1971 - 1975 St. Laurent Boulevard

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report (Rev #1)

Prepared for:

Starlight Development
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March 2023

PN: 2020-23

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1 Screening

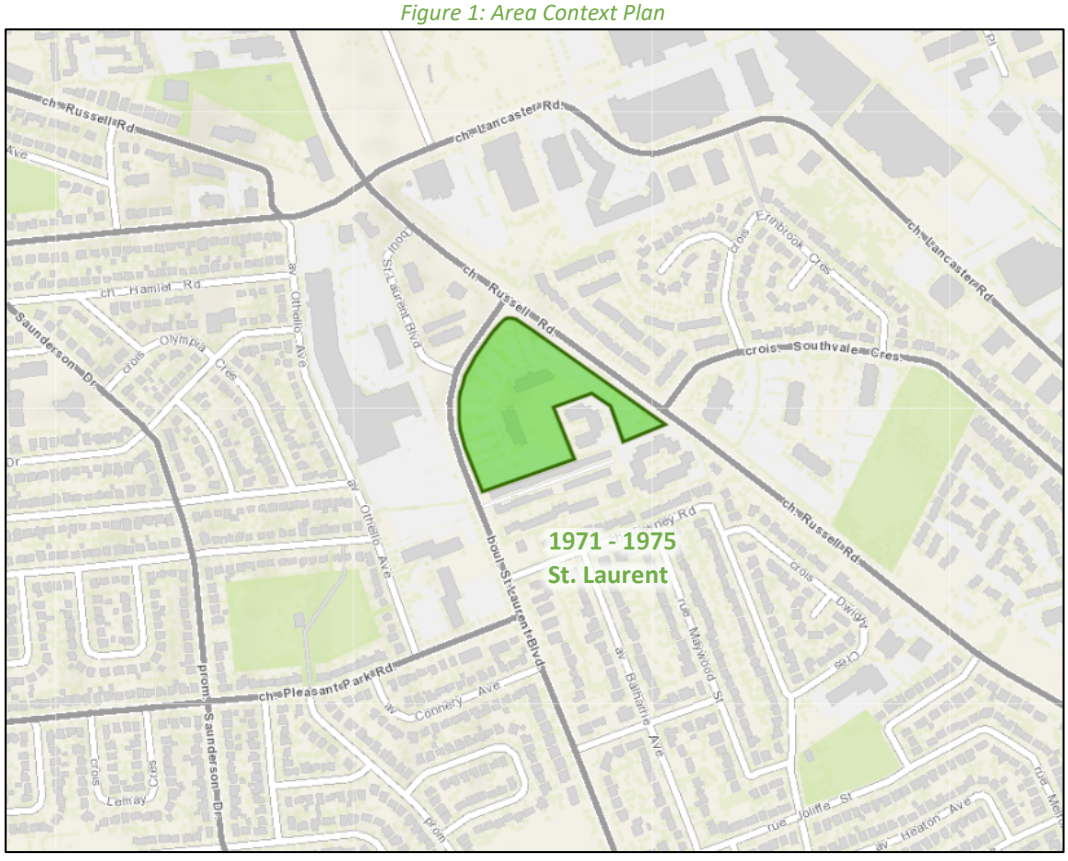
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component and the Network Impact Component. This study has been prepared to support a site plan application.

2 Existing and Planned Conditions

2.1 Proposed Development

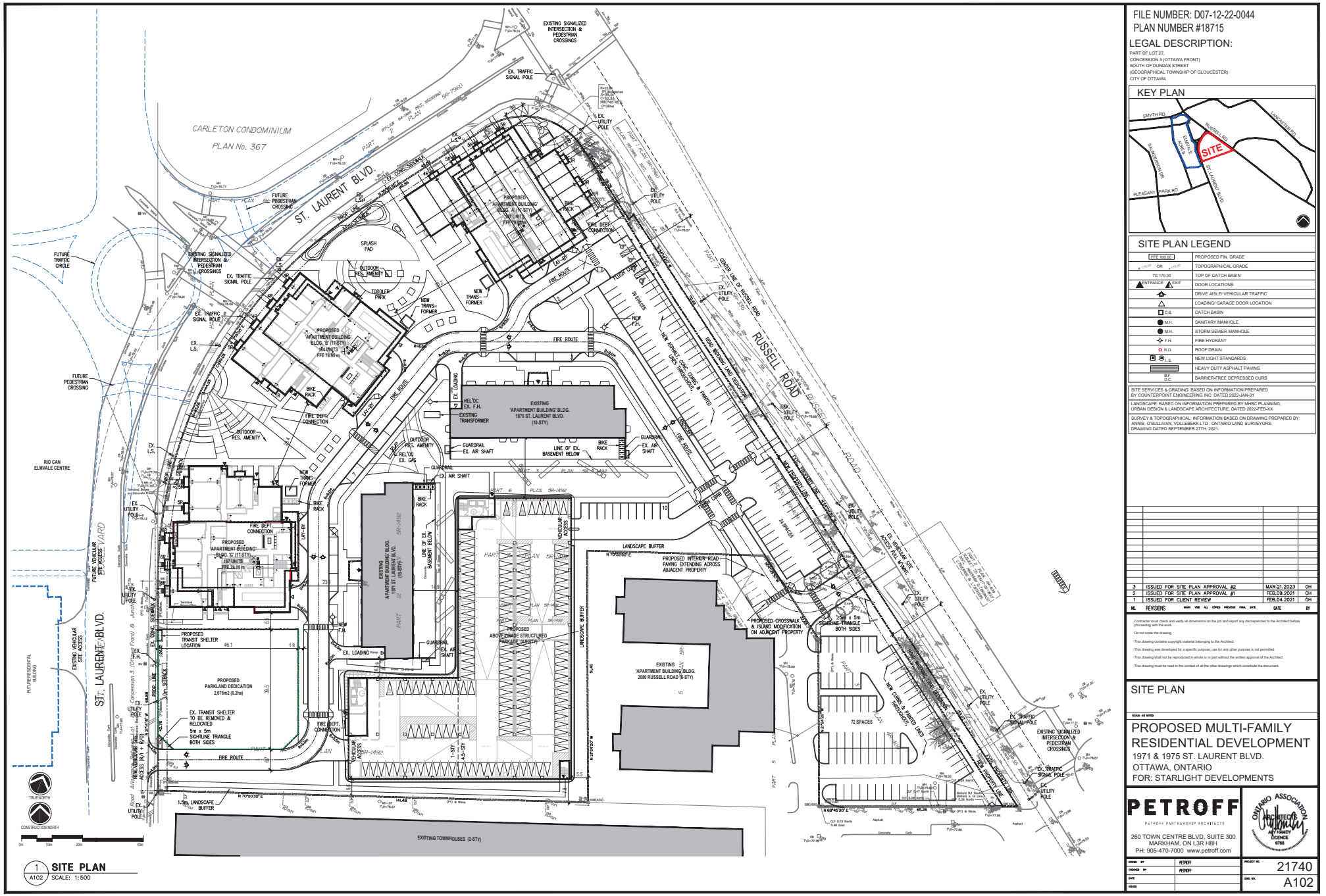
The existing site, located at 1971 and 1975 St. Laurent Boulevard, is zoned as Arterial Mainstreet (AM10 H(54)) & Residential Fifth Density Zone (R5B H(18)). The site currently includes two 18 storey apartment towers with a total of 500 units and approximately 494 surface parking spaces. The proposed redevelopment would replace the existing surface parking spaces with three 17 storey residential buildings with a total of 498 units, a parkland, and a 4.5-storey parking structure with 523 parking spaces. The remaining surface parking would be a total of 176 spaces. The anticipated full build-out and occupancy horizon is 2030 with construction occurring in sequence. The existing full-movements access onto Russell Road will be maintained and right-in/right-out access onto St. Laurent Boulevard is proposed, along with the internal site connected to the south. The site is located within the St. Laurent Arterial Mainstreet Design Priority Area. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: November 24, 2022

Figure 2: Concept Plan



1 A102 **SITE PLAN**
SCALE: 1:500

FILE NUMBER: D07-12-22-0044
PLAN NUMBER #18715

LEGAL DESCRIPTION:

PART OF LOT 27,
CONCESSION 3 (OTTAWA FRONT)
SOUTH OF DUNDAS STREET
(GEOGRAPHICAL TOWNSHIP OF GLOUCESTER)
CITY OF OTTAWA

KEY PLAN

SITE PLAN LEGEND

FFE 100.00	PROPOSED FIN. GRADE
115.00 OR 115.00	TOPOGRAPHICAL GRADE
TG 179.00	TOP OF CATCH BASIN
ENTRANCE / EXIT	DOOR LOCATIONS
	DRIVE AISLE/ VEHICULAR TRAFFIC
	LOADING/ GARAGE DOOR LOCATION
C.B.	CATCH BASIN
M.H.	SANITARY MANHOLE
M.H.	STORM SEWER MANHOLE
F.H.	FIRE HYDRANT
R.D.	ROOF DRAIN
L.S.	NEW LIGHT STANDARDS
	HEAVY DUTY ASPHALT PAVING
B.F. D.C.	BARRIER-FREE DEPRESSED CURB

SITE SERVICES & GRADING: BASED ON INFORMATION PREPARED BY COUNTERPOINT ENGINEERING INC. DATED 2022-JAN-31

LANDSCAPE: BASED ON INFORMATION PREPARED BY MHBC PLANNING, URBAN DESIGN & LANDSCAPE ARCHITECTURE, DATED 2022-FEB-XX

SURVEY & TOPOGRAPHICAL: INFORMATION BASED ON DRAWING PREPARED BY: ANNIS, O'SULLIVAN, VOLLEBEKK LTD . ONTARIO LAND SURVEYORS DRAWING DATED SEPTEMBER 27TH, 2021.

NO.	REVISIONS	DATE	BY
3	ISSUED FOR SITE PLAN APPROVAL #2	MAR.21.2023	OH
2	ISSUED FOR SITE PLAN APPROVAL #1	FEB.09.2021	OH
1	ISSUED FOR CLIENT REVIEW	FEB.04.2021	OH

Contractor must check and verify all dimensions on the job and report any discrepancies to the Architect before proceeding with the work.

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This drawing must be read in the context of all the other drawings which constitute the document.

SITE PLAN

SCALE: AS NOTED

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

1971 & 1975 ST. LAURENT BLVD.
OTTAWA, ONTARIO
FOR: STARLIGHT DEVELOPMENTS

PETROFF
PETROFF PARTNERSHIP ARCHITECTS
260 TOWN CENTRE BLVD, SUITE 300
MARKHAM, ON L3R H8H
PH: 905-470-7000 www.petroff.com

ONTARIO ASSOCIATION OF ARCHITECTS
LAY MEMBER LICENCE
6768

DRAWN BY	PETROFF
CHECKED BY	PETROFF
DATE	
ISSUED	
PROJECT NO.	21740
DWG. NO.	A102

2.2 Existing Conditions

2.2.1 Area Road Network

St. Laurent Boulevard: St. Laurent Boulevard is a City of Ottawa arterial road north of Russell Road, with a discontinuous section south of Lancaster Road and a collector road to the west of Russell Road. North of Lancaster Road has a divided five-lane urban cross-section with a dedicated southbound bus lane. The cycletrack is provided on the west side of the road and sidewalks are provided on both sides. West of Russell Road has a divided four-lane urban cross-section with sidewalks on both sides. Seventy-five metres north of Lancaster Road, the posted speed limit is 70 km/h and the posted speed limit is 50 km/h to the south, the City-protected right-of-way is 44.5 metres north of Lancaster Road, and the existing right of way is 26.0 metres within the remainder of the study area. St. Laurent Boulevard is designated as a truck route north of Russell Road.

Russell Road: Russell Road is a City of Ottawa arterial road. Between Lancaster Road and the southern St. Laurent Boulevard intersection, the roadway consists of a divided four-lane semi-urban cross-section and includes a bike lane on the west side of the road. South of St. Laurent Boulevard, the roadway is a two-lane semi-urban cross-section, which changes to rural cross-section 95.0 metres south St. Laurent Boulevard. The sidewalks are provided along the west side of the roadway north St. Laurent Boulevard and transit to the asphalt pathway to the south. The posted speed limit is 50 km/h and the City-protected right-of-way is 37.5 metres. Russell Road is designated as a truck route.

Smyth Road: Smyth Road is a City of Ottawa arterial road with a four-lane urban cross-section with sidewalks on both sides of the road. The posted speed limit is 50 km/h and the City-protected right-of-way is 26.0 metres. Smyth Road is designated as a truck route.

Pleasant Park Road: Pleasant Park Road is a City of Ottawa collector road with a two-lane urban cross-section with a sidewalk on the north side of the road and with on-street parking permitted on the north side of the road. The unposted speed limit is assumed to be 50 km/h and the existing right of way is 20.0 metres.

Southvale Crescent: Southvale Crescent is a City of Ottawa collector road with a two-lane urban cross-section with sidewalks on both sides of the road. The posted speed limit is 50 km/h and the existing right of way is 20.0 metres.

Lancaster Road: Lancaster Road is a City of Ottawa collector road with a two-lane cross-section. Sidewalks and curbside bike lanes on both sides of the road within the study area. The unposted speed limit is assumed to be 50 km/h and the existing right of way is 24.0 metres within the study area. Lancaster Road is designated as a truck route.

St. Laurent Boulevard Service Road: St. Laurent Boulevard Service Road is a City of Ottawa local road. The roadway has a divided three-lane cross-section with one northbound lane and two southbound bus lanes. The unposted speed limit is assumed to be 50 km/h and the existing right of way is 25.5 metres within the study area.

2.2.2 Existing Intersections

The existing signalized area intersections within 400 metres of the site have been summarized below:

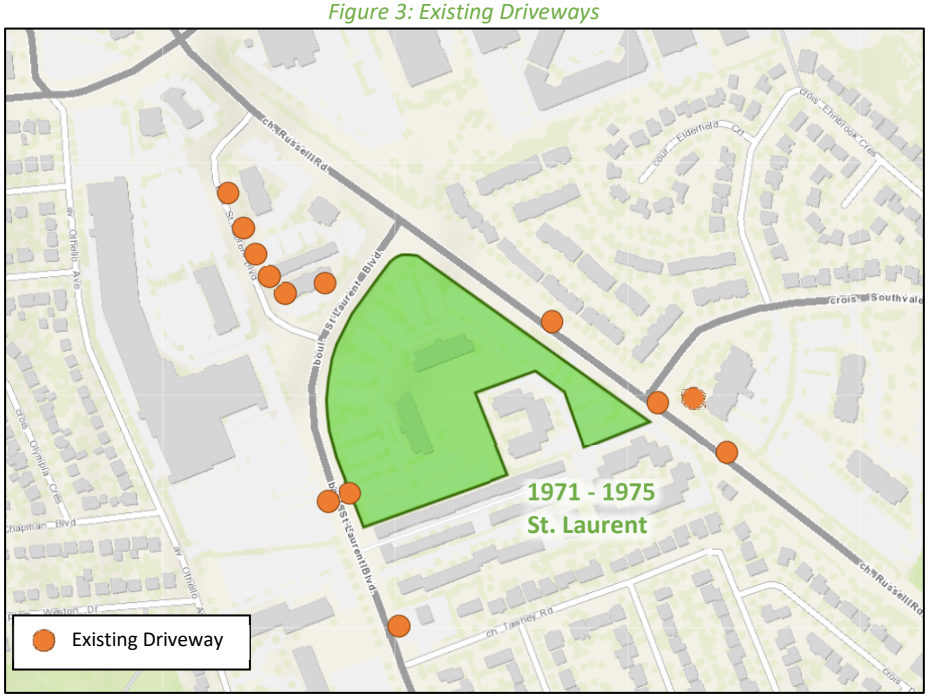
St. Laurent Boulevard at Smyth Road / Lancaster Road	The intersection of St. Laurent Boulevard at Smyth Road/ Lancaster Road is a signalized intersection. The northbound approach consists of an auxiliary left-turn, a through lane, a shared through/channelized right-turn lane, and a pocket bike lane and the southbound approach consists of an auxiliary left-turn lane, two through lanes, a bike pocket that transitions the cycletrack to an on-street bike lane through the right-turn channel, and an auxiliary channelized right-turn lane. The

	eastbound approach consists of an auxiliary left-turn lane, a left-turn lane, a through lane, a bike pocket, and a channelized right-turn lane, and the westbound approach consists of an auxiliary left-turn lane, a through lane, an auxiliary shared through/channelized right-turn lane, and a bike lane. No turn restrictions were noted.
Russell Road at St. Laurent Boulevard	The intersection of Russell Road at St. Laurent Boulevard is a signalized intersection. The northbound approach of Russell Road consists of an auxiliary left-turn, a through lane, and an auxiliary through lane, and the southbound approach consists of two through lanes, a bike pocket, and an auxiliary channelized right-turn lane. The eastbound approach consists of a left-turn lane and a shared left-turn/channelized right-turn lane. No turn restrictions were noted.
Russell Road at Southvale Crescent N	The intersection of Russell Road at Southvale Crescent is a signalized intersection. The northbound approach consists of a shared through/right-turn lane, and the southbound approach consists of an auxiliary left-turn and a through lane. The westbound approach consists of an auxiliary left-turn lane and a right-turn lane. No turn restrictions were noted.
St. Laurent Boulevard at St. Laurent Boulevard Service Road	The intersection of St. Laurent Boulevard at St. Laurent Boulevard Service Road is a signalized intersection. The northbound approach consists of an auxiliary left-turn and two through lanes, and the southbound approach consists of a through lane and a shared through/channelized right-turn lane. The eastbound approach consists of a shared left-turn/ channelized right-turn lane. No turn restrictions were noted.
St. Laurent Boulevard at Pleasant Park Road	The intersection of St. Laurent Boulevard at Pleasant Park Road is a signalized intersection. The northbound approach consists of an auxiliary left-turn and a through lane and the southbound approach consists of a through lane and a right-turn lane. The eastbound approach consists of an auxiliary left-turn lane and a right-turn lane. No turn restrictions were noted.
Russell Road at Access #1	The intersection of Russell Road at Access #1 is a stop-controlled intersection on the minor approach of Access #1. Each approach consists of a shared all-movement lane. No turn restrictions were noted.
St. Laurent Boulevard at Access #2	The intersection of St. Laurent Boulevard at Access #2 is a stop-controlled intersection on the minor approach of Access #2. The northbound and southbound approaches each consists of an auxiliary left-turn, a through lane, and a shared through/right-turn lane. The eastbound and westbound approaches each consists of a shared all-movement lane. No turn restrictions were noted.

2.2.3 Existing Driveways

Within 200 metres of the site accesses, one driveway to Ottawa Community housing and one to a detached home are located on the west side of Russell Road. On the east side of Russell Road, a driveway to the mid-rise building is present. Opposite the existing site access on St. Laurent Boulevard, a driveway to a retail plaza is present, and a driveway to an automotive repair shop is present on the east side of St. Laurent Boulevard. Driveways are also present on the east sides of St. Laurent Boulevard Service Road to two mid-rise buildings, one detached dwelling, and three low-rise buildings. Figure 4 illustrates the existing driveways.

Figure 3: Existing Driveways



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: November 24, 2022

2.2.4 Cycling and Pedestrian Facilities

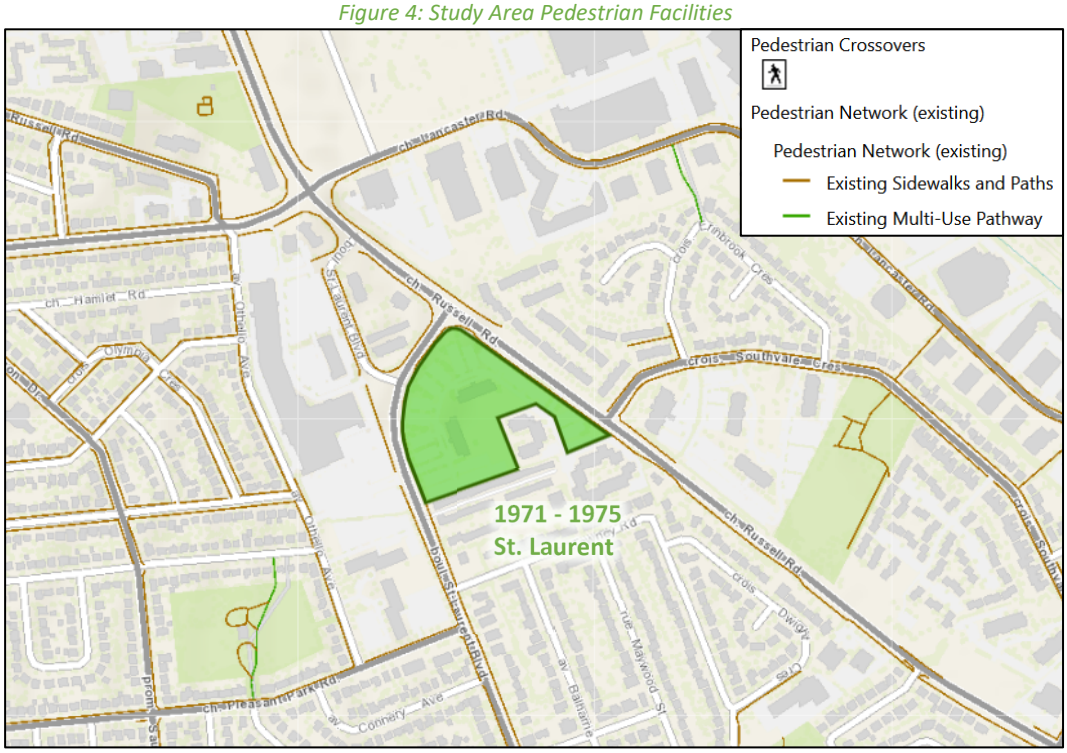
Figure 4 illustrates the pedestrian facilities in the study area and Figure *5* illustrates the cycling facilities.

Sidewalks are provided on both sides along Smyth Road, St. Laurent Boulevard, St. Laurent Boulevard Service, and Southvale Crescent. Sidewalks are also provided on the west side of Russell Road and the north side of Pleasant Park Road. Along Lancaster Road, sidewalks are present on both sides west of the Canada Science and Technology Museum and on the south side to the east.

Cycle tracks are provided on the west side of St. Laurent Boulevard north of Smyth Road within the study area. Curbside bike lanes are on both sides of Lancaster Road for 200 metres to the east of St. Laurent Boulevard and along St. Laurent Boulevard south of Pleasant Park Road. Paved shoulders are provided along Russell Road southeast of St. Laurent Boulevard.

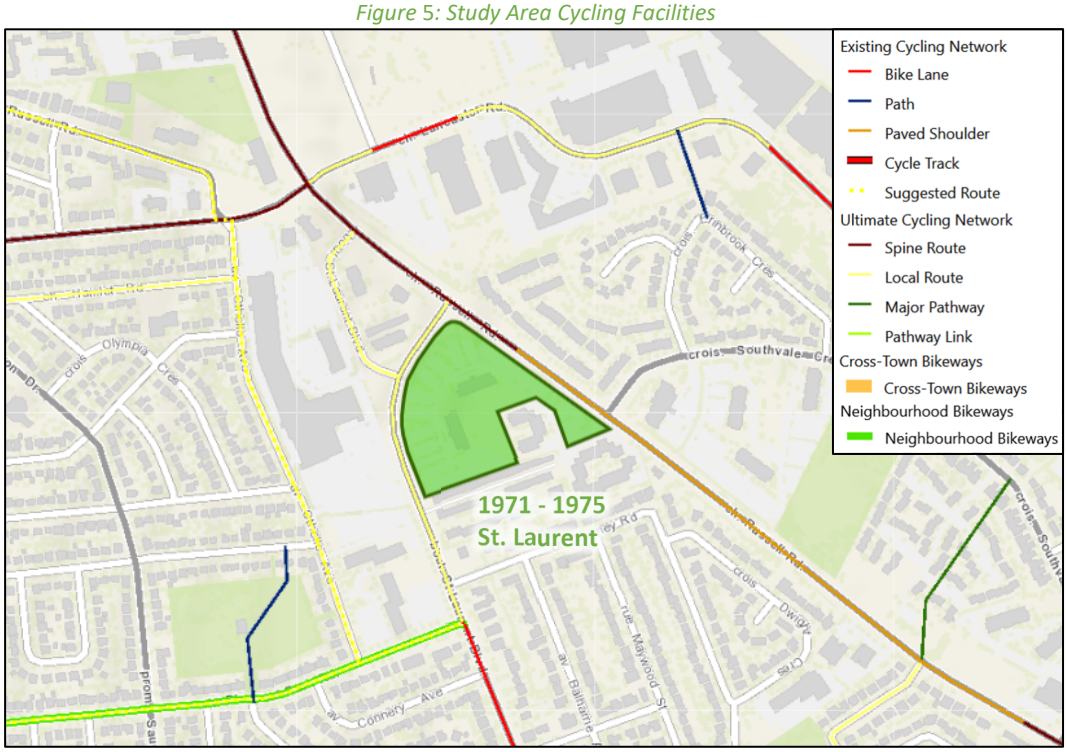
Russell Road south of Lancaster Road, Smyth Road, and St. Laurent Boulevard north of Lancaster Road are spine routes. St. Laurent Boulevard southeast of Russell Road, Russell Road north of Smyth Road, Othello Avenue, Pleasant Park Road, and St. Laurent Boulevard Service Road are local routes. Pleasant Park Road is a neighbourhood bikeway.

Figure 4: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: November 24, 2022

Figure 5: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: November 24, 2022

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 6 and Figure 7, respectively.

Figure 6: Existing Pedestrian Volumes

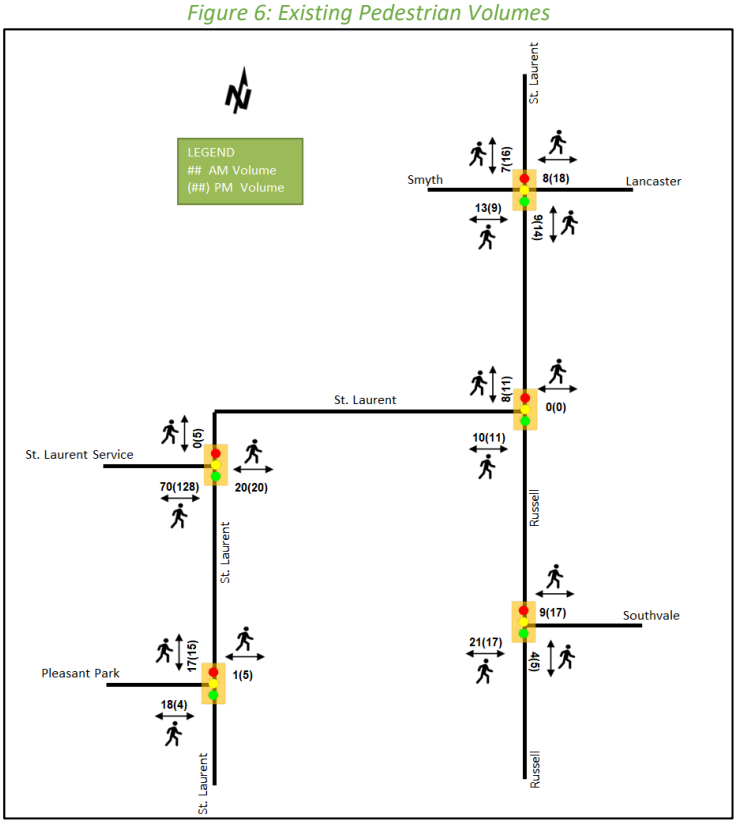
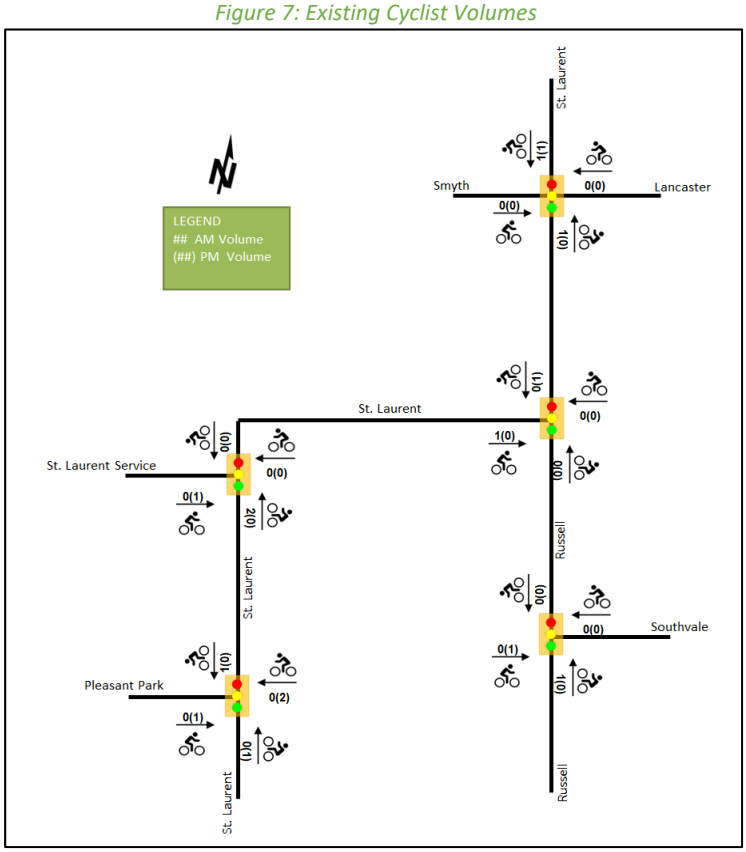


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

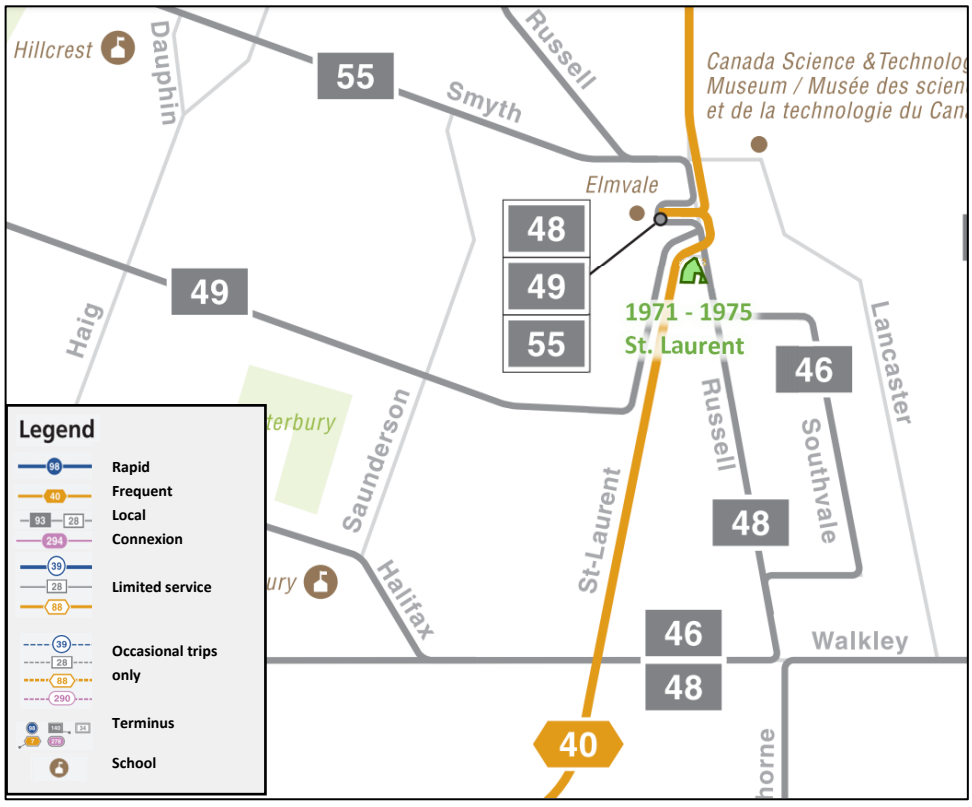
Figure 8 illustrates the transit system map in the study area and Figure 9 illustrates nearby transit stops. All transit information is from November 24, 2022 and is included for general information purposes and context to the surrounding area.

Within the study area, route #55 travels along Smyth Road, route #40 travels along St. Laurent Boulevard, route #46 travels along Russell Road, St. Laurent Boulevard, and Southvale Crescent, and route #48 travels along Russell Road.

Primary stops are located at the Elmvale Mall, Russell Road at Southvale Crescent, St. Laurent Boulevard at the site access, and St. Laurent Boulevard at Tawney Road. The frequency of these routes within proximity of the proposed site based on November 24, 2022 service levels are:

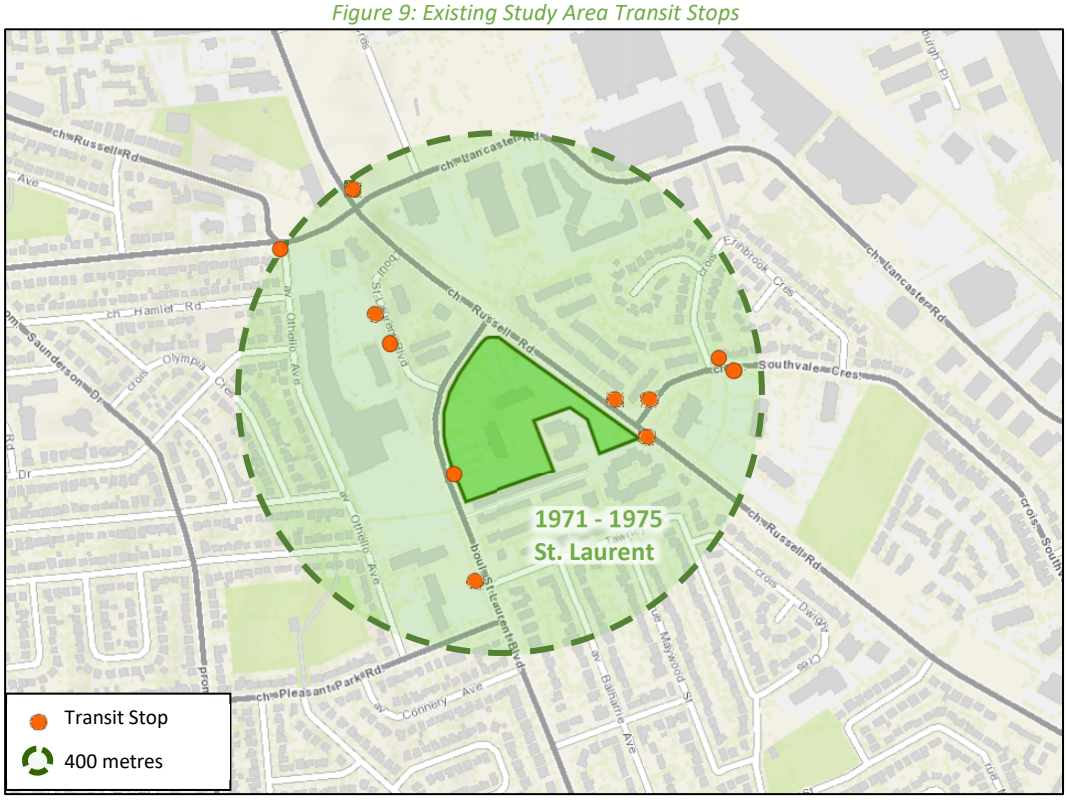
- Route #40 – 10-15-minute service in the peak period/direction, 15-minute daytime service, 30-minute service after 7:00 PM
- Route #46 – 15-minute service in peak periods, 30-minute service all-day
- Route #48 – 30-minute daytime service, one-hour service after 9:00 PM
- Route #49 – 30-minute service in peak periods, sporadic service outside of peaks
- Route #55 – 15-20-minute service all day, 30-minute service after 7:00 PM

Figure 8: Existing Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: November 24, 2022

Figure 9: Existing Study Area Transit Stops



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: November 24, 2022

2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the Study Area.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa for the existing Study Area intersection. Table 1 summarizes the intersection count dates.

Table 1: Intersection Count Date

Intersection	Count Date	Source
St. Laurent Boulevard at Smyth Road/Lancaster Road	Thursday, March 05, 2020	City of Ottawa
Russell Road at St. Laurent Boulevard	Tuesday, April 11, 2017	City of Ottawa
Russell Road at Southvale Crescent N	Tuesday, January 07, 2020	City of Ottawa
St. Laurent Boulevard at St. Laurent Boulevard Service	Tuesday, December 06, 2016	City of Ottawa
St. Laurent Boulevard at Pleasant Park Road	Thursday, March 21, 2019	City of Ottawa
Russell Road at Access #1	Wednesday, September 2, 2015 Thursday, September 3, 2015	Elmvale Acres Shopping Centre Redevelopment - Phase 1 (Parsons, 2019)

Figure 10 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. The level of service for signalized intersections is based on the v/c calculation for individual lane movements and HCM 2000 v/c calculations for the overall intersection. Detailed turning movement count data is included in Appendix B and the Synchro worksheets are provided in Appendix C.

Figure 10: Existing Traffic Counts

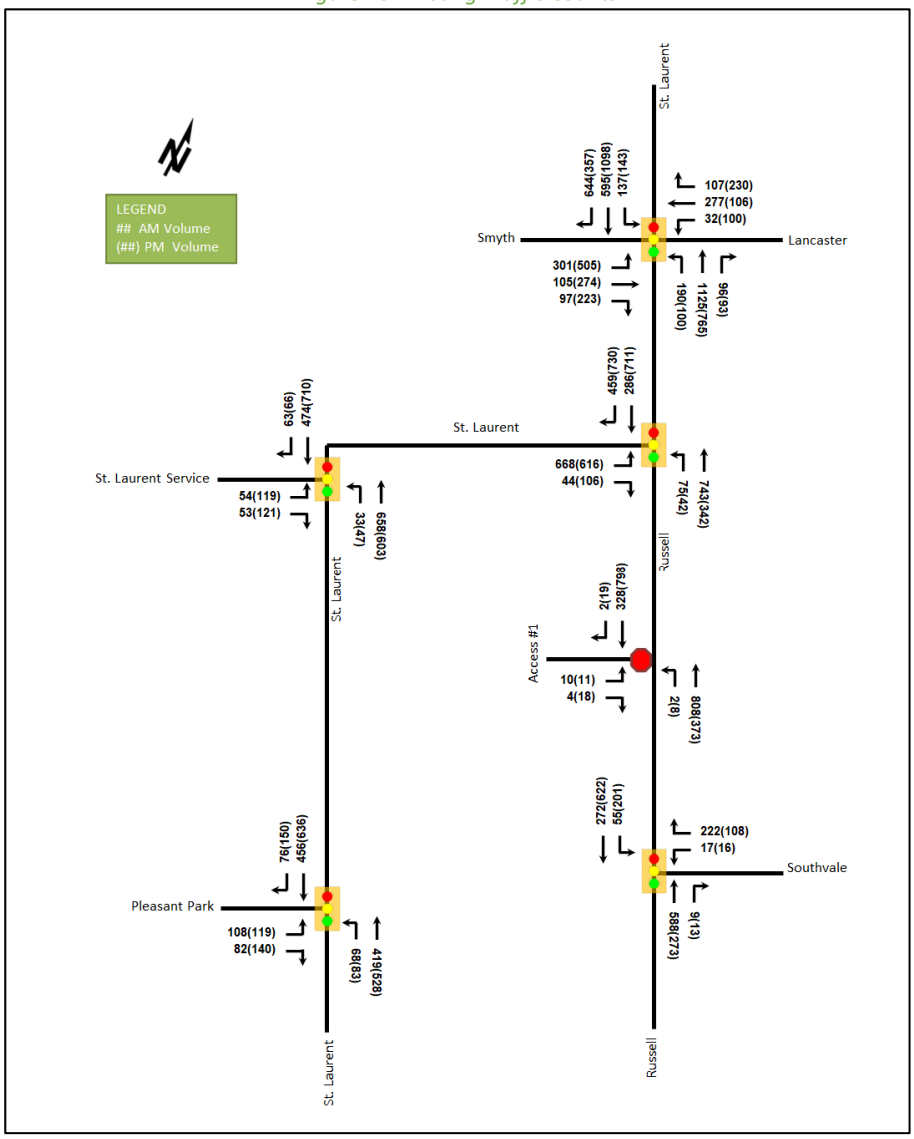


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
St. Laurent Boulevard & Smyth Road / Lancaster Road *Signalized*	EBL	D	0.87	75.4	**#64.6**	**F**	**1.03**	**94.6**	**#107.0**
	EBT	A	0.27	39.8	40.9	D	0.82	63.0	**#117.9**
	EBR	A	0.25	5.4	9.8	A	0.50	8.6	21.8
	WBL	A	0.36	62.1	18.5	B	0.61	64.1	41.9
	WBT/R	C	0.80	55.1	63.1	B	0.62	26.9	36.0
	NBL	**F**	**1.02**	**119.3**	**#108.5**	C	0.78	**87.3**	**#56.1**
	NBT/R	**F**	**1.07**	**79.4**	**#237.4**	D	0.81	40.6	132.1
	SBL	C	0.80	**81.1**	**#69.7**	D	0.84	**87.2**	**#83.3**
	SBT	A	0.54	30.7	81.0	E	0.95	52.3	**#202.8**
	SBR	D	0.90	32.1	**#168.0**	A	0.53	8.8	39.0
	Overall	**E**	**1.00**	**59.4**	-	**E**	**0.97**	**49.8**	-
Russell Road & St. Laurent Boulevard *Signalized*	EBL/R	C	0.73	23.9	63.5	C	0.74	24.0	63.8
	NBL	A	0.16	11.5	12.3	A	0.16	12.9	8.0
	NBT	A	0.60	15.7	56.1	A	0.27	11.6	22.8
	SBT	A	0.33	19.4	26.8	B	0.67	23.8	**#77.6**
	SBR	B	0.62	6.0	20.7	C	0.77	8.2	**#46.5**
	Overall	**C**	**0.72**	**16.6**	-	**C**	**0.71**	**17.6**	-
Russell Road & Southvale Crescent N *Signalized*	WBL	A	0.07	21.5	6.0	A	0.06	18.8	5.3
	WBR	A	0.56	8.9	15.3	A	0.34	7.2	9.7
	NBT/R	B	0.65	11.2	92.7	A	0.27	6.0	31.5
	SBL	A	0.18	6.8	8.9	A	0.33	7.6	27.7
	SBT	A	0.30	6.2	30.5	A	0.58	10.2	**#96.6**
	Overall	**A**	**0.55**	**9.6**	-	**A**	**0.51**	**8.7**	-
St. Laurent Boulevard & St. Laurent Boulevard Service *Signalized*	SEL/R	B	0.47	18.3	18.3	C	0.70	23.0	32.9
	NEL	A	0.08	5.0	m5.0	A	0.13	7.2	m3.5
	NET	A	0.32	5.3	37.5	A	0.40	6.6	23.0
	SWT/R	A	0.26	4.9	23.0	A	0.47	9.8	50.8
	Overall	**A**	**0.35**	**6.2**	-	**A**	**0.52**	**10.4**	-
St. Laurent Boulevard & Pleasant Park Road *Signalized*	EBL	A	0.40	25.6	23.4	A	0.45	26.3	24.8
	EBR	A	0.28	7.9	9.4	A	0.39	7.2	11.7
	NBL	A	0.14	5.7	8.4	A	0.28	8.6	12.7
	NBT	A	0.38	6.5	42.3	A	0.55	9.3	63.2
	SBT	A	0.43	4.2	16.9	B	0.65	12.6	110.4
	SBR	A	0.09	0.4	0.2	A	0.18	2.0	1.0
	Overall	**A**	**0.48**	**7.0**	-	**B**	**0.63**	**10.9**	-
Russell Road & Access #1 Un*signalized*	EB	C	0.07	21.5	1.5	C	0.13	22.0	3.0
	NBL	A	0.00	8.0	0.0	A	0.01	9.9	0.0
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.3**	-	**A**	**-**	**0.6**	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 0.90
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, capacity issues are noted at the intersection of St. Laurent Boulevard & Smyth Road / Lancaster Road. The northbound left-turn and shared through/right-turn movements are over theoretical capacity and may be subject to high delays and extended queues during AM peak hour and eastbound left-turn movement will experience similar constraints during PM peak hour. Extended queues may be exhibited

on the eastbound left-turn, southbound left-turn and southbound right-turn movements during AM peak hour, and on the eastbound through, northbound left-turn and southbound left-turn and through movements during PM peak hour. High delays are anticipated on the southbound left-turn movement during AM peak hour and the northbound left-turn and southbound left-turn during PM peak hour.

The intersection of the Russell Road at St. Laurent Boulevard may be subject to extended queues on the southbound through and right-turn movements during PM peak hour.

The southbound through movement at the intersection of Russell Road and Southvale Crescent N may exhibit extended queues during PM peak hour.

2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study are road network. Table 3 summarizes the collisions types and conditions in the study area, Figure 11 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix D.

Table 3: Study Area Collision Summary, 2016-2020

		Number	%
Total Collisions		**75**	**100%**
Classification	**Fatality**	2	3%
	Non-Fatal Injury	17	23%
	Property Damage Only	56	75%
Initial Impact Type	**Approaching**	1	1%
	Angle	18	24%
	Rear end	25	33%
	Sideswipe	8	11%
	Turning Movement	16	21%
	SMV Other	6	8%
	Other	1	1%
Road Surface Condition	**Dry**	56	75%
	Wet	10	13%
	Loose Snow	1	1%
	Slush	1	1%
	Packed Snow	2	3%
	Ice	5	7%
Pedestrian Involved		4	5%
Cyclists Involved		2	3%

Figure 11: Study Area Collision Records

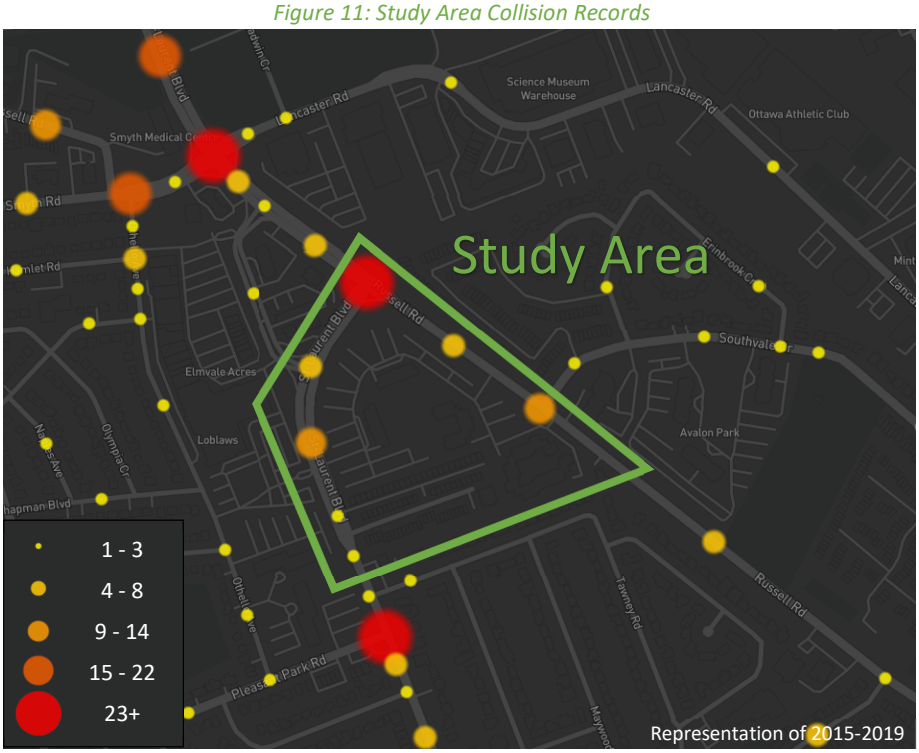


Table 4: Summary of Collision Locations, 2016-2020

	Number	%
Intersections / Segments	**75**	**100%**
Russell Rd @ St. Laurent Blvd	43	57%
Russell Rd @ Southvale Cres N	9	12%
St. Laurent Blvd btwn St. Laurent Blvd Service Rd& Dwellingham Priv	9	12%
St. Laurent Blvd @ St. Laurent Blvd Service	5	7%
Russell Rd btwn St. Laurent Blvd & Southvale Cres	5	7%
St. Laurent Blvd @ Dwellingham Priv	2	3%
St. Laurent Blvd btwn Dwellingham Priv & Tawney Rd	2	3%

Within the study area, the intersections of Russell Road at St. Laurent Boulevard is noted to have experienced higher collisions than other locations, and Russell Road at Southvale Crescent N is noted to have two fatal collisions. Table 5 and Table 6 summarize the collision types and conditions for each of these locations.

Table 5: Russell Road at St. Laurent Boulevard Collision Summary

		Number	%
Total Collisions		**43**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	12	28%
	Property Damage Only	31	72%
Initial Impact Type	**Angle**	9	21%
	Rear end	18	42%
	Sideswipe	1	2%
	Turning Movement	12	28%
	SMV Other	2	5%
	Other	1	2%
Road Surface Condition	**Dry**	33	77%
	Wet	7	16%
	Loose Snow	0	0%
	Slush	1	2%
	Unknown	2	5%
Pedestrian Involved		1	2%
Cyclists Involved		1	2%

The Russell Road at St. Laurent Boulevard intersection had a total of 43 collisions during the 2016-2020 time period, with 31 involving property damage only and the remaining twelve having non-fatal injuries. The collision types are most represented by the rear end with 18 collisions, followed by turning movement with twelve collisions, angle with nine, SMV other with two, and with the remaining collision types represented by sideswipe and other. Weather conditions do not affect collisions at this location. The detailed collision records outline the rear end collisions are predominantly due to the congested conditions along St Laurent Boulevard.

From the detailed collision records (data received included 2015-2019), the turning volume movements are predominantly involve southbound through and northbound left-turn movements (11 of 15) and on dry conditions (10 of 12). The angled collisions predominantly involve southbound through and eastbound left-turn movements (8 of 14) and all occurred on dry conditions. The intersection is a typical 90-degree T-intersection with linear geometry on the approaches. The angled collisions suggest vehicles violate the signal control and the turning movement collisions may be several factors.

One possible condition related to both collision types would be offset placement of the second southbound signal head to the east side of the roadway, which leaves a solitary signal head to control two through lanes. The placement on the east side is more representative of a left-turn control and not for through movements. It is recommended that the City review and explore possible solutions for the intersection. No further review is required as part of this study.

Table 6: Russell Road at Southvale Crescent N Collision Summary

		Number	%
Total Collisions		**9**	**100%**
Classification	**Fatality**	2	22%
	Non-Fatal Injury	0	0%
	Property Damage Only	7	78%
Initial Impact Type	**Angle**	2	22%
	Rear end	3	33%
	Sideswipe	1	11%
	Turning Movement	1	11%
	SMV Other	2	22%
Road Surface Condition	**Dry**	7	78%
	Loose Snow	1	11%
	Ice	1	11%
Pedestrian Involved		1	11%
Cyclists Involved		0	0%

The Russell Road at Southvale Crescent N intersection had a total of nine collisions during the 2016-2020 time period, seven with property damage only and two fatal collisions, including one turning movement and one SMV other collision. The turning movement type fatality occurred during the afternoon at 4:26 PM in dry driving conditions in April of 2018, where a vehicle occupant was killed as a result of a two-vehicle collision. The SMV other type of fatality occurred during the morning at 7:54 am in dry driving conditions in September of 2019, where a pedestrian was struck and killed by an OC Transpo bus. The property damage collision types are most represented by the rear end with six (four northbound and 2 southbound), followed by two collisions each for angle (westbound) and SMV other. While two different types of collisions resulted in fatalities, no identifiable trends are present. Weather conditions do not affect collisions at this location. No further review is required as part of this study.

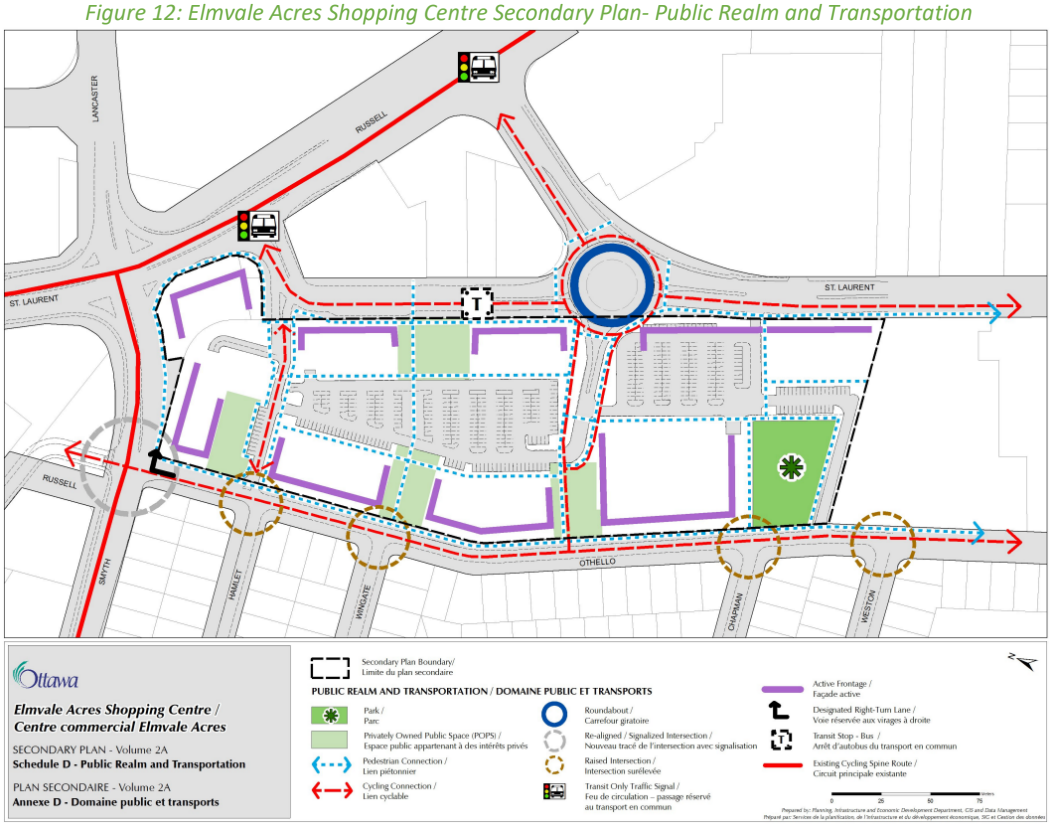
2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

Within the Transportation Master Plan (TMP), the Rapid Transit and Transit Priority (RTTP) Network's Network Concept diagram shows an at-grade bus rapid transit (BRT) corridor along Russell Road continuing north along St. Laurent Boulevard and isolated transit priority measures along Smyth Road and St. Laurent Boulevard south of Smyth Road within the study area. Only the isolated transit priority measures along St Laurent Boulevard to the north of the Service Road are currently within the Affordable Network.

The Elmvale Acres Shopping Centre Secondary Plan identified a realignment of the intersection of Smyth Road with Russell Road and Othello Avenue and a new roundabout at the intersection of St. Laurent Boulevard at St. Laurent Boulevard Service Road. A transit-only left-turn signal will be provided at the intersection of St. Laurent Boulevard and Russell Road providing northbound access to Russell Road, and a transit-priority signal will be provided at the corner of St. Laurent Boulevard and Russell Road. Figure 12 illustrates the changes anticipated to the area intersection.

Figure 12: Elmvale Acres Shopping Centre Secondary Plan- Public Realm and Transportation



Source: https://documents.ottawa.ca/sites/documents/files/scheduled_elmvale_sp_en.pdf Accessed: November 24, 2022

Within the Ottawa Cycling Plan, shared use lanes constitute the phase one (2014-2019) project of the Pleasant Park Road Neighbourhood Bikeway, and bike lanes on St. Laurent Boulevard between Pleasant Park Road and Russell Road are planned for implementation as part of phase two (2020-2025) projects.

2.3.2 Other Study Area Developments

1910 St. Laurent Boulevard - Phase 1

The proposed development application includes a site plan for the expansion of the Elmvale Acres Shopping Centre to include 168 high-rise residential units and 1,100m^2 of retail space. The development is anticipated to be completed by 2021 and generate 40 new AM and 83 new PM peak hour two-way auto trips. (Parsons, 2019)

355 & 374 Everest Private

The proposed development includes a site plan proposing an eight-storey mid-rise apartment building with 101 units and a six to eight-storey mid-rise apartment building with 192 units. The development is predicted to generate 85 new AM two-way peak-hour auto trips and 92 new PM two-way peak-hour auto trips. The anticipated build-out horizon is 2020 or 2021. (Parsons, 2019)

2525 Lancaster Road

The proposed development includes a site plan proposing a parking lot. No TIA is available as part of this application.

1740 – 1760 St. Laurent Boulevard

The proposed development includes a site plan to develop four 12 to 15-storey apartment buildings with a total of 672 apartment units and 2900 m^2 commercial space. Phase one is predicted to be completed by 2022 and full

build out of the site is predicted by 2024. The development is predicted to generate 228 new AM two-way peak-hour auto trips and 263 new PM two-way peak-hour auto trips.

2571 Lancaster Road

The proposed development includes a site plan proposing 3,828 m^2 of office centre space, 710 m^2 of warehouse space, and 536 m^2 of shop space. The development is predicted to be completed in 2022 and full occupancy in mid 2023. Currently, only scoping report is available.

2025 Othello Avenue

The proposed development includes an Official Plan Amendment to develop 27-storey and 18-storey high-rise residential towers with 563 units. The development is anticipated to be buildout by 2023, and the development is predicted to generate 56 new AM two-way peak-hour auto trips and 63 new PM two-way peak-hour auto trips. (Parsons, 2021)

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- St. Laurent Boulevard at:
  - Smyth Road/Lancaster Road
  - St. Laurent Boulevard Service Road
  - Pleasant Park Road
  - Access #2 (Future)
- Russell Road at:
  - St. Laurent Boulevard
  - Southvale Crescent N
  - Access #1

The boundary road will be Russell Road and St. Laurent Boulevard, and screenline SL54 is present north of the study area and will not be analyzed as part of this report.

3.2 Time Periods

As the proposed development is composed entirely of residential units the AM and PM peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year is 2030. As a result, the full build-out plus five years horizon year is 2035.

4 Exemption Review

Table 7 summarizes the exemptions for this TIA.

Table 7: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	Exempt

Module	Element	Explanation	Exempt/Required
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Exempt

5 Development-Generated Travel Demand

5.1 Mode Shares

Examining the mode shares recommended in the TRANS Trip Generation Manual (2020) for the subject district, derived from the most recent National Capital Region Origin-Destination survey (OD Survey), the existing average district mode shares by land use for Alta Vista have been summarized in Table 8.

Table 8: TRANS Trip Generation Manual Recommended Mode Shares – Alta Vista

Travel Mode	Multi-Unit (High-Rise)	
	AM	PM
Auto Driver	38%	45%
Auto Passenger	12%	16%
Transit	42%	28%
Cycling	2%	2%
Walking	7%	9%
Total	**100%**	**100%**

5.2 Trip Generation

This TIA has been prepared using the vehicle and person trip rates for the residential dwellings using the TRANS Trip Generation Manual (2020). Table 9 summarizes the person trip rates for the proposed residential land uses for each peak period.

Table 9: Trip Generation Person Trip Rates by Peak Period

Land Use	Land Use Code	Peak Period	Person Trip Rates
Multi-Unit High-Rise	221 & 222 (TRANS)	AM	0.80
		PM	0.90

Using the above person trip rates, the total person trip generation has been estimated. Table 10 summarizes the total person trip generation for the residential land uses.

Table 10: Total Residential Person Trip Generation by Peak Period

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Multi-Unit (High-Rise)	498	123	275	398	260	188	448

Using the above mode share targets for the person trip rates, the person trips by mode have been projected. Table 11 summarizes the trip generation by mode and peak hour using the residential peak hour adjustment factor.

Table 11: Residential Trip Generation by Mode

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Multi-Unit (High-Rise)	Auto Driver	**38%**	23	49	72	**45%**	51	37	88
	Auto Passenger	**12%**	7	16	23	**16%**	18	13	31
	Transit	**42%**	29	64	93	**28%**	34	25	59
	Cycling	**2%**	1	3	4	**2%**	2	2	4
	Walking	**7%**	5	11	16	**9%**	12	9	21
	Total	**100%**	**65**	**143**	**208**	**100%**	**117**	**86**	**203**

As shown above, a total of 72 AM new and 88 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

5.3 Trip Distribution

To understand the travel patterns of the subject development, the OD Survey has been reviewed to determine the travel for the residential component, and these patterns were applied based on the build-out of Alta Vista. Table 12 summarizes the distributions.

Table 12: OD Survey Distribution – Alta Vista

To/From	Residential % of Trips
North	25%
South	20%
East	5%
West	50%
Total	**100%**

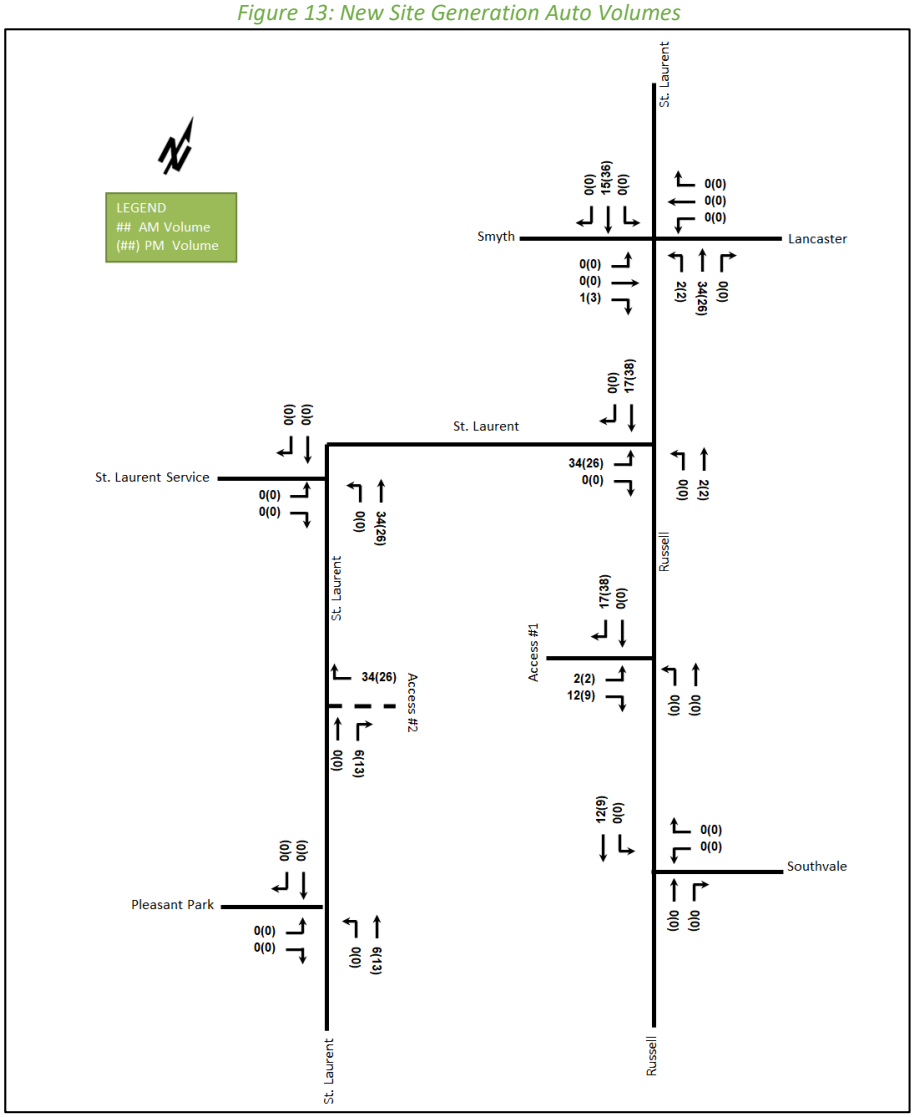
5.4 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the study area road network. Table 13 summarizes the proportional assignment to the study area roadways, and Figure 13 illustrates the new site generated volumes.

Table 13: Trip Assignment

To/From	Inbound Via	Outbound Via
North	25% St. Laurent Boulevard (N)	25% St. Laurent Boulevard (N)
South	20% St. Laurent Boulevard (S)	20% Russell Road (S)
East	5% Russell Road (N)	5% St. Laurent Boulevard (N)
West	40% St. Laurent Boulevard (N) 5% Smyth Road (via St. Laurent Boulevard) 5% St. Laurent Boulevard (S)	40% St. Laurent Boulevard (N) 5% Smyth Road (via St. Laurent Boulevard) 5% Russell Road (S)
Total	**100%**	**100%**

Figure 13: New Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3. None of the proposed changes are considered to have any notable impact on the study area traffic volumes and travel patterns.

6.2 Background Growth

A review of the background projections from the City's TRANS Regional Model for the 2011 and 2031 horizons was completed to determine the background growth for each of the study area roadways. The TRANS model plots and a summary of the results of the model interpolation are provided in Appendix E.

When comparing the existing volumes to 2031 horizons, the existing volumes northbound and southbound directions in the study area have exceeded the forecasted volumes. Resultantly, growth rates derived from the existing horizon to the 2031 model horizon rounded to the nearest 0.25% will be peak-directionally applied to the appropriate roadway's mainline volumes and to the appropriate major turning movements at the intersections. Table 14 summarizes the growth rates applied within the study area.

Table 14: TRANS Regional Model Projections – Study Area Growth Rates

Street	AM Peak Hour		PM Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
Smyth Rd	2.00%	-	-	2.00%
Lancaster Rd	2.75%	-	-	2.75%
	Northbound	**Southbound**	**Northbound**	**Southbound**
St. Laurent Blvd	-	-	-	-

6.3 Other Developments

The background developments explicitly considered in the background conditions (Section 6.3) include:

- 1910 St. Laurent Boulevard
- 355 & 374 Everest Private
- 2025 Othello Avenue
- 1740 – 1760 St. Laurent Boulevard

The background development volumes within the study area have been provided in Appendix F.

7 Demand Rationalization

7.1 2030 Future Background Operations

Figure 14 illustrates the 2030 background volumes and Table 15 summarizes the 2030 background intersection operations. The level of service for signalized intersections is based on the v/c calculation for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2030 future background horizon are provided in Appendix G.

Figure 14: 2030 Future Background Volumes

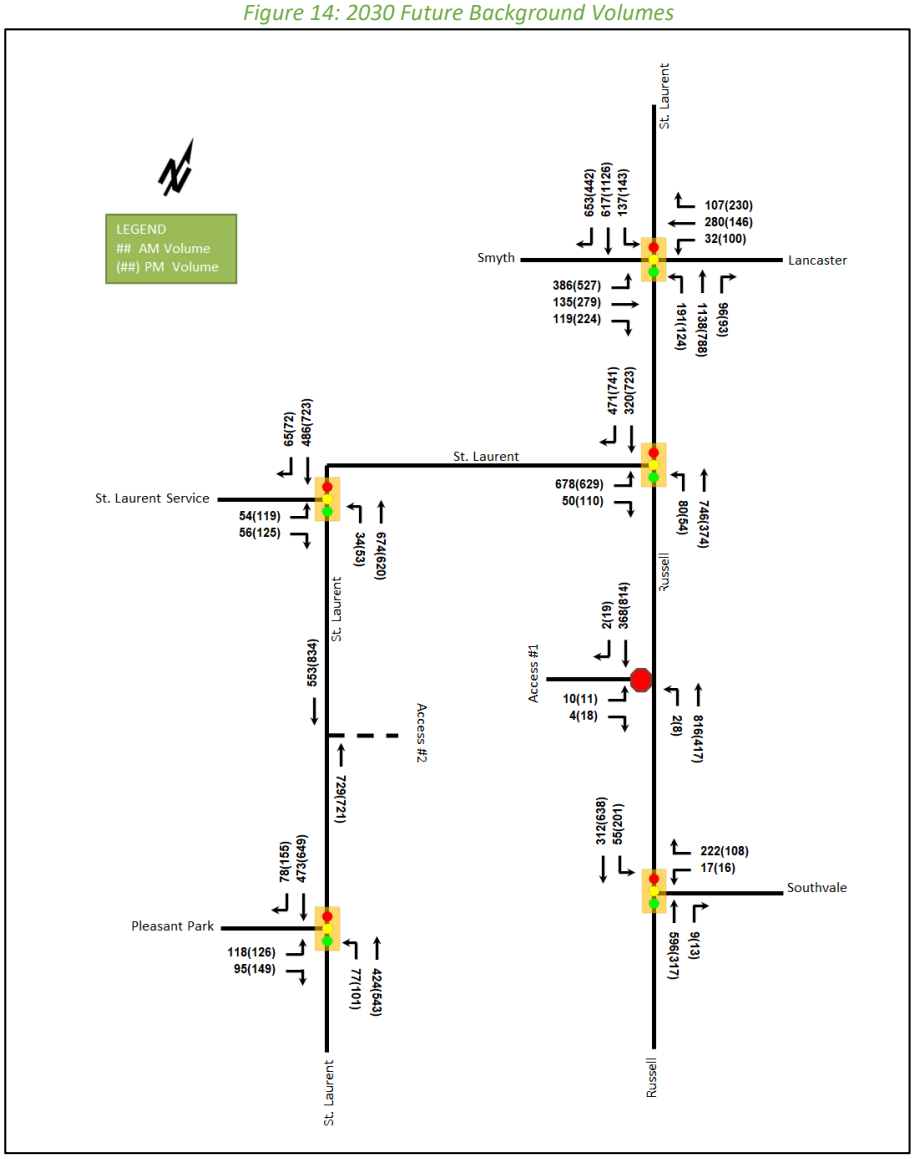


Table 15: 2030 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
St. Laurent Boulevard & Smyth Road / Lancaster Road *Signalized*	EBL	E	1.00	**99.4**	**#79.3**	E	0.97	**80.5**	**#97.8**
	EBT	A	0.32	41.1	46.3	C	0.77	60.1	**#99.7**
	EBR	A	0.29	7.1	12.4	A	0.47	8.6	20.3
	WBL	A	0.33	61.4	17.2	A	0.58	64.0	38.9
	WBT/R	C	0.76	53.5	56.6	B	0.64	27.5	35.3
	NBL	D	0.87	**85.9**	**#96.8**	C	0.76	**81.2**	**#64.5**
	NBT/R	E	0.94	49.0	**#205.0**	C	0.72	35.8	118.8
	SBL	C	0.74	74.8	**#60.3**	C	0.77	79.1	**#73.5**
	SBT	A	0.50	30.0	74.8	D	0.87	43.8	**#177.8**
	SBR	D	0.81	21.4	113.4	A	0.56	7.4	35.3
	Overall	**E**	**0.93**	**48.1**	-	**D**	**0.89**	**43.4**	-
Russell Road & St. Laurent Boulevard *Signalized*	EBL/R	B	0.67	22.3	57.1	B	0.69	22.2	57.4
	NBL	A	0.15	11.5	11.9	A	0.17	12.8	8.9
	NBT	A	0.54	14.7	49.0	A	0.27	11.6	22.5
	SBT	A	0.33	19.4	27.1	B	0.61	22.1	63.1
	SBR	A	0.59	5.7	19.6	C	0.74	7.3	29.6
	Overall	**B**	**0.66**	**15.8**	-	**B**	**0.66**	**16.3**	-
Russell Road & Southvale Crescent N *Signalized*	WBL	A	0.06	21.4	5.6	A	0.05	18.7	4.9
	WBR	A	0.52	8.3	14.0	A	0.31	7.2	9.2
	NBT/R	A	0.59	9.9	78.4	A	0.28	6.1	32.9
	SBL	A	0.14	6.2	7.8	A	0.30	7.3	24.6
	SBT	A	0.31	6.3	31.6	A	0.54	9.0	81.3
	Overall	**A**	**0.50**	**8.7**	-	**A**	**0.47**	**8.0**	-
St. Laurent Boulevard & St. Laurent Boulevard Service *Signalized*	SEL/R	B	0.44	18.0	16.2	C	0.66	20.5	28.7
	NEL	A	0.07	4.8	4.8	A	0.16	6.5	m5.2
	NET	A	0.29	5.0	33.3	A	0.32	5.7	19.1
	SWT/R	A	0.24	4.7	20.4	A	0.41	8.3	42.3
	Overall	**A**	**0.32**	**5.9**	-	**A**	**0.46**	**9.0**	-
St. Laurent Boulevard & Pleasant Park Road *Signalized*	EBL	A	0.39	25.6	23.0	A	0.43	26.2	24.1
	EBR	A	0.29	7.9	9.5	A	0.39	7.4	11.6
	NBL	A	0.14	5.6	8.3	A	0.23	7.3	12.6
	NBT	A	0.35	6.2	37.1	A	0.45	7.5	55.0
	SBT	A	0.40	4.0	16.1	A	0.53	10.5	101.7
	SBR	A	0.08	0.4	0.2	A	0.15	2.6	4.5
	Overall	**A**	**0.45**	**6.9**	-	**A**	**0.58**	**9.5**	-
Russell Road & Access #1 Un*signalized*	EB	C	0.05	19.8	1.5	C	0.11	19.9	3.0
	NBL	A	0.00	8.0	0.0	A	0.01	9.5	0.0
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.2**	**-**	**A**	**-**	**0.5**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

Except for the intersection of St. Laurent Boulevard and Smyth Road / Lancaster Road, study area intersections operate well during both the AM and PM peak hours. The incremental improvement to the intersection operations is predominantly a result of the peak hour factor adjustment to 1.00 for forecasted conditions.

At the intersection of St. Laurent Boulevard and Smyth Road / Lancaster Road, the eastbound left-turn, northbound left-turn, northbound shared through/right-turn, and southbound left-turn movements during AM peak hour and eastbound left-turn, eastbound through, northbound left-turn, southbound left-turn, and southbound through movement during PM peak hour may subject to extended queues. High delays may be exhibited on the northbound left-turn movement during AM peak and on the eastbound left-turn and northbound left-turn movement during PM peak.

7.2 2035 Future Background Operations

Figure 15 illustrates the 2035 background volumes and Table 16 summarizes the 2035 background intersection operations. The level of service for signalized intersections is based on the v/c calculation for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The synchro worksheets for the 2035 future background horizon are provided in Appendix H.

Figure 15: 2035 Future Background Volumes

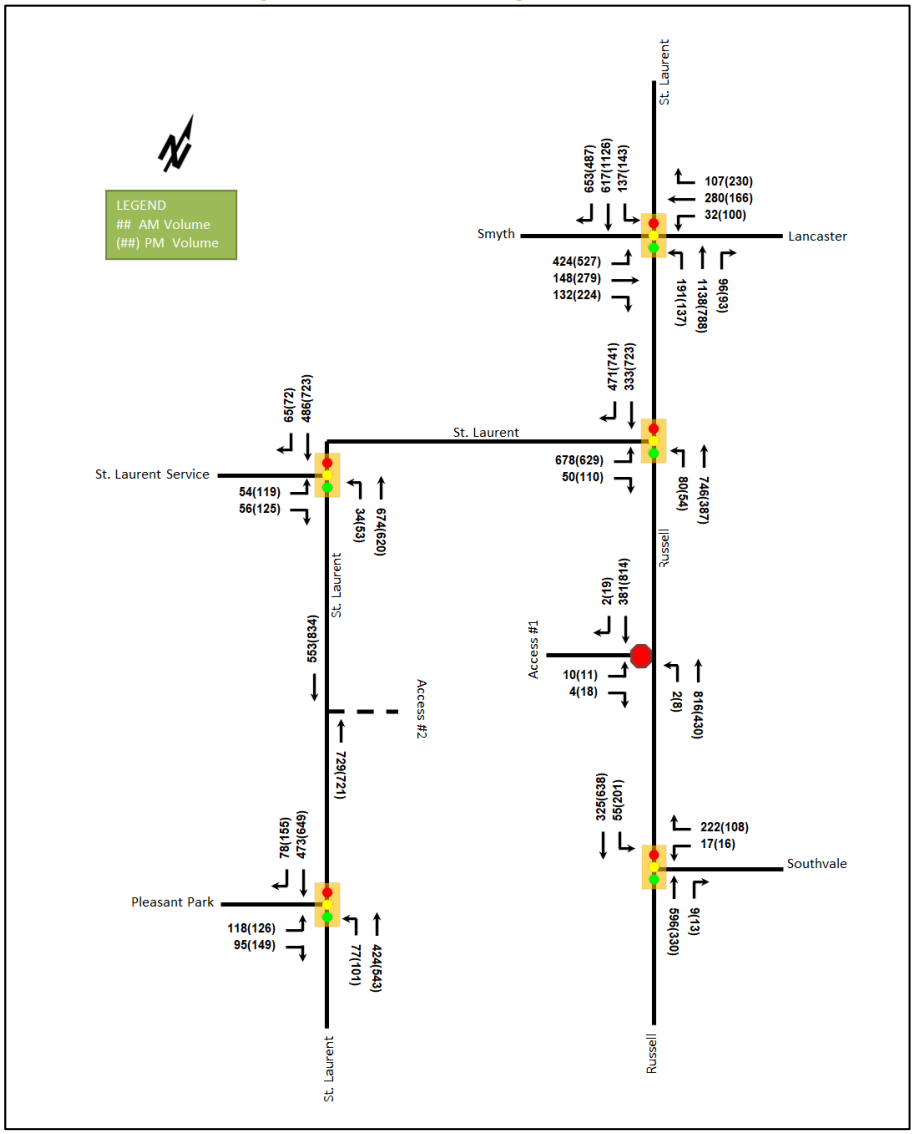


Table 16: 2035 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
St. Laurent Boulevard & Smyth Road / Lancaster Road *Signalized*	EBL	**F**	**1.10**	**124.7**	**#89.9**	E	0.97	**80.5**	**#97.8**
	EBT	A	0.35	41.7	50.2	C	0.77	60.1	**#99.7**
	EBR	A	0.32	8.8	16.0	A	0.47	8.6	20.3
	WBL	A	0.33	61.4	17.2	A	0.58	64.0	38.9
	WBT/R	C	0.76	53.5	56.6	B	0.67	29.7	38.3
	NBL	D	0.87	**85.9**	**#96.8**	C	0.77	79.4	**#72.3**
	NBT/R	E	0.94	49.0	**#205.0**	C	0.72	35.8	118.8
	SBL	C	0.74	74.8	**#60.3**	C	0.77	79.1	**#73.5**
	SBT	A	0.50	30.0	74.8	D	0.90	46.5	**#177.8**
	SBR	D	0.81	21.4	113.4	A	0.60	7.9	38.9
	Overall	**E**	**0.95**	**51.2**	-	**D**	**0.89**	**44.0**	-
Russell Road & St. Laurent Boulevard *Signalized*	EBL/R	B	0.67	22.3	57.1	B	0.69	22.2	57.4
	NBL	A	0.15	11.5	11.9	A	0.17	12.8	8.9
	NBT	A	0.54	14.7	49.0	A	0.28	11.6	23.3
	SBT	A	0.34	19.5	28.1	B	0.61	22.1	63.1
	SBR	A	0.59	5.7	19.6	C	0.74	7.3	29.6
	Overall	**B**	**0.66**	**15.8**	-	**B**	**0.66**	**16.3**	-
Russell Road & Southvale Crescent N *Signalized*	WBL	A	0.06	21.4	5.6	A	0.05	18.7	4.9
	WBR	A	0.52	8.3	14.0	A	0.31	7.2	9.2
	NBT/R	A	0.59	9.9	78.4	A	0.29	6.2	34.4
	SBL	A	0.14	6.2	7.8	A	0.30	7.3	24.8
	SBT	A	0.32	6.4	33.2	A	0.54	9.0	81.3
	Overall	**A**	**0.50**	**8.7**	-	**A**	**0.47**	**8.0**	-
St. Laurent Boulevard & St. Laurent Boulevard Service *Signalized*	SEL/R	B	0.44	18.0	16.2	C	0.66	20.5	28.7
	NEL	A	0.07	4.8	4.8	A	0.16	6.5	m5.2
	NET	A	0.29	5.0	33.3	A	0.32	5.7	19.1
	SWT/R	A	0.24	4.7	20.4	A	0.41	8.3	42.3
	Overall	**A**	**0.32**	**5.9**	-	**A**	**0.46**	**9.0**	-
St. Laurent Boulevard & Pleasant Park Road *Signalized*	EBL	A	0.39	25.6	23.0	A	0.43	26.2	24.1
	EBR	A	0.29	7.9	9.5	A	0.39	7.4	11.6
	NBL	A	0.14	5.6	8.3	A	0.23	7.4	12.6
	NBT	A	0.35	6.2	37.1	A	0.45	7.5	55.0
	SBT	A	0.40	4.0	16.1	A	0.53	10.5	101.7
	SBR	A	0.08	0.4	0.2	A	0.15	2.6	4.5
	Overall	**A**	**0.45**	**6.9**	-	**A**	**0.58**	**9.6**	-
Russell Road & Access #1 Un*signalized*	EB	C	0.06	20.1	1.5	C	0.11	20.1	3.0
	NBL	A	0.00	8.1	0.0	A	0.01	9.5	0.0
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.2**	**-**	**A**	**-**	**0.5**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The intersections at the 2035 future background condition are anticipated to operate similarly to the 2030 background conditions except for the eastbound left-turn movement at the intersection of St. Laurent Boulevard and Smyth Road / Lancaster Road. The eastbound left-turn movement at St. Laurent Boulevard and Smyth Road / Lancaster Road intersection is over theoretical capacity and may be subject to high delays and have extended

queues during AM peak hour due to the background growth and developments. Further optimized signal timings may address the constraint and reduce the v/c of all movements to be 1.00 or below.

7.2.1 2035 Future Background Elmvale Acres Roundabout Sensitivity

The Elmvale Acres Shopping Centre Secondary Plan identified a new roundabout at the intersection of St. Laurent Boulevard at St. Laurent Boulevard Service Road in the future. A sensitivity of this intersection is provided for the 2035 future background operations to assess the roundabout should the future redevelopment complete the construction of this intersection improvement. The volumes at the roundabout have been re-assigned from the background conditions to approximate the split of the volumes from the St. Laurent Boulevard Service Road to both the Service Road and the Elmvale Mall access.

Figure 16 and Table 17 illustrate 2035 background volumes and operations at the St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection when the roundabout is constructed. Sidra 8 was used to model the roundabouts and the sidra worksheets at the roundabout for the 2035 future background horizon are provided in Appendix I.

Figure 16: 2035 Future Background Elmvale Acres Roundabout

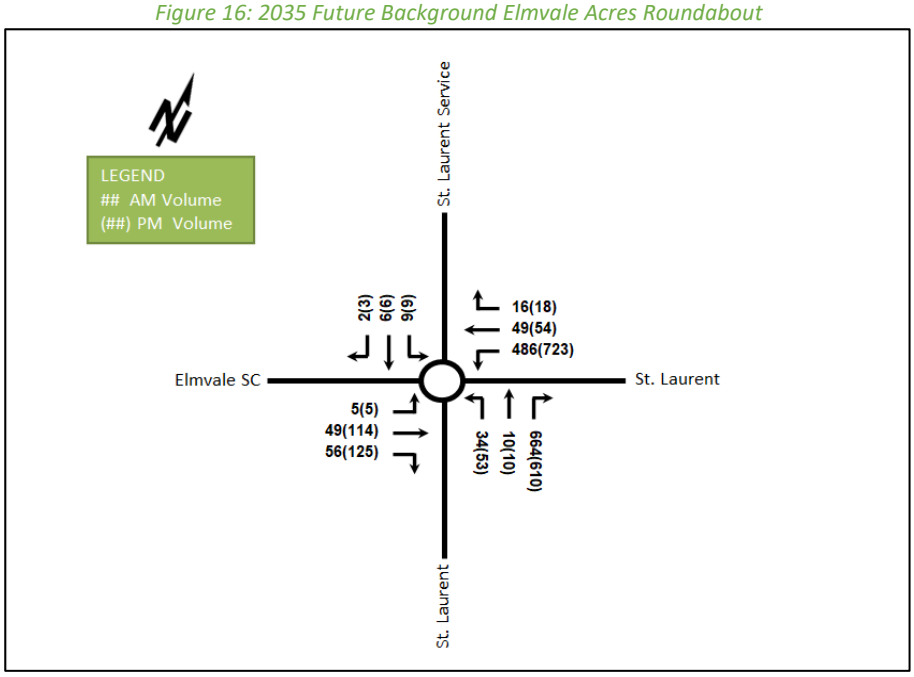


Table 17: Elmvale Acres Roundabout Operations - 2035 Future Background

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
St. Laurent Boulevard & St. Laurent Boulevard Service *Roundabout*	EB	A	0.11	1.7	3.1	A	0.28	2.6	8.4
	WB	A	0.20	7.2	6.1	A	0.29	7.4	10.2
	NB	A	0.26	3.0	9.0	A	0.28	3.4	9.8
	SB	A	0.02	7.7	0.8	A	0.03	8.5	1.0
	Overall	**A**	**0.26**	**4.6**	**9.0**	**A**	**0.29**	**5.2**	**10.2**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection operates well should the roundabout be realized by the 2035 horizon.

7.3 Modal Share Sensitivity and Demand Rationalization Conclusions

High delays and extended queues have been noted at the intersection of St. Laurent Boulevard and Smyth Road / Lancaster Road in the existing condition, and capacity constraint has been noted on the eastbound left-turn movement at the intersection of St. Laurent Boulevard and Smyth Road / Lancaster Road in the future background condition.

The site volumes are projected to be three vehicles on northbound left-turn movement (1.57% of existing volumes), 35 vehicles on northbound through movement (3.11% of existing volumes), 16 on southbound through movement (2.69% of existing volumes), and one vehicle on eastbound right-turn movement (1.03% of existing volumes) during AM peak hour.

During PM peak hour, site volumes are projected to be two vehicles on northbound left-turn movement (2.00% of existing volumes), 26 vehicles on northbound shared through movement (3.40% of existing volumes), 36 on southbound through movement (3.28% of existing volumes), and three vehicles on eastbound right-turn movement (1.35% of existing volumes).

The capacity constraint on the eastbound left-turn movement at St. Laurent Boulevard and Smyth Road / Lancaster Road intersection is due to the background growth and developments, and further optimized signal timings may address the constraint and reduce the v/c of all movements to be 1.00 or below. The site volumes are not anticipated to be a contributing factor to the network constraints. No further demand rationalization is required as part of this TIA.

8 Development Design

8.1 Design for Sustainable Modes

The existing surface parking lot will be reduced from 494 parking spaces to 176 spaces with the redevelopment of the site, and the new parking structure will include an additional 523 parking spaces. The new buildings will provide a total of 522 bike spaces including eight exterior bike racks provided by each building main entrances. Hard surface connections are provided between all building entrances and the surrounding pedestrian facilities on Russell Road and St. Laurent Boulevard. All exterior doors are located within a 300 metre walking distance to Elmvale Station or adjacent bus stops. It is noted that an existing bus stop is located at the proposed access on St. Laurent Boulevard, which is illustrated in Figure 17 and Figure 18, and the bus stop will need to be relocated approximately 35 metres north of the existing location.

Figure 17: Existing Bus Stop - St Laurent / Ad. 1971

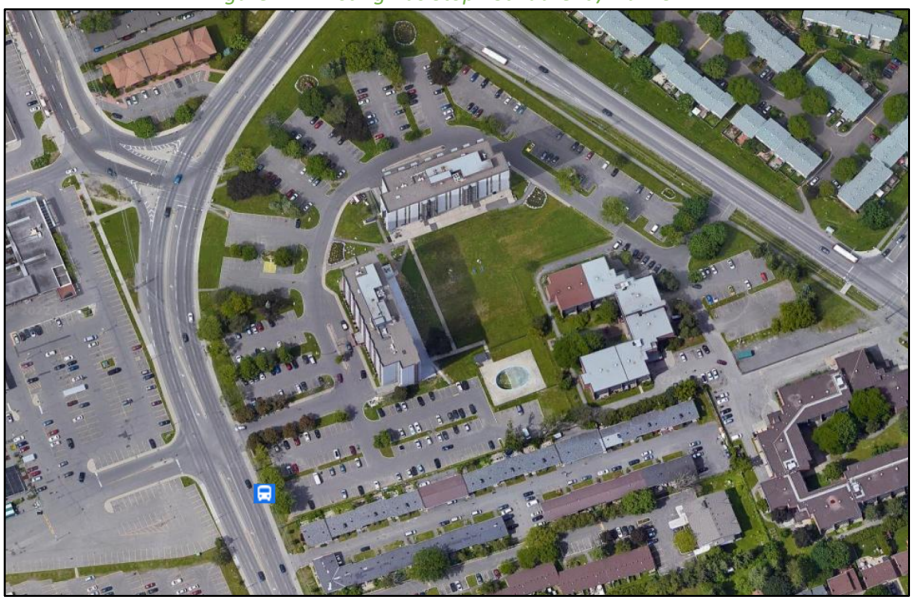
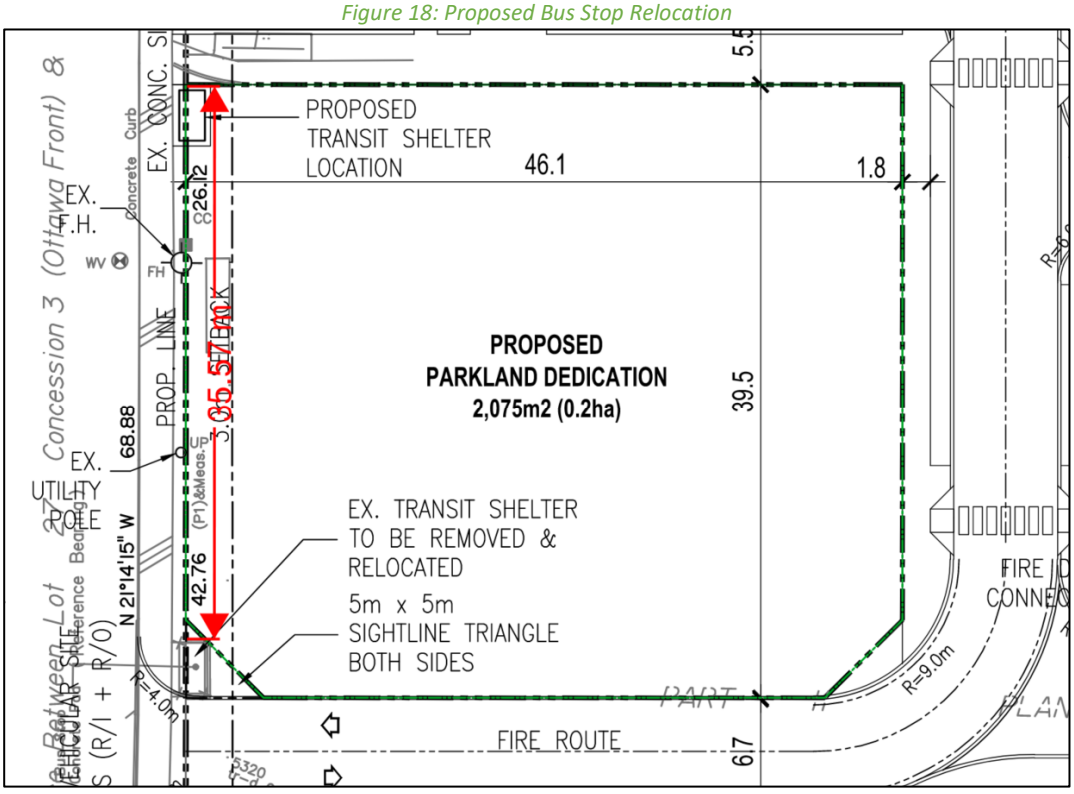


Figure 18: Proposed Bus Stop Relocation



8.2 Circulation and Access

Vehicle access is provided via two two-way accesses onto St. Laurent Boulevard and Russell Road. The two-way access onto St. Laurent Boulevard is 6.7m wide, the two-way access onto Russell Road is 8.5m wide, and a 6.7m internal aisle connects two accesses within the development. Lay-by parking and loading dock are provided in front of each building. The garbage truck, move-in truck, and fire truck turning movements can be accommodated on site. The turning templates are provided in Appendix J.

9 Parking

9.1 Parking Supply

The redevelopment will provide a total of 699 parking spaces, with 176 surface parking spaces and 523 parking structure spaces for the entire site. A total of 522 bicycle spaces will be provided, including 498 proposed bicycle spaces and 24 existing spaces. Each building will have a total of eight exterior bike racks by the main entrances, and the rest of bike parking spaces will be provided on the ground floor and underground. The reallocation of parking will provide a paring ratio of 0.7 spaces per unit, reducing the existing buildings from 0.99 to 0.7 spaces per unit. The minimum parking requirement is 0.7 spaces per unit, which is 699 spaces for the entire site, and the proposed parking spaces meet the parking requirements.

The redevelopment proposed 522 bike parking spaces, and it meets the minimum bicycle parking provision at a ratio of 0.5 spaces per unit. No change to the existing building bike parking is proposed.

10 Boundary Street Design

Table 18 summarizes the MMLOS analysis for the boundary streets of St. Laurent Boulevard and Russell Road. The existing and future conditions for both streets will be the same and are considered in one row. The St. Laurent Boulevard analysis is based on "Arterial Main Street" and "General Urban Area", and Russell Road is based on "General Urban Area". The MMLOS worksheets have been provided in Appendix K.

Table 18: Boundary Street MMLOS Analysis

Segment	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target
St. Laurent Boulevard	**E**	C	**E**	B	D	D	N/A	N/A
Russell Road	**E**	C	**D**	C	**D**	B	B	D

The pedestrian LOS will not be met along the segment of St. Laurent Boulevard and Russell Road. To meet the theoretical pedestrian LOS targets, the sidewalks would need to be at least 2 metres and boulevards widened to be larger than 2 metres.

The bicycle LOS will not be met along the segment of St. Laurent Boulevard and Russell Road. To meet the theoretical bicycle LOS targets, operating speeds would need to be decreased to less than 50 km/h. Physically separated facilities would also score a LOS of A and help meet the pedestrian LOS targets.

The transit LOS will not be met along the segment of Russell Road. To meet transit LOS, a bus lane or separated ROW would be required.

11 Access Intersections Design

11.1 Location and Design of Access

The development will maintain an existing full-movements access onto Russell Road and propose a right-in/right-out access onto St. Laurent Boulevard.

The throat length for the access on St. Laurent Boulevard is proposed to be approximately 40 metres, and it meets the minimums of 25.0 metres, from Table 8.9.3 of the TAC Geometric Design Guidelines. The throat length of the access on Russell Road is proposed to be approximately 34.5 metres, does not meet the suggested minimum 40.0 metres. The site plan aligns the parking garage entrance to the St. Laurent Boulevard frontage, reducing the likelihood of the Russell Road access requiring a longer queue storage/throat length. It is also noted that an existing building is located at the Russell Road access and would not permit the throat length being extended.

11.2 Intersection Control

Based upon the projected volumes, the site access will have stop-control on the minor approach.

11.3 Access Intersection Design

11.3.1 2030 Future Total Access Intersection Operations

The turning movement counts at the intersection of St. Laurent Boulevard at Access #2 was acquired from the Elmvale Acres Shopping Centre Redevelopment - Phase 1 report (Parsons, 2019), and volumes were re-distributed in future horizons. The 2030 future total intersection volumes are illustrated in Figure 19 and the access intersection operations are summarized below in Table 19. Synchro 11 has been used to model the unsignalized intersections and HCM 2010 methodology was used for unsignalized intersection operation. The Synchro worksheets have been provided in Appendix M.

Figure 19: 2030 Future Total Volumes

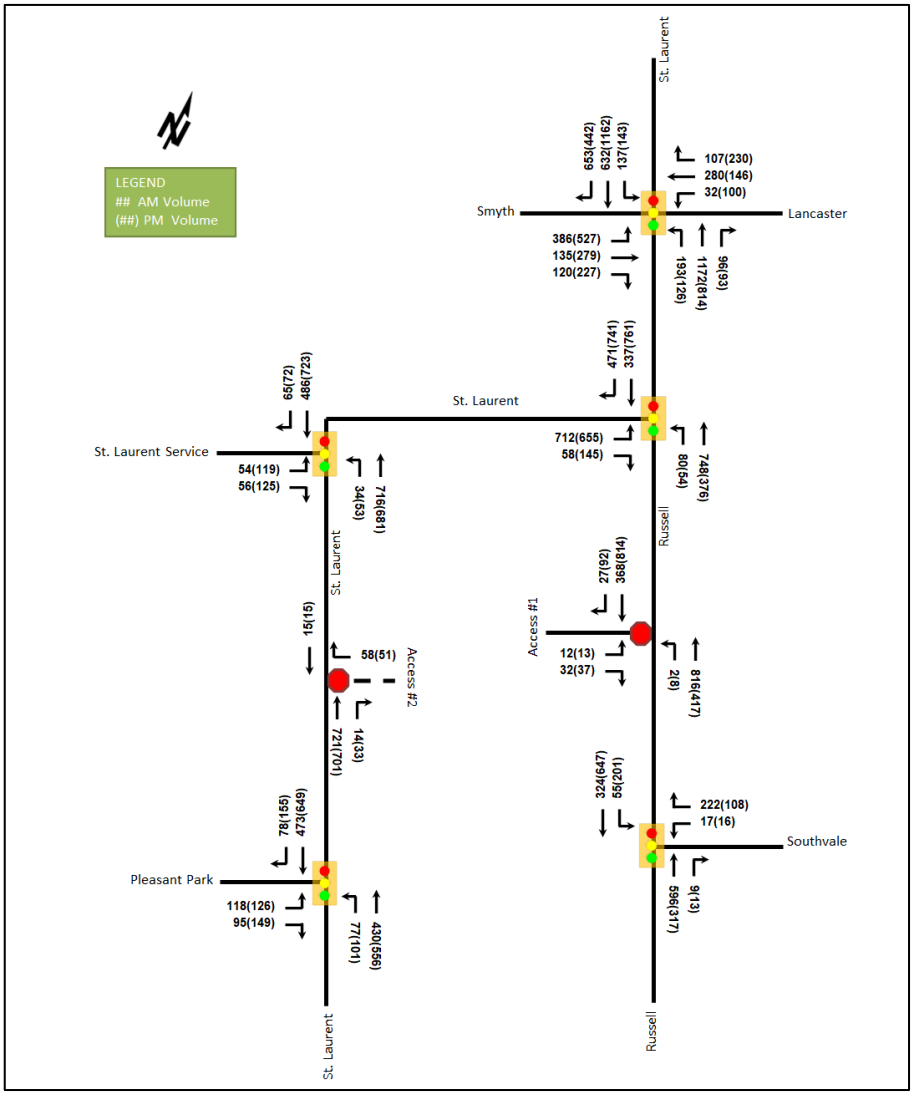


Table 19: 2030 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
	EB	B	0.11	14.8	3.0	C	0.18	20.5	4.5

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Russell Road & Access #1 Un*signalized*	NBL	A	0.00	8.1	0.0	A	0.01	9.8	0.0
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.5**	**-**	**A**	**-**	**0.8**	**-**
St. Laurent Boulevard & Access #2 Un*signalized*	WB	B	0.09	11.3	2.3	B	0.08	11.2	2.3
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.5**	**-**	**A**	**-**	**0.4**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The 2030 future total access intersections operate satisfactorily.

11.3.2 2035 Future Total Access Intersection Operations

The 2035 future total intersection volumes are illustrated in Figure 20 and the access intersection operations are summarized below in Table 20. Synchro 11 has been used to model the unsignalized intersections and HCM 2010 methodology was used for unsignalized intersection operation. The Synchro and Sidra worksheets have been provided in Appendix N.

Figure 20: 2035 Future Total Volumes

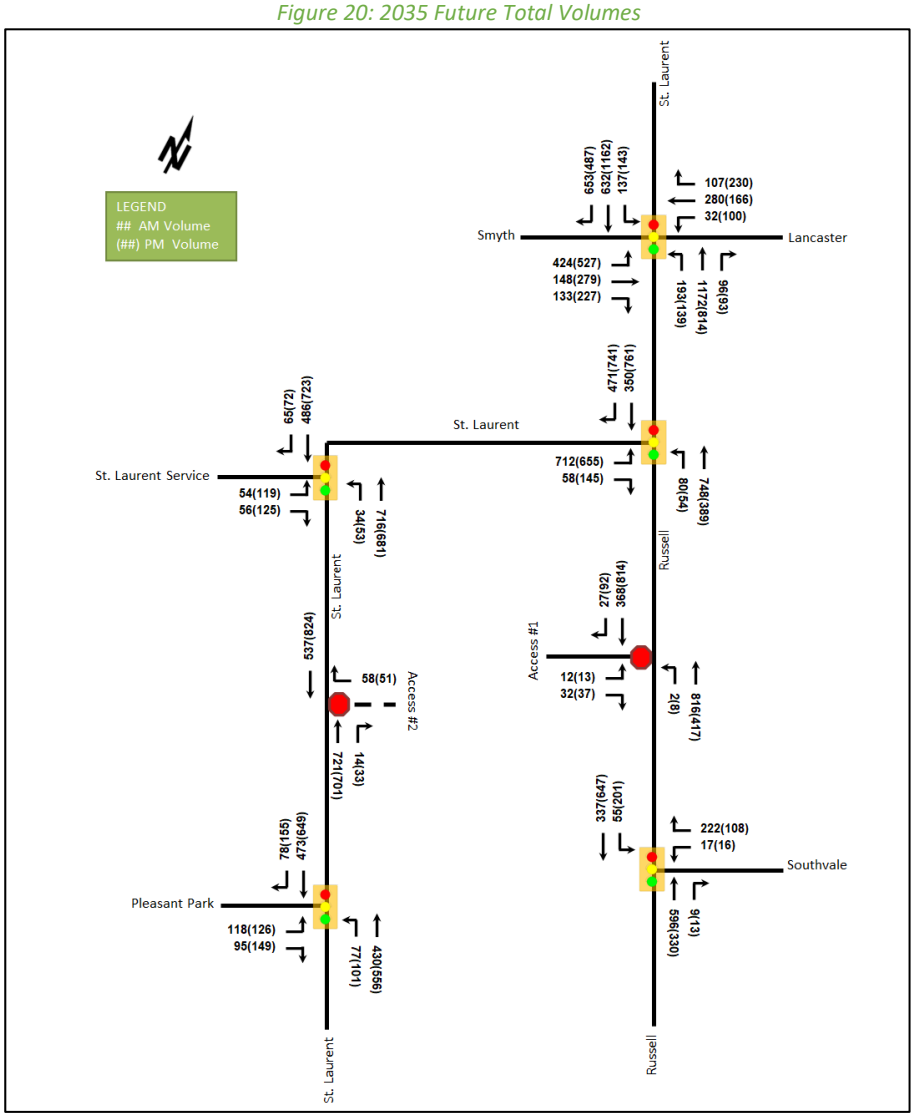


Table 20: 2035 Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Russell Road & Access #1 Unsignalized	EB	B	0.11	14.8	3.0	C	0.18	20.5	4.5
	NBL	A	0.00	8.1	0.0	A	0.01	9.8	0.0
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.5**	**-**	**A**	**-**	**0.8**	**-**
St. Laurent Boulevard & Access #2 Unsignalized	WB	B	0.09	11.3	2.3	B	0.08	11.2	2.3
	NB	-	-	-	-	-	-	-	-
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**0.5**	**-**	**A**	**-**	**0.4**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The 2035 future total access intersections operate satisfactorily.

11.3.3 Access Intersection MMLOS

The access intersection is unsignalized, and therefore no access intersection MMLOS analysis has been conducted.

11.3.4 Recommended Design Elements

No changes to the site accesses are proposed.

12 Transportation Demand Management

12.1 Context for TDM

The mode shares used within the TIA represent the recommended shares for the Alta Vista, and the subject site lies within proximity to the planned transit at Elmvale Station. Overall, the modal shares are likely to be achieved and supporting TDM measures should be provided to encourage shifts towards sustainable modes.

The subject site is within the St. Laurent Arterial Mainstreet Design Priority Area, and the total proposed bedroom count within the new buildings is estimated to be 777 bedrooms.

12.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel and transit based upon the proximity to the planned transit at Elmvale Station, and those assumptions have been carried through the analysis. The unmodified district mode shares have been applied, risks to other network users from failing to meet mode share targets are low.

12.3 TDM Program

The “suite of post occupancy TDM measures” has been summarized in the TDM checklists for the residential land uses. The checklist is provided in Appendix L. The key TDM measures recommended include:

- Display local area maps with walking and cycling routes, and transit route information and schedules at major entrances
- Provide a multimodal travel option information package to new residents
- Contract with providers to install on-site bikeshare (or other micromobility alternatives) and carshare spaces
- Inclusion of a 1-year Presto card for first time apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
- Unbundle parking cost from rental costs

13 Neighbourhood Traffic Management

Site traffic is proposed to access the arterial network via St. Laurent Boulevard (a collector road). The TIA Guidelines propose a threshold of 300 vehicles per peak hour for the classification of collector roads, equivalent to five cars per minute, which per City guidance is to be interpreted as two-way volumes. The City Staff have further noted that these thresholds are too low for analysis and are under review for future update.

The existing volumes on St. Laurent Boulevard are 1,218 two-way vehicles in the AM peak hour and 1,481 two-way vehicles in the PM peak hour. Overall, the site is anticipated to generate approximately 34 and 26 two-way vehicle trips during the AM and PM peak hours, respectively, all of which will access St. Laurent Boulevard travelling northbound from the south or north of the access to Russell Road. While over the prescribed theoretical local road capacity, this volume increase is not considered a significant impact on St. Laurent Boulevard and does not require redesignation of the road classification.

14 Transit

14.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 21 summarizes the transit trip generation.

Table 21: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Transit	42% (28%)	29	64	93	34	25	59

The proposed development is anticipated to generate an additional 91 AM peak hour transit trips and 58 PM peak hour transit trips. From the trip distribution found in section 5.3, these values can be further broken down. Table 22 summarizes forecasted site-generated transit ridership trips by direction and the equivalent bus loads.

Table 22: Forecasted Site-Generated Transit Ridership

Direction	AM Peak Hour		PM Peak Hour		Service Type	Approximate Equivalent Peak Hour/Direction Bus Loads
	In	Out	In	Out		
North	7	16	8	6	Buses	One third of a standard bus
South	6	13	7	5	Buses	One quarter of a standard bus
East	1	3	2	1	Buses	Negligible
West	15	32	17	13	Buses	Half of a standard bus

14.2 Transit Priority

Examining the study area intersection delays, negligible impacts are noted on the transit movements at the study area intersections as a result of the development site traffic.

15 Network Intersection Design

15.1 Network Intersection Control

No change to the existing signalized control is recommended for the network intersections.

15.2 Network Intersection Design

15.2.1 2030 Future Total Network Intersection Operations

The 2030 future total network intersection operations are summarized below in Table 23. The level of service for signalized intersections is based on the v/c calculation for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The Synchro worksheets have been provided in Appendix M.

Table 23: 2030 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
St. Laurent Boulevard & Smyth Road / Lancaster Road *Signalized*	EBL	E	1.00	**99.4**	**#79.3**	E	0.97	**80.5**	**#97.8**
	EBT	A	0.32	41.1	46.3	C	0.77	60.1	**#99.7**
	EBR	A	0.29	7.2	12.8	A	0.48	8.6	20.6
	WBL	A	0.33	61.4	17.2	A	0.58	64.0	38.9
	WBT/R	C	0.76	53.5	56.6	B	0.65	28.0	35.7
	NBL	D	0.88	**87.3**	**#97.8**	C	0.77	**81.5**	**#65.5**
	NBT/R	E	0.97	53.2	**#213.8**	C	0.74	36.6	123.6
	SBL	C	0.74	74.8	**#60.3**	C	0.77	79.1	**#73.5**
	SBT	A	0.52	30.2	77.0	E	0.91	46.6	**#187.3**
	SBR	D	0.81	21.5	113.8	A	0.56	8.1	38.6
	Overall	**E**	**0.95**	**49.5**	-	**D**	**0.90**	**44.4**	-
Russell Road & St. Laurent Boulevard *Signalized*	EBL/R	C	0.71	23.3	61.2	C	0.74	23.7	63.2
	NBL	A	0.15	11.5	11.9	A	0.17	13.2	8.9
	NBT	A	0.55	14.8	49.2	A	0.27	11.6	22.6
	SBT	A	0.34	19.6	28.5	B	0.65	23.0	**#68.7**
	SBR	A	0.59	5.7	19.6	C	0.74	7.3	29.6
	Overall	**B**	**0.68**	**16.3**	-	**B**	**0.70**	**17.2**	-
Russell Road & Southvale Crescent N *Signalized*	WBL	A	0.06	21.4	5.6	A	0.05	18.7	4.9
	WBR	A	0.52	8.3	14.0	A	0.31	7.2	9.2
	NBT/R	A	0.59	9.9	78.4	A	0.28	6.1	32.9
	SBL	A	0.14	6.2	7.8	A	0.30	7.3	24.6
	SBT	A	0.32	6.4	33.1	A	0.55	9.2	83.1
	Overall	**A**	**0.50**	**8.7**	-	**A**	**0.48**	**8.1**	-
St. Laurent Boulevard & St. Laurent Boulevard Service *Signalized*	SEL/R	B	0.44	18.0	16.2	C	0.66	20.5	28.7
	NEL	A	0.07	4.8	m4.7	A	0.16	6.5	m5.1
	NET	A	0.31	5.2	35.4	A	0.36	5.8	20.5
	SWT/R	A	0.24	4.7	20.4	A	0.41	8.3	42.3
	Overall	**A**	**0.33**	**6.0**	-	**A**	**0.46**	**9.0**	-
St. Laurent Boulevard & Pleasant Park Road *Signalized*	EBL	A	0.39	25.6	23.0	A	0.43	26.2	24.1
	EBR	A	0.29	7.9	9.5	A	0.39	7.4	11.6
	NBL	A	0.14	5.6	8.3	A	0.23	7.4	12.6
	NBT	A	0.35	6.2	37.9	A	0.46	7.7	56.8
	SBT	A	0.40	4.0	15.2	A	0.53	10.7	102.6
	SBR	A	0.08	0.3	0.1	A	0.15	2.8	4.9
	Overall	**A**	**0.45**	**6.9**	-	**A**	**0.58**	**9.6**	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The network intersection operations for the 2030 future total horizon operate similarly to the 2030 future background conditions.

The intersection of the Russell Road at St. Laurent Boulevard may be subject to extended queues on the southbound through movement during PM peak hour.

15.2.2 2035 Future Total Network Intersection Operations

The 2035 future total network intersection operations are summarized below in Table 24. The level of service for signalized intersections is based on the v/c calculation for individual lane movements and HCM 2000 v/c calculations for the overall intersection. The Synchro worksheets have been provided in Appendix N.

Table 24: 2035 Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
St. Laurent Boulevard & Smyth Road / Lancaster Road *Signalized*	EBL	**F**	**1.10**	**124.7**	**#89.9**	E	0.97	**80.5**	**#97.8**
	EBT	A	0.35	41.7	50.2	C	0.77	60.1	**#99.7**
	EBR	A	0.32	8.8	16.0	A	0.48	8.6	20.6
	WBL	A	0.33	61.4	17.2	A	0.58	64.0	38.9
	WBT/R	C	0.76	53.5	56.6	B	0.68	30.1	38.6
	NBL	D	0.88	**87.3**	**#97.8**	C	0.76	78.6	**#73.8**
	NBT/R	E	0.97	53.2	**#213.8**	C	0.74	36.6	123.6
	SBL	C	0.74	74.8	**#60.3**	C	0.77	79.1	**#73.5**
	SBT	A	0.52	30.2	77.0	E	0.93	50.7	**#187.3**
	SBR	D	0.81	21.5	113.8	B	0.61	8.6	42.7
	Overall	**E**	**0.96**	**52.6**	-	**E**	**0.91**	**45.3**	-
Russell Road & St. Laurent Boulevard *Signalized*	EBL/R	C	0.71	23.3	61.2	C	0.74	23.7	63.2
	NBL	A	0.16	11.5	11.9	A	0.17	13.2	8.9
	NBT	A	0.55	14.8	49.2	A	0.28	11.6	23.4
	SBT	A	0.36	19.7	29.5	B	0.65	23.0	**#68.7**
	SBR	A	0.59	5.7	19.6	C	0.74	7.3	29.6
	Overall	**B**	**0.68**	**16.3**	-	**B**	**0.70**	**17.2**	-
Russell Road & Southvale Crescent N *Signalized*	WBL	A	0.06	21.4	5.6	A	0.05	18.7	4.9
	WBR	A	0.52	8.3	14.0	A	0.31	7.2	9.2
	NBT/R	A	0.59	9.9	78.4	A	0.29	6.2	34.4
	SBL	A	0.14	6.2	7.8	A	0.30	7.3	24.8
	SBT	A	0.33	6.5	34.6	A	0.55	9.2	83.1
	Overall	**A**	**0.50**	**8.7**	-	**A**	**0.48**	**8.1**	-
St. Laurent Boulevard & St. Laurent Boulevard Service *Signalized*	SEL/R	B	0.44	18.0	16.2	C	0.66	20.5	28.7
	NEL	A	0.07	4.8	m4.7	A	0.16	6.5	m5.0
	NET	A	0.31	5.2	35.4	A	0.36	5.8	20.4
	SWT/R	A	0.24	4.7	20.4	A	0.41	8.3	42.3
	Overall	**A**	**0.33**	**6.0**	-	**A**	**0.46**	**8.9**	-
St. Laurent Boulevard & Pleasant Park Road *Signalized*	EBL	A	0.39	25.6	23.0	A	0.43	26.2	24.1
	EBR	A	0.29	7.9	9.5	A	0.39	7.4	11.6
	NBL	A	0.14	5.6	8.3	A	0.23	7.4	12.6
	NBT	A	0.35	6.2	37.9	A	0.46	7.7	56.8
	SBT	A	0.40	4.0	15.1	A	0.53	10.7	102.5
	SBR	A	0.08	0.3	0.2	A	0.15	2.9	5.2
	Overall	**A**	**0.45**	**6.9**	-	**A**	**0.58**	**9.7**	-

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The network intersection operations for the 2035 future total horizon operate similarly to the 2035 future background conditions. The constraint on the eastbound left-turn movement at St. Laurent Boulevard & Smyth Road / Lancaster Road will remain due to the background growth and developments, and further optimized signal timings may address the constraint and reduce the v/c of all movements to be 1.00 or below. The southbound through movement at the intersection of Russell Road & St. Laurent Boulevard during PM peak hour may start to be subject to extended queues.

15.2.2.1 2035 Future Total Elmvale Acres Roundabout Sensitivity

Figure 21 and Table 25 illustrate 2035 future total volumes and operations at the St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection when the roundabout is constructed. The volumes at the St. Laurent Boulevard at St. Laurent Boulevard Service Road roundabout were re-assigned. Sidra 8 was used to model the roundabouts and the sidra worksheets at the roundabout for the 2035 future total horizon are provided in Appendix O.

Figure 21: 2035 Future Total Elmvale Acres Roundabout

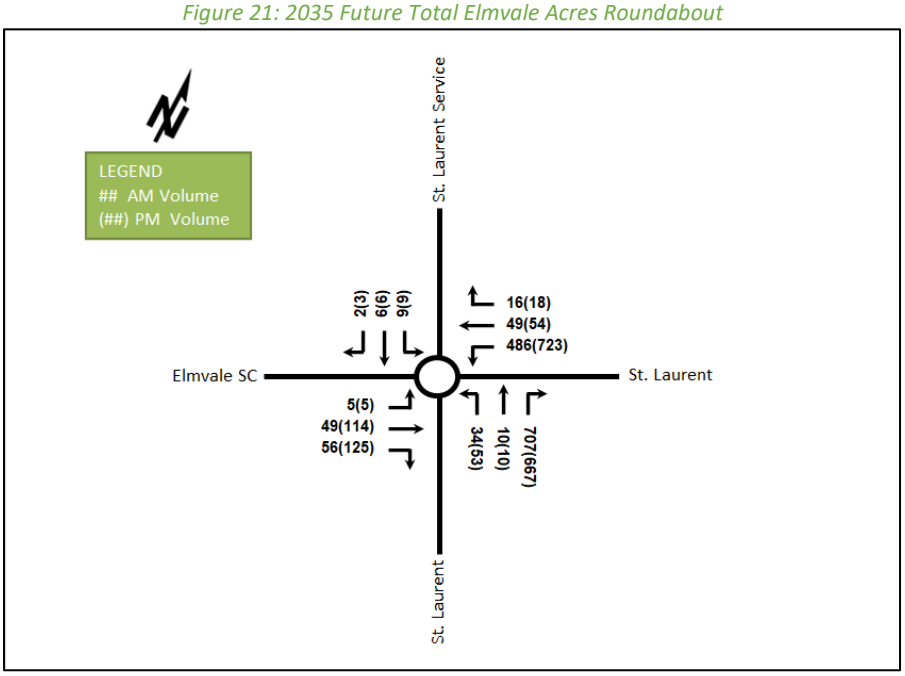


Table 25: Elmvale Acres Roundabout Operations - 2035 Future Total

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
St. Laurent Boulevard & St. Laurent Boulevard Service *Roundabout*	EB	A	0.12	1.7	3.1	A	0.29	2.6	8.4
	WB	A	0.20	7.2	6.0	A	0.29	7.4	10.2
	NB	A	0.28	3.0	9.7	A	0.30	3.4	10.8
	SB	A	0.02	7.7	0.8	A	0.03	8.5	1.0
	Overall	**A**	**0.27**	**4.6**	**9.7**	**A**	**0.30**	**5.1**	**10.8**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

The St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection operates well should the roundabout be realized by the 2035 horizon.

15.2.3 Network Intersection MMLOS

Table 26 summarizes the MMLOS analysis for the network intersections within the study area. The existing and future conditions for both intersections will be the same and are considered in one row. The intersection of Russell Road at Southvale Crescent is based on “General Urban Area”, and other intersections are based on “Arterial Main Street” and “General Urban Area”. The MMLOS worksheets have been provided in Appendix K.

Table 26: Study Area Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
St. Laurent Blvd at Smyth Rd/ Lancaster Rd	F	C	F	B	F	B	A	D	E	D
Russell Rd at St. Laurent Blvd	F	C	F	B	D	B	N/A	N/A	B	D
Russell Road at Southvale Cres	E	C	D	B	B	B	N/A	N/A	A	D
St. Laurent Blvd at St. Laurent Blvd Service Rd (Existing)	F	C	F	B	D	D	N/A	N/A	A	D
St. Laurent Blvd at Pleasant Park Rd	D	C	F	B	B	D	N/A	N/A	A	D

The pedestrian LOS targets will not be met at the existing or future intersections within the study area. As typical for arterial roads, the crossing distance does not permit the targets to be met. To meet pedestrian LOS targets, the maximum crossing distance on all pedestrian crossings would need to be reduced to three lane-widths.

The bicycle LOS targets will not be met at the existing or future intersections within the study area. To meet bicycle LOS targets, the left-turn configurations would need to be two-stage or include turn boxes or protected facilities would be required at the intersections.

The transit LOS targets will not be met in the existing or future condition at the intersections of St. Laurent Boulevard at Smyth Road/ Lancaster Road and Russell Road at St. Laurent Boulevard. To meet transit LOS, the delay at the intersections of St. Laurent Boulevard at Smyth Road/ Lancaster Road would need to be reduced to below 10 seconds on all transit movements, and the delay at the intersections of Russell Road at St. Laurent Boulevard would need to be reduced to below 30 seconds.

15.2.4 Recommended Design Elements

No study area intersection design elements are proposed as part of this study.

16 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

Proposed Site and Screening

- The proposed site includes three 17 storey residential buildings with a total of 498 units, parkland, and a 4.5-storey parking structure with 523 parking spaces
- The remaining surface parking would be a total of 176 spaces
- The existing full-movements access onto Russell Road will maintain and right-in/right-out access onto St. Laurent Boulevard is proposed, along with the internal site connected to the south
- The anticipated full build-out and occupancy horizon is 2030 with the individual buildings being constructed in sequence
- The trip generation, location, and safety triggers were met for the TIA Screening

Existing Conditions

- St. Laurent Boulevard, Russell Road, and Smyth Road are arterial roads, and Pleasant Park Road, Southvale Crescent, and Lancaster Road are collector roads within the study area

- Cycle tracks are on the west side of St. Laurent Boulevard north of Smyth Road, and curbside bike lanes are on both sides of Lancaster Road for 200 metres to the east of St. Laurent Boulevard and along St. Laurent Boulevard south of Pleasant Park Road
- Paved shoulders are provided along Russell Road southeast of St. Laurent Boulevard
- Sidewalks are provided on both sides along Smyth Road, St. Laurent Boulevard, St. Laurent Boulevard Service, Southvale Crescent and along Lancaster Road west of the Canada Science and Technology Museum, on the west side of Russell Road and the north side of Pleasant Park Road, and the south side of Lancaster Road east of Lancaster Road
- Russell Road south of Lancaster Road, Smyth Road, and St. Laurent Boulevard north of Lancaster Road are spine routes. St. Laurent Boulevard southeast of Russell Road, Russell Road north of Smyth Road, Othello Avenue, Pleasant Park Road, and St. Laurent Boulevard Service Road are local routes. Pleasant Park Road is a neighbourhood bikeway
- The high volumes roadways have produced a high number of collisions at the study area intersections, primarily at the Russell Road at St. Laurent Boulevard intersection (57% or 43 collisions), predominantly represented by the rear end and turning movement
- Two fatal collisions have occurred at the Russell Road at Southvale Crescent N intersection in 2018 and 2019, and involved one turning movement and one single motor vehicle other type collisions.
- Queuing issues and capacity issues are noted on various movements at the intersection of St. Laurent Boulevard at Smyth Road / Lancaster Road, and queuing issues are noted on a few movements at the intersection of Russell Road at St. Laurent Boulevard and Russell Road at Southvale Crescent N

Development Generated Travel Demand

- The proposed development is forecasted to produce 208 two-way people trips during the AM peak hour and 203 two-way people trips during the PM peak hour
- Of the forecasted people trips, 72 two-way trips will be vehicle trips during the AM peak hour and 88 two-way trips will be vehicle trips during the PM peak hour based on a 38% AM and 45% PM modal share target
- Of the forecasted trips, 25% are anticipated to travel north, 20% to the south, 5% to the east, and 50% to the west

Background Conditions

- The background developments were explicitly included in the background conditions, along with a total background growth of 2.00% per annum along Smyth Road and 2.75% per annum along Lancaster Road
- The study area intersections in 2030 future condition will operate similar to the existing conditions with incremental improvement due to peak hour factor adjustment to 1.00 for forecasted conditions
- The St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection operates well should the roundabout be realized by the 2035 horizon

Development Design

- The existing surface parking lot will be reduced from 494 parking spaces to 176 spaces with the redevelopment of the site, and the new parking structure will include an additional 523 parking spaces
- Hard surface connections are provided between all building entrances and the surrounding pedestrian facilities on Russell Road and St. Laurent Boulevard

- All exterior doors are located within a 300 metre walking distance to Elmvale Station or adjacent bus stops
- An existing bus stop is located at the proposed access on St. Laurent Boulevard, and it needs to be relocated approximately 35 metres north of the existing location
- The garbage truck, move-in truck and fire truck turning movements can be accommodated on site
- Lay-by parking and loading dock are provided in front of each building

Parking

- The redevelopment proposes a parking ratio for the new buildings and existing buildings of 0.7 spaces per unit, with a total of 699 parking spaces
- The parking will be provided through 176 surface spaces and 523 parking structure spaces
- A total of 522 bicycle spaces will be provided, including 498 proposed bicycle spaces and 24 existing spaces
- The minimum parking and bicycle parking requirements are satisfied

Boundary Street Design

- The pedestrian LOS will not be met along the boundary streets, which requires an increase to the sidewalks to be at least 2 metres and boulevards widened to be larger than 2 metres
- The bicycle LOS will not be met along the boundary streets, which needs the operating speed to be decreased to less than 50 km/h or physically separated to be created
- The transit LOS will not be met along the segment of Russell Road, which requires a bus lane or separated ROW to be created

Access Intersections Design

- The development will maintain two existing full-movements accesses, one onto St. Laurent Boulevard and one onto Russell Road, along with the internal site connected to the south
- The site accesses will be stop-controlled on the minor approach
- The access on St. Laurent Boulevard provides approximately 40 metres of the TAC recommended 25 metre throat length, and the Russel Road access provides approximately 34.5 metres of the TAC recommended 40 metre throat length
- The existing building does not permit the throat length to be extended and the site has been oriented towards St. Laurent Boulevard to reduce queue storage requirements along Russell Road
- No changes to the site accesses are proposed
- The 2030 and 2035 future total access intersection operate satisfactorily

TDM

- Supportive TDM measures to be included within the proposed development should include:
    - Display local area maps with walking and cycling routes, and transit route information and schedules at major entrances
    - Provide a multimodal travel option information package to new residents
    - Contract with providers to install on-site bikeshare (or other micromobility alternatives) and carshare spaces
    - Inclusion of a 1-year Presto card for first time apartment rental, with a set time frame for this offer (e.g. 6-months) from the initial opening of the site
    - Unbundle parking cost from rental costs

NTM

- The site is anticipated to generate approximately 34 to 26 two-way vehicle trips during the peak hours on St. Laurent Boulevard
- The additional traffic is not considered a significant impact compared to the existing two-way vehicles during the peak hours and no mitigation it required from a network perspective

Transit

- The forecasted transit trips will include 93 two-way trips during the AM peak and 59 two-way trips during the PM peak
- Peak hour increases in transit ridership resulting from the site equate to one third of a standard bus load northerly of the site, one quarter of a standard bus load southerly of the site, negligible increase in traffic east of the site and half of a standard bus load westerly of the site
- Negligible impacts are noted on the transit movements at the study area intersections as a result of the development site traffic

Network Intersection Design

- Generally, the network intersections operate at the future total horizons will operate similarly to the future background conditions
- The St. Laurent Boulevard at St. Laurent Boulevard Service Road intersection operates well should the roundabout be realized by the 2035 horizon
- The pedestrian LOS targets will not be met at the existing or future intersections within the study area, which require crossing distances need to be reduced to equal or less than three lane widths
- The bicycle LOS targets will not be met at the existing or future intersections within the study area, and it is limited by the lack of dedicated facilities and improved left-turn configurations
- The transit LOS targets will not be met at the intersections of St. Laurent Boulevard at Smyth Road/ Lancaster Road and Russell Road at St. Laurent Boulevard, which requires the delay to be below 10 seconds and 30 seconds respectively

17 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:

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Transportation Engineering-Intern

Reviewed By:

Andrew Harte, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

6 Plaza Court
Ottawa ON K2H 7W1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: Novemeber 22, 2021
Project Number: 2020-23
Project Reference: 1971 & 1975 St. Laurent Blvd

1.1 Description of Proposed Development	
Municipal Address	1971 & 1975 St. Laurent Boulevard
Description of Location	South of the intersection of St. Laurent Blvd & Russell Rd. Existing residential parking lot and two residential towers.
Land Use Classification	Arterial Mainstreet (AM10 H(54)) & Residential Fifth Density Zone (R5B H(18))
Development Size	Three residential buildings with a total of 495 new residential units.
Accesses	One existing on St. Laurent Blvd, one existing on Russell Rd
Phase of Development	All phases
Buildout Year	2025
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Townhomes or apartments	
Development Size	495	Units
Trip Generation Trigger	Yes	

1.3 Location Triggers		
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	Yes	
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	Yes	
Location Trigger	Yes	

1.4. Safety Triggers		
Are posted speed limits on a boundary street 80 km/hr or greater?	No	
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	Yes	No newly proposed driveway
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	Yes	No newly proposed driveway
Is the proposed driveway within auxiliary lanes of an intersection?	Yes	No newly proposed driveway
Does the proposed driveway make use of an existing median break that serves an existing site?	Yes	Existing access on Russell Road in taper of Southvale Crescent intersection SBL
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	Yes	Two fatilities in past five years at Russell Road at Southvale Crescent N intersection
Does the development include a drive-thru facility?	No	
Safety Trigger	Yes	

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that s/he meets the four criteria listed below.

CERTIFICATION

1. I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;
2. I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
3. I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
4. I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise [check √ appropriate field(s)] is either transportation engineering √ or transportation planning □.

[1,2] **License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.**

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
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Fax: 613-560-6006

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Urbanisme et Gestion de la croissance
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Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at ___Ottawa_____ this __20__ day of _____September_____, 2018.
(City)

Name: _____Andrew Harte_____
(Please Print)

Professional Title: _____Professional Engineer_____

_____
Signature of Individual certifier that s/he meets the above four criteria

Office Contact Information (Please Print)
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City / Postal Code: Ottawa / K2H 7W1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com

Appendix B

Turning Movement Count Data

CGH TRANSPORTATION

Transportation Services - Traffic Services

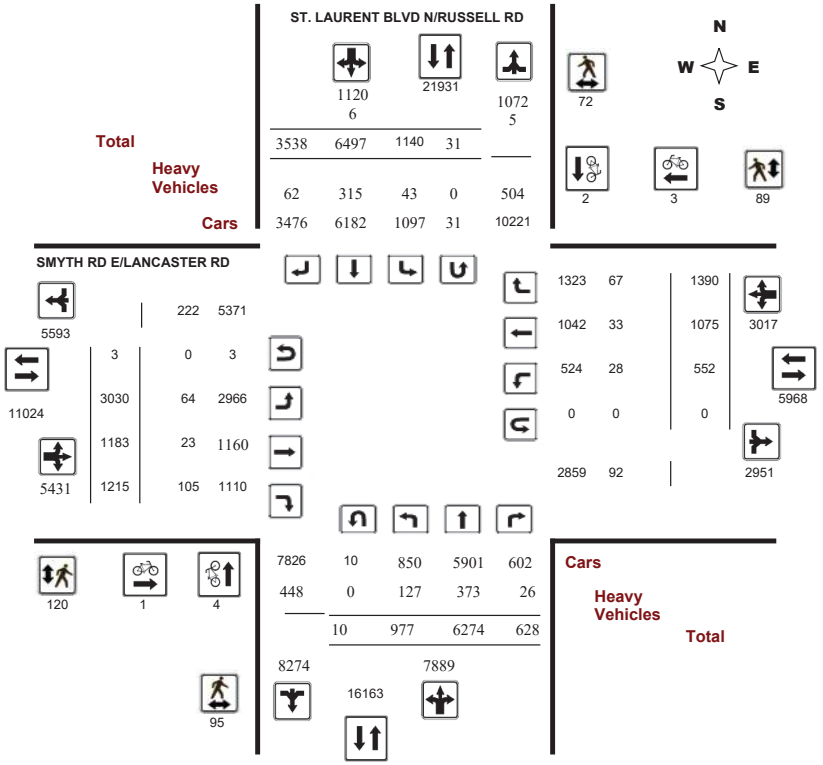
Turning Movement Count - Study Results

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



5469232 - MAR 5, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

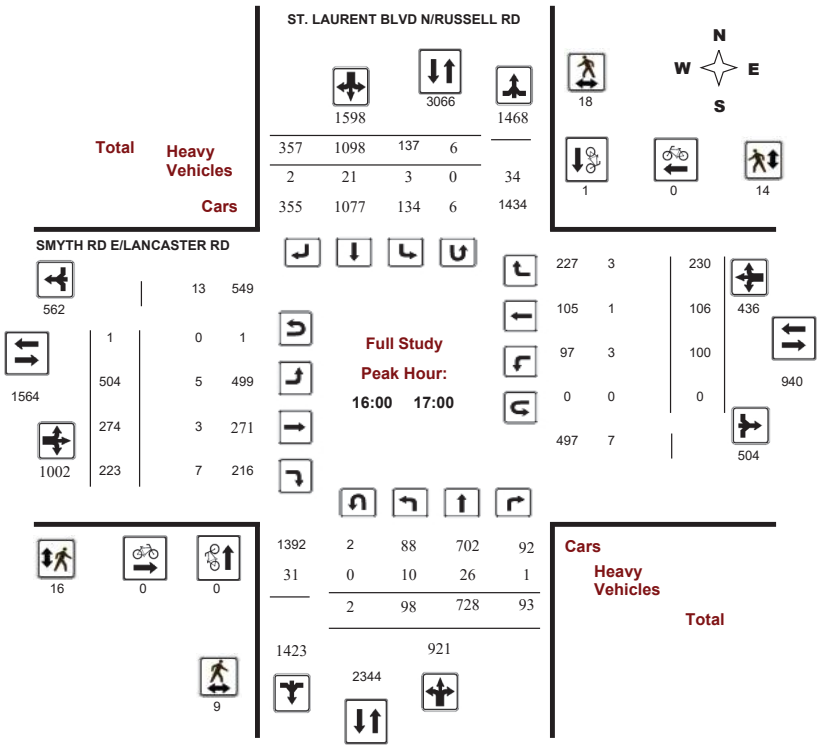
Turning Movement Count - Study Results

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



5469232 - MAR 5, 2020 - 8HRS - LORETTA

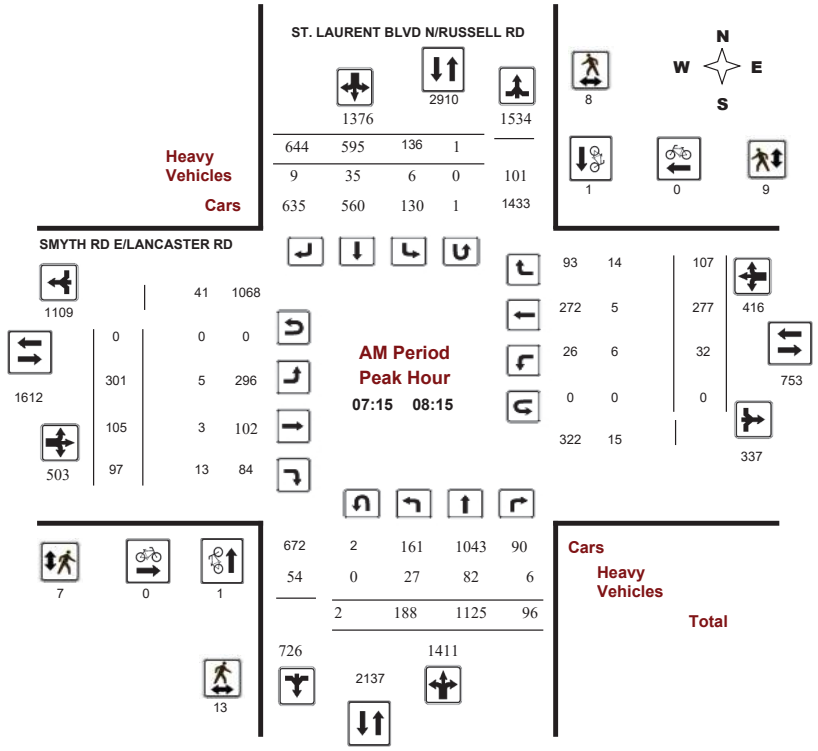
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

Start Time: 07:00 **Device:** Miovision



Comments 5469232 - MAR 5, 2020 - 8HRS - LORETTA

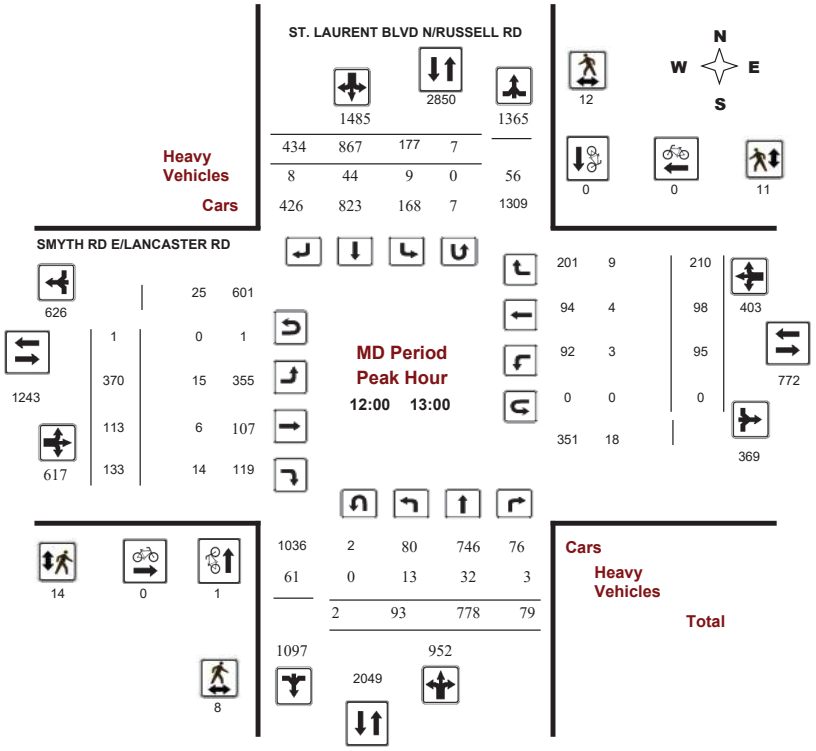
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

Start Time: 07:00 **Device:** Miovision



Comments 5469232 - MAR 5, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

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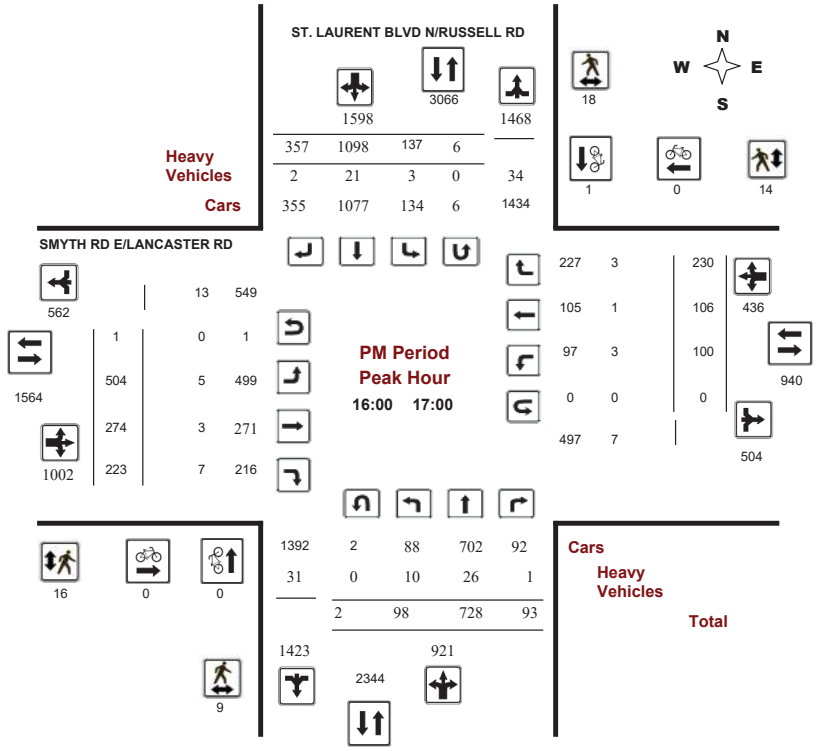


Comments 5469232 - MAR 5, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Thursday, March 05, 2020

Total Observed U-Turns

Northbound: 10 Southbound: 31

Eastbound: 3 Westbound: 0

AADT Factor 1.00

	ST. LAURENT BLVD N/RUSSELL RD									SMYTH RD E/LANCASTER RD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	179	1061	79	**1319**	118	569	641	**1328**	**2647**	267	92	94	**453**	32	292	94	**418**	**871**	**3518**
08:00 09:00	180	971	89	**1240**	135	658	619	**1412**	**2652**	301	122	102	**525**	25	201	123	**349**	**874**	**3526**
09:00 10:00	145	700	73	**918**	176	593	423	**1192**	**2110**	250	95	96	**441**	53	116	141	**310**	**751**	**2861**
11:30 12:30	88	768	79	**935**	166	816	399	**1381**	**2316**	386	95	146	**627**	86	86	212	**384**	**1011**	**3327**
12:30 13:30	92	767	79	**938**	173	807	410	**1390**	**2328**	371	98	134	**603**	95	95	197	**387**	**990**	**3318**
15:00 16:00	108	598	70	**776**	128	1008	354	**1490**	**2266**	561	260	257	**1078**	65	88	186	**339**	**1417**	**3683**
16:00 17:00	98	728	93	**919**	137	1098	357	**1592**	**2511**	504	274	223	**1001**	100	106	230	**436**	**1437**	**3948**
17:00 18:00	87	681	66	**834**	107	948	335	**1390**	**2224**	390	147	163	**700**	96	91	207	**394**	**1094**	**3318**
Sub Total	977	6274	628	**7879**	1140	6497	3538	**11175**	**19054**	3030	1183	1215	**5428**	552	1075	1390	**3017**	**8445**	**27499**
U Turns				**10**				**31**	**41**				**3**				**0**	**3**	**44**
Total	977	6274	628	**7889**	1140	6497	3538	**11206**	**19095**	3030	1183	1215	**5431**	552	1075	1390	**3017**	**8448**	**27543**
EQ 12Hr	1358	8721	873	**10966**	1585	9031	4918	**15576**	**26542**	4212	1644	1689	**7549**	767	1494	1932	**4194**	**11743**	**38285**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	1280	8219	823	**10335**	1493	8511	4635	**14680**	**26542**	3969	1550	1592	**7115**	723	1408	1821	**3952**	**11743**	**38285**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1**					
AVG 24Hr	1677	10767	1078	**13538**	1956	11150	6072	**19231**	**32769**	5200	2030	2085	**9320**	947	1845	2385	**5177**	**14497**	**47266**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		ST. LAURENT BLVD N/RUSSELL R									SMYTH RD E/LANCASTER RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	33	201	9	243	20	107	158	285	41	43	13	18	74	5	72	16	93	41	695
07:15	07:30	52	274	20	346	23	171	169	363	28	63	24	22	109	7	66	21	94	28	912
07:30	07:45	40	273	22	337	27	139	164	331	40	75	27	25	127	8	86	32	126	40	921
07:45	08:00	54	313	28	395	48	152	150	350	43	86	28	29	143	12	68	25	105	43	993
08:00	08:15	42	265	26	333	38	133	161	332	54	77	26	21	124	5	57	29	91	54	880
08:15	08:30	48	271	20	339	27	177	142	347	48	63	25	25	113	6	53	27	86	48	885
08:30	08:45	52	200	17	269	34	166	175	375	44	94	33	30	157	9	51	37	97	44	898
08:45	09:00	38	235	26	299	36	182	141	360	49	67	38	26	131	5	40	30	75	49	865
09:00	09:15	41	188	18	247	39	145	132	316	43	68	36	30	134	12	30	31	73	43	770
09:15	09:30	34	173	26	233	43	168	107	320	35	49	18	22	89	12	32	31	75	35	717
09:30	09:45	33	186	14	233	46	126	93	266	29	69	19	23	111	16	31	48	95	29	705
09:45	10:00	37	153	15	205	48	154	91	293	30	64	22	21	107	13	23	31	67	30	672
11:30	11:45	30	158	17	205	46	168	94	308	33	98	20	43	161	17	22	55	94	33	768
11:45	12:00	20	222	24	267	35	201	94	330	33	103	17	40	160	27	19	46	92	33	849
12:00	12:15	14	189	13	217	52	214	97	364	23	103	32	38	173	29	22	56	107	23	861
12:15	12:30	24	199	25	249	33	233	114	382	24	82	26	25	133	13	23	55	91	24	855
12:30	12:45	28	176	21	225	55	192	101	350	26	89	29	34	153	29	35	48	112	26	840
12:45	13:00	27	214	20	261	37	228	122	389	36	96	26	36	158	24	18	51	93	36	901
13:00	13:15	17	184	18	220	45	203	86	335	27	98	28	36	162	21	19	59	99	27	816
13:15	13:30	20	193	20	233	36	184	101	322	31	88	15	28	131	21	23	39	83	31	769
15:00	15:15	24	157	15	198	26	230	94	351	28	130	72	55	257	14	28	48	90	28	896
15:15	15:30	35	109	14	158	33	251	76	360	26	154	63	72	290	16	20	57	93	26	901
15:30	15:45	25	168	19	212	27	293	110	432	26	140	59	48	247	14	23	39	76	26	967
15:45	16:00	24	164	22	210	42	234	74	352	27	137	66	82	285	21	17	42	80	27	927
16:00	16:15	20	207	17	245	35	311	84	431	15	130	65	46	241	26	22	73	121	15	1038
16:15	16:30	32	182	29	244	43	237	87	369	14	147	78	64	290	27	21	42	90	14	993
16:30	16:45	24	186	22	232	25	304	93	422	19	105	54	60	219	30	28	57	115	19	988
16:45	17:00	22	153	25	200	34	246	93	376	15	122	77	53	252	17	35	58	110	15	938
17:00	17:15	26	179	14	219	21	263	76	362	16	102	38	48	188	28	34	86	148	16	917
17:15	17:30	16	159	16	191	35	240	101	377	6	100	41	42	183	30	22	44	96	6	847
17:30	17:45	21	193	20	234	20	253	75	350	24	97	37	39	173	19	13	45	77	24	834
17:45	18:00	24	150	16	190	31	192	83	306	13	91	31	34	156	19	22	32	73	13	725
Total:		977	6274	628	7889	1140	6497	3538	11206	946	3030	1183	1215	5431	552	1075	1390	3017	946	27,543

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

		ST. LAURENT BLVD N/RUSSELL RD			SMYTH RD E/LANCASTER RD			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	1	1	0	0	0	1
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	1	0	1	0	0	0	1
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	1	0	1	1	0	1	2
09:00	09:15	0	0	0	0	1	1	1
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	1	1	1
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	1	0	1	0	0	0	1
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	1	1	0	0	0	1
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	1	0	1	0	1	1	2
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0
Total		4	2	**6**	1	3	4	10

Transportation Services - Traffic Services

Turning Movement Count - Study Results

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

ST. LAURENT BLVD N/RUSSELL R **SMYTH RD E/LANCASTER RD**

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	**0**	0	1	**1**	**1**
07:15 07:30	2	2	**4**	0	1	**1**	**5**
07:30 07:45	3	2	**5**	0	0	**0**	**5**
07:45 08:00	2	2	**4**	0	2	**2**	**6**
08:00 08:15	6	2	**8**	7	6	**13**	**21**
08:15 08:30	3	0	**3**	3	3	**6**	**9**
08:30 08:45	3	2	**5**	7	1	**8**	**13**
08:45 09:00	1	1	**2**	2	3	**5**	**7**
09:00 09:15	6	2	**8**	4	0	**4**	**12**
09:15 09:30	3	0	**3**	1	2	**3**	**6**
09:30 09:45	1	1	**2**	2	2	**4**	**6**
09:45 10:00	2	1	**3**	3	2	**5**	**8**
11:30 11:45	6	3	**9**	6	5	**11**	**20**
11:45 12:00	6	0	**6**	8	9	**17**	**23**
12:00 12:15	4	4	**8**	7	5	**12**	**20**
12:15 12:30	2	3	**5**	7	3	**10**	**15**
12:30 12:45	0	0	**0**	0	1	**1**	**1**
12:45 13:00	2	5	**7**	0	2	**2**	**9**
13:00 13:15	5	0	**5**	3	8	**11**	**16**
13:15 13:30	0	7	**7**	4	1	**5**	**12**
15:00 15:15	2	1	**3**	0	3	**3**	**6**
15:15 15:30	2	5	**7**	6	0	**6**	**13**
15:30 15:45	5	1	**6**	3	1	**4**	**10**
15:45 16:00	3	3	**6**	5	1	**6**	**12**
16:00 16:15	2	5	**7**	4	2	**6**	**13**
16:15 16:30	1	6	**7**	7	3	**10**	**17**
16:30 16:45	2	1	**3**	2	1	**3**	**6**
16:45 17:00	4	6	**10**	3	8	**11**	**21**
17:00 17:15	6	3	**9**	10	2	**12**	**21**
17:15 17:30	7	2	**9**	8	2	**10**	**19**
17:30 17:45	3	1	**4**	5	8	**13**	**17**
17:45 18:00	1	1	**2**	3	1	**4**	**6**
Total	95	72	**167**	120	89	**209**	**376**

5469232 - MAR 5, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

ST. LAURENT BLVD N/RUSSELL R **SMYTH RD E/LANCASTER RD**

		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	3	18	0	**21**	0	14	6	**20**	**41**	1	1	4	**6**	1	0	2	**3**	**9**	**50**
07:15	07:30	3	12	2	**17**	1	8	2	**11**	**28**	1	0	2	**3**	2	2	3	**7**	**10**	**38**
07:30	07:45	8	14	2	**24**	2	13	1	**16**	**40**	1	2	4	**7**	1	0	6	**7**	**14**	**54**
07:45	08:00	6	22	2	**30**	3	8	2	**13**	**43**	0	1	4	**5**	2	1	2	**5**	**10**	**53**
08:00	08:15	10	34	0	**44**	0	6	4	**10**	**54**	3	0	3	**6**	1	2	3	**6**	**12**	**66**
08:15	08:30	4	23	0	**27**	3	17	1	**21**	**48**	0	0	6	**6**	0	4	2	**6**	**12**	**60**
08:30	08:45	5	23	2	**30**	3	7	4	**14**	**44**	3	0	3	**6**	0	3	2	**5**	**11**	**55**
08:45	09:00	9	25	1	**35**	0	11	3	**14**	**49**	3	1	4	**8**	0	1	6	**7**	**15**	**64**
09:00	09:15	5	16	1	**22**	3	13	5	**21**	**43**	4	1	3	**8**	2	0	2	**4**	**12**	**55**
09:15	09:30	7	12	1	**20**	4	10	1	**15**	**35**	2	0	5	**7**	2	2	4	**8**	**15**	**50**
09:30	09:45	6	12	0	**18**	0	11	0	**11**	**29**	1	1	5	**7**	3	3	5	**11**	**18**	**47**
09:45	10:00	4	11	1	**16**	1	6	7	**14**	**30**	1	2	4	**7**	0	1	3	**4**	**11**	**41**
11:30	11:45	3	12	1	**16**	0	13	4	**17**	**33**	4	0	2	**6**	1	1	1	**3**	**9**	**42**
11:45	12:00	3	6	2	**11**	2	19	1	**22**	**33**	3	0	4	**7**	1	1	2	**4**	**11**	**44**
12:00	12:15	1	5	0	**6**	1	12	4	**17**	**23**	6	1	4	**11**	1	1	1	**3**	**14**	**37**
12:15	12:30	5	4	0	**9**	3	11	1	**15**	**24**	1	0	4	**5**	0	2	5	**7**	**12**	**36**
12:30	12:45	3	7	2	**12**	4	10	0	**14**	**26**	5	3	2	**10**	1	0	1	**2**	**12**	**38**
12:45	13:00	4	16	1	**21**	1	11	3	**15**	**36**	3	2	4	**9**	1	1	2	**4**	**13**	**49**
13:00	13:15	1	12	2	**15**	3	9	0	**12**	**27**	4	0	6	**10**	0	1	2	**3**	**13**	**40**
13:15	13:30	6	11	0	**17**	0	12	2	**14**	**31**	6	0	4	**10**	0	2	2	**4**	**14**	**45**
15:00	15:15	2	3	0	**5**	2	17	4	**23**	**28**	1	0	1	**2**	0	1	1	**2**	**4**	**32**
15:15	15:30	3	6	1	**10**	1	13	2	**16**	**26**	3	1	4	**8**	0	0	1	**1**	**9**	**35**
15:30	15:45	4	5	2	**11**	1	14	0	**15**	**26**	0	1	3	**4**	1	1	2	**4**	**8**	**34**
15:45	16:00	5	10	0	**15**	1	10	1	**12**	**27**	0	2	3	**5**	1	1	3	**5**	**10**	**37**
16:00	16:15	5	5	0	**10**	0	5	0	**5**	**15**	1	1	2	**4**	1	0	0	**1**	**5**	**20**
16:15	16:30	2	5	1	**8**	0	5	1	**6**	**14**	1	1	1	**3**	0	0	2	**2**	**5**	**19**
16:30	16:45	1	9	0	**10**	2	6	1	**9**	**19**	1	0	3	**4**	1	0	0	**1**	**5**	**24**
16:45	17:00	2	7	0	**9**	1	5	0	**6**	**15**	2	1	1	**4**	1	1	1	**3**	**7**	**22**
17:00	17:15	1	4	1	**6**	0	8	2	**10**	**16**	2	0	2	**4**	0	0	1	**1**	**5**	**21**
17:15	17:30	1	4	0	**5**	0	1	0	**1**	**6**	0	0	4	**4**	0	0	0	**0**	**4**	**10**
17:30	17:45	3	12	0	**15**	0	9	0	**9**	**24**	1	1	2	**4**	3	1	0	**4**	**8**	**32**
17:45	18:00	2	8	1	**11**	1	1	0	**2**	**13**	0	0	2	**2**	1	0	0	**1**	**3**	**16**
Total:	None	127	373	26	**526**	43	315	62	**420**	**946**	64	23	105	**192**	28	33	67	**128**	**320**	**1,266**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

SMYTH RD E/LANCASTER RD @ ST. LAURENT BLVD N/R

Survey Date: Thursday, March 05, 2020 **WO No:** 39290

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		ST. LAURENT BLVD N/RUSSELL R		SMYTH RD E/LANCASTER RD		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	2	1	0	0	3
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	1	0	0	1
08:30	08:45	0	0	0	0	0
08:45	09:00	0	1	0	0	1
09:00	09:15	0	0	0	0	0
09:15	09:30	0	2	0	0	2
09:30	09:45	0	1	0	0	1
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	1	0	0	0	1
12:00	12:15	1	1	0	0	2
12:15	12:30	1	2	0	0	3
12:30	12:45	0	2	1	0	3
12:45	13:00	0	2	0	0	2
13:00	13:15	1	1	0	0	2
13:15	13:30	0	1	0	0	1
15:00	15:15	2	1	0	0	3
15:15	15:30	0	0	1	0	1
15:30	15:45	0	2	0	0	2
15:45	16:00	0	2	0	0	2
16:00	16:15	1	1	0	0	2
16:15	16:30	1	2	1	0	4
16:30	16:45	0	0	0	0	0
16:45	17:00	0	3	0	0	3
17:00	17:15	0	2	0	0	2
17:15	17:30	0	1	0	0	1
17:30	17:45	0	2	0	0	2
17:45	18:00	0	0	0	0	0
Total		10	31	3	0	44

Transportation Services - Traffic Services

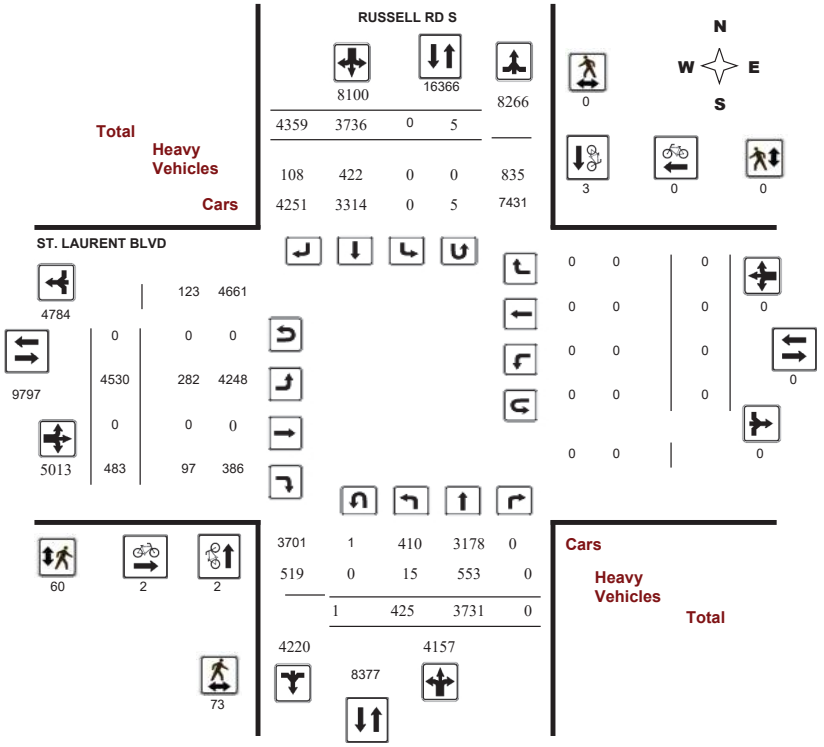
Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

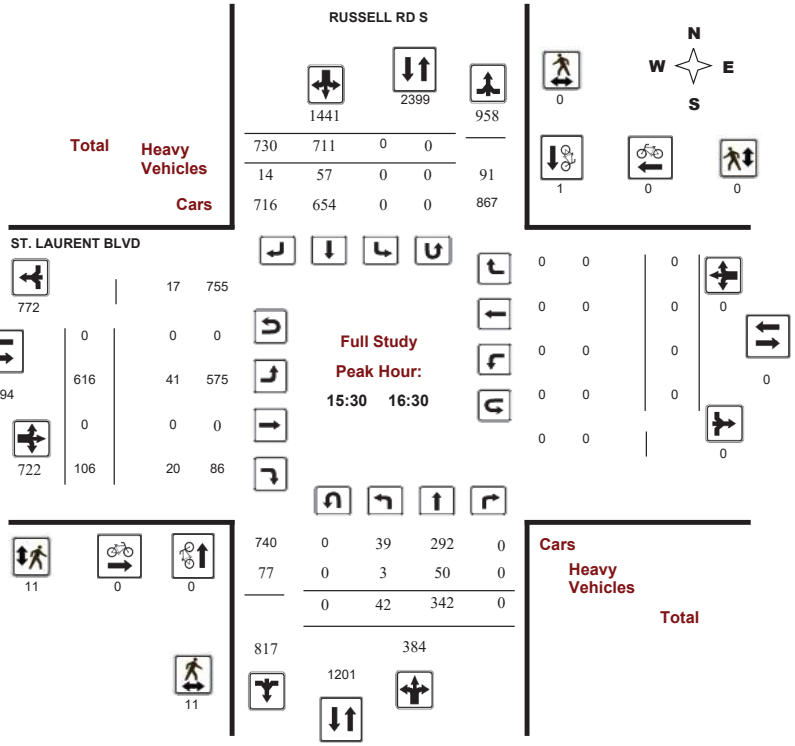
Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



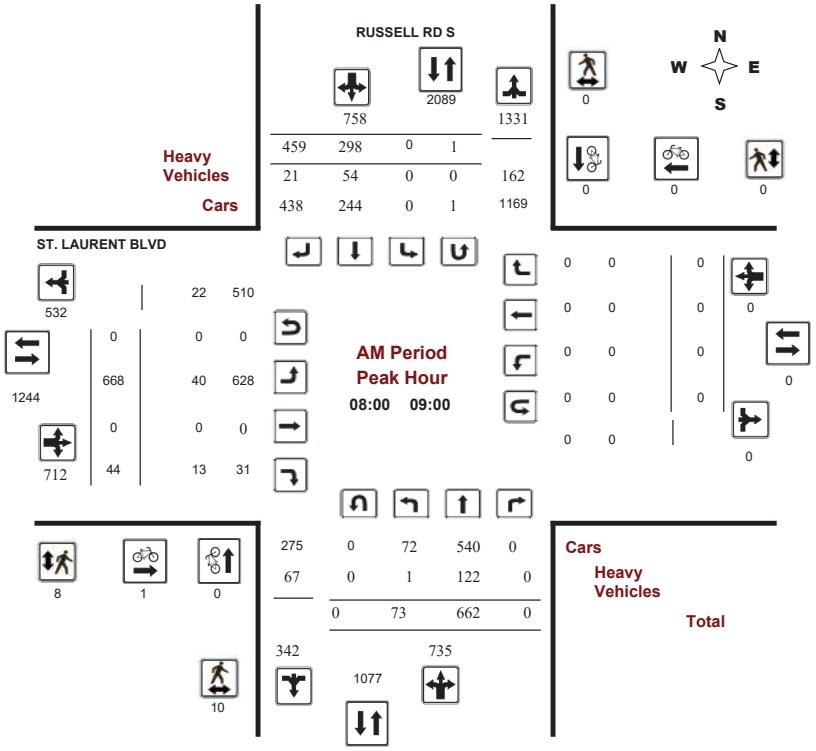
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision



Comments

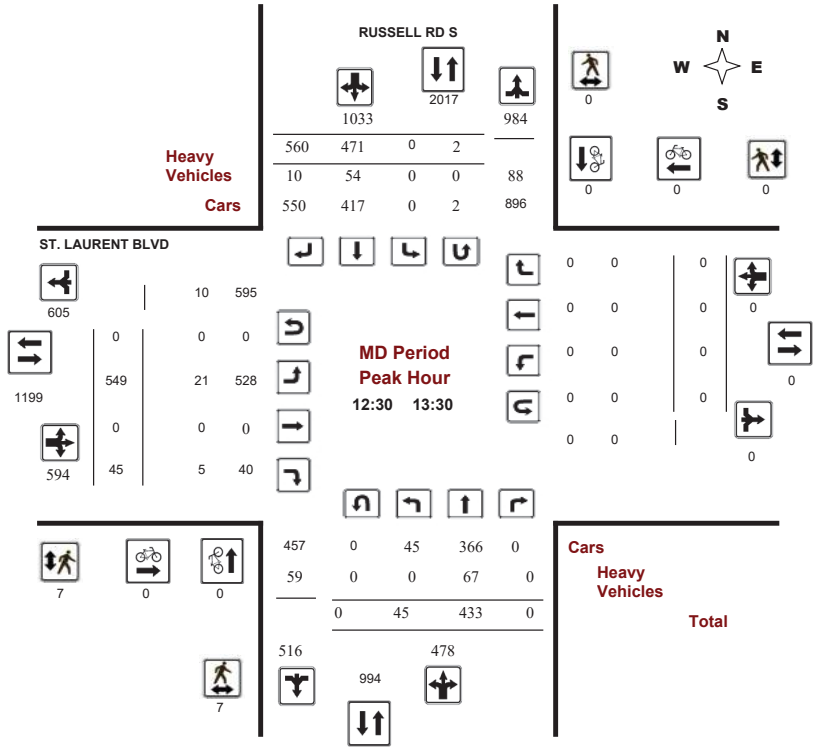
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision



Comments

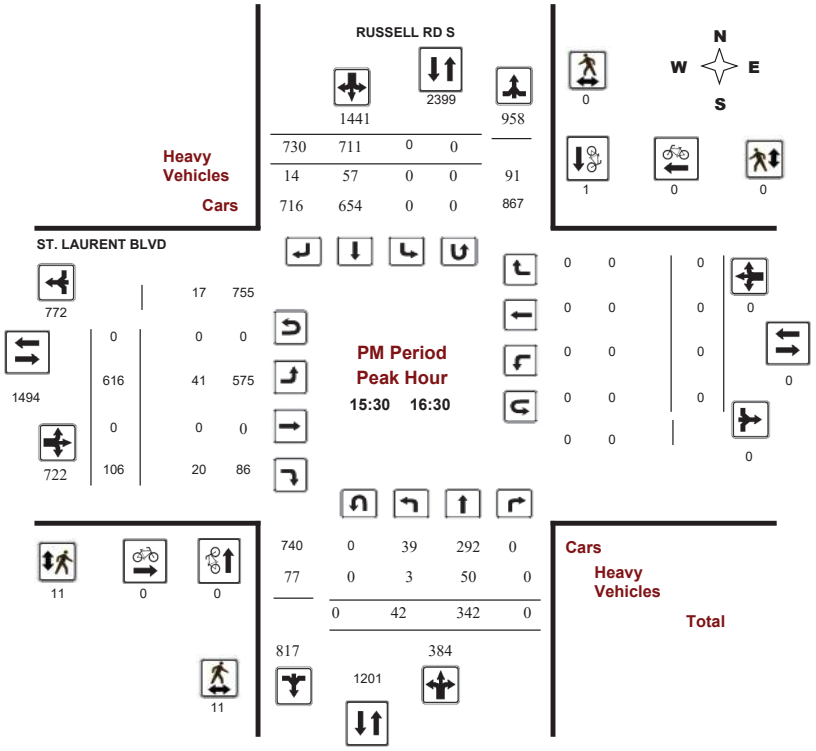
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, April 11, 2017

Total Observed U-Turns

Northbound: 1 Southbound: 5

Eastbound: 0 Westbound: 0

AADT Factor .90

	RUSSELL RD S									ST. LAURENT BLVD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	49	604	0	**653**	0	277	391	**668**	**1321**	561	0	25	**586**	0	0	0	**0**	**586**	**1907**
08:00 09:00	73	662	0	**735**	0	298	459	**757**	**1492**	668	0	44	**712**	0	0	0	**0**	**712**	**2204**
09:00 10:00	49	486	0	**535**	0	319	385	**704**	**1239**	490	0	28	**518**	0	0	0	**0**	**518**	**1757**
11:30 12:30	51	452	0	**503**	0	438	480	**918**	**1421**	551	0	57	**608**	0	0	0	**0**	**608**	**2029**
12:30 13:30	45	433	0	**478**	0	471	560	**1031**	**1509**	549	0	45	**594**	0	0	0	**0**	**594**	**2103**
15:00 16:00	47	375	0	**422**	0	696	704	**1400**	**1822**	578	0	81	**659**	0	0	0	**0**	**659**	**2481**
16:00 17:00	43	356	0	**399**	0	672	684	**1356**	**1755**	605	0	109	**714**	0	0	0	**0**	**714**	**2469**
17:00 18:00	68	363	0	**431**	0	565	696	**1261**	**1692**	528	0	94	**622**	0	0	0	**0**	**622**	**2314**
Sub Total	425	3731	0	**4156**	0	3736	4359	**8095**	**12251**	4530	0	483	**5013**	0	0	0	**0**	**5013**	**17264**
U Turns				**1**				**5**	**6**				**0**				**0**	**0**	**6**
Total	425	3731	0	**4157**	0	3736	4359	**8100**	**12257**	4530	0	483	**5013**	0	0	0	**0**	**5013**	**17270**
EQ 12Hr	591	5186	0	**5778**	0	5193	6059	**11259**	**17037**	6297	0	671	**6968**	0	0	0	**0**	**6968**	**24005**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	501	4399	0	**4901**	0	4405	5139	**9550**	**15333**	5341	0	569	**5910**	0	0	0	**0**	**6271**	**21604**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**0.9**					
AVG 24Hr	656	5762	0	**6420**	0	5770	6732	**12510**	**18930**	6997	0	746	**7743**	0	0	0	**0**	**7743**	**26673**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		RUSSELL RD S									ST. LAURENT BLVD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	4	124	0	128	0	56	66	122	38	108	0	4	112	0	0	0	0	38	362
07:15	07:30	6	143	0	149	0	66	96	162	37	142	0	11	153	0	0	0	0	37	464
07:30	07:45	14	163	0	177	0	76	119	195	48	157	0	3	160	0	0	0	0	48	532
07:45	08:00	25	174	0	199	0	79	110	189	42	154	0	7	161	0	0	0	0	42	549
08:00	08:15	18	174	0	192	0	72	115	187	52	166	0	11	177	0	0	0	0	52	556
08:15	08:30	21	163	0	184	0	63	121	185	43	177	0	13	190	0	0	0	0	43	559
08:30	08:45	16	152	0	168	0	79	110	189	49	161	0	13	174	0	0	0	0	49	531
08:45	09:00	18	173	0	191	0	84	113	197	54	164	0	7	171	0	0	0	0	54	559
09:00	09:15	15	117	0	132	0	81	102	183	40	132	0	9	141	0	0	0	0	40	456
09:15	09:30	9	130	0	139	0	90	91	181	44	113	0	9	122	0	0	0	0	44	442
09:30	09:45	8	129	0	137	0	79	86	165	40	138	0	3	141	0	0	0	0	40	443
09:45	10:00	17	110	0	127	0	69	106	175	35	107	0	7	114	0	0	0	0	35	416
11:30	11:45	8	116	0	124	0	96	97	193	32	134	0	20	154	0	0	0	0	32	471
11:45	12:00	10	125	0	135	0	114	137	252	40	156	0	11	167	0	0	0	0	40	554
12:00	12:15	15	102	0	117	0	127	130	258	31	131	0	11	142	0	0	0	0	31	517
12:15	12:30	18	109	0	127	0	101	116	217	31	130	0	15	145	0	0	0	0	31	489
12:30	12:45	17	109	0	126	0	116	128	244	29	145	0	20	165	0	0	0	0	29	535
12:45	13:00	10	113	0	123	0	121	145	266	32	135	0	8	143	0	0	0	0	32	532
13:00	13:15	7	105	0	112	0	105	151	257	40	126	0	8	134	0	0	0	0	40	503
13:15	13:30	11	106	0	117	0	129	136	266	30	143	0	9	152	0	0	0	0	30	535
15:00	15:15	10	122	0	132	0	155	179	334	40	135	0	11	146	0	0	0	0	40	612
15:15	15:30	15	82	0	97	0	182	168	350	46	146	0	21	167	0	0	0	0	46	614
15:30	15:45	9	99	0	108	0	175	175	350	43	146	0	27	173	0	0	0	0	43	631
15:45	16:00	13	72	0	85	0	184	182	366	33	151	0	22	173	0	0	0	0	33	624
16:00	16:15	11	97	0	108	0	182	186	368	23	153	0	27	180	0	0	0	0	23	656
16:15	16:30	9	74	0	83	0	170	187	357	25	166	0	30	196	0	0	0	0	25	636
16:30	16:45	17	98	0	115	0	177	174	351	22	130	0	28	158	0	0	0	0	22	624
16:45	17:00	6	87	0	94	0	143	137	280	16	156	0	24	180	0	0	0	0	16	554
17:00	17:15	26	104	0	130	0	149	208	357	26	126	0	23	149	0	0	0	0	26	636
17:15	17:30	17	76	0	93	0	150	177	327	14	138	0	31	169	0	0	0	0	14	589
17:30	17:45	12	99	0	111	0	127	178	305	13	123	0	21	144	0	0	0	0	13	560
17:45	18:00	13	84	0	97	0	139	133	272	10	141	0	19	160	0	0	0	0	10	529
Total:		425	3731	0	4157	0	3736	4359	8100	1098	4530	0	483	5013	0	0	0	0	1098	17,270

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		RUSSELL RD S			ST. LAURENT BLVD			Grand Total
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	1	0	1	1
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	1	0	1	0	0	0	1
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	1	1	0	0	0	1
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	2	2	0	0	0	2
17:30	17:45	1	0	1	0	0	0	1
17:45	18:00	0	0	0	1	0	1	1
Total		2	3	**5**	2	0	2	7

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

Time Period		RUSSELL RD S			ST. LAURENT BLVD			Grand Total
		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	
07:00	07:15	3	0	**3**	1	0	**1**	**4**
07:15	07:30	2	0	**2**	2	0	**2**	**4**
07:30	07:45	2	0	**2**	2	0	**2**	**4**
07:45	08:00	5	0	**5**	5	0	**5**	**10**
08:00	08:15	2	0	**2**	3	0	**3**	**5**
08:15	08:30	1	0	**1**	0	0	**0**	**1**
08:30	08:45	3	0	**3**	2	0	**2**	**5**
08:45	09:00	4	0	**4**	3	0	**3**	**7**
09:00	09:15	1	0	**1**	0	0	**0**	**1**
09:15	09:30	1	0	**1**	0	0	**0**	**1**
09:30	09:45	1	0	**1**	2	0	**2**	**3**
09:45	10:00	0	0	**0**	3	0	**3**	**3**
11:30	11:45	1	0	**1**	1	0	**1**	**2**
11:45	12:00	3	0	**3**	3	0	**3**	**6**
12:00	12:15	1	0	**1**	3	0	**3**	**4**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	1	0	**1**	1	0	**1**	**2**
12:45	13:00	1	0	**1**	0	0	**0**	**1**
13:00	13:15	3	0	**3**	0	0	**0**	**3**
13:15	13:30	2	0	**2**	6	0	**6**	**8**
15:00	15:15	2	0	**2**	3	0	**3**	**5**
15:15	15:30	2	0	**2**	1	0	**1**	**3**
15:30	15:45	4	0	**4**	5	0	**5**	**9**
15:45	16:00	1	0	**1**	3	0	**3**	**4**
16:00	16:15	5	0	**5**	2	0	**2**	**7**
16:15	16:30	1	0	**1**	1	0	**1**	**2**
16:30	16:45	7	0	**7**	2	0	**2**	**9**
16:45	17:00	5	0	**5**	1	0	**1**	**6**
17:00	17:15	2	0	**2**	2	0	**2**	**4**
17:15	17:30	3	0	**3**	1	0	**1**	**4**
17:30	17:45	4	0	**4**	1	0	**1**	**5**
17:45	18:00	0	0	**0**	1	0	**1**	**1**
Total	.....	73	0	**73**	60	0	**60**	**133**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		RUSSELL RD S									ST. LAURENT BLVD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	18	0	**18**	0	14	6	**20**	**38**	8	0	3	**11**	0	0	0	**0**	**11**	**49**
07:15	07:30	1	15	0	**16**	0	18	3	**21**	**37**	10	0	4	**14**	0	0	0	**0**	**14**	**51**
07:30	07:45	0	18	0	**18**	0	22	8	**30**	**48**	9	0	2	**11**	0	0	0	**0**	**11**	**59**
07:45	08:00	2	24	0	**26**	0	11	5	**16**	**42**	8	0	2	**10**	0	0	0	**0**	**10**	**52**
08:00	08:15	1	33	0	**34**	0	14	4	**18**	**52**	9	0	3	**12**	0	0	0	**0**	**12**	**64**
08:15	08:30	0	22	0	**22**	0	12	9	**21**	**43**	14	0	6	**20**	0	0	0	**0**	**20**	**63**
08:30	08:45	0	35	0	**35**	0	10	4	**14**	**49**	11	0	2	**13**	0	0	0	**0**	**13**	**62**
08:45	09:00	0	32	0	**32**	0	18	4	**22**	**54**	6	0	2	**8**	0	0	0	**0**	**8**	**62**
09:00	09:15	0	17	0	**17**	0	21	2	**23**	**40**	11	0	2	**13**	0	0	0	**0**	**13**	**53**
09:15	09:30	0	23	0	**23**	0	18	3	**21**	**44**	8	0	3	**11**	0	0	0	**0**	**11**	**55**
09:30	09:45	0	23	0	**23**	0	14	3	**17**	**40**	8	0	1	**9**	0	0	0	**0**	**9**	**49**
09:45	10:00	3	21	0	**24**	0	10	1	**11**	**35**	6	0	3	**9**	0	0	0	**0**	**9**	**44**
11:30	11:45	0	19	0	**19**	0	9	4	**13**	**32**	13	0	3	**16**	0	0	0	**0**	**16**	**48**
11:45	12:00	0	26	0	**26**	0	12	2	**14**	**40**	3	0	2	**5**	0	0	0	**0**	**5**	**45**
12:00	12:15	0	15	0	**15**	0	14	2	**16**	**31**	6	0	2	**8**	0	0	0	**0**	**8**	**39**
12:15	12:30	1	16	0	**17**	0	12	2	**14**	**31**	7	0	2	**9**	0	0	0	**0**	**9**	**40**
12:30	12:45	0	14	0	**14**	0	14	1	**15**	**29**	6	0	1	**7**	0	0	0	**0**	**7**	**36**
12:45	13:00	0	20	0	**20**	0	11	1	**12**	**32**	4	0	1	**5**	0	0	0	**0**	**5**	**37**
13:00	13:15	0	24	0	**24**	0	12	4	**16**	**40**	7	0	2	**9**	0	0	0	**0**	**9**	**49**
13:15	13:30	0	9	0	**9**	0	17	4	**21**	**30**	4	0	1	**5**	0	0	0	**0**	**5**	**35**
15:00	15:15	1	20	0	**21**	0	11	8	**19**	**40**	8	0	2	**10**	0	0	0	**0**	**10**	**50**
15:15	15:30	0	14	0	**14**	0	26	6	**32**	**46**	8	0	3	**11**	0	0	0	**0**	**11**	**57**
15:30	15:45	0	14	0	**14**	0	24	5	**29**	**43**	8	0	5	**13**	0	0	0	**0**	**13**	**56**
15:45	16:00	1	11	0	**12**	0	16	5	**21**	**33**	11	0	3	**14**	0	0	0	**0**	**14**	**47**
16:00	16:15	1	13	0	**14**	0	8	1	**9**	**23**	9	0	7	**16**	0	0	0	**0**	**16**	**39**
16:15	16:30	1	12	0	**13**	0	9	3	**12**	**25**	13	0	5	**18**	0	0	0	**0**	**18**	**43**
16:30	16:45	0	10	0	**10**	0	9	3	**12**	**22**	13	0	8	**21**	0	0	0	**0**	**21**	**43**
16:45	17:00	1	9	0	**10**	0	6	0	**6**	**16**	12	0	5	**17**	0	0	0	**0**	**17**	**33**
17:00	17:15	1	10	0	**11**	0	12	3	**15**	**26**	11	0	2	**13**	0	0	0	**0**	**13**	**39**
17:15	17:30	0	3	0	**3**	0	11	0	**11**	**14**	9	0	5	**14**	0	0	0	**0**	**14**	**28**
17:30	17:45	1	7	0	**8**	0	4	1	**5**	**13**	12	0	3	**15**	0	0	0	**0**	**15**	**28**
17:45	18:00	0	6	0	**6**	0	3	1	**4**	**10**	10	0	2	**12**	0	0	0	**0**	**12**	**22**
Total:	None	15	553	0	**568**	0	422	108	**530**	**1098**	282	0	97	**379**	0	0	0	**0**	**379**	**1,477**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD S @ ST. LAURENT BLVD

Survey Date: Tuesday, April 11, 2017 **WO No:** 36886

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		RUSSELL RD S	ST. LAURENT BLVD			
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	1	0	0	1
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	1	0	0	1
12:00	12:15	0	1	0	0	1
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	1	0	0	1
13:15	13:30	0	1	0	0	1
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	1	0	0	0	1
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		1	5	0	0	6

Transportation Services - Traffic Services

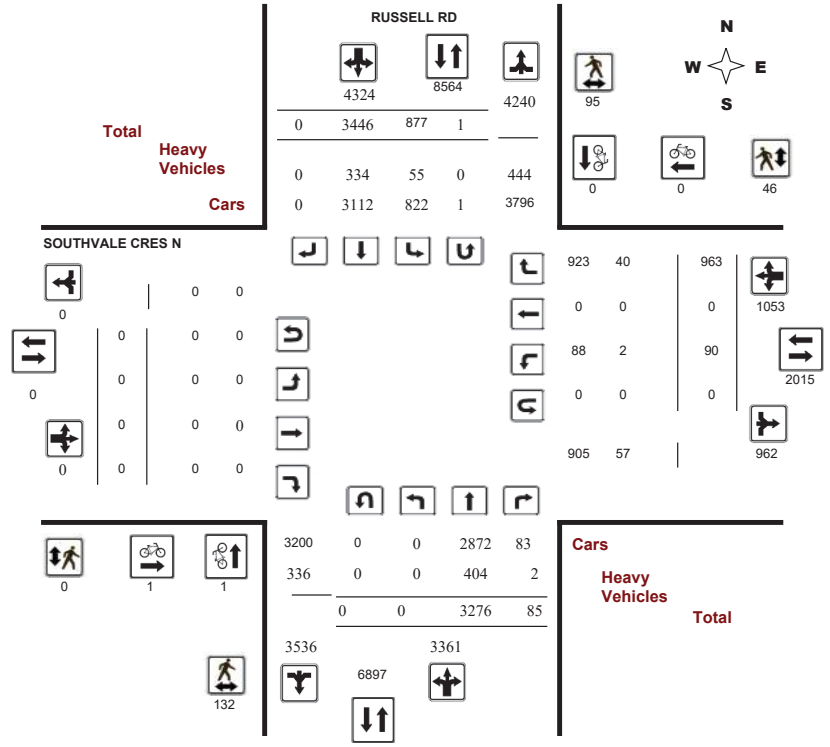
Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 **WO No:** 39257

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

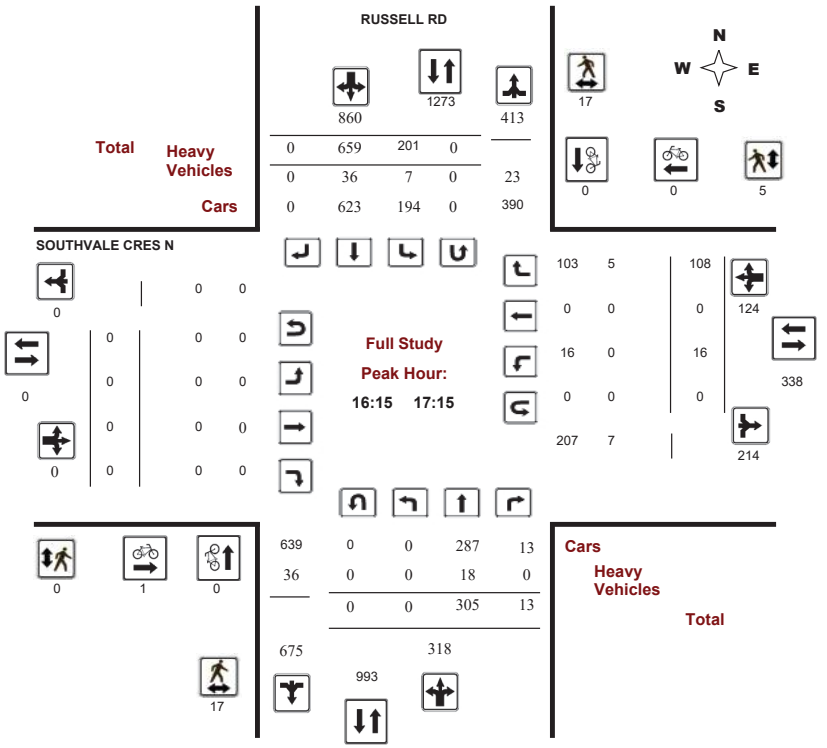
Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 **WO No:** 39257

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA

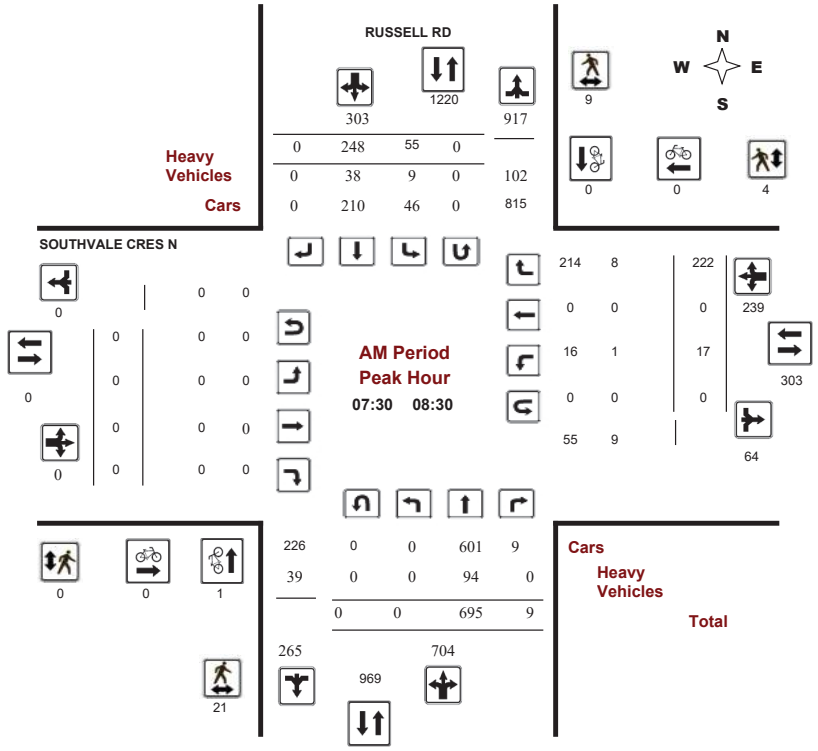
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 **WO No:** 39257

Start Time: 07:00 **Device:** Miovision



Comments 5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA

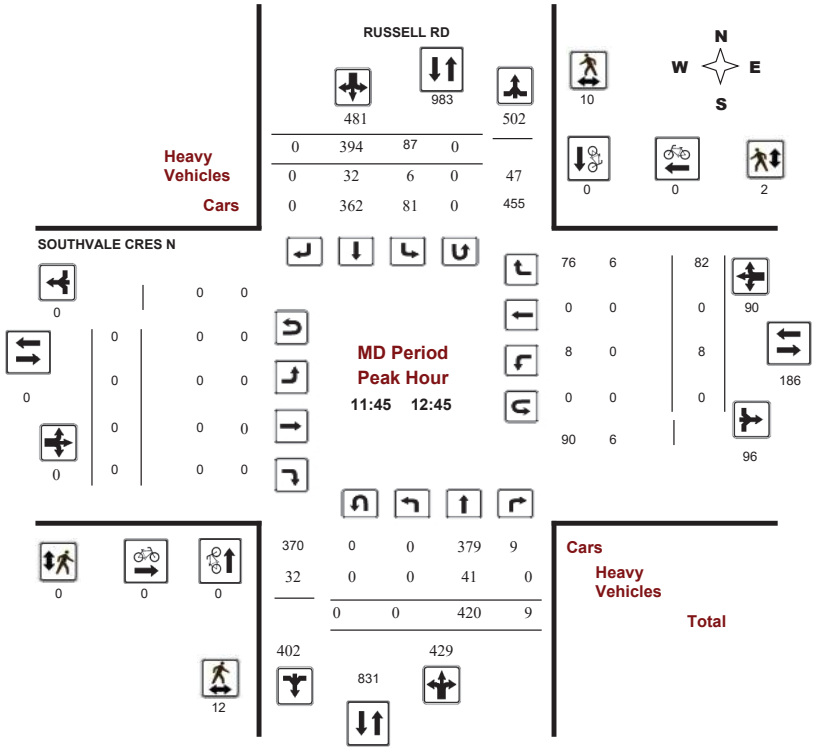
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 **WO No:** 39257

Start Time: 07:00 **Device:** Miovision



Comments 5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA

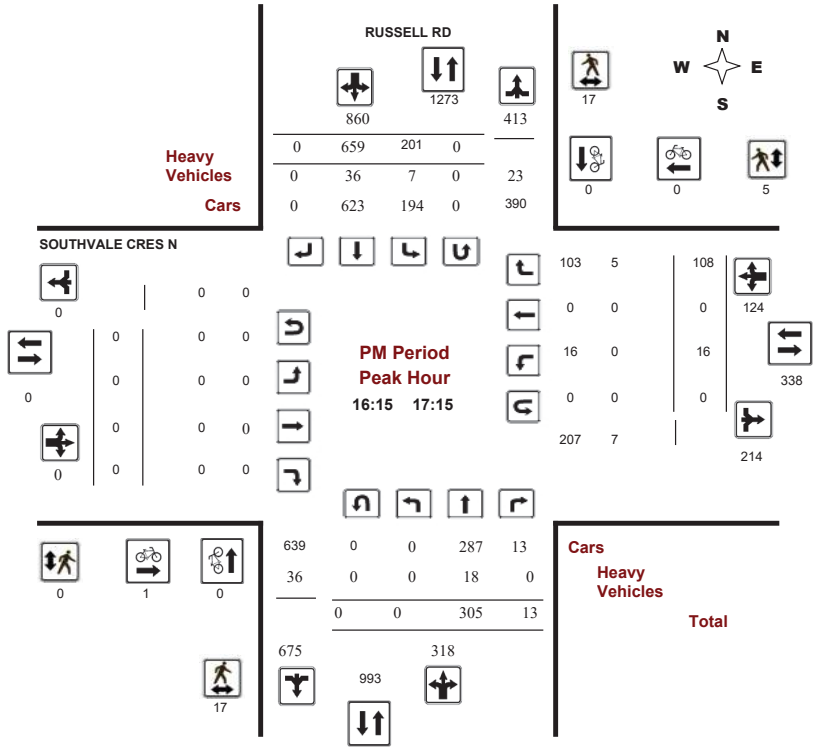
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 **WO No:** 39257

Start Time: 07:00 **Device:** Miovision



Comments 5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 **WO No:** 39257

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, January 07, 2020

Total Observed U-Turns

Northbound: 0 Southbound: 1

Eastbound: 0 Westbound: 0

AADT Factor 1.10

	RUSSELL RD								SOUTHVALE CRES N								
	Northbound				Southbound				Eastbound				Westbound				
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	0	628	5	**633**	52	247	0	**299**	**932**	0	0	0	**0**	18	0	201	**219**	**219**	**1151**
08:00 09:00	0	599	9	**608**	57	270	0	**327**	**935**	0	0	0	**0**	12	0	178	**190**	**190**	**1125**
09:00 10:00	0	376	5	**381**	52	252	0	**304**	**685**	0	0	0	**0**	10	0	102	**112**	**112**	**797**
11:30 12:30	0	403	9	**412**	87	404	0	**491**	**903**	0	0	0	**0**	7	0	86	**93**	**93**	**996**
12:30 13:30	0	380	11	**391**	79	405	0	**484**	**875**	0	0	0	**0**	6	0	84	**90**	**90**	**965**
15:00 16:00	0	314	13	**327**	158	666	0	**824**	**1151**	0	0	0	**0**	6	0	99	**105**	**105**	**1256**
16:00 17:00	0	287	15	**302**	188	676	0	**864**	**1166**	0	0	0	**0**	13	0	104	**117**	**117**	**1283**
17:00 18:00	0	289	18	**307**	204	526	0	**730**	**1037**	0	0	0	**0**	18	0	109	**127**	**127**	**1164**
Sub Total	0	3276	85	**3361**	877	3446	0	**4323**	**7684**	0	0	0	**0**	90	0	963	**1053**	**1053**	**8737**
U Turns	0			**0**	1			**1**	**1**	**0**			**0**	0			**0**	**0**	**1**
Total	0	3276	85	**3361**	878	3446	0	**4324**	**7685**	0	0	0	**0**	90	0	963	**1053**	**1053**	**8738**
EQ 12Hr	0	4554	118	**4672**	1220	4790	0	**6010**	**10682**	0	0	0	**0**	125	0	1339	**1464**	**1464**	**12146**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	0	5009	130	**5139**	1342	5269	0	**6611**	**11750**	0	0	0	**0**	138	0	1473	**1611**	**1611**	**13361**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1.10**					
AVG 24Hr	0	6562	170	**6732**	1758	6902	0	**8660**	**15392**	0	0	0	**0**	181	0	1930	**2111**	**2111**	**17503**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 **WO No:** 39257

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		RUSSELL RD									SOUTHVALE CRES N									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	122	2	124	13	57	0	70	**194**	0	0	0	0	3	0	30	33	**33**	**227**
07:15	07:30	0	150	0	150	8	62	0	70	**220**	0	0	0	0	3	0	47	50	**50**	**270**
07:30	07:45	0	177	2	179	15	63	0	78	**257**	0	0	0	0	6	0	63	69	**69**	**326**
07:45	08:00	0	179	1	180	16	65	0	81	**261**	0	0	0	0	6	0	61	67	**67**	**328**
08:00	08:15	0	177	4	181	11	57	0	68	**249**	0	0	0	0	2	0	39	41	**41**	**290**
08:15	08:30	0	162	2	164	13	63	0	76	**240**	0	0	0	0	3	0	59	62	**62**	**302**
08:30	08:45	0	129	1	130	11	70	0	81	**211**	0	0	0	0	2	0	34	36	**36**	**247**
08:45	09:00	0	131	2	133	22	80	0	102	**235**	0	0	0	0	5	0	46	51	**51**	**286**
09:00	09:15	0	95	1	96	15	63	0	78	**174**	0	0	0	0	3	0	27	30	**30**	**204**
09:15	09:30	0	96	1	97	12	62	0	74	**171**	0	0	0	0	1	0	25	26	**26**	**197**
09:30	09:45	0	84	2	86	10	63	0	73	**159**	0	0	0	0	3	0	27	30	**30**	**189**
09:45	10:00	0	101	1	102	16	64	0	80	**182**	0	0	0	0	3	0	23	26	**26**	**208**
11:30	11:45	0	88	1	89	20	101	0	121	**210**	0	0	0	0	2	0	27	29	**29**	**239**
11:45	12:00	0	108	1	109	21	104	0	125	**234**	0	0	0	0	2	0	21	23	**23**	**257**
12:00	12:15	0	103	0	103	14	88	0	102	**205**	0	0	0	0	2	0	12	14	**14**	**219**
12:15	12:30	0	104	7	111	32	111	0	143	**254**	0	0	0	0	1	0	26	27	**27**	**281**
12:30	12:45	0	105	1	106	20	91	0	111	**217**	0	0	0	0	3	0	23	26	**26**	**243**
12:45	13:00	0	90	2	92	14	118	0	132	**224**	0	0	0	0	3	0	16	19	**19**	**243**
13:00	13:15	0	96	5	101	14	96	0	110	**211**	0	0	0	0	0	0	19	19	**19**	**230**
13:15	13:30	0	89	3	92	31	100	0	131	**223**	0	0	0	0	0	0	26	26	**26**	**249**
15:00	15:15	0	74	1	75	46	164	0	210	**285**	0	0	0	0	3	0	22	25	**25**	**310**
15:15	15:30	0	90	3	93	32	161	0	193	**286**	0	0	0	0	1	0	23	24	**24**	**310**
15:30	15:45	0	81	5	86	42	186	0	228	**314**	0	0	0	0	1	0	24	25	**25**	**339**
15:45	16:00	0	69	4	73	38	155	0	193	**266**	0	0	0	0	1	0	30	31	**31**	**297**
16:00	16:15	0	59	3	62	43	169	0	212	**274**	0	0	0	0	4	0	24	28	**28**	**302**
16:15	16:30	0	90	4	94	45	179	0	224	**318**	0	0	0	0	4	0	21	25	**25**	**343**
16:30	16:45	0	73	4	77	52	156	0	208	**285**	0	0	0	0	1	0	23	24	**24**	**309**
16:45	17:00	0	65	4	69	48	172	0	220	**289**	0	0	0	0	4	0	36	40	**40**	**329**
17:00	17:15	0	77	1	78	56	152	0	208	**286**	0	0	0	0	7	0	28	35	**35**	**321**
17:15	17:30	0	70	8	78	67	143	0	210	**288**	0	0	0	0	5	0	24	29	**29**	**317**
17:30	17:45	0	66	2	68	41	113	0	154	**222**	0	0	0	0	3	0	31	34	**34**	**256**
17:45	18:00	0	76	7	83	40	118	0	158	**241**	0	0	0	0	3	0	26	29	**29**	**270**
Total:		0	3276	85	3361	878	3446	0	4324	**7685**	0	0	0	0	90	0	963	1053	**7685**	**8,738**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 **WO No:** 39257

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

		RUSSELL RD			SOUTHVALE CRES N			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	**0**	0	0	**0**	**0**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	0	0	**0**	**0**
08:15	08:30	1	0	**1**	0	0	**0**	**1**
08:30	08:45	0	0	**0**	0	0	**0**	**0**
08:45	09:00	0	0	**0**	0	0	**0**	**0**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	0	0	**0**	0	0	**0**	**0**
12:00	12:15	0	0	**0**	0	0	**0**	**0**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	0	0	**0**	0	0	**0**	**0**
15:00	15:15	0	0	**0**	0	0	**0**	**0**
15:15	15:30	0	0	**0**	0	0	**0**	**0**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	0	0	**0**	0	0	**0**	**0**
16:15	16:30	0	0	**0**	0	0	**0**	**0**
16:30	16:45	0	0	**0**	1	0	**1**	**1**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
17:00	17:15	0	0	**0**	0	0	**0**	**0**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	0	**0**	0	0	**0**	**0**
Total		1	0	**1**	1	0	**1**	**2**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 **WO No:** 39257

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

Time Period	RUSSELL RD NB Approach (E or W Crossing)	RUSSELL RD SB Approach (E or W Crossing)	RUSSELL RD Total	SOUTHVALE CRES N EB Approach (N or S Crossing)	SOUTHVALE CRES N WB Approach (N or S Crossing)	SOUTHVALE CRES N Total	Grand Total
07:00 07:15	1	4	**5**	0	1	**1**	**6**
07:15 07:30	1	3	**4**	0	1	**1**	**5**
07:30 07:45	5	3	**8**	0	0	**0**	**8**
07:45 08:00	5	3	**8**	0	2	**2**	**10**
08:00 08:15	5	2	**7**	0	0	**0**	**7**
08:15 08:30	6	1	**7**	0	2	**2**	**9**
08:30 08:45	4	2	**6**	0	1	**1**	**7**
08:45 09:00	1	3	**4**	0	1	**1**	**5**
09:00 09:15	3	1	**4**	0	0	**0**	**4**
09:15 09:30	1	4	**5**	0	1	**1**	**6**
09:30 09:45	3	1	**4**	0	1	**1**	**5**
09:45 10:00	2	1	**3**	0	4	**4**	**7**
11:30 11:45	3	2	**5**	0	2	**2**	**7**
11:45 12:00	6	1	**7**	0	0	**0**	**7**
12:00 12:15	2	5	**7**	0	0	**0**	**7**
12:15 12:30	1	2	**3**	0	1	**1**	**4**
12:30 12:45	3	2	**5**	0	1	**1**	**6**
12:45 13:00	6	2	**8**	0	1	**1**	**9**
13:00 13:15	3	5	**8**	0	4	**4**	**12**
13:15 13:30	3	1	**4**	0	1	**1**	**5**
15:00 15:15	8	5	**13**	0	6	**6**	**19**
15:15 15:30	4	1	**5**	0	2	**2**	**7**
15:30 15:45	13	5	**18**	0	4	**4**	**22**
15:45 16:00	2	6	**8**	0	0	**0**	**8**
16:00 16:15	8	4	**12**	0	0	**0**	**12**
16:15 16:30	5	6	**11**	0	3	**3**	**14**
16:30 16:45	3	4	**7**	0	0	**0**	**7**
16:45 17:00	8	3	**11**	0	1	**1**	**12**
17:00 17:15	1	4	**5**	0	1	**1**	**6**
17:15 17:30	6	3	**9**	0	2	**2**	**11**
17:30 17:45	6	5	**11**	0	3	**3**	**14**
17:45 18:00	4	1	**5**	0	0	**0**	**5**
Total	132	95	**227**	0	46	**46**	**273**

5469198 - TUE JAN 07, 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 WO No: 39257

Start Time: 07:00 Device: Miovision

Full Study Heavy Vehicles

Time Period		RUSSELL RD Northbound LT	ST	RT	N TOT	RUSSELL RD Southbound LT	ST	RT	S TOT	STR TOT	SOUTHVALE CRES N Eastbound LT	ST	RT	E TOT	SOUTHVALE CRES N Westbound LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	24	0	**24**	2	10	0	**12**	**36**	0	0	0	**0**	0	0	1	**1**	**1**	**37**
07:15	07:30	0	15	0	**15**	0	18	0	**18**	**33**	0	0	0	**0**	0	0	1	**1**	**1**	**34**
07:30	07:45	0	19	0	**19**	3	9	0	**12**	**31**	0	0	0	**0**	1	0	2	**3**	**3**	**34**
07:45	08:00	0	13	0	**13**	1	10	0	**11**	**24**	0	0	0	**0**	0	0	2	**2**	**2**	**26**
08:00	08:15	0	33	0	**33**	2	9	0	**11**	**44**	0	0	0	**0**	0	0	2	**2**	**2**	**46**
08:15	08:30	0	29	0	**29**	3	10	0	**13**	**42**	0	0	0	**0**	0	0	2	**2**	**2**	**44**
08:30	08:45	0	17	0	**17**	3	12	0	**15**	**32**	0	0	0	**0**	0	0	1	**1**	**1**	**33**
08:45	09:00	0	16	0	**16**	4	22	0	**26**	**42**	0	0	0	**0**	0	0	2	**2**	**2**	**44**
09:00	09:15	0	19	0	**19**	3	20	0	**23**	**42**	0	0	0	**0**	0	0	2	**2**	**2**	**44**
09:15	09:30	0	12	0	**12**	1	7	0	**8**	**20**	0	0	0	**0**	0	0	2	**2**	**2**	**22**
09:30	09:45	0	13	0	**13**	1	8	0	**9**	**22**	0	0	0	**0**	0	0	0	**0**	**0**	**22**
09:45	10:00	0	21	0	**21**	0	11	0	**11**	**32**	0	0	0	**0**	0	0	0	**0**	**0**	**32**
11:30	11:45	0	14	0	**14**	3	14	0	**17**	**31**	0	0	0	**0**	0	0	2	**2**	**2**	**33**
11:45	12:00	0	10	0	**10**	3	7	0	**10**	**20**	0	0	0	**0**	0	0	2	**2**	**2**	**22**
12:00	12:15	0	14	0	**14**	1	7	0	**8**	**22**	0	0	0	**0**	0	0	2	**2**	**2**	**24**
12:15	12:30	0	10	0	**10**	1	10	0	**11**	**21**	0	0	0	**0**	0	0	0	**0**	**0**	**21**
12:30	12:45	0	7	0	**7**	1	8	0	**9**	**16**	0	0	0	**0**	0	0	2	**2**	**2**	**18**
12:45	13:00	0	12	0	**12**	0	10	0	**10**	**22**	0	0	0	**0**	1	0	1	**2**	**2**	**24**
13:00	13:15	0	9	0	**9**	1	11	0	**12**	**21**	0	0	0	**0**	0	0	1	**1**	**1**	**22**
13:15	13:30	0	14	0	**14**	0	5	0	**5**	**19**	0	0	0	**0**	0	0	1	**1**	**1**	**20**
15:00	15:15	0	14	0	**14**	3	15	0	**18**	**32**	0	0	0	**0**	0	0	1	**1**	**1**	**33**
15:15	15:30	0	10	1	**11**	1	15	0	**16**	**27**	0	0	0	**0**	0	0	2	**2**	**2**	**29**
15:30	15:45	0	10	0	**10**	4	16	0	**20**	**30**	0	0	0	**0**	0	0	1	**1**	**1**	**31**
15:45	16:00	0	5	1	**6**	0	13	0	**13**	**19**	0	0	0	**0**	0	0	1	**1**	**1**	**20**
16:00	16:15	0	3	0	**3**	3	9	0	**12**	**15**	0	0	0	**0**	0	0	0	**0**	**0**	**15**
16:15	16:30	0	8	0	**8**	4	11	0	**15**	**23**	0	0	0	**0**	0	0	1	**1**	**1**	**24**
16:30	16:45	0	3	0	**3**	1	8	0	**9**	**12**	0	0	0	**0**	0	0	2	**2**	**2**	**14**
16:45	17:00	0	4	0	**4**	1	8	0	**9**	**13**	0	0	0	**0**	0	0	1	**1**	**1**	**14**
17:00	17:15	0	3	0	**3**	1	9	0	**10**	**13**	0	0	0	**0**	0	0	1	**1**	**1**	**14**
17:15	17:30	0	8	0	**8**	2	3	0	**5**	**13**	0	0	0	**0**	0	0	1	**1**	**1**	**14**
17:30	17:45	0	4	0	**4**	1	5	0	**6**	**10**	0	0	0	**0**	0	0	1	**1**	**1**	**11**
17:45	18:00	0	11	0	**11**	1	4	0	**5**	**16**	0	0	0	**0**	0	0	0	**0**	**0**	**16**
Total:	None	0	404	2	**406**	55	334	0	**389**	**795**	0	0	0	**0**	2	0	40	**42**	**42**	**837**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

RUSSELL RD @ SOUTHVALE CRES N

Survey Date: Tuesday, January 07, 2020 **WO No:** 39257

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

Time Period		RUSSELL RD Northbound U-Turn Total	RUSSELL RD Southbound U-Turn Total	SOUTHVALE CRES N Eastbound U-Turn Total	SOUTHVALE CRES N Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	**0**
07:15	07:30	0	0	0	0	**0**
07:30	07:45	0	0	0	0	**0**
07:45	08:00	0	0	0	0	**0**
08:00	08:15	0	0	0	0	**0**
08:15	08:30	0	0	0	0	**0**
08:30	08:45	0	0	0	0	**0**
08:45	09:00	0	0	0	0	**0**
09:00	09:15	0	0	0	0	**0**
09:15	09:30	0	1	0	0	**1**
09:30	09:45	0	0	0	0	**0**
09:45	10:00	0	0	0	0	**0**
11:30	11:45	0	0	0	0	**0**
11:45	12:00	0	0	0	0	**0**
12:00	12:15	0	0	0	0	**0**
12:15	12:30	0	0	0	0	**0**
12:30	12:45	0	0	0	0	**0**
12:45	13:00	0	0	0	0	**0**
13:00	13:15	0	0	0	0	**0**
13:15	13:30	0	0	0	0	**0**
15:00	15:15	0	0	0	0	**0**
15:15	15:30	0	0	0	0	**0**
15:30	15:45	0	0	0	0	**0**
15:45	16:00	0	0	0	0	**0**
16:00	16:15	0	0	0	0	**0**
16:15	16:30	0	0	0	0	**0**
16:30	16:45	0	0	0	0	**0**
16:45	17:00	0	0	0	0	**0**
17:00	17:15	0	0	0	0	**0**
17:15	17:30	0	0	0	0	**0**
17:30	17:45	0	0	0	0	**0**
17:45	18:00	0	0	0	0	**0**
Total		0	1	0	0	**1**

Transportation Services - Traffic Services

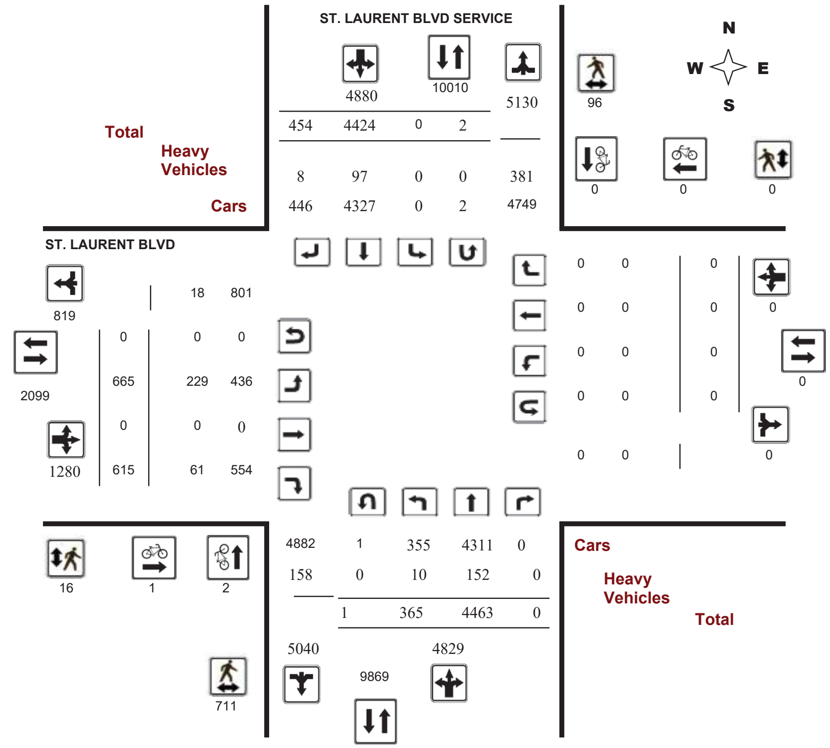
Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

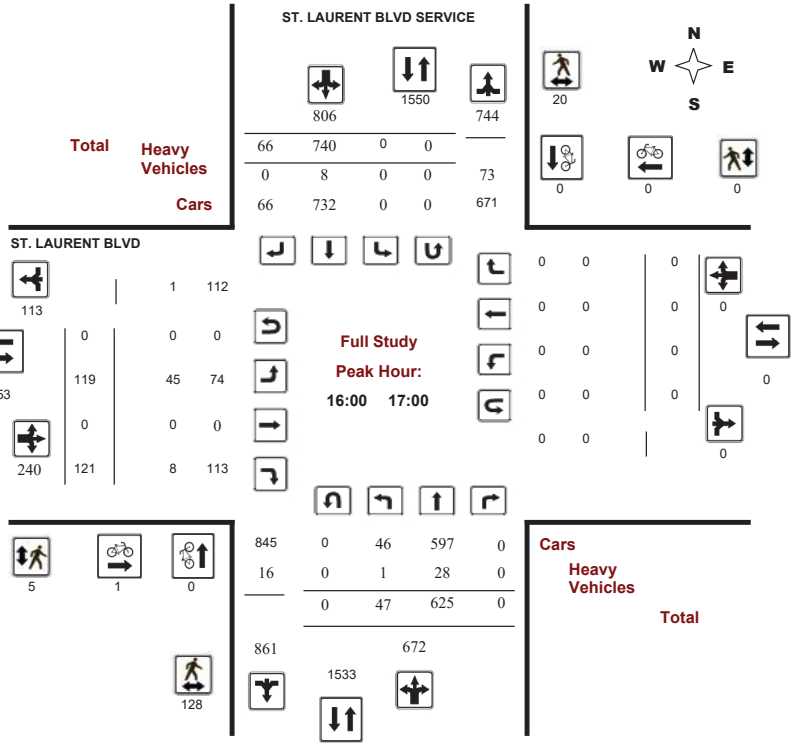
Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



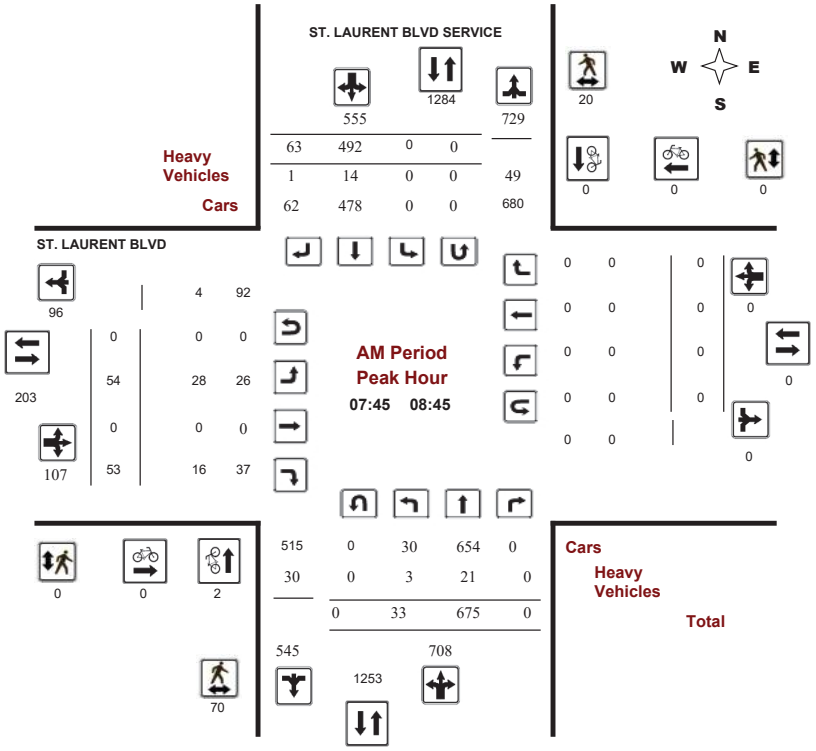
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision



Comments

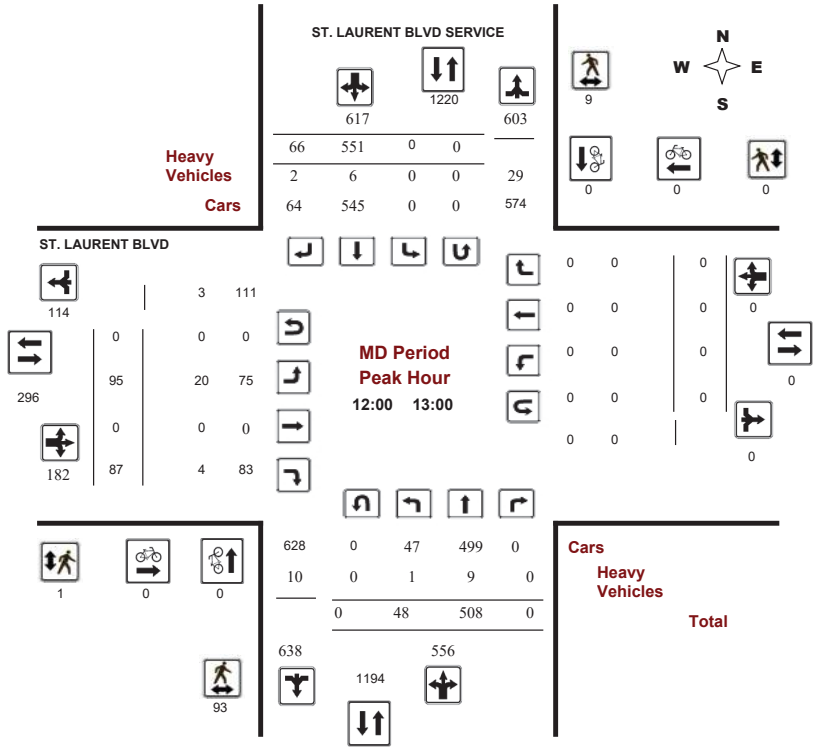
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision



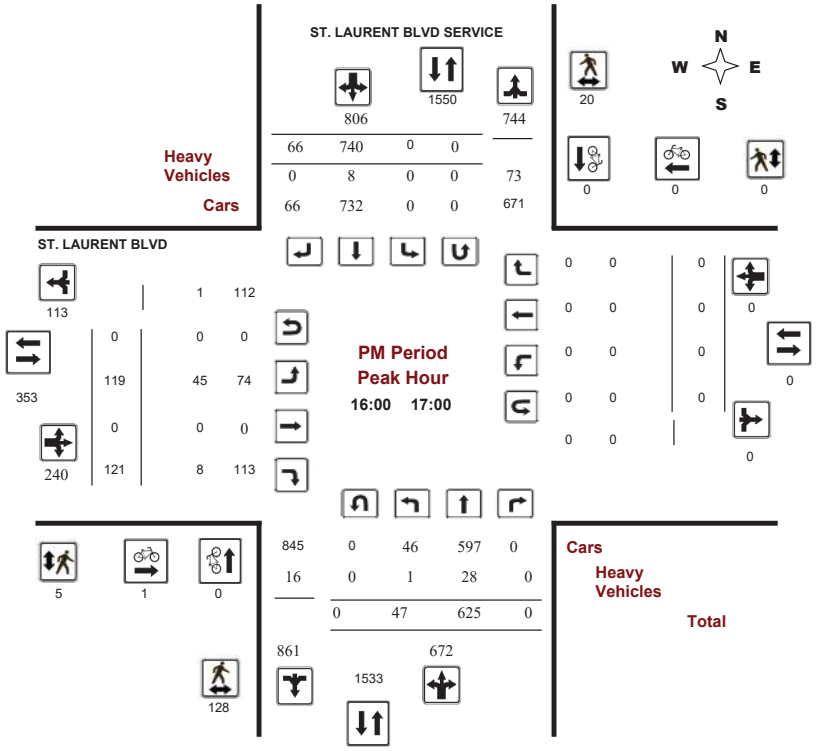
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision



Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, December 06, 2016

Total Observed U-Turns

Northbound: 1 Southbound: 2

Eastbound: 0 Westbound: 0

AADT Factor 1.30

	ST. LAURENT BLVD SERVICE									ST. LAURENT BLVD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	32	569	0	**601**	0	463	31	**494**	**1095**	48	0	51	**99**	0	0	0	**0**	**99**	**1194**
08:00 09:00	31	660	0	**691**	0	474	60	**534**	**1225**	52	0	43	**95**	0	0	0	**0**	**95**	**1320**
09:00 10:00	39	516	0	**555**	0	341	32	**373**	**928**	55	0	51	**106**	0	0	0	**0**	**106**	**1034**
11:30 12:30	49	534	0	**583**	0	514	67	**581**	**1164**	83	0	57	**140**	0	0	0	**0**	**140**	**1304**
12:30 13:30	61	487	0	**548**	0	549	65	**614**	**1162**	83	0	100	**183**	0	0	0	**0**	**183**	**1345**
15:00 16:00	60	539	0	**599**	0	652	69	**721**	**1320**	112	0	94	**206**	0	0	0	**0**	**206**	**1526**
16:00 17:00	47	625	0	**672**	0	740	66	**806**	**1478**	119	0	121	**240**	0	0	0	**0**	**240**	**1718**
17:00 18:00	46	533	0	**579**	0	691	64	**755**	**1334**	113	0	98	**211**	0	0	0	**0**	**211**	**1545**
Sub Total	365	4463	0	**4828**	0	4424	454	**4878**	**9706**	665	0	615	**1280**	0	0	0	**0**	**1280**	**10986**
U Turns	0			**0**	0			**0**	**0**	**0**			**0**	0			**0**	**0**	**0**
Total	365	4463	0	**4828**	0	4424	454	**4878**	**9706**	665	0	615	**1280**	0	0	0	**0**	**1280**	**10986**
EQ 12Hr	509	6204	0	**6713**	3	6149	631	**6783**	**13496**	924	0	855	**1779**	0	0	0	**0**	**1779**	**15275**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	662	8065	0	**8727**	4	7994	820	**8818**	**17545**	1201	0	1112	**2313**	0	0	0	**0**	**2313**	**19858**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1.30**					
AVG 24Hr	867	10565	0	**11432**	5	10472	1074	**11551**	**22983**	1573	0	1457	**3030**	0	0	0	**0**	**3030**	**26013**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		ST. LAURENT BLVD SERVICE									ST. LAURENT BLVD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	3	107	0	110	0	98	5	103	**213**	9	0	7	16	0	0	0	0	**16**	**229**
07:15	07:30	8	143	0	151	0	100	6	106	**257**	15	0	11	26	0	0	0	0	**26**	**283**
07:30	07:45	9	149	0	158	0	130	8	138	**296**	9	0	13	22	0	0	0	0	**22**	**318**
07:45	08:00	12	170	0	182	0	135	12	147	**329**	15	0	20	35	0	0	0	0	**35**	**364**
08:00	08:15	7	168	0	175	0	120	21	141	**316**	10	0	12	22	0	0	0	0	**22**	**338**
08:15	08:30	8	161	0	169	0	112	21	133	**302**	13	0	6	19	0	0	0	0	**19**	**321**
08:30	08:45	6	176	0	182	0	125	9	134	**316**	16	0	15	31	0	0	0	0	**31**	**347**
08:45	09:00	10	155	0	165	0	117	9	126	**291**	13	0	10	23	0	0	0	0	**23**	**314**
09:00	09:15	14	128	0	142	0	106	7	113	**255**	15	0	18	33	0	0	0	0	**33**	**288**
09:15	09:30	1	141	0	142	0	91	10	101	**243**	15	0	9	24	0	0	0	0	**24**	**267**
09:30	09:45	6	124	0	130	1	63	7	71	**201**	12	0	14	26	0	0	0	0	**26**	**227**
09:45	10:00	18	123	0	141	0	81	8	89	**230**	13	0	10	23	0	0	0	0	**23**	**253**
11:30	11:45	15	128	0	143	0	135	19	154	**297**	18	0	16	34	0	0	0	0	**34**	**331**
11:45	12:00	11	133	0	144	0	117	12	129	**273**	16	0	7	23	0	0	0	0	**23**	**296**
12:00	12:15	14	162	0	176	0	126	19	145	**321**	27	0	12	39	0	0	0	0	**39**	**360**
12:15	12:30	9	111	0	120	0	136	17	153	**273**	22	0	22	44	0	0	0	0	**44**	**317**
12:30	12:45	10	115	0	125	0	146	16	162	**287**	18	0	30	48	0	0	0	0	**48**	**335**
12:45	13:00	15	120	0	135	0	143	14	157	**292**	28	0	23	51	0	0	0	0	**51**	**343**
13:00	13:15	15	134	0	149	0	136	18	154	**303**	17	0	20	37	0	0	0	0	**37**	**340**
13:15	13:30	21	118	0	139	0	124	17	141	**280**	20	0	27	47	0	0	0	0	**47**	**327**
15:00	15:15	10	139	0	149	0	147	14	161	**310**	25	0	19	44	0	0	0	0	**44**	**354**
15:15	15:30	13	127	0	140	0	163	18	181	**321**	24	0	17	41	0	0	0	0	**41**	**362**
15:30	15:45	20	143	0	163	0	163	24	187	**350**	32	0	27	59	0	0	0	0	**59**	**409**
15:45	16:00	17	130	0	147	0	179	13	192	**339**	31	0	31	62	0	0	0	0	**62**	**401**
16:00	16:15	20	178	0	198	0	165	20	185	**383**	33	0	27	60	0	0	0	0	**60**	**443**
16:15	16:30	10	152	0	162	0	189	12	201	**363**	23	0	44	67	0	0	0	0	**67**	**430**
16:30	16:45	11	155	0	166	0	200	11	211	**377**	30	0	22	52	0	0	0	0	**52**	**429**
16:45	17:00	6	140	0	146	0	186	23	209	**355**	33	0	28	61	0	0	0	0	**61**	**416**
17:00	17:15	12	146	0	158	0	206	20	226	**384**	29	0	17	46	0	0	0	0	**46**	**430**
17:15	17:30	12	142	0	154	0	180	18	198	**352**	27	0	27	54	0	0	0	0	**54**	**406**
17:30	17:45	13	121	0	134	0	174	16	190	**324**	29	0	34	63	0	0	0	0	**63**	**387**
17:45	18:00	10	124	0	134	1	131	10	142	**276**	28	0	20	48	0	0	0	0	**48**	**324**
Total:		366	4463	0	4829	2	4424	454	4880	**9709**	665	0	615	1280	0	0	0	0	**9709**	**10,989**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		ST. LAURENT BLVD SERVICE			ST. LAURENT BLVD			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	**0**	0	0	**0**	**0**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	1	0	**1**	0	0	**0**	**1**
08:15	08:30	1	0	**1**	0	0	**0**	**1**
08:30	08:45	0	0	**0**	0	0	**0**	**0**
08:45	09:00	0	0	**0**	0	0	**0**	**0**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	0	0	**0**	0	0	**0**	**0**
12:00	12:15	0	0	**0**	0	0	**0**	**0**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	0	0	**0**	0	0	**0**	**0**
15:00	15:15	0	0	**0**	0	0	**0**	**0**
15:15	15:30	0	0	**0**	0	0	**0**	**0**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	0	0	**0**	0	0	**0**	**0**
16:15	16:30	0	0	**0**	0	0	**0**	**0**
16:30	16:45	0	0	**0**	1	0	**1**	**1**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
17:00	17:15	0	0	**0**	0	0	**0**	**0**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	0	**0**	0	0	**0**	**0**
Total		2	0	**2**	1	0	**1**	**3**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

Time Period		ST. LAURENT BLVD SERVICE			ST. LAURENT BLVD			
		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00	07:15	7	10	**17**	0	0	**0**	**17**
07:15	07:30	22	4	**26**	0	0	**0**	**26**
07:30	07:45	19	4	**23**	0	0	**0**	**23**
07:45	08:00	26	7	**33**	0	0	**0**	**33**
08:00	08:15	12	3	**15**	0	0	**0**	**15**
08:15	08:30	12	5	**17**	0	0	**0**	**17**
08:30	08:45	20	5	**25**	0	0	**0**	**25**
08:45	09:00	17	1	**18**	0	0	**0**	**18**
09:00	09:15	16	2	**18**	1	0	**1**	**19**
09:15	09:30	16	3	**19**	0	0	**0**	**19**
09:30	09:45	5	4	**9**	0	0	**0**	**9**
09:45	10:00	15	0	**15**	0	0	**0**	**15**
11:30	11:45	13	0	**13**	1	0	**1**	**14**
11:45	12:00	22	3	**25**	0	0	**0**	**25**
12:00	12:15	14	3	**17**	0	0	**0**	**17**
12:15	12:30	36	2	**38**	0	0	**0**	**38**
12:30	12:45	21	1	**22**	0	0	**0**	**22**
12:45	13:00	22	3	**25**	1	0	**1**	**26**
13:00	13:15	22	2	**24**	0	0	**0**	**24**
13:15	13:30	18	0	**18**	0	0	**0**	**18**
15:00	15:15	43	3	**46**	0	0	**0**	**46**
15:15	15:30	30	0	**30**	0	0	**0**	**30**
15:30	15:45	22	0	**22**	0	0	**0**	**22**
15:45	16:00	26	2	**28**	0	0	**0**	**28**
16:00	16:15	39	4	**43**	1	0	**1**	**44**
16:15	16:30	36	3	**39**	2	0	**2**	**41**
16:30	16:45	26	6	**32**	0	0	**0**	**32**
16:45	17:00	27	7	**34**	2	0	**2**	**36**
17:00	17:15	28	2	**30**	6	0	**6**	**36**
17:15	17:30	30	3	**33**	0	0	**0**	**33**
17:30	17:45	18	2	**20**	1	0	**1**	**21**
17:45	18:00	31	2	**33**	1	0	**1**	**34**
Total	.....	711	96	**807**	16	0	**16**	**823**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		ST. LAURENT BLVD SERVICE									ST. LAURENT BLVD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	3	0	**3**	0	6	0	**6**	**9**	5	0	5	**10**	0	0	0	**0**	**10**	**19**
07:15	07:30	1	3	0	**4**	0	4	0	**4**	**8**	10	0	2	**12**	0	0	0	**0**	**12**	**20**
07:30	07:45	1	2	0	**3**	0	8	0	**8**	**11**	6	0	3	**9**	0	0	0	**0**	**9**	**20**
07:45	08:00	0	3	0	**3**	0	4	0	**4**	**7**	8	0	6	**14**	0	0	0	**0**	**14**	**21**
08:00	08:15	2	5	0	**7**	0	2	0	**2**	**9**	7	0	4	**11**	0	0	0	**0**	**11**	**20**
08:15	08:30	0	6	0	**6**	0	5	1	**6**	**12**	6	0	3	**9**	0	0	0	**0**	**9**	**21**
08:30	08:45	1	7	0	**8**	0	3	0	**3**	**11**	7	0	3	**10**	0	0	0	**0**	**10**	**21**
08:45	09:00	0	9	0	**9**	0	2	0	**2**	**11**	5	0	0	**5**	0	0	0	**0**	**5**	**16**
09:00	09:15	1	8	0	**9**	0	5	1	**6**	**15**	7	0	2	**9**	0	0	0	**0**	**9**	**24**
09:15	09:30	0	7	0	**7**	0	4	1	**5**	**12**	7	0	1	**8**	0	0	0	**0**	**8**	**20**
09:30	09:45	0	7	0	**7**	0	1	1	**2**	**9**	4	0	2	**6**	0	0	0	**0**	**6**	**15**
09:45	10:00	0	3	0	**3**	0	5	0	**5**	**8**	6	0	1	**7**	0	0	0	**0**	**7**	**15**
11:30	11:45	0	4	0	**4**	0	5	0	**5**	**9**	7	0	1	**8**	0	0	0	**0**	**8**	**17**
11:45	12:00	0	2	0	**2**	0	1	1	**2**	**4**	3	0	0	**3**	0	0	0	**0**	**3**	**7**
12:00	12:15	0	3	0	**3**	0	2	0	**2**	**5**	6	0	1	**7**	0	0	0	**0**	**7**	**12**
12:15	12:30	0	1	0	**1**	0	1	0	**1**	**2**	5	0	1	**6**	0	0	0	**0**	**6**	**8**
12:30	12:45	0	4	0	**4**	0	1	2	**3**	**7**	5	0	1	**6**	0	0	0	**0**	**6**	**13**
12:45	13:00	1	1	0	**2**	0	2	0	**2**	**4**	4	0	1	**5**	0	0	0	**0**	**5**	**9**
13:00	13:15	0	2	0	**2**	0	7	1	**8**	**10**	5	0	2	**7**	0	0	0	**0**	**7**	**17**
13:15	13:30	0	4	0	**4**	0	4	0	**4**	**8**	5	0	1	**6**	0	0	0	**0**	**6**	**14**
15:00	15:15	1	2	0	**3**	0	5	0	**5**	**8**	6	0	2	**8**	0	0	0	**0**	**8**	**16**
15:15	15:30	1	5	0	**6**	0	5	0	**5**	**11**	7	0	1	**8**	0	0	0	**0**	**8**	**19**
15:30	15:45	0	7	0	**7**	0	2	0	**2**	**9**	11	0	3	**14**	0	0	0	**0**	**14**	**23**
15:45	16:00	0	4	0	**4**	0	3	0	**3**	**7**	5	0	2	**7**	0	0	0	**0**	**7**	**14**
16:00	16:15	1	10	0	**11**	0	4	0	**4**	**15**	13	0	2	**15**	0	0	0	**0**	**15**	**30**
16:15	16:30	0	6	0	**6**	0	1	0	**1**	**7**	7	0	2	**9**	0	0	0	**0**	**9**	**16**
16:30	16:45	0	7	0	**7**	0	2	0	**2**	**9**	15	0	2	**17**	0	0	0	**0**	**17**	**26**
16:45	17:00	0	5	0	**5**	0	1	0	**1**	**6**	10	0	2	**12**	0	0	0	**0**	**12**	**18**
17:00	17:15	0	7	0	**7**	0	1	0	**1**	**8**	8	0	2	**10**	0	0	0	**0**	**10**	**18**
17:15	17:30	0	5	0	**5**	0	0	0	**0**	**5**	10	0	1	**11**	0	0	0	**0**	**11**	**16**
17:30	17:45	0	7	0	**7**	0	1	0	**1**	**8**	10	0	2	**12**	0	0	0	**0**	**12**	**20**
17:45	18:00	0	3	0	**3**	0	0	0	**0**	**3**	9	0	0	**9**	0	0	0	**0**	**9**	**12**
Total:	None	10	152	0	**162**	0	97	8	**105**	**267**	229	0	61	**290**	0	0	0	**0**	**290**	**557**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE

Survey Date: Tuesday, December 06, 2016 **WO No:** 36585

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		ST. LAURENT BLVD SERVICE		ST. LAURENT BLVD		
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	**0**
07:15	07:30	0	0	0	0	**0**
07:30	07:45	0	0	0	0	**0**
07:45	08:00	0	0	0	0	**0**
08:00	08:15	0	0	0	0	**0**
08:15	08:30	0	0	0	0	**0**
08:30	08:45	0	0	0	0	**0**
08:45	09:00	0	0	0	0	**0**
09:00	09:15	0	0	0	0	**0**
09:15	09:30	0	0	0	0	**0**
09:30	09:45	0	1	0	0	**1**
09:45	10:00	0	0	0	0	**0**
11:30	11:45	0	0	0	0	**0**
11:45	12:00	0	0	0	0	**0**
12:00	12:15	0	0	0	0	**0**
12:15	12:30	0	0	0	0	**0**
12:30	12:45	0	0	0	0	**0**
12:45	13:00	0	0	0	0	**0**
13:00	13:15	0	0	0	0	**0**
13:15	13:30	0	0	0	0	**0**
15:00	15:15	0	0	0	0	**0**
15:15	15:30	0	0	0	0	**0**
15:30	15:45	0	0	0	0	**0**
15:45	16:00	0	0	0	0	**0**
16:00	16:15	0	0	0	0	**0**
16:15	16:30	0	0	0	0	**0**
16:30	16:45	0	0	0	0	**0**
16:45	17:00	0	0	0	0	**0**
17:00	17:15	0	0	0	0	**0**
17:15	17:30	1	0	0	0	**1**
17:30	17:45	0	0	0	0	**0**
17:45	18:00	0	1	0	0	**1**
Total		1	2	0	0	**3**

Transportation Services - Traffic Services

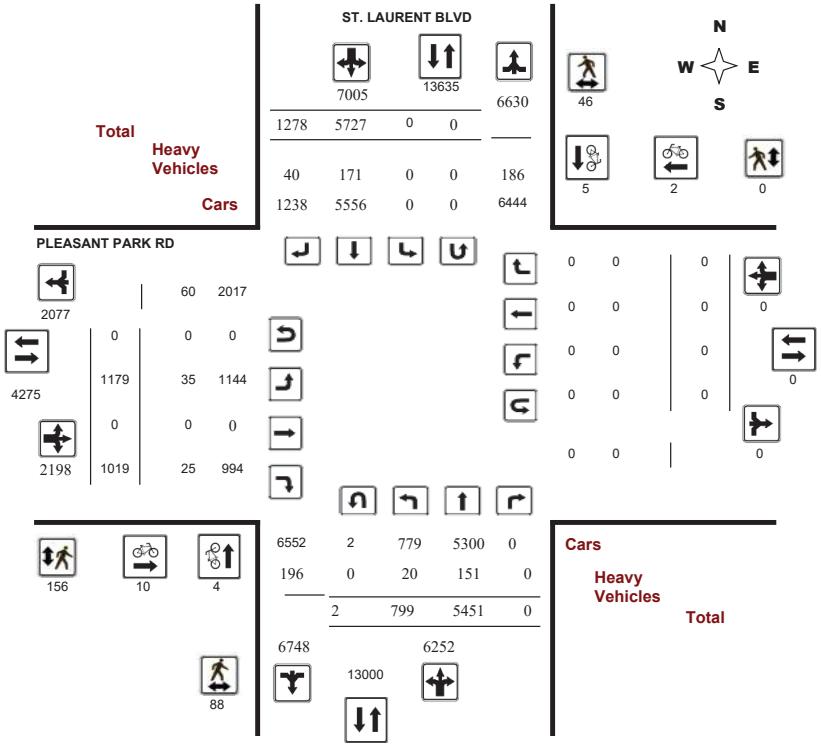
Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

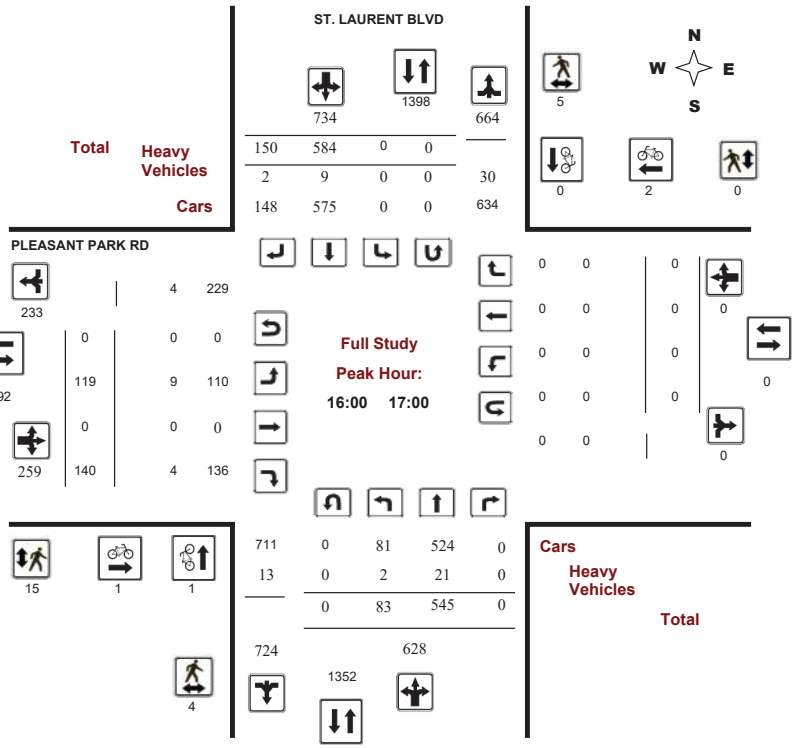
Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		ST. LAURENT BLVD									PLEASANT PARK RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	10	78	0	88	0	97	20	117	**205**	22	0	17	39	0	0	0	0	**39**	**244**
07:15	07:30	11	100	0	111	0	92	14	106	**217**	28	0	13	41	0	0	0	0	**41**	**258**
07:30	07:45	20	128	0	148	0	138	17	155	**303**	19	0	20	39	0	0	0	0	**39**	**342**
07:45	08:00	28	141	0	169	0	129	25	154	**323**	39	0	32	71	0	0	0	0	**71**	**394**
08:00	08:15	26	134	0	160	0	100	21	121	**281**	36	0	25	61	0	0	0	0	**61**	**342**
08:15	08:30	26	123	0	149	0	107	22	129	**278**	27	0	17	44	0	0	0	0	**44**	**322**
08:30	08:45	15	117	0	132	0	104	28	132	**264**	32	0	15	47	0	0	0	0	**47**	**311**
08:45	09:00	16	137	0	153	0	114	25	139	**292**	30	0	23	53	0	0	0	0	**53**	**345**
09:00	09:15	15	109	0	124	0	100	19	119	**243**	18	0	17	35	0	0	0	0	**35**	**278**
09:15	09:30	12	90	0	102	0	97	19	116	**218**	28	0	13	41	0	0	0	0	**41**	**259**
09:30	09:45	16	107	0	123	0	98	12	110	**233**	20	0	22	42	0	0	0	0	**42**	**275**
09:45	10:00	15	92	0	107	0	76	26	102	**209**	20	0	13	33	0	0	0	0	**33**	**242**
10:00	10:15	11	89	0	100	0	81	14	95	**195**	23	0	11	34	0	0	0	0	**34**	**229**
10:15	10:30	13	99	0	112	0	93	21	114	**226**	18	0	16	34	0	0	0	0	**34**	**260**
10:30	10:45	11	113	0	124	0	108	19	127	**251**	19	0	12	31	0	0	0	0	**31**	**282**
10:45	11:00	12	91	0	103	0	88	19	107	**210**	29	0	10	39	0	0	0	0	**39**	**249**
11:00	11:15	10	110	0	120	0	112	20	132	**252**	27	0	23	50	0	0	0	0	**50**	**302**
11:15	11:30	22	115	0	137	0	95	22	117	**254**	14	0	15	29	0	0	0	0	**29**	**283**
11:30	11:45	19	124	0	143	0	107	23	130	**273**	32	0	18	50	0	0	0	0	**50**	**323**
11:45	12:00	15	122	0	137	0	117	19	136	**273**	17	0	16	33	0	0	0	0	**33**	**306**
12:00	12:15	16	129	0	145	0	109	25	134	**279**	17	0	19	36	0	0	0	0	**36**	**315**
12:15	12:30	12	122	0	134	0	115	32	147	**281**	32	0	26	58	0	0	0	0	**58**	**339**
12:30	12:45	13	117	0	130	0	119	26	145	**275**	25	0	12	37	0	0	0	0	**37**	**312**
12:45	13:00	12	127	0	139	0	134	28	162	**301**	25	0	17	42	0	0	0	0	**42**	**343**
13:00	13:15	21	102	0	123	0	117	19	136	**259**	15	0	14	29	0	0	0	0	**29**	**288**
13:15	13:30	4	85	0	89	0	150	22	172	**261**	25	0	16	41	0	0	0	0	**41**	**302**
13:30	13:45	14	130	0	144	0	130	16	146	**290**	19	0	20	39	0	0	0	0	**39**	**329**
13:45	14:00	17	101	0	118	0	116	33	149	**267**	17	0	22	39	0	0	0	0	**39**	**306**
14:00	14:15	11	116	0	127	0	118	25	143	**270**	23	0	18	41	0	0	0	0	**41**	**311**
14:15	14:30	15	113	0	128	0	122	28	150	**278**	28	0	20	48	0	0	0	0	**48**	**326**
14:30	14:45	16	118	0	134	0	127	24	151	**285**	26	0	19	45	0	0	0	0	**45**	**330**
14:45	15:00	23	126	0	149	0	117	31	148	**297**	24	0	21	45	0	0	0	0	**45**	**342**
15:00	15:15	26	133	0	159	0	142	42	184	**343**	20	0	24	44	0	0	0	0	**44**	**387**
15:15	15:30	22	109	0	131	0	156	40	196	**327**	29	0	33	62	0	0	0	0	**62**	**389**
15:30	15:45	16	131	0	147	0	153	31	184	**331**	25	0	35	60	0	0	0	0	**60**	**391**
15:45	16:00	15	107	0	122	0	139	38	177	**299**	21	0	39	60	0	0	0	0	**60**	**359**
16:00	16:15	22	157	0	179	0	149	38	187	**366**	34	0	30	64	0	0	0	0	**64**	**430**
16:15	16:30	23	136	0	159	0	146	41	187	**346**	35	0	41	76	0	0	0	0	**76**	**422**
16:30	16:45	24	142	0	166	0	145	30	175	**341**	26	0	33	59	0	0	0	0	**59**	**400**
16:45	17:00	14	110	0	124	0	144	41	185	**309**	24	0	36	60	0	0	0	0	**60**	**369**
17:00	17:15	27	107	0	134	0	149	36	185	**319**	27	0	26	53	0	0	0	0	**53**	**372**
17:15	17:30	21	127	0	148	0	161	44	205	**353**	28	0	35	63	0	0	0	0	**63**	**416**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

17:30	17:45	17	122	0	139	0	130	26	156	**295**	27	0	20	47	0	0	0	0	**47**	**342**
17:45	18:00	12	93	0	105	0	134	34	168	**273**	35	0	25	60	0	0	0	0	**60**	**333**
18:00	18:15	16	95	0	111	0	119	31	150	**261**	21	0	22	43	0	0	0	0	**43**	**304**
18:15	18:30	17	104	0	121	0	110	33	143	**264**	11	0	17	28	0	0	0	0	**28**	**292**
18:30	18:45	16	94	0	110	0	104	32	136	**246**	13	0	15	28	0	0	0	0	**28**	**274**
18:45	19:00	16	79	0	95	0	119	27	146	**241**	29	0	16	45	0	0	0	0	**45**	**286**
Total:		801	5451	0	6252	0	5727	1278	7005	**13257**	1179	0	1019	2198	0	0	0	0	**13257**	**15,455**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		ST. LAURENT BLVD			PLEASANT PARK RD			
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	1	**1**	0	0	**0**	**1**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	1	0	**1**	**1**
08:15	08:30	0	0	**0**	1	0	**1**	**1**
08:30	08:45	0	0	**0**	2	0	**2**	**2**
08:45	09:00	0	0	**0**	4	0	**4**	**4**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
10:00	10:15	0	0	**0**	0	0	**0**	**0**
10:15	10:30	0	0	**0**	0	0	**0**	**0**
10:30	10:45	0	0	**0**	0	0	**0**	**0**
10:45	11:00	0	0	**0**	0	0	**0**	**0**
11:00	11:15	0	0	**0**	0	0	**0**	**0**
11:15	11:30	0	0	**0**	0	0	**0**	**0**
11:30	11:45	1	0	**1**	0	0	**0**	**1**
11:45	12:00	0	0	**0**	0	0	**0**	**0**
12:00	12:15	0	0	**0**	0	0	**0**	**0**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	0	1	**1**	0	0	**0**	**1**
13:30	13:45	0	0	**0**	0	0	**0**	**0**
13:45	14:00	0	0	**0**	0	0	**0**	**0**
14:00	14:15	0	0	**0**	0	0	**0**	**0**
14:15	14:30	0	0	**0**	0	0	**0**	**0**
14:30	14:45	0	0	**0**	0	0	**0**	**0**
14:45	15:00	1	0	**1**	0	0	**0**	**1**
15:00	15:15	0	0	**0**	0	0	**0**	**0**
15:15	15:30	0	0	**0**	0	0	**0**	**0**
15:30	15:45	0	1	**1**	0	0	**0**	**1**
15:45	16:00	0	1	**1**	1	0	**1**	**2**
16:00	16:15	1	0	**1**	0	0	**0**	**1**
16:15	16:30	0	0	**0**	0	2	**2**	**2**
16:30	16:45	0	0	**0**	1	0	**1**	**1**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
17:00	17:15	0	0	**0**	0	0	**0**	**0**
17:15	17:30	1	0	**1**	0	0	**0**	**1**
17:30	17:45	0	1	**1**	0	0	**0**	**1**
17:45	18:00	0	0	**0**	0	0	**0**	**0**
18:00	18:15	0	0	**0**	0	0	**0**	**0**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

18:15	18:30	0	0	**0**	0	0	**0**	**0**
18:30	18:45	0	0	**0**	0	0	**0**	**0**
18:45	19:00	0	0	**0**	0	0	**0**	**0**
Total		4	5	**9**	10	2	**12**	**21**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

	ST. LAURENT BLVD			PLEASANT PARK RD			
Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	0	**1**	1	0	**1**	**2**
07:15 07:30	0	0	**0**	1	0	**1**	**1**
07:30 07:45	8	0	**8**	4	0	**4**	**12**
07:45 08:00	9	1	**10**	11	0	**11**	**21**
08:00 08:15	4	0	**4**	0	0	**0**	**4**
08:15 08:30	3	0	**3**	6	0	**6**	**9**
08:30 08:45	2	0	**2**	5	0	**5**	**7**
08:45 09:00	2	0	**2**	3	0	**3**	**5**
09:00 09:15	0	1	**1**	0	0	**0**	**1**
09:15 09:30	0	0	**0**	1	0	**1**	**1**
09:30 09:45	0	2	**2**	2	0	**2**	**4**
09:45 10:00	0	1	**1**	3	0	**3**	**4**
10:00 10:15	1	2	**3**	0	0	**0**	**3**
10:15 10:30	2	0	**2**	0	0	**0**	**2**
10:30 10:45	3	0	**3**	3	0	**3**	**6**
10:45 11:00	3	0	**3**	2	0	**2**	**5**
11:00 11:15	2	1	**3**	2	0	**2**	**5**
11:15 11:30	2	0	**2**	1	0	**1**	**3**
11:30 11:45	1	0	**1**	3	0	**3**	**4**
11:45 12:00	2	0	**2**	1	0	**1**	**3**
12:00 12:15	2	2	**4**	1	0	**1**	**5**
12:15 12:30	2	0	**2**	2	0	**2**	**4**
12:30 12:45	2	0	**2**	3	0	**3**	**5**
12:45 13:00	2	3	**5**	3	0	**3**	**8**
13:00 13:15	0	0	**0**	4	0	**4**	**4**
13:15 13:30	0	0	**0**	6	0	**6**	**6**
13:30 13:45	4	0	**4**	7	0	**7**	**11**
13:45 14:00	3	0	**3**	4	0	**4**	**7**
14:00 14:15	3	3	**6**	6	0	**6**	**12**
14:15 14:30	3	0	**3**	3	0	**3**	**6**
14:30 14:45	5	5	**10**	11	0	**11**	**21**
14:45 15:00	2	4	**6**	14	0	**14**	**20**
15:00 15:15	1	1	**2**	3	0	**3**	**5**
15:15 15:30	4	3	**7**	3	0	**3**	**10**
15:30 15:45	1	3	**4**	4	0	**4**	**8**
15:45 16:00	1	1	**2**	4	0	**4**	**6**
16:00 16:15	0	1	**1**	4	0	**4**	**5**
16:15 16:30	1	1	**2**	4	0	**4**	**6**
16:30 16:45	2	2	**4**	2	0	**2**	**6**
16:45 17:00	1	1	**2**	5	0	**5**	**7**
17:00 17:15	0	0	**0**	0	0	**0**	**0**
17:15 17:30	0	2	**2**	2	0	**2**	**4**
17:30 17:45	2	0	**2**	4	0	**4**	**6**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

17:45 18:00	1	2	**3**	3	0	**3**	**6**
18:00 18:15	0	3	**3**	2	0	**2**	**5**
18:15 18:30	0	1	**1**	0	0	**0**	**1**
18:30 18:45	0	0	**0**	2	0	**2**	**2**
18:45 19:00	1	0	**1**	1	0	**1**	**2**
Total	88	46	**134**	156	0	**156**	**290**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		ST. LAURENT BLVD									PLEASANT PARK RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	3	0	**3**	0	5	2	**7**	**10**	0	0	0	**0**	0	0	0	**0**	**0**	**10**
07:15	07:30	1	3	0	**4**	0	6	2	**8**	**12**	1	0	0	**1**	0	0	0	**0**	**1**	**13**
07:30	07:45	0	4	0	**4**	0	7	0	**7**	**11**	0	0	0	**0**	0	0	0	**0**	**0**	**11**
07:45	08:00	1	5	0	**6**	0	8	4	**12**	**18**	1	0	0	**1**	0	0	0	**0**	**1**	**19**
08:00	08:15	1	3	0	**4**	0	9	1	**10**	**14**	0	0	0	**0**	0	0	0	**0**	**0**	**14**
08:15	08:30	0	3	0	**3**	0	3	1	**4**	**7**	0	0	0	**0**	0	0	0	**0**	**0**	**7**
08:30	08:45	1	4	0	**5**	0	6	2	**8**	**13**	0	0	0	**0**	0	0	0	**0**	**0**	**13**
08:45	09:00	3	3	0	**6**	0	2	1	**3**	**9**	0	0	1	**1**	0	0	0	**0**	**1**	**10**
09:00	09:15	0	3	0	**3**	0	5	1	**6**	**9**	1	0	0	**1**	0	0	0	**0**	**1**	**10**
09:15	09:30	0	2	0	**2**	0	3	1	**4**	**6**	3	0	0	**3**	0	0	0	**0**	**3**	**9**
09:30	09:45	1	2	0	**3**	0	3	0	**3**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
09:45	10:00	0	2	0	**2**	0	1	0	**1**	**3**	0	0	0	**0**	0	0	0	**0**	**0**	**3**
10:00	10:15	0	1	0	**1**	0	2	1	**3**	**4**	0	0	0	**0**	0	0	0	**0**	**0**	**4**
10:15	10:30	0	5	0	**5**	0	3	1	**4**	**9**	1	0	2	**3**	0	0	0	**0**	**3**	**12**
10:30	10:45	0	1	0	**1**	0	4	1	**5**	**6**	1	0	0	**1**	0	0	0	**0**	**1**	**7**
10:45	11:00	0	1	0	**1**	0	3	2	**5**	**6**	1	0	0	**1**	0	0	0	**0**	**1**	**7**
11:00	11:15	0	5	0	**5**	0	3	0	**3**	**8**	1	0	2	**3**	0	0	0	**0**	**3**	**11**
11:15	11:30	0	2	0	**2**	0	3	1	**4**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
11:30	11:45	2	2	0	**4**	0	7	0	**7**	**11**	0	0	1	**1**	0	0	0	**0**	**1**	**12**
11:45	12:00	0	1	0	**1**	0	2	1	**3**	**4**	0	0	1	**1**	0	0	0	**0**	**1**	**5**
12:00	12:15	1	3	0	**4**	0	4	0	**4**	**8**	1	0	0	**1**	0	0	0	**0**	**1**	**9**
12:15	12:30	1	1	0	**2**	0	0	2	**2**	**4**	1	0	0	**1**	0	0	0	**0**	**1**	**5**
12:30	12:45	0	5	0	**5**	0	3	0	**3**	**8**	0	0	0	**0**	0	0	0	**0**	**0**	**8**
12:45	13:00	0	1	0	**1**	0	2	0	**2**	**3**	0	0	2	**2**	0	0	0	**0**	**2**	**5**
13:00	13:15	0	2	0	**2**	0	3	0	**3**	**5**	0	0	2	**2**	0	0	0	**0**	**2**	**7**
13:15	13:30	0	3	0	**3**	0	3	0	**3**	**6**	0	0	2	**2**	0	0	0	**0**	**2**	**8**
13:30	13:45	0	4	0	**4**	0	7	0	**7**	**11**	0	0	1	**1**	0	0	0	**0**	**1**	**12**
13:45	14:00	0	1	0	**1**	0	4	3	**7**	**8**	0	0	0	**0**	0	0	0	**0**	**0**	**8**
14:00	14:15	0	3	0	**3**	0	3	0	**3**	**6**	1	0	0	**1**	0	0	0	**0**	**1**	**7**
14:15	14:30	0	2	0	**2**	0	5	1	**6**	**8**	1	0	0	**1**	0	0	0	**0**	**1**	**9**
14:30	14:45	0	2	0	**2**	0	7	1	**8**	**10**	2	0	0	**2**	0	0	0	**0**	**2**	**12**
14:45	15:00	1	3	0	**4**	0	0	0	**0**	**4**	0	0	0	**0**	0	0	0	**0**	**0**	**4**
15:00	15:15	3	7	0	**10**	0	5	2	**7**	**17**	1	0	0	**1**	0	0	0	**0**	**1**	**18**
15:15	15:30	0	1	0	**1**	0	8	1	**9**	**10**	1	0	1	**2**	0	0	0	**0**	**2**	**12**
15:30	15:45	0	1	0	**1**	0	3	1	**4**	**5**	2	0	1	**3**	0	0	0	**0**	**3**	**8**
15:45	16:00	0	5	0	**5**	0	1	0	**1**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
16:00	16:15	1	8	0	**9**	0	4	1	**5**	**14**	3	0	3	**6**	0	0	0	**0**	**6**	**20**
16:15	16:30	1	3	0	**4**	0	1	1	**2**	**6**	3	0	0	**3**	0	0	0	**0**	**3**	**9**
16:30	16:45	0	5	0	**5**	0	3	0	**3**	**8**	1	0	0	**1**	0	0	0	**0**	**1**	**9**
16:45	17:00	0	5	0	**5**	0	1	0	**1**	**6**	2	0	1	**3**	0	0	0	**0**	**3**	**9**
17:00	17:15	0	2	0	**2**	0	2	1	**3**	**5**	1	0	0	**1**	0	0	0	**0**	**1**	**6**
17:15	17:30	0	3	0	**3**	0	7	0	**7**	**10**	0	0	2	**2**	0	0	0	**0**	**2**	**12**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

17:30	17:45	1	8	0	**9**	0	2	1	**3**	**12**	1	0	0	**1**	0	0	0	**0**	**1**	**13**
17:45	18:00	0	3	0	**3**	0	1	0	**1**	**4**	1	0	2	**3**	0	0	0	**0**	**3**	**7**
18:00	18:15	0	3	0	**3**	0	3	1	**4**	**7**	1	0	0	**1**	0	0	0	**0**	**1**	**8**
18:15	18:30	0	4	0	**4**	0	1	1	**2**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
18:30	18:45	1	7	0	**8**	0	2	0	**2**	**10**	1	0	1	**2**	0	0	0	**0**	**2**	**12**
18:45	19:00	0	1	0	**1**	0	1	1	**2**	**3**	1	0	0	**1**	0	0	0	**0**	**1**	**4**
Total:	None	20	151	0	**171**	0	171	40	**211**	**382**	35	0	25	**60**	0	0	0	**0**	**60**	**442**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

Time Period		ST. LAURENT BLVD		PLEASANT PARK RD		
		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	**0**
07:15	07:30	0	0	0	0	**0**
07:30	07:45	1	0	0	0	**1**
07:45	08:00	0	0	0	0	**0**
08:00	08:15	0	0	0	0	**0**
08:15	08:30	0	0	0	0	**0**
08:30	08:45	0	0	0	0	**0**
08:45	09:00	0	0	0	0	**0**
09:00	09:15	0	0	0	0	**0**
09:15	09:30	0	0	0	0	**0**
09:30	09:45	0	0	0	0	**0**
09:45	10:00	0	0	0	0	**0**
10:00	10:15	0	0	0	0	**0**
10:15	10:30	0	0	0	0	**0**
10:30	10:45	0	0	0	0	**0**
10:45	11:00	0	0	0	0	**0**
11:00	11:15	0	0	0	0	**0**
11:15	11:30	0	0	0	0	**0**
11:30	11:45	0	0	0	0	**0**
11:45	12:00	0	0	0	0	**0**
12:00	12:15	0	0	0	0	**0**
12:15	12:30	0	0	0	0	**0**
12:30	12:45	0	0	0	0	**0**
12:45	13:00	0	0	0	0	**0**
13:00	13:15	0	0	0	0	**0**
13:15	13:30	0	0	0	0	**0**
13:30	13:45	0	0	0	0	**0**
13:45	14:00	0	0	0	0	**0**
14:00	14:15	0	0	0	0	**0**
14:15	14:30	0	0	0	0	**0**
14:30	14:45	0	0	0	0	**0**
14:45	15:00	0	0	0	0	**0**
15:00	15:15	0	0	0	0	**0**
15:15	15:30	0	0	0	0	**0**
15:30	15:45	0	0	0	0	**0**
15:45	16:00	0	0	0	0	**0**
16:00	16:15	0	0	0	0	**0**
16:15	16:30	0	0	0	0	**0**
16:30	16:45	0	0	0	0	**0**
16:45	17:00	0	0	0	0	**0**
17:00	17:15	0	0	0	0	**0**
17:15	17:30	0	0	0	0	**0**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019 **WO No:** 38459

Start Time: 07:00 **Device:** Miovision

17:30	17:45	0	0	0	0	**0**
17:45	18:00	0	0	0	0	**0**
18:00	18:15	0	0	0	0	**0**
18:15	18:30	0	0	0	0	**0**
18:30	18:45	0	0	0	0	**0**
18:45	19:00	1	0	0	0	**1**
Total		2	0	0	0	**2**

Transportation Services - Traffic Services

Work Order
38459

Turning Movement Count - Full Study Summary Report

PLEASANT PARK RD @ ST. LAURENT BLVD

Survey Date: Thursday, March 21, 2019

Total Observed U-Turns

Northbound: 2 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor
1.00

Full Study

	ST. LAURENT BLVD									PLEASANT PARK RD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	**NB TOT**	LT	ST	RT	**SB TOT**	**STR TOT**	LT	ST	RT	**EB TOT**	LT	ST	RT	**WB TOT**	**STR TOT**	**Grand Total**
07:00 08:00	68	447	0	**515**	0	456	76	**532**	**1047**	108	0	82	**190**	0	0	0	**0**	**190**	**1237**
08:00 09:00	83	511	0	**594**	0	425	96	**521**	**1115**	125	0	80	**205**	0	0	0	**0**	**205**	**1320**
09:00 10:00	58	398	0	**456**	0	371	76	**447**	**903**	86	0	65	**151**	0	0	0	**0**	**151**	**1054**
10:00 11:00	47	392	0	**439**	0	370	73	**443**	**882**	89	0	49	**138**	0	0	0	**0**	**138**	**1020**
11:00 12:00	66	471	0	**537**	0	431	84	**515**	**1052**	90	0	72	**162**	0	0	0	**0**	**162**	**1214**
12:00 13:00	53	495	0	**548**	0	477	111	**588**	**1136**	99	0	74	**173**	0	0	0	**0**	**173**	**1309**
13:00 14:00	56	418	0	**474**	0	513	90	**603**	**1077**	76	0	72	**148**	0	0	0	**0**	**148**	**1225**
14:00 15:00	65	473	0	**538**	0	484	108	**592**	**1130**	101	0	78	**179**	0	0	0	**0**	**179**	**1309**
15:00 16:00	79	480	0	**559**	0	590	151	**741**	**1300**	95	0	131	**226**	0	0	0	**0**	**226**	**1526**
16:00 17:00	83	545	0	**628**	0	584	150	**734**	**1362**	119	0	140	**259**	0	0	0	**0**	**259**	**1621**
17:00 18:00	77	449	0	**526**	0	574	140	**714**	**1240**	117	0	106	**223**	0	0	0	**0**	**223**	**1463**
18:00 19:00	64	372	0	**436**	0	452	123	**575**	**1011**	74	0	70	**144**	0	0	0	**0**	**144**	**1155**
Sub Total	799	5451	0	**6250**	0	5727	1278	**7005**	**13255**	1179	0	1019	**2198**	0	0	0	**0**	**2198**	**15453**
U Turns	2			**2**	0			**0**	**2**	**0**			**0**	0			**0**	**0**	**2**
Total	799	5451	0	**6252**	0	5727	1278	**7005**	**13257**	1179	0	1019	**2198**	0	0	0	**0**	**2198**	**15455**
AVG 12Hr	799	5451	0	**6252**	0	5727	1278	**7005**	**13257**	1179	0	1019	**2198**	0	0	0	**0**	**2198**	**15455**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **1.00**

AVG 24Hr	1047	7141	0	**8190**	0	7502	1674	**9177**	**17367**	1544	0	1335	**2879**	0	0	0	**0**	**2879**	**20246**

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Comments:

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	301	105	97	32	277	107	190	1125	96	137	595	644
Future Volume (vph)	301	105	97	32	277	107	190	1125	96	137	595	644
Satd. Flow (prot)	3216	1728	1339	1421	3062	0	1483	3118	0	1626	3191	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3177	1728	1295	1395	3062	0	1477	3118	0	1622	3191	1448
Satd. Flow (RTOR)			132		41			9				385
Lane Group Flow (vph)	334	117	108	36	427	0	211	1357	0	152	661	716
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0		20.0	52.0		20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%		16.7%	43.3%		16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
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)	5.6	5.7	5.7	5.6	5.7		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	14.3	30.1	30.1	8.5	19.6		16.8	48.9		14.0	46.1	46.1
Actuated g/C Ratio	0.12	0.25	0.25	0.07	0.16		0.14	0.41		0.12	0.38	0.38
v/c Ratio	0.87	0.27	0.25	0.36	0.80		1.02	1.07		0.80	0.54	0.90
Control Delay	75.4	39.8	5.4	62.1	55.1		119.3	79.4		81.1	30.7	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	75.4	39.8	5.4	62.1	55.1		119.3	79.4		81.1	30.7	32.1
LOS	E	D	A	E	E		F	E		F	C	C
Approach Delay		54.4			55.7			84.8			36.4	
Approach LOS		D			E			F			D	
Queue Length 50th (m)	40.4	23.2	0.0	8.2	46.2		~55.6	~194.7		34.8	62.8	84.4
Queue Length 95th (m)	#64.6	40.9	9.8	18.5	63.1		#108.5	#237.4		#69.7	81.0	#168.0
Internal Link Dist (m)		111.9			87.8			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	385	434	424	170	602		207	1274		197	1225	793
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	0.87	0.27	0.25	0.21	0.71		1.02	1.07		0.77	0.54	0.90

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 125
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.07

Intersection Signal Delay: 59.4	Intersection LOS: E
Intersection Capacity Utilization 86.0%	ICU Level of Service E
Analysis Period (min) 15	

~ 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.

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster

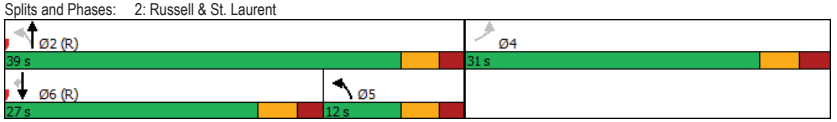
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	668	44	75	743	286	459
Future Volume (vph)	668	44	75	743	286	459
Satd. Flow (prot)	3034	0	1658	2866	2866	1441
Flt Permitted	0.955		0.559			
Satd. Flow (perm)	3034	0	970	2866	2866	1412
Satd. Flow (RTOR)	11					510
Lane Group Flow (vph)	791	0	83	826	318	510
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	23.9	23.9
Actuated g/C Ratio	0.36		0.48	0.48	0.34	0.34
v/c Ratio	0.73		0.16	0.60	0.33	0.62
Control Delay	23.9		11.5	15.7	19.4	6.0
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.9		11.5	15.7	19.4	6.0
LOS	C		B	B	B	A
Approach Delay	23.9			15.3	11.1	
Approach LOS	C			B	B	
Queue Length 50th (m)	44.6		5.6	39.3	16.8	0.0
Queue Length 95th (m)	63.5		12.3	56.1	26.8	20.7
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1090		528	1371	978	818
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.73		0.16	0.60	0.33	0.62

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 56.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	222	588	9	55	272
Future Volume (vph)	17	222	588	9	55	272
Satd. Flow (prot)	1595	1455	1560	0	1458	1548
Flt Permitted	0.950				0.341	
Satd. Flow (perm)	1531	1401	1560	0	523	1548
Satd. Flow (RTOR)		242	2			
Lane Group Flow (vph)	19	247	663	0	61	302
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		23.5	23.5
Total Split (s)	22.3	22.3	42.7		42.7	42.7
Total Split (%)	34.3%	34.3%	65.7%		65.7%	65.7%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.8		42.8	42.8
Actuated g/C Ratio	0.18	0.18	0.66		0.66	0.66
v/c Ratio	0.07	0.56	0.65		0.18	0.30
Control Delay	21.5	8.9	11.2		6.8	6.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.5	8.9	11.2		6.8	6.2
LOS	C	A	B		A	A
Approach Delay	9.8		11.2			6.3
Approach LOS	A		B			A
Queue Length 50th (m)	2.0	0.5	36.0		2.2	11.8
Queue Length 95th (m)	6.0	15.3	92.7		8.9	30.5
Internal Link Dist (m)	422.1		18.0			54.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	400	545	1027		344	1019
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.05	0.45	0.65		0.18	0.30

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 10 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 65.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell

Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	54	53	33	658	474	63
Future Volume (vph)	54	53	33	658	474	63
Satd. Flow (prot)	1112	0	1551	3283	3228	0
Flt Permitted	0.975		0.426			
Satd. Flow (perm)	1103	0	696	3283	3228	0
Satd. Flow (RTOR)	59				29	
Lane Group Flow (vph)	119	0	37	731	597	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	11.3		42.1	42.1	42.1	
Actuated g/C Ratio	0.19		0.70	0.70	0.70	
v/c Ratio	0.47		0.08	0.32	0.26	
Control Delay	18.3		5.0	5.3	4.9	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.3		5.0	5.3	4.9	
LOS	B		A	A	A	
Approach Delay	18.3			5.3	4.9	
Approach LOS	B			A	A	
Queue Length 50th (m)	5.9		1.3	19.4	11.3	
Queue Length 95th (m)	17.1		m5.0	37.5	23.0	
Internal Link Dist (m)	18.7			103.8	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	487		488	2303	2273	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.24		0.08	0.32	0.26	

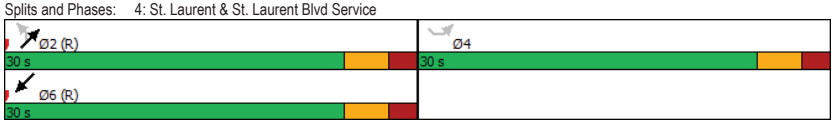
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 6.2	Intersection LOS: A
Intersection Capacity Utilization 56.7%	ICU Level of Service B
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



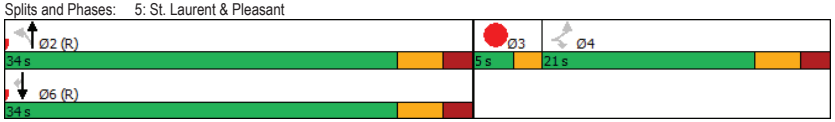
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	108	82	68	419	456	76	
Future Volume (vph)	108	82	68	419	456	76	
Satd. Flow (prot)	1658	1483	1642	1728	1679	1401	
Flt Permitted	0.950		0.450				
Satd. Flow (perm)	1654	1393	770	1728	1679	1337	
Satd. Flow (RTOR)		91				84	
Lane Group Flow (vph)	120	91	76	466	507	84	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	10.9	10.9	42.3	42.3	42.3	42.3	
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70	
v/c Ratio	0.40	0.28	0.14	0.38	0.43	0.09	
Control Delay	25.6	7.9	5.7	6.5	4.2	0.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	7.9	5.7	6.5	4.2	0.4	
LOS	C	A	A	A	A	A	
Approach Delay	17.9			6.4	3.7		
Approach LOS	B			A	A		
Queue Length 50th (m)	12.0	0.0	2.7	20.2	10.5	0.0	
Queue Length 95th (m)	23.4	9.4	8.4	42.3	16.9	0.2	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	427	427	542	1217	1183	967	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.28	0.21	0.14	0.38	0.43	0.09	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 3 (5%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.43

Intersection Signal Delay: 7.0	Intersection LOS: A
Intersection Capacity Utilization 56.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	4	2	808	328	2
Future Vol, veh/h	10	4	2	808	328	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	4	2	898	364	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1267	365	366	0	-	0
Stage 1	365	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	186	680	1193	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	396	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	185	680	1193	-	-	-
Mov Cap-2 Maneuver	185	-	-	-	-	-
Stage 1	700	-	-	-	-	-
Stage 2	396	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	21.5	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1193	-	234	-	-
HCM Lane V/C Ratio	0.002	-	0.066	-	-
HCM Control Delay (s)	8	0	21.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	0	20	16	2	22	51	653	8	8	502	17
Future Vol, veh/h	16	0	20	16	2	22	51	653	8	8	502	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	35	-	108	21	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	0	22	18	2	24	57	726	9	9	558	19

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1064	1435	289	1142	1440	368	577	0	0	735	0	0
Stage 1	586	586	-	845	845	-	-	-	-	-	-	-
Stage 2	478	849	-	297	595	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	177	133	708	155	132	629	993	-	-	866	-	-
Stage 1	463	495	-	324	377	-	-	-	-	-	-	-
Stage 2	537	375	-	687	491	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	159	124	708	142	123	629	993	-	-	866	-	-
Mov Cap-2 Maneuver	159	124	-	142	123	-	-	-	-	-	-	-
Stage 1	437	490	-	306	356	-	-	-	-	-	-	-
Stage 2	483	354	-	659	486	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.1	23	0.6	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	993	-	-	279	244	866	-	-
HCM Lane V/C Ratio	0.057	-	-	0.143	0.182	0.01	-	-
HCM Control Delay (s)	8.8	-	-	20.1	23	9.2	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.5	0.7	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	505	274	223	100	106	230	100	765	93	143	1098	357
Future Volume (vph)	505	274	223	100	106	230	100	765	93	143	1098	357
Satd. Flow (prot)	3216	1745	1469	1642	2891	0	1537	3195	0	1658	3316	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3122	1745	1430	1626	2891	0	1530	3195	0	1648	3316	1427
Satd. Flow (RTOR)			248		188			12				326
Lane Group Flow (vph)	561	304	248	111	374	0	111	953	0	159	1220	397
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0		17.0	49.0		17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%		14.2%	40.8%		14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
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)	5.6	5.7	5.7	5.6	5.7		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	25.7	25.7	13.4	18.7		11.2	43.9		13.8	46.5	46.5
Actuated g/C Ratio	0.17	0.21	0.21	0.11	0.16		0.09	0.37		0.12	0.39	0.39
v/c Ratio	1.03	0.82	0.50	0.61	0.62		0.78	0.81		0.84	0.95	0.53
Control Delay	94.6	63.0	8.6	64.1	26.9		87.3	40.6		87.2	52.3	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	94.6	63.0	8.6	64.1	26.9		87.3	40.6		87.2	52.3	8.8
LOS	F	E	A	E	C		F	D		F	D	A
Approach Delay		66.8			35.4			45.5			45.7	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	~72.6	66.3	0.0	25.3	20.4		25.9	105.5		38.0	~161.0	11.2
Queue Length 95th (m)	#107.0	#117.9	21.8	41.9	36.0		#56.1	132.1		#83.3	#202.8	39.0
Internal Link Dist (m)		111.7			91.7			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	546	373	500	279	690		146	1177		190	1285	753
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	1.03	0.82	0.50	0.40	0.54		0.76	0.81		0.84	0.95	0.53

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 49.8	Intersection LOS: D
Intersection Capacity Utilization 87.4%	ICU Level of Service E
Analysis Period (min) 15	

~ 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.

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	616	106	42	342	711	730
Future Volume (vph)	616	106	42	342	711	730
Satd. Flow (prot)	2962	0	1580	2941	3131	1483
Flt Permitted	0.959		0.254			
Satd. Flow (perm)	2962	0	421	2941	3131	1448
Satd. Flow (RTOR)	32					811
Lane Group Flow (vph)	802	0	47	380	790	811
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	26.3	26.3
Actuated g/C Ratio	0.36		0.48	0.48	0.38	0.38
v/c Ratio	0.74		0.16	0.27	0.67	0.77
Control Delay	24.0		12.9	11.6	23.8	8.2
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	24.0		12.9	11.6	23.8	8.2
LOS	C		B	B	C	A
Approach Delay	24.0			11.7	15.9	
Approach LOS	C			B	B	
Queue Length 50th (m)	44.5		3.1	14.7	49.8	0.0
Queue Length 95th (m)	63.8		8.0	22.8	#77.6	#46.5
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1078		309	1407	1176	1050
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.74		0.15	0.27	0.67	0.77

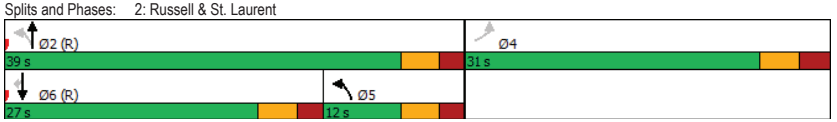
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 2: Russell & St. Laurent



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	108	273	13	201	622
Future Volume (vph)	16	108	273	13	201	622
Satd. Flow (prot)	1658	1441	1670	0	1642	1695
Flt Permitted	0.950				0.568	
Satd. Flow (perm)	1608	1370	1670	0	978	1695
Satd. Flow (RTOR)		120	6			
Lane Group Flow (vph)	18	120	317	0	223	691
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		15.5	15.5
Total Split (s)	22.3	22.3	37.7		37.7	37.7
Total Split (%)	37.2%	37.2%	62.8%		62.8%	62.8%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.0		42.0	42.0
Actuated g/C Ratio	0.19	0.19	0.70		0.70	0.70
v/c Ratio	0.06	0.34	0.27		0.33	0.58
Control Delay	18.8	7.2	6.0		7.6	10.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	18.8	7.2	6.0		7.6	10.2
LOS	B	A	A		A	B
Approach Delay	8.7		6.0			9.6
Approach LOS	A		A			A
Queue Length 50th (m)	1.7	0.0	11.9		9.1	36.5
Queue Length 95th (m)	5.3	9.7	31.5		27.7	#96.6
Internal Link Dist (m)	422.1		26.8			60.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	455	474	1170		683	1185
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.25	0.27		0.33	0.58

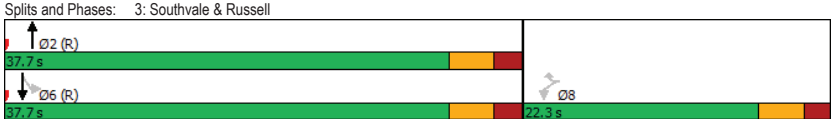
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 53 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 61.2%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 3: Southvale & Russell



Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	119	121	33	658	710	66
Future Volume (vph)	119	121	33	658	710	66
Satd. Flow (prot)	1252	0	1658	3252	3265	0
Flt Permitted	0.976		0.295			
Satd. Flow (perm)	1243	0	514	3252	3265	0
Satd. Flow (RTOR)	82				19	
Lane Group Flow (vph)	266	0	37	731	862	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	15.5		33.7	33.7	33.7	
Actuated g/C Ratio	0.26		0.56	0.56	0.56	
v/c Ratio	0.70		0.13	0.40	0.47	
Control Delay	23.0		7.2	6.6	9.8	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	23.0		7.2	6.6	9.8	
LOS	C		A	A	A	
Approach Delay	23.0			6.7	9.8	
Approach LOS	C			A	A	
Queue Length 50th (m)	18.1		1.5	15.7	24.7	
Queue Length 95th (m)	32.9		m3.5	23.0	50.8	
Internal Link Dist (m)	15.1			104.0	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	558		288	1828	1844	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.48		0.13	0.40	0.47	

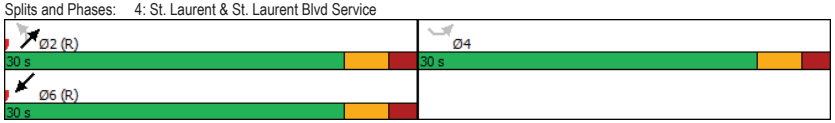
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 10.4	Intersection LOS: B
Intersection Capacity Utilization 57.9%	ICU Level of Service B
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



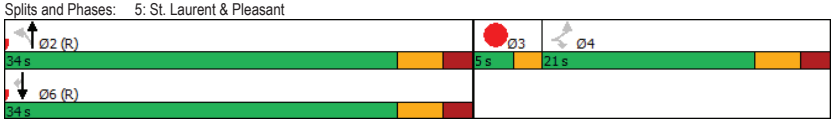
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	119	140	83	528	636	150	
Future Volume (vph)	119	140	83	528	636	150	
Satd. Flow (prot)	1566	1469	1658	1712	1745	1483	
Flt Permitted	0.950		0.302				
Satd. Flow (perm)	1548	1424	524	1712	1745	1421	
Satd. Flow (RTOR)		156				167	
Lane Group Flow (vph)	132	156	92	587	707	167	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	11.4	11.4	37.6	37.6	37.6	37.6	
Actuated g/C Ratio	0.19	0.19	0.63	0.63	0.63	0.63	
v/c Ratio	0.45	0.39	0.28	0.55	0.65	0.18	
Control Delay	26.3	7.2	8.6	9.3	12.6	2.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.3	7.2	8.6	9.3	12.6	2.0	
LOS	C	A	A	A	B	A	
Approach Delay	16.0			9.2	10.6		
Approach LOS	B			A	B		
Queue Length 50th (m)	13.3	0.0	3.6	28.9	60.9	3.0	
Queue Length 95th (m)	24.8	11.7	12.7	63.2	110.4	1.0	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	399	483	328	1072	1093	952	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.33	0.32	0.28	0.55	0.65	0.18	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 10.9	Intersection LOS: B
Intersection Capacity Utilization 66.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	18	8	373	798	19
Future Vol, veh/h	11	18	8	373	798	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	20	9	414	887	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1330	898	908	0	-	0
Stage 1	898	-	-	-	-	-
Stage 2	432	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	171	338	750	-	-	-
Stage 1	398	-	-	-	-	-
Stage 2	655	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	168	338	750	-	-	-
Mov Cap-2 Maneuver	168	-	-	-	-	-
Stage 1	392	-	-	-	-	-
Stage 2	655	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	750	-	244	-	-
HCM Lane V/C Ratio	0.012	-	0.132	-	-
HCM Control Delay (s)	9.9	0	22	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	6	41	10	3	22	70	608	20	29	768	34
Future Vol, veh/h	20	6	41	10	3	22	70	608	20	29	768	34
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	35	-	108	21	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	7	46	11	3	24	78	676	22	32	853	38

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1432	1790	446	1337	1798	349	891	0	0	698	0	0
Stage 1	936	936	-	843	843	-	-	-	-	-	-	-
Stage 2	496	854	-	494	955	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	95	80	560	111	79	647	757	-	-	894	-	-
Stage 1	285	342	-	325	378	-	-	-	-	-	-	-
Stage 2	524	373	-	526	335	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	79	69	560	85	68	647	757	-	-	894	-	-
Mov Cap-2 Maneuver	79	69	-	85	68	-	-	-	-	-	-	-
Stage 1	256	330	-	292	339	-	-	-	-	-	-	-
Stage 2	448	335	-	457	323	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	44.8	30.6	1	0.3
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	757	-	-	162	179	894	-	-
HCM Lane V/C Ratio	0.103	-	-	0.46	0.217	0.036	-	-
HCM Control Delay (s)	10.3	-	-	44.8	30.6	9.2	-	-
HCM Lane LOS	B	-	-	E	D	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	2.1	0.8	0.1	-	-

Appendix D

Collision Data

CGH TRANSPORTATION

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition	# Vehicles	# Motorcycles	# Bicycles	# Pedestrians
10/1/2016	2016	18:06	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
1/21/2016	2016	8:21	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
10/25/2016	2016	11:05	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	3	0	0	0
4/15/2016	2016	21:20	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
8/16/2016	2016	6:11	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	03 - Dawn	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	1	0
8/2/2016	2016	18:22	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
9/9/2016	2016	14:57	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
9/13/2016	2016	17:23	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	0	0
4/6/2017	2017	14:00	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
4/27/2017	2017	16:16	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
9/13/2017	2017	17:00	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
9/21/2017	2017	9:51	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
10/7/2018	2018	13:05	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
11/22/2018	2018	8:35	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	06 - Ice	2	0	0	0
12/16/2018	2018	17:03	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	07 - SMV other	02 - Wet	1	0	0	1
2/14/2018	2018	9:59	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	02 - Wet	2	0	0	0
2/23/2018	2018	12:36	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
5/3/2018	2018	13:00	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	02 - Rain	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
6/11/2018	2018	16:36	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	3	0	0	0
8/4/2018	2018	17:20	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/14/2018	2018	8:21	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	04 - Slush	2	0	0	0
9/7/2018	2018	16:40	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	07 - SMV other	01 - Dry	1	0	0	0
9/23/2018	2018	19:30	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
9/21/2018	2018	16:50	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	06 - Strong wind	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
8/22/2019	2019	16:50	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
8/23/2019	2019	12:30	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
12/26/2019	2019	17:15	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	04 - Freezing Rain	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	06 - Ice	2	0	0	0
12/19/2019	2019	6:35	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
2/1/2019	2019	15:40	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
2/11/2019	2019	8:15	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
3/19/2019	2019	16:45	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
4/24/2019	2019	21:21	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
4/18/2019	2019	10:25	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
5/10/2019	2019	20:54	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
8/10/2019	2019	12:45	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
8/12/2019	2019	13:58	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	0	0
2/20/2020	2020	17:53	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
3/25/2020	2020	18:30	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	05 - Dusk	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
7/31/2020	2020	13:03	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	03 - Rear end	01 - Dry	2	0	0	0
8/19/2020	2020	9:42	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	0	0	0
9/10/2020	2020	22:12	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
12/21/2020	2020	10:25	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	99 - Other	01 - Dry	2	0	0	0
12/21/2020	2020	14:10	RUSSELL RD S @ ST. LAURENT BLVD (0007734)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
3/24/2016	2016	17:56	RUSSELL RD @ SOUTHVALE CRES N (0002650)	03 - Snow	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	07 - SMV other	06 - Ice	1	0	0	0
11/8/2018	2018	12:15	RUSSELL RD @ SOUTHVALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
12/3/2018	2018	19:56	RUSSELL RD @ SOUTHVALE CRES N (0002650)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
3/27/2018	2018	8:36	RUSSELL RD @ SOUTHVALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
4/29/2018	2018	16:26	RUSSELL RD @ SOUTHVALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	01 - Fatal injury	05 - Turning movement	01 - Dry	2	0	0	0
5/27/2018	2018	12:45	RUSSELL RD @ SOUTHVALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
1/10/2018	2018	18:04	RUSSELL RD @ SOUTHVALE CRES N (0002650)	04 - Freezing Rain	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	03 - Loose snow	2	0	0	0
7/13/2018	2018	15:32	RUSSELL RD @ SOUTHVALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	00 - Unknown	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
9/24/2019	2019	7:54	RUSSELL RD @ SOUTHVALE CRES N (0002650)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	01 - Fatal injury	07 - SMV other	01 - Dry	1	0	0	1
11/3/2016	2016	13:30	ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE (0008760)	99 - Other	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	03 - Rear end	02 - Wet	2	0	0	0
2/3/2017	2017	13:08	ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE (0008760)	01 - Clear	01 - Daylight	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
2/12/2018	2018	3:30	ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE (0008760)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	02 - Angle	05 - Packed snow	2	0	0	0
2/2/2018	2018	20:37	ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE (0008760)	01 - Clear	07 - Dark	01 - Traffic signal	01 - Functioning	03 - P.D. only	05 - Turning movement	01 - Dry	2	0	0	0
1/29/2019	2019	8:21	ST. LAURENT BLVD @ ST. LAURENT BLVD SERVICE (0008760)	05 - Drifting Snow	01 - Daylight	01 - Traffic signal	00 - Unknown	03 - P.D. only	04 - Sideswipe	05 - Packed snow	2	0	0	0
2/21/2018	2018	8:20	DWELLINGHAM PRIV @ ST. LAURENT BLVD (0006421)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	05 - Turning movement	02 - Wet	2	0	0	0
12/14/2020	2020	8:32	DWELLINGHAM PRIV @ ST. LAURENT BLVD (0006421)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	02 - Angle	01 - Dry	2	0	1	0
2/21/2016	2016	16:57	RUSSELL RD btwn ST. LAURENT BLVD & SOUTHVALE CRES (__3ZA3RV)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	04 - Sideswipe	01 - Dry	2	0	0	0
10/27/2017	2017	15:02	RUSSELL RD btwn ST. LAURENT BLVD & SOUTHVALE CRES (__3ZA3RV)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0
10/17/2018	2018	10:23	RUSSELL RD btwn ST. LAURENT BLVD & SOUTHVALE CRES (__3ZA3RV)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
11/28/2018	2018	17:57	RUSSELL RD btwn ST. LAURENT BLVD & SOUTHVALE CRES (__3ZA3RV)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	04 - Sideswipe	02 - Wet	2	0	0	0
9/1/2019	2019	10:17	RUSSELL RD btwn ST. LAURENT BLVD & SOUTHVALE CRES (__3ZA3RV)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	05 - Turning movement	01 - Dry	2	1	0	0
2/25/2016	2016	18:00	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (__3ZA1L3)	04 - Freezing Rain	07 - Dark	10 - No control	0	03 - P.D. only	01 - Approaching	06 - Ice	2	0	0	0
1/29/2018	2018	12:32	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (__3ZA1L3)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
3/20/2018	2018	10:28	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (__3ZA1L3)	01 - Clear	01 - Daylight	10 - No control	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	1	0	0	1
4/16/2018	2018	10:07	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (__3ZA1L3)	04 - Freezing Rain	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	06 - Ice	2	0	0	0
11/10/2019	2019	17:14	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (__3ZA1L3)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
11/26/2019	2019	19:15	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (__3ZA1L3)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
12/19/2019	2019	19:00	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (__3ZA1L3)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
3/27/2019	2019	7:37	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (__3ZA1L3)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	01 - Dry	3	0	0	0
1/17/2019	2019	13:10	ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV (__3ZA1L3)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	02 - Angle	01 - Dry	2	0	0	0
10/10/2017	2017	19:29	ST. LAURENT BLVD btwn DWELLINGHAM PRIV & TAWNEY RD (__3ZA76V)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	03 - Rear end	01 - Dry	2	0	0	0
3/9/2020	2020	8:46	ST. LAURENT BLVD btwn DWELLINGHAM PRIV & TAWNEY RD (__3ZA76V)	01 - Clear	01 - Daylight	10 - No control	0	03 - P.D. only	04 - Sideswipe	01 - Dry	2	0	0	0

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Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: RUSSELL RD @ SOUTHVALE CRES N

Traffic Control: Traffic signal **Total Collisions:** 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-14, Wed,08:24	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2015-Feb-18, Wed,08:40	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	Pick-up truck	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	

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Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: RUSSELL RD @ SOUTHVALE CRES N

Traffic Control: Traffic signal **Total Collisions:** 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jul-07, Tue,12:57	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Mar-24, Thu,17:56	Snow	SMV other	P.D. only	Ice	North	Slowing or stopping	Automobile, station wagon	Pole (utility, power)	0
2018-Jan-10, Wed,18:04	Freezing Rain	Rear end	P.D. only	Loose snow	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Mar-27, Tue,08:36	Clear	Angle	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Apr-29, Sun,16:26	Clear	Turning movement	Fatal injury	Dry	South	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-May-27, Sun,12:45	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Jul-13, Fri,15:32	Clear	Sideswipe	P.D. only	Dry	South	Unknown	Unknown	Other motor vehicle	0
					South	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Nov-08, Thu,12:15	Clear	Rear end	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-03, Mon,19:56	Clear	Angle	P.D. only	Dry	West	Turning right	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Sep-24, Tue,07:54	Clear	SMV other	Fatal injury	Dry	West	Turning left	Municipal transit bus	Pedestrian	1

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal **Total Collisions:** 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-30, Fri,18:32	Clear	SMV other	Non-fatal injury	Slush	East	Turning left	Pick-up truck	Pedestrian	1

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From: January 1, 2015 **To:** December 31, 2019

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal **Total Collisions:** 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Feb-02, Mon,13:23	Snow	Rear end	P.D. only	Loose snow	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Feb-03, Tue,21:27	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Feb-18, Wed,18:41	Snow	Rear end	P.D. only	Loose snow	South	Going ahead	Pick-up truck	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2015-Jun-12, Fri,14:30	Rain	Turning movement	P.D. only	Wet	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Unknown	Other motor vehicle	
2015-Jun-17, Wed,07:31	Clear	SMV other	Non-fatal injury	Dry	North	Going ahead	Truck - closed	Pedestrian	1
2015-Jun-20, Sat,19:59	Clear	Angle	Non-fatal injury	Dry	East	Turning left	Motorcycle	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Jul-17, Fri,18:02	Clear	SMV other	P.D. only	Dry	North	Turning left	Automobile, station wagon	Curb	0
2015-Aug-19, Wed,14:50	Clear	Sideswipe	P.D. only	Dry	South	Changing lanes	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	
2015-Oct-01, Thu,13:12	Clear	Angle	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Passenger van	Other motor vehicle	
2015-Oct-20, Tue,23:00	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Nov-03, Tue,18:34	Clear	Angle	P.D. only	Dry	South	Going ahead	Pick-up truck	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2015-Nov-17, Tue,17:22	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2015-Nov-25, Wed,16:53	Clear	Turning movement	Non-fatal injury	Dry	North	Turning left	Passenger van	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

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From: January 1, 2015 **To:** December 31, 2019

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal **Total Collisions:** 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Nov-28, Sat,08:19	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Delivery van	Other motor vehicle	
2015-Dec-24, Thu,20:17	Clear	Turning movement	Non-fatal injury	Dry	South	Making "U" turn	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Other motor vehicle	
2016-Jan-21, Thu,08:21	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Passenger van	Other motor vehicle	
2016-Apr-15, Fri,21:20	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Aug-02, Tue,18:22	Clear	Rear end	P.D. only	Dry	South	Turning right	Truck - closed	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2016-Aug-16, Tue,06:11	Clear	Angle	Non-fatal injury	Dry	East	Turning right	Bicycle	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Cyclist	
2016-Sep-09, Fri,14:57	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Delivery van	Other motor vehicle	
2016-Sep-13, Tue,17:23	Clear	Turning movement	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Oct-01, Sat,18:06	Clear	Angle	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Pick-up truck	Other motor vehicle	
2016-Oct-25, Tue,11:05	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2017-Apr-06, Thu,14:00	Rain	Sideswipe	P.D. only	Wet	East	Turning left	Delivery van	Other motor vehicle	0
					East	Turning left	Pick-up truck	Other motor vehicle	

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From: January 1, 2015 **To:** December 31, 2019

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal **Total Collisions:** 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2017-Apr-27, Thu,16:16	Clear	Rear end	P.D. only	Dry	East	Going ahead	Pick-up truck	Other motor vehicle	0
					East	Stopped	Pick-up truck	Other motor vehicle	
2017-Sep-13, Wed,17:00	Clear	Rear end	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Pick-up truck	Other motor vehicle	
2017-Sep-21, Thu,09:51	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Tow truck	Other motor vehicle	
2018-Jan-14, Sun,08:21	Clear	Angle	P.D. only	Slush	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Passenger van	Other motor vehicle	
2018-Feb-14, Wed,09:59	Clear	Angle	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	
2018-Feb-23, Fri,12:36	Rain	Turning movement	P.D. only	Wet	South	Making "U" turn	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-May-03, Thu,13:00	Rain	Turning movement	P.D. only	Wet	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Passenger van	Other motor vehicle	
2018-Jun-11, Mon,16:36	Clear	Turning movement	Non-fatal injury	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Turning left	Municipal transit bus	Other motor vehicle	
2018-Aug-04, Sat,17:20	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2018-Sep-07, Fri,16:40	Clear	SMV other	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Curb	0
2018-Sep-21, Fri,16:50	Strong wind	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Sep-23, Sun,19:30	Clear	Turning movement	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Turning left	Unknown	Other motor vehicle	

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From: January 1, 2015 **To:** December 31, 2019

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal **Total Collisions:** 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2018-Oct-07, Sun,13:05	Clear	Rear end	Non-fatal injury	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					East	Turning right	Pick-up truck	Other motor vehicle	
2018-Nov-22, Thu,08:35	Clear	Rear end	Non-fatal injury	Ice	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-16, Sun,17:03	Clear	SMV other	Non-fatal injury	Wet	East	Going ahead	Passenger van	Pedestrian	1
2019-Feb-01, Fri,15:40	Clear	Rear end	P.D. only	Wet	South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Unknown	Other motor vehicle	
2019-Feb-11, Mon,08:15	Clear	Rear end	P.D. only	Dry	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Stopped	Passenger van	Other motor vehicle	
2019-Mar-19, Tue,16:45	Clear	Rear end	P.D. only	Wet	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Apr-18, Thu,10:25	Clear	Rear end	P.D. only	Dry	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Passenger van	Other motor vehicle	
2019-Apr-24, Wed,21:21	Clear	Turning movement	P.D. only	Dry	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-May-10, Fri,20:54	Clear	Angle	Non-fatal injury	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Aug-10, Sat,12:45	Clear	Rear end	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Pick-up truck	Other motor vehicle	
2019-Aug-12, Mon,13:58	Clear	Angle	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	
2019-Aug-22, Thu,16:50	Clear	Turning movement	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Turning left	Automobile, station wagon	Other motor vehicle	

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Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: RUSSELL RD S @ ST. LAURENT BLVD

Traffic Control: Traffic signal **Total Collisions:** 52

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Aug-23, Fri,12:30	Clear	Rear end	P.D. only	Dry	South	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Automobile, station wagon	Other motor vehicle	
2019-Dec-19, Thu,06:35	Clear	Turning movement	P.D. only	Dry	North	Turning left	Pick-up truck	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Dec-26, Thu,17:15	Freezing Rain	Angle	P.D. only	Ice	North	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Turning left	Automobile, station wagon	Other motor vehicle	

Location: ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV

Traffic Control: No control **Total Collisions:** 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jan-04, Sun,15:10	Snow	Sideswipe	P.D. only	Slush	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Passenger van	Other motor vehicle	
2015-Feb-02, Mon,13:12	Snow	Angle	P.D. only	Loose snow	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Delivery van	Other motor vehicle	
2015-Mar-15, Sun,07:58	Snow	Angle	Non-fatal injury	Slush	West	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2016-Feb-25, Thu,18:00	Freezing Rain	Approaching	P.D. only	Ice	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Other motor vehicle	
2018-Jan-29, Mon,12:32	Clear	SMV other	Non-fatal injury	Dry	South	Going ahead	Municipal transit bus	Pedestrian	1
2018-Mar-20, Tue,10:28	Clear	SMV other	Non-fatal injury	Dry	East	Turning right	Automobile, station wagon	Pedestrian	1
2018-Apr-16, Mon,10:07	Freezing Rain	Sideswipe	P.D. only	Ice	South	Going ahead	Truck - closed	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Jan-17, Thu,13:10	Clear	Angle	P.D. only	Dry	East	Turning right	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: ST. LAURENT BLVD btwn TO BE DETERMINED & DWELLINGHAM PRIV

Traffic Control: No control **Total Collisions:** 12

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Mar-27, Wed,07:37	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					South	Stopped	Automobile, station wagon	Other motor vehicle	
2019-Nov-10, Sun,17:14	Clear	Rear end	P.D. only	Dry	South	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Turning right	Pick-up truck	Other motor vehicle	
2019-Nov-26, Tue,19:15	Clear	Angle	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	
2019-Dec-19, Thu,19:00	Clear	Angle	P.D. only	Dry	East	Turning left	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Appendix E

City TRANS Forecasts – Background Growth

CGH TRANSPORTATION

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

1802 St Laurent

2011 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: April 30, 2021
EMME Scenario: 21711

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

200 400 600 800

The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

TRANS Regional Model

Version 2.15 - Assigned June 16, 2020

AM Peak Hour Total Traffic Volume

1802 St Laurent

2031 Model - Basecase

N/A

User Initials: TIMW
Plot Prepared: April 30, 2021
EMME Scenario: 21711

TRANS

Legend

AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

N

Distance (m)

200 400 600 800

The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

Appendix F

Background Development Volumes

CGH TRANSPORTATION

Figure 10: 'New' Site-Generated Traffic

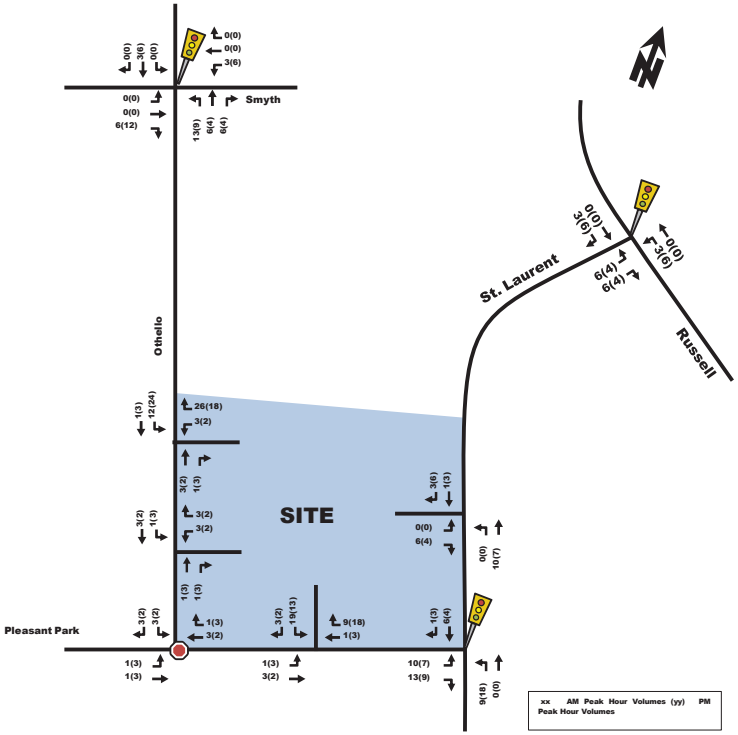


Figure 11: 'Existing' Site-Generated Traffic

Figure 12: 'New' Site-Generated Traffic

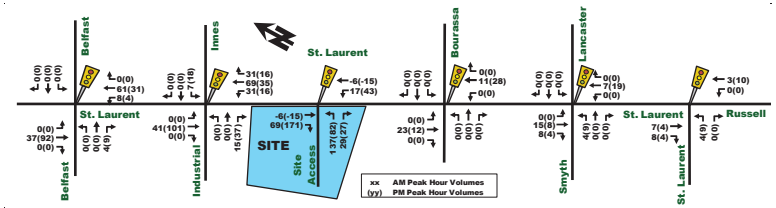
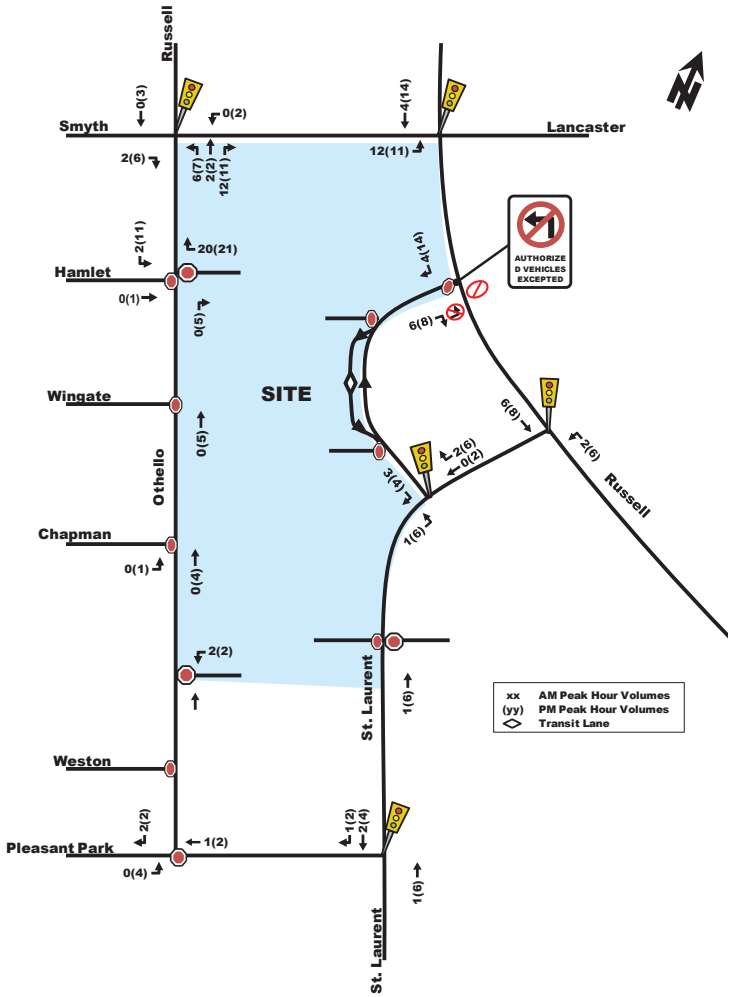
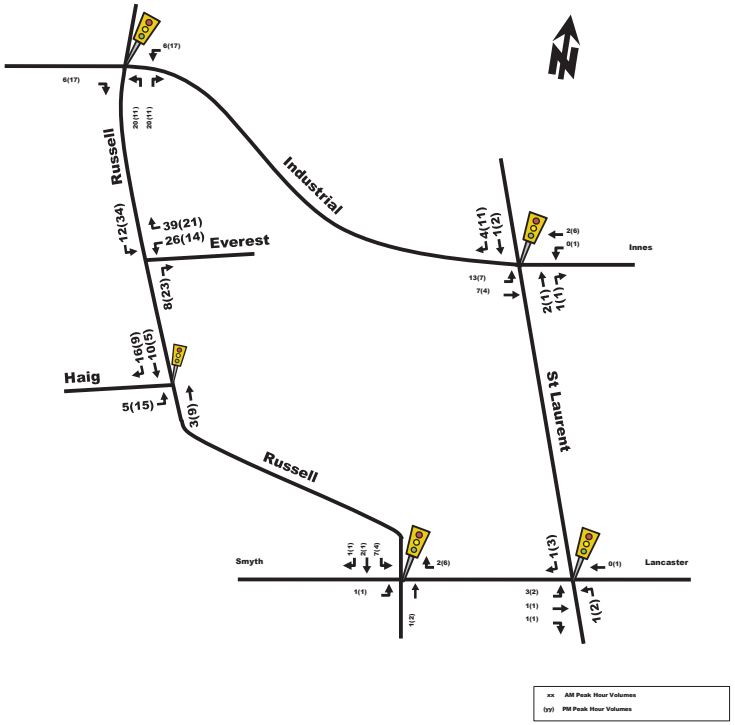


Figure 8: Phase 1-Generated Traffic (year 2021)



PARSONS

Figure 8: Residential Development Site-Generated Traffic



Appendix G

Synchro Intersection Worksheets – 2030 Future Background Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	386	135	119	32	280	107	191	1138	96	137	617	653
Future Volume (vph)	386	135	119	32	280	107	191	1138	96	137	617	653
Satd. Flow (prot)	3216	1728	1339	1421	3066	0	1483	3119	0	1626	3191	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3178	1728	1295	1396	3066	0	1477	3119	0	1622	3191	1448
Satd. Flow (RTOR)			132		41			8				403
Lane Group Flow (vph)	386	135	119	32	387	0	191	1234	0	137	617	653
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0		20.0	52.0		20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%		16.7%	43.3%		16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
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)	5.6	5.7	5.7	5.6	5.7		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	14.4	29.4	29.4	8.2	18.5		17.8	50.2		13.7	46.1	46.1
Actuated g/C Ratio	0.12	0.24	0.24	0.07	0.15		0.15	0.42		0.11	0.38	0.38
v/c Ratio	1.00	0.32	0.29	0.33	0.76		0.87	0.94		0.74	0.50	0.81
Control Delay	99.4	41.1	7.1	61.4	53.5		85.9	49.0		74.8	30.0	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	99.4	41.1	7.1	61.4	53.5		85.9	49.0		74.8	30.0	21.4
LOS	F	D	A	E	D		F	D		E	C	C
Approach Delay		69.9			54.1			53.9			30.4	
Approach LOS		E			D			D			C	
Queue Length 50th (m)	~47.5	27.5	0.0	7.3	41.5		44.7	149.5		31.0	57.7	56.0
Queue Length 95th (m)	#79.3	46.3	12.4	17.2	56.6		#96.8	#205.0		#60.3	74.8	113.4
Internal Link Dist (m)		111.9			87.8			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	385	422	416	170	603		220	1309		197	1225	804
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	1.00	0.32	0.29	0.19	0.64		0.87	0.94		0.70	0.50	0.81

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00
Intersection Signal Delay: 48.1 Intersection LOS: D
Intersection Capacity Utilization 89.0% ICU Level of Service E
Analysis Period (min) 15
~ 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.

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster

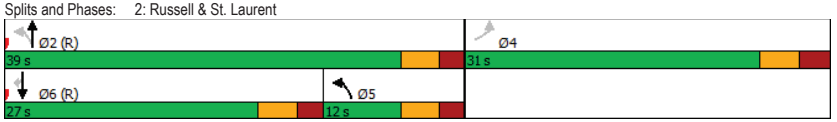
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	678	50	80	746	320	471
Future Volume (vph)	678	50	80	746	320	471
Satd. Flow (prot)	3029	0	1658	2866	2866	1441
Flt Permitted	0.956		0.558			
Satd. Flow (perm)	3029	0	969	2866	2866	1412
Satd. Flow (RTOR)	12					471
Lane Group Flow (vph)	728	0	80	746	320	471
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	23.9	23.9
Actuated g/C Ratio	0.36		0.48	0.48	0.34	0.34
v/c Ratio	0.67		0.15	0.54	0.33	0.59
Control Delay	22.3		11.5	14.7	19.4	5.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	22.3		11.5	14.7	19.4	5.7
LOS	C		B	B	B	A
Approach Delay	22.3			14.4	11.2	
Approach LOS	C			B	B	
Queue Length 50th (m)	39.9		5.4	34.2	17.0	0.0
Queue Length 95th (m)	57.1		11.9	49.0	27.1	19.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1089		527	1371	978	792
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.67		0.15	0.54	0.33	0.59

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 57.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



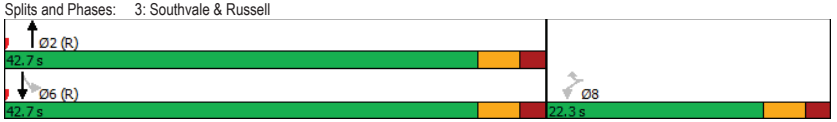
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	222	596	9	55	312
Future Volume (vph)	17	222	596	9	55	312
Satd. Flow (prot)	1595	1455	1560	0	1458	1548
Flt Permitted	0.950				0.377	
Satd. Flow (perm)	1531	1401	1560	0	578	1548
Satd. Flow (RTOR)		222	2			
Lane Group Flow (vph)	17	222	605	0	55	312
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		23.5	23.5
Total Split (s)	22.3	22.3	42.7		42.7	42.7
Total Split (%)	34.3%	34.3%	65.7%		65.7%	65.7%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.8		42.8	42.8
Actuated g/C Ratio	0.18	0.18	0.66		0.66	0.66
v/c Ratio	0.06	0.52	0.59		0.14	0.31
Control Delay	21.4	8.3	9.9		6.2	6.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.4	8.3	9.9		6.2	6.3
LOS	C	A	A		A	A
Approach Delay	9.2		9.9			6.3
Approach LOS	A		A			A
Queue Length 50th (m)	1.8	0.0	30.9		1.9	12.2
Queue Length 95th (m)	5.6	14.0	78.4		7.8	31.6
Internal Link Dist (m)	422.1		18.0			54.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	400	530	1027		380	1019
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.42	0.59		0.14	0.31

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 10 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



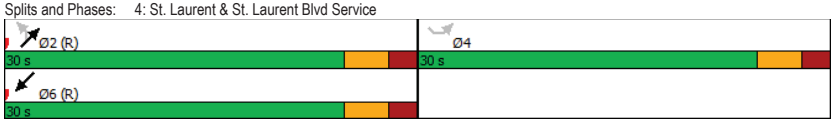
Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	54	56	34	674	486	65
Future Volume (vph)	54	56	34	674	486	65
Satd. Flow (prot)	1112	0	1551	3283	3228	0
Flt Permitted	0.976		0.446			
Satd. Flow (perm)	1103	0	728	3283	3228	0
Satd. Flow (RTOR)	56				29	
Lane Group Flow (vph)	110	0	34	674	551	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	11.0		42.3	42.3	42.3	
Actuated g/C Ratio	0.18		0.70	0.70	0.70	
v/c Ratio	0.44		0.07	0.29	0.24	
Control Delay	18.0		4.8	5.0	4.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.0		4.8	5.0	4.7	
LOS	B		A	A	A	
Approach Delay	18.0			5.0	4.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	5.3		1.3	17.4	10.2	
Queue Length 95th (m)	16.2		4.8	33.3	20.4	
Internal Link Dist (m)	18.7			103.8	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	485		513	2315	2285	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.23		0.07	0.29	0.24	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 5.9	Intersection LOS: A
Intersection Capacity Utilization 57.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



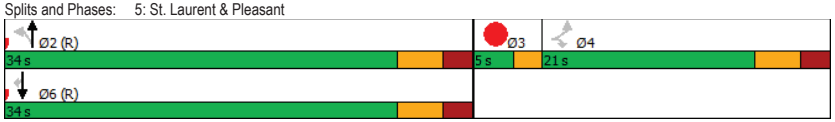
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	118	95	77	424	473	78	
Future Volume (vph)	118	95	77	424	473	78	
Satd. Flow (prot)	1658	1483	1642	1728	1679	1401	
Flt Permitted	0.950		0.473				
Satd. Flow (perm)	1654	1393	809	1728	1679	1337	
Satd. Flow (RTOR)		95				78	
Lane Group Flow (vph)	118	95	77	424	473	78	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	10.9	10.9	42.3	42.3	42.3	42.3	
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70	
v/c Ratio	0.39	0.29	0.14	0.35	0.40	0.08	
Control Delay	25.6	7.9	5.6	6.2	4.0	0.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	7.9	5.6	6.2	4.0	0.4	
LOS	C	A	A	A	A	A	
Approach Delay	17.7			6.1	3.5		
Approach LOS	B			A	A		
Queue Length 50th (m)	11.8	0.0	2.7	17.9	9.8	0.0	
Queue Length 95th (m)	23.0	9.5	8.3	37.1	16.1	0.2	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	427	430	570	1219	1184	966	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.28	0.22	0.14	0.35	0.40	0.08	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 3 (5%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	4	2	816	368	2
Future Vol, veh/h	10	4	2	816	368	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	4	2	816	368	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1189	369	370	0	-	0
Stage 1	369	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	208	677	1189	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	207	677	1189	-	-	-
Mov Cap-2 Maneuver	207	-	-	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	433	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1189	-	258	-	-
HCM Lane V/C Ratio	0.002	-	0.054	-	-
HCM Control Delay (s)	8	0	19.8	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	527	279	224	100	146	230	124	788	93	143	1126	442
Future Volume (vph)	527	279	224	100	146	230	124	788	93	143	1126	442
Satd. Flow (prot)	3216	1745	1469	1642	2935	0	1537	3195	0	1658	3316	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3128	1745	1430	1625	2935	0	1530	3195	0	1647	3316	1427
Satd. Flow (RTOR)			224		195			12				393
Lane Group Flow (vph)	527	279	224	100	376	0	124	881	0	143	1126	442
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0		17.0	49.0		17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%		14.2%	40.8%		14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
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)	5.6	5.7	5.7	5.6	5.7		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	24.9	24.9	12.6	17.1		12.7	45.9		13.5	46.6	46.6
Actuated g/C Ratio	0.17	0.21	0.21	0.10	0.14		0.11	0.38		0.11	0.39	0.39
v/c Ratio	0.97	0.77	0.47	0.58	0.64		0.76	0.72		0.77	0.87	0.56
Control Delay	80.5	60.1	8.6	64.0	27.5		81.2	35.8		79.1	43.8	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	80.5	60.1	8.6	64.0	27.5		81.2	35.8		79.1	43.8	7.4
LOS	F	E	A	E	C		F	D		E	D	A
Approach Delay		59.4			35.1			41.4			37.4	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	64.2	61.9	0.0	22.8	20.6		28.1	94.4		32.6	134.4	7.6
Queue Length 95th (m)	#97.8	#99.7	20.3	38.9	35.3		#64.5	118.8		#73.5	#177.8	35.3
Internal Link Dist (m)		111.7			91.7			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	546	361	474	279	704		163	1229		185	1287	794
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	0.97	0.77	0.47	0.36	0.53		0.76	0.72		0.77	0.87	0.56

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 43.4	Intersection LOS: D
Intersection Capacity Utilization 90.8%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster

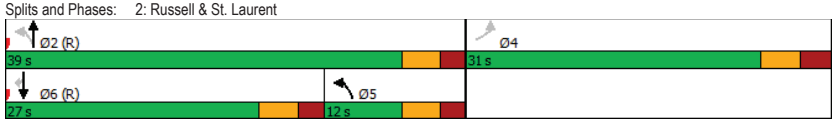
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	629	110	54	374	723	741
Future Volume (vph)	629	110	54	374	723	741
Satd. Flow (prot)	2961	0	1580	2941	3131	1483
Flt Permitted	0.959		0.290			
Satd. Flow (perm)	2961	0	481	2941	3131	1448
Satd. Flow (RTOR)	32					741
Lane Group Flow (vph)	739	0	54	374	723	741
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	26.3	26.3
Actuated g/C Ratio	0.36		0.48	0.48	0.38	0.38
v/c Ratio	0.69		0.17	0.27	0.61	0.74
Control Delay	22.2		12.8	11.6	22.1	7.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	22.2		12.8	11.6	22.1	7.3
LOS	C		B	B	C	A
Approach Delay	22.2			11.7	14.6	
Approach LOS	C			B	B	
Queue Length 50th (m)	39.7		3.6	14.5	44.3	0.0
Queue Length 95th (m)	57.4		8.9	22.5	63.1	29.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1078		332	1407	1176	1006
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.69		0.16	0.27	0.61	0.74

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 62.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



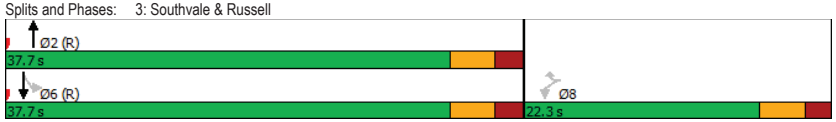
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	108	317	13	201	638
Future Volume (vph)	16	108	317	13	201	638
Satd. Flow (prot)	1658	1441	1672	0	1642	1695
Flt Permitted	0.950				0.561	
Satd. Flow (perm)	1608	1370	1672	0	966	1695
Satd. Flow (RTOR)		108	5			
Lane Group Flow (vph)	16	108	330	0	201	638
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		15.5	15.5
Total Split (s)	22.3	22.3	37.7		37.7	37.7
Total Split (%)	37.2%	37.2%	62.8%		62.8%	62.8%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.0		42.0	42.0
Actuated g/C Ratio	0.19	0.19	0.70		0.70	0.70
v/c Ratio	0.05	0.31	0.28		0.30	0.54
Control Delay	18.7	7.2	6.1		7.3	9.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	18.7	7.2	6.1		7.3	9.0
LOS	B	A	A		A	A
Approach Delay	8.7		6.1			8.6
Approach LOS	A		A			A
Queue Length 50th (m)	1.5	0.0	12.7		8.0	32.0
Queue Length 95th (m)	4.9	9.2	32.9		24.6	81.3
Internal Link Dist (m)	422.1		26.8			60.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	455	465	1171		675	1185
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.23	0.28		0.30	0.54

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 53 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 61.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	119	125	53	620	723	72
Future Volume (vph)	119	125	53	620	723	72
Satd. Flow (prot)	1252	0	1658	3252	3261	0
Flt Permitted	0.976		0.330			
Satd. Flow (perm)	1243	0	575	3252	3261	0
Satd. Flow (RTOR)	102				21	
Lane Group Flow (vph)	244	0	53	620	795	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	14.0		35.2	35.2	35.2	
Actuated g/C Ratio	0.23		0.59	0.59	0.59	
v/c Ratio	0.66		0.16	0.32	0.41	
Control Delay	20.5		6.5	5.7	8.3	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	20.5		6.5	5.7	8.3	
LOS	C		A	A	A	
Approach Delay	20.5			5.7	8.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	14.0		2.0	12.7	19.8	
Queue Length 95th (m)	28.7		m5.2	19.1	42.3	
Internal Link Dist (m)	15.1			104.0	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	569		337	1909	1923	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.43		0.16	0.32	0.41	

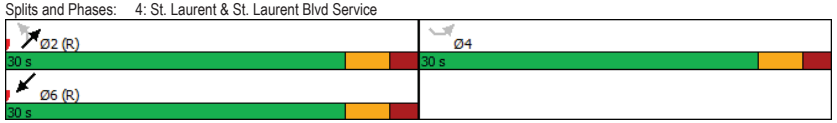
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 9.0	Intersection LOS: A
Intersection Capacity Utilization 65.4%	ICU Level of Service C
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



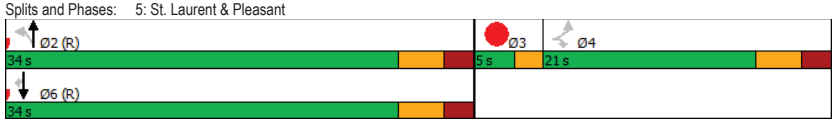
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	126	149	101	543	649	155	
Future Volume (vph)	126	149	101	543	649	155	
Satd. Flow (prot)	1566	1469	1658	1712	1745	1483	
Flt Permitted	0.950		0.356				
Satd. Flow (perm)	1548	1424	618	1712	1745	1421	
Satd. Flow (RTOR)		149				155	
Lane Group Flow (vph)	126	149	101	543	649	155	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	11.2	11.2	42.0	42.0	42.0	42.0	
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70	
v/c Ratio	0.43	0.39	0.23	0.45	0.53	0.15	
Control Delay	26.2	7.4	7.3	7.5	10.5	2.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.2	7.4	7.3	7.5	10.5	2.6	
LOS	C	A	A	A	B	A	
Approach Delay	16.0			7.5	9.0		
Approach LOS	B			A	A		
Queue Length 50th (m)	12.7	0.0	3.9	25.5	53.3	1.5	
Queue Length 95th (m)	24.1	11.6	12.6	55.0	101.7	4.5	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	399	478	432	1197	1220	1040	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.32	0.31	0.23	0.45	0.53	0.15	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 66.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	18	8	417	814	19
Future Vol, veh/h	11	18	8	417	814	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	18	8	417	814	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1257	824	833	0	-	0
Stage 1	824	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	189	373	800	-	-	-
Stage 1	431	-	-	-	-	-
Stage 2	654	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	187	373	800	-	-	-
Mov Cap-2 Maneuver	187	-	-	-	-	-
Stage 1	425	-	-	-	-	-
Stage 2	654	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.9	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	800	-	271	-	-
HCM Lane V/C Ratio	0.01	-	0.107	-	-
HCM Control Delay (s)	9.5	0	19.9	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Appendix H

Synchro Intersection Worksheets – 2035 Future Background Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	424	148	132	32	280	107	191	1138	96	137	617	653
Future Volume (vph)	424	148	132	32	280	107	191	1138	96	137	617	653
Satd. Flow (prot)	3216	1728	1339	1421	3066	0	1483	3119	0	1626	3191	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3175	1728	1295	1396	3066	0	1476	3119	0	1622	3191	1448
Satd. Flow (RTOR)			132		41			8				403
Lane Group Flow (vph)	424	148	132	32	387	0	191	1234	0	137	617	653
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0		20.0	52.0		20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%		16.7%	43.3%		16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
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)	5.6	5.7	5.7	5.6	5.7		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	14.4	29.4	29.4	8.2	18.5		17.8	50.2		13.7	46.1	46.1
Actuated g/C Ratio	0.12	0.24	0.24	0.07	0.15		0.15	0.42		0.11	0.38	0.38
v/c Ratio	1.10	0.35	0.32	0.33	0.76		0.87	0.94		0.74	0.50	0.81
Control Delay	124.7	41.7	8.8	61.4	53.5		85.9	49.0		74.8	30.0	21.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	124.7	41.7	8.8	61.4	53.5		85.9	49.0		74.8	30.0	21.4
LOS	F	D	A	E	D		F	D		E	C	C
Approach Delay		85.5			54.1			53.9			30.4	
Approach LOS		F			D			D			C	
Queue Length 50th (m)	~58.3	30.3	0.0	7.3	41.5		44.7	149.5		31.0	57.7	56.0
Queue Length 95th (m)	#89.9	50.2	16.0	17.2	56.6		#96.8	#205.0		#60.3	74.8	113.4
Internal Link Dist (m)		111.9			87.8			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	385	422	416	170	603		220	1309		197	1225	804
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	0.35	0.32	0.19	0.64		0.87	0.94		0.70	0.50	0.81

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster
AM Peak Hour
2035 Future Background-Signalized

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 51.2	Intersection LOS: D
Intersection Capacity Utilization 90.1%	ICU Level of Service E
Analysis Period (min) 15	

~ 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.

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster

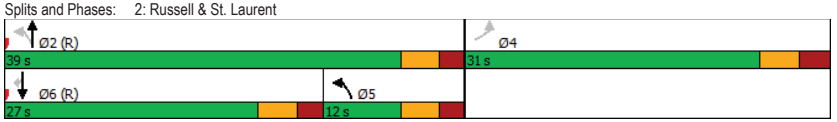
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	678	50	80	746	333	471
Future Volume (vph)	678	50	80	746	333	471
Satd. Flow (prot)	3029	0	1658	2866	2866	1441
Flt Permitted	0.956		0.551			
Satd. Flow (perm)	3029	0	957	2866	2866	1412
Satd. Flow (RTOR)	12					471
Lane Group Flow (vph)	728	0	80	746	333	471
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	23.9	23.9
Actuated g/C Ratio	0.36		0.48	0.48	0.34	0.34
v/c Ratio	0.67		0.15	0.54	0.34	0.59
Control Delay	22.3		11.5	14.7	19.5	5.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	22.3		11.5	14.7	19.5	5.7
LOS	C		B	B	B	A
Approach Delay	22.3			14.4	11.4	
Approach LOS	C			B	B	
Queue Length 50th (m)	39.9		5.4	34.2	17.7	0.0
Queue Length 95th (m)	57.1		11.9	49.0	28.1	19.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1089		523	1371	978	792
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.67		0.15	0.54	0.34	0.59

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 57.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



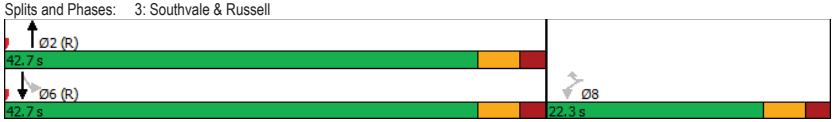
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	222	596	9	55	325
Future Volume (vph)	17	222	596	9	55	325
Satd. Flow (prot)	1595	1455	1560	0	1458	1548
Flt Permitted	0.950				0.377	
Satd. Flow (perm)	1531	1401	1560	0	578	1548
Satd. Flow (RTOR)		222	2			
Lane Group Flow (vph)	17	222	605	0	55	325
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		23.5	23.5
Total Split (s)	22.3	22.3	42.7		42.7	42.7
Total Split (%)	34.3%	34.3%	65.7%		65.7%	65.7%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.8		42.8	42.8
Actuated g/C Ratio	0.18	0.18	0.66		0.66	0.66
v/c Ratio	0.06	0.52	0.59		0.14	0.32
Control Delay	21.4	8.3	9.9		6.2	6.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.4	8.3	9.9		6.2	6.4
LOS	C	A	A		A	A
Approach Delay	9.2		9.9			6.4
Approach LOS	A		A			A
Queue Length 50th (m)	1.8	0.0	30.9		1.9	12.9
Queue Length 95th (m)	5.6	14.0	78.4		7.8	33.2
Internal Link Dist (m)	422.1		18.0			54.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	400	530	1027		380	1019
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.42	0.59		0.14	0.32

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 10 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



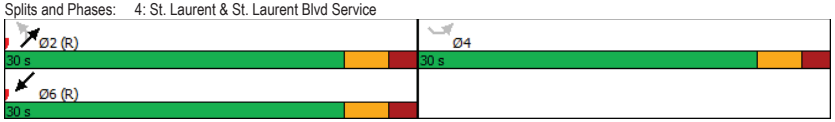
Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	54	56	34	674	486	65
Future Volume (vph)	54	56	34	674	486	65
Satd. Flow (prot)	1112	0	1551	3283	3228	0
Flt Permitted	0.976		0.446			
Satd. Flow (perm)	1103	0	728	3283	3228	0
Satd. Flow (RTOR)	56				29	
Lane Group Flow (vph)	110	0	34	674	551	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	11.0		42.3	42.3	42.3	
Actuated g/C Ratio	0.18		0.70	0.70	0.70	
v/c Ratio	0.44		0.07	0.29	0.24	
Control Delay	18.0		4.8	5.0	4.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.0		4.8	5.0	4.7	
LOS	B		A	A	A	
Approach Delay	18.0			5.0	4.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	5.3		1.3	17.4	10.2	
Queue Length 95th (m)	16.2		4.8	33.3	20.4	
Internal Link Dist (m)	18.7			103.8	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	485		513	2315	2285	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.23		0.07	0.29	0.24	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 5.9	Intersection LOS: A
Intersection Capacity Utilization 57.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



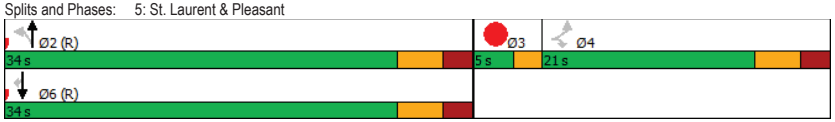
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	118	95	77	424	473	78	
Future Volume (vph)	118	95	77	424	473	78	
Satd. Flow (prot)	1658	1483	1642	1728	1679	1401	
Flt Permitted	0.950		0.473				
Satd. Flow (perm)	1654	1393	808	1728	1679	1337	
Satd. Flow (RTOR)		95				78	
Lane Group Flow (vph)	118	95	77	424	473	78	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	10.9	10.9	42.3	42.3	42.3	42.3	
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70	
v/c Ratio	0.39	0.29	0.14	0.35	0.40	0.08	
Control Delay	25.6	7.9	5.6	6.2	4.0	0.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	7.9	5.6	6.2	4.0	0.4	
LOS	C	A	A	A	A	A	
Approach Delay	17.7			6.1	3.5		
Approach LOS	B			A	A		
Queue Length 50th (m)	11.8	0.0	2.7	17.9	9.8	0.0	
Queue Length 95th (m)	23.0	9.5	8.3	37.1	16.1	0.2	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	427	430	570	1219	1184	966	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.28	0.22	0.14	0.35	0.40	0.08	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 3 (5%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	4	2	816	381	2
Future Vol, veh/h	10	4	2	816	381	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	4	2	816	381	2

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1202	382	383	0	-	0
Stage 1	382	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	204	665	1175	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	203	665	1175	-	-	-
Mov Cap-2 Maneuver	203	-	-	-	-	-
Stage 1	688	-	-	-	-	-
Stage 2	433	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.1	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1175	-	253	-	-
HCM Lane V/C Ratio	0.002	-	0.055	-	-
HCM Control Delay (s)	8.1	0	20.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	527	279	224	100	166	230	137	788	93	143	1126	487
Future Volume (vph)	527	279	224	100	166	230	137	788	93	143	1126	487
Satd. Flow (prot)	3216	1745	1469	1642	2955	0	1537	3195	0	1658	3316	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3125	1745	1430	1625	2955	0	1529	3195	0	1647	3316	1427
Satd. Flow (RTOR)			224		195			12				433
Lane Group Flow (vph)	527	279	224	100	396	0	137	881	0	143	1126	487
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0		17.0	49.0		17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%		14.2%	40.8%		14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
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)	5.6	5.7	5.7	5.6	5.7		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	24.9	24.9	12.6	17.1		14.0	45.9		13.5	45.4	45.4
Actuated g/C Ratio	0.17	0.21	0.21	0.10	0.14		0.12	0.38		0.11	0.38	0.38
v/c Ratio	0.97	0.77	0.47	0.58	0.67		0.77	0.72		0.77	0.90	0.60
Control Delay	80.5	60.1	8.6	64.0	29.7		79.4	35.8		79.1	46.5	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	80.5	60.1	8.6	64.0	29.7		79.4	35.8		79.1	46.5	7.9
LOS	F	E	A	E	C		E	D		E	D	A
Approach Delay		59.4			36.6			41.7			38.5	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	64.2	61.9	0.0	22.8	23.3		31.3	94.4		32.6	134.4	8.4
Queue Length 95th (m)	#97.8	#99.7	20.3	38.9	38.3		#72.3	118.8		#73.5	#177.8	38.9
Internal Link Dist (m)		111.7			91.7			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	546	361	474	279	707		178	1229		185	1253	808
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	0.97	0.77	0.47	0.36	0.56		0.77	0.72		0.77	0.90	0.60

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 44.0	Intersection LOS: D
Intersection Capacity Utilization 91.8%	ICU Level of Service F
Analysis Period (min) 15	

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

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster

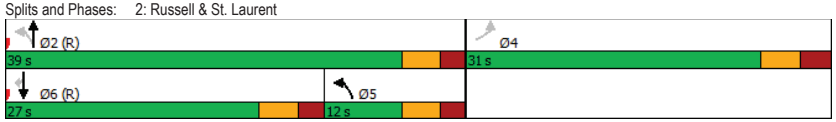
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	629	110	54	387	723	741
Future Volume (vph)	629	110	54	387	723	741
Satd. Flow (prot)	2961	0	1580	2941	3131	1483
Flt Permitted	0.959		0.290			
Satd. Flow (perm)	2961	0	481	2941	3131	1448
Satd. Flow (RTOR)	32					741
Lane Group Flow (vph)	739	0	54	387	723	741
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	26.3	26.3
Actuated g/C Ratio	0.36		0.48	0.48	0.38	0.38
v/c Ratio	0.69		0.17	0.28	0.61	0.74
Control Delay	22.2		12.8	11.6	22.1	7.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	22.2		12.8	11.6	22.1	7.3
LOS	C		B	B	C	A
Approach Delay	22.2			11.8	14.6	
Approach LOS	C			B	B	
Queue Length 50th (m)	39.7		3.6	15.1	44.3	0.0
Queue Length 95th (m)	57.4		8.9	23.3	63.1	29.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1078		332	1407	1176	1006
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.69		0.16	0.28	0.61	0.74

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 62.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



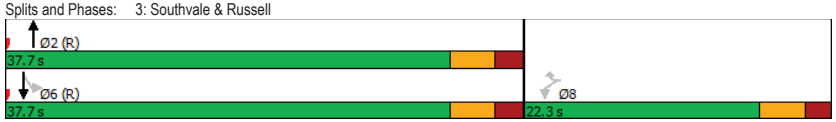
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	108	330	13	201	638
Future Volume (vph)	16	108	330	13	201	638
Satd. Flow (prot)	1658	1441	1672	0	1642	1695
Flt Permitted	0.950				0.555	
Satd. Flow (perm)	1608	1370	1672	0	956	1695
Satd. Flow (RTOR)		108	5			
Lane Group Flow (vph)	16	108	343	0	201	638
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		15.5	15.5
Total Split (s)	22.3	22.3	37.7		37.7	37.7
Total Split (%)	37.2%	37.2%	62.8%		62.8%	62.8%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.0		42.0	42.0
Actuated g/C Ratio	0.19	0.19	0.70		0.70	0.70
v/c Ratio	0.05	0.31	0.29		0.30	0.54
Control Delay	18.7	7.2	6.2		7.3	9.0
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	18.7	7.2	6.2		7.3	9.0
LOS	B	A	A		A	A
Approach Delay	8.7		6.2			8.6
Approach LOS	A		A			A
Queue Length 50th (m)	1.5	0.0	13.2		8.0	32.0
Queue Length 95th (m)	4.9	9.2	34.4		24.8	81.3
Internal Link Dist (m)	422.1		26.8			60.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	455	465	1171		668	1185
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.23	0.29		0.30	0.54

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 53 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 61.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	119	125	53	620	723	72
Future Volume (vph)	119	125	53	620	723	72
Satd. Flow (prot)	1252	0	1658	3252	3261	0
Flt Permitted	0.976		0.330			
Satd. Flow (perm)	1243	0	575	3252	3261	0
Satd. Flow (RTOR)	102				21	
Lane Group Flow (vph)	244	0	53	620	795	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	14.0		35.2	35.2	35.2	
Actuated g/C Ratio	0.23		0.59	0.59	0.59	
v/c Ratio	0.66		0.16	0.32	0.41	
Control Delay	20.5		6.5	5.7	8.3	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	20.5		6.5	5.7	8.3	
LOS	C		A	A	A	
Approach Delay	20.5			5.7	8.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	14.0		2.0	12.7	19.8	
Queue Length 95th (m)	28.7		m5.2	19.1	42.3	
Internal Link Dist (m)	15.1			104.0	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	569		337	1909	1923	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.43		0.16	0.32	0.41	

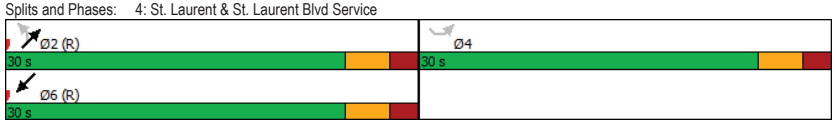
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 9.0	Intersection LOS: A
Intersection Capacity Utilization 65.4%	ICU Level of Service C
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	126	149	101	543	649	155	
Future Volume (vph)	126	149	101	543	649	155	
Satd. Flow (prot)	1566	1469	1658	1712	1745	1483	
Flt Permitted	0.950		0.356				
Satd. Flow (perm)	1548	1424	617	1712	1745	1421	
Satd. Flow (RTOR)		149				155	
Lane Group Flow (vph)	126	149	101	543	649	155	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	11.2	11.2	42.0	42.0	42.0	42.0	
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70	
v/c Ratio	0.43	0.39	0.23	0.45	0.53	0.15	
Control Delay	26.2	7.4	7.4	7.5	10.5	2.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.2	7.4	7.4	7.5	10.5	2.6	
LOS	C	A	A	A	B	A	
Approach Delay	16.0			7.5	9.0		
Approach LOS	B			A	A		
Queue Length 50th (m)	12.7	0.0	3.9	25.5	53.3	1.5	
Queue Length 95th (m)	24.1	11.6	12.6	55.0	101.7	4.5	
Internal Link Dist (m)	450.4			257.0	226.8		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	399	478	431	1197	1220	1040	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.32	0.31	0.23	0.45	0.53	0.15	

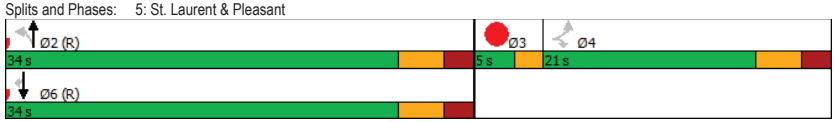
Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 66.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	18	8	430	814	19
Future Vol, veh/h	11	18	8	430	814	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	18	8	430	814	19

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1270	824	833	0	-	0
Stage 1	824	-	-	-	-	-
Stage 2	446	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	186	373	800	-	-	-
Stage 1	431	-	-	-	-	-
Stage 2	645	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	184	373	800	-	-	-
Mov Cap-2 Maneuver	184	-	-	-	-	-
Stage 1	425	-	-	-	-	-
Stage 2	645	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.1	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	800	-	268	-	-
HCM Lane V/C Ratio	0.01	-	0.108	-	-
HCM Control Delay (s)	9.5	0	20.1	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Appendix I

Sidra Intersection Worksheets - 2035 Future Background Conditions

MOVEMENT SUMMARY

Site: 101 [St Laurent - Elmvale AM FB2035 (Site Folder: General)]

Starlight 1971 St Laurent Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: St Laurent														
1	L2	34	2.0	34	2.0	0.256	7.7	LOS A	1.3	9.0	0.20	0.39	0.20	39.8
2	T1	10	2.0	10	2.0	0.256	2.3	LOS A	1.3	9.0	0.20	0.39	0.20	49.5
3	R2	664	2.0	664	2.0	0.256	2.7	LOS A	1.3	9.0	0.20	0.37	0.20	48.1
Approach		708	2.0	708	2.0	0.256	3.0	LOS A	1.3	9.0	0.20	0.37	0.20	47.6
East: St Laurent														
4	L2	486	2.0	486	2.0	0.196	7.6	LOS A	0.8	6.0	0.15	0.55	0.15	47.7
5	T1	49	2.0	49	2.0	0.196	4.4	LOS A	0.8	6.0	0.14	0.54	0.14	35.5
6	R2	16	2.0	16	2.0	0.196	2.6	LOS A	0.8	6.0	0.14	0.54	0.14	46.0
Approach		551	2.0	551	2.0	0.196	7.2	LOS A	0.8	6.0	0.15	0.55	0.15	46.2
North: Service Road														
7	L2	9	50.0	9	50.0	0.024	10.3	LOS B	0.1	0.8	0.47	0.60	0.47	47.3
8	T1	6	50.0	6	50.0	0.024	4.7	LOS A	0.1	0.8	0.47	0.60	0.47	47.1
9	R2	2	50.0	2	50.0	0.024	5.0	LOS A	0.1	0.8	0.47	0.60	0.47	45.6
Approach		17	50.0	17	50.0	0.024	7.7	LOS A	0.1	0.8	0.47	0.60	0.47	47.0
West: Elmvale Mall														
10	L2	5	2.0	5	2.0	0.114	3.6	LOS A	0.4	3.1	0.44	0.33	0.44	37.9
11	T1	49	2.0	49	2.0	0.114	1.6	LOS A	0.4	3.1	0.44	0.33	0.44	37.2
12	R2	56	2.0	56	2.0	0.114	1.6	LOS A	0.4	3.1	0.44	0.33	0.44	36.5
Approach		110	2.0	110	2.0	0.114	1.7	LOS A	0.4	3.1	0.44	0.33	0.44	36.9
All Vehicles		1386	2.6	1386	2.6	0.256	4.6	LOS A	1.3	9.0	0.20	0.44	0.20	46.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [St Laurent - Elmvale PM FB2035 (Site Folder: General)]

Starlight 1971 St Laurent Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance

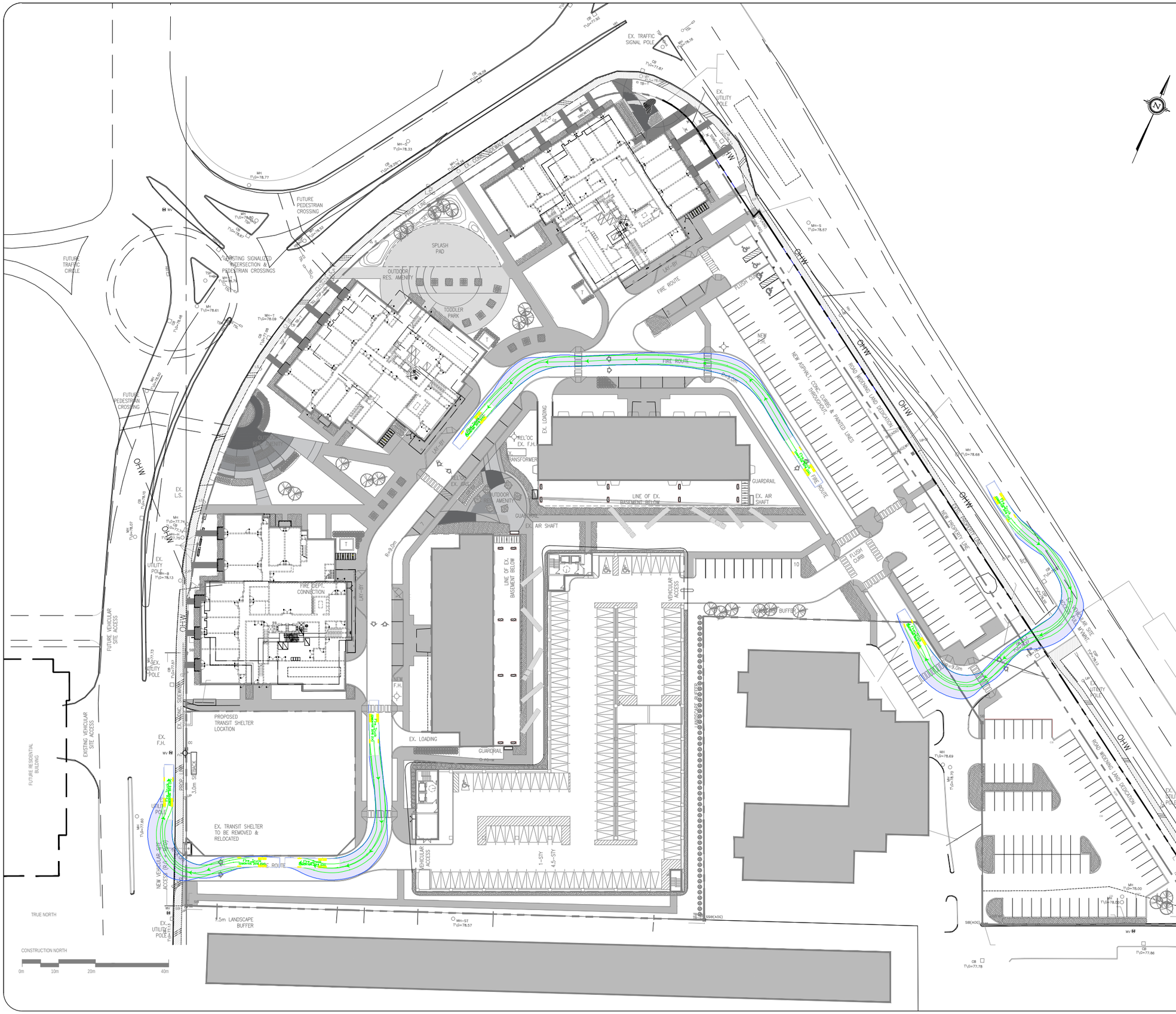
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: St Laurent														
1	L2	53	2.0	53	2.0	0.279	8.0	LOS A	1.4	9.6	0.31	0.44	0.31	39.5
2	T1	10	2.0	10	2.0	0.279	2.6	LOS A	1.4	9.6	0.31	0.44	0.31	48.9
3	R2	610	2.0	610	2.0	0.279	3.0	LOS A	1.4	9.8	0.30	0.42	0.30	47.7
Approach		673	2.0	673	2.0	0.279	3.4	LOS A	1.4	9.8	0.30	0.42	0.30	46.9
East: St Laurent														
4	L2	723	2.0	723	2.0	0.290	7.7	LOS A	1.4	10.2	0.20	0.56	0.20	47.5
5	T1	54	2.0	54	2.0	0.290	4.5	LOS A	1.4	10.2	0.20	0.55	0.20	35.4
6	R2	18	2.0	18	2.0	0.290	2.7	LOS A	1.4	10.2	0.20	0.55	0.20	45.8
Approach		795	2.0	795	2.0	0.290	7.4	LOS A	1.4	10.2	0.20	0.56	0.20	46.4
North: Service Road														
7	L2	9	50.0	9	50.0	0.030	11.2	LOS B	0.1	1.0	0.54	0.67	0.54	46.9
8	T1	6	50.0	6	50.0	0.030	5.6	LOS A	0.1	1.0	0.54	0.67	0.54	46.7
9	R2	3	50.0	3	50.0	0.030	5.9	LOS A	0.1	1.0	0.54	0.67	0.54	45.3
Approach		18	50.0	18	50.0	0.030	8.5	LOS A	0.1	1.0	0.54	0.67	0.54	46.6
West: Elmvale Mall														
10	L2	5	2.0	5	2.0	0.284	4.5	LOS A	1.2	8.4	0.57	0.51	0.57	37.6
11	T1	114	2.0	114	2.0	0.284	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	37.0
12	R2	125	2.0	125	2.0	0.284	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	36.3
Approach		244	2.0	244	2.0	0.284	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	36.7
All Vehicles		1730	2.5	1730	2.5	0.290	5.2	LOS A	1.4	10.2	0.30	0.50	0.30	44.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix J

Turning Templates

CGH TRANSPORTATION



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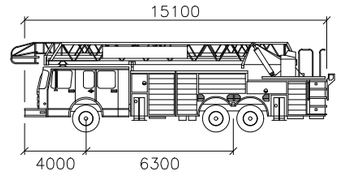


Fire Truck

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 32.6

REV:	DESCRIPTION:	BY:	DATE:
05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-05

STATUS:

CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT: Starlight Development
1400-3280 Bloor Street West, Centre Town
Toronto, ON
M8X 2X3

ARCHITECT:

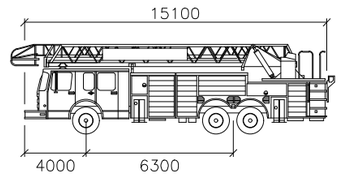
SITE: 1971-1975 St. Laurent

TITLE: Turning Movement Analysis
Fire Truck Movements (1)

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH

PROJECT NO:	DRAWING NO:	REVISION:
2020-23	001	05

Notes:



Fire Truck

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 32.6

REV:	DESCRIPTION:	BY:	DATE:
05	Updated Site Plan	AN	2023-03-21
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03	Issued for Review	AN	2022-12-05
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STATUS:

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6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT: Starlight Development
1400-3280 Bloor Street West, Centre Town
Toronto, ON
M8X 2X3

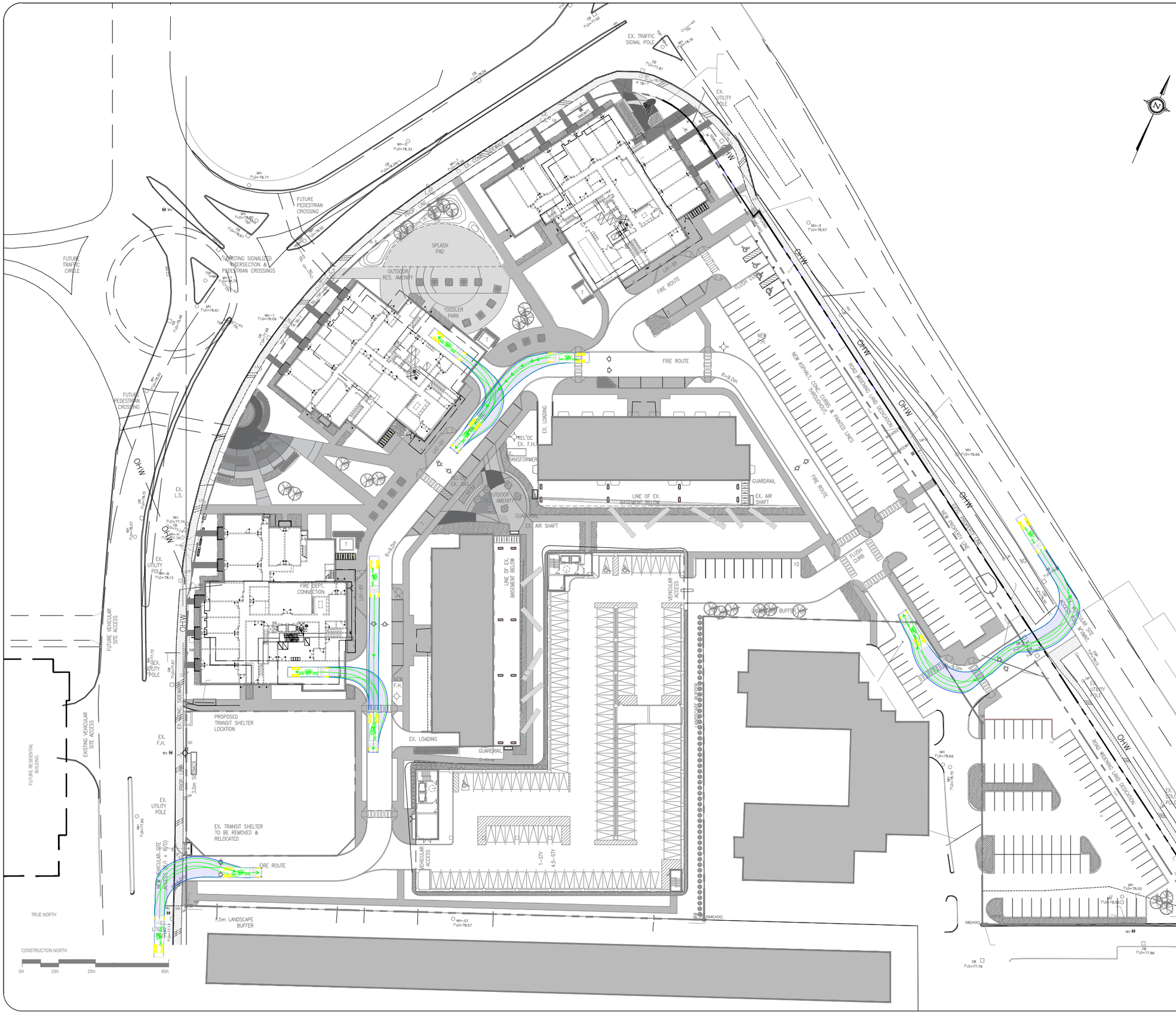
ARCHITECT:

SITE: 1971-1975 St. Laurent

TITLE: Turning Movement Analysis
Fire Truck Movements (2)

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH

PROJECT NO:	DRAWING NO:	REVISION:
2020-23	002	05



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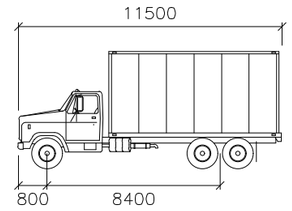

HSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

REV:	DESCRIPTION:	BY:	DATE:
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04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
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CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT: Starlight Development
1400-3280 Bloor Street West, Centre Town
Toronto, ON
M8X 2X3

ARCHITECT:

SITE: 1971-1975 St. Laurent

TITLE: Turning Movement Analysis
HSU Turning Movements (1)

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH

PROJECT NO:	DRAWING NO:	REVISION:
2020-23	003	05

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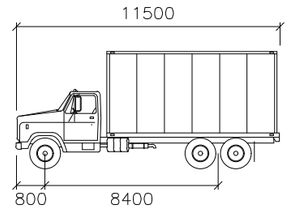

HSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

REV:	DESCRIPTION:	BY:	DATE:
05	Updated Site Plan	AN	2023-03-21
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CLIENT: Starlight Development
1400-3280 Bloor Street West, Centre Town
Toronto, ON
M8X 2X3

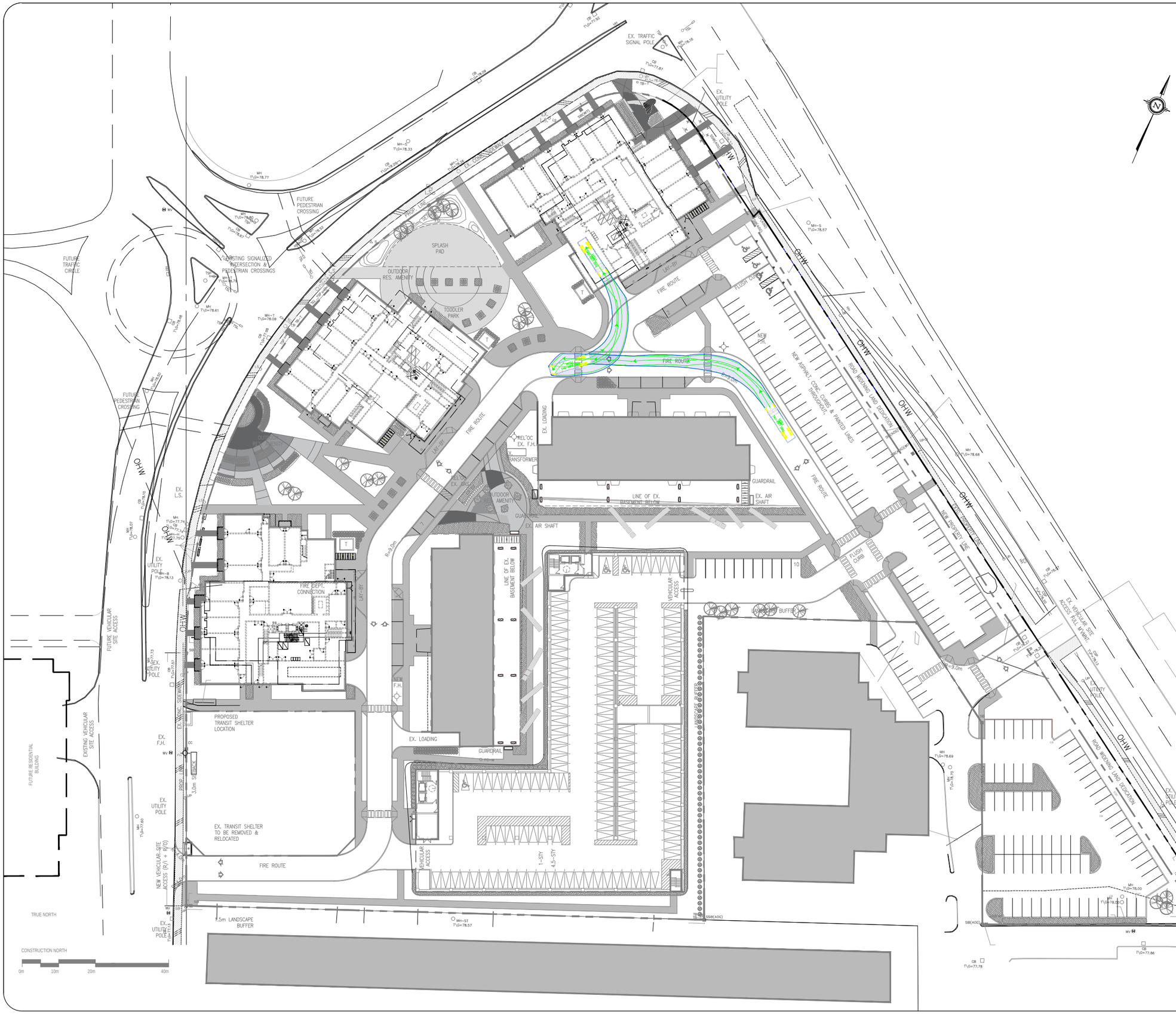
ARCHITECT:

SITE: 1971-1975 St. Laurent

TITLE: Turning Movement Analysis
HSU Turning Movements (2)

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH

PROJECT NO:	DRAWING NO:	REVISION:
2020-23	004	05



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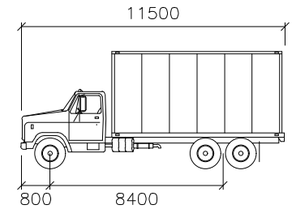

HSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

REV:	DESCRIPTION:	BY:	DATE:
05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-05

STATUS:

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6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT: Starlight Development
1400-3280 Bloor Street West, Centre Town
Toronto, ON
M8X 2X3

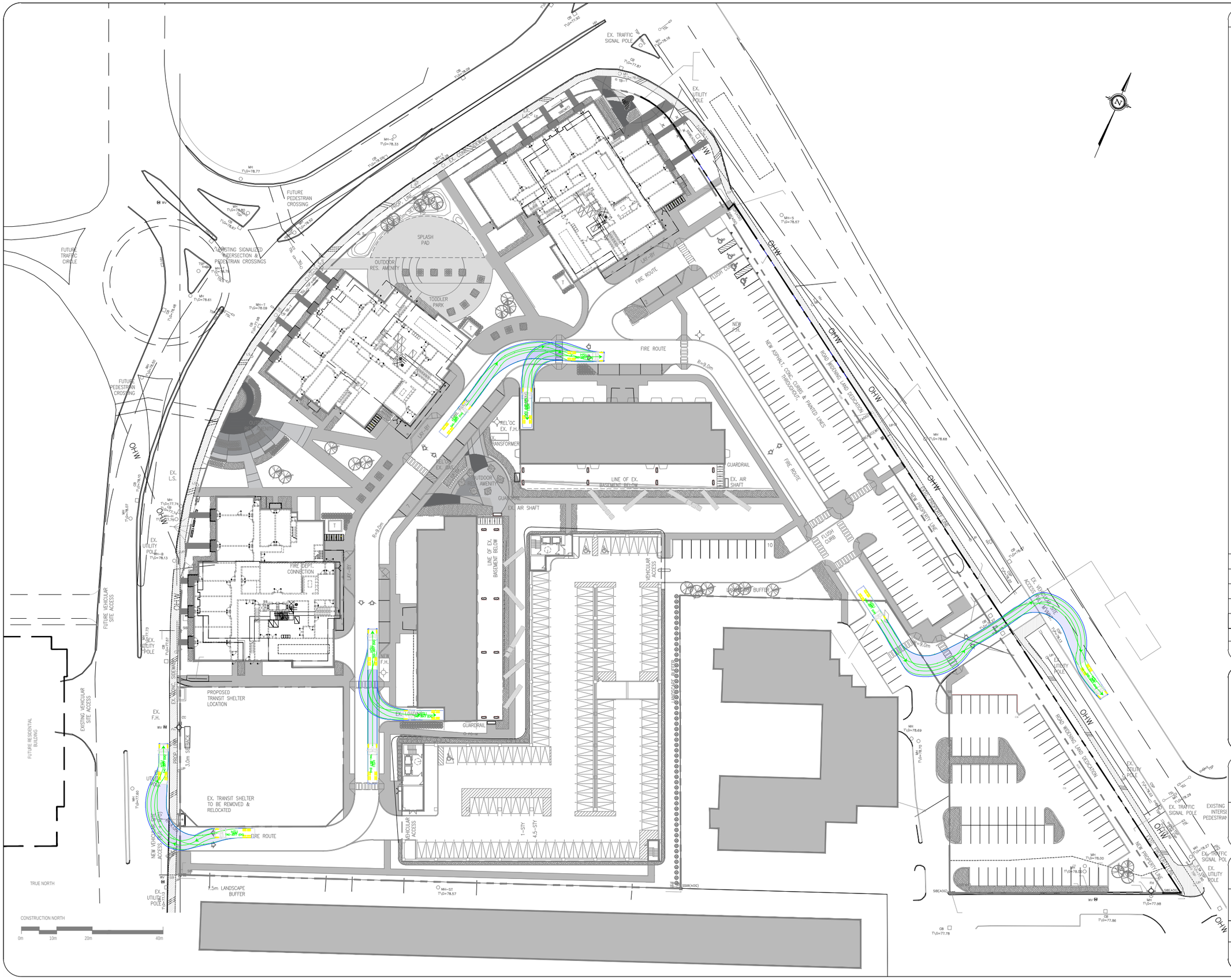
ARCHITECT:

SITE: 1971-1975 St. Laurent

TITLE: Turning Movement Analysis
HSU Turning Movements (3)

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH

PROJECT NO:	DRAWING NO:	REVISION:
2020-23	005	05



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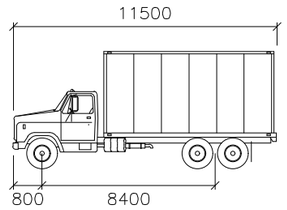


HSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

REV:	DESCRIPTION:	BY:	DATE:
05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-05

STATUS:

CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT: Starlight Development
1400-3280 Bloor Street West, Centre Town
Toronto, ON
M8X 2X3

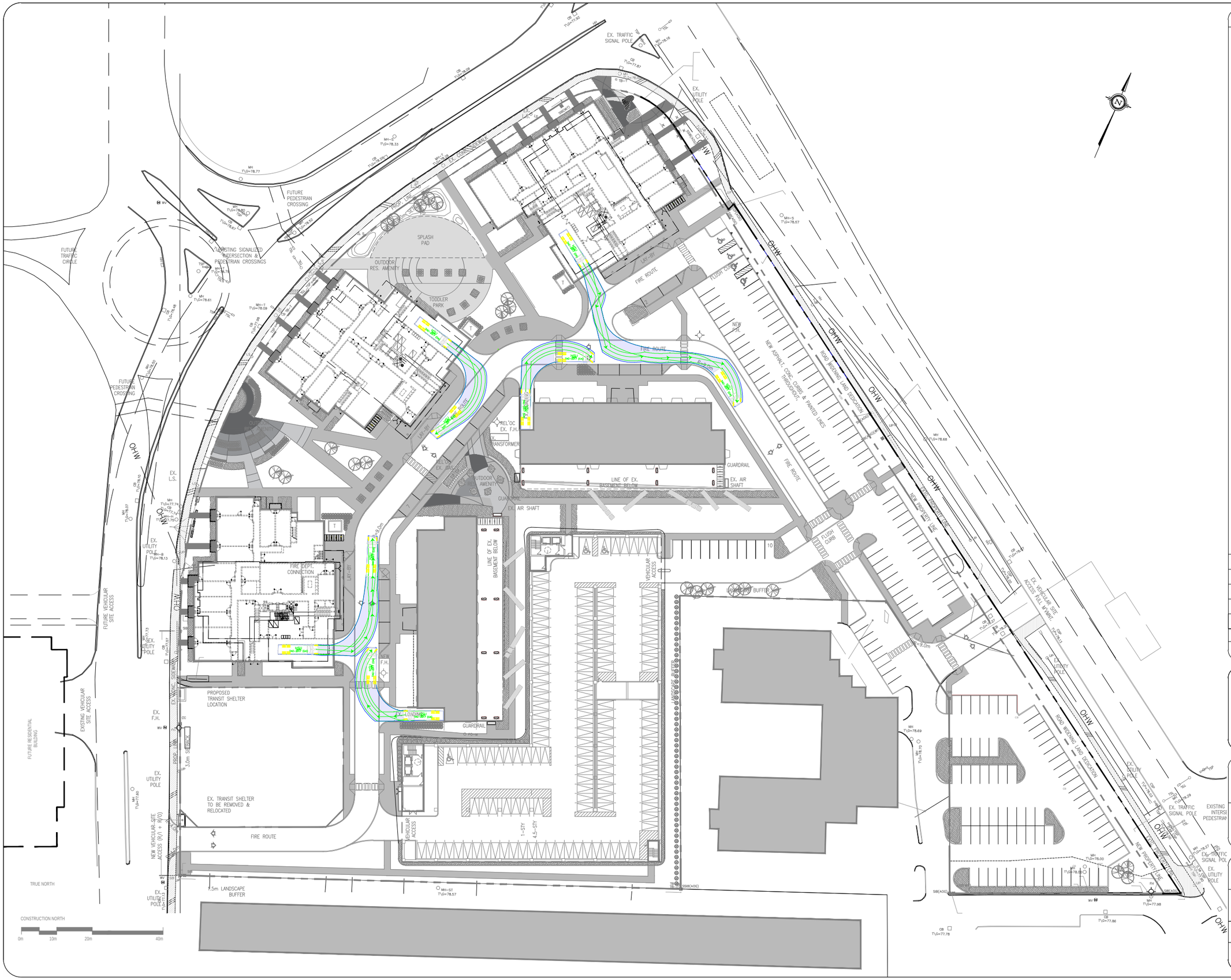
ARCHITECT:

SITE: 1971-1975 St. Laurent

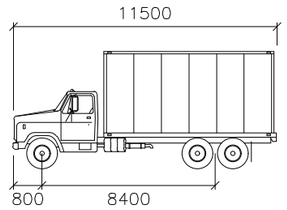
TITLE: Turning Movement Analysis
HSU Turning Movements (4)

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH

PROJECT NO:	DRAWING NO:	REVISION:
2020-23	006	05



Notes:



HSU

	mm
Width	: 2600
Track	: 2600
Lock to Lock Time	: 6.0
Steering Angle	: 40.0

REV:	DESCRIPTION:	BY:	DATE:
05	Updated Site Plan	AN	2023-03-21
04	Updated Site Plan	AN	2022-12-12
03	Issued for Review	AN	2022-12-05
02	Issued for Review	AN	2022-10-20
01	Issued for Review	BB	2022-10-13

STATUS:

CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT: Starlight Development
1400-3280 Bloor Street West, Centre Town
Toronto, ON
M8X 2X3

ARCHITECT:

SITE: 1971-1975 St. Laurent

TITLE: Turning Movement Analysis
HSU Turning Movements (5)

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2023-03-21	AN	AH

PROJECT NO:	DRAWING NO:	REVISION:
2020-23	007	05

Appendix K

MMLOS Analysis

CGH TRANSPORTATION

Multi-Modal Level of Service - Intersections Form

Consultant	**CGH Transportation Inc.**	**Project**	**1971 & 1975 St. Laurent Boulevard**
Scenario	**Existing/Future**	**Date**	**12/12/2022**
Comments			

	INTERSECTIONS	St. Laurent Boulevard at Smyth Road/ Lancaster Road				Russell Road at St. Laurent Boulevard				Russell Road at Southvale Crescent				St. Laurent Boulevard at St. Laurent Boulevard Service Road (Existing)				St. Laurent Boulevard at Pleasant Park			
	Crossing Side	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	10+	10+	10+	10+		9		10+	4	4	5		10+	10+		9	5	5		4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m
	Conflicting Left Turns	Protected	Protected	Protected	Protected		No left turn / Prohib.		Protected/ Permissive	No left turn / Prohib.	Permissive	Permissive		Permissive	No left turn / Prohib.		Permissive	Permissive	No left turn / Prohib.		Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control		Permissive or yield control		Permissive or yield control	Permissive or yield control	No right turn	Permissive or yield control		No right turn	Permissive or yield control		Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control
	Right Turns on Red (RToR) ?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed		RTOR allowed	RTOR allowed	RTOR prohibited	RTOR allowed		RTOR allowed	RTOR prohibited		RTOR allowed	RTOR allowed	RTOR prohibited		RTOR allowed
	Ped Signal Leading Interval?	No	No	No	No		No		No	No	No	No		No	No		No	No	No		Yes
	Right Turn Channel	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane	Conv'tl without Receiving Lane		Conv'tl without Receiving Lane		Conventional with Receiving Lane	No Channel	No Right Turn	No Channel		No Right Turn	Conventional with Receiving Lane		Conv'tl without Receiving Lane	No Right Turn	No Channel		No Channel
	Corner Radius	>25m	>25m	>25m	>25m		15-25m		15-25m	5-10m	No Right Turn	10-15m		No Right Turn	15-25m		15-25m	No Right Turn	10-15m		5-10m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings
	PETSI Score	**-36**	**-36**	**-36**	**-36**		**-19**		**-46**	**62**	**71**	**37**		**-30**	**-35**		**-27**	**52**	**48**		**56**
	Ped. Exposure to Traffic LoS	**F**	**F**	**F**	**F**	**-**	**F**	**-**	**F**	**C**	**C**	**E**	**-**	**F**	**F**	**-**	**F**	**D**	**D**	**-**	**D**
	Cycle Length	120	120	120	120		70		70	60	60	60		60	60		60	60	60		60
	Effective Walk Time	31	31	7	7		34		10	7	18	18		17	17		9	21	29		8
	Average Pedestrian Delay	**33**	**33**	**53**	**53**		**9**		**26**	**23**	**15**	**15**		**15**	**15**		**22**	**13**	**8**		**23**
	Pedestrian Delay LoS	**D**	**D**	**E**	**E**	**-**	**A**	**-**	**C**	**C**	**B**	**B**	**-**	**B**	**B**	**-**	**C**	**B**	**A**	**-**	**C**
	Level of Service	**F**	**F**	**F**	**F**	**-**	**F**	**-**	**F**	**C**	**C**	**E**	**-**	**F**	**F**	**-**	**F**	**D**	**D**	**-**	**D**
		F				**F**				**E**				**F**				**D**			
	Approach From	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Curb Bike Lane, Cycletrack or MUP	Pocket Bike Lane	Pocket Bike Lane	Pocket Bike Lane	Pocket Bike Lane	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic
	Right Turn Lane Configuration	Not Applicable	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn	Bike lane shifts to the left of right turn			≤ 50 m		≤ 50 m	≤ 50 m		≤ 50 m			≤ 50 m	> 50 m			≤ 50 m
	Right Turning Speed	Not Applicable	> 30 km/h	> 30 km/h	> 30 km/h	>25 to 30 km/h			>25 km/h		≤ 25 km/h	≤ 25 km/h		>25 km/h			>25 km/h	≤ 25 km/h			≤ 25 km/h
	Cyclist relative to RT motorists	**Not Applicable**	**F**	**F**	**F**	**F**	**#N/A**	**-**	**E**	**#N/A**	**D**	**D**	**-**	**E**	**#N/A**	**-**	**E**	**F**	**#N/A**	**-**	**D**
	Separated or Mixed Traffic	**Separated**	**Separated**	**Separated**	**Separated**	**Separated**	**Mixed Traffic**	**-**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**-**	**Mixed Traffic**	**Mixed Traffic**	**-**	**Mixed Traffic**	**Mixed Traffic**	**Mixed Traffic**	**-**	**Mixed Traffic**
	Left Turn Approach	2-stage, LT box	≥ 2 lanes crossed	≥ 2 lanes crossed	≥ 2 lanes crossed		≥ 2 lanes crossed		No lane crossed	One lane crossed		One lane crossed			≥ 2 lanes crossed		One lane crossed		One lane crossed		One lane crossed
	Operating Speed	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h	> 50 to < 60 km/h		> 50 to < 60 km/h		> 50 to < 60 km/h	> 40 to ≤ 50 km/h		> 40 to ≤ 50 km/h			> 50 to < 60 km/h		> 50 to < 60 km/h		> 50 to < 60 km/h		> 50 to < 60 km/h
	Left Turning Cyclist	**A**	**F**	**F**	**F**	**-**	**F**	**-**	**C**	**D**	**-**	**D**	**-**	**-**	**F**	**-**	**E**	**-**	**E**	**-**	**E**
	Level of Service	**A**	**F**	**F**	**F**	**-**	**#N/A**	**-**	**E**	**#N/A**	**-**	**D**	**-**	**-**	**#N/A**	**-**	**E**	**-**	**#N/A**	**-**	**E**
		F				**#N/A**				**#N/A**				**#N/A**				**#N/A**			
Transit	Average Signal Delay	≤ 40 sec	> 40 sec		≤ 10 sec	≤ 30 sec	≤ 20 sec		≤ 30 sec	≤ 10 sec	≤ 10 sec	≤ 10 sec		≤ 10 sec	≤ 10 sec		≤ 30 sec	≤ 10 sec	≤ 10 sec		
	Level of Service	**E**	**F**	**-**	**B**	**D**	**C**	**-**	**D**	**B**	**B**	**B**	**-**	**B**	**B**	**-**	**D**	**B**	**B**	**-**	**-**
		F				**D**				**B**				**D**				**B**			
Truck	Effective Corner Radius	> 15 m	> 15 m	> 15 m	> 15 m																
	Number of Receiving Lanes on Departure from Intersection	≥ 2	≥ 2	≥ 2	≥ 2																
	Level of Service	**A**	**A**	**A**	**A**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
		A				**-**				**-**				**-**				**-**			
Auto	Volume to Capacity Ratio	0.91 - 1.00				0.61 - 0.70				0.0 - 0.60				0.0 - 0.60				0.0 - 0.60			
	Level of Service	**E**				**B**				**A**				**A**				**A**			

Multi-Modal Level of Service - Segments Form

Consultant	**CGH Transportation Inc.**	**Project**	**1971 & 1975 St. Laurent Boulevard**
Scenario	**Existing/Future**	**Date**	**12/12/2022**
Comments			

SEGMENTS			St. Laurent Blvd	Russell Rd	Section
			1	2	3
Pedestrian	Sidewalk Width Boulevard Width		≥ 2 m < 0.5	1.5 m > 2 m	
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000	
	Operating Speed On-Street Parking		> 50 to 60 km/h no	> 50 to 60 km/h no	
	Exposure to Traffic PLoS	**-**	**E**	**E**	**-**
	Effective Sidewalk Width				
	Pedestrian Volume				
	Crowding PLoS		**-**	**-**	**-**
	Level of Service		**-**	**-**	**-**
Bicycle	Type of Cycling Facility		Mixed Traffic	Mixed Traffic	
	Number of Travel Lanes		4-5 lanes total	≤ 2 (no centreline)	
	Operating Speed		≥ 50 to 60 km/h	≥ 50 to 60 km/h	
	# of Lanes & Operating Speed LoS		**E**	**D**	**-**
	Bike Lane (+ Parking Lane) Width				
	Bike Lane Width LoS	**E**	**-**	**-**	**-**
	Bike Lane Blockages				
	Blockage LoS		**-**	**-**	**-**
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge	
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes	
	Sidestreet Operating Speed		≤ 40 km/h	≤ 40 km/h	
	Unsignalized Crossing - Lowest LoS		**A**	**A**	**-**
	Level of Service		**E**	**D**	**-**
Transit	Facility Type		Mixed Traffic	Mixed Traffic	
	Friction or Ratio Transit:Posted Speed	**D**	Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8	
	Level of Service		**D**	**D**	**-**
Truck	Truck Lane Width			> 3.7 m	
	Travel Lanes per Direction	**B**		1	
	Level of Service		**-**	**B**	**-**

Appendix L

TDM Checklist

CGH TRANSPORTATION

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☑
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☑
	2.3	**Bicycle repair station**	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☑
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☐
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐

TDM-Supportive Development Design and Infrastructure Checklist **City of Ottawa**
Version 1.0 (30 June 2017)

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide up to three carshare parking spaces in an R3, R4 or R5 Zone for specified residential uses *(see Zoning By-law Section 94)*	☑
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☑
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☐

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Residential developments*	Check if proposed & add descriptions
		1. TDM PROGRAM MANAGEMENT	
		1.1 Program coordinator	
BASIC	★	1.1.1 Designate an internal coordinator, or contract with an external coordinator	☐
		1.2 Travel surveys	
BETTER		1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
		2. WALKING AND CYCLING	
		2.1 Information on walking/cycling routes & destinations	
BASIC		2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☑
		2.2 Bicycle skills training	
BETTER		2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses	☐

		TDM measures: *Residential developments*	Check if proposed & add descriptions
		3. TRANSIT	
		3.1 Transit information	
BASIC		3.1.1 Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☑
BETTER		3.1.2 Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
		3.2 Transit fare incentives	
BASIC	★	3.2.1 Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☐
BETTER		3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	☑
		3.3 Enhanced public transit service	
BETTER	★	3.3.1 Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐
		3.4 Private transit service	
BETTER		3.4.1 Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
		4. CARSHARING & BIKESHARING	
		4.1 Bikeshare stations & memberships	
BETTER		4.1.1 Contract with provider to install on-site bikeshare station *(multi-family)*	☑
BETTER		4.1.2 Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
		4.2 Carshare vehicles & memberships	
BETTER		4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	☑
BETTER		4.2.2 Provide residents with carshare memberships, either free or subsidized	☐
		5. PARKING	
		5.1 Priced parking	
BASIC	★	5.1.1 Unbundle parking cost from purchase price *(condominium)*	☐
BASIC	★	5.1.2 Unbundle parking cost from monthly rent *(multi-family)*	☑

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☑
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐

Appendix M

Synchro Intersection Worksheets – 2030 Future Total Conditions

CGH TRANSPORTATION

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	386	135	120	32	280	107	193	1172	96	137	632	653
Future Volume (vph)	386	135	120	32	280	107	193	1172	96	137	632	653
Satd. Flow (prot)	3216	1728	1339	1421	3066	0	1483	3122	0	1626	3191	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3175	1728	1295	1396	3066	0	1476	3122	0	1622	3191	1448
Satd. Flow (RTOR)			132		41			8				402
Lane Group Flow (vph)	386	135	120	32	387	0	193	1268	0	137	632	653
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0		20.0	52.0		20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%		16.7%	43.3%		16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
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)	5.6	5.7	5.7	5.6	5.7		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	14.4	29.4	29.4	8.2	18.5		17.8	50.2		13.7	46.1	46.1
Actuated g/C Ratio	0.12	0.24	0.24	0.07	0.15		0.15	0.42		0.11	0.38	0.38
v/c Ratio	1.00	0.32	0.29	0.33	0.76		0.88	0.97		0.74	0.52	0.81
Control Delay	99.4	41.1	7.2	61.4	53.5		87.3	53.2		74.8	30.2	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	99.4	41.1	7.2	61.4	53.5		87.3	53.2		74.8	30.2	21.5
LOS	F	D	A	E	D		F	D		E	C	C
Approach Delay		69.9			54.1			57.7			30.5	
Approach LOS		E			D			E			C	
Queue Length 50th (m)	~47.5	27.5	0.0	7.3	41.5		45.2	~166.1		31.0	59.4	56.3
Queue Length 95th (m)	#79.3	46.3	12.8	17.2	56.6		#97.8	#213.8		#60.3	77.0	113.8
Internal Link Dist (m)		111.9			87.8			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	385	422	416	170	603		220	1310		197	1225	803
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	1.00	0.32	0.29	0.19	0.64		0.88	0.97		0.70	0.52	0.81

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00
Intersection Signal Delay: 49.5 Intersection LOS: D
Intersection Capacity Utilization 90.0% ICU Level of Service E
Analysis Period (min) 15
~ 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.

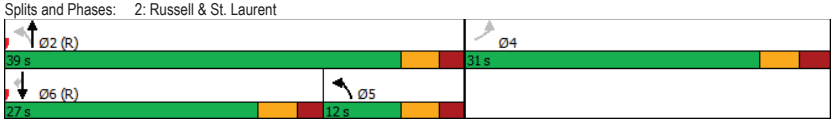
Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	712	58	80	748	337	471
Future Volume (vph)	712	58	80	748	337	471
Satd. Flow (prot)	3020	0	1658	2866	2866	1441
Flt Permitted	0.956		0.549			
Satd. Flow (perm)	3020	0	953	2866	2866	1412
Satd. Flow (RTOR)	14					471
Lane Group Flow (vph)	770	0	80	748	337	471
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	23.9	23.9
Actuated g/C Ratio	0.36		0.48	0.48	0.34	0.34
v/c Ratio	0.71		0.15	0.55	0.34	0.59
Control Delay	23.3		11.5	14.8	19.6	5.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.3		11.5	14.8	19.6	5.7
LOS	C		B	B	B	A
Approach Delay	23.3			14.4	11.5	
Approach LOS	C			B	B	
Queue Length 50th (m)	42.9		5.4	34.2	18.0	0.0
Queue Length 95th (m)	61.2		11.9	49.2	28.5	19.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1087		521	1371	978	792
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.71		0.15	0.55	0.34	0.59

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 58.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



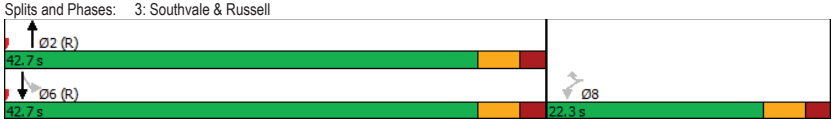
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	222	596	9	55	324
Future Volume (vph)	17	222	596	9	55	324
Satd. Flow (prot)	1595	1455	1560	0	1458	1548
Flt Permitted	0.950				0.377	
Satd. Flow (perm)	1531	1401	1560	0	578	1548
Satd. Flow (RTOR)		222	2			
Lane Group Flow (vph)	17	222	605	0	55	324
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		23.5	23.5
Total Split (s)	22.3	22.3	42.7		42.7	42.7
Total Split (%)	34.3%	34.3%	65.7%		65.7%	65.7%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.8		42.8	42.8
Actuated g/C Ratio	0.18	0.18	0.66		0.66	0.66
v/c Ratio	0.06	0.52	0.59		0.14	0.32
Control Delay	21.4	8.3	9.9		6.2	6.4
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.4	8.3	9.9		6.2	6.4
LOS	C	A	A		A	A
Approach Delay	9.2		9.9			6.4
Approach LOS	A		A			A
Queue Length 50th (m)	1.8	0.0	30.9		1.9	12.8
Queue Length 95th (m)	5.6	14.0	78.4		7.8	33.1
Internal Link Dist (m)	422.1		18.0			54.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	400	530	1027		380	1019
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.42	0.59		0.14	0.32

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 10 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	54	56	34	716	486	65
Future Volume (vph)	54	56	34	716	486	65
Satd. Flow (prot)	1112	0	1551	3283	3228	0
Flt Permitted	0.976		0.446			
Satd. Flow (perm)	1103	0	728	3283	3228	0
Satd. Flow (RTOR)	56				29	
Lane Group Flow (vph)	110	0	34	716	551	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	11.0		42.3	42.3	42.3	
Actuated g/C Ratio	0.18		0.70	0.70	0.70	
v/c Ratio	0.44		0.07	0.31	0.24	
Control Delay	18.0		4.8	5.2	4.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.0		4.8	5.2	4.7	
LOS	B		A	A	A	
Approach Delay	18.0			5.1	4.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	5.3		1.3	18.7	10.2	
Queue Length 95th (m)	16.2		m4.7	35.4	20.4	
Internal Link Dist (m)	18.7			139.8	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	485		513	2315	2285	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.23		0.07	0.31	0.24	

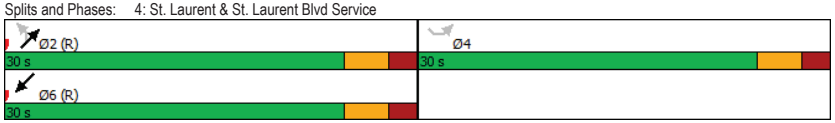
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 6.0	Intersection LOS: A
Intersection Capacity Utilization 57.2%	ICU Level of Service B
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



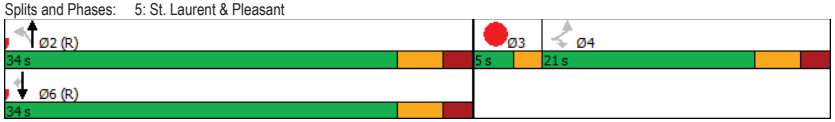
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	118	95	77	430	473	78	
Future Volume (vph)	118	95	77	430	473	78	
Satd. Flow (prot)	1658	1483	1642	1728	1679	1401	
Flt Permitted	0.950		0.473				
Satd. Flow (perm)	1654	1393	808	1728	1679	1337	
Satd. Flow (RTOR)		95				78	
Lane Group Flow (vph)	118	95	77	430	473	78	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	10.9	10.9	42.3	42.3	42.3	42.3	
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70	
v/c Ratio	0.39	0.29	0.14	0.35	0.40	0.08	
Control Delay	25.6	7.9	5.6	6.2	4.0	0.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	7.9	5.6	6.2	4.0	0.3	
LOS	C	A	A	A	A	A	
Approach Delay	17.7			6.1	3.4		
Approach LOS	B			A	A		
Queue Length 50th (m)	11.8	0.0	2.7	18.1	9.4	0.0	
Queue Length 95th (m)	23.0	9.5	8.3	37.9	15.2	0.1	
Internal Link Dist (m)	450.4			257.0	107.5		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	427	430	570	1219	1184	966	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.28	0.22	0.14	0.35	0.40	0.08	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 3 (5%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	32	2	816	368	27
Future Vol, veh/h	12	32	2	816	368	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	32	2	816	368	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1202	382	395	0	-	0
Stage 1	382	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	204	665	1164	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	203	665	1164	-	-	-
Mov Cap-2 Maneuver	203	-	-	-	-	-
Stage 1	688	-	-	-	-	-
Stage 2	433	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1164	-	410	-	-
HCM Lane V/C Ratio	0.002	-	0.107	-	-
HCM Control Delay (s)	8.1	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	58	721	14	0	537
Future Vol, veh/h	0	58	721	14	0	537
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	58	721	14	0	537

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	368	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	629	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	629	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	- 629	-
HCM Lane V/C Ratio	-	- 0.092	-
HCM Control Delay (s)	-	- 11.3	-
HCM Lane LOS	-	- B	-
HCM 95th %tile Q(veh)	-	- 0.3	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	527	279	227	100	146	230	126	814	93	143	1162	442
Future Volume (vph)	527	279	227	100	146	230	126	814	93	143	1162	442
Satd. Flow (prot)	3216	1745	1469	1642	2935	0	1537	3198	0	1658	3316	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3123	1745	1430	1625	2935	0	1529	3198	0	1647	3316	1427
Satd. Flow (RTOR)			227		192			11				381
Lane Group Flow (vph)	527	279	227	100	376	0	126	907	0	143	1162	442
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0		17.0	49.0		17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%		14.2%	40.8%		14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
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)	5.6	5.7	5.7	5.6	5.7		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	24.9	24.9	12.6	17.1		12.9	45.9		13.5	46.5	46.5
Actuated g/C Ratio	0.17	0.21	0.21	0.10	0.14		0.11	0.38		0.11	0.39	0.39
v/c Ratio	0.97	0.77	0.48	0.58	0.65		0.77	0.74		0.77	0.91	0.56
Control Delay	80.5	60.1	8.6	64.0	28.0		81.5	36.6		79.1	46.6	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	80.5	60.1	8.6	64.0	28.0		81.5	36.6		79.1	46.6	8.1
LOS	F	E	A	E	C		F	D		E	D	A
Approach Delay		59.2			35.5			42.1			39.5	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	64.2	61.9	0.0	22.8	21.0		28.6	98.4		32.6	140.9	9.5
Queue Length 95th (m)	#97.8	#99.7	20.6	38.9	35.7		#65.5	123.6		#73.5	#187.3	38.6
Internal Link Dist (m)		111.7			91.7			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	546	361	476	279	701		164	1229		185	1283	785
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	0.97	0.77	0.48	0.36	0.54		0.77	0.74		0.77	0.91	0.56

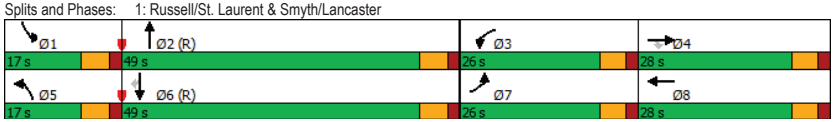
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 44.4	Intersection LOS: D
Intersection Capacity Utilization 92.0%	ICU Level of Service F
Analysis Period (min) 15	

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

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	655	145	54	376	761	741
Future Volume (vph)	655	145	54	376	761	741
Satd. Flow (prot)	2938	0	1580	2941	3131	1483
Flt Permitted	0.961		0.269			
Satd. Flow (perm)	2938	0	446	2941	3131	1448
Satd. Flow (RTOR)	43					741
Lane Group Flow (vph)	800	0	54	376	761	741
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	26.3	26.3
Actuated g/C Ratio	0.36		0.48	0.48	0.38	0.38
v/c Ratio	0.74		0.17	0.27	0.65	0.74
Control Delay	23.7		13.2	11.6	23.0	7.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.7		13.2	11.6	23.0	7.3
LOS	C		B	B	C	A
Approach Delay	23.7			11.8	15.3	
Approach LOS	C			B	B	
Queue Length 50th (m)	43.8		3.6	14.6	47.4	0.0
Queue Length 95th (m)	63.2		8.9	22.6	#68.7	29.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1076		318	1407	1176	1006
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.74		0.17	0.27	0.65	0.74

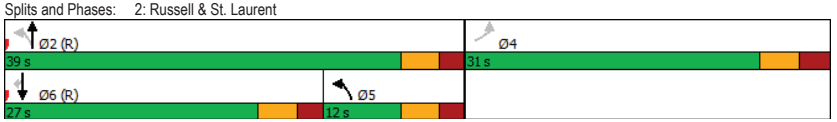
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 17.2	Intersection LOS: B
Intersection Capacity Utilization 65.3%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 2: Russell & St. Laurent



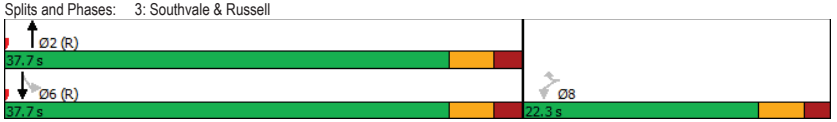
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	108	317	13	201	647
Future Volume (vph)	16	108	317	13	201	647
Satd. Flow (prot)	1658	1441	1672	0	1642	1695
Flt Permitted	0.950				0.561	
Satd. Flow (perm)	1608	1370	1672	0	966	1695
Satd. Flow (RTOR)		108	5			
Lane Group Flow (vph)	16	108	330	0	201	647
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		15.5	15.5
Total Split (s)	22.3	22.3	37.7		37.7	37.7
Total Split (%)	37.2%	37.2%	62.8%		62.8%	62.8%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.0		42.0	42.0
Actuated g/C Ratio	0.19	0.19	0.70		0.70	0.70
v/c Ratio	0.05	0.31	0.28		0.30	0.55
Control Delay	18.7	7.2	6.1		7.3	9.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	18.7	7.2	6.1		7.3	9.2
LOS	B	A	A		A	A
Approach Delay	8.7		6.1			8.7
Approach LOS	A		A			A
Queue Length 50th (m)	1.5	0.0	12.7		8.0	32.7
Queue Length 95th (m)	4.9	9.2	32.9		24.6	83.1
Internal Link Dist (m)	422.1		26.8			60.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	455	465	1171		675	1185
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.23	0.28		0.30	0.55

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 53 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 8.1	Intersection LOS: A
Intersection Capacity Utilization 61.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	119	125	53	681	723	72
Future Volume (vph)	119	125	53	681	723	72
Satd. Flow (prot)	1252	0	1658	3252	3261	0
Flt Permitted	0.976		0.330			
Satd. Flow (perm)	1243	0	575	3252	3261	0
Satd. Flow (RTOR)	102				21	
Lane Group Flow (vph)	244	0	53	681	795	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	14.0		35.2	35.2	35.2	
Actuated g/C Ratio	0.23		0.59	0.59	0.59	
v/c Ratio	0.66		0.16	0.36	0.41	
Control Delay	20.5		6.5	5.8	8.3	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	20.5		6.5	5.8	8.3	
LOS	C		A	A	A	
Approach Delay	20.5			5.8	8.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	14.0		2.0	13.9	19.8	
Queue Length 95th (m)	28.7		m5.1	20.5	42.3	
Internal Link Dist (m)	15.1			138.0	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	569		337	1909	1923	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.43		0.16	0.36	0.41	

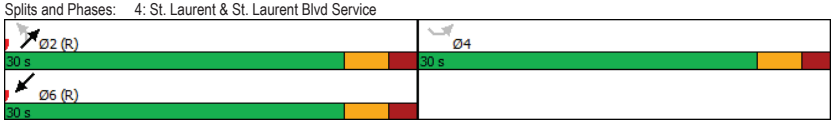
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 9.0	Intersection LOS: A
Intersection Capacity Utilization 65.4%	ICU Level of Service C
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



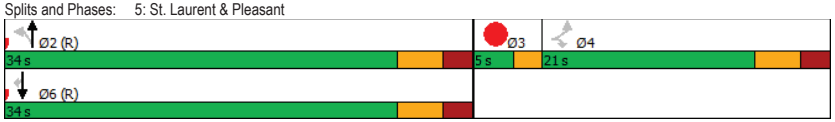
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	126	149	101	556	649	155	
Future Volume (vph)	126	149	101	556	649	155	
Satd. Flow (prot)	1566	1469	1658	1712	1745	1483	
Flt Permitted	0.950		0.356				
Satd. Flow (perm)	1548	1424	617	1712	1745	1421	
Satd. Flow (RTOR)		149				155	
Lane Group Flow (vph)	126	149	101	556	649	155	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	11.2	11.2	42.0	42.0	42.0	42.0	
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70	
v/c Ratio	0.43	0.39	0.23	0.46	0.53	0.15	
Control Delay	26.2	7.4	7.4	7.7	10.7	2.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.2	7.4	7.4	7.7	10.7	2.8	
LOS	C	A	A	A	B	A	
Approach Delay	16.0			7.6	9.1		
Approach LOS	B			A	A		
Queue Length 50th (m)	12.7	0.0	3.9	26.2	54.7	1.7	
Queue Length 95th (m)	24.1	11.6	12.6	56.8	102.6	4.9	
Internal Link Dist (m)	450.4			257.0	100.4		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	399	478	431	1197	1220	1040	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.32	0.31	0.23	0.46	0.53	0.15	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 66.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	37	8	417	814	92
Future Vol, veh/h	13	37	8	417	814	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	37	8	417	814	92

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1293	860	906	0	-	0
Stage 1	860	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	180	356	751	-	-	-
Stage 1	414	-	-	-	-	-
Stage 2	654	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	177	356	751	-	-	-
Mov Cap-2 Maneuver	177	-	-	-	-	-
Stage 1	408	-	-	-	-	-
Stage 2	654	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.5	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	751	-	282	-	-
HCM Lane V/C Ratio	0.011	-	0.177	-	-
HCM Control Delay (s)	9.8	0	20.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	51	701	33	0	824
Future Vol, veh/h	0	51	701	33	0	824
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	51	701	33	0	824

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	367	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	630	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	630	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	- 630	-
HCM Lane V/C Ratio	-	- 0.081	-
HCM Control Delay (s)	-	- 11.2	-
HCM Lane LOS	-	- B	-
HCM 95th %tile Q(veh)	-	- 0.3	-

Appendix N

Synchro Intersection Worksheets – 2035 Future Total Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	424	148	133	32	280	107	193	1172	96	137	632	653
Future Volume (vph)	424	148	133	32	280	107	193	1172	96	137	632	653
Satd. Flow (prot)	3216	1728	1339	1421	3066	0	1483	3122	0	1626	3191	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3175	1728	1295	1396	3066	0	1476	3122	0	1622	3191	1448
Satd. Flow (RTOR)			133		41			8				402
Lane Group Flow (vph)	424	148	133	32	387	0	193	1268	0	137	632	653
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	20.0	28.0	28.0	20.0	28.0		20.0	52.0		20.0	52.0	52.0
Total Split (%)	16.7%	23.3%	23.3%	16.7%	23.3%		16.7%	43.3%		16.7%	43.3%	43.3%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
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)	5.6	5.7	5.7	5.6	5.7		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	14.4	29.4	29.4	8.2	18.5		17.8	50.2		13.7	46.1	46.1
Actuated g/C Ratio	0.12	0.24	0.24	0.07	0.15		0.15	0.42		0.11	0.38	0.38
v/c Ratio	1.10	0.35	0.32	0.33	0.76		0.88	0.97		0.74	0.52	0.81
Control Delay	124.7	41.7	8.8	61.4	53.5		87.3	53.2		74.8	30.2	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	124.7	41.7	8.8	61.4	53.5		87.3	53.2		74.8	30.2	21.5
LOS	F	D	A	E	D		F	D		E	C	C
Approach Delay		85.4			54.1			57.7			30.5	
Approach LOS		F			D			E			C	
Queue Length 50th (m)	~58.3	30.3	0.0	7.3	41.5		45.2	~166.1		31.0	59.4	56.3
Queue Length 95th (m)	#89.9	50.2	16.0	17.2	56.6		#97.8	#213.8		#60.3	77.0	113.8
Internal Link Dist (m)		111.9			87.8			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	385	422	417	170	603		220	1310		197	1225	803
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	0.35	0.32	0.19	0.64		0.88	0.97		0.70	0.52	0.81

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 110 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
1: Russell/St. Laurent & Smyth/Lancaster
AM Peak Hour
2035 Future Total-Signalized

Maximum v/c Ratio: 1.10

Intersection Signal Delay: 52.6	Intersection LOS: D
Intersection Capacity Utilization 91.1%	ICU Level of Service F
Analysis Period (min) 15	

~ 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.

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster

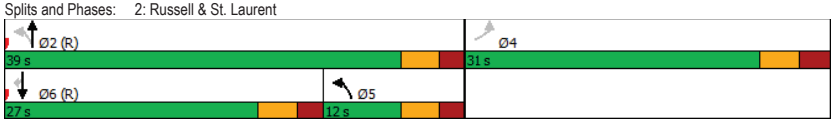
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	712	58	80	748	350	471
Future Volume (vph)	712	58	80	748	350	471
Satd. Flow (prot)	3020	0	1658	2866	2866	1441
Flt Permitted	0.956		0.542			
Satd. Flow (perm)	3020	0	941	2866	2866	1412
Satd. Flow (RTOR)	14					471
Lane Group Flow (vph)	770	0	80	748	350	471
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	23.9	23.9
Actuated g/C Ratio	0.36		0.48	0.48	0.34	0.34
v/c Ratio	0.71		0.16	0.55	0.36	0.59
Control Delay	23.3		11.5	14.8	19.7	5.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.3		11.5	14.8	19.7	5.7
LOS	C		B	B	B	A
Approach Delay	23.3			14.4	11.7	
Approach LOS	C			B	B	
Queue Length 50th (m)	42.9		5.4	34.2	18.8	0.0
Queue Length 95th (m)	61.2		11.9	49.2	29.5	19.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1087		516	1371	978	792
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.71		0.16	0.55	0.36	0.59

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 58.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Russell & St. Laurent



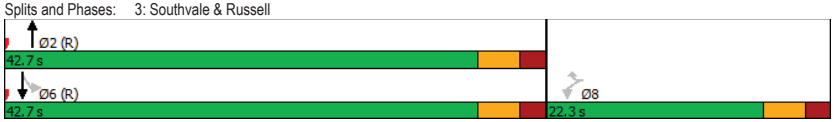
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	17	222	596	9	55	337
Future Volume (vph)	17	222	596	9	55	337
Satd. Flow (prot)	1595	1455	1560	0	1458	1548
Flt Permitted	0.950				0.377	
Satd. Flow (perm)	1531	1401	1560	0	578	1548
Satd. Flow (RTOR)		222	2			
Lane Group Flow (vph)	17	222	605	0	55	337
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		23.5	23.5
Total Split (s)	22.3	22.3	42.7		42.7	42.7
Total Split (%)	34.3%	34.3%	65.7%		65.7%	65.7%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.8		42.8	42.8
Actuated g/C Ratio	0.18	0.18	0.66		0.66	0.66
v/c Ratio	0.06	0.52	0.59		0.14	0.33
Control Delay	21.4	8.3	9.9		6.2	6.5
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	21.4	8.3	9.9		6.2	6.5
LOS	C	A	A		A	A
Approach Delay	9.2		9.9			6.5
Approach LOS	A		A			A
Queue Length 50th (m)	1.8	0.0	30.9		1.9	13.5
Queue Length 95th (m)	5.6	14.0	78.4		7.8	34.6
Internal Link Dist (m)	422.1		18.0			54.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	400	530	1027		380	1019
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.42	0.59		0.14	0.33

Intersection Summary
Cycle Length: 65
Actuated Cycle Length: 65
Offset: 10 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 8.7	Intersection LOS: A
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	54	56	34	716	486	65
Future Volume (vph)	54	56	34	716	486	65
Satd. Flow (prot)	1112	0	1551	3283	3228	0
Flt Permitted	0.976		0.446			
Satd. Flow (perm)	1103	0	728	3283	3228	0
Satd. Flow (RTOR)	56				29	
Lane Group Flow (vph)	110	0	34	716	551	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	11.0		42.3	42.3	42.3	
Actuated g/C Ratio	0.18		0.70	0.70	0.70	
v/c Ratio	0.44		0.07	0.31	0.24	
Control Delay	18.0		4.8	5.2	4.7	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	18.0		4.8	5.2	4.7	
LOS	B		A	A	A	
Approach Delay	18.0			5.1	4.7	
Approach LOS	B			A	A	
Queue Length 50th (m)	5.3		1.3	18.7	10.2	
Queue Length 95th (m)	16.2		m4.7	35.4	20.4	
Internal Link Dist (m)	18.7			132.5	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	485		513	2315	2285	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.23		0.07	0.31	0.24	

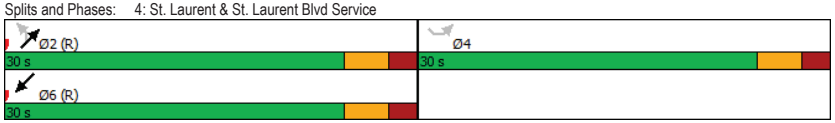
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 6.0	Intersection LOS: A
Intersection Capacity Utilization 57.2%	ICU Level of Service B
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



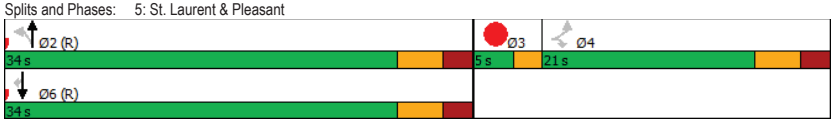
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	118	95	77	430	473	78	
Future Volume (vph)	118	95	77	430	473	78	
Satd. Flow (prot)	1658	1483	1642	1728	1679	1401	
Flt Permitted	0.950		0.473				
Satd. Flow (perm)	1654	1393	808	1728	1679	1337	
Satd. Flow (RTOR)		95				78	
Lane Group Flow (vph)	118	95	77	430	473	78	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	10.9	10.9	42.3	42.3	42.3	42.3	
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70	
v/c Ratio	0.39	0.29	0.14	0.35	0.40	0.08	
Control Delay	25.6	7.9	5.6	6.2	4.0	0.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.6	7.9	5.6	6.2	4.0	0.3	
LOS	C	A	A	A	A	A	
Approach Delay	17.7			6.1	3.4		
Approach LOS	B			A	A		
Queue Length 50th (m)	11.8	0.0	2.7	18.1	9.4	0.0	
Queue Length 95th (m)	23.0	9.5	8.3	37.9	15.2	0.1	
Internal Link Dist (m)	450.4			257.0	106.5		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	427	430	570	1219	1184	966	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.28	0.22	0.14	0.35	0.40	0.08	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 3 (5%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	12	32	2	816	368	27
Future Vol, veh/h	12	32	2	816	368	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	32	2	816	368	27

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1202	382	395	0	-	0
Stage 1	382	-	-	-	-	-
Stage 2	820	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	204	665	1164	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	203	665	1164	-	-	-
Mov Cap-2 Maneuver	203	-	-	-	-	-
Stage 1	688	-	-	-	-	-
Stage 2	433	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1164	-	410	-	-
HCM Lane V/C Ratio	0.002	-	0.107	-	-
HCM Control Delay (s)	8.1	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	58	721	14	0	537
Future Vol, veh/h	0	58	721	14	0	537
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	58	721	14	0	537

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	368	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	629	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	629	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	- 629	-
HCM Lane V/C Ratio	-	- 0.092	-
HCM Control Delay (s)	-	- 11.3	-
HCM Lane LOS	-	- B	-
HCM 95th %tile Q(veh)	-	- 0.3	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	527	279	227	100	166	230	139	814	93	143	1162	487
Future Volume (vph)	527	279	227	100	166	230	139	814	93	143	1162	487
Satd. Flow (prot)	3216	1745	1469	1642	2955	0	1537	3198	0	1658	3316	1483
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3125	1745	1430	1625	2955	0	1529	3198	0	1647	3316	1427
Satd. Flow (RTOR)			227		192			11				420
Lane Group Flow (vph)	527	279	227	100	396	0	139	907	0	143	1162	487
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									6
Detector Phase	7	4	4	3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	5.0	10.0	10.0	5.0	10.0		5.0	10.0		5.0	10.0	10.0
Minimum Split (s)	10.6	27.7	27.7	10.6	27.7		11.0	27.9		16.0	27.9	27.9
Total Split (s)	26.0	28.0	28.0	26.0	28.0		17.0	49.0		17.0	49.0	49.0
Total Split (%)	21.7%	23.3%	23.3%	21.7%	23.3%		14.2%	40.8%		14.2%	40.8%	40.8%
Yellow Time (s)	3.7	3.7	3.7	3.7	3.7		4.2	4.2		4.2	4.2	4.2
All-Red Time (s)	1.9	2.0	2.0	1.9	2.0		1.8	1.7		1.8	1.7	1.7
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)	5.6	5.7	5.7	5.6	5.7		6.0	5.9		6.0	5.9	5.9
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	C-Max
Act Effct Green (s)	20.4	24.9	24.9	12.6	17.1		14.2	45.9		13.5	45.1	45.1
Actuated g/C Ratio	0.17	0.21	0.21	0.10	0.14		0.12	0.38		0.11	0.38	0.38
v/c Ratio	0.97	0.77	0.48	0.58	0.68		0.76	0.74		0.77	0.93	0.61
Control Delay	80.5	60.1	8.6	64.0	30.1		78.6	36.6		79.1	50.7	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	80.5	60.1	8.6	64.0	30.1		78.6	36.6		79.1	50.7	8.6
LOS	F	E	A	E	C		E	D		E	D	A
Approach Delay		59.2			37.0			42.2			41.5	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	64.2	61.9	0.0	22.8	23.6		31.8	98.4		32.6	140.9	10.5
Queue Length 95th (m)	#97.8	#99.7	20.6	38.9	38.6		#73.8	123.6		#73.5	#187.3	42.7
Internal Link Dist (m)		111.7			91.7			251.9			606.7	
Turn Bay Length (m)	54.0			36.0			166.0			105.0		78.0
Base Capacity (vph)	546	361	476	279	705		182	1229		185	1245	798
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	0.97	0.77	0.48	0.36	0.56		0.76	0.74		0.77	0.93	0.61

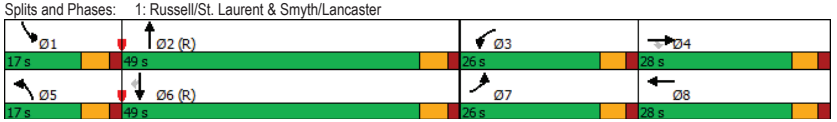
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 41 (34%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 45.3	Intersection LOS: D
Intersection Capacity Utilization 93.0%	ICU Level of Service F
Analysis Period (min) 15	

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

Splits and Phases: 1: Russell/St. Laurent & Smyth/Lancaster



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	655	145	54	389	761	741
Future Volume (vph)	655	145	54	389	761	741
Satd. Flow (prot)	2938	0	1580	2941	3131	1483
Flt Permitted	0.961		0.269			
Satd. Flow (perm)	2938	0	446	2941	3131	1448
Satd. Flow (RTOR)	43					741
Lane Group Flow (vph)	800	0	54	389	761	741
Turn Type	Perm		pm+pt	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases	4		2			6
Detector Phase	4		5	2	6	6
Switch Phase						
Minimum Initial (s)	10.0		5.0	10.0	10.0	10.0
Minimum Split (s)	30.0		10.5	23.5	26.5	26.5
Total Split (s)	31.0		12.0	39.0	27.0	27.0
Total Split (%)	44.3%		17.1%	55.7%	38.6%	38.6%
Yellow Time (s)	3.3		3.3	3.3	3.3	3.3
All-Red Time (s)	2.7		2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0		5.5	5.5	5.5	5.5
Lead/Lag			Lag		Lead	Lead
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	Max		None	C-Max	C-Max	C-Max
Act Effct Green (s)	25.0		33.5	33.5	26.3	26.3
Actuated g/C Ratio	0.36		0.48	0.48	0.38	0.38
v/c Ratio	0.74		0.17	0.28	0.65	0.74
Control Delay	23.7		13.2	11.6	23.0	7.3
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	23.7		13.2	11.6	23.0	7.3
LOS	C		B	B	C	A
Approach Delay	23.7			11.8	15.3	
Approach LOS	C			B	B	
Queue Length 50th (m)	43.8		3.6	15.2	47.4	0.0
Queue Length 95th (m)	63.2		8.9	23.4	#68.7	29.6
Internal Link Dist (m)	118.9			68.8	251.9	
Turn Bay Length (m)			72.0			79.0
Base Capacity (vph)	1076		318	1407	1176	1006
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.74		0.17	0.28	0.65	0.74

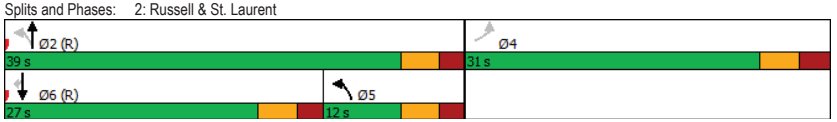
Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 27 (39%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 17.2	Intersection LOS: B
Intersection Capacity Utilization 65.3%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 2: Russell & St. Laurent



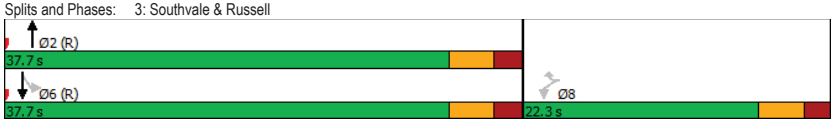
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	108	330	13	201	647
Future Volume (vph)	16	108	330	13	201	647
Satd. Flow (prot)	1658	1441	1672	0	1642	1695
Flt Permitted	0.950				0.555	
Satd. Flow (perm)	1608	1370	1672	0	956	1695
Satd. Flow (RTOR)		108	5			
Lane Group Flow (vph)	16	108	343	0	201	647
Turn Type	Perm	Perm	NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8	8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	22.3	22.3	35.5		15.5	15.5
Total Split (s)	22.3	22.3	37.7		37.7	37.7
Total Split (%)	37.2%	37.2%	62.8%		62.8%	62.8%
Yellow Time (s)	3.3	3.3	3.3		3.3	3.3
All-Red Time (s)	2.0	2.0	2.2		2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.3	5.3	5.5		5.5	5.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max		C-Max	C-Max
Act Effct Green (s)	11.4	11.4	42.0		42.0	42.0
Actuated g/C Ratio	0.19	0.19	0.70		0.70	0.70
v/c Ratio	0.05	0.31	0.29		0.30	0.55
Control Delay	18.7	7.2	6.2		7.3	9.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	18.7	7.2	6.2		7.3	9.2
LOS	B	A	A		A	A
Approach Delay	8.7		6.2			8.7
Approach LOS	A		A			A
Queue Length 50th (m)	1.5	0.0	13.2		8.0	32.7
Queue Length 95th (m)	4.9	9.2	34.4		24.8	83.1
Internal Link Dist (m)	422.1		26.8			60.5
Turn Bay Length (m)	38.0				70.0	
Base Capacity (vph)	455	465	1171		668	1185
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.04	0.23	0.29		0.30	0.55

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 53 (88%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 8.1	Intersection LOS: A
Intersection Capacity Utilization 61.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Southvale & Russell



Lane Group	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Volume (vph)	119	125	53	681	723	72
Future Volume (vph)	119	125	53	681	723	72
Satd. Flow (prot)	1252	0	1658	3252	3261	0
Flt Permitted	0.976		0.330			
Satd. Flow (perm)	1243	0	575	3252	3261	0
Satd. Flow (RTOR)	102				21	
Lane Group Flow (vph)	244	0	53	681	795	0
Turn Type	Perm		Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	4		2			
Detector Phase	4		2	2	6	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	29.4		28.4	28.4	28.4	
Total Split (s)	30.0		30.0	30.0	30.0	
Total Split (%)	50.0%		50.0%	50.0%	50.0%	
Yellow Time (s)	3.3		3.3	3.3	3.3	
All-Red Time (s)	2.1		2.1	2.1	2.1	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.4		5.4	5.4	5.4	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None		C-Max	C-Max	C-Max	
Act Effct Green (s)	14.0		35.2	35.2	35.2	
Actuated g/C Ratio	0.23		0.59	0.59	0.59	
v/c Ratio	0.66		0.16	0.36	0.41	
Control Delay	20.5		6.5	5.8	8.3	
Queue Delay	0.0		0.0	0.0	0.0	
Total Delay	20.5		6.5	5.8	8.3	
LOS	C		A	A	A	
Approach Delay	20.5			5.8	8.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	14.0		2.0	13.8	19.8	
Queue Length 95th (m)	28.7		m5.0	20.4	42.3	
Internal Link Dist (m)	15.1			135.3	118.9	
Turn Bay Length (m)			65.0			
Base Capacity (vph)	569		337	1909	1923	
Starvation Cap Reductn	0		0	0	0	
Spillback Cap Reductn	0		0	0	0	
Storage Cap Reductn	0		0	0	0	
Reduced v/c Ratio	0.43		0.16	0.36	0.41	

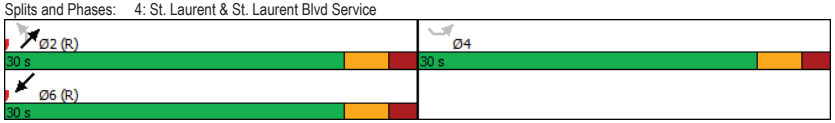
Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 45 (75%), Referenced to phase 2:NETL and 6:SWT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 8.9	Intersection LOS: A
Intersection Capacity Utilization 65.4%	ICU Level of Service C
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: St. Laurent & St. Laurent Blvd Service



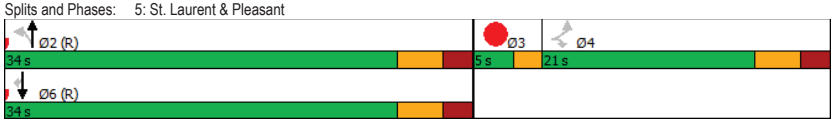
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	Ø3
Lane Configurations							
Traffic Volume (vph)	126	149	101	556	649	155	
Future Volume (vph)	126	149	101	556	649	155	
Satd. Flow (prot)	1566	1469	1658	1712	1745	1483	
Flt Permitted	0.950		0.356				
Satd. Flow (perm)	1548	1424	617	1712	1745	1421	
Satd. Flow (RTOR)		149				155	
Lane Group Flow (vph)	126	149	101	556	649	155	
Turn Type	Perm	Perm	Perm	NA	NA	Perm	
Protected Phases				2	6		3
Permitted Phases	4	4	2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	1.0
Minimum Split (s)	18.5	18.5	22.5	22.5	25.5	25.5	3.0
Total Split (s)	21.0	21.0	34.0	34.0	34.0	34.0	5.0
Total Split (%)	35.0%	35.0%	56.7%	56.7%	56.7%	56.7%	8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	2.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes					Yes
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
Act Effct Green (s)	11.2	11.2	42.0	42.0	42.0	42.0	
Actuated g/C Ratio	0.19	0.19	0.70	0.70	0.70	0.70	
v/c Ratio	0.43	0.39	0.23	0.46	0.53	0.15	
Control Delay	26.2	7.4	7.4	7.7	10.7	2.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.2	7.4	7.4	7.7	10.7	2.9	
LOS	C	A	A	A	B	A	
Approach Delay	16.0			7.6	9.2		
Approach LOS	B			A	A		
Queue Length 50th (m)	12.7	0.0	3.9	26.2	54.8	1.7	
Queue Length 95th (m)	24.1	11.6	12.6	56.8	102.5	5.2	
Internal Link Dist (m)	450.4			257.0	107.1		
Turn Bay Length (m)	36.0		47.0				
Base Capacity (vph)	399	478	431	1197	1220	1040	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.32	0.31	0.23	0.46	0.53	0.15	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 23 (38%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 9.7	Intersection LOS: A
Intersection Capacity Utilization 66.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: St. Laurent & Pleasant



Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	37	8	417	814	92
Future Vol, veh/h	13	37	8	417	814	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	37	8	417	814	92

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1293	860	906	0	-	0
Stage 1	860	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	180	356	751	-	-	-
Stage 1	414	-	-	-	-	-
Stage 2	654	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	177	356	751	-	-	-
Mov Cap-2 Maneuver	177	-	-	-	-	-
Stage 1	408	-	-	-	-	-
Stage 2	654	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.5	0.2	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	751	-	282	-	-
HCM Lane V/C Ratio	0.011	-	0.177	-	-
HCM Control Delay (s)	9.8	0	20.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	51	701	33	0	824
Future Vol, veh/h	0	51	701	33	0	824
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	51	701	33	0	824

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	367	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	630	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	630	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBT
Capacity (veh/h)	-	- 630	-
HCM Lane V/C Ratio	-	- 0.081	-
HCM Control Delay (s)	-	- 11.2	-
HCM Lane LOS	-	- B	-
HCM 95th %tile Q(veh)	-	- 0.3	-

Appendix O

Sidra Intersection Worksheets - 2035 Future Total Conditions

MOVEMENT SUMMARY

Site: 101 [St Laurent - Elmvale AM FT2035 (Site Folder: General)]

Starlight 1971 St Laurent Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: St Laurent														
1	L2	34	2.0	34	2.0	0.277	7.7	LOS A	1.4	9.7	0.20	0.39	0.20	39.8
2	T1	10	2.0	10	2.0	0.277	2.3	LOS A	1.4	9.7	0.20	0.39	0.20	49.5
3	R2	707	2.0	707	2.0	0.277	2.7	LOS A	1.4	9.7	0.20	0.37	0.20	48.1
Approach		751	2.0	751	2.0	0.277	3.0	LOS A	1.4	9.7	0.20	0.37	0.20	47.6
East: St Laurent														
4	L2	486	2.0	486	2.0	0.199	7.6	LOS A	0.8	6.0	0.15	0.55	0.15	47.7
5	T1	49	2.0	49	2.0	0.199	4.4	LOS A	0.8	6.0	0.14	0.54	0.14	35.5
6	R2	16	2.0	16	2.0	0.199	2.6	LOS A	0.8	6.0	0.14	0.54	0.14	46.0
Approach		551	2.0	551	2.0	0.199	7.2	LOS A	0.8	6.0	0.15	0.55	0.15	46.2
North: Service Road														
7	L2	9	50.0	9	50.0	0.024	10.3	LOS B	0.1	0.8	0.47	0.60	0.47	47.3
8	T1	6	50.0	6	50.0	0.024	4.7	LOS A	0.1	0.8	0.47	0.60	0.47	47.1
9	R2	2	50.0	2	50.0	0.024	5.0	LOS A	0.1	0.8	0.47	0.60	0.47	45.6
Approach		17	50.0	17	50.0	0.024	7.7	LOS A	0.1	0.8	0.47	0.60	0.47	47.0
West: Elmvale Mall														
10	L2	5	2.0	5	2.0	0.115	3.6	LOS A	0.4	3.1	0.44	0.33	0.44	37.9
11	T1	49	2.0	49	2.0	0.115	1.6	LOS A	0.4	3.1	0.44	0.33	0.44	37.2
12	R2	56	2.0	56	2.0	0.115	1.6	LOS A	0.4	3.1	0.44	0.33	0.44	36.5
Approach		110	2.0	110	2.0	0.115	1.7	LOS A	0.4	3.1	0.44	0.33	0.44	36.9
All Vehicles		1429	2.6	1429	2.6	0.277	4.6	LOS A	1.4	9.7	0.20	0.44	0.20	46.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [St Laurent - Elmvale PM FT2035 (Site Folder: General)]

Starlight 1971 St Laurent Blvd
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: St Laurent														
1	L2	53	2.0	53	2.0	0.304	8.0	LOS A	1.5	10.6	0.31	0.44	0.31	39.5
2	T1	10	2.0	10	2.0	0.304	2.6	LOS A	1.5	10.6	0.31	0.44	0.31	49.0
3	R2	667	2.0	667	2.0	0.304	3.0	LOS A	1.5	10.8	0.31	0.42	0.31	47.7
Approach		730	2.0	730	2.0	0.304	3.4	LOS A	1.5	10.8	0.31	0.42	0.31	47.0
East: St Laurent														
4	L2	723	2.0	723	2.0	0.292	7.7	LOS A	1.4	10.2	0.20	0.56	0.20	47.5
5	T1	54	2.0	54	2.0	0.292	4.5	LOS A	1.4	10.2	0.20	0.55	0.20	35.4
6	R2	18	2.0	18	2.0	0.292	2.7	LOS A	1.4	10.2	0.20	0.55	0.20	45.8
Approach		795	2.0	795	2.0	0.292	7.4	LOS A	1.4	10.2	0.20	0.56	0.20	46.4
North: Service Road														
7	L2	9	50.0	9	50.0	0.030	11.2	LOS B	0.1	1.0	0.54	0.67	0.54	46.9
8	T1	6	50.0	6	50.0	0.030	5.6	LOS A	0.1	1.0	0.54	0.67	0.54	46.7
9	R2	3	50.0	3	50.0	0.030	5.9	LOS A	0.1	1.0	0.54	0.67	0.54	45.3
Approach		18	50.0	18	50.0	0.030	8.5	LOS A	0.1	1.0	0.54	0.67	0.54	46.6
West: Elmvale Mall														
10	L2	5	2.0	5	2.0	0.285	4.5	LOS A	1.2	8.4	0.57	0.51	0.57	37.6
11	T1	114	2.0	114	2.0	0.285	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	37.0
12	R2	125	2.0	125	2.0	0.285	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	36.3
Approach		244	2.0	244	2.0	0.285	2.6	LOS A	1.2	8.4	0.57	0.51	0.57	36.7
All Vehicles		1787	2.5	1787	2.5	0.304	5.1	LOS A	1.5	10.8	0.30	0.50	0.30	45.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.