5566 Robinson Street, Niagara Falls, ON Traffic Impact & Parking Study

Paradigm Transportation Solutions Limited

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210614

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Project Summary

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Client
La Pue International Inc.
6158 Allendale Avenue
Niagara Falls ON L2G 0A5

Client Contact
Lisa Vo

5566 Robinson Street, Niagara Falls, ON Transportation Impact & Parking Study (2nd Submission)

Consultant Project Team
Stew Elkins, B.E.S
Adam Makarewicz, CET, MITE
Greg Lue, M.A.Sc., P.Eng.
Erica Bayley, P.Eng.

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Paradigm Transportation Solutions Limited
5A-150 Pinebush Road
Cambridge ON N1R 8J8
p: 519.896.3163
905.381.2229
416.479.9684
www.ptsl.com

Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study (TIS) and Parking Study for a proposed residential and commercial development located at 5592 Robinson Street & 6158 Allendale Avenue in the City of Niagara Falls.

This study aims to determine the net impacts of the development traffic on the surrounding road network and document the adequacy of the proposed parking supply. This study will identify any improvements, if needed, to support the Site's development.

A previous transportation impact study was prepared for this development in 2022[1]. The City and Region reviewed the study and provided comments. The comments received to date have been addressed within this updated report.

Findings

This study evaluated the impacts of the construction of 962 new residential dwelling units and 516 m^2 (5,553 sq.ft.) for ground-floor retail.

Vehicle access to the Site is proposed through a driveway connection to Robinson Street and a driveway connection to Allendale Avenue. Access to underground parking is proposed through the north access to Allendale Road, while access to the above-ground parking is proposed through the west access to Robinson Street.

Transportation Impact Study

- The proposed development will generate approximately 269 AM new peak hour trips and 310 PM new peak hour trips. For clarification, the trip generation estimates do not consider modal split credits. The subject site's location is within walking distance of many nearby amenities that would offer somewhat reduced vehicular trips than what is portrayed herein.
- Detailed traffic analysis was conducted for each study area intersections under Base traffic conditions and 2031 Background and Total traffic conditions.

[1] 210614: 5566 Robinson Street, Niagara Falls, ON – Traffic Impact and Parking Study, Paradigm, April 2022

- The capacity analysis showed that the study area intersections would experience localized traffic congestion from background traffic growth in the PM peak hour. Based on the analysis, the following capacity constraints are noted:
  - **Stanley Street and Ferry Street** – The westbound through lane is projected to operate with high delays in the future 2031 horizon (with and without the development). The eastbound and southbound left-turn movements and northbound and southbound shared through/right turn lane is also projected to operate at LOS F with a v/c ratio greater than 1.00. From a vehicle capacity perspective, widening the Ferry Street corridor is expected to alleviate this condition. However, it should be evaluated further from the Region's view, given its implications regarding the active transportation network and property impacts. The Niagara Region TMP recognizes the significant regional corridors already experience congestion and operational constraints and has long been recognized as challenges to travel in Niagara Region.
  - **Stanley Street and Robinson Street** – Under the future 2031 horizon (without the development), the westbound and southbound approaches are projected to operate at LOS D with a v/c ratio greater than 0.90 during the weekday PM peak hour. A possible mitigation measure is implementing a permitted/protective phase (advanced green) for the southbound approach and optimizing the cycling length and splits.
  - **Allendale Avenue and Ferry Street** – Under the 2031 Total horizon (with the development), the northbound approach is projected to operate at LOS E. Traffic control signals are not recommended given the insufficient intersection spacing. As a v/c of 0.55 is projected, the northbound approach operates at 55% or less of its available capacity. As northbound left-turning traffic is moderate (27 during the weekday PM peak hour), it is expected that, over time, residents will redistribute and reroute through Robinson Street/Main Street to avoid turning movements at the unsignalized intersection.
- A sensitivity analysis has been completed and identified that the study area intersections are expected to operate with considerable improvements with the proposed improvements noted above.

Residential Parking

- Zoning by-law (ZBL 79-200) stipulates a parking supply of 1.40 parking spaces per residential unit.
- Parking regulations stipulated in the City of Niagara Falls By-law for residential zones are 35% higher than neighbouring municipalities that have adopted new standards.
- The Site provides a robust pedestrian-oriented environment and connects to various critical destinations within Niagara Falls. The site vicinity is served by a combination of road types with pedestrian sidewalks.
- The level of transit accessibility provided in the area offers good non-automobile travel opportunities and reduces the need to use a car to access the Site. In addition to the Site being served by three local transit routes, the Main Street Hub is located approximately 850 metres (12-minute walk) from the subject site, where additional transit routes can be accessed.
- A review of the travel characteristics of trips made to/from the area during the weekday periods indicates that over 20% of trips are made by non-auto means.
- A review of vehicle rates for the city suggests that approximately 35 percent of apartments surveyed do not own a vehicle. Further disposition of the survey results can conclude that the actual vehicle ownership, based on a weighted average, is 0.74 vehicles per unit.
- Lower vehicle ownership rates may be seen for seniors or lower-income residents; however, the TTS data indicates that 57% of residents within an apartment building are under the age of 60, with 51% of residents having an income up to 40,000 dollars per year. The median income in Ontario was reported at $37,500 in 2019, based on the latest information through Statistics Canada. The demographic for apartments is evenly split between seniors and adults, and the income levels are on par with the typical median in Ontario.
- Paradigm reviewed a proxy site survey for an existing high-rise residential condominium complex in St. Catharines that observed a maximum rate of 0.89 spaces/unit.
- Sales data from phase one of an adjacent development 300 metres to the north (5528 Ferry Street) shows a parking rate of 0.64 parking spaces per unit. At a more refined level, the parking demand per bedroom is summarized as follows:

  - 0.60 spaces per 1 Bedroom Unit
  - 0.58 spaces per 1 Bedroom + Den Unit
  - 0.68 spaces per 2 Bedroom Unit
- Providing reduced parking to promote non-automotive uses is consistent with best practices and is reflected in the City's Transportation Master Plan. The TMP explicitly states that the city will consider Transportation Demand Management in the context of all development reviews.
- By incorporating TDM measures such as bicycle parking spaces per unit, car share spaces, and unbundled parking, parking demand for the Site will further support the proposed supply of 0.74 spaces per unit.

Conclusions

The signal timing plans of the study area intersections are recommended to be modified to accommodate the increased background traffic growth and site traffic within the study area.

It is acknowledged that the intersection of Ferry Street and Stanley Street currently exhibits several movements operating with high levels of delay during the weekday PM peak hour. The delay will increase further with general growth projected for the area (without the proposed development). The Niagara Region TMP recognizes the significant regional corridors already experience congestion and operational constraints and has long been recognized as challenges to travel in Niagara Region.

From a vehicle capacity perspective, widening the Ferry Street corridor is expected to alleviate this condition; however, given the property constraints in this area, it is not likely feasible that additional through lane capacity can be implemented to address the noted congestion issues. It is understood that the Region and the City are aware of the congestion issues occurring in this area. The congestion issues appear to be primarily driven by tourism. Traffic Demand Management measures geared explicitly at visitors to the City of Niagara Falls, such as encouraging the use of WEGO to reduce vehicle travel within the tourism core, should be considered by the City and Region to address the issue.

The addition of a westbound right-turn lane at the intersection of Stanley Avenue and Robinson Street is expected to alleviate forecasted congestion in the PM peak hour. With the existing lane width, it is possible that the right-turn lane can be painted without the need to widen the roadway.

The City of Niagara Falls growth objective is to create and develop a transit and pedestrian-friendly, sustainable, and livable City through urban design criteria and guidelines. The Official Plan embraces sustainability and creates a vision for complete compact communities served by streets made for walking, cycling, and an attractive transit system. This vision is supported by policies to reduce auto dependence and limit the amount of land occupied by automobile parking. The transportation policies are deliberately interspersed with the land-use policies to emphasize the importance of considering both areas to achieve the overall vision of complete compact communities.

The parking supply is one of the most critical measures to shift demand from vehicles to sustainable travel modes. Research conducted focused on the provision of off-street parking and the choice to drive among individuals travelling. This research found that reductions in off-street vehicular parking for office, residential, and retail developments reduce the overall automobile mode share associated with those developments relative to projects with the same land uses in similar contexts that provide more off-street vehicular parking.

This research is further echoed within the Government of Ontario's "Housing Affordability Task Force." One of the main recommendations by the Housing Task Force is removing or reducing the parking requirements in cities with over 50,000 in population. The report identified that residential minimum parking requirements should ensure a basic, responsible parking level is provided without increasing development costs. Minimum parking requirements add as much as $165,000 to the price of a new housing unit.

A parking supply of 0.74 spaces per residential unit is supported for the area based on a review of vehicle ownership rates and previous sales data from an adjacent high-rise development. This sales data provides further support and justification that the number of parking spaces that have been sold is well below the City's Zoning requirements and is reflective of an average rate of 0.64 spaces per unit. While the Phase 1 data only represents a third of the residential units, it strongly supports the notion that the proposed supply of 0.74 spaces per unit is supportable.

Lastly, the proposed parking supply is supported through a robust Transportation Demand Management (TDM) program that includes bicycle parking, active uses at grade, car share vehicles, and unbundled parking.

Recommendations

Based on the findings of this study, the following is recommended:

- The City of Niagara Falls monitors operations of the signalized intersections along Stanley Avenue to ensure appropriate signal timing plans.
- The Region of Niagara reviews the operations along the Ferry Street and Stanley Street intersections against the policies within the TMP to determine the preferred approach to accommodating all modes of transportation.
- The City of Niagara Falls consider the addition of a westbound right-turn lane at the intersection of Stanley Avenue and Robinson Street.
- The development implements a robust Transportation Demand Management program to support the reduced parking supply of 0.74 spaces per unit.

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1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study (TIS) and Parking Study for a proposed residential and commercial development located at 5592 Robinson Street & 6158 Allendale Avenue in the City of Niagara Falls. **Figure 1.1** illustrates the location of the subject site.

Figure 1.1 illustrates the location of the subject site.

This study determines the impacts of the additional traffic generated by the subject site on the surrounding road network and the remedial measures necessary to accommodate future traffic satisfactorily. The scope of this study includes:

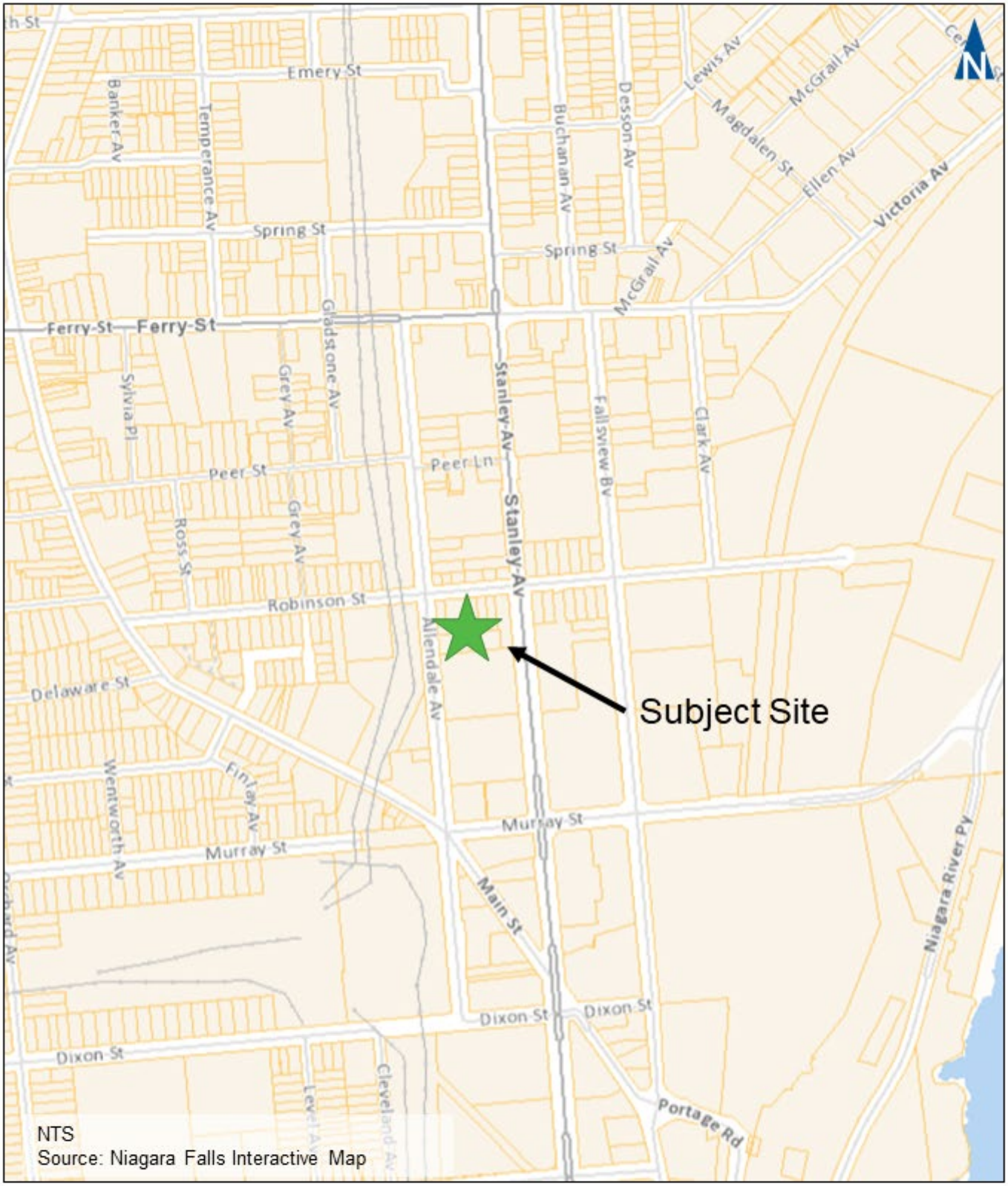
- Determine and assess the current study area traffic conditions;
- Forecast the additional traffic generated by the proposed development;
- Analyze the impacts of the additional traffic on the study area intersections for the horizon year of 10-years (2031);
- Recommend any necessary remedial measures to mitigate the traffic impacts; and
- Review the proposed parking supply, and determine its adequacy compared to estimated parking demands.

The study scope was developed in consultation with the Niagara Region and the City of Niagara Falls in November 2021. **Appendix A** contains the pre-study consultation material.

1.2 Study Area

The study area intersections assessed in this study include:

- Robinson Street & Main Street (unsignalized);
- Robinson Street & Allendale Avenue (unsignalized);
- Robinson Street & Stanley Avenue (signalized);
- Allendale Avenue & Main Street & Murray Street (signalized);
- Stanley Avenue & Ferry Street (signalized);
- Stanley Avenue & Main Street & Dixon Street (signalized);
- Ferry Street & Allendale Avenue (unsignalized) ;
- Stanley Avenue & Murray Street (signalized); and
- Two site driveways.



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Location of Subject Site

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Figure 1.1

2 Existing Conditions

2.1 Roadway Characteristics

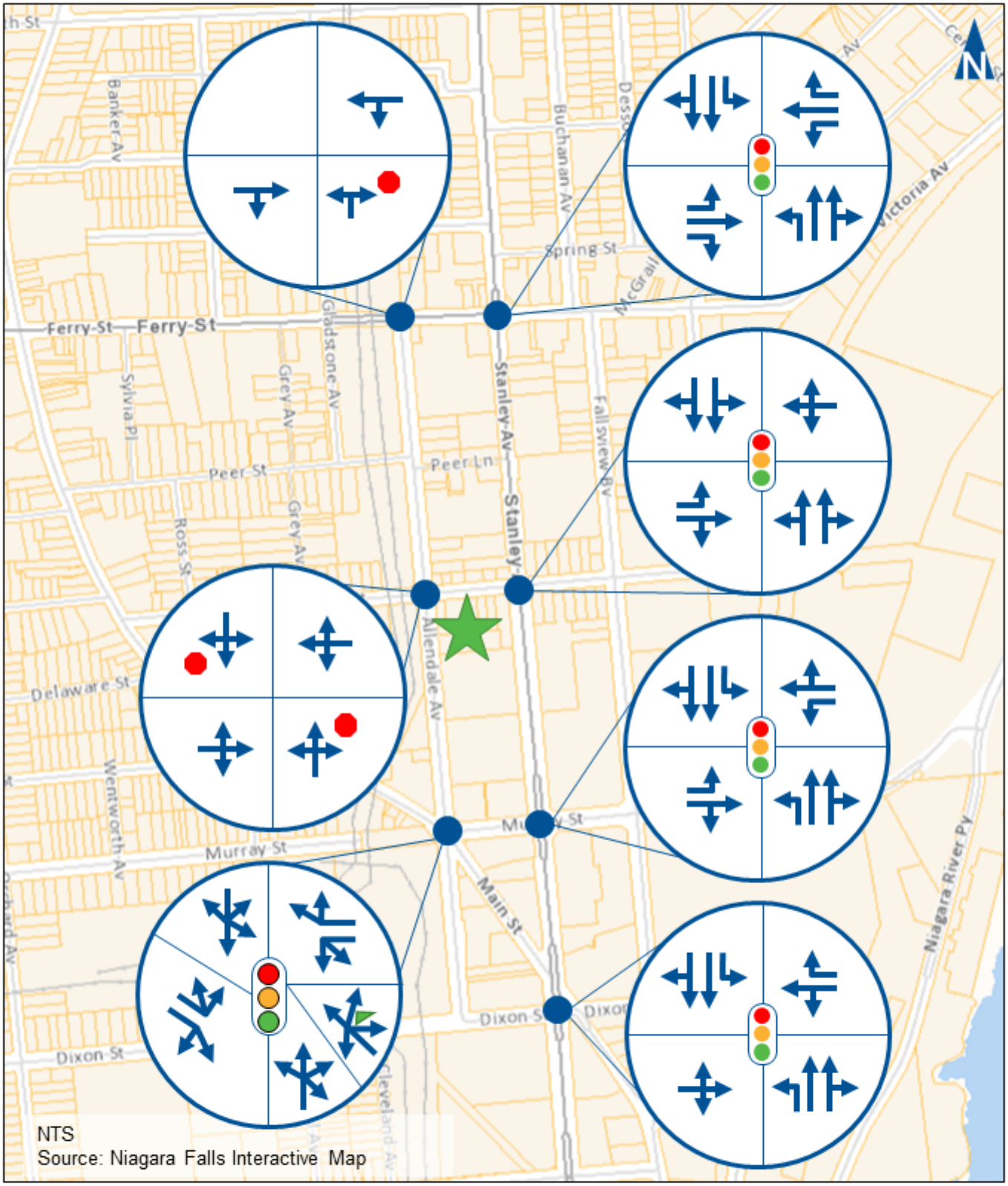
The City of Niagara Falls roadways of interest within the study area include:

- **Ferry Street** is an east-west regional road[2] with a two-lane cross-section. The statutory speed limit of 50 km/h is assumed. Sidewalks are present on both sides of the road. No dedicated on-street cycling facilities are present on the road.
- **Robinson Street** is an east-west collector[3] road east of Allendale Avenue and local road west of Allendale Avenue. The road has a two-lane cross-section, and the statutory speed limit of 50 km/h is assumed. Sidewalks are present on both sides of the road. No dedicated on-street cycling facilities are present on the road.
- **Murray Street** is an east-west collector road with a two-lane cross-section. The statutory speed limit of 50 km/h is assumed. Sidewalks are present on both sides of the road. No dedicated on-street cycling facilities are present on the road.
- **Stanley Avenue** is a north-south regional road with a four-lane cross-section south of Ferry Street and a five-lane cross-section (two lanes in each direction and a centre two-way left-turn lane) north of Ferry Street. Sidewalks are present on both sides of the road. No dedicated on-street cycling facilities are present on the road. The statutory speed limit of 50 km/h is assumed.
- **Allendale Avenue** is a north-south collector road with a two-lane cross-section. The statutory speed limit of 50 km/h is assumed. Sidewalks are present on the west side of the road, south of Main Street, and on the east side, north of Robinson Street. No dedicated on-street cycling facilities are present on the road.
- **Main Street** is an east-west collector road with a two-lane cross-section. The statutory speed limit of 50 km/h is assumed. Sidewalks are present on both sides of the road. No dedicated on-street cycling facilities are present on the road.

[2] Niagara Region – Regional Road Map 2021
[3] City of Niagara Falls – Official Plan Schedule C 2008

- **Dixon Street** is an east-west collector road with a two-lane cross-section. The statutory speed limit of 50 km/h is assumed. Sidewalks are present on both sides of the road, east of Stanley Avenue and west of Stanley Avenue on the south side of the road. No dedicated on-street cycling facilities are present on the road.

Figure 2.1 illustrates the existing lane configurations and traffic control at the study area intersections.



Existing Lane Configuration & Traffic Control

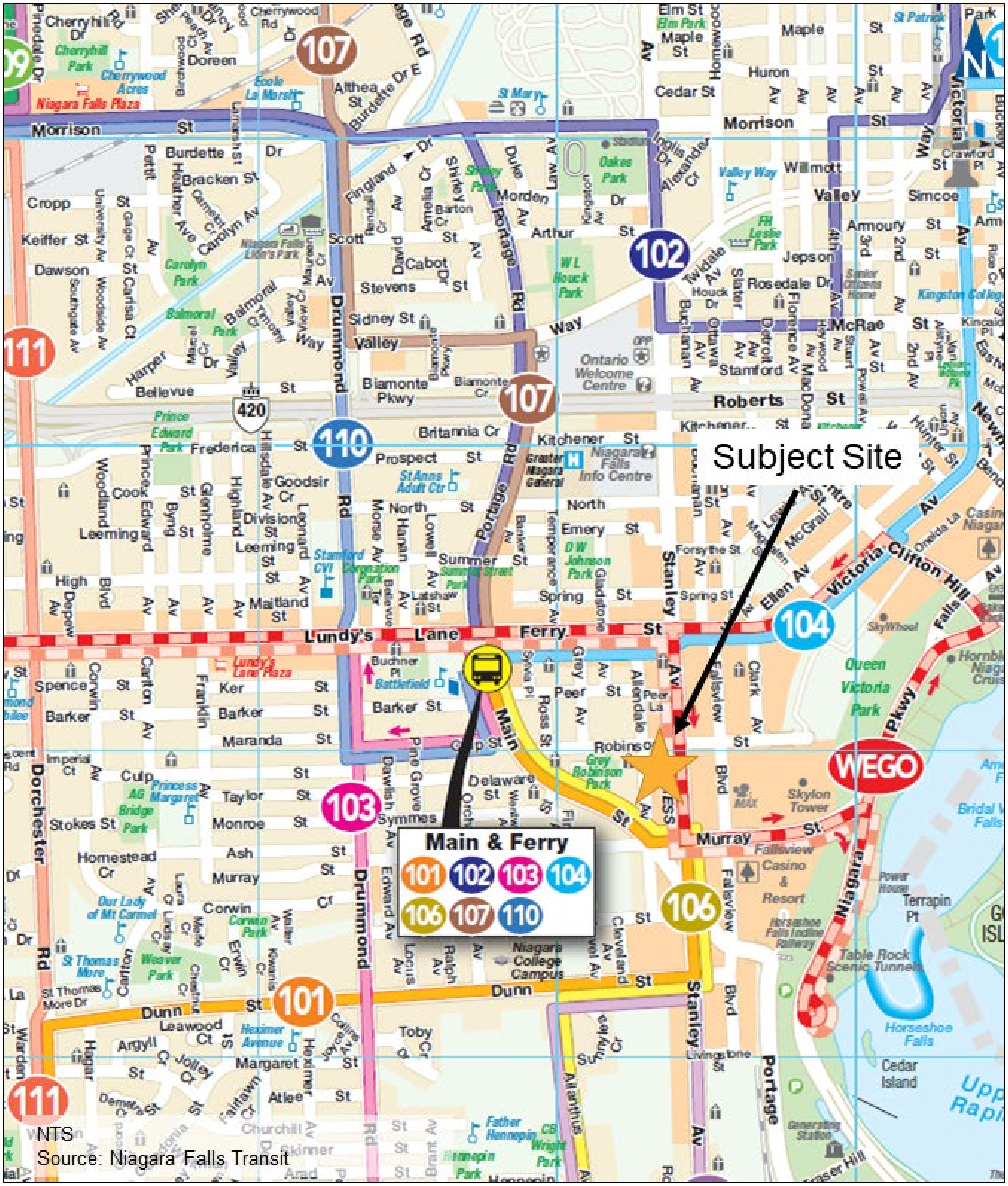
2.2 Transit Service

Transit service in Niagara Falls is provided by two operators: Niagara Falls Transit (NFT) and Niagara Region Transit (NRT). NFT operates local transit routes within the city, while NRT provides regional service between various municipalities. NRT does not currently use any roads within the study area. NFT operates the following routes, which offer direct connections to the subject site:

- **Route 101** operates between the Main Street & Ferry Street terminal and the Canadian Drive Hub, running along Dunn Street and McLeod Road. Service is provided Monday to Saturday from approximately 6:32 AM to 5:54 PM with up to 30-minute headways.
- **Route 106/206** operates between the Main & Ferry transit terminal and Willoughby & Gunning intersection, running along Stanley Avenue and Portage Road. Service is provided Monday to Saturday from approximately 6:00 AM to 11:20 PM with up to 30-minute headways. Sunday service is provided between 7:00 AM and 8:50 PM with 30-minute headways.
- **WEGO Red Line** provides service along Lundy's Lane between Campark Resort and Table Rock Welcome Centre. Service runs every 30 minutes between 6:00 AM and 10:22 PM on Sunday to Thursday (Sunday service starts one hour later at 7:00 AM). On Friday and Saturday, bus service runs every 30 minutes between 6:00 AM and 12:22 AM.

The Main Street Hub is located approximately 850 metres (12-minute walk) from the subject site. At the Main Street & Ferry Street terminal, additional NFT routes can be accessed.

Figure 2.2 illustrates the existing local transit network within the study area. The closest bus stops are located within a 2-minute walk: the first is approximately 100 metres (1-minute walk) east along Robinson Street, and the second is 150 metres (2-minute walk) north on Stanley Avenue.



Existing Local Transit Network

Figure 2.2

2.3 Pedestrian and Cycling Network

Pedestrian infrastructure typically consists of sidewalks or multi-use paths parallel to the roadway. Cycling infrastructure typically consists of on-street and off-street facilities. On-street facilities comprise cycling lanes, signed cycling routes, and paved shoulders. Off-street facilities are in the form of multi-use or informal trails.

Pedestrian infrastructure within the study area consists of sidewalks generally on both sides of the road for most roads in the study area, except Allendale Avenue.

However, there are no dedicated on-street cycling facilities within the study area.

2.4 Traffic Volumes

To assess intersection operations, Turning Movement Counts (TMC) is used to quantify the movement of vehicles. Existing traffic counts at an intersection or on a road section form the analysis's foundation. The traffic counts are usually collected during peak periods at an intersection to complete the level of service analysis.

Weekday peak hour TMC data was collected by Niagara Region, City of Niagara Falls, and Paradigm between 2019 and October 2021. **Table 2.1** summarizes the location and date of the existing TMC data collected for the analysis. **Appendix B** contains the turning movement data. Traffic data collected before 2021 has been factored in using a 2% per annum growth rate.

TABLE 2.1: TRAFFIC COUNT LOCATION AND DATE

Intersection	Date
Robinson Street & Allendale Avenue (unsignalized);	August 2018/July 2019
Robinson Street & Stanley Avenue (signalized);	June 2018
Allendale Avenue & Main Street & Murray Street (signalized);	October 2021
Stanley Avenue & Ferry Street (signalized);	July 2019
Stanley Avenue & Main Street & Dixon Street (signalized);	November 2016
Ferry Street & Allendale Avenue (unsignalized); and	August 2018
Stanley Avenue & Murray Street (signalized).	August 2015

Traffic volumes within Niagara Falls vary depending on the season. During the summer months, Niagara Falls attracts a large number of

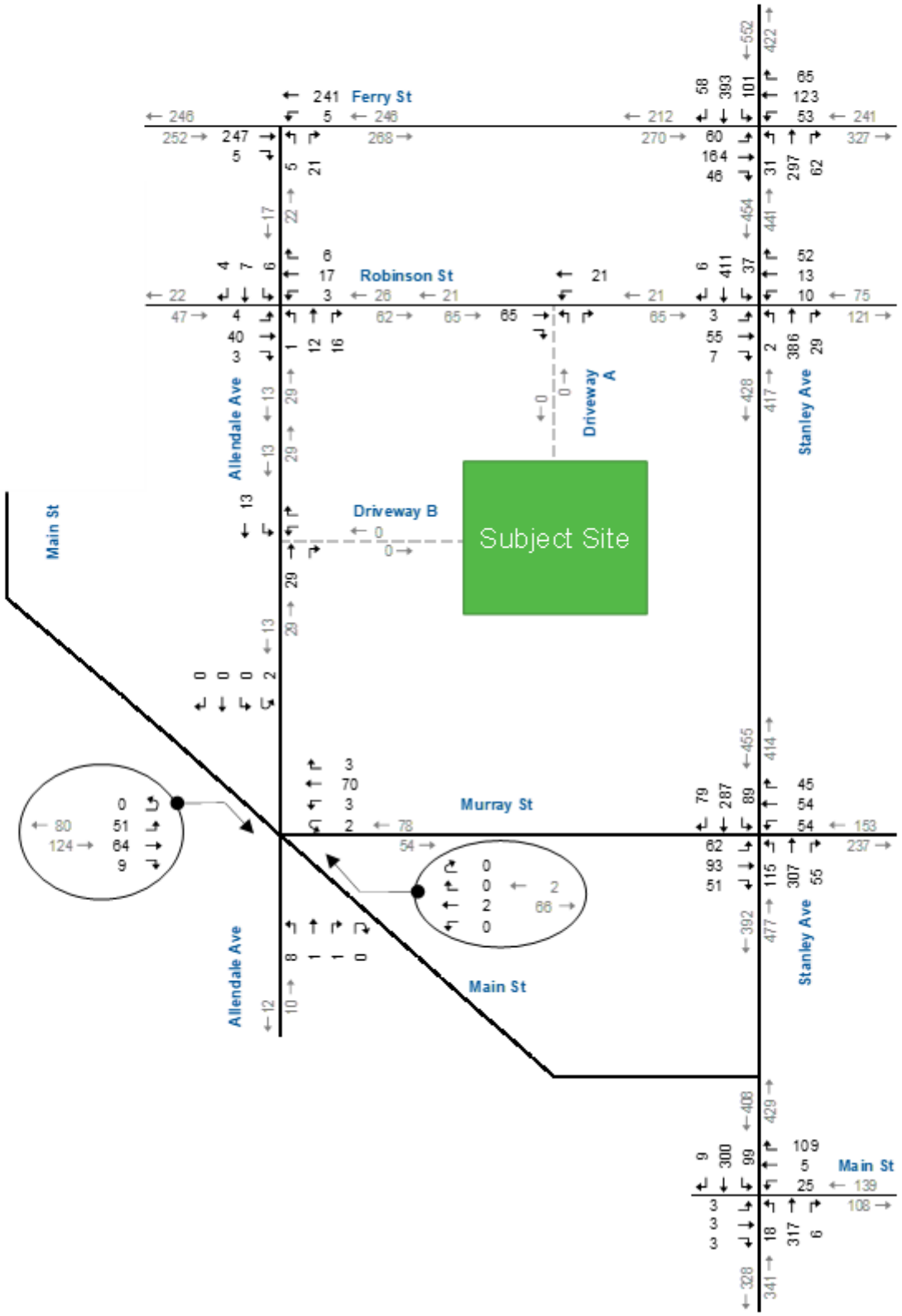
tourists, resulting in summer traffic volumes being noticeably higher than the rest of the year.

Niagara regional road traffic data[4] from 2018 shows that summer average daily traffic on Ferry Street (Regional Road 20) and Stanley Avenue (Regional Road 102) varies between 12% lower to 17% higher than the average annual daily traffic within the study area.

Based on the data, a seasonal factor of 1.15 (15% increase) was applied to the traffic counts collected in October and November.

Figure 2.3 illustrates the base year traffic volumes.

[4] Niagara Region, Regional Road Traffic Volumes 2020 https://niagaraopendata.ca/dataset/regional-road-traffic-volumes



Base Year Traffic Volumes
AM Peak Hour

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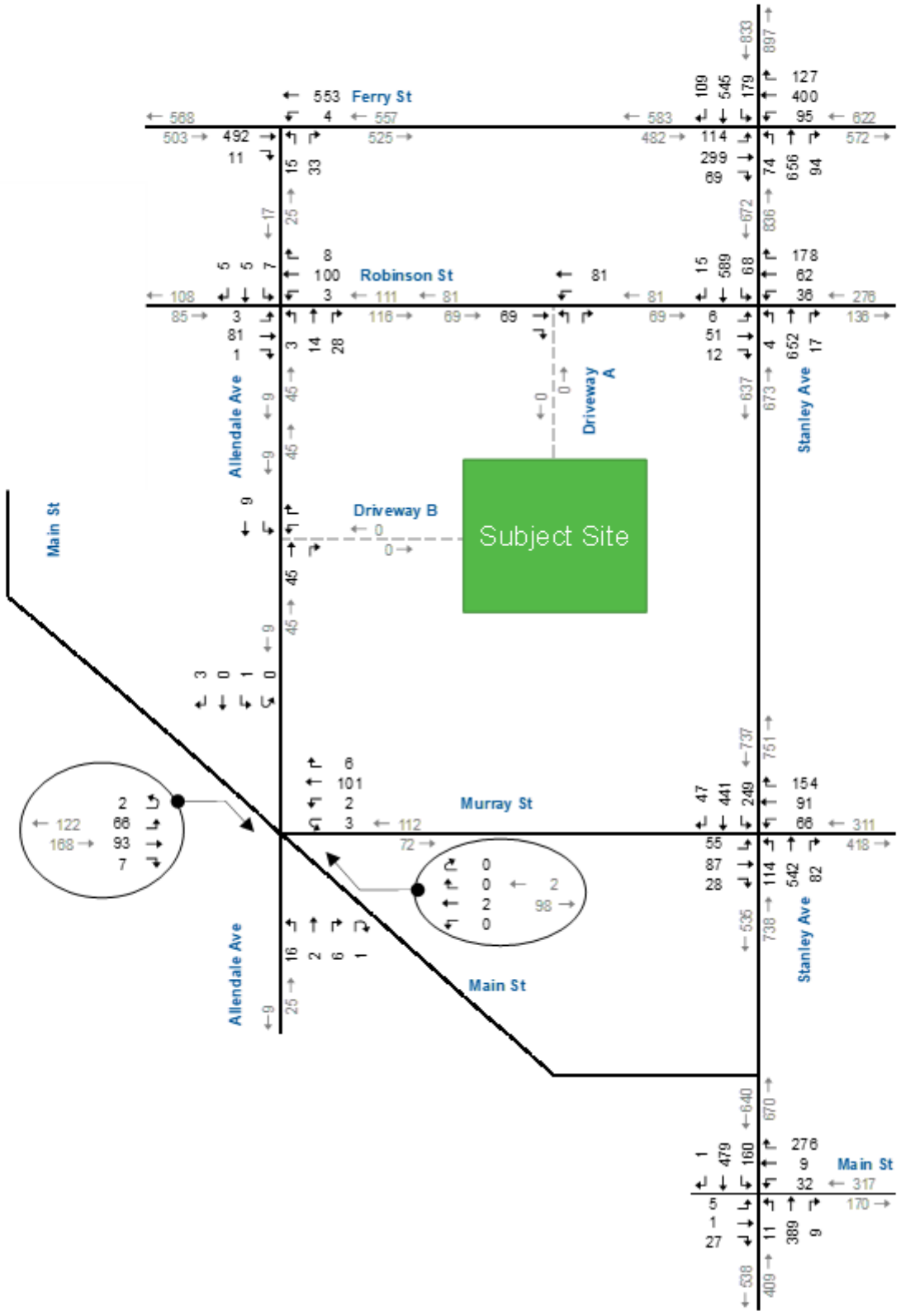
Figure 2.3a



Base Year Traffic Volumes
PM Peak Hour

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Figure 2.3b

2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying traffic flow efficiency at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to move compared to the estimated capacity for that movement. The capacity is based on several criteria related to the opposing traffic flows. The highest possible rating is LOS A, under which the average total delay is equal to or less than 10 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections (50 seconds at unsignalized intersections), the movement is considered to have a LOS F and remedial measures are usually implemented if feasible.

The intersections' operations in the study area were evaluated using the existing lane configuration, traffic control, existing base year traffic volumes and signal timings. In locations where current signal timings were not available, Synchro optimized signal timings were used.

The service conditions on the existing road network have been assessed using Synchro 10. Based on City of Niagara Falls guidelines[5], movements are considered critical under the following conditions:

- Signalized intersections:
  - Volume to capacity ratios for through movements or shared through/turning movements is greater than or equal to 0.85,
  - Volume to capacity ratios for exclusive turning movements is greater than or equal to 0.95, and
- Unsignalized intersections
  - Delays classified as LOS E-F;

[5] Guidelines for the Preparation of Transportation Impact Studies and Site Plan Review, Niagara Falls, 2011

The service conditions on the existing road network have been assessed using Synchro 10. **Table 2.3** summarizes the results of the analysis for the current weekday AM and PM peak hour intersection operations, and the critical movements are outlined below:

Weekday PM Peak Hour

- Stanley Street & Ferry Street (signalized):
  - Westbound through lane operates with delays in the LOS D range with a v/c ratio greater than 0.85.
  - Southbound left-turn lane queue length extends beyond the available storage.
- Murray Street & Main Street / Allendale Avenue (signalized):
  - Southeast bound hard left/bear left-turn lane queue length extends beyond the available storage.

Appendix C contains the detailed Synchro reports.

TABLE 2.2A: BASE YEAR TRAFFIC OPERATIONS – AM PEAK HOUR

Analysis Period	Intersection	Control Type	Movement	Measure of Effectiveness										
				Direction						Approach		Overall		
				LOS	Delay (s)	V/C	95th	Storage	Available	LOS	Delay	LOS	Delay	V/C
AM Peak Hour	Stanley St & Ferry St	TCS	EB L	D	36	0.25	20	100	80	D	46	C	23.2	0.34
			EB T	D	51.8	0.70	58.9	--	--					
			EB R	D	40.1	0.03	2	45	43					
			WB L	D	36.2	0.25	18	35	17	D	41.7			
			WB T	D	44.8	0.53	45.3	--	--					
			WB R	D	40.4	0.05	7.7	30	22					
			NB L	A	10	0.07	7.5	25	18	B	12.9			
			NB T / R	B	13.2	0.22	39.5	--	--					
			SB L	A	7.6	0.18	18.8	55	36	B	10.9			
			SB T / R	B	11.7	0.26	47.7	--	--					
	Stanley St & Robinson St	TCS	EB L	C	29.2	0.03	2.6	35	32	C	30.9	A	7.4	0.26
			EB T / R	C	31	0.41	18.4	--	--					
			WB	C	30.1	0.23	14.7	--	--	C	30.1			
			NB	A	3.6	0.21	16.4	--	--	A	3.6			
			SB	A	3.8	0.24	18.7	--	--	A	3.8			
	Murray St & Stanley Ave	TCS	EB L	D	36.3	0.39	23.2	30	6.8	D	36.8	B	13.9	0.3
			EB T / R	D	37	0.49	39.3	--	--					
			WB L	D	37.2	0.44	21.7	30	8.3	D	35.8			
			WB T / R	D	35	0.27	24.2	--	--					
			NB L	A	7.3	0.22	22.1	70	48	A	6.8			
			NB T / R	A	6.6	0.20	25.3	--	--					
			SB L	A	4.5	0.16	10.5	60	50	A	3.8			
			SB T / R	A	3.6	0.17	15.5	--	--					
	Stanley St & Dixon St & Main St	TCS	EB	D	41.8	0.06	5.9	--	--	D	41.8	B	10.7	0.2
			WB L / T	D	43.7	0.33	15.2	20	4.8	D	42.3			
			WB R	D	41.9	0.08	16.3	--	--					
			NB L	A	4.2	0.03	2	65	63	A	5.4			
			NB T / R	A	5.5	0.16	19.5	--	--					
			SB L	A	2.6	0.15	7.1	135	128	A	3.8			
			SB T / R	A	4.1	0.14	17.3	--	--					
	Allendale Ave & Ferry St	TWSC	EB	A	0	0.16	0	--	--	A	0	A	0.6	--
			WB	A	0.2	0.00	0.1	--	--	A	0.2			
			NB	B	10.3	0.04	1	--	--	B	10.3			
	Allendale Ave & Robinson St	TWSC	EB	A	0.6	0.00	0.1	--	--	A	0.6	A	4	--
			WB	A	0.8	0.00	0	--	--	A	0.8			
			NB	A	9.1	0.03	0.8	--	--	A	9.1			
			SB	A	9.3	0.02	0.5	--	--	A	9.3			
	Murray St & Main St / Allendale Ave	TCS	WB HL / L	C	22	0.02	4	45	42	C	24	D	37	0.47
			WB BR / WBR	C	24	0.31	23	--	--					
			NB	C	32	0.15	6	--	--	C	32			
			SB	A	0	0.00	2	--	--	A	0			
			SEB HL / BL	A	0	0.00	18	20	2	A	0			
			SEB T / BR	A	0	0.00	21	--	--					
			NWB	C	22	0.01	2	--	--	C	22			

TWSC - Two-Way Stop Control *LOS - Level of Service* *HL - Hard Left*

TCS - Traffic Control Signal *V/C - Volume to Capacity Ratio* *BL - Bear Left*

TABLE 2.2B: BASE YEAR TRAFFIC OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Control Type	Movement	Measure of Effectiveness										
				Direction						Approach		Overall		
				LOS	Delay (s)	V/C	95th	Storage	Available	LOS	Delay	LOS	Delay	V/C
PM Peak Hour	Stanley St & Ferry St	TCS	EB L	C	25	0.47	24	100	76	C	31	C	34.6	0.76
			EB T	C	34.6	0.62	84.7	--	--					
			EB R	C	27	0.05	6.7	45	38					
			WB L	C	23.6	0.3	20.3	35	15	D	41.9			
			WB T	D	50.4	0.86	121	--	--					
			WB R	C	28.9	0.17	20.4	30	9.6					
			NB L	C	22.2	0.29	21.2	25	3.8	D	37.3			
			NB T / R	D	38.8	0.77	136	--	--					
			SB L	C	26.1	0.68	62.1	55	-7	C	28.5			
			SB T / R	C	29.2	0.58	104	--	--					
	Stanley St & Robinson St	TCS	EB L	C	23.6	0.06	3.4	35	32	C	24.2	B	12.5	0.51
			EB T / R	C	24.2	0.19	14.2	--	--					
			WB	C	33.2	0.7	41.7	--	--	C	33.2			
			NB	A	7.4	0.38	45.6	--	--	A	7.4			
			SB	A	8.1	0.46	49.6	--	--	A	8.1			
	Murray St & Stanley Ave	TCS	EB L	D	37.1	0.53	21.4	30	8.6	C	33.8	B	16	0.6
			EB T / R	C	32.2	0.32	29.7	--	--					
			WB L	C	32.8	0.35	22	30	8	D	36.6			
			WB T / R	D	37.7	0.63	51.3	--	--					
			NB L	B	12.9	0.29	33.9	70	36	B	12.8			
			NB T / R	B	12.8	0.41	70	--	--					
			SB L	A	8.9	0.59	36.5	60	24	A	6.5			
			SB T / R	A	5.2	0.24	31.2	--	--					
	Stanley St & Dixon St & Main St	TCS	EB	D	40.4	0.07	9.7	--	--	D	40.4	B	14.3	0.3
			WB L / T	D	42.7	0.38	18.3	20	1.7	D	41.4			
			WB R	D	41.2	0.21	24.3	--	--					
			NB L	A	5.4	0.02	1.9	65	63	A	6.7			
			NB T / R	A	6.8	0.2	30.3	--	--					
			SB L	A	3.2	0.25	14.7	135	120	A	4.3			
			SB T / R	A	4.7	0.22	32.3	--	--					
	Allendale Ave & Ferry St	TWSC	EB	A	0	0.32	0	--	--	A	0	A	0.8	--
			WB	A	0.1	0.00	0.1	--	--	A	0.1			
			NB	C	17.2	0.15	4.2	--	--	B	17.2			
	Allendale Ave & Robinson St	TWSC	EB	A	0.3	0.00	0	--	--	A	0.3	A	2.5	--
			WB	A	0.2	0.00	0	--	--	A	0.2			
			NB	A	9.6	0.06	1.5	--	--	A	9.6			
			SB	B	10.1	0.02	0.6	--	--	B	10.1			
	Murray St & Main St / Allendale Ave	TCS	WB HL / L	C	24	0.02	4	45	41	C	28	D	37	0.47
			WB BR / WBR	C	28	0.44	35	--	--					
			NB	C	34	0.26	12	--	--	C	34			
			SB	A	0	0.00	0	--	--	A	0			
			SEB HL / BL	C	28	0.34	24	20	-4	A	0			
			SEB T / BR	A	0	0.00	30	--	--					
			NWB	A	0	0.00	2	--	--	A	0			

TWSC - Two-Way Stop Control *LOS - Level of Service* *HL - Hard Left*

TCS - Traffic Control Signal *V/C - Volume to Capacity Ratio* *BL - Bear Left*

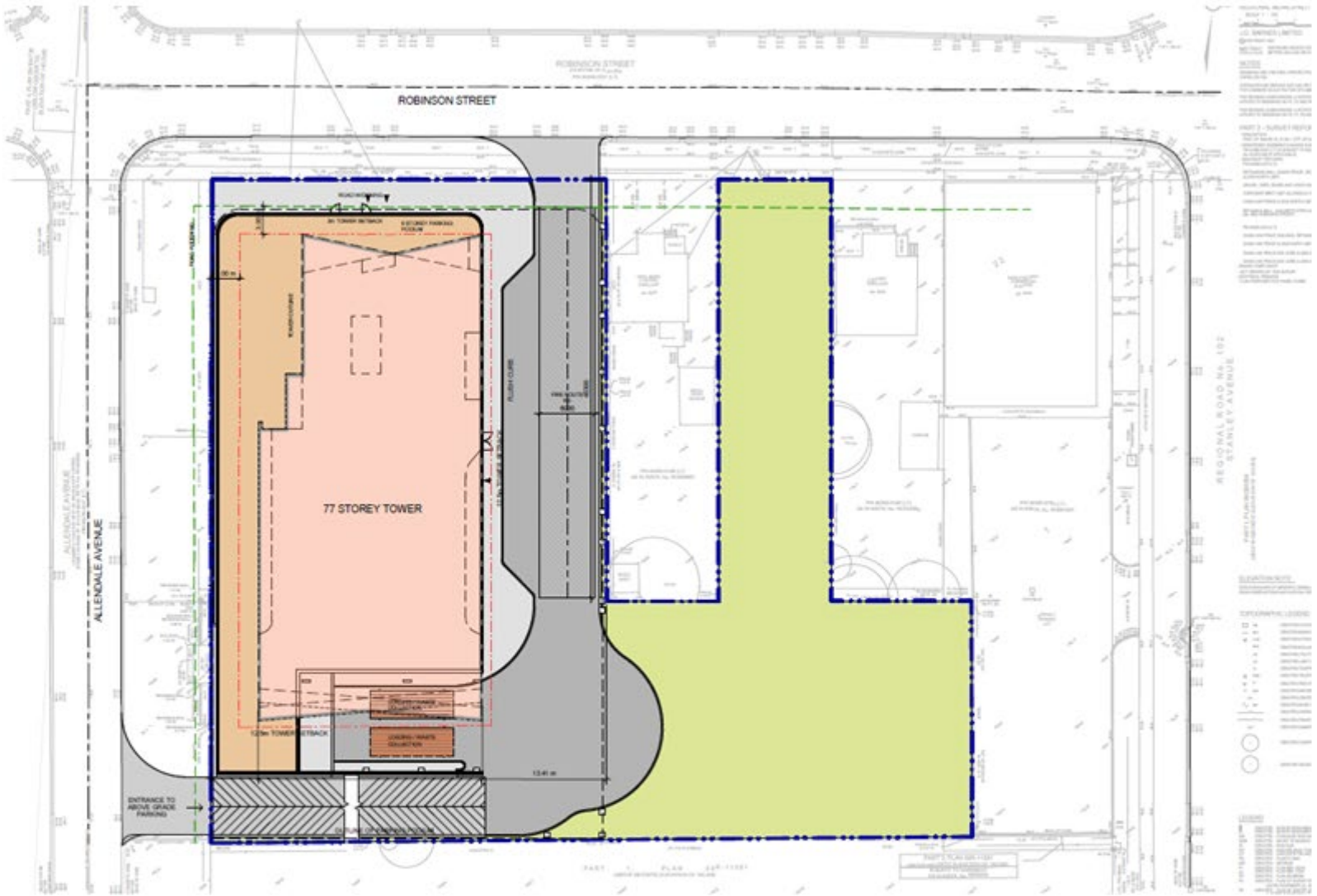
3 Development Concept

3.1 Site Description

The subject site is located at 5592 Robinson Street & 6158 Allendale Avenue in the City of Niagara Falls. The property owner proposes redeveloping the lands as a high-rise tower extending to 77 storeys with residential condominium units (962 units) and 516 m^2 (5,553 sq.ft.) of ground-floor retail. A total of 715 parking spaces are proposed.

Vehicle access to the Site is proposed through a driveway connection to Robinson Street and a driveway connection to Allendale Avenue. Access to underground parking is proposed through the north access to Allendale Road, while access to the above-ground parking is proposed through the west access to Robinson Street. Trips to the north and west accesses are assumed to be split proportional to the available parking (54% north access, 46% west access).

Figure 3.1 illustrates the site concept plan.



paradigm TRANSPORTATION SOLUTIONS LIMITED

Site Concept Plan

3.2 Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation[6] methods are used to estimate the site trip generation. The following land use codes were referenced:

- LUC 222 Multifamily Housing (High-Rise)
- LUC 822 Retail Plaza (<40,000 sq.ft GFA)

Data for the peak hour of adjacent street traffic were used to estimate trip generation. Fitted curve equations with satisfactory R^2 values and independent variables were applied. If no equations were provided or satisfactory R^2 values and independent variables were unavailable, the average rates have been applied.

The resulting summation is the "raw" trip generation – unadjusted for modal split credits. The effects of these other factors on the actual net new trip generation on the local roadway system are discussed in detail in the following sections. The subject site's location is within walking distance of many nearby amenities that would offer somewhat reduced vehicular trips than what is portrayed herein.

3.2.1 Internal Capture

The ITE Trip Generation Handbook describes a multi-use development as a single project that consists of two or more ITE land use classifications in which trips can be made between land uses without using the off-site roadway system. This sharing of trips between compatible land uses an internal capture without travelling off-site.

Based on this information, the proposed development is considered a multi-use development with compatible commercial land, and uses likely to share – or capture – trips that do not require vehicular travel outside the Site.

The ITE Trip Generation Handbook has been utilized to account for internal trips within the development. By way of example, some portion of the traffic destined to and from the retail uses located within the Site will likely originate from the on-site residential units, requiring only a walking trip. The detailed calculations are provided in **Appendix D**.

ITE data suggests an internal capture rate of up to 1-5% for the respective peak hours.

[6] Trip Generation Manual 10th Edition + Supplement Institute of Transportation Engineers Washington DC 2020

3.2.2 Pass-By Trips

Pass-by trips are a subset of a trip generation that only applies to commercial/retail developments. These trips are already present on the roadway in which businesses attract them to their Site as they pass by. The estimates of pass-by trips were derived using the Trip Generation Handbook published by ITE.

An example of a pass-by trip is a vehicle driving from home to work and stopping for coffee. It is noted that pass-by trips are already included in the background traffic stream and do not load additional traffic onto the road network. The ITE Trip Generation Handbook provides a 34% pass-by trip rate for LUC 820 during the weekday PM peak hour and 26% for the Saturday peak hour. No information is available for a pass-by rate during the weekday AM peak hour.

Based on the traffic volume distribution through the study area, it is assumed that the pass-by trips will come from Stanley Avenue.

3.2.3 Net Trip Generation Estimates

Table 3.1 summarizes the projected trip generation associated with the build-out of the development. As noted earlier, these estimates were based on the standardized ITE rates with internal and pass-by credits.

The development is estimated to generate approximately 269 AM new peak hour trips and 310 PM new peak hour trips. For clarification, the trip generation estimates do not consider modal split credits. The subject site's location is within walking distance of many nearby amenities that would offer somewhat reduced vehicular trips than what is portrayed herein.

Table 3.2 summarizes the estimated trip distribution for the subject site. The trip distribution is based on traffic count data and Transportation Tomorrow Survey[7] (TTS) data for the subject site zone. **Figure 3.2** illustrates site-generated peak hour traffic volumes.

[7] Transportation Tomorrow Survey 2016, University of Toronto Data Management Group.

TABLE 3.1: TRIP GENERATION

ITE Land Use Code / Number of Units	Trips	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Sum	Rate	In	Out	Sum
222 - Multifamily Housing (High-Rise) 686 Units	Total	Eqn.	88	172	**260**	Eqn.	188	120	**308**
	Internal	1%	1	1	**2**	2%	5	2	**7**
	New		**87**	**171**	**258**		**183**	**118**	**301**
822 - Retail Plaza (<40k sq. ft GFA) 4,299 sq.ft	Total	2.36	8	5	**13**	6.59	19	19	**38**
	Internal	15%	1	1	**2**	18%	2	5	**7**
	Pass-by	--	0	0	**0**	34%	11	11	**22**
	New	**--**	**7**	**4**	**11**	**--**	**6**	**3**	**9**
Total	**Total**	--	**96**	**177**	**273**	--	**207**	**139**	**346**
	Internal	1%	**2**	**2**	**4**	4%	**7**	**7**	**14**
	Pass-by	0%	**0**	**0**	**0**	6%	**11**	**11**	**22**
	New	**99%**	**94**	**175**	**269**	**90%**	**189**	**121**	**310**

Equations

LUC 222 Rate per Unit AM: 0.27 | PM: 0.32

LUC 822 Rate per 1,000 sq.ft GFA AM: 2.36 | PM: 6.59

3.2.4 Trip Distribution and Assignment

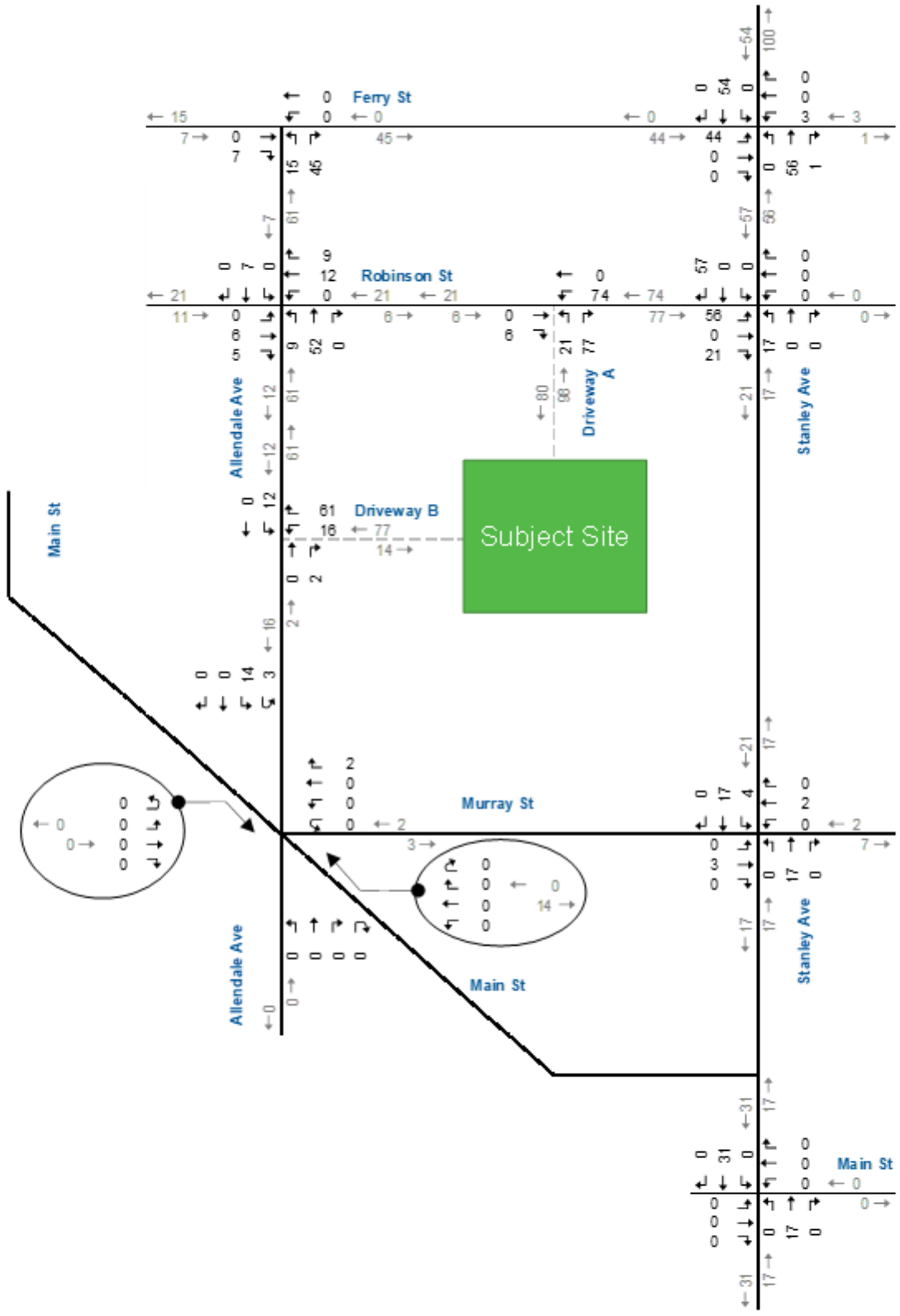
The directional distribution of traffic approaching and departing the development is a function of several variables: population densities, existing travel patterns, and the efficiency of the roadways leading to the Site. The estimated distribution is based on the Transportation Tomorrow Survey[8] (TTS) review. **Table 3.2** summarizes the estimated trip distribution.

TABLE 3.2: TRIP DISTRIBUTION

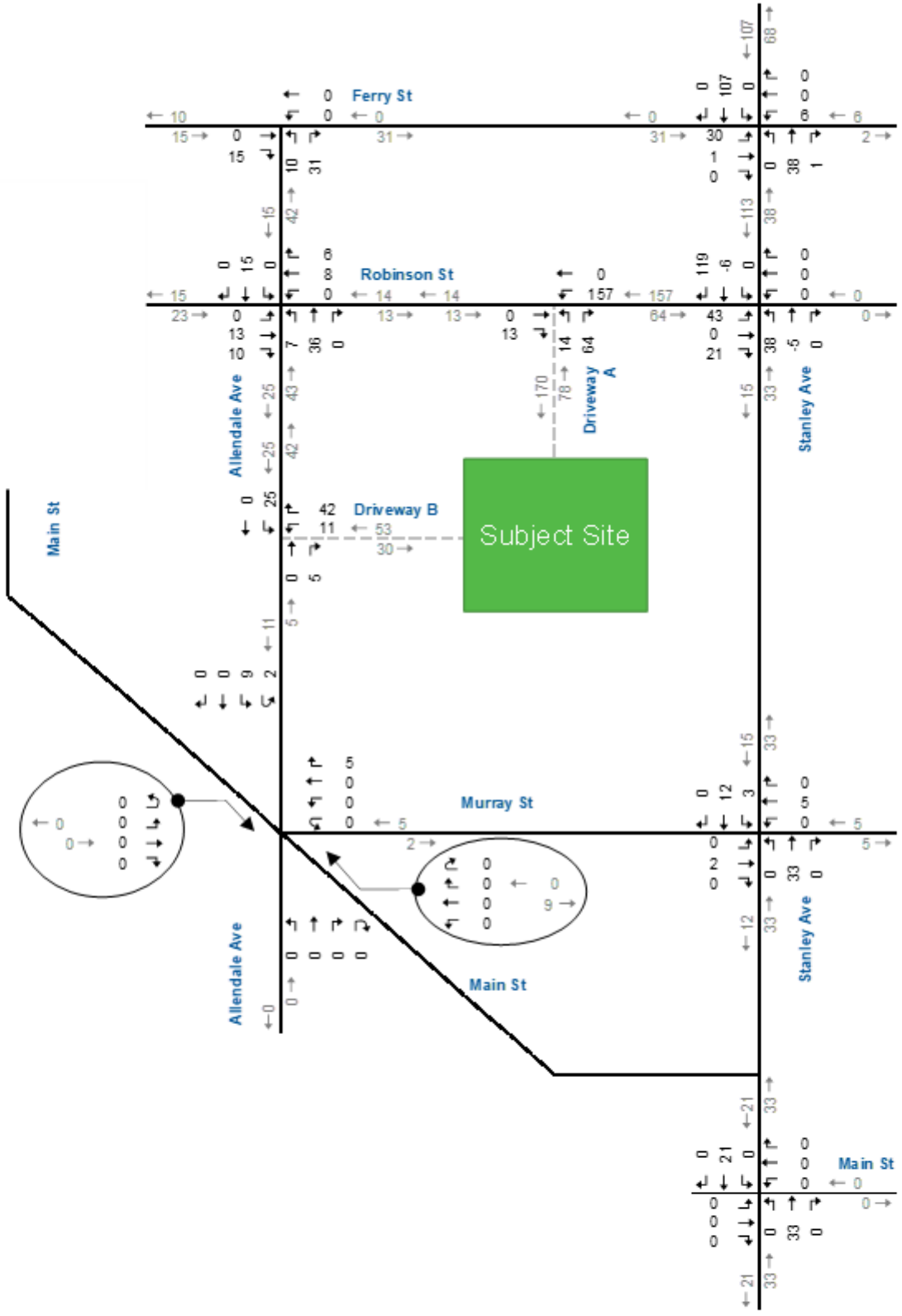
Distribution	IN	OUT
North via Stanley Avenue	57%	57%
South via Stanley Avenue	18%	17%
East via Ferry Street	3%	1%
West via Ferry Street	8%	9%
West via Main Street	12%	12%
East via Murray Street	3%	4%
TOTAL	**100%**	**100%**

The assignment of development forecasts is illustrated in **Figure 3.2.**

[8] Transportation Tomorrow Survey, Data Management Group, 2016



Site Generated Traffic Volumes
AM Peak Hour



Site Generated Traffic Volumes
PM Peak Hour

5566 Robinson Street TIS & Parking Study
210614

Figure 3.2b

4 Future Conditions

A 10-year horizon (2031) has been utilized to analyze future traffic conditions.

4.1 Future Traffic Growth

Traffic growth on area roadways is a function of the expected land development, economic activity, and changes in demographics. A frequently used procedure estimates an annual percentage increase and applies that increase to the study area traffic volumes. An alternative approach is to identify estimated traffic generated by specific planned significant developments that would be expected to affect the project study area roadways. For this assessment, both methods were utilized.

4.1.1 General Growth Rate

Based on discussions with City of Niagara Falls staff, a general growth rate of 2.0% was applied to the area roadways to account for population and employment growth.

4.1.2 Site Specific Growth

It was agreed with the City that traffic associated with the following developments would be included in the background traffic projections. Trip generation and distribution of traffic generated by the developments were taken from the respective traffic impact studies provided by the City[9]. The background developments included are located at the following locations:

- Stanley Avenue and Ferry Street southwest corner – Mixed-use development;
- Stanley Avenue and Dunn Street northwest corner – Mixed-use development;
- Stanley Avenue and Murray Street – Hyatt hotel; and
- East end of Robinson Street – Three hotels.

[9] Stanley Avenue and Ferry Street, Proposed Mixed-Use Development Traffic Impact and Parking Study, Associated Engineering, 2019

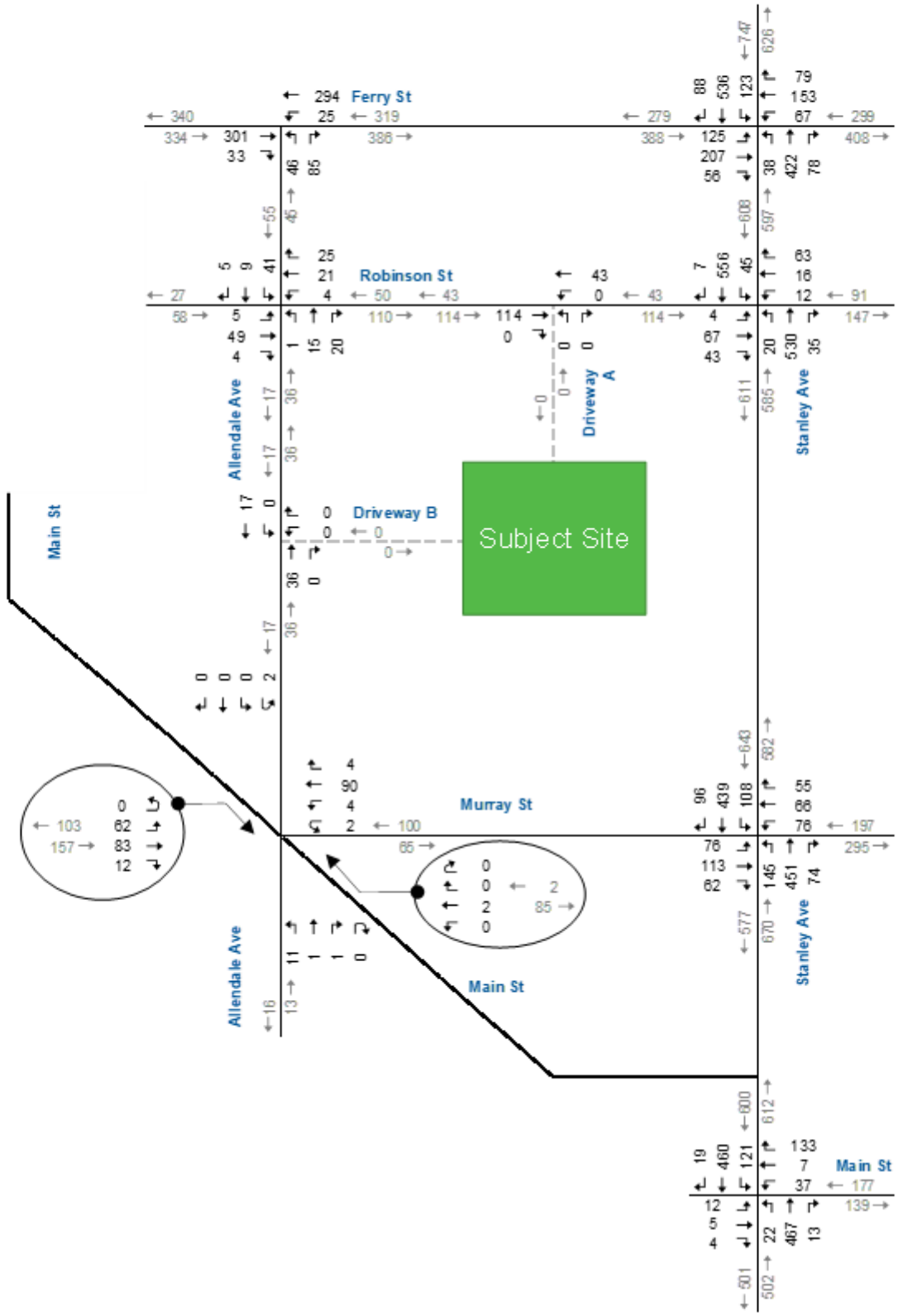
4.2 Future Traffic Projections

4.2.1 Background Projections

The forecast background traffic volumes within the study area are estimated to consist of generalized background traffic growth and other planned developments. **Figure 4.1** illustrates the forecasted background traffic volumes.

4.2.2 Total Projections

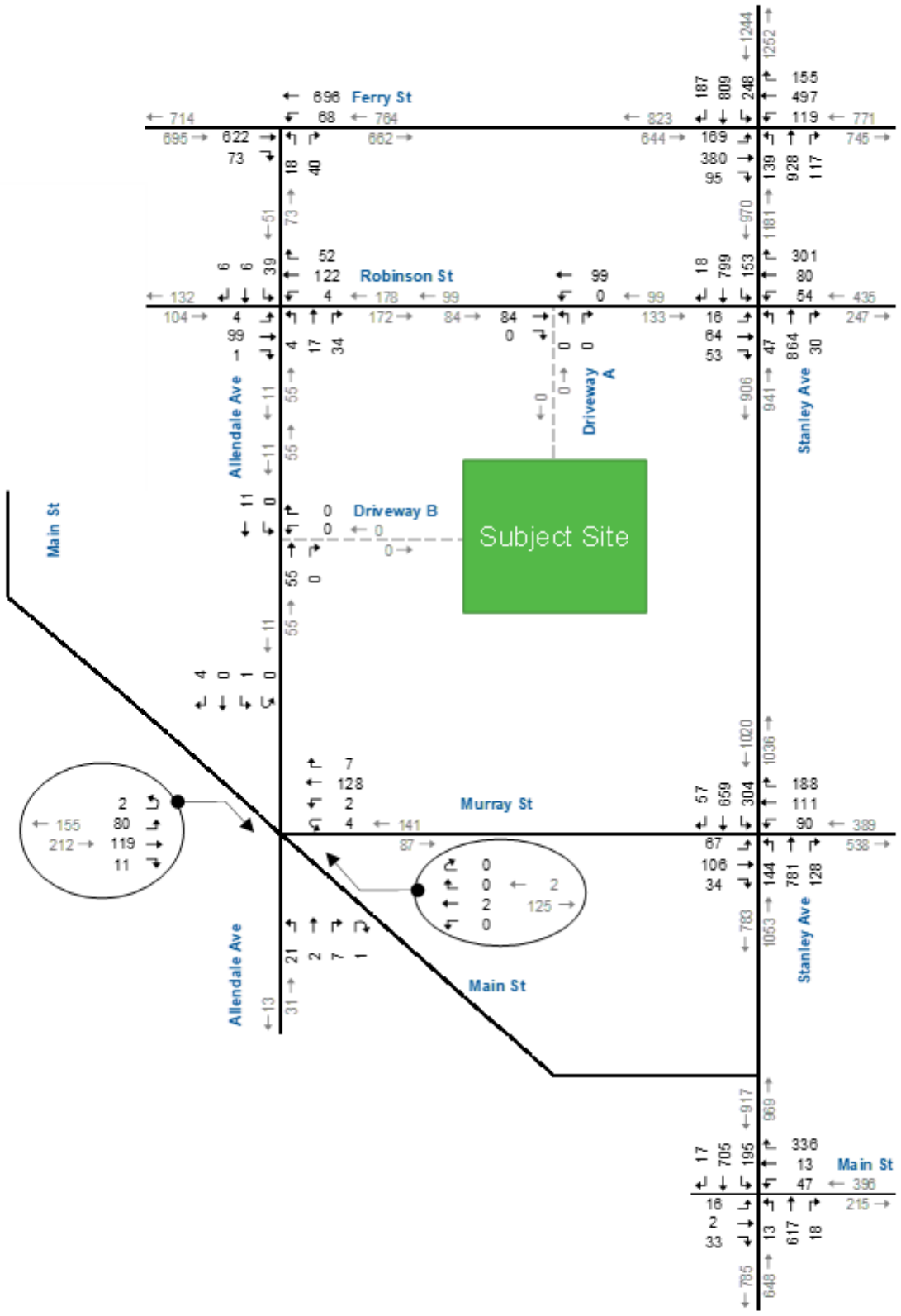
The forecasts total traffic volumes within the study area are estimated to consist of generalized background traffic growth, other planned developments, and Site generated traffic. **Figure 4.2** illustrates the forecasted total traffic volumes.



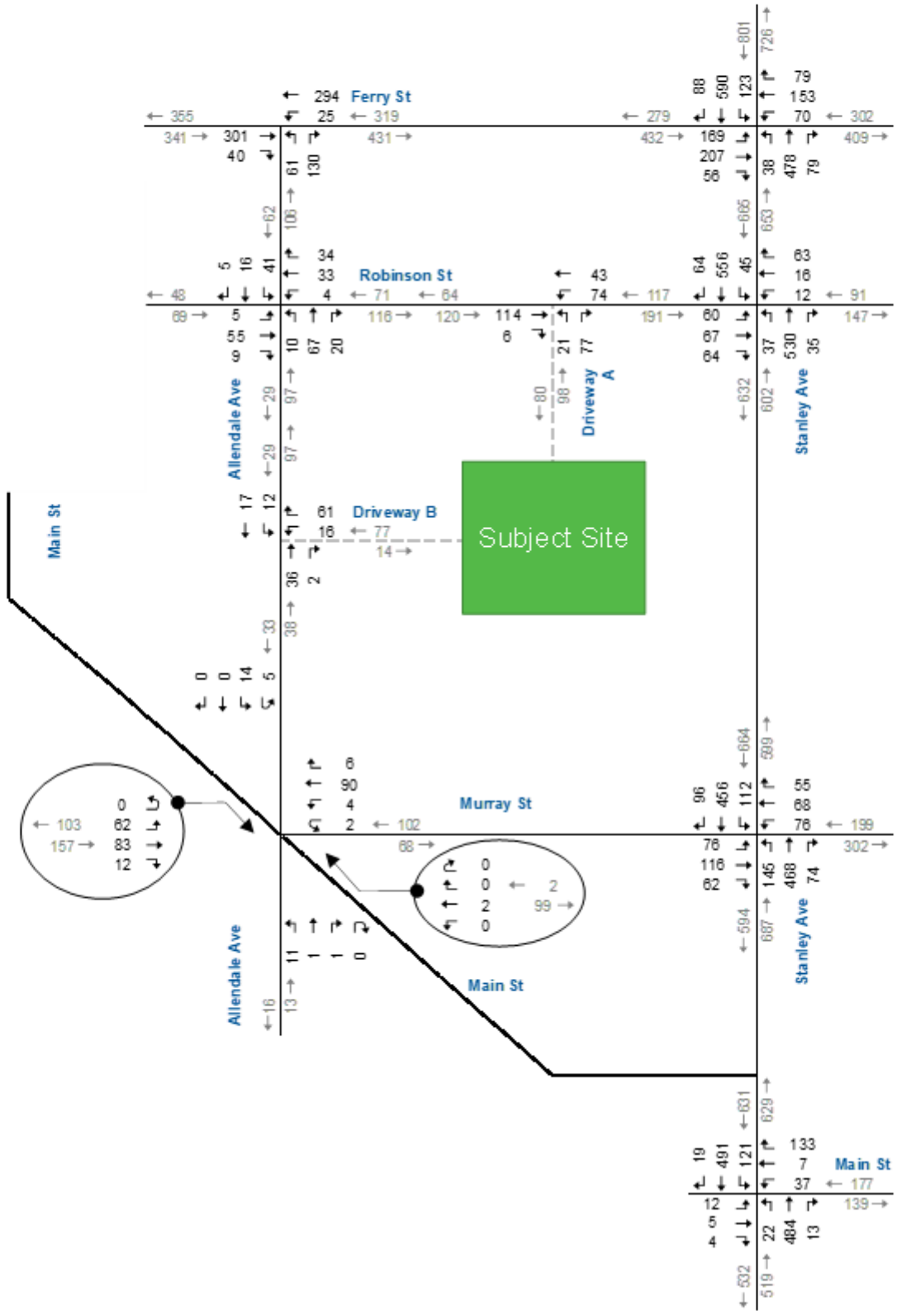
Background Traffic Volumes
AM Peak Hour

5566 Robinson Street TIS & Parking Study
210614

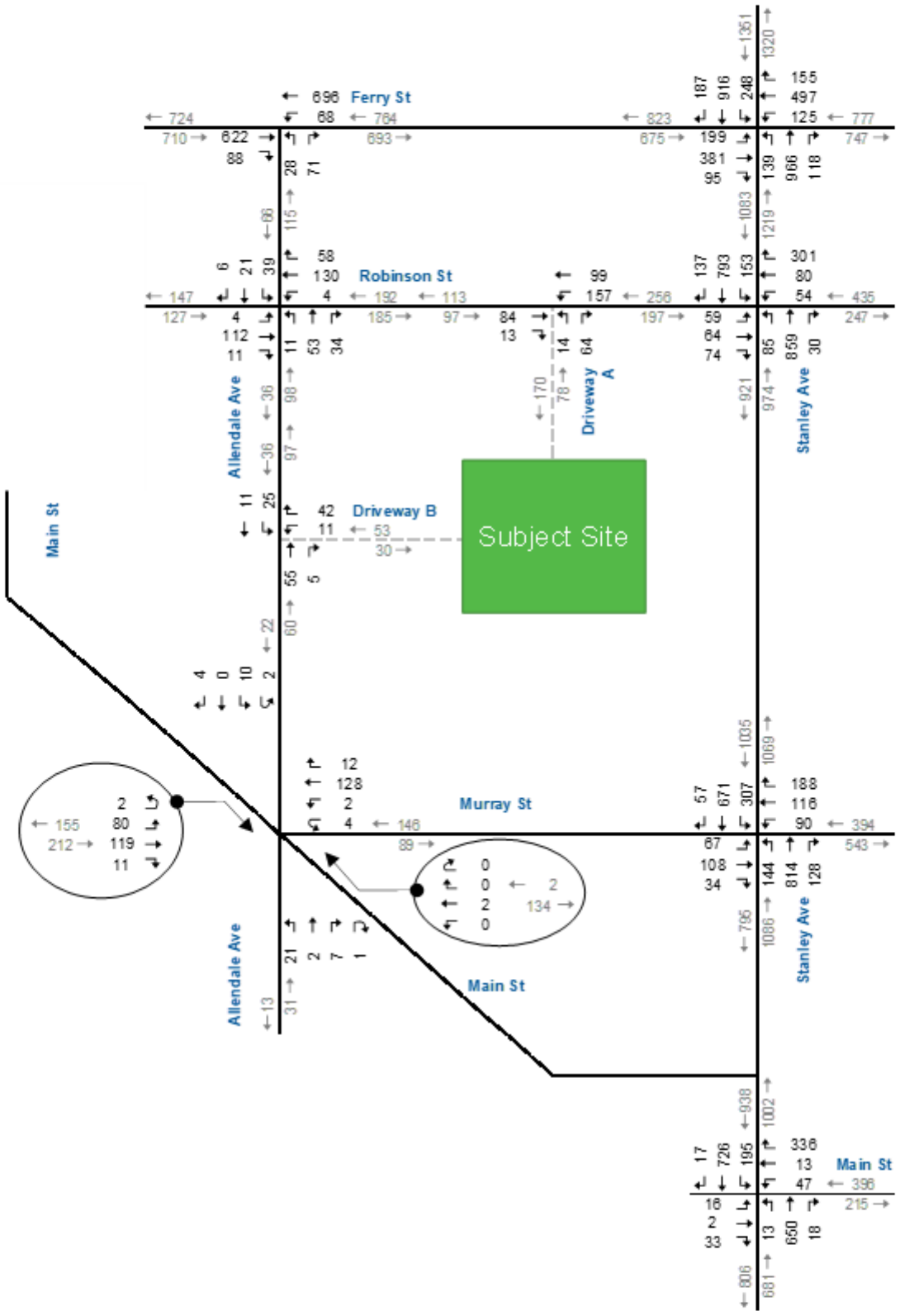
Figure 4.1a



Background Traffic Volumes
PM Peak Hour



Total Traffic Volumes
AM Peak Hour



Total Traffic Volumes
PM Peak Hour

5566 Robinson Street TIS & Parking Study
210614

Figure 4.2b

4.3 Evaluation of Impacts

4.3.1 Background Traffic Operations

Operational analysis for the background traffic scenario followed the same methodology used for the existing traffic conditions. Signal timings were optimized to improve traffic operations through the corridor. **Table 4.1** details the level of service conditions; the following is noted:

Weekday AM Peak Hour

- Murray Street & Main Street / Allendale Avenue (signalized):
  - Southeast bound hard left/bear left-turn lane queue length is forecast to extend beyond the available storage.

Weekday PM Peak Hour

- Stanley Street & Ferry Street (signalized):
  - The eastbound left-turn lane is forecast to operate with delays in the LOS F range with a v/c ratio greater than 1.00.
  - Westbound through lane is forecast to operate with delays in the LOS F range with a v/c ratio greater than 1.00.
  - Northbound left-turn lane 95th percentile queue length is forecast to extend beyond the available storage.
  - Northbound shared through/right lane is forecast to operate with delays in the LOS E range with a v/c ratio greater than 1.00.
  - The southbound left-turn lane is forecast to operate with delays in the LOS F range with a v/c ratio greater than 1.00. Queue lengths are forecast to extend beyond the available storage.
  - Overall, the intersection is forecast to operate with delays in the LOS E range and a v/c ratio greater than 1.00.
- Stanley Street & Robinson Street (signalized):
  - The westbound approach is forecast to operate with delays in the LOS E range with a v/c ratio greater than 0.95.
  - The southbound approach is forecast to operate with delays in the LOS E range with a v/c ratio greater than 1.00.
- Murray Street & Stanley Avenue (signalized):

- Southbound left-turn lane 95th percentile queue length is forecast to extend beyond the available storage.

- Stanley Street & Dixon Street & Main Street (signalized):
  - Westbound through/left-turn lane queue length is forecast to extend beyond the available storage.
- Allendale Avenue & Ferry Street (signalized):
  - The northbound approach is forecast to operate with delays in the LOS E range.
- Murray Street & Main Street / Allendale Avenue (signalized):
  - Southeast-bound hard left/bear left-turn lane queue length is forecast to extend beyond the available storage.

Appendix E contains the detailed Synchro reports.

TABLE 4.1A: BACKGROUND TRAFFIC OPERATIONS – AM PEAK HOUR

Analysis Period	Intersection	Control Type	Movement	Measure of Effectiveness										
				Direction						Approach		Overall		
				LOS	Delay (s)	V/C	95th	Storage	Available	LOS	Delay	LOS	Delay	V/C
AM Peak Hour	Stanley St & Ferry St	TCS	EB L	C	33	0.48	36	100	64	D	41	C	24.2	0.48
			EB T	D	47.3	0.70	70.5	--	--					
			EB R	D	36.6	0.04	0	45	45					
			WB L	D	35.4	0.31	21.2	35	14	D	41			
			WB T	D	44.6	0.59	53.3	--	--					
			WB R	D	38.7	0.06	5.8	30	24					
			NB L	B	12.1	0.10	8.7	25	16	B	16.6			
			NB T / R	B	17	0.33	58.7	--	--					
			SB L	A	9.6	0.27	22.9	55	32	B	14.1			
			SB T / R	B	15	0.39	70	--	--					
	Stanley St & Robinson St	TCS	EB L	C	28.4	0.02	2.9	35	32	C	30.6	A	8.2	0.35
			EB T / R	C	30.7	0.48	22.9	--	--					
			WB	C	29.4	0.25	15.9	--	--	C	29.4			
			NB	A	4.4	0.30	27.2	--	--	A	4.4			
			SB	A	4.6	0.34	29.6	--	--	A	4.6			
	Murray St & Stanley Ave	TCS	EB L	D	35.6	0.46	26.9	30	3.1	D	36.4	B	14.6	0.4
			EB T / R	D	36.8	0.55	46	--	--					
			WB L	D	42.2	0.61	28.7	30	1.3	D	37.1			
			WB T / R	C	33.9	0.33	28.4	--	--					
			NB L	B	10.8	0.35	35	70	35	A	9.3			
			NB T / R	A	8.9	0.31	43.2	--	--					
			SB L	A	5.5	0.24	14	60	46	A	4.7			
			SB T / R	A	4.6	0.26	28.6	--	--					
	Stanley St & Dixon St & Main St	TCS	EB	D	41.5	0.16	10.7	--	--	D	41.5	B	10.9	0.3
			WB L / T	D	43.8	0.44	20.1	20	-0	D	41.8			
			WB R	D	41.1	0.10	17.7	--	--					
			NB L	A	4.6	0.04	2.5	65	63	A	6.4			
			NB T / R	A	6.5	0.24	31	--	--					
			SB L	A	2.9	0.21	9.2	135	126	A	4.5			
			SB T / R	A	4.9	0.22	28.2	--	--					
	Allendale Ave & Ferry St	TWSC	EB	A	0	0.21	0	--	--	A	0	A	2.7	--
			WB	A	0.8	0.02	0.6	--	--	A	0.8			
			NB	B	13.9	0.26	8.3	--	--	B	13.9			
	Allendale Ave & Robinson St	TWSC	EB	A	0.6	0.00	0.1	--	--	A	0.6	A	4.7	--
			WB	A	0.6	0.00	0.1	--	--	A	0.6			
			NB	A	9.2	0.04	1.1	--	--	A	9.2			
			SB	A	9.8	0.07	1.9	--	--	A	9.8			
	Murray St & Main St / Allendale Ave	TCS	WB HL / L	C	23	0.03	4	45	41	C	26	D	37	0.47
			WB BR / WBR	C	27	0.39	30	--	--					
			NB	C	34	0.19	8	--	--	C	34			
			SB	C	32	0.02	2	--	--	C	32			
			SEB HL / BL	C	26	0.29	22	20	-2	C	27			
			SEB T / BR	C	27	0.35	31	--	--					
			NWB	C	24	0.01	2	--	--	C	24			
	Driveway A & Robinson St	TWSC	EB	A	0	0.07	0	--	--	A	0	A	0	--
			WB	A	0	0.00	0	--	--	A	0			
			NB	A	0	0.00	0	--	--	A	0			
	Driveway B & Allendale Ave	TWSC	WB	A	0	0.00	0	--	--	A	0	A	0	--
			NB	A	0	0.02	0	--	--	A	0			
			SB	A	0	0.00	0	--	--	A	0			

TABLE 4.1B: BACKGROUND TRAFFIC OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Control Type	Movement	Measure of Effectiveness										
				Direction						Approach		Overall		
				LOS	Delay (s)	V/C	95th	Storage	Available	LOS	Delay	LOS	Delay	V/C
PM Peak Hour	Stanley St & Ferry St	TCS	EB L	F	104	1.03	73	100	27	E	56	E	62.5	1.09
			EB T	D	41.2	0.78	131	--	--					
			EB R	C	26.9	0.07	8.9	45	36					
			WB L	C	27.2	0.53	30.7	35	4.3	E	69.8			
			WB T	F	92.8	1.05	201	--	--					
			WB R	C	28.7	0.19	24.4	30	5.6					
			NB L	D	44.7	0.80	48.3	25	-23	E	71.4			
			NB T / R	E	75	1.04	189	--	--					
			SB L	F	105	1.06	103	55	-48	D	52.9			
			SB T / R	D	39.9	0.87	148	--	--					
	Stanley St & Robinson St	TCS	EB L	B	18.1	0.10	6.3	35	29	B	18.5	D	47.1	1.04
			EB T / R	B	18.5	0.19	19	--	--					
			WB	E	56.3	0.96	111	--	--	E	56.3			
			NB	B	17.7	0.75	80.4	--	--	B	17.7			
			SB	E	75.3	1.09	127	--	--	E	75.3			
	Murray St & Stanley Ave	TCS	EB L	D	40.5	0.62	26.7	30	3.3	C	33.2	C	24.4	0.8
			EB T / R	C	29.8	0.34	34.8	--	--					
			WB L	C	31	0.43	28.4	30	1.6	D	36.7			
			WB T / R	D	38.4	0.71	66.3	--	--					
			NB L	C	29.5	0.59	57.5	70	13	C	26.8			
			NB T / R	C	26.3	0.75	129	--	--					
			SB L	C	34	0.83	93.7	60	-34	B	15.4			
			SB T / R	A	7.5	0.38	52.3	--	--					
	Stanley St & Dixon St & Main St	TCS	EB	D	39.4	0.15	13.5	--	--	D	39.4	B	14.4	0.4
			WB L / T	D	42.1	0.47	23.3	20	-3	D	41			
			WB R	D	40.8	0.35	30.2	--	--					
			NB L	A	6.3	0.03	2.5	65	63	A	8.8			
			NB T / R	A	8.8	0.34	57.6	--	--					
			SB L	A	4	0.39	20.8	135	114	A	5.6			
			SB T / R	A	6	0.34	56.7	--	--					
	Allendale Ave & Ferry St	TWSC	EB	A	0	0.44	0	--	--	A	0	A	2.8	--
			WB	A	2.2	0.09	2.3	--	--	A	2.2			
			NB	E	44.9	0.42	14.7	--	--	D	44.9			
	Allendale Ave & Robinson St	TWSC	EB	A	0.3	0.00	0.1	--	--	A	0.3	A	3.1	--
			WB	A	0.2	0.00	0.1	--	--	A	0.2			
			NB	A	10	0.08	2	--	--	A	10			
			SB	B	11.5	0.09	2.4	--	--	B	11.5			
	Murray St & Main St / Allendale Ave	TCS	WB HL / L	C	24	0.02	4	45	41	C	30	D	37	0.47
			WB BR / WBR	C	30	0.51	47	--	--					
			NB	D	38	0.34	17	--	--	D	38			
			SB	D	35	0.00	0	--	--	D	35			
			SEB HL / BL	C	30	0.37	31	20	-11	C	31			
			SEB T / BR	C	31	0.45	46	--	--					
			NWB	C	26	0.01	2	--	--	C	26			
	Driveway A & Robinson St	TWSC	EB	A	0	0.05	0	--	--	A	0	A	0	--
			WB	A	0	0.00	0	--	--	A	0			
			NB	A	0	0.00	0	--	--	A	0			
	Driveway B & Allendale Ave	TWSC	WB	A	0	0.00	0	--	--	A	0	A	0	--
			NB	A	0	0.04	0	--	--	A	0			
			SB	A	0	0.00	0	--	--	A	0			

TWSC - Two-Way Stop Control
TCS - Traffic Control Signal
LOS - Level of Service
V/C - Volume to Capacity Ratio
HL - Hard Left
BL - Bear Left

4.3.2 Total Traffic Operations

Operational analysis for the total traffic scenario followed the same methodology used for the existing traffic conditions. Signal timings were optimized to improve traffic operations through the corridor. **Table 4.2** details the level of service conditions; the following is noted:

Weekday AM Peak Hour

- Murray Street & Main Street / Allendale Avenue (signalized):
  - Southeast bound hard left/bear left-turn lane queue length is forecast to extend beyond the available storage.

Weekday PM Peak Hour

- Stanley Street & Ferry Street (signalized):
  - Similar operations are expected compared to the Background scenario; however, the southbound shared through/right turn lane is projected to degrade from LOS D to LOS F with a v/c ratio greater than 1.00 under the Total traffic scenario.
    - The eastbound left-turn lane is forecast to operate with delays in the LOS F range with a v/c ratio greater than 1.00.
    - Westbound through lane is forecast to operate with delays in the LOS F range with a v/c ratio greater than 1.00.
    - Northbound left-turn 95th percentile queue length is forecast to extend beyond the available storage.
    - Northbound shared through/right lane is forecast to operate with delays in the LOS E range with a v/c ratio greater than 1.00. The 95th percentile queue length is forecast to extend beyond the available storage.
    - The southbound left-turn lane is forecast to operate with delays in the LOS F range with a v/c ratio greater than 1.00. The 95th percentile queue length is forecast to extend beyond the available storage.
    - Southbound shared through/right-turn lane is forecast to operate with delays in the LOS D range with a v/c ratio greater than 0.90.
    - Overall, the intersection is forecast to operate with delays in the LOS E range and a v/c ratio greater than 1.00.
- Stanley Street & Robinson Street (signalized):

- In comparison to the Background scenario, similar operations are expected.
  - The westbound approach is forecast to operate with delays in the LOS D range with a v/c ratio greater than 0.95.
  - The northbound approach is forecast to operate with delays in the LOS D range with a v/c ratio greater than 1.00.
  - The southbound approach is forecast to operate with delays in the LOS F range with a v/c ratio greater than 1.00.
  - Overall, the intersection is forecast to operate with delays in the LOS E range and a v/c ratio greater than 1.00.

- Murray Street & Stanley Avenue (signalized):
  - In comparison to the Background scenario, similar operations are expected.
    - Southbound left-turn lane 95th percentile queue length is forecast to extend beyond the available storage.
- Stanley Street & Dixon Street & Main Street (signalized):
  - In comparison to the Background scenario, similar operations are expected.
    - Westbound through/left-turn lane 95th percentile queue length is forecast to extend beyond the available storage.
- Allendale Avenue & Ferry Street (signalized):
  - Compared to the Background scenario, the northbound approach is projected to degrade from LOS E to LOS F under the Total traffic scenario.
    - The northbound approach is forecast to operate with delays in the LOS F range.
- Murray Street & Main Street / Allendale Avenue (signalized):
  - In comparison to the Background scenario, similar operations are expected.
    - Southeast-bound hard left/bear left-turn lane 95th percentile queue length is forecast to extend beyond the available storage.

Appendix F contains the detailed Synchro reports.

TABLE 4.2A: TOTAL TRAFFIC OPERATIONS – AM PEAK HOUR

Analysis Period	Intersection	Control Type	Movement	Measure of Effectiveness										
				Direction						Approach		Overall		
				LOS	Delay (s)	V/C	95th	Storage	Available	LOS	Delay	LOS	Delay	V/C
AM Peak Hour	Stanley St & Ferry St	TCS	EB L	D	36	0.61	49	100	52	D	40	C	24.9	0.51
			EB T	D	44.4	0.66	70.3	--	--					
			EB R	D	35.6	0.04	0	45	45					
			WB L	D	37.9	0.32	22.2	35	13	D	44.8			
			WB T	D	50.1	0.67	55.8	--	--					
			WB R	D	40.7	0.06	0.4	30	30					
			NB L	B	12.4	0.11	8.6	25	16	B	17.4			
			NB T / R	B	17.7	0.38	65.6	--	--					
			SB L	A	10	0.30	22.4	55	33	B	14.9			
			SB T / R	B	15.8	0.42	76.4	--	--					
	Stanley St & Robinson St	TCS	EB L	C	29.6	0.38	18	35	17	C	30	A	9.4	0.38
			EB T / R	C	30.2	0.47	24.1	--	--					
			WB	C	28.9	0.24	15.7	--	--	C	28.9			
			NB	A	4.8	0.33	29.6	--	--	A	4.8			
			SB	A	5	0.37	33.3	--	--	A	5			
	Murray St & Stanley Ave	TCS	EB L	D	35.4	0.45	26.8	30	3.2	D	36.4	B	14.6	0.4
			EB T / R	D	36.8	0.56	46.8	--	--					
			WB L	D	42	0.61	28.7	30	1.3	D	37			
			WB T / R	C	33.8	0.33	29.2	--	--					
			NB L	B	11.2	0.36	35.7	70	34	A	9.5			
			NB T / R	A	9.1	0.32	45.6	--	--					
			SB L	A	5.7	0.25	14.8	60	45	A	4.9			
			SB T / R	A	4.7	0.27	30.2	--	--					
	Stanley St & Dixon St & Main St	TCS	EB	D	41.5	0.16	10.7	--	--	D	41.5	B	10.7	0.3
			WB L / T	D	43.8	0.44	20.1	20	-0	D	41.8			
			WB R	D	41.1	0.10	17.7	--	--					
			NB L	A	4.6	0.04	2.5	65	63	A	6.4			
			NB T / R	A	6.5	0.25	32.2	--	--					
			SB L	A	2.9	0.21	9.2	135	126	A	4.6			
			SB T / R	A	4.9	0.24	30.2	--	--					
	Allendale Ave & Ferry St	TWSC	EB	A	0	0.22	0	--	--	A	0	A	3.7	--
			WB	A	0.8	0.02	0.6	--	--	A	0.8			
			NB	C	15.3	0.37	13.7	--	--	B	15.3			
	Allendale Ave & Robinson St	TWSC	EB	A	0.5	0.00	0.1	--	--	A	0.5	A	5.8	--
			WB	A	0.4	0.00	0.1	--	--	A	0.4			
			NB	B	10.3	0.14	3.7	--	--	B	10.3			
			SB	B	10.5	0.09	2.5	--	--	B	10.5			
	Murray St & Main St / Allendale Ave	TCS	WB HL / L	C	24	0.03	4	45	41	C	27	D	37	0.47
			WB BR / WBR	C	28	0.40	31	--	--					
			NB	C	33	0.15	8	--	--	C	33			
			SB	C	33	0.19	10	--	--	C	33			
			SEB HL / BL	C	27	0.29	22	20	-2	C	28			
			SEB T / BR	C	28	0.35	31	--	--					
			NWB	C	25	0.01	2	--	--	C	25			
	Driveway A & Robinson St	TWSC	EB	A	0	0.08	0	--	--	A	0	A	4.6	--
			WB	A	5	0.06	1.4	--	--	A	5			
			NB	A	9.9	0.13	3.5	--	--	A	9.9			
	Driveway B & Allendale Ave	TWSC	WB	A	8.9	0.08	2.2	--	--	A	8.9	A	5.4	--
			NB	A	0	0.02	0	--	--	A	0			
			SB	A	3.1	0.01	0.2	--	--	A	3.1			

TWSC - Two-Way Stop Control *LOS - Level of Service* *HL - Hard Left*

TCS - Traffic Control Signal *V/C - Volume to Capacity Ratio* *BL - Bear Left*

TABLE 4.2B: TOTAL TRAFFIC OPERATIONS – PM PEAK HOUR

Analysis Period	Intersection	Control Type	Movement	Measure of Effectiveness										
				Direction						Approach		Overall		
				LOS	Delay (s)	V/C	95th	Storage	Available	LOS	Delay	LOS	Delay	V/C
PM Peak Hour	Stanley St & Ferry St	TCS	EB L	F	124	1.11	87	100	13	E	64	E	69.5	1.17
			EB T	D	42.2	0.79	133	--	--					
			EB R	C	27.1	0.07	8.9	45	36					
			WB L	C	29	0.56	32.4	35	2.6	F	80.9			
			WB T	F	110	1.10	206	--	--					
			WB R	C	29.7	0.19	24.9	30	5.1					
			NB L	E	68.8	0.91	56.7	25	-32	E	73.7			
			NB T / R	E	74.3	1.04	195	--	--					
			SB L	F	128	1.12	107	55	-52	E	61.7			
			SB T / R	D	46.9	0.94	181	--	--					
	Stanley St & Robinson St	TCS	EB L	C	20.1	0.37	17.8	35	17	B	19.1	E	79.7	1.13
			EB T / R	B	18.6	0.20	20.1	--	--					
			WB	E	56.5	0.96	111	--	--	E	56.5			
			NB	D	47.8	1.01	122	--	--	D	47.8			
			SB	F	129	1.23	147	--	--	F	129			
	Murray St & Stanley Ave	TCS	EB L	D	39.5	0.62	26.8	30	3.2	C	32.7	C	25.9	0.8
			EB T / R	C	29.5	0.34	35.4	--	--					
			WB L	C	30.6	0.42	28.4	30	1.6	D	36.7			
			WB T / R	D	38.5	0.72	68.5	--	--					
			NB L	C	31.3	0.61	58.2	70	12	C	28.9			
			NB T / R	C	28.5	0.80	137	--	--					
			SB L	D	40.2	0.86	101	60	-41	B	17.4			
			SB T / R	A	7.7	0.38	53.4	--	--					
	Stanley St & Dixon St & Main St	TCS	EB	D	39.1	0.15	13.4	--	--	D	39.1	B	14.5	0.4
			WB L / T	D	41.7	0.46	23.1	20	-3	D	41.1			
			WB R	D	40.9	0.40	32.1	--	--					
			NB L	A	6.4	0.04	2.5	65	63	A	9.1			
			NB T / R	A	9.2	0.36	62.5	--	--					
			SB L	A	4.2	0.40	21.4	135	114	A	5.8			
			SB T / R	A	6.2	0.35	60.1	--	--					
	Allendale Ave & Ferry St	TWSC	EB	A	0	0.45	0	--	--	A	0	A	4.9	--
			WB	A	2.3	0.09	2.3	--	--	A	2.3			
			NB	F	61.3	0.65	29.8	--	--	F	61.3			
	Allendale Ave & Robinson St	TWSC	EB	A	0.2	0.00	0.1	--	--	A	0.2	A	4.2	--
			WB	A	0.2	0.00	0.1	--	--	A	0.2			
			NB	B	11.5	0.16	4.6	--	--	B	11.5			
			SB	B	12.4	0.13	3.6	--	--	B	12.4			
	Murray St & Main St / Allendale Ave	TCS	WB HL / L	C	24	0.02	4	45	41	C	30	D	37	0.47
			WB BR / WBR	C	30	0.52	48	--	--					
			NB	D	39	0.35	17	--	--	D	39			
			SB	D	36	0.01	0	--	--	D	36			
			SEB HL / BL	C	31	0.37	32	20	-12	C	31			
			SEB T / BR	C	31	0.45	46	--	--					
			NWB	C	27	0.01	2	--	--	C	27			
	Driveway A & Robinson St	TWSC	EB	A	0	0.06	0	--	--	A	0	A	4.9	--
			WB	A	5.1	0.12	3.1	--	--	A	5.1			
			NB	B	10.1	0.11	2.9	--	--	B	10.1			
	Driveway B & Allendale Ave	TWSC	WB	A	9	0.06	1.5	--	--	A	9	A	4.4	--
			NB	A	0	0.04	0	--	--	A	0			
			SB	A	5.2	0.02	0.4	--	--	A	5.2			

TWSC - Two-Way Stop Control *LOS - Level of Service* *HL - Hard Left*

TCS - Traffic Control Signal *V/C - Volume to Capacity Ratio* *BL - Bear Left*

5 Remedial Measures

This chapter summarizes the investigation results to identify if improvement measures are required to accommodate the impacts of the proposed development.

5.1 Intersection/Roadway Mitigation

5.1.1 Stanley Street and Ferry Street

Under base year conditions, the westbound through lane operates at LOS D with a v/c ratio greater than 0.85 during the weekday PM peak hour.

Under the future 2031 Background horizon (without the development), the westbound through lane is projected to continue to operate at LOS F with a v/c ratio exceeding 1.00. The eastbound, southbound, and northbound approaches are forecast to have movements operating at LOS E or worse with v/c ratios greater than 1.00. Under the 2031 Total horizon (with the development) and the capacity constraints noted under the 2031 Background horizon, the congestion for these movements are forecast to increase by up to 30 seconds.

It is understood that the Region and the City are aware of the congestion issues occurring in this area. The congestion issues appear to be primarily driven by tourism.

The Niagara Region Transportation Master Plan[10] (TMP) recognizes the significant corridors crossing the QEW, Welland Canal and Niagara Escarpment, which already experience congestion and operational constraints and have long been recognized as challenges to travel in Niagara Region. Opportunities to develop transportation solutions must address the TMP guiding principle of the “balanced needs” approach.

With that said, from a pure vehicle capacity perspective, the following geometric improvements would likely be required to improve operations during the weekday peak hours:

- Additional through lane along Ferry Street, west of Stanley Street to Main Street. Possibly scenario is to convert the westbound right turn lane to a shared through/right turn lane. Through this conversion, the pedestrian crossing distances at the intersections would not be impacted, and a road widening would be limited to Ferry Street, west of Stanley Street.

[10] Niagara Region Transportation Master Plan, October 2017

- The Region has noted the limited right-of way along Ferry Street and thus the ability to widen the roadway for additional capacity may not be possible.

5.1.2 Stanley Street and Robinson Street

At the Stanley Street and Robinson Street intersection, individual movements currently operate at LOS C or better during the weekday AM and PM peak hours.

Under the future 2031 Background horizon (without the development), the westbound and southbound approaches are projected to operate at LOS E with a v/c ratio greater than 0.95 during the weekday PM peak hour. Under the future 2031 Total horizon, similar levels of delay are projected as noted under the 2031 Background horizon. The northbound approach is forecast to degrade to LOS D with a v/c ratio above 1.00.

During the PM peak hour, northbound and southbound movements along Stanley Street are forecast to experience high volumes of traffic. In addition, the westbound right-turn experiences relatively high volumes of traffic. Optimizing signal timings reduces delay but does not mitigate the congestion from conflicting flows.

A possible mitigation measure to improve operations and reduce delay at the intersection would be implementing a westbound right-turn lane and optimizing the cycling length and splits.

5.1.3 Allendale Avenue at Ferry Street

At the Allendale Avenue and Ferry Street intersection, individual movements currently operate at LOS C or better during the weekday AM and PM peak hours.

Under the future 2031 Background horizon (without the development), the northbound approach is forecast to operate at LOS E during the PM peak hour.

Under the 2031 Total horizon with additional traffic generated by the development, the northbound approach is projected to degrade to a LOS F with a v/c ratio no more significant than 0.65. However, the delay results from high traffic volumes along Ferry Street, creating additional delays to the northbound approach.

A traffic control signal warrant has not been assessed for this intersection, given there is a downstream intersection at Stanley Street and Ferry Street located 130 metres to the east. Signalization of the

intersection is not a feasible improvement option given the spacing limitations.

For further context, v/c is a measurement of the operating capacity of a roadway or intersection. The number of vehicles passing is divided by the number of vehicles that could theoretically pass when at capacity. If the v/c is less than 1.00, spare capacity is still available to service demand. As a v/c of 0.65 is projected, the northbound approach operates at 65% or less of its available capacity.

The site traffic is distributed based on ease of access to the Site. It is expected that, over time, residents will redistribute and reroute through Robinson Street/Main Street to avoid turning movements at the unsignalized intersection.

5.2 Sensitivity Analysis

A sensitivity analysis to assess the identified improvements noted above at the study area intersections have been undertaken for the 2031 Total horizon. The following improvements and assumptions have been assumed:

- Stanley Street at Ferry Street: Additional eastbound/westbound through lane along Ferry Street, west of Stanley Street. The westbound right turn lane at Stanley Street and Ferry Street has been converted to a shared right turn/through lane.
- Stanley Street at Robinson Street: A westbound right turn lane and optimized cycle length and splits.

Figure 5.1 illustrates the proposed lane configuration. **Table 5.1** summarizes the results of the sensitivity analysis. **Appendix G** contains the detailed Synchro reports.

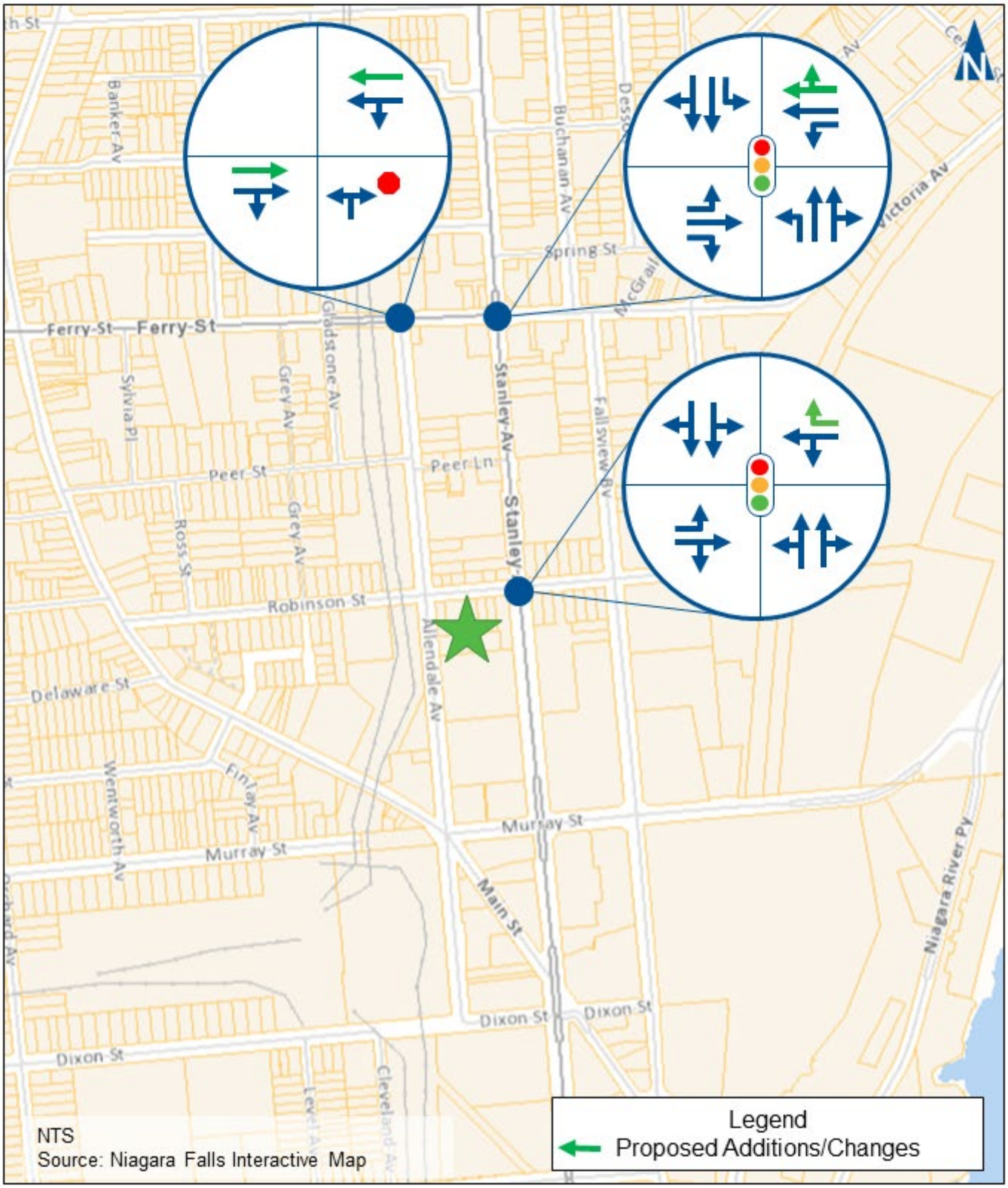
Widening the Ferry Street corridor is expected to alleviate some capacity constraints; however, given the property constraints in this area, it is not likely feasible that additional through lane capacity can be implemented. Traffic Demand Management measures geared explicitly at visitors to the City of Niagara Falls, such as encouraging the use of WEGO to reduce vehicle travel within the tourism core, are expected to be the recommended improvement option.

TABLE 5.1: SENSITIVITY ANALYSIS (PM PEAK HOUR)

Analysis Period	Intersection	Control Type	Movement	Measure of Effectiveness										
				Direction						Approach		Overall		
				LOS	Delay (s)	V/C	95th	Storage	Available	LOS	Delay	LOS	Delay	V/C
PM Peak Hour	Stanley St & Ferry St	TCS	EB L	E	77	0.96	79	100	21	E	56	D	53.5	1.02
			EB T	D	52.5	0.87	143	--	--					
			EB R	C	29.2	0.07	9.3	45	36					
			WB L	D	47.2	0.72	39	35	-4	E	61.8			
			WB T	E	64.6	0.95	118	--	--					
			WB T / R	E	64.6	0.95	118	30	-88					
			NB L	D	43.1	0.80	48.5	25	-24	E	57			
			NB T / R	E	58.8	0.99	187	--	--					
			SB L	E	79.4	0.97	99.4	55	-44	D	44.2			
			SB T / R	D	36.3	0.87	159	--	--					
	Stanley St & Robinson St	TCS	EB L	C	31.1	0.34	20.9	35	14	C	31.2	C	20.9	0.92
			EB T / R	C	31.3	0.39	30.5	--	--					
			WB	D	37.3	0.65	41.7	--	--	D	38.9			
			NB	B	11.4	0.70	95.9	--	--	B	11.4			
			SB	C	20.4	0.90	157	--	--	C	20.4			
	Allendale Ave & Ferry St	TWSC	EB	A	0	0.27	0	--	--	A	0	A	1.6	--
			WB	A	3	0.30	2.3	--	--	A	1.2			
			NB	C	17.2	0.27	8.5	--	--	C	17.2			

TWSC - Two-Way Stop Control *LOS - Level of Service* *HL - Hard Left*

TCS - Traffic Control Signal *V/C - Volume to Capacity Ratio* *BL - Bear Left*



Proposed Lane Configuration & Traffic Control

Existing signal timings within the study area were optimized in the horizon year forecasts to minimize the delay. It is expected that the City of Niagara Falls will continue to monitor and adjust signal timings in the future as traffic volumes increase and travel patterns change.

5.3 Neighbourhood Impacts

Based on pre-consultation, City staff requested the impact of cut-through traffic be considered, specifically to/from the west along Robinson Street and Peer Street.

Approximately 20% of site traffic is expected to/from the west. This traffic is expected to travel across Ferry Street to Allendale Avenue or from Main Street and across Robinson Street.

As outlined in the future total traffic operations, the unsignalized intersection of Allendale Avenue and Ferry Street is forecast to operate with northbound traffic experiencing delays in the LOS E range. Over time, it is expected that site traffic will redistribute and reroute through Robinson Street/Main Street to avoid turning movements at the unsignalized intersection. Based on the trip generation estimates, if westbound traffic reroutes from Ferry Street to Robinson Street, the site traffic volumes along Robinson Street are not expected to exceed 40 outbound trips and 40 inbound trips for the AM or PM peak hours.

Based on the ease of access, significant site traffic is not expected to utilize Peer Street to access the Site.

6 Parking Review

As with any equilibrium system, there are a minimum of two components required to be in balance and reach the equilibrium point. With parking systems, this involves the balance of parking supply and demand. Achieving an appropriate supply level is equally important as demand. The ubiquitous oversupply of cheap and accessible parking has long been a significant contributing factor to single-occupant vehicle (SOV) travel growth.

There is a strong focus on the pedestrian environment and an emphasis on active transportation in the Official Plan. As the development proposal focuses on accommodating a suitable pedestrian environment, one that would encourage active transit based on the de-emphasis on parking, the use of blanketly applying the Zoning By-law across the development does not reflect these goals.

6.1 Zoning Requirements

The current parking requirements for this development are governed by the City of Niagara Falls Zoning By-law 79-200 and Zoning By-law 2012-061. It is recognized that the actual demand for parking spaces may vary from Development to Development

The minimum parking rates for the proposed Development under Zoning By-law 79-200 and 2012-061 are as follows:

- 1.4 parking for each dwelling unit; and
- Parking is exempt for the commercial area (mm) and café (bb), per By-law 2012-061.

The parking requirement for the development under the City's current Zoning By-Law is 1,347 residential spaces. **Table 6.1** summarizes the minimum parking standard calculations.

The development proposes 715 parking spaces. However, several considerations justify a parking supply that is lower than is required under the City's standard by-law, as explained in the remainder of this chapter.

TABLE 6.1: ZONING PARKING BY-LAW REQUIREMENTS

Land Use	Units		City of Niagara Falls By-Law		Parking
Apartment Dwelling (High-rise)	962	Units	1.4	spaces/unit	1346.8
Commercial & Café	4,299	sq.ft	--		0
Total Parking Required					**1,367**

6.2 Other Jurisdictions

Parking standards are increasingly seen as an instrument of planning policy, and parking ratios are now viewed as having the primary role in determining car use. Parking ratios have existed in most cities since the 1950s and have often been amended incrementally. Consequently, it is not surprising that municipalities are often unable to trace the justification or reasoning behind some of the older parking ratios found in their current Zoning By-laws.

Given that parking standards reflect an “average” condition, they will rarely prescribe the number of parking spaces to match the parking demands of any individual development project exactly. Other municipalities recognize the advantages of parking ratios supporting broader Official Plan objectives. The empirical challenge is understanding how parking demand for a given use may vary. The policy question is where the parking standard or ratio should be set in that range.

The Town of Oakville recently developed a new zoning by-law for lands located north of Dundas Street. The parking rates within this by-law for multiple dwelling units stipulate that a maximum parking rate of 1.25 per unit would be accepted with no prescribed minimum parking requirement. In contrast to generic minimum parking requirements, North Oakville provides maximum limits to restrict the total number of spaces that can be constructed rather than establish a minimum number.

The City of Welland has recently undertaken a comprehensive review of the zoning by-law to ensure that land and growth are appropriately managed and that the zoning regulations are up to date. As part of this work, updated parking requirements were developed, which requires multiple dwellings to provide a parking rate of 1.00 parking space per unit.

City of Hamilton has a staggered approach for parking requirements for multiple dwellings. The minimum parking required depends on the

size of the dwellings and the number of units, with a maximum parking rate of 1.25 spaces per unit.

Attitudes towards automobile ownership and its role in an urban lifestyle are changing in the eyes of both consumers and policymakers, and lower parking regulations reflect this. As parking regulations are an attempt to supply to meet demand, regulations that require a lower supply for future buildings are an indication that future demand is likely to be lower with the rise of sustainable travel modes (transit, cycling, and walking).

Parking regulations stipulated in the City of Niagara Falls By-law for residential zones are 35% higher than neighbouring municipalities that have adopted new standards.

The subject site is situated in a transit-accessible location with ample pedestrian facilities and is positioned to support a lower parking rate.

Table 6.2 summarizes the parking standard calculations for other jurisdictions. This comparison outlines the new parking rate standards being accepted by municipalities through a comprehensive review of research and best practices. The rates stipulated in the antiquated Zoning By-law provide for an oversupply of parking.

TABLE 6.2: OTHER JURISDICTIONS PARKING BY-LAWS

Municipality	Land Use	Parking Rate
Town of Oakville (North Oakville)	Multiple Residential	0.00 spaces per unit or maximum of 1.25 space per unit
	Visitor	0.20 spaces per unit
City of Welland	Multiple Residential	1.00 space per unit
City of Hamilton	Multiple Residential	0.00 space per unit or maximum of 1.25 spaces per unit

6.3 Policy Framework

The Growth Plan for the Greater Golden Horseshoe (Ministry of Infrastructure, 2020)[11], Provincial Policy Statement (MMAH, 2020)[12], and Niagara Falls Official Plan[13] all directly call for a shift away from automobile travel and towards more sustainable forms of transportation, including transit, and active transportation:

- The Growth Plan states: "Population and employment growth will be accommodated by … reducing dependence on the automobile through the development of mixed-use, transit-supportive, pedestrian-friendly urban environments" (Section 4.2.10);
- The Provincial Policy Statement (PPS) states that land-use patterns should "minimize the length and number of vehicle trips, and support current and future use of transit and active transportation" (Section 1.6.7.4).

Traditionally, transportation networks focused on increasing the road network's capacity to accommodate more vehicles. However, as outlined in Niagara Region's Transportation Master Plan (TMP), the transportation system needs to look at a "balanced needs" approach that encourages alternative modes of transportation.

The City of Niagara Falls OP identifies that an integrated and multi-modal transportation system will be achieved. Decision-making will be prioritized to shift more trips away from the private car and more sustainable transportation options, such as walking, biking, transit, and car-sharing.

The intent is to reprioritize mobility to balance the transportation system. A more sustainable city requires an integrated transportation system that supports a compact urban form. Bringing jobs, housing services, and amenities closer encourages non-automobile modes of travel, providing more choice to Niagara Falls residents.

[11] A Place to Grow, Growth Plan for the Greater Golden Horseshoe, 2020.
[12] Provincial Policy Statement, 2020
[13] Official Plan for the City of Niagara Falls, 2019

6.3.1 Climate Change

Municipalities have been identified by the Government of Canada as critical partners in the fight against climate change, as they influence 50% of Canada's greenhouse gas (GHG) emissions. Land use planning is one of the most effective processes for local adaptation to climate change. Existing tools available, such as official plans, zoning by-laws, and development permits, can help minimize climate change risk to the community.

Climate change and air pollution must be addressed to achieve a sustainable community and human and ecosystem health. Climate change and air pollution impacts are caused primarily by burning fossil fuels, resulting in the emission of greenhouse gases and air pollutants. These impacts can be reduced through sustainable and efficient land use and transportation policies that reduce air and greenhouse gas emissions.

In Ontario, GHG emissions from the transportation sector in 2016 were 34% higher than in 1990. The majority of those emissions are due to passenger vehicles on the road. In Niagara, transportation emissions at the community level in 2006 accounted for 40% of total emissions. Achieving a reduction in automobile dependence and lowering GHG emissions from the transportation sector is a way to mitigate climate change and promote other sustainable travel forms.

6.3.2 Parking and GHG Emissions

While single-occupant vehicle trips are commonly targeted in transport policies, they are only a consequence of the spatial layout and densities of the accompanying land uses. Therefore, there is merit in targeting the underlying cause of these carbon emissions rather than solely focusing on policies to reduce private vehicle use.

Parking management has an important role to play as an instrument to reduce carbon emissions[14]. In this respect, car parking is the "glue" between these facets of the land use and transport environment. In addition, car parking is a critical factor that can be targeted relatively quickly by planners and their municipality plans.

The transportation sector is currently responsible for 23% of Canada's GHG emissions[15] and offers tremendous opportunities for significant emissions reduction. Municipalities in Canada are lagging behind other

[14] Parking as a tool to reduce carbon emissions, McCormick Rankin Cagney Pty Ltd, 2009

[15] Reducing GHG Emissions in Canada's Transportation Sector, Clean Energy Canada, June 2016.

countries in supporting zero-emission vehicles and other sustainable transportation policies. Cities need to transition towards zero and low-emissions transportation modes, increase cleaner fuels, improve public transit ridership, and encourage denser, mixed-use communities to reduce emissions. A significant encouragement is needed to shift travel modes from single-occupant vehicles towards public transit, auto-share and active transportation to reduce greenhouse gas emissions related to the transportation sector

6.3.3 Societal Changes

A sudden, dramatic shift in travel patterns occurred early in 2020 as society adjusted to the emergence of COVID-19, its declaration as a pandemic and subsequent public health measures to stop its spread.

As a result, recent societal changes have made it easier to live without owning a car. Vehicles-for-hire and bicycles have both increased in popularity. Online shopping has reduced the need for a vehicle to bring large purchases home. It has made it convenient for everyday errands to be delivered (i.e., groceries, household items). The future arrival of automated vehicles may further support a reduction in personal automobile ownership and use. These societal changes will decrease vehicle parking needs with a shift to curbside management.

As businesses have adapted and residents have embraced the convenience of the delivery of everyday items, these changes will remain for the foreseeable future, providing further incentive to residents not requiring a vehicle.

Results from the 2016 TTS show that approximately 35% of apartment households in Niagara Falls do not own a vehicle. These proportions have likely increased since 2016 and will continue to grow due to societal changes. The City has noted that a portion of existing apartments in Niagara Falls are for seniors or lower income residents and may not be as representative of the socioeconomic status of the proposed condominium residents. However similar percentages of apartment households that do not own a vehicle are observed in other cities such as St. Catharines (24%) and Hamilton (39%).

Given the expected changes in automobile ownership brought about by the changes in mobility-related technologies, it is likely that if the change in the parking policy framework is not revised, new residential developments will be left with an oversupply of parking, which if provided below grade will result in redundant space that will not be repurposed in the future.

6.3.4 Affordability

According to the Government of Ontario, housing prices in Ontario almost tripled, far outpacing the income growth. The Government of Ontario has developed a "Housing Affordability Task Force" comprised of industry leaders and experts to produce a report identifying and recommending measures to address the housing supply crisis[16].

One of the main recommendations by the Housing Task Force to increase housing supply and affordability is to reduce and streamline urban design rules to lower the costs of development. The Housing Task Force recommends removing or reducing the parking requirements in cities with over 50,000 people.

Generous parking requirements reduce housing affordability and impose various economic and environmental costs. The Housing Task Force reports that minimum parking requirements add as much as $165,000 to the price of a new housing unit, and parking space demand is falling, with one in three parking stalls going unsold. Based on typical affordable housing development costs, one parking space per unit increases costs by approximately 12.5%, and two parking spaces can raise prices by 25%.

Residential minimum parking requirements should ensure that a basic, responsible parking level is provided without unduly increasing the development costs.

6.3.5 Parking Reform

Minimum parking requirements have long been a staple of urban planning regulations based on some formulation. These regulations, unfortunately, have been driven by auto-centric engineering models. Over the past seven decades, the built form in Niagara Falls has been evolving significantly. Recent changes in transportation technology and services, characterized by ride-hailing and automobile sharing, and the emerging technologies dominated by autonomous vehicles (AVs) suggest that automobile ownership will likely experience declines.

The City of Niagara Falls growth objective is to create and develop a transit and pedestrian-friendly, sustainable, and livable City through urban design criteria and guidelines. The OP embraces sustainability and creates a vision for complete compact communities served by streets made for walking, cycling, and an attractive transit system. This vision is supported by policies to reduce auto dependence and limit the amount of land occupied by automobile parking. The transportation policies are deliberately interspersed with the land-use policies to

[16] Housing Affordability Task Force Report, Government of Ontario, February 2022

emphasize the importance of considering both areas to achieve the overall vision of complete compact communities.

The intent is to reprioritize mobility to balance the transportation system. A more sustainable city requires an integrated transportation system that supports a compact urban form. Bringing jobs, housing services, and amenities closer encourages non-automobile modes of travel, providing more choice to Niagara Falls residents.

Suppose the city wishes to encourage active transportation and transit-friendly neighbourhoods as outlined in the OP and strategic vision. In that case, the city needs to recognize that minimum parking requirements present a significant barrier to these goals. It must be remembered that parking carries high costs, heavily subsidizes the choice to drive, and hampers the ability to promote sustainable developments. Parking should not be viewed as only an amenity required to support our cities and our ability to drive; instead, it must be considered a significant economic investment that carries outcomes that shape our cities and regions.

As outlined in **Section 6.2,** other municipalities recognize this and have reduced parking requirements to reflect this. To reiterate, the City of Niagara Falls requires, on average, 35% more parking to be provided for this development than would be needed for the Town of Oakville (North Oakville), City of Welland and City of Hamilton that have adopted new parking requirements.

6.4 Parking Demand Forecasts

A review of actual parking demands likely to be generated by the proposed development has been considered to assess, independent and separate from a review of the Residential Zoning By-Law requirements.

The “real” demands established for each land use are based upon a review of parking demand technical resources and information collected by Paradigm and others at comparable land uses. The specified demands consider several influencing factors in play, including market demands and the effects of interaction between uses.

A summary discussion relating to each of the significant land use components is provided in the following sections.

6.4.1 Residential Vehicle Ownership

A review of vehicle ownership provided by the 2016 Transportation Tomorrow Survey (TTS) for the City of Niagara Falls suggests that approximately 35% of apartments surveyed do not own a vehicle. Further disposition of the survey results can conclude that the actual vehicle ownership, based on a weighted average, is 0.74 vehicles per unit.

Table 6.3 summarizes the vehicle ownership characteristics.

TABLE 6.3: VEHICLE OWNERSHIP – NIAGARA FALLS (2016 TTS)

Year	Vehicles Per Household					Households	Vehicles	Ownership
	0	1	2	3	4			
2016	2599 *35%*	4124 *56%*	631 *9%*	25 *0%*	0 *0%*	7,379	5,461	0.74

The vehicle ownership evaluation offers some insight into the parking requirements of apartments within the City of Niagara Falls. This review indicates that, despite preconceived notions, not all residents in apartment dwellings own a vehicle.

A review of socio-economic TTS data suggests that this vehicle ownership rate reflects lifestyle choice rather than age or economic status. Lower vehicle ownership rates may be seen for seniors or lower-income residents. TTS data indicates that 57% of apartment residents are under the age of 60, with 51% of residents having an income of up to 40,000 dollars per year. In comparison, 24% of residents exceed this amount. The median income in Ontario was reported at $41,200 in 2020, based on the latest information through

Statistics Canada[17]. The data would indicate that the demographic for apartments is evenly split between seniors and adults and the income levels are on par with the typical median in Ontario.

Opportunities exist to provide reduced parking requirements associated with the proposed development, given the Site's location and proximity to transit. Access to local amenities within the City of Niagara Falls can be met through active travel modes.

The potential parking supply for the proposed 686 units can be estimated by applying the 2016 vehicle ownership data set. This analysis supports that the proposed parking supply of 575 residential spaces would meet and exceed the residential requirements.

Table 6.4 outlines the estimated parking demand based on the vehicle ownership rates.

TABLE 6.4: DEMAND-BASED ON VEHICLE OWNERSHIP

Use	Units	Parking Rate[a]	Spaces Required
Apartment Dwelling	962	0.74 per unit	712
Total Parking Required			**712**

a - TTS 2016 (Niagara Falls)

6.4.2 Travel Characteristics

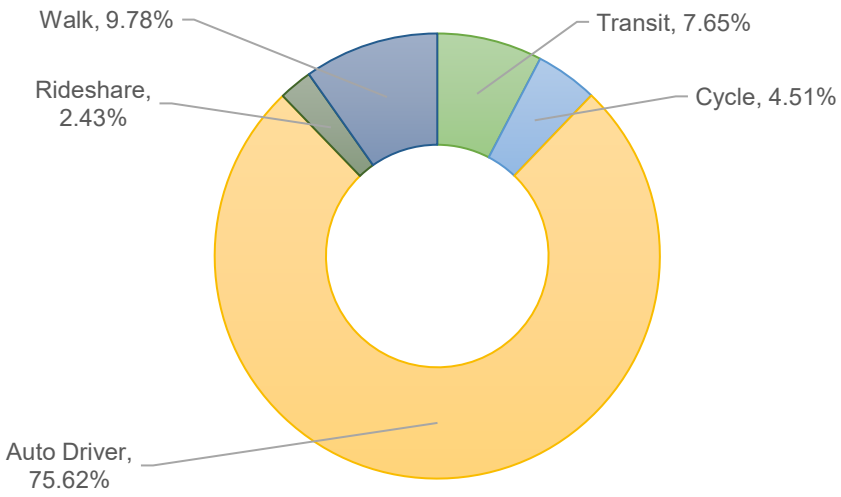
A review of travel characteristics provided by the 2016 Transportation Tomorrow Survey (TTS) for residents living in Niagara Falls confirms that a significant proportion of travel undertaken during the morning and afternoon peak periods is by non-auto means.

Information provided by the TTS program suggests that the proportion of people who choose to drive in the area is, on average, 76%. Based on this data, it is reasonable to assume that only 76% of unit owners would require an automobile for everyday travel. In contrast, the remainder of the trips is fulfilled through transit and active modes.

Chart 6.5 outlines the 2016 trip characteristics within the City of Niagara Falls for apartments.

[17] https://www12.statcan.gc.ca/

CHART 6.5: TRIPS IN THE STUDY AREA



The parking supply proposed will provide a parking resource that will logically be used by building residents who need a car for day-to-day use; indispensable users. Such residents would prioritize purchasing a unit and expect to utilize the on-site parking facilities. The proposed parking supply would accommodate parking of all units in the building (assuming one space is provided to any particular unit), which exceeds the base proportion of building unit occupants who need to drive regularly, approximately 76 percent during the peak periods.

Other unit purchasers who do not need to use a car on an ongoing basis would be satisfied by other available methods. They would not need to own a vehicle and not require a parking space.

6.4.3 Residential Proxy Surveys

Paradigm has reviewed a proxy site survey[18] for an existing residential condominium complex located at 15 Towering Heights Boulevard in the City of St. Catharines. The development is a 13-storey, 125-unit building with 183 parking spaces.

Two overnight parking surveys were conducted at the proxy Site on Thursday, February 28, 2019, and Saturday, March 2, 2019. An overnight period (10 PM to 1 AM) was used to capture the maximum capacity for the parking needs. **Table 6.6** summarizes the parking

[18] Stanley Avenue and Ferry Street Proposed Mixed Use Development Traffic Impact and Parking Study, 2019

utilization for the parking survey. **Appendix H** contains the proxy survey data.

TABLE 6.6: PROXY SITE PARKING UTILIZATION

Date of Survey	Spaces	Utilization
Total Parking Capacity	**183**	**--**
Thursday February 28, 2019	112	61%
Saturday March 2, 2019	109	60%

The parking survey shows that overnight parking was in the order of 109 to 112 spaces at the proxy Site or utilization of approximately 60% of parking capacity. For the building with 125 residential units, the parking rate was observed at 0.89 spaces/unit.

6.4.4 Stanley District Sales Data

As part of the pre-consultation, City staff advised that updated parking surveys within the city should be undertaken to provide additional data and support regarding the proposed parking supply. However, a suitable proxy site could not be located through an exhaustive search. As a result, City staff advised the previous proxy site would be sufficient.

The Applicant has provided sales data from the First Phase of one of their adjacent developments located at 5528 Ferry Street (the Stanley District) to appease the city with additional parking data further. A review of this data provides further support that the number of parking spaces that have been sold is well below the previous approval of 1.00 parking spaces per unit that 5528 Ferry Street received. The data is reflective of an average rate of 0.64 spaces per unit.

While the Phase 1 data only represents a third of the residential units, it strongly supports the notion that a reduced parking supply for the area is supportable. **Table 6.7** summarizes the sales data. **Appendix I** includes the sales data.

TABLE 6.7: PHASE 1 SALES DATA

Unit Type	Units Sold	Parking Spaces	Spaces/Unit
1 Bedroom	68	41	0.60
2 Bedroom	145	99	0.68
1 Bedroom + Den	67	39	0.58
TOTAL	**280**	**179**	**0.64**

6.4.5 Parking Supply Influence

The parking supply is one of the most critical measures to shift demand from vehicles to sustainable travel modes. Recent research indicates that an area with more parking influences a higher demand for more automobile use.

- A New York City study of three boroughs showed a clear relationship between guaranteed vehicular parking at home and a greater tendency to use the automobile for trips made to and from work, even when both work and home are well served by transit. The study infers that driving to other non-work activities is also likely to be higher for households with guaranteed vehicular parking[19].
- A study of households within a two-mile radius of ten rail stations in New Jersey concluded that those developments would not reduce automobile use if development near transit stations had a high parking supply. The parking supply can undermine the incentive to use transit that proximity to transit provides[20].
- A study of nine cities across the United States looked at whether citywide changes in vehicular parking cause automobile use to increase or whether minimum parking requirements are an appropriate response to the already rising automobile use. The study concluded that: “parking provision in cities is a likely cause of increased driving among residents and employees in those places.”[21]

Many existing Zoning By-Law parking requirements are antiquated and require updating to conform to and reflect current policies and best practices. Many municipalities recognize this and update parking requirements based on parking surveys and inter-jurisdictional reviews.

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

6.5 Parking Demand Summary

Based on a review of vehicle ownership rates, proxy data, and current sales data of adjacent development, parking demand varies between 0.64 - 0.89 spaces per unit, well below the city's prescribed zoning requirements (1.40 spaces per unit).

Based on best practices and policy objectives, the proposed reduction is supported through a Transportation Demand Management (TDM) program. The provision of providing reduced parking in support of TMD measures is reflected in the City's Transportation Master Plan [22]:

- Consider TDM in the context of all development reviews
- Establish maximum parking requirements, and parking exceptions, for residential, commercial, industrial and institutional developments.
- Land use and transportation are fundamentally linked. To successfully promote sustainable transport, transit-oriented development (TOD), transit improvements and intelligent growth initiatives should co-exist to achieve significant results.
- The city should consider any form of parking an integral component of a broader TDM strategy and sustainable urban development initiatives. These initiatives should champion sustainability and showcase the efficient movement of people and goods.

[22] Niagara Falls, Sustainable Transportation Master Plan, October 2011

7 Transportation Demand Management

A Transportation Demand Management (TDM) plan aims to reduce the development's overall traffic and parking impacts by implementing strategies to affect the demand side of the transportation equation. TDM strategies include all the incentives and disincentives that increase people's likelihood of changing their travel behaviour. Strategies include financial incentives, time incentives, new or enhanced commuter services, dissemination of information, and marketing alternative services.

The TDM plan has been formulated to extend reasonable and practical strategies that encourage residents and visitors to take alternative modes of transportation. The strategies identified are expected to improve transportation access and connectivity within the development and reset of the study area.

7.1 Through Design

Several factors that influence peoples' travel mode choices support land-use/infrastructure that encourages people to choose modes other than driving alone. These strategies are already accounted for through the development's overall design and include the following.

7.1.1 Housing Density

Designing the plan with increased densities reduces Greenhouse Gas (GHG) emissions associated with traffic in several ways. Density is usually measured in persons, jobs, or dwellings per unit area. Increased densities generally shorten the distance people travel and provide greater options for the mode of travel. This strategy also provides a foundation for the implementation of many other strategies which would benefit from increased densities.

7.1.2 Land Use-Density Mix

Having different land uses nearby can decrease vehicle mode share since trips between land-use types are shorter and may be accommodated by non-automotive transportation. The mix of high-density housing and commercial uses provides land use diversity, reducing the number of automobile trips residents or employees make.

In addition, the proximity to tourist attractions and other highly travelled destinations provides additional ease for non-automotive transportation.

7.1.3 Pedestrian Facilities

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

Walking is encouraged by providing a pedestrian-friendly site layout that features an extensive network of sidewalks and entrances at critical points within the Site and connecting to the existing pedestrian network. The majority of the Site is provided with direct public access for pedestrians via multiple street-level entrances from Robinson Street and Allendale Avenue. This is intended to provide a comprehensive network of pedestrian connections to allow for an enhanced pedestrian experience for all Site users.

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

7.1.4 Bicycle Facilities

Increasing bicycling to and within Niagara Falls is crucial for reducing vehicle trips. The number of people bicycling is directly related to the quality of the bicycling network and the presence of bicycle facilities. While there are no dedicated cycling facilities in the study area, Robinson Street provides wide lane widths with signage reminding automobiles to share the road with cyclists.

7.1.5 Transit

The use of transit places less reliance on personal automobiles for trips that convenient and desirable transit options can complete. The provision of suitable and desirable transit can be made by providing well-lit transit stops with seating and weather-protective shelters. Additional amenities, including bicycle parking, schedule information, real-time bus status, and maps, can increase the convenience of the transit network.

The subject site is currently served by three (3) Niagara Falls Transit/WEGO Routes that operate primarily on Stanley Avenue and Robinson Street, connecting residential neighbourhoods with destinations across Niagara Falls. Headways are on the order of 30 minutes during most service hours.

The subject site is located in an area with ample transit access. The closest bus stops are within a 2-minute walk, and the Main Street Hub

is located approximately 850 metres (12-minute walk) from the subject site. At the Main Street & Ferry Street terminal, additional NFT routes can be accessed.

7.2 Proposed Strategies

The development will implement the proposed strategies identified herein to reduce the number of auto-trips made to/from the Development:

7.2.1 Transportation Information

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

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

7.2.2 Parking Supply

Finding the right balance needed to support the City's goals is critical, mainly since parking is an expensive resource. Sufficient automobile parking is necessary for the development to be successful. However, too much parking can encourage traffic congestion, limit the ability to meet trip reduction goals, increase project costs, and impact site design and aesthetics.

Research conducted in San Francisco focuses on whether or not a relationship exists between the provision of off-street parking and the choice to drive among individuals travelling to or from the Site. Research completed found that reductions in off-street vehicular parking for office, residential, and retail developments reduce the overall automobile mode share associated with those developments relative to projects with the same land uses in similar contexts that provide more off-street vehicular parking.

In other words, more off-street vehicular parking is linked to more driving, and people without dedicated parking spaces are less likely to drive. Based on recent research, a reduced Parking Supply is one of the most effective TDM measures available to reduce vehicle travel[23].

[23] Transportation Demand Management Technical Justification, City and County of San Francisco, June 2018.

If free and unregulated parking is provided, there is little incentive for many residents and visitors to use alternative modes of transportation. Free and abundant parking encourages people to drive alone rather than car or vanpool, drop off or pick up, walk, cycle, or take transit. Alternative sustainable modes are put at a substantial disadvantage when too much free parking is provided.

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

7.2.3 Unbundled Parking

Implementing a paid-parking operation is one of the most effective TDM strategies for encouraging alternative travel habits. Occupants are not forced to pay for parking they do not need and allow consumers to adjust their parking supply to reflect their needs. To further encourage residents of the apartment building to utilize sustainable travel modes, the development will enable residents to opt-out of purchasing their parking space, providing a discount on the purchase price.

The development will consider the use of unbundled parking. This is an essential factor as residents are notified at the project's onset that parking is proposed to be provided as an additional cost instead of the price to rent a unit. If residents are significantly considering changing their travel behaviour, the cost of renting a parking space could be a contributing factor to this change.

7.2.4 Carshare

Carsharing services are developed by private companies, cooperatives, or software applications facilitating peer-to-peer car-sharing. The provision of car share spaces is recognized as effective at reducing parking demand. It provides residents with a vehicle for infrequent instances when transit, walking, and cycling are not appropriate for the intended trip.

A significant barrier is establishing and maintaining a critical mass of users in individual neighbourhoods. Carsharing cannot develop until enough potential users in each area are familiar with the concept, understand how it can benefit them and are willing to commit themselves to a Carshare organization. The Applicant will protect and provide two spaces on-site for two car share vehicles.

7.3 TDM in Development Approvals

Parking supply can be a controversial topic, and some industry and municipal representatives may resist lowering parking supplies for various reasons. Municipal staff need to understand the benefits of effective parking supply management and its relationship with TDM and recognize that TDM is a policy initiative outlined in the City's Transportation Master Plan.

Municipal staff should undertake a regular review of the parking requirements in their Zoning By-Law to ensure parking requirements are not excessive compared to findings of current technical research and what other municipalities are doing. Opportunities for reducing parking supply requirements in the Zoning By-Law should be explored and implemented to complement the TDM initiatives being promoted by a development.

As outlined in **Section 6.2,** the City of Niagara Falls parking regulations are 35% higher when comparing the minimum requirements outlined by neighbouring municipalities adopting new standards based on best practices.

7.3.1 Parking Supply Credit

Some municipalities have created TDM checklists to assess new projects for sustainable development practices. The fact that minimum parking requirements are stipulated in antiquated Zoning By-law requirements means that a developer can provide more parking if desired. Requiring a minimum amount of parking is generally not considered supportive of TDM initiatives if it risks the provision of an over-supply of parking.

The emphasis should be on minimizing the over-supply of parking by using the lowest reasonable requirement for the area in contrast to the usual approach of requiring extra parking just in case there is not enough.

7.3.2 TDM Checklist

As outlined in Chapter 6, the parking study justification has indicated that the development's parking supply of 0.74 spaces per unit is supportable.

To further promote sustainable modes of travel, a TDM plan is recommended for the development and should reference the above for consideration. The existence of these options does not necessarily ensure they will be utilized. However, these alternatives are considered to provide significant encouragement to those residents willing to make the change to sustainable transportation.

The TDM checklist, as developed by the City of Kitchener, was related to the work completed for the Comprehensive Zoning By-law review that includes updating parking standards to reflect best practices (i.e., these two documents complement each other). As Niagara Falls does not have a comprehensive checklist developed, the City of Kitchener's checklists relied on. The following measures are proposed that have been considered that will further reduce the sites parking demand:

- Provision of 0.38 bicycle spaces per unit (73 parking space credit)
- Two car share spaces (8 parking space credit)
- The building owner will charge parking as a separate cost to occupants (96 parking space credit)

Appendix J contains the City of Kitchener's TDM checklist.

8 Conclusions and Recommendations

8.1 Conclusions

The signal timing plans of the study area intersections are recommended to be modified to accommodate the increased background traffic growth and site traffic within the study area.

It is acknowledged that the intersection of Ferry Street and Stanley Street currently exhibits several movements operating with high levels of delay during the weekday PM peak hour. The delay will increase further with general growth projected for the area (without the proposed development). The Niagara Region TMP recognizes the significant regional corridors already experience congestion and operational constraints and has long been recognized as challenges to travel in Niagara Region.

From a vehicle capacity perspective, widening the Ferry Street corridor is expected to alleviate this condition; however, given the property constraints in this area, it is not likely feasible that additional through lane capacity can be implemented to address the noted congestion issues. It is understood that the Region and the City are aware of the congestion issues occurring in this area. The congestion issues appear to be primarily driven by tourism. Traffic Demand Management measures geared explicitly at visitors to the City of Niagara Falls, such as encouraging the use of WEGO to reduce vehicle travel within the tourism core, should be considered by the City and Region to address the issue.

The addition of a westbound right-turn lane at the intersection of Stanley Avenue and Robinson Street is expected to alleviate forecasted congestion in the PM peak hour. With the existing lane width, it is possible that the right-turn lane can be painted without the need to widen the roadway.

The City of Niagara Falls growth objective is to create and develop a transit and pedestrian-friendly, sustainable, and livable City through urban design criteria and guidelines. The Official Plan embraces sustainability and creates a vision for complete compact communities served by streets made for walking, cycling, and an attractive transit system. This vision is supported by policies to reduce auto dependence and limit the amount of land occupied by automobile parking. The transportation policies are deliberately interspersed with the land-use policies to emphasize the importance of considering both areas to achieve the overall vision of complete compact communities.

The parking supply is one of the most critical measures to shift demand from vehicles to sustainable travel modes. Research conducted focused on the provision of off-street parking and the choice to drive among individuals travelling. This research found that reductions in off-street vehicular parking for office, residential, and retail developments reduce the overall automobile mode share associated with those developments relative to projects with the same land uses in similar contexts that provide more off-street vehicular parking.

This research is further echoed within the Government of Ontario's "Housing Affordability Task Force." One of the main recommendations by the Housing Task Force is removing or reducing the parking requirements in cities with over 50,000 in population. The report identified that residential minimum parking requirements should ensure a basic, responsible parking level is provided without increasing development costs. Minimum parking requirements add as much as $165,000 to the price of a new housing unit.

A parking supply of 0.74 spaces per residential unit is supported for the area based on a review of vehicle ownership rates and previous sales data from an adjacent high-rise development. While the Phase 1 data only represents a third of the residential units, it strongly supports the notion that the proposed supply of 0.74 spaces per unit is supportable. This sales data provides further support and justification that the number of parking spaces that have been sold is well below the City's Zoning requirements and is reflective of an average rate of 0.64 spaces per unit.

Lastly, the proposed parking supply is supported through a robust Transportation Demand Management (TDM) program that includes bicycle parking, active uses at grade, car share vehicles, and unbundled parking.

8.2 Recommendations

Based on the findings of this study, the following is recommended:

- The City of Niagara Falls monitors operations of the signalized intersections along Stanley Avenue to ensure appropriate signal timing plans.
- The Region of Niagara reviews the operations along the Ferry Street and Stanley Street intersections against the policies within the TMP to determine the preferred approach to accommodating all modes of transportation.

- The City of Niagara Falls consider the addition of a westbound right-turn lane at the intersection of Stanley Avenue and Robinson Street.
- The development implements a robust Transportation Demand Management program to support the reduced parking supply of 0.74 spaces per unit.

Appendix A

Terms of Reference

Greg Lue

From: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Sent: January 6, 2022 11:28 AM
To: Adam Makarewicz
Cc: Greg Lue; Christine Bowness; John Grubich (jgrubich@niagarafalls.ca)
Subject: RE: [EXTERNAL]-210614 - 5566 Robinson Street, Niagara Falls - TIS and Parking Study Terms of Reference

Hello Adam,

We have counts for the two Stanley Ave locations for the weekdays – you will have to request them through the website at the following link: https://www.niagararegion.ca/living/roads/permits/traffic-data-requests.aspx.

We would ask that you increase the counts by 2% for each year since the counts.

Unfortunately we do not have weekend counts therefore as per the City's suggestion we will ask that the summer counts be completed later and the TIS for the site plan be updated to reflect those numbers.

If you require anything further please let me know.

Thank you

Susan M. Dunsmore, P. Eng.
Manager, Development Engineering
Planning and Development Services

Phone: (905) 980-6000 or 1-800-263-7215 ext 3661
Address: 1815 Sir Isaac Brock Way, Thorold ON, L2V4T7

From: Adam Makarewicz <amakarewicz@ptsl.com>
Sent: Thursday, January 06, 2022 10:07 AM
To: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Cc: Greg Lue <glue@ptsl.com>; Christine Bowness <cbowness@ptsl.com>
Subject: FW: [EXTERNAL]-210614 - 5566 Robinson Street, Niagara Falls - TIS and Parking Study Terms of Reference

Hi Susan,

Looping you into the conversation in terms of data collection. We have some counts scheduled to be completed next week at the following regional road intersections:

Weekday
- Stanley Avenue (RR 102) & Main Street & Dixon Street
- Ferry Street (RR 20) & Allendale Avenue
- Stanley Avenue (RR 102) & Murray Street

Saturday
- Stanley Avenue (RR 102) & Robinson Street
- Stanley Avenue (RR 102) & Ferry Street

Given the current situation with the lockdown, does the Region have any historical traffic data that we could use with a factor applied? If not, would you consider a re-analysis of these intersections during a future site plan application similar to what the City has proposed?

All the best,

Adam J. Makarewicz
Senior Project Manager

Paradigm Transportation Solutions Limited
5A-150 Pinebush Road, Cambridge ON N1R 8J8
p: 905.381.2229 x303
e: amakarewicz@ptsl.com
w: www.ptsl.com

From: John Grubich <jgrubich@niagarafalls.ca>
Sent: 6-Jan-22 9:35 AM
To: Adam Makarewicz <amakarewicz@ptsl.com>; Mathew Bilodeau <mbilodeau@niagarafalls.ca>
Cc: Greg Lue <glue@ptsl.com>; Christine Bowness <cbowness@ptsl.com>
Subject: RE: [EXTERNAL]-210614 - 5566 Robinson Street, Niagara Falls - TIS and Parking Study Terms of Reference

Adam;

Collecting data now would not be appropriate, due to the current situation with the pandemic and the winter season. I found 2018 summer volumes for Allendale/Robinson that could be used for the 2 City intersection in your study. However, we will ask that a re-analysis be carried out with actual summer data as a condition of a future site plan application.

You should consult with the Niagara Region on what approach they would like applied to the intersections under their jurisdiction.

John Grubich, C.E.T. | Traffic Planning Supervisor | Municipal Works - Transportation Services | City of Niagara Falls
8208 Heartland Forest Road | Niagara Falls, ON L2H 0L7 | (905) 356-7521 ext 5214 | Fax 905-356-5576 | jgrubich@niagarafalls.ca

From: Adam Makarewicz <amakarewicz@ptsl.com>
Sent: January 4, 2022 10:26 AM
To: John Grubich <jgrubich@niagarafalls.ca>; Mathew Bilodeau <mbilodeau@niagarafalls.ca>
Cc: Greg Lue <glue@ptsl.com>; Christine Bowness <cbowness@ptsl.com>
Subject: RE: [EXTERNAL]-210614 - 5566 Robinson Street, Niagara Falls - TIS and Parking Study Terms of Reference

Hi John and Mathew,

We have some counts scheduled to be completed next week at following intersections:

Weekday
- Robinson Street & Main Street (unsignalized);
- Robinson Street & Allendale Avenue (unsignalized);
- Stanley Avenue & Main Street & Dixon Street (signalized);
- Ferry Street & Allendale Avenue (unsignalized); and
- Stanley Avenue & Murray Street (signalized).

Saturday
- Robinson Street & Stanley Avenue (signalized);
- Stanley Avenue & Ferry Street (signalized);

Would you be OK if we still proceeded with the counts and applied a factor given the recent closures implemented by the Province?

All the best,

Adam J. Makarewicz
Senior Project Manager

Paradigm Transportation Solutions Limited
5A-150 Pinebush Road, Cambridge ON N1R 8J8
p: 905.381.2229 x303
e: amakarewicz@ptsl.com
w: **MailScanner has detected a possible fraud attempt from "linkprotect.cudasvc.com" that could be a fraud attempt as the link does not match the site its claiming to be** www.ptsl.com

---

From: John Grubich <jgrubich@niagarafalls.ca>
Sent: 11-Nov-21 10:08 AM
To: Greg Lue <glue@ptsl.com>
Cc: Adam Makarewicz <amakarewicz@ptsl.com>; Mathew Bilodeau <mbilodeau@niagarafalls.ca>
Subject: RE: [EXTERNAL]-210614 - 5566 Robinson Street, Niagara Falls - TIS and Parking Study Terms of Reference

Greg;

One additional item I forgot to include;

Please address and provide recommendations on neighbourhood traffic infiltration to/from this development, specifically from the west via Robinson and Peer Streets. Allendale Avenue and the hydro corridor is the boundary between the tourist core to the east and low density residential developments to the west.

Thank you.

John Grubich, C.E.T. | Traffic Planning Supervisor | Municipal Works - Transportation Services | City of Niagara Falls
8208 Heartland Forest Road | Niagara Falls, ON L2H 0L7 | (905) 356-7521 ext 5214 | Fax 905-356-5576 | jgrubich@niagarafalls.ca

---

From: John Grubich
Sent: Wednesday, November 10, 2021 10:52 AM
To: 'Greg Lue' <glue@ptsl.com>; Susan.Dunsmore@niagararegion.ca
Cc: Adam Makarewicz <amakarewicz@ptsl.com>; Mathew Bilodeau <mbilodeau@niagarafalls.ca>
Subject: RE: [EXTERNAL]-210614 - 5566 Robinson Street, Niagara Falls - TIS and Parking Study Terms of Reference

Greg;

Thank you for forwarding your terms of reference for this proposed development.

If the Region agrees, I'd like to have the Ferry / Allendale intersection included in the study area.

Please add background traffic from the following developments as they overlap with your study area:

- Stanley / Ferry SW Corner, mixed use development
- Stanley / Dunn NW corner, mixed use development
- Stanley / Murray NE corner, Hyatt hotel
- East end of Robinson, 3 hotels

Attached are the trip diagrams for each.

With respect to parking, the City has adopted a defacto 1.25 parking space per unit rate for multi-unit residential developments; however the City standard is 1.4 parking spaces per unit. You will need to provide a strong site-specific rationale to support a lower parking rate. The owner for the Ferry / Allendale development is seeking additional long term off-site parking so the report they used to justify a lower parking rate will not be accepted. In most cases, proxy site data is concluding a parking rate of 1.25 for most studies. A lower rate is only supported by staff where appropriate.

Please let me know if you have any questions.

John Grubich, C.E.T. | Traffic Planning Supervisor | Municipal Works - Transportation Services | City of Niagara Falls
8208 Heartland Forest Road | Niagara Falls, ON L2H 0L7 | (905) 356-7521 ext 5214 | Fax 905-356-5576 | jgrubich@niagarafalls.ca

---

From: Greg Lue <glue@ptsl.com>
Sent: Monday, November 1, 2021 4:18 PM
To: John Grubich <jgrubich@niagarafalls.ca>; Susan.Dunsmore@niagararegion.ca
Cc: Adam Makarewicz <amakarewicz@ptsl.com>
Subject: [EXTERNAL]-210614 - 5566 Robinson Street, Niagara Falls - TIS and Parking Study Terms of Reference

Hi all,

Paradigm Transportations Solutions Limited has been retained to conduct a Transportation Impact Analysis and Parking Study for a proposed redevelopment at the southeast corner of Robinson Street and Allendale Avenue; municipal address 5566 Robinson Street & 6158 Allendale Avenue. The property owner is proposing to redevelop the lands as a high-rise tower extending to 77 storeys with residential condominium units (918 units) and a hotel (484 rooms) with ground floor retail. A total of 1,138 parking spaces are proposed.

Vehicle access to the site is proposed through a driveway connection to Robinson Street and a driveway connection to Allendale Avenue. Access to underground parking is proposed through access ramps that can be accessed through an internal roundabout proposed on-site.

Concept plan is in early stages and is not currently available. Location of subject site and study area intersections attached.

Proposed Terms of Reference
Study Area Intersections

- Robinson Street & Main Street (unsignalized);
- Robinson Street & Allendale Avenue (unsignalized);
- Robinson Street & Stanley Avenue (signalized);
- Allendale Avenue & Main Street & Murray Street (signalized);
- Stanley Avenue & Ferry Street (signalized);
- Stanley Avenue & Murray Street (signalized); and
- Up to two site driveways

Existing Data

- Does the City/Region have issues with historic traffic counts being used and grown to a 2021 base year using a generalized 2% growth rate?
- For intersections without available data, does the City/Region have issues with traffic counts being collected given that the summer peak tourism season is over?

Horizon Years

- 2021 Base Year
- 10-years from date of study (2031)

Analysis Periods

- Weekday AM peak hour
- Weekday PM peak hour
- Saturday Peak Hour

Analysis

- Synchro 10
- HCM 2000
- SimTraffic Queueing (five 60-min iterations)

Background Traffic

- Generalized growth rate 2% per annum
- Traffic generated by any in stream developments in the area. **City of Niagara Falls** – can you comment on this and provide any relevant studies or inputs to estimate the traffic for the site(s)?

Site Traffic Estimates

- ITE Trip Generation Data 10th Edition
- No modal split reductions

Site Traffic Distribution

- Existing travel patterns/TTS data

Parking Study

- Parking generation for the site will be calculated using parking rates obtained from ITE Parking Generation Manual, proxy site survey data, and Zoning By-Law comparisons. For proxy site data it is proposed that parking survey data collected for the Stanley Avenue and Ferry Street Proposed Mixed Use Development Traffic Impact and Parking Study (2019) be utilized. Surveys were conducted on Thursday, February 28th, 2019 from 10 PM – 1 AM and Saturday March 2nd, 2019 from 10 PM – 1 AM.
- A parking rate will be recommended that is deemed applicable to the subject site taking into account the development's location. The recommended rate will then be used to estimate the number of parking spaces needed to meet the projected parking demand. The estimated parking supply needed will be compared to the By-law required supply to assess the feasibility of providing less than the By-law supply requirements. In the event that the parking review determines that a parking reduction cannot be justified, the report will speak to this point.

Report

- We will document the study methodologies, findings, and conclusions in a report with appendices containing the detailed analysis results and any data collected.

Greg Lue, M.A.Sc., P.Eng.
Transportation Engineer

Paradigm Transportation Solutions Limited
5A-150 Pinebush Road, Cambridge ON N1R 8J8
p: 905.381.2229 x307
m: 905.981.7479
e: glue@ptsl.com
w: **MailScanner has detected a possible fraud attempt from "linkprotect.cudasvc.com" that could be a fraud attempt as the link does not match the site its claiming to be** www.ptsl.com

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Greg Lue

From: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Sent: November 8, 2021 9:54 AM
To: Greg Lue
Cc: Adam Makarewicz; John Grubich; Alguire, Robert
Subject: RE: 210614 - 5566 Robinson Street, Niagara Falls - TIS and Parking Study Terms of Reference

Hello Greg,

Regional transportation staff have reviewed the Terms of reference and their comments are below in green. If you require any Regional traffic data an online request can be made through the following link: https://www.niagararegion.ca/living/roads/permits/traffic-data-requests.aspx. If there are any recommended changes to Regional intersections or road a function design is to be included in the TIS.

If you require anything further please contact me at your convenience.

Thank you

Susan M. Dunsmore, P. Eng.
Manager, Development Engineering
Planning and Development Services

Phone: (905) 980-6000 or 1-800-263-7215 ext 3661
Address: 1815 Sir Isaac Brock Way, Thorold ON, L2V4T7

Niagara Region

From: Greg Lue <glue@ptsl.com>
Sent: Monday, November 01, 2021 4:18 PM
To: John Grubich <jgrubich@niagarafalls.ca>; Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Cc: Adam Makarewicz <amakarewicz@ptsl.com>
Subject: 210614 - 5566 Robinson Street, Niagara Falls - TIS and Parking Study Terms of Reference

Hi all,

Paradigm Transportations Solutions Limited has been retained to conduct a Transportation Impact Analysis and Parking Study for a proposed redevelopment at the southeast corner of Robinson Street and Allendale Avenue; municipal

address 5566 Robinson Street & 6158 Allendale Avenue. The property owner is proposing to redevelop the lands as a high-rise tower extending to 77 storeys with residential condominium units (918 units) and a hotel (484 rooms) with ground floor retail. A total of 1,138 parking spaces are proposed.

Vehicle access to the site is proposed through a driveway connection to Robinson Street and a driveway connection to Allendale Avenue. Access to underground parking is proposed through access ramps that can be accessed through an internal roundabout proposed on-site.

Concept plan is in early stages and is not currently available. Location of subject site and study area intersections attached.

Proposed Terms of Reference

Study Area Intersections

- Robinson Street & Main Street (unsignalized); ok
- Robinson Street & Allendale Avenue (unsignalized); ok
- Robinson Street & Stanley Avenue (signalized); ok
- Allendale Avenue & Main Street & Murray Street (signalized); ok
- Stanley Avenue & Ferry Street (signalized); ok
- Stanley Avenue & Main Street & Dixon Street (signalized)
- Stanley Avenue & Murray Street (signalized); and ok
- Up to two site driveways ok

Existing Data

- Does the City/Region have issues with historic traffic counts being used and grown to a 2021 base year using a generalized 2% growth rate?

It is acceptable to use historic traffic counts before the pandemic (March 2020) within 5 years, given the current COVID-19 conditions (remote working/study conditions), and growing it into 2021 base year using a 2% growth rate.

- For intersections without available data, does the City/Region have issues with traffic counts being collected given that the summer peak tourism season is over?

Given the current COVID-19 conditions, any traffic counts at this time wouldn't represent typical conditions. Therefore, an adjustment factor is to be applied to the carried counts and to be defendable.

Horizon Years: Agreed

- 2021 Base Year
- 10-years from date of study (2031)

Analysis Periods: Agreed

- Weekday AM peak hour
- Weekday PM peak hour
- Saturday Peak Hour

Analysis: Agreed

- Synchro 10
- HCM 2000
- SimTraffic Queueing (five 60-min iterations)

Background Traffic

- Generalized growth rate 2% per annum. Agreed

- Traffic generated by any in stream developments in the area. **City of Niagara Falls** – can you comment on this and provide any relevant studies or inputs to estimate the traffic for the site(s)?

Site Traffic Estimates: Agreed

- ITE Trip Generation Data 10th Edition
- No modal split reductions

Site Traffic Distribution

- Existing travel patterns/TTS 2016 data

Parking Study

- Parking generation for the site will be calculated using parking rates obtained from ITE Parking Generation Manual, proxy site survey data, and Zoning By-Law comparisons. For proxy site data it is proposed that parking survey data collected for the Stanley Avenue and Ferry Street Proposed Mixed Use Development Traffic Impact and Parking Study (2019) be utilized. Surveys were conducted on Thursday, February 28th, 2019 from 10 PM – 1 AM and Saturday March 2nd, 2019 from 10 PM – 1 AM.
- A parking rate will be recommended that is deemed applicable to the subject site taking into account the development's location. The recommended rate will then be used to estimate the number of parking spaces needed to meet the projected parking demand. The estimated parking supply needed will be compared to the By-law required supply to assess the feasibility of providing less than the By-law supply requirements. In the event that the parking review determines that a parking reduction cannot be justified, the report will speak to this point.

Report

- We will document the study methodologies, findings, and conclusions in a report with appendices containing the detailed analysis results and any data collected.

Greg Lue, M.A.Sc., P.Eng.
Transportation Engineer

Paradigm Transportation Solutions Limited
5A-150 Pinebush Road, Cambridge ON N1R 8J8
p: 905.381.2229 x307
m: 905.981.7479
e: glue@ptsl.com
w: www.ptsl.com

Appendix B

Existing Traffic Data

Main St @ Allendale @ Murray

Municipality: Niagara Falls
Major Road: Main
Minor Road: Allendale

Date: July 11, 2019

Major Road Runs: Northwest/Southeast
Weather Conditions: Clear/Dry
Person No. 1 Cam

Main St @ Allendale @ Murray

Municipality: Niagara Falls
Major Road: Main
Minor Road: Allendale

Date: July 11, 2019

Major Road Runs: Northwest/Southeast
Weather Conditions: Clear/Dry
Person No. 1 Cam

	Main Northwest Approach									Allendale North Approach									Murray East Approach									Main Southeast Approach									Allendale South Approach								
	Cars				Trucks				Ped.	Cars				Trucks				Ped.	Cars				Trucks				Ped.	Cars				Trucks				Ped.	Cars				Trucks				Ped.
	Left	Left	Thru	Right	Left	Left	Thru	Right	Cross.	Left	Left	Thru	Right	Left	Left	Thru	Right	Cross.	Left	Left	Right	Right	Left	Left	Right	Right	Cross.	Left	Thru	Right	Right	Left	Thru	Right	Right	Cross.	Left	Thru	Right	Right	Left	Thru	Right	Right	Cross.
	Allendale	Murray	Main	Allendale	Allendale	Murray	Main	Allendale		Murray	Main	Allendale	Main	Murray	Main	Allendale	Main		Main	Allendale	Main	Allendale	Main	Allendale	Main	Allendale		Allendale	Main	Allendale	Murray	Allendale	Main	Allendale	Murray		Main	Allendale	Murray	Main	Main	Allendale	Murray	Main	
10:15		16	16	1		2				1								6		1	18	8			1		5				1				3	2	2	2						3
10:30		10	14	3			1		4	2	1	1						15	2		15	2			2		7								1	3	2			1				2
10:45	1	12	19	7	1	2	1		1	1	1							3	2	4	10	1		1	2		4	1	2		1					4	5	1				1		4
11:00		17	15	2							2							2	4	1	24	3			1		1		1						5	6	2							15
11:15	1	10	29			1				2								4	2	2	18	1			3		3		1			1		1	4	2	2	1	1			1		6
11:30		24	10	1		1			1	1				1				3	2	1	23	8			2		5				3					6	7	1						
11:45		17	19	3		1	2		1	1	3		1					6	1	1	19	3		1	2		2		4		1					8	5		1			1		6
12:00		13	19	2						2	1		1					4	6	2	29	2	1		3				4		3				2	10	3	1		1				5
12:15		15	17	4		1			4	1	1		1	1				5	3	3	19								3		2				12	18	2	1						10
12:30		15	18	1		1	1		2	1		2						3	1	2	16	5			1		1		1	1	2				1	1	1	3			1			4
12:45		19	19			1			5	1	1		1					16	1		23	3			1		2		1				2	1	3	6	6	1						4
13:00		25	18	5					1	1	2	2						11		1	17	1	1		1						4				2	7	4	1		1				2
13:15		19	16	3		5			1	1								4		1	18	4			1		3		1		1					2	3				1			4
13:30		18	18	2				1					2					3		3	20	8							1		2			1		2	5			1		2		1
13:45	2	15	31	3		2			1	1								3	2	1	12	9							2		1		1		5	5	2	2				2		1
14:00	1	20	18	4			2		1									6		4	22	4			1		4				1				4	1	2	2		1		1		3
15:15		18	27	3		2	1				1	1						19		1	36	11		2	1		5		3	1	5				14	12	8	2	1					6
15:30	2	17	33				1		1									12	1	3	35	6	1		2		3		3	3	2				20	14	6	4	1	1				16
15:45		24	30	3		2			1			3						10	1		20	9			2		1		8		4		2		5	6	6			1	1	2		7
16:00		21	32	8					1	2	1		1	1		2		7	2	3	33	9			2		7		2	1	3				13	7	5			1				3
16:15	1	27	24	1		2				2	2	3	1			1		10	2	1	32	7			1		1		2	2	2				11	15	7	1						7
16:30		16	24	1			1		1		1	3						9	2	1	30	6			5		5		1	1	2				3	10	4	1	2	2				2
16:45		18	39	10		2			1			4						13	1		31	10		1	1		2		2	3	4		2		2	19	4	1		2				1
17:00		19	38	6			1		7					1				10	5		37	7			2		2		2	1	1					17	5	3	1	1				24
17:15	1	12	21	4		2			2		1	2						8	1	2	27	6			1		2		3							18	3	2	2		1			3
17:30		17	30								2	2						10	4	1	22	4		1	2		3		1		2					5	3	1	1	1	1			4
17:45	1	8	31	7		2	2		3	2								10		1	24	8		1	1				4		2		1		5	5	4		2					12
18:00	1	17	18	3				1	2	1		1	1					11	2	2	19	12			3		1		1						2	5	4	1		1				4
18:15		25	29	2		2			1	1	1							9	1		19	3			5				1						7	4	3				1			11
18:30	4	16	17	4						1			1					7		2	14	2					5		2		1				2	9		1		1				6
18:45		13	17	5		1			1	2	1	1						4	1	1	16	10			2		1		1		1				3	11	1							6
19:00		20	13	2			1		5			1						11	4	2	15	6			1		2	1	1				1		2	4	1		1	1				1

Allendale Ave @ Robinson St

Mid-day Peak Diagram

Specified Period
From: 10:00:00
To: 14:00:00

One Hour Peak
From: 10:30:00
To: 11:30:00

Municipality: Niagara Falls
Site #: 0000000041
Intersection: Robinson St & Allendale Ave
TFR File #: 3
Count date: 11-Jul-2019

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Robinson St runs W/E

North Leg Total: 40
North Entering: 14
North Peds: 4
Peds Cross: ⋈

Cyclists	0	0	0	0
Trucks	0	0	0	0
Cars	2	4	8	14
Totals	2	4	8	

Cyclists	1
Trucks	1
Cars	24
Totals	26

East Leg Total: 137
East Entering: 43
East Peds: 0
Peds Cross: ⧖

Allendale Ave

Cyclists	Trucks	Cars	Totals
1	1	35	37

Cars	Trucks	Cyclists	Totals
7	0	0	7
32	1	1	34
2	0	0	2
41	1	1	

Robinson St

N
W E
S

Cyclists	Trucks	Cars	Totals
0	0	1	1
0	0	54	54
0	0	1	1
0	0	56	

Robinson St

Cars	Trucks	Cyclists	Totals
94	0	0	94

Allendale Ave

Peds Cross: ⧖
West Peds: 0
West Entering: 56
West Leg Total: 93

Cars	7
Trucks	0
Cyclists	0
Totals	7

Cars	1	16	32	49
Trucks	0	1	0	1
Cyclists	0	1	0	1
Totals	1	18	32	

Peds Cross: ⋈
South Peds: 1
South Entering: 51
South Leg Total: 58

Comments

Allendale Ave @ Robinson St

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 19:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

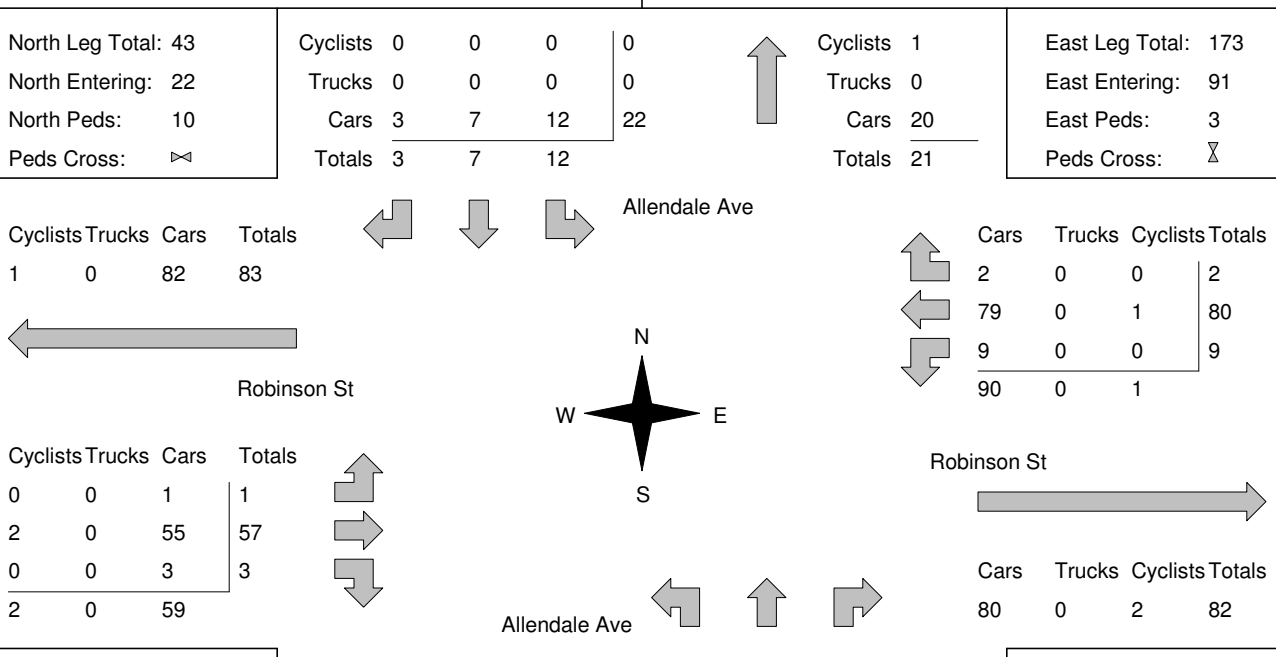
Municipality: Niagara Falls
Site #: 0000000041
Intersection: Robinson St & Allendale Ave
TFR File #: 3
Count date: 11-Jul-2019

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Non-Signalized Intersection ****

Major Road: Robinson St runs W/E



Comments

Allendale Ave @ Robinson St

Total Count Diagram

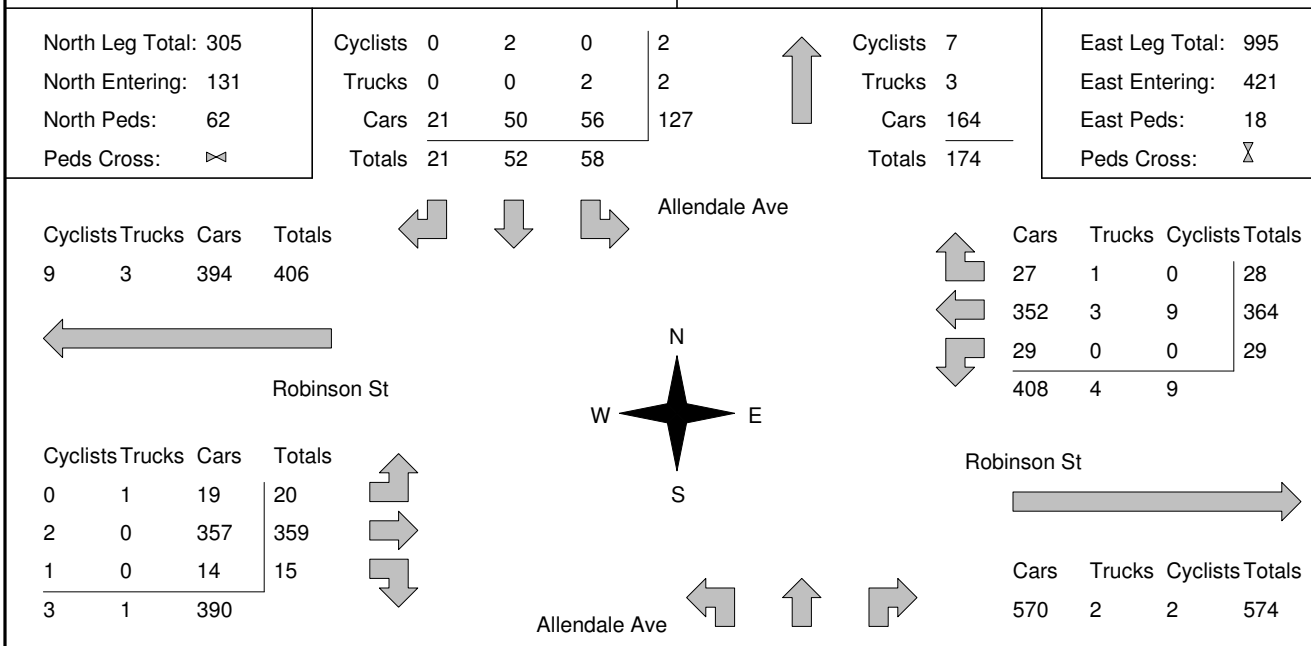
Municipality: Niagara Falls
Site #: 0000000041
Intersection: Robinson St & Allendale Ave
TFR File #: 3
Count date: 11-Jul-2019

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

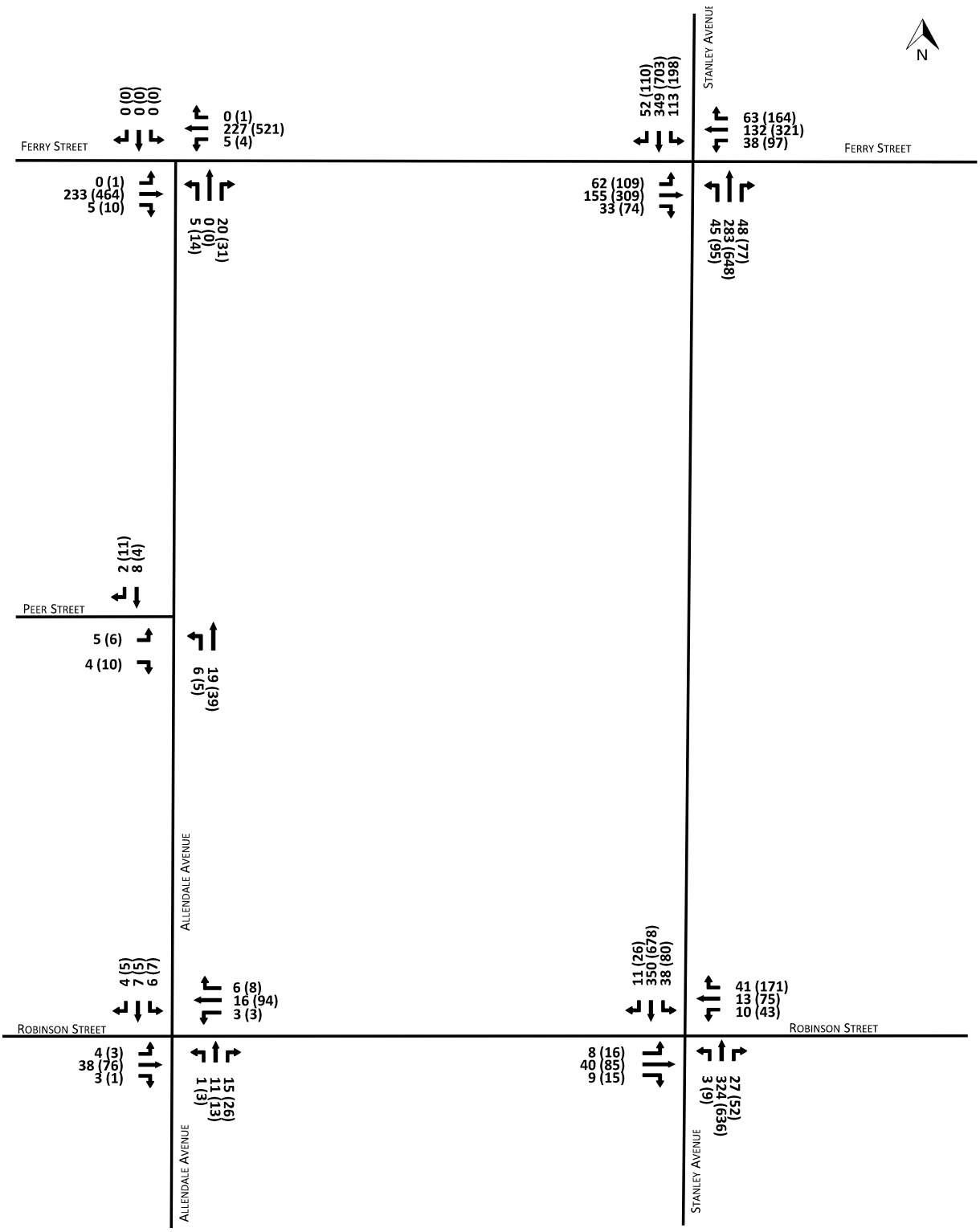
**** Non-Signalized Intersection ****

Major Road: Robinson St runs W/E

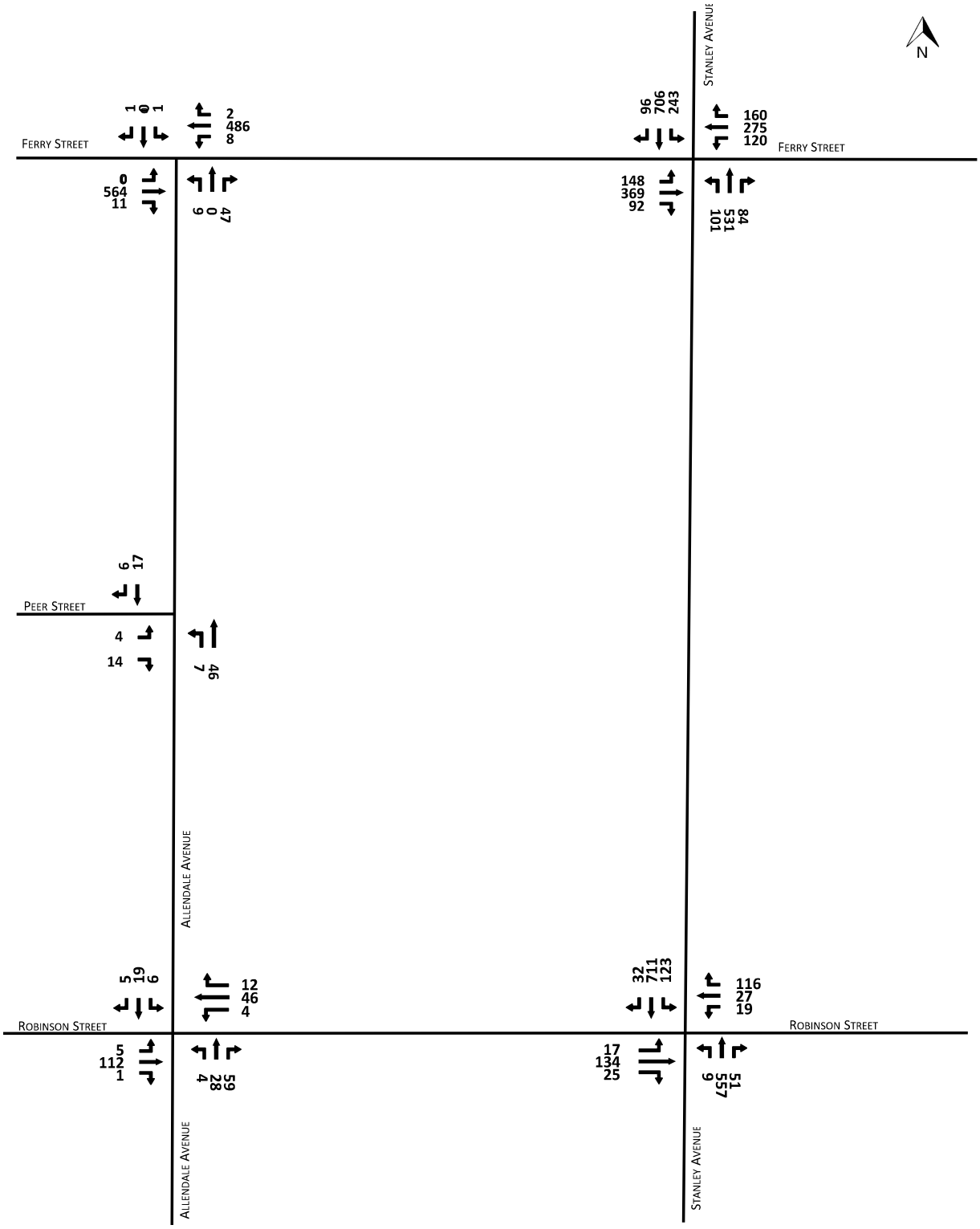


Comments

Base Year (2018) Background Traffic
AM (PM) Summer Weekend Peak Hour



Base Year (2018) Background Traffic
Summer Weekend Midday Peak Hour



Allendale Road & Murray Street/Main Street -... - TMC

Tue Oct 5, 2021
Full Length (7 AM-10 AM, 11 AM-1 PM, 3 PM-6 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 882477, Location: 43.083393, -79.085977, Site Code: 200646

Provided by: Paradigm Transportation Solutions Limited
5A-150 Pinebush Road, Cambridge, ON, N1R 8J8, CA

Leg	Murray Street							Allendale Road							Allendale Road							Main Street							Main Street							
Direction	Westbound							Northbound							Southbound							Southeastbound							Northwestbound							
Time	HL	L	BR	R	U	App	Ped*	BL	T	R	HR	U	App	Ped*	L	BL	T	HR	U	App	Ped*	HL	BL	T	BR	U	App	Ped*	HL	T	BR	HR	U	App	Ped*	Int
2021-10-05 7:00AM	0	0	6	0	0	**6**	0	1	0	0	0	0	**1**	1	1	0	0	0	0	**1**	2	0	8	7	0	0	**15**	0	0	0	0	1	0	**1**	0	**24**
7:15AM	0	0	6	1	0	**7**	1	0	1	1	0	0	**2**	2	0	0	0	0	0	**0**	6	0	3	10	2	0	**15**	2	0	0	0	0	0	**0**	1	**24**
7:30AM	0	0	13	0	0	**13**	1	1	0	0	0	0	**1**	0	0	0	0	1	0	**1**	3	1	13	13	1	0	**28**	0	0	0	0	0	0	**0**	1	**43**
7:45AM	0	1	11	1	0	**13**	1	0	0	1	0	0	**1**	3	0	0	0	0	0	**0**	6	0	10	14	3	0	**27**	0	0	0	0	0	0	**0**	0	**41**
Hourly Total	0	1	36	2	0	**39**	3	2	1	2	0	0	**5**	6	1	0	0	1	0	**2**	17	1	34	44	6	0	**85**	2	0	0	0	1	0	**1**	2	**132**
8:00AM	2	0	3	0	0	**5**	2	0	0	0	0	0	**0**	0	0	0	0	0	0	**0**	5	0	13	7	1	0	**21**	0	0	0	0	0	0	**0**	0	**26**
8:15AM	0	1	13	0	0	**14**	0	0	0	0	0	0	**0**	1	0	2	1	0	0	**3**	5	0	2	17	0	0	**19**	3	0	0	0	0	0	**0**	0	**36**
8:30AM	0	1	20	1	0	**22**	1	0	1	0	0	0	**1**	1	1	0	0	0	0	**1**	5	0	13	19	3	0	**35**	2	0	0	0	0	0	**0**	0	**59**
8:45AM	1	0	15	1	0	**17**	2	2	0	0	0	0	**2**	0	1	0	0	0	0	**1**	3	0	6	14	3	0	**23**	2	0	0	0	0	0	**0**	2	**43**
Hourly Total	3	2	51	2	0	**58**	5	2	1	0	0	0	**3**	2	2	2	1	0	0	**5**	18	0	34	57	7	0	**98**	7	0	0	0	0	0	**0**	2	**164**
9:00AM	0	1	16	0	0	**17**	2	2	0	1	0	0	**3**	0	0	0	0	0	0	**0**	9	0	15	12	2	0	**29**	2	0	2	0	0	0	**2**	0	**51**
9:15AM	1	1	10	1	0	**13**	2	3	0	0	0	0	**3**	0	0	0	0	0	0	**0**	4	0	10	11	0	0	**21**	0	0	0	0	0	0	**0**	1	**37**
9:30AM	0	0	10	0	0	**10**	1	2	0	0	0	0	**2**	5	0	0	0	0	1	**1**	0	0	7	18	0	0	**25**	2	0	0	0	0	0	**0**	2	**38**
9:45AM	0	2	13	0	0	**15**	1	2	1	0	0	0	**3**	1	1	0	0	0	0	**1**	1	0	5	11	0	0	**16**	1	0	1	0	1	0	**2**	2	**37**
Hourly Total	1	4	49	1	0	**55**	6	9	1	1	0	0	**11**	6	1	0	0	0	1	**2**	14	0	37	52	2	0	**91**	5	0	3	0	1	0	**4**	5	**163**
11:00AM	0	0	18	2	0	**20**	1	5	0	0	0	0	**5**	2	1	0	0	2	0	**3**	4	1	8	8	0	0	**17**	3	0	1	0	1	0	**2**	1	**47**
11:15AM	2	1	11	2	0	**16**	1	3	0	0	0	0	**3**	3	0	1	0	1	0	**2**	0	4	11	19	0	0	**34**	0	0	0	0	2	0	**2**	1	**57**
11:30AM	0	1	9	0	0	**10**	4	5	3	0	1	0	**9**	0	0	1	0	1	0	**2**	2	0	12	24	1	0	**37**	1	0	0	0	0	0	**0**	2	**58**
11:45AM	0	1	14	0	0	**15**	0	2	3	0	0	0	**5**	3	0	0	2	0	0	**2**	6	0	13	14	0	0	**27**	2	0	1	0	0	0	**1**	0	**50**
Hourly Total	2	3	52	4	0	**61**	6	15	6	0	1	0	**22**	8	1	2	2	4	0	**9**	12	5	44	65	1	0	**115**	6	0	2	0	3	0	**5**	4	**212**
12:00PM	0	0	12	0	0	**12**	0	4	0	0	0	0	**4**	1	0	0	1	1	0	**2**	2	0	10	19	0	0	**29**	2	0	0	0	0	0	**0**	0	**47**
12:15PM	0	1	22	1	0	**24**	0	4	0	0	0	0	**4**	0	1	0	0	1	0	**2**	4	0	10	12	0	0	**22**	3	0	0	0	0	0	**0**	0	**52**
12:30PM	0	1	7	1	0	**9**	0	1	2	0	0	0	**3**	3	0	0	1	0	0	**1**	3	0	9	12	2	0	**23**	2	0	0	0	0	0	**0**	2	**36**
12:45PM	0	1	9	1	1	**12**	1	1	0	1	0	0	**2**	0	0	0	0	0	0	**0**	6	0	10	16	1	0	**27**	1	0	0	0	0	0	**0**	0	**41**
Hourly Total	0	3	50	3	1	**57**	1	10	2	1	0	0	**13**	4	1	0	2	2	0	**5**	15	0	39	59	3	0	**101**	8	0	0	0	0	0	**0**	2	**176**
3:00PM	0	1	21	1	0	**23**	0	6	0	1	0	0	**7**	0	1	1	0	0	0	**2**	4	0	4	21	0	0	**25**	2	1	0	0	0	0	**1**	1	**58**
3:15PM	2	1	18	2	0	**23**	0	5	0	0	0	0	**5**	2	0	0	0	1	0	**1**	2	1	6	14	0	0	**21**	0	0	2	0	1	0	**3**	0	**53**
3:30PM	1	0	19	1	0	**21**	0	5	0	3	1	0	**9**	1	0	0	0	0	0	**0**	0	2	18	18	2	0	**40**	1	0	0	0	0	0	**0**	1	**70**
3:45PM	0	0	15	1	0	**16**	2	2	1	2	0	0	**5**	1	0	0	0	2	0	**2**	6	0	19	29	3	0	**51**	2	0	3	0	1	0	**4**	0	**78**
Hourly Total	3	2	73	5	0	**83**	2	18	1	6	1	0	**26**	4	1	1	0	3	0	**5**	12	3	47	82	5	0	**137**	5	1	5	0	2	0	**8**	2	**259**
4:00PM	0	1	21	2	0	**24**	2	4	0	0	0	0	**4**	1	0	1	0	1	0	**2**	7	0	11	15	0	0	**26**	0	0	0	0	0	0	**0**	1	**56**
4:15PM	2	1	33	1	0	**37**	0	3	1	0	0	0	**4**	0	0	0	0	0	0	**0**	4	0	9	19	1	0	**29**	1	0	1	0	1	0	**2**	0	**72**
4:30PM	0	1	26	1	0	**28**	8	4	1	1	0	0	**6**	7	0	0	0	0	0	**0**	6	2	8	19	3	0	**32**	3	0	2	0	0	0	**2**	1	**68**
4:45PM	1	0	20	0	0	**21**	2	2	1	0	2	0	**5**	1	0	2	0	0	0	**2**	5	1	9	26	1	0	**37**	3	0	1	0	0	0	**1**	1	**66**
Hourly Total	3	3	100	4	0	**110**	12	13	3	1	2	0	**19**	9	0	3	0	1	0	**4**	22	3	37	79	5	0	**124**	7	0	4	0	1	0	**5**	3	**262**
5:00PM	0	0	15	0	0	**15**	0	2	3	0	0	0	**5**	2	0	0	0	0	0	**0**	0	0	16	19	0	0	**35**	0	0	2	0	0	0	**2**	1	**57**
5:15PM	2	2	26	0	0	**30**	1	5	0	0	0	0	**5**	4	1	0	1	0	0	**2**	7	0	9	26	2	0	**37**	2	0	2	0	0	0	**2**	0	**76**
5:30PM	0	0	10	1	2	**13**	1	2	0	2	0	0	**4**	0	0	0	0	0	0	**0**	1	1	10	19	1	0	**31**	0	0	0	0	3	0	**3**	0	**51**
5:45PM	0	1	14	0	0	**15**	7	1	1	0	0	0	**2**	4	0	0	1	0	0	**1**	15	0	13	19	1	0	**33**	3	1	0	0	1	0	**2**	2	**53**
Hourly Total	2	3	65	1	2	**73**	9	10	4	2	0	0	**16**	10	1	0	2	0	0	**3**	23	1	48	83	4	0	**136**	5	1	4	0	4	0	**9**	3	**237**
Total	14	21	476	22	3	**536**	44	79	19	13	4	0	**115**	49	8	8	7	11	1	**35**	133	13	320	521	33	0	**887**	45	2	18	0	12	0	**32**	23	**1605**
% Approach	2.6%	3.9%	88.8%	4.1%	0.6%	**-**	-	68.7%	16.5%	11.3%	3.5%	0%	**-**	-	22.9%	22.9%	20.0%	31.4%	2.9%	**-**	-	1.5%	36.1%	58.7%	3.7%	0%	**-**	-	6.3%	56.3%	0%	37.5%	0%	**-**	-	-
% Total	0.9%	1.3%	29.7%	1.4%	0.2%	**33.4%**	-	4.9%	1.2%	0.8%	0.2%	0%	**7.2%**	-	0.5%	0.5%	0.4%	0.7%	0.1%	**2.2%**	-	0.8%	19.9%	32.5%	2.1%	0%	**55.3%**	-	0.1%	1.1%	0%	0.7%	0%	**2.0%**	-	-
Motorcycles	0	0	2	0	0	**2**	-	0	1	1	0	0	**2**	-	0	0	1	1	0	**2**	-	0	1	1	1	0	**3**	-	0	0	0	0	0	**0**	-	9
% Motorcycles	0%	0%	0.4%	0%	0%	**0.4%**	-	0%	5.3%	7.7%	0%	0%	**1.7%**	-	0%	0%	14.3%	9.1%	0%	**5.7%**	-	0%	0.3%	0.2%	3.0%	0%	**0.3%**	-	0%	0%	0%	0%	0%	**0%**	-	0.6%

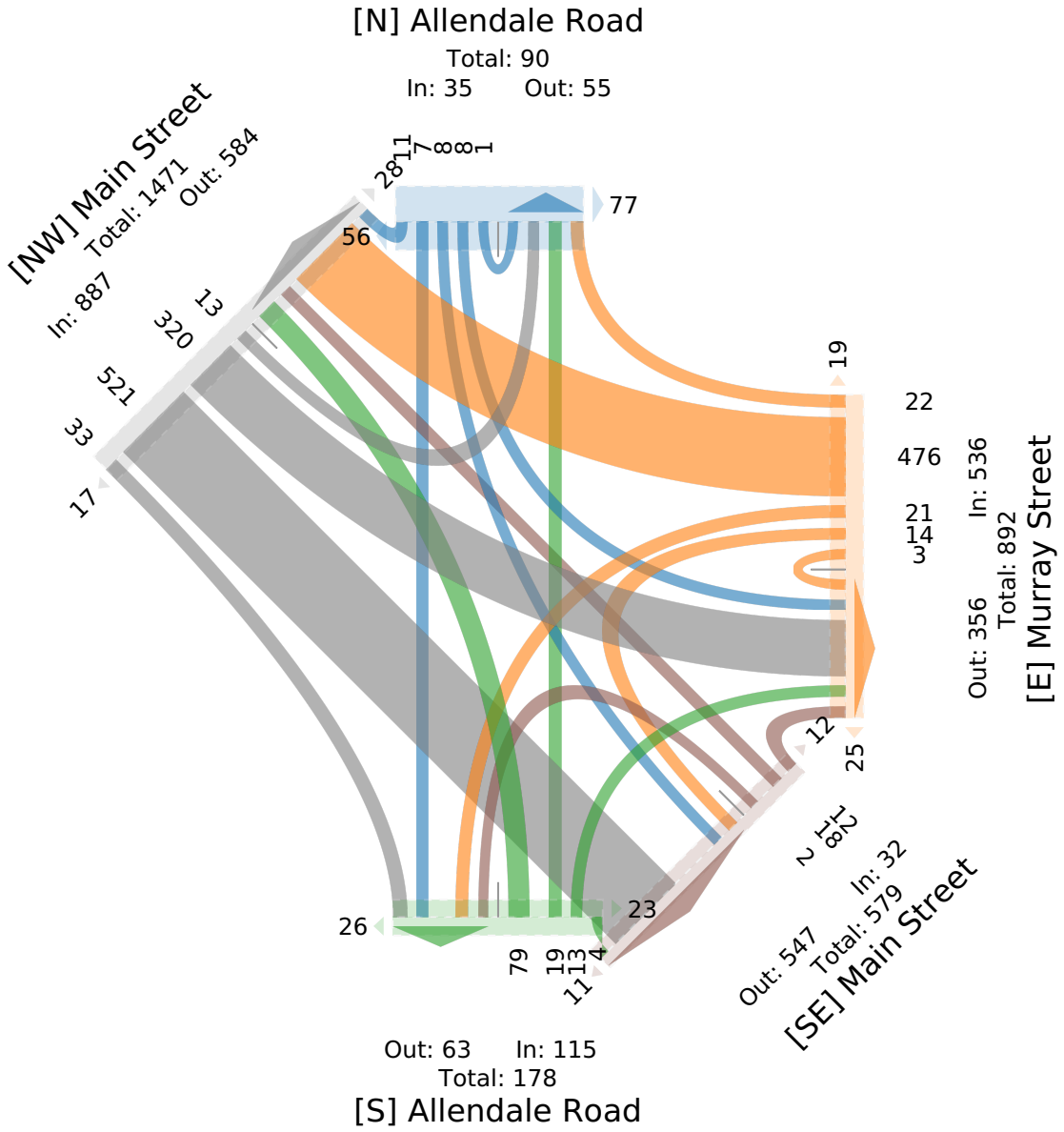
Leg	Murray Street							Allendale Road							Allendale Road							Main Street							Main Street							
Direction	Westbound							Northbound							Southbound							Southeastbound							Northwestbound							
Time	HL	L	BR	R	U	**App**	Ped*	BL	T	R	HR	U	**App**	Ped*	L	BL	T	HR	U	**App**	Ped*	HL	BL	T	BR	U	**App**	Ped*	HL	T	BR	HR	U	**App**	Ped*	**Int**
Lights	14	21	441	20	3	**499**	-	76	16	12	4	0	**108**	-	8	6	6	9	1	**30**	-	13	290	505	31	0	**839**	-	2	16	0	11	0	**29**	-	1505
% Lights	100%	100%	92.6%	90.9%	100%	**93.1%**	-	96.2%	84.2%	92.3%	100%	0%	**93.9%**	-	100%	75.0%	85.7%	81.8%	100%	**85.7%**	-	100%	90.6%	96.9%	93.9%	0%	**94.6%**	-	100%	88.9%	0%	91.7%	0%	**90.6%**	-	93.8%
Single-Unit Trucks	0	0	3	2	0	**5**	-	2	2	0	0	0	**4**	-	0	1	0	1	0	**2**	-	0	1	9	0	0	**10**	-	0	0	0	0	0	**0**	-	21
% Single-Unit Trucks	0%	0%	0.6%	9.1%	0%	**0.9%**	-	2.5%	10.5%	0%	0%	0%	**3.5%**	-	0%	12.5%	0%	9.1%	0%	**5.7%**	-	0%	0.3%	1.7%	0%	0%	**1.1%**	-	0%	0%	0%	0%	0%	**0%**	-	1.3%
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	30	0	0	**30**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	26	2	1	0	**29**	-	0	0	0	0	0	**0**	-	59
% Buses	0%	0%	6.3%	0%	0%	**5.6%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	8.1%	0.4%	3.0%	0%	**3.3%**	-	0%	0%	0%	0%	0%	**0%**	-	3.7%
Bicycles on Road	0	0	0	0	0	**0**	-	1	0	0	0	0	**1**	-	0	1	0	0	0	**1**	-	0	2	4	0	0	**6**	-	0	2	0	1	0	**3**	-	11
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	1.3%	0%	0%	0%	0%	**0.9%**	-	0%	12.5%	0%	0%	0%	**2.9%**	-	0%	0.6%	0.8%	0%	0%	**0.7%**	-	0%	11.1%	0%	8.3%	0%	**9.4%**	-	0.7%
Pedestrians	-	-	-	-	-	-	42	-	-	-	-	-	-	47	-	-	-	-	-	-	129	-	-	-	-	-	-	43	-	-	-	-	-	-	22	
% Pedestrians	-	-	-	-	-	-	95.5%	-	-	-	-	-	-	95.9%	-	-	-	-	-	-	97.0%	-	-	-	-	-	-	95.6%	-	-	-	-	-	-	95.7%	-
Bicycles on Crosswalk	-	-	-	-	-	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-	4	-	-	-	-	-	-	2	-	-	-	-	-	-	1	
% Bicycles on Crosswalk	-	-	-	-	-	-	4.5%	-	-	-	-	-	-	4.1%	-	-	-	-	-	-	3.0%	-	-	-	-	-	-	4.4%	-	-	-	-	-	-	4.3%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Allendale Road & Murray Street/Main Street -... - TMC

Tue Oct 5, 2021
Full Length (7 AM-10 AM, 11 AM-1 PM, 3 PM-6 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 882477, Location: 43.083393, -79.085977, Site Code: 200646

Provided by: Paradigm Transportation Solutions Limited
5A-150 Pinebush Road,
Cambridge, ON, N1R 8J8, CA



Allendale Road & Murray Street/Main Street -... - TMC

Tue Oct 5, 2021
AM Peak (8:30 AM - 9:30 AM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 882477, Location: 43.083393, -79.085977, Site Code: 200646

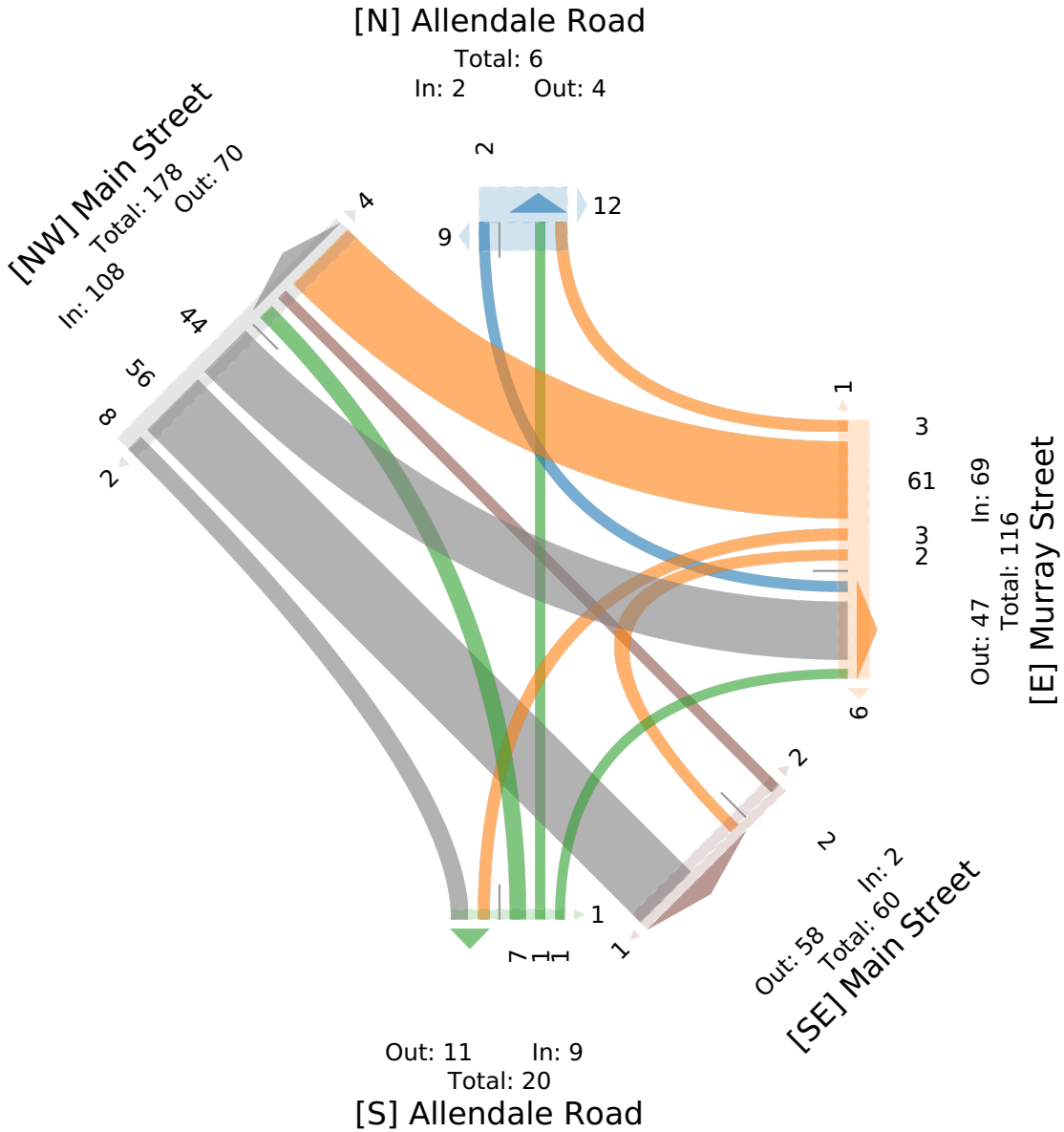
Provided by: Paradigm Transportation Solutions Limited
5A-150 Pinebush Road,
Cambridge, ON, N1R 8J8, CA

Leg	Murray Street							Allendale Road							Allendale Road							Main Street							Main Street							
Direction	Westbound							Northbound							Southbound							Southeastbound							Northwestbound							
Time	HL	L	BR	R	U	App	Ped*	BL	T	R	HR	U	App	Ped*	L	BL	T	HR	U	App	Ped*	HL	BL	T	BR	U	App	Ped*	HL	T	BR	HR	U	App	Ped*	Int
2021-10-05 8:30AM	0	1	20	1	0	**22**	1	0	1	0	0	0	**1**	1	1	0	0	0	0	**1**	5	0	13	19	3	0	**35**	2	0	0	0	0	0	**0**	0	**59**
8:45AM	1	0	15	1	0	**17**	2	2	0	0	0	0	**2**	0	1	0	0	0	0	**1**	3	0	6	14	3	0	**23**	2	0	0	0	0	0	**0**	2	**43**
9:00AM	0	1	16	0	0	**17**	2	2	0	1	0	0	**3**	0	0	0	0	0	0	**0**	9	0	15	12	2	0	**29**	2	0	2	0	0	0	**2**	0	**51**
9:15AM	1	1	10	1	0	**13**	2	3	0	0	0	0	**3**	0	0	0	0	0	0	**0**	4	0	10	11	0	0	**21**	0	0	0	0	0	0	**0**	1	**37**
Total	2	3	61	3	0	**69**	7	7	1	1	0	0	**9**	1	2	0	0	0	0	**2**	21	0	44	56	8	0	**108**	6	0	2	0	0	0	**2**	3	**190**
% Approach	2.9%	4.3%	88.4%	4.3%	0%	**-**	-	77.8%	11.1%	11.1%	0%	0%	**-**	-	100%	0%	0%	0%	0%	**-**	-	0%	40.7%	51.9%	7.4%	0%	**-**	-	0%	100%	0%	0%	0%	**-**	-	-
% Total	1.1%	1.6%	32.1%	1.6%	0%	**36.3%**	-	3.7%	0.5%	0.5%	0%	0%	**4.7%**	-	1.1%	0%	0%	0%	0%	**1.1%**	-	0%	23.2%	29.5%	4.2%	0%	**56.8%**	-	0%	1.1%	0%	0%	0%	**1.1%**	-	-
PHF	0.500	0.750	0.763	0.750	-	**0.784**	-	0.583	0.250	0.250	-	-	**0.750**	-	0.500	-	-	-	-	**0.500**	-	-	0.733	0.737	0.667	-	**0.771**	-	-	0.250	-	-	-	**0.250**	-	0.805
Motorcycles	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Motorcycles	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Lights	2	3	54	3	0	**62**	-	6	1	1	0	0	**8**	-	2	0	0	0	0	**2**	-	0	40	53	8	0	**101**	-	0	2	0	0	0	**2**	-	175
% Lights	100%	100%	88.5%	100%	0%	**89.9%**	-	85.7%	100%	100%	0%	0%	**88.9%**	-	100%	0%	0%	0%	0%	**100%**	-	0%	90.9%	94.6%	100%	0%	**93.5%**	-	0%	100%	0%	0%	0%	**100%**	-	92.1%
Single-Unit Trucks	0	0	1	0	0	**1**	-	1	0	0	0	0	**1**	-	0	0	0	0	0	**0**	-	0	0	3	0	0	**3**	-	0	0	0	0	0	**0**	-	5
% Single-Unit Trucks	0%	0%	1.6%	0%	0%	**1.4%**	-	14.3%	0%	0%	0%	0%	**11.1%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	5.4%	0%	0%	**2.8%**	-	0%	0%	0%	0%	0%	**0%**	-	2.6%
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	6	0	0	**6**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	4	0	0	0	**4**	-	0	0	0	0	0	**0**	-	10
% Buses	0%	0%	9.8%	0%	0%	**8.7%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	9.1%	0%	0%	0%	**3.7%**	-	0%	0%	0%	0%	0%	**0%**	-	5.3%
Bicycles on Road	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Pedestrians	-	-	-	-	-	-	6	-	-	-	-	-	-	1	-	-	-	-	-	-	20	-	-	-	-	-	-	6	-	-	-	-	-	-	3	
% Pedestrians	-	-	-	-	-	-	85.7%	-	-	-	-	-	-	100%	-	-	-	-	-	-	95.2%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	14.3%	-	-	-	-	-	-	0%	-	-	-	-	-	-	4.8%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Allendale Road & Murray Street/Main Street -... - TMC
Tue Oct 5, 2021
AM Peak (8:30 AM - 9:30 AM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 882477, Location: 43.083393, -79.085977, Site Code: 200646

Provided by: Paradigm Transportation Solutions Limited
5A-150 Pinebush Road,
Cambridge, ON, N1R 8J8, CA



Allendale Road & Murray Street/Main Street -... - TMC

Tue Oct 5, 2021
Midday Peak (11 AM - 12 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 882477, Location: 43.083393, -79.085977, Site Code: 200646

Provided by: Paradigm Transportation Solutions Limited
5A-150 Pinebush Road, Cambridge, ON, N1R 8J8, CA

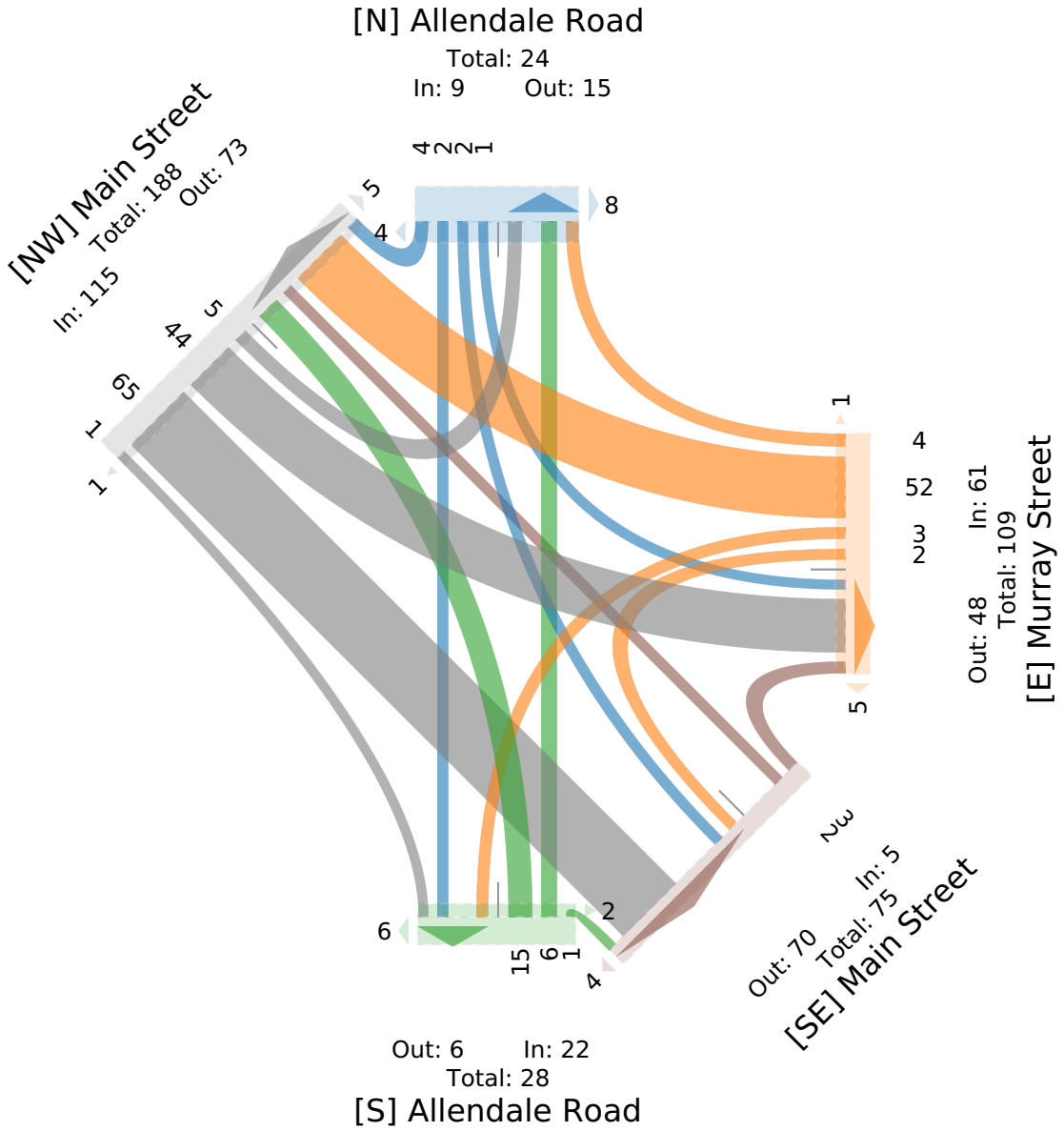
Leg	Murray Street							Allendale Road							Allendale Road							Main Street							Main Street							
Direction	Westbound							Northbound							Southbound							Southeastbound							Northwestbound							
Time	HL	L	BR	R	U	App	Ped*	BL	T	R	HR	U	App	Ped*	L	BL	T	HR	U	App	Ped*	HL	BL	T	BR	U	App	Ped*	HL	T	BR	HR	U	App	Ped*	Int
2021-10-05 11:00AM	0	0	18	2	0	**20**	1	5	0	0	0	0	**5**	2	1	0	0	2	0	**3**	4	1	8	8	0	0	**17**	3	0	1	0	1	0	**2**	1	**47**
11:15AM	2	1	11	2	0	**16**	1	3	0	0	0	0	**3**	3	0	1	0	1	0	**2**	0	4	11	19	0	0	**34**	0	0	0	0	2	0	**2**	1	**57**
11:30AM	0	1	9	0	0	**10**	4	5	3	0	1	0	**9**	0	0	1	0	1	0	**2**	2	0	12	24	1	0	**37**	1	0	0	0	0	0	**0**	2	**58**
11:45AM	0	1	14	0	0	**15**	0	2	3	0	0	0	**5**	3	0	0	2	0	0	**2**	6	0	13	14	0	0	**27**	2	0	1	0	0	0	**1**	0	**50**
Total	2	3	52	4	0	**61**	6	15	6	0	1	0	**22**	8	1	2	2	4	0	**9**	12	5	44	65	1	0	**115**	6	0	2	0	3	0	**5**	4	**212**
% Approach	3.3%	4.9%	85.2%	6.6%	0%	**-**	-	68.2%	27.3%	0%	4.5%	0%	**-**	-	11.1%	22.2%	22.2%	44.4%	0%	**-**	-	4.3%	38.3%	56.5%	0.9%	0%	**-**	-	0%	40.0%	0%	60.0%	0%	**-**	-	-
% Total	0.9%	1.4%	24.5%	1.9%	0%	**28.8%**	-	7.1%	2.8%	0%	0.5%	0%	**10.4%**	-	0.5%	0.9%	0.9%	1.9%	0%	**4.2%**	-	2.4%	20.8%	30.7%	0.5%	0%	**54.2%**	-	0%	0.9%	0%	1.4%	0%	**2.4%**	-	-
PHF	0.250	0.750	0.722	0.500	-	**0.763**	-	0.750	0.500	-	0.250	-	**0.611**	-	0.250	0.500	0.250	0.500	-	**0.750**	-	0.313	0.846	0.677	0.250	-	**0.777**	-	-	0.250	-	0.375	-	**0.500**	-	0.909
Motorcycles	0	0	1	0	0	**1**	-	0	1	0	0	0	**1**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	2
% Motorcycles	0%	0%	1.9%	0%	0%	**1.6%**	-	0%	16.7%	0%	0%	0%	**4.5%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0.9%
Lights	2	3	48	3	0	**56**	-	15	5	0	1	0	**21**	-	1	2	2	3	0	**8**	-	5	41	64	1	0	**111**	-	0	1	0	3	0	**4**	-	200
% Lights	100%	100%	92.3%	75.0%	0%	**91.8%**	-	100%	83.3%	0%	100%	0%	**95.5%**	-	100%	100%	100%	75.0%	0%	**88.9%**	-	100%	93.2%	98.5%	100%	0%	**96.5%**	-	0%	50.0%	0%	100%	0%	**80.0%**	-	94.3%
Single-Unit Trucks	0	0	1	1	0	**2**	-	0	0	0	0	0	**0**	-	0	0	0	1	0	**1**	-	0	1	1	0	0	**2**	-	0	0	0	0	0	**0**	-	5
% Single-Unit Trucks	0%	0%	1.9%	25.0%	0%	**3.3%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	25.0%	0%	**11.1%**	-	0%	2.3%	1.5%	0%	0%	**1.7%**	-	0%	0%	0%	0%	0%	**0%**	-	2.4%
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	2	0	0	**2**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	2	0	0	0	**2**	-	0	0	0	0	0	**0**	-	4
% Buses	0%	0%	3.8%	0%	0%	**3.3%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	4.5%	0%	0%	0%	**1.7%**	-	0%	0%	0%	0%	0%	**0%**	-	1.9%
Bicycles on Road	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	1	0	0	0	**1**	-	1
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	50.0%	0%	0%	0%	**20.0%**	-	0.5%
Pedestrians	-	-	-	-	-	-	6	-	-	-	-	-	-	7	-	-	-	-	-	-	12	-	-	-	-	-	-	6	-	-	-	-	-	-	4	
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	87.5%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	12.5%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Allendale Road & Murray Street/Main Street -... - TMC

Tue Oct 5, 2021
Midday Peak (11 AM - 12 PM)
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 882477, Location: 43.083393, -79.085977, Site Code: 200646

Provided by: Paradigm Transportation Solutions Limited
5A-150 Pinebush Road,
Cambridge, ON, N1R 8J8, CA



Allendale Road & Murray Street/Main Street -... - TMC

Tue Oct 5, 2021
PM Peak (3:30 PM - 4:30 PM) - Overall Peak Hour
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 882477, Location: 43.083393, -79.085977, Site Code: 200646

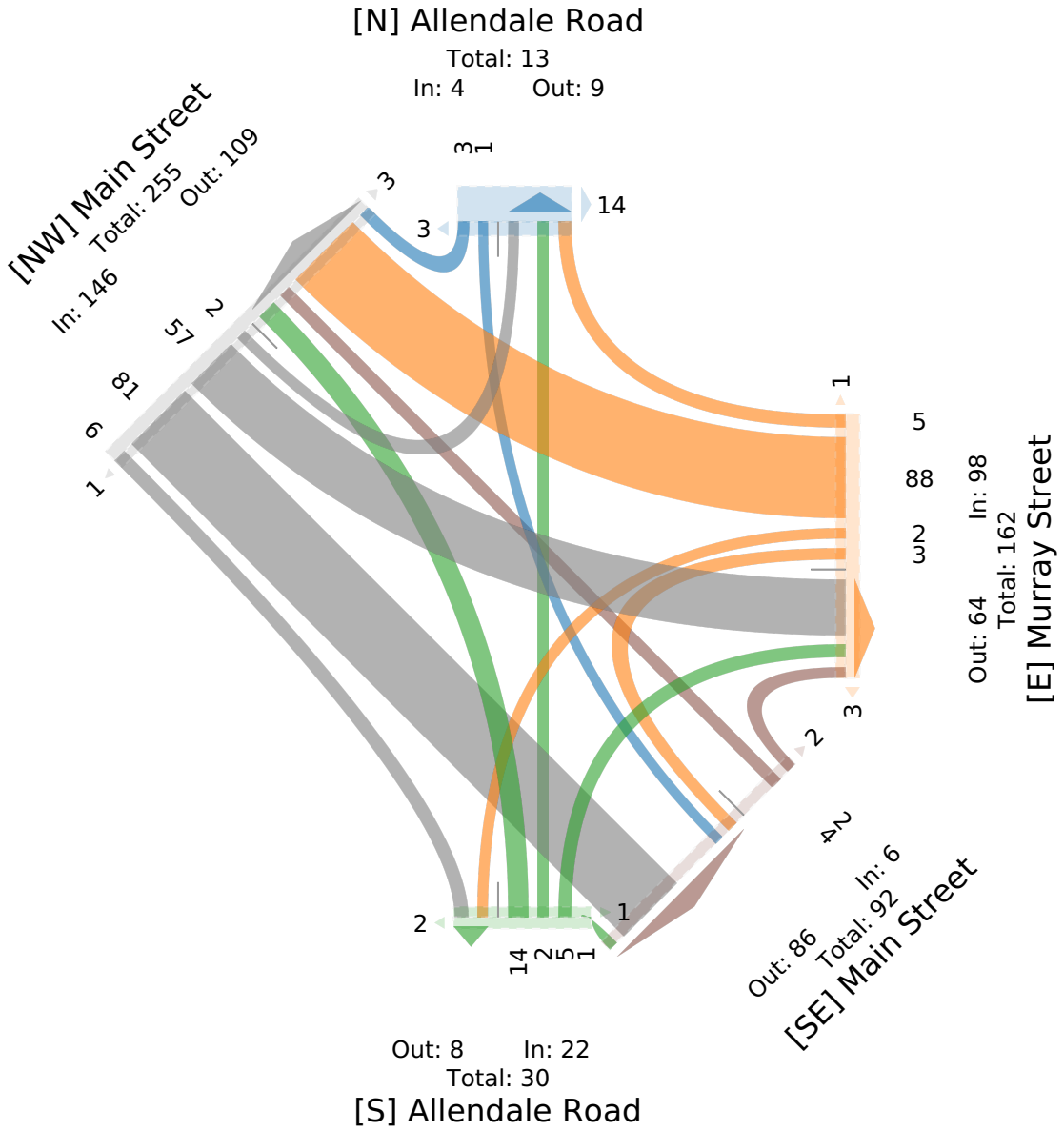
Provided by: Paradigm Transportation Solutions Limited
5A-150 Pinebush Road, Cambridge, ON, N1R 8J8, CA

Leg	Murray Street							Allendale Road							Allendale Road							Main Street							Main Street							
Direction	Westbound							Northbound							Southbound							Southeastbound							Northwestbound							
Time	HL	L	BR	R	U	App	Ped*	BL	T	R	HR	U	App	Ped*	L	BL	T	HR	U	App	Ped*	HL	BL	T	BR	U	App	Ped*	HL	T	BR	HR	U	App	Ped*	Int
2021-10-05 3:30PM	1	0	19	1	0	**21**	0	5	0	3	1	0	**9**	1	0	0	0	0	0	**0**	0	2	18	18	2	0	**40**	1	0	0	0	0	0	**0**	1	**70**
3:45PM	0	0	15	1	0	**16**	2	2	1	2	0	0	**5**	1	0	0	0	2	0	**2**	6	0	19	29	3	0	**51**	2	0	3	0	1	0	**4**	0	**78**
4:00PM	0	1	21	2	0	**24**	2	4	0	0	0	0	**4**	1	0	1	0	1	0	**2**	7	0	11	15	0	0	**26**	0	0	0	0	0	0	**0**	1	**56**
4:15PM	2	1	33	1	0	**37**	0	3	1	0	0	0	**4**	0	0	0	0	0	0	**0**	4	0	9	19	1	0	**29**	1	0	1	0	1	0	**2**	0	**72**
Total	3	2	88	5	0	**98**	4	14	2	5	1	0	**22**	3	0	1	0	3	0	**4**	17	2	57	81	6	0	**146**	4	0	4	0	2	0	**6**	2	**276**
% Approach	3.1%	2.0%	89.8%	5.1%	0%	**-**	-	63.6%	9.1%	22.7%	4.5%	0%	**-**	-	0%	25.0%	0%	75.0%	0%	**-**	-	1.4%	39.0%	55.5%	4.1%	0%	**-**	-	0%	66.7%	0%	33.3%	0%	**-**	-	-
% Total	1.1%	0.7%	31.9%	1.8%	0%	**35.5%**	-	5.1%	0.7%	1.8%	0.4%	0%	**8.0%**	-	0%	0.4%	0%	1.1%	0%	**1.4%**	-	0.7%	20.7%	29.3%	2.2%	0%	**52.9%**	-	0%	1.4%	0%	0.7%	0%	**2.2%**	-	-
PHF	0.375	0.500	0.667	0.625	-	**0.662**	-	0.700	0.500	0.417	0.250	-	**0.611**	-	-	0.250	-	0.375	-	**0.500**	-	0.250	0.750	0.714	0.500	-	**0.725**	-	-	0.333	-	0.500	-	**0.375**	-	0.893
Motorcycles	0	0	1	0	0	**1**	-	0	0	0	0	0	**0**	-	0	0	0	1	0	**1**	-	0	0	0	1	0	**1**	-	0	0	0	0	0	**0**	-	3
% Motorcycles	0%	0%	1.1%	0%	0%	**1.0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	33.3%	0%	**25.0%**	-	0%	0%	0%	16.7%	0%	**0.7%**	-	0%	0%	0%	0%	0%	**0%**	-	1.1%
Lights	3	2	82	5	0	**92**	-	14	2	5	1	0	**22**	-	0	1	0	2	0	**3**	-	2	53	78	5	0	**138**	-	0	4	0	2	0	**6**	-	261
% Lights	100%	100%	93.2%	100%	0%	**93.9%**	-	100%	100%	100%	100%	0%	**100%**	-	0%	100%	0%	66.7%	0%	**75.0%**	-	100%	93.0%	96.3%	83.3%	0%	**94.5%**	-	0%	100%	0%	100%	0%	**100%**	-	94.6%
Single-Unit Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	2	0	0	**2**	-	0	0	0	0	0	**0**	-	2
% Single-Unit Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	2.5%	0%	0%	**1.4%**	-	0%	0%	0%	0%	0%	**0%**	-	0.7%
Articulated Trucks	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0
% Articulated Trucks	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%
Buses	0	0	5	0	0	**5**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	4	0	0	0	**4**	-	0	0	0	0	0	**0**	-	9
% Buses	0%	0%	5.7%	0%	0%	**5.1%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	7.0%	0%	0%	0%	**2.7%**	-	0%	0%	0%	0%	0%	**0%**	-	3.3%
Bicycles on Road	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	0	0	0	**0**	-	0	0	1	0	0	**1**	-	0	0	0	0	0	**0**	-	1
% Bicycles on Road	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	0%	0%	0%	**0%**	-	0%	0%	1.2%	0%	0%	**0.7%**	-	0%	0%	0%	0%	0%	**0%**	-	0.4%
Pedestrians	-	-	-	-	-	-	4	-	-	-	-	-	-	3	-	-	-	-	-	-	17	-	-	-	-	-	-	4	-	-	-	-	-	-	2	
% Pedestrians	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-	-	-	-	-	-	100%	-
Bicycles on Crosswalk	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-

*Pedestrians and Bicycles on Crosswalk. BL: Bear left, BR: Bear right, HL: Hard left, HR: Hard right, L: Left, R: Right, T: Thru, U: U-Turn

Allendale Road & Murray Street/Main Street -... - TMC
Tue Oct 5, 2021
PM Peak (3:30 PM - 4:30 PM) - Overall Peak Hour
All Classes (Motorcycles, Lights, Single-Unit Trucks, Articulated Trucks, Buses, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 882477, Location: 43.083393, -79.085977, Site Code: 200646

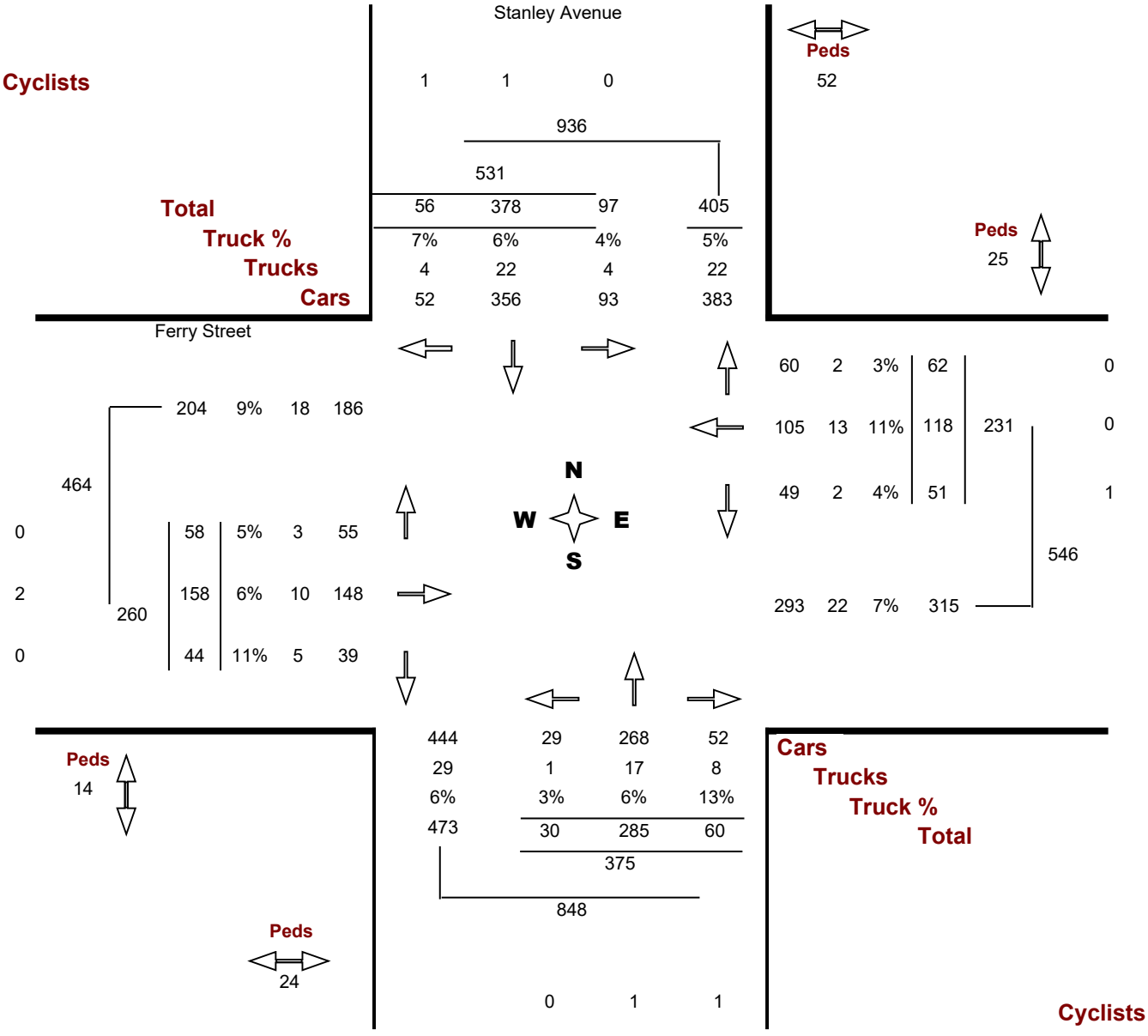
Provided by: Paradigm Transportation Solutions Limited
5A-150 Pinebush Road,
Cambridge, ON, N1R 8J8, CA



Turning Movements Report - AM Period

Location..... Ferry Street @ Stanley Avenue
Municipality. NIAGARA FALLS
Traffic Cont.
Major Dir..... North south

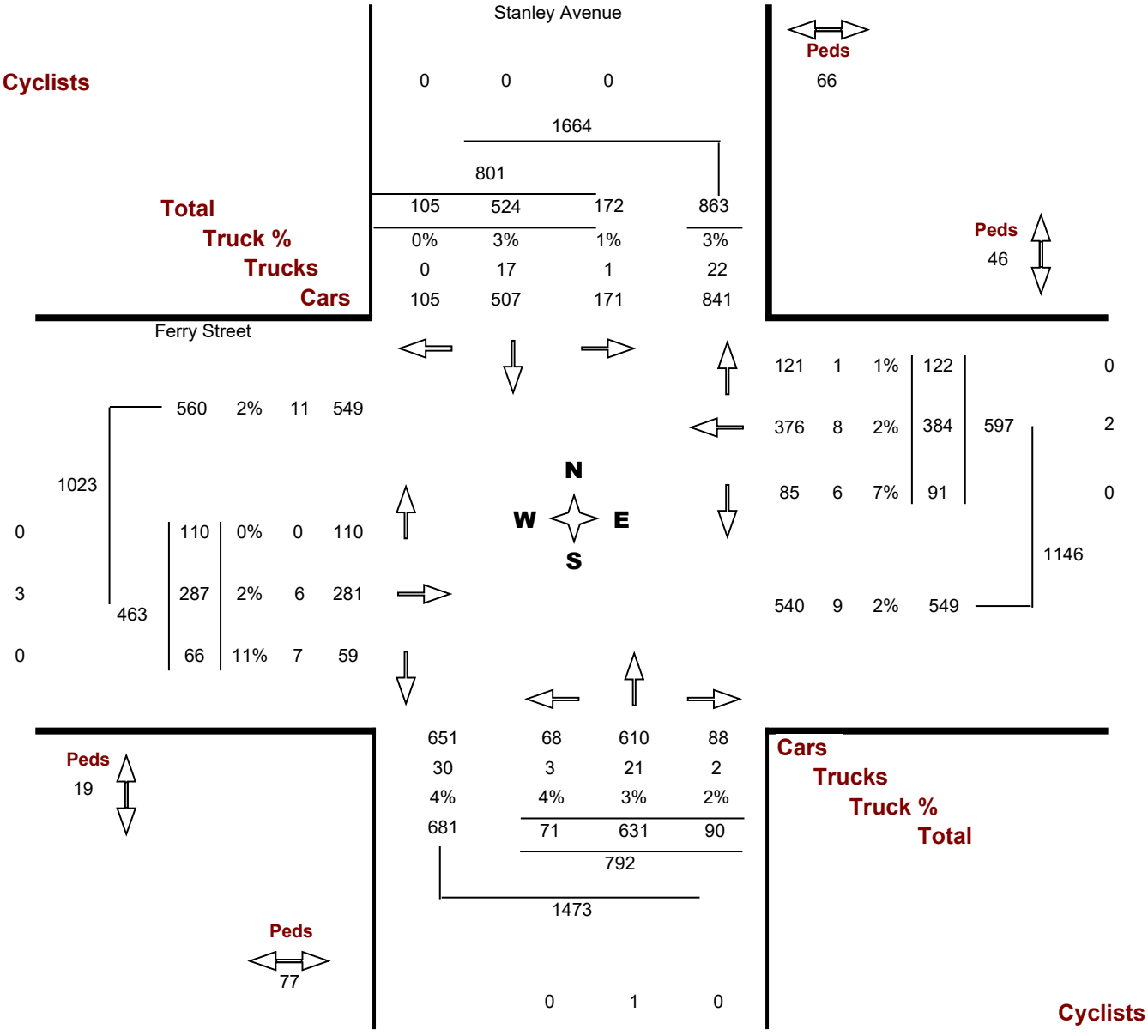
GeoID..... 01148
Count Date. Tuesday, 16 July, 2019
Count Time. 07:00 AM — 09:00 AM
Peak Hour.. 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

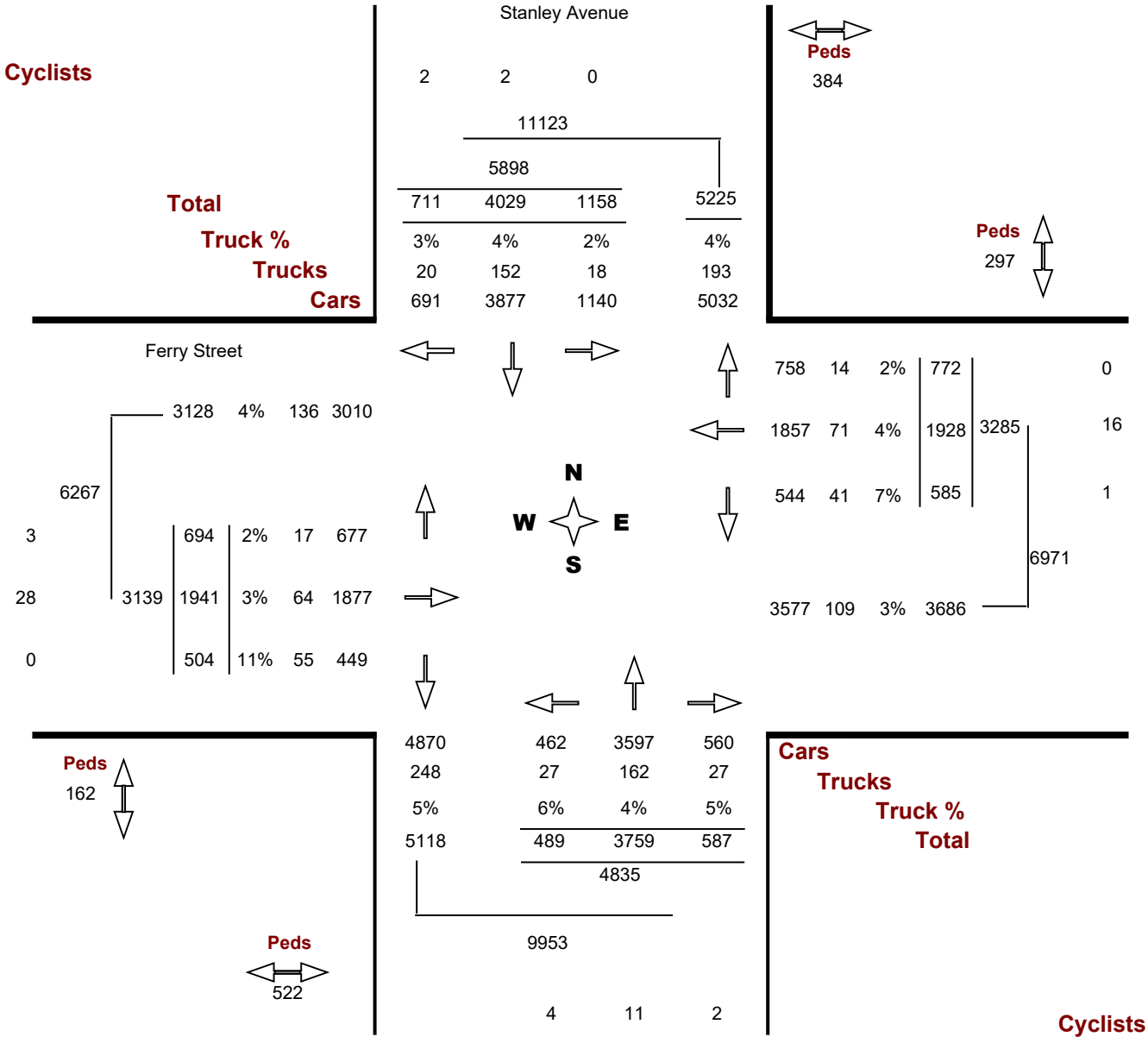
Location..... Ferry Street @ Stanley Avenue
Municipality. NIAGARA FALLS
Traffic Cont.
Major Dir..... North south

GeoID..... 01148
Count Date. Tuesday, 16 July, 2019
Count Time. 03:00 PM — 06:00 PM
Peak Hour.. 04:15 PM — 05:15 PM



Turning Movement Count Report
Full Study

Location..... Ferry Street @ Stanley Avenue
Municipality..... NIAGARA FALLS
GeoID..... 01148
Count Date..... Tuesday, 16 July, 2019



Turning Movement Count - Details Report (15 min)

Location..... Ferry Street @ Stanley Avenue

Municipality..... NIAGARA FALLS

Count Date..... Tuesday, July 16, 2019

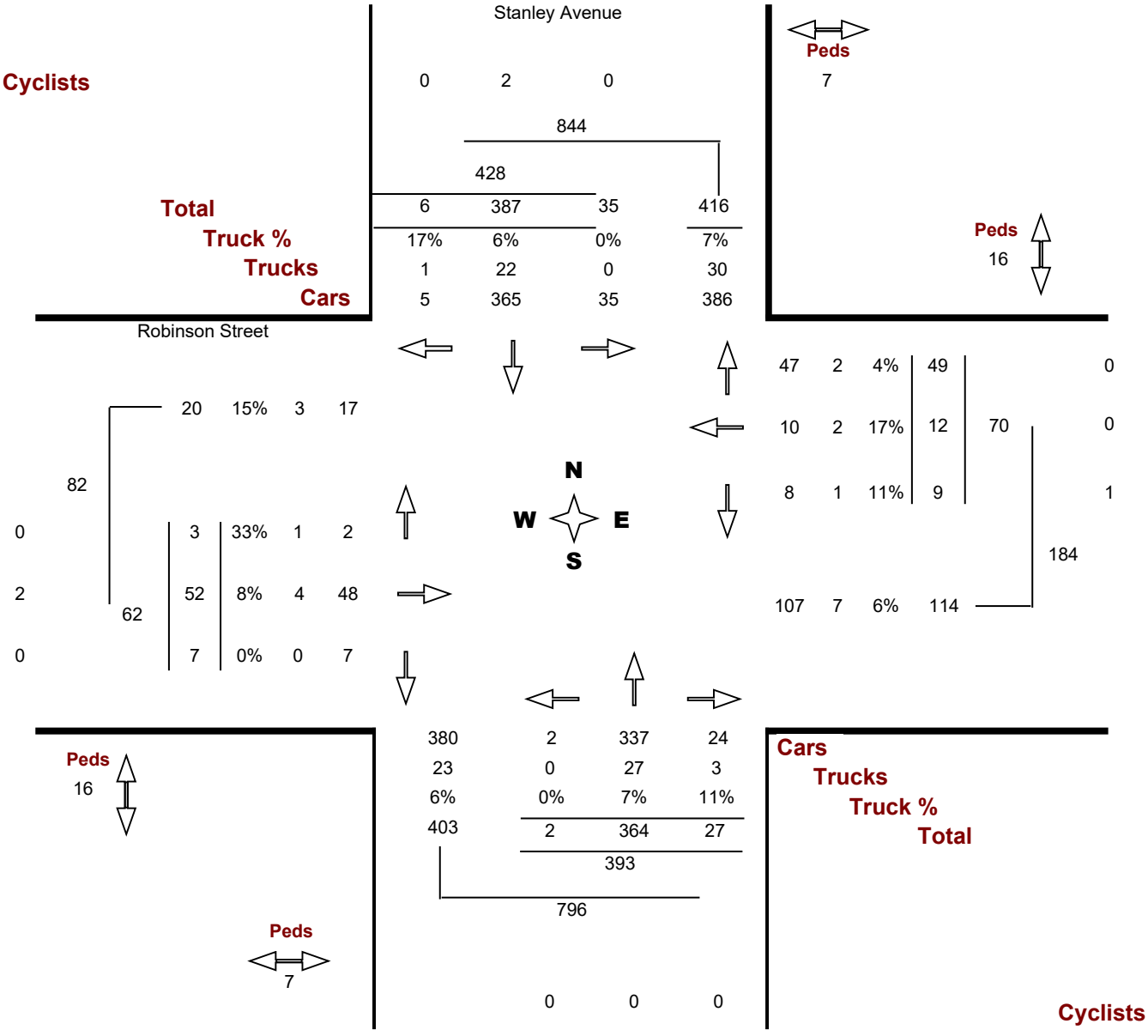
		Stanley Avenue										Ferry Street									
		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
07:00	07:15	12	52	12	0	76	6	42	6	0	54	7	15	11	0	33	9	21	11	0	41
07:15	07:30	16	48	12	0	76	7	49	7	0	63	4	11	10	0	25	6	22	8	0	36
07:30	07:45	24	75	11	0	110	7	55	10	0	72	8	26	16	0	50	9	37	6	0	52
07:45	08:00	25	87	11	0	123	6	66	6	0	78	14	24	16	0	54	13	37	12	0	62
Hourly Total		77	262	46	0	385	26	212	29	0	267	33	76	53	0	162	37	117	37	0	191
08:00	08:15	17	88	14	0	119	4	67	10	0	81	11	21	12	0	44	13	29	6	0	48
08:15	08:30	21	91	14	0	126	11	63	17	0	91	10	30	10	0	50	15	35	13	0	63
08:30	08:45	31	93	12	0	136	5	77	19	0	101	15	31	18	0	64	12	54	10	0	76
08:45	09:00	28	106	16	0	150	10	78	14	0	102	15	36	22	0	73	18	40	15	0	73
Hourly Total		97	378	56	0	531	30	285	60	0	375	51	118	62	0	231	58	158	44	0	260
11:00	11:15	11	136	24	0	171	16	126	24	0	166	27	75	29	0	131	32	71	24	0	127
11:15	11:30	38	157	25	0	220	17	133	28	0	178	21	49	24	0	94	28	68	18	0	114
11:30	11:45	43	159	28	0	230	13	114	35	0	162	22	45	21	0	88	22	75	10	0	107
11:45	12:00	40	161	29	0	230	13	121	11	0	145	16	60	34	0	110	39	72	14	0	125
Hourly Total		132	613	106	0	851	59	494	98	0	651	86	229	108	0	423	121	286	66	0	473
12:00	12:15	45	158	30	0	233	8	109	22	0	139	21	53	23	0	97	31	69	14	0	114
12:15	12:30	41	148	21	0	210	12	148	15	0	175	15	54	33	0	102	25	74	26	0	125
12:30	12:45	55	170	25	0	250	24	112	9	0	145	16	70	32	0	118	15	62	15	0	92
12:45	13:00	46	148	27	0	221	19	129	16	0	164	24	61	18	0	103	21	72	23	0	116
Hourly Total		187	624	103	0	914	63	498	62	0	623	76	238	106	0	420	92	277	78	0	447
13:00	13:15	41	144	15	0	200	11	118	17	0	146	20	61	21	0	102	16	58	21	0	95
13:15	13:30	56	159	27	0	242	17	117	16	0	150	15	46	18	0	79	25	66	18	0	109
13:30	13:45	48	161	19	0	228	18	99	17	0	134	18	58	20	0	96	25	83	22	0	130
13:45	14:00	36	122	26	0	184	22	125	25	0	172	18	68	30	0	116	22	63	23	0	108
Hourly Total		181	586	87	0	854	68	459	75	0	602	71	233	89	0	393	88	270	84	0	442
15:00	15:15	41	143	30	0	214	23	136	24	0	183	19	95	33	0	147	24	54	16	0	94
15:15	15:30	44	137	32	0	213	21	167	23	0	211	23	88	23	0	134	27	68	20	0	115
15:30	15:45	41	143	22	0	206	12	157	21	0	190	20	69	35	0	124	15	79	16	0	110
15:45	16:00	35	138	29	0	202	23	152	21	0	196	34	74	40	0	148	24	69	15	0	108
Hourly Total		161	561	113	0	835	79	612	89	0	780	96	326	131	0	553	90	270	67	0	427
16:00	16:15	34	139	24	0	197	17	152	21	0	190	21	94	20	0	135	23	72	13	0	108

		Stanley Avenue											Ferry Street								
		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
16:15	16:30	40	119	21	0	180	18	150	21	0	189	21	110	26	0	157	31	70	13	0	114
16:30	16:45	52	151	27	0	230	19	164	22	0	205	21	84	21	0	126	24	84	19	0	127
16:45	17:00	40	119	27	0	186	16	157	28	0	201	23	99	31	0	153	27	76	19	0	122
Hourly Total		166	528	99	0	793	70	623	92	0	785	86	387	98	0	571	105	302	64	0	471
17:00	17:15	40	135	30	0	205	18	160	19	0	197	26	91	44	0	161	28	57	15	0	100
17:15	17:30	34	119	23	0	176	30	142	25	0	197	24	74	37	0	135	29	61	16	0	106
17:30	17:45	40	102	26	0	168	25	150	24	0	199	22	80	22	0	124	21	78	17	0	116
17:45	18:00	43	121	22	0	186	21	124	14	0	159	14	76	22	0	112	25	65	16	0	106
Hourly Total		157	477	101	0	735	94	576	82	0	752	86	321	125	0	532	103	261	64	0	428
Grand Total		1158	4029	711	0	5898	489	3759	587	0	4835	585	1928	772	0	3285	694	1941	504	0	3139
Truck %		2%	4%	3%	0%	3%	6%	4%	5%	0%	4%	7%	4%	2%	0%	4%	2%	3%	11%	0%	4%

Turning Movements Report - AM Period

Location..... Robinson Street @ Stanley Avenue
Municipality. NIAGARA FALLS
Traffic Cont.
Major Dir..... North south

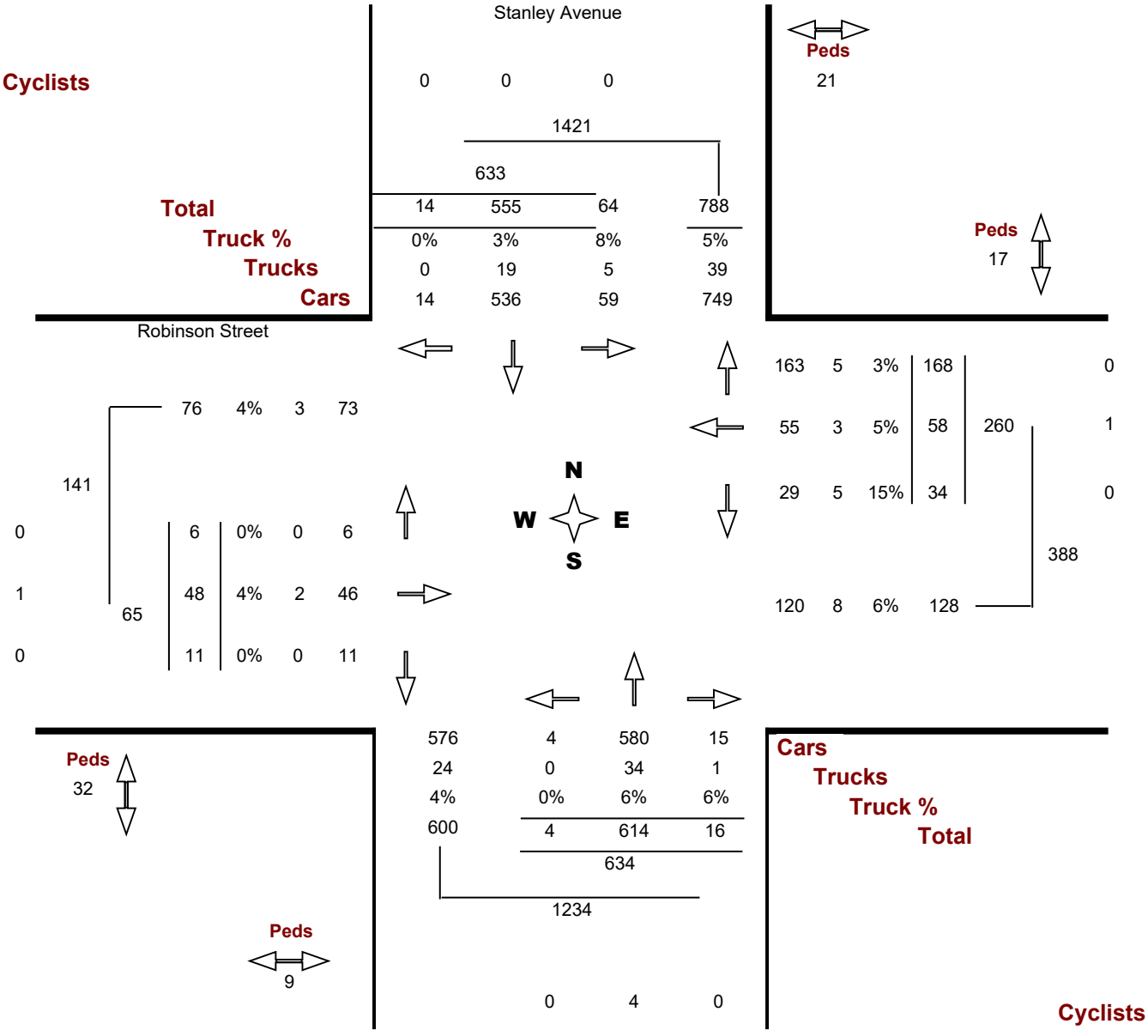
GeoID..... 01591
Count Date. Thursday, 14 June, 2018
Count Time. 07:00 AM — 09:00 AM
Peak Hour.. 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

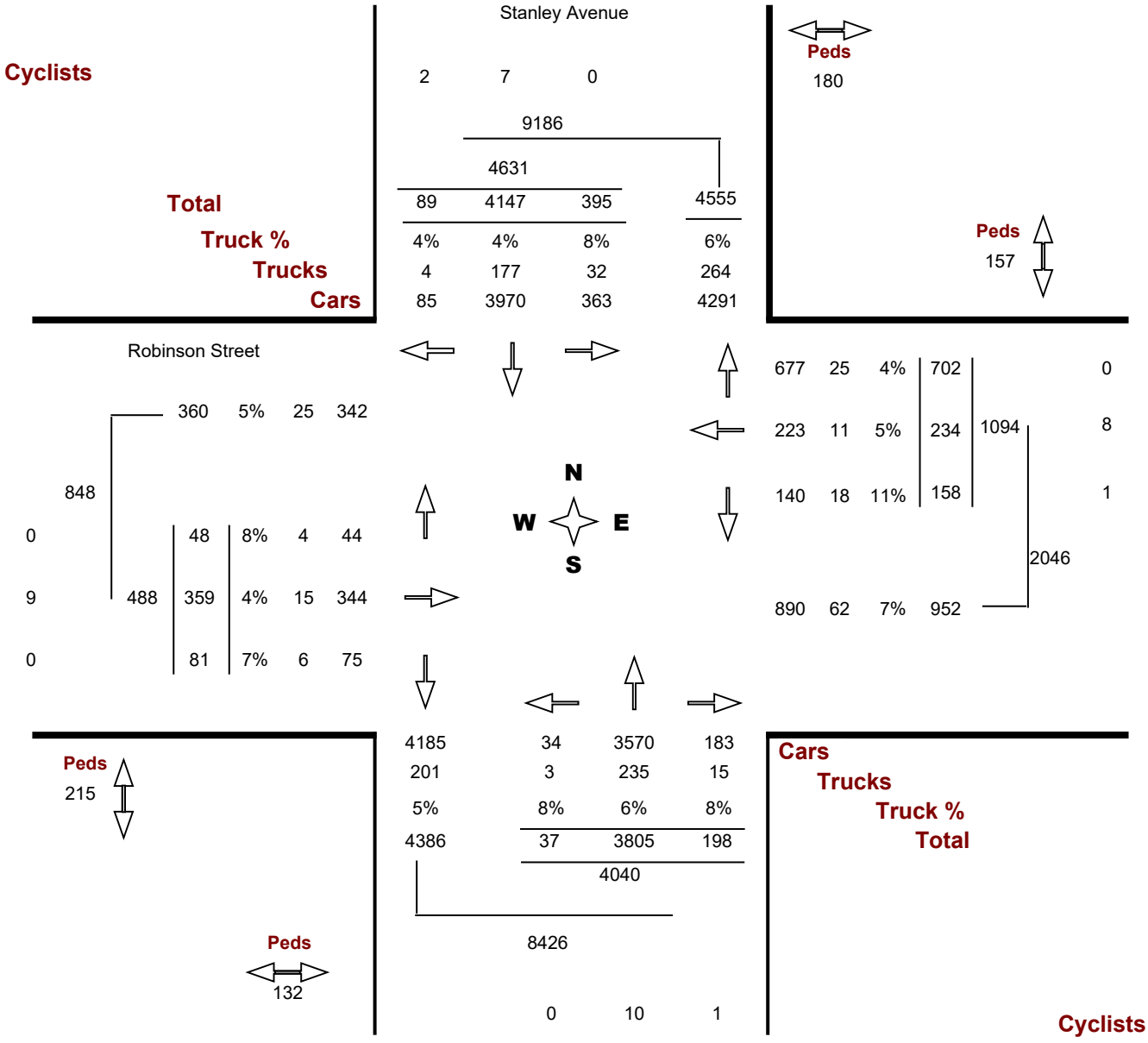
Location..... Robinson Street @ Stanley Avenue
Municipality. NIAGARA FALLS
Traffic Cont.
Major Dir..... North south

GeoID..... 01591
Count Date. Thursday, 14 June, 2018
Count Time. 03:00 PM — 06:00 PM
Peak Hour.. 04:15 PM — 05:15 PM



Turning Movement Count Report
Full Study

Location..... Robinson Street @ Stanley Avenue
Municipality..... NIAGARA FALLS
GeoID..... 01591
Count Date..... Thursday, 14 June, 2018



Turning Movement Count - Details Report (15 min)

Location..... Robinson Street @ Stanley Avenue

Municipality..... NIAGARA FALLS

Count Date..... Thursday, June 14, 2018

		Stanley Avenue										Robinson Street									
		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
07:00	07:15	3	54	1	0	58	2	50	2	0	54	1	1	5	0	7	2	4	3	0	9
07:15	07:30	1	68	0	0	69	0	38	7	0	45	4	2	6	0	12	0	5	1	0	6
07:30	07:45	6	98	1	0	105	1	69	5	0	75	2	1	6	0	9	1	14	0	0	15
07:45	08:00	2	87	5	0	94	1	81	9	0	91	1	4	5	0	10	3	10	0	0	13
Hourly Total		12	307	7	0	326	4	238	23	0	265	8	8	22	0	38	6	33	4	0	43
08:00	08:15	7	79	1	0	87	0	87	5	0	92	2	1	9	0	12	1	11	1	0	13
08:15	08:30	6	109	3	0	118	1	87	5	0	93	3	0	16	0	19	0	12	1	0	13
08:30	08:45	9	91	1	0	101	0	91	7	0	98	2	8	9	0	19	1	18	1	0	20
08:45	09:00	13	108	1	0	122	1	99	10	0	110	2	3	15	0	20	1	11	4	0	16
Hourly Total		35	387	6	0	428	2	364	27	0	393	9	12	49	0	70	3	52	7	0	62
11:00	11:15	15	152	5	0	172	1	123	5	0	129	5	4	16	0	25	3	12	3	0	18
11:15	11:30	22	138	1	0	161	1	107	8	0	116	2	8	16	0	26	0	12	1	0	13
11:30	11:45	14	145	5	0	164	1	120	11	0	132	4	2	9	0	15	0	12	4	0	16
11:45	12:00	12	152	5	0	169	1	129	10	0	140	4	6	11	0	21	1	12	2	0	15
Hourly Total		63	587	16	0	666	4	479	34	0	517	15	20	52	0	87	4	48	10	0	62
12:00	12:15	16	123	1	0	140	1	128	9	0	138	1	4	19	0	24	1	9	5	0	15
12:15	12:30	10	170	3	0	183	2	135	7	0	144	4	8	18	0	30	2	12	4	0	18
12:30	12:45	13	166	4	0	183	2	133	10	0	145	5	10	25	0	40	5	10	5	0	20
12:45	13:00	12	155	4	0	171	1	116	7	0	124	8	11	23	0	42	1	16	2	0	19
Hourly Total		51	614	12	0	677	6	512	33	0	551	18	33	85	0	136	9	47	16	0	72
13:00	13:15	12	137	4	0	153	1	109	4	0	114	4	5	18	0	27	1	8	3	0	12
13:15	13:30	20	141	3	0	164	1	120	2	0	123	6	5	13	0	24	0	13	4	0	17
13:30	13:45	16	122	1	0	139	1	107	3	0	111	3	2	22	0	27	2	10	1	0	13
13:45	14:00	14	146	0	0	160	1	115	8	0	124	3	6	27	0	36	0	7	6	0	13
Hourly Total		62	546	8	0	616	4	451	17	0	472	16	18	80	0	114	3	38	14	0	55
15:00	15:15	17	130	2	0	149	2	161	10	0	173	10	9	21	0	40	4	13	2	0	19
15:15	15:30	12	145	2	0	159	1	138	8	0	147	10	11	39	0	60	1	10	6	0	17
15:30	15:45	12	158	1	0	171	3	166	9	0	178	7	13	33	0	53	1	16	1	0	18
15:45	16:00	21	147	2	0	170	1	133	5	0	139	7	16	24	0	47	1	13	4	0	18
Hourly Total		62	580	7	0	649	7	598	32	0	637	34	49	117	0	200	7	52	13	0	72
16:00	16:15	9	150	3	0	162	1	162	2	0	165	11	18	36	0	65	4	11	0	0	15

		Stanley Avenue												Robinson Street								
		North Approach					South Approach					East Approach					West Approach					
Time Period		LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
16:15	16:30	14	148	5	0	167	1	106	1	0	108	5	11	35	0	51	1	10	4	0	15
16:30	16:45	27	133	4	0	164	2	149	6	0	157	14	11	31	0	56	2	20	3	0	25
16:45	17:00	9	150	4	0	163	1	170	4	0	175	6	14	45	0	65	1	14	2	0	17
Hourly Total		59	581	16	0	656	5	587	13	0	605	36	54	147	0	237	8	55	9	0	72
17:00	17:15	14	124	1	0	139	0	189	5	0	194	9	22	57	0	88	2	4	2	0	8
17:15	17:30	11	131	5	0	147	4	121	4	0	129	1	10	27	0	38	0	15	1	0	16
17:30	17:45	10	136	6	0	152	0	134	8	0	142	8	5	33	0	46	4	8	0	0	12
17:45	18:00	16	154	5	0	175	1	132	2	0	135	4	3	33	0	40	2	7	5	0	14
Hourly Total		51	545	17	0	613	5	576	19	0	600	22	40	150	0	212	8	34	8	0	50
Grand Total		395	4147	89	0	4631	37	3805	198	0	4040	158	234	702	0	1094	48	359	81	0	488
Truck %		8%	4%	4%	0%	5%	8%	6%	8%	0%	6%	11%	5%	4%	0%	5%	8%	4%	7%	0%	5%

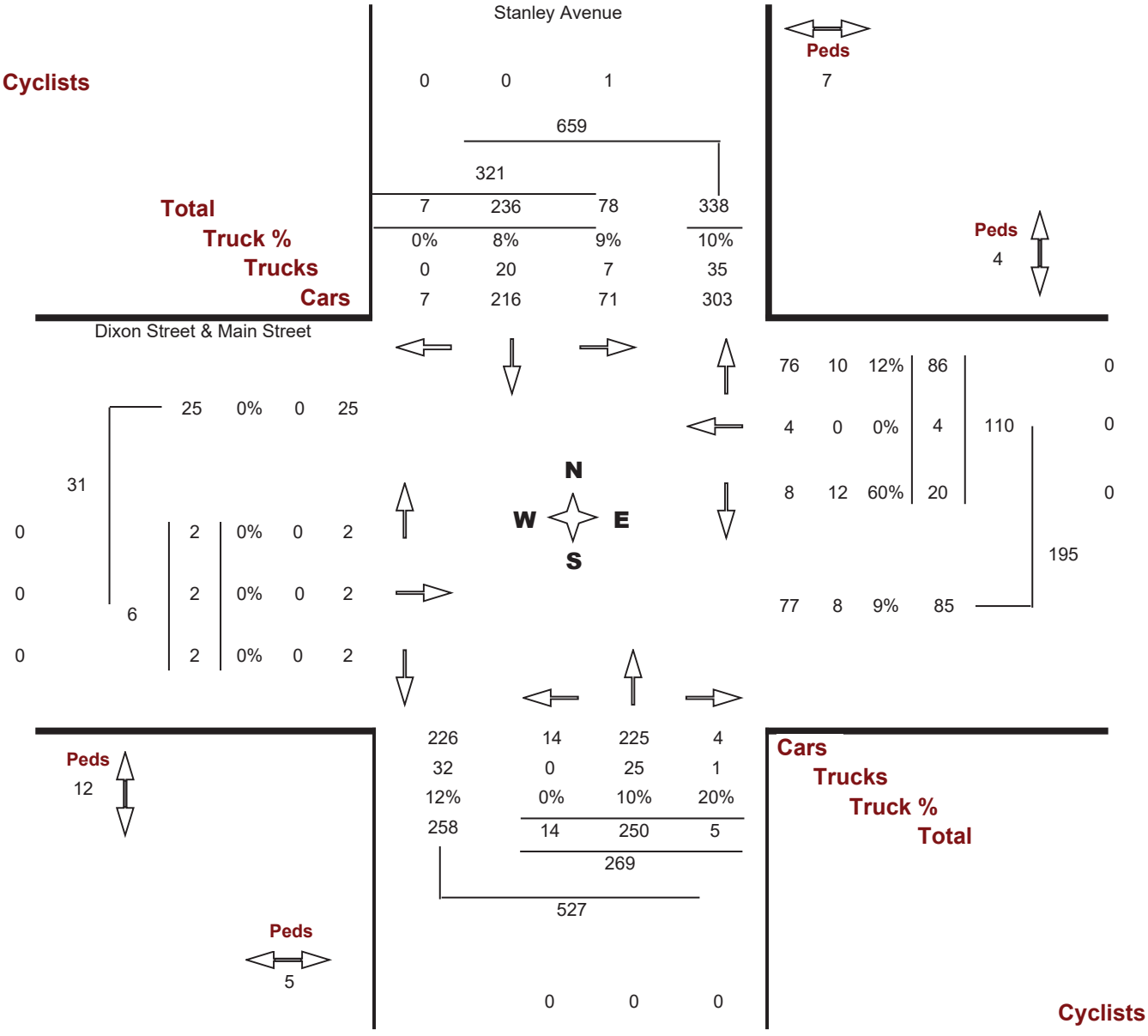
Turning Movements Report - AM Period

Location..... Dixon Street & Main Street @ Stanley Avenue **GeoID.....** 01584

Municipality. NIAGARA FALLS **Count Date.** Monday, 21 November, 2016

Traffic Cont. **Count Time.** 07:00 AM — 09:00 AM

Major Dir..... North south **Peak Hour..** 08:00 AM — 09:00 AM



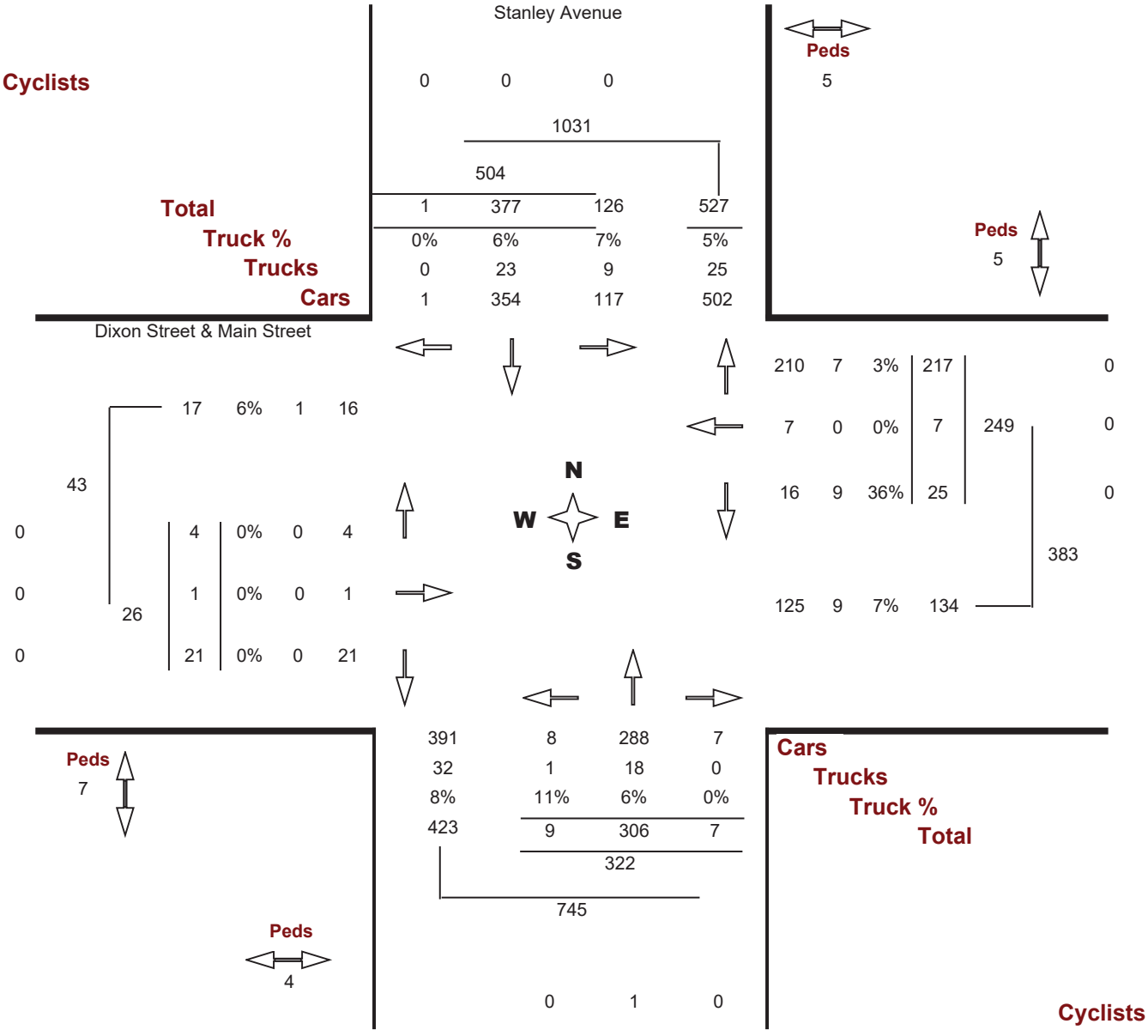
Turning Movements Report - PM Period

Location..... Dixon Street & Main Street @ Stanley Avenue **GeoID.....** 01584

Municipality. NIAGARA FALLS **Count Date.** Monday, 21 November, 2016

Traffic Cont. **Count Time.** 03:00 PM — 06:00 PM

Major Dir..... North south **Peak Hour..** 03:30 PM — 04:30 PM



Turning Movement Count - Details Report (15 min)

Location..... Dixon Street & Main Street @ Stanley Avenue

Municipality..... NIAGARA FALLS

Count Date..... Monday, November 21, 2016

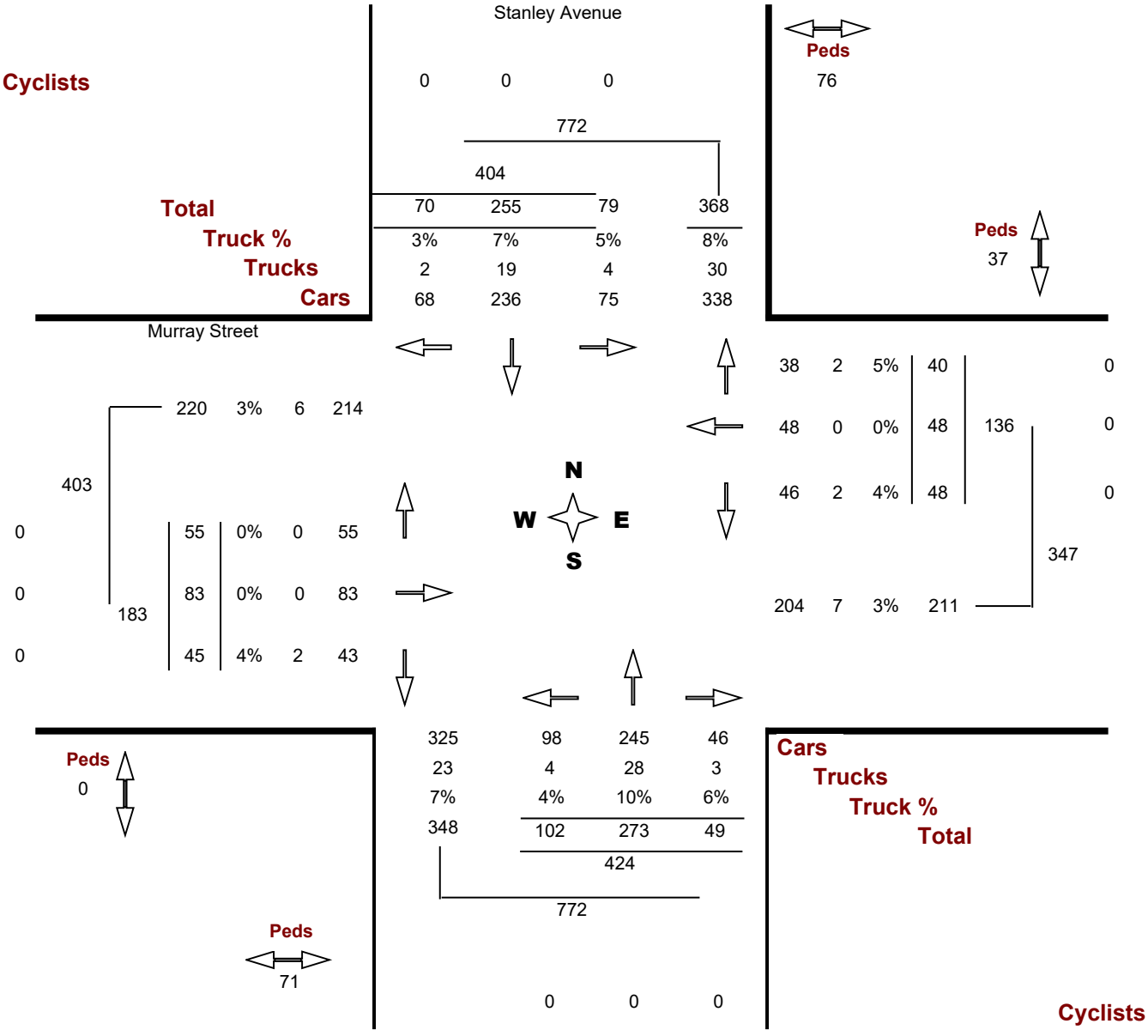
		Stanley Avenue											Dixon Street & Main Street									
		North Approach					South Approach						East Approach					West Approach				
Time Period		LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
07:00	07:15	11	39	1	0	51	1	34	0	0	35	3	0	20	0	23	0	0	0	0	0
07:15	07:30	11	49	0	0	60	2	39	3	0	44	4	1	19	0	24	0	1	0	0	1
07:30	07:45	16	47	1	0	64	2	43	0	0	45	2	0	28	0	30	0	2	2	0	4
07:45	08:00	22	60	0	0	82	1	53	2	0	56	4	0	18	0	22	0	0	1	0	1
Hourly Total		60	195	2	0	257	6	169	5	0	180	13	1	85	0	99	0	3	3	0	6
08:00	08:15	14	52	0	0	66	1	50	2	0	53	3	3	16	0	22	1	1	1	0	3
08:15	08:30	21	52	1	0	74	2	66	3	0	71	4	0	22	0	26	0	1	0	0	1
08:30	08:45	17	70	2	0	89	7	62	0	0	69	3	1	19	0	23	1	0	0	0	1
08:45	09:00	26	62	4	0	92	4	72	0	0	76	10	0	29	0	39	0	0	1	0	1
Hourly Total		78	236	7	0	321	14	250	5	0	269	20	4	86	0	110	2	2	2	0	6
11:00	11:15	21	48	0	0	69	1	63	1	0	65	9	4	30	0	43	1	0	3	0	4
11:15	11:30	15	65	0	0	80	2	56	3	0	61	8	0	43	0	51	3	1	0	0	4
11:30	11:45	29	64	1	0	94	2	68	7	0	77	4	2	38	0	44	3	4	1	0	8
11:45	12:00	22	73	2	0	97	1	53	5	0	59	2	1	25	0	28	1	1	3	0	5
Hourly Total		87	250	3	0	340	6	240	16	0	262	23	7	136	0	166	8	6	7	0	21
12:00	12:15	19	72	0	0	91	2	69	1	0	72	5	3	33	0	41	6	2	5	0	13
12:15	12:30	21	60	2	0	83	2	68	4	0	74	3	2	26	0	31	3	2	2	0	7
12:30	12:45	35	67	1	0	103	3	56	2	0	61	6	1	32	0	39	0	1	4	0	5
12:45	13:00	26	64	3	0	93	4	63	3	0	70	3	0	28	0	31	0	0	3	0	3
Hourly Total		101	263	6	0	370	11	256	10	0	277	17	6	119	0	142	9	5	14	0	28
13:00	13:15	21	61	0	0	82	1	60	1	0	62	3	0	28	0	31	1	0	1	0	2
13:15	13:30	26	71	0	0	97	2	44	0	0	46	5	1	38	0	44	1	0	2	0	3
13:30	13:45	28	71	1	0	100	2	71	3	0	76	6	1	41	0	48	0	0	5	0	5
13:45	14:00	32	70	1	0	103	5	52	1	0	58	7	3	24	0	34	3	0	3	0	6
Hourly Total		107	273	2	0	382	10	227	5	0	242	21	5	131	0	157	5	0	11	0	16
15:00	15:15	26	94	0	0	120	3	57	4	0	64	9	0	36	0	45	1	0	5	0	6
15:15	15:30	38	87	1	0	126	0	49	4	0	53	4	1	42	0	47	0	0	3	0	3
15:30	15:45	33	104	0	0	137	3	84	1	0	88	8	1	70	0	79	1	0	5	0	6
15:45	16:00	25	87	1	0	113	2	80	3	0	85	2	0	39	0	41	3	1	5	0	9
Hourly Total		122	372	2	0	496	8	270	12	0	290	23	2	187	0	212	5	1	18	0	24
16:00	16:15	31	118	0	0	149	2	76	1	0	79	8	3	55	0	66	0	0	5	0	5

		Stanley Avenue										Dixon Street & Main Street									
		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
16:15	16:30	37	68	0	0	105	2	66	2	0	70	7	3	53	0	63	0	0	6	0	6
16:30	16:45	23	98	0	0	121	3	75	3	0	81	11	6	62	0	79	3	0	7	0	10
16:45	17:00	30	71	0	0	101	4	58	3	0	65	5	2	49	0	56	3	0	5	0	8
Hourly Total		121	355	0	0	476	11	275	9	0	295	31	14	219	0	264	6	0	23	0	29
17:00	17:15	17	90	0	0	107	1	67	3	0	71	3	3	44	0	50	2	1	1	0	4
17:15	17:30	30	90	1	0	121	0	54	2	0	56	6	5	33	0	44	6	1	3	0	10
17:30	17:45	34	71	1	0	106	3	54	6	0	63	11	0	31	0	42	0	1	1	0	2
17:45	18:00	24	62	3	0	89	1	51	2	0	54	2	3	24	0	29	2	0	1	0	3
Hourly Total		105	313	5	0	423	5	226	13	0	244	22	11	132	0	165	10	3	6	0	19
Grand Total		781	2257	27	0	3065	71	1913	75	0	2059	170	50	1095	0	1315	45	20	84	0	149
Truck %		10%	7%	0%	0%	8%	3%	6%	5%	0%	6%	56%	2%	7%	0%	13%	4%	0%	0%	0%	1%

Turning Movements Report - AM Period

Location..... Murray Street @ Stanley Avenue
Municipality. NIAGARA FALLS
Traffic Cont.
Major Dir..... North south

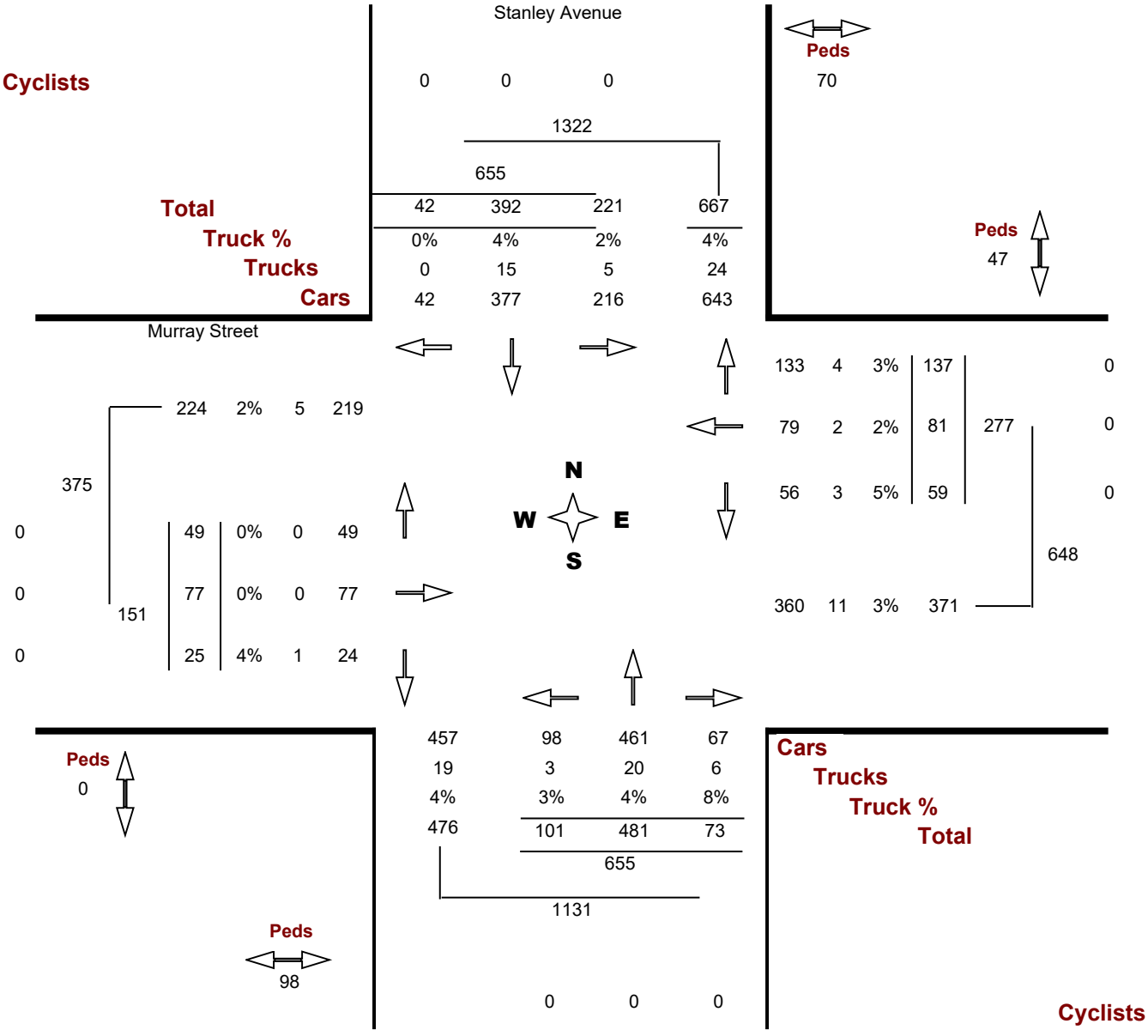
GeoID..... 01587
Count Date. Monday, 17 August, 2015
Count Time. 07:00 AM — 09:00 AM
Peak Hour.. 08:00 AM — 09:00 AM



Turning Movements Report - PM Period

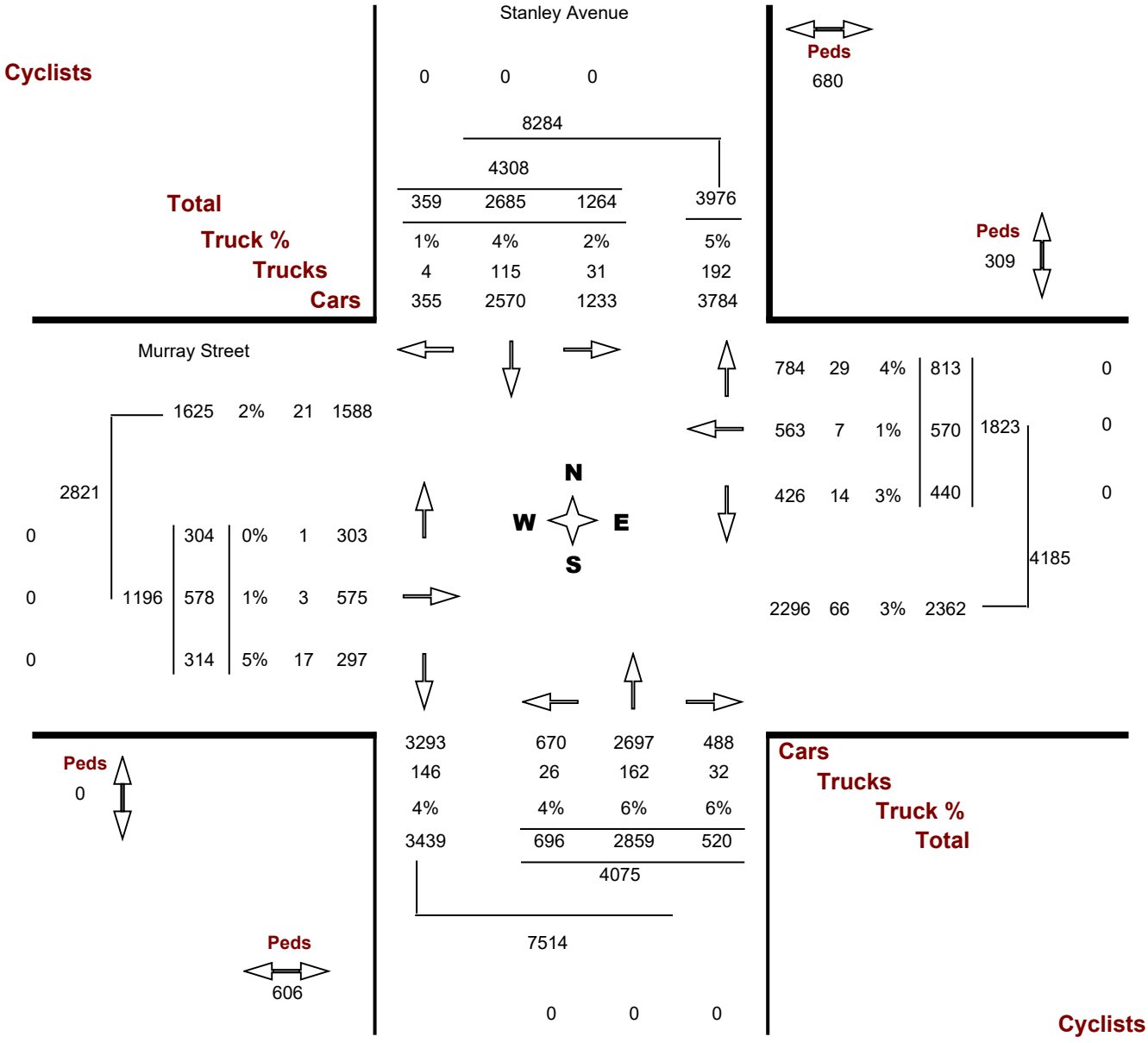
Location..... Murray Street @ Stanley Avenue
Municipality. NIAGARA FALLS
Traffic Cont.
Major Dir..... North south

GeoID..... 01587
Count Date. Monday, 17 August, 2015
Count Time. 03:00 PM — 06:00 PM
Peak Hour.. 03:00 PM — 04:00 PM



Turning Movement Count Report
Full Study

Location..... Murray Street @ Stanley Avenue
Municipality..... NIAGARA FALLS
GeoID..... 01587
Count Date..... Monday, 17 August, 2015



Turning Movement Count - Details Report (15 min)

Location..... Murray Street @ Stanley Avenue

Municipality..... NIAGARA FALLS

Count Date..... Monday, August 17, 2015

		Stanley Avenue										Murray Street									
		North Approach					South Approach					East Approach					West Approach				
Time Period		LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
07:00	07:15	5	38	14	0	57	12	32	3	0	47	3	13	8	0	24	6	8	15	0	29
07:15	07:30	12	45	14	0	71	15	42	6	0	63	9	12	9	0	30	5	10	12	0	27
07:30	07:45	16	67	24	0	107	16	50	10	0	76	13	12	7	0	32	5	12	18	0	35
07:45	08:00	11	67	21	0	99	20	49	11	0	80	6	20	5	0	31	12	21	19	0	52
Hourly Total		44	217	73	0	334	63	173	30	0	266	31	57	29	0	117	28	51	64	0	143
08:00	08:15	18	54	14	0	86	24	48	7	0	79	9	12	7	0	28	14	26	13	0	53
08:15	08:30	18	51	17	0	86	25	63	12	0	100	9	10	14	0	33	11	16	7	0	34
08:30	08:45	24	74	16	0	114	31	79	14	0	124	13	15	5	0	33	14	20	17	0	51
08:45	09:00	19	76	23	0	118	22	83	16	0	121	17	11	14	0	42	16	21	8	0	45
Hourly Total		79	255	70	0	404	102	273	49	0	424	48	48	40	0	136	55	83	45	0	183
11:00	11:15	37	82	14	0	133	21	105	18	0	144	10	23	22	0	55	7	17	12	0	36
11:15	11:30	62	114	13	0	189	10	67	14	0	91	10	13	23	0	46	9	17	6	0	32
11:30	11:45	45	90	6	0	141	12	91	19	0	122	22	14	23	0	59	15	32	9	0	56
11:45	12:00	53	106	11	0	170	21	95	24	0	140	10	19	32	0	61	11	14	8	0	33
Hourly Total		197	392	44	0	633	64	358	75	0	497	52	69	100	0	221	42	80	35	0	157
12:00	12:15	45	85	6	0	136	14	100	17	0	131	14	18	21	0	53	8	15	9	0	32
12:15	12:30	46	85	7	0	138	33	78	14	0	125	4	13	29	0	46	9	12	8	0	29
12:30	12:45	53	85	7	0	145	25	81	15	0	121	14	21	16	0	51	6	21	8	0	35
12:45	13:00	46	87	9	0	142	19	81	22	0	122	10	13	23	0	46	9	19	7	0	35
Hourly Total		190	342	29	0	561	91	340	68	0	499	42	65	89	0	196	32	67	32	0	131
13:00	13:15	44	103	11	0	158	16	72	18	0	106	7	19	22	0	48	12	13	12	0	37
13:15	13:30	65	72	11	0	148	20	79	20	0	119	7	10	28	0	45	0	22	6	0	28
13:30	13:45	43	86	9	0	138	20	89	18	0	127	16	17	24	0	57	15	23	9	0	47
13:45	14:00	59	94	6	0	159	18	74	20	0	112	12	18	37	0	67	8	20	4	0	32
Hourly Total		211	355	37	0	603	74	314	76	0	464	42	64	111	0	217	35	78	31	0	144
15:00	15:15	60	108	8	0	176	21	116	19	0	156	13	13	38	0	64	3	14	3	0	20
15:15	15:30	48	93	14	0	155	23	113	13	0	149	17	22	36	0	75	20	20	6	0	46
15:30	15:45	57	105	10	0	172	28	117	21	0	166	13	21	30	0	64	9	21	13	0	43
15:45	16:00	56	86	10	0	152	29	135	20	0	184	16	25	33	0	74	17	22	3	0	42
Hourly Total		221	392	42	0	655	101	481	73	0	655	59	81	137	0	277	49	77	25	0	151
16:00	16:15	30	88	11	0	129	20	122	17	0	159	32	21	41	0	94	1	16	11	0	28

		Stanley Avenue												Murray Street								
		North Approach					South Approach					East Approach					West Approach					
Time Period		LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
16:15	16:30	42	98	3	0	143	18	112	15	0	145	18	25	39	0	82	4	14	9	0	27
16:30	16:45	45	100	8	0	153	26	118	22	0	166	25	27	41	0	93	12	14	18	0	44
16:45	17:00	34	82	12	0	128	34	126	18	0	178	20	27	40	0	87	11	23	9	0	43
Hourly Total		151	368	34	0	553	98	478	72	0	648	95	100	161	0	356	28	67	47	0	142
17:00	17:15	51	96	6	0	153	27	106	14	0	147	21	25	31	0	77	8	14	10	0	32
17:15	17:30	45	95	4	0	144	23	119	24	0	166	21	18	26	0	65	8	19	8	0	35
17:30	17:45	36	86	10	0	132	24	96	19	0	139	16	24	50	0	90	8	20	9	0	37
17:45	18:00	39	87	10	0	136	29	121	20	0	170	13	19	39	0	71	11	22	8	0	41
Hourly Total		171	364	30	0	565	103	442	77	0	622	71	86	146	0	303	35	75	35	0	145
Grand Total		1264	2685	359	0	4308	696	2859	520	0	4075	440	570	813	0	1823	304	578	314	0	1196
Truck %		2%	4%	1%	0%	3%	4%	6%	6%	0%	5%	3%	1%	4%	0%	3%	0%	1%	5%	0%	2%

Signal Code: 102MRR
Intersection: RR102(Stanley Ave.) & Murray St.
Municipality: niagarafalls
Owner: region
Last Modified: 5/13/2021 11:14:04 AM

Timing Parameters	SBD ADVANCE STANLEY AVE.	NBD & SBD THRU STANLEY AVE.	EBD & WBD THRU MURRAY ST.	n/a	n/a	n/a
Min Green	6	8	8	0	0	0
Walk	0	10	10	0	0	0
Ped Clearance	0	16	18	0	0	0
Vehicle Ext.	2.3	2.5	2.3	0	0	0
Max Green	15	35	28	0	0	0
Yellow	3	4	4	0	0	0
All Red	0	3	3	0	0	0

		Offset
Minimum Cycle	30	0
Pedestrian Cycle	68	
Maximum Cycle	100	96
Operation	FA	

Installed On:
7/29/2014
Count Date:
8/17/2015

FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

Close Window | Print Entry* | Refresh Entry

***Note: you need to change the paper orientation from Portriat to Landscape**

Signal Code: 102DXN
Intersection: RR102(STANLEY AVE.) & DIXON ST.
Municipality: niagarafalls
Owner: region
Last Modified: 10/29/2020 10:57:55 AM

Timing Parameters	NBD & SBD LEFT STANLEY	NBD & SBD STANLEY	EBD & WBD DIXON	n/a	n/a	n/a
Min Green	6	8	8	0	0	0
Walk	0	11	10	0	0	0
Ped Clearance	0	19	17	0	0	0
Vehicle Ext.	2.3	2.5	2.3	0	0	0
Max Green	15	35	30	0	0	0
Yellow	3	4	4	0	0	0
All Red	0	3	3	0	0	0

		Offset
Minimum Cycle	30	0
Pedestrian Cycle	71	
Maximum Cycle	100	85
Operation	FA	

Installed On:
7/29/2014
Count Date:
8/26/2009

FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

Close Window | Print Entry* | Refresh Entry

***Note: you need to change the paper orientation from Portriat to Landscape**

Signal Code: 020102

Intersection: RR20(Ferry St.) & RR102 (Stanley Ave.)

Municipality: niagarafalls

Owner: Region

Last Modified: 2018-08-01 12:10:30 PM

Timing Parameters	EBD & WBD ADVANCE FERRY ST.	EBD & WBD THRU FERRY	NBD & SBD ADVANCE STANLEY AVE.	NBD & SBD THRU STANLEY	n/a	n/a
Min Green	6	8	6	8	0	0
Walk	0	10	0	10	0	0
Ped Clearance	0	17	0	17	0	0
Vehicle Ext.	2.5	2.2	2.5	2.2	0	0
Max Green	12	40	10	29	0	0
Yellow	3	4.1	3	4.1	0	0
All Red	0	2.4	0	2.4	0	0

		Offset
Minimum Cycle	29	0
Pedestrian Cycle	67	
Maximum Cycle	110	6
Operation	FA	

Installed On:	2015-12-10
Count Date:	2015-08-10

FA = Fully Actuated SA = Semi Actuated FT = Fixed Time

Signal Code: MANMRR

Intersection: MAIN ST./MURRAY ST. & ALLANDALE DR.

Municipality: niagarafalls

Owner: City

Last Modified: 2019-03-21 4:00:25 PM

Timing Parameters	NBD & SBD MAIN	WBD MURRAY	NBD & SBD ALLANDALE	PED INT. MAIN	n/a	n/a
Min Green	8	8	8	0	0	0
Walk	7	7	6	7	0	0
Ped Clearance	14	7	7	14	0	0
Vehicle Ext.	5	5	3	0	0	0
Max Green	25	20	25	0	0	0
Yellow	4.1	4.1	4.1	3.3	0	0
All Red	2.7	2.7	2.7	0	0	0

		Offset
Minimum Cycle	44.4	0
Pedestrian Cycle	24.3	
Maximum Cycle	90.4	0
Operation	FA	

Installed On:	2014-12-16
Count Date:	--/--/----

FA = Fully Actuated SA = Semi Actuated FT = Fixed Time

Signal Code: 102DXN

Intersection: RR102(STANLEY AVE.) & DIXON ST.

Municipality: niagarafalls

Owner: region

Last Modified: 2021-10-18 11:26:48 AM

Timing Parameters	NBD & SBD LEFT STANLEY	NBD & SBD STANLEY	EBD DIXON	n/a	n/a	n/a
Min Green	6	8	8	0	0	0
Walk	0	11	10	0	0	0
Ped Clearance	0	19	17	0	0	0
Vehicle Ext.	2.3	2.5	2.3	0	0	0
Max Green	15	35	30	0	0	0
Yellow	3	4	4	0	0	0
All Red	0	3	3	0	0	0

		Offset
Minimum Cycle	30	0
Pedestrian Cycle	71	
Maximum Cycle	97	85
Operation	FA	

Installed On:	2014-07-29
Count Date:	2009-08-26

FA = Fully Actuated SA = Semi Actuated FT = Fixed Time

Signal Code: 102MRR

Intersection: RR102(Stanley Ave.) & Murray St.

Municipality: niagarafalls

Owner: region

Last Modified: 2021-05-13 11:14:04 AM

Timing Parameters	SBD ADVANCE STANLEY AVE.	NBD & SBD THRU STANLEY AVE.	EBD & WBD THRU MURRAY ST.	n/a	n/a	n/a
Min Green	6	8	8	0	0	0
Walk	0	10	10	0	0	0
Ped Clearance	0	16	18	0	0	0
Vehicle Ext.	2.3	2.5	2.3	0	0	0
Max Green	15	35	28	0	0	0
Yellow	3	4	4	0	0	0
All Red	0	3	3	0	0	0

		Offset
Minimum Cycle	30	0
Pedestrian Cycle	68	
Maximum Cycle	100	96
Operation	FA	

Installed On:	2014-07-29
Count Date:	2015-08-17

FA = Fully Actuated SA = Semi Actuated FT = Fixed Time

Signal Code: 102RBN

Intersection: RR102 (STANLEY AVE.) & ROBINSON ST.

Municipality: niagarafalls

Owner: region

Last Modified: 2021-10-20 11:54:50 AM

Timing Parameters	NBD & SBD THRU STANLEY AVE.	EBD & WBD THRU ROBINSON ST.	n/a	n/a	n/a	n/a
Min Green	8	8	0	0	0	0
Walk	8	8	0	0	0	0
Ped Clearance	13	13	0	0	0	0
Vehicle Ext.	2.2	2.1	0	0	0	0
Max Green	35	20	0	0	0	0
Yellow	4	4	0	0	0	0
All Red	3	3	0	0	0	0

		Offset
Minimum Cycle	30	0
Pedestrian Cycle	56	
Maximum Cycle	100	29
Operation	FA	

Installed On:	2017-02-23
Count Date:	2018-06-14

FA = Fully Actuated SA = Semi Actuated FT = Fixed Time

Appendix C

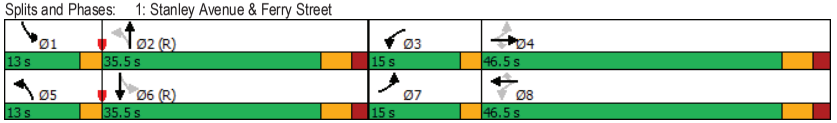
Base Year Traffic Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	164	46	53	123	65	31	297	62	101	393	58
Future Volume (vph)	60	164	46	53	123	65	31	297	62	101	393	58
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	100.0		45.0	35.0		30.0	25.0		0.0	55.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.974			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3175	0	1630	3198	0
Flt Permitted	0.620			0.501			0.473			0.497		
Satd. Flow (perm)	1064	1716	1458	860	1716	1458	812	3175	0	853	3198	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94		22			14	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		126.3			127.8			359.4			139.5	
Travel Time (s)		9.1			9.2			25.9			10.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	178	50	58	134	71	34	323	67	110	427	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	178	50	58	134	71	34	390	0	110	490	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	33.5	33.5	9.5	33.5	33.5	9.5	33.5		9.5	33.5	
Total Split (s)	15.0	46.5	46.5	15.0	46.5	46.5	13.0	35.5		13.0	35.5	
Total Split (%)	13.6%	42.3%	42.3%	13.6%	42.3%	42.3%	11.8%	32.3%		11.8%	32.3%	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1		3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4		0.0	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)	26.8	16.2	16.2	26.5	16.1	16.1	70.0	60.6		74.6	65.8	
Actuated g/C Ratio	0.24	0.15	0.15	0.24	0.15	0.15	0.64	0.55		0.68	0.60	
v/c Ratio	0.22	0.71	0.17	0.22	0.54	0.24	0.06	0.22		0.17	0.26	
Control Delay	29.2	59.1	2.3	29.1	50.4	6.1	8.5	14.3		8.5	13.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	29.2	59.1	2.3	29.1	50.4	6.1	8.5	14.3		8.5	13.0	
LOS	C	E	A	C	D	A	A	B		A	B	
Approach Delay		42.8			33.7			13.9			12.2	
Approach LOS		D			C			B			B	
Queue Length 50th (m)	11.0	38.8	0.0	9.8	28.4	0.0	2.4	21.8		8.1	28.0	
Queue Length 95th (m)	19.6	58.9	2.0	18.0	45.3	7.7	7.5	39.5		18.8	47.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		102.3			103.8			335.4			115.5	
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Base Capacity (vph)	338	624	590	307	624	590	618	1759		653	1919	
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	0.19	0.29	0.08	0.19	0.21	0.12	0.06	0.22		0.17	0.26	

Intersection Summary		
Area Type:	Other	
Cycle Length: 110		
Actuated Cycle Length: 110		
Offset: 6 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 90		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.71		
Intersection Signal Delay: 21.9	Intersection LOS: C	
Intersection Capacity Utilization 49.0%	ICU Level of Service A	
Analysis Period (min) 15		

Splits and Phases: 1: Stanley Avenue & Ferry Street



Queues
1: Stanley Avenue & Ferry Street

Base Year
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	65	178	50	58	134	71	34	390	110	490
v/c Ratio	0.22	0.71	0.17	0.22	0.54	0.24	0.06	0.22	0.17	0.26
Control Delay	29.2	59.1	2.3	29.1	50.4	6.1	8.5	14.3	8.5	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	59.1	2.3	29.1	50.4	6.1	8.5	14.3	8.5	13.0
Queue Length 50th (m)	11.0	38.8	0.0	9.8	28.4	0.0	2.4	21.8	8.1	28.0
Queue Length 95th (m)	19.6	58.9	2.0	18.0	45.3	7.7	7.5	39.5	18.8	47.7
Internal Link Dist (m)		102.3			103.8			335.4		115.5
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0		55.0	
Base Capacity (vph)	338	624	590	307	624	590	618	1759	653	1919
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	0.19	0.29	0.08	0.19	0.21	0.12	0.06	0.22	0.17	0.26

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Stanley Avenue & Ferry Street

Base Year
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	164	46	53	123	65	31	297	62	101	393	58
Future Volume (vph)	60	164	46	53	123	65	31	297	62	101	393	58
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3176		1630	3197	
Flt Permitted	0.62	1.00	1.00	0.50	1.00	1.00	0.47	1.00		0.50	1.00	
Satd. Flow (perm)	1063	1716	1458	860	1716	1458	812	3176		852	3197	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	178	50	58	134	71	34	323	67	110	427	63
RTOR Reduction (vph)	0	0	43	0	0	61	0	10	0	0	6	0
Lane Group Flow (vph)	65	178	7	58	134	10	34	380	0	110	484	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	23.4	16.3	16.3	23.0	16.1	16.1	63.8	60.0		70.8	64.0	
Effective Green, g (s)	23.4	16.3	16.3	23.0	16.1	16.1	63.8	60.0		70.8	64.0	
Actuated g/C Ratio	0.21	0.15	0.15	0.21	0.15	0.15	0.58	0.55		0.64	0.58	
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Vehicle Extension (s)	2.5	2.2	2.2	2.5	2.2	2.2	2.5	2.2		2.5	2.2	
Lane Grp Cap (vph)	262	254	216	228	251	213	499	1732		603	1860	
v/s Ratio Prot	c0.02	c0.10		0.02	0.08		0.00	0.12		c0.01	c0.15	
v/s Ratio Perm	0.04		0.01	0.04		0.01	0.04			0.10		
v/c Ratio	0.25	0.70	0.03	0.25	0.53	0.05	0.07	0.22		0.18	0.26	
Uniform Delay, d1	35.5	44.5	40.1	35.7	43.5	40.4	9.9	12.9		7.5	11.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	7.3	0.0	0.4	1.3	0.0	0.0	0.3		0.1	0.3	
Delay (s)	35.9	51.8	40.1	36.2	44.8	40.4	10.0	13.2		7.6	11.7	
Level of Service	D	D	D	D	D	D	A	B		A	B	
Approach Delay (s)		46.3			41.7			12.9			10.9	
Approach LOS		D			D			B			B	

Intersection Summary					
HCM 2000 Control Delay	23.2	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.34				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)		19.0	
Intersection Capacity Utilization	49.0%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	55	7	10	13	52	2	386	29	37	411	6
Future Volume (vph)	3	55	7	10	13	52	2	386	29	37	411	6
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	35.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.982			0.906			0.989			0.998	
Flt Protected	0.950				0.993						0.996	
Satd. Flow (prot)	1630	1685	0	0	1544	0	0	3224	0	0	3240	0
Flt Permitted	0.704				0.940			0.954			0.890	
Satd. Flow (perm)	1208	1685	0	0	1461	0	0	3076	0	0	2895	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			57			16			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		131.7			129.4			319.9			359.4	
Travel Time (s)		9.5			9.3			23.0			25.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	60	8	11	14	57	2	420	32	40	447	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	68	0	0	82	0	0	454	0	0	494	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		28.0	28.0		28.0	28.0	
Total Split (s)	28.0	28.0		28.0	28.0		42.0	42.0		42.0	42.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0			7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	7.2	7.2			7.2			52.6			52.6	
Actuated g/C Ratio	0.10	0.10			0.10			0.75			0.75	
v/c Ratio	0.02	0.38			0.41			0.20			0.23	
Control Delay	27.0	31.9			19.1			3.8			4.1	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	27.0	31.9			19.1			3.8			4.1	
LOS	C	C			B			A			A	
Approach Delay		31.7			19.1			3.8			4.1	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	0.4	7.9			3.2			9.0			10.3	
Queue Length 95th (m)	2.6	18.4			14.7			16.4			18.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		107.7			105.4			295.9			335.4	
Turn Bay Length (m)	35.0											
Base Capacity (vph)	362	511			478			2314			2175	
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	0.01	0.13			0.17			0.20			0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 29 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 6.9		Intersection LOS: A	
Intersection Capacity Utilization 55.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 2: Stanley Avenue & Robinson Street

Queues
2: Stanley Avenue & Robinson Street

Base Year
AM Peak Hour

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	3	68	82	454	494
v/c Ratio	0.02	0.38	0.41	0.20	0.23
Control Delay	27.0	31.9	19.1	3.8	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	31.9	19.1	3.8	4.1
Queue Length 50th (m)	0.4	7.9	3.2	9.0	10.3
Queue Length 95th (m)	2.6	18.4	14.7	16.4	18.7
Internal Link Dist (m)		107.7	105.4	295.9	335.4
Turn Bay Length (m)	35.0				
Base Capacity (vph)	362	511	478	2314	2175
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	0.01	0.13	0.17	0.20	0.23

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2: Stanley Avenue & Robinson Street

Base Year
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	55	7	10	13	52	2	386	29	37	411	6
Future Volume (vph)	3	55	7	10	13	52	2	386	29	37	411	6
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0			7.0			7.0			7.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.98			0.91			0.99			1.00	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1630	1685			1544			3225			3240	
Flt Permitted	0.70	1.00			0.94			0.95			0.89	
Satd. Flow (perm)	1207	1685			1461			3076			2897	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	60	8	11	14	57	2	420	32	40	447	7
RTOR Reduction (vph)	0	7	0	0	52	0	0	5	0	0	1	0
Lane Group Flow (vph)	3	61	0	0	30	0	0	449	0	0	493	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	6.2	6.2			6.2			49.8			49.8	
Effective Green, g (s)	6.2	6.2			6.2			49.8			49.8	
Actuated g/C Ratio	0.09	0.09			0.09			0.71			0.71	
Clearance Time (s)	7.0	7.0			7.0			7.0			7.0	
Vehicle Extension (s)	2.1	2.1			2.1			2.2			2.2	
Lane Grp Cap (vph)	106	149			129			2188			2061	
v/s Ratio Prot		c0.04										
v/s Ratio Perm	0.00				0.02			0.15			c0.17	
v/c Ratio	0.03	0.41			0.23			0.21			0.24	
Uniform Delay, d1	29.1	30.2			29.7			3.4			3.5	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.8			0.4			0.2			0.3	
Delay (s)	29.2	31.0			30.1			3.6			3.8	
Level of Service	C	C			C			A			A	
Approach Delay (s)		30.9			30.1			3.6			3.8	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	7.4	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.26			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	55.3%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	93	51	54	54	45	115	307	55	89	287	79
Future Volume (vph)	62	93	51	54	54	45	115	307	55	89	287	79
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	30.0		0.0	30.0		0.0	70.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.93	0.97		0.94	0.96			0.99		0.97		
Frt		0.947			0.932			0.977			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	1586	0	1599	1531	0	1599	2931	0	1583	3033	0
Flt Permitted	0.641			0.512			0.517			0.484		
Satd. Flow (perm)	1047	1586	0	813	1531	0	870	2931	0	780	3033	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			47			26			65	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		123.4			170.2			248.0			319.9	
Travel Time (s)		8.9			12.3			17.9			23.0	
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Adj. Flow (vph)	67	101	55	59	59	49	125	334	60	97	312	86
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	156	0	59	108	0	125	394	0	97	398	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Detector Phase	4	4		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		33.0	33.0		9.0	33.0	
Total Split (s)	35.0	35.0		35.0	35.0		42.0	42.0		18.0	60.0	
Total Split (%)	36.8%	36.8%		36.8%	36.8%		44.2%	44.2%		18.9%	63.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0		1.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		C-Min	C-Min		None	C-Min	
Act Effct Green (s)	15.8	15.8		15.8	15.8		63.2	63.2		71.2	71.2	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.67	0.67		0.75	0.75	
v/c Ratio	0.39	0.54		0.44	0.37		0.22	0.20		0.15	0.17	
Control Delay	40.4	35.0		44.5	23.4		9.2	7.1		4.4	3.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.4	35.0		44.5	23.4		9.2	7.1		4.4	3.4	
LOS	D	D		D	C		A	A		A	A	
Approach Delay		36.6			30.9			7.6			3.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			A			A	
Queue Length 50th (m)	11.7	22.2		10.4	10.4		8.7	13.2		4.0	7.6	
Queue Length 95th (m)	23.2	39.3		21.7	24.2		22.1	25.3		10.5	15.5	
Internal Link Dist (m)		99.4			146.2			224.0			295.9	
Turn Bay Length (m)	30.0			30.0			70.0			60.0		
Base Capacity (vph)	341	538		265	531		578	1958		702	2288	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.20	0.29		0.22	0.20		0.22	0.20		0.14	0.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 1 (1%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 13.6		Intersection LOS: B	
Intersection Capacity Utilization 69.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Stanley Avenue & Murray St

Queues
3: Stanley Avenue & Murray St

Base Year
AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	67	156	59	108	125	394	97	398
v/c Ratio	0.39	0.54	0.44	0.37	0.22	0.20	0.15	0.17
Control Delay	40.4	35.0	44.5	23.4	9.2	7.1	4.4	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	35.0	44.5	23.4	9.2	7.1	4.4	3.4
Queue Length 50th (m)	11.7	22.2	10.4	10.4	8.7	13.2	4.0	7.6
Queue Length 95th (m)	23.2	39.3	21.7	24.2	22.1	25.3	10.5	15.5
Internal Link Dist (m)		99.4		146.2		224.0		295.9
Turn Bay Length (m)	30.0		30.0		70.0		60.0	
Base Capacity (vph)	341	538	265	531	578	1958	702	2288
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.29	0.22	0.20	0.22	0.20	0.14	0.17

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Stanley Avenue & Murray St

Base Year
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	93	51	54	54	45	115	307	55	89	287	79
Future Volume (vph)	62	93	51	54	54	45	115	307	55	89	287	79
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.96		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.93	1.00		0.95	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.95		1.00	0.93		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1554	1587		1511	1531		1599	2931		1557	3031	
Flt Permitted	0.64	1.00		0.51	1.00		0.52	1.00		0.48	1.00	
Satd. Flow (perm)	1049	1587		814	1531		871	2931		794	3031	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	101	55	59	59	49	125	334	60	97	312	86
RTOR Reduction (vph)	0	26	0	0	39	0	0	9	0	0	16	0
Lane Group Flow (vph)	67	130	0	59	69	0	125	385	0	97	382	0
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	12.8	12.8		12.8	12.8		59.6	59.6		68.2	68.2	
Effective Green, g (s)	15.8	15.8		15.8	15.8		62.6	62.6		67.2	71.2	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.66	0.66		0.71	0.75	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.3	2.5	
Lane Grp Cap (vph)	174	263		135	254		573	1931		598	2271	
v/s Ratio Prot		c0.08			0.04			0.13		0.01	c0.13	
v/s Ratio Perm	0.06			0.07			c0.14			0.11		
v/c Ratio	0.39	0.49		0.44	0.27		0.22	0.20		0.16	0.17	
Uniform Delay, d1	35.3	36.0		35.6	34.6		6.5	6.4		4.4	3.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.1		1.6	0.4		0.9	0.2		0.1	0.2	
Delay (s)	36.3	37.0		37.2	35.0		7.3	6.6		4.5	3.6	
Level of Service	D	D		D	C		A	A		A	A	
Approach Delay (s)		36.8			35.8			6.8			3.8	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.27			
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	69.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	3	3	25	5	109	18	317	6	99	300	9
Future Volume (vph)	3	3	3	25	5	109	18	317	6	99	300	9
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	20.0		0.0	65.0		0.0	135.0		0.0
Storage Lanes	0		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.955				0.850		0.997			0.996	
Flt Protected		0.984			0.960		0.950			0.950		
Satd. Flow (prot)	0	1612	0	0	1647	1458	1630	3250	0	1630	3247	0
Flt Permitted		0.876			0.753		0.549			0.518		
Satd. Flow (perm)	0	1435	0	0	1292	1458	942	3250	0	889	3247	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				118		2			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.6			131.8			135.9			248.0	
Travel Time (s)		8.3			9.5			9.8			17.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	3	3	27	5	118	20	345	7	108	326	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	32	118	20	352	0	108	336	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	34.0	34.0		34.0	34.0	34.0	9.5	37.0		9.5	37.0	
Total Split (s)	37.0	37.0		37.0	37.0	37.0	18.0	42.0		18.0	42.0	
Total Split (%)	38.1%	38.1%		38.1%	38.1%	38.1%	18.6%	43.3%		18.6%	43.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	0.0	3.0		0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)		7.3			7.3	7.3	75.7	66.6		79.2	72.4	
Actuated g/C Ratio		0.08			0.08	0.08	0.78	0.69		0.82	0.75	
v/c Ratio		0.08			0.33	0.54	0.03	0.16		0.14	0.14	
Control Delay		35.5			50.7	17.6	2.1	5.9		2.3	4.3	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		35.5			50.7	17.6	2.1	5.9		2.3	4.3	
LOS		D			D	B	A	A		A	A	
Approach Delay		35.5			24.6			5.7			3.8	
Approach LOS		D			C			A			A	
Queue Length 50th (m)		1.1			6.1	0.0	0.5	10.8		2.8	6.4	
Queue Length 95th (m)		5.9			15.2	16.3	2.0	19.5		7.1	17.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		91.6			107.8			111.9			224.0	
Turn Bay Length (m)							65.0			135.0		
Base Capacity (vph)		445			399	532	880	2231		844	2423	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.02			0.08	0.22	0.02	0.16		0.13	0.14	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 97			
Offset: 85 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 8.0		Intersection LOS: A	
Intersection Capacity Utilization 38.7%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Stanley Avenue & Dixon Street/Main Street

Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	9	32	118	20	352	108	336
v/c Ratio	0.08	0.33	0.54	0.03	0.16	0.14	0.14
Control Delay	35.5	50.7	17.6	2.1	5.9	2.3	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.5	50.7	17.6	2.1	5.9	2.3	4.3
Queue Length 50th (m)	1.1	6.1	0.0	0.5	10.8	2.8	6.4
Queue Length 95th (m)	5.9	15.2	16.3	2.0	19.5	7.1	17.3
Internal Link Dist (m)	91.6	107.8			111.9		224.0
Turn Bay Length (m)				65.0		135.0	
Base Capacity (vph)	445	399	532	880	2231	844	2423
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.08	0.22	0.02	0.16	0.13	0.14

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	3	3	25	5	109	18	317	6	99	300	9
Future Volume (vph)	3	3	3	25	5	109	18	317	6	99	300	9
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.95			1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1612			1646	1458	1630	3250		1630	3245	
Flt Permitted		0.88			0.75	1.00	0.55	1.00		0.52	1.00	
Satd. Flow (perm)		1436			1292	1458	943	3250		888	3245	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	3	3	27	5	118	20	345	7	108	326	10
RTOR Reduction (vph)	0	3	0	0	0	109	0	1	0	0	1	0
Lane Group Flow (vph)	0	6	0	0	32	9	20	351	0	108	335	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		7.3			7.3	7.3	68.7	66.6		75.7	70.6	
Effective Green, g (s)		7.3			7.3	7.3	68.7	66.6		75.7	70.6	
Actuated g/C Ratio		0.08			0.08	0.08	0.71	0.69		0.78	0.73	
Clearance Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Vehicle Extension (s)		2.3			2.3	2.3	2.3	2.5		2.3	2.5	
Lane Grp Cap (vph)		108			97	109	682	2231		739	2361	
v/s Ratio Prot							0.00	c0.11		c0.01	0.10	
v/s Ratio Perm		0.00			c0.02	0.01	0.02			0.10		
v/c Ratio		0.06			0.33	0.08	0.03	0.16		0.15	0.14	
Uniform Delay, d1		41.7			42.5	41.7	4.2	5.3		2.6	4.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			1.2	0.2	0.0	0.2		0.1	0.1	
Delay (s)		41.8			43.7	41.9	4.2	5.5		2.6	4.1	
Level of Service		D			D	D	A	A		A	A	
Approach Delay (s)		41.8			42.3			5.4			3.8	
Approach LOS		D			D			A			A	

Intersection Summary					
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.17				
Actuated Cycle Length (s)	97.0	Sum of lost time (s)		17.0	
Intersection Capacity Utilization	38.7%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	247	5	5	241	5	21
Future Volume (vph)	247	5	5	241	5	21
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.889	
Flt Protected				0.999	0.991	
Satd. Flow (prot)	1712	0	0	1714	1512	0
Flt Permitted				0.999	0.991	
Satd. Flow (perm)	1712	0	0	1714	1512	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	158.5			126.3	366.1	
Travel Time (s)	11.4			9.1	26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	268	5	5	262	5	23
Shared Lane Traffic (%)						
Lane Group Flow (vph)	273	0	0	267	28	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	247	5	5	241	5	21
Future Volume (Veh/h)	247	5	5	241	5	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	268	5	5	262	5	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				126		
pX, platoon unblocked					0.94	
vC, conflicting volume			273		542	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			273		479	270
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	97
cM capacity (veh/h)			1290		510	768

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	273	267	28
Volume Left	0	5	5
Volume Right	5	0	23
cSH	1700	1290	704
Volume to Capacity	0.16	0.00	0.04
Queue Length 95th (m)	0.0	0.1	1.0
Control Delay (s)	0.0	0.2	10.3
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	10.3
Approach LOS			B

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	28.1%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	40	3	3	17	6	1	12	16	6	7	4
Future Volume (vph)	4	40	3	3	17	6	1	12	16	6	7	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.966			0.926			0.972	
Flt Protected		0.996			0.995			0.998			0.982	
Satd. Flow (prot)	0	1695	0	0	1649	0	0	1586	0	0	1638	0
Flt Permitted		0.996			0.995			0.998			0.982	
Satd. Flow (perm)	0	1695	0	0	1649	0	0	1586	0	0	1638	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		398.3			131.7			319.4			366.1	
Travel Time (s)		28.7			9.5			23.0			26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	43	3	3	18	7	1	13	17	7	8	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	50	0	0	28	0	0	31	0	0	19	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization	14.1%
	ICU Level of Service A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	40	3	3	17	6	1	12	16	6	7	4
Future Volume (Veh/h)	4	40	3	3	17	6	1	12	16	6	7	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	43	3	3	18	7	1	13	17	7	8	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					132							
pX, platoon unblocked												
vC, conflicting volume	25			46			88	84	44	104	82	22
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	25			46			88	84	44	104	82	22
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	98	98	99	99	100
cM capacity (veh/h)	1589			1562			884	803	1025	849	805	1056

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	50	28	31	19
Volume Left	4	3	1	7
Volume Right	3	7	17	4
cSH	1589	1562	915	865
Volume to Capacity	0.00	0.00	0.03	0.02
Queue Length 95th (m)	0.1	0.0	0.8	0.5
Control Delay (s)	0.6	0.8	9.1	9.3
Lane LOS	A	A	A	A
Approach Delay (s)	0.6	0.8	9.1	9.3
Approach LOS			A	A

Intersection Summary			
Average Delay		4.0	
Intersection Capacity Utilization		14.1%	ICU Level of Service A
Analysis Period (min)		15	

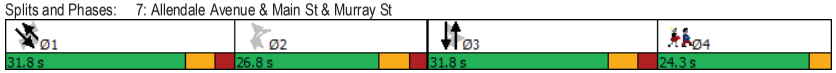
Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL2	SBT	SEL	SET	NWT
Lane Configurations												
Traffic Volume (vph)	2	3	70	3	8	1	1	2	0	51	64	2
Future Volume (vph)	2	3	70	3	8	1	1	2	0	51	64	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)		45.0	0.0		0.0		0.0			20.0		
Storage Lanes		1	1		0		0			1		
Taper Length (m)		7.5			7.5					7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99	0.87			0.97			0.97	0.98		
Frt			0.850			0.989						
Flt Protected		0.950				0.960			0.950	0.950		
Satd. Flow (prot)	0	1662	1460	0	0	1482	0	0	1662	1662	1667	1750
Flt Permitted		0.716				0.917				0.757		
Satd. Flow (perm)	0	1240	1272	0	0	1384	0	0	1697	1299	1667	1750
Right Turn on Red				No								
Satd. Flow (RTOR)												
Link Speed (k/h)		50				50			50		50	50
Link Distance (m)		123.4				224.2			319.4		197.9	158.7
Travel Time (s)		8.9				16.1			23.0		14.2	11.4
Confl. Peds. (#/hr)	3	1	6	21	6		7	7		7		
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	5%	0%
Adj. Flow (vph)	2	4	86	4	10	1	1	2	0	63	79	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	90	0	0	12	0	0	2	63	79	2
Turn Type	Perm	Perm	Perm		Perm	NA		Perm	NA	Perm	NA	NA
Protected Phases						3			3		1	1
Permitted Phases	2	2	2		3			3		1		
Detector Phase	2	2	2		3	3		3	3	1	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	20.8	20.8	20.8		19.8	19.8		19.8	19.8	27.8	27.8	27.8
Total Split (s)	26.8	26.8	26.8		31.8	31.8		31.8	31.8	31.8	31.8	31.8
Total Split (%)	23.4%	23.4%	23.4%		27.7%	27.7%		27.7%	27.7%	27.7%	27.7%	27.7%
Yellow Time (s)	4.1	4.1	4.1		4.1	4.1		4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	2.7		2.7	2.7		2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)		-2.8	-2.8			-2.8			-2.8	-2.8	-2.8	-2.8
Total Lost Time (s)		4.0	4.0			4.0			4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag		Lead	Lead		Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min		None	None		None	None	Min	Min	Min
Act Effct Green (s)		15.1	15.1			11.1			11.1	13.8	13.8	13.8
Actuated g/C Ratio		0.23	0.23			0.17			0.17	0.21	0.21	0.21
v/c Ratio		0.02	0.30			0.05			0.01	0.23	0.22	0.01
Control Delay		21.8	25.2			28.5			28.5	25.6	24.8	23.5
Queue Delay		0.0	0.0			0.0			0.0	0.0	0.0	0.0
Total Delay		21.8	25.2			28.5			28.5	25.6	24.8	23.5
LOS		C	C			C			C	C	C	C
Approach Delay		25.0				28.5			28.5		25.2	23.5

Lane Group	Ø4
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (m)	
Storage Lanes	
Taper Length (m)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (k/h)	
Link Distance (m)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	4
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	24.3
Total Split (s)	24.3
Total Split (%)	21%
Yellow Time (s)	3.3
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	Lag
Lead-Lag Optimize?	
Recall Mode	Ped
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	

Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL2	SBT	SEL	SET	NWT
Approach LOS		C				C			C		C	C
Queue Length 50th (m)		0.5	8.5			1.2			0.2	6.0	7.5	0.2
Queue Length 95th (m)		3.5	23.2			6.3			2.2	18.1	21.1	1.9
Internal Link Dist (m)		99.4				200.2			295.4		173.9	134.7
Turn Bay Length (m)		45.0								20.0		
Base Capacity (vph)		451	463			613			752	576	739	776
Starvation Cap Reductn		0	0			0			0	0	0	0
Spillback Cap Reductn		0	0			0			0	0	0	0
Storage Cap Reductn		0	0			0			0	0	0	0
Reduced v/c Ratio		0.01	0.19			0.02			0.00	0.11	0.11	0.00

Intersection Summary			
Area Type:	Other		
Cycle Length: 114.7			
Actuated Cycle Length: 64.3			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.30			
Intersection Signal Delay: 25.3		Intersection LOS: C	
Intersection Capacity Utilization 38.8%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Allendale Avenue & Main St & Murray St



Lane Group	Ø4
Approach LOS	
Queue Length 50th (m)	
Queue Length 95th (m)	
Internal Link Dist (m)	
Turn Bay Length (m)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Queues
7: Allendale Avenue & Main St & Murray St

Base Year
AM Peak Hour

Lane Group	WBL	WBR	NBT	SBT	SEL	SET	NWT
Lane Group Flow (vph)	6	90	12	2	63	79	2
v/c Ratio	0.02	0.30	0.05	0.01	0.23	0.22	0.01
Control Delay	21.8	25.2	28.5	28.5	25.6	24.8	23.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	25.2	28.5	28.5	25.6	24.8	23.5
Queue Length 50th (m)	0.5	8.5	1.2	0.2	6.0	7.5	0.2
Queue Length 95th (m)	3.5	23.2	6.3	2.2	18.1	21.1	1.9
Internal Link Dist (m)	99.4		200.2	295.4		173.9	134.7
Turn Bay Length (m)	45.0				20.0		
Base Capacity (vph)	451	463	613	752	576	739	776
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.19	0.02	0.00	0.11	0.11	0.00

Intersection Summary

HCM Signalized Intersection Capacity Analysis
7: Allendale Avenue & Main St & Murray St

Base Year
AM Peak Hour

Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL2	SBT	SEL	SET	NWT
Lane Configurations												
Traffic Volume (vph)	2	3	70	3	8	1	1	2	0	51	64	2
Future Volume (vph)	2	3	70	3	8	1	1	2	0	51	64	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0			4.0			4.0	4.0	4.0	4.0
Lane Util. Factor		1.00	1.00			1.00			1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.91			1.00			1.00	1.00	1.00	1.00
Flpb, ped/bikes		0.99	1.00			0.99			0.98	0.99	1.00	1.00
Frt		1.00	0.85			0.99			1.00	1.00	1.00	1.00
Flt Protected		0.95	1.00			0.96			0.95	0.95	1.00	1.00
Satd. Flow (prot)		1652	1334			1463			1632	1643	1667	1750
Flt Permitted		0.72	1.00			0.92			1.00	0.76	1.00	1.00
Satd. Flow (perm)		1245	1334			1397			1718	1309	1667	1750
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	2	4	86	4	10	1	1	2	0	63	79	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	6	90	0	0	12	0	0	2	63	79	2
Confl. Peds. (#/hr)	3	1	6	21	6		7	7		7		
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	5%	0%
Turn Type	Perm	Perm	Perm		Perm	NA		Perm	NA	Perm	NA	NA
Protected Phases						3			3		1	1
Permitted Phases	2	2	2		3			3		1		
Actuated Green, G (s)		12.2	12.2			1.2			1.2	11.0	11.0	11.0
Effective Green, g (s)		15.0	15.0			4.0			4.0	13.8	13.8	13.8
Actuated g/C Ratio		0.22	0.22			0.06			0.06	0.20	0.20	0.20
Clearance Time (s)		6.8	6.8			6.8			6.8	6.8	6.8	6.8
Vehicle Extension (s)		5.0	5.0			3.0			3.0	5.0	5.0	5.0
Lane Grp Cap (vph)		268	287			80			98	259	330	346
v/s Ratio Prot											0.05	0.00
v/s Ratio Perm		0.00	c0.07			c0.01			0.00	c0.05		
v/c Ratio		0.02	0.31			0.15			0.02	0.24	0.24	0.01
Uniform Delay, d1		21.5	23.0			31.2			31.0	23.5	23.5	22.4
Progression Factor		1.00	1.00			1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1	1.3			0.9			0.1	1.0	0.8	0.0
Delay (s)		21.6	24.3			32.1			31.0	24.5	24.3	22.4
Level of Service		C	C			C			C	C	C	C
Approach Delay (s)		24.1				32.1			31.0		24.4	22.4
Approach LOS		C				C			C		C	C

Intersection Summary			
HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.17		
Actuated Cycle Length (s)	69.6	Sum of lost time (s)	18.1
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 1: Stanley Avenue & Ferry Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	39.1	75.4	37.0	39.2	59.7	36.2	19.4	39.2	48.9	26.0	43.0	34.8
Average Queue (m)	13.3	34.9	8.1	12.4	23.5	11.2	5.1	12.4	18.6	9.1	21.5	10.4
95th Queue (m)	28.5	60.4	25.8	27.5	46.1	28.5	15.3	28.6	37.9	19.6	39.1	24.0
Link Distance (m)		104.7			113.4			335.8	335.8		126.1	126.1
Upstream Blk Time (%)		0										
Queuing Penalty (veh)		0										
Storage Bay Dist (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Storage Blk Time (%)		4	0	0	6	0	0	1			0	
Queuing Penalty (veh)		5	0	1	7	0	0	0			0	

Intersection: 2: Stanley Avenue & Robinson Street

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	LTR	LT	TR	LT	TR
Maximum Queue (m)	9.1	28.7	30.5	29.7	32.9	37.4	28.1
Average Queue (m)	0.9	12.6	11.7	9.2	11.4	14.3	8.7
95th Queue (m)	5.1	23.3	21.8	22.9	26.7	31.5	23.1
Link Distance (m)		109.0	115.6	299.4	299.4	335.8	335.8
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	35.0						
Storage Blk Time (%)		0					
Queuing Penalty (veh)		0					

Intersection: 3: Stanley Avenue & Murray St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	36.6	48.8	34.2	44.7	38.2	44.5	42.8	32.3	38.6	46.6
Average Queue (m)	14.0	21.1	12.2	15.6	16.4	19.5	20.3	12.4	16.2	18.0
95th Queue (m)	29.1	37.3	26.1	32.4	29.8	38.3	38.2	25.3	32.6	36.3
Link Distance (m)		94.8		156.4		224.8	224.8		299.4	299.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	30.0		30.0		70.0			60.0		
Storage Blk Time (%)	0	3	1	2						
Queuing Penalty (veh)	1	2	1	1						

Intersection: 4: Stanley Avenue & Dixon Street/Main Street

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	R	L	T	TR	L	T	TR
Maximum Queue (m)	14.4	21.3	19.9	9.0	24.2	13.1	20.0	16.6	19.8
Average Queue (m)	2.8	7.9	10.9	1.8	6.7	2.7	7.0	2.3	3.6
95th Queue (m)	10.8	18.2	18.6	7.6	19.4	10.0	16.4	10.0	13.1
Link Distance (m)	101.8		117.3		127.5	127.5		224.8	224.8
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		20.0		65.0			135.0		
Storage Blk Time (%)		2	0						
Queuing Penalty (veh)		2	0						

Intersection: 5: Allendale Avenue & Ferry Street

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	5.5	10.6
Average Queue (m)	0.2	5.8
95th Queue (m)	2.7	12.8
Link Distance (m)	104.7	345.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Allendale Avenue & Robinson Street

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (m)	11.7	9.2
Average Queue (m)	6.2	4.4
95th Queue (m)	13.1	11.7
Link Distance (m)	290.2	345.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Allendale Avenue & Main St & Murray St

Movement	WB	WB	NB	SB	SE	SE	NW
Directions Served	<L	R>	LTR	<LTR	<L	TR	LTR
Maximum Queue (m)	6.3	26.7	14.2	7.4	18.4	23.8	2.2
Average Queue (m)	0.6	8.7	2.2	0.5	5.7	4.9	0.1
95th Queue (m)	3.6	20.3	8.9	3.4	14.3	15.4	0.9
Link Distance (m)		94.8	197.5	290.2		171.8	136.3
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	45.0				20.0		
Storage Blk Time (%)					0	0	
Queuing Penalty (veh)					0	0	

Zone Summary

Zone wide Queuing Penalty: 20

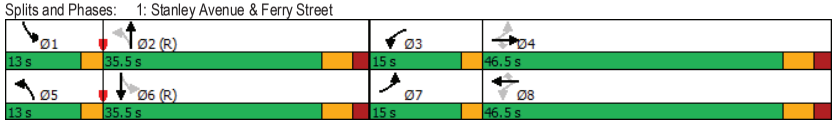
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	299	69	95	400	127	74	656	94	179	545	109
Future Volume (vph)	114	299	69	95	400	127	74	656	94	179	545	109
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	100.0		45.0	35.0		30.0	25.0		0.0	55.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.981			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3198	0	1630	3178	0
Flt Permitted	0.216			0.403			0.321			0.171		
Satd. Flow (perm)	371	1716	1458	691	1716	1458	551	3198	0	293	3178	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			94			94		14			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		126.3			127.8			359.4			139.5	
Travel Time (s)		9.1			9.2			25.9			10.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	124	325	75	103	435	138	80	713	102	195	592	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	325	75	103	435	138	80	815	0	195	710	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	33.5	33.5	9.5	33.5	33.5	9.5	33.5		9.5	33.5	
Total Split (s)	15.0	46.5	46.5	15.0	46.5	46.5	13.0	35.5		13.0	35.5	
Total Split (%)	13.6%	42.3%	42.3%	13.6%	42.3%	42.3%	11.8%	32.3%		11.8%	32.3%	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1		3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4		0.0	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)	47.2	33.5	33.5	44.9	32.3	32.3	47.4	36.1		54.4	42.3	
Actuated g/C Ratio	0.43	0.30	0.30	0.41	0.29	0.29	0.43	0.33		0.49	0.38	
v/c Ratio	0.45	0.62	0.15	0.29	0.86	0.28	0.26	0.77		0.66	0.58	
Control Delay	21.9	37.5	3.8	18.3	53.7	11.2	19.6	40.5		31.6	31.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	21.9	37.5	3.8	18.3	53.7	11.2	19.6	40.5		31.6	31.2	
LOS	C	D	A	B	D	B	B	D		C	C	
Approach Delay		29.0			39.6			38.6			31.3	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	16.1	62.1	0.0	13.2	92.1	7.2	9.4	90.2		24.7	66.7	
Queue Length 95th (m)	23.8	84.7	6.7	20.3	120.9	20.4	21.2	#135.5		#62.1	#103.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		102.3			103.8			335.4			115.5	
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Base Capacity (vph)	300	626	592	400	624	590	346	1059		295	1234	
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	0.41	0.52	0.13	0.26	0.70	0.23	0.23	0.77		0.66	0.58	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 6 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 34.9 Intersection LOS: C
Intersection Capacity Utilization 80.9% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Stanley Avenue & Ferry Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	124	325	75	103	435	138	80	815	195	710
v/c Ratio	0.45	0.62	0.15	0.29	0.86	0.28	0.26	0.77	0.66	0.58
Control Delay	21.9	37.5	3.8	18.3	53.7	11.2	19.6	40.5	31.6	31.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	37.5	3.8	18.3	53.7	11.2	19.6	40.5	31.6	31.2
Queue Length 50th (m)	16.1	62.1	0.0	13.2	92.1	7.2	9.4	90.2	24.7	66.7
Queue Length 95th (m)	23.8	84.7	6.7	20.3	120.9	20.4	21.2	#135.5	#62.1	#103.9
Internal Link Dist (m)		102.3			103.8			335.4		115.5
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0		55.0	
Base Capacity (vph)	300	626	592	400	624	590	346	1059	295	1234
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	0.41	0.52	0.13	0.26	0.70	0.23	0.23	0.77	0.66	0.58

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	299	69	95	400	127	74	656	94	179	545	109
Future Volume (vph)	114	299	69	95	400	127	74	656	94	179	545	109
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3199		1630	3179	
Flt Permitted	0.22	1.00	1.00	0.40	1.00	1.00	0.32	1.00		0.17	1.00	
Satd. Flow (perm)	370	1716	1458	691	1716	1458	551	3199		293	3179	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	124	325	75	103	435	138	80	713	102	195	592	118
RTOR Reduction (vph)	0	0	52	0	0	66	0	9	0	0	12	0
Lane Group Flow (vph)	124	325	23	103	435	72	80	806	0	195	698	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	43.7	33.5	33.5	41.5	32.4	32.4	42.7	36.0		51.4	41.7	
Effective Green, g (s)	43.7	33.5	33.5	41.5	32.4	32.4	42.7	36.0		51.4	41.7	
Actuated g/C Ratio	0.40	0.30	0.30	0.38	0.29	0.29	0.39	0.33		0.47	0.38	
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Vehicle Extension (s)	2.5	2.2	2.2	2.5	2.2	2.2	2.5	2.2		2.5	2.2	
Lane Grp Cap (vph)	263	522	444	338	505	429	279	1046		287	1205	
v/s Ratio Prot	c0.04	0.19		0.03	c0.25		0.02	c0.25		c0.08	0.22	
v/s Ratio Perm	0.14		0.02	0.09		0.05	0.09			0.24		
v/c Ratio	0.47	0.62	0.05	0.30	0.86	0.17	0.29	0.77		0.68	0.58	
Uniform Delay, d1	23.6	32.8	27.0	23.2	36.7	28.8	21.8	33.3		20.4	27.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	1.8	0.0	0.4	13.7	0.1	0.4	5.5		5.7	2.0	
Delay (s)	24.6	34.6	27.0	23.6	50.4	28.9	22.2	38.8		26.1	29.2	
Level of Service	C	C	C	C	D	C	C	D		C	C	
Approach Delay (s)		31.2			41.9			37.3			28.5	
Approach LOS		C			D			D			C	

Intersection Summary				
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	80.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	51	12	36	62	178	4	652	17	68	589	15
Future Volume (vph)	6	51	12	36	62	178	4	652	17	68	589	15
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	35.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.971			0.913			0.996			0.997	
Flt Protected	0.950				0.994						0.995	
Satd. Flow (prot)	1630	1666	0	0	1557	0	0	3247	0	0	3234	0
Flt Permitted	0.399				0.941			0.952			0.800	
Satd. Flow (perm)	685	1666	0	0	1474	0	0	3091	0	0	2600	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			134			5			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		131.7			129.4			319.9			359.4	
Travel Time (s)		9.5			9.3			23.0			25.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	55	13	39	67	193	4	709	18	74	640	16
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	68	0	0	299	0	0	731	0	0	730	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		28.0	28.0		28.0	28.0	
Total Split (s)	28.0	28.0		28.0	28.0		42.0	42.0		42.0	42.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0			7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	12.9	12.9			12.9			43.1			43.1	
Actuated g/C Ratio	0.18	0.18			0.18			0.62			0.62	
v/c Ratio	0.06	0.21			0.78			0.38			0.46	
Control Delay	20.5	19.6			28.6			8.6			9.5	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	20.5	19.6			28.6			8.6			9.5	
LOS	C	B			C			A			A	
Approach Delay		19.7			28.6			8.6			9.5	
Approach LOS		B			C			A			A	
Queue Length 50th (m)	0.8	6.5			21.3			23.4			24.7	
Queue Length 95th (m)	3.4	14.2			41.7			45.6			49.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		107.7			105.4			295.9			335.4	
Turn Bay Length (m)	35.0											
Base Capacity (vph)	205	508			536			1903			1600	
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	0.03	0.13			0.56			0.38			0.46	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 29 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 12.7		Intersection LOS: B	
Intersection Capacity Utilization 82.4%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 2: Stanley Avenue & Robinson Street

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	7	68	299	731	730
v/c Ratio	0.06	0.21	0.78	0.38	0.46
Control Delay	20.5	19.6	28.6	8.6	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	19.6	28.6	8.6	9.5
Queue Length 50th (m)	0.8	6.5	21.3	23.4	24.7
Queue Length 95th (m)	3.4	14.2	41.7	45.6	49.6
Internal Link Dist (m)		107.7	105.4	295.9	335.4
Turn Bay Length (m)	35.0				
Base Capacity (vph)	205	508	536	1903	1600
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	0.03	0.13	0.56	0.38	0.46

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	51	12	36	62	178	4	652	17	68	589	15
Future Volume (vph)	6	51	12	36	62	178	4	652	17	68	589	15
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0			7.0			7.0			7.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.97			0.91			1.00			1.00	
Flt Protected	0.95	1.00			0.99			1.00			0.99	
Satd. Flow (prot)	1630	1666			1556			3247			3233	
Flt Permitted	0.40	1.00			0.94			0.95			0.80	
Satd. Flow (perm)	685	1666			1474			3091			2600	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	55	13	39	67	193	4	709	18	74	640	16
RTOR Reduction (vph)	0	11	0	0	109	0	0	2	0	0	2	0
Lane Group Flow (vph)	7	57	0	0	190	0	0	729	0	0	728	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	12.9	12.9			12.9			43.1			43.1	
Effective Green, g (s)	12.9	12.9			12.9			43.1			43.1	
Actuated g/C Ratio	0.18	0.18			0.18			0.62			0.62	
Clearance Time (s)	7.0	7.0			7.0			7.0			7.0	
Vehicle Extension (s)	2.1	2.1			2.1			2.2			2.2	
Lane Grp Cap (vph)	126	307			271			1903			1600	
v/s Ratio Prot		0.03										
v/s Ratio Perm	0.01				c0.13			0.24			c0.28	
v/c Ratio	0.06	0.19			0.70			0.38			0.46	
Uniform Delay, d1	23.5	24.1			26.7			6.8			7.2	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.1			6.4			0.6			0.9	
Delay (s)	23.6	24.2			33.2			7.4			8.1	
Level of Service	C	C			C			A			A	
Approach Delay (s)		24.2			33.2			7.4			8.1	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	82.4%	ICU Level of Service	E	
Analysis Period (min)	15			

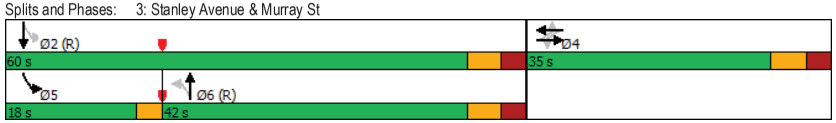
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	87	28	66	91	154	114	542	82	249	441	47
Future Volume (vph)	55	87	28	66	91	154	114	542	82	249	441	47
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	30.0		0.0	30.0		0.0	70.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.95	0.98		0.94	0.94			0.99		0.98		
Frt		0.964			0.906			0.980			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	1638	0	1599	1452	0	1599	2943	0	1583	3075	0
Flt Permitted	0.325			0.622			0.455			0.316		
Satd. Flow (perm)	542	1638	0	984	1452	0	766	2943	0	517	3075	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			95			21			21	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		123.4			170.2			248.0			319.9	
Travel Time (s)		8.9			12.3			17.9			23.0	
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Adj. Flow (vph)	60	95	30	72	99	167	124	589	89	271	479	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	125	0	72	266	0	124	678	0	271	530	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Detector Phase	4	4		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		33.0	33.0		9.0	33.0	
Total Split (s)	35.0	35.0		35.0	35.0		42.0	42.0		18.0	60.0	
Total Split (%)	36.8%	36.8%		36.8%	36.8%		44.2%	44.2%		18.9%	63.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0		1.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		C-Min	C-Min		None	C-Min	
Act Effct Green (s)	19.9	19.9		19.9	19.9		52.9	52.9		67.1	67.1	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.56	0.56		0.71	0.71	
v/c Ratio	0.53	0.35		0.35	0.70		0.29	0.41		0.57	0.24	
Control Delay	48.1	28.0		34.3	31.1		17.3	14.9		11.0	5.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	48.1	28.0		34.3	31.1		17.3	14.9		11.0	5.9	
LOS	D	C		C	C		B	B		B	A	
Approach Delay		34.5			31.8			15.3			7.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			B			A	
Queue Length 50th (m)	10.4	17.6		12.0	30.7		11.6	35.0		15.9	15.5	
Queue Length 95th (m)	21.4	29.7		22.0	51.3		33.9	70.0		36.5	31.2	
Internal Link Dist (m)		99.4			146.2			224.0			295.9	
Turn Bay Length (m)	30.0			30.0			70.0			60.0		
Base Capacity (vph)	176	546		321	537		427	1651		527	2176	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.34	0.23		0.22	0.50		0.29	0.41		0.51	0.24	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 1 (1%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 16.7		Intersection LOS: B	
Intersection Capacity Utilization 79.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Stanley Avenue & Murray St



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	60	125	72	266	124	678	271	530
v/c Ratio	0.53	0.35	0.35	0.70	0.29	0.41	0.57	0.24
Control Delay	48.1	28.0	34.3	31.1	17.3	14.9	11.0	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.1	28.0	34.3	31.1	17.3	14.9	11.0	5.9
Queue Length 50th (m)	10.4	17.6	12.0	30.7	11.6	35.0	15.9	15.5
Queue Length 95th (m)	21.4	29.7	22.0	51.3	33.9	70.0	36.5	31.2
Internal Link Dist (m)		99.4		146.2		224.0		295.9
Turn Bay Length (m)	30.0		30.0		70.0		60.0	
Base Capacity (vph)	176	546	321	537	427	1651	527	2176
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.23	0.22	0.50	0.29	0.41	0.51	0.24

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	87	28	66	91	154	114	542	82	249	441	47
Future Volume (vph)	55	87	28	66	91	154	114	542	82	249	441	47
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.94		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.94	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.96		1.00	0.91		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1588	1638		1504	1452		1599	2944		1574	3074	
Flt Permitted	0.33	1.00		0.62	1.00		0.46	1.00		0.32	1.00	
Satd. Flow (perm)	544	1638		985	1452		766	2944		524	3074	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	95	30	72	99	167	124	589	89	271	479	51
RTOR Reduction (vph)	0	14	0	0	75	0	0	9	0	0	6	0
Lane Group Flow (vph)	60	111	0	72	191	0	124	669	0	271	524	0
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	16.9	16.9		16.9	16.9		49.9	49.9		64.1	64.1	
Effective Green, g (s)	19.9	19.9		19.9	19.9		52.9	52.9		63.1	67.1	
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.56	0.56		0.66	0.71	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.3	2.5	
Lane Grp Cap (vph)	113	343		206	304		426	1639		460	2171	
v/s Ratio Prot		0.07			c0.13			0.23		c0.06	0.17	
v/s Ratio Perm	0.11			0.07			0.16			c0.33		
v/c Ratio	0.53	0.32		0.35	0.63		0.29	0.41		0.59	0.24	
Uniform Delay, d1	33.4	31.8		32.0	34.2		11.1	12.1		7.4	4.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.7	0.4		0.7	3.5		1.7	0.8		1.5	0.3	
Delay (s)	37.1	32.2		32.8	37.7		12.9	12.8		8.9	5.2	
Level of Service	D	C		C	D		B	B		A	A	
Approach Delay (s)		33.8			36.6			12.8			6.5	
Approach LOS		C			D			B			A	

Intersection Summary				
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	79.6%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1	27	32	9	276	11	389	9	160	479	1
Future Volume (vph)	5	1	27	32	9	276	11	389	9	160	479	1
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	20.0		0.0	65.0		0.0	135.0		0.0
Storage Lanes	0		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.888				0.850		0.997				
Flt Protected		0.993			0.963		0.950			0.950		
Satd. Flow (prot)	0	1513	0	0	1652	1458	1630	3250	0	1630	3260	0
Flt Permitted		0.940			0.750		0.459			0.478		
Satd. Flow (perm)	0	1432	0	0	1287	1458	787	3250	0	820	3260	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29				300		3				
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.6			131.8			135.9			248.0	
Travel Time (s)		8.3			9.5			9.8			17.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	1	29	35	10	300	12	423	10	174	521	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	35	0	0	45	300	12	433	0	174	522	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	34.0	34.0		34.0	34.0	34.0	9.5	37.0		9.5	37.0	
Total Split (s)	37.0	37.0		37.0	37.0	37.0	18.0	42.0		18.0	42.0	
Total Split (%)	38.1%	38.1%		38.1%	38.1%	38.1%	18.6%	43.3%		18.6%	43.3%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	0.0	3.0		0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)		8.9			8.9	8.9	72.9	63.8		78.1	72.4	
Actuated g/C Ratio		0.09			0.09	0.09	0.75	0.66		0.81	0.75	
v/c Ratio		0.22			0.38	0.74	0.02	0.20		0.24	0.21	
Control Delay		19.8			49.0	16.4	3.0	7.6		3.4	4.9	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		19.8			49.0	16.4	3.0	7.6		3.4	4.9	
LOS		B			D	B	A	A		A	A	
Approach Delay		19.8			20.6			7.5			4.5	
Approach LOS		B			C			A			A	
Queue Length 50th (m)		1.1			8.6	0.0	0.3	14.9		5.2	11.5	
Queue Length 95th (m)		9.7			18.3	24.3	1.9	30.3		14.7	32.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		91.6			107.8			111.9			224.0	
Turn Bay Length (m)							65.0			135.0		
Base Capacity (vph)		462			398	658	763	2138		785	2432	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.08			0.11	0.46	0.02	0.20		0.22	0.21	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 97			
Offset: 85 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.74			
Intersection Signal Delay: 9.4		Intersection LOS: A	
Intersection Capacity Utilization 52.2%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Stanley Avenue & Dixon Street/Main Street

Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	35	45	300	12	433	174	522
v/c Ratio	0.22	0.38	0.74	0.02	0.20	0.24	0.21
Control Delay	19.8	49.0	16.4	3.0	7.6	3.4	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	49.0	16.4	3.0	7.6	3.4	4.9
Queue Length 50th (m)	1.1	8.6	0.0	0.3	14.9	5.2	11.5
Queue Length 95th (m)	9.7	18.3	24.3	1.9	30.3	14.7	32.3
Internal Link Dist (m)	91.6	107.8			111.9		224.0
Turn Bay Length (m)				65.0		135.0	
Base Capacity (vph)	462	398	658	763	2138	785	2432
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.11	0.46	0.02	0.20	0.22	0.21

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1	27	32	9	276	11	389	9	160	479	1
Future Volume (vph)	5	1	27	32	9	276	11	389	9	160	479	1
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.89			1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		0.99			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1513			1651	1458	1630	3249		1630	3259	
Flt Permitted		0.94			0.75	1.00	0.46	1.00		0.48	1.00	
Satd. Flow (perm)		1433			1287	1458	787	3249		820	3259	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	1	29	35	10	300	12	423	10	174	521	1
RTOR Reduction (vph)	0	26	0	0	0	272	0	1	0	0	0	0
Lane Group Flow (vph)	0	9	0	0	45	28	12	432	0	174	522	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		8.9			8.9	8.9	64.9	63.8		74.1	70.0	
Effective Green, g (s)		8.9			8.9	8.9	64.9	63.8		74.1	70.0	
Actuated g/C Ratio		0.09			0.09	0.09	0.67	0.66		0.76	0.72	
Clearance Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Vehicle Extension (s)		2.3			2.3	2.3	2.3	2.5		2.3	2.5	
Lane Grp Cap (vph)		131			118	133	536	2136		687	2351	
v/s Ratio Prot							0.00	0.13		c0.02	0.16	
v/s Ratio Perm		0.01			c0.03	0.02	0.01			c0.17		
v/c Ratio		0.07			0.38	0.21	0.02	0.20		0.25	0.22	
Uniform Delay, d1		40.3			41.5	40.8	5.4	6.6		3.1	4.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			1.2	0.5	0.0	0.2		0.1	0.2	
Delay (s)		40.4			42.7	41.2	5.4	6.8		3.2	4.7	
Level of Service		D			D	D	A	A		A	A	
Approach Delay (s)		40.4			41.4			6.7			4.3	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.28			
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	52.2%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	492	11	4	553	15	33
Future Volume (vph)	492	11	4	553	15	33
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997				0.907	
Flt Protected					0.985	
Satd. Flow (prot)	1711	0	0	1716	1533	0
Flt Permitted					0.985	
Satd. Flow (perm)	1711	0	0	1716	1533	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	158.5			126.3	366.1	
Travel Time (s)	11.4			9.1	26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	535	12	4	601	16	36
Shared Lane Traffic (%)						
Lane Group Flow (vph)	547	0	0	605	52	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	492	11	4	553	15	33
Future Volume (Veh/h)	492	11	4	553	15	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	535	12	4	601	16	36
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				126		
pX, platoon unblocked					0.76	
vC, conflicting volume			547		1150	541
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			547		1038	541
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		92	93
cM capacity (veh/h)			1022		193	541

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	547	605	52
Volume Left	0	4	16
Volume Right	12	0	36
cSH	1700	1022	348
Volume to Capacity	0.32	0.00	0.15
Queue Length 95th (m)	0.0	0.1	4.2
Control Delay (s)	0.0	0.1	17.2
Lane LOS		A	C
Approach Delay (s)	0.0	0.1	17.2
Approach LOS			C

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		45.1%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	81	1	3	100	8	3	14	28	7	5	5
Future Volume (vph)	3	81	1	3	100	8	3	14	28	7	5	5
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.990			0.916			0.962	
Flt Protected		0.998			0.999			0.997			0.978	
Satd. Flow (prot)	0	1711	0	0	1697	0	0	1567	0	0	1614	0
Flt Permitted		0.998			0.999			0.997			0.978	
Satd. Flow (perm)	0	1711	0	0	1697	0	0	1567	0	0	1614	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		398.3			131.7			319.4			366.1	
Travel Time (s)		28.7			9.5			23.0			26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	88	1	3	109	9	3	15	30	8	5	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	0	0	121	0	0	48	0	0	18	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 17.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	81	1	3	100	8	3	14	28	7	5	5
Future Volume (Veh/h)	3	81	1	3	100	8	3	14	28	7	5	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	88	1	3	109	9	3	15	30	8	5	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					132							
pX, platoon unblocked												
vC, conflicting volume	118			89			222	218	88	252	214	114
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	118			89			222	218	88	252	214	114
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	98	97	99	99	99
cM capacity (veh/h)	1470			1506			724	677	970	667	680	939

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	92	121	48	18
Volume Left	3	3	3	8
Volume Right	1	9	30	5
cSH	1470	1506	839	730
Volume to Capacity	0.00	0.00	0.06	0.02
Queue Length 95th (m)	0.0	0.0	1.5	0.6
Control Delay (s)	0.3	0.2	9.6	10.1
Lane LOS	A	A	A	B
Approach Delay (s)	0.3	0.2	9.6	10.1
Approach LOS			A	B

Intersection Summary					
Average Delay			2.5		
Intersection Capacity Utilization			17.8%	ICU Level of Service	A
Analysis Period (min)			15		

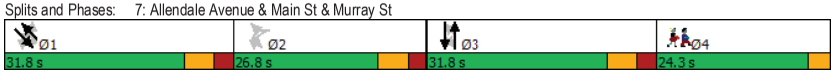
Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL	SBT	SBR	SEL2
Lane Configurations												
Traffic Volume (vph)	3	2	101	6	16	2	6	1	1	0	3	2
Future Volume (vph)	3	2	101	6	16	2	6	1	1	0	3	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)		45.0	0.0		0.0		0.0		0.0		0.0	
Storage Lanes		1	1		0		0		0		0	
Taper Length (m)		7.5			7.5				7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99	0.87			0.97				0.96		
Frt			0.850			0.964				0.892		
Flt Protected		0.950				0.968				0.990		
Satd. Flow (prot)	0	1662	1460	0	0	1470	0	0	0	1489	0	0
Flt Permitted		0.703				0.797				0.926		
Satd. Flow (perm)	0	1218	1272	0	0	1189	0	0	0	1390	0	0
Right Turn on Red				No				No			Yes	
Satd. Flow (RTOR)										132		
Link Speed (k/h)		50				50				50		
Link Distance (m)		123.4				224.2				319.4		
Travel Time (s)		8.9				16.1				23.0		
Confl. Peds. (#/hr)	3	1	6	21	6		7	2	2		6	21
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	2	125	7	20	2	7	1	1	0	4	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	132	0	0	30	0	0	0	5	0	0
Turn Type	Perm	Perm	Perm		Perm	NA			Perm	NA		Perm
Protected Phases						3				3		
Permitted Phases	2	2	2		3				3			1
Detector Phase	2	2	2		3	3			3	3		1
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0			8.0	8.0		8.0
Minimum Split (s)	20.8	20.8	20.8		19.8	19.8			19.8	19.8		27.8
Total Split (s)	26.8	26.8	26.8		31.8	31.8			31.8	31.8		31.8
Total Split (%)	23.4%	23.4%	23.4%		27.7%	27.7%			27.7%	27.7%		27.7%
Yellow Time (s)	4.1	4.1	4.1		4.1	4.1			4.1	4.1		4.1
All-Red Time (s)	2.7	2.7	2.7		2.7	2.7			2.7	2.7		2.7
Lost Time Adjust (s)		-2.8	-2.8			-2.8				-2.8		
Total Lost Time (s)		4.0	4.0			4.0				4.0		
Lead/Lag	Lag	Lag	Lag		Lead	Lead			Lead	Lead		Lead
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min		None	None			None	None		Min
Act Effct Green (s)		17.8	17.8			11.8				11.8		
Actuated g/C Ratio		0.24	0.24			0.16				0.16		
v/c Ratio		0.02	0.44			0.16				0.02		
Control Delay		26.4	32.6			36.0				0.0		
Queue Delay		0.0	0.0			0.0				0.0		
Total Delay		26.4	32.6			36.0				0.0		
LOS		C	C			D				A		
Approach Delay		32.3				36.0						

Lane Group	SEL	SET	NWT	Ø4
Lane Configurations				
Traffic Volume (vph)	66	93	2	
Future Volume (vph)	66	93	2	
Ideal Flow (vphpl)	1750	1750	1750	
Storage Length (m)	20.0			
Storage Lanes	1			
Taper Length (m)	7.5			
Lane Util. Factor	1.00	1.00	1.00	
Ped Bike Factor	0.92			
Frt				
Flt Protected	0.950			
Satd. Flow (prot)	1662	1667	1750	
Flt Permitted	0.757			
Satd. Flow (perm)	1224	1667	1750	
Right Turn on Red				
Satd. Flow (RTOR)				
Link Speed (k/h)		50	50	
Link Distance (m)		197.9	158.7	
Travel Time (s)		14.2	11.4	
Confl. Peds. (#/hr)	7			
Peak Hour Factor	0.81	0.81	0.81	
Heavy Vehicles (%)	0%	5%	0%	
Adj. Flow (vph)	81	115	2	
Shared Lane Traffic (%)				
Lane Group Flow (vph)	83	115	2	
Turn Type	Perm	NA	NA	
Protected Phases		1	1	4
Permitted Phases	1			
Detector Phase	1	1	1	
Switch Phase				
Minimum Initial (s)	8.0	8.0	8.0	1.0
Minimum Split (s)	27.8	27.8	27.8	24.3
Total Split (s)	31.8	31.8	31.8	24.3
Total Split (%)	27.7%	27.7%	27.7%	21%
Yellow Time (s)	4.1	4.1	4.1	3.3
All-Red Time (s)	2.7	2.7	2.7	0.0
Lost Time Adjust (s)	-2.8	-2.8	-2.8	
Total Lost Time (s)	4.0	4.0	4.0	
Lead/Lag	Lead	Lead	Lead	Lag
Lead-Lag Optimize?				
Recall Mode	Min	Min	Min	Ped
Act Effct Green (s)	15.8	15.8	15.8	
Actuated g/C Ratio	0.21	0.21	0.21	
v/c Ratio	0.32	0.33	0.01	
Control Delay	32.6	31.3	28.0	
Queue Delay	0.0	0.0	0.0	
Total Delay	32.6	31.3	28.0	
LOS	C	C	C	
Approach Delay		31.8	28.0	

Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL	SBT	SBR	SEL2
Approach LOS		C				D						
Queue Length 50th (m)		0.8	18.6			4.4				0.0		
Queue Length 95th (m)		3.7	34.5			12.3				0.0		
Internal Link Dist (m)		99.4				200.2				295.4		
Turn Bay Length (m)		45.0										
Base Capacity (vph)		383	400			456				614		
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		0.02	0.33			0.07				0.01		

Intersection Summary			
Area Type:	Other		
Cycle Length: 114.7			
Actuated Cycle Length: 75.5			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 31.9		Intersection LOS: C	
Intersection Capacity Utilization 39.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Allendale Avenue & Main St & Murray St



Lane Group	SEL	SET	NWT	Ø4
Approach LOS		C	C	
Queue Length 50th (m)	11.8	16.3	0.3	
Queue Length 95th (m)	23.9	30.1	1.9	
Internal Link Dist (m)		173.9	134.7	
Turn Bay Length (m)	20.0			
Base Capacity (vph)	469	640	671	
Starvation Cap Reductn	0	0	0	
Spillback Cap Reductn	0	0	0	
Storage Cap Reductn	0	0	0	
Reduced v/c Ratio	0.18	0.18	0.00	

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT	SEL	SET	NWT
Lane Group Flow (vph)	6	132	30	5	83	115	2
v/c Ratio	0.02	0.44	0.16	0.02	0.32	0.33	0.01
Control Delay	26.4	32.6	36.0	0.0	32.6	31.3	28.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.4	32.6	36.0	0.0	32.6	31.3	28.0
Queue Length 50th (m)	0.8	18.6	4.4	0.0	11.8	16.3	0.3
Queue Length 95th (m)	3.7	34.5	12.3	0.0	23.9	30.1	1.9
Internal Link Dist (m)	99.4		200.2	295.4		173.9	134.7
Turn Bay Length (m)	45.0				20.0		
Base Capacity (vph)	383	400	456	614	469	640	671
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.33	0.07	0.01	0.18	0.18	0.00

Intersection Summary

Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL	SBT	SBR	SEL2
Lane Configurations												
Traffic Volume (vph)	3	2	101	6	16	2	6	1	1	0	3	2
Future Volume (vph)	3	2	101	6	16	2	6	1	1	0	3	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0			4.0				4.0		
Lane Util. Factor		1.00	1.00			1.00				1.00		
Frpb, ped/bikes		1.00	0.91			0.99				0.97		
Flpb, ped/bikes		0.99	1.00			0.99				1.00		
Frt		1.00	0.85			0.96				0.89		
Flt Protected		0.95	1.00			0.97				0.99		
Satd. Flow (prot)		1651	1323			1457				1497		
Flt Permitted		0.70	1.00			0.80				0.93		
Satd. Flow (perm)		1222	1323			1200				1401		
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	4	2	125	7	20	2	7	1	1	0	4	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	5	0	0
Lane Group Flow (vph)	0	6	132	0	0	30	0	0	0	0	0	0
Confl. Peds. (#/hr)	3	1	6	21	6		7	2	2		6	21
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	Perm	Perm		Perm	NA			Perm	NA		Perm
Protected Phases						3				3		
Permitted Phases	2	2	2		3				3			1
Actuated Green, G (s)		14.8	14.8			4.7				4.7		
Effective Green, g (s)		17.6	17.6			7.5				7.5		
Actuated g/C Ratio		0.23	0.23			0.10				0.10		
Clearance Time (s)		6.8	6.8			6.8				6.8		
Vehicle Extension (s)		5.0	5.0			3.0				3.0		
Lane Grp Cap (vph)		275	298			115				134		
v/s Ratio Prot												
v/s Ratio Perm		0.00	c0.10			c0.03				0.00		
v/c Ratio		0.02	0.44			0.26				0.00		
Uniform Delay, d1		23.5	26.0			32.7				31.9		
Progression Factor		1.00	1.00			1.00				1.00		
Incremental Delay, d2		0.1	2.2			1.2				0.0		
Delay (s)		23.6	28.2			33.9				31.9		
Level of Service		C	C			C				C		
Approach Delay (s)		28.0				33.9				31.9		
Approach LOS		C				C				C		

Intersection Summary			
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	78.0	Sum of lost time (s)	18.1
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	NWT
Lane Configurations			
Traffic Volume (vph)	66	93	2
Future Volume (vph)	66	93	2
Ideal Flow (vphpl)	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00
Flpb, ped/bikes	0.95	1.00	1.00
Frt	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00
Satd. Flow (prot)	1576	1667	1750
Flt Permitted	0.76	1.00	1.00
Satd. Flow (perm)	1255	1667	1750
Peak-hour factor, PHF	0.81	0.81	0.81
Adj. Flow (vph)	81	115	2
RTOR Reduction (vph)	0	0	0
Lane Group Flow (vph)	83	115	2
Confl. Peds. (#/hr)	7		
Heavy Vehicles (%)	0%	5%	0%
Turn Type	Perm	NA	NA
Protected Phases		1	1
Permitted Phases	1		
Actuated Green, G (s)	12.9	12.9	12.9
Effective Green, g (s)	15.7	15.7	15.7
Actuated g/C Ratio	0.20	0.20	0.20
Clearance Time (s)	6.8	6.8	6.8
Vehicle Extension (s)	5.0	5.0	5.0
Lane Grp Cap (vph)	252	335	352
v/s Ratio Prot		c0.07	0.00
v/s Ratio Perm	0.07		
v/c Ratio	0.33	0.34	0.01
Uniform Delay, d1	26.6	26.7	24.9
Progression Factor	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.3	0.0
Delay (s)	28.3	28.0	24.9
Level of Service	C	C	C
Approach Delay (s)		28.1	24.9
Approach LOS		C	C

Intersection Summary

Intersection: 1: Stanley Avenue & Ferry Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	43.1	99.8	52.5	42.5	123.3	37.5	32.3	108.2	108.7	62.3	93.7	82.5
Average Queue (m)	19.2	52.0	13.8	23.1	99.2	23.4	15.5	53.4	60.0	28.3	49.6	38.4
95th Queue (m)	34.5	88.1	40.4	47.1	142.1	47.4	33.4	91.9	95.2	55.2	81.7	68.0
Link Distance (m)		104.7			113.4			335.8	335.8		126.1	126.1
Upstream Blk Time (%)		0			20							
Queuing Penalty (veh)		2			0							
Storage Bay Dist (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Storage Blk Time (%)		12	0	2	51	0	0	28		0	4	
Queuing Penalty (veh)		22	0	12	113	2	0	21		1	8	

Intersection: 2: Stanley Avenue & Robinson Street

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	LTR	LT	TR	LT	TR
Maximum Queue (m)	12.7	22.0	81.5	53.7	55.2	87.7	78.3
Average Queue (m)	2.0	10.2	36.5	18.7	23.2	37.1	25.6
95th Queue (m)	8.4	20.3	63.7	42.1	45.8	71.4	57.8
Link Distance (m)		109.0	115.6	299.4	299.4	335.8	335.8
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	35.0						
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: Stanley Avenue & Murray St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	33.1	38.3	37.4	66.8	62.0	77.8	88.1	65.9	75.4	54.4
Average Queue (m)	11.3	17.6	17.0	31.0	19.0	42.2	42.6	34.0	25.0	25.8
95th Queue (m)	24.6	32.8	35.7	55.6	40.5	69.4	70.1	58.2	51.5	47.8
Link Distance (m)		94.8		156.4		224.8	224.8		299.4	299.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	30.0		30.0		70.0			60.0		
Storage Blk Time (%)	1	2	3	12	0	1		2	0	
Queuing Penalty (veh)	1	1	7	8	0	1		4	0	

Intersection: 4: Stanley Avenue & Dixon Street/Main Street

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	R	L	T	TR	L	T	TR
Maximum Queue (m)	20.9	24.7	54.7	10.1	49.1	37.6	39.8	37.1	35.2
Average Queue (m)	6.2	10.0	21.7	1.4	16.3	6.7	12.6	7.8	8.1
95th Queue (m)	15.6	22.0	40.1	6.9	37.7	21.8	26.9	23.8	24.3
Link Distance (m)	101.8		117.3		127.5	127.5		224.8	224.8
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		20.0		65.0			135.0		
Storage Blk Time (%)		3	7		0				
Queuing Penalty (veh)		7	3		0				

Intersection: 5: Allendale Avenue & Ferry Street

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	7.9	17.0	20.5
Average Queue (m)	0.3	0.9	8.5
95th Queue (m)	3.8	7.0	17.2
Link Distance (m)	148.5	104.7	345.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Allendale Avenue & Robinson Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	1.7	1.8	16.6	9.2
Average Queue (m)	0.1	0.1	7.1	4.3
95th Queue (m)	1.2	1.2	14.5	11.6
Link Distance (m)	374.0	109.0	290.2	345.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Allendale Avenue & Main St & Murray St

Movement	WB	WB	NB	SB	SE	SE	NW
Directions Served	<L	R>	LTR>	LTR	<L	TR	LTR
Maximum Queue (m)	7.6	36.2	16.7	5.9	26.2	32.6	0.8
Average Queue (m)	0.6	13.8	4.0	0.8	8.3	8.7	0.0
95th Queue (m)	3.9	29.8	11.4	4.3	18.7	23.0	0.3
Link Distance (m)		94.8	193.1	290.2		171.8	132.7
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	45.0				20.0		
Storage Blk Time (%)		0			1	2	
Queuing Penalty (veh)		0			1	2	

Zone Summary

Zone wide Queuing Penalty: 215

Appendix D

ITE Internal Trip Capture

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	210614 - 5566 Robinson Street	**Organization:**	Paradigm Transportation Solutions Limited
Project Location:	Niagara Falls, ON	**Performed By:**	
Scenario Description:		**Date:**	
Analysis Year:	Site Generated Traffic	**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office			-	0		
Retail	820	5,553	Square Feet	13	8	5
Restaurant	-	-	-	0		
Cinema/Entertainment	-	-	-	0		
Residential	222	962	Dwelling Units	260	88	172
Hotel				0		
All Other Land Uses[2]	-	-	-	0		
Total				273	96	177

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	1	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	273	96	177
Internal Capture Percentage	1%	2%	1%
External Vehicle-Trips[3]	269	94	175
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	13%	20%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	1%	1%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	210614 - 5566 Robinson Street
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	8	8	1.00	5	5
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	88	88	1.00	172	172
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	1		1	0	1	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	3	2	34	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	0	0	0	0
Retail	0		0	0	2	0
Restaurant	0	1		0	4	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	7	8	7	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	87	88	87	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	4	5	4	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	171	172	171	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	210614 - 5566 Robinson Street	**Organization:**	Paradigm Transportation Solutions Limited
Project Location:	Niagara Falls, ON	**Performed By:**	
Scenario Description:		**Date:**	
Analysis Year:	Site Generated Traffic	**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office			-	0		
Retail	820	5,553	Square Feet	38	19	19
Restaurant	-	-	-	0		
Cinema/Entertainment	-	-	-	0		
Residential	222	962	Dwelling Units	308	188	120
Hotel				0		
All Other Land Uses[2]	-	-	-	0		
Total				346	207	139

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	5	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	2	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	346	207	139
Internal Capture Percentage	4%	3%	5%
External Vehicle-Trips[3]	332	200	132
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	11%	26%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	3%	2%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	210614 - 5566 Robinson Street
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	19	19	1.00	19	19
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	188	188	1.00	120	120
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		6	1	5	1
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	5	50	25	0		4
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	0	0	8	0
Retail	0		0	0	86	0
Restaurant	0	10		0	30	0
Cinema/Entertainment	0	1	0		8	0
Residential	0	2	0	0		0
Hotel	0	0	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	2	17	19	17	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	5	183	188	183	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	5	14	19	14	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	2	118	120	118	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Appendix E

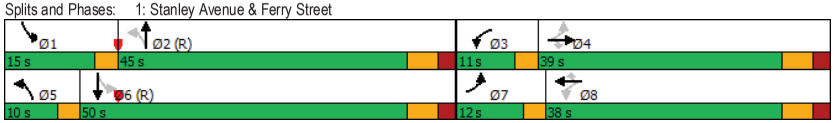
Background Traffic Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	207	56	67	153	79	38	422	78	123	536	88
Future Volume (vph)	125	207	56	67	153	79	38	422	78	123	536	88
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	100.0		45.0	35.0		30.0	25.0		0.0	55.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.977			0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3185	0	1630	3191	0
Flt Permitted	0.484			0.490			0.386			0.396		
Satd. Flow (perm)	830	1716	1458	841	1716	1458	662	3185	0	679	3191	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			124			124		21			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		126.3			127.8			359.4			139.5	
Travel Time (s)		9.1			9.2			25.9			10.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	225	61	73	166	86	41	459	85	134	583	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	136	225	61	73	166	86	41	544	0	134	679	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	33.5	33.5	9.5	33.5	33.5	9.5	33.5		9.5	33.5	
Total Split (s)	12.0	39.0	39.0	11.0	38.0	38.0	10.0	45.0		15.0	50.0	
Total Split (%)	10.9%	35.5%	35.5%	10.0%	34.5%	34.5%	9.1%	40.9%		13.6%	45.5%	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1		3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4		0.0	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)	31.4	20.7	20.7	28.5	17.6	17.6	65.5	55.8		71.0	61.8	
Actuated g/C Ratio	0.29	0.19	0.19	0.26	0.16	0.16	0.60	0.51		0.65	0.56	
v/c Ratio	0.45	0.70	0.16	0.27	0.61	0.26	0.09	0.33		0.26	0.38	
Control Delay	33.1	53.5	0.9	28.9	51.3	4.2	9.4	17.6		10.1	15.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	33.1	53.5	0.9	28.9	51.3	4.2	9.4	17.6		10.1	15.6	
LOS	C	D	A	C	D	A	A	B		B	B	
Approach Delay		39.3			33.8			17.0			14.7	
Approach LOS		D			C			B			B	
Queue Length 50th (m)	23.2	48.9	0.0	12.0	35.1	0.0	3.1	35.7		10.9	44.9	
Queue Length 95th (m)	36.0	70.5	0.0	21.2	53.3	5.8	8.7	58.7		22.9	70.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		102.3			103.8			335.4			115.5	
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Base Capacity (vph)	302	507	518	279	491	506	462	1627		542	1800	
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	0.45	0.44	0.12	0.26	0.34	0.17	0.09	0.33		0.25	0.38	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 6 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 23.1		Intersection LOS: C	
Intersection Capacity Utilization 57.1%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Stanley Avenue & Ferry Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	136	225	61	73	166	86	41	544	134	679
v/c Ratio	0.45	0.70	0.16	0.27	0.61	0.26	0.09	0.33	0.26	0.38
Control Delay	33.1	53.5	0.9	28.9	51.3	4.2	9.4	17.6	10.1	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	53.5	0.9	28.9	51.3	4.2	9.4	17.6	10.1	15.6
Queue Length 50th (m)	23.2	48.9	0.0	12.0	35.1	0.0	3.1	35.7	10.9	44.9
Queue Length 95th (m)	36.0	70.5	0.0	21.2	53.3	5.8	8.7	58.7	22.9	70.0
Internal Link Dist (m)		102.3			103.8			335.4		115.5
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0		55.0	
Base Capacity (vph)	302	507	518	279	491	506	462	1627	542	1800
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	0.45	0.44	0.12	0.26	0.34	0.17	0.09	0.33	0.25	0.38

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	207	56	67	153	79	38	422	78	123	536	88
Future Volume (vph)	125	207	56	67	153	79	38	422	78	123	536	88
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3183		1630	3191	
Flt Permitted	0.48	1.00	1.00	0.49	1.00	1.00	0.39	1.00		0.40	1.00	
Satd. Flow (perm)	831	1716	1458	841	1716	1458	662	3183		679	3191	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	136	225	61	73	166	86	41	459	85	134	583	96
RTOR Reduction (vph)	0	0	50	0	0	72	0	10	0	0	9	0
Lane Group Flow (vph)	136	225	11	73	166	14	41	534	0	134	670	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	29.5	20.7	20.7	24.5	18.2	18.2	59.2	55.2		67.0	60.0	
Effective Green, g (s)	29.5	20.7	20.7	24.5	18.2	18.2	59.2	55.2		67.0	60.0	
Actuated g/C Ratio	0.27	0.19	0.19	0.22	0.17	0.17	0.54	0.50		0.61	0.55	
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Vehicle Extension (s)	2.5	2.2	2.2	2.5	2.2	2.2	2.5	2.2		2.5	2.2	
Lane Grp Cap (vph)	286	322	274	232	283	241	391	1597		489	1740	
v/s Ratio Prot	c0.04	c0.13		0.02	0.10		0.00	0.17		c0.02	c0.21	
v/s Ratio Perm	0.09		0.01	0.05		0.01	0.05			0.14		
v/c Ratio	0.48	0.70	0.04	0.31	0.59	0.06	0.10	0.33		0.27	0.39	
Uniform Delay, d1	32.3	41.7	36.5	34.9	42.4	38.7	12.0	16.4		9.4	14.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	5.6	0.0	0.6	2.2	0.1	0.1	0.6		0.2	0.6	
Delay (s)	33.2	47.3	36.6	35.4	44.6	38.7	12.1	17.0		9.6	15.0	
Level of Service	C	D	D	D	D	D	B	B		A	B	
Approach Delay (s)		41.2			41.0			16.6			14.1	
Approach LOS		D			D			B			B	

Intersection Summary					
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.48				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)		19.0	
Intersection Capacity Utilization	57.1%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	67	43	12	16	63	20	530	35	45	556	7
Future Volume (vph)	4	67	43	12	16	63	20	530	35	45	556	7
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	35.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.941			0.906			0.991			0.998	
Flt Protected	0.950				0.993			0.998			0.996	
Satd. Flow (prot)	1630	1614	0	0	1544	0	0	3224	0	0	3240	0
Flt Permitted	0.937				0.931			0.922			0.867	
Satd. Flow (perm)	1608	1614	0	0	1447	0	0	2978	0	0	2821	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47			68			13			2	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		79.4			129.4			319.9			359.4	
Travel Time (s)		5.7			9.3			23.0			25.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	73	47	13	17	68	22	576	38	49	604	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	120	0	0	98	0	0	636	0	0	661	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		28.0	28.0		28.0	28.0	
Total Split (s)	29.0	29.0		29.0	29.0		41.0	41.0		41.0	41.0	
Total Split (%)	41.4%	41.4%		41.4%	41.4%		58.6%	58.6%		58.6%	58.6%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0			7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	8.1	8.1			8.1			51.7			51.7	
Actuated g/C Ratio	0.12	0.12			0.12			0.74			0.74	
v/c Ratio	0.02	0.53			0.43			0.29			0.32	
Control Delay	25.5	26.7			17.8			4.8			5.1	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	25.5	26.7			17.8			4.8			5.1	
LOS	C	C			B			A			A	
Approach Delay		26.7			17.8			4.8			5.1	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	0.5	9.6			3.8			14.5			15.9	
Queue Length 95th (m)	2.9	22.9			15.9			27.2			29.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		55.4			105.4			295.9			335.4	
Turn Bay Length (m)	35.0											
Base Capacity (vph)	505	539			501			2203			2084	
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	0.01	0.22			0.20			0.29			0.32	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 29 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 7.5		Intersection LOS: A	
Intersection Capacity Utilization 66.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 2: Stanley Avenue & Robinson Street

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	4	120	98	636	661
v/c Ratio	0.02	0.53	0.43	0.29	0.32
Control Delay	25.5	26.7	17.8	4.8	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	26.7	17.8	4.8	5.1
Queue Length 50th (m)	0.5	9.6	3.8	14.5	15.9
Queue Length 95th (m)	2.9	22.9	15.9	27.2	29.6
Internal Link Dist (m)		55.4	105.4	295.9	335.4
Turn Bay Length (m)	35.0				
Base Capacity (vph)	505	539	501	2203	2084
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	0.01	0.22	0.20	0.29	0.32

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	67	43	12	16	63	20	530	35	45	556	7
Future Volume (vph)	4	67	43	12	16	63	20	530	35	45	556	7
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0			7.0			7.0			7.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.94			0.91			0.99			1.00	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1630	1615			1545			3225			3242	
Flt Permitted	0.94	1.00			0.93			0.92			0.87	
Satd. Flow (perm)	1608	1615			1447			2979			2820	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	73	47	13	17	68	22	576	38	49	604	8
RTOR Reduction (vph)	0	42	0	0	61	0	0	4	0	0	1	0
Lane Group Flow (vph)	4	78	0	0	37	0	0	632	0	0	660	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	7.1	7.1			7.1			48.9			48.9	
Effective Green, g (s)	7.1	7.1			7.1			48.9			48.9	
Actuated g/C Ratio	0.10	0.10			0.10			0.70			0.70	
Clearance Time (s)	7.0	7.0			7.0			7.0			7.0	
Vehicle Extension (s)	2.1	2.1			2.1			2.2			2.2	
Lane Grp Cap (vph)	163	163			146			2081			1969	
v/s Ratio Prot		c0.05										
v/s Ratio Perm	0.00				0.03			0.21			c0.23	
v/c Ratio	0.02	0.48			0.25			0.30			0.34	
Uniform Delay, d1	28.3	29.7			29.0			4.0			4.2	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.0	1.0			0.4			0.4			0.5	
Delay (s)	28.4	30.7			29.4			4.4			4.6	
Level of Service	C	C			C			A			A	
Approach Delay (s)		30.6			29.4			4.4			4.6	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	8.2	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.35			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	66.1%	ICU Level of Service	C	
Analysis Period (min)	15			

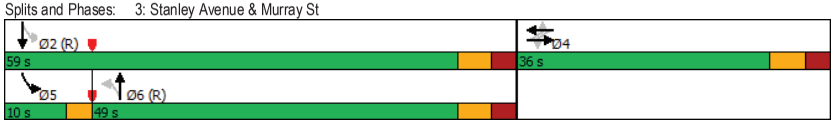
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	113	62	76	66	55	145	451	74	108	439	96
Future Volume (vph)	76	113	62	76	66	55	145	451	74	108	439	96
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	30.0		0.0	30.0		0.0	70.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.94	0.97		0.95	0.96			0.99		0.98		
Frt		0.947			0.932			0.979			0.973	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	1586	0	1599	1531	0	1599	2938	0	1583	3044	0
Flt Permitted	0.593			0.455			0.433			0.384		
Satd. Flow (perm)	972	1586	0	726	1531	0	729	2938	0	624	3044	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31			48			26			46	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		123.4			170.2			248.0			319.9	
Travel Time (s)		8.9			12.3			17.9			23.0	
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Adj. Flow (vph)	83	123	67	83	72	60	158	490	80	117	477	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	190	0	83	132	0	158	570	0	117	581	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Detector Phase	4	4		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		33.0	33.0		9.0	33.0	
Total Split (s)	36.0	36.0		36.0	36.0		49.0	49.0		10.0	59.0	
Total Split (%)	37.9%	37.9%		37.9%	37.9%		51.6%	51.6%		10.5%	62.1%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0		1.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		C-Min	C-Min		None	C-Min	
Act Effct Green (s)	17.8	17.8		17.8	17.8		59.0	59.0		69.2	69.2	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.62	0.62		0.73	0.73	
v/c Ratio	0.46	0.59		0.61	0.41		0.35	0.31		0.23	0.26	
Control Delay	41.1	36.1		53.4	24.1		13.4	9.6		5.8	4.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.1	36.1		53.4	24.1		13.4	9.6		5.8	4.8	
LOS	D	D		D	C		B	A		A	A	
Approach Delay		37.6			35.4			10.4			5.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			B			A	
Queue Length 50th (m)	14.4	28.2		14.9	14.1		13.2	23.0		5.5	14.8	
Queue Length 95th (m)	26.9	46.0		28.7	28.4		35.0	43.2		14.0	28.6	
Internal Link Dist (m)		99.4			146.2			224.0			295.9	
Turn Bay Length (m)	30.0			30.0			70.0			60.0		
Base Capacity (vph)	327	554		244	547		452	1834		522	2231	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.25	0.34		0.34	0.24		0.35	0.31		0.22	0.26	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 1 (1%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 70.5%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Stanley Avenue & Murray St



Queues
3: Stanley Avenue & Murray St

Background
AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	83	190	83	132	158	570	117	581
v/c Ratio	0.46	0.59	0.61	0.41	0.35	0.31	0.23	0.26
Control Delay	41.1	36.1	53.4	24.1	13.4	9.6	5.8	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	36.1	53.4	24.1	13.4	9.6	5.8	4.8
Queue Length 50th (m)	14.4	28.2	14.9	14.1	13.2	23.0	5.5	14.8
Queue Length 95th (m)	26.9	46.0	28.7	28.4	35.0	43.2	14.0	28.6
Internal Link Dist (m)		99.4		146.2		224.0		295.9
Turn Bay Length (m)	30.0		30.0		70.0		60.0	
Base Capacity (vph)	327	554	244	547	452	1834	522	2231
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.34	0.34	0.24	0.35	0.31	0.22	0.26

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Stanley Avenue & Murray St

Background
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	113	62	76	66	55	145	451	74	108	439	96
Future Volume (vph)	76	113	62	76	66	55	145	451	74	108	439	96
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.96		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.94	1.00		0.95	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.95		1.00	0.93		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1559	1587		1518	1531		1599	2938		1569	3044	
Flt Permitted	0.59	1.00		0.45	1.00		0.43	1.00		0.38	1.00	
Satd. Flow (perm)	973	1587		727	1531		729	2938		635	3044	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	123	67	83	72	60	158	490	80	117	477	104
RTOR Reduction (vph)	0	25	0	0	39	0	0	10	0	0	12	0
Lane Group Flow (vph)	83	165	0	83	93	0	158	560	0	117	569	0
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	14.8	14.8		14.8	14.8		56.0	56.0		66.2	66.2	
Effective Green, g (s)	17.8	17.8		17.8	17.8		59.0	59.0		65.2	69.2	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.62	0.62		0.69	0.73	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.3	2.5	
Lane Grp Cap (vph)	182	297		136	286		452	1824		496	2217	
v/s Ratio Prot		0.10			0.06			0.19		0.02	c0.19	
v/s Ratio Perm	0.09			c0.11			c0.22			0.15		
v/c Ratio	0.46	0.55		0.61	0.33		0.35	0.31		0.24	0.26	
Uniform Delay, d1	34.3	35.0		35.4	33.4		8.7	8.4		5.4	4.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	1.8		6.7	0.5		2.1	0.4		0.1	0.3	
Delay (s)	35.6	36.8		42.2	33.9		10.8	8.9		5.5	4.6	
Level of Service	D	D		D	C		B	A		A	A	
Approach Delay (s)		36.4			37.1			9.3			4.7	
Approach LOS		D			D			A			A	

Intersection Summary					
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.40				
Actuated Cycle Length (s)	95.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	70.5%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	5	4	37	7	133	22	467	13	121	460	19
Future Volume (vph)	12	5	4	37	7	133	22	467	13	121	460	19
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	20.0		0.0	65.0		0.0	135.0		0.0
Storage Lanes	0		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.975				0.850		0.996			0.994	
Flt Protected		0.971			0.960		0.950			0.950		
Satd. Flow (prot)	0	1624	0	0	1647	1458	1630	3247	0	1630	3240	0
Flt Permitted		0.791			0.746		0.459			0.439		
Satd. Flow (perm)	0	1323	0	0	1280	1458	787	3247	0	753	3240	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				145		3			5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.6			131.8			135.9			248.0	
Travel Time (s)		8.3			9.5			9.8			17.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	5	4	40	8	145	24	508	14	132	500	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	22	0	0	48	145	24	522	0	132	521	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	34.0	34.0		34.0	34.0	34.0	9.5	37.0		9.5	37.0	
Total Split (s)	38.0	38.0		38.0	38.0	38.0	10.0	46.0		13.0	49.0	
Total Split (%)	39.2%	39.2%		39.2%	39.2%	39.2%	10.3%	47.4%		13.4%	50.5%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	0.0	3.0		0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)		8.3			8.3	8.3	74.4	65.2		78.4	71.4	
Actuated g/C Ratio		0.09			0.09	0.09	0.77	0.67		0.81	0.74	
v/c Ratio		0.19			0.44	0.56	0.04	0.24		0.20	0.22	
Control Delay		38.2			53.8	16.1	2.5	6.9		2.9	5.0	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		38.2			53.8	16.1	2.5	6.9		2.9	5.0	
LOS		D			D	B	A	A		A	A	
Approach Delay		38.3			25.5			6.7			4.6	
Approach LOS		D			C			A			A	
Queue Length 50th (m)		3.4			9.2	0.0	0.7	18.3		3.9	11.5	
Queue Length 95th (m)		10.7			20.1	17.7	2.5	31.0		9.2	28.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		91.6			107.8			111.9			224.0	
Turn Bay Length (m)							65.0			135.0		
Base Capacity (vph)		425			409	564	679	2184		701	2384	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.05			0.12	0.26	0.04	0.24		0.19	0.22	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 97			
Offset: 85 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 8.8		Intersection LOS: A	
Intersection Capacity Utilization 45.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Stanley Avenue & Dixon Street/Main Street

Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	48	145	24	522	132	521
v/c Ratio	0.19	0.44	0.56	0.04	0.24	0.20	0.22
Control Delay	38.2	53.8	16.1	2.5	6.9	2.9	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	53.8	16.1	2.5	6.9	2.9	5.0
Queue Length 50th (m)	3.4	9.2	0.0	0.7	18.3	3.9	11.5
Queue Length 95th (m)	10.7	20.1	17.7	2.5	31.0	9.2	28.2
Internal Link Dist (m)	91.6	107.8			111.9		224.0
Turn Bay Length (m)				65.0		135.0	
Base Capacity (vph)	425	409	564	679	2184	701	2384
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.12	0.26	0.04	0.24	0.19	0.22

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	5	4	37	7	133	22	467	13	121	460	19
Future Volume (vph)	12	5	4	37	7	133	22	467	13	121	460	19
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.98			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1626			1647	1458	1630	3247		1630	3240	
Flt Permitted		0.79			0.75	1.00	0.46	1.00		0.44	1.00	
Satd. Flow (perm)		1323			1280	1458	788	3247		752	3240	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	5	4	40	8	145	24	508	14	132	500	21
RTOR Reduction (vph)	0	4	0	0	0	133	0	1	0	0	1	0
Lane Group Flow (vph)	0	18	0	0	48	12	24	521	0	132	520	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		8.3			8.3	8.3	67.4	65.2		74.7	69.5	
Effective Green, g (s)		8.3			8.3	8.3	67.4	65.2		74.7	69.5	
Actuated g/C Ratio		0.09			0.09	0.09	0.69	0.67		0.77	0.72	
Clearance Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Vehicle Extension (s)		2.3			2.3	2.3	2.3	2.5		2.3	2.5	
Lane Grp Cap (vph)		113			109	124	566	2182		637	2321	
v/s Ratio Prot							0.00	c0.16		c0.01	0.16	
v/s Ratio Perm		0.01			c0.04	0.01	0.03			0.15		
v/c Ratio		0.16			0.44	0.10	0.04	0.24		0.21	0.22	
Uniform Delay, d1		41.1			42.1	40.9	4.6	6.2		2.8	4.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			1.7	0.2	0.0	0.3		0.1	0.2	
Delay (s)		41.5			43.8	41.1	4.6	6.5		2.9	4.9	
Level of Service		D			D	D	A	A		A	A	
Approach Delay (s)		41.5			41.8			6.4			4.5	
Approach LOS		D			D			A			A	

Intersection Summary					
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.26				
Actuated Cycle Length (s)	97.0	Sum of lost time (s)		17.0	
Intersection Capacity Utilization	45.1%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	301	33	25	294	46	85
Future Volume (vph)	301	33	25	294	46	85
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.987				0.913	
Flt Protected				0.996	0.983	
Satd. Flow (prot)	1693	0	0	1709	1540	0
Flt Permitted				0.996	0.983	
Satd. Flow (perm)	1693	0	0	1709	1540	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	158.5			126.3	366.1	
Travel Time (s)	11.4			9.1	26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	327	36	27	320	50	92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	363	0	0	347	142	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	301	33	25	294	46	85
Future Volume (Veh/h)	301	33	25	294	46	85
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	327	36	27	320	50	92
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				126		
pX, platoon unblocked					0.92	
vC, conflicting volume			363		719	345
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			363		650	345
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		87	87
cM capacity (veh/h)			1196		390	698

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	363	347	142
Volume Left	0	27	50
Volume Right	36	0	92
cSH	1700	1196	546
Volume to Capacity	0.21	0.02	0.26
Queue Length 95th (m)	0.0	0.6	8.3
Control Delay (s)	0.0	0.8	13.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.8	13.9
Approach LOS			B

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	49	4	4	21	25	1	15	20	41	9	5
Future Volume (vph)	5	49	4	4	21	25	1	15	20	41	9	5
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.932			0.924			0.989	
Flt Protected		0.996			0.996			0.999			0.964	
Satd. Flow (prot)	0	1693	0	0	1593	0	0	1584	0	0	1636	0
Flt Permitted		0.996			0.996			0.999			0.964	
Satd. Flow (perm)	0	1693	0	0	1593	0	0	1584	0	0	1636	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		398.3			52.3			77.2			366.1	
Travel Time (s)		28.7			3.8			5.6			26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	53	4	4	23	27	1	16	22	45	10	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	62	0	0	54	0	0	39	0	0	60	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	49	4	4	21	25	1	15	20	41	9	5
Future Volume (Veh/h)	5	49	4	4	21	25	1	15	20	41	9	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	53	4	4	23	27	1	16	22	45	10	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					132							
pX, platoon unblocked												
vC, conflicting volume	50			57			120	123	55	140	112	36
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	50			57			120	123	55	140	112	36
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	98	98	94	99	100
cM capacity (veh/h)	1557			1547			840	763	1012	796	774	1036

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	62	54	39	60
Volume Left	5	4	1	45
Volume Right	4	27	22	5
cSH	1557	1547	888	808
Volume to Capacity	0.00	0.00	0.04	0.07
Queue Length 95th (m)	0.1	0.1	1.1	1.9
Control Delay (s)	0.6	0.6	9.2	9.8
Lane LOS	A	A	A	A
Approach Delay (s)	0.6	0.6	9.2	9.8
Approach LOS			A	A

Intersection Summary					
Average Delay	4.7				
Intersection Capacity Utilization	21.1%	ICU Level of Service		A	
Analysis Period (min)	15				

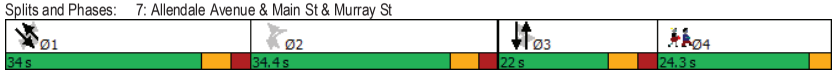
Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL2	SBT	SEL	SET	SER
Lane Configurations												
Traffic Volume (vph)	2	4	90	4	11	1	1	2	0	62	83	12
Future Volume (vph)	2	4	90	4	11	1	1	2	0	62	83	12
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)		45.0	0.0		0.0		0.0			20.0		0.0
Storage Lanes		1	1		0		0			1		0
Taper Length (m)		7.5			7.5					7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99	0.87			0.97			0.97	0.98	1.00	
Frt			0.850			0.992					0.981	
Flt Protected		0.950				0.958			0.950	0.950		
Satd. Flow (prot)	0	1662	1460	0	0	1477	0	0	1662	1662	1640	0
Flt Permitted		0.707				0.751			0.747	0.757		
Satd. Flow (perm)	0	1225	1272	0	0	1131	0	0	1268	1299	1640	0
Right Turn on Red				No								No
Satd. Flow (RTOR)												
Link Speed (k/h)		50				50			50		50	
Link Distance (m)		123.4				224.2			242.2		197.9	
Travel Time (s)		8.9				16.1			17.4		14.2	
Confl. Peds. (#/hr)	3	1	6	21	6		7	7		7		1
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	5%	0%
Adj. Flow (vph)	2	5	111	5	14	1	1	2	0	77	102	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	116	0	0	16	0	0	2	77	117	0
Turn Type	Perm	Perm	Perm		Perm	NA		Perm	NA	Perm	NA	
Protected Phases						3			3		1	
Permitted Phases	2	2	2		3			3		1		
Detector Phase	2	2	2		3	3		3	3	1	1	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	
Minimum Split (s)	20.8	20.8	20.8		19.8	19.8		19.8	19.8	27.8	27.8	
Total Split (s)	34.4	34.4	34.4		22.0	22.0		22.0	22.0	34.0	34.0	
Total Split (%)	30.0%	30.0%	30.0%		19.2%	19.2%		19.2%	19.2%	29.6%	29.6%	
Yellow Time (s)	4.1	4.1	4.1		4.1	4.1		4.1	4.1	4.1	4.1	
All-Red Time (s)	2.7	2.7	2.7		2.7	2.7		2.7	2.7	2.7	2.7	
Lost Time Adjust (s)		-2.8	-2.8			-2.8			-2.8	-2.8	-2.8	
Total Lost Time (s)		4.0	4.0			4.0			4.0	4.0	4.0	
Lead/Lag	Lag	Lag	Lag		Lead	Lead		Lead	Lead	Lead	Lead	
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min		None	None		None	None	Min	Min	
Act Effct Green (s)		16.9	16.9			11.4			11.4	15.6	15.6	
Actuated g/C Ratio		0.24	0.24			0.16			0.16	0.22	0.22	
v/c Ratio		0.02	0.38			0.09			0.01	0.27	0.33	
Control Delay		24.8	29.4			34.1			33.5	29.1	29.0	
Queue Delay		0.0	0.0			0.0			0.0	0.0	0.0	
Total Delay		24.8	29.4			34.1			33.5	29.1	29.0	
LOS		C	C			C			C	C	C	
Approach Delay		29.2				34.1			33.5		29.1	

Lane Group	NWT	Ø4
Lane Configurations		
Traffic Volume (vph)	2	
Future Volume (vph)	2	
Ideal Flow (vphpl)	1750	
Storage Length (m)		
Storage Lanes		
Taper Length (m)		
Lane Util. Factor	1.00	
Ped Bike Factor		
Frt		
Flt Protected		
Satd. Flow (prot)	1750	
Flt Permitted		
Satd. Flow (perm)	1750	
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (k/h)	50	
Link Distance (m)	158.7	
Travel Time (s)	11.4	
Confl. Peds. (#/hr)		
Peak Hour Factor	0.81	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	2	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	2	
Turn Type	NA	
Protected Phases	1	4
Permitted Phases		
Detector Phase	1	
Switch Phase		
Minimum Initial (s)	8.0	1.0
Minimum Split (s)	27.8	24.3
Total Split (s)	34.0	24.3
Total Split (%)	29.6%	21%
Yellow Time (s)	4.1	3.3
All-Red Time (s)	2.7	0.0
Lost Time Adjust (s)	-2.8	
Total Lost Time (s)	4.0	
Lead/Lag	Lead	Lag
Lead-Lag Optimize?		
Recall Mode	Min	Ped
Act Effct Green (s)	15.6	
Actuated g/C Ratio	0.22	
v/c Ratio	0.01	
Control Delay	26.5	
Queue Delay	0.0	
Total Delay	26.5	
LOS	C	
Approach Delay	26.5	

Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL2	SBT	SEL	SET	SER
Approach LOS		C				C			C		C	
Queue Length 50th (m)		0.6	11.6			1.7			0.2	7.7	11.8	
Queue Length 95th (m)		4.0	29.9			8.0			2.2	22.1	30.5	
Internal Link Dist (m)		99.4				200.2			218.2		173.9	
Turn Bay Length (m)		45.0								20.0		
Base Capacity (vph)		546	567			298			334	571	721	
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		0.01	0.20			0.05			0.01	0.13	0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 114.7			
Actuated Cycle Length: 71			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.38			
Intersection Signal Delay: 29.4		Intersection LOS: C	
Intersection Capacity Utilization 39.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Allendale Avenue & Main St & Murray St



Lane Group	NWT	Ø4
Approach LOS	C	
Queue Length 50th (m)	0.2	
Queue Length 95th (m)	1.9	
Internal Link Dist (m)	134.7	
Turn Bay Length (m)		
Base Capacity (vph)	770	
Starvation Cap Reductn	0	
Spillback Cap Reductn	0	
Storage Cap Reductn	0	
Reduced v/c Ratio	0.00	

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT	SEL	SET	NWT
Lane Group Flow (vph)	7	116	16	2	77	117	2
v/c Ratio	0.02	0.38	0.09	0.01	0.27	0.33	0.01
Control Delay	24.8	29.4	34.1	33.5	29.1	29.0	26.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	29.4	34.1	33.5	29.1	29.0	26.5
Queue Length 50th (m)	0.6	11.6	1.7	0.2	7.7	11.8	0.2
Queue Length 95th (m)	4.0	29.9	8.0	2.2	22.1	30.5	1.9
Internal Link Dist (m)	99.4		200.2	218.2		173.9	134.7
Turn Bay Length (m)	45.0				20.0		
Base Capacity (vph)	546	567	298	334	571	721	770
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.20	0.05	0.01	0.13	0.16	0.00

Intersection Summary

Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL2	SBT	SEL	SET	SER
Lane Configurations												
Traffic Volume (vph)	2	4	90	4	11	1	1	2	0	62	83	12
Future Volume (vph)	2	4	90	4	11	1	1	2	0	62	83	12
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0			4.0			4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00			1.00			1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.91			1.00			1.00	1.00	1.00	
Flpb, ped/bikes		0.99	1.00			0.98			0.98	0.99	1.00	
Frt		1.00	0.85			0.99			1.00	1.00	0.98	
Flt Protected		0.95	1.00			0.96			0.95	0.95	1.00	
Satd. Flow (prot)		1652	1327			1455			1630	1642	1640	
Flt Permitted		0.71	1.00			0.75			0.75	0.76	1.00	
Satd. Flow (perm)		1229	1327			1141			1281	1307	1640	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	2	5	111	5	14	1	1	2	0	77	102	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	7	116	0	0	16	0	0	2	77	117	0
Confl. Peds. (#/hr)	3	1	6	21	6		7	7		7		1
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	5%	0%
Turn Type	Perm	Perm	Perm		Perm	NA		Perm	NA	Perm	NA	
Protected Phases						3			3		1	
Permitted Phases	2	2	2		3			3		1		
Actuated Green, G (s)		14.0	14.0			2.7			2.7	12.7	12.7	
Effective Green, g (s)		16.8	16.8			5.5			5.5	15.5	15.5	
Actuated g/C Ratio		0.22	0.22			0.07			0.07	0.21	0.21	
Clearance Time (s)		6.8	6.8			6.8			6.8	6.8	6.8	
Vehicle Extension (s)		5.0	5.0			3.0			3.0	5.0	5.0	
Lane Grp Cap (vph)		275	297			83			93	270	338	
v/s Ratio Prot											c0.07	
v/s Ratio Perm		0.01	c0.09			c0.01			0.00	0.06		
v/c Ratio		0.03	0.39			0.19			0.02	0.29	0.35	
Uniform Delay, d1		22.7	24.7			32.7			32.3	25.1	25.4	
Progression Factor		1.00	1.00			1.00			1.00	1.00	1.00	
Incremental Delay, d2		0.1	1.8			1.1			0.1	1.2	1.3	
Delay (s)		22.8	26.5			33.8			32.3	26.3	26.7	
Level of Service		C	C			C			C	C	C	
Approach Delay (s)		26.3				33.8			32.3		26.5	
Approach LOS		C				C			C		C	

Intersection Summary				
HCM 2000 Control Delay	26.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.23			
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	18.1	
Intersection Capacity Utilization	39.0%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	NWT
Lane Configurations	
Traffic Volume (vph)	2
Future Volume (vph)	2
Ideal Flow (vphpl)	1750
Total Lost time (s)	4.0
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	1.00
Flt Protected	1.00
Satd. Flow (prot)	1750
Flt Permitted	1.00
Satd. Flow (perm)	1750
Peak-hour factor, PHF	0.81
Adj. Flow (vph)	2
RTOR Reduction (vph)	0
Lane Group Flow (vph)	2
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	0%
Turn Type	NA
Protected Phases	1
Permitted Phases	
Actuated Green, G (s)	12.7
Effective Green, g (s)	15.5
Actuated g/C Ratio	0.21
Clearance Time (s)	6.8
Vehicle Extension (s)	5.0
Lane Grp Cap (vph)	361
v/s Ratio Prot	0.00
v/s Ratio Perm	
v/c Ratio	0.01
Uniform Delay, d1	23.6
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	23.6
Level of Service	C
Approach Delay (s)	23.6
Approach LOS	C

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	114	0	0	43	0	0
Future Volume (vph)	114	0	0	43	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1716	0	0	1716	1716	0
Flt Permitted						
Satd. Flow (perm)	1716	0	0	1716	1716	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	52.3			79.4	51.1	
Travel Time (s)	3.8			5.7	3.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	124	0	0	47	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	124	0	0	47	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 9.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	114	0	0	43	0	0
Future Volume (Veh/h)	114	0	0	43	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	124	0	0	47	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				79		
pX, platoon unblocked						
vC, conflicting volume			124		171	124
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			124		171	124
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1463		819	927

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	124	47	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1463	1700
Volume to Capacity	0.07	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			9.8%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	36	0	0	17
Future Volume (vph)	0	0	36	0	0	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1716	0	1716	0	0	1716
Flt Permitted						
Satd. Flow (perm)	1716	0	1716	0	0	1716
Link Speed (k/h)	50		50			50
Link Distance (m)	48.2		242.2			77.2
Travel Time (s)	3.5		17.4			5.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	39	0	0	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	39	0	0	18
Sign Control	Stop		Free			Free

Intersection Summary				
Area Type:	Other			
Control Type: Unsignalized				
Intersection Capacity Utilization 6.7%			ICU Level of Service A	
Analysis Period (min) 15				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	36	0	0	17
Future Volume (Veh/h)	0	0	36	0	0	17
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	39	0	0	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			242			
pX, platoon unblocked						
vC, conflicting volume	57	39			39	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	57	39			39	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	950	1033			1571	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	39	18
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1571
Volume to Capacity	0.00	0.02	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		6.7%	ICU Level of Service	A
Analysis Period (min)		15		

Intersection: 1: Stanley Avenue & Ferry Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	45.8	70.6	52.4	39.3	80.2	37.4	32.2	50.7	56.8	59.1	79.7	57.9
Average Queue (m)	23.4	35.3	10.5	14.9	34.2	14.7	7.0	19.5	24.7	15.1	30.8	20.2
95th Queue (m)	40.4	59.0	31.2	32.4	61.4	35.1	18.9	42.7	47.6	35.7	60.2	43.5
Link Distance (m)		104.7			113.4			335.9	335.9		126.1	126.1
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Storage Blk Time (%)		4	0	0	12	0	0	5			1	
Queuing Penalty (veh)		8	0	0	18	0	0	2			1	

Intersection: 2: Stanley Avenue & Robinson Street

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	LTR	LT	TR	LT	TR
Maximum Queue (m)	7.3	35.8	31.0	39.5	46.9	45.1	37.6
Average Queue (m)	0.7	16.7	13.5	14.3	16.7	19.5	14.8
95th Queue (m)	4.4	30.1	25.2	31.3	36.5	38.6	33.2
Link Distance (m)		58.6	115.6	299.3	299.3	335.9	335.9
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	35.0						
Storage Blk Time (%)		0					
Queuing Penalty (veh)		0					

Intersection: 3: Stanley Avenue & Murray St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	37.3	54.9	36.9	44.9	55.1	59.4	61.2	35.5	50.1	56.2
Average Queue (m)	16.2	25.6	16.1	17.7	20.9	28.2	27.5	15.0	22.7	25.7
95th Queue (m)	33.3	47.3	31.5	34.2	39.6	50.2	51.5	28.6	43.6	48.2
Link Distance (m)		94.8		156.4		224.8	224.8		299.3	299.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	30.0		30.0		70.0			60.0		
Storage Blk Time (%)	2	7	2	2		0			0	
Queuing Penalty (veh)	3	5	2	2		0			0	

Intersection: 4: Stanley Avenue & Dixon Street/Main Street

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	R	L	T	TR	L	T	TR
Maximum Queue (m)	18.0	23.0	25.0	11.5	40.5	34.7	24.2	17.5	25.0
Average Queue (m)	6.3	9.9	12.9	2.9	13.4	6.1	10.1	4.5	7.0
95th Queue (m)	15.9	21.2	21.5	10.0	31.5	20.2	19.7	13.8	19.4
Link Distance (m)	101.8		117.3		127.5	127.5		224.8	224.8
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		20.0		65.0			135.0		
Storage Blk Time (%)		3	1						
Queuing Penalty (veh)		4	0						

Intersection: 5: Allendale Avenue & Ferry Street

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	1.4	22.4	22.1
Average Queue (m)	0.0	2.9	12.0
95th Queue (m)	1.0	13.1	19.0
Link Distance (m)	148.5	104.7	347.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Allendale Avenue & Robinson Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	5.3	5.0	14.4	17.1
Average Queue (m)	0.2	0.2	6.6	7.8
95th Queue (m)	2.2	2.1	13.3	14.6
Link Distance (m)	374.0	33.4	61.0	347.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Allendale Avenue & Main St & Murray St

Movement	WB	WB	NB	SB	SE	SE	NW
Directions Served	<L	R>	LTR	<LTR	<L	TR	LTR
Maximum Queue (m)	6.3	37.2	11.5	5.8	25.4	42.8	1.8
Average Queue (m)	1.0	11.7	2.6	0.4	7.5	9.8	0.1
95th Queue (m)	4.7	27.2	8.7	3.5	18.4	27.4	0.9
Link Distance (m)		94.8	197.5	213.5		171.9	136.3
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	45.0				20.0		
Storage Blk Time (%)		0			1	3	
Queuing Penalty (veh)		0			1	2	

Intersection: 9: Driveway A & Robinson Street

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 10: Allendale Avenue & Driveway B

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Zone Summary

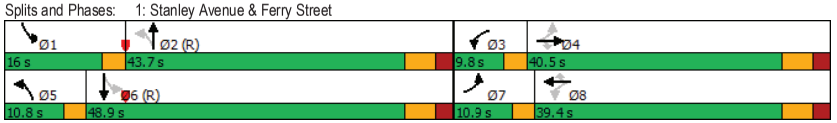
Zone wide Queuing Penalty: 49

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	380	95	119	497	155	139	928	117	248	809	187
Future Volume (vph)	169	380	95	119	497	155	139	928	117	248	809	187
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	100.0		45.0	35.0		30.0	25.0		0.0	55.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.983			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3204	0	1630	3169	0
Flt Permitted	0.118			0.283			0.125			0.100		
Satd. Flow (perm)	202	1716	1458	486	1716	1458	214	3204	0	172	3169	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			124			124		13			30	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		126.3			127.8			359.4			139.5	
Travel Time (s)		9.1			9.2			25.9			10.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	184	413	103	129	540	168	151	1009	127	270	879	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	184	413	103	129	540	168	151	1136	0	270	1082	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	33.5	33.5	9.5	33.5	33.5	9.5	33.5		9.5	33.5	
Total Split (s)	10.9	40.5	40.5	9.8	39.4	39.4	10.8	43.7		16.0	48.9	
Total Split (%)	9.9%	36.8%	36.8%	8.9%	35.8%	35.8%	9.8%	39.7%		14.5%	44.5%	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1		3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4		0.0	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)	45.4	34.0	34.0	43.2	32.9	32.9	48.5	37.2		56.7	42.4	
Actuated g/C Ratio	0.41	0.31	0.31	0.39	0.30	0.30	0.44	0.34		0.52	0.39	
v/c Ratio	0.99	0.78	0.19	0.49	1.05	0.32	0.78	1.04		1.04	0.87	
Control Delay	91.0	46.3	4.1	27.1	92.6	11.1	45.5	74.1		94.8	39.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	91.0	46.3	4.1	27.1	92.6	11.1	45.5	74.1		94.8	39.7	
LOS	F	D	A	C	F	B	D	E		F	D	
Approach Delay		51.8			66.1			70.8			50.7	
Approach LOS		D			E			E			D	
Queue Length 50th (m)	26.2	84.6	0.0	17.6	~133.6	7.2	17.5	~145.4		~49.1	114.7	
Queue Length 95th (m)	#72.6	#131.4	8.9	30.7	#201.0	24.4	#48.3	#188.8		#103.4	#148.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		102.3			103.8			335.4			115.5	
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Base Capacity (vph)	185	530	536	261	513	522	194	1092		260	1239	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.99	0.78	0.19	0.49	1.05	0.32	0.78	1.04		1.04	0.87	

Intersection Summary
Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 6 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.05
Intersection Signal Delay: 60.2 Intersection LOS: E
Intersection Capacity Utilization 102.9% ICU Level of Service G
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: Stanley Avenue & Ferry Street



Queues
1: Stanley Avenue & Ferry Street

Background
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	184	413	103	129	540	168	151	1136	270	1082
v/c Ratio	0.99	0.78	0.19	0.49	1.05	0.32	0.78	1.04	1.04	0.87
Control Delay	91.0	46.3	4.1	27.1	92.6	11.1	45.5	74.1	94.8	39.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.0	46.3	4.1	27.1	92.6	11.1	45.5	74.1	94.8	39.7
Queue Length 50th (m)	26.2	84.6	0.0	17.6	~133.6	7.2	17.5	~145.4	~49.1	114.7
Queue Length 95th (m)	#72.6	#131.4	8.9	30.7	#201.0	24.4	#48.3	#188.8	#103.4	#148.2
Internal Link Dist (m)		102.3			103.8			335.4		115.5
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0		55.0	
Base Capacity (vph)	185	530	536	261	513	522	194	1092	260	1239
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.78	0.19	0.49	1.05	0.32	0.78	1.04	1.04	0.87

Intersection Summary

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

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

HCM Signalized Intersection Capacity Analysis
1: Stanley Avenue & Ferry Street

Background
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	380	95	119	497	155	139	928	117	248	809	187
Future Volume (vph)	169	380	95	119	497	155	139	928	117	248	809	187
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3205		1630	3168	
Flt Permitted	0.12	1.00	1.00	0.28	1.00	1.00	0.13	1.00		0.10	1.00	
Satd. Flow (perm)	202	1716	1458	485	1716	1458	215	3205		171	3168	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	184	413	103	129	540	168	151	1009	127	270	879	203
RTOR Reduction (vph)	0	0	71	0	0	87	0	9	0	0	18	0
Lane Group Flow (vph)	184	413	32	129	540	81	151	1127	0	270	1064	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	41.9	34.0	34.0	39.7	32.9	32.9	45.0	37.2		53.2	42.4	
Effective Green, g (s)	41.9	34.0	34.0	39.7	32.9	32.9	45.0	37.2		53.2	42.4	
Actuated g/C Ratio	0.38	0.31	0.31	0.36	0.30	0.30	0.41	0.34		0.48	0.39	
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Vehicle Extension (s)	2.5	2.2	2.2	2.5	2.2	2.2	2.5	2.2		2.5	2.2	
Lane Grp Cap (vph)	179	530	450	245	513	436	188	1083		255	1221	
v/s Ratio Prot	c0.07	0.24		0.03	0.31		0.06	0.35		c0.13	0.34	
v/s Ratio Perm	c0.32		0.02	0.16		0.06	0.27			c0.39		
v/c Ratio	1.03	0.78	0.07	0.53	1.05	0.19	0.80	1.04		1.06	0.87	
Uniform Delay, d1	29.1	34.6	26.8	25.6	38.5	28.6	23.8	36.4		32.1	31.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	74.8	6.7	0.0	1.6	54.3	0.1	20.9	38.6		72.7	8.7	
Delay (s)	103.9	41.2	26.9	27.2	92.8	28.7	44.7	75.0		104.8	39.9	
Level of Service	F	D	C	C	F	C	D	E		F	D	
Approach Delay (s)		55.6			69.8			71.4			52.9	
Approach LOS		E			E			E			D	

Intersection Summary					
HCM 2000 Control Delay	62.5	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.09				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)		19.0	
Intersection Capacity Utilization	102.9%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	64	53	54	80	301	47	864	30	153	799	18
Future Volume (vph)	16	64	53	54	80	301	47	864	30	153	799	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	35.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.932			0.907			0.995			0.997	
Flt Protected	0.950				0.994			0.998			0.992	
Satd. Flow (prot)	1630	1599	0	0	1547	0	0	3237	0	0	3224	0
Flt Permitted	0.347				0.936			0.826			0.586	
Satd. Flow (perm)	595	1599	0	0	1457	0	0	2679	0	0	1905	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		58			90			7			4	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		79.3			129.4			319.9			359.4	
Travel Time (s)		5.7			9.3			23.0			25.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	70	58	59	87	327	51	939	33	166	868	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	128	0	0	473	0	0	1023	0	0	1054	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		28.0	28.0		28.0	28.0	
Total Split (s)	28.0	28.0		28.0	28.0		42.0	42.0		42.0	42.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0			7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	20.6	20.6			20.6			35.4			35.4	
Actuated g/C Ratio	0.29	0.29			0.29			0.51			0.51	
v/c Ratio	0.10	0.25			0.96			0.75			1.09	
Control Delay	19.6	12.4			54.9			18.2			77.6	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	19.6	12.4			54.9			18.2			77.6	
LOS	B	B			D			B			E	
Approach Delay		13.2			54.9			18.2			77.6	
Approach LOS		B			D			B			E	
Queue Length 50th (m)	1.7	7.0			52.5			55.6			~89.4	
Queue Length 95th (m)	6.3	19.0			#111.1			80.4			#127.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		55.3			105.4			295.9			335.4	
Turn Bay Length (m)	35.0											
Base Capacity (vph)	178	520			500			1360			966	
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	0.10	0.25			0.95			0.75			1.09	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 29 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 47.6		Intersection LOS: D	
Intersection Capacity Utilization 109.9%		ICU Level of Service H	
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: 2: Stanley Avenue & Robinson Street

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	17	128	473	1023	1054
v/c Ratio	0.10	0.25	0.96	0.75	1.09
Control Delay	19.6	12.4	54.9	18.2	77.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	19.6	12.4	54.9	18.2	77.6
Queue Length 50th (m)	1.7	7.0	52.5	55.6	~89.4
Queue Length 95th (m)	6.3	19.0	#111.1	80.4	#127.4
Internal Link Dist (m)		55.3	105.4	295.9	335.4
Turn Bay Length (m)	35.0				
Base Capacity (vph)	178	520	500	1360	966
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	0.10	0.25	0.95	0.75	1.09

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	64	53	54	80	301	47	864	30	153	799	18
Future Volume (vph)	16	64	53	54	80	301	47	864	30	153	799	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0			7.0			7.0			7.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.93			0.91			1.00			1.00	
Flt Protected	0.95	1.00			0.99			1.00			0.99	
Satd. Flow (prot)	1630	1599			1546			3236			3225	
Flt Permitted	0.35	1.00			0.94			0.83			0.59	
Satd. Flow (perm)	596	1599			1457			2679			1904	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	70	58	59	87	327	51	939	33	166	868	20
RTOR Reduction (vph)	0	41	0	0	64	0	0	3	0	0	2	0
Lane Group Flow (vph)	17	87	0	0	409	0	0	1020	0	0	1052	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.6	20.6			20.6			35.4			35.4	
Effective Green, g (s)	20.6	20.6			20.6			35.4			35.4	
Actuated g/C Ratio	0.29	0.29			0.29			0.51			0.51	
Clearance Time (s)	7.0	7.0			7.0			7.0			7.0	
Vehicle Extension (s)	2.1	2.1			2.1			2.2			2.2	
Lane Grp Cap (vph)	175	470			428			1354			962	
v/s Ratio Prot		0.05										
v/s Ratio Perm	0.03				c0.28			0.38			c0.55	
v/c Ratio	0.10	0.19			0.96			0.75			1.09	
Uniform Delay, d1	17.9	18.4			24.3			13.8			17.3	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.1			32.1			3.9			58.0	
Delay (s)	18.1	18.5			56.3			17.7			75.3	
Level of Service	B	B			E			B			E	
Approach Delay (s)		18.5			56.3			17.7			75.3	
Approach LOS		B			E			B			E	

Intersection Summary				
HCM 2000 Control Delay	47.1	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	109.9%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	106	34	90	111	188	144	781	128	304	659	57
Future Volume (vph)	67	106	34	90	111	188	144	781	128	304	659	57
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	30.0		0.0	30.0		0.0	70.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.96	0.98		0.94	0.94			0.99		0.99		
Frt		0.963			0.906			0.979			0.988	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	1635	0	1599	1453	0	1599	2938	0	1583	3079	0
Flt Permitted	0.282			0.587			0.357			0.141		
Satd. Flow (perm)	474	1635	0	932	1453	0	601	2938	0	233	3079	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			95			22			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		123.4			170.2			248.0			319.9	
Travel Time (s)		8.9			12.3			17.9			23.0	
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Adj. Flow (vph)	73	115	37	98	121	204	157	849	139	330	716	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	152	0	98	325	0	157	988	0	330	778	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Detector Phase	4	4		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		33.0	33.0		9.0	33.0	
Total Split (s)	35.0	35.0		35.0	35.0		40.0	40.0		20.0	60.0	
Total Split (%)	36.8%	36.8%		36.8%	36.8%		42.1%	42.1%		21.1%	63.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0		1.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		C-Min	C-Min		None	C-Min	
Act Effct Green (s)	23.5	23.5		23.5	23.5		41.9	41.9		63.5	63.5	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.44	0.44		0.67	0.67	
v/c Ratio	0.62	0.36		0.43	0.76		0.59	0.75		0.81	0.38	
Control Delay	53.6	26.8		34.1	33.9		34.8	28.2		34.8	8.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	53.6	26.8		34.1	33.9		34.8	28.2		34.8	8.4	
LOS	D	C		C	C		C	C		C	A	
Approach Delay		35.5			33.9			29.1			16.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			C			C			B	
Queue Length 50th (m)	12.5	21.1		15.8	41.2		24.3	87.4		35.3	30.7	
Queue Length 95th (m)	26.7	34.8		28.4	66.3		#57.5	#128.9		#93.7	52.3	
Internal Link Dist (m)		99.4			146.2			224.0			295.9	
Turn Bay Length (m)	30.0			30.0			70.0			60.0		
Base Capacity (vph)	154	545		304	538		265	1309		414	2064	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.47	0.28		0.32	0.60		0.59	0.75		0.80	0.38	

Intersection Summary		
Area Type:	Other	
Cycle Length: 95		
Actuated Cycle Length: 95		
Offset: 1 (1%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green		
Natural Cycle: 90		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 0.81		
Intersection Signal Delay: 25.4	Intersection LOS: C	
Intersection Capacity Utilization 89.8%	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: 3: Stanley Avenue & Murray St

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	73	152	98	325	157	988	330	778
v/c Ratio	0.62	0.36	0.43	0.76	0.59	0.75	0.81	0.38
Control Delay	53.6	26.8	34.1	33.9	34.8	28.2	34.8	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	26.8	34.1	33.9	34.8	28.2	34.8	8.4
Queue Length 50th (m)	12.5	21.1	15.8	41.2	24.3	87.4	35.3	30.7
Queue Length 95th (m)	26.7	34.8	28.4	66.3	#57.5	#128.9	#93.7	52.3
Internal Link Dist (m)		99.4		146.2		224.0		295.9
Turn Bay Length (m)	30.0		30.0		70.0		60.0	
Base Capacity (vph)	154	545	304	538	265	1309	414	2064
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.28	0.32	0.60	0.59	0.75	0.80	0.38

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	106	34	90	111	188	144	781	128	304	659	57
Future Volume (vph)	67	106	34	90	111	188	144	781	128	304	659	57
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.94		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.91		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1598	1636		1509	1452		1599	2938		1582	3080	
Flt Permitted	0.28	1.00		0.59	1.00		0.36	1.00		0.14	1.00	
Satd. Flow (perm)	474	1636		933	1452		601	2938		234	3080	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	115	37	98	121	204	157	849	139	330	716	62
RTOR Reduction (vph)	0	14	0	0	72	0	0	12	0	0	5	0
Lane Group Flow (vph)	73	138	0	98	254	0	157	976	0	330	773	0
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	20.5	20.5		20.5	20.5		38.9	38.9		60.5	60.5	
Effective Green, g (s)	23.5	23.5		23.5	23.5		41.9	41.9		59.5	63.5	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.44	0.44		0.63	0.67	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.3	2.5	
Lane Grp Cap (vph)	117	404		230	359		265	1295		396	2058	
v/s Ratio Prot		0.08			c0.17			0.33		c0.15	0.25	
v/s Ratio Perm	0.15			0.10			0.26			c0.37		
v/c Ratio	0.62	0.34		0.43	0.71		0.59	0.75		0.83	0.38	
Uniform Delay, d1	31.8	29.4		30.1	32.6		20.1	22.2		20.4	7.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.6	0.4		0.9	5.8		9.4	4.1		13.6	0.5	
Delay (s)	40.5	29.8		31.0	38.4		29.5	26.3		34.0	7.5	
Level of Service	D	C		C	D		C	C		C	A	
Approach Delay (s)		33.2			36.7			26.8			15.4	
Approach LOS		C			D			C			B	

Intersection Summary					
HCM 2000 Control Delay	24.4	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.78				
Actuated Cycle Length (s)	95.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	89.8%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	2	33	47	13	336	13	617	18	195	705	17
Future Volume (vph)	16	2	33	47	13	336	13	617	18	195	705	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	20.0		0.0	65.0		0.0	135.0		0.0
Storage Lanes	0		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.912				0.850		0.996			0.997	
Flt Protected		0.985			0.962		0.950			0.950		
Satd. Flow (prot)	0	1541	0	0	1650	1458	1630	3247	0	1630	3250	0
Flt Permitted		0.872			0.735		0.355			0.358		
Satd. Flow (perm)	0	1364	0	0	1261	1458	609	3247	0	614	3250	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36				347		3			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.6			131.8			135.9			248.0	
Travel Time (s)		8.3			9.5			9.8			17.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	2	36	51	14	365	14	671	20	212	766	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	65	365	14	691	0	212	784	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	34.0	34.0		34.0	34.0	34.0	9.5	37.0		9.5	37.0	
Total Split (s)	37.0	37.0		37.0	37.0	37.0	10.0	42.0		18.0	50.0	
Total Split (%)	38.1%	38.1%		38.1%	38.1%	38.1%	10.3%	43.3%		18.6%	51.5%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	0.0	3.0		0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)		10.6			10.6	10.6	70.3	61.2		76.4	70.7	
Actuated g/C Ratio		0.11			0.11	0.11	0.72	0.63		0.79	0.73	
v/c Ratio		0.30			0.47	0.78	0.03	0.34		0.37	0.33	
Control Delay		22.2			49.9	17.6	3.8	10.1		5.1	6.3	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		22.2			49.9	17.6	3.8	10.1		5.1	6.3	
LOS		C			D	B	A	B		A	A	
Approach Delay		22.2			22.5			10.0			6.1	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		3.5			12.4	3.3	0.4	28.8		7.3	21.0	
Queue Length 95th (m)		13.5			23.3	30.2	2.5	57.6		20.8	56.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		91.6			107.8			111.9			224.0	
Turn Bay Length (m)							65.0			135.0		
Base Capacity (vph)		446			390	690	526	2049		640	2369	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.12			0.17	0.53	0.03	0.34		0.33	0.33	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 97			
Offset: 85 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 11.0		Intersection LOS: B	
Intersection Capacity Utilization 63.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 4: Stanley Avenue & Dixon Street/Main Street

Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	65	365	14	691	212	784
v/c Ratio	0.30	0.47	0.78	0.03	0.34	0.37	0.33
Control Delay	22.2	49.9	17.6	3.8	10.1	5.1	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	49.9	17.6	3.8	10.1	5.1	6.3
Queue Length 50th (m)	3.5	12.4	3.3	0.4	28.8	7.3	21.0
Queue Length 95th (m)	13.5	23.3	30.2	2.5	57.6	20.8	56.7
Internal Link Dist (m)	91.6	107.8			111.9		224.0
Turn Bay Length (m)				65.0		135.0	
Base Capacity (vph)	446	390	690	526	2049	640	2369
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.17	0.53	0.03	0.34	0.33	0.33

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	2	33	47	13	336	13	617	18	195	705	17
Future Volume (vph)	16	2	33	47	13	336	13	617	18	195	705	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.91			1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1540			1651	1458	1630	3246		1630	3249	
Flt Permitted		0.87			0.74	1.00	0.35	1.00		0.36	1.00	
Satd. Flow (perm)		1364			1262	1458	609	3246		615	3249	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	2	36	51	14	365	14	671	20	212	766	18
RTOR Reduction (vph)	0	32	0	0	0	309	0	1	0	0	1	0
Lane Group Flow (vph)	0	23	0	0	65	56	14	690	0	212	783	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		10.6			10.6	10.6	62.3	61.2		72.4	68.3	
Effective Green, g (s)		10.6			10.6	10.6	62.3	61.2		72.4	68.3	
Actuated g/C Ratio		0.11			0.11	0.11	0.64	0.63		0.75	0.70	
Clearance Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Vehicle Extension (s)		2.3			2.3	2.3	2.3	2.5		2.3	2.5	
Lane Grp Cap (vph)		149			137	159	402	2047		544	2287	
v/s Ratio Prot							0.00	0.21		c0.03	0.24	
v/s Ratio Perm		0.02			c0.05	0.04	0.02			c0.26		
v/c Ratio		0.15			0.47	0.35	0.03	0.34		0.39	0.34	
Uniform Delay, d1		39.1			40.6	40.0	6.3	8.4		3.8	5.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			1.5	0.8	0.0	0.4		0.3	0.4	
Delay (s)		39.4			42.1	40.8	6.3	8.8		4.0	6.0	
Level of Service		D			D	D	A	A		A	A	
Approach Delay (s)		39.4			41.0			8.8			5.6	
Approach LOS		D			D			A			A	

Intersection Summary					
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.41				
Actuated Cycle Length (s)	97.0	Sum of lost time (s)		17.0	
Intersection Capacity Utilization	63.4%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	622	73	68	696	18	40
Future Volume (vph)	622	73	68	696	18	40
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.986				0.908	
Flt Protected				0.996	0.984	
Satd. Flow (prot)	1692	0	0	1709	1533	0
Flt Permitted				0.996	0.984	
Satd. Flow (perm)	1692	0	0	1709	1533	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	158.5			126.3	366.1	
Travel Time (s)	11.4			9.1	26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	676	79	74	757	20	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	755	0	0	831	63	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	622	73	68	696	18	40
Future Volume (Veh/h)	622	73	68	696	18	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	676	79	74	757	20	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				126		
pX, platoon unblocked					0.66	
vC, conflicting volume			755		1620	716
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			755		1681	716
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		68	90
cM capacity (veh/h)			855		63	430

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	755	831	63
Volume Left	0	74	20
Volume Right	79	0	43
cSH	1700	855	151
Volume to Capacity	0.44	0.09	0.42
Queue Length 95th (m)	0.0	2.3	14.7
Control Delay (s)	0.0	2.2	44.9
Lane LOS		A	E
Approach Delay (s)	0.0	2.2	44.9
Approach LOS			E

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	98.0%	ICU Level of Service	F
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	99	1	4	122	52	4	17	34	39	6	6
Future Volume (vph)	4	99	1	4	122	52	4	17	34	39	6	6
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.960			0.915			0.983	
Flt Protected		0.998			0.999			0.997			0.964	
Satd. Flow (prot)	0	1711	0	0	1645	0	0	1565	0	0	1626	0
Flt Permitted		0.998			0.999			0.997			0.964	
Satd. Flow (perm)	0	1711	0	0	1645	0	0	1565	0	0	1626	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		398.3			52.4			76.2			366.1	
Travel Time (s)		28.7			3.8			5.5			26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	108	1	4	133	57	4	18	37	42	7	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	113	0	0	194	0	0	59	0	0	56	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization	28.5%
	ICU Level of Service A
Analysis Period (min)	15

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	99	1	4	122	52	4	17	34	39	6	6
Future Volume (Veh/h)	4	99	1	4	122	52	4	17	34	39	6	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	108	1	4	133	57	4	18	37	42	7	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					132							
pX, platoon unblocked												
vC, conflicting volume	190			109			296	314	108	332	286	162
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	190			109			296	314	108	332	286	162
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	97	96	93	99	99
cM capacity (veh/h)	1384			1481			642	598	945	581	620	883

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	113	194	59	56
Volume Left	4	4	4	42
Volume Right	1	57	37	7
cSH	1384	1481	782	612
Volume to Capacity	0.00	0.00	0.08	0.09
Queue Length 95th (m)	0.1	0.1	2.0	2.4
Control Delay (s)	0.3	0.2	10.0	11.5
Lane LOS	A	A	A	B
Approach Delay (s)	0.3	0.2	10.0	11.5
Approach LOS			A	B

Intersection Summary				
Average Delay			3.1	
Intersection Capacity Utilization			28.5%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL	SBT	SBR	SEL2
Lane Configurations												
Traffic Volume (vph)	4	2	128	7	21	2	7	1	1	0	4	2
Future Volume (vph)	4	2	128	7	21	2	7	1	1	0	4	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)		45.0	0.0		0.0		0.0		0.0		0.0	
Storage Lanes		1	1		0		0		0		0	
Taper Length (m)		7.5			7.5				7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99	0.87			0.97				0.96		
Frt			0.850			0.964				0.887		
Flt Protected		0.950				0.967				0.992		
Satd. Flow (prot)	0	1662	1460	0	0	1466	0	0	0	1481	0	0
Flt Permitted		0.692				0.792				0.939		
Satd. Flow (perm)	0	1200	1272	0	0	1179	0	0	0	1400	0	0
Right Turn on Red				No				No			Yes	
Satd. Flow (RTOR)										132		
Link Speed (k/h)		50				50				50		
Link Distance (m)		123.4				224.2				243.2		
Travel Time (s)		8.9				16.1				17.5		
Confl. Peds. (#/hr)	3	1	6	21	6		7	2	2		6	21
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	5	2	158	9	26	2	9	1	1	0	5	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	167	0	0	38	0	0	0	6	0	0
Turn Type	Perm	Perm	Perm		Perm	NA			Perm	NA		Perm
Protected Phases						3				3		
Permitted Phases	2	2	2		3				3			1
Detector Phase	2	2	2		3	3			3	3		1
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0			8.0	8.0		8.0
Minimum Split (s)	20.8	20.8	20.8		19.8	19.8			19.8	19.8		27.8
Total Split (s)	37.4	37.4	37.4		21.0	21.0			21.0	21.0		32.0
Total Split (%)	32.6%	32.6%	32.6%		18.3%	18.3%			18.3%	18.3%		27.9%
Yellow Time (s)	4.1	4.1	4.1		4.1	4.1			4.1	4.1		4.1
All-Red Time (s)	2.7	2.7	2.7		2.7	2.7			2.7	2.7		2.7
Lost Time Adjust (s)		-2.8	-2.8			-2.8				-2.8		
Total Lost Time (s)		4.0	4.0			4.0				4.0		
Lead/Lag	Lag	Lag	Lag		Lead	Lead			Lead	Lead		Lead
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min		None	None			None	None		Min
Act Effct Green (s)		21.4	21.4			12.5				12.5		
Actuated g/C Ratio		0.26	0.26			0.15				0.15		
v/c Ratio		0.02	0.51			0.21				0.02		
Control Delay		27.5	35.2			41.5				0.2		
Queue Delay		0.0	0.0			0.0				0.0		
Total Delay		27.5	35.2			41.5				0.2		
LOS		C	D			D				A		
Approach Delay		34.9				41.5				0.2		

Lane Group	SEL	SET	SER	NWT	Ø4
Lane Configurations					
Traffic Volume (vph)	80	119	11	2	
Future Volume (vph)	80	119	11	2	
Ideal Flow (vphpl)	1750	1750	1750	1750	
Storage Length (m)	20.0		0.0		
Storage Lanes	1		0		
Taper Length (m)	7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	
Ped Bike Factor	0.92	1.00			
Frt		0.987			
Flt Protected	0.950				
Satd. Flow (prot)	1662	1649	0	1750	
Flt Permitted	0.757				
Satd. Flow (perm)	1224	1649	0	1750	
Right Turn on Red			No		
Satd. Flow (RTOR)					
Link Speed (k/h)		50		50	
Link Distance (m)		197.9		158.7	
Travel Time (s)		14.2		11.4	
Confl. Peds. (#/hr)	7		1		
Peak Hour Factor	0.81	0.81	0.81	0.81	
Heavy Vehicles (%)	0%	5%	0%	0%	
Adj. Flow (vph)	99	147	14	2	
Shared Lane Traffic (%)					
Lane Group Flow (vph)	101	161	0	2	
Turn Type	Perm	NA		NA	
Protected Phases		1		1	4
Permitted Phases	1				
Detector Phase	1	1		1	
Switch Phase					
Minimum Initial (s)	8.0	8.0		8.0	1.0
Minimum Split (s)	27.8	27.8		27.8	24.3
Total Split (s)	32.0	32.0		32.0	24.3
Total Split (%)	27.9%	27.9%		27.9%	21%
Yellow Time (s)	4.1	4.1		4.1	3.3
All-Red Time (s)	2.7	2.7		2.7	0.0
Lost Time Adjust (s)	-2.8	-2.8		-2.8	
Total Lost Time (s)	4.0	4.0		4.0	
Lead/Lag	Lead	Lead		Lead	Lag
Lead-Lag Optimize?					
Recall Mode	Min	Min		Min	Ped
Act Effct Green (s)	18.8	18.8		18.8	
Actuated g/C Ratio	0.23	0.23		0.23	
v/c Ratio	0.36	0.43		0.01	
Control Delay	35.4	34.8		30.5	
Queue Delay	0.0	0.0		0.0	
Total Delay	35.4	34.8		30.5	
LOS	D	C		C	
Approach Delay		35.1		30.5	

Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL	SBT	SBR	SEL2
Approach LOS		C				D				A		
Queue Length 50th (m)		0.9	25.6			6.1				0.0		
Queue Length 95th (m)		4.3	46.5			16.7				0.0		
Internal Link Dist (m)		99.4				200.2				219.2		
Turn Bay Length (m)		45.0										
Base Capacity (vph)		511	541			255				406		
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		0.01	0.31			0.15				0.01		

Intersection Summary			
Area Type:	Other		
Cycle Length: 114.7			
Actuated Cycle Length: 83.2			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 35.1		Intersection LOS: D	
Intersection Capacity Utilization 40.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Allendale Avenue & Main St & Murray St

Lane Group	SEL	SET	SER	NWT	Ø4
Approach LOS		D		C	
Queue Length 50th (m)	15.3	24.9		0.3	
Queue Length 95th (m)	31.4	45.7		2.1	
Internal Link Dist (m)		173.9		134.7	
Turn Bay Length (m)	20.0				
Base Capacity (vph)	436	588		624	
Starvation Cap Reductn	0	0		0	
Spillback Cap Reductn	0	0		0	
Storage Cap Reductn	0	0		0	
Reduced v/c Ratio	0.23	0.27		0.00	

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT	SEL	SET	NWT
Lane Group Flow (vph)	7	167	38	6	101	161	2
v/c Ratio	0.02	0.51	0.21	0.02	0.36	0.43	0.01
Control Delay	27.5	35.2	41.5	0.2	35.4	34.8	30.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	35.2	41.5	0.2	35.4	34.8	30.5
Queue Length 50th (m)	0.9	25.6	6.1	0.0	15.3	24.9	0.3
Queue Length 95th (m)	4.3	46.5	16.7	0.0	31.4	45.7	2.1
Internal Link Dist (m)	99.4		200.2	219.2		173.9	134.7
Turn Bay Length (m)	45.0				20.0		
Base Capacity (vph)	511	541	255	406	436	588	624
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.31	0.15	0.01	0.23	0.27	0.00

Intersection Summary

Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL	SBT	SBR	SEL2
Lane Configurations												
Traffic Volume (vph)	4	2	128	7	21	2	7	1	1	0	4	2
Future Volume (vph)	4	2	128	7	21	2	7	1	1	0	4	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0			4.0				4.0		
Lane Util. Factor		1.00	1.00			1.00				1.00		
Frpb, ped/bikes		1.00	0.90			0.99				0.97		
Flpb, ped/bikes		0.99	1.00			0.99				1.00		
Frt		1.00	0.85			0.96				0.89		
Flt Protected		0.95	1.00			0.97				0.99		
Satd. Flow (prot)		1651	1313			1450				1488		
Flt Permitted		0.69	1.00			0.79				0.94		
Satd. Flow (perm)		1202	1313			1188				1410		
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	5	2	158	9	26	2	9	1	1	0	5	2
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	5	0	0
Lane Group Flow (vph)	0	7	167	0	0	38	0	0	0	1	0	0
Confl. Peds. (#/hr)	3	1	6	21	6		7	2	2		6	21
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	Perm	Perm		Perm	NA			Perm	NA		Perm
Protected Phases						3				3		
Permitted Phases	2	2	2		3				3			1
Actuated Green, G (s)		18.4	18.4			5.2				5.2		
Effective Green, g (s)		21.2	21.2			8.0				8.0		
Actuated g/C Ratio		0.25	0.25			0.09				0.09		
Clearance Time (s)		6.8	6.8			6.8				6.8		
Vehicle Extension (s)		5.0	5.0			3.0				3.0		
Lane Grp Cap (vph)		298	325			111				131		
v/s Ratio Prot												
v/s Ratio Perm		0.01	c0.13			c0.03				0.00		
v/c Ratio		0.02	0.51			0.34				0.00		
Uniform Delay, d1		24.3	27.7			36.3				35.1		
Progression Factor		1.00	1.00			1.00				1.00		
Incremental Delay, d2		0.1	2.7			1.8				0.0		
Delay (s)		24.4	30.4			38.1				35.2		
Level of Service		C	C			D				D		
Approach Delay (s)		30.2				38.1				35.2		
Approach LOS		C				D				D		

Intersection Summary			
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	85.5	Sum of lost time (s)	18.1
Intersection Capacity Utilization	40.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWT
Lane Configurations				
Traffic Volume (vph)	80	119	11	2
Future Volume (vph)	80	119	11	2
Ideal Flow (vphpl)	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00		1.00
Frpb, ped/bikes	1.00	1.00		1.00
Flpb, ped/bikes	0.94	1.00		1.00
Frt	1.00	0.99		1.00
Flt Protected	0.95	1.00		1.00
Satd. Flow (prot)	1568	1649		1750
Flt Permitted	0.76	1.00		1.00
Satd. Flow (perm)	1249	1649		1750
Peak-hour factor, PHF	0.81	0.81	0.81	0.81
Adj. Flow (vph)	99	147	14	2
RTOR Reduction (vph)	0	0	0	0
Lane Group Flow (vph)	101	161	0	2
Confl. Peds. (#/hr)	7		1	
Heavy Vehicles (%)	0%	5%	0%	0%
Turn Type	Perm	NA		NA
Protected Phases		1		1
Permitted Phases	1			
Actuated Green, G (s)	15.9	15.9		15.9
Effective Green, g (s)	18.7	18.7		18.7
Actuated g/C Ratio	0.22	0.22		0.22
Clearance Time (s)	6.8	6.8		6.8
Vehicle Extension (s)	5.0	5.0		5.0
Lane Grp Cap (vph)	273	360		382
v/s Ratio Prot		c0.10		0.00
v/s Ratio Perm	0.08			
v/c Ratio	0.37	0.45		0.01
Uniform Delay, d1	28.4	28.9		26.1
Progression Factor	1.00	1.00		1.00
Incremental Delay, d2	1.8	1.8		0.0
Delay (s)	30.2	30.8		26.1
Level of Service	C	C		C
Approach Delay (s)		30.5		26.1
Approach LOS		C		C

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	84	0	0	99	0	0
Future Volume (vph)	84	0	0	99	0	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1716	0	0	1716	1716	0
Flt Permitted						
Satd. Flow (perm)	1716	0	0	1716	1716	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	52.4			79.3	43.1	
Travel Time (s)	3.8			5.7	3.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	0	0	108	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	91	0	0	108	0	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 9.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	84	0	0	99	0	0
Future Volume (Veh/h)	84	0	0	99	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	0	0	108	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				79		
pX, platoon unblocked						
vC, conflicting volume			91		199	91
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			91		199	91
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1504		790	967

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	91	108	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1504	1700
Volume to Capacity	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			9.0%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	0	55	0	0	11
Future Volume (vph)	0	0	55	0	0	11
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	1716	0	1716	0	0	1716
Flt Permitted						
Satd. Flow (perm)	1716	0	1716	0	0	1716
Link Speed (k/h)	50		50			50
Link Distance (m)	51.9		243.2			76.2
Travel Time (s)	3.7		17.5			5.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	60	0	0	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	60	0	0	12
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 6.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	55	0	0	11
Future Volume (Veh/h)	0	0	55	0	0	11
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	60	0	0	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			243			
pX, platoon unblocked						
vC, conflicting volume	72	60			60	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	72	60			60	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	932	1005			1544	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	60	12
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1544
Volume to Capacity	0.00	0.04	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		6.7%	ICU Level of Service	A
Analysis Period (min)		15		

Intersection: 1: Stanley Avenue & Ferry Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	101.1	113.9	52.5	42.5	127.5	37.5	32.4	243.9	244.8	62.4	139.5	136.6
Average Queue (m)	57.2	72.2	21.6	29.2	118.9	25.9	27.7	168.1	171.7	58.2	117.7	105.9
95th Queue (m)	102.1	119.7	54.3	52.3	123.1	50.2	39.7	301.4	302.8	75.8	160.7	159.0
Link Distance (m)		104.7			113.4			335.8	335.8		126.1	126.1
Upstream Blk Time (%)	1	5			70			1	2		43	21
Queuing Penalty (veh)	0	31			0			5	9		0	0
Storage Bay Dist (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Storage Blk Time (%)	2	23	0	8	65	0	24	54		26	40	
Queuing Penalty (veh)	10	60	2	53	177	2	110	76		103	99	

Intersection: 2: Stanley Avenue & Robinson Street

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	LTR	LT	TR	LT	TR
Maximum Queue (m)	12.8	36.8	126.4	114.8	120.5	330.2	332.4
Average Queue (m)	3.8	15.8	74.4	55.7	56.1	240.5	228.3
95th Queue (m)	11.6	29.4	130.5	113.4	117.4	411.3	415.7
Link Distance (m)		57.8	115.6	299.4	299.4	335.8	335.8
Upstream Blk Time (%)			12			12	7
Queuing Penalty (veh)			0			62	35
Storage Bay Dist (m)	35.0						
Storage Blk Time (%)		0					
Queuing Penalty (veh)		0					

Intersection: 3: Stanley Avenue & Murray St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	37.3	53.4	37.4	121.0	77.3	122.8	118.3	67.4	133.0	95.2
Average Queue (m)	16.1	22.0	22.9	52.3	33.1	69.1	70.7	44.8	44.2	35.8
95th Queue (m)	32.7	41.9	43.0	94.4	68.9	105.0	104.8	72.6	95.0	68.6
Link Distance (m)		94.8		156.4		224.8	224.8		299.4	299.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	30.0		30.0		70.0			60.0		
Storage Blk Time (%)	2	4	1	31	0	6		8	0	
Queuing Penalty (veh)	2	3	4	28	1	8		25	1	

Intersection: 4: Stanley Avenue & Dixon Street/Main Street

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	R	L	T	TR	L	T	TR
Maximum Queue (m)	22.3	27.3	63.3	11.5	65.4	50.5	41.0	54.7	52.8
Average Queue (m)	9.2	12.8	29.5	2.3	26.4	15.4	16.4	15.0	15.1
95th Queue (m)	18.4	27.8	51.0	8.8	52.8	37.2	31.0	37.6	39.9
Link Distance (m)	101.8		117.3		127.5	127.5		224.8	224.8
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		20.0		65.0			135.0		
Storage Blk Time (%)		4	17		0				
Queuing Penalty (veh)		14	10		0				

Intersection: 5: Allendale Avenue & Ferry Street

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	79.5	87.1	44.5
Average Queue (m)	10.0	22.4	13.8
95th Queue (m)	53.9	64.5	33.9
Link Distance (m)	148.5	104.7	346.8
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Allendale Avenue & Robinson Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	5.5	1.7	15.8	18.9
Average Queue (m)	0.2	0.1	8.3	7.2
95th Queue (m)	2.7	1.2	14.1	14.4
Link Distance (m)	374.0	33.8	60.4	346.8
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Allendale Avenue & Main St & Murray St

Movement	WB	WB	NB	SB	SE	SE	NW
Directions Served	<L	R>	LTR>	LTR	<L	TR	LTR
Maximum Queue (m)	6.3	38.8	22.9	8.5	26.2	49.7	0.6
Average Queue (m)	0.9	17.6	5.6	0.9	11.5	14.9	0.0
95th Queue (m)	4.5	33.1	15.4	5.0	24.4	35.2	0.3
Link Distance (m)		94.8	193.1	214.4		171.9	132.7
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	45.0				20.0		
Storage Blk Time (%)		0			3	5	
Queuing Penalty (veh)		0			4	4	

Intersection: 9: Driveway A & Robinson Street

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 10: Allendale Avenue & Driveway B

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Zone Summary

Zone wide Queuing Penalty: 940

Appendix F

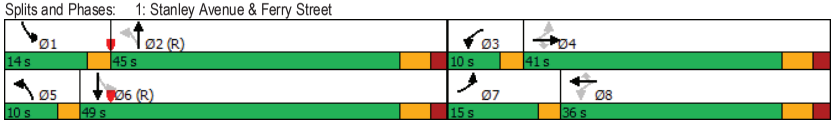
Total Traffic Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	207	56	70	153	79	38	478	79	123	590	88
Future Volume (vph)	169	207	56	70	153	79	38	478	79	123	590	88
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	100.0		45.0	35.0		30.0	25.0		0.0	55.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.979			0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3191	0	1630	3195	0
Flt Permitted	0.443			0.615			0.354			0.361		
Satd. Flow (perm)	760	1716	1458	1055	1716	1458	607	3191	0	619	3195	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			124			154		19			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		126.3			127.8			359.4			139.5	
Travel Time (s)		9.1			9.2			25.9			10.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	184	225	61	76	166	86	41	520	86	134	641	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	184	225	61	76	166	86	41	606	0	134	737	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	33.5	33.5	9.5	33.5	33.5	9.5	33.5		9.5	33.5	
Total Split (s)	15.0	41.0	41.0	10.0	36.0	36.0	10.0	45.0		14.0	49.0	
Total Split (%)	13.6%	37.3%	37.3%	9.1%	32.7%	32.7%	9.1%	40.9%		12.7%	44.5%	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1		3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4		0.0	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)	33.4	21.9	21.9	25.5	15.3	15.3	65.0	55.4		70.5	61.3	
Actuated g/C Ratio	0.30	0.20	0.20	0.23	0.14	0.14	0.59	0.50		0.64	0.56	
v/c Ratio	0.57	0.66	0.16	0.27	0.70	0.26	0.10	0.38		0.28	0.41	
Control Delay	36.5	50.4	0.9	29.2	60.1	1.8	9.4	18.3		10.3	16.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	36.5	50.4	0.9	29.2	60.1	1.8	9.4	18.3		10.3	16.2	
LOS	D	D	A	C	E	A	A	B		B	B	
Approach Delay		38.5			37.7			17.7			15.3	
Approach LOS		D			D			B			B	
Queue Length 50th (m)	32.4	48.2	0.0	12.4	36.3	0.0	3.2	41.2		11.0	50.4	
Queue Length 95th (m)	48.5	70.3	0.0	22.2	55.8	0.4	8.6	65.6		22.4	76.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		102.3			103.8			335.4			115.5	
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Base Capacity (vph)	325	538	542	283	460	503	430	1615		500	1787	
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	0.57	0.42	0.11	0.27	0.36	0.17	0.10	0.38		0.27	0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 110			
Actuated Cycle Length: 110			
Offset: 6 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 23.8		Intersection LOS: C	
Intersection Capacity Utilization 61.3%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Stanley Avenue & Ferry Street



Queues
1: Stanley Avenue & Ferry Street

Future Total
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	184	225	61	76	166	86	41	606	134	737
v/c Ratio	0.57	0.66	0.16	0.27	0.70	0.26	0.10	0.38	0.28	0.41
Control Delay	36.5	50.4	0.9	29.2	60.1	1.8	9.4	18.3	10.3	16.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	50.4	0.9	29.2	60.1	1.8	9.4	18.3	10.3	16.2
Queue Length 50th (m)	32.4	48.2	0.0	12.4	36.3	0.0	3.2	41.2	11.0	50.4
Queue Length 95th (m)	48.5	70.3	0.0	22.2	55.8	0.4	8.6	65.6	22.4	76.4
Internal Link Dist (m)		102.3			103.8			335.4		115.5
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0		55.0	
Base Capacity (vph)	325	538	542	283	460	503	430	1615	500	1787
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	0.57	0.42	0.11	0.27	0.36	0.17	0.10	0.38	0.27	0.41

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1: Stanley Avenue & Ferry Street

Future Total
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	207	56	70	153	79	38	478	79	123	590	88
Future Volume (vph)	169	207	56	70	153	79	38	478	79	123	590	88
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3190		1630	3196	
Flt Permitted	0.44	1.00	1.00	0.61	1.00	1.00	0.35	1.00		0.36	1.00	
Satd. Flow (perm)	760	1716	1458	1054	1716	1458	607	3190		620	3196	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	184	225	61	76	166	86	41	520	86	134	641	96
RTOR Reduction (vph)	0	0	49	0	0	74	0	10	0	0	8	0
Lane Group Flow (vph)	184	225	12	76	166	12	41	596	0	134	729	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	30.5	21.9	21.9	21.5	15.9	15.9	58.8	54.8		66.5	59.5	
Effective Green, g (s)	30.5	21.9	21.9	21.5	15.9	15.9	58.8	54.8		66.5	59.5	
Actuated g/C Ratio	0.28	0.20	0.20	0.20	0.14	0.14	0.53	0.50		0.60	0.54	
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Vehicle Extension (s)	2.5	2.2	2.2	2.5	2.2	2.2	2.5	2.2		2.5	2.2	
Lane Grp Cap (vph)	302	341	290	235	248	210	361	1589		454	1728	
v/s Ratio Prot	c0.06	c0.13		0.02	0.10		0.00	0.19		c0.02	c0.23	
v/s Ratio Perm	0.10		0.01	0.05		0.01	0.06			0.15		
v/c Ratio	0.61	0.66	0.04	0.32	0.67	0.06	0.11	0.38		0.30	0.42	
Uniform Delay, d1	32.6	40.6	35.6	37.3	44.6	40.6	12.3	17.0		9.8	15.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	3.7	0.0	0.6	5.6	0.1	0.1	0.7		0.3	0.8	
Delay (s)	35.5	44.4	35.6	37.9	50.1	40.7	12.4	17.7		10.0	15.8	
Level of Service	D	D	D	D	D	D	B	B		B	B	
Approach Delay (s)		39.8			44.8			17.4			14.9	
Approach LOS		D			D			B			B	

Intersection Summary					
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.51				
Actuated Cycle Length (s)	110.0	Sum of lost time (s)		19.0	
Intersection Capacity Utilization	61.3%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	67	64	12	16	63	37	530	35	45	556	64
Future Volume (vph)	60	67	64	12	16	63	37	530	35	45	556	64
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	35.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.927			0.906			0.991			0.985	
Flt Protected	0.950				0.993			0.997			0.997	
Satd. Flow (prot)	1630	1590	0	0	1544	0	0	3221	0	0	3201	0
Flt Permitted	0.926				0.926			0.877			0.870	
Satd. Flow (perm)	1589	1590	0	0	1439	0	0	2833	0	0	2793	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70			68			12			23	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		79.4			129.4			319.9			359.4	
Travel Time (s)		5.7			9.3			23.0			25.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	73	70	13	17	68	40	576	38	49	604	70
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	143	0	0	98	0	0	654	0	0	723	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		28.0	28.0		28.0	28.0	
Total Split (s)	29.0	29.0		29.0	29.0		41.0	41.0		41.0	41.0	
Total Split (%)	41.4%	41.4%		41.4%	41.4%		58.6%	58.6%		58.6%	58.6%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0			7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	8.6	8.6			8.6			51.2			51.2	
Actuated g/C Ratio	0.12	0.12			0.12			0.73			0.73	
v/c Ratio	0.34	0.56			0.42			0.32			0.35	
Control Delay	31.6	23.9			17.0			5.2			5.4	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	31.6	23.9			17.0			5.2			5.4	
LOS	C	C			B			A			A	
Approach Delay		26.3			17.0			5.2			5.4	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	8.4	9.5			3.8			15.7			17.7	
Queue Length 95th (m)	18.0	24.1			15.7			29.6			33.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		55.4			105.4			295.9			335.4	
Turn Bay Length (m)	35.0											
Base Capacity (vph)	499	547			498			2076			2049	
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	0.13	0.26			0.20			0.32			0.35	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 70			
Offset: 29 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 8.6		Intersection LOS: A	
Intersection Capacity Utilization 73.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 2: Stanley Avenue & Robinson Street

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	65	143	98	654	723
v/c Ratio	0.34	0.56	0.42	0.32	0.35
Control Delay	31.6	23.9	17.0	5.2	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.6	23.9	17.0	5.2	5.4
Queue Length 50th (m)	8.4	9.5	3.8	15.7	17.7
Queue Length 95th (m)	18.0	24.1	15.7	29.6	33.3
Internal Link Dist (m)		55.4	105.4	295.9	335.4
Turn Bay Length (m)	35.0				
Base Capacity (vph)	499	547	498	2076	2049
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	0.13	0.26	0.20	0.32	0.35

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	67	64	12	16	63	37	530	35	45	556	64
Future Volume (vph)	60	67	64	12	16	63	37	530	35	45	556	64
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0			7.0			7.0			7.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.93			0.91			0.99			0.99	
Flt Protected	0.95	1.00			0.99			1.00			1.00	
Satd. Flow (prot)	1630	1590			1545			3222			3202	
Flt Permitted	0.93	1.00			0.93			0.88			0.87	
Satd. Flow (perm)	1589	1590			1440			2834			2795	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	73	70	13	17	68	40	576	38	49	604	70
RTOR Reduction (vph)	0	62	0	0	61	0	0	4	0	0	7	0
Lane Group Flow (vph)	65	81	0	0	37	0	0	650	0	0	716	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	7.6	7.6			7.6			48.4			48.4	
Effective Green, g (s)	7.6	7.6			7.6			48.4			48.4	
Actuated g/C Ratio	0.11	0.11			0.11			0.69			0.69	
Clearance Time (s)	7.0	7.0			7.0			7.0			7.0	
Vehicle Extension (s)	2.1	2.1			2.1			2.2			2.2	
Lane Grp Cap (vph)	172	172			156			1959			1932	
v/s Ratio Prot		c0.05										
v/s Ratio Perm	0.04				0.03			0.23			c0.26	
v/c Ratio	0.38	0.47			0.24			0.33			0.37	
Uniform Delay, d1	29.0	29.3			28.6			4.3			4.5	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.9			0.3			0.5			0.5	
Delay (s)	29.6	30.2			28.9			4.8			5.0	
Level of Service	C	C			C			A			A	
Approach Delay (s)		30.0			28.9			4.8			5.0	
Approach LOS		C			C			A			A	

Intersection Summary				
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	14.0	
Intersection Capacity Utilization	73.4%	ICU Level of Service	D	
Analysis Period (min)	15			

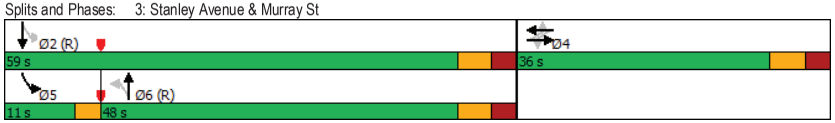
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	116	62	76	68	55	145	468	74	112	456	96
Future Volume (vph)	76	116	62	76	68	55	145	468	74	112	456	96
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	30.0		0.0	30.0		0.0	70.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.94	0.97		0.95	0.96			0.99		0.98		
Frt		0.948			0.933			0.980			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	1589	0	1599	1534	0	1599	2942	0	1583	3046	0
Flt Permitted	0.590			0.451			0.425			0.374		
Satd. Flow (perm)	967	1589	0	720	1534	0	715	2942	0	609	3046	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			46			25			44	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		123.4			170.2			248.0			319.9	
Travel Time (s)		8.9			12.3			17.9			23.0	
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Adj. Flow (vph)	83	126	67	83	74	60	158	509	80	122	496	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	193	0	83	134	0	158	589	0	122	600	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Detector Phase	4	4		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		33.0	33.0		9.0	33.0	
Total Split (s)	36.0	36.0		36.0	36.0		48.0	48.0		11.0	59.0	
Total Split (%)	37.9%	37.9%		37.9%	37.9%		50.5%	50.5%		11.6%	62.1%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0		1.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		C-Min	C-Min		None	C-Min	
Act Effct Green (s)	18.0	18.0		18.0	18.0		58.7	58.7		69.0	69.0	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.62	0.62		0.73	0.73	
v/c Ratio	0.46	0.59		0.61	0.41		0.36	0.32		0.24	0.27	
Control Delay	40.7	36.2		53.1	24.5		13.8	9.9		5.9	5.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.7	36.2		53.1	24.5		13.8	9.9		5.9	5.0	
LOS	D	D		D	C		B	A		A	A	
Approach Delay		37.6			35.4			10.7			5.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			D			B			A	
Queue Length 50th (m)	14.4	28.9		14.8	14.8		13.4	24.2		5.8	15.7	
Queue Length 95th (m)	26.8	46.8		28.7	29.2		35.7	45.6		14.8	30.2	
Internal Link Dist (m)		99.4			146.2			224.0			295.9	
Turn Bay Length (m)	30.0			30.0			70.0			60.0		
Base Capacity (vph)	325	555		242	547		441	1826		517	2225	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.26	0.35		0.34	0.24		0.36	0.32		0.24	0.27	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 1 (1%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green			
Natural Cycle: 80			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 15.2		Intersection LOS: B	
Intersection Capacity Utilization 70.7%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 3: Stanley Avenue & Murray St



Queues
3: Stanley Avenue & Murray St

Future Total
AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	83	193	83	134	158	589	122	600
v/c Ratio	0.46	0.59	0.61	0.41	0.36	0.32	0.24	0.27
Control Delay	40.7	36.2	53.1	24.5	13.8	9.9	5.9	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	36.2	53.1	24.5	13.8	9.9	5.9	5.0
Queue Length 50th (m)	14.4	28.9	14.8	14.8	13.4	24.2	5.8	15.7
Queue Length 95th (m)	26.8	46.8	28.7	29.2	35.7	45.6	14.8	30.2
Internal Link Dist (m)		99.4		146.2		224.0		295.9
Turn Bay Length (m)	30.0		30.0		70.0		60.0	
Base Capacity (vph)	325	555	242	547	441	1826	517	2225
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.35	0.34	0.24	0.36	0.32	0.24	0.27

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Stanley Avenue & Murray St

Future Total
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	116	62	76	68	55	145	468	74	112	456	96
Future Volume (vph)	76	116	62	76	68	55	145	468	74	112	456	96
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.96		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.94	1.00		0.95	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.95		1.00	0.93		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1560	1589		1518	1534		1599	2941		1570	3046	
Flt Permitted	0.59	1.00		0.45	1.00		0.43	1.00		0.37	1.00	
Satd. Flow (perm)	968	1589		720	1534		715	2941		619	3046	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	126	67	83	74	60	158	509	80	122	496	104
RTOR Reduction (vph)	0	24	0	0	37	0	0	10	0	0	12	0
Lane Group Flow (vph)	83	169	0	83	97	0	158	579	0	122	588	0
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	15.0	15.0		15.0	15.0		55.7	55.7		66.0	66.0	
Effective Green, g (s)	18.0	18.0		18.0	18.0		58.7	58.7		65.0	69.0	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.62	0.62		0.68	0.73	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.3	2.5	
Lane Grp Cap (vph)	183	301		136	290		441	1817		486	2212	
v/s Ratio Prot		0.11			0.06			0.20		0.02	c0.19	
v/s Ratio Perm	0.09			c0.12			c0.22			0.16		
v/c Ratio	0.45	0.56		0.61	0.33		0.36	0.32		0.25	0.27	
Uniform Delay, d1	34.1	34.9		35.3	33.3		8.9	8.6		5.5	4.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	1.9		6.7	0.5		2.3	0.5		0.2	0.3	
Delay (s)	35.4	36.8		42.0	33.8		11.2	9.1		5.7	4.7	
Level of Service	D	D		D	C		B	A		A	A	
Approach Delay (s)		36.4			37.0			9.5			4.9	
Approach LOS		D			D			A			A	

Intersection Summary					
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.41				
Actuated Cycle Length (s)	95.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	70.7%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	5	4	37	7	133	22	484	13	121	491	19
Future Volume (vph)	12	5	4	37	7	133	22	484	13	121	491	19
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	20.0		0.0	65.0		0.0	135.0		0.0
Storage Lanes	0		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.975				0.850		0.996			0.994	
Flt Protected		0.971			0.960		0.950			0.950		
Satd. Flow (prot)	0	1624	0	0	1647	1458	1630	3247	0	1630	3240	0
Flt Permitted		0.791			0.746		0.444			0.431		
Satd. Flow (perm)	0	1323	0	0	1280	1458	762	3247	0	739	3240	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				145		3			5	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.6			131.8			135.9			248.0	
Travel Time (s)		8.3			9.5			9.8			17.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	5	4	40	8	145	24	526	14	132	534	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	22	0	0	48	145	24	540	0	132	555	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	34.0	34.0		34.0	34.0	34.0	9.5	37.0		9.5	37.0	
Total Split (s)	38.0	38.0		38.0	38.0	38.0	10.0	46.0		13.0	49.0	
Total Split (%)	39.2%	39.2%		39.2%	39.2%	39.2%	10.3%	47.4%		13.4%	50.5%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	0.0	3.0		0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)		8.3			8.3	8.3	74.4	65.2		78.4	71.4	
Actuated g/C Ratio		0.09			0.09	0.09	0.77	0.67		0.81	0.74	
v/c Ratio		0.19			0.44	0.56	0.04	0.25		0.20	0.23	
Control Delay		38.2			53.8	16.1	2.5	7.0		2.9	5.1	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		38.2			53.8	16.1	2.5	7.0		2.9	5.1	
LOS		D			D	B	A	A		A	A	
Approach Delay		38.3			25.5			6.8			4.7	
Approach LOS		D			C			A			A	
Queue Length 50th (m)		3.4			9.2	0.0	0.7	19.1		3.9	12.5	
Queue Length 95th (m)		10.7			20.1	17.7	2.5	32.2		9.2	30.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		91.6			107.8			111.9			224.0	
Turn Bay Length (m)							65.0			135.0		
Base Capacity (vph)		425			409	564	661	2184		691	2384	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.05			0.12	0.26	0.04	0.25		0.19	0.23	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 97			
Offset: 85 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 8.7		Intersection LOS: A	
Intersection Capacity Utilization 45.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Stanley Avenue & Dixon Street/Main Street

Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	22	48	145	24	540	132	555
v/c Ratio	0.19	0.44	0.56	0.04	0.25	0.20	0.23
Control Delay	38.2	53.8	16.1	2.5	7.0	2.9	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	53.8	16.1	2.5	7.0	2.9	5.1
Queue Length 50th (m)	3.4	9.2	0.0	0.7	19.1	3.9	12.5
Queue Length 95th (m)	10.7	20.1	17.7	2.5	32.2	9.2	30.2
Internal Link Dist (m)	91.6	107.8			111.9		224.0
Turn Bay Length (m)				65.0		135.0	
Base Capacity (vph)	425	409	564	661	2184	691	2384
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.12	0.26	0.04	0.25	0.19	0.23

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	5	4	37	7	133	22	484	13	121	491	19
Future Volume (vph)	12	5	4	37	7	133	22	484	13	121	491	19
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.98			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1626			1647	1458	1630	3247		1630	3241	
Flt Permitted		0.79			0.75	1.00	0.44	1.00		0.43	1.00	
Satd. Flow (perm)		1323			1280	1458	762	3247		739	3241	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	5	4	40	8	145	24	526	14	132	534	21
RTOR Reduction (vph)	0	4	0	0	0	133	0	1	0	0	1	0
Lane Group Flow (vph)	0	18	0	0	48	12	24	539	0	132	554	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		8.3			8.3	8.3	67.4	65.2		74.7	69.5	
Effective Green, g (s)		8.3			8.3	8.3	67.4	65.2		74.7	69.5	
Actuated g/C Ratio		0.09			0.09	0.09	0.69	0.67		0.77	0.72	
Clearance Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Vehicle Extension (s)		2.3			2.3	2.3	2.3	2.5		2.3	2.5	
Lane Grp Cap (vph)		113			109	124	549	2182		628	2322	
v/s Ratio Prot							0.00	0.17		c0.01	c0.17	
v/s Ratio Perm		0.01			c0.04	0.01	0.03			0.15		
v/c Ratio		0.16			0.44	0.10	0.04	0.25		0.21	0.24	
Uniform Delay, d1		41.1			42.1	40.9	4.6	6.3		2.8	4.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			1.7	0.2	0.0	0.3		0.1	0.2	
Delay (s)		41.5			43.8	41.1	4.6	6.5		2.9	4.9	
Level of Service		D			D	D	A	A		A	A	
Approach Delay (s)		41.5			41.8			6.4			4.6	
Approach LOS		D			D			A			A	

Intersection Summary					
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.26				
Actuated Cycle Length (s)	97.0	Sum of lost time (s)		17.0	
Intersection Capacity Utilization	45.6%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	301	40	25	294	61	130
Future Volume (vph)	301	40	25	294	61	130
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.984				0.908	
Flt Protected				0.996	0.984	
Satd. Flow (prot)	1688	0	0	1709	1533	0
Flt Permitted				0.996	0.984	
Satd. Flow (perm)	1688	0	0	1709	1533	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	158.5			126.3	366.1	
Travel Time (s)	11.4			9.1	26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	327	43	27	320	66	141
Shared Lane Traffic (%)						
Lane Group Flow (vph)	370	0	0	347	207	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	301	40	25	294	61	130
Future Volume (Veh/h)	301	40	25	294	61	130
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	327	43	27	320	66	141
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				126		
pX, platoon unblocked					0.92	
vC, conflicting volume			370		722	348
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			370		652	348
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		83	80
cM capacity (veh/h)			1189		388	695

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	370	347	207
Volume Left	0	27	66
Volume Right	43	0	141
cSH	1700	1189	555
Volume to Capacity	0.22	0.02	0.37
Queue Length 95th (m)	0.0	0.6	13.7
Control Delay (s)	0.0	0.8	15.3
Lane LOS		A	C
Approach Delay (s)	0.0	0.8	15.3
Approach LOS			C

Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	58.3%	ICU Level of Service		B
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	55	9	4	33	34	10	67	20	41	16	5
Future Volume (vph)	5	55	9	4	33	34	10	67	20	41	16	5
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.935			0.972			0.990	
Flt Protected		0.997			0.997			0.995			0.968	
Satd. Flow (prot)	0	1680	0	0	1599	0	0	1659	0	0	1644	0
Flt Permitted		0.997			0.997			0.995			0.968	
Satd. Flow (perm)	0	1680	0	0	1599	0	0	1659	0	0	1644	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		398.3			52.3			77.2			366.1	
Travel Time (s)		28.7			3.8			5.6			26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	60	10	4	36	37	11	73	22	45	17	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	0	77	0	0	106	0	0	67	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	55	9	4	33	34	10	67	20	41	16	5
Future Volume (Veh/h)	5	55	9	4	33	34	10	67	20	41	16	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	60	10	4	36	37	11	73	22	45	17	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					132							
pX, platoon unblocked												
vC, conflicting volume	73			70			151	156	65	196	142	54
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	73			70			151	156	65	196	142	54
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	90	98	93	98	100
cM capacity (veh/h)	1527			1531			795	732	999	686	744	1012

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	75	77	106	67
Volume Left	5	4	11	45
Volume Right	10	37	22	5
cSH	1527	1531	781	718
Volume to Capacity	0.00	0.00	0.14	0.09
Queue Length 95th (m)	0.1	0.1	3.7	2.5
Control Delay (s)	0.5	0.4	10.3	10.5
Lane LOS	A	A	B	B
Approach Delay (s)	0.5	0.4	10.3	10.5
Approach LOS			B	B

Intersection Summary				
Average Delay	5.8			
Intersection Capacity Utilization	22.6%	ICU Level of Service		A
Analysis Period (min)	15			

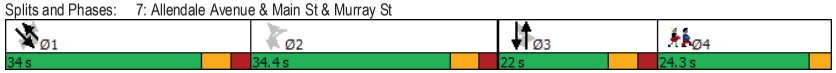
Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL2	SBL	SBT	SEL	SET
Lane Configurations												
Traffic Volume (vph)	2	4	90	6	11	1	1	5	14	0	62	83
Future Volume (vph)	2	4	90	6	11	1	1	5	14	0	62	83
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)		45.0	0.0		0.0		0.0		0.0		20.0	
Storage Lanes		1	1		0		0		0		1	
Taper Length (m)		7.5			7.5				7.5		7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99	0.87			0.97				0.96	0.98	1.00
Frt			0.850			0.992						0.981
Flt Protected		0.950				0.958				0.950	0.950	
Satd. Flow (prot)	0	1662	1460	0	0	1477	0	0	0	1662	1662	1640
Flt Permitted		0.707				0.736				0.747	0.757	
Satd. Flow (perm)	0	1225	1273	0	0	1109	0	0	0	1256	1299	1640
Right Turn on Red				No								
Satd. Flow (RTOR)												
Link Speed (k/h)		50				50				50		50
Link Distance (m)		123.4				224.2				242.2		197.9
Travel Time (s)		8.9				16.1				17.4		14.2
Confl. Peds. (#/hr)	3	1	6	21	6		7	7	2		7	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	0%	5%
Adj. Flow (vph)	2	5	111	7	14	1	1	6	17	0	77	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	118	0	0	16	0	0	0	23	77	117
Turn Type	Perm	Perm	Perm		Perm	NA		Perm	Perm	NA	Perm	NA
Protected Phases						3				3		1
Permitted Phases	2	2	2		3			3	3		1	
Detector Phase	2	2	2		3	3		3	3	3	1	1
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	20.8	20.8	20.8		19.8	19.8		19.8	19.8	19.8	27.8	27.8
Total Split (s)	34.4	34.4	34.4		22.0	22.0		22.0	22.0	22.0	34.0	34.0
Total Split (%)	30.0%	30.0%	30.0%		19.2%	19.2%		19.2%	19.2%	19.2%	29.6%	29.6%
Yellow Time (s)	4.1	4.1	4.1		4.1	4.1		4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.7	2.7	2.7		2.7	2.7		2.7	2.7	2.7	2.7	2.7
Lost Time Adjust (s)		-2.8	-2.8			-2.8				-2.8	-2.8	-2.8
Total Lost Time (s)		4.0	4.0			4.0				4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag		Lead	Lead		Lead	Lead	Lead	Lead	Lead
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min		None	None		None	None	None	Min	Min
Act Effct Green (s)		17.4	17.4			11.6				11.6	15.9	15.9
Actuated g/C Ratio		0.23	0.23			0.15				0.15	0.21	0.21
v/c Ratio		0.02	0.40			0.09				0.12	0.28	0.34
Control Delay		26.0	31.6			35.8				35.6	31.2	31.2
Queue Delay		0.0	0.0			0.0				0.0	0.0	0.0
Total Delay		26.0	31.6			35.8				35.6	31.2	31.2
LOS		C	C			D				D	C	C
Approach Delay		31.3				35.8				35.6		31.2

Lane Group	SER	NWT	Ø4
Lane Configurations			
Traffic Volume (vph)	12	2	
Future Volume (vph)	12	2	
Ideal Flow (vphpl)	1750	1750	
Storage Length (m)	0.0		
Storage Lanes	0		
Taper Length (m)			
Lane Util. Factor	1.00	1.00	
Ped Bike Factor			
Frt			
Flt Protected			
Satd. Flow (prot)	0	1750	
Flt Permitted			
Satd. Flow (perm)	0	1750	
Right Turn on Red	No		
Satd. Flow (RTOR)			
Link Speed (k/h)		50	
Link Distance (m)		158.7	
Travel Time (s)		11.4	
Confl. Peds. (#/hr)	1		
Peak Hour Factor	0.81	0.81	
Heavy Vehicles (%)	0%	0%	
Adj. Flow (vph)	15	2	
Shared Lane Traffic (%)			
Lane Group Flow (vph)	0	2	
Turn Type		NA	
Protected Phases		1	4
Permitted Phases			
Detector Phase		1	
Switch Phase			
Minimum Initial (s)		8.0	1.0
Minimum Split (s)		27.8	24.3
Total Split (s)		34.0	24.3
Total Split (%)		29.6%	21%
Yellow Time (s)		4.1	3.3
All-Red Time (s)		2.7	0.0
Lost Time Adjust (s)		-2.8	
Total Lost Time (s)		4.0	
Lead/Lag		Lead	Lag
Lead-Lag Optimize?			
Recall Mode		Min	Ped
Act Effct Green (s)		15.9	
Actuated g/C Ratio		0.21	
v/c Ratio		0.01	
Control Delay		27.5	
Queue Delay		0.0	
Total Delay		27.5	
LOS		C	
Approach Delay		27.5	

Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL2	SBL	SBT	SEL	SET
Approach LOS		C				D				D		C
Queue Length 50th (m)		0.9	16.5			2.3				3.3	10.7	16.4
Queue Length 95th (m)		4.1	30.9			8.1				10.2	22.3	31.0
Internal Link Dist (m)		99.4				200.2				218.2		173.9
Turn Bay Length (m)		45.0									20.0	
Base Capacity (vph)		518	538			277				314	542	684
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		0.01	0.22			0.06				0.07	0.14	0.17

Intersection Summary			
Area Type:	Other		
Cycle Length: 114.7			
Actuated Cycle Length: 75			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.40			
Intersection Signal Delay: 31.7		Intersection LOS: C	
Intersection Capacity Utilization 39.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Allendale Avenue & Main St & Murray St



Lane Group	SER	NWT	Ø4
Approach LOS		C	
Queue Length 50th (m)		0.3	
Queue Length 95th (m)		2.0	
Internal Link Dist (m)		134.7	
Turn Bay Length (m)			
Base Capacity (vph)		730	
Starvation Cap Reductn		0	
Spillback Cap Reductn		0	
Storage Cap Reductn		0	
Reduced v/c Ratio		0.00	

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT	SEL	SET	NWT
Lane Group Flow (vph)	7	118	16	23	77	117	2
v/c Ratio	0.02	0.40	0.09	0.12	0.28	0.34	0.01
Control Delay	26.0	31.6	35.8	35.6	31.2	31.2	27.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	31.6	35.8	35.6	31.2	31.2	27.5
Queue Length 50th (m)	0.9	16.5	2.3	3.3	10.7	16.4	0.3
Queue Length 95th (m)	4.1	30.9	8.1	10.2	22.3	31.0	2.0
Internal Link Dist (m)	99.4		200.2	218.2		173.9	134.7
Turn Bay Length (m)	45.0				20.0		
Base Capacity (vph)	518	538	277	314	542	684	730
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.22	0.06	0.07	0.14	0.17	0.00

Intersection Summary

Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	SBL2	SBL	SBT	SEL	SET
Lane Configurations												
Traffic Volume (vph)	2	4	90	6	11	1	1	5	14	0	62	83
Future Volume (vph)	2	4	90	6	11	1	1	5	14	0	62	83
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0			4.0				4.0	4.0	4.0
Lane Util. Factor		1.00	1.00			1.00				1.00	1.00	1.00
Frpb, ped/bikes		1.00	0.91			1.00				1.00	1.00	1.00
Flpb, ped/bikes		0.99	1.00			0.98				0.97	0.99	1.00
Frt		1.00	0.85			0.99				1.00	1.00	0.98
Flt Protected		0.95	1.00			0.96				0.95	0.95	1.00
Satd. Flow (prot)		1651	1324			1455				1619	1641	1640
Flt Permitted		0.71	1.00			0.74				0.75	0.76	1.00
Satd. Flow (perm)		1229	1324			1118				1273	1307	1640
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	2	5	111	7	14	1	1	6	17	0	77	102
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	7	118	0	0	16	0	0	0	23	77	117
Confl. Peds. (#/hr)	3	1	6	21	6		7	7	2		7	
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	0%	5%
Turn Type	Perm	Perm	Perm		Perm	NA		Perm	Perm	NA	Perm	NA
Protected Phases						3				3		1
Permitted Phases	2	2	2		3			3	3		1	
Actuated Green, G (s)		14.5	14.5			4.5				4.5	13.0	13.0
Effective Green, g (s)		17.3	17.3			7.3				7.3	15.8	15.8
Actuated g/C Ratio		0.22	0.22			0.09				0.09	0.20	0.20
Clearance Time (s)		6.8	6.8			6.8				6.8	6.8	6.8
Vehicle Extension (s)		5.0	5.0			3.0				3.0	5.0	5.0
Lane Grp Cap (vph)		273	295			105				119	266	333
v/s Ratio Prot												c0.07
v/s Ratio Perm		0.01	c0.09			0.01				c0.02	0.06	
v/c Ratio		0.03	0.40			0.15				0.19	0.29	0.35
Uniform Delay, d1		23.6	25.7			32.3				32.4	26.1	26.5
Progression Factor		1.00	1.00			1.00				1.00	1.00	1.00
Incremental Delay, d2		0.1	1.9			0.7				0.8	1.3	1.3
Delay (s)		23.6	27.6			33.0				33.2	27.4	27.8
Level of Service		C	C			C				C	C	C
Approach Delay (s)		27.4				33.0				33.2		27.7
Approach LOS		C				C				C		C

Intersection Summary					
HCM 2000 Control Delay	28.1	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.23				
Actuated Cycle Length (s)	77.6	Sum of lost time (s)		18.1	
Intersection Capacity Utilization	39.0%	ICU Level of Service		A	
Analysis Period (min)	15				

c Critical Lane Group

Movement	SER	NWT
Lane Configurations		
Traffic Volume (vph)	12	2
Future Volume (vph)	12	2
Ideal Flow (vphpl)	1750	1750
Total Lost time (s)		4.0
Lane Util. Factor		1.00
Frpb, ped/bikes		1.00
Flpb, ped/bikes		1.00
Frt		1.00
Flt Protected		1.00
Satd. Flow (prot)		1750
Flt Permitted		1.00
Satd. Flow (perm)		1750
Peak-hour factor, PHF	0.81	0.81
Adj. Flow (vph)	15	2
RTOR Reduction (vph)	0	0
Lane Group Flow (vph)	0	2
Confl. Peds. (#/hr)	1	
Heavy Vehicles (%)	0%	0%
Turn Type		NA
Protected Phases		1
Permitted Phases		
Actuated Green, G (s)		13.0
Effective Green, g (s)		15.8
Actuated g/C Ratio		0.20
Clearance Time (s)		6.8
Vehicle Extension (s)		5.0
Lane Grp Cap (vph)		356
v/s Ratio Prot		0.00
v/s Ratio Perm		
v/c Ratio		0.01
Uniform Delay, d1		24.6
Progression Factor		1.00
Incremental Delay, d2		0.0
Delay (s)		24.6
Level of Service		C
Approach Delay (s)		24.6
Approach LOS		C

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	114	6	74	43	21	77
Future Volume (vph)	114	6	74	43	21	77
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.894	
Flt Protected				0.969	0.989	
Satd. Flow (prot)	1704	0	0	1662	1517	0
Flt Permitted				0.969	0.989	
Satd. Flow (perm)	1704	0	0	1662	1517	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	52.3			79.4	51.1	
Travel Time (s)	3.8			5.7	3.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	124	7	80	47	23	84
Shared Lane Traffic (%)						
Lane Group Flow (vph)	131	0	0	127	107	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 26.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	114	6	74	43	21	77
Future Volume (Veh/h)	114	6	74	43	21	77
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	124	7	80	47	23	84
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				79		
pX, platoon unblocked						
vC, conflicting volume			131		334	128
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			131		334	128
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			94		96	91
cM capacity (veh/h)			1454		624	923

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	131	127	107
Volume Left	0	80	23
Volume Right	7	0	84
cSH	1700	1454	837
Volume to Capacity	0.08	0.06	0.13
Queue Length 95th (m)	0.0	1.4	3.5
Control Delay (s)	0.0	5.0	9.9
Lane LOS		A	A
Approach Delay (s)	0.0	5.0	9.9
Approach LOS			A

Intersection Summary			
Average Delay		4.6	
Intersection Capacity Utilization		26.7%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	16	61	36	2	12	17
Future Volume (vph)	16	61	36	2	12	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.893		0.993			
Flt Protected	0.990					0.979
Satd. Flow (prot)	1517	0	1704	0	0	1680
Flt Permitted	0.990					0.979
Satd. Flow (perm)	1517	0	1704	0	0	1680
Link Speed (k/h)	50		50			50
Link Distance (m)	48.2		242.2			77.2
Travel Time (s)	3.5		17.4			5.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	66	39	2	13	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	83	0	41	0	0	31
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.1%			ICU Level of Service A
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	16	61	36	2	12	17
Future Volume (Veh/h)	16	61	36	2	12	17
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	66	39	2	13	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			242			
pX, platoon unblocked						
vC, conflicting volume	84	40			41	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	84	40			41	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			99	
cM capacity (veh/h)	910	1031			1568	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	83	41	31
Volume Left	17	0	13
Volume Right	66	2	0
cSH	1004	1700	1568
Volume to Capacity	0.08	0.02	0.01
Queue Length 95th (m)	2.2	0.0	0.2
Control Delay (s)	8.9	0.0	3.1
Lane LOS	A		A
Approach Delay (s)	8.9	0.0	3.1
Approach LOS	A		

Intersection Summary				
Average Delay		5.4		
Intersection Capacity Utilization		20.1%	ICU Level of Service	A
Analysis Period (min)		15		

Intersection: 1: Stanley Avenue & Ferry Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	63.2	63.9	44.8	41.8	80.8	37.4	26.2	52.0	56.0	39.6	66.5	58.2
Average Queue (m)	29.5	34.9	9.0	15.4	33.2	15.5	7.7	23.0	29.2	15.0	31.8	25.0
95th Queue (m)	50.9	57.5	26.4	32.4	61.8	35.2	20.7	44.0	50.9	31.0	55.1	48.4
Link Distance (m)		104.7			113.4			335.9	335.9		126.1	126.1
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Storage Blk Time (%)		5	0	1	12	0	0	6		0	1	
Queuing Penalty (veh)		12	0	1	17	0	0	2		0	1	

Intersection: 2: Stanley Avenue & Robinson Street

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	LTR	LT	TR	LT	TR
Maximum Queue (m)	29.6	39.5	25.9	42.0	48.1	47.7	47.1
Average Queue (m)	13.2	17.7	11.9	16.3	17.9	22.9	20.1
95th Queue (m)	25.7	31.3	22.2	34.8	38.2	43.3	41.7
Link Distance (m)		58.6	115.6	299.3	299.3	335.9	335.9
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	35.0						
Storage Blk Time (%)	0	1					
Queuing Penalty (veh)	0	1					

Intersection: 3: Stanley Avenue & Murray St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	37.3	49.4	35.3	42.4	49.9	55.1	56.3	39.7	52.0	52.2
Average Queue (m)	17.6	24.1	15.8	17.3	21.5	29.1	28.9	16.1	24.9	27.6
95th Queue (m)	33.9	43.7	30.4	33.3	40.1	48.7	49.5	31.8	44.2	47.7
Link Distance (m)		94.8		156.4		224.8	224.8		299.3	299.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	30.0		30.0		70.0			60.0		
Storage Blk Time (%)	1	5	1	2				0	0	
Queuing Penalty (veh)	2	4	2	1				0	0	

Intersection: 4: Stanley Avenue & Dixon Street/Main Street

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	R	L	T	TR	L	T	TR
Maximum Queue (m)	18.2	23.9	33.0	14.2	35.5	24.2	28.1	25.4	25.6
Average Queue (m)	5.0	10.7	14.1	3.4	15.1	5.8	9.6	4.8	6.8
95th Queue (m)	14.5	21.1	25.1	10.9	32.5	17.0	19.6	15.2	19.2
Link Distance (m)	101.8		117.3		127.5	127.5		224.8	224.8
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		20.0		65.0			135.0		
Storage Blk Time (%)		5	2						
Queuing Penalty (veh)		6	1						

Intersection: 5: Allendale Avenue & Ferry Street

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	29.1	33.2
Average Queue (m)	3.9	14.3
95th Queue (m)	16.8	24.5
Link Distance (m)	104.7	347.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Allendale Avenue & Robinson Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	3.6	5.0	18.2	13.0
Average Queue (m)	0.1	0.2	9.4	8.2
95th Queue (m)	1.8	2.1	14.3	13.1
Link Distance (m)	374.0	33.4	61.0	347.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Allendale Avenue & Main St & Murray St

Movement	WB	WB	NB	SB	SE	SE	NW
Directions Served	<L	R>	LTR	<LTR	<L	TR	LTR
Maximum Queue (m)	6.3	29.3	14.1	15.2	23.4	31.6	2.8
Average Queue (m)	0.7	12.2	3.1	3.7	7.0	8.1	0.2
95th Queue (m)	4.0	25.8	10.4	11.1	16.6	21.9	1.2
Link Distance (m)		94.8	197.5	213.5		171.9	136.3
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	45.0				20.0		
Storage Blk Time (%)					1	2	
Queuing Penalty (veh)					1	1	

Intersection: 9: Driveway A & Robinson Street

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	10.7	17.4
Average Queue (m)	2.3	10.2
95th Queue (m)	9.1	16.2
Link Distance (m)	58.6	40.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allendale Avenue & Driveway B

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	18.0	3.7
Average Queue (m)	8.7	0.1
95th Queue (m)	15.5	1.9
Link Distance (m)	39.4	61.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

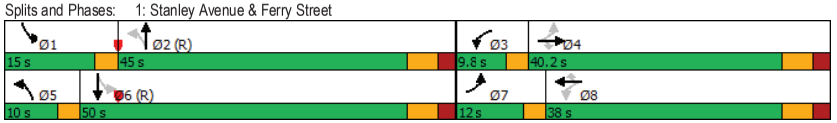
Zone wide Queuing Penalty: 53

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	381	95	125	497	155	139	966	118	248	916	187
Future Volume (vph)	199	381	95	125	497	155	139	966	118	248	916	187
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	100.0		45.0	35.0		30.0	25.0		0.0	55.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.984			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3208	0	1630	3178	0
Flt Permitted	0.119			0.287			0.104			0.096		
Satd. Flow (perm)	204	1716	1458	492	1716	1458	178	3208	0	165	3178	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			124			124		13			26	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		126.3			127.8			359.4			139.5	
Travel Time (s)		9.1			9.2			25.9			10.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	216	414	103	136	540	168	151	1050	128	270	996	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	216	414	103	136	540	168	151	1178	0	270	1199	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	33.5	33.5	9.5	33.5	33.5	9.5	33.5		9.5	33.5	
Total Split (s)	12.0	40.2	40.2	9.8	38.0	38.0	10.0	45.0		15.0	50.0	
Total Split (%)	10.9%	36.5%	36.5%	8.9%	34.5%	34.5%	9.1%	40.9%		13.6%	45.5%	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1	4.1	3.0	4.1		3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4	2.4	0.0	2.4		0.0	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)	46.2	33.7	33.7	41.8	31.5	31.5	49.0	38.5		57.0	43.5	
Actuated g/C Ratio	0.42	0.31	0.31	0.38	0.29	0.29	0.45	0.35		0.52	0.40	
v/c Ratio	1.07	0.79	0.19	0.53	1.10	0.33	0.88	1.04		1.10	0.94	
Control Delay	108.8	47.2	4.1	28.9	108.4	11.6	66.3	73.5		115.4	46.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	108.8	47.2	4.1	28.9	108.4	11.6	66.3	73.5		115.4	46.7	
LOS	F	D	A	C	F	B	E	E		F	D	
Approach Delay		59.3			76.3			72.6			59.4	
Approach LOS		E			E			E			E	
Queue Length 50th (m)	~37.4	85.3	0.0	18.8	~138.7	7.3	17.6	~151.0		~53.2	133.1	
Queue Length 95th (m)	#86.8	#133.0	8.9	32.4	#206.1	24.9	#56.7	#194.7		#107.4	#181.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		102.3			103.8			335.4			115.5	
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Base Capacity (vph)	202	525	532	257	491	506	171	1131		245	1272	
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	1.07	0.79	0.19	0.53	1.10	0.33	0.88	1.04		1.10	0.94	

Intersection Summary		
Area Type:	Other	
Cycle Length: 110		
Actuated Cycle Length: 110		
Offset: 6 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 100		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.10		
Intersection Signal Delay: 66.7	Intersection LOS: E	
Intersection Capacity Utilization 105.9%	ICU Level of Service G	
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: Stanley Avenue & Ferry Street



Queues
1: Stanley Avenue & Ferry Street

Future Total
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	216	414	103	136	540	168	151	1178	270	1199
v/c Ratio	1.07	0.79	0.19	0.53	1.10	0.33	0.88	1.04	1.10	0.94
Control Delay	108.8	47.2	4.1	28.9	108.4	11.6	66.3	73.5	115.4	46.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	108.8	47.2	4.1	28.9	108.4	11.6	66.3	73.5	115.4	46.7
Queue Length 50th (m)	~37.4	85.3	0.0	18.8	~138.7	7.3	17.6	~151.0	~53.2	133.1
Queue Length 95th (m)	#86.8	#133.0	8.9	32.4	#206.1	24.9	#56.7	#194.7	#107.4	#181.2
Internal Link Dist (m)		102.3			103.8			335.4		115.5
Turn Bay Length (m)	100.0		45.0	35.0		30.0	25.0		55.0	
Base Capacity (vph)	202	525	532	257	491	506	171	1131	245	1272
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	1.07	0.79	0.19	0.53	1.10	0.33	0.88	1.04	1.10	0.94

Intersection Summary

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

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

HCM Signalized Intersection Capacity Analysis
1: Stanley Avenue & Ferry Street

Future Total
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	381	95	125	497	155	139	966	118	248	916	187
Future Volume (vph)	199	381	95	125	497	155	139	966	118	248	916	187
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1716	1458	1630	1716	1458	1630	3207		1630	3177	
Flt Permitted	0.12	1.00	1.00	0.29	1.00	1.00	0.10	1.00		0.10	1.00	
Satd. Flow (perm)	204	1716	1458	493	1716	1458	178	3207		165	3177	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	216	414	103	136	540	168	151	1050	128	270	996	203
RTOR Reduction (vph)	0	0	71	0	0	88	0	8	0	0	16	0
Lane Group Flow (vph)	216	414	32	136	540	80	151	1170	0	270	1183	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	42.7	33.7	33.7	38.3	31.5	31.5	45.5	38.5		53.5	43.5	
Effective Green, g (s)	42.7	33.7	33.7	38.3	31.5	31.5	45.5	38.5		53.5	43.5	
Actuated g/C Ratio	0.39	0.31	0.31	0.35	0.29	0.29	0.41	0.35		0.49	0.40	
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5	6.5	3.0	6.5		3.0	6.5	
Vehicle Extension (s)	2.5	2.2	2.2	2.5	2.2	2.2	2.5	2.2		2.5	2.2	
Lane Grp Cap (vph)	195	525	446	241	491	417	166	1122		240	1256	
v/s Ratio Prot	c0.09	0.24		0.03	0.31		0.06	0.36		c0.12	0.37	
v/s Ratio Perm	c0.34		0.02	0.16		0.05	0.32			c0.42		
v/c Ratio	1.11	0.79	0.07	0.56	1.10	0.19	0.91	1.04		1.12	0.94	
Uniform Delay, d1	28.2	34.9	27.0	26.6	39.2	29.6	24.8	35.8		31.8	32.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	96.3	7.3	0.0	2.4	70.6	0.1	44.0	38.6		95.9	14.9	
Delay (s)	124.4	42.2	27.1	29.0	109.9	29.7	68.8	74.3		127.6	46.9	
Level of Service	F	D	C	C	F	C	E	E		F	D	
Approach Delay (s)		64.3			80.9			73.7			61.7	
Approach LOS		E			F			E			E	

Intersection Summary				
HCM 2000 Control Delay	69.5	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.17			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	105.9%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	64	74	54	80	301	85	859	30	153	793	137
Future Volume (vph)	59	64	74	54	80	301	85	859	30	153	793	137
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	35.0		0.0	0.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.920			0.907			0.995			0.981	
Flt Protected	0.950				0.994			0.996			0.993	
Satd. Flow (prot)	1630	1578	0	0	1547	0	0	3231	0	0	3175	0
Flt Permitted	0.347				0.933			0.637			0.585	
Satd. Flow (perm)	595	1578	0	0	1452	0	0	2066	0	0	1871	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		80			91			6			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		79.3			129.4			319.9			359.4	
Travel Time (s)		5.7			9.3			23.0			25.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	70	80	59	87	327	92	934	33	166	862	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	150	0	0	473	0	0	1059	0	0	1177	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	28.0	28.0		28.0	28.0		28.0	28.0		28.0	28.0	
Total Split (s)	28.0	28.0		28.0	28.0		42.0	42.0		42.0	42.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%		60.0%	60.0%		60.0%	60.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0			0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0			7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)	20.6	20.6			20.6			35.4			35.4	
Actuated g/C Ratio	0.29	0.29			0.29			0.51			0.51	
v/c Ratio	0.37	0.29			0.96			1.01			1.22	
Control Delay	26.6	11.3			55.1			50.5			130.1	
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	26.6	11.3			55.1			50.5			130.1	
LOS	C	B			E			D			F	
Approach Delay		15.9			55.1			50.5			130.1	
Approach LOS		B			E			D			F	
Queue Length 50th (m)	6.9	7.0			52.4			~77.2			~108.0	
Queue Length 95th (m)	17.8	20.1			#111.1			#121.6			#147.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		55.3			105.4			295.9			335.4	
Turn Bay Length (m)	35.0											
Base Capacity (vph)	178	529			499			1048			963	
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	0.36	0.28			0.95			1.01			1.22	

Intersection Summary		
Area Type:	Other	
Cycle Length: 70		
Actuated Cycle Length: 70		
Offset: 29 (41%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 90		
Control Type: Actuated-Coordinated		
Maximum v/c Ratio: 1.22		
Intersection Signal Delay: 80.7	Intersection LOS: F	
Intersection Capacity Utilization 122.7%	ICU Level of Service H	
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: 2: Stanley Avenue & Robinson Street

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	64	150	473	1059	1177
v/c Ratio	0.37	0.29	0.96	1.01	1.22
Control Delay	26.6	11.3	55.1	50.5	130.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	11.3	55.1	50.5	130.1
Queue Length 50th (m)	6.9	7.0	52.4	~77.2	~108.0
Queue Length 95th (m)	17.8	20.1	#111.1	#121.6	#147.3
Internal Link Dist (m)		55.3	105.4	295.9	335.4
Turn Bay Length (m)	35.0				
Base Capacity (vph)	178	529	499	1048	963
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	0.36	0.28	0.95	1.01	1.22

Intersection Summary

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

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	64	74	54	80	301	85	859	30	153	793	137
Future Volume (vph)	59	64	74	54	80	301	85	859	30	153	793	137
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0			7.0			7.0			7.0	
Lane Util. Factor	1.00	1.00			1.00			0.95			0.95	
Frt	1.00	0.92			0.91			1.00			0.98	
Flt Protected	0.95	1.00			0.99			1.00			0.99	
Satd. Flow (prot)	1630	1578			1546			3231			3176	
Flt Permitted	0.35	1.00			0.93			0.64			0.58	
Satd. Flow (perm)	596	1578			1451			2067			1871	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	70	80	59	87	327	92	934	33	166	862	149
RTOR Reduction (vph)	0	56	0	0	64	0	0	3	0	0	16	0
Lane Group Flow (vph)	64	94	0	0	409	0	0	1056	0	0	1161	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.6	20.6			20.6			35.4			35.4	
Effective Green, g (s)	20.6	20.6			20.6			35.4			35.4	
Actuated g/C Ratio	0.29	0.29			0.29			0.51			0.51	
Clearance Time (s)	7.0	7.0			7.0			7.0			7.0	
Vehicle Extension (s)	2.1	2.1			2.1			2.2			2.2	
Lane Grp Cap (vph)	175	464			427			1045			946	
v/s Ratio Prot		0.06										
v/s Ratio Perm	0.11				c0.28			0.51			c0.62	
v/c Ratio	0.37	0.20			0.96			1.01			1.23	
Uniform Delay, d1	19.5	18.5			24.3			17.3			17.3	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	0.6	0.1			32.2			30.5			111.5	
Delay (s)	20.1	18.6			56.5			47.8			128.8	
Level of Service	C	B			E			D			F	
Approach Delay (s)		19.1			56.5			47.8			128.8	
Approach LOS		B			E			D			F	

Intersection Summary					
HCM 2000 Control Delay	79.7	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	1.13				
Actuated Cycle Length (s)	70.0	Sum of lost time (s)		14.0	
Intersection Capacity Utilization	122.7%	ICU Level of Service		H	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	108	34	90	116	188	144	814	128	307	671	57
Future Volume (vph)	67	108	34	90	116	188	144	814	128	307	671	57
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	30.0		0.0	30.0		0.0	70.0		0.0	60.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor	0.96	0.98		0.94	0.95			0.99		0.99		
Frt		0.964			0.907			0.980			0.988	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	1638	0	1599	1456	0	1599	2942	0	1583	3079	0
Flt Permitted	0.280			0.586			0.352			0.123		
Satd. Flow (perm)	470	1638	0	931	1456	0	592	2942	0	203	3079	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			91			21			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		123.4			170.2			248.0			319.9	
Travel Time (s)		8.9			12.3			17.9			23.0	
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Adj. Flow (vph)	73	117	37	98	126	204	157	885	139	334	729	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	73	154	0	98	330	0	157	1024	0	334	791	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Detector Phase	4	4		4	4		6	6		5	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		8.0	8.0		6.0	8.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		33.0	33.0		9.0	33.0	
Total Split (s)	35.0	35.0		35.0	35.0		40.0	40.0		20.0	60.0	
Total Split (%)	36.8%	36.8%		36.8%	36.8%		42.1%	42.1%		21.1%	63.2%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		0.0	3.0	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.0	-3.0		1.0	-3.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	Min	Min		Min	Min		C-Min	C-Min		None	C-Min	
Act Effct Green (s)	23.9	23.9		23.9	23.9		41.1	41.1		63.1	63.1	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.43	0.43		0.66	0.66	
v/c Ratio	0.62	0.36		0.42	0.76		0.62	0.80		0.84	0.39	
Control Delay	52.6	26.5		33.5	34.4		36.6	30.5		40.5	8.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	52.6	26.5		33.5	34.4		36.6	30.5		40.5	8.6	
LOS	D	C		C	C		D	C		D	A	
Approach Delay		34.9			34.2			31.3			18.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			B	
Queue Length 50th (m)	12.4	21.3		15.7	42.8		25.0	94.4		39.9	32.3	
Queue Length 95th (m)	26.8	35.4		28.4	68.5		#58.2	#137.1		#100.7	53.4	
Internal Link Dist (m)		99.4			146.2			224.0			295.9	
Turn Bay Length (m)	30.0			30.0			70.0			60.0		
Base Capacity (vph)	153	546		303	536		255	1284		400	2049	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.48	0.28		0.32	0.62		0.62	0.80		0.83	0.39	

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 95			
Offset: 1 (1%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green			
Natural Cycle: 90			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 27.0		Intersection LOS: C	
Intersection Capacity Utilization 91.0%		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: 3: Stanley Avenue & Murray St

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	73	154	98	330	157	1024	334	791
v/c Ratio	0.62	0.36	0.42	0.76	0.62	0.80	0.84	0.39
Control Delay	52.6	26.5	33.5	34.4	36.6	30.5	40.5	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	26.5	33.5	34.4	36.6	30.5	40.5	8.6
Queue Length 50th (m)	12.4	21.3	15.7	42.8	25.0	94.4	39.9	32.3
Queue Length 95th (m)	26.8	35.4	28.4	68.5	#58.2	#137.1	#100.7	53.4
Internal Link Dist (m)		99.4		146.2		224.0		295.9
Turn Bay Length (m)	30.0		30.0		70.0		60.0	
Base Capacity (vph)	153	546	303	536	255	1284	400	2049
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.28	0.32	0.62	0.62	0.80	0.83	0.39

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	108	34	90	116	188	144	814	128	307	671	57
Future Volume (vph)	67	108	34	90	116	188	144	814	128	307	671	57
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	0.95		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.94	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.91		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1599	1638		1510	1457		1599	2941		1582	3080	
Flt Permitted	0.28	1.00		0.59	1.00		0.35	1.00		0.12	1.00	
Satd. Flow (perm)	472	1638		931	1457		593	2941		205	3080	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	117	37	98	126	204	157	885	139	334	729	62
RTOR Reduction (vph)	0	13	0	0	68	0	0	12	0	0	5	0
Lane Group Flow (vph)	73	141	0	98	262	0	157	1012	0	334	786	0
Confl. Peds. (#/hr)	76		71	71		76			37	37		
Heavy Vehicles (%)	0%	0%	4%	4%	0%	5%	4%	10%	6%	5%	7%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			4			6		5	2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)	20.9	20.9		20.9	20.9		38.1	38.1		60.1	60.1	
Effective Green, g (s)	23.9	23.9		23.9	23.9		41.1	41.1		59.1	63.1	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.43	0.43		0.62	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.3	2.5	
Lane Grp Cap (vph)	118	412		234	366		256	1272		388	2045	
v/s Ratio Prot		0.09			c0.18			0.34		c0.16	0.26	
v/s Ratio Perm	0.15			0.11			0.26			c0.37		
v/c Ratio	0.62	0.34		0.42	0.72		0.61	0.80		0.86	0.38	
Uniform Delay, d1	31.5	29.1		29.7	32.4		20.8	23.3		23.1	7.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.0	0.4		0.9	6.1		10.5	5.2		17.1	0.5	
Delay (s)	39.5	29.5		30.6	38.5		31.3	28.5		40.2	7.7	
Level of Service	D	C		C	D		C	C		D	A	
Approach Delay (s)		32.7			36.7			28.9			17.4	
Approach LOS		C			D			C			B	

Intersection Summary					
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.80				
Actuated Cycle Length (s)	95.0	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	91.0%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	2	33	47	13	336	13	650	18	195	726	17
Future Volume (vph)	16	2	33	47	13	336	13	650	18	195	726	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	20.0		0.0	65.0		0.0	135.0		0.0
Storage Lanes	0		0	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.912				0.850		0.996			0.997	
Flt Protected		0.985			0.962		0.950			0.950		
Satd. Flow (prot)	0	1541	0	0	1650	1458	1630	3247	0	1630	3250	0
Flt Permitted		0.872			0.735		0.347			0.341		
Satd. Flow (perm)	0	1364	0	0	1261	1458	595	3247	0	585	3250	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36				338		3			3	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		115.6			131.8			135.9			248.0	
Travel Time (s)		8.3			9.5			9.8			17.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	2	36	51	14	365	14	707	20	212	789	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	55	0	0	65	365	14	727	0	212	807	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	34.0	34.0		34.0	34.0	34.0	9.5	37.0		9.5	37.0	
Total Split (s)	37.0	37.0		37.0	37.0	37.0	10.0	42.0		18.0	50.0	
Total Split (%)	38.1%	38.1%		38.1%	38.1%	38.1%	10.3%	43.3%		18.6%	51.5%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	0.0	3.0		0.0	3.0	
Lost Time Adjust (s)		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	C-Max		None	C-Max	
Act Effct Green (s)		10.9			10.9	10.9	70.0	60.8		76.1	70.4	
Actuated g/C Ratio		0.11			0.11	0.11	0.72	0.63		0.78	0.73	
v/c Ratio		0.30			0.46	0.79	0.03	0.36		0.39	0.34	
Control Delay		21.7			48.7	18.8	4.1	10.6		5.4	6.6	
Queue Delay		0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		21.7			48.7	18.8	4.1	10.6		5.4	6.6	
LOS		C			D	B	A	B		A	A	
Approach Delay		21.7			23.3			10.4			6.3	
Approach LOS		C			C			B			A	
Queue Length 50th (m)		3.5			12.4	5.0	0.4	30.7		7.3	21.8	
Queue Length 95th (m)		13.4			23.1	32.1	2.5	62.5		21.4	60.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		91.6			107.8			111.9			224.0	
Turn Bay Length (m)							65.0			135.0		
Base Capacity (vph)		446			390	684	515	2037		620	2359	
Starvation Cap Reductn		0			0	0	0	0		0	0	
Spillback Cap Reductn		0			0	0	0	0		0	0	
Storage Cap Reductn		0			0	0	0	0		0	0	
Reduced v/c Ratio		0.12			0.17	0.53	0.03	0.36		0.34	0.34	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 97			
Offset: 85 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Natural Cycle: 85			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 11.3		Intersection LOS: B	
Intersection Capacity Utilization 64.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 4: Stanley Avenue & Dixon Street/Main Street

Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	65	365	14	727	212	807
v/c Ratio	0.30	0.46	0.79	0.03	0.36	0.39	0.34
Control Delay	21.7	48.7	18.8	4.1	10.6	5.4	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	48.7	18.8	4.1	10.6	5.4	6.6
Queue Length 50th (m)	3.5	12.4	5.0	0.4	30.7	7.3	21.8
Queue Length 95th (m)	13.4	23.1	32.1	2.5	62.5	21.4	60.1
Internal Link Dist (m)	91.6	107.8			111.9		224.0
Turn Bay Length (m)				65.0		135.0	
Base Capacity (vph)	446	390	684	515	2037	620	2359
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.17	0.53	0.03	0.36	0.34	0.34

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	2	33	47	13	336	13	650	18	195	726	17
Future Volume (vph)	16	2	33	47	13	336	13	650	18	195	726	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.91			1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		0.98			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1540			1651	1458	1630	3246		1630	3249	
Flt Permitted		0.87			0.74	1.00	0.35	1.00		0.34	1.00	
Satd. Flow (perm)		1364			1262	1458	595	3246		586	3249	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	2	36	51	14	365	14	707	20	212	789	18
RTOR Reduction (vph)	0	32	0	0	0	300	0	1	0	0	1	0
Lane Group Flow (vph)	0	23	0	0	65	65	14	726	0	212	806	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		10.9			10.9	10.9	61.9	60.8		72.1	68.0	
Effective Green, g (s)		10.9			10.9	10.9	61.9	60.8		72.1	68.0	
Actuated g/C Ratio		0.11			0.11	0.11	0.64	0.63		0.74	0.70	
Clearance Time (s)		7.0			7.0	7.0	3.0	7.0		3.0	7.0	
Vehicle Extension (s)		2.3			2.3	2.3	2.3	2.5		2.3	2.5	
Lane Grp Cap (vph)		153			141	163	391	2034		524	2277	
v/s Ratio Prot							0.00	0.22		c0.03	0.25	
v/s Ratio Perm		0.02			c0.05	0.04	0.02			c0.27		
v/c Ratio		0.15			0.46	0.40	0.04	0.36		0.40	0.35	
Uniform Delay, d1		38.9			40.3	40.0	6.4	8.7		3.9	5.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			1.4	0.9	0.0	0.5		0.3	0.4	
Delay (s)		39.1			41.7	40.9	6.4	9.2		4.2	6.2	
Level of Service		D			D	D	A	A		A	A	
Approach Delay (s)		39.1			41.1			9.1			5.8	
Approach LOS		D			D			A			A	

Intersection Summary					
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.42				
Actuated Cycle Length (s)	97.0	Sum of lost time (s)		17.0	
Intersection Capacity Utilization	64.4%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	622	88	68	696	28	71
Future Volume (vph)	622	88	68	696	28	71
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.983				0.903	
Flt Protected				0.996	0.986	
Satd. Flow (prot)	1687	0	0	1709	1528	0
Flt Permitted				0.996	0.986	
Satd. Flow (perm)	1687	0	0	1709	1528	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	158.5			126.3	366.1	
Travel Time (s)	11.4			9.1	26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	676	96	74	757	30	77
Shared Lane Traffic (%)						
Lane Group Flow (vph)	772	0	0	831	107	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	622	88	68	696	28	71
Future Volume (Veh/h)	622	88	68	696	28	71
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	676	96	74	757	30	77
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				126		
pX, platoon unblocked					0.68	
vC, conflicting volume			772		1629	724
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			772		1691	724
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		53	82
cM capacity (veh/h)			843		63	426

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	772	831	107
Volume Left	0	74	30
Volume Right	96	0	77
cSH	1700	843	163
Volume to Capacity	0.45	0.09	0.65
Queue Length 95th (m)	0.0	2.3	29.8
Control Delay (s)	0.0	2.3	61.3
Lane LOS		A	F
Approach Delay (s)	0.0	2.3	61.3
Approach LOS			F

Intersection Summary				
Average Delay	4.9			
Intersection Capacity Utilization	101.6%	ICU Level of Service		G
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	112	11	4	130	58	11	53	34	39	21	6
Future Volume (vph)	4	112	11	4	130	58	11	53	34	39	21	6
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.959			0.953			0.987	
Flt Protected		0.999			0.999			0.994			0.972	
Satd. Flow (prot)	0	1693	0	0	1644	0	0	1625	0	0	1646	0
Flt Permitted		0.999			0.999			0.994			0.972	
Satd. Flow (perm)	0	1693	0	0	1644	0	0	1625	0	0	1646	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		398.3			52.4			76.2			366.1	
Travel Time (s)		28.7			3.8			5.5			26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	122	12	4	141	63	12	58	37	42	23	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	138	0	0	208	0	0	107	0	0	72	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	30.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	112	11	4	130	58	11	53	34	39	21	6
Future Volume (Veh/h)	4	112	11	4	130	58	11	53	34	39	21	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	122	12	4	141	63	12	58	37	42	23	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					132							
pX, platoon unblocked												
vC, conflicting volume	204			134			335	348	128	382	322	172
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	204			134			335	348	128	382	322	172
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			98	90	96	92	96	99
cM capacity (veh/h)	1368			1451			593	572	922	507	592	871

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	138	208	107	72
Volume Left	4	4	12	42
Volume Right	12	63	37	7
cSH	1368	1451	662	555
Volume to Capacity	0.00	0.00	0.16	0.13
Queue Length 95th (m)	0.1	0.1	4.6	3.6
Control Delay (s)	0.2	0.2	11.5	12.4
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	0.2	11.5	12.4
Approach LOS			B	B

Intersection Summary					
Average Delay	4.2				
Intersection Capacity Utilization	30.4%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	2	128	12	21	2	7	1	2	10	0	4
Future Volume (vph)	4	2	128	12	21	2	7	1	2	10	0	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)		45.0	0.0		0.0		0.0			0.0		0.0
Storage Lanes		1	1		0		0			0		0
Taper Length (m)		7.5			7.5					7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99	0.87			0.97					0.96	
Frt			0.850			0.964					0.964	
Flt Protected		0.950				0.967					0.964	
Satd. Flow (prot)	0	1662	1461	0	0	1466	0	0	0	0	1607	0
Flt Permitted		0.692				0.784					0.799	
Satd. Flow (perm)	0	1200	1273	0	0	1167	0	0	0	0	1296	0
Right Turn on Red				No				No				Yes
Satd. Flow (RTOR)											132	
Link Speed (k/h)		50				50					50	
Link Distance (m)		123.4				224.2					243.2	
Travel Time (s)		8.9				16.1					17.5	
Confl. Peds. (#/hr)	3	1	6	21	6		7	2	7	2		6
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	5	2	158	15	26	2	9	1	2	12	0	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	173	0	0	38	0	0	0	0	19	0
Turn Type	Perm	Perm	Perm		Perm	NA			Perm	Perm	NA	
Protected Phases						3					3	
Permitted Phases	2	2	2		3				3	3		
Detector Phase	2	2	2		3	3			3	3	3	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0			8.0	8.0	8.0	
Minimum Split (s)	20.8	20.8	20.8		19.8	19.8			19.8	19.8	19.8	
Total Split (s)	38.4	38.4	38.4		21.0	21.0			21.0	21.0	21.0	
Total Split (%)	33.5%	33.5%	33.5%		18.3%	18.3%			18.3%	18.3%	18.3%	
Yellow Time (s)	4.1	4.1	4.1		4.1	4.1			4.1	4.1	4.1	
All-Red Time (s)	2.7	2.7	2.7		2.7	2.7			2.7	2.7	2.7	
Lost Time Adjust (s)		-2.8	-2.8			-2.8					-2.8	
Total Lost Time (s)		4.0	4.0			4.0					4.0	
Lead/Lag	Lag	Lag	Lag		Lead	Lead			Lead	Lead	Lead	
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min		None	None			None	None	None	
Act Effct Green (s)		22.2	22.2			12.5					12.5	
Actuated g/C Ratio		0.26	0.26			0.15					0.15	
v/c Ratio		0.02	0.52			0.22					0.06	
Control Delay		27.3	35.1			42.0					0.4	
Queue Delay		0.0	0.0			0.0					0.0	
Total Delay		27.3	35.1			42.0					0.4	
LOS		C	D			D					A	
Approach Delay		34.8				42.0					0.4	

Lane Group	SEL2	SEL	SET	SER	NWT	Ø4
Lane Configurations						
Traffic Volume (vph)	2	80	119	11	2	
Future Volume (vph)	2	80	119	11	2	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	
Storage Length (m)		20.0		0.0		
Storage Lanes		1		0		
Taper Length (m)		7.5				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.92	1.00			
Frt			0.987			
Flt Protected		0.950				
Satd. Flow (prot)	0	1662	1649	0	1750	
Flt Permitted		0.757				
Satd. Flow (perm)	0	1224	1649	0	1750	
Right Turn on Red				No		
Satd. Flow (RTOR)						
Link Speed (k/h)			50		50	
Link Distance (m)			197.9		158.7	
Travel Time (s)			14.2		11.4	
Confl. Peds. (#/hr)	21	7		1		
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	
Heavy Vehicles (%)	0%	0%	5%	0%	0%	
Adj. Flow (vph)	2	99	147	14	2	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	101	161	0	2	
Turn Type	Perm	Perm	NA		NA	
Protected Phases			1		1	4
Permitted Phases	1	1				
Detector Phase	1	1	1		1	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0		8.0	1.0
Minimum Split (s)	27.8	27.8	27.8		27.8	24.3
Total Split (s)	31.0	31.0	31.0		31.0	24.3
Total Split (%)	27.0%	27.0%	27.0%		27.0%	21%
Yellow Time (s)	4.1	4.1	4.1		4.1	3.3
All-Red Time (s)	2.7	2.7	2.7		2.7	0.0
Lost Time Adjust (s)		-2.8	-2.8		-2.8	
Total Lost Time (s)		4.0	4.0		4.0	
Lead/Lag	Lead	Lead	Lead		Lead	Lag
Lead-Lag Optimize?						
Recall Mode	Min	Min	Min		Min	Ped
Act Effct Green (s)		19.1	19.1		19.1	
Actuated g/C Ratio		0.23	0.23		0.23	
v/c Ratio		0.36	0.43		0.01	
Control Delay		35.8	35.2		30.5	
Queue Delay		0.0	0.0		0.0	
Total Delay		35.8	35.2		30.5	
LOS		D	D		C	
Approach Delay			35.4		30.5	

Lane Group	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Approach LOS		C				D					A	
Queue Length 50th (m)		0.9	26.7			6.2					0.0	
Queue Length 95th (m)		4.3	47.9			16.7					0.0	
Internal Link Dist (m)		99.4				200.2					219.2	
Turn Bay Length (m)		45.0										
Base Capacity (vph)		518	549			249					380	
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		0.01	0.32			0.15					0.05	

Intersection Summary			
Area Type:	Other		
Cycle Length: 114.7			
Actuated Cycle Length: 84.2			
Natural Cycle: 95			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 34.3		Intersection LOS: C	
Intersection Capacity Utilization 40.5%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Allendale Avenue & Main St & Murray St

Lane Group	SEL2	SEL	SET	SER	NWT	Ø4
Approach LOS			D		C	
Queue Length 50th (m)		15.5	25.0		0.3	
Queue Length 95th (m)		31.7	45.9		2.1	
Internal Link Dist (m)			173.9		134.7	
Turn Bay Length (m)		20.0				
Base Capacity (vph)		414	558		592	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		0.24	0.29		0.00	

Intersection Summary

Lane Group	WBL	WBR	NBT	SBT	SEL	SET	NWT
Lane Group Flow (vph)	7	173	38	19	101	161	2
v/c Ratio	0.02	0.52	0.22	0.06	0.36	0.43	0.01
Control Delay	27.3	35.1	42.0	0.4	35.8	35.2	30.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	35.1	42.0	0.4	35.8	35.2	30.5
Queue Length 50th (m)	0.9	26.7	6.2	0.0	15.5	25.0	0.3
Queue Length 95th (m)	4.3	47.9	16.7	0.0	31.7	45.9	2.1
Internal Link Dist (m)	99.4		200.2	219.2		173.9	134.7
Turn Bay Length (m)	45.0				20.0		
Base Capacity (vph)	518	549	249	380	414	558	592
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.32	0.15	0.05	0.24	0.29	0.00

Intersection Summary

Movement	WBL2	WBL	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	2	128	12	21	2	7	1	2	10	0	4
Future Volume (vph)	4	2	128	12	21	2	7	1	2	10	0	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0			4.0					4.0	
Lane Util. Factor		1.00	1.00			1.00					1.00	
Frpb, ped/bikes		1.00	0.90			0.99					0.99	
Flpb, ped/bikes		0.99	1.00			0.99					0.98	
Frt		1.00	0.85			0.96					0.96	
Flt Protected		0.95	1.00			0.97					0.96	
Satd. Flow (prot)		1651	1312			1450					1577	
Flt Permitted		0.69	1.00			0.78					0.80	
Satd. Flow (perm)		1202	1312			1176					1307	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	5	2	158	15	26	2	9	1	2	12	0	5
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	17	0
Lane Group Flow (vph)	0	7	173	0	0	38	0	0	0	0	2	0
Confl. Peds. (#/hr)	3	1	6	21	6		7	2	7	2		6
Heavy Vehicles (%)	0%	0%	2%	0%	14%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	Perm	Perm		Perm	NA			Perm	Perm	NA	
Protected Phases						3					3	
Permitted Phases	2	2	2		3				3	3		
Actuated Green, G (s)		19.3	19.3			5.2					5.2	
Effective Green, g (s)		22.1	22.1			8.0					8.0	
Actuated g/C Ratio		0.26	0.26			0.09					0.09	
Clearance Time (s)		6.8	6.8			6.8					6.8	
Vehicle Extension (s)		5.0	5.0			3.0					3.0	
Lane Grp Cap (vph)		307	335			108					120	
v/s Ratio Prot												
v/s Ratio Perm		0.01	c0.13			c0.03					0.00	
v/c Ratio		0.02	0.52			0.35					0.01	
Uniform Delay, d1		24.1	27.6			36.8					35.7	
Progression Factor		1.00	1.00			1.00					1.00	
Incremental Delay, d2		0.1	2.7			2.0					0.0	
Delay (s)		24.2	30.3			38.8					35.7	
Level of Service		C	C			D					D	
Approach Delay (s)		30.0				38.8					35.7	
Approach LOS		C				D					D	

Intersection Summary			
HCM 2000 Control Delay	31.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	86.5	Sum of lost time (s)	18.1
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

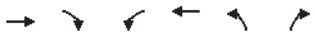
c Critical Lane Group

Movement	SEL2	SEL	SET	SER	NWT
Lane Configurations					
Traffic Volume (vph)	2	80	119	11	2
Future Volume (vph)	2	80	119	11	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750
Total Lost time (s)		4.0	4.0		4.0
Lane Util. Factor		1.00	1.00		1.00
Frpb, ped/bikes		1.00	1.00		1.00
Flpb, ped/bikes		0.94	1.00		1.00
Frt		1.00	0.99		1.00
Flt Protected		0.95	1.00		1.00
Satd. Flow (prot)		1567	1649		1750
Flt Permitted		0.76	1.00		1.00
Satd. Flow (perm)		1248	1649		1750
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	2	99	147	14	2
RTOR Reduction (vph)	0	0	0	0	0
Lane Group Flow (vph)	0	101	161	0	2
Confl. Peds. (#/hr)	21	7		1	
Heavy Vehicles (%)	0%	0%	5%	0%	0%
Turn Type	Perm	Perm	NA		NA
Protected Phases			1		1
Permitted Phases	1	1			
Actuated Green, G (s)		16.1	16.1		16.1
Effective Green, g (s)		18.9	18.9		18.9
Actuated g/C Ratio		0.22	0.22		0.22
Clearance Time (s)		6.8	6.8		6.8
Vehicle Extension (s)		5.0	5.0		5.0
Lane Grp Cap (vph)		272	360		382
v/s Ratio Prot			c0.10		0.00
v/s Ratio Perm		0.08			
v/c Ratio		0.37	0.45		0.01
Uniform Delay, d1		28.7	29.3		26.4
Progression Factor		1.00	1.00		1.00
Incremental Delay, d2		1.8	1.8		0.0
Delay (s)		30.5	31.1		26.5
Level of Service		C	C		C
Approach Delay (s)			30.9		26.5
Approach LOS			C		C

Intersection Summary

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	84	13	157	99	14	64
Future Volume (vph)	84	13	157	99	14	64
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.982				0.889	
Flt Protected				0.970	0.991	
Satd. Flow (prot)	1685	0	0	1664	1512	0
Flt Permitted				0.970	0.991	
Satd. Flow (perm)	1685	0	0	1664	1512	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	52.4			79.3	43.1	
Travel Time (s)	3.8			5.7	3.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	14	171	108	15	70
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	0	0	279	85	0
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	84	13	157	99	14	64
Future Volume (Veh/h)	84	13	157	99	14	64
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	14	171	108	15	70
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				79		
pX, platoon unblocked						
vC, conflicting volume			105		548	98
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			105		548	98
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		97	93
cM capacity (veh/h)			1486		440	958

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	105	279	85
Volume Left	0	171	15
Volume Right	14	0	70
cSH	1700	1486	793
Volume to Capacity	0.06	0.12	0.11
Queue Length 95th (m)	0.0	3.1	2.9
Control Delay (s)	0.0	5.1	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	5.1	10.1
Approach LOS			B

Intersection Summary				
Average Delay			4.9	
Intersection Capacity Utilization			33.6%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	11	42	55	5	25	11
Future Volume (vph)	11	42	55	5	25	11
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.893		0.990			
Flt Protected	0.990					0.967
Satd. Flow (prot)	1517	0	1699	0	0	1659
Flt Permitted	0.990					0.967
Satd. Flow (perm)	1517	0	1699	0	0	1659
Link Speed (k/h)	50		50			50
Link Distance (m)	51.9		243.2			76.2
Travel Time (s)	3.7		17.5			5.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	46	60	5	27	12
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	65	0	0	39
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 18.9%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	42	55	5	25	11
Future Volume (Veh/h)	11	42	55	5	25	11
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	46	60	5	27	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			243			
pX, platoon unblocked						
vC, conflicting volume	128	62			65	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	128	62			65	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	95			98	
cM capacity (veh/h)	851	1002			1537	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	58	65	39
Volume Left	12	0	27
Volume Right	46	5	0
cSH	967	1700	1537
Volume to Capacity	0.06	0.04	0.02
Queue Length 95th (m)	1.5	0.0	0.4
Control Delay (s)	9.0	0.0	5.2
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	5.2
Approach LOS	A		

Intersection Summary				
Average Delay		4.4		
Intersection Capacity Utilization		18.9%	ICU Level of Service	A
Analysis Period (min)		15		

Intersection: 1: Stanley Avenue & Ferry Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	104.6	116.5	52.5	42.4	127.6	37.5	32.4	254.4	256.6	62.4	141.6	139.8
Average Queue (m)	60.6	79.8	25.7	29.6	118.6	26.2	25.0	151.5	155.7	57.6	130.8	128.2
95th Queue (m)	106.2	123.7	60.3	51.2	122.7	48.9	40.9	271.9	275.0	79.9	141.6	142.7
Link Distance (m)		104.7			113.4			335.8	335.8		126.1	126.1
Upstream Blk Time (%)	1	9			72			0	0		67	43
Queuing Penalty (veh)	0	61			0			0	0		0	0
Storage Bay Dist (m)	100.0		45.0	35.0		30.0	25.0			55.0		
Storage Blk Time (%)	4	27	2	10	65	1	17	51		33	53	
Queuing Penalty (veh)	18	81	9	65	183	8	84	71		150	131	

Intersection: 2: Stanley Avenue & Robinson Street

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	LTR	LT	TR	LT	TR
Maximum Queue (m)	28.9	38.0	121.4	220.6	226.4	344.8	348.8
Average Queue (m)	10.9	16.9	69.6	96.0	94.7	302.2	298.5
95th Queue (m)	22.8	31.4	113.5	200.5	200.6	397.9	404.9
Link Distance (m)		57.8	115.6	299.4	299.4	335.8	335.8
Upstream Blk Time (%)			3	1	1	17	16
Queuing Penalty (veh)			0	3	3	98	89
Storage Bay Dist (m)	35.0						
Storage Blk Time (%)	0	1					
Queuing Penalty (veh)	0	0					

Intersection: 3: Stanley Avenue & Murray St

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	34.0	43.5	37.4	114.7	77.3	152.6	155.1	67.2	128.3	84.8
Average Queue (m)	14.1	21.5	22.7	48.6	35.6	74.5	77.9	39.6	38.8	31.6
95th Queue (m)	28.4	38.9	42.2	93.5	73.9	130.9	131.3	68.3	89.3	59.3
Link Distance (m)		94.8		156.4		224.8	224.8		299.4	299.4
Upstream Blk Time (%)				0		0	0			
Queuing Penalty (veh)				0		2	2			
Storage Bay Dist (m)	30.0		30.0		70.0			60.0		
Storage Blk Time (%)	1	3	2	28	2	9		7	0	
Queuing Penalty (veh)	1	2	7	25	7	13		23	0	

Intersection: 4: Stanley Avenue & Dixon Street/Main Street

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LT	R	L	T	TR	L	T	TR
Maximum Queue (m)	31.9	27.2	72.3	10.3	69.6	64.7	43.8	58.2	53.9
Average Queue (m)	10.4	13.6	29.9	2.0	30.5	17.1	16.2	17.3	19.0
95th Queue (m)	22.8	27.9	53.5	8.3	56.3	44.1	32.5	41.9	43.1
Link Distance (m)	101.8		117.3		127.5	127.5		224.8	224.8
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		20.0		65.0			135.0		
Storage Blk Time (%)		3	18		0				
Queuing Penalty (veh)		10	11		0				

Intersection: 5: Allendale Avenue & Ferry Street

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	116.6	85.3	99.4
Average Queue (m)	21.3	27.3	37.0
95th Queue (m)	86.1	76.6	138.8
Link Distance (m)	148.5	104.7	346.8
Upstream Blk Time (%)	1	0	
Queuing Penalty (veh)	0	4	
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Allendale Avenue & Robinson Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	3.5	10.3	20.3	15.4
Average Queue (m)	0.1	0.5	9.9	8.1
95th Queue (m)	1.8	4.2	16.4	14.1
Link Distance (m)	374.0	33.8	60.4	346.8
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Allendale Avenue & Main St & Murray St

Movement	WB	WB	NB	SB	SE	SE	NW
Directions Served	<L	R>	LTR>	<LTR	<L	TR	LTR
Maximum Queue (m)	8.8	45.3	24.1	11.5	27.4	49.1	0.8
Average Queue (m)	1.1	18.4	6.4	3.0	11.5	16.6	0.0
95th Queue (m)	5.4	35.5	17.2	9.5	25.3	36.0	0.4
Link Distance (m)		94.8	193.1	214.4		171.9	132.7
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	45.0				20.0		
Storage Blk Time (%)		0			2	9	
Queuing Penalty (veh)		0			2	7	

Intersection: 9: Driveway A & Robinson Street

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	16.0	17.8
Average Queue (m)	4.0	8.8
95th Queue (m)	12.7	15.6
Link Distance (m)	57.8	32.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 10: Allendale Avenue & Driveway B

Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	16.7	1.4	10.2
Average Queue (m)	7.4	0.0	0.5
95th Queue (m)	14.3	1.0	4.6
Link Distance (m)	43.2	214.4	60.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 1174

Appendix G

Total Traffic Operations Sensitivity

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	381	95	125	497	155	139	966	118	248	916	187
Future Volume (vph)	199	381	95	125	497	155	139	966	118	248	916	187
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	100.0		0.0	35.0		30.0	25.0		0.0	55.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.964			0.984			0.975	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1630	1716	1458	1630	3142	0	1630	3208	0	1630	3178	0
Flt Permitted	0.143			0.281			0.115			0.092		
Satd. Flow (perm)	245	1716	1458	482	3142	0	197	3208	0	158	3178	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			124		35			13			27	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		126.3			198.9			359.4			139.5	
Travel Time (s)		9.1			14.3			25.9			10.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	216	414	103	136	540	168	151	1050	128	270	996	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	216	414	103	136	708	0	151	1178	0	270	1199	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		

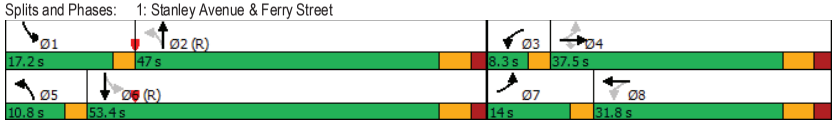
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	33.5	33.5	9.5	33.5		9.5	33.5		9.5	33.5	
Total Split (s)	14.0	37.5	37.5	8.3	31.8		10.8	47.0		17.2	53.4	
Total Split (%)	12.7%	34.1%	34.1%	7.5%	28.9%		9.8%	42.7%		15.6%	48.5%	
Maximum Green (s)	11.0	31.0	31.0	5.3	25.3		7.8	40.5		14.2	46.9	
Yellow Time (s)	3.0	4.1	4.1	3.0	4.1		3.0	4.1		3.0	4.1	
All-Red Time (s)	0.0	2.4	2.4	0.0	2.4		0.0	2.4		0.0	2.4	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.5	6.5	3.0	6.5		3.0	6.5		3.0	6.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.2	2.2	2.5	2.2		2.5	2.2		2.5	2.2	
Recall Mode	None	None	None	None	None		None	C-Max		None	C-Max	
Walk Time (s)		10.0	10.0		10.0			10.0			10.0	
Flash Dont Walk (s)		17.0	17.0		17.0			17.0			17.0	
Pedestrian Calls (#/hr)		0	0		0			0			0	
Act Effct Green (s)	42.5	30.7	30.7	33.8	25.0		51.8	40.5		61.5	47.2	
Actuated g/C Ratio	0.39	0.28	0.28	0.31	0.23		0.47	0.37		0.56	0.43	
v/c Ratio	0.93	0.86	0.21	0.67	0.95		0.78	0.99		0.96	0.87	
Control Delay	70.8	56.9	4.5	43.6	64.0		45.4	58.8		73.7	36.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	70.8	56.9	4.5	43.6	64.0		45.4	58.8		73.7	36.4	
LOS	E	E	A	D	E		D	E		E	D	
Approach Delay		53.6			60.7			57.2			43.2	
Approach LOS		D			E			E			D	
Queue Length 50th (m)	33.9	88.6	0.0	20.2	79.7		15.8	136.6		44.8	125.4	
Queue Length 95th (m)	#78.7	#142.9	9.3	#39.0	#117.8		#48.5	#187.3		#99.4	#158.6	
Internal Link Dist (m)		102.3			174.9			335.4			115.5	
Turn Bay Length (m)	100.0			35.0			25.0			55.0		
Base Capacity (vph)	232	483	499	203	749		194	1189		281	1377	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.93	0.86	0.21	0.67	0.95		0.78	0.99		0.96	0.87	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 6 (5%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 52.6 Intersection LOS: D
Intersection Capacity Utilization 97.8% 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: Stanley Avenue & Ferry Street



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	216	414	103	136	708	151	1178	270	1199
v/c Ratio	0.93	0.86	0.21	0.67	0.95	0.78	0.99	0.96	0.87
Control Delay	70.8	56.9	4.5	43.6	64.0	45.4	58.8	73.7	36.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.8	56.9	4.5	43.6	64.0	45.4	58.8	73.7	36.4
Queue Length 50th (m)	33.9	88.6	0.0	20.2	79.7	15.8	136.6	44.8	125.4
Queue Length 95th (m)	#78.7	#142.9	9.3	#39.0	#117.8	#48.5	#187.3	#99.4	#158.6
Internal Link Dist (m)		102.3			174.9		335.4		115.5
Turn Bay Length (m)	100.0			35.0		25.0		55.0	
Base Capacity (vph)	232	483	499	203	749	194	1189	281	1377
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.86	0.21	0.67	0.95	0.78	0.99	0.96	0.87

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	381	95	125	497	155	139	966	118	248	916	187
Future Volume (vph)	199	381	95	125	497	155	139	966	118	248	916	187
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	3.0	6.5	6.5	3.0	6.5		3.0	6.5		3.0	6.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1716	1458	1630	3144		1630	3207		1630	3177	
Flt Permitted	0.14	1.00	1.00	0.28	1.00		0.11	1.00		0.09	1.00	
Satd. Flow (perm)	245	1716	1458	482	3144		197	3207		158	3177	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	216	414	103	136	540	168	151	1050	128	270	996	203
RTOR Reduction (vph)	0	0	74	0	27	0	0	8	0	0	15	0
Lane Group Flow (vph)	216	414	29	136	681	0	151	1170	0	270	1184	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	39.0	30.7	30.7	30.3	25.0		48.3	40.5		58.0	47.2	
Effective Green, g (s)	39.0	30.7	30.7	30.3	25.0		48.3	40.5		58.0	47.2	
Actuated g/C Ratio	0.35	0.28	0.28	0.28	0.23		0.44	0.37		0.53	0.43	
Clearance Time (s)	3.0	6.5	6.5	3.0	6.5		3.0	6.5		3.0	6.5	
Vehicle Extension (s)	2.5	2.2	2.2	2.5	2.2		2.5	2.2		2.5	2.2	
Lane Grp Cap (vph)	225	478	406	188	714		188	1180		277	1363	
v/s Ratio Prot	c0.10	0.24		0.03	0.22		0.06	0.36		c0.13	0.37	
v/s Ratio Perm	c0.24		0.02	0.16			0.30			c0.39		
v/c Ratio	0.96	0.87	0.07	0.72	0.95		0.80	0.99		0.97	0.87	
Uniform Delay, d1	28.7	37.7	29.2	35.0	41.9		22.2	34.6		32.7	28.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	48.1	14.8	0.0	12.1	22.7		20.9	24.2		46.7	7.7	
Delay (s)	76.8	52.5	29.2	47.2	64.6		43.1	58.8		79.4	36.3	
Level of Service	E	D	C	D	E		D	E		E	D	
Approach Delay (s)		56.4			61.8			57.0			44.2	
Approach LOS		E			E			E			D	

Intersection Summary				
HCM 2000 Control Delay	53.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	97.8%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	64	74	54	80	301	85	859	30	153	793	137
Future Volume (vph)	59	64	74	54	80	301	85	859	30	153	793	137
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	35.0		0.0	0.0		15.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	0		1	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt		0.920				0.850		0.995			0.981	
Flt Protected	0.950				0.980			0.996			0.993	
Satd. Flow (prot)	1630	1578	0	0	1681	1458	0	3231	0	0	3175	0
Flt Permitted	0.664				0.802			0.697			0.607	
Satd. Flow (perm)	1139	1578	0	0	1376	1458	0	2261	0	0	1941	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		60				193		5			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		79.3			129.4			319.9			359.4	
Travel Time (s)		5.7			9.3			23.0			25.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	70	80	59	87	327	92	934	33	166	862	149
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	150	0	0	146	327	0	1059	0	0	1177	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	28.0	28.0		28.0	28.0	28.0	28.0	28.0		9.5	28.0	
Total Split (s)	28.0	28.0		28.0	28.0	28.0	52.5	52.5		9.5	62.0	
Total Split (%)	31.1%	31.1%		31.1%	31.1%	31.1%	58.3%	58.3%		10.6%	68.9%	
Maximum Green (s)	21.0	21.0		21.0	21.0	21.0	45.5	45.5		5.0	55.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		3.5	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		1.0	3.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0			0.0	
Total Lost Time (s)	7.0	7.0			7.0	7.0		7.0			7.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	2.1	2.1		2.1	2.1	2.1	2.2	2.2		3.0	2.2	
Recall Mode	None	None		None	None	None	Max	Max		None	Max	
Walk Time (s)	8.0	8.0		8.0	8.0	8.0	8.0	8.0			8.0	
Flash Dont Walk (s)	13.0	13.0		13.0	13.0	13.0	13.0	13.0			13.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0			0	
Act Effct Green (s)	13.6	13.6			13.6	13.6		55.2			55.2	
Actuated g/C Ratio	0.16	0.16			0.16	0.16		0.67			0.67	
v/c Ratio	0.34	0.49			0.65	0.82		0.70			0.90	
Control Delay	35.1	24.2			45.7	30.6		12.9			24.5	
Queue Delay	0.0	0.0			0.0	0.0		0.0			0.0	
Total Delay	35.1	24.2			45.7	30.6		12.9			24.5	
LOS	D	C			D	C		B			C	
Approach Delay		27.5			35.3			12.9			24.5	
Approach LOS		C			D			B			C	
Queue Length 50th (m)	9.5	13.4			22.9	20.9		48.7			70.8	
Queue Length 95th (m)	20.9	30.5			41.7	51.9		95.9			#156.7	
Internal Link Dist (m)		55.3			105.4			295.9			335.4	
Turn Bay Length (m)	35.0					15.0						
Base Capacity (vph)	289	446			350	515		1508			1304	
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	0.22	0.34			0.42	0.63		0.70			0.90	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 82.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 22.3		Intersection LOS: C	
Intersection Capacity Utilization 102.6%		ICU Level of Service G	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Stanley Avenue & Robinson Street

Lane Group	EBL	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	64	150	146	327	1059	1177
v/c Ratio	0.34	0.49	0.65	0.82	0.70	0.90
Control Delay	35.1	24.2	45.7	30.6	12.9	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.1	24.2	45.7	30.6	12.9	24.5
Queue Length 50th (m)	9.5	13.4	22.9	20.9	48.7	70.8
Queue Length 95th (m)	20.9	30.5	41.7	51.9	95.9	#156.7
Internal Link Dist (m)		55.3	105.4		295.9	335.4
Turn Bay Length (m)	35.0			15.0		
Base Capacity (vph)	289	446	350	515	1508	1304
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	0.22	0.34	0.42	0.63	0.70	0.90

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	64	74	54	80	301	85	859	30	153	793	137
Future Volume (vph)	59	64	74	54	80	301	85	859	30	153	793	137
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0	7.0			7.0	7.0		7.0			7.0	
Lane Util. Factor	1.00	1.00			1.00	1.00		0.95			0.95	
Frt	1.00	0.92			1.00	0.85		1.00			0.98	
Flt Protected	0.95	1.00			0.98	1.00		1.00			0.99	
Satd. Flow (prot)	1630	1578			1682	1458		3231			3176	
Flt Permitted	0.66	1.00			0.80	1.00		0.70			0.61	
Satd. Flow (perm)	1139	1578			1375	1458		2261			1942	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	70	80	59	87	327	92	934	33	166	862	149
RTOR Reduction (vph)	0	50	0	0	0	161	0	2	0	0	11	0
Lane Group Flow (vph)	64	100	0	0	146	166	0	1057	0	0	1166	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	13.6	13.6			13.6	13.6		55.2			55.2	
Effective Green, g (s)	13.6	13.6			13.6	13.6		55.2			55.2	
Actuated g/C Ratio	0.16	0.16			0.16	0.16		0.67			0.67	
Clearance Time (s)	7.0	7.0			7.0	7.0		7.0			7.0	
Vehicle Extension (s)	2.1	2.1			2.1	2.1		2.2			2.2	
Lane Grp Cap (vph)	187	259			225	239		1507			1294	
v/s Ratio Prot		0.06										
v/s Ratio Perm	0.06				0.11	c0.11		0.47			c0.60	
v/c Ratio	0.34	0.39			0.65	0.69		0.70			0.90	
Uniform Delay, d1	30.6	30.9			32.4	32.6		8.6			11.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.5	0.4			4.9	7.0		2.8			8.9	
Delay (s)	31.1	31.3			37.3	39.7		11.4			20.4	
Level of Service	C	C			D	D		B			C	
Approach Delay (s)		31.2			38.9			11.4			20.4	
Approach LOS		C			D			B			C	

Intersection Summary					
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.92				
Actuated Cycle Length (s)	82.8	Sum of lost time (s)		18.5	
Intersection Capacity Utilization	102.6%	ICU Level of Service		G	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	622	88	68	696	28	71
Future Volume (vph)	622	88	68	696	28	71
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt	0.981				0.903	
Flt Protected				0.996	0.986	
Satd. Flow (prot)	3198	0	0	3247	1528	0
Flt Permitted				0.996	0.986	
Satd. Flow (perm)	3198	0	0	3247	1528	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	158.5			126.3	366.1	
Travel Time (s)	11.4			9.1	26.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	676	96	74	757	30	77
Shared Lane Traffic (%)						
Lane Group Flow (vph)	772	0	0	831	107	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	622	88	68	696	28	71
Future Volume (Veh/h)	622	88	68	696	28	71
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	676	96	74	757	30	77
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				126		
pX, platoon unblocked					0.83	
vC, conflicting volume			772		1250	386
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			772		894	386
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			91		86	87
cM capacity (veh/h)			839		213	612

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	451	321	326	505	107
Volume Left	0	0	74	0	30
Volume Right	0	96	0	0	77
cSH	1700	1700	839	1700	401
Volume to Capacity	0.27	0.19	0.09	0.30	0.27
Queue Length 95th (m)	0.0	0.0	2.3	0.0	8.5
Control Delay (s)	0.0	0.0	3.0	0.0	17.2
Lane LOS			A		C
Approach Delay (s)	0.0		1.2		17.2
Approach LOS					C

Intersection Summary				
Average Delay	1.6			
Intersection Capacity Utilization	61.2%	ICU Level of Service		B
Analysis Period (min)	15			

Intersection: 1: Stanley Avenue & Ferry Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	103.7	110.6	50.6	42.4	197.4	37.5	32.4	245.3	250.6	62.4	138.6	136.6
Average Queue (m)	50.2	70.8	14.1	33.5	188.5	36.0	24.6	148.3	153.1	55.5	117.4	109.8
95th Queue (m)	94.6	111.1	34.5	53.4	203.3	44.2	40.1	277.0	282.3	80.2	159.3	160.1
Link Distance (m)		104.3	104.3		184.6			332.4	332.4		124.8	124.8
Upstream Blk Time (%)	1	4	0		69			0	0		46	34
Queuing Penalty (veh)	0	12	0		0			0	1		0	0
Storage Bay Dist (m)	100.0			35.0		30.0	25.0			55.0		
Storage Blk Time (%)	1	4		28	51	42	14	49		16	47	
Queuing Penalty (veh)	4	9		182	268	155	70	67		74	116	

Intersection: 2: Stanley Avenue & Robinson Street

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	LT	R	LT	TR	LT	TR
Maximum Queue (m)	34.2	39.2	109.9	22.5	169.4	175.2	341.7	345.8
Average Queue (m)	12.7	20.1	59.3	22.0	79.8	77.5	258.0	250.6
95th Queue (m)	27.1	35.7	104.7	24.2	163.6	164.8	415.2	421.4
Link Distance (m)		57.8	115.6		299.4	299.4	332.4	332.4
Upstream Blk Time (%)			2		0	1	13	12
Queuing Penalty (veh)			0		0	3	73	68
Storage Bay Dist (m)	35.0			15.0				
Storage Blk Time (%)	0	1	29	45				
Queuing Penalty (veh)	0	1	87	60				

Intersection: 5: Allendale Avenue & Ferry Street

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	53.0	18.1	21.3	15.8	39.1
Average Queue (m)	6.2	1.2	9.1	1.0	14.1
95th Queue (m)	34.1	13.1	20.6	8.8	27.7
Link Distance (m)	148.6	148.6	104.3	104.3	343.2
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Zone Summary

Zone wide Queuing Penalty: 1251

Appendix H

Parking Study Proxy Survey Data

Parking Study

Location:	15 Towering Heights Blvd. St. Catharines	Date:	February 28th - March 1st
Observer:	CK	Time:	22:00 - 01:00
Weather:	Clear		

Vehicles Parked at Start	Inside:	49	Visitor:	6
	Outside:	57	TOTAL:	112

Time	Vehicles at End of Period
22:00 - 22:15	112
22:16 - 22:30	113
22:31 - 22:45	113
22:46 - 23:00	112
23:01 - 23:15	113
23:16 - 23:30	114
23:31 - 23:45	114
23:46 - 00:00	114
00:01 - 00:15	114
00:16 - 00:30	114
00:31 - 00:45	115
00:46 - 01:00	116
MAXIMUM VEHICLES:	116

Parking Study

Location:	15 Towering Heights Blvd. St. Catharines	Date:	March 2nd - 3rd, 2019
Observer:	CK	Time:	22:00 - 01:00
Weather:	Clear		

Vehicles Parked at Start	Inside:	45	Visitor:	8
	Outside:	56	TOTAL:	109

Time	Vehicles at End of Period
22:00 - 22:15	109
22:16 - 22:30	109
22:31 - 22:45	110
22:46 - 23:00	110
23:01 - 23:15	111
23:16 - 23:30	112
23:31 - 23:45	111
23:46 - 00:00	113
00:01 - 00:15	114
00:16 - 00:30	116
00:31 - 00:45	117
00:46 - 01:00	118
MAXIMUM VEHICLES:	118

Appendix I

5528 Ferry Street Phase 1 Sales Data

The Stanley District - Apr 06, 2022 - Powered By Avesdo								
Suite	Level	Unit	Floor Plan	Bed	Status	Sq.Ft.	Parking	
206 - T	2	6	Bistro	1	Sold Firm	551	1	
306 - T	3	6	Bistro	1	Sold Firm	551	1	
406 - T	4	6	Bistro	1	Sold Firm	551	1	
506 - T	5	6	Bistro	1	Sold Firm	551	1	
606 - T	6	6	Bistro	1	Sold Firm	551	1	
706 - T	7	6	Bistro	1	Sold Firm	551	1	
806 - T	8	6	Bistro	1	Sold Firm	551	1	
906 - T	9	6	Bistro	1	Sold Firm	551	0	
1006 - T	10	6	Bistro	1	Sold Firm	551	0	
1106 - T	11	6	Bistro	1	Sold Firm	551	1	
1206 - T	12	6	Bistro	1	Sold Firm	551	1	
1306 - T	13	6	Bistro	1	Sold Firm	551	1	
1406 - T	14	6	Bistro	1	Sold Firm	551	0	
1506 - T	15	6	Bistro	1	Sold Firm	551	1	
1606 - T	16	6	Bistro	1	Sold Firm	551	1	
1706 - T	17	6	Bistro	1	Sold Firm	551	0	
1804 - T	18	4	Bistro	1	Sold Firm	551	0	
1904 - T	19	4	Bistro	1	Sold Firm	551	0	
211 - T	2	11	Bistro -Rev-	1	Sold Firm	551	0	
311 - T	3	11	Bistro -Rev-	1	Sold Firm	551	0	
411 - T	4	11	Bistro -Rev-	1	Sold Firm	551	0	
511 - T	5	11	Bistro -Rev-	1	Sold Firm	551	1	
611 - T	6	11	Bistro -Rev-	1	Sold Firm	551	1	
711 - T	7	11	Bistro -Rev-	1	Sold Firm	551	0	
811 - T	8	11	Bistro -Rev-	1	Sold Firm	551	1	
911 - T	9	11	Bistro -Rev-	1	Sold Firm	551	1	
1011 - T	10	11	Bistro -Rev-	1	Sold Firm	551	1	
1109 - T	11	9	Bistro -Rev-	1	Sold Firm	551	1	
1211 - T	12	11	Bistro -Rev-	1	Sold Firm	551	1	
1311 - T	13	11	Bistro -Rev-	1	Sold Firm	551	1	
1411 - T	14	11	Bistro -Rev-	1	Sold Firm	551	1	
1511 - T	15	11	Bistro -Rev-	1	Sold Firm	551	0	
1611 - T	16	11	Bistro -Rev-	1	Sold Firm	551	1	
1711 - T	17	11	Bistro -Rev-	1	Sold Firm	551	1	
1809 - T	18	9	Bistro -Rev-	1	Sold Firm	551	1	
1909 - T	19	9	Bistro -Rev-	1	Sold Firm	551	1	
204 - T	2	4	Cinema	1	Sold Firm	532	1	
304 - T	3	4	Cinema	1	Sold Firm	532	1	
404 - T	4	4	Cinema	1	Sold Firm	532	1	
504 - T	5	4	Cinema	1	Sold Firm	532	0	
604 - T	6	4	Cinema	1	Sold Firm	532	1	
704 - T	7	4	Cinema	1	Sold Firm	532	0	
804 - T	8	4	Cinema	1	Sold Firm	532	1	
904 - T	9	4	Cinema	1	Sold Firm	532	1	
1004 - T	10	4	Cinema	1	Sold Firm	532	1	
1104 - T	11	4	Cinema	1	Sold Firm	532	0	
1204 - T	12	4	Cinema	1	Sold Firm	532	1	
1304 - T	13	4	Cinema	1	Sold Firm	532	1	
1404 - T	14	4	Cinema	1	Sold Firm	532	0	
1504 - T	15	4	Cinema	1	Sold Firm	532	0	
1604 - T	16	4	Cinema	1	Sold Firm	532	0	
1704 - T	17	4	Cinema	1	Sold Firm	532	0	
213 - T	2	13	Culture	1	Sold Firm	513	0	
313 - T	3	13	Culture	1	Sold Firm	513	1	
413 - T	4	13	Culture	1	Sold Firm	513	0	
513 - T	5	13	Culture	1	Sold Firm	513	0	
613 - T	6	13	Culture	1	Sold Firm	513	0	
713 - T	7	13	Culture	1	Sold Firm	513	0	
813 - T	8	13	Culture	1	Sold Firm	513	1	
913 - T	9	13	Culture	1	Sold Firm	513	0	
1013 - T	10	13	Culture	1	Sold Firm	513	0	
1111 - T	11	11	Culture	1	Sold Firm	513	1	
1213 - T	12	13	Culture	1	Sold Firm	513	1	
1313 - T	13	13	Culture	1	Sold Firm	513	1	
1413 - T	14	13	Culture	1	Sold Firm	513	1	
1513 - T	15	13	Culture	1	Sold Firm	513	0	
1613 - T	16	13	Culture	1	Sold Firm	513	1	
1713 - T	17	13	Culture	1	Sold Firm	513	0	
		Total		68	-	538	41	0.60 1 Bedroom
2003 - T	20	3	Diversity	2	Sold Firm	2904	1	
214 - T	2	14	Explore	2	Sold Firm	738	1	
314 - T	3	14	Explore	2	Sold Firm	738	1	
414 - T	4	14	Explore	2	Sold Firm	738	1	
514 - T	5	14	Explore	2	Sold Firm	738	0	
614 - T	6	14	Explore	2	Sold Firm	738	0	
714 - T	7	14	Explore	2	Sold Firm	738	1	
814 - T	8	14	Explore	2	Sold Firm	738	1	
914 - T	9	14	Explore	2	Sold Firm	738	0	
1014 - T	10	14	Explore	2	Sold Firm	738	1	

1112 - T	11	12	Explore	2	Sold Firm	738	0
1214 - T	12	14	Explore	2	Sold Firm	738	1
1314 - T	13	14	Explore	2	Sold Firm	734	1
1414 - T	14	14	Explore	2	Sold Firm	738	1
1514 - T	15	14	Explore	2	Sold Firm	738	0
1614 - T	16	14	Explore	2	Sold Firm	738	1
1714 - T	17	14	Explore	2	Sold Firm	738	1
1810 - T	18	10	Festival	2	Sold Firm	706	1
1910 - T	19	10	Festival	2	Sold Firm	706	1
1911 - T	19	11	Gallery	2	Sold Firm	916	0
208 - T	2	8	Heritage	2	Sold Firm	765	1
308 - T	3	8	Heritage	2	Sold Firm	765	1
408 - T	4	8	Heritage	2	Available	765	0
508 - T	5	8	Heritage	2	Available	765	0
608 - T	6	8	Heritage	2	Sold Firm	765	0
708 - T	7	8	Heritage	2	Sold Firm	765	1
808 - T	8	8	Heritage	2	Sold Firm	765	0
908 - T	9	8	Heritage	2	Sold Firm	765	1
1008 - T	10	8	Heritage	2	Sold Firm	765	1
1208 - T	12	8	Heritage	2	Sold Firm	765	1
1308 - T	13	8	Heritage	2	Sold Firm	765	1
1408 - T	14	8	Heritage	2	Sold Firm	765	0
1508 - T	15	8	Heritage	2	Sold Firm	765	1
1608 - T	16	8	Heritage	2	Sold Firm	765	1
1708 - T	17	8	Heritage	2	Sold Firm	765	1
1806 - T	18	6	Heritage	2	Sold Firm	765	1
1906 - T	19	6	Heritage	2	Sold Firm	765	1
209 - T	2	9	Heritage -Rev-	2	Sold Firm	765	1
309 - T	3	9	Heritage -Rev-	2	Sold Firm	765	1
409 - T	4	9	Heritage -Rev-	2	Sold Firm	765	1
509 - T	5	9	Heritage -Rev-	2	Sold Firm	765	1
609 - T	6	9	Heritage -Rev-	2	Sold Firm	765	1
709 - T	7	9	Heritage -Rev-	2	Sold Firm	765	0
809 - T	8	9	Heritage -Rev-	2	Sold Firm	765	1
909 - T	9	9	Heritage -Rev-	2	Sold Firm	765	0
1009 - T	10	9	Heritage -Rev-	2	Sold Firm	765	0
1209 - T	12	9	Heritage -Rev-	2	Sold Firm	765	0
1309 - T	13	9	Heritage -Rev-	2	Sold Firm	765	1
1409 - T	14	9	Heritage -Rev-	2	Sold Firm	765	0
1509 - T	15	9	Heritage -Rev-	2	Sold Firm	765	0
1609 - T	16	9	Heritage -Rev-	2	Sold Firm	765	1
1709 - T	17	9	Heritage -Rev-	2	Sold Firm	765	1
1807 - T	18	7	Heritage -Rev-	2	Sold Firm	765	1
1907 - T	19	7	Heritage -Rev-	2	Sold Firm	765	0
1802 - T	18	2	Monument	2	Sold Firm	1608	1
203 - T	2	3	Scenery	2	Sold Firm	776	0
303 - T	3	3	Scenery	2	Sold Firm	772	0
403 - T	4	3	Scenery	2	Sold Firm	772	1
503 - T	5	3	Scenery	2	Sold Firm	772	0
603 - T	6	3	Scenery	2	Sold Firm	772	1
703 - T	7	3	Scenery	2	Sold Firm	772	1
803 - T	8	3	Scenery	2	Sold Firm	772	1
903 - T	9	3	Scenery	2	Sold Firm	772	1
1003 - T	10	3	Scenery	2	Sold Firm	772	1
1103 - T	11	3	Scenery	2	Sold Firm	772	0
1203 - T	12	3	Scenery	2	Sold Firm	772	0
1303 - T	13	3	Scenery	2	Sold Firm	772	1
1403 - T	14	3	Scenery	2	Sold Firm	772	1
1503 - T	15	3	Scenery	2	Sold Firm	772	1
1603 - T	16	3	Scenery	2	Sold Firm	772	0
1703 - T	17	3	Scenery	2	Sold Firm	772	1
1803 - T	18	3	Skylon	2	Sold Firm	746	1
1903 - T	19	3	Skylon	2	Sold Firm	746	2
2001 - T	20	1	Souvenir	2	Sold Firm	1501	1
2004 - T	20	4	Souvenir -Rev-	2	Sold Firm	1501	1
205 - T	2	5	Theatre	2	Sold Firm	731	1
305 - T	3	5	Theatre	2	Sold Firm	731	1
405 - T	4	5	Theatre	2	Sold Firm	731	1
505 - T	5	5	Theatre	2	Sold Firm	731	0
605 - T	6	5	Theatre	2	Sold Firm	731	1
705 - T	7	5	Theatre	2	Sold Firm	731	1
805 - T	8	5	Theatre	2	Sold Firm	731	1
905 - T	9	5	Theatre	2	Sold Firm	731	1
1005 - T	10	5	Theatre	2	Sold Firm	731	0
1105 - T	11	5	Theatre	2	Sold Firm	731	0
1205 - T	12	5	Theatre	2	Sold Firm	731	1
1305 - T	13	5	Theatre	2	Sold Firm	731	1
1405 - T	14	5	Theatre	2	Sold Firm	731	1
1505 - T	15	5	Theatre	2	Sold Firm	731	1
1605 - T	16	5	Theatre	2	Sold Firm	731	1
1705 - T	17	5	Theatre	2	Sold Firm	731	1
201 - T	2	1	Tourist	2	Sold Firm	789	1
301 -T	3	1	Tourist	2	Sold Firm	789	1
401 - T	4	1	Tourist	2	Sold Firm	789	1

501 - T	5	1	Tourist	2	Sold Firm	789	0	
601 - T	6	1	Tourist	2	Sold Firm	789	0	
701 - T	7	1	Tourist	2	Sold Firm	789	0	
801 - T	8	1	Tourist	2	Sold Firm	789	0	
901 - T	9	1	Tourist	2	Sold Firm	789	0	
1001 - T	10	1	Tourist	2	Sold Firm	789	0	
1101 - T	11	1	Tourist	2	Sold Firm	789	0	
1201 - T	12	1	Tourist	2	Sold Firm	789	1	
1301 - T	13	1	Tourist	2	Sold Firm	789	0	
1401 - T	14	1	Tourist	2	Sold Firm	789	1	
1501 - T	15	1	Tourist	2	Sold Firm	789	1	
1601 - T	16	1	Tourist	2	Sold Firm	789	1	
1701 - T	17	1	Tourist	2	Sold Firm	789	1	
1801 - T	18	1	Tourist	2	Available	789	0	
1901 - T	19	1	Tourist	2	Sold Firm	789	0	
216 - T	2	16	Tourist -Rev-	2	Sold Firm	789	0	
316 - T	3	16	Tourist -Rev-	2	Sold Firm	789	1	
416 - T	4	16	Tourist -Rev-	2	Sold Firm	789	0	
516 - T	5	16	Tourist -Rev-	2	Sold Firm	789	0	
616 - T	6	16	Tourist -Rev-	2	Sold Firm	789	0	
716 - T	7	16	Tourist -Rev-	2	Sold Firm	789	1	
816 - T	8	16	Tourist -Rev-	2	Sold Firm	789	1	
916 - T	9	16	Tourist -Rev-	2	Sold Firm	789	0	
1016 - T	10	16	Tourist -Rev-	2	Sold Firm	789	0	
1114 - T	11	14	Tourist -Rev-	2	Sold Firm	789	1	
1216 - T	12	16	Tourist -Rev-	2	Available	789	0	
1316 - T	13	16	Tourist -Rev-	2	Sold Firm	789	0	
1416 - T	14	16	Tourist -Rev-	2	Sold Firm	789	1	
1516 - T	15	16	Tourist -Rev-	2	Sold Firm	789	1	
1616 - T	16	16	Tourist -Rev-	2	Sold Firm	789	1	
1716 - T	17	16	Tourist -Rev-	2	Sold Firm	789	2	
1812 - T	18	12	Tourist -Rev-	2	Sold Firm	789	1	
1912 - T	19	12	Tourist -Rev-	2	Sold Firm	789	1	
2002 - T	20	2	Vineyard	2	Sold Firm	2925	2	
1902 - T	19	2	Weekend	2	Sold Firm	932	1	
212 - T	2	12	Winery	2	Sold Firm	689	1	
312 - T	3	12	Winery	2	Sold Firm	689	0	
412 - T	4	12	Winery	2	Sold Firm	689	1	
512 - T	5	12	Winery	2	Sold Firm	689	0	
612 - T	6	12	Winery	2	Sold Firm	689	0	
712 - T	7	12	Winery	2	Sold Firm	689	1	
812 - T	8	12	Winery	2	Sold Firm	689	0	
912 - T	9	12	Winery	2	Sold Firm	689	1	
1012 - T	10	12	Winery	2	Sold Firm	689	1	
1110 - T	11	10	Winery	2	Sold Firm	689	1	
1212 - T	12	12	Winery	2	Sold Firm	689	1	
1312 - T	13	12	Winery	2	Sold Firm	689	1	
1412 - T	14	12	Winery	2	Sold Firm	689	1	
1512 - T	15	12	Winery	2	Sold Firm	689	1	
1612 - T	16	12	Winery	2	Sold Firm	689	1	
1712 - T	17	12	Winery	2	Sold Firm	689	1	
		Total		145	-	803	99	0.68 2 Bedroom
1107 - T	11	7	Lively	1 + Den	Sold Firm	658	1	
207 - T	2	7	Carnival	1+Den	Sold Firm	634	0	
307 - T	3	7	Carnival	1+Den	Sold Firm	634	0	
407 - T	4	7	Carnival	1+Den	Sold Firm	634	0	
507 - T	5	7	Carnival	1+Den	Sold Firm	634	1	
607 - T	6	7	Carnival	1+Den	Sold Firm	634	1	
707 - T	7	7	Carnival	1+Den	Sold Firm	634	0	
807 - T	8	7	Carnival	1+Den	Sold Firm	634	0	
907 - T	9	7	Carnival	1+Den	Sold Firm	634	1	
1007 - T	10	7	Carnival	1+Den	Sold Firm	634	0	
1207 - T	12	7	Carnival	1+Den	Sold Firm	634	1	
1307 - T	13	7	Carnival	1+Den	Sold Firm	634	0	
1407 - T	14	7	Carnival	1+Den	Sold Firm	634	0	
1507 - T	15	7	Carnival	1+Den	Sold Firm	634	1	
1607 - T	16	7	Carnival	1+Den	Sold Firm	634	1	
1707 - T	17	7	Carnival	1+Den	Sold Firm	634	1	
1805 - T	18	5	Carnival	1+Den	Sold Firm	634	1	
1905 - T	19	5	Carnival	1+Den	Sold Firm	634	0	
210 - T	2	10	Carnival -Rev-	1+Den	Sold Firm	634	0	
310 - T	3	10	Carnival -Rev-	1+Den	Sold Firm	634	1	
410 - T	4	10	Carnival -Rev-	1+Den	Sold Firm	634	1	
510 - T	5	10	Carnival -Rev-	1+Den	Sold Firm	634	0	
610 - T	6	10	Carnival -Rev-	1+Den	Sold Firm	634	1	
710 - T	7	10	Carnival -Rev-	1+Den	Sold Firm	634	1	
810 - T	8	10	Carnival -Rev-	1+Den	Sold Firm	634	1	
910 - T	9	10	Carnival -Rev-	1+Den	Sold Firm	634	1	
1010 - T	10	10	Carnival -Rev-	1+Den	Sold Firm	634	0	
1210 - T	12	10	Carnival -Rev-	1+Den	Sold Firm	634	1	
1310 - T	13	10	Carnival -Rev-	1+Den	Sold Firm	634	1	
1410 - T	14	10	Carnival -Rev-	1+Den	Sold Firm	634	1	
1510 - T	15	10	Carnival -Rev-	1+Den	Sold Firm	634	1	
1610 - T	16	10	Carnival -Rev-	1+Den	Sold Firm	634	0	

1710 - T	17	10	Carnival -Rev-	1+Den	Sold Firm	634	0		
1808 - T	18	8	Carnival -Rev-	1+Den	Sold Firm	634	0		
1908 - T	19	8	Carnival -Rev-	1+Den	Sold Firm	634	1		
202 - T	2	2	Museum	1+Den	Sold Firm	698	0		
302 - T	3	2	Museum	1+Den	Sold Firm	698	1		
402 - T	4	2	Museum	1+Den	Sold Firm	698	1		
502 - T	5	2	Museum	1+Den	Sold Firm	698	0		
602 - T	6	2	Museum	1+Den	Sold Firm	698	0		
702 - T	7	2	Museum	1+Den	Sold Firm	698	1		
802 - T	8	2	Museum	1+Den	Sold Firm	698	1		
902 - T	9	2	Museum	1+Den	Sold Firm	698	1		
1002 - T	10	2	Museum	1+Den	Sold Firm	698	1		
1102 - T	11	2	Museum	1+Den	Sold Firm	698	0		
1202 - T	12	2	Museum	1+Den	Sold Firm	698	1		
1302 - T	13	2	Museum	1+Den	Sold Firm	698	0		
1402 - T	14	2	Museum	1+Den	Sold Firm	698	1		
1502 - T	15	2	Museum	1+Den	Sold Firm	698	1		
1602 - T	16	2	Museum	1+Den	Sold Firm	698	1		
1702 - T	17	2	Museum	1+Den	Sold Firm	698	1		
215 - T	2	15	Museum -Rev-	1+Den	Sold Firm	698	1		
315 - T	3	15	Museum -Rev-	1+Den	Sold Firm	698	0		
415 - T	4	15	Museum -Rev-	1+Den	Sold Firm	698	0		
515 - T	5	15	Museum -Rev-	1+Den	Sold Firm	698	0		
615 - T	6	15	Museum -Rev-	1+Den	Sold Firm	698	0		
715 - T	7	15	Museum -Rev-	1+Den	Sold Firm	698	0		
815 - T	8	15	Museum -Rev-	1+Den	Available	698	0		
915 - T	9	15	Museum -Rev-	1+Den	Sold Firm	698	0		
1015 - T	10	15	Museum -Rev-	1+Den	Sold Firm	698	1		
1113 - T	11	13	Museum -Rev-	1+Den	Sold Firm	698	0		
1215 - T	12	15	Museum -Rev-	1+Den	Sold Firm	698	0		
1315 - T	13	15	Museum -Rev-	1+Den	Sold Firm	698	1		
1415 - T	14	15	Museum -Rev-	1+Den	Sold Firm	698	2		
1515 - T	15	15	Museum -Rev-	1+Den	Sold Firm	698	1		
1615 - T	16	15	Museum -Rev-	1+Den	Sold Firm	698	1		
1715 - T	17	15	Museum -Rev-	1+Den	Sold Firm	698	1		
		Total		67	-	665	39	0.58	1 Bedroom + Den
1108 - T	11	8	Lively	2 + Den	Sold Firm	658	1		
2101 - T	21	1	ARTISTY		Available	9463	0		
1811 - T	18	11	Attraction		Sold Firm	1468	0		

Appendix J

City of Kitchener TDM Checklist

PARTS TDM: City of Kitchener TDM Checklist

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

Site Location: _____ **Landowner / Developer Name:** _____

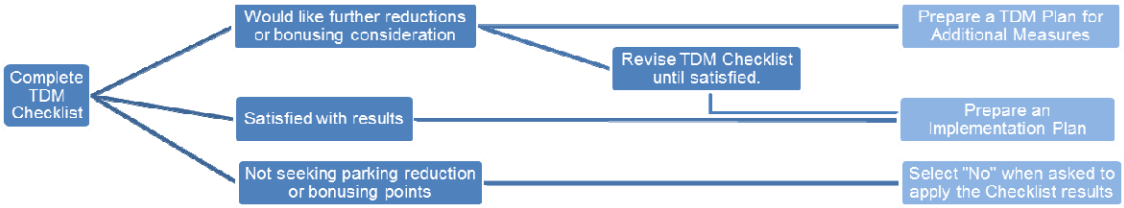
Zone: _____ **TDM Checklist No. (filled by staff):** _____

Using the TDM Report Checklist

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

TDM Report Reference Guide

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



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

Instructions to Complete the TDM Checklist

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

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

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

TABLE A — SHARED PARKING REQUIREMENTS

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

TABLE A1. Zoning By-law Requirements			TABLE A2. Shared Parking Rate Breakdown							
			Morning		Noon		Afternoon		Evening	
Land Use	Parking	Class A Bike Parking	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Office	0	0	0	0	0	0	0	0	0	0
Medical	0	0	0	0	0	0	0	0	0	0
Real Estate	0	0	0	0	0	0	0	0	0	0
Financial Institution	0	0	0	0	0	0	0	0	0	0
Retail	0	0	0	0	0	0	0	0	0	0
Personal Services	0	0								
Art Gallery	0	0								
Museum	0	0								
Repair Establishment	0	0								
Restaurant/Take-out Restaurant	0	0	0	0	0	0	0	0	0	0
Hotel (rooms)		0	0	0	0	0	0	0	0	0
Hotel (Function Space)	0	0	0	0	0	0	0	0	0	0
Residential - Resident	963	0	867	867	626	626	867	867	963	963
Residential - Visitor	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0
Total Required Parking	963	0	867	867	626	626	867	867	963	963
Shared / Unassigned Required Parking	**963**		**Parking Reduction (Individual Uses)**		**0**	**% Reduction Over Unshared Parking (Individual Uses)**		**0.0**		
Plaza Complex or Mixed-Office-Residential [T]	0	0	Parking Reduction (Plaza / Mixed [TT])		0	% Reduction Over Unshared Parking (Plaza / Mixed [TT])		#DIV/0!		

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

Shared Parking Summary	Yes or No ?	Resultant Parking Required
Would you like to apply Table A shared rates for a parking reduction?	No	963.0 Spaces

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

PARTS TDM: City of Kitchener TDM Checklist

TABLE B	OPTIONAL TDM MEASURES

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

Measure	Features	Parking Reduction Available	To a Maximum Reduction of		Developer Proposes Provision of		Maximum Reduction Allowable	Bonusing Points (TBD)
			Amount	Unit	Amount	Unit		
B1	Provision of indoor secure bicycle parking spaces beyond the minimum amount required by the Zoning By-law.	1 car space reduction per 5 bicycle spaces beyond minimum Zoning By-law requirement.	10%	of total parking required	368	Bicycle Spaces beyond minimum required	73	
B2	Non-residential uses: provision of shower and change facilities at an amount of not less than 13sqm in equal proportion of male and female facilities (Note: maximum reduction amount calculated based on required bicycle parking).	2 car space reduction for each additional shower facility provided at (13sqm).	8	parking space(s)	0	sqm of shower / change facilities	0	
B3*	Non-residential (office) uses: Provision of 1 car share vehicle and dedicated parking space in a priority location that is publically accessible for a development with at least 25 required parking spaces, and 1 additional car share vehicle and dedicated parking space for every 50 additional required parking spaces. (Note: maximum reduction amount calculated based on required parking).	4 car space reduction for each car share vehicle and dedicated parking space provided	0	parking space(s)	0	Non-residential car share vehicle(s) and Space(s)	0	
	Residential uses: Provision of 1 car share vehicle and dedicated parking space in a priority location that is publically accessible unless it is a private shared vehicle for every 75 dwelling units. (Note: maximum reduction amount calculated based on required parking).	4 car space reduction for each car share vehicle and dedicated parking space provided	48	parking space(s)	2	Residential car share vehicle(s) and Space(s)	8	
B4	Non-residential uses: Provision of ride share parking spaces in a priority location.	3 car space reduction for each ride share space provided	5%	of total parking required		Priority Car Pool Spaces	0	
B5	Provision of active uses at-grade along street frontages.	1% car space reduction	1%	of total parking required	☐ Yes	Check "Yes" (left) if you will provide	0	
B6*	The building owner/occupant will provide fully subsidized transit passes for all occupants for a period of two years.	10% car space reduction	10%	of total parking required	☐ Yes	Check "Yes" (left) if you will provide	0	
B7	Building owner/occupant agrees to charge for parking as a separate cost to occupants.	10% car space reduction	10%	of total parking required	☑ Yes	Check "Yes" (left) if you will provide	96	
B8*	Employment Uses: Building owner/occupant agrees to join Travelwise (TMA) that provides ride matching services for car/vanpooling and emergency ride home options.	10% car space reduction	10%	of total parking required	☐ Yes	Check "Yes" (left) if you will provide	0	
B9	Enhanced bus shelters with seating are provided at the transit stop immediately adjacent to the development in consultation with the City of Kitchener and the Region of Waterloo.	Not Applicable for parking reduction	Can only be applied to bonusing consideration		☐ Yes	Check "Yes" (left) if you will provide	0	
B10	Provide television monitors in visible and accessible locations on site and in adjacent transit stops to allow to City of Kitchener and the Region of Waterloo to display information regarding public transportation.	Not Applicable for parking reduction	Can only be applied to bonusing consideration		☐ Yes	Check "Yes" (left) if you will provide	0	
B11	Provision of bicycle self-service station equipped with tools necessary to perform basic repairs and maintenance	Not Applicable for parking reduction	Can only be applied to bonusing consideration		☐ Yes	Check "Yes" (left) if you will provide	0	
B12	25% to 49% of required parking is located underground or in a structure	Not Applicable for parking reduction	Can only be applied to bonusing consideration Select only one option (right)		☐ Yes	Check "Yes" (left) if you will provide	0	
	50% - 74% of required parking is located underground or in a structure				☐ Yes	Check "Yes" (left) if you will provide	0	
	A minimum of 75% of required parking is located underground or in a structure				☐ Yes	Check "Yes" (left) if you will provide	0	
B13	Non-residential use: Implements paid parking system, where price is set greater than the cost of a monthly transit pass, on all or part of the site (e.g. parking permits, paid parking near main entrances, enabled by gate and transponder access, or Pay & Display stations).	1% car space reduction for every 10% of parking spaces under a paid parking system	10%	of total parking required	0%	% of total parking spaces under paid parking system	0	

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

TABLE C	POTENTIAL PARKING REDUCTION SUMMARY	
Displayed below are the potential reductions to required parking spaces available based on the amounts entered into Table A and Table B above.		
Original # Parking Spaces Required:	963	0
Shared Parking Reduction [P]:	0	0
Parking Reduction for TDM Measures B1-B12:	177	0
Total Parking Reduction:	177	0
Resultant Parking Requirement:	786	0
PERCENT REDUCTION	18	#DIV/0!

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

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

*Approach to bonusing to be determined by City staff

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

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

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

Select an Option
Yes

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