone are a number of factors that influence peoples' travel mode choices. These strategies are already accounted for through the developments overall design and include the following.

6.2.1 Pedestrian Facilities

Accessibility to and from a development is essential in helping to ensure that those that can walk, do. Proper pedestrian connections from the surrounding community to the development should be constructed to ensure safety and to enhance the overall pedestrian experience.

Walking is encouraged by the provision of a pedestrian-friendly site layout that features an extensive network of sidewalks and entrances at key points both within the site and connecting to the existing pedestrian network. The majority of the site is provided with direct public access for pedestrians via two street level entrances from Regional Road 25 and Louis Saint Laurent Avenue. This is intended to provide a comprehensive network of pedestrian connections to allow for an enhanced pedestrian experience for all users of the site.

By taking advantage of the future public sidewalk network to attract and serve pedestrians, combined with multiple pedestrian connections within the site, the development offers walkability as one of the key design features.

6.2.2 Bicycle Facilities

Increasing bicycling to, from and within Milton is a key strategy to reducing vehicle trips. The number of people bicycling is directly related to the quality of the bicycling network and presence of bicycling facilities.

As outlined in **Section 2.3**, the site is adequately served by bicycle infrastructure such as the on-street cycle lanes on Louis Saint Laurent Avenue and the asphalt multi-use trails on both Regional Road 25 and Louis Saint Laurent Avenue.

6.2.3 Secure Bicycle Parking

Commuting by bicycle can be a significant financial investment for many making even a small chance of bicycle theft enough of a reason to choose another mode of transport. As a result, it is important to that the development provide adequate and appropriate bicycle parking options so that cyclists can feel comfortable leaving their bicycle for extended periods of time.

To promote and help in achieving a greater reliance on bicycle travel, the development proposes to adopt the following cycling-oriented strategies:

- Provision of at least 55 indoor bicycle parking spaces located within the underground parking garage for use by residents;
- Provision of outdoor bicycle racks located adjacent to the main entrances to provide adequate and secure bicycle parking for visitors, if feasible;
- Monitor and evaluate cycling use as required with potential to increase bicycle parking based on demand.

With the proposed bicycle parking spaces, residents and visitors are more likely to choose to travel to/from the site by cycling. This increase in sustainable transportation helps to create a reduction of automobile trips and thus a reduction in vehicle parking demand.

6.2.4 Transit

The subject site is currently served by Milton Transit Route 9. This route operates by connecting residential neighbourhoods with the Milton GO Station. Headways are on the order of 60 minutes during most service hours, with shorter headways provided during peak hour services.

Creating a transit improvement plan focused on improvements tailored to the needs to improve speed, reliability, comfort and accessibility of transit service is recommended to be undertaken by Milton Transit to improve first and last mile trips by local municipal transit use. Some initiatives that could be considered include:

- Expanded service
- New shelters (weather protected waiting and sitting area);
- Improved signage posted route;
- Electronic scheduling information;
- On-street transit priority measures;
- Improved headways;
- Wired Smart bus stations (Wi-Fi, USB ports).

At the development level, direct links connecting residents and visitor to nearby bus stops are planned to be provided as part of the overall design

scheme making the development area more navigable towards local bus stops.

6.3 Proposed Strategies

The proposed strategies identified herein will be implemented by the applicant to reduce the number of auto-trips made to/from the development:

6.3.1 Transportation Information

The applicant should consider developing marketing/informational materials as part of their initial scope of work. Information on transportation options and/or links to the appropriate website should be conveyed to all prospective residents as a component of a resident welcome packet.

Available information should include schedules for local and regional transit services, bicycle and trail networks and the location of retail and recreational establishments.

6.3.2 Parking

Sufficient automobile parking is necessary for the development to be successful. However, too much parking can encourage traffic congestion, limit the ability to meet trip reduction goals, increase project costs, and impact site design and aesthetics can discourage the use of other modes. Finding the right balance needed to support the Towns' goals is critical, particularly, given that parking is an expensive resource.

The role of parking management is also a key element to helping Milton meet its trip reduction goals. If free and unregulated parking is provided, there is little incentive for many residents and visitors to use alternative modes of transportation.

Free and abundant parking encourages people to drive alone rather than car or van pool, be dropped off or picked up, walk, cycle or take transit. When too much parking is provided, and is provided free of cost to the user, the use of alternative sustainable modes is put at a substantial disadvantage.

At the same time however, the uses proposed on the site require a certain amount of base parking supply in order to be successful. Per the current development plan, 404 parking spaces (383 spaces plus 21 tandem spaces) are provided for the 276 residential units whereas the Zoning requirements stipulate 483 parking spaces are required.

Based on the imperial data collected as part of this study, it is evident that parking demand at typical apartments are significantly lower than the rates stipulated in the Town's Zoning By-law and suggest a parking supply of 404 parking spaces (383 spaces plus 21 tandem spaces) is sufficient for the development.

As the development promotes the use of other modes of transportation through reduced on-site parking that will meet the projected demand, the development plays a significant role in setting an example for residents and visitors to consider non-automotive travel.

The parking management strategy is designed to help ensure there are enough parking spaces to support the site, while avoiding an over abundance of parking supply. Balancing these factors should help achieve trip reduction goals, reduce development costs, and support the success of a pedestrian friendly development.

6.4 Optional Strategies

In addition to the strategies above, the applicant may wish to implement more strategies. The following strategies are strictly optional, and the applicant should weigh each carefully before implementing to both ensure it is cost-effective and does not adversely impact the overall community (such as parking spillover).

6.4.1 On-Site Bicycle Repair Facilities

Providing basic tools for keeping bicycles in good working order can encourage residents and commuters to try biking and keep them riding. Bicycle repair facilities, such as hand tools and an air compressor for tires, are a small investment that can keep bicycles in circulation and maximize bicycle trips.

Do-it-yourself bicycle repair stands could be provided, including tire gauges, air pumps, wrenches and other tools for minor repairs. At a minimum, a repair facility should be located within the underground parking garage for use by residents.

6.4.2 Unbundled Parking

Implementing a paid-parking operation is one of the most effective TDM strategies for encouraging alternative travel habits. To further encourage residents of the apartment building to utilize sustainable travel modes, the development could lease parking spaces separately from the cost to rent a unit. This is more equitable and efficient, since occupants are not forced to pay for parking they do not need and allows consumers to adjust their parking supply to reflect their needs.

This is an important factor as residents are notified at the onset of the project that parking is proposed to be provided as an additional cost in lieu of the price to rent a unit. If residents are significantly considering changing their travel behaviour, the cost of renting a parking space could be a contributing factor to this change.

6.4.3 Presto Pass

To create a climate in which sustainable transportation is considered "the norm", an incentive could be included for residents. Given the desire to create an environment where sustainable transportation options are the norm, the development could consider providing all residents with a preloaded presto with a nominal amount of at least $10 dollars. This would help create and establish a culture of transit use amongst the development.

6.4.4 Live Transit Information

Live transit information, such as next scheduled departure for transit vehicles and applicable GO Transit routes at Milton GO Station, can be permanently displayed in a central location such as the lobby of the apartment building.

Displaying this information in this location allows passengers to time their trips appropriately and stay in a climate-controlled area during times of severe weather.

6.5 Projected Trip Reductions

The Town of Milton recommended the use of the City of Kitchener's TDM Checklist to identify projected trip reductions by including certain TDM measures. **Appendix H** contains the City of Kitchener's TDM checklist.

Taking into consideration the parking reductions as outlined in the City of Kitchener checklists, the proposed TDM measures proposed by the development results in a parking reduction of 53 resulting in a parking supply of 430 parking spaces. The TDM measures provided are as follows:

- Active uses at grade along street frontages
  (4 parking space reduction) City of Kitchener
- Building owner will provide subsidized presto passes
  (2 parking space reduction – Partial Credit) City of Kitchener
- Building owner will charge parking as a separate cost to occupants
  (47 parking space reduction) City of Kitchener

Increasing awareness of sustainable transportation opportunities for residents can assist in lowering the site's parking demand and ultimately the site's transportation impacts. General education of all modes of transportation, including their benefits and how to make the best use of them, are a key component to TDM success.

6.5.1 Parking Supply

One of the most important TDM measures that is not provided with a mechanism for trip reduction and parking reduction is the parking supply. This measure is one of the most effective TDM measure available. Recent

research indicates that an area with more parking influences a higher demand for more automobile use.

A New York City study of three boroughs showed a clear relationship between guaranteed vehicular parking at home and a greater tendency to use the automobile for trips made to and from work, even when both work and home are well served by transit. The study infers that driving to other non-work activities is also likely to be higher for households with guaranteed vehicular parking[10].

A study of households within a two mile radius of ten rail stations in New Jersey concluded that if development near transit stations is developed with a high parking supply, then those developments will not reduce automobile use compared to developments located further away from transit stations, and that parking supply can undermine the incentive to use transit that proximity to transit provides[11].

A study of nine cities across the United States looked at the question of whether citywide changes in vehicular parking cause automobile use to increase, or whether minimum parking requirements an appropriate response the already rising automobile use. The study concluded that: “parking provision in cities is a likely cause of increased driving among residents and employees in those places”.[12]

To reiterate, many existing Zoning By-Law parking requirements are antiquated and require updating to conform and reflect current polices and best practices. Many municipalities recognize this and are updating parking requirements based on parking surveys and inter-jurisdictional review.

As outlined in **Section 5.3,** other municipalities recognize this and have reduced the parking requirements to be reflective of best practices based on a number of methodologies. To reiterate, **the Town of Milton requires on average 23% more parking to be provided** for this development than would be required by the Town of Oakville and City of Burlington that have adopted new parking requirements. With the incorporation of unbundled parking spaces, the proposed supply of 404 parking spaces (383 spaces plus 21 tandem spaces); would be considered appropriate for the adjacent municipalities.

[10] Rachel Weinberger, Death by a thousand curb-cuts: Evidence on the effect of minimum parking requirements on the choice to drive. Transport Policy, 20, March 2012.
[11] Daniel Chatman, Does Transit-Oriented Development Need the Transit?, Access, Fall 2015.
[12] Chris McCahill, et al., Effects of Parking Provision on Automobile Use in Cities: Inferring Causality, Transportation Research Board, November 13, 2015.

6.6 Proposed Monitoring & Evaluation

6.6.1 Cycling

It is recommended that the operator of the site monitor the on-site bicycle parking spaces to ensure demand matches supply. An indicator to suggest that the site's bicycle parking demand is exceeding supply is observing bicycles locked to the street furniture on-site or immediately adjacent to the subject site.

Should the site's bicycle parking demand regularly exceed the supply, consideration be given to expanding the amount of on-site bicycle parking provided.

6.6.2 Walking

It is recommended that the operator of the site monitor the long-term desire lines, if any, created by the erosion caused by pedestrians crossing the site's landscaped areas. Should desire lines form there may be an opportunity to adjust the site's landscaping to encourage use of the designated on-site pedestrian sidewalks.

7 Conclusions and Recommendations

7.1 Conclusions

Transportation Impact Study

This study evaluated the impacts associated within the construction of 276 residential units in three 6-storey buildings on a parcel of land bounded by Regional Road 25 north of Louis Saint Laurent. Access to the site is proposed via two right-in/right-out driveway to Regional Road 25 and Louis Saint Laurent Avenue. Overall the proposed development is projected to generate approximately 99 new vehicle trips during the weekday AM peak hour and 119 new vehicle trips during the weekday PM peak hour.

Detailed traffic analysis was conducted for each of the study area intersections under Base conditions, 2024, and 2029 Background and Total conditions.

The new traffic forecast to be added by full-build out of the development to the study area roadways results in relatively small impacts at the various study intersections. The analysis has further determined that the proposed driveways to Regional Road 25 and Louis Saint Laurent Avenue will operate at LOS C or better during the weekday peak periods under the 2024 and 2029 Total conditions.

With the proposed development having access through a right in/out driveway to Regional Road 25, it is suggested that a northbound right turn taper be constructed to allow right-turning traffic to safely slow down before making the turn from the higher speed roadway, without interfering with through traffic on Regional Road 25.

It is acknowledged that deficiencies currently exist at the Regional Road 25 and Louis Saint Laurent intersection and they can be expected to persist in the future with anticipated growth in traffic, independent of the development. As outlined in the capacity analysis summary tables, impacts to peak hour operations at the intersection of Regional Road 25 at Louis Saint Laurent Avenue between future background and total traffic conditions are expected to be relatively minor as a result of the proposed development. As a result, there are no recommended improvements at Regional Road 25 and Louis Saint Laurent Avenue necessary to accommodate the proposed development.

Parking Study

The proposed site provides for a total of 404 parking spaces (383 spaces plus 21 tandem spaces); equating to a parking rate of 1.39 parking spaces per unit (resident and visitor). The parking requirement under Zoning By-Law 2009-189 stipulates a parking supply of 483 spaces; equating to a parking rate of 1.75 spaces per unit (resident and visitor). The proposed parking supply of 404 parking spaces (383 spaces plus 21 tandem spaces) does not

meet the Zoning requirements as a shortfall of 100 spaces is noted, however, the 1.75 spaces per unit is much higher than many comparable municipalities.

To provide further support that the proposed supply of 1.39 spaces per unit will not result in a shortfall of parking, projected peak parking demand for the site has been estimated based on compiled parking surveys as well as industry standard rates contained within the ITE Parking Generation. Based on these methodologies, forecast parking demand for the proposed development is projected to be 362 parking spaces (1.31 spaces per unit).

Many existing Zoning By-Law parking requirements are antiquated and require updating to conform and reflect current polices and best practices. Many municipalities recognize the oversupply of parking and are updating the zoning requirement to reflect. Key municipalities that have recognized this include Town of Oakville, City of Burlington, and City of Kitchener. These municipalities have undertaken a comprehensive review of parking requirements and recognized that changes are required to meet policy objectives.

The Town of Milton requires on average 23% more parking to be provided for this development than would be required by the City of Burlington or Town of Oakville that have adopted new parking requirements. Through the incorporation of unbundled parking spaces, the proposed supply of 404 parking spaces (383 spaces plus 21 tandem spaces) is sufficient.

The transition from an automobile-dependent environment to one that is transit-supportive will require strategies to assist in shifting modal split and enabling the emergence of a more pedestrian-friendly transit-supportive environment. The over provision of free or low-cost parking creates areas that are dominated by parking infrastructure can have a negative impact on ridership and the pedestrian environment as well as providing an incentive for single-occupant vehicle use.

Based upon the recent research and best practices being implemented by municipalities, a reduced Parking Supply is one of the most effective TDM measure available to reduce vehicle travel. The role of parking management is a key element to helping Milton meet its trip reduction goals. If free and unregulated parking is provided, there is little incentive for many residents and visitors to use alternative modes of transportation.

Overall, the forecasted demand provides a statistically valid justification that the proposed parking supply of 404 parking spaces (383 spaces plus 21 tandem spaces) is sufficient for the proposed development program.

Travel Demand Management

The site plan proposes several TDM measures that include:

- Sidewalk connections linking the building's primary entrance to the municipal roadway along Louis Saint Laurent Avenue and Regional Road 25 are proposed;
- Minimum bicycle parking spaces are provided based on the Town's Zoning requirement; and
- Convenient access to the existing transit network is provided with transit stops located at the intersection of Regional Road 25 and Louis Saint Laurent Avenue.

Additional measures that are currently not included on the site plan that could be considered to further help promote and encourage TDM include:

- Milton Transit to upgrade the existing transit stops with concrete landing pads and shelters.
- The applicant consider providing preloaded presto passes to residents.
- The site operator monitor the on-site bicycle parking supply to ensure and appropriate amount of bicycle parking is provided.
- The site operator monitor the long-term desire lines, if any, created by the erosion caused by pedestrians crossing the site's landscaped areas. Should desire lines form there may be an opportunity to adjust the site's landscaping to encourage use of the designated on-site pedestrian sidewalks.
- Based on the City of Kitchener's TDM Checklist, a potential reduction of 53 parking spaces could be realized with the additional measures incorporated.

7.2 Recommendations

Based on the findings of this study, it is recommended that:

- That the Region of Halton and Town of Milton monitor the future traffic volumes at the intersection of Regional Road 25 and Louis Saint Laurent Avenue when they Boyne Secondary Plan area is built out to confirm the lane geometry and signal timing phases; and
- A northbound right turn taper be provided along Regional Road 25 at the proposed driveway to provide a safe right-turn maneuver based on the potential for higher speeds on Regional Road 25.
- Flexible delineators (to act as a median) be installed by the Applicant on Regional Road 25 extending from the Louis Saint Laurent Avenue intersection to 45 metres north of the proposed Site Driveway to prohibit left-turns in and out of the site.

Appendix A

Pre-Study Consultation

Adam Makarewicz

From: Monaghan, Patrick <Patrick.Monaghan@halton.ca>
Sent: 25-Jun-19 10:52 AM
To: Andrew Evans
Cc: Adam Makarewicz; Andrew Brown; Hudson, Brian; McNeish, Amanda; McGregor, David; 'Michael.Turco@milton.ca'
Subject: RE: (190334) 6349 Regional Road 25 (West Site), Town of Milton - Scope of Work
Attachments: Derry at RR25 TIS Report - Site Traffic.pdf

Hi Andrew,

Thanks for providing the proposed Terms of Reference for the Transportation Impact Study.

Proposed Transportation Impact Study Terms of Reference

Transportation Planning at the Region have reviewed the Terms of Reference provided below and offer the following comments:

Study Area

- The proposed study area is acceptable, however the study area may need to be expanded upon review of the results of the study.

Scenarios

- Please consider a 5 and 10 year (AM+PM) scenario.
- The Region's Road Capital Plan includes the widening of Regional Road 25 to 6 lanes from Britannia Road to Derry Road, construction is currently planned to start in 2027.

Background Growth

5 Year Growth

- This parcel is located in close proximity to the Boyne Secondary Plan area. The growth is expected at Regional Road 25 and Louis St Laurent as a result of the development of the Boyne Secondary Plan lands. Please consider the following Boyne Area "site traffic" growth volume expected at Regional Road 25 and Louis St Laurent intersection in the PM period. Please reverse these volumes in the AM Peak Period.

	RR25 @ LSL
EBL	80
EBT	336
EBR	160
WBL	99
WBT	287
WBR	83
NBL	199
NBT	260

NBR	75
SBL	125
SBT	647
SBR	175

- In addition please consider the site traffic from a development north of this study area at the Regional Road 25 and Louis St. Laurent intersection (see attached Site Traffic figure).

10 Year Growth

- Please consider a 2% Compounded annually growth rate to the 5 year volume forecast (2024 to 2029).

Access to Regional Road 25

- Access spacing is required to conform to the Regional Access Management Guidelines and subject to the completion of the Transportation Impact Study. The Access Management Guidelines are available on-line at http://old.halton.ca/common/pages/UserFile.aspx?fileId=136320. The Halton Region Access Management Guidelines are supported by an Access Management by-law 32-17.

- It should be noted that due to insufficient spacing, the Region will not consider a full movement access from this property directly from Regional Road 25.

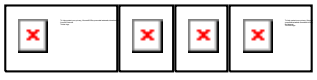
  In addition, the above noted By-law indicates that "*access to a Regional road from private property shall be permitted only where such access is necessary because access to a local road is not feasible;*". Should the Transportation Impact Study demonstrate that an access to Regional Road 25 is necessary, a right-in right-out access will be considered.

  As per the Halton Region Access Management Guidelines, a concrete centre median extension would be required to physically restrict access to right-in right-out, extending 45m north and south of the access curb returns. Should this design not be possible due to conflicts with an adjacent access, a "pork chop" centre median will also be required.

- Should an access to both Louis St Laurent and Regional Rad 25 be proposed, the Transportation Study should also consider the potential "cut through" traffic born by the proposed development configuration.

Kind Regards,
Patrick

Patrick Monaghan
Transportation Planning Coordinator
Infrastructure Planning & Policy
Public Works
Halton Region
905-825-6000, ext. 7213 | 1-866-442-5866



From: Michael.Turco@milton.ca [mailto:Michael.Turco@milton.ca]
Sent: Thursday, June 20, 2019 9:37 AM
To: 'Andrew Evans'
Cc: Adam Makarewicz; Andrew Brown; Monaghan, Patrick
Subject: RE: (190334) 6349 Regional Road 25 (West Site), Town of Milton - Scope of Work

Hi Andrew,

Please see the Town's comments below in green:

Let me know if you have any questions.

Regards,

Michael Turco, C.E.T., MITE
Transportation Planning Technologist
150 Mary Street, Milton ON,
905-878-7252 x2363
www.milton.ca

From: Andrew Evans <aevans@ptsl.com>
Sent: Wednesday, May 22, 2019 9:24 AM
To: Michael Turco <Michael.Turco@milton.ca>; Monaghan, Patrick <Patrick.Monaghan@halton.ca>
Cc: Adam Makarewicz <amakarewicz@ptsl.com>; Andrew Brown <abrown@ptsl.com>
Subject: (190334) 6349 Regional Road 25 (West Site), Town of Milton - Scope of Work

Greetings,

Paradigm has been retained to undertake a Transportation Impact Assessment (TIA), Parking Study (PS), Access & Circulation Review (ACR) and a Pavement Marking and Signage Plan (PMS) for 6349 Regional Road 25 (West Site) in the Town of Milton.

The subject site is located within the northeast corner of Regional Road 25 and Louis Saint Laurent Avenue in the Town of Milton. The property owner is proposing to construct four (4) building pads varying from one (1) to six (6) storeys with a total of 270 residential units. Vehicle access is proposed

via a driveway connection to Regional Road 25 and Louis Saint Laurent Avenue. A total parking supply of 405 spaces is proposed. This supply does not meet the Town of Milton's zoning requirements as currently planned.

Below is our scope of work for your review and comments.

A **Transportation Impact Assessment (TIA)** to evaluate the effects of the proposed development on the transportation system and recommend improvements, if necessary, to address potential impacts. The study will follow the Town of Milton Transportation Impact Study Guidelines (2014) and Halton Region Transportation Impact Study Guidelines (2015). The study area will comprise the following one (1) intersection:

- Regional Road 25 at Louis Saint Laurent Avenue (signalized);
- Up to two (2) site driveways

Traffic forecasts and analysis will be completed for one (1) planning horizons (five (5) years from the date the study is commissioned) and two (2) analysis periods (weekday AM and PM peak hours).

We will conduct eight (8) hour turning movement and classification counts (7:00 to 10:00 AM, 11:30 AM to 1:30 PM, and 4:00 to 7:00 PM) at the study area intersections.

We will prepare vehicle traffic forecasts for each planning horizon and analysis period. The components of the forecasts are as follows:

- Existing 2019 volumes will be derived from the traffic counts;
- Future Background volumes for the remaining horizon years will be estimated by applying a growth rate to the Existing volumes and adding anticipated trips from nearby approved and in-stream developments.

  Growth rates and developments to include in the background traffic forecasts will be provided/confirmed by the Town/Region; The Town has discussed the required background growth rates & developments with Halton Region. The Region has advised that they will be providing this information in their scope of work comments.
- Vehicle trips generated by the proposed development will be forecast based on the rates contained in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition). These trips will be distributed and assigned to the study area intersections based on existing traffic patterns and Transportation Tomorrow Survey data. The resulting net site-generated traffic will be added to the Future Background estimates to produce Future Total volumes for each future horizon year and analysis period.

We will analyze the operation of the study area intersections for the Existing, Future Background (without the development) and Future Total (with the development) traffic conditions for each horizon year and analysis period using Synchro software. Volume-to-capacity (v/c) ratios, Level of Service (LOS) and queuing will be assessed.

Based on the analysis results, we will identify any operational deficiencies as well as the net impact of the proposed development on the study area road network. The need for road improvements (e.g., auxiliary turn lanes) and/or other mitigating measures (e.g., traffic control device modifications) to address deficiencies will be determined. We will assess whether these measures are required due to non-site traffic (i.e. Existing or Future Background) or the increase in volumes resulting from the proposed development (i.e. Future Total).

We will explore opportunities to reduce vehicular traffic volumes generated by the proposed development through non-auto mode

A **Parking Study (PS)** to estimate the parking demand generated by the proposed development and establish the number of on-site parking spaces that should be provided, recognizing site constraints and local conditions. If needed, a strategy would be developed to satisfy the parking demands of the proposed development.

We will conduct proxy site surveys at two (2) locations to collect parking generation data specific to the proposed land uses. The surveys will be undertaken from 7:00 PM to 3:00 AM on one (1) typical weekday at sites with similar characteristics as the proposed development. ~~**The locations, dates and times to be surveyed will be provided/confirmed by the Town**~~. The study must outline the similarities between the proxy sites and the proposed site and why they will generate a similar parking demand. The selection and justification of the survey sites is the responsibility of the consultant. The proxy sites must be located within Milton, or alternatively, Oakville or Burlington.

We will calculate parking generation rates for the proposed land use from the proxy site survey data collected in Task 1. The derived rates will be compared to data cited in the Institute of Transportation Engineers (ITE) *Parking Generation (5th Edition)* and other available information to confirm their validity. Data from the ITE reference document may be used instead of the proxy site rates if determined to be more appropriate for the proposed land use.

We will calculate the parking supply required for the proposed development by the municipal zoning by-law. If the planned parking supply does not meet the by-law requirement, we will forecast peak parking demand based on the rates developed. This forecast will be further refined through consideration of typical auto ownership characteristics.

If the planned parking supply for the proposed development will adequately serve the forecast peak demand, we will provide a justification for the proposed number of spaces, recognizing site constraints, local conditions and potential spillover impacts. If not, we will identify parking management measures that could be considered to alleviate the projected supply deficit (e.g., transit, active transportation, TDM strategies, shared parking). ~~This may include use of legal on-street and off-site parking nearby.~~

A comprehensive TDM plan using the City of Kitchener's TDM Checklist (see attached) is required. **Through the proposed TDM checklist measures, it must be ensured that the resultant parking requirement in Table C is less than or equal to the proposed parking supply.** All proposed TDM measures must be included in the recommendation section of the report.

An **Access and Circulation Review (ACR)** to ensure compliance of the proposed development plan with review agency requirements and applicable industry guidelines.

We will review the site access and circulation design to ensure compliance with review agency requirements and applicable industry guidelines. The analysis will be completed using AutoTURN and include assessments of vehicle access and egress, clearance and swept path manoeuvres within the site based on a suitable design vehicle (e.g. fire truck, garbage truck) to identify potential conflicts with the site driveways, circulation aisles, loading areas and/or parking layout (i.e. no "dead end" spaces). Recommended design changes resulting from the assessment will be provided to the client (or its agents) for consideration. Please also confirm that two PTAC design vehicles can simultaneously navigate the underground parking ramp without striking.

We will determine sight distance requirements following applicable review agency and industry guidelines and assess compliance based on field measurements. If the sight distance available does not meet the minimum requirement, mitigating measures will be identified.

We will review the concept plans to assess the design and operation of the proposed accesses and internal roadways. This includes the adequacy of sight lines, spacing and location of the

proposed site access locations, and a review of the roadway and intersection design. Confirm that the access meets all OPSD 350.010 and TAC requirements.

A **Pavement Marking and Signage Plan (PMP)** to illustrate the locations and details of all signs and pavement markings on site. – **We would like to defer this until the Site Plan Approvals stage of the development** – Can be deferred to site plan stage

The site design appears to be conducive to traffic infiltration / cut-through traffic. Please evaluate this concern and make recommendations to mitigate the potential issue (e.g. significant traffic calming measures throughout the internal roadways of the site)

Detailed Recommendations regarding on-site/off-site roadway improvements, site access, site circulation, and TDM measures are to be made.

Please be advised that the Louis St. Laurent Avenue site access right-in, right-out "porkchop" island shown on the concept plan is essentially redundant as there is an existing raised concrete concrete median along this section of Louis St. Laurent Avenue. The porkchop island should be removed from the proposed design. The centre median on Louis St. Laurent Avenue will remain in place, making the site access a right-in, right-out only access.

Thank you and regards.

Andrew Evans, M.Sc.
Transportation Planner

Paradigm Transportation Solutions Limited
5A-150 Pinebush Road Cambridge ON N1R 8J8
p: 905.381.2229 x **305** **<<< New Extension Number**
m: 519.497.3239
e: aevans@ptsl.com
w: www.ptsl.com

Appendix B

Existing Turning Movement Counts

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Regional Road 25 & Louis Saint Laurent Avenue
Site Code:
Start Date: 06/06/2019

Turning Movement Data

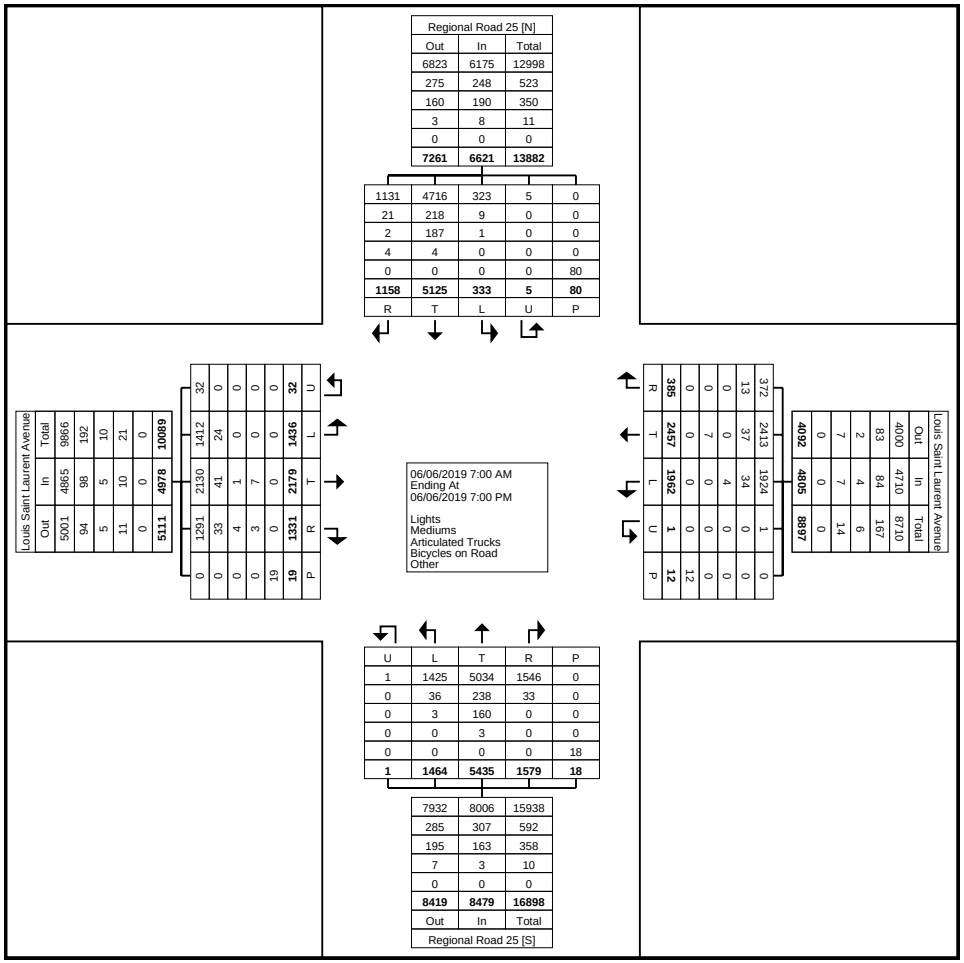
Start Time	Louis Saint Laurent Avenue Eastbound						Louis Saint Laurent Avenue Westbound						Regional Road 25 Northbound						Regional Road 25 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	63	46	59	0	0	168	89	18	7	0	0	114	7	117	26	0	0	150	3	180	11	0	1	194	626
7:15 AM	59	60	73	0	0	192	122	37	9	0	0	168	23	129	29	0	0	181	8	196	9	0	1	213	754
7:30 AM	67	67	72	1	0	207	99	48	20	1	0	168	20	146	53	0	2	219	8	276	21	1	3	306	900
7:45 AM	71	93	88	0	0	252	115	119	14	0	0	248	44	193	46	0	0	283	10	253	16	0	6	279	1062
Hourly Total	260	266	292	1	0	819	425	222	50	1	0	698	94	585	154	0	2	833	29	905	57	1	11	992	3342
8:00 AM	71	149	85	1	0	306	105	197	16	0	0	318	22	168	46	0	0	236	5	183	28	0	8	216	1076
8:15 AM	90	148	82	1	0	321	99	96	15	0	0	210	40	206	42	0	0	288	6	212	26	0	1	244	1063
8:30 AM	50	92	72	0	1	214	104	87	13	0	0	204	26	181	37	0	0	244	10	189	28	0	1	227	889
8:45 AM	72	103	50	3	1	228	70	57	24	0	0	151	35	165	43	0	0	243	4	167	18	0	2	189	811
Hourly Total	283	492	289	5	2	1069	378	437	68	0	0	883	123	720	168	0	0	1011	25	751	100	0	12	876	3839
9:00 AM	48	70	36	0	0	154	72	66	12	0	0	150	26	134	31	0	0	191	6	131	22	0	0	159	654
9:15 AM	34	44	38	0	0	116	67	48	8	0	0	123	20	127	28	0	1	175	8	168	29	0	2	205	619
9:30 AM	36	51	37	1	2	125	54	47	12	0	1	113	20	117	17	0	0	154	7	147	13	0	0	167	559
9:45 AM	38	54	35	2	0	129	42	41	11	0	0	94	21	128	18	0	0	167	8	116	17	0	1	141	531
Hourly Total	156	219	146	3	2	524	235	202	43	0	1	480	87	506	94	0	1	687	29	562	81	0	3	672	2363
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	30	47	38	1	0	116	36	30	6	0	1	72	25	125	25	0	0	175	9	130	15	0	2	154	517
11:45 AM	27	41	37	5	0	110	30	34	6	0	1	70	33	143	16	0	0	192	11	137	24	0	2	172	544
Hourly Total	57	88	75	6	0	226	66	64	12	0	2	142	58	268	41	0	0	367	20	267	39	0	4	326	1061
12:00 PM	36	44	29	0	0	109	41	38	18	0	0	97	17	145	38	0	1	200	8	115	42	0	2	165	571
12:15 PM	30	53	24	0	0	107	36	54	8	0	0	98	27	129	28	0	2	184	5	117	35	0	1	157	546
12:30 PM	42	47	23	0	0	112	34	41	10	0	1	85	27	144	33	0	0	204	7	109	29	0	2	145	546
12:45 PM	26	43	22	1	4	92	35	52	13	0	0	100	28	149	30	0	3	207	6	125	39	1	1	171	570
Hourly Total	134	187	98	1	4	420	146	185	49	0	1	380	99	567	129	0	6	795	26	466	145	1	6	638	2233
1:00 PM	36	49	20	1	0	106	29	45	4	0	0	78	29	144	24	0	0	197	12	130	27	0	3	169	550
1:15 PM	33	45	29	1	0	108	25	48	15	0	0	88	24	124	34	0	0	182	7	132	34	0	0	173	551
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	69	94	49	2	0	214	54	93	19	0	0	166	53	268	58	0	0	379	19	262	61	0	3	342	1101
4:00 PM	42	78	33	1	0	154	71	75	9	0	0	155	62	181	58	0	0	301	12	181	39	0	0	232	842
4:15 PM	45	64	39	1	0	149	50	81	15	0	1	146	76	211	81	0	1	368	12	167	40	0	3	219	882
4:30 PM	39	74	42	1	0	156	45	105	10	0	0	160	74	213	96	0	0	383	15	173	42	0	0	230	929
4:45 PM	42	58	34	0	1	134	54	102	14	0	1	170	79	250	83	0	1	412	14	177	51	0	4	242	958
Hourly Total	168	274	148	3	1	593	220	363	48	0	2	631	291	855	318	0	2	1464	53	698	172	0	7	923	3611
5:00 PM	28	65	29	1	0	123	50	102	7	0	4	159	89	266	96	1	1	452	16	169	58	1	5	244	978
5:15 PM	35	83	28	0	5	146	47	140	10	0	0	197	81	223	95	0	0	399	14	165	60	0	2	239	981
5:30 PM	32	54	24	1	1	111	59	99	13	0	0	171	82	236	89	0	2	407	14	178	63	1	3	256	945
5:45 PM	47	93	35	4	1	179	54	113	16	0	0	183	88	225	100	0	1	413	22	132	55	0	0	209	984

Hourly Total	142	295	116	6	7	559	210	454	46	0	4	710	340	950	380	1	4	1671	66	644	236	2	10	948	3888
6:00 PM	47	58	27	1	2	133	66	122	15	0	1	203	83	200	61	0	1	344	15	151	67	0	2	233	913
6:15 PM	47	44	29	1	1	121	55	102	13	0	1	170	85	188	77	0	2	350	18	139	64	0	8	221	862
6:30 PM	38	80	34	2	0	154	55	112	11	0	0	178	71	202	59	0	0	332	20	131	80	1	11	232	896
6:45 PM	35	82	28	1	0	146	52	101	11	0	0	164	80	126	40	0	0	246	13	149	56	0	3	218	774
Hourly Total	167	264	118	5	3	554	228	437	50	0	2	715	319	716	237	0	3	1272	66	570	267	1	24	904	3445
Grand Total	1436	2179	1331	32	19	4978	1962	2457	385	1	12	4805	1464	5435	1579	1	18	8479	333	5125	1158	5	80	6621	24883
Approach %	28.8	43.8	26.7	0.6	-	-	40.8	51.1	8.0	0.0	-	-	17.3	64.1	18.6	0.0	-	-	5.0	77.4	17.5	0.1	-	-	-
Total %	5.8	8.8	5.3	0.1	-	20.0	7.9	9.9	1.5	0.0	-	19.3	5.9	21.8	6.3	0.0	-	34.1	1.3	20.6	4.7	0.0	-	26.6	-
Lights	1412	2130	1291	32	-	4865	1924	2413	372	1	-	4710	1425	5034	1546	1	-	8006	323	4716	1131	5	-	6175	23756
% Lights	98.3	97.8	97.0	100.0	-	97.7	98.1	98.2	96.6	100.0	-	98.0	97.3	92.6	97.9	100.0	-	94.4	97.0	92.0	97.7	100.0	-	93.3	95.5
Mediums	24	41	33	0	-	98	34	37	13	0	-	84	36	238	33	0	-	307	9	218	21	0	-	248	737
% Mediums	1.7	1.9	2.5	0.0	-	2.0	1.7	1.5	3.4	0.0	-	1.7	2.5	4.4	2.1	0.0	-	3.6	2.7	4.3	1.8	0.0	-	3.7	3.0
Articulated Trucks	0	1	4	0	-	5	4	0	0	0	-	4	3	160	0	0	-	163	1	187	2	0	-	190	362
% Articulated Trucks	0.0	0.0	0.3	0.0	-	0.1	0.2	0.0	0.0	0.0	-	0.1	0.2	2.9	0.0	0.0	-	1.9	0.3	3.6	0.2	0.0	-	2.9	1.5
Bicycles on Road	0	7	3	0	-	10	0	7	0	0	-	7	0	3	0	0	-	3	0	4	4	0	-	8	28
% Bicycles on Road	0.0	0.3	0.2	0.0	-	0.2	0.0	0.3	0.0	0.0	-	0.1	0.0	0.1	0.0	0.0	-	0.0	0.0	0.1	0.3	0.0	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	48	-	-
% Bicycles on Crosswalk	-	-	-	-	15.8	-	-	-	-	-	16.7	-	-	-	-	-	11.1	-	-	-	-	-	60.0	-	-
Pedestrians	-	-	-	-	16	-	-	-	-	-	10	-	-	-	-	-	16	-	-	-	-	-	32	-	-
% Pedestrians	-	-	-	-	84.2	-	-	-	-	-	83.3	-	-	-	-	-	88.9	-	-	-	-	-	40.0	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Regional Road 25 & Louis Saint Laurent Avenue
Site Code:
Start Date: 06/06/2019



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Regional Road 25 & Louis Saint Laurent Avenue
Site Code:
Start Date: 06/06/2019

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Louis Saint Laurent Avenue Eastbound						Louis Saint Laurent Avenue Westbound						Regional Road 25 Northbound						Regional Road 25 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	67	67	72	1	0	207	99	48	20	1	0	168	20	146	53	0	2	219	8	276	21	1	3	306	900
7:45 AM	71	93	88	0	0	252	115	119	14	0	0	248	44	193	46	0	0	283	10	253	16	0	6	279	1062
8:00 AM	71	149	85	1	0	306	105	197	16	0	0	318	22	168	46	0	0	236	5	183	28	0	8	216	1076
8:15 AM	90	148	82	1	0	321	99	96	15	0	0	210	40	206	42	0	0	288	6	212	26	0	1	244	1063
Total	299	457	327	3	0	1086	418	460	65	1	0	944	126	713	187	0	2	1026	29	924	91	1	18	1045	4101
Approach %	27.5	42.1	30.1	0.3	-	-	44.3	48.7	6.9	0.1	-	-	12.3	69.5	18.2	0.0	-	-	2.8	88.4	8.7	0.1	-	-	-
Total %	7.3	11.1	8.0	0.1	-	26.5	10.2	11.2	1.6	0.0	-	23.0	3.1	17.4	4.6	0.0	-	25.0	0.7	22.5	2.2	0.0	-	25.5	-
PHF	0.831	0.767	0.929	0.750	-	0.846	0.909	0.584	0.813	0.250	-	0.742	0.716	0.865	0.882	0.000	-	0.891	0.725	0.837	0.813	0.250	-	0.854	0.953
Lights	295	450	317	3	-	1065	408	443	61	1	-	913	124	667	180	0	-	971	28	851	85	1	-	965	3914
% Lights	98.7	98.5	96.9	100.0	-	98.1	97.6	96.3	93.8	100.0	-	96.7	98.4	93.5	96.3	-	-	94.6	96.6	92.1	93.4	100.0	-	92.3	95.4
Mediums	4	7	10	0	-	21	10	17	4	0	-	31	2	34	7	0	-	43	1	45	5	0	-	51	146
% Mediums	1.3	1.5	3.1	0.0	-	1.9	2.4	3.7	6.2	0.0	-	3.3	1.6	4.8	3.7	-	-	4.2	3.4	4.9	5.5	0.0	-	4.9	3.6
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	11	0	0	-	11	0	28	1	0	-	29	40
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	1.5	0.0	-	-	1.1	0.0	3.0	1.1	0.0	-	2.8	1.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.1	0.0	-	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	16	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	88.9	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	11.1	-	-

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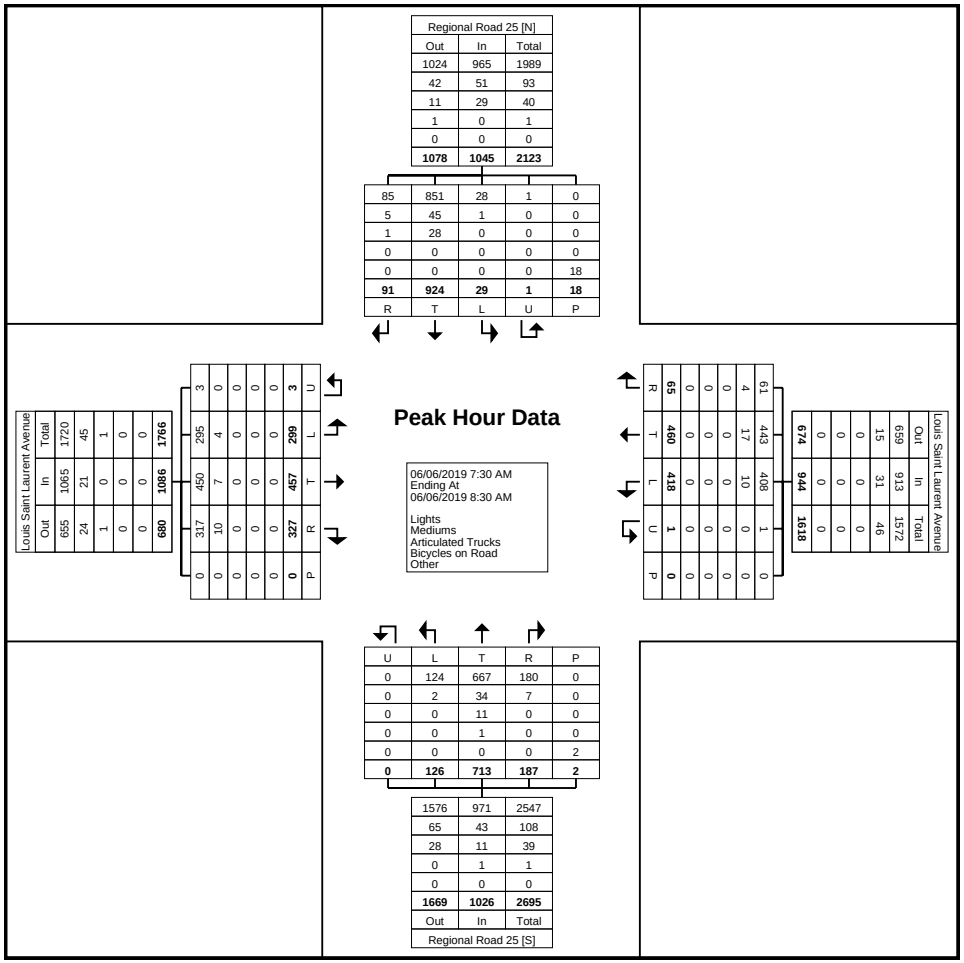

Turning Movement Peak Hour Data Plot (7:30 AM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Regional Road 25 & Louis Saint Laurent Avenue
Site Code:
Start Date: 06/06/2019

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Louis Saint Laurent Avenue Eastbound						Louis Saint Laurent Avenue Westbound						Regional Road 25 Northbound						Regional Road 25 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	36	44	29	0	0	109	41	38	18	0	0	97	17	145	38	0	1	200	8	115	42	0	2	165	571
12:15 PM	30	53	24	0	0	107	36	54	8	0	0	98	27	129	28	0	2	184	5	117	35	0	1	157	546
12:30 PM	42	47	23	0	0	112	34	41	10	0	1	85	27	144	33	0	0	204	7	109	29	0	2	145	546
12:45 PM	26	43	22	1	4	92	35	52	13	0	0	100	28	149	30	0	3	207	6	125	39	1	1	171	570
Total	134	187	98	1	4	420	146	185	49	0	1	380	99	567	129	0	6	795	26	466	145	1	6	638	2233
Approach %	31.9	44.5	23.3	0.2	-	-	38.4	48.7	12.9	0.0	-	-	12.5	71.3	16.2	0.0	-	-	4.1	73.0	22.7	0.2	-	-	-
Total %	6.0	8.4	4.4	0.0	-	18.8	6.5	8.3	2.2	0.0	-	17.0	4.4	25.4	5.8	0.0	-	35.6	1.2	20.9	6.5	0.0	-	28.6	-
PHF	0.798	0.882	0.845	0.250	-	0.938	0.890	0.856	0.681	0.000	-	0.950	0.884	0.951	0.849	0.000	-	0.960	0.813	0.932	0.863	0.250	-	0.933	0.978
Lights	128	183	95	1	-	407	143	182	46	0	-	371	93	497	126	0	-	716	26	407	144	1	-	578	2072
% Lights	95.5	97.9	96.9	100.0	-	96.9	97.9	98.4	93.9	-	-	97.6	93.9	87.7	97.7	-	-	90.1	100.0	87.3	99.3	100.0	-	90.6	92.8
Mediums	6	1	1	0	-	8	3	1	3	0	-	7	5	38	3	0	-	46	0	33	1	0	-	34	95
% Mediums	4.5	0.5	1.0	0.0	-	1.9	2.1	0.5	6.1	-	-	1.8	5.1	6.7	2.3	-	-	5.8	0.0	7.1	0.7	0.0	-	5.3	4.3
Articulated Trucks	0	0	1	0	-	1	0	0	0	0	-	0	1	30	0	0	-	31	0	26	0	0	-	26	58
% Articulated Trucks	0.0	0.0	1.0	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	1.0	5.3	0.0	-	-	3.9	0.0	5.6	0.0	0.0	-	4.1	2.6
Bicycles on Road	0	3	1	0	-	4	0	2	0	0	-	2	0	2	0	0	-	2	0	0	0	0	-	0	8
% Bicycles on Road	0.0	1.6	1.0	0.0	-	1.0	0.0	1.1	0.0	-	-	0.5	0.0	0.4	0.0	-	-	0.3	0.0	0.0	0.0	0.0	-	0.0	0.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	6	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	33.3	-	-	-	-	-	100.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	66.7	-	-	-	-	-	0.0	-	-

Paradigm Transportation Solutions Limited
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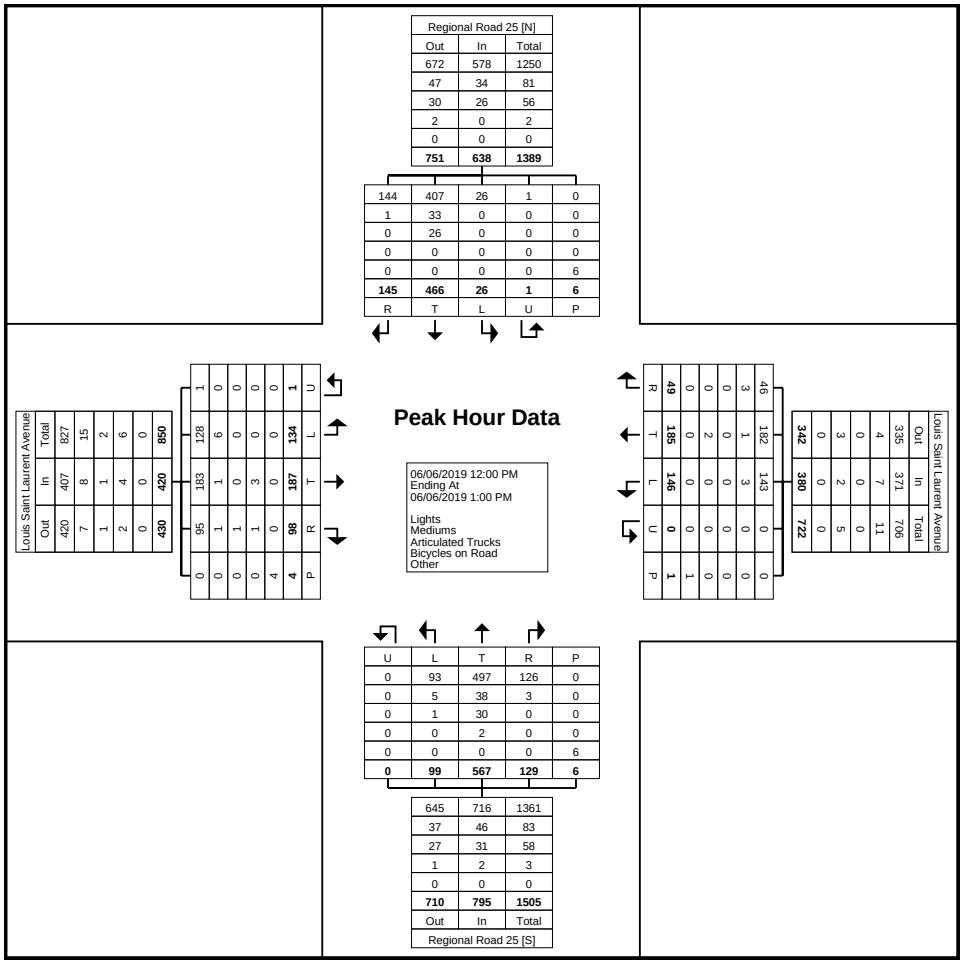

Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Regional Road 25 & Louis Saint Laurent Avenue
Site Code:
Start Date: 06/06/2019

Turning Movement Peak Hour Data (5:00 PM)

Start Time	Louis Saint Laurent Avenue Eastbound						Louis Saint Laurent Avenue Westbound						Regional Road 25 Northbound						Regional Road 25 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
5:00 PM	28	65	29	1	0	123	50	102	7	0	4	159	89	266	96	1	1	452	16	169	58	1	5	244	978
5:15 PM	35	83	28	0	5	146	47	140	10	0	0	197	81	223	95	0	0	399	14	165	60	0	2	239	981
5:30 PM	32	54	24	1	1	111	59	99	13	0	0	171	82	236	89	0	2	407	14	178	63	1	3	256	945
5:45 PM	47	93	35	4	1	179	54	113	16	0	0	183	88	225	100	0	1	413	22	132	55	0	0	209	984
Total	142	295	116	6	7	559	210	454	46	0	4	710	340	950	380	1	4	1671	66	644	236	2	10	948	3888
Approach %	25.4	52.8	20.8	1.1	-	-	29.6	63.9	6.5	0.0	-	-	20.3	56.9	22.7	0.1	-	-	7.0	67.9	24.9	0.2	-	-	-
Total %	3.7	7.6	3.0	0.2	-	14.4	5.4	11.7	1.2	0.0	-	18.3	8.7	24.4	9.8	0.0	-	43.0	1.7	16.6	6.1	0.1	-	24.4	-
PHF	0.755	0.793	0.829	0.375	-	0.781	0.890	0.811	0.719	0.000	-	0.901	0.955	0.893	0.950	0.250	-	0.924	0.750	0.904	0.937	0.500	-	0.926	0.988
Lights	141	293	115	6	-	555	208	451	46	0	-	705	339	920	379	1	-	1639	65	618	234	2	-	919	3818
% Lights	99.3	99.3	99.1	100.0	-	99.3	99.0	99.3	100.0	-	-	99.3	99.7	96.8	99.7	100.0	-	98.1	98.5	96.0	99.2	100.0	-	96.9	98.2
Mediums	1	1	1	0	-	3	2	0	0	0	-	2	0	14	1	0	-	15	1	9	0	0	-	10	30
% Mediums	0.7	0.3	0.9	0.0	-	0.5	1.0	0.0	0.0	-	-	0.3	0.0	1.5	0.3	0.0	-	0.9	1.5	1.4	0.0	0.0	-	1.1	0.8
Articulated Trucks	0	1	0	0	-	1	0	0	0	0	-	0	1	16	0	0	-	17	0	15	0	0	-	15	33
% Articulated Trucks	0.0	0.3	0.0	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	0.3	1.7	0.0	0.0	-	1.0	0.0	2.3	0.0	0.0	-	1.6	0.8
Bicycles on Road	0	0	0	0	-	0	0	3	0	0	-	3	0	0	0	0	-	0	0	2	2	0	-	4	7
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.7	0.0	-	-	0.4	0.0	0.0	0.0	0.0	-	0.0	0.0	0.3	0.8	0.0	-	0.4	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	5	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	50.0	-	-	-	-	-	0.0	-	-	-	-	-	50.0	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	2	-	-	-	-	-	4	-	-	-	-	-	5	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	50.0	-	-	-	-	-	100.0	-	-	-	-	-	50.0	-	-

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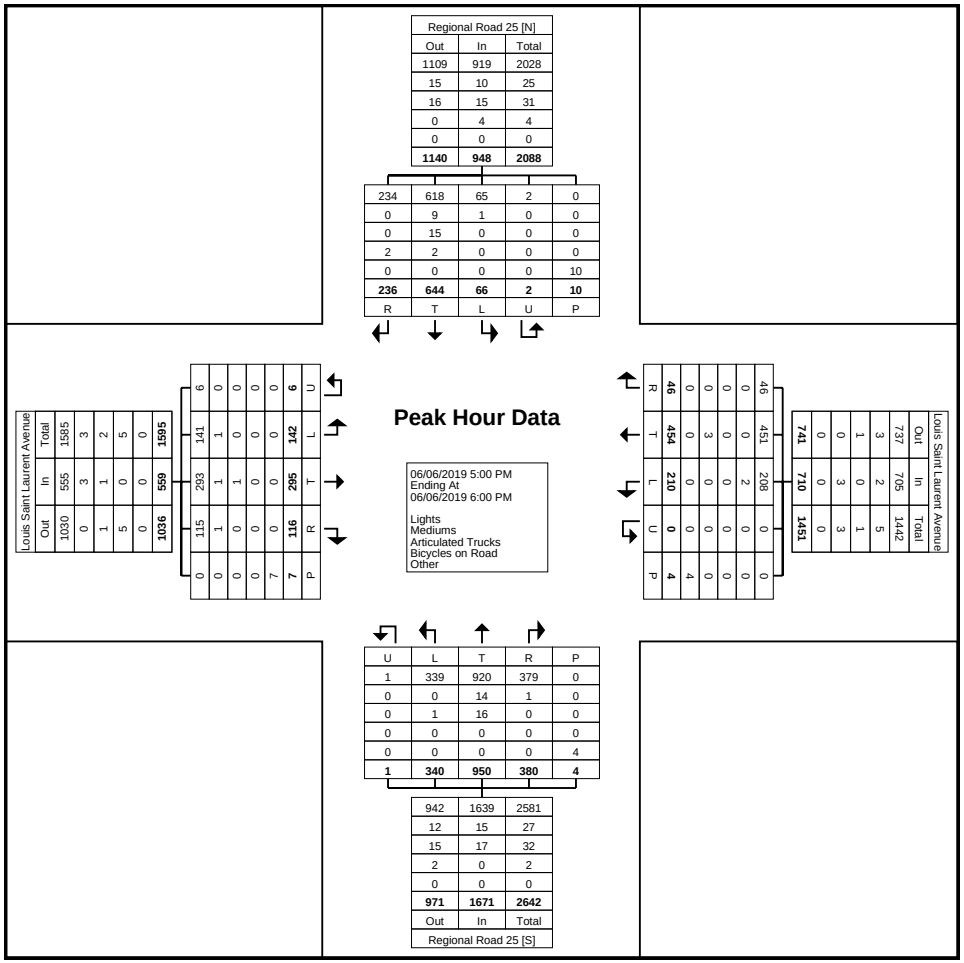
Start Date: 06/06/2019



Turning Movement Peak Hour Data Plot (5:00 PM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Regional Road 25 & Louis Saint Laurent Avenue
Site Code:
Start Date: 06/06/2019

Appendix C

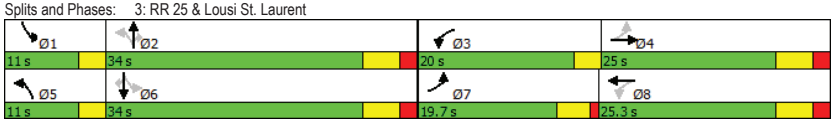
Existing Intersection Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	299	457	327	418	460	65	126	713	187	29	924	91
Future Volume (vph)	299	457	327	418	460	65	126	713	187	29	924	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	60.0		60.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	0.99		1.00	1.00							
Frt		0.937			0.981				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3282	0	1770	3381	0	1770	3406	1553	1752	3343	1509
Flt Permitted	0.256			0.207			0.143			0.202		
Satd. Flow (perm)	477	3282	0	385	3381	0	266	3406	1553	373	3343	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		182			16				203			127
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		486.1			525.8			613.9			524.1	
Travel Time (s)		29.2			31.5			31.6			27.0	
Confl. Peds. (#/hr)	18		2	2		18						
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%	3%	2%	4%	6%	2%	6%	4%	3%	8%	7%
Adj. Flow (vph)	325	497	355	454	500	71	137	775	203	32	1004	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	325	852	0	454	571	0	137	775	203	32	1004	99
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.5	24.0		11.0	24.0		11.0	26.0	26.0	11.0	26.0	26.0
Total Split (s)	19.7	25.0		20.0	25.3		11.0	34.0	34.0	11.0	34.0	34.0
Total Split (%)	21.9%	27.8%		22.2%	28.1%		12.2%	37.8%	37.8%	12.2%	37.8%	37.8%
Maximum Green (s)	15.2	19.0		17.0	19.3		8.0	28.0	28.0	8.0	28.0	28.0
Yellow Time (s)	3.5	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0		0.0	2.0		0.0	2.0	2.0	0.0	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	0.0
Total Lost Time (s)	4.5	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
Walk Time (s)		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
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	35.7	19.0		39.3	19.3		39.0	28.0	28.0	39.0	28.0	28.0
Actuated g/C Ratio	0.40	0.21		0.44	0.21		0.43	0.31	0.31	0.43	0.31	0.31
v/c Ratio	0.79	1.02		1.06	0.77		0.55	0.73	0.33	0.11	0.97	0.18
Control Delay	33.7	65.1		83.9	40.7		22.9	32.5	5.1	14.1	52.4	3.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	65.1		83.9	40.7		22.9	32.5	5.1	14.1	52.4	3.3
LOS	C	E		F	D		C	C	A	B	D	A
Approach Delay		56.4			59.8			26.4			47.1	
Approach LOS		E			E			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.06			
Intersection Signal Delay: 47.3		Intersection LOS: D	
Intersection Capacity Utilization 95.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 3: RR 25 & Lousi St. Laurent



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	325	852	454	571	137	775	203	32	1004	99
v/c Ratio	0.79	1.02	1.06	0.77	0.55	0.73	0.33	0.11	0.97	0.18
Control Delay	33.7	65.1	83.9	40.7	22.9	32.5	5.1	14.1	52.4	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.7	65.1	83.9	40.7	22.9	32.5	5.1	14.1	52.4	3.3
Queue Length 50th (m)	38.5	~69.3	~72.6	50.4	13.9	65.6	0.0	3.0	94.1	0.0
Queue Length 95th (m)	#76.0	#111.0	#132.8	#69.8	25.0	87.4	15.2	8.0	#137.1	7.2
Internal Link Dist (m)		462.1		501.8		589.9			500.1	
Turn Bay Length (m)	50.0		50.0		60.0		60.0	50.0		50.0
Base Capacity (vph)	410	836	429	737	248	1059	623	284	1040	556
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	0.79	1.02	1.06	0.77	0.55	0.73	0.33	0.11	0.97	0.18

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	299	457	327	418	460	65	126	713	187	29	924	91
Future Volume (vph)	299	457	327	418	460	65	126	713	187	29	924	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1783	3284		1769	3382		1770	3406	1553	1752	3343	1509
Flt Permitted	0.26	1.00		0.21	1.00		0.14	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	481	3284		386	3382		266	3406	1553	374	3343	1509
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)	325	497	355	454	500	71	137	775	203	32	1004	99
RTOR Reduction (vph)	0	144	0	0	13	0	0	0	140	0	0	68
Lane Group Flow (vph)	325	708	0	454	558	0	137	775	63	32	1004	31
Confl. Peds. (#/hr)	18		2	2		18						
Heavy Vehicles (%)	1%	2%	3%	2%	4%	6%	2%	6%	4%	3%	8%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	34.2	19.0		36.3	19.3		36.0	28.0	28.0	36.0	28.0	28.0
Effective Green, g (s)	34.2	19.0		36.3	19.3		36.0	28.0	28.0	36.0	28.0	28.0
Actuated g/C Ratio	0.38	0.21		0.40	0.21		0.40	0.31	0.31	0.40	0.31	0.31
Clearance Time (s)	4.5	6.0		3.0	6.0		3.0	6.0	6.0	3.0	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
Lane Grp Cap (vph)	402	693		416	725		240	1059	483	272	1040	469
v/s Ratio Prot	0.14	0.22		c0.21	0.17		c0.05	0.23		0.01	c0.30	
v/s Ratio Perm	0.17			c0.23			0.18		0.04	0.04		0.02
v/c Ratio	0.81	1.02		1.09	0.77		0.57	0.73	0.13	0.12	0.97	0.07
Uniform Delay, d1	21.7	35.5		23.7	33.3		20.1	27.7	22.3	17.4	30.5	21.8
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	15.9	39.9		71.0	7.7		9.5	4.5	0.6	0.9	20.7	0.3
Delay (s)	37.7	75.4		94.7	41.0		29.6	32.1	22.8	18.2	51.2	22.1
Level of Service	D	E		F	D		C	C	C	B	D	C
Approach Delay (s)		65.0			64.8			30.1			47.8	
Approach LOS		E			E			C			D	

Intersection Summary				
HCM 2000 Control Delay	51.8	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	1.01			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.5	
Intersection Capacity Utilization	95.6%	ICU Level of Service	F	
Analysis Period (min)	15			

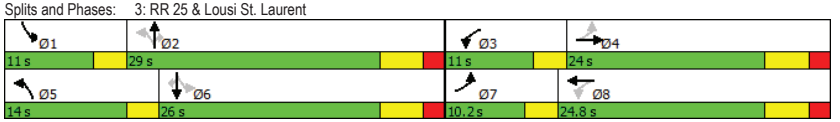
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	295	116	210	454	46	340	950	380	66	644	236
Future Volume (vph)	142	295	116	210	454	46	340	950	380	66	644	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	60.0		60.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	0.99	1.00		1.00	1.00		1.00		0.98	1.00		0.98
Frt		0.958			0.986				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3408	0	1787	3552	0	1805	3539	1615	1770	3471	1615
Flt Permitted	0.354			0.405			0.199			0.200		
Satd. Flow (perm)	662	3408	0	760	3552	0	377	3539	1588	372	3471	1582
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		73			14				413			257
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		486.1			525.8			613.9			524.1	
Travel Time (s)		29.2			31.5			31.6			27.0	
Confl. Peds. (#/hr)	10		4	4		10	7		4	4		7
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%	1%	1%	1%	0%	0%	0%	2%	0%	2%	4%	0%
Adj. Flow (vph)	154	321	126	228	493	50	370	1033	413	72	700	257
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	447	0	228	543	0	370	1033	413	72	700	257
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.5	24.0		11.0	24.0		11.0	26.0	26.0	11.0	26.0	26.0
Total Split (s)	10.2	24.0		11.0	24.8		14.0	29.0	29.0	11.0	26.0	26.0
Total Split (%)	13.6%	32.0%		14.7%	33.1%		18.7%	38.7%	38.7%	14.7%	34.7%	34.7%
Maximum Green (s)	7.2	18.0		8.0	18.8		11.0	23.0	23.0	8.0	20.0	20.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0	2.0	0.0	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	0.0
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
Walk Time (s)		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
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	28.2	18.0		29.8	18.8		37.0	23.0	23.0	31.0	20.0	20.0
Actuated g/C Ratio	0.38	0.24		0.40	0.25		0.49	0.31	0.31	0.41	0.27	0.27
v/c Ratio	0.43	0.51		0.55	0.60		0.94	0.95	0.53	0.24	0.76	0.42
Control Delay	17.8	22.9		20.3	27.5		49.2	45.1	5.2	12.4	31.5	5.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	22.9		20.3	27.5		49.2	45.1	5.2	12.4	31.5	5.6
LOS	B	C		C	C		D	D	A	B	C	A
Approach Delay		21.6			25.3			36.8			23.7	
Approach LOS		C			C			D			C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 75		
Actuated Cycle Length: 75		
Natural Cycle: 75		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.95		
Intersection Signal Delay: 29.3		Intersection LOS: C
Intersection Capacity Utilization 79.9%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 3: RR 25 & Lousi St. Laurent



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	154	447	228	543	370	1033	413	72	700	257
v/c Ratio	0.43	0.51	0.55	0.60	0.94	0.95	0.53	0.24	0.76	0.42
Control Delay	17.8	22.9	20.3	27.5	49.2	45.1	5.2	12.4	31.5	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	22.9	20.3	27.5	49.2	45.1	5.2	12.4	31.5	5.6
Queue Length 50th (m)	13.9	25.0	21.5	36.5	33.1	78.5	0.0	5.4	50.2	0.0
Queue Length 95th (m)	25.8	39.2	37.2	52.6	#84.3	#119.0	19.2	11.8	69.8	16.6
Internal Link Dist (m)		462.1		501.8		589.9			500.1	
Turn Bay Length (m)	50.0		50.0		60.0		60.0	50.0		50.0
Base Capacity (vph)	356	873	411	900	395	1085	773	302	925	610
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	0.43	0.51	0.55	0.60	0.94	0.95	0.53	0.24	0.76	0.42

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	295	116	210	454	46	340	950	380	66	644	236
Future Volume (vph)	142	295	116	210	454	46	340	950	380	66	644	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1784	3407		1786	3552		1804	3539	1588	1769	3471	1582
Flt Permitted	0.35	1.00		0.40	1.00		0.20	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	666	3407		761	3552		377	3539	1588	373	3471	1582
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)	154	321	126	228	493	50	370	1033	413	72	700	257
RTOR Reduction (vph)	0	55	0	0	10	0	0	0	286	0	0	188
Lane Group Flow (vph)	154	392	0	228	533	0	370	1033	127	72	700	69
Confl. Peds. (#/hr)	10		4	4		10	7		4	4		7
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	2%	0%	2%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	25.2	18.0		26.8	18.8		34.0	23.0	23.0	28.0	20.0	20.0
Effective Green, g (s)	25.2	18.0		26.8	18.8		34.0	23.0	23.0	28.0	20.0	20.0
Actuated g/C Ratio	0.34	0.24		0.36	0.25		0.45	0.31	0.31	0.37	0.27	0.27
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	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
Lane Grp Cap (vph)	331	817		381	890		380	1085	486	288	925	421
v/s Ratio Prot	0.04	0.11		c0.06	c0.15		c0.14	0.29		0.03	0.20	
v/s Ratio Perm	0.11			0.15			c0.30		0.08	0.07		0.04
v/c Ratio	0.47	0.48		0.60	0.60		0.97	0.95	0.26	0.25	0.76	0.16
Uniform Delay, d1	18.2	24.5		17.9	24.8		15.8	25.5	19.6	16.6	25.3	21.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	2.0		6.8	3.0		40.0	18.0	1.3	2.1	5.8	0.8
Delay (s)	22.9	26.5		24.6	27.7		55.8	43.4	20.9	18.7	31.0	21.9
Level of Service	C	C		C	C		E	D	C	B	C	C
Approach Delay (s)		25.6			26.8			40.8			27.9	
Approach LOS		C			C			D			C	

Intersection Summary				
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	79.9%	ICU Level of Service	D	
Analysis Period (min)	15			

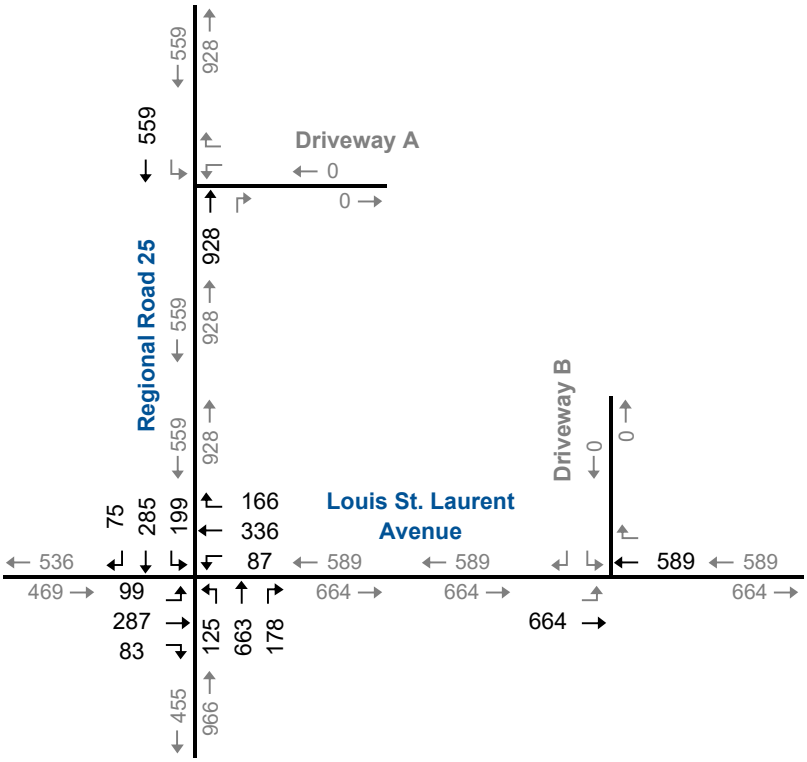
c Critical Lane Group

Appendix D

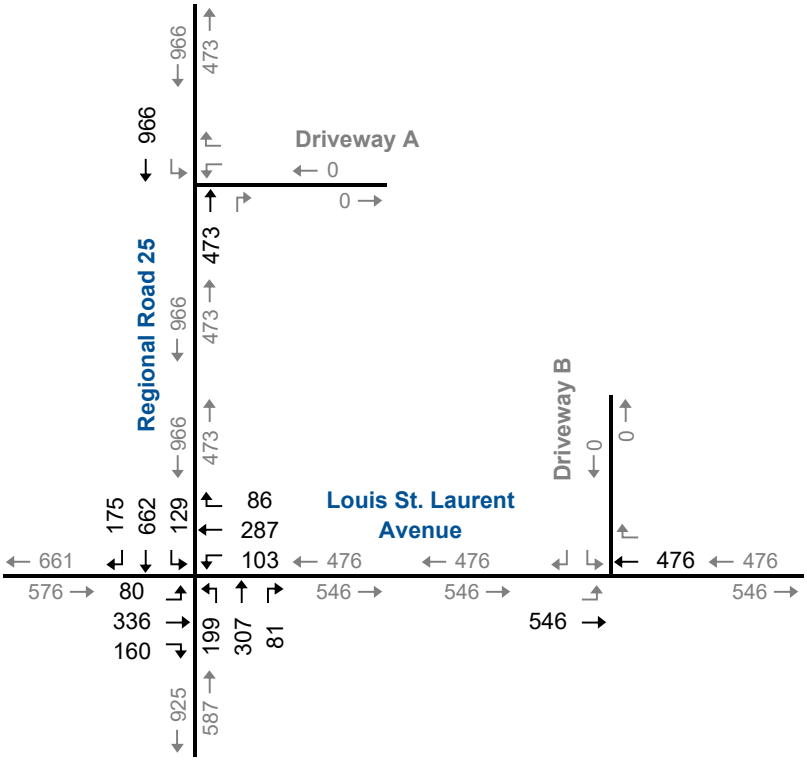
Background Development Traffic Assignments

Background 2024

AM Peak Hour



PM Peak Hour



Appendix E

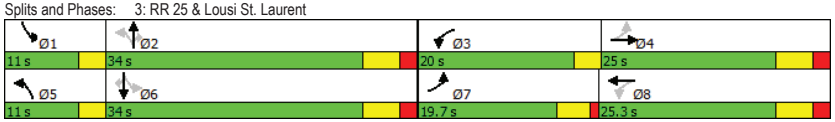
Future Intersection Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	398	744	410	505	796	231	251	1376	365	228	1209	166
Future Volume (vph)	398	744	410	505	796	231	251	1376	365	228	1209	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	60.0		60.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99			0.99							
Frt		0.947			0.966				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3322	0	1770	3310	0	1770	3406	1553	1752	3343	1509
Flt Permitted	0.211			0.207			0.143			0.143		
Satd. Flow (perm)	397	3322	0	386	3310	0	266	3406	1553	264	3343	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		105			38				249			127
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		486.1			525.8			613.9			524.1	
Travel Time (s)		29.2			31.5			31.6			27.0	
Confl. Peds. (#/hr)	18		2	2		18						
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%	3%	2%	4%	6%	2%	6%	4%	3%	8%	7%
Adj. Flow (vph)	433	809	446	549	865	251	273	1496	397	248	1314	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	433	1255	0	549	1116	0	273	1496	397	248	1314	180
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.5	24.0		11.0	24.0		11.0	26.0	26.0	11.0	26.0	26.0
Total Split (s)	19.7	25.0		20.0	25.3		11.0	34.0	34.0	11.0	34.0	34.0
Total Split (%)	21.9%	27.8%		22.2%	28.1%		12.2%	37.8%	37.8%	12.2%	37.8%	37.8%
Maximum Green (s)	15.2	19.0		17.0	19.3		8.0	28.0	28.0	8.0	28.0	28.0
Yellow Time (s)	3.5	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0		0.0	2.0		0.0	2.0	2.0	0.0	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	0.0
Total Lost Time (s)	4.5	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
Walk Time (s)		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
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	35.7	19.0		39.3	19.3		39.0	28.0	28.0	39.0	28.0	28.0
Actuated g/C Ratio	0.40	0.21		0.44	0.21		0.43	0.31	0.31	0.43	0.31	0.31
v/c Ratio	1.10	1.60		1.28	1.51		1.10	1.41	0.61	1.01	1.26	0.32
Control Delay	101.5	302.4		166.4	264.7		108.7	219.3	14.0	81.5	155.7	9.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	101.5	302.4		166.4	264.7		108.7	219.3	14.0	81.5	155.7	9.9
LOS	F	F		F	F		F	F	B	F	F	A
Approach Delay		250.8			232.3			167.7			130.1	
Approach LOS		F			F			F			F	

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 90		
Natural Cycle: 150		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 1.60		
Intersection Signal Delay: 192.8		Intersection LOS: F
Intersection Capacity Utilization 129.1%		ICU Level of Service H
Analysis Period (min) 15		

Splits and Phases: 3: RR 25 & Lousi St. Laurent



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	433	1255	549	1116	273	1496	397	248	1314	180
v/c Ratio	1.10	1.60	1.28	1.51	1.10	1.41	0.61	1.01	1.26	0.32
Control Delay	101.5	302.4	166.4	264.7	108.7	219.3	14.0	81.5	155.7	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	101.5	302.4	166.4	264.7	108.7	219.3	14.0	81.5	155.7	9.9
Queue Length 50th (m)	~72.9	~167.1	~109.7	~148.7	~38.7	~194.4	20.4	~27.9	~159.8	6.8
Queue Length 95th (m)	#132.0	#209.7	#174.2	#190.3	#88.8	#237.1	51.5	#77.6	#201.6	22.7
Internal Link Dist (m)		462.1		501.8		589.9			500.1	
Turn Bay Length (m)	50.0		50.0		60.0		60.0	50.0		50.0
Base Capacity (vph)	392	784	429	739	248	1059	654	246	1040	556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	1.60	1.28	1.51	1.10	1.41	0.61	1.01	1.26	0.32

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	398	744	410	505	796	231	251	1376	365	228	1209	166
Future Volume (vph)	398	744	410	505	796	231	251	1376	365	228	1209	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3321		1770	3311		1770	3406	1553	1752	3343	1509
Flt Permitted	0.21	1.00		0.21	1.00		0.14	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	396	3321		386	3311		266	3406	1553	264	3343	1509
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)	433	809	446	549	865	251	273	1496	397	248	1314	180
RTOR Reduction (vph)	0	83	0	0	30	0	0	0	172	0	0	87
Lane Group Flow (vph)	433	1172	0	549	1086	0	273	1496	225	248	1314	93
Confl. Peds. (#/hr)	18		2	2		18						
Heavy Vehicles (%)	1%	2%	3%	2%	4%	6%	2%	6%	4%	3%	8%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	34.2	19.0		36.3	19.3		36.0	28.0	28.0	36.0	28.0	28.0
Effective Green, g (s)	34.2	19.0		36.3	19.3		36.0	28.0	28.0	36.0	28.0	28.0
Actuated g/C Ratio	0.38	0.21		0.40	0.21		0.40	0.31	0.31	0.40	0.31	0.31
Clearance Time (s)	4.5	6.0		3.0	6.0		3.0	6.0	6.0	3.0	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
Lane Grp Cap (vph)	385	701		417	710		240	1059	483	237	1040	469
v/s Ratio Prot	0.19	c0.35		c0.25	0.33		c0.10	c0.44		0.09	0.39	
v/s Ratio Perm	0.24			0.28			0.35		0.15	0.32		0.06
v/c Ratio	1.12	1.67		1.32	1.53		1.14	1.41	0.47	1.05	1.26	0.20
Uniform Delay, d1	23.7	35.5		23.8	35.4		23.3	31.0	25.0	23.3	31.0	22.8
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	84.2	308.7		158.6	245.5		100.2	191.3	3.2	71.2	126.3	0.9
Delay (s)	107.9	344.2		182.3	280.9		123.5	222.3	28.2	94.4	157.3	23.7
Level of Service	F	F		F	F		F	F	C	F	F	C
Approach Delay (s)		283.6			248.4			174.3			134.6	
Approach LOS		F			F			F			F	

Intersection Summary

HCM 2000 Control Delay	207.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.46		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	19.5
Intersection Capacity Utilization	129.1%	ICU Level of Service	H
Analysis Period (min)	15		

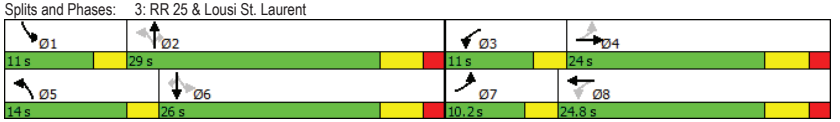
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	222	631	276	313	741	132	539	1257	461	195	1306	411
Future Volume (vph)	222	631	276	313	741	132	539	1257	461	195	1306	411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	60.0		60.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		1.00	1.00				0.98			0.98
Frt		0.954			0.977				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3392	0	1787	3514	0	1805	3539	1615	1770	3471	1615
Flt Permitted	0.222			0.213			0.174			0.200		
Satd. Flow (perm)	417	3392	0	400	3514	0	331	3539	1588	373	3471	1582
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87			26				300			249
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		486.1			525.8			613.9			524.1	
Travel Time (s)		29.2			31.5			31.6			27.0	
Confl. Peds. (#/hr)	10		4	4		10	7		4	4		7
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%	1%	1%	1%	0%	0%	0%	2%	0%	2%	4%	0%
Adj. Flow (vph)	241	686	300	340	805	143	586	1366	501	212	1420	447
Shared Lane Traffic (%)												
Lane Group Flow (vph)	241	986	0	340	948	0	586	1366	501	212	1420	447
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.5	24.0		11.0	24.0		11.0	26.0	26.0	11.0	26.0	26.0
Total Split (s)	10.2	24.0		11.0	24.8		14.0	29.0	29.0	11.0	26.0	26.0
Total Split (%)	13.6%	32.0%		14.7%	33.1%		18.7%	38.7%	38.7%	14.7%	34.7%	34.7%
Maximum Green (s)	7.2	18.0		8.0	18.8		11.0	23.0	23.0	8.0	20.0	20.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0	2.0	0.0	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	0.0
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
Walk Time (s)		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
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	28.2	18.0		29.8	18.8		37.0	23.0	23.0	31.0	20.0	20.0
Actuated g/C Ratio	0.38	0.24		0.40	0.25		0.49	0.31	0.31	0.41	0.27	0.27
v/c Ratio	0.84	1.12		1.11	1.05		1.55	1.26	0.72	0.70	1.54	0.74
Control Delay	43.1	96.1		106.4	73.9		278.5	150.4	15.9	26.4	271.5	19.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	96.1		106.4	73.9		278.5	150.4	15.9	26.4	271.5	19.6
LOS	D	F		F	E		F	F	B	C	F	B
Approach Delay		85.7			82.5			153.6			192.4	
Approach LOS		F			F			F			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.55			
Intersection Signal Delay: 140.2		Intersection LOS: F	
Intersection Capacity Utilization 126.4%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 3: RR 25 & Lousi St. Laurent



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	241	986	340	948	586	1366	501	212	1420	447
v/c Ratio	0.84	1.12	1.11	1.05	1.55	1.26	0.72	0.70	1.54	0.74
Control Delay	43.1	96.1	106.4	73.9	278.5	150.4	15.9	26.4	271.5	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	96.1	106.4	73.9	278.5	150.4	15.9	26.4	271.5	19.6
Queue Length 50th (m)	22.9	~85.4	~39.5	~81.2	~107.8	~136.8	24.3	17.1	~159.1	25.5
Queue Length 95th (m)	#53.3	#123.6	#90.1	#119.0	#169.5	#177.0	61.1	#40.0	#199.6	#64.8
Internal Link Dist (m)		462.1		501.8		589.9			500.1	
Turn Bay Length (m)	50.0		50.0		60.0		60.0	50.0		50.0
Base Capacity (vph)	288	880	306	900	379	1085	694	303	925	604
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	0.84	1.12	1.11	1.05	1.55	1.26	0.72	0.70	1.54	0.74

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	222	631	276	313	741	132	539	1257	461	195	1306	411
Future Volume (vph)	222	631	276	313	741	132	539	1257	461	195	1306	411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1786	3394		1787	3515		1805	3539	1588	1770	3471	1582
Flt Permitted	0.22	1.00		0.21	1.00		0.17	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	418	3394		400	3515		330	3539	1588	373	3471	1582
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)	241	686	300	340	805	143	586	1366	501	212	1420	447
RTOR Reduction (vph)	0	66	0	0	19	0	0	0	208	0	0	183
Lane Group Flow (vph)	241	920	0	340	929	0	586	1366	293	212	1420	264
Confl. Peds. (#/hr)	10		4	4		10	7		4	4		7
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	2%	0%	2%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	25.2	18.0		26.8	18.8		34.0	23.0	23.0	28.0	20.0	20.0
Effective Green, g (s)	25.2	18.0		26.8	18.8		34.0	23.0	23.0	28.0	20.0	20.0
Actuated g/C Ratio	0.34	0.24		0.36	0.25		0.45	0.31	0.31	0.37	0.27	0.27
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	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
Lane Grp Cap (vph)	271	814		290	881		365	1085	486	288	925	421
v/s Ratio Prot	0.09	0.27		c0.12	0.26		c0.23	0.39		0.08	0.41	
v/s Ratio Perm	0.21			c0.29			c0.49		0.18	0.20		0.17
v/c Ratio	0.89	1.13		1.17	1.05		1.61	1.26	0.60	0.74	1.54	0.63
Uniform Delay, d1	21.4	28.5		21.8	28.1		18.5	26.0	22.1	18.7	27.5	24.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.3	73.8		107.9	45.5		285.0	124.1	5.5	15.4	246.3	6.9
Delay (s)	53.7	102.3		129.8	73.6		303.5	150.1	27.6	34.1	273.8	31.2
Level of Service	D	F		F	E		F	F	C	C	F	C
Approach Delay (s)		92.7			88.5			161.7			197.2	
Approach LOS		F			F			F			F	

Intersection Summary					
HCM 2000 Control Delay	146.8	HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio	1.49				
Actuated Cycle Length (s)	75.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	126.4%	ICU Level of Service		H	
Analysis Period (min)	15				

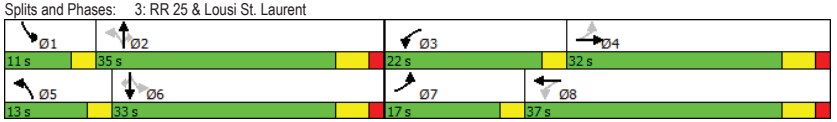
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	439	821	453	558	879	255	277	1519	403	252	1335	183
Future Volume (vph)	439	821	453	558	879	255	277	1519	403	252	1335	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	60.0		60.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor		0.99			0.99							
Frt		0.947			0.966				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3322	0	1770	3308	0	1770	4893	1553	1752	4803	1509
Flt Permitted	0.160			0.138			0.143			0.154		
Satd. Flow (perm)	301	3322	0	257	3308	0	266	4893	1553	284	4803	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		104			40				321			138
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		486.1			525.8			613.9			524.1	
Travel Time (s)		29.2			31.5			31.6			27.0	
Confl. Peds. (#/hr)	18		2	2		18						
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%	3%	2%	4%	6%	2%	6%	4%	3%	8%	7%
Adj. Flow (vph)	477	892	492	607	955	277	301	1651	438	274	1451	199
Shared Lane Traffic (%)												
Lane Group Flow (vph)	477	1384	0	607	1232	0	301	1651	438	274	1451	199
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.5	24.0		11.0	24.0		11.0	26.0	26.0	11.0	26.0	26.0
Total Split (s)	17.0	32.0		22.0	37.0		13.0	35.0	35.0	11.0	33.0	33.0
Total Split (%)	17.0%	32.0%		22.0%	37.0%		13.0%	35.0%	35.0%	11.0%	33.0%	33.0%
Maximum Green (s)	14.0	26.0		19.0	31.0		10.0	29.0	29.0	8.0	27.0	27.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	1.0	-2.0		1.0	-2.0		1.0	-2.0	-2.0	1.0	-2.0	-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
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
Walk Time (s)		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
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	41.0	28.0		50.0	33.0		40.0	31.0	31.0	36.0	29.0	29.0
Actuated g/C Ratio	0.41	0.28		0.50	0.33		0.40	0.31	0.31	0.36	0.29	0.29
v/c Ratio	1.51	1.38		1.52	1.10		1.25	1.09	0.62	1.34	1.04	0.37
Control Delay	269.3	204.9		270.0	91.3		165.4	85.2	12.4	204.9	71.4	11.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	269.3	204.9		270.0	91.3		165.4	85.2	12.4	204.9	71.4	11.8
LOS	F	F		F	F		F	F	B	F	E	B
Approach Delay		221.4			150.2			82.0			84.3	
Approach LOS		F			F			F			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.52			
Intersection Signal Delay: 130.6		Intersection LOS: F	
Intersection Capacity Utilization 124.8%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 3: RR 25 & Lousi St. Laurent



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	477	1384	607	1232	301	1651	438	274	1451	199
v/c Ratio	1.51	1.38	1.52	1.10	1.25	1.09	0.62	1.34	1.04	0.37
Control Delay	269.3	204.9	270.0	91.3	165.4	85.2	12.4	204.9	71.4	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	269.3	204.9	270.0	91.3	165.4	85.2	12.4	204.9	71.4	11.8
Queue Length 50th (m)	~118.7	~191.0	~157.1	~148.5	~59.1	~139.5	17.7	~54.4	~117.9	9.2
Queue Length 95th (m)	#182.8	#235.0	#225.9	#191.6	#113.1	#170.2	51.4	#107.4	#148.1	27.7
Internal Link Dist (m)		462.1		501.8		589.9			500.1	
Turn Bay Length (m)	50.0		50.0		60.0		60.0	50.0		50.0
Base Capacity (vph)	316	1005	400	1118	241	1516	702	205	1392	535
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.51	1.38	1.52	1.10	1.25	1.09	0.62	1.34	1.04	0.37

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	439	821	453	558	879	255	277	1519	403	252	1335	183
Future Volume (vph)	439	821	453	558	879	255	277	1519	403	252	1335	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3321		1770	3309		1770	4893	1553	1752	4803	1509
Flt Permitted	0.16	1.00		0.14	1.00		0.14	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	301	3321		257	3309		266	4893	1553	284	4803	1509
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)	477	892	492	607	955	277	301	1651	438	274	1451	199
RTOR Reduction (vph)	0	75	0	0	27	0	0	0	221	0	0	98
Lane Group Flow (vph)	477	1309	0	607	1205	0	301	1651	217	274	1451	101
Confl. Peds. (#/hr)	18		2	2		18						
Heavy Vehicles (%)	1%	2%	3%	2%	4%	6%	2%	6%	4%	3%	8%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	40.0	26.0		48.0	31.0		39.0	29.0	29.0	35.0	27.0	27.0
Effective Green, g (s)	38.0	28.0		47.0	33.0		37.0	31.0	31.0	33.0	29.0	29.0
Actuated g/C Ratio	0.38	0.28		0.47	0.33		0.37	0.31	0.31	0.33	0.29	0.29
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	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
Lane Grp Cap (vph)	307	929		393	1091		233	1516	481	196	1392	437
v/s Ratio Prot	0.20	0.39		c0.28	0.36		c0.12	0.34		0.10	0.30	
v/s Ratio Perm	0.39			c0.45			0.36		0.14	c0.36		0.07
v/c Ratio	1.55	1.41		1.54	1.10		1.29	1.09	0.45	1.40	1.04	0.23
Uniform Delay, d1	26.2	36.0		28.9	33.5		27.1	34.5	27.7	30.8	35.5	27.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	264.7	190.6		257.4	60.6		159.5	51.4	3.0	207.0	35.9	1.2
Delay (s)	290.9	226.6		286.3	94.1		186.6	85.9	30.7	237.8	71.4	28.3
Level of Service	F	F		F	F		F	F	C	F	E	C
Approach Delay (s)		243.1			157.6			88.5			90.7	
Approach LOS		F			F			F			F	

Intersection Summary				
HCM 2000 Control Delay	140.7	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.41			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	124.8%	ICU Level of Service	H	
Analysis Period (min)	15			

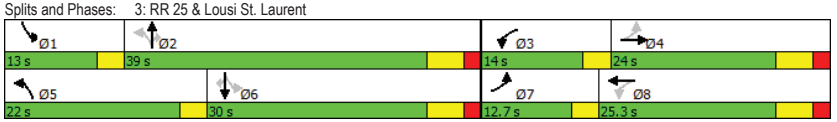
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	697	305	346	818	146	595	1388	509	215	1442	454
Future Volume (vph)	245	697	305	346	818	146	595	1388	509	215	1442	454
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	60.0		60.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	1.00	0.99			1.00				0.98	1.00		0.98
Frt		0.954			0.977				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3391	0	1787	3513	0	1805	5085	1615	1770	4988	1615
Flt Permitted	0.235			0.219			0.148			0.154		
Satd. Flow (perm)	441	3391	0	412	3513	0	281	5085	1586	287	4988	1579
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		71			21				341			257
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		486.1			525.8			613.9			524.1	
Travel Time (s)		29.2			31.5			31.6			27.0	
Confl. Peds. (#/hr)	10		4	4		10	7		4	4		7
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%	1%	1%	1%	0%	0%	0%	2%	0%	2%	4%	0%
Adj. Flow (vph)	266	758	332	376	889	159	647	1509	553	234	1567	493
Shared Lane Traffic (%)												
Lane Group Flow (vph)	266	1090	0	376	1048	0	647	1509	553	234	1567	493
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.5	24.0		11.0	24.0		11.0	26.0	26.0	11.0	26.0	26.0
Total Split (s)	12.7	24.0		14.0	25.3		22.0	39.0	39.0	13.0	30.0	30.0
Total Split (%)	14.1%	26.7%		15.6%	28.1%		24.4%	43.3%	43.3%	14.4%	33.3%	33.3%
Maximum Green (s)	9.7	18.0		11.0	19.3		19.0	33.0	33.0	10.0	24.0	24.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	1.0	-2.0		1.0	-2.0		1.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	1.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
Walk Time (s)		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
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	28.7	20.0		31.3	21.3		48.0	35.0	35.0	41.0	26.0	26.0
Actuated g/C Ratio	0.32	0.22		0.35	0.24		0.53	0.39	0.39	0.46	0.29	0.29
v/c Ratio	0.99	1.35		1.27	1.24		1.43	0.76	0.67	0.71	1.09	0.77
Control Delay	77.8	194.3		170.2	148.2		227.4	27.0	12.8	30.3	83.4	23.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.8	194.3		170.2	148.2		227.4	27.0	12.8	30.3	83.4	23.3
LOS	E	F		F	F		F	C	B	C	F	C
Approach Delay		171.4			154.0			72.0			65.1	
Approach LOS		F			F			E			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.43			
Intersection Signal Delay: 102.3		Intersection LOS: F	
Intersection Capacity Utilization 122.5%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 3: RR 25 & Lousi St. Laurent



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	266	1090	376	1048	647	1509	553	234	1567	493
v/c Ratio	0.99	1.35	1.27	1.24	1.43	0.76	0.67	0.71	1.09	0.77
Control Delay	77.8	194.3	170.2	148.2	227.4	27.0	12.8	30.3	83.4	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.8	194.3	170.2	148.2	227.4	27.0	12.8	30.3	83.4	23.3
Queue Length 50th (m)	34.8	~133.4	~67.4	~124.8	~143.5	85.6	28.5	21.5	~118.6	39.3
Queue Length 95th (m)	#78.0	#174.6	#124.7	#165.8	#211.5	103.9	66.7	#54.3	#148.5	#85.5
Internal Link Dist (m)		462.1		501.8		589.9			500.1	
Turn Bay Length (m)	50.0		50.0		60.0		60.0	50.0		50.0
Base Capacity (vph)	270	808	296	847	454	1977	825	328	1440	638
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	0.99	1.35	1.27	1.24	1.43	0.76	0.67	0.71	1.09	0.77

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	245	697	305	346	818	146	595	1388	509	215	1442	454
Future Volume (vph)	245	697	305	346	818	146	595	1388	509	215	1442	454
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	1.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1786	3392		1787	3514		1805	5085	1586	1770	4988	1579
Flt Permitted	0.24	1.00		0.22	1.00		0.15	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	442	3392		411	3514		281	5085	1586	287	4988	1579
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)	266	758	332	376	889	159	647	1509	553	234	1567	493
RTOR Reduction (vph)	0	55	0	0	16	0	0	0	208	0	0	183
Lane Group Flow (vph)	266	1035	0	376	1032	0	647	1509	345	234	1567	310
Confl. Peds. (#/hr)	10		4	4		10	7		4	4		7
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	2%	0%	2%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	27.7	18.0		30.3	19.3		46.0	33.0	33.0	34.0	24.0	24.0
Effective Green, g (s)	25.7	20.0		28.3	21.3		45.0	35.0	35.0	38.0	26.0	26.0
Actuated g/C Ratio	0.29	0.22		0.31	0.24		0.50	0.39	0.39	0.42	0.29	0.29
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	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
Lane Grp Cap (vph)	256	753		282	831		445	1977	616	318	1440	456
v/s Ratio Prot	0.10	c0.31		c0.15	0.29		c0.29	0.30		0.10	0.31	
v/s Ratio Perm	0.20			0.27			c0.44		0.22	0.21		0.20
v/c Ratio	1.04	1.37		1.33	1.24		1.45	0.76	0.56	0.74	1.09	0.68
Uniform Delay, d1	29.9	35.0		28.0	34.4		25.4	23.9	21.5	18.6	32.0	28.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	66.8	176.8		172.2	119.0		216.5	2.9	3.6	14.1	51.6	8.0
Delay (s)	96.7	211.8		200.2	153.4		241.9	26.8	25.1	32.7	83.6	36.3
Level of Service	F	F		F	F		F	C	C	C	F	D
Approach Delay (s)		189.2			165.7			77.8			68.2	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM 2000 Control Delay	110.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	122.5%	ICU Level of Service	H
Analysis Period (min)	15		

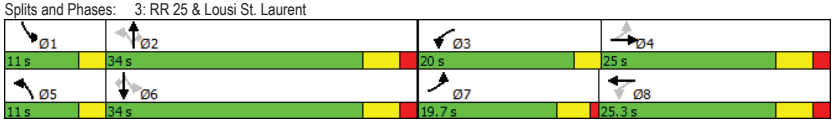
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	405	744	410	547	809	231	251	1382	365	234	1209	166
Future Volume (vph)	405	744	410	547	809	231	251	1382	365	234	1209	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	60.0		60.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		0.99			0.99							
Frt		0.947			0.967				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3322	0	1770	3314	0	1770	3406	1553	1752	3343	1509
Flt Permitted	0.211			0.207			0.143			0.143		
Satd. Flow (perm)	397	3322	0	386	3314	0	266	3406	1553	264	3343	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		105			37				248			127
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		486.1			131.0			613.9			111.8	
Travel Time (s)		29.2			7.9			31.6			5.7	
Confl. Peds. (#/hr)	18		2	2		18						
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%	3%	2%	4%	6%	2%	6%	4%	3%	8%	7%
Adj. Flow (vph)	440	809	446	595	879	251	273	1502	397	254	1314	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	440	1255	0	595	1130	0	273	1502	397	254	1314	180
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.5	24.0		11.0	24.0		11.0	26.0	26.0	11.0	26.0	26.0
Total Split (s)	19.7	25.0		20.0	25.3		11.0	34.0	34.0	11.0	34.0	34.0
Total Split (%)	21.9%	27.8%		22.2%	28.1%		12.2%	37.8%	37.8%	12.2%	37.8%	37.8%
Maximum Green (s)	15.2	19.0		17.0	19.3		8.0	28.0	28.0	8.0	28.0	28.0
Yellow Time (s)	3.5	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0		0.0	2.0		0.0	2.0	2.0	0.0	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	0.0
Total Lost Time (s)	4.5	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
Walk Time (s)		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
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	35.7	19.0		39.3	19.3		39.0	28.0	28.0	39.0	28.0	28.0
Actuated g/C Ratio	0.40	0.21		0.44	0.21		0.43	0.31	0.31	0.43	0.31	0.31
v/c Ratio	1.12	1.60		1.39	1.53		1.10	1.42	0.61	1.03	1.26	0.32
Control Delay	107.6	302.4		211.4	272.9		108.7	221.7	14.1	88.1	155.7	9.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	107.6	302.4		211.4	272.9		108.7	221.7	14.1	88.1	155.7	9.9
LOS	F	F		F	F		F	F	B	F	F	A
Approach Delay		251.8			251.6			169.6			130.9	
Approach LOS		F			F			F			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.60			
Intersection Signal Delay: 198.6		Intersection LOS: F	
Intersection Capacity Utilization 131.9%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 3: RR 25 & Lousi St. Laurent



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	440	1255	595	1130	273	1502	397	254	1314	180
v/c Ratio	1.12	1.60	1.39	1.53	1.10	1.42	0.61	1.03	1.26	0.32
Control Delay	107.6	302.4	211.4	272.9	108.7	221.7	14.1	88.1	155.7	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	107.6	302.4	211.4	272.9	108.7	221.7	14.1	88.1	155.7	9.9
Queue Length 50th (m)	~75.6	~167.1	~127.7	~151.7	~38.7	~195.6	20.5	~31.7	~159.8	6.8
Queue Length 95th (m)	#135.1	#209.7	#193.8	#193.3	#88.8	#238.5	51.6	#80.4	#201.6	22.7
Internal Link Dist (m)		462.1		107.0		589.9			87.8	
Turn Bay Length (m)	50.0		50.0		60.0		60.0	50.0		50.0
Base Capacity (vph)	392	784	429	739	248	1059	654	246	1040	556
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.12	1.60	1.39	1.53	1.10	1.42	0.61	1.03	1.26	0.32

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	405	744	410	547	809	231	251	1382	365	234	1209	166
Future Volume (vph)	405	744	410	547	809	231	251	1382	365	234	1209	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3321		1770	3313		1770	3406	1553	1752	3343	1509
Flt Permitted	0.21	1.00		0.21	1.00		0.14	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	396	3321		386	3313		266	3406	1553	264	3343	1509
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)	440	809	446	595	879	251	273	1502	397	254	1314	180
RTOR Reduction (vph)	0	83	0	0	29	0	0	0	171	0	0	87
Lane Group Flow (vph)	440	1172	0	595	1101	0	273	1502	226	254	1314	93
Confl. Peds. (#/hr)	18		2	2		18						
Heavy Vehicles (%)	1%	2%	3%	2%	4%	6%	2%	6%	4%	3%	8%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	34.2	19.0		36.3	19.3		36.0	28.0	28.0	36.0	28.0	28.0
Effective Green, g (s)	34.2	19.0		36.3	19.3		36.0	28.0	28.0	36.0	28.0	28.0
Actuated g/C Ratio	0.38	0.21		0.40	0.21		0.40	0.31	0.31	0.40	0.31	0.31
Clearance Time (s)	4.5	6.0		3.0	6.0		3.0	6.0	6.0	3.0	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
Lane Grp Cap (vph)	385	701		417	710		240	1059	483	237	1040	469
v/s Ratio Prot	0.19	c0.35		c0.27	0.33		c0.10	c0.44		0.09	0.39	
v/s Ratio Perm	0.24			0.31			0.35		0.15	0.33		0.06
v/c Ratio	1.14	1.67		1.43	1.55		1.14	1.42	0.47	1.07	1.26	0.20
Uniform Delay, d1	23.7	35.5		23.8	35.4		23.3	31.0	25.0	23.3	31.0	22.8
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	90.8	308.7		205.6	254.7		100.2	193.8	3.2	78.8	126.3	0.9
Delay (s)	114.5	344.2		229.3	290.1		123.5	224.8	28.2	102.1	157.3	23.7
Level of Service	F	F		F	F		F	F	C	F	F	C
Approach Delay (s)		284.6			269.1			176.2			135.5	
Approach LOS		F			F			F			F	

Intersection Summary					
HCM 2000 Control Delay	213.4	HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio	1.49				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)		19.5	
Intersection Capacity Utilization	131.9%	ICU Level of Service		H	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	19	2005	13	0	1609
Future Volume (vph)	0	19	2005	13	0	1609
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt		0.865	0.999			
Flt Protected						
Satd. Flow (prot)	0	1611	3536	0	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1611	3536	0	0	3539
Link Speed (k/h)	50		50			70
Link Distance (m)	41.1		111.8			412.3
Travel Time (s)	3.0		8.0			21.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	21	2179	14	0	1749
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	2193	0	0	1749
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	2005	13	0	1609
Future Volume (Veh/h)	0	19	2005	13	0	1609
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	2179	14	0	1749
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			112			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	3060	1096			2193	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3087	276			1845	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	6	504			227	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	21	1453	740	874	874
Volume Left	0	0	0	0	0
Volume Right	21	0	14	0	0
cSH	504	1700	1700	1700	1700
Volume to Capacity	0.04	0.85	0.44	0.51	0.51
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0
Control Delay (s)	12.5	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	12.5	0.0		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay		0.1			
Intersection Capacity Utilization		65.8%	ICU Level of Service		C
Analysis Period (min)		15			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1343	1532	12	0	55
Future Volume (vph)	0	1343	1532	12	0	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.999			0.865
Flt Protected						
Satd. Flow (prot)	0	3539	3536	0	0	1644
Flt Permitted						
Satd. Flow (perm)	0	3539	3536	0	0	1644
Link Speed (k/h)		50	60		50	
Link Distance (m)		131.0	394.8		49.8	
Travel Time (s)		9.4	23.7		3.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Adj. Flow (vph)	0	1460	1665	13	0	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1460	1678	0	0	60
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		0.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1343	1532	12	0	55
Future Volume (Veh/h)	0	1343	1532	12	0	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1460	1665	13	0	60
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		131				
pX, platoon unblocked					0.80	
vC, conflicting volume	1678				2402	839
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1678				2254	839
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	81
cM capacity (veh/h)	387				29	313

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	730	730	1110	568	60
Volume Left	0	0	0	0	0
Volume Right	0	0	0	13	60
cSH	1700	1700	1700	1700	313
Volume to Capacity	0.43	0.43	0.65	0.33	0.19
Queue Length 95th (m)	0.0	0.0	0.0	0.0	5.6
Control Delay (s)	0.0	0.0	0.0	0.0	19.2
Lane LOS					C
Approach Delay (s)	0.0		0.0		19.2
Approach LOS					C

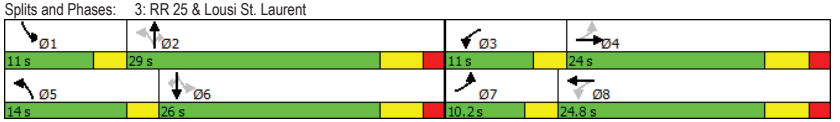
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	631	276	334	753	132	539	1288	461	213	1306	411
Future Volume (vph)	233	631	276	334	753	132	539	1288	461	213	1306	411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	60.0		60.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	0.99		1.00	1.00				0.98			0.98
Frt		0.954			0.978				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3392	0	1787	3518	0	1805	3539	1615	1770	3471	1615
Flt Permitted	0.222			0.213			0.174			0.200		
Satd. Flow (perm)	417	3392	0	400	3518	0	331	3539	1588	373	3471	1582
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87			25				293			249
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		486.1			128.3			613.9			108.4	
Travel Time (s)		29.2			7.7			31.6			5.6	
Confl. Peds. (#/hr)	10		4	4		10	7		4	4		7
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%	1%	1%	1%	0%	0%	0%	2%	0%	2%	4%	0%
Adj. Flow (vph)	253	686	300	363	818	143	586	1400	501	232	1420	447
Shared Lane Traffic (%)												
Lane Group Flow (vph)	253	986	0	363	961	0	586	1400	501	232	1420	447
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.5	24.0		11.0	24.0		11.0	26.0	26.0	11.0	26.0	26.0
Total Split (s)	10.2	24.0		11.0	24.8		14.0	29.0	29.0	11.0	26.0	26.0
Total Split (%)	13.6%	32.0%		14.7%	33.1%		18.7%	38.7%	38.7%	14.7%	34.7%	34.7%
Maximum Green (s)	7.2	18.0		8.0	18.8		11.0	23.0	23.0	8.0	20.0	20.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0	2.0	0.0	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	0.0
Total Lost Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
Walk Time (s)		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
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	28.2	18.0		29.8	18.8		37.0	23.0	23.0	31.0	20.0	20.0
Actuated g/C Ratio	0.38	0.24		0.40	0.25		0.49	0.31	0.31	0.41	0.27	0.27
v/c Ratio	0.88	1.12		1.19	1.07		1.55	1.29	0.73	0.77	1.54	0.74
Control Delay	49.2	96.1		133.4	78.6		278.5	163.7	16.5	31.5	271.5	19.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	96.1		133.4	78.6		278.5	163.7	16.5	31.5	271.5	19.6
LOS	D	F		F	E		F	F	B	C	F	B
Approach Delay		86.5			93.6			161.1			191.4	
Approach LOS		F			F			F			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.55			
Intersection Signal Delay: 144.6		Intersection LOS: F	
Intersection Capacity Utilization 127.5%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 3: RR 25 & Lousi St. Laurent



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	253	986	363	961	586	1400	501	232	1420	447
v/c Ratio	0.88	1.12	1.19	1.07	1.55	1.29	0.73	0.77	1.54	0.74
Control Delay	49.2	96.1	133.4	78.6	278.5	163.7	16.5	31.5	271.5	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.2	96.1	133.4	78.6	278.5	163.7	16.5	31.5	271.5	19.6
Queue Length 50th (m)	24.2	~85.4	~46.6	~83.5	~107.8	~142.4	25.4	19.0	~159.1	25.5
Queue Length 95th (m)	#57.9	#123.6	#98.9	#121.4	#169.5	#182.8	62.5	#47.6	#199.6	#64.8
Internal Link Dist (m)		462.1		104.3		589.9			84.4	
Turn Bay Length (m)	50.0		50.0		60.0		60.0	50.0		50.0
Base Capacity (vph)	288	880	306	900	379	1085	690	303	925	604
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	0.88	1.12	1.19	1.07	1.55	1.29	0.73	0.77	1.54	0.74

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	233	631	276	334	753	132	539	1288	461	213	1306	411
Future Volume (vph)	233	631	276	334	753	132	539	1288	461	213	1306	411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3394		1787	3517		1805	3539	1588	1770	3471	1582
Flt Permitted	0.22	1.00		0.21	1.00		0.17	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	418	3394		400	3517		330	3539	1588	373	3471	1582
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)	253	686	300	363	818	143	586	1400	501	232	1420	447
RTOR Reduction (vph)	0	66	0	0	19	0	0	0	203	0	0	183
Lane Group Flow (vph)	253	920	0	363	942	0	586	1400	298	232	1420	264
Confl. Peds. (#/hr)	10		4	4		10	7		4	4		7
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	2%	0%	2%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	25.2	18.0		26.8	18.8		34.0	23.0	23.0	28.0	20.0	20.0
Effective Green, g (s)	25.2	18.0		26.8	18.8		34.0	23.0	23.0	28.0	20.0	20.0
Actuated g/C Ratio	0.34	0.24		0.36	0.25		0.45	0.31	0.31	0.37	0.27	0.27
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	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
Lane Grp Cap (vph)	271	814		290	881		365	1085	486	288	925	421
v/s Ratio Prot	0.09	0.27		c0.13	0.27		c0.23	0.40		0.09	0.41	
v/s Ratio Perm	0.22			c0.31			c0.49		0.19	0.21		0.17
v/c Ratio	0.93	1.13		1.25	1.07		1.61	1.29	0.61	0.81	1.54	0.63
Uniform Delay, d1	22.1	28.5		21.8	28.1		18.5	26.0	22.2	18.9	27.5	24.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.0	73.8		138.5	50.7		285.0	137.6	5.7	20.9	246.3	6.9
Delay (s)	62.0	102.3		160.3	78.8		303.5	163.6	27.9	39.8	273.8	31.2
Level of Service	E	F		F	E		F	F	C	D	F	C
Approach Delay (s)		94.1			101.1			169.2			196.2	
Approach LOS		F			F			F			F	

Intersection Summary

HCM 2000 Control Delay	151.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.53		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	127.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	14	1611	43	0	1930
Future Volume (vph)	0	14	1611	43	0	1930
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt		0.865	0.996			
Flt Protected						
Satd. Flow (prot)	0	1611	3525	0	0	3539
Flt Permitted						
Satd. Flow (perm)	0	1611	3525	0	0	3539
Link Speed (k/h)	50		50			70
Link Distance (m)	45.7		108.4			415.7
Travel Time (s)	3.3		7.8			21.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	15	1751	47	0	2098
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	15	1798	0	0	2098
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	14	1611	43	0	1930
Future Volume (Veh/h)	0	14	1611	43	0	1930
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	15	1751	47	0	2098
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			109			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	2824	899			1798	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2749	7			1288	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	11	753			375	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	15	1167	631	1049	1049
Volume Left	0	0	0	0	0
Volume Right	15	0	47	0	0
cSH	753	1700	1700	1700	1700
Volume to Capacity	0.02	0.69	0.37	0.62	0.62
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	9.9	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.9	0.0		0.0	
Approach LOS	A				

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		56.7%	ICU Level of Service	B
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1305	1186	31	0	33
Future Volume (vph)	0	1305	1186	31	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.996			0.865
Flt Protected						
Satd. Flow (prot)	0	3539	3525	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	3539	3525	0	0	1611
Link Speed (k/h)		50	60		50	
Link Distance (m)		128.3	397.5		31.3	
Travel Time (s)		9.2	23.9		2.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1418	1289	34	0	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1418	1323	0	0	36
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		0.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1305	1186	31	0	33
Future Volume (Veh/h)	0	1305	1186	31	0	33
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1418	1289	34	0	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		128				
pX, platoon unblocked					0.79	
vC, conflicting volume	1323				2015	662
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1323				1757	662
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	91
cM capacity (veh/h)	518				60	405

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	709	709	859	464	36
Volume Left	0	0	0	0	0
Volume Right	0	0	0	34	36
cSH	1700	1700	1700	1700	405
Volume to Capacity	0.42	0.42	0.51	0.27	0.09
Queue Length 95th (m)	0.0	0.0	0.0	0.0	2.3
Control Delay (s)	0.0	0.0	0.0	0.0	14.8
Lane LOS					B
Approach Delay (s)	0.0		0.0		14.8
Approach LOS					B

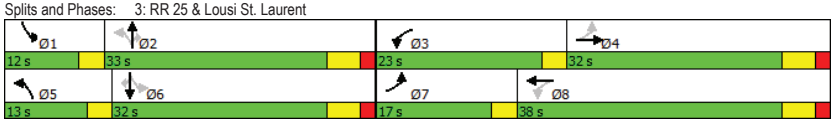
Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		43.8%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	446	821	453	600	892	255	277	1525	403	258	1335	183
Future Volume (vph)	446	821	453	600	892	255	277	1525	403	258	1335	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	60.0		60.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor		0.99			0.99							
Frt		0.947			0.967				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3322	0	1770	3312	0	1770	4893	1553	1752	4803	1509
Flt Permitted	0.160			0.138			0.154			0.160		
Satd. Flow (perm)	301	3322	0	257	3312	0	287	4893	1553	295	4803	1509
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		104			40				311			136
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		486.1			131.0			613.9			111.8	
Travel Time (s)		29.2			7.9			31.6			5.7	
Confl. Peds. (#/hr)	18		2	2		18						
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%	3%	2%	4%	6%	2%	6%	4%	3%	8%	7%
Adj. Flow (vph)	485	892	492	652	970	277	301	1658	438	280	1451	199
Shared Lane Traffic (%)												
Lane Group Flow (vph)	485	1384	0	652	1247	0	301	1658	438	280	1451	199
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.5	24.0		11.0	24.0		11.0	26.0	26.0	11.0	26.0	26.0
Total Split (s)	17.0	32.0		23.0	38.0		13.0	33.0	33.0	12.0	32.0	32.0
Total Split (%)	17.0%	32.0%		23.0%	38.0%		13.0%	33.0%	33.0%	12.0%	32.0%	32.0%
Maximum Green (s)	14.0	26.0		20.0	32.0		10.0	27.0	27.0	9.0	26.0	26.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	1.0	-2.0		1.0	-2.0		1.0	-2.0	-2.0	1.0	-2.0	-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
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
Walk Time (s)		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
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	41.0	28.0		51.0	34.0		38.0	29.0	29.0	36.0	28.0	28.0
Actuated g/C Ratio	0.41	0.28		0.51	0.34		0.38	0.29	0.29	0.36	0.28	0.28
v/c Ratio	1.53	1.38		1.56	1.08		1.24	1.17	0.65	1.26	1.08	0.38
Control Delay	280.2	204.9		287.8	83.6		164.0	117.6	14.2	173.2	84.4	12.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	280.2	204.9		287.8	83.6		164.0	117.6	14.2	173.2	84.4	12.5
LOS	F	F		F	F		F	F	B	F	F	B
Approach Delay		224.5			153.7			104.5			89.8	
Approach LOS		F			F			F			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.56			
Intersection Signal Delay: 140.2		Intersection LOS: F	
Intersection Capacity Utilization 127.6%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 3: RR 25 & Lousi St. Laurent



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	485	1384	652	1247	301	1658	438	280	1451	199
v/c Ratio	1.53	1.38	1.56	1.08	1.24	1.17	0.65	1.26	1.08	0.38
Control Delay	280.2	204.9	287.8	83.6	164.0	117.6	14.2	173.2	84.4	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	280.2	204.9	287.8	83.6	164.0	117.6	14.2	173.2	84.4	12.5
Queue Length 50th (m)	~122.2	~191.0	~172.8	~148.0	~58.8	~148.3	20.0	~53.3	~121.7	9.6
Queue Length 95th (m)	#186.3	#235.0	#243.4	#191.3	#112.8	#178.9	55.8	#106.9	#151.9	28.6
Internal Link Dist (m)		462.1		107.0		589.9			87.8	
Turn Bay Length (m)	50.0		50.0		60.0		60.0	50.0		50.0
Base Capacity (vph)	316	1005	418	1152	242	1418	671	222	1344	520
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.53	1.38	1.56	1.08	1.24	1.17	0.65	1.26	1.08	0.38

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	446	821	453	600	892	255	277	1525	403	258	1335	183
Future Volume (vph)	446	821	453	600	892	255	277	1525	403	258	1335	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3321		1770	3310		1770	4893	1553	1752	4803	1509
Flt Permitted	0.16	1.00		0.14	1.00		0.15	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	301	3321		257	3310		287	4893	1553	295	4803	1509
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)	485	892	492	652	970	277	301	1658	438	280	1451	199
RTOR Reduction (vph)	0	75	0	0	26	0	0	0	221	0	0	98
Lane Group Flow (vph)	485	1309	0	652	1221	0	301	1658	217	280	1451	101
Confl. Peds. (#/hr)	18		2	2		18						
Heavy Vehicles (%)	1%	2%	3%	2%	4%	6%	2%	6%	4%	3%	8%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	40.0	26.0		49.0	32.0		37.0	27.0	27.0	35.0	26.0	26.0
Effective Green, g (s)	38.0	28.0		48.0	34.0		35.0	29.0	29.0	33.0	28.0	28.0
Actuated g/C Ratio	0.38	0.28		0.48	0.34		0.35	0.29	0.29	0.33	0.28	0.28
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	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
Lane Grp Cap (vph)	307	929		410	1125		233	1418	450	213	1344	422
v/s Ratio Prot	0.20	0.39		c0.30	0.37		c0.12	c0.34		0.10	0.30	
v/s Ratio Perm	0.39			c0.46			0.34		0.14	0.33		0.07
v/c Ratio	1.58	1.41		1.59	1.08		1.29	1.17	0.48	1.31	1.08	0.24
Uniform Delay, d1	26.2	36.0		28.9	33.0		28.5	35.5	29.3	30.2	36.0	27.8
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	276.0	190.6		277.0	53.0		159.5	84.1	3.7	170.8	49.1	1.3
Delay (s)	302.2	226.6		305.9	86.0		188.0	119.6	33.0	201.0	85.1	29.1
Level of Service	F	F		F	F		F	F	C	F	F	C
Approach Delay (s)		246.2			161.5			112.4			96.1	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	150.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	127.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

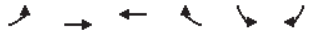
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	19	2213	13	0	1776
Future Volume (vph)	0	19	2213	13	0	1776
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	0.91
Frt		0.865	0.999			
Flt Protected						
Satd. Flow (prot)	0	1611	5080	0	0	5085
Flt Permitted						
Satd. Flow (perm)	0	1611	5080	0	0	5085
Link Speed (k/h)	50		50			70
Link Distance (m)	41.1		111.8			412.3
Travel Time (s)	3.0		8.0			21.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	21	2405	14	0	1930
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	2419	0	0	1930
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	2213	13	0	1776
Future Volume (Veh/h)	0	19	2213	13	0	1776
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	2405	14	0	1930
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			112			
pX, platoon unblocked	0.72	0.72			0.72	
vC, conflicting volume	3055	809			2419	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2498	0			1617	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	97			100	
cM capacity (veh/h)	17	783			288	

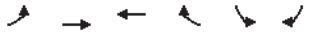
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	21	962	962	495	643	643	643
Volume Left	0	0	0	0	0	0	0
Volume Right	21	0	0	14	0	0	0
cSH	783	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.57	0.57	0.29	0.38	0.38	0.38
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.7	0.0			0.0		
Approach LOS	A						

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	53.0%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1482	1692	12	0	55
Future Volume (vph)	0	1482	1692	12	0	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.999			0.865
Flt Protected						
Satd. Flow (prot)	0	3539	3536	0	0	1644
Flt Permitted						
Satd. Flow (perm)	0	3539	3536	0	0	1644
Link Speed (k/h)		50	60		50	
Link Distance (m)		131.0	394.8		49.8	
Travel Time (s)		9.4	23.7		3.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Adj. Flow (vph)	0	1611	1839	13	0	60
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1611	1852	0	0	60
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		0.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1482	1692	12	0	55
Future Volume (Veh/h)	0	1482	1692	12	0	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1611	1839	13	0	60
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		131				
pX, platoon unblocked					0.74	
vC, conflicting volume	1852				2651	926
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1852				2525	926
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	78
cM capacity (veh/h)	332				17	274

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	806	806	1226	626	60
Volume Left	0	0	0	0	0
Volume Right	0	0	0	13	60
cSH	1700	1700	1700	1700	274
Volume to Capacity	0.47	0.47	0.72	0.37	0.22
Queue Length 95th (m)	0.0	0.0	0.0	0.0	6.5
Control Delay (s)	0.0	0.0	0.0	0.0	21.8
Lane LOS					C
Approach Delay (s)	0.0		0.0		21.8
Approach LOS					C

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	57.2%	ICU Level of Service		B
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	697	305	367	830	146	595	1420	509	233	1442	454
Future Volume (vph)	256	697	305	367	830	146	595	1420	509	233	1442	454
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	60.0		60.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor		0.99			1.00				0.98	1.00		0.98
Frt		0.954			0.978				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3391	0	1787	3516	0	1805	5085	1615	1770	4988	1615
Flt Permitted	0.211			0.182			0.148			0.174		
Satd. Flow (perm)	397	3391	0	342	3516	0	281	5085	1586	324	4988	1579
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		73			22				270			221
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		486.1			128.3			613.9			108.4	
Travel Time (s)		29.2			7.7			31.6			5.6	
Confl. Peds. (#/hr)	10		4	4		10	7		4	4		7
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%	1%	1%	1%	0%	0%	0%	2%	0%	2%	4%	0%
Adj. Flow (vph)	278	758	332	399	902	159	647	1543	553	253	1567	493
Shared Lane Traffic (%)												
Lane Group Flow (vph)	278	1090	0	399	1061	0	647	1543	553	253	1567	493
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		5.0	20.0	20.0	5.0	20.0	20.0
Minimum Split (s)	9.5	24.0		11.0	24.0		11.0	26.0	26.0	11.0	26.0	26.0
Total Split (s)	11.0	26.0		14.0	29.0		20.0	37.0	37.0	13.0	30.0	30.0
Total Split (%)	12.2%	28.9%		15.6%	32.2%		22.2%	41.1%	41.1%	14.4%	33.3%	33.3%
Maximum Green (s)	8.0	20.0		11.0	23.0		17.0	31.0	31.0	10.0	24.0	24.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	1.0	-2.0		1.0	-2.0		1.0	-2.0	-2.0	1.0	-2.0	-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
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max		Max	Max		Max	Max	Max	Max	Max	Max
Walk Time (s)		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
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	29.0	22.0		35.0	25.0		46.0	33.0	33.0	35.0	26.0	26.0
Actuated g/C Ratio	0.32	0.24		0.39	0.28		0.51	0.37	0.37	0.39	0.29	0.29
v/c Ratio	1.18	1.23		1.36	1.07		1.56	0.83	0.74	0.94	1.09	0.80
Control Delay	140.3	144.6		206.5	81.2		287.6	30.6	19.0	62.8	83.4	27.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	140.3	144.6		206.5	81.2		287.6	30.6	19.0	62.8	83.4	27.8
LOS	F	F		F	F		F	C	B	E	F	C
Approach Delay		143.7			115.5			88.9			69.3	
Approach LOS		F			F			F			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.56			
Intersection Signal Delay: 97.6		Intersection LOS: F	
Intersection Capacity Utilization 123.6%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 3: RR 25 & Lousi St. Laurent

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	278	1090	399	1061	647	1543	553	253	1567	493
v/c Ratio	1.18	1.23	1.36	1.07	1.56	0.83	0.74	0.94	1.09	0.80
Control Delay	140.3	144.6	206.5	81.2	287.6	30.6	19.0	62.8	83.4	27.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	140.3	144.6	206.5	81.2	287.6	30.6	19.0	62.8	83.4	27.8
Queue Length 50th (m)	~41.7	~125.5	~78.4	~112.3	~151.5	92.0	43.8	27.0	~118.6	46.7
Queue Length 95th (m)	#92.2	#166.7	#135.9	#153.3	#219.6	111.5	86.3	#74.3	#148.5	#101.0
Internal Link Dist (m)		462.1		104.3		589.9			84.4	
Turn Bay Length (m)	50.0		50.0		60.0		60.0	50.0		50.0
Base Capacity (vph)	236	884	293	992	414	1864	752	270	1440	613
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.18	1.23	1.36	1.07	1.56	0.83	0.74	0.94	1.09	0.80

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	697	305	367	830	146	595	1420	509	233	1442	454
Future Volume (vph)	256	697	305	367	830	146	595	1420	509	233	1442	454
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3392		1787	3515		1805	5085	1586	1770	4988	1579
Flt Permitted	0.21	1.00		0.18	1.00		0.15	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	396	3392		342	3515		281	5085	1586	324	4988	1579
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)	278	758	332	399	902	159	647	1543	553	253	1567	493
RTOR Reduction (vph)	0	55	0	0	16	0	0	0	171	0	0	157
Lane Group Flow (vph)	278	1035	0	399	1045	0	647	1543	382	253	1567	336
Confl. Peds. (#/hr)	10		4	4		10	7		4	4		7
Heavy Vehicles (%)	1%	1%	1%	1%	0%	0%	0%	2%	0%	2%	4%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	28.0	20.0		34.0	23.0		44.0	31.0	31.0	34.0	24.0	24.0
Effective Green, g (s)	26.0	22.0		32.0	25.0		43.0	33.0	33.0	32.0	26.0	26.0
Actuated g/C Ratio	0.29	0.24		0.36	0.28		0.48	0.37	0.37	0.36	0.29	0.29
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	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
Lane Grp Cap (vph)	222	829		282	976		405	1864	581	259	1440	456
v/s Ratio Prot	0.10	0.31		c0.16	0.30		c0.28	0.30		0.10	0.31	
v/s Ratio Perm	0.26			c0.35			c0.48		0.24	0.25		0.21
v/c Ratio	1.25	1.25		1.41	1.07		1.60	0.83	0.66	0.98	1.09	0.74
Uniform Delay, d1	30.2	34.0		25.4	32.5		25.1	25.9	23.8	24.5	32.0	28.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	145.0	121.8		206.4	49.7		280.3	4.4	5.7	50.3	51.6	10.2
Delay (s)	175.2	155.8		231.8	82.2		305.4	30.3	29.5	74.8	83.6	39.1
Level of Service	F	F		F	F		F	C	C	E	F	D
Approach Delay (s)		159.7			123.1			95.0			73.1	
Approach LOS		F			F			F			E	

Intersection Summary

HCM 2000 Control Delay	105.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	123.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	14	1779	43	0	2129
Future Volume (vph)	0	14	1779	43	0	2129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.91	0.91	1.00	0.91
Frt		0.865	0.996			
Flt Protected						
Satd. Flow (prot)	0	1611	5065	0	0	5085
Flt Permitted						
Satd. Flow (perm)	0	1611	5065	0	0	5085
Link Speed (k/h)	50		50			70
Link Distance (m)	45.7		108.4			415.7
Travel Time (s)	3.3		7.8			21.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	15	1934	47	0	2314
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	15	1981	0	0	2314
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	14	1779	43	0	2129
Future Volume (Veh/h)	0	14	1779	43	0	2129
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	15	1934	47	0	2314
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			109			
pX, platoon unblocked	0.72	0.72			0.72	
vC, conflicting volume	2729	668			1981	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2054	0			1022	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	98			100	
cM capacity (veh/h)	35	785			489	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	15	774	774	434	771	771	771
Volume Left	0	0	0	0	0	0	0
Volume Right	15	0	0	47	0	0	0
cSH	785	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.02	0.46	0.46	0.26	0.45	0.45	0.45
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.7	0.0			0.0		
Approach LOS	A						

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	45.3%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1439	1310	31	0	33
Future Volume (vph)	0	1439	1310	31	0	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	1.00
Frt			0.997			0.865
Flt Protected						
Satd. Flow (prot)	0	3539	3529	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	3539	3529	0	0	1611
Link Speed (k/h)		50	60		50	
Link Distance (m)		128.3	397.5		31.3	
Travel Time (s)		9.2	23.9		2.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1564	1424	34	0	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1564	1458	0	0	36
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.6	3.6		0.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		4.8	4.8		4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	1439	1310	31	0	33
Future Volume (Veh/h)	0	1439	1310	31	0	33
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1564	1424	34	0	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		128				
pX, platoon unblocked					0.77	
vC, conflicting volume	1458				2223	729
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1458				1997	729
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	90
cM capacity (veh/h)	460				41	365

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	782	782	949	509	36
Volume Left	0	0	0	0	0
Volume Right	0	0	0	34	36
cSH	1700	1700	1700	1700	365
Volume to Capacity	0.46	0.46	0.56	0.30	0.10
Queue Length 95th (m)	0.0	0.0	0.0	0.0	2.6
Control Delay (s)	0.0	0.0	0.0	0.0	15.9
Lane LOS					C
Approach Delay (s)	0.0		0.0		15.9
Approach LOS					C

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		47.2%	ICU Level of Service	A
Analysis Period (min)		15		

Appendix F

AutoTURN

HSU

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

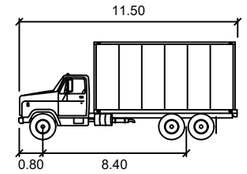
NO.	DATE	INITIAL	REVISION DETAIL

APPROVAL:

AUTOTURN ASSESSMENT - CREEKSIDE CONDOS
TAC - HEAVY SINGLE UNIT (HSU)
6439 REGIONAL ROAD 25
TOWN OF MILTON

paradigm

PROJECT NO.: 190334	DATE: SEPTEMBER 2019	SCALE: 1:1000	DRAWING NO.:
DRAWN: SC	DESIGN: SC	CHECK: AMa	AT 1



HSU

	meters
Width	: 2.60
Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

REGIONAL RD 25

HSU
AC-1999 (CA)

3.8m

LOUIS ST. LAURENT AVE

NO.	DATE	INITIAL	REVISION DETAIL

APPROVAL:

AUTOTURN ASSESSMENT - CREEKSIDE CONDOS
TAC - HEAVY SINGLE UNIT (HSU) - INBOUND
6439 REGIONAL ROAD 25
TOWN OF MILTON

paradigm

PROJECT NO.: 190334	DATE: SEPTEMBER 2019	SCALE: 1:1000	DRAWING NO.:
DRAWN: SC	DESIGN: SC	CHECK: AMa	AT 2

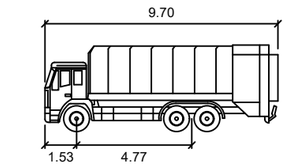
NO.	DATE	INITIAL	REVISION DETAIL

APPROVAL:

AUTOTURN ASSESSMENT - CREEKSIDE CONDOS
TAC - HEAVY SINGLE UNIT (HSU) - OUTBOUND
6439 REGIONAL ROAD 25
TOWN OF MILTON

paradigm

PROJECT NO.: 190334	DATE: SEPTEMBER 2019	SCALE: 1:1000	DRAWING NO.:
DRAWN: SC	DESIGN: SC	CHECK: AMa	AT 1



Halton Front End

	meters
Width	: 2.70
Track	: 2.70
Lock to Lock Time	: 6.0
Steering Angle	: 23.9

REGIONAL RD 25

LOUIS ST. LAURENT AVE

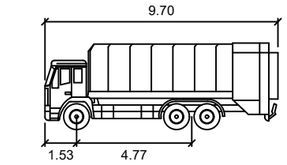
NO.	DATE	INITIAL	REVISION DETAIL

APPROVAL:

AUTOTURN ASSESSMENT - CREEKSIDE CONDOS
HALTON FRONT END
6439 REGIONAL ROAD 25
TOWN OF MILTON

paradigm

PROJECT NO.: 190334	DATE: SEPTEMBER 2019	SCALE: 1:1000	DRAWING NO.: AT 4
DRAWN: SC	DESIGN: SC	CHECK: AMa	



Halton Front End

	meters
Width	: 2.70
Track	: 2.70
Lock to Lock Time	: 6.0
Steering Angle	: 23.9

REGIONAL RD 25

Halton Front End
Outbound

Halton Front End
Outbound

Halton Front End
Outbound

LOUIS ST. LAURENT AVE

NO.	DATE	INITIAL	REVISION DETAIL

APPROVAL:

AUTOTURN ASSESSMENT - CREEKSIDE CONDOS
HALTON FRONT END - INBOUND
6439 REGIONAL ROAD 25
TOWN OF MILTON

paradigm

PROJECT NO.: 190334	DATE: SEPTEMBER 2019	SCALE: 1:1000	DRAWING NO.:
DRAWN: SC	DESIGN: SC	CHECK: AMa	AT 5

Halton Front End

	meters
Width	: 2.70
Track	: 2.70
Lock to Lock Time	: 6.0
Steering Angle	: 23.9

NO.	DATE	INITIAL	REVISION DETAIL

APPROVAL:

AUTOTURN ASSESSMENT - CREEKSIDE CONDOS
HALTON FRONT END - OUTBOUND
6439 REGIONAL ROAD 25
TOWN OF MILTON

paradigm

PROJECT NO.: 190334	DATE: SEPTEMBER 2019	SCALE: 1:1000	DRAWING NO.:
DRAWN: SC	DESIGN: SC	CHECK: AMa	AT 6

Halton White Good

meters

Width	: 3.20
Track	: 3.20
Lock to Lock Time	: 6.0
Steering Angle	: 35.1

NO.	DATE	INITIAL	REVISION DETAIL

APPROVAL:

AUTOTURN ASSESSMENT - CREEKSIDE CONDOS
HALTON WHITE GOODS
6439 REGIONAL ROAD 25
TOWN OF MILTON

paradigm

PROJECT NO.: 190334	DATE: SEPTEMBER 2019	SCALE: 1:1000	DRAWING NO.: AT 7
DRAWN: SC	DESIGN: SC	CHECK: AMa	

Halton White Good

meters

Width	: 3.20
Track	: 3.20
Lock to Lock Time	: 6.0
Steering Angle	: 35.1

NO.	DATE	INITIAL	REVISION DETAIL

APPROVAL:

AUTOTURN ASSESSMENT - CREEKSIDE CONDOS
HALTON WHITE GOODS - INBOUND
6439 REGIONAL ROAD 25
TOWN OF MILTON

paradigm

PROJECT NO.: 190334	DATE: SEPTEMBER 2019	SCALE: 1:1000	DRAWING NO.:
DRAWN: SC	DESIGN: SC	CHECK: AMa	AT 8

Halton White Good

meters

Width	: 3.20
Track	: 3.20
Lock to Lock Time	: 6.0
Steering Angle	: 35.1

NO.	DATE	INITIAL	REVISION DETAIL

APPROVAL:

AUTOTURN ASSESSMENT - CREEKSIDE CONDOS
HALTON WHITE GOODS - OUTBOUND
6439 REGIONAL ROAD 25
TOWN OF MILTON

paradigm

PROJECT NO.: 190334	DATE: SEPTEMBER 2019	SCALE: 1:1000	DRAWING NO.:
DRAWN: SC	DESIGN: SC	CHECK: AMa	AT 9

Appendix G

Parking Survey

33 Whitmer Street - 148 Residential Units										Overall	1.04
										Visitor - Max Observed	0.19
										Resident - Max Observed	0.84
TIME ENDING	Saturday November 4 2017			Tuesday October 31 2017			Wednesday November 1 2017			Average		
	Visitor	Residential	Total	Visitor	Residential	Total	Visitor	Residential	Total	Visitor	Residential	Total
16:15	2	96	98	1	90	91	3	80	83	2	89	91
16:30	2	98	100	2	91	93	3	85	88	2	91	94
16:45	2	100	102	2	95	97	3	83	86	2	93	95
17:00	2	103	105	2	97	99	3	86	89	2	95	98
17:15	2	102	104	2	99	101	3	91	94	2	97	100
17:30	2	105	107	2	99	101	3	93	96	2	99	101
17:45	2	107	109	2	105	107	3	96	99	2	103	105
18:00	4	104	108	5	104	109	6	95	101	5	101	106
18:15	4	105	109	5	111	116	6	103	109	5	106	111
18:30	6	110	116	5	115	120	7	106	113	6	110	116
18:45	7	114	121	5	113	118	7	106	113	6	111	117
19:00	8	117	125	7	116	123	9	110	119	8	114	122
19:15	8	120	128	8	116	124	9	110	119	8	115	124
19:30	8	119	127	9	118	127	10	112	122	9	116	125
19:45	11	117	128	11	122	133	12	116	128	11	118	130
20:00	13	114	127	14	122	136	15	115	130	14	117	131
20:15	18	117	135	15	120	135	18	112	130	17	116	133
20:30	20	120	140	18	118	136	20	111	131	19	116	136
20:45	21	117	138	19	117	136	21	114	135	20	116	136
21:00	23	120	143	20	114	134	23	113	136	22	116	138
21:15	25	121	146	21	118	139	24	118	142	23	119	142
21:30	27	121	148	24	120	144	27	119	146	26	120	146
21:45	29	123	152	24	122	146	28	121	149	27	122	149
22:00	31	127	158	26	125	151	30	124	154	29	125	154

33 Whitmer Street is that are located within the southeast corner of Main Street West and Whitmer Street in Milton, Ontario. This development is made up of a six-storey buildings with a total of 148 residential units varying from 1 bedroom to 2 bedrooms. There is 149 residential parking spaces and 38 visitor parking spaces.

640-650 Suave, Milton										
							Units	350		
Total Spaces	612							1.75	spaces/unit	
On Site	242	occupied Spaces at start								
Start	**In**	**Out**	**Net**	**+/-**						
4:13	47	20	269	343			Max	497	1.42	spaces/unit
4:43	37	29	277	335			Avg	416	1.19	spaces/unit
5:13	50	29	298	314						
5:43	61	35	324	288						
6:13	55	35	344	268						
6:43	52	42	354	258						
7:13	36	34	356	256						
7:43	49	30	375	237						
8:13	49	22	402	210						
8:43	43	23	422	190						
9:13	31	16	437	175						
9:43	30	17	450	162						
10:13	28	16	462	150						
10:43	18	12	468	144						
11:13	14	4	478	134						
11:43	11	6	483	129						
12:13	6	4	485	127						
12:43	8	3	490	122						
1:13	5	0	495	117						
1:43	4	2	497	115						
2:13	1	1	497	115						
2:43	0	0	497	115						

Appendix H

City of Kitchener TDM Checklist

PARTS TDM: City of Kitchener TDM Checklist

Applicant Name: _____ **Date of Application (YY-MM-DD):** _____

Site Location: 6439 Regional Road 25, Milton **Landowner / Developer Name:** _____

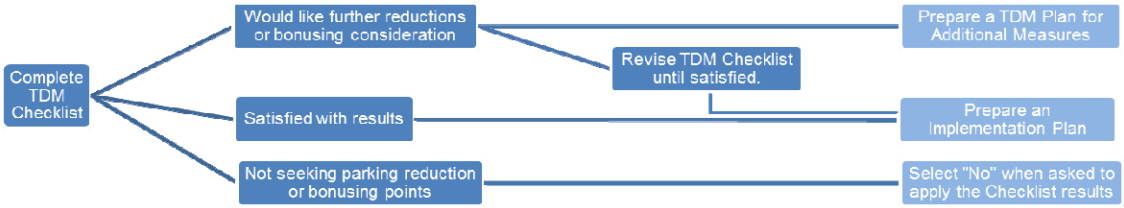
Zone: _____ **TDM Checklist No. (filled by staff):** _____

Using the TDM Report Checklist

The TDM Checklist is one component of submitting a TDM Report, and a tool intended for Developers' use when determining potential parking reductions in exchange for certain TDM measures. Derived from the Region of Waterloo's TDM Checklist and Parking Management Worksheet, this City of Kitchener TDM Checklist is required to be completed for all developments within Station Areas with the exception of residential developments with 6 units or less. Currently, this Checklist applies to lands located within the Station Study Areas identified in PARTS Phase 1, and supersedes the Region's Checklist and Parking Management Worksheet for any developments within those defined areas.

TDM Report Reference Guide

A Reference Guide has been prepared for submission of a TDM Report, and can be found appended to the PARTS Phase 2: TDM Strategy.
The general process behind completing a TDM Report is depicted by the diagram below.



* Specific requirements for an Implementation Plan or TDM Plan are included within the Reference Guide.

Instructions to Complete the TDM Checklist

To complete the TDM Checklist, fill out Table A and Table B. Once completed, review the Summary Results in Table C and Table D.

Table A is broken down into two sections. Please complete Table A1 with any applicable parking and bicycle parking requirements from Schedule 6 of the Zoning By-law for your site. Mixed-use developments may also be eligible for shared parking space reductions where the development will use unassigned parking spaces; if in Table A1 you specify parking requirements for multiple land uses, Table A2 will automatically calculate shared parking rates and a percent parking reduction.

Table B indicates optional TDM measures that can included by the developer in exchange for potential parking reductions. Complete Table B for a potential parking reduction.

TABLE A — SHARED PARKING REQUIREMENTS

Mixed-use developments may be eligible for parking space reductions based on shared parking ratios between uses. Please fill out the yellow boxes in the table below based on the Zoning By-Law requirements for parking and bicycle parking for your land use(s). Orange boxes will automatically show your results.

TABLE A1. Zoning By-law Requirements			TABLE A2. Shared Parking Rate Breakdown							
			Morning		Noon		Afternoon		Evening	
Land Use	Parking	Class A Bike Parking	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Office	0	0	0	0	0	0	0	0	0	0
Medical	0	0	0	0	0	0	0	0	0	0
Real Estate	0	0	0	0	0	0	0	0	0	0
Financial Institution	0	0	0	0	0	0	0	0	0	0
Retail	0	0	0	0	0	0	0	0	0	0
Personal Services	0	0								
Art Gallery	0	0								
Museum	0	0								
Repair Establishment	0	0								
Restaurant/Take-out Restaurant	0	0	0	0	0	0	0	0	0	0
Hotel (rooms)	0	0	0	0	0	0	0	0	0	0
Hotel (Function Space)	0	0	0	0	0	0	0	0	0	0
Residential - Resident	405	0	365	365	264	264	365	365	405	405
Residential - Visitor	68	0	14	14	14	14	34	41	68	68
Other	0	0	0	0	0	0	0	0	0	0
Total Required Parking	473	0	379	379	278	278	399	406	473	473
Shared / Unassigned Required Parking	**473**		Parking Reduction (Individual Uses)		**0**	% Reduction Over Unshared Parking (Individual Uses)		**0.0**		
Plaza Complex or Mixed-Office-Residential [T]	0	0	Parking Reduction (Plaza / Mixed [TT])		0	% Reduction Over Unshared Parking (Plaza / Mixed [TT])		#DIV/0!		

[T] Note: See Zoning By-Law S.6 to calculate parking requirement for Plaza / Mixed uses. | [TT] Note: For further potential reductions, apply individual use rates in Table A1.

Shared Parking Summary	Yes or No ?	Resultant Parking Required
Would you like to apply Table A shared rates for a parking reduction?	Yes	473.0 Spaces

Note: to apply these rates, 100% of parking must be shared between uses and unassigned. If you would like to use shared parking rates for only a portion of the required parking spaces, you must provide the proposed shared parking rates and applicable reductions in an Implementation Plan or TDM Plan within the TDM Report.

PARTS TDM: City of Kitchener TDM Checklist

TABLE B	OPTIONAL TDM MEASURES

Certain TDM measures are required by the Zoning By-Law. Exceeding these minimum requirements is optional and can lead to parking reductions based on the discretion of the City of Kitchener. To complete this form, please fill out the yellow boxes in the table below with details about your development proposal. Please refer to the Urban Design Manual for feature design standards.

Measure	Features	Parking Reduction Available	To a Maximum Reduction of		Developer Proposes Provision of		Maximum Reduction Allowable	Bonusing Points (TBD)
			Amount	Unit	Amount	Unit		
B1	Provision of bicycle parking spaces beyond the minimum amount required by the Zoning By-law.	1 car space reduction per 5 bicycle spaces beyond minimum Zoning By-law requirement.	10%	of total parking required		Bicycle Spaces beyond minimum required	0	
B2	Non-residential uses: provision of shower and change facilities at an amount of not less than 13m2 in equal proportion of male and female facilities (Note: maximum reduction amount calculated based on required bicycle parking).	2 car space reduction for each additional shower facility provided at (13m2).	0	parking space(s)	0	m2 of shower / change facilities	0	
B3*	Non-residential (office) uses: Provision of 1 car share vehicle and dedicated parking space in a priority location that is publically accessible for a development with at least 25 required parking spaces, and 1 additional car share vehicle and dedicated parking space for every 50 additional required parking spaces. (Note: maximum reduction amount calculated based on required parking).	4 car space reduction for each car share vehicle and dedicated parking space provided	0	parking space(s)	0	Non-residential car share vehicle(s) and Space(s)	0	
	Residential uses: Provision of 1 car share vehicle and dedicated parking space in a priority location that is publically accessible unless it is a private shared vehicle for every 75 dwelling units. (Note: maximum reduction amount calculated based on required parking).	4 car space reduction for each car share vehicle and dedicated parking space provided	24	parking space(s)	0	Residential car share vehicle(s) and Space(s)	0	
B4	Non-residential uses: Provision of ride share parking spaces in a priority location.	3 car space reduction for each ride share space provided	5%	of total parking required	0	Priority Car Pool Spaces	0	
B5	Provision of active uses at-grade along street frontages.	1% car space reduction	1%	of total parking required	☑ Yes	Check "Yes" (left) if you will provide	4	
B6*	The building owner/occupant will provide subsidized transit passes for all occupants for a period of two years.	10% car space reduction	10%	of total parking required	☐ Yes	Check "Yes" (left) if you will provide	0	
B7	Building owner/occupant agrees to charge for parking as a separate cost to occupants.	10% car space reduction	10%	of total parking required	☑ Yes	Check "Yes" (left) if you will provide	47	
B8*	Employment Uses: Building owner/occupant agrees to join Travelwise (TMA) that provides ride matching services for car/vanpooling and emergency ride home options.	10% car space reduction	10%	of total parking required	☐ Yes	Check "Yes" (left) if you will provide	0	
B9	Enhanced bus shelters with seating are provided at the transit stop immediately adjacent to the development in consultation with the City of Kitchener and the Region of Waterloo.	Not Applicable for parking reduction	Can only be applied to bonusing consideration		☐ Yes	Check "Yes" (left) if you will provide	0	
B10	Provide television monitors in visible and accessible locations on site and in adjacent transit stops to allow to City of Kitchener and the Region of Waterloo to display information regarding public transportation.	Not Applicable for parking reduction	Can only be applied to bonusing consideration		☐ Yes	Check "Yes" (left) if you will provide	0	
B11	Provision of bicycle self-service station equipped with tools necessary to perform basic repairs and maintenance	Not Applicable for parking reduction	Can only be applied to bonusing consideration		☐ Yes	Check "Yes" (left) if you will provide	0	
B12	25% to 49% of required parking is located underground or in a structure	Not Applicable for parking reduction	Can only be applied to bonusing consideration Select only one option (right)		☐ Yes	Check "Yes" (left) if you will provide	0	
	50% - 74% of required parking is located underground or in a structure				☐ Yes	Check "Yes" (left) if you will provide	0	
	A minimum of 75% of required parking is located underground or in a structure				☐ Yes	Check "Yes" (left) if you will provide	0	
B13	Non-residential use: Implements paid parking system, where price is set greater than the cost of a monthly transit pass, on all or part of the site (e.g. parking permits, paid parking near main entrances, enabled by gate and transponder access, or Pay & Display stations).	1% car space reduction for every 10% of parking spaces under a paid parking system	10%	of total parking required	0%	% of total parking spaces under paid parking system	0	

* If you have selected Measures B3, B6 or B8 for a parking reduction, you must demonstrate to the satisfaction of the Director of Transportation Services that you will be able to achieve the proposed TDM measure, including any ongoing programming or management that may be required for program success.

TABLE C	POTENTIAL PARKING REDUCTION SUMMARY	
Displayed below are the potential reductions to required parking spaces available based on the amounts entered into Table A and Table B above.		
Original # Parking Spaces Required:	473	0
Shared Parking Reduction [P]:	0	0
Parking Reduction for TDM Measures B1-B12:	51	0
Total Parking Reduction:	51	0
Resultant Parking Requirement:	422	0
PERCENT REDUCTION	11	#DIV/0!

[P] Note: If applicable, Parking Reductions for Plaza / Mixed-Use are noted in brown

TABLE D	BONUSING POINT SCORE SUMMARY *	
If you achieved a Bonusing Points score greater than X, you may be eligible for bonusing. Please contact City of Kitchener staff for more details.		
Total Bonusing Points Achieved	0	
Eligible for Bonusing Consideration?	No	

*Approach to bonusing to be determined by City staff

NEXT STEPS
Thank you for completing the TDM Checklist. Please select whether you would like to apply for a potential parking reduction at the bottom of this page. Refer to the TDM Report Reference Guide for submission requirements to City of Kitchener Staff. If you would like to achieve a greater parking reduction than may be considered through the TDM Checklist, you may develop a TDM Plan as set out in the TDM Report Reference Guide.

Would you like to apply Table C rates for a parking reduction?

If you selected No, please submit your completed Checklist to City staff for review.

Select an Option

If you selected Yes, please refer to the TDM Report Reference Guide for submission requirements of an Implementation Plan or TDM Plan.