951 Gladstone Avenue and 145 Loretta Avenue North

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

Step 5 TIA Report

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Table of Contents

List of Figures

Table of Tables

List of Appendices

1 Screening

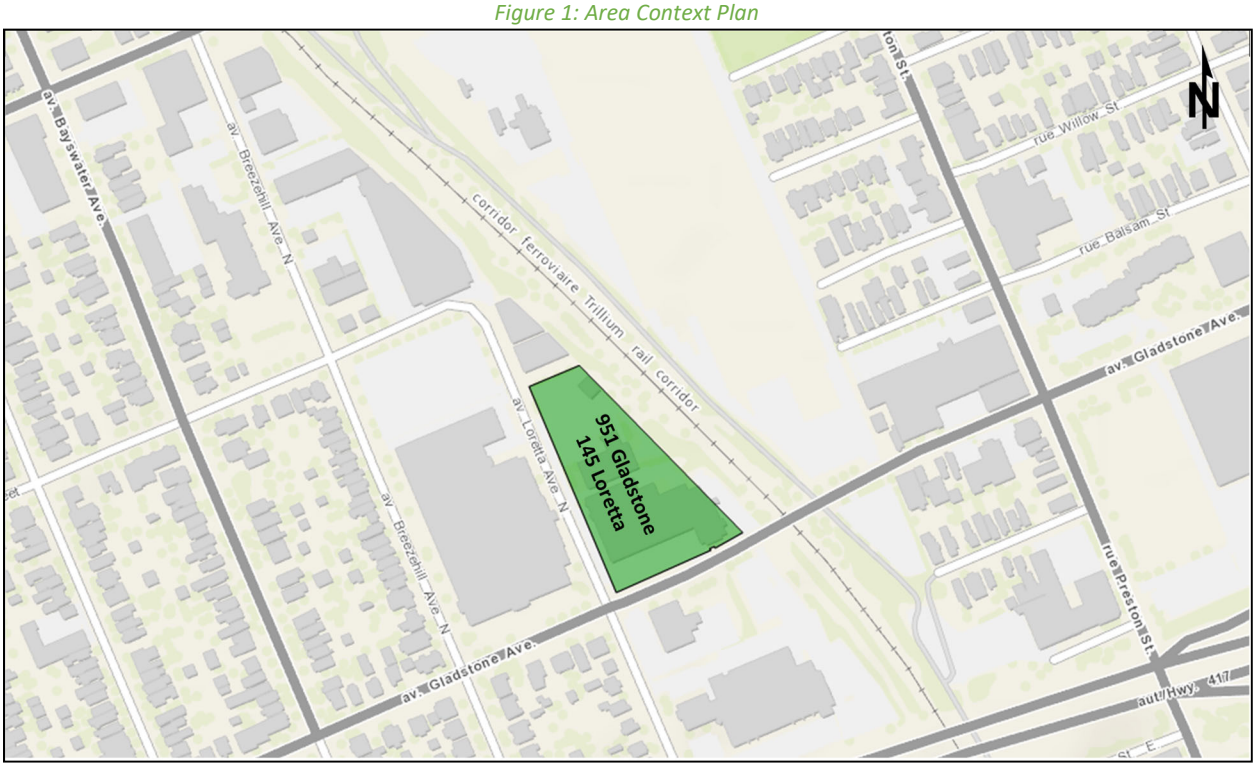
This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for TIA Study PM. As shown in the Screening Form, a TIA is required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

2 Existing and Planned Conditions

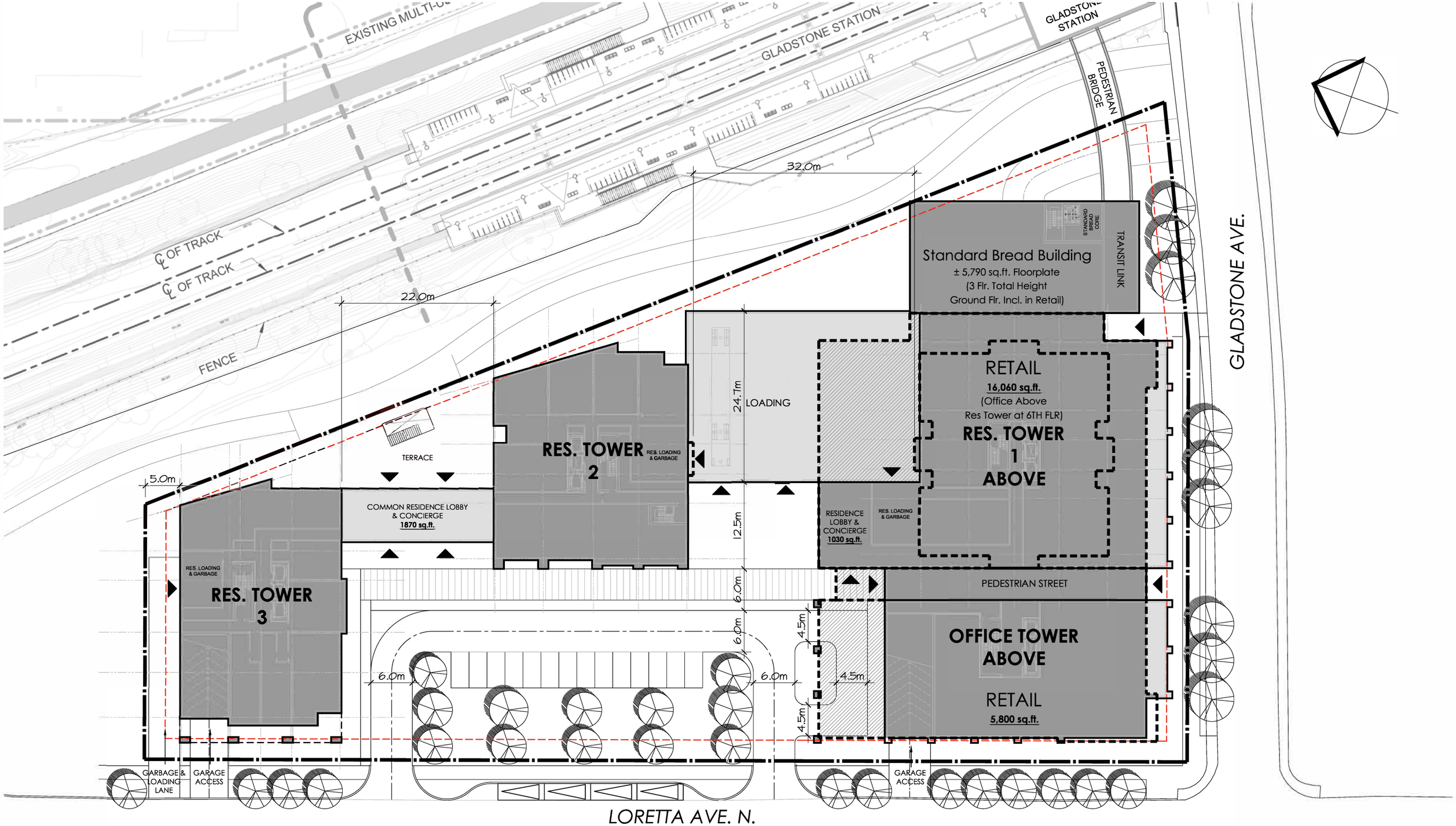
2.1 Proposed Development

The proposed development, located at 951 Gladstone Avenue and 145 Loretta Avenue North, is currently zoned general industrial. The existing land uses include brewery, jujitsu club, cross-fit gym, glass blowing, art studio, beer and wine supply, bread bakery, and other assorted industrial uses. The proposed Official Plan and Zoning By-Law Amendments would all for high-rise residential and commercial/retail uses. The proposed development would include apartments totalling 931 units, 141,750 sq. ft of office space, and 21,686 sq. ft. of retail space. The existing access on Gladstone Avenue will remain, and a one-way access loop along Loretta Avenue North. The frontage along Loretta Avenue North would formalize the curb edge and remove the paved shoulder and open access along the building frontage. A pedestrian bridge is proposed on the east side of the development, adjacent to Gladstone Avenue, to connect directly with the future Gladstone Trillium Line Station. The anticipated full build-out and occupancy horizon is 2023. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: October 5, 2018



GLADSTONE + LORETTA

Site Plan

scale 1:500

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2.2 Existing Conditions

2.2.1 Area Road Network

Gladstone Avenue: Gladstone Avenue is a City of Ottawa major collector road with a two-lane urban cross-section including sidewalks and a posted speed limit of 40 km/h. The current right-of-way is 20.0 metres, with additional width provided in proximity to the rail corridor.

Loretta Avenue North/Laurel Street: Loretta Avenue N is a City of Ottawa local road with a two-lane urban cross-section including paved shoulders on the east side and a sidewalk on the west side. The posted speed is 40 km/h and the right-of-way is 20.0 metres.

Breezehill Avenue: Breezehill Avenue is a City of Ottawa local road with a two-lane urban cross-section, including sidewalks, and parking on the east side of the road. The posted speed limit is 40 km/h and the right-of-way is 20.0 metres.

Bayswater Avenue: Bayswater Avenue is a City of Ottawa collector road with a two-lane urban cross-section, including sidewalks and on-street parking. The unposted speed limit is 50 km/h and the right-of-way is 25.o metres.

Preston Street: Preston Street is a City of Ottawa arterial road with a two-lane urban cross-section, including parking lanes and auxiliary lanes at major intersections. The unposted speed limit is 50 km/h and the Ottawa Official Plan reserves a 23.0 metre right-of-way.

Somerset Street West: Somerset Street West is a City of Ottawa arterial road with a two-lane cross-section, including sidewalks and on street parking. The unposted speed limit is 50 km/h and the right-of-way is 20.0 metres. East of Breezehill Avenue, bike lanes are provided.

2.2.2 Existing Intersections

Gladstone Avenue / Bayswater Avenue	The intersection of Gladstone Avenue and Bayswater Avenue is a signalized intersection with shared all movement lanes on each approach. No turn restrictions were noted.
Gladstone Avenue / Preston Street	The intersection of Gladstone Avenue and Preston Street is a signalized intersection with auxiliary left-turn lanes on the northbound, westbound, and southbound approaches. No turn restrictions were noted.
Somerset Street West / Breezehill Avenue	The intersection of Somerset Street West and Breezehill Avenue is a minor stop-controlled intersection with shared movement lanes on all approaches. Bike lanes along Somerset Street West start/end on the east side of the intersection. No turn restrictions were noted.

2.2.3 Existing Driveways

Along Gladstone Avenue, a driveway to the City of Ottawa yard (175 Loretta Avenue North) is located opposite the existing site access adjacent to the Trillium Rail Corridor, and an access to 950 Gladstone Avenue within 5.0 metres of the Loretta Avenue North intersection. Between Loretta Avenue North and Breezehill Avenue, an access

loop is located on the north side of Gladstone Avenue to the Canadian Bank Note Limited, and five driveways are located on the south side.

Along Loretta Avenue North, two accesses are provided on the west side of the road for the Canadian Bank Note Limited site, and a single access is located north of the proposed site for 131 Loretta Avenue North. The paved shoulder is used for perpendicular parking along Loretta Avenue North as well.

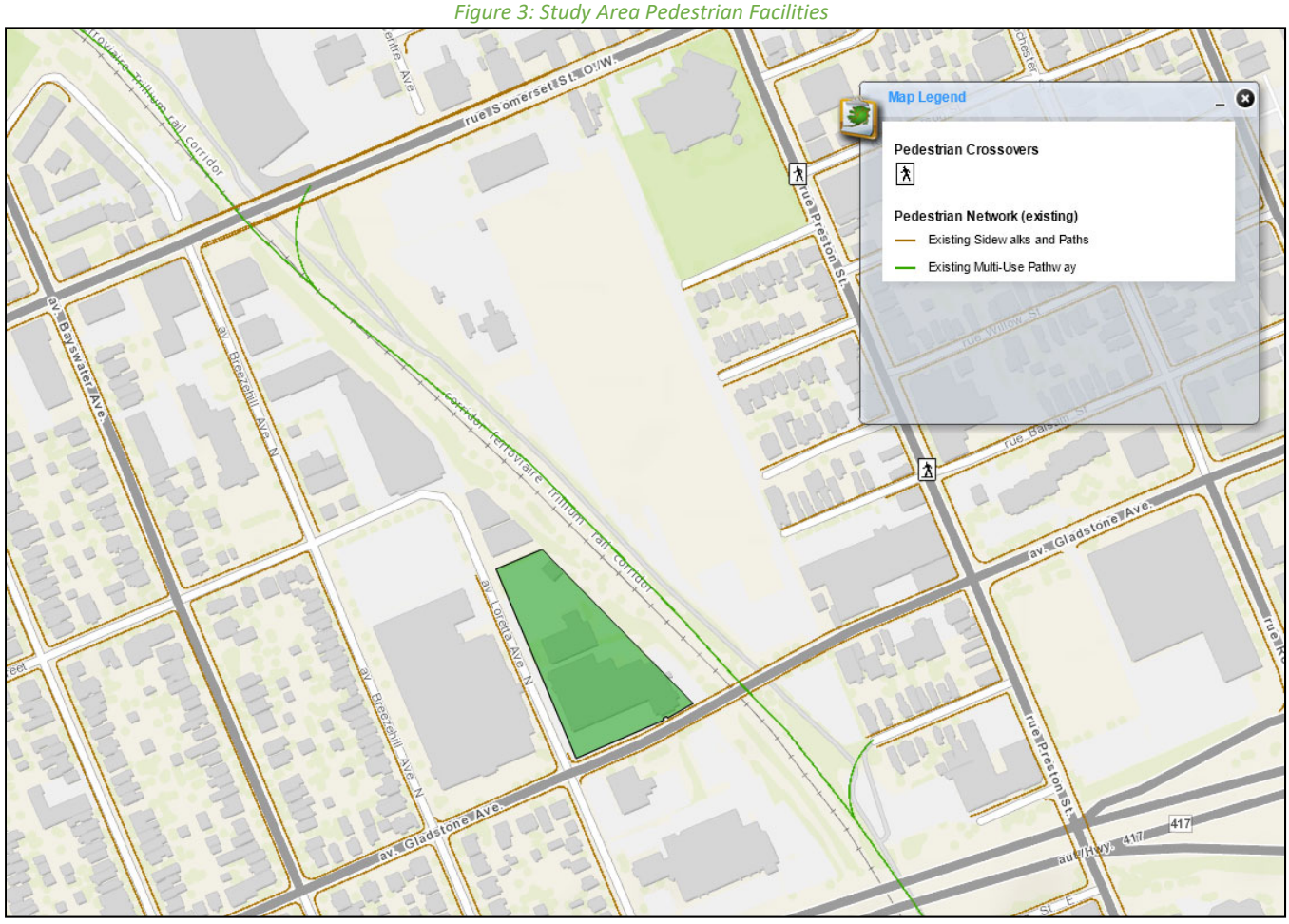
2.2.4 Existing Cycling and Pedestrian Facilities

Figure 3 illustrates the pedestrian facilities in the study area and Figure 4 illustrates the cycling facilities.

Sidewalks are provided along both sides of the roadways in the study area with the exception of the east side of Breezehill Avenue between Gladstone Avenue and Laurel Street, on both sides of Laurel Street, and the east side of Loretta Avenue North. The Trillium Pathway is a multi-use pathway along the east side of the Trillium Rail Corridor.

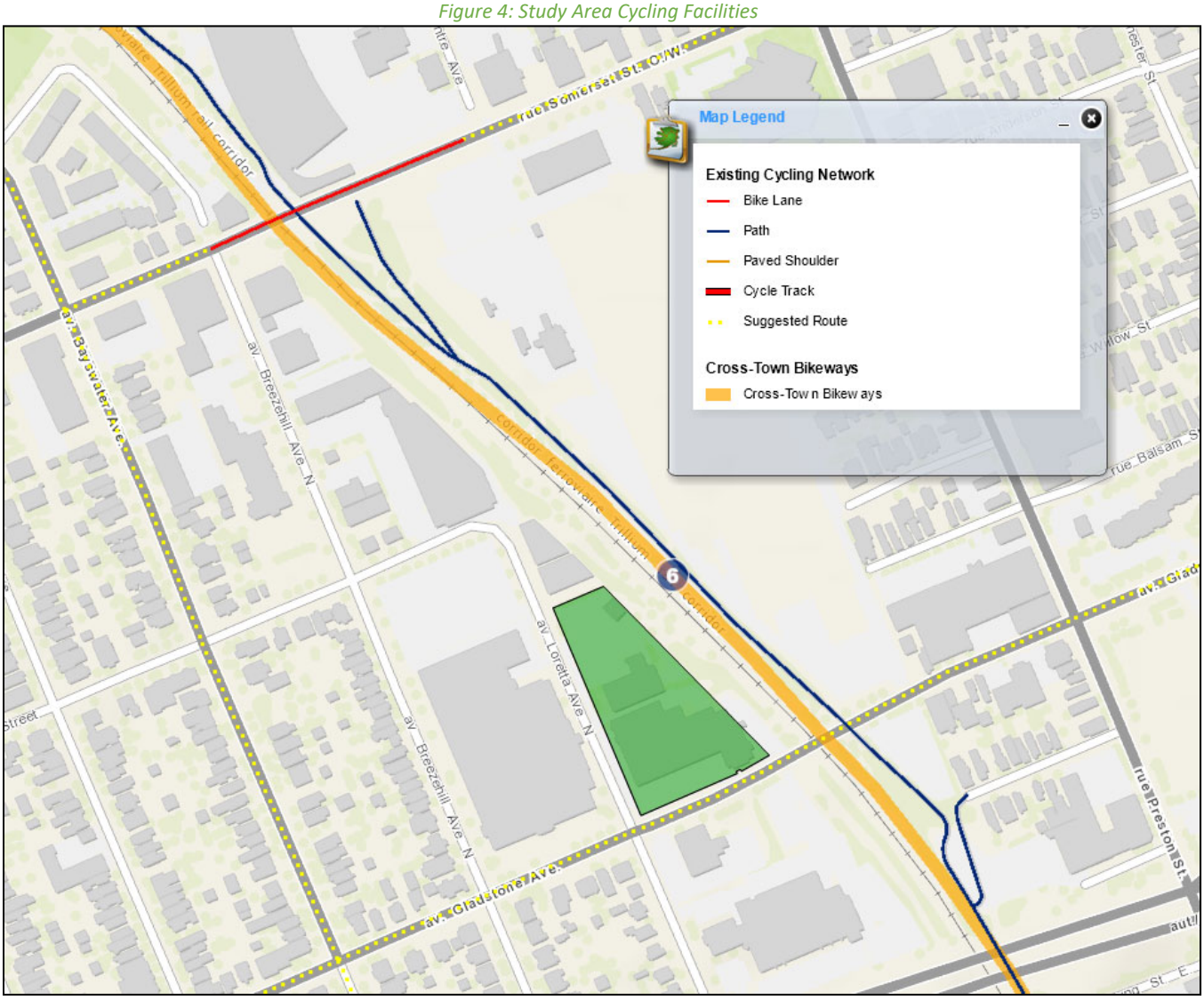
The cycling network consists of the Trillium Pathway as a cross-town bikeway, suggested biking routes along Gladstone Avenue, Bayswater Avenue and Somerset Street W, including bike lanes on the bridge over the Trillium Rail Corridor.

Figure 3: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: October 5, 2018

Figure 4: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: October 5, 2018

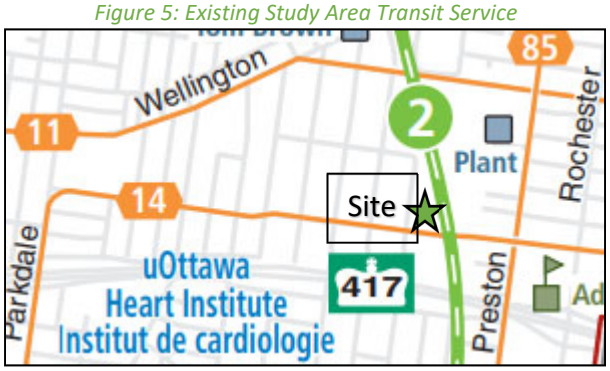
2.2.5 Existing Transit

Within the study area, Route #14 operates along Gladstone Avenue, Route #11 along Somerset Street W, and Route #85 along Preston Street. Figure 5 illustrates the transit routes in the study area. The frequency of these routes within proximity to the proposed site is currently:

- Route #11 - every 15-30 minutes, with higher frequency during the commuter peaks and day time
- Route #14 – every 30 minutes, with higher frequency during the commuter peaks and day time
- Route #85 - every 15-30 minutes, with higher frequency during the commuter peaks and day time

The Trillium Station at Carling Avenue is located approximately 1.0 km walking distance to the south and the Bayview Station is approximately 1.1 km walking distance to the north.

Figure 5: Existing Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: October 5, 2018

2.2.6 Existing Area Traffic Management Measures

Within the study area, vertical centreline stake bollards are located along Gladstone Avenue, Breezehill Avenue, and Bayswater Avenue.

2.2.7 Existing Peak Hour Travel Demand

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

Table 1: Intersection Count Date

Intersection	Count Date
Gladstone Avenue and Bayswater Avenue	Wednesday July 27, 2016
Gladstone Avenue and Preston Street	Tuesday June 20,2017
Somerset Street West and Breezehill Avenue	Thursday August 12, 2015

The intersections were not assigned any growth to estimate the 2018 adjusted traffic counts and Table 2 summarizes the existing study area intersection operations. Figure 6 illustrates the existing traffic volumes.

Detailed turning movement count data is included in Appendix B, and the synchro worksheets are provided in Appendix C.

Figure 6: Existing Traffic Volumes

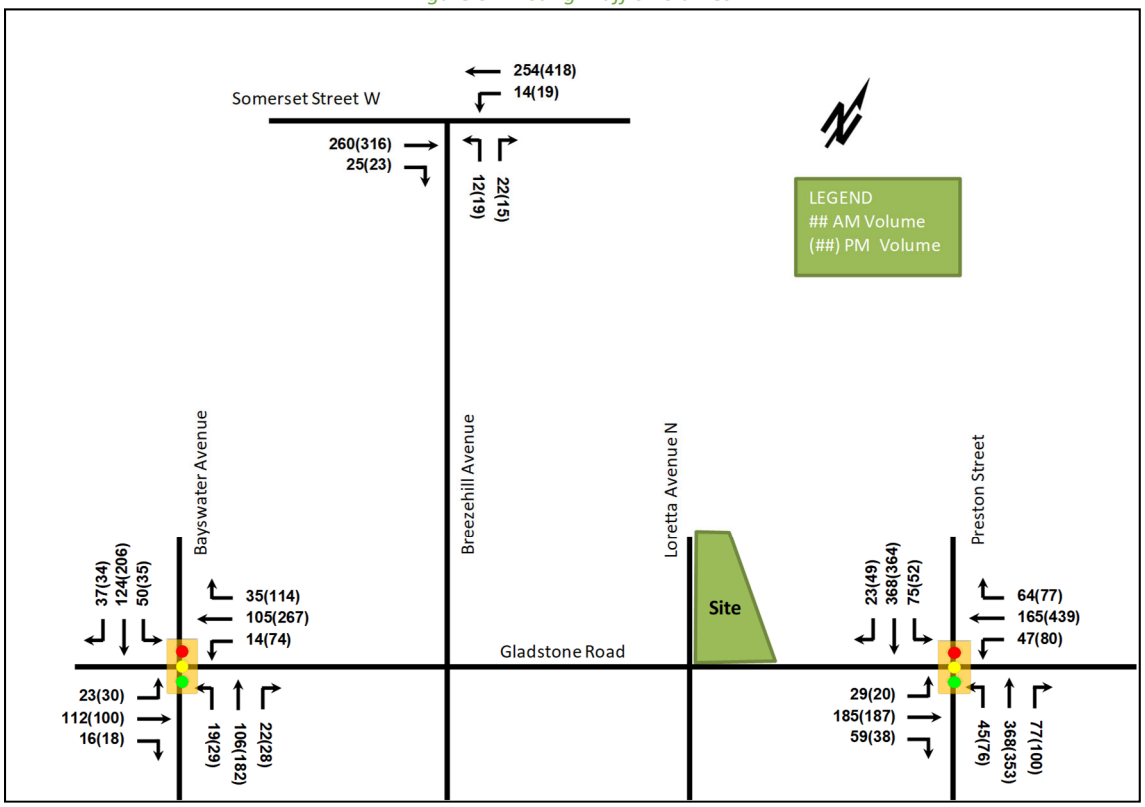


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Gladstone Avenue & Preston Street *Signalized*	EB	C	29.9	0.68	#55.5	B	18.5	0.48	40.6
	WBL	C	24.4	0.26	13.0	B	17.2	0.24	16.2
	WBT/R	C	25.5	0.56	43.0	D	40.0	0.90	#115.5
	NBL	A	8.1	0.11	6.8	B	15.8	0.29	15.0
	NBT/R	B	11.5	0.52	53.0	B	19.8	0.67	72.3
	SBL	A	9.4	0.21	10.9	B	14.9	0.23	11.0
	SBT/R	B	10.8	0.46	45.5	B	18.5	0.61	64.3
	Overall	**B**	**17.0**	-	-	**C**	**24.6**	-	-
Gladstone Avenue & Bayswater Avenue *Signalized*	EB	B	10.1	0.23	18.1	A	8.2	0.22	15.7
	WB	A	8.9	0.23	17.0	B	14.3	0.64	57.1
	NB	B	13.8	0.28	21.1	C	20.9	0.53	38.7
	SB	B	16.1	0.43	30.8	C	23.3	0.62	45.6
	Overall	**B**	**12.6**	-	-	**B**	**17.1**	-	-
Somerset Street W & Breezehill Avenue *Unsignalized*	EB	A	0.0	0.00	0.0	A	0.0	0.00	0.0
	WB	A	0.4	0.01	0.0	A	0.4	0.02	0.1
	NB	B	11.4	0.06	0.2	B	14.6	0.10	0.3
	Overall	**A**	**0.8**	-	-	**A**	**0.8**	-	-

The existing intersection operations predominantly operate with high levels of service during the peak hours.

The queue in the eastbound and westbound through/right-turn lanes at the Gladstone Avenue and Preston Street intersection may extend beyond the adjacent private approach accesses.

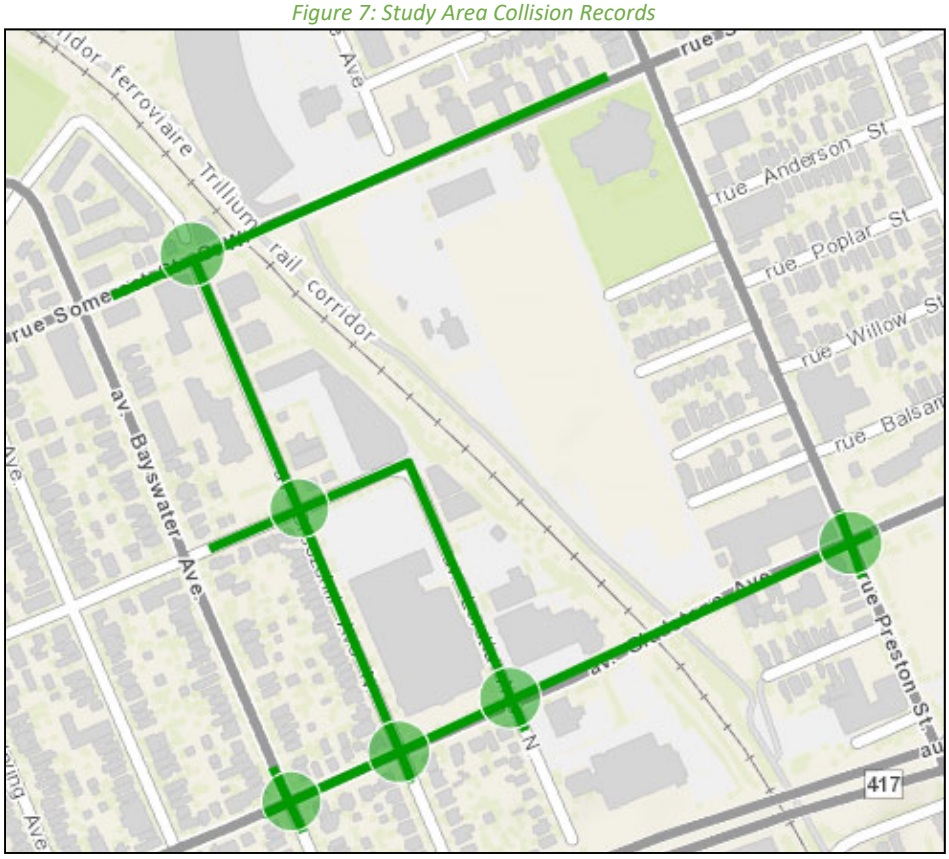
2.2.8 Collision Analysis

Collision data has been acquired from the City of Ottawa open data website (data.ottawa.ca) for four years prior to the commencement of this TIA for the surrounding study are road network. Table 3 summarizes the collisions documented in the study area and Figure 7 illustrates the intersections and segments analyzed.

Table 3 :Study Area Collision Summary

		Number	%
Total Collisions		**53**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	19	36%
	Property Damage Only	34	64%
Initial Impact Type	**Angle**	14	26%
	Rear end	10	19%
	Sideswipe	4	8%
	Turning Movement	13	25%
	SMV Other	4	8%
	SMV Unattended	6	11%
	Other	2	4%
Road Surface Condition	**Dry**	36	68%
	Wet	13	25%
	Loose Snow	2	4%
	Slush	1	2%
	Packed Snow	0	0%
	Ice	1	2%
Pedestrian Involved		0	0%
Cyclists Involved		7	13%

Figure 7: Study Area Collision Records



Of the collisions noted above, 18 collisions occurred at the Gladstone Avenue and Preston Street intersection, and 11 collisions occurred on Somerset Street West between Breezehill Avenue and Preston Street. Along the frontage of the proposed site, a single collision was noted at the Gladstone Avenue and Loretta Avenue North intersection and 2 collisions on Gladstone Avenue between Loretta Avenue North and Preston Street. The other location of note is the Gladstone Avenue and Bayswater Avenue that had a total of 8 collisions.

With respect to the cyclist and pedestrian collisions, the cyclist collisions were all noted at the Gladstone Avenue/Preston Street intersection (4) and the Somerset Street West segment between Breezehill Avenue and Preston Street (3).

Collision data is included in Appendix D.

2.3 Planned Conditions

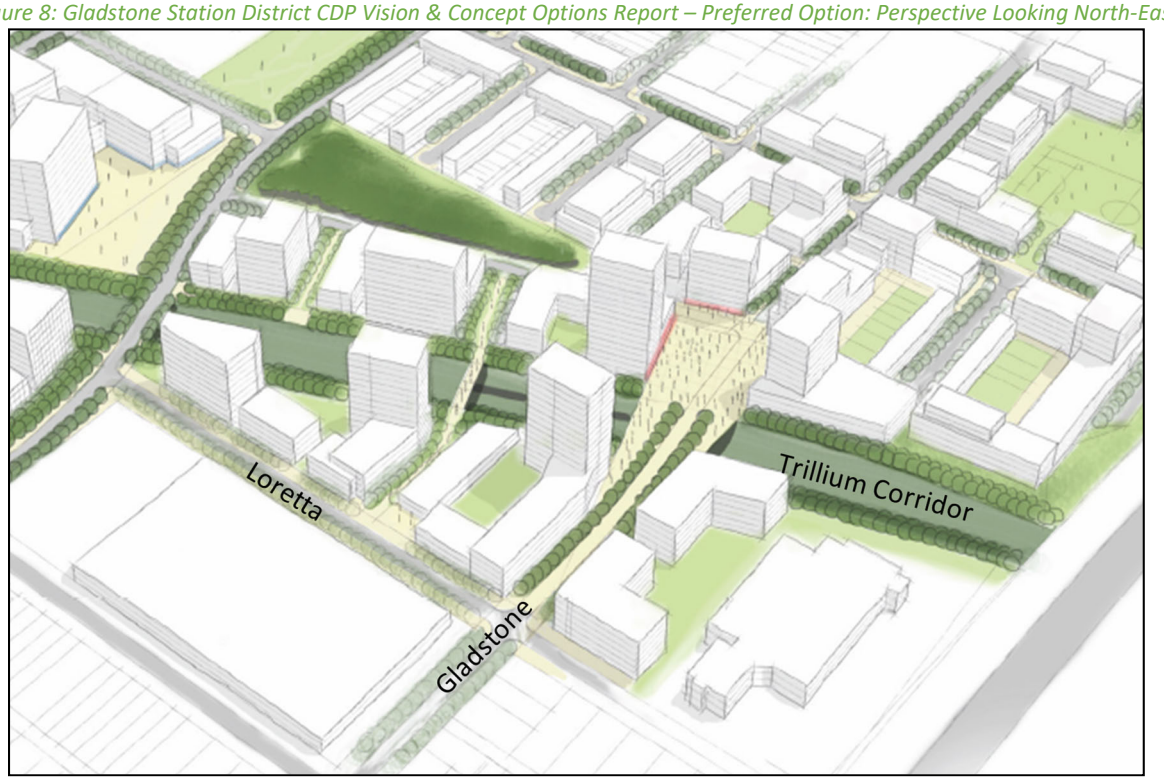
2.3.1 Changes to the Area Transportation Network

The subject development is within the Gladstone Station District CDP (2014) and as such, is subject to the development and planning vision outlined with the CDP. The CDP visioning option for the transit-oriented development node, illustrated in Figure 8, has the following new transportation infrastructure elements:

- Trillium LRT station plaza identified as a node/landmark/gateway for the community
- a multi-use crossing is proposed over the rail line between Gladstone Avenue and Laurel Street W
- a new road connection across the rail line between Laurel Street W and Oak Street

Beyond the station plaza, these improvements are not identified in the City's affordable network and not time frame is available for their construction.

Figure 8: Gladstone Station District CDP Vision & Concept Options Report – Preferred Option: Perspective Looking North-East



2.3.2 Other Study Area Developments

1040 and 1050 Somerset Street

The combined site would include a 32-storey residential building between the Trillium Rail corridor and Breezehill Avenue, and a 23-storey residential building on the west side of Breezehill Avenue. Both sites would include ground floor commercial/retail and provide underground parking. Access to the 1040 site was proposed along Breezehill Avenue and a laneway access on Somerset Street West was proposed for the 1050 site. These files have not advanced since 2013.

989 Somerset Street

The proposed development consists of a mixed-use building with ground floor retail and 127 residential units above. The transportation impact of this site will be primarily on Somerset Street West and Preston Street. In addition, this file has not advanced since 2014.

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of Gladstone Avenue and Bayswater Avenue, Gladstone Avenue and Preston Street, and Somerset Street West and Breezehill Avenue. Gladstone Avenue and Loretta Avenue North are noted as the boundary roads for the site.

The TRANS screenline SL-29 will need to be reviewed along the Trillium rail corridor, for the Gladstone Avenue and Somerset Street W bridge crossings.

3.2 Time Periods

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

3.3 Horizon Years

The anticipated build-out year is 2023. As a result, the full build-out plus five years horizon year is 2028.

4 Exemption Review

Table 4 summarizes the exemptions for this TIA.

Table 4: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	**Exempt**
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	**Exempt**
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Required

5 Development-Generated Travel Demand

5.1 Trip Generation and Mode Shares

This TIA has been prepared using the vehicle and person trip rates for the residential components using the TRANS Trip Generation Study Report (2009) and person trip rates for general office and the vehicle trip rates for the retail components using the ITE Trip Generation Manual (10th Edition). To estimate person trip generation for the retail component, a factor of 1.28 has been applied to the ITE rates. Table 5 summarizes the person trip rates for the proposed land uses.

Table 5: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
High-rise condominiums (3+ floors)	232 (TRANS)	AM	-	1.03
		PM	-	0.85
General Office (Dense Multi-Use)	710	AM	-	1.51
		PM	-	1.57
Shopping Centre (Dense Multi-Use)	820	AM	2.41	3.08
		PM	4.92	6.3

Using the above Person Trip rates, the total person trip generation has been estimates. Table 6 below illustrates the total person trip generation by dwelling type.

Table 6: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
High-rise condominiums	931	268	688	956	459	332	791
General Office	141.75	53	161	214	140	83	223
Shopping Centre	21.69	15	52	67	86	51	137
Total Person Trips		**336**	**901**	**1,237**	**685**	**466**	**1,151**

As the proposed development is within a transit-oriented development zone, TOD mode shares will be applied for the development and are summarized in Table 7.

Table 7: TOD Mode Share

Travel Mode	Mode Share
Auto Driver	15%
Auto Passenger	5%
Transit	65%
Non-Auto	15%
Total	100%

Internal capture rates from the ITE Trip Generation Handbook 3rd Edition assigned to the development for the office and retail components for mixed-use developments. The rates summarized in Table 8 represent the percentage of trips to/from the retail or office uses based on the residential component.

Table 8: Internal Capture Rates

Land Use	AM		PM	
	In	Out	Total	In
General Office	3%	1%	57%	2%
Shopping Centre	17%	14%	10%	26%

Using the above mode shares, person trip rates, and the internal capture rates the person trips by mode have been projected. Table 9 summarizes the trip generation by mode.

Table 9: Trip Generation by Mode

Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	15%	50	134	184	90	68	157
Auto Passenger	5%	17	44	62	30	23	53
Transit	65%	215	579	795	387	294	681
Non-Auto Modes	15%	50	134	184	90	68	157
Internal Capture		5	9	14	89	15	104
Total	100%	336	901	1,237	685	466	1,151

As shown above, 184 AM and 157 PM peak hour two-way vehicle trips are projected as a result of the proposed development.

5.2 Trip Distribution

To understand the travel patterns of the subject development the OD Survey has been reviewed to determine the existing travel patterns. Table 10 below summarizes the distribution.

Table 10: OD Survey Existing Mode Share – Ottawa Inner

To/From	Percent of Trips
North	20%
South	35%
East	25%
West	20%
Total	100%

5.3 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the Study Area road network and are illustrated in Figure 9 and Figure 10.

Figure 9: Traffic Assignment (%)

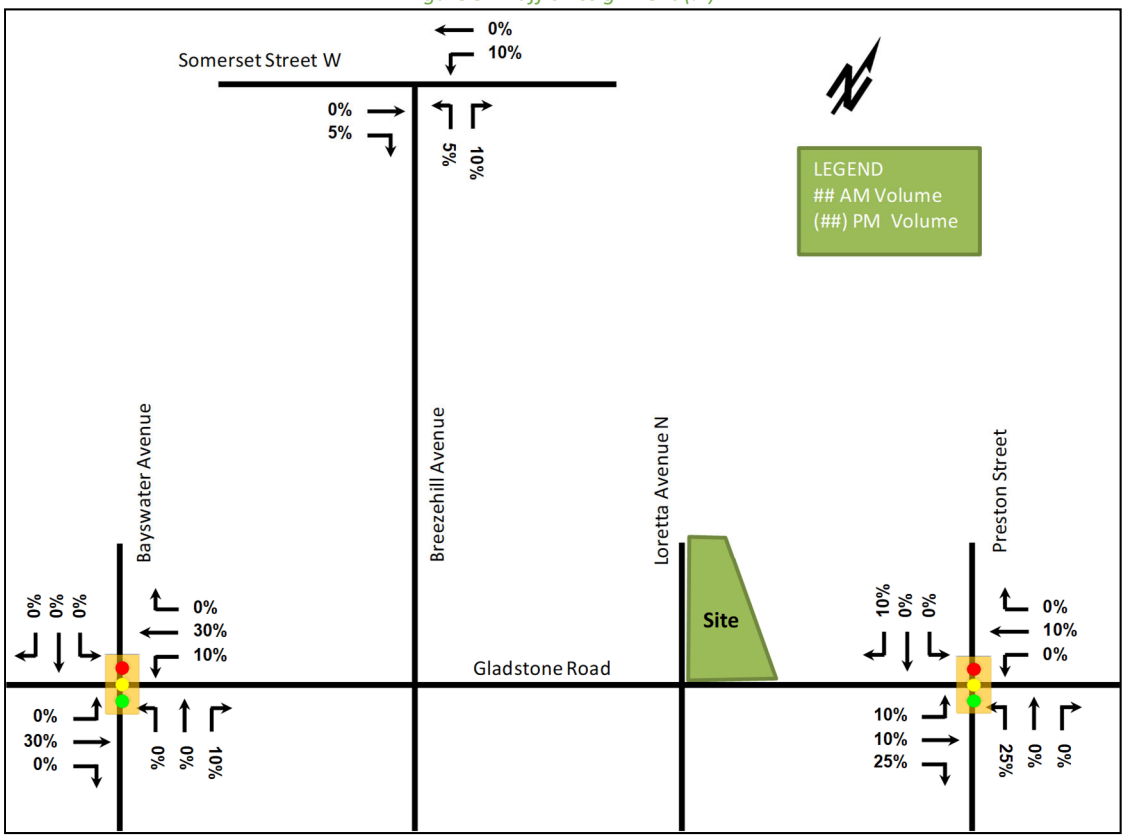
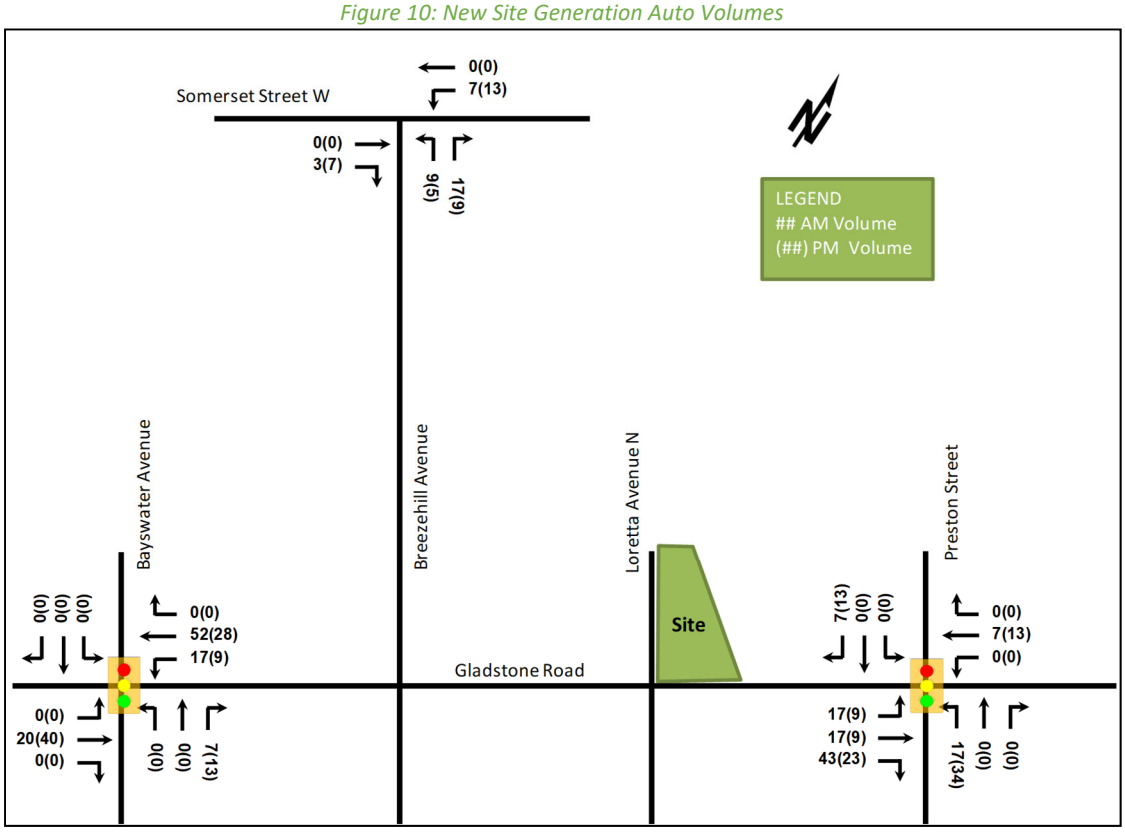


Figure 10: New Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3.1. Beyond the opening of the Trillium LRT Gladstone Station, no addition network changes have been included the preparation of this TIA.

6.2 Background Growth

The auto demand within the inner area of Ottawa has been documented as decreasing over the past 10 years, resulting in reduced demand on many roadways. As such, no growth has been applied to the study area intersections.

6.3 Other Developments

No background developments were explicitly considered as part of this TIA.

The future background traffic volumes are anticipated to remain the same as the existing conditions and no improvements are recommended.

7 Demand Rationalization

The existing SL-29 screenline two-way volumes, by mode, along the Trillium rail corridor for the Gladstone Avenue and Somerset Street W crossings has been summarized in Table 11. The auto volumes are approximately 60% to the east during the AM peak and 70% to the west during the PM peak. The theoretical capacity of these roadways could range between 700-900 vehicles per lane, which would provide approximately 30% or more residual capacity in the peak direction for each of these roadways, or be the equivalent to a level of service B.

Table 11: SL-29 Screenline Summary

Vehicle/Mode	Gladstone Bridge		Somerset Bridge	
	AM	PM	AM	PM
	404	676	494	850
	72	61	120	135
	57	65	168	264
	91	86	88	41
	9	10	10	9

Based on the capacity analysis and screenline data, no capacity constraints are currently noted for the area and rationalization for adjusted demand is not required for this TIA.

8 Transportation Demand Management

8.1 Context for TDM

The mode shares used within the TIA represent the planning level targets for a transit-oriented design (TOD). Should these mode shares not be reached, the subject site accesses Loretta Avenue, connecting to Gladstone Avenue and Breezehill Avenue, will see an impact on the adjacent residential land-uses. If the travel modes match the existing Ottawa West area mode hares, this would increase the vehicular traffic by over 3 times the TOD mode shares.

The subject site is within a TOD area. Tenants have not been finalized at this time, therefore any relocations from within Ottawa-Gatineau or the specific business operations cannot be confirmed until the tenants are known.

For the residential land use, total bedrooms within the development is subject to final owner purchasing preferences and no age restrictions are noted. The retail and office land uses will be determined by lease options and are entirely dependant on tenants to determine the number and occupation of employees, and clients/customers travelling from the Ottawa-Gatineau area and within 2.0km of the site.

8.2 Need and Opportunity

The subject site has been assumed to rely predominantly on transit due to the proximity to the future Gladstone LRT Station. As mentioned above, a decrease in the assumed 65% transit mode share to the existing 50% auto mode share for the area, would see an increase of over 3 times the auto trips from the proposed development.

The development is planned to coincide with the Gladstone Station construction. The convenience of the transit station should provide the opportunity to reach the forecast transit mode share, although incentives for new residential tenants exists within the TDM framework. Hard measures, such as reduced parking provisions, would limit the risk of higher auto mode shares being produced from the site.

8.3 TDM Program

The “suite of post occupancy TDM measures” has been summarized in the TDM checklists for both the residential and non-residential land uses. The checklist is provided in Appendix E.

The key TDM measures recommended include:

- Enhanced connectivity of pedestrians and cyclists to the adjacent network and adjacent Gladstone LRT station
- Engagement with local bike share programs (e.g. VeloGO) to include onsite space for bike rack/storage
- Posting of pedestrian, cycling, and transit information and maps at primary entrances/exits
- Inclusion of a 1-month Presto card for first time new residential tenants, along with a set time frame for this offer (e.g. 6-months) from the ‘opening’ of the building/tower.

9 Neighbourhood Traffic Management

The existing (and future background) volumes along Gladstone Avenue at Preston Avenue are approximately 550 vehicles during the peak hours in the peak direction. This exceeds the TIA Guidelines threshold of 300 vehicles during the peak hour. This threshold is too low for collector roadways and is not considered to be an existing or background issue, and the increase of approximately 90-135 vehicles during the peak hours in the peak direction from the subject site is not considered significant for a collector roadway.

10 Transit

10.1 Route Capacity

The existing Trillium line provides capacity for 1,000 passengers per direction per hour on a 15-minute service schedule. The future plans include a steady increase in service time to 8-minutes (1,750 passengers per direction per hour) as demand increases.

Based on the trip distribution and forecasted transit trips for the site, an upper limit of 375 northbound and 200 southbound outbound trips during the AM peak, and 200 northbound and 135 southbound inbound trips during the PM peak could be expected on the Trillium LRT. The range of the impacts are 13.5-37.5% of the existing service capacity of the Trillium LRT. Therefore, a revised service time schedule of 10-12 minutes may be required to support this development.

If a maximum of 10% of the transit mode share utilizes the existing route #14, this may see the need for an additional single bus (55-person capacity) during the peak hours to accommodate the additional demand.

10.2 Transit Priority

No transit priority is required/considered for the study area.

11 Review of Network Concept

The background and forecasted site trips do not exceed the anticipated lane capacities on the boundary road network. The construction and connectivity to the future Gladstone LRT Station is a priority to ensure the transit modal share is achieved and there is a minimal impact on the road network.

12 Network Intersection Design

12.1 Intersection Control

The operation of the Somerset Street W and Breezehill Avenue intersection does not warrant signalization. The warrant calculation has been provided in Appendix F.

12.2 Intersection Design

12.2.1 Total Future Conditions

The future total future traffic volumes for both the 2023 and 2028 horizons are the same and have been illustrated in Figure 11 and the intersection operations are summarized in Table 12. The level of service is based on the HCM criteria for average delay at unsignalized and signalized intersections. The synchro worksheets have been provided in Appendix G.

Figure 11: Future Total Traffic Volumes

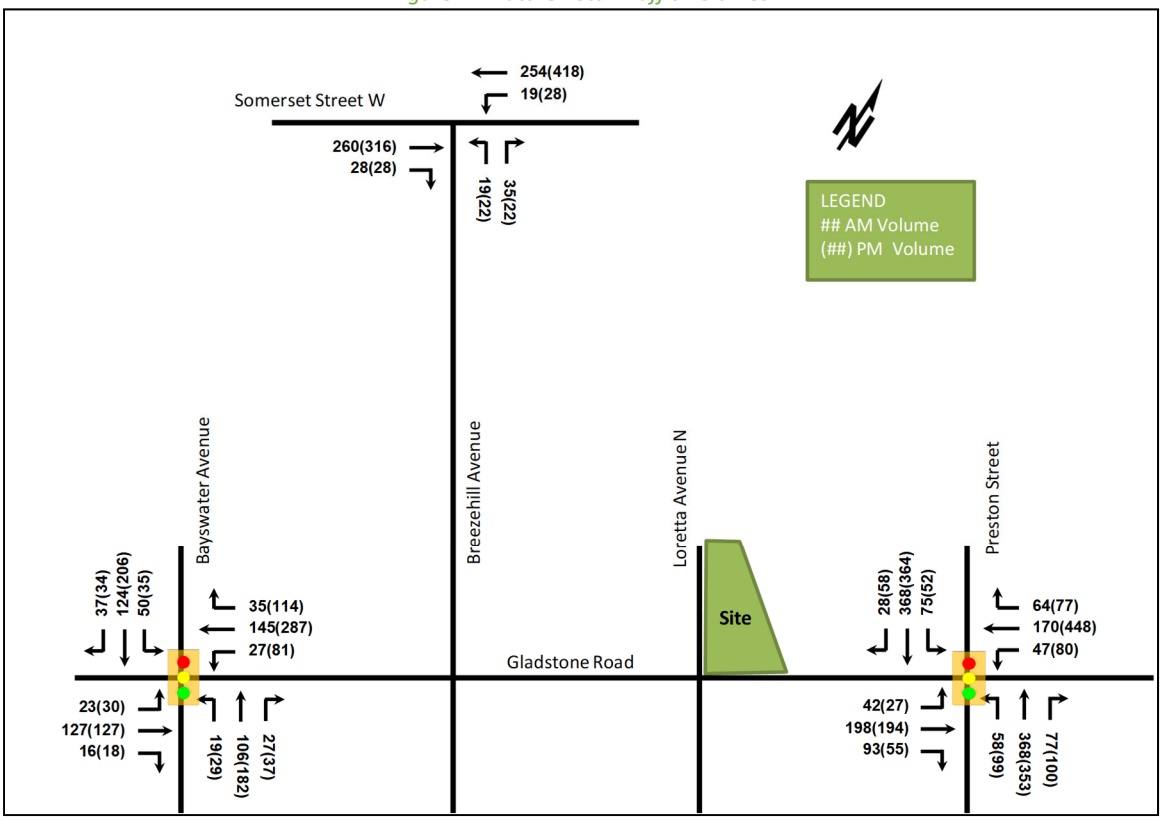


Table 12: Future Total Network Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95th)	LOS	Delay	V/C	Q (95th)
Gladstone Avenue & Preston Street *Signalized*	EB	C	33.6	0.75	#67.1	C	20.5	0.55	41.6
	WBL	C	24.4	0.25	12.1	B	17.5	0.25	14.8
	WBT/R	C	24.3	0.52	39.4	D	39.4	0.89	#101.1
	NBL	A	8.1	0.12	7.6	B	15.0	0.28	16.8
	NBT/R	B	10.6	0.47	45.7	B	16.5	0.57	62.3
	SBL	A	8.8	0.17	9.6	B	13.2	0.16	9.5
	SBT/R	B	10.2	0.42	40.4	B	16.0	0.53	57.5
	Overall	**B**	**17.6**	-	-	**C**	**23.2**	-	-
Gladstone Avenue & Bayswater Avenue *Signalized*	EB	C	22.6	0.47	24.3	B	11.4	0.30	16.9
	WB	C	24.5	0.57	29.2	C	24.0	0.79	53.6
	NB	A	5.9	0.16	13.7	B	14.8	0.36	35.6
	SB	A	6.6	0.23	19.3	B	15.6	0.40	40.2
	Overall	**B**	**15.1**	-	-	**B**	**18.2**	-	-
Somerset Street W & Breezehill Avenue *Unsignalized*	EB	A	0.0	0.00	0.0	A	0.0	0.00	0.0
	WB	A	0.5	0.02	0.0	A	0.5	0.02	0.1
	NB	B	11.2	0.09	0.3	B	13.6	0.10	0.3
	Overall	**A**	**1.2**	-	-	**A**	**1.0**	-	-

The future total intersection operations are similar to the existing conditions.

12.2.2 Design Elements

No intersection modifications are recommended for the study area intersections.

13 Summary of Improvements Indicated and Modifications Options

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

Proposed Site and Screening

- The proposed site includes 931 residential units, 141,750 sq. ft of office space, and 21,686 sq. ft. of retail space and is located on the northeast quadrant of the Gladstone Avenue and Loretta Avenue N intersection
- A one-way access loop will be provided along Loretta Avenue N and the existing access on Gladstone Avenue will continue to be used
- A pedestrian connect to the future Gladstone LRT Station is also proposed
- The development is proposed to be completed as a single phase by 2023
- The Trip Generation, Location, and Safety triggers were all met for the TIA Screening

Existing Conditions

- Gladstone Avenue (collector), Loretta Avenue N, Breezehill Avenue, Bayswater Avenue (collector), Preston Street (arterial), and Somerset Street W (arterial) are the local road ways, posted at 40km/h or unposted at 50 km/h
- The study area roads have sidewalks on at least one side of the local roads and both sides of the collectors and arterials
- Bike lanes are provided on Somerset Street W, east of Breezehill Avenue, and Gladstone Avenue, Bayswater Avenue and Somerset Street W are suggested bike routes
- The Trillium Pathway runs along the east side of the Trillium LRT corridor
- The existing transit route #14 travels along Gladstone Avenue, route #11 along Somerset Street W and #85 along Preston Street
- The Carling and Bayview Trillium LRT Stations are within a 1.1km walk from the site
- No operational issues are noted for the study area intersections

Development Generated Travel Demand

- The proposed development is forecasted to generate 1,237 people two-way trips during the AM peak and 1,151 people two-way trips during the PM peak
- Based on the transit-oriented design area mode shares, a total of 184 two-way vehicle trips will be generated during the AM peak and 157 two-way vehicles trips during the PM peak
- The distribution of the site trips is estimated to be 20% to the north, 35% to the south, 25% to the east, and 20% to the west

Background Conditions

- Adjacent developments have either been on hold for extended periods of time with an unknown horizon, or are too small to have a noticeable impact on the adjacent road network
- Additionally, the background growth in the Ottawa core has been decreasing and a 0% growth was assumed for the area
- The future background intersection operations are the same as the existing intersections

Design Review Component

- The review of the Development Design, Parking, Boundary Street Design, and Access Intersection Design will be completed during the Site Plan submission

TDM

- The development is planned to be completed along side the future Gladstone LRT Station and is the primary supportive infrastructure element to achieve the assumed mode shares and site success
- Additional supportive TDM measures include:
  - Enhanced connectivity of pedestrians and cyclists to the adjacent network and adjacent Gladstone LRT station
  - Engagement with local bike share programs (e.g. VeloGO) to include onsite space for bike rack/storage
  - Posting of pedestrian, cycling, and transit information and maps at primary entrances/exits
  - Inclusion of a 1-month Presto card for first time new residential tenants, along with a set time frame for this offer (e.g. 6-months) from the 'opening' of the building/tower.

Neighbourhood Traffic Management

- The TIA thresholds are met for the existing and background conditions for collector roadways on Gladstone Avenue
- The forecasted site traffic will be minimal, and it is not considered an issue for the adjacent neighbourhood

Transit

- The forecasted transit trips will include 795 two-way trips during the AM peak and 681 two-way trips during the PM peak
- An additional peak hour bus for route #14 may be required to support the proposed development
- The Trillium LRT service time may need to be increased, reducing the 15-minute service time to a 10-12-minute service time to support the proposed development
- No transit priority measures are recommended

Review of Network Concept

- The site is not anticipated to impact the transportation network concepts

Network Intersection Design

- No improvements for the study area intersection are required to support the proposed development
- The existing operational issues are not exacerbated by the additional site auto traffic

14 Next Steps

Following the approval of the OPA/ZBA submission, an updated TIA report will be completed for the Site Plan submission, pending developer timelines. This updated report will update the forecasting report modules and provide the Design Review Component analysis of the TIA guidelines.

Prepared By:

Andrew Harte, P.Eng.
Senior Transportation Engineer

Reviewed By:

Christopher Gordon, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

TIA Plan Reports

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

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

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

CERTIFICATION

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

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

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Ville d'Ottawa
Services d 'infrastructure et Viabilité des collectivités
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

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

Name: _____Andrew Harte_____
(Please Print)

Professional Title: _____Professional Engineer_____

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

Office Contact Information (Please Print)
Address: 13 Markham Avenue
City / Postal Code: Ottawa / K2G 3Z1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com

CGH TRANSPORTATION INC.

13 Markham Avenue
Nepean ON K2G 3Z1

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: Oct. 5, 2018
Project Number: 2018-36
Project Reference: Trinity - Gladstone-Loretta

1.1 Description of Proposed Development	
Municipal Address	951 Gladstone Ave, 145 Loretta Ave N
Description of Location	PLAN 73 BLK C LOTS 2 AND 3;PT LOT 1 WCA LOTS 1 TO 4 ELA;PT BLK C PT CHAMPAGNE AVE; PLAN 73 BLK C LOTS 5 TO 8
Land Use Classification	Apartments (Bachelor-3 Bdrm), Office, Retail
Development Size	Apartments: 931 units, Office: 141,750 sq. ft, Retail 21,686 sq.ft
Accesses	2 accesses, Loretta Ave
Phase of Development	Single Phase
Buildout Year	2023
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Townhomes or apartments	
Development Size	931	Units
Trip Generation Trigger	Yes	

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

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

Appendix B

Turning Movement Counts

Transportation Services - Traffic Services

W.O. 36100

Turning Movement Count - 15 Minute Summary Report

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

		BAYSWATER AVE								GLADSTONE AVE									
		Northbound				Southbound				Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	13	3	**16**	11	31	6	**48**	**64**	5	22	3	**30**	2	11	6	**19**	**49**	**113**
07:15	07:30	2	21	2	**25**	3	23	3	**29**	**54**	5	21	3	**29**	2	18	5	**25**	**54**	**108**
07:30	07:45	1	19	2	**22**	10	32	2	**44**	**66**	9	24	3	**36**	3	21	8	**32**	**68**	**134**
07:45	08:00	2	25	7	**34**	8	35	5	**48**	**82**	5	28	3	**36**	4	14	4	**22**	**58**	**140**
08:00	08:15	3	20	5	**28**	18	30	11	**59**	**87**	5	36	1	**42**	3	19	7	**29**	**71**	**158**
08:15	08:30	5	32	3	**40**	8	29	7	**44**	**84**	7	28	4	**39**	1	22	9	**32**	**71**	**155**
08:30	08:45	3	24	7	**34**	10	32	15	**57**	**91**	5	23	8	**36**	5	26	10	**41**	**77**	**168**
08:45	09:00	8	30	7	**45**	14	33	4	**51**	**96**	6	25	3	**34**	5	38	9	**52**	**86**	**182**
09:00	09:15	3	27	8	**38**	9	24	7	**40**	**78**	7	28	3	**38**	5	19	8	**32**	**70**	**148**
09:15	09:30	4	18	10	**32**	10	28	9	**47**	**79**	3	29	2	**34**	2	20	8	**30**	**64**	**143**
09:30	09:45	7	13	8	**28**	10	14	5	**29**	**57**	6	23	5	**34**	3	21	7	**31**	**65**	**122**
09:45	10:00	4	12	5	**21**	9	19	2	**30**	**51**	5	24	3	**32**	1	25	6	**32**	**64**	**115**
11:30	11:45	4	28	5	**37**	2	21	5	**28**	**65**	2	27	2	**31**	12	24	10	**46**	**77**	**142**
11:45	12:00	5	15	14	**34**	10	23	6	**39**	**73**	1	30	3	**34**	5	46	14	**65**	**99**	**172**
12:00	12:15	6	25	9	**40**	8	28	8	**44**	**84**	5	28	0	**33**	7	35	8	**50**	**83**	**167**
12:15	12:30	6	17	5	**28**	8	23	13	**44**	**72**	4	26	4	**34**	6	38	15	**59**	**93**	**165**
12:30	12:45	7	28	10	**45**	5	18	3	**26**	**71**	8	29	4	**41**	3	27	6	**36**	**77**	**148**
12:45	13:00	7	27	13	**47**	10	15	4	**29**	**76**	3	26	5	**34**	7	28	10	**45**	**79**	**155**
13:00	13:15	3	14	3	**20**	7	24	4	**35**	**55**	4	30	3	**37**	4	32	16	**52**	**89**	**144**
13:15	13:30	5	20	8	**33**	10	17	4	**31**	**64**	9	33	4	**46**	2	38	10	**50**	**96**	**160**
15:00	15:15	4	48	5	**57**	10	30	9	**49**	**106**	6	32	3	**41**	7	27	11	**45**	**86**	**192**
15:15	15:30	2	53	3	**58**	6	42	8	**56**	**114**	8	20	8	**36**	9	35	26	**70**	**106**	**220**
15:30	15:45	1	52	7	**60**	4	38	2	**44**	**104**	7	28	2	**37**	11	60	35	**106**	**143**	**247**
15:45	16:00	4	46	5	**55**	8	25	6	**39**	**94**	5	25	5	**35**	9	46	23	**78**	**113**	**207**
16:00	16:15	6	57	7	**70**	12	35	10	**57**	**127**	11	30	6	**47**	13	69	33	**115**	**162**	**289**
16:15	16:30	7	44	3	**54**	9	47	9	**65**	**119**	8	26	1	**35**	24	66	27	**117**	**152**	**271**
16:30	16:45	8	44	8	**60**	5	69	9	**83**	**143**	7	26	8	**41**	11	66	32	**109**	**150**	**293**
16:45	17:00	8	37	10	**55**	9	55	6	**70**	**125**	4	18	3	**25**	26	66	22	**114**	**139**	**264**
17:00	17:15	9	40	2	**51**	6	58	15	**79**	**130**	9	26	6	**41**	22	57	27	**106**	**147**	**277**
17:15	17:30	5	36	10	**51**	9	37	12	**58**	**109**	9	23	6	**38**	16	73	26	**115**	**153**	**262**
17:30	17:45	3	28	5	**36**	6	35	8	**49**	**85**	11	29	5	**45**	11	50	13	**74**	**119**	**204**
17:45	18:00	6	26	9	**41**	10	28	10	**48**	**89**	6	21	2	**29**	5	38	11	**54**	**83**	**172**
TOTAL:		148	939	208	**1295**	274	998	227	**1499**	**2794**	195	844	121	**1160**	246	1175	462	**1883**	**3043**	**5837**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order 36100

BAYSWATER AVE @ GLADSTONE AVE

Count Date: Wednesday, July 27, 2016 **Start Time:** 07:00

		BAYSWATER AVE			GLADSTONE AVE			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	08:00	6	2	**8**	29	14	**43**	**51**
08:00	09:00	12	7	**19**	63	18	**81**	**100**
09:00	10:00	5	0	**5**	19	15	**34**	**39**
11:30	12:30	2	0	**2**	11	14	**25**	**27**
12:30	13:30	2	0	**2**	10	0	**10**	**12**
15:00	16:00	3	4	**7**	10	9	**19**	**26**
16:00	17:00	3	7	**10**	21	51	**72**	**82**
17:00	18:00	11	11	**22**	35	40	**75**	**97**
Total	.....	44	31	**75**	198	161	**359**	**434**

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

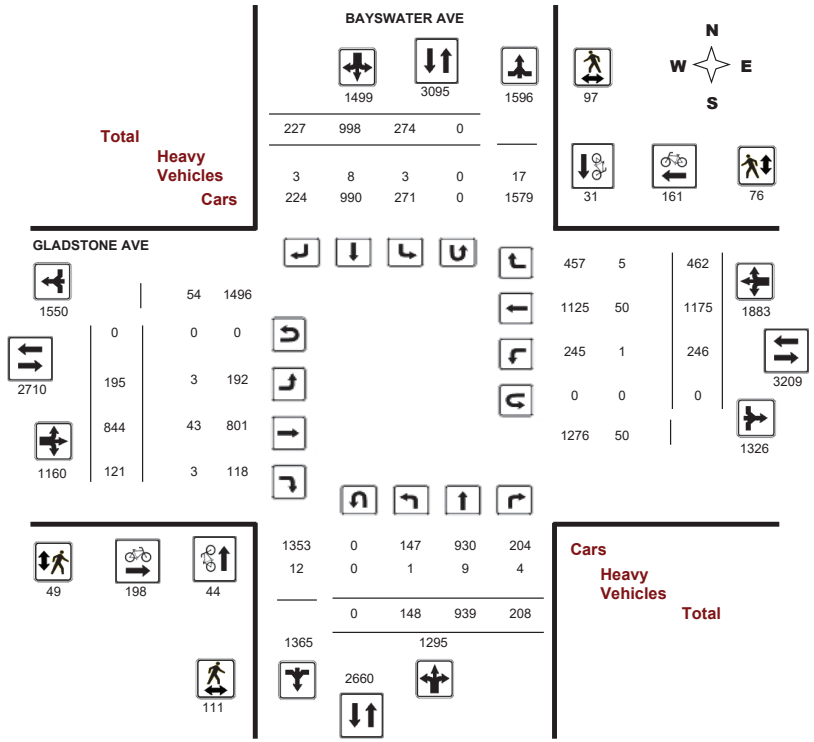
Turning Movement Count - Full Study Diagram

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

WO#: 36100

Device: Miovision



Comments

Transportation Services - Traffic Services

W.O. 36100

Turning Movement Count - Heavy Vehicle Report

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

		BAYSWATER AVE								GLADSTONE AVE										
		Northbound				Southbound				Eastbound				Westbound						
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	08:00	0	0	1	**1**	1	1	0	**2**	**3**	2	2	0	**4**	1	8	0	**9**	**13**	**16**
08:00	09:00	0	2	0	**2**	0	3	1	**4**	**6**	0	4	2	**6**	0	7	1	**8**	**14**	**20**
09:00	10:00	0	1	0	**1**	0	1	0	**1**	**2**	0	4	0	**4**	0	5	0	**5**	**9**	**11**
11:30	12:30	0	1	3	**4**	1	0	1	**2**	**6**	0	6	0	**6**	0	8	2	**10**	**16**	**22**
12:30	13:30	1	5	0	**6**	1	2	0	**3**	**9**	0	9	1	**10**	0	9	0	**9**	**19**	**28**
15:00	16:00	0	0	0	**0**	0	0	0	**0**	**0**	0	9	0	**9**	0	3	2	**5**	**14**	**14**
16:00	17:00	0	0	0	**0**	0	0	1	**1**	**1**	1	6	0	**7**	0	6	0	**6**	**13**	**14**
17:00	18:00	0	0	0	**0**	0	1	0	**1**	**1**	0	3	0	**3**	0	4	0	**4**	**7**	**8**
Sub Total		1	9	4	**14**	3	8	3	**14**	**28**	3	43	3	**49**	1	50	5	**56**	**105**	**133**
U-Turns (Heavy Vehicles)					**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total		1	9	4	**0**	3	8	3	**14**	**28**	3	43	3	**49**	1	50	5	**56**	**105**	**133**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Work Order 36100

Turning Movement Count - Pedestrian Volume Report

BAYSWATER AVE @ GLADSTONE AVE

Count Date: Wednesday, July 27, 2016 **Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	1	2	0	1	1	3
07:15 07:30	3	0	3	1	0	1	4
07:30 07:45	4	5	9	2	1	3	12
07:45 08:00	3	3	6	1	6	7	13
07:00 08:00	11	9	20	4	8	12	32
08:00 08:15	2	5	7	1	3	4	11
08:15 08:30	5	6	11	1	4	5	16
08:30 08:45	8	2	10	0	0	0	10
08:45 09:00	1	5	6	1	1	2	8
08:00 09:00	16	18	34	3	8	11	45
09:00 09:15	3	5	8	2	0	2	10
09:15 09:30	2	2	4	1	2	3	7
09:30 09:45	4	3	7	2	2	4	11
09:45 10:00	2	1	3	0	3	3	6
09:00 10:00	11	11	22	5	7	12	34
11:30 11:45	1	4	5	0	1	1	6
11:45 12:00	3	0	3	0	4	4	7
12:00 12:15	3	0	3	0	9	9	12
12:15 12:30	4	1	5	2	1	3	8
11:30 12:30	11	5	16	2	15	17	33
12:30 12:45	3	0	3	2	1	3	6
12:45 13:00	5	1	6	0	0	0	6
13:00 13:15	4	1	5	0	2	2	7
13:15 13:30	5	2	7	1	3	4	11
12:30 13:30	17	4	21	3	6	9	30
15:00 15:15	0	1	1	0	1	1	2
15:15 15:30	3	1	4	4	2	6	10
15:30 15:45	4	2	6	1	2	3	9
15:45 16:00	2	2	4	0	3	3	7
15:00 16:00	9	6	15	5	8	13	28
16:00 16:15	6	9	15	3	4	7	22
16:15 16:30	2	1	3	4	0	4	7
16:30 16:45	8	7	15	5	5	10	25
16:45 17:00	11	6	17	1	2	3	20
16:00 17:00	27	23	50	13	11	24	74
17:00 17:15	3	8	11	3	1	4	15
17:15 17:30	1	7	8	3	7	10	18
17:30 17:45	2	3	5	2	5	7	12
17:45 18:00	3	3	6	6	0	6	12
17:00 18:00	9	21	30	14	13	27	57
Total	111	97	208	49	76	125	333

Comment:

Transportation Services - Traffic Services

Work Order 36100

Turning Movement Count - Full Study Summary Report

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

Full Study

	BAYSWATER AVE									GLADSTONE AVE									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	5	78	14	97	32	121	16	169	266	24	95	12	131	11	64	23	98	229	495
08:00 09:00	19	106	22	147	50	124	37	211	358	23	112	16	151	14	105	35	154	305	663
09:00 10:00	18	70	31	119	38	85	23	146	265	21	104	13	138	11	85	29	125	263	528
11:30 12:30	21	85	33	139	28	95	32	155	294	12	111	9	132	30	143	47	220	352	646
12:30 13:30	22	89	34	145	32	74	15	121	266	24	118	16	158	16	125	42	183	341	607
15:00 16:00	11	199	20	230	28	135	25	188	418	26	105	18	149	36	168	95	299	448	866
16:00 17:00	29	182	28	239	35	206	34	275	514	30	100	18	148	74	267	114	455	603	1117
17:00 18:00	23	130	26	179	31	158	45	234	413	35	99	19	153	54	218	77	349	502	915
Sub Total	148	939	208	1295	274	998	227	1499	2794	195	844	121	1160	246	1175	462	1883	3043	5837
U Turns				0				0	0				0				0	0	0
Total	148	939	208	1295	274	998	227	1499	2794	195	844	121	1160	246	1175	462	1883	3043	5837
EQ 12Hr	206	1305	289	1800	381	1387	316	2084	3884	271	1173	168	1612	342	1633	642	2617	4229	8113
Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**																			
AVG 12Hr	185	1175	260	1620	343	1248	284	1875	3495	244	1056	151	1451	308	1470	578	2356	3807	7302
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **.90**																			
AVG 24Hr	243	1539	341	2122	449	1636	372	2457	4579	320	1383	198	1901	403	1926	757	3086	4987	9566
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**																			

Comments:

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

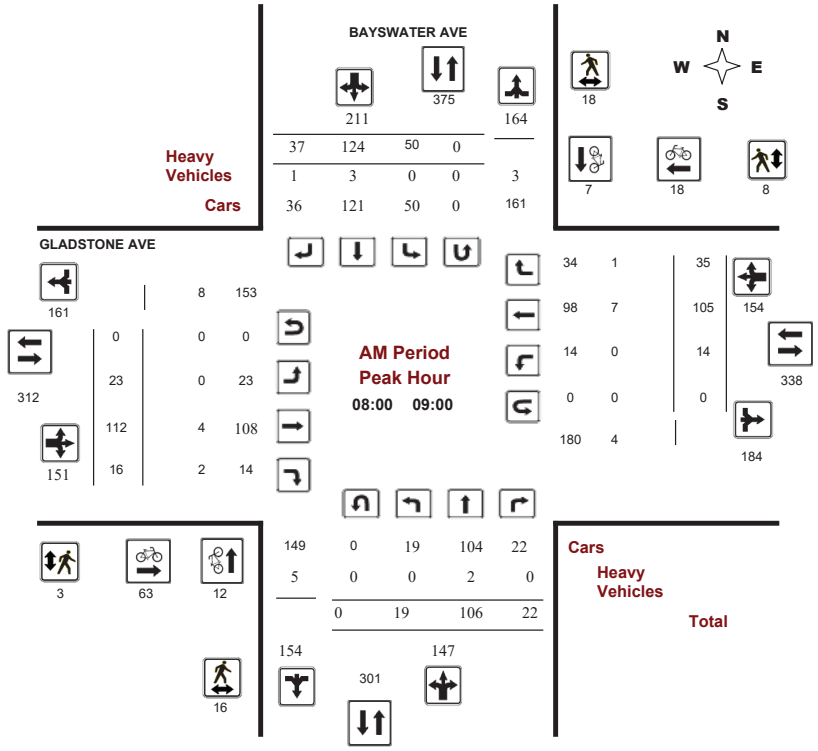
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36100

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



Comments

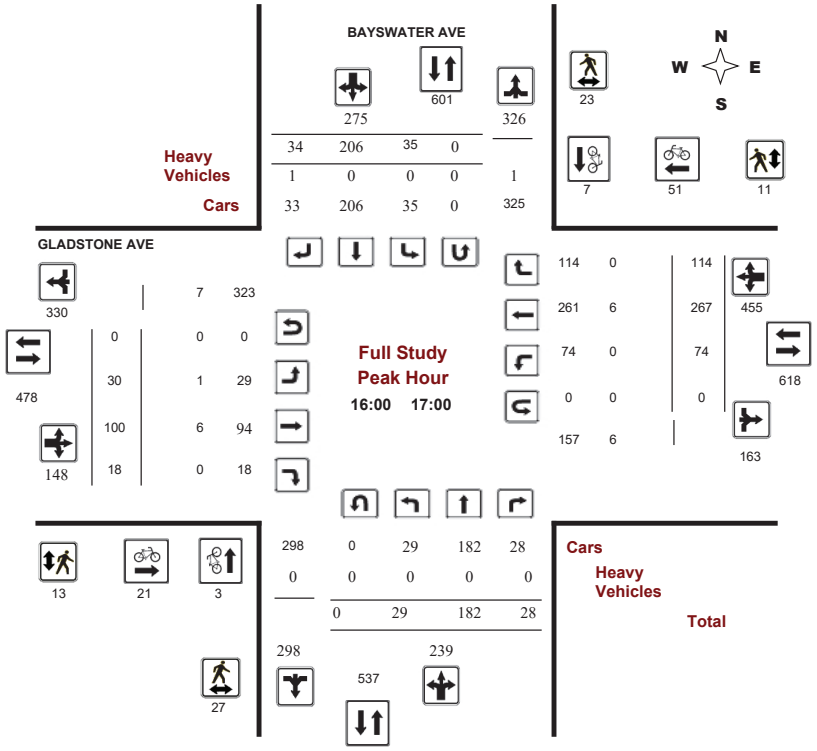
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36100

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



Comments

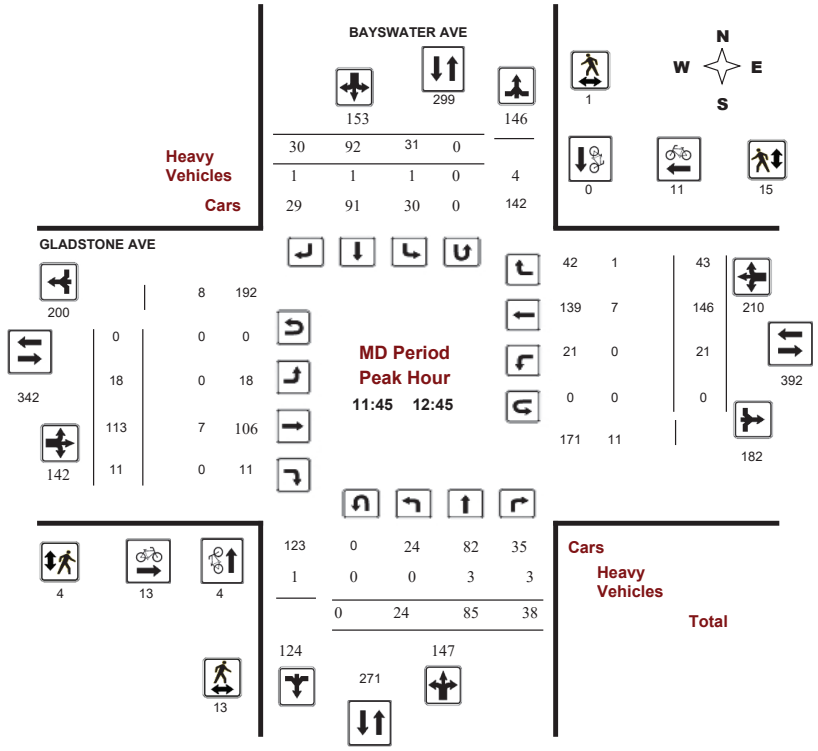
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36100

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



Comments

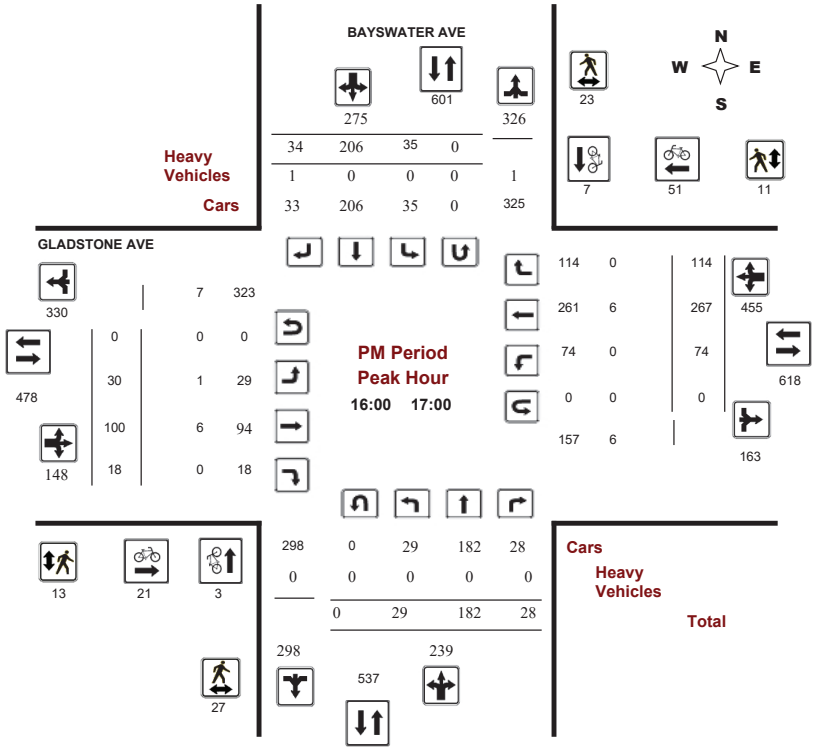
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016 **WO No:** 36100

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



Comments

Transportation Services - Traffic Services

Work Order 36100

Turning Movement Count - 15 Min U-Turn Total Report

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

Transportation Services - Traffic Services

W.O. 35301

Turning Movement Count - 15 Minute Summary Report

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 4 Westbound: 2

BREEZEHILL AVE **SOMERSET ST**

		Northbound				Southbound				Eastbound				Westbound						
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	2	0	2	**4**	0	0	0	**0**	**4**	0	27	5	**32**	3	21	0	**24**	**56**	**60**
07:15	07:30	0	0	6	**6**	0	0	0	**0**	**6**	0	29	3	**32**	2	35	0	**37**	**69**	**75**
07:30	07:45	2	0	3	**5**	0	0	0	**0**	**5**	0	53	2	**55**	1	35	0	**36**	**91**	**96**
07:45	08:00	2	0	4	**6**	0	0	0	**0**	**6**	0	62	3	**65**	4	54	0	**58**	**123**	**129**
08:00	08:15	3	0	6	**9**	0	0	0	**0**	**9**	0	65	5	**70**	4	56	0	**60**	**130**	**139**
08:15	08:30	4	0	5	**9**	0	0	0	**0**	**9**	0	92	3	**95**	4	42	0	**46**	**141**	**150**
08:30	08:45	3	0	4	**7**	0	0	0	**0**	**7**	0	54	5	**59**	3	40	0	**43**	**102**	**109**
08:45	09:00	3	0	9	**12**	0	0	0	**0**	**12**	0	64	4	**68**	4	50	0	**54**	**122**	**134**
09:00	09:15	3	0	6	**9**	0	0	0	**0**	**9**	0	63	8	**71**	5	68	0	**73**	**144**	**153**
09:15	09:30	5	0	4	**9**	0	0	0	**0**	**9**	0	62	4	**66**	5	53	0	**58**	**124**	**133**
09:30	09:45	6	0	7	**13**	0	0	0	**0**	**13**	0	76	3	**79**	2	66	0	**68**	**147**	**160**
09:45	10:00	2	0	5	**7**	0	0	0	**0**	**7**	0	59	10	**70**	2	67	0	**69**	**139**	**146**
11:30	11:45	5	0	2	**7**	0	0	0	**0**	**7**	0	81	2	**83**	3	74	0	**77**	**160**	**167**
11:45	12:00	9	0	3	**12**	0	0	0	**0**	**12**	0	81	3	**84**	5	69	0	**74**	**158**	**170**
12:00	12:15	7	0	12	**19**	0	0	0	**0**	**19**	0	78	8	**86**	12	80	0	**92**	**178**	**197**
12:15	12:30	4	0	8	**12**	0	0	0	**0**	**12**	0	69	4	**74**	5	70	0	**75**	**149**	**161**
12:30	12:45	6	0	3	**9**	0	0	0	**0**	**9**	0	71	5	**76**	2	64	0	**66**	**142**	**151**
12:45	13:00	1	0	4	**5**	0	0	0	**0**	**5**	0	80	9	**89**	5	72	0	**77**	**166**	**171**
13:00	13:15	4	0	3	**7**	0	0	0	**0**	**7**	0	65	7	**72**	2	66	0	**68**	**140**	**147**
13:15	13:30	5	0	5	**10**	0	0	0	**0**	**10**	0	49	5	**54**	6	86	0	**92**	**146**	**156**
15:00	15:15	6	0	2	**8**	0	0	0	**0**	**8**	0	65	5	**70**	2	74	0	**76**	**146**	**154**
15:15	15:30	7	0	6	**13**	0	0	0	**0**	**13**	0	66	2	**68**	5	89	0	**94**	**162**	**175**
15:30	15:45	8	0	8	**16**	0	0	0	**0**	**16**	0	58	4	**62**	3	93	0	**96**	**158**	**174**
15:45	16:00	4	0	2	**6**	0	0	0	**0**	**6**	0	61	4	**66**	6	75	0	**81**	**147**	**153**
16:00	16:15	2	0	7	**9**	0	0	0	**0**	**9**	0	73	3	**76**	5	96	0	**101**	**177**	**186**
16:15	16:30	3	0	5	**8**	0	0	0	**0**	**8**	0	87	7	**94**	7	108	0	**115**	**209**	**217**
16:30	16:45	5	0	3	**8**	0	0	0	**0**	**8**	0	65	8	**73**	4	104	0	**109**	**182**	**190**
16:45	17:00	3	0	4	**7**	0	0	0	**0**	**7**	0	86	3	**89**	6	114	0	**120**	**209**	**216**
17:00	17:15	8	0	3	**11**	0	0	0	**0**	**11**	0	78	5	**83**	2	92	0	**94**	**177**	**188**
17:15	17:30	4	0	3	**7**	0	0	0	**0**	**7**	0	78	3	**81**	7	113	0	**121**	**202**	**209**
17:30	17:45	4	0	5	**9**	0	0	0	**0**	**9**	0	64	3	**68**	7	110	0	**117**	**185**	**194**
17:45	18:00	2	0	6	**8**	0	0	0	**0**	**8**	0	76	2	**78**	3	93	0	**96**	**174**	**182**
TOTAL:		132	0	155	**287**	0	0	0	**0**	**287**	0	2137	147	**2288**	136	2329	0	**2467**	**4755**	**5042**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order 35301

BREEZEHILL AVE @ SOMERSET ST

Count Date: Thursday, August 13, 2015 **Start Time:** 07:00

	BREEZEHILL AVE			SOMERSET ST			
Time Period	Northbound	Southbound	**Street Total**	Eastbound	Westbound	**Street Total**	**Grand Total**
07:00 08:00	6	0	**6**	38	24	**62**	**68**
08:00 09:00	17	0	**17**	99	39	**138**	**155**
09:00 10:00	6	0	**6**	33	28	**61**	**67**
11:30 12:30	4	0	**4**	28	25	**53**	**57**
12:30 13:30	2	0	**2**	21	30	**51**	**53**
15:00 16:00	3	0	**3**	41	34	**75**	**78**
16:00 17:00	3	0	**3**	50	79	**129**	**132**
17:00 18:00	4	0	**4**	59	101	**160**	**164**
Total	45	0	**45**	369	360	**729**	**774**

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

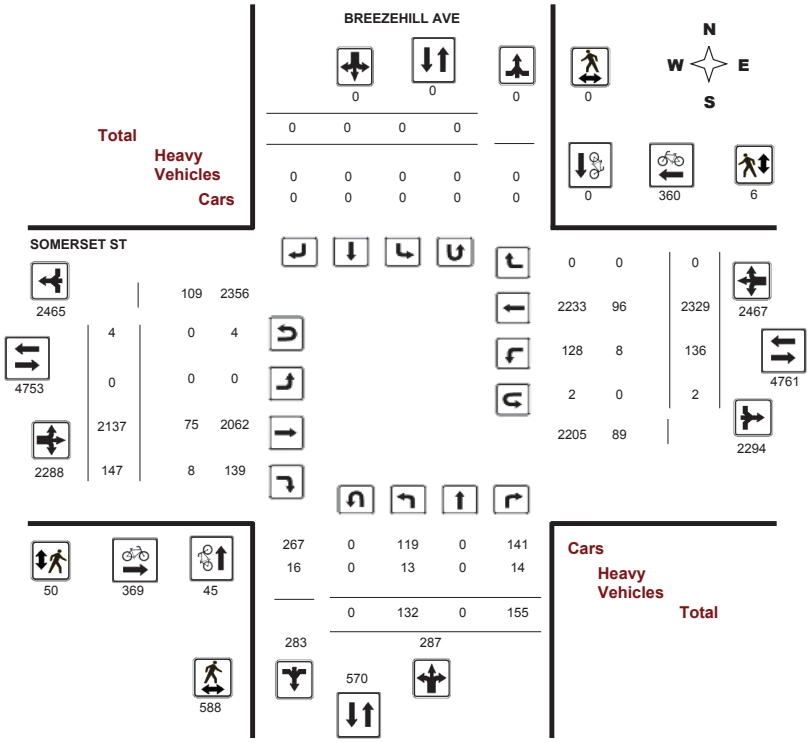
Transportation Services - Traffic Services

Turning Movement Count - Full Study Diagram

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015 **WO#:** 35301

Device: Miovision



Comments

Transportation Services - Traffic Services

W.O. 35301

Turning Movement Count - Heavy Vehicle Report

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

Time Period	BREEZEHILL AVE Northbound LT	ST	RT	N TOT	Southbound LT	ST	RT	S TOT	STR TOT	SOMERSET ST Eastbound LT	ST	RT	E TOT	Westbound LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 08:00	2	0	1	**3**	0	0	0	**0**	**3**	0	7	1	**8**	2	12	0	**14**	**22**	**25**
08:00 09:00	1	0	2	**3**	0	0	0	**0**	**3**	0	12	0	**12**	1	15	0	**16**	**28**	**31**
09:00 10:00	4	0	6	**10**	0	0	0	**0**	**10**	0	11	2	**13**	0	15	0	**15**	**28**	**38**
11:30 12:30	4	0	2	**6**	0	0	0	**0**	**6**	0	10	0	**10**	4	11	0	**15**	**25**	**31**
12:30 13:30	1	0	0	**1**	0	0	0	**0**	**1**	0	7	3	**10**	1	13	0	**14**	**24**	**25**
15:00 16:00	1	0	3	**4**	0	0	0	**0**	**4**	0	11	0	**11**	0	15	0	**15**	**26**	**30**
16:00 17:00	0	0	0	**0**	0	0	0	**0**	**0**	0	7	1	**8**	0	7	0	**7**	**15**	**15**
17:00 18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	10	1	**11**	0	8	0	**8**	**19**	**19**
Sub Total	13	0	14	**27**	0	0	0	**0**	**27**	0	75	8	**83**	8	96	0	**104**	**187**	**214**
U-Turns (Heavy Vehicles)				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	13	0	14	**0**	0	0	0	**0**	**27**	0	75	8	**83**	8	96	0	**104**	**187**	**214**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Work Order 35301

Turning Movement Count - Pedestrian Volume Report

BREEZEHILL AVE @ SOMERSET ST

Count Date: Thursday, August 13, 2015 **Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	8	0	**8**	0	0	**0**	**8**
07:15 07:30	8	0	**8**	0	1	**1**	**9**
07:30 07:45	14	0	**14**	1	0	**1**	**15**
07:45 08:00	15	0	**15**	2	1	**3**	**18**
07:00 08:00	45	0	**45**	3	2	**5**	**50**
08:00 08:15	10	0	**10**	1	1	**2**	**12**
08:15 08:30	25	0	**25**	0	0	**0**	**25**
08:30 08:45	14	0	**14**	3	0	**3**	**17**
08:45 09:00	10	0	**10**	0	0	**0**	**10**
08:00 09:00	59	0	**59**	4	1	**5**	**64**
09:00 09:15	13	0	**13**	0	0	**0**	**13**
09:15 09:30	12	0	**12**	0	0	**0**	**12**
09:30 09:45	16	0	**16**	0	0	**0**	**16**
09:45 10:00	9	0	**9**	0	0	**0**	**9**
09:00 10:00	50	0	**50**	0	0	**0**	**50**
11:30 11:45	18	0	**18**	2	0	**2**	**20**
11:45 12:00	8	0	**8**	3	0	**3**	**11**
12:00 12:15	21	0	**21**	2	0	**2**	**23**
12:15 12:30	19	0	**19**	0	1	**1**	**20**
11:30 12:30	66	0	**66**	7	1	**8**	**74**
12:30 12:45	21	0	**21**	0	0	**0**	**21**
12:45 13:00	16	0	**16**	0	0	**0**	**16**
13:00 13:15	16	0	**16**	0	0	**0**	**16**
13:15 13:30	18	0	**18**	0	1	**1**	**19**
12:30 13:30	71	0	**71**	0	1	**1**	**72**
15:00 15:15	19	0	**19**	2	0	**2**	**21**
15:15 15:30	26	0	**26**	1	0	**1**	**27**
15:30 15:45	21	0	**21**	1	0	**1**	**22**
15:45 16:00	21	0	**21**	0	0	**0**	**21**
15:00 16:00	87	0	**87**	4	0	**4**	**91**
16:00 16:15	13	0	**13**	2	0	**2**	**15**
16:15 16:30	20	0	**20**	6	0	**6**	**26**
16:30 16:45	24	0	**24**	3	0	**3**	**27**
16:45 17:00	30	0	**30**	6	0	**6**	**36**
16:00 17:00	87	0	**87**	17	0	**17**	**104**
17:00 17:15	26	0	**26**	3	0	**3**	**29**
17:15 17:30	37	0	**37**	5	1	**6**	**43**
17:30 17:45	35	0	**35**	7	0	**7**	**42**
17:45 18:00	25	0	**25**	0	0	**0**	**25**
17:00 18:00	123	0	**123**	15	1	**16**	**139**
Total	588	0	**588**	50	6	**56**	**644**

Comment:

Transportation Services - Traffic Services

Work Order 35301

Turning Movement Count - Full Study Summary Report

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 4 Westbound: 2

AADT Factor .90

Full Study

	BREEZEHILL AVE								SOMERSET ST									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	6	0	15	**21**	0	0	0	**0**	**21**	0	171	13	**184**	10	145	0	**155**	**339**	**360**
08:00 09:00	13	0	24	**37**	0	0	0	**0**	**37**	0	275	17	**292**	15	188	0	**203**	**495**	**532**
09:00 10:00	16	0	22	**38**	0	0	0	**0**	**38**	0	260	25	**285**	14	254	0	**268**	**553**	**591**
11:30 12:30	25	0	25	**50**	0	0	0	**0**	**50**	0	309	17	**326**	25	293	0	**318**	**644**	**694**
12:30 13:30	16	0	15	**31**	0	0	0	**0**	**31**	0	265	26	**291**	15	288	0	**303**	**594**	**625**
15:00 16:00	25	0	18	**43**	0	0	0	**0**	**43**	0	250	15	**265**	16	331	0	**347**	**612**	**655**
16:00 17:00	13	0	19	**32**	0	0	0	**0**	**32**	0	311	21	**332**	22	422	0	**444**	**776**	**808**
17:00 18:00	18	0	17	**35**	0	0	0	**0**	**35**	0	296	13	**309**	19	408	0	**427**	**736**	**771**
Sub Total	132	0	155	**287**	0	0	0	**0**	**287**	0	2137	147	**2284**	136	2329	0	**2465**	**4749**	**5036**
U Turns				**0**				**0**	**0**				**4**				**2**	**6**	**6**
Total	132	0	155	**287**	0	0	0	**0**	**287**	0	2137	147	**2288**	136	2329	0	**2467**	**4755**	**5042**
EQ 12Hr	183	0	215	**399**	0	0	0	**0**	**399**	0	2970	204	**3180**	189	3237	0	**3429**	**6609**	**7008**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	165	0	194	**359**	0	0	0	**0**	**359**	0	2673	184	**2862**	170	2914	0	**3086**	**5948**	**6307**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	216	0	254	**470**	0	0	0	**0**	**470**	0	3502	241	**3750**	223	3817	0	**4043**	**7793**	**8263**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													**1.31**						

Comments:

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

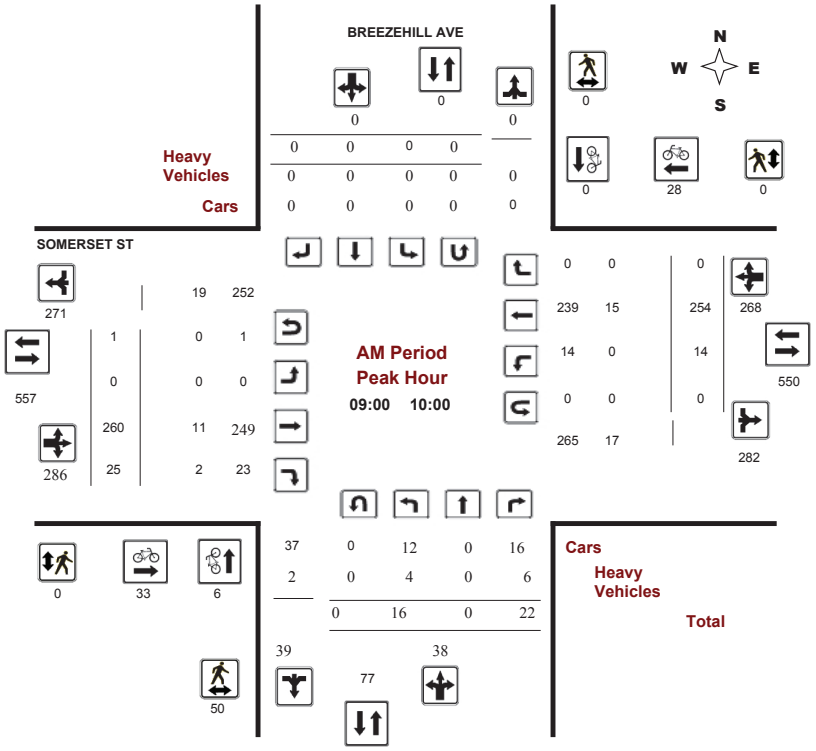
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015 **WO No:** 35301

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



Comments

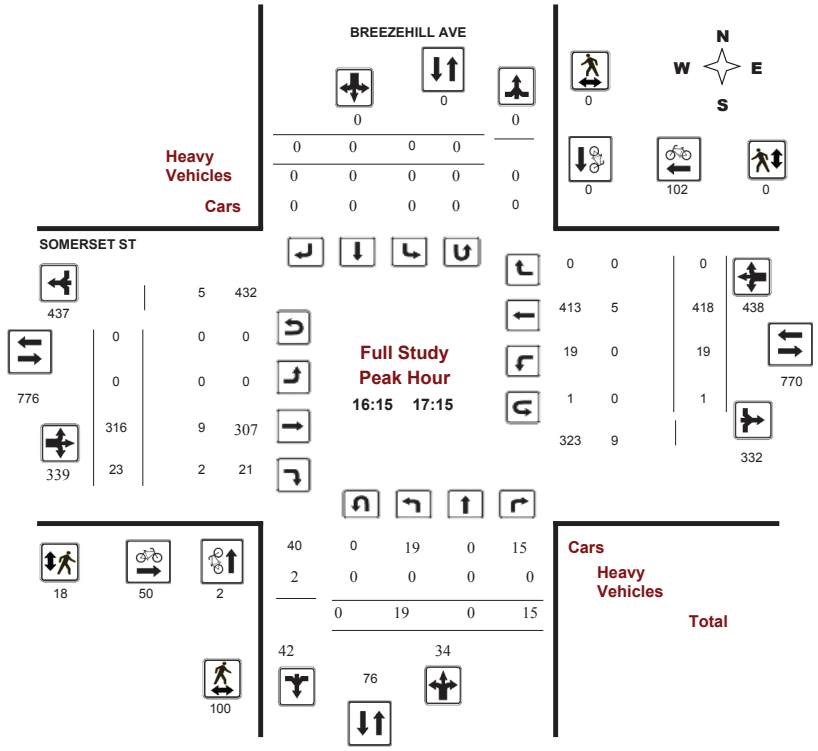
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015 **WO No:** 35301

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



Comments

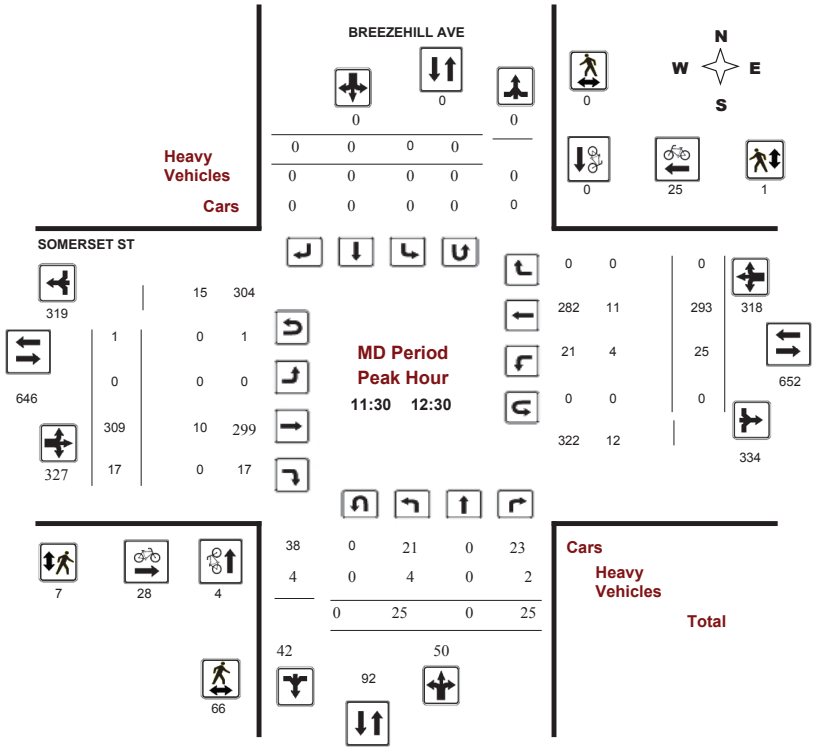
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015 **WO No:** 35301

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



Comments

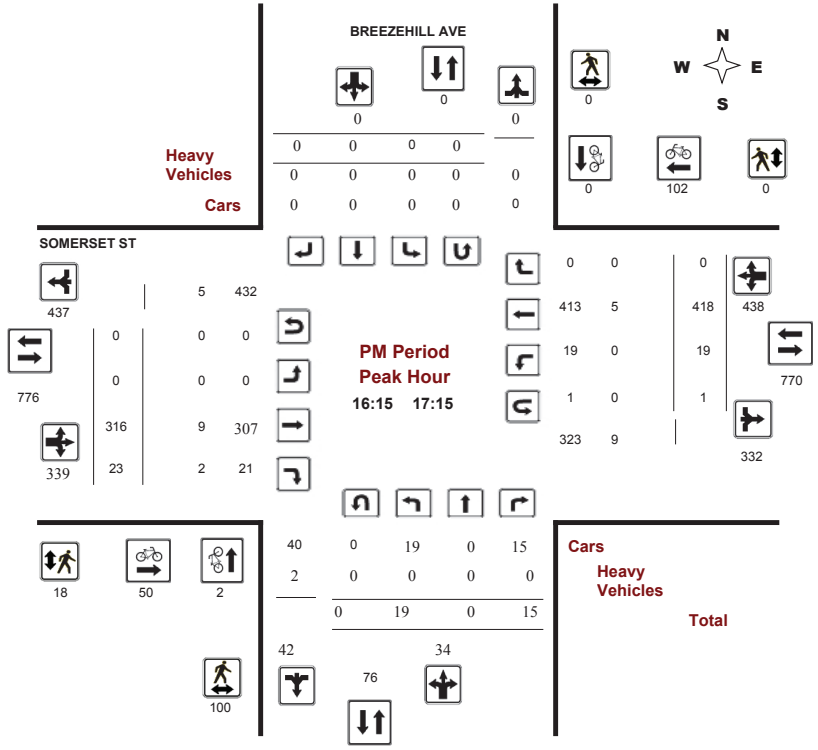
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015 **WO No:** 35301

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



Comments

Transportation Services - Traffic Services

Work Order 35301

Turning Movement Count - 15 Min U-Turn Total Report

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	1	0	1
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	1	0	1
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	1	0	1
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	1	1
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	1	1
17:30	17:45	0	0	1	0	1
17:45	18:00	0	0	0	0	0
Total		0	0	4	2	6

Transportation Services - Traffic Services

W.O. 37132

Turning Movement Count - 15 Minute Summary Report

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 1 Westbound: 0

		PRESTON ST									GLADSTONE AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	12	66	16	**94**	12	82	2	**96**	**190**	4	25	10	**39**	10	27	19	**56**	**95**	**285**
07:15	07:30	3	78	19	**100**	14	104	3	**121**	**221**	2	24	8	**34**	10	23	12	**45**	**79**	**300**
07:30	07:45	13	85	15	**113**	10	70	4	**84**	**197**	3	29	13	**45**	8	25	12	**45**	**90**	**287**
07:45	08:00	13	95	15	**123**	17	90	7	**114**	**237**	11	32	10	**53**	13	24	14	**51**	**104**	**341**
08:00	08:15	12	99	17	**128**	19	85	3	**107**	**235**	7	39	16	**62**	13	28	21	**62**	**124**	**359**
08:15	08:30	14	100	27	**141**	18	91	10	**119**	**260**	9	56	19	**84**	17	40	17	**74**	**158**	**418**
08:30	08:45	9	120	21	**150**	20	91	3	**114**	**264**	5	52	14	**71**	6	49	14	**69**	**140**	**404**
08:45	09:00	10	94	16	**120**	16	78	0	**94**	**214**	10	50	13	**73**	12	41	16	**69**	**142**	**356**
09:00	09:15	13	81	20	**114**	21	108	10	**139**	**253**	5	27	13	**45**	12	35	17	**64**	**109**	**362**
09:15	09:30	19	61	18	**98**	23	94	8	**125**	**223**	8	27	12	**47**	12	40	21	**73**	**120**	**343**
09:30	09:45	14	79	17	**110**	24	84	11	**119**	**229**	9	25	10	**45**	21	26	15	**62**	**107**	**336**
09:45	10:00	9	73	19	**101**	16	75	3	**94**	**195**	4	30	11	**45**	11	38	17	**66**	**111**	**306**
11:30	11:45	8	70	20	**98**	20	63	4	**87**	**185**	5	24	14	**43**	29	22	20	**71**	**114**	**299**
11:45	12:00	9	67	23	**99**	15	89	13	**117**	**216**	2	38	12	**52**	27	53	27	**107**	**159**	**375**
12:00	12:15	13	79	21	**113**	11	84	11	**106**	**219**	5	35	13	**53**	30	41	28	**99**	**152**	**371**
12:15	12:30	11	89	25	**125**	16	67	5	**88**	**213**	5	35	14	**54**	22	44	29	**95**	**149**	**362**
12:30	12:45	7	53	19	**79**	18	97	11	**126**	**205**	6	33	13	**52**	21	34	27	**82**	**134**	**339**
12:45	13:00	16	63	27	**106**	21	77	4	**102**	**208**	8	32	19	**59**	22	44	25	**91**	**150**	**358**
13:00	13:15	13	89	19	**121**	14	83	9	**106**	**227**	9	40	19	**68**	24	44	21	**89**	**157**	**384**
13:15	13:30	12	73	22	**107**	29	75	8	**112**	**219**	10	35	11	**56**	21	41	21	**83**	**139**	**358**
15:00	15:15	15	84	29	**128**	8	95	8	**111**	**239**	5	39	26	**70**	24	62	27	**113**	**183**	**422**
15:15	15:30	21	118	24	**163**	17	97	9	**123**	**286**	6	40	11	**57**	16	64	15	**95**	**152**	**438**
15:30	15:45	12	98	16	**126**	13	73	10	**96**	**222**	5	39	14	**58**	26	92	20	**138**	**196**	**418**
15:45	16:00	13	108	16	**137**	12	86	6	**104**	**241**	10	48	14	**72**	19	96	15	**130**	**202**	**443**
16:00	16:15	27	118	19	**164**	15	83	9	**107**	**271**	4	40	8	**52**	22	97	14	**133**	**185**	**456**
16:15	16:30	14	104	22	**140**	12	95	10	**117**	**257**	3	48	11	**62**	18	107	20	**145**	**207**	**464**
16:30	16:45	16	83	29	**128**	9	86	8	**103**	**231**	6	51	13	**70**	24	101	20	**145**	**215**	**446**
16:45	17:00	22	92	23	**137**	15	103	10	**128**	**265**	3	43	6	**52**	18	114	24	**156**	**208**	**473**
17:00	17:15	24	95	27	**146**	16	80	21	**117**	**263**	8	45	8	**61**	20	117	13	**150**	**211**	**474**
17:15	17:30	12	79	24	**115**	7	85	8	**100**	**215**	1	40	9	**50**	24	100	20	**144**	**194**	**409**
17:30	17:45	13	86	31	**130**	15	71	7	**93**	**223**	8	48	8	**64**	26	85	25	**136**	**200**	**423**
17:45	18:00	13	84	12	**109**	6	94	11	**111**	**220**	8	45	12	**65**	27	78	20	**125**	**190**	**410**
TOTAL:		432	2763	668	**3863**	499	2735	246	**3480**	**7343**	194	1214	404	**1813**	605	1832	626	**3063**	**4876**	**12219**

Note: U-Turns are included in Totals.

Comment:

Transportation Services - Traffic Services

Turning Movement Count - Cyclist Volume Report

Work Order 37132

GLADSTONE AVE @ PRESTON ST

Count Date: Tuesday, June 20, 2017 **Start Time:** 07:00

		PRESTON ST			GLADSTONE AVE			
Time Period		Northbound	Southbound	**Street Total**	Eastbound	Westbound	**Street Total**	**Grand Total**
07:00	08:00	0	8	**8**	19	14	**33**	**41**
08:00	09:00	10	14	**24**	47	25	**72**	**96**
09:00	10:00	7	8	**15**	15	21	**36**	**51**
11:30	12:30	5	9	**14**	10	8	**18**	**32**
12:30	13:30	8	10	**18**	4	14	**18**	**36**
15:00	16:00	8	8	**16**	17	15	**32**	**48**
16:00	17:00	11	13	**24**	20	42	**62**	**86**
17:00	18:00	7	8	**15**	27	38	**65**	**80**
Total	.....	56	78	**134**	159	177	**336**	**470**

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

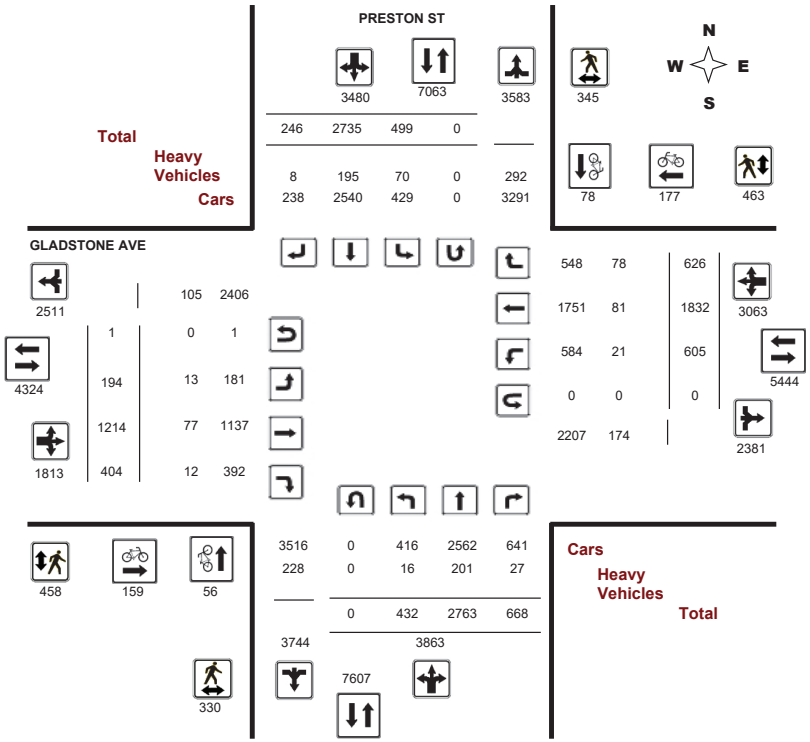
Turning Movement Count - Full Study Diagram

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017

WO#: 37132

Device: Miovision



Comments

Transportation Services - Traffic Services

W.O. 37132

Turning Movement Count - Heavy Vehicle Report

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017

		PRESTON ST									GLADSTONE AVE									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	08:00	1	26	5	**32**	13	22	1	**36**	**68**	2	12	1	**15**	0	9	5	**14**	**29**	**97**
08:00	09:00	1	28	5	**34**	11	26	0	**37**	**71**	4	10	3	**17**	4	12	10	**26**	**43**	**114**
09:00	10:00	4	33	5	**42**	12	40	0	**52**	**94**	2	12	4	**18**	3	13	12	**28**	**46**	**140**
11:30	12:30	1	25	2	**28**	6	29	4	**39**	**67**	1	9	1	**11**	3	9	14	**26**	**37**	**104**
12:30	13:30	5	27	2	**34**	15	22	0	**37**	**71**	1	10	2	**13**	7	11	11	**29**	**42**	**113**
15:00	16:00	3	27	4	**34**	3	24	3	**30**	**64**	3	6	1	**10**	3	12	8	**23**	**33**	**97**
16:00	17:00	1	21	3	**25**	7	18	0	**25**	**50**	0	11	0	**11**	0	9	11	**20**	**31**	**81**
17:00	18:00	0	14	1	**15**	3	14	0	**17**	**32**	0	7	0	**7**	1	6	7	**14**	**21**	**53**
Sub Total		16	201	27	**244**	70	195	8	**273**	**517**	13	77	12	**102**	21	81	78	**180**	**282**	**799**
U-Turns (Heavy Vehicles)					**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total		16	201	27	**0**	70	195	8	**273**	**517**	13	77	12	**102**	21	81	78	**180**	**282**	**799**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Transportation Services - Traffic Services

Work Order 37132

Turning Movement Count - Pedestrian Volume Report

GLADSTONE AVE @ PRESTON ST

Count Date: Tuesday, June 20, 2017 **Start Time:** 07:00

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	3	**4**	1	3	**4**	**8**
07:15 07:30	7	5	**12**	3	4	**7**	**19**
07:30 07:45	7	10	**17**	8	12	**20**	**37**
07:45 08:00	19	6	**25**	12	14	**26**	**51**
07:00 08:00	34	24	**58**	24	33	**57**	**115**
08:00 08:15	10	7	**17**	9	16	**25**	**42**
08:15 08:30	8	9	**17**	4	15	**19**	**36**
08:30 08:45	26	22	**48**	21	40	**61**	**109**
08:45 09:00	13	16	**29**	10	23	**33**	**62**
08:00 09:00	57	54	**111**	44	94	**138**	**249**
09:00 09:15	12	6	**18**	3	9	**12**	**30**
09:15 09:30	8	6	**14**	5	14	**19**	**33**
09:30 09:45	4	9	**13**	9	3	**12**	**25**
09:45 10:00	9	10	**19**	10	12	**22**	**41**
09:00 10:00	33	31	**64**	27	38	**65**	**129**
11:30 11:45	9	4	**13**	8	14	**22**	**35**
11:45 12:00	8	9	**17**	11	9	**20**	**37**
12:00 12:15	14	13	**27**	18	13	**31**	**58**
12:15 12:30	14	9	**23**	27	8	**35**	**58**
11:30 12:30	45	35	**80**	64	44	**108**	**188**
12:30 12:45	10	9	**19**	16	20	**36**	**55**
12:45 13:00	8	8	**16**	13	16	**29**	**45**
13:00 13:15	6	11	**17**	20	14	**34**	**51**
13:15 13:30	4	6	**10**	12	12	**24**	**34**
12:30 13:30	28	34	**62**	61	62	**123**	**185**
15:00 15:15	6	7	**13**	16	14	**30**	**43**
15:15 15:30	9	11	**20**	10	19	**29**	**49**
15:30 15:45	10	5	**15**	17	11	**28**	**43**
15:45 16:00	21	11	**32**	11	13	**24**	**56**
15:00 16:00	46	34	**80**	54	57	**111**	**191**
16:00 16:15	8	14	**22**	22	14	**36**	**58**
16:15 16:30	10	15	**25**	20	16	**36**	**61**
16:30 16:45	10	16	**26**	33	22	**55**	**81**
16:45 17:00	16	12	**28**	28	12	**40**	**68**
16:00 17:00	44	57	**101**	103	64	**167**	**268**
17:00 17:15	15	16	**31**	23	18	**41**	**72**
17:15 17:30	13	17	**30**	18	22	**40**	**70**
17:30 17:45	9	18	**27**	13	8	**21**	**48**
17:45 18:00	6	25	**31**	27	23	**50**	**81**
17:00 18:00	43	76	**119**	81	71	**152**	**271**
Total	330	345	**675**	458	463	**921**	**1596**

Comment:

Transportation Services - Traffic Services

Work Order 37132

Turning Movement Count - Full Study Summary Report

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 1 Westbound: 0

AADT Factor .90

Full Study

	PRESTON ST									GLADSTONE AVE									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	41	324	65	**430**	53	346	16	**415**	**845**	20	110	41	**171**	41	99	57	**197**	**368**	**1213**
08:00 09:00	45	413	81	**539**	73	345	16	**434**	**973**	31	197	62	**290**	48	158	68	**274**	**564**	**1537**
09:00 10:00	55	294	74	**423**	84	361	32	**477**	**900**	26	109	46	**181**	56	139	70	**265**	**446**	**1346**
11:30 12:30	41	305	89	**435**	62	303	33	**398**	**833**	17	132	53	**202**	108	160	104	**372**	**574**	**1407**
12:30 13:30	48	278	87	**413**	82	332	32	**446**	**859**	33	140	62	**235**	88	163	94	**345**	**580**	**1439**
15:00 16:00	61	408	85	**554**	50	351	33	**434**	**988**	26	166	65	**257**	85	314	77	**476**	**733**	**1721**
16:00 17:00	79	397	93	**569**	51	367	37	**455**	**1024**	16	182	38	**236**	82	419	78	**579**	**815**	**1839**
17:00 18:00	62	344	94	**500**	44	330	47	**421**	**921**	25	178	37	**240**	97	380	78	**555**	**795**	**1716**
Sub Total	432	2763	668	**3863**	499	2735	246	**3480**	**7343**	194	1214	404	**1812**	605	1832	626	**3063**	**4875**	**12218**
U Turns				**0**				**0**	**0**				**1**				**0**	**1**	**1**
Total	432	2763	668	**3863**	499	2735	246	**3480**	**7343**	194	1214	404	**1813**	605	1832	626	**3063**	**4876**	**12219**
EQ 12Hr	600	3841	929	**5370**	694	3802	342	**4837**	**10207**	270	1687	562	**2520**	841	2546	870	**4258**	**6778**	**16985**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																	**1.39**		
AVG 12Hr	540	3457	836	**4833**	624	3421	308	**4353**	**9186**	243	1519	505	**2268**	757	2292	783	**3832**	**6100**	**15286**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																	**.90**		
AVG 24Hr	708	4528	1095	**6331**	818	4482	403	**5703**	**12034**	318	1990	662	**2971**	991	3002	1026	**5020**	**7991**	**20025**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																	**1.31**		

Comments:

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

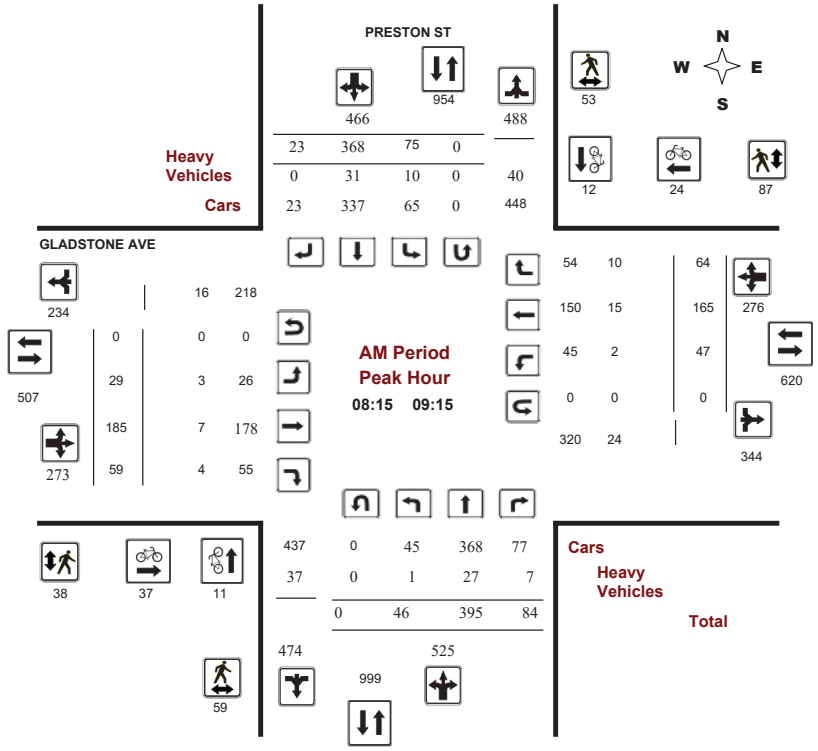
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017 **WO No:** 37132

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



Comments

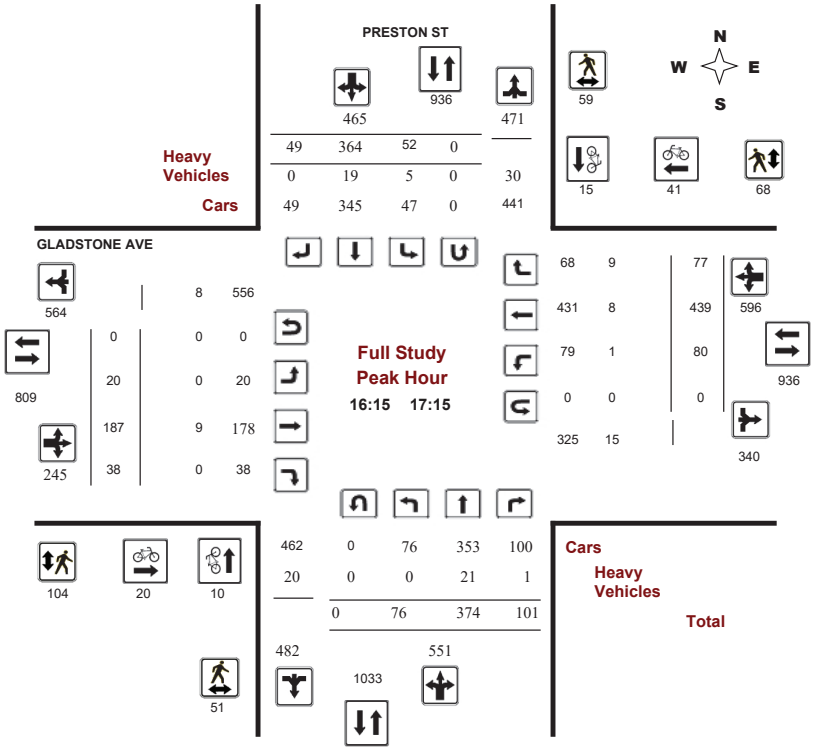
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017 **WO No:** 37132

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



Comments

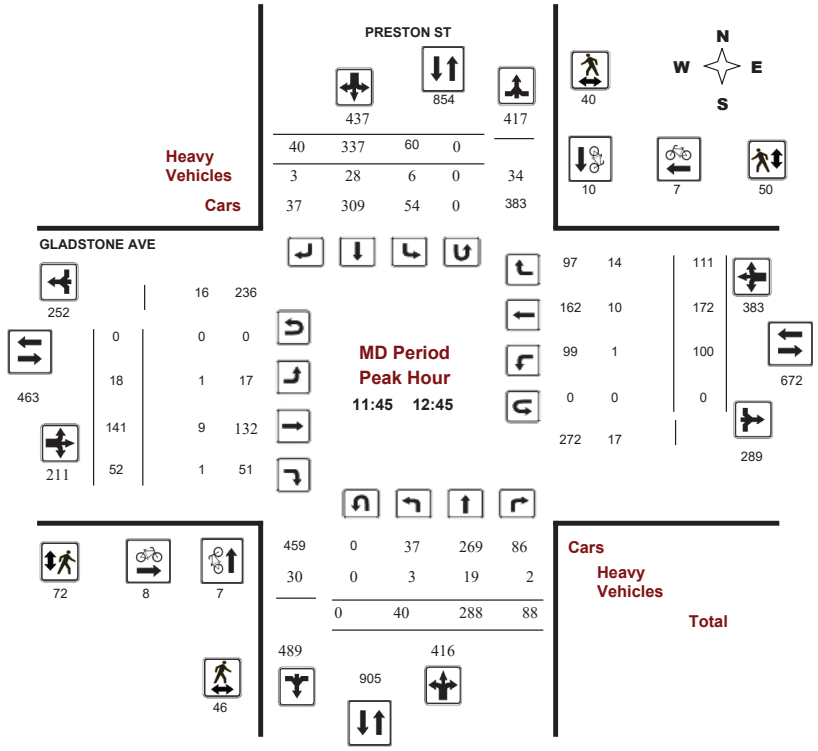
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017 **WO No:** 37132

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



Comments

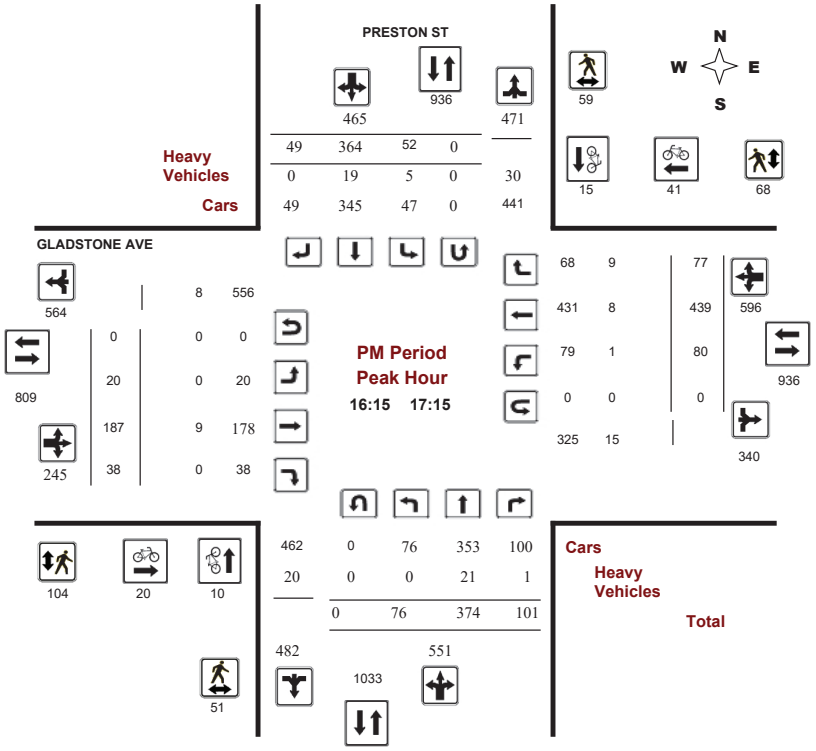
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017 **WO No:** 37132

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



Comments

Transportation Services - Traffic Services

Work Order
37132

Turning Movement Count - 15 Min U-Turn Total Report

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017

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

Appendix C

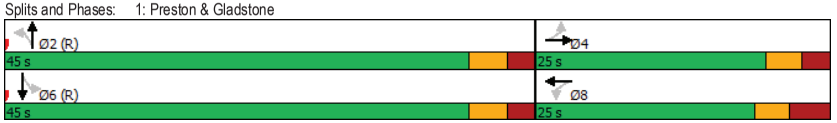
Existing Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	185	59	47	165	64	45	368	77	75	368	23
Future Volume (vph)	29	185	59	47	165	64	45	368	77	75	368	23
Satd. Flow (prot)	0	1648	0	1621	1634	0	1621	1662	0	1621	1691	0
Flt Permitted		0.942		0.452			0.457			0.409		
Satd. Flow (perm)	0	1560	0	771	1634	0	780	1662	0	698	1691	0
Satd. Flow (RTOR)		20			27			25			7	
Lane Group Flow (vph)	0	304	0	52	254	0	50	495	0	83	435	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	21.5	21.5		22.5	22.5		23.7	23.7		23.7	23.7	
Total Split (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	
Total Split (%)	35.7%	35.7%		35.7%	35.7%		64.3%	64.3%		64.3%	64.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		3.5	3.5		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.5		6.5	6.5		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		19.5		18.5	18.5		39.3	39.3		39.3	39.3	
Actuated g/C Ratio		0.28		0.26	0.26		0.56	0.56		0.56	0.56	
v/c Ratio		0.68		0.26	0.56		0.11	0.52		0.21	0.46	
Control Delay		29.9		24.4	25.5		8.1	11.5		9.4	10.8	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		29.9		24.4	25.5		8.1	11.5		9.4	10.8	
LOS		C		C	C		A	B		A	B	
Approach Delay		29.9			25.3			11.2			10.6	
Approach LOS		C			C			B			B	
Queue Length 50th (m)		30.3		4.9	23.4		2.6	31.8		4.5	27.5	
Queue Length 95th (m)		#55.5		13.0	43.0		6.8	53.0		10.9	45.5	
Internal Link Dist (m)		118.4			126.7			144.2			119.4	
Turn Bay Length (m)				36.0			18.0			27.0		
Base Capacity (vph)		449		203	451		437	944		391	952	
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		0.68		0.26	0.56		0.11	0.52		0.21	0.46	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 37 (53%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 17.0	Intersection LOS: B
Intersection Capacity Utilization 82.3%	ICU Level of Service E
Analysis Period (min) 15	

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

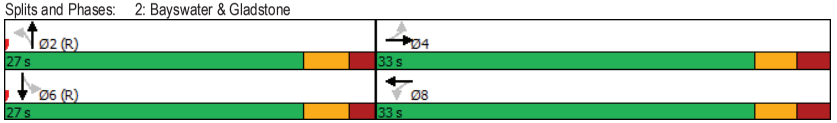
Splits and Phases: 1: Preston & Gladstone



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	23	112	16	14	105	35	19	106	22	50	124	37
Future Volume (vph)	23	112	16	14	105	35	19	106	22	50	124	37
Satd. Flow (prot)	0	1669	0	0	1645	0	0	1662	0	0	1645	0
Flt Permitted		0.945			0.971			0.946			0.894	
Satd. Flow (perm)	0	1589	0	0	1605	0	0	1581	0	0	1488	0
Satd. Flow (RTOR)		13			32			16			20	
Lane Group Flow (vph)	0	168	0	0	172	0	0	163	0	0	235	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	21.5	21.5		21.5	21.5		20.3	20.3		20.3	20.3	
Total Split (s)	33.0	33.0		33.0	33.0		27.0	27.0		27.0	27.0	
Total Split (%)	55.0%	55.0%		55.0%	55.0%		45.0%	45.0%		45.0%	45.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		27.5			27.5			21.7			21.7	
Actuated g/C Ratio		0.46			0.46			0.36			0.36	
v/c Ratio		0.23			0.23			0.28			0.43	
Control Delay		10.1			8.9			13.8			16.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		10.1			8.9			13.8			16.1	
LOS		B			A			B			B	
Approach Delay		10.1			8.9			13.8			16.1	
Approach LOS		B			A			B			B	
Queue Length 50th (m)		8.9			7.9			10.2			15.8	
Queue Length 95th (m)		18.1			17.0			21.1			30.8	
Internal Link Dist (m)		86.5			86.5			86.5			68.6	
Turn Bay Length (m)												
Base Capacity (vph)		735			752			582			550	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.23			0.23			0.28			0.43	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 12.6	Intersection LOS: B
Intersection Capacity Utilization 43.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Bayswater & Gladstone



Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	260	25	14	254	12	22
Future Vol, veh/h	260	25	14	254	12	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	289	28	16	282	13	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	317	0	617	303
Stage 1	-	-	-	-	303	-
Stage 2	-	-	-	-	314	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1243	-	453	737
Stage 1	-	-	-	-	749	-
Stage 2	-	-	-	-	741	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1243	-	446	737
Mov Cap-2 Maneuver	-	-	-	-	446	-
Stage 1	-	-	-	-	749	-
Stage 2	-	-	-	-	730	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	599	-	-	1243	-
HCM Lane V/C Ratio	0.063	-	-	0.013	-
HCM Control Delay (s)	11.4	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	187	38	80	439	77	76	353	100	52	364	49
Future Volume (vph)	20	187	38	80	439	77	76	353	100	52	364	49
Satd. Flow (prot)	0	1663	0	1621	1668	0	1621	1650	0	1621	1675	0
Flt Permitted		0.847		0.564			0.379			0.336		
Satd. Flow (perm)	0	1415	0	962	1668	0	647	1650	0	573	1675	0
Satd. Flow (RTOR)		15			15			26			12	
Lane Group Flow (vph)	0	272	0	89	574	0	84	503	0	58	458	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	21.5	21.5		22.5	22.5		23.7	23.7		23.7	23.7	
Total Split (s)	33.0	33.0		33.0	33.0		37.0	37.0		37.0	37.0	
Total Split (%)	47.1%	47.1%		47.1%	47.1%		52.9%	52.9%		52.9%	52.9%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		3.5	3.5		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.5		6.5	6.5		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		27.5		26.5	26.5		31.3	31.3		31.3	31.3	
Actuated g/C Ratio		0.39		0.38	0.38		0.45	0.45		0.45	0.45	
v/c Ratio		0.48		0.24	0.90		0.29	0.67		0.23	0.61	
Control Delay		18.5		17.2	40.0		15.8	19.8		14.9	18.5	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		18.5		17.2	40.0		15.8	19.8		14.9	18.5	
LOS		B		B	D		B	B		B	B	
Approach Delay		18.5			36.9			19.2			18.1	
Approach LOS		B			D			B			B	
Queue Length 50th (m)		22.4		7.2	62.0		6.1	43.2		4.1	38.9	
Queue Length 95th (m)		40.6		16.2	#115.5		15.0	72.3		11.0	64.3	
Internal Link Dist (m)		118.4			126.7			144.2			119.4	
Turn Bay Length (m)				36.0			18.0			27.0		
Base Capacity (vph)		565		364	640		289	752		256	755	
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		0.48		0.24	0.90		0.29	0.67		0.23	0.61	

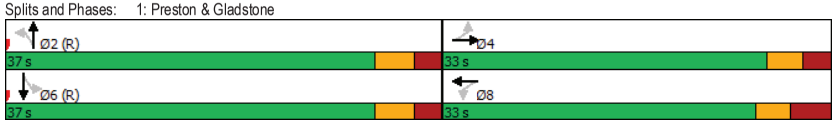
Intersection Summary		
Cycle Length: 70		
Actuated Cycle Length: 70		
Offset: 40 (57%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green		
Natural Cycle: 60		
Control Type: Pretimed		
Maximum v/c Ratio: 0.90		
Intersection Signal Delay: 24.6	Intersection LOS: C	
Intersection Capacity Utilization 80.8%	ICU Level of Service D	
Analysis Period (min) 15		

Lanes, Volumes, Timings
1: Preston & Gladstone

02-19-2019

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

Splits and Phases: 1: Preston & Gladstone



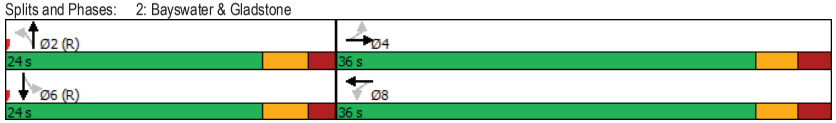
Lanes, Volumes, Timings
2: Bayswater & Gladstone

02-19-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	100	18	74	267	114	29	182	28	35	206	34
Future Volume (vph)	30	100	18	74	267	114	29	182	28	35	206	34
Satd. Flow (prot)	0	1662	0	0	1635	0	0	1669	0	0	1667	0
Flt Permitted		0.869			0.923			0.938			0.934	
Satd. Flow (perm)	0	1459	0	0	1521	0	0	1575	0	0	1566	0
Satd. Flow (RTOR)		17			41			12			12	
Lane Group Flow (vph)	0	164	0	0	506	0	0	265	0	0	306	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	21.5	21.5		21.5	21.5		20.3	20.3		20.3	20.3	
Total Split (s)	36.0	36.0		36.0	36.0		24.0	24.0		24.0	24.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		30.5			30.5			18.7			18.7	
Actuated g/C Ratio		0.51			0.51			0.31			0.31	
v/c Ratio		0.22			0.64			0.53			0.62	
Control Delay		8.2			14.3			20.9			23.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.2			14.3			20.9			23.3	
LOS		A			B			C			C	
Approach Delay		8.2			14.3			20.9			23.3	
Approach LOS		A			B			C			C	
Queue Length 50th (m)		7.5			31.2			20.7			25.0	
Queue Length 95th (m)		15.7			57.1			38.7			45.6	
Internal Link Dist (m)		86.5			86.5			86.5			68.6	
Turn Bay Length (m)												
Base Capacity (vph)		750			793			499			496	
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		0.22			0.64			0.53			0.62	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 53 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 17.1	Intersection LOS: B
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Bayswater & Gladstone



Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	316	23	19	418	19	15
Future Vol, veh/h	316	23	19	418	19	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	351	26	21	464	21	17

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	377	0	870	364
Stage 1	-	-	-	-	364	-
Stage 2	-	-	-	-	506	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1181	-	322	681
Stage 1	-	-	-	-	703	-
Stage 2	-	-	-	-	606	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1181	-	314	681
Mov Cap-2 Maneuver	-	-	-	-	314	-
Stage 1	-	-	-	-	703	-
Stage 2	-	-	-	-	591	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	14.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	412	-	-	1181	-
HCM Lane V/C Ratio	0.092	-	-	0.018	-
HCM Control Delay (s)	14.6	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Appendix D

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition
2016-10-02	2016	1:33:00 PM	BAYSWATER AVE @ GLADSTONE AVE	02 - Rain	01 - Daylight	01 - Traffic signal	02 - Intersection related	02 - Non-fatal injury	03 - Rear end	02 - Wet
2015-02-05	2015	12:54:00 PM	BAYSWATER AVE @ GLADSTONE AVE	01 - Clear	01 - Daylight	01 - Traffic signal	03 - At intersection	02 - Non-fatal injury	02 - Angle	02 - Wet
2016-06-14	2016	5:42:00 PM	BAYSWATER AVE @ GLADSTONE AVE	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Intersection related	03 - P.D. only	03 - Rear end	01 - Dry
2016-11-12	2016	6:01:00 PM	BAYSWATER AVE @ GLADSTONE AVE	01 - Clear	07 - Dark	01 - Traffic signal	02 - Intersection related	03 - P.D. only	03 - Rear end	01 - Dry
2017-08-21	2017	1:29:00 PM	BAYSWATER AVE @ GLADSTONE AVE	01 - Clear	01 - Daylight	01 - Traffic signal	03 - At intersection	03 - P.D. only	05 - Turning movement	01 - Dry
2017-10-14	2017	12:20:00 PM	BAYSWATER AVE @ GLADSTONE AVE	01 - Clear	01 - Daylight	01 - Traffic signal	03 - At intersection	03 - P.D. only	05 - Turning movement	02 - Wet
2017-11-28	2017	7:06:00 PM	BAYSWATER AVE @ GLADSTONE AVE	01 - Clear	07 - Dark	01 - Traffic signal	02 - Intersection related	02 - Non-fatal injury	03 - Rear end	01 - Dry
2017-02-12	2017	1:39:00 PM	BAYSWATER AVE @ GLADSTONE AVE	03 - Snow	01 - Daylight	01 - Traffic signal	03 - At intersection	03 - P.D. only	02 - Angle	03 - Loose snow
2016-12-07	2016	3:25:00 PM	BREEZEHILL AVE @ GLADSTONE AVE	01 - Clear	01 - Daylight	02 - Stop sign	03 - At intersection	02 - Non-fatal injury	05 - Turning movement	02 - Wet
2014-08-11	2014	4:00:00 PM	BREEZEHILL AVE @ GLADSTONE AVE	01 - Clear	01 - Daylight	02 - Stop sign	03 - At intersection	03 - P.D. only	02 - Angle	01 - Dry
2015-12-14	2015	4:00:00 PM	BREEZEHILL AVE @ SOMERSET ST	01 - Clear	05 - Dusk	02 - Stop sign	03 - At intersection	02 - Non-fatal injury	02 - Angle	01 - Dry
2016-09-29	2016	12:00:00 AM	BREEZEHILL AVE N btwn SOMERSET ST W & LAUREL ST	01 - Clear	00 - Unknowr	10 - No control	01 - Non intersection	03 - P.D. only	06 - SMV unattended veh	01 - Dry
2015-11-11	2015	7:26:00 PM	GLADSTONE AVE @ LORETTA AVE	02 - Rain	07 - Dark	02 - Stop sign	03 - At intersection	02 - Non-fatal injury	05 - Turning movement	02 - Wet
2016-06-29	2016	9:45:00 AM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Intersection related	03 - P.D. only	07 - SMV other	01 - Dry
2017-10-23	2017	2:18:00 PM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Intersection related	03 - P.D. only	02 - Angle	01 - Dry
2017-12-27	2017	9:15:00 AM	GLADSTONE AVE @ PRESTON ST	03 - Snow	01 - Daylight	01 - Traffic signal	03 - At intersection	03 - P.D. only	05 - Turning movement	06 - Ice
2016-02-12	2016	5:40:00 PM	GLADSTONE AVE @ PRESTON ST	03 - Snow	05 - Dusk	01 - Traffic signal	02 - Intersection related	03 - P.D. only	03 - Rear end	03 - Loose snow
2014-09-11	2014	9:26:00 PM	GLADSTONE AVE @ PRESTON ST	01 - Clear	07 - Dark	01 - Traffic signal	03 - At intersection	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2014-11-10	2014	5:47:00 PM	GLADSTONE AVE @ PRESTON ST	01 - Clear	07 - Dark	01 - Traffic signal	03 - At intersection	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2014-10-01	2014	5:08:00 PM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	03 - At intersection	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2014-02-03	2014	4:20:00 PM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Intersection related	03 - P.D. only	03 - Rear end	02 - Wet
2014-04-20	2014	11:48:00 AM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	03 - At intersection	03 - P.D. only	02 - Angle	01 - Dry
2014-05-08	2014	2:17:00 PM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Intersection related	03 - P.D. only	99 - Other	01 - Dry
2014-11-08	2014	12:01:00 PM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Intersection related	03 - P.D. only	03 - Rear end	01 - Dry
2014-12-02	2014	8:44:00 AM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Intersection related	03 - P.D. only	99 - Other	01 - Dry
2014-11-18	2014	8:57:00 AM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	03 - At intersection	03 - P.D. only	05 - Turning movement	01 - Dry
2014-11-24	2014	1:08:00 AM	GLADSTONE AVE @ PRESTON ST	01 - Clear	07 - Dark	01 - Traffic signal	03 - At intersection	03 - P.D. only	07 - SMV other	02 - Wet
2016-08-10	2016	9:45:00 AM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	03 - At intersection	02 - Non-fatal injury	03 - Rear end	01 - Dry
2016-07-26	2016	3:25:00 PM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Intersection related	02 - Non-fatal injury	07 - SMV other	01 - Dry
2016-04-01	2016	6:23:00 AM	GLADSTONE AVE @ PRESTON ST	01 - Clear	03 - Dawn	01 - Traffic signal	03 - At intersection	02 - Non-fatal injury	07 - SMV other	02 - Wet
2016-08-09	2016	6:13:00 PM	GLADSTONE AVE @ PRESTON ST	01 - Clear	01 - Daylight	01 - Traffic signal	02 - Intersection related	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2015-10-27	2015	5:05:00 PM	GLADSTONE AVE btwn BAYSWATER AVE & BREEZEHILL AV	01 - Clear	01 - Daylight	10 - No control	04 - At/near private drive	03 - P.D. only	02 - Angle	01 - Dry
2014-12-12	2014	4:54:00 PM	GLADSTONE AVE btwn BAYSWATER AVE & BREEZEHILL AV	01 - Clear	07 - Dark	10 - No control	04 - At/near private drive	03 - P.D. only	02 - Angle	04 - Slush
2014-09-11	2014	11:18:00 AM	GLADSTONE AVE btwn LORETTA AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	04 - At/near private drive	03 - P.D. only	02 - Angle	01 - Dry
2014-09-04	2014	2:06:00 PM	GLADSTONE AVE btwn LORETTA AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	03 - P.D. only	03 - Rear end	01 - Dry
2014-02-07	2014	3:00:00 PM	LAUREL ST btwn BAYSWATER AVE & BREEZEHILL AVE N	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	03 - P.D. only	06 - SMV unattended veh	02 - Wet
2015-06-06	2015	8:00:00 PM	LAUREL ST btwn BREEZEHILL AVE N & LORETTA AVE N	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	03 - P.D. only	06 - SMV unattended veh	01 - Dry
2017-01-03	2017	12:46:00 AM	SOMERSET ST W btwn BAYSWATER AVE & BREEZEHILL AV	01 - Clear	07 - Dark	10 - No control	04 - At/near private drive	02 - Non-fatal injury	05 - Turning movement	02 - Wet
2015-08-05	2015	10:59:00 AM	SOMERSET ST W btwn BAYSWATER AVE & BREEZEHILL AV	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	03 - P.D. only	04 - Sideswipe	01 - Dry
2014-04-14	2014	5:38:00 PM	SOMERSET ST W btwn BAYSWATER AVE & BREEZEHILL AV	02 - Rain	01 - Daylight	10 - No control	04 - At/near private drive	03 - P.D. only	02 - Angle	02 - Wet
2017-05-09	2017	2:42:00 PM	SOMERSET ST W btwn BAYSWATER AVE & BREEZEHILL AV	01 - Clear	01 - Daylight	10 - No control	04 - At/near private drive	03 - P.D. only	02 - Angle	01 - Dry
2017-12-07	2017	3:38:00 PM	SOMERSET ST W btwn BAYSWATER AVE & BREEZEHILL AV	01 - Clear	01 - Daylight	10 - No control	04 - At/near private drive	03 - P.D. only	02 - Angle	01 - Dry
2015-04-10	2015	12:00:00 PM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	03 - P.D. only	06 - SMV unattended veh	01 - Dry
2015-03-04	2015	8:22:00 AM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	04 - At/near private drive	03 - P.D. only	02 - Angle	02 - Wet
2015-09-26	2015	9:23:00 AM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	03 - P.D. only	06 - SMV unattended veh	01 - Dry
2014-03-06	2014	5:38:00 PM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	05 - Dusk	10 - No control	01 - Non intersection	02 - Non-fatal injury	03 - Rear end	01 - Dry
2014-05-15	2014	8:40:00 AM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2016-05-08	2016	1:37:00 PM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	02 - Non-fatal injury	04 - Sideswipe	01 - Dry
2016-07-11	2016	6:43:00 PM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	04 - At/near private drive	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2016-08-03	2016	9:12:00 AM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	03 - P.D. only	04 - Sideswipe	01 - Dry
2017-06-08	2017	4:42:00 PM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	02 - Non-fatal injury	05 - Turning movement	01 - Dry
2017-11-30	2017	11:17:00 AM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	01 - Non intersection	03 - P.D. only	06 - SMV unattended veh	01 - Dry
2017-01-20	2017	1:01:00 PM	SOMERSET ST W btwn BREEZEHILL AVE N & PRESTON ST	01 - Clear	01 - Daylight	10 - No control	04 - At/near private drive	03 - P.D. only	02 - Angle	02 - Wet

Appendix E

TDM Checklist

TDM Measures Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

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

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

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

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		1. TDM PROGRAM MANAGEMENT	
		1.1 Program coordinator	
BASIC	★	1.1.1 Designate an internal coordinator, or contract with an external coordinator	☑
		1.2 Travel surveys	
BETTER		1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
		2. WALKING AND CYCLING	
		2.1 Information on walking/cycling routes & destinations	
BASIC		2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances	☑
		2.2 Bicycle skills training	
		Commuter travel	
BETTER	★	2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses	☐
		2.3 Valet bike parking	
		Visitor travel	
BETTER		2.3.1 Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	☐

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		3. TRANSIT	
		3.1 Transit information	
BASIC		3.1.1 Display relevant transit schedules and route maps at entrances	☑
BASIC		3.1.2 Provide online links to OC Transpo and STO information	☑
BETTER		3.1.3 Provide real-time arrival information display at entrances	☑
		3.2 Transit fare incentives	
		Commuter travel	
BETTER		3.2.1 Offer preloaded PRESTO cards to encourage commuters to use transit	☑
BETTER	★	3.2.2 Subsidize or reimburse monthly transit pass purchases by employees	☐
		Visitor travel	
BETTER		3.2.3 Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	☐
		3.3 Enhanced public transit service	
		Commuter travel	
BETTER		3.3.1 Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	☐
		Visitor travel	
BETTER		3.3.2 Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	☐
		3.4 Private transit service	
		Commuter travel	
BETTER		3.4.1 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	☐
		Visitor travel	
BETTER		3.4.2 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	☐

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
	4.	**RIDESHARING**	
	4.1	**Ridematching service**	
		Commuter travel	
BASIC ★	4.1.1	Provide a dedicated ridematching portal at OttawaRideMatch.com	☐
	4.2	**Carpool parking price incentives**	
		Commuter travel	
BETTER	4.2.1	Provide discounts on parking costs for registered carpools	☑
	4.3	**Vanpool service**	
		Commuter travel	
BETTER	4.3.1	Provide a vanpooling service for long-distance commuters	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Bikeshare stations & memberships**	
BETTER	5.1.1	Contract with provider to install on-site bikeshare station for use by commuters and visitors	☑
		Commuter travel	
BETTER	5.1.2	Provide employees with bikeshare memberships for local business travel	☐
	5.2	**Carshare vehicles & memberships**	
		Commuter travel	
BETTER	5.2.1	Contract with provider to install on-site carshare vehicles and promote their use by tenants	☑
BETTER	5.2.2	Provide employees with carshare memberships for local business travel	☐
	6.	**PARKING**	
	6.1	**Priced parking**	
		Commuter travel	
BASIC ★	6.1.1	Charge for long-term parking (daily, weekly, monthly)	☐
BASIC	6.1.2	Unbundle parking cost from lease rates at multi-tenant sites	☑
		Visitor travel	
BETTER	6.1.3	Charge for short-term parking (hourly)	☐

TDM Measures Checklist **City of Ottawa**
Version 1.0 (30 June 2017)

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
	7.	**TDM MARKETING & COMMUNICATIONS**	
	7.1	**Multimodal travel information**	
		Commuter travel	
BASIC ★	7.1.1	Provide a multimodal travel option information package to new/relocating employees and students	☑
		Visitor travel	
BETTER ★	7.1.2	Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	☐
	7.2	**Personalized trip planning**	
		Commuter travel	
BETTER ★	7.2.1	Offer personalized trip planning to new/relocating employees	☐
	7.3	**Promotions**	
		Commuter travel	
BETTER	7.3.1	Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	☐
	8.	**OTHER INCENTIVES & AMENITIES**	
	8.1	**Emergency ride home**	
		Commuter travel	
BETTER ★	8.1.1	Provide emergency ride home service to non-driving commuters	☐
	8.2	**Alternative work arrangements**	
		Commuter travel	
BASIC ★	8.2.1	Encourage flexible work hours	☐
BETTER	8.2.2	Encourage compressed workweeks	☐
BETTER ★	8.2.3	Encourage telework	☐
	8.3	**Local business travel options**	
		Commuter travel	
BASIC ★	8.3.1	Provide local business travel options that minimize the need for employees to bring a personal car to work	☐
	8.4	**Commuter incentives**	
		Commuter travel	
BETTER	8.4.1	Offer employees a taxable, mode-neutral commuting allowance	☐
	8.5	**On-site amenities**	
		Commuter travel	
BETTER	8.5.1	Provide on-site amenities/services to minimize mid-day or mid-commute errands	☐

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

Legend

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

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

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

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

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

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

TDM-Supportive Development Design and Infrastructure Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☑
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☑
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☑
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps *(see Official Plan policy 4.3.10)*	☑
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians *(see Official Plan policy 4.3.11)*	☑
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☑
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☑
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☑
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☑

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☑
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☑
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☐
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☑
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☑
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☑
	2.4	**Bicycle repair station**	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☑
BASIC	3.1.2	Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	☑
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☑
	4.	**RIDESHARING**	
	4.1	**Pick-up & drop-off facilities**	
BASIC	4.1.1	Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	☑
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☑

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☑
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	☐
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐

TDM-Supportive Development Design and Infrastructure Checklist:
Residential Developments (multi-family or condominium)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☑
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☑
REQUIRED	1.2.2	Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible *(see Official Plan policy 4.3.12)*	☑

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☑
REQUIRED	1.2.4	Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps *(see Official Plan policy 4.3.10)*	☑
REQUIRED	1.2.5	Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians *(see Official Plan policy 4.3.11)*	☑
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☑
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☑
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☑
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☑

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

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

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

Appendix F

TAC Signal Warrant

City of Ottawa Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Somerset St W	Direction (EW or NS)	EW	Road Authority:	City of Ottawa
Side Street (name)	Breezehill Ave	Direction (EW or NS)	NS	City:	City of Ottawa
Quadrant / Int #		Comments	Enter Comments about the analysis here.	Analysis Date:	
	CHECK SHEET			Count Date:	
press 'CHECK SHEET' button to calculate results				Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Somerset St W	WB		1					435	1
Somerset St W	EB					1		105	1
Breezehill Ave	NB				1				
Breezehill Ave	SB								

Demographics		
Elem. School/Mobility Impaired	(y/n)	
Senior's Complex	(y/n)	
Pathway to School	(y/n)	
Metro Area Population	(#)	
Central Business District	(y/n)	

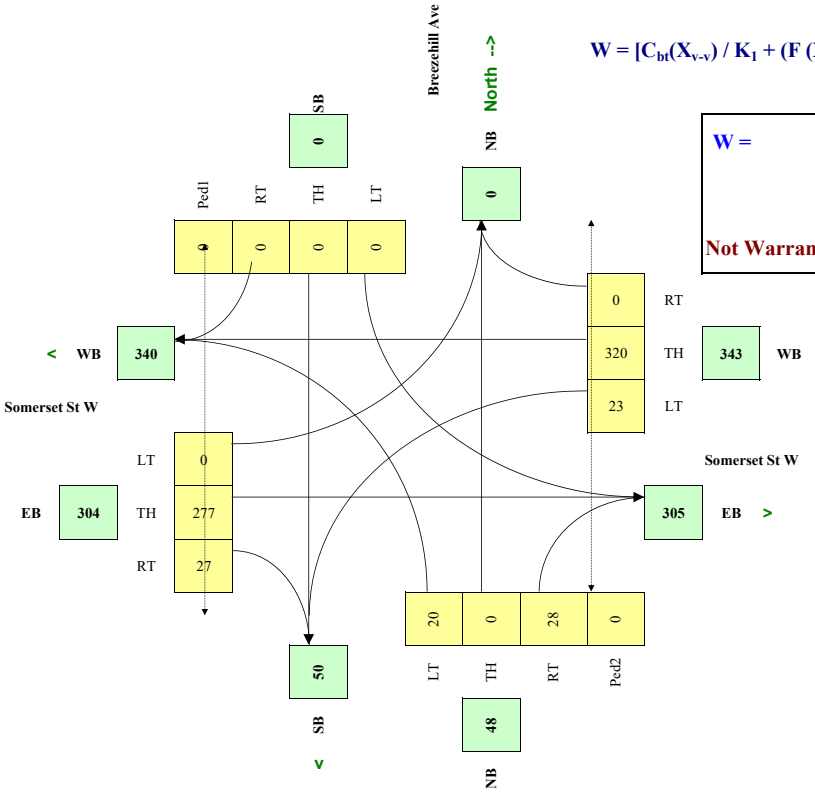
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Somerset St W	EW	50	2.0%	y	0.0
Breezehill Ave	NS		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	17	0	32	0	0	0	17	229	0	0	234	25				
	19	0	35	0	0	0	19	254	0	0	260	28				
	22	0	41	0	0	0	22	298	0	0	305	33				
	17	0	17	0	0	0	22	323	0	0	244	22				
	22	0	22	0	0	0	28	418	0	0	316	28				
	21	0	21	0	0	0	27	399	0	0	302	27				
Total (6-hour peak)	118	0	168	0	0	0	135	1,921	0	0	1,661	163	0	0	0	0
Average (6-hour peak)	20	0	28	0	0	0	23	320	0	0	277	27	0	0	0	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F(X_{v\text{-}p}) L) / K_2] \times C_i$$



W =

Veh *Ped*

Not Warranted - Vs<75

RESET SHEET

Appendix G

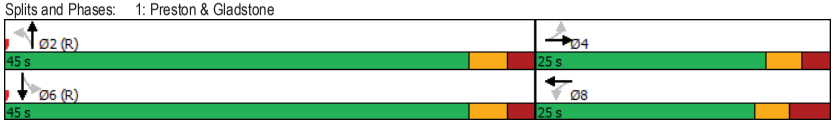
Future Total Synchro Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	198	93	47	170	64	58	368	77	75	368	28
Future Volume (vph)	42	198	93	47	170	64	58	368	77	75	368	28
Satd. Flow (prot)	0	1631	0	1621	1636	0	1621	1662	0	1621	1687	0
Flt Permitted		0.929		0.422			0.489			0.449		
Satd. Flow (perm)	0	1525	0	720	1636	0	834	1662	0	766	1687	0
Satd. Flow (RTOR)		28			26			25			9	
Lane Group Flow (vph)	0	333	0	47	234	0	58	445	0	75	396	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	21.5	21.5		22.5	22.5		23.7	23.7		23.7	23.7	
Total Split (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	
Total Split (%)	35.7%	35.7%		35.7%	35.7%		64.3%	64.3%		64.3%	64.3%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		3.5	3.5		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.5		6.5	6.5		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		19.5		18.5	18.5		39.3	39.3		39.3	39.3	
Actuated g/C Ratio		0.28		0.26	0.26		0.56	0.56		0.56	0.56	
v/c Ratio		0.75		0.25	0.52		0.12	0.47		0.17	0.42	
Control Delay		33.6		24.4	24.3		8.1	10.6		8.8	10.2	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		33.6		24.4	24.3		8.1	10.6		8.8	10.2	
LOS		C		C	C		A	B		A	B	
Approach Delay		33.6			24.3			10.3			10.0	
Approach LOS		C			C			B			B	
Queue Length 50th (m)		33.4		4.5	21.1		3.0	27.1		4.0	24.2	
Queue Length 95th (m)		#67.1		12.1	39.4		7.6	45.7		9.6	40.4	
Internal Link Dist (m)		118.4			126.7			144.2			119.4	
Turn Bay Length (m)				36.0			18.0			27.0		
Base Capacity (vph)		445		190	451		468	944		430	951	
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		0.75		0.25	0.52		0.12	0.47		0.17	0.42	

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 37 (53%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 86.2%	ICU Level of Service E
Analysis Period (min) 15	

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

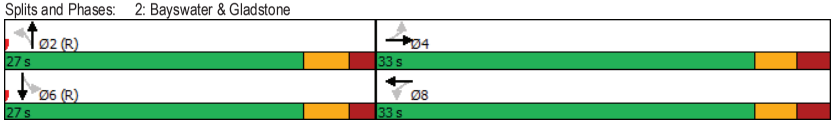
Splits and Phases: 1: Preston & Gladstone



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Volume (vph)	23	127	16	27	145	35	19	106	27	50	124	37
Future Volume (vph)	23	127	16	27	145	35	19	106	27	50	124	37
Satd. Flow (prot)	0	1672	0	0	1657	0	0	1655	0	0	1645	0
Flt Permitted		0.948			0.953			0.952			0.901	
Satd. Flow (perm)	0	1596	0	0	1588	0	0	1585	0	0	1500	0
Satd. Flow (RTOR)		12			23			20			20	
Lane Group Flow (vph)	0	166	0	0	207	0	0	152	0	0	211	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Minimum Split (s)	21.5	21.5		21.5	21.5		20.3	20.3		20.3	20.3	
Total Split (s)	33.0	33.0		33.0	33.0		27.0	27.0		27.0	27.0	
Total Split (%)	55.0%	55.0%		55.0%	55.0%		45.0%	45.0%		45.0%	45.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		27.5			27.5			21.7			21.7	
Actuated g/C Ratio		0.46			0.46			0.36			0.36	
v/c Ratio		0.22			0.28			0.26			0.38	
Control Delay		10.1			10.2			13.1			15.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		10.1			10.2			13.1			15.2	
LOS		B			B			B			B	
Approach Delay		10.1			10.2			13.1			15.2	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		8.8			10.8			9.1			13.8	
Queue Length 95th (m)		17.9			21.4			19.4			27.4	
Internal Link Dist (m)		86.5			86.5			86.5			68.6	
Turn Bay Length (m)												
Base Capacity (vph)		738			740			586			555	
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		0.22			0.28			0.26			0.38	

Intersection Summary	
Cycle Length: 60	
Actuated Cycle Length: 60	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.38	
Intersection Signal Delay: 12.2	Intersection LOS: B
Intersection Capacity Utilization 45.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Bayswater & Gladstone



HCM 2010 TWSC
3: Breezehill & Somerset 02-19-2019

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	260	28	19	254	19	35
Future Vol, veh/h	260	28	19	254	19	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	260	28	19	254	19	35

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	288	0	566	274
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	292	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1274	-	486	765
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	758	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1274	-	478	765
Mov Cap-2 Maneuver	-	-	-	-	478	-
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	745	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	11.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	632	-	-	1274	-
HCM Lane V/C Ratio	0.085	-	-	0.015	-
HCM Control Delay (s)	11.2	-	-	7.9	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Lanes, Volumes, Timings
1: Preston & Gladstone 11-12-2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	194	55	80	448	77	99	353	100	52	364	58
Future Volume (vph)	27	194	55	80	448	77	99	353	100	52	364	58
Satd. Flow (prot)	0	1652	0	1621	1668	0	1621	1650	0	1621	1670	0
Flt Permitted		0.807		0.547			0.430			0.401		
Satd. Flow (perm)	0	1339	0	933	1668	0	734	1650	0	684	1670	0
Satd. Flow (RTOR)		21			14			26			15	
Lane Group Flow (vph)	0	276	0	80	525	0	99	453	0	52	422	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)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	21.5	21.5		22.5	22.5		23.7	23.7		23.7	23.7	
Total Split (s)	33.0	33.0		33.0	33.0		37.0	37.0		37.0	37.0	
Total Split (%)	47.1%	47.1%		47.1%	47.1%		52.9%	52.9%		52.9%	52.9%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		3.5	3.5		2.4	2.4		2.4	2.4	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)		5.5		6.5	6.5		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		25.5		24.5	24.5		33.3	33.3		33.3	33.3	
Actuated g/C Ratio		0.36		0.35	0.35		0.48	0.48		0.48	0.48	
v/c Ratio		0.55		0.25	0.89		0.28	0.57		0.16	0.53	
Control Delay		20.5		17.5	39.4		15.0	16.5		13.2	16.0	
Queue Delay		0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay		20.5		17.5	39.4		15.0	16.5		13.2	16.0	
LOS		C		B	D		B	B		B	B	
Approach Delay		20.5			36.5			16.3			15.7	
Approach LOS		C			D			B			B	
Queue Length 50th (m)		22.5		6.4	54.2		7.3	37.1		3.6	34.4	
Queue Length 95th (m)		41.6		14.8	#101.1		16.8	62.3		9.5	57.5	
Internal Link Dist (m)		118.4			126.7			144.2			119.4	
Turn Bay Length (m)				36.0			18.0			27.0		
Base Capacity (vph)		538		353	640		349	798		325	802	
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		0.51		0.23	0.82		0.28	0.57		0.16	0.53	

Intersection Summary
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 40 (57%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Lanes, Volumes, Timings
1: Preston & Gladstone

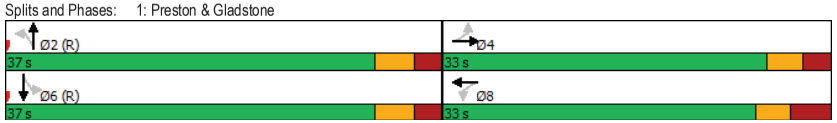
11-12-2018

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 23.2	Intersection LOS: C
Intersection Capacity Utilization 87.2%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 1: Preston & Gladstone



Lanes, Volumes, Timings
2: Bayswater & Gladstone

11-12-2018

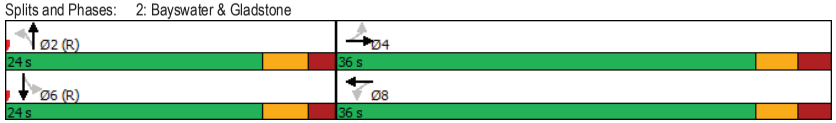
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	127	18	81	287	114	29	182	37	35	206	34
Future Volume (vph)	30	127	18	81	287	114	29	182	37	35	206	34
Satd. Flow (prot)	0	1669	0	0	1638	0	0	1662	0	0	1667	0
Flt Permitted		0.893			0.913			0.944			0.940	
Satd. Flow (perm)	0	1502	0	0	1508	0	0	1578	0	0	1576	0
Satd. Flow (RTOR)		14			38			15			12	
Lane Group Flow (vph)	0	175	0	0	482	0	0	248	0	0	275	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)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	21.5	21.5		21.5	21.5		20.3	20.3		20.3	20.3	
Total Split (s)	36.0	36.0		36.0	36.0		24.0	24.0		24.0	24.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.5			5.5			5.3			5.3	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	
Act Effct Green (s)		23.4			23.4			25.8			25.8	
Actuated g/C Ratio		0.39			0.39			0.43			0.43	
v/c Ratio		0.30			0.79			0.36			0.40	
Control Delay		11.4			24.0			14.8			15.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.4			24.0			14.8			15.6	
LOS		B			C			B			B	
Approach Delay		11.4			24.0			14.8			15.6	
Approach LOS		B			C			B			B	
Queue Length 50th (m)		10.5			37.4			15.3			17.7	
Queue Length 95th (m)		16.9			53.6			35.6			40.2	
Internal Link Dist (m)		86.5			86.5			86.5			68.6	
Turn Bay Length (m)												
Base Capacity (vph)		770			785			687			685	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.23			0.61			0.36			0.40	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 53 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 67.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Bayswater & Gladstone



Intersection	
Int Delay, s/veh	1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	316	28	28	418	22	22
Future Vol, veh/h	316	28	28	418	22	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	316	28	28	418	22	22

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	344	0	804	330
Stage 1	-	-	-	-	330	-
Stage 2	-	-	-	-	474	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1215	-	352	712
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	626	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1215	-	341	712
Mov Cap-2 Maneuver	-	-	-	-	341	-
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	607	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	13.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	461	-	-	1215	-
HCM Lane V/C Ratio	0.095	-	-	0.023	-
HCM Control Delay (s)	13.6	-	-	8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-