DILLON CONSULTING

LS GP INC.

Walkley Road Apartments
2190 Halifax Drive

Transportation Impact Assessment

July 2019 – 19-9285

Certification

1. I have reviewed and have a sound understanding of the objectives, needs, and requirements of the City of Ottawa's Official Plan and the Transportation Impact Assessment (2017) Guidelines;

2. I have a sound knowledge of industry standard practice with respect to the presentation of transportation impact assessment reports, including multimodal 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 or registered professional in good standing, whose field of expertise is either transportation engineering or transportation planning.

Signature of individual certifier that s/he meets the above four criteria.

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Table of Contents

Figures

Tables

List of Appendices

1.0 Screening

1.1 Description of Proposed Development

Municipal Address	2190 Halifax Drive, Ottawa, Ontario
Description of Location	LS GP INC.'s Walkley Road Apartment building is located on the north west corner of Walkley Road and Halifax Drive. The site is approximately 650m east of the intersection of Walkley Road and Conroy Road.
Ward	Ward 18 – Alta Vista
Land Use Classification	R5B H(39) Permitting various residential housing options And, Additional permitted uses include community centre, community health and resource centre, day care, office, recreational and athletic facility, and utility installation provided that they are located in a building containing dwelling units.
Development Size	202 new apartment units 177 net new parking spots: • 233 new underground parking spaces • 56 fewer surface parking spaces
Number of accesses and locations	1. Three accesses on Walkley Road, west of Halifax Drive 2. One access on Halifax Drive, 250m north of Walkley Road
Phases of development	One phase
Build-out year	2021

1.2 Trip Generation Trigger

Land Use Type	Minimum Development Size	Yes	No
Single-family homes	40 units		x
Townhomes or apartments	90 units	x	
Office	3,500 sq.m.		x
Industrial	5,000 sq.m.		x
Fast-food restaurant or coffee shop	100 sq.m.		x
Destination retail	1,000 sq.m.		x
Gas station or convenience market	75 sq.m.		x
Other	60 person trips or more during weekday peak hours	x	

1.3 Location Triggers

	Yes	No
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?	x	
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		x

1.4 Safety Triggers

	Yes	No
Are posted speed limits on a boundary street 80 km/hr or greater?		x
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		x
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)?	x	
Is the proposed driveway within auxiliary lanes of an intersection?		x
Does the proposed driveway make use of an existing median break that serves an existing site?		x
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		x
Does the development include a drive-thru facility?		x

1.5 Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?	x	
Does the development satisfy the Location Trigger?	x	
Does the development satisfy the Safety Trigger?	x	

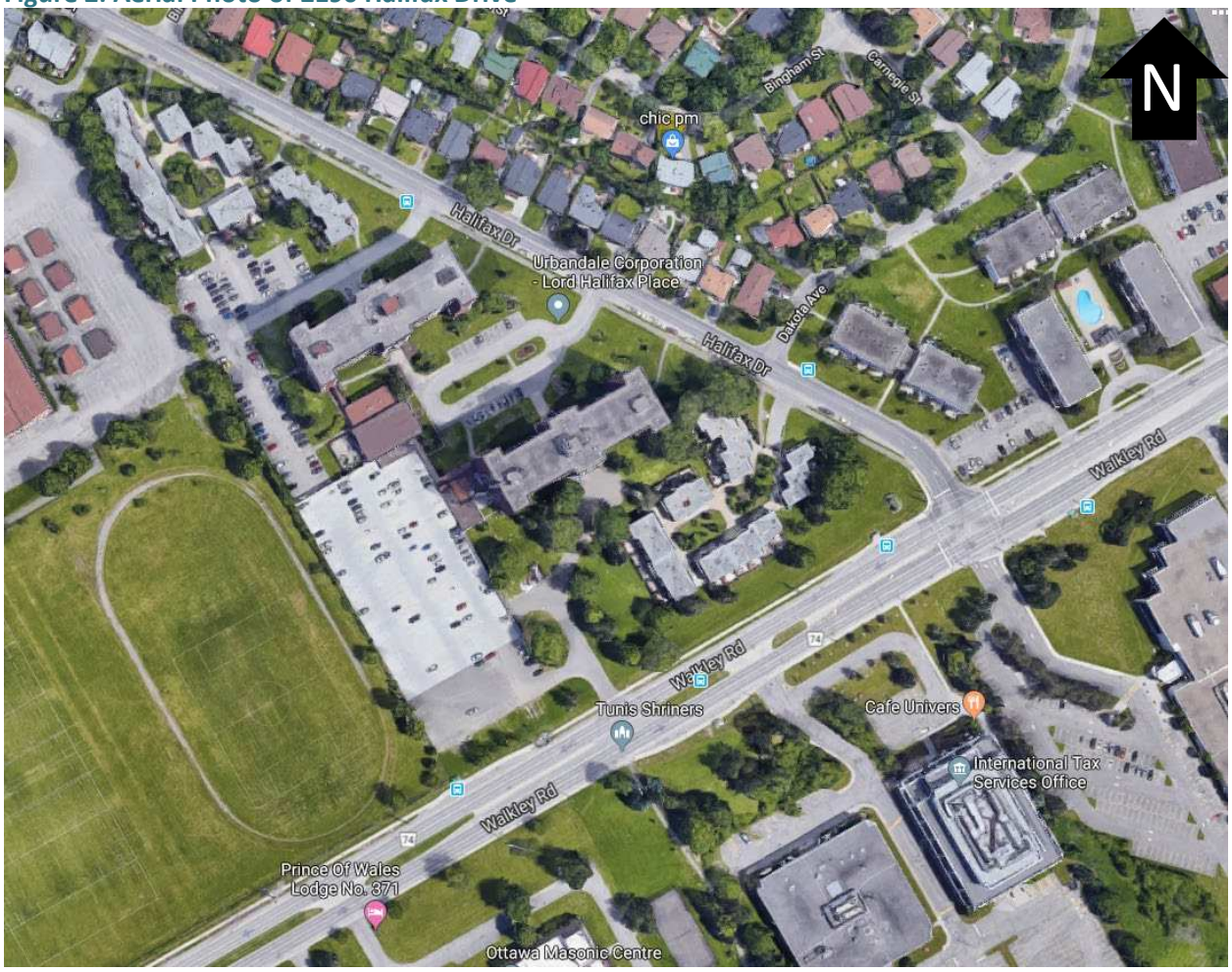
Since the development satisfies each of these triggers, both the design review component and the network impact component will be addressed in the TIA.

Figure 1 illustrates the site location. **Figure 2** provides an aerial photo of the site.

Figure 1: Site Location

Source: geoOttawa, accessed February 19, 2019

Figure 2: Aerial Photo of 2190 Halifax Drive



Source: Google Maps, accessed July 2019

2.0 Scoping

2.1 Existing and Planned Conditions

2.1.1 Proposed Development

The proposed development will add 202 high density residential apartment units to an existing residential complex on the north-west corner of Walkley Road and Halifax Drive.

The existing development includes two towers with 360 units and 50 row homes, owned and operated by Urbandale Corporation. The existing site has 375 surface parking spaces and 234 underground parking spaces.

The proposal replaces part of the existing surface parking in the south-west corner of the lot with the new apartment tower and add additional underground parking. The proposed site plan shifts the existing Walkley Road access to the east, and adds two additional accesses to Walkley Road.

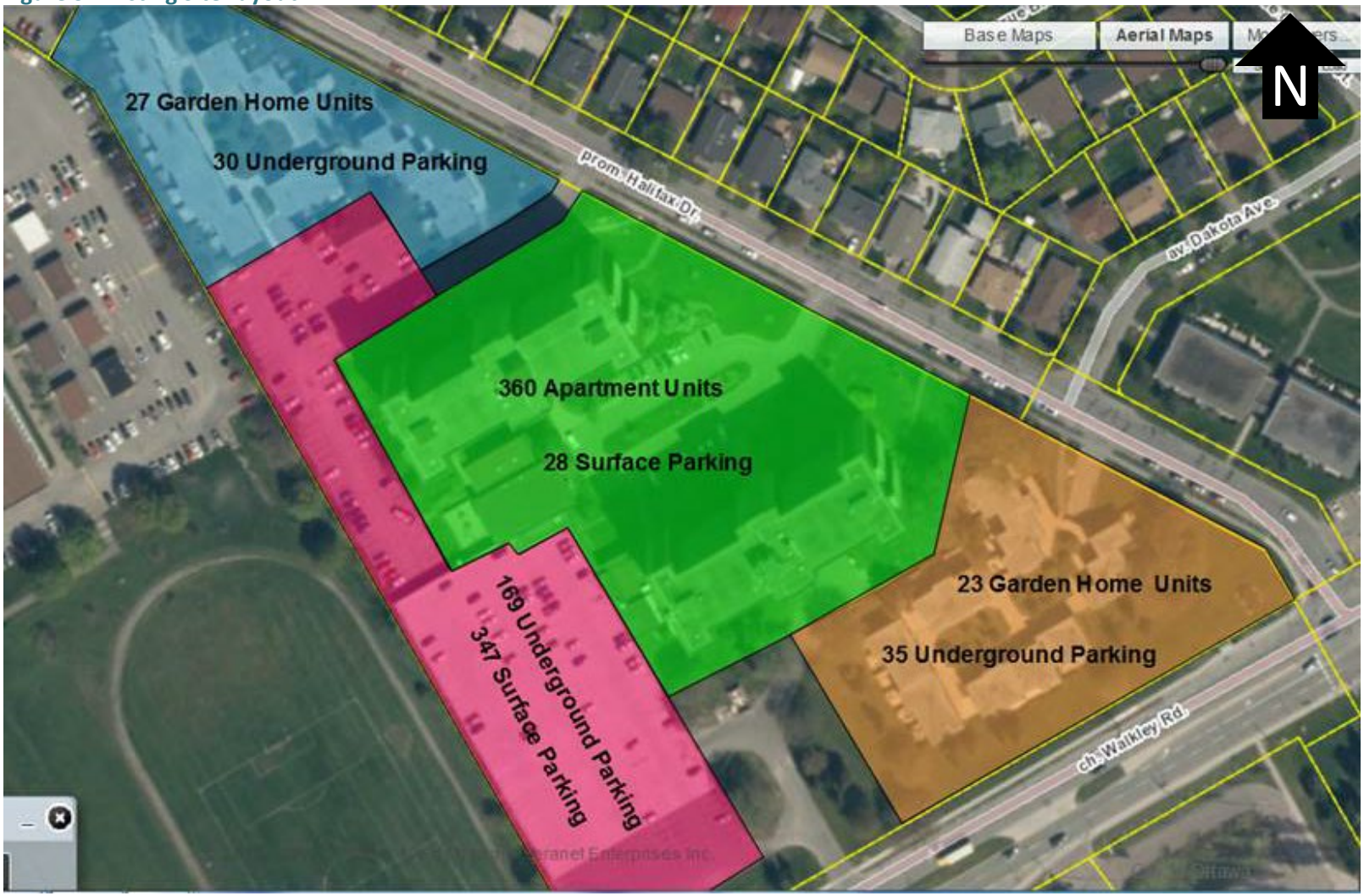
The proposed new vehicle trips generated by the additional land use is identified in **Table 1.**

Table 1: Vehicle Trip Generation Totals

Land Use	Units	AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
222: High-rise apartment, 10+ floors	202	48	11	37	54	33	21

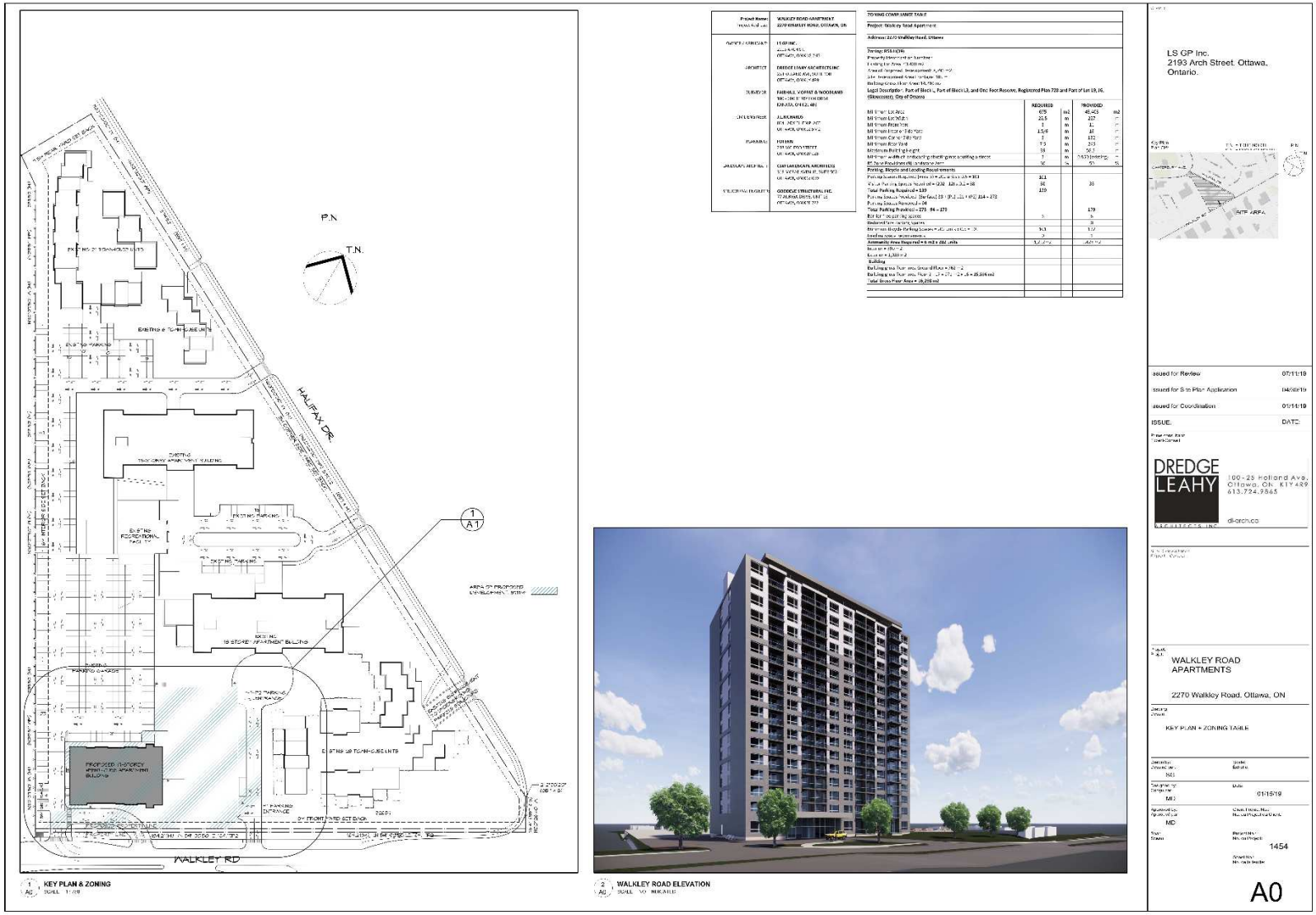
Figure 3 illustrates the current layout of the site and **Figure 4** illustrates the proposed site plan.

Figure 3: Existing Site Layout



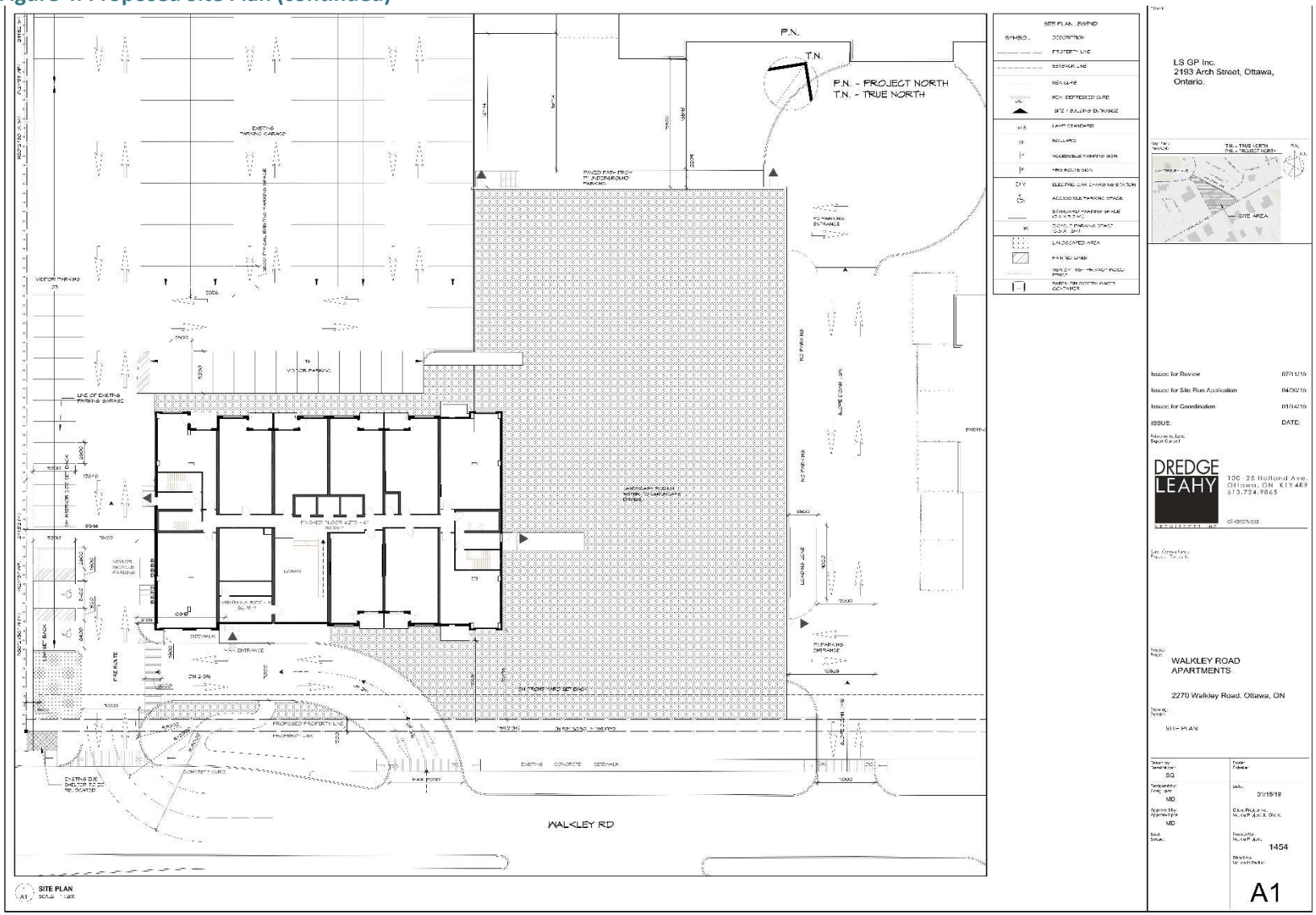
Source: LS GP INC.

Figure 4: Proposed Site Plan



Source: Site plan, July 11, 2019 by LS GP INC.

Figure 4: Proposed Site Plan (continued)



Source: Site plan, July 11, 2019 by LS GP INC.

2.1.2 Existing Conditions

2.1.2.1 Roads and Traffic Control

The roadways under consideration in the study area are described as follows:

Walkley Road	Walkley Road is four-lane Arterial road located south of the proposed development. It is an important east-west corridor which extends from Mooney's Bay to Highway 417. The posted speed limit on Walkley Road is 50 km/h.
Halifax Drive	Halifax Drive is a two-lane Collector road owned by the City of Ottawa. It connects Canterbury Avenue and the LS GP Inc. neighbourhood to Walkley Road. Halifax Drive has an unposted speed limit of 50 km/h.

2.1.2.2 Walking and Cycling

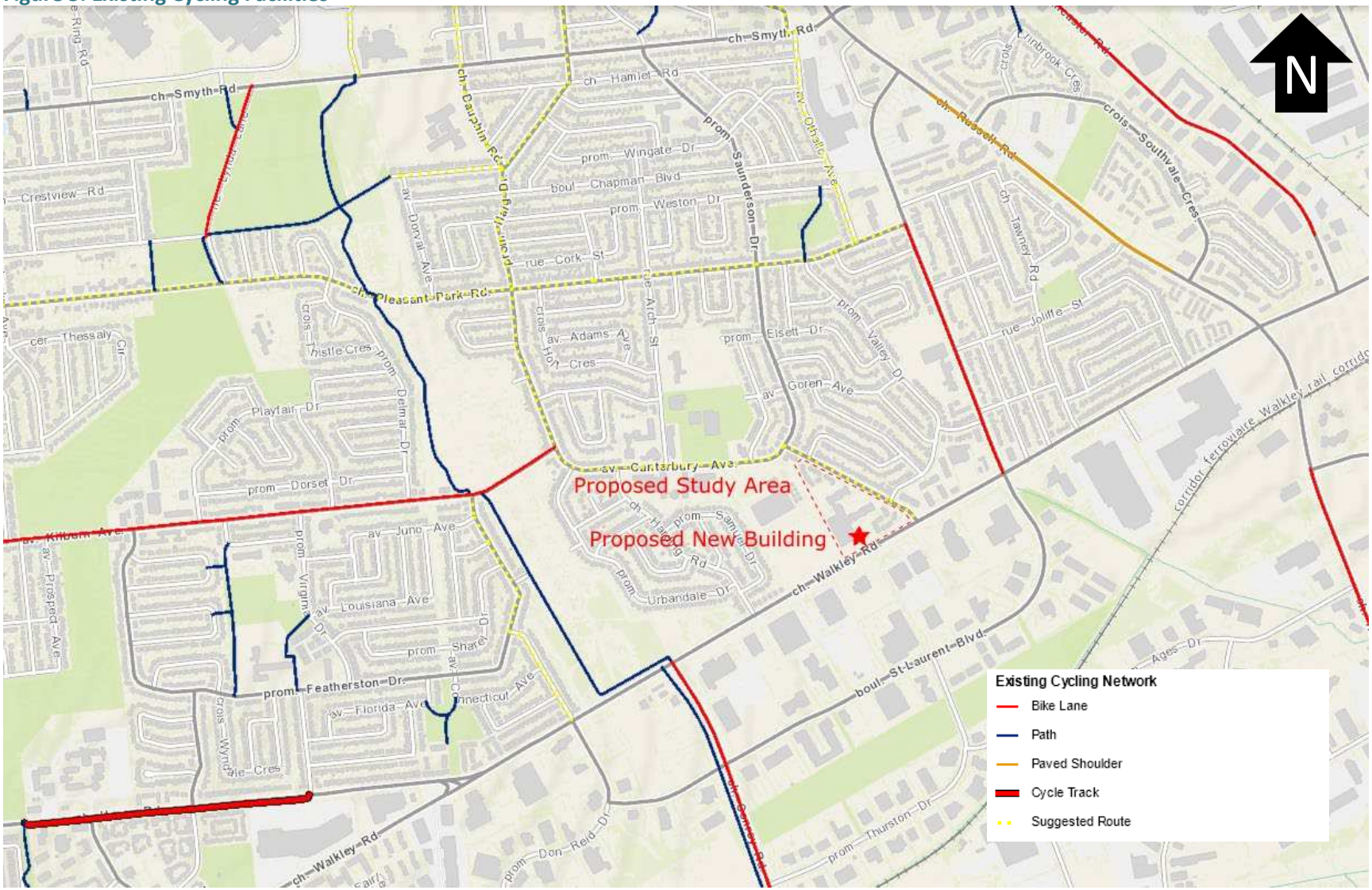
There are sidewalks along both sides of Walkley Road, and along the west side of Halifax Drive. **Figure 5** illustrates the cycling facilities in the study area; there are no cycling facilities on Walkley Road.

The City's 2013 Transportation Master Plan (TMP) identifies Walkley Road as a Spine Cycling Route.

2.1.2.3 Transit

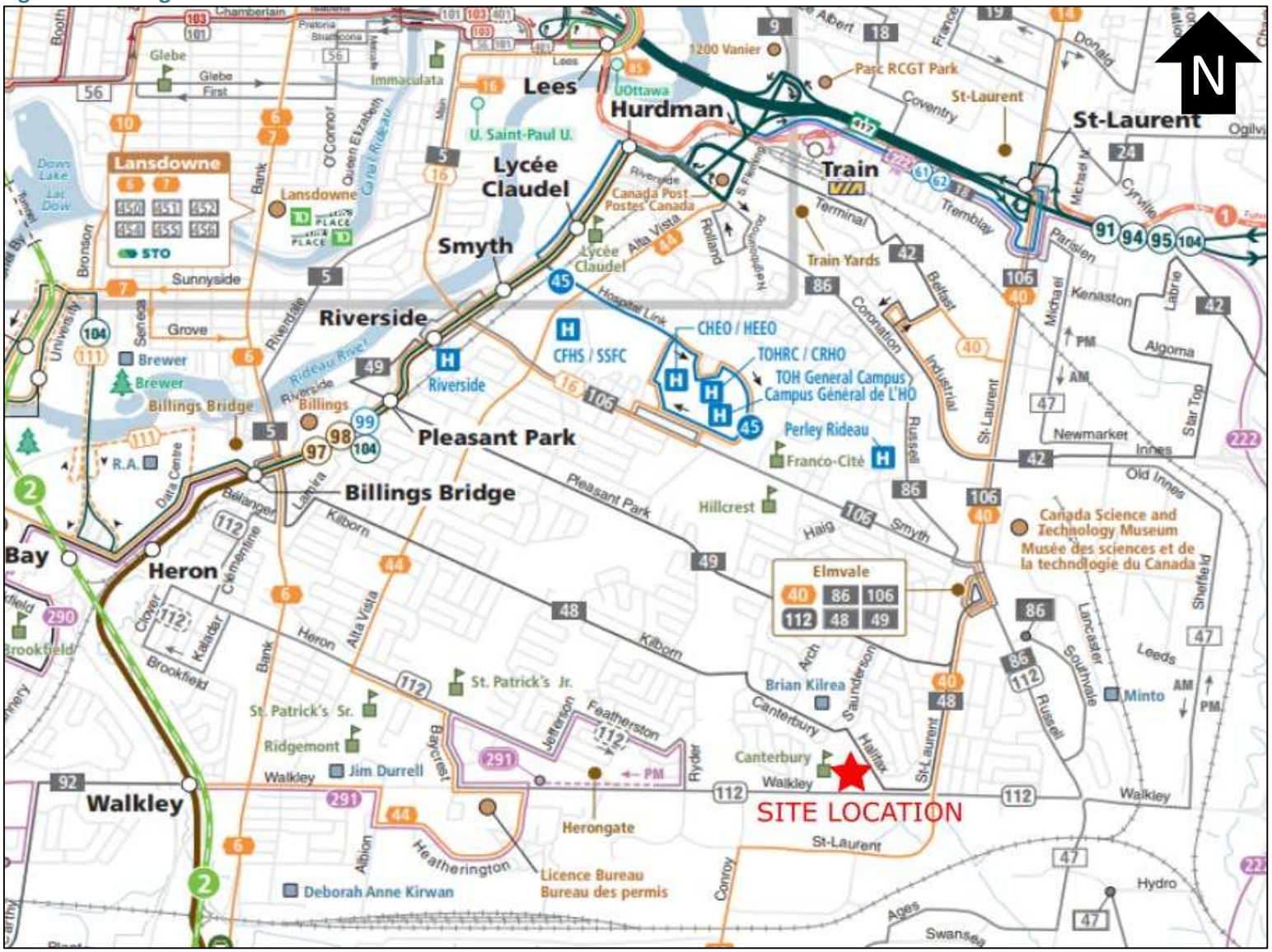
Figure 6 shows the existing transit service near the proposed development. Along Walkley Road, route 112 stops in front of the development with 15 minute service intervals during the peak periods. Route 48 also services the development along Halifax Drive with 30 minute headways during peak periods.

Figure 5: Existing Cycling Facilities



Source: geoOttawa, accessed February 12th, 2019

Figure 6: Existing Transit Service



Source: OC Transpo, accessed February 26th, 2019

2.1.2.4 Traffic Management Measures

There are no traffic management measures in the study area.

2.1.2.5 Traffic Volumes

Table 2 summarizes the traffic count data used for this study. Historical counts were obtained to identify an appropriate background growth rate for the study area.

Table 2: Traffic Count Data

Intersection	Date	Source	Peak Hour
1. Walkley Road / Halifax Drive	July 2007	City of Ottawa	**AM:** 07:45-08:45 **PM:** 16:30–17:30
2. Walkley Road / Halifax Drive	June 2010	City of Ottawa	**AM:** 07:30-08:30 **PM:** 16:00-17:00
3. Walkley Road / Halifax Drive	December 2016	City of Ottawa	**AM:** 07:45-08:45 **PM:** 15:30-16:30
4. Walkley Road / Private Driveway	February 2019	Dillon	**AM:** 07:30-08:30 **PM:** 15:45-16:45
5. Halifax Drive / Private Driveway	February 2019	Dillon	**AM:** 08:15-09:15 **PM:** 15:30-16:30

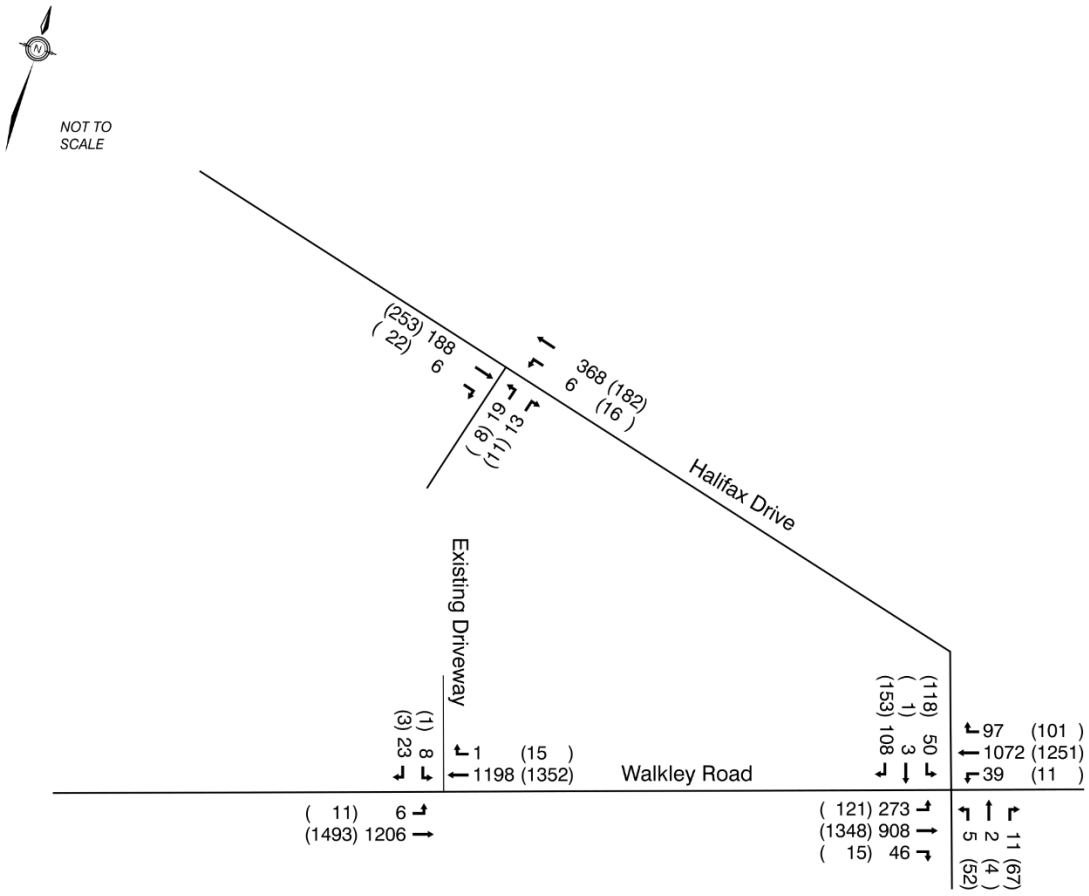
Figure 7 illustrates the existing study area traffic volumes and **Appendix A** contains the existing traffic counts. **Figure 8** illustrates the existing lane geometry and traffic control.

2.1.2.6 Collision History

At the intersection of Walkley Road / Halifax Drive, there have been 18 collisions over a four year period. The majority of the collisions were rear end collisions, with most collisions resulting in property damage only. There were no fatal collisions recorded in the study area. The collision breakdown is as follows:

- 12 with property damage only;
- 6 with non-fatal injuries;
- 6 rear ends;
- 3 side swipe;
- 3 turning movement;
- 1 angle; and
- 5 other.

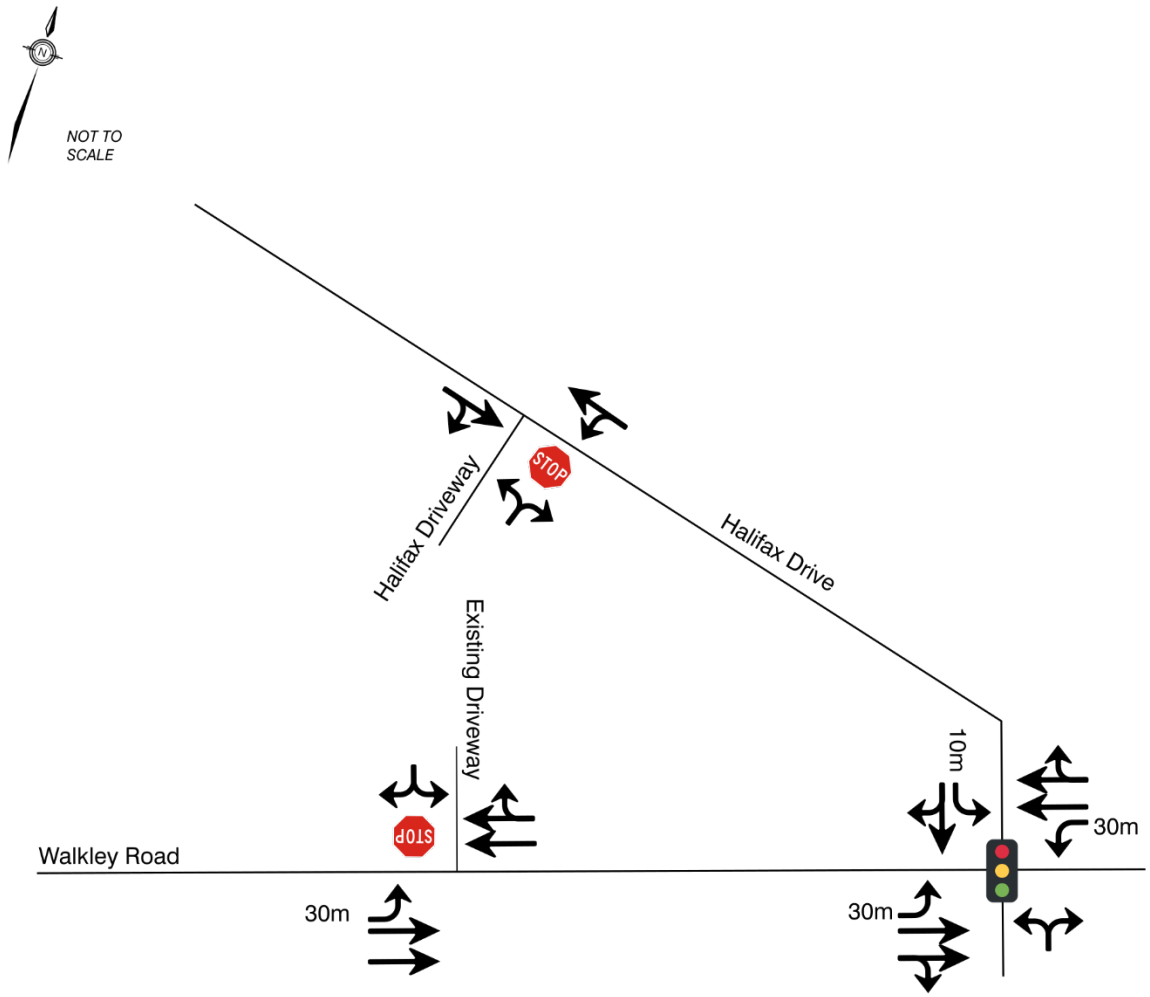
Figure 7: Existing Traffic Volumes



Legend:

- AM (PM)
- peak hour turning
- movement volumes

Figure 8: Existing Lane Configuration and Traffic Control



Legend:

Lane configuration

25m Turning lane storage

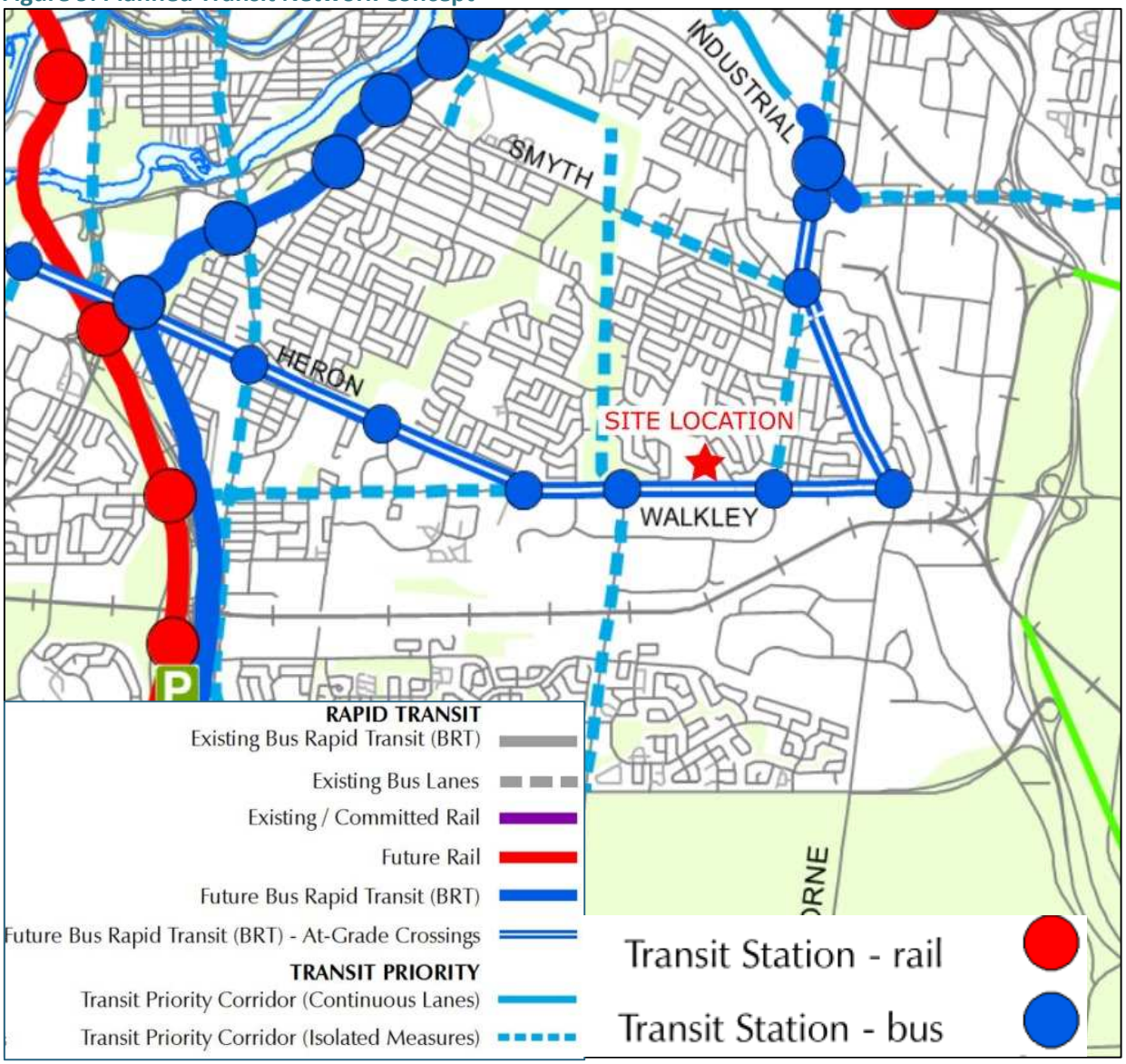
2.1.3 Planned Conditions

2.1.3.1 Road and Transit Network Modifications

The City of Ottawa 2013 TMP identifies Walkley Road as a transit priority corridor with at-grade crossings. However, the TMP does not include this project within the 2031 "Affordable" projects list and therefore the timing of this project is unknown. **Figure 9** illustrates the planned transit network concept in the area of the site.

Halifax Drive is a collector road with no modification plans identified in the 2013 TMP.

Figure 9: Planned Transit Network Concept



Source: City of Ottawa 2013 TMP, Transit Network Concept – 2015 revision

2.1.3.2 Walking and Cycling

Walkley Road is identified in the Ultimate Cycling Network as a Spine Route, while Halifax Drive is identified as a Local Cycling Route.

There are sidewalks on both sides of Walkley Road, and along the west side of Halifax Drive. The existing pedestrian facilities on Halifax Drive do not meet current Accessibility for Ontarians with Disabilities Act (AODA) standards; the sidewalk is less than 1.8m wide with an asphalt surface, as opposed to a concrete surface as required by AODA standards.

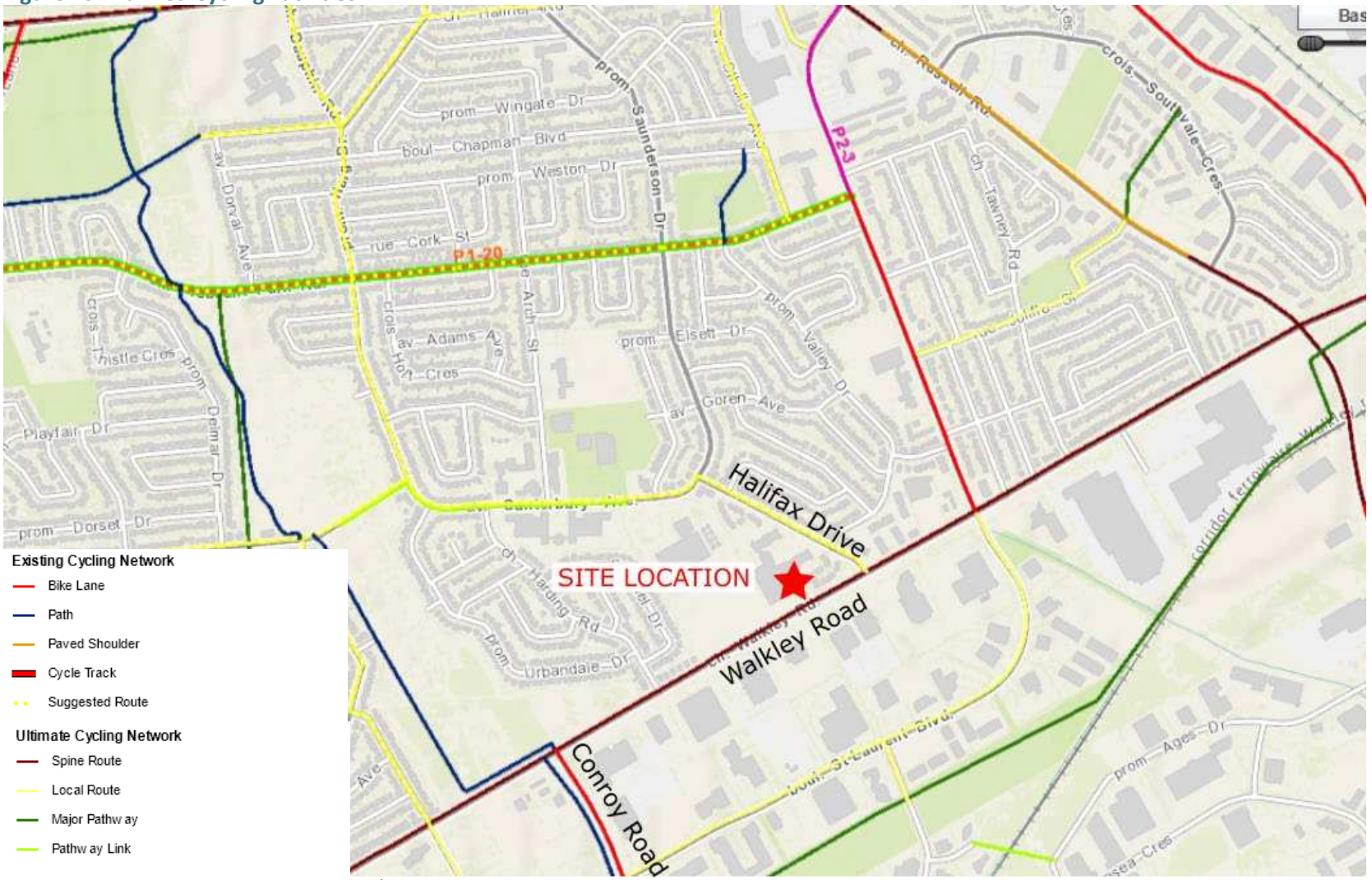
Figure 10 illustrates the planned cycling network in the area; there are no changes from existing.

2.1.3.3 Future Background Developments

The City of Ottawa's development applications search tool was used to identify other developments within the study area that could impact study area intersections. One development was identified at 2480 Walkley Road, approximately 850 metres east of the site, with a buildout/occupancy date of 2020.

This background development is expected to add 14 vehicle trips in the AM peak hour and 8 vehicle trips during the PM peak hour to the study area network. These trips were accounted for explicitly as background traffic.

Figure 10: Planned Cycling Facilities



Source: geoOttawa, accessed February 12th, 2019

2.2 Study Parameters

2.2.1 Study Area

The study area consists of the intersection of Walkley Road and Halifax Drive, and the site driveways accessing Walkley Road and Halifax Drive.

2.2.2 Time Periods

The development is residential and therefore the weekday AM and PM peak hours will govern the analysis.

2.2.3 Horizon Years

Full occupancy of the new tower is expected in 2021. The analysis will assess transportation for the 2021 horizon year and the 2026 horizon year representing 5-years post buildout.

2.3 Exemptions Review

Table 3 presents the exemptions review table from the City of Ottawa's 2017 *Transportation Impact Assessment Guidelines*.

Table 3: Exemptions Review

Module	Element	Exemption Consideration	Status
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Included
	4.1.3 New Street Networks	Only required for plans of subdivision	Excluded
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Included
	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 non-residential site plans expected to have fewer than 60 employees and/or students on location at any given time	Included
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	Exempt
4.8 Network Concept		Only required when proposed development generates more than 200 person trips during the peak hour in excess of the equivalent volume permitted by established zoning	Exempt
4.9 Intersection Design	All Elements	Not required if site generation trigger is not met	Included

3.0 Forecasting

3.1 Development-Generated Travel Demand

3.1.1 Trip Generation and Mode Shares

The proposed new development is comprised entirely of high-rise apartment units within a single tower. Since the proposed development will be similar to the existing adjacent development, Dillon used the existing development as a proxy to estimate trip generation for the proposed development. Dillon compared the observed trip generation rate against the City's recommended method for trip generation calculations, the TRANS *Trip Generation Study Report (2009).*

Table 4 compares the TRANS vehicle trip rates to the observed trip generation rates. The TRANS vehicle trip rates are slightly higher than those observed at the site. The TRANS Trip Rates have been carried forward as the basis for the proposed site trip generation.

Table 4: Existing Site Trip Generation Rates

Source	Existing No. of Units	Peak Hour	In		Out		Total	
			Trips	Rate	Trips	Rate	Trips	Rate
Observed Trip Generation Rate	410	AM	19	0.05	63	0.16	82	0.21
		PM	64	0.17	23	0.06	87	0.22
TRANS Trip Rate	410	AM	-	-	-	-	98	0.24
		PM	-	-	-	-	111	0.27

Table 5 summarizes the trip generation rates and directional trip distribution as indicated within TRANS Tables 3.18 and 6.2, respectively. **Table 6** summarizes the number of trip generation for the proposed development.

Table 5: Proposed Development Vehicle Trip Generation Rates

Land Use	Units	AM Peak Hour			PM Peak Hour		
		Rate	In	Out	Rate	In	Out
222: High-rise apartment 10+ floors	202	0.24	23%	77%	0.27	61%	39%

Table 6: Proposed Development Vehicle Trip Generation Traffic Volumes

Land Use	Units	AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out
222: High-rise apartment 10+ floors	202	48	11	37	54	33	21

Walkley Road is designated as a future Bus Rapid Transit (BRT) corridor, but this corridor will not be completed within the time horizon of this study. Within this studies horizon, it is anticipated the mode shares will remain relatively constant. Therefore we have assumed a mode share consistent with the mode shares outlined in TRANS Table 3.13.

Table 7 summarizes the trip generation by mode for the proposed development; person trips are calculated using the vehicle trip generation values and the mode share rates, i.e. total person trips = 48 auto driver trips / (divide by) 37% auto driver mode share = 129 person trips.

Table 7: Trip Generation by Mode

Travel Mode	Mode Share for Apartment in Urban Area (TRANS Table 3.13)		AM Peak Hour			PM Peak Hour		
	AM	PM	Total	In	Out	Total	In	Out
Auto Driver	37%	40%	48	11	37	54	33	21
Auto Passenger	8%	9%	10	2	8	12	7	5
Transit	41%	37%	53	12	41	50	30	20
Non-Motorized	14%	14%	18	4	14	19	12	7
Total Person Trips	**100%**	**100%**	**129**	**29**	**100**	**135**	**82**	**53**

As a residential development, this site will not be generating any pass-by trips. **Appendix B** contains the TRANS Tables used for these calculations.

3.1.2 Trip Distribution

Trip distribution was identified based on the existing distribution of traffic to/from the existing site, which was determined through a review of the existing traffic counts.

3.1.3 Trip Assignment

Figure 11 illustrates the site generated traffic assignment to the road network based on the trip distribution and logical routing through the transportation network.

Figure 12 illustrates the site generated traffic volumes.

Figure 11: Site Generated Traffic Assignment Percentages

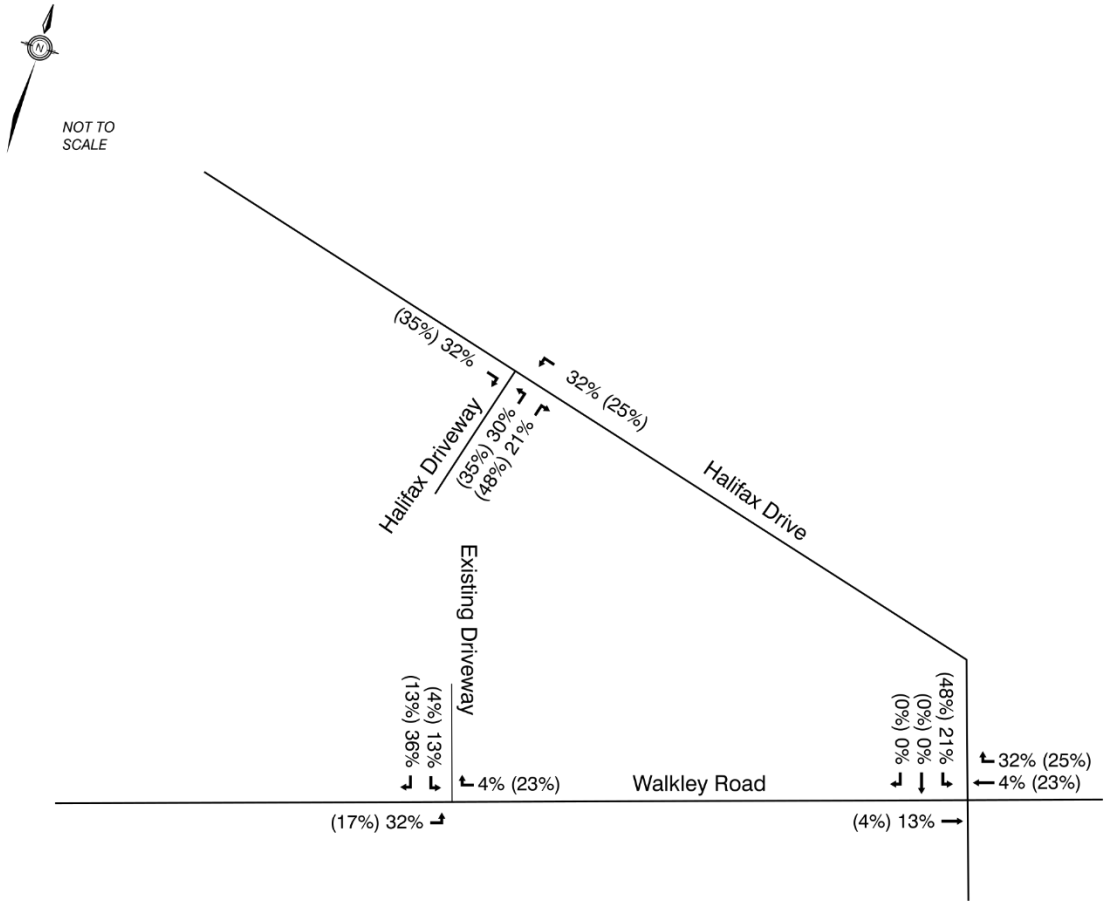
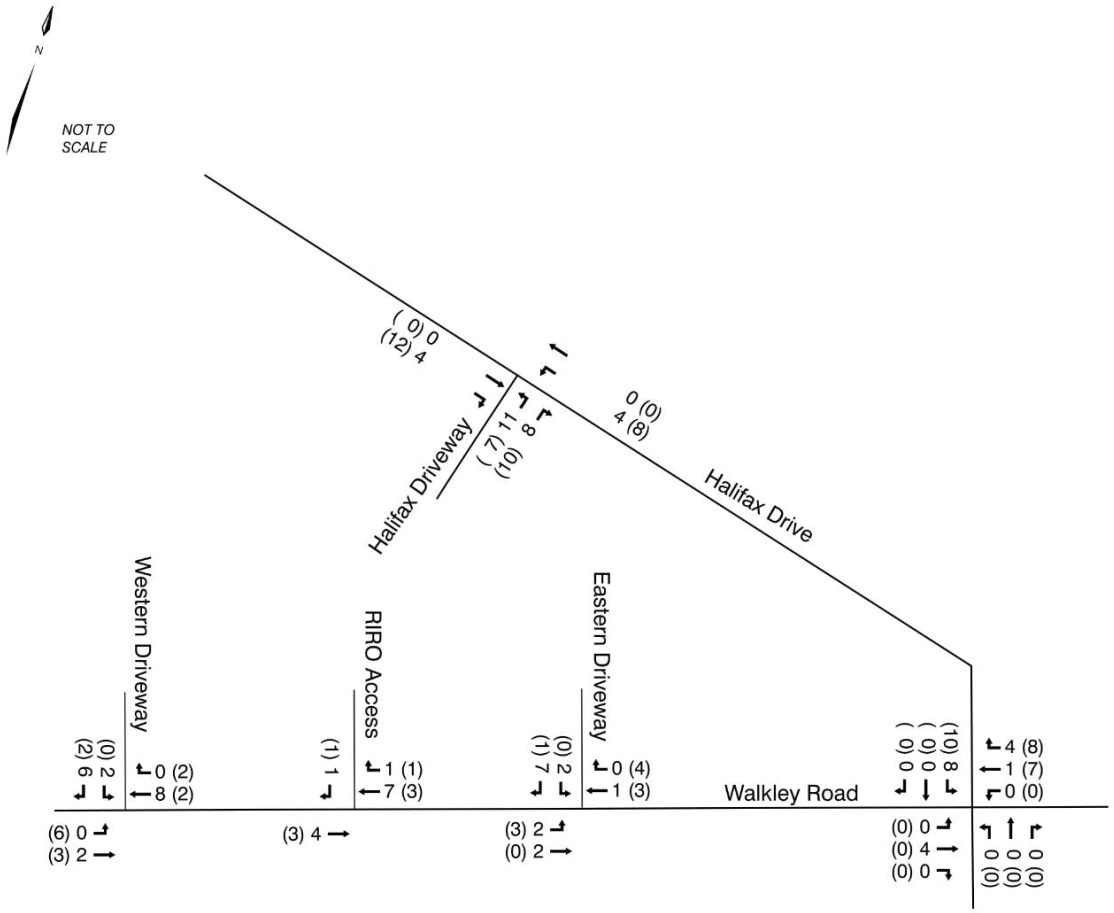


Figure 12: Site Generated Traffic Volumes



3.2 Background Network Travel Demand

3.2.1 Transportation Network Plan

The City of Ottawa TMP identifies Walkley Road as a future Bus Rapid Transit (BRT) corridor with dedicated median BRT bus lanes, and it is anticipated that Walkley Road will be widened to accommodate the median BRT bus lanes.

However, the TMP does not include this project within the 2031 Affordable Transit Network and therefore the transportation network plans will not impact background network travel demands.

3.2.2 Background Growth

Background growth refers to additional future traffic volume generated by population and employment growth in parts of the City beyond the study area and adjacent neighbourhoods.

Historical traffic count data was obtained from the City. These historical traffic counts were reviewed and the background annual traffic volume growth rate was determined to be 0.7%. To be conservative, a traffic volume growth rate of 1.0%, compounded annually, was used within the analysis.

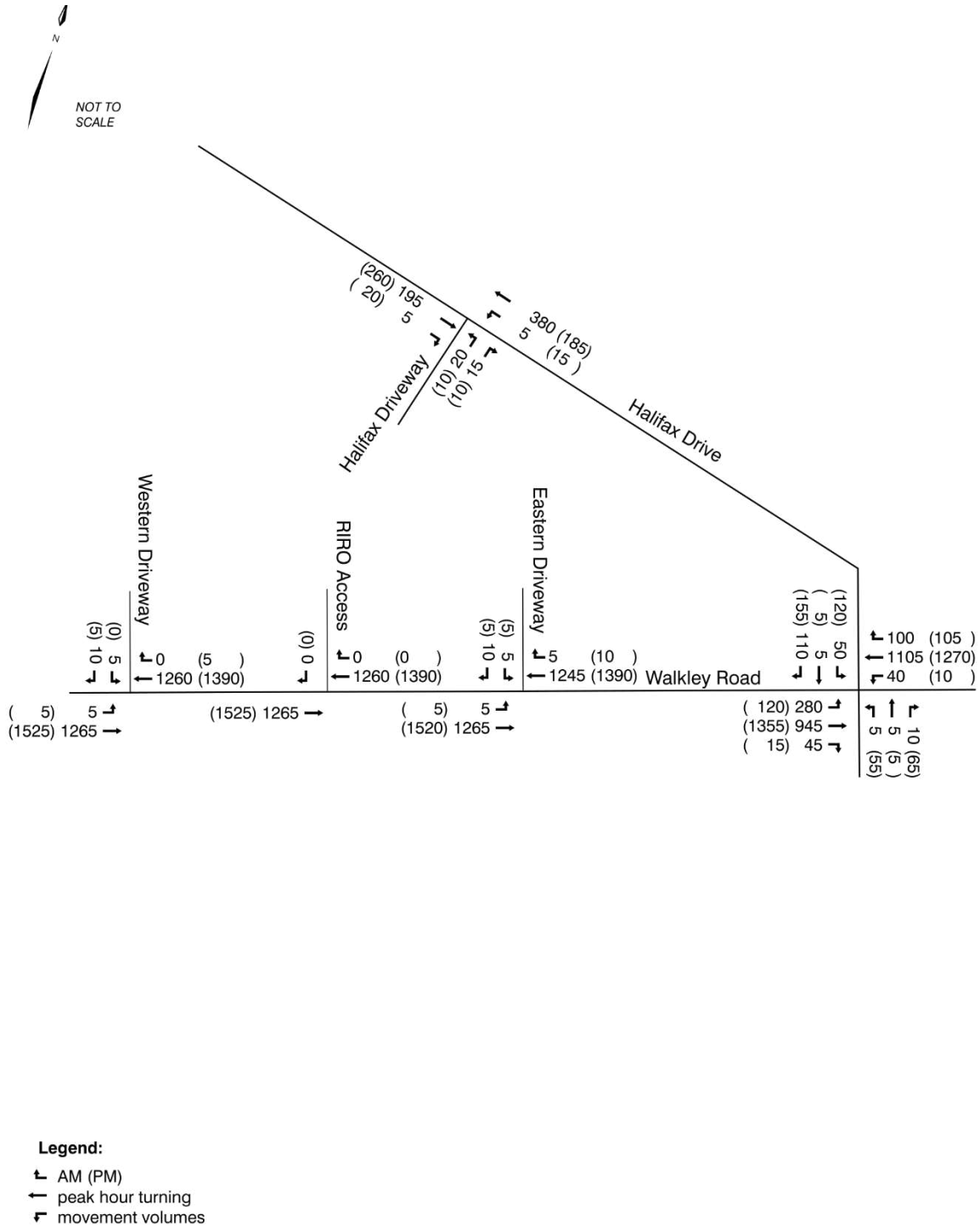
3.2.3 Other Developments

The City of Ottawa's development applications search tool was used to identify other developments within the study area that could impact study area intersections. One development was identified at 2480 Walkley Road, approximately 850 metres west of the site, with a build/occupancy date of 2020. This background development will add a total of 14 trips in the AM peak hour, and 8 trips in the PM peak hour. These were accounted for under background traffic volumes.

3.2.4 Future Background Traffic Volumes

Figure 13 and **Figure 14**, respectively, illustrate the 2021 and 2026 future background traffic volumes.

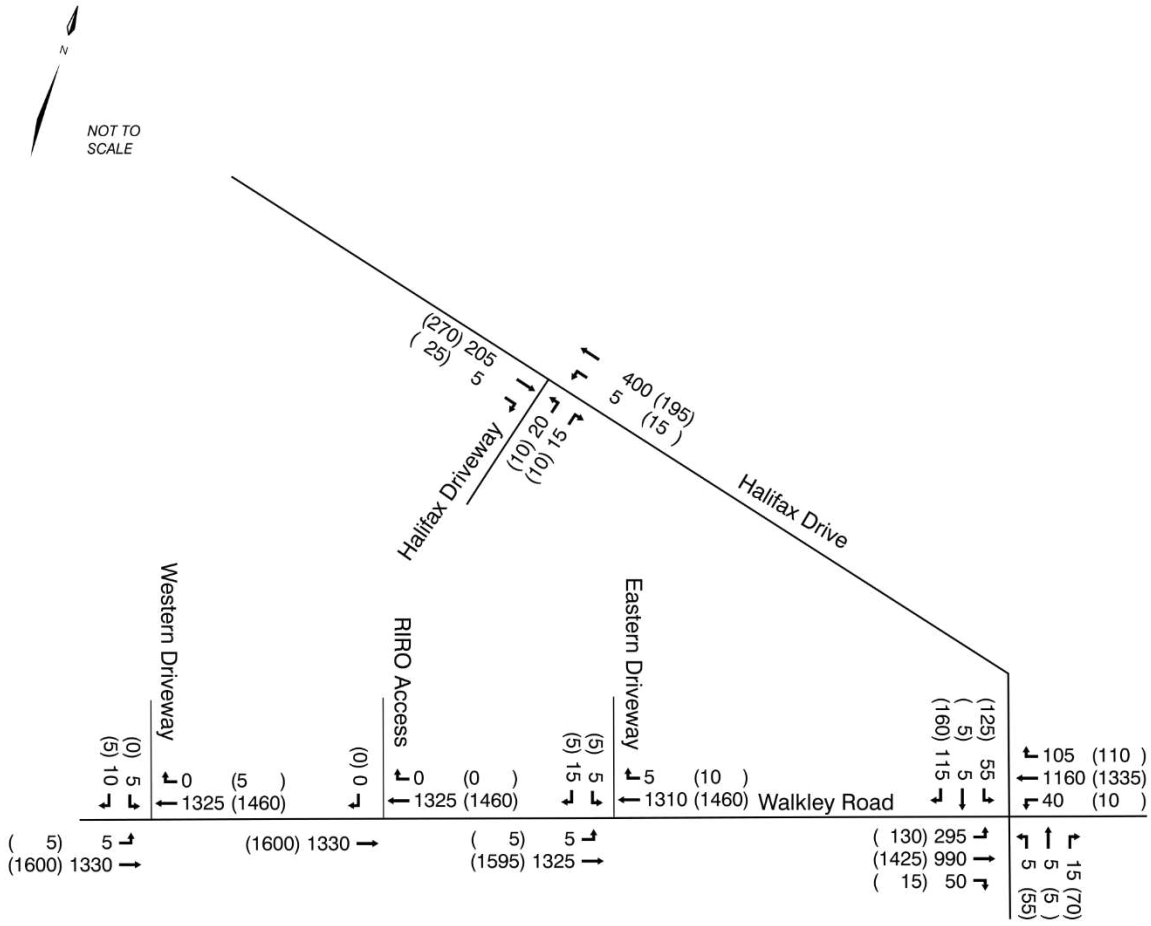
Figure 13: 2021 Background Traffic Volumes



Legend:

- AM (PM)
- peak hour turning
- movement volumes

Figure 14: 2026 Background Traffic Volumes



Legend:

- AM (PM)
- peak hour turning
- movement volumes

3.3 Total Traffic

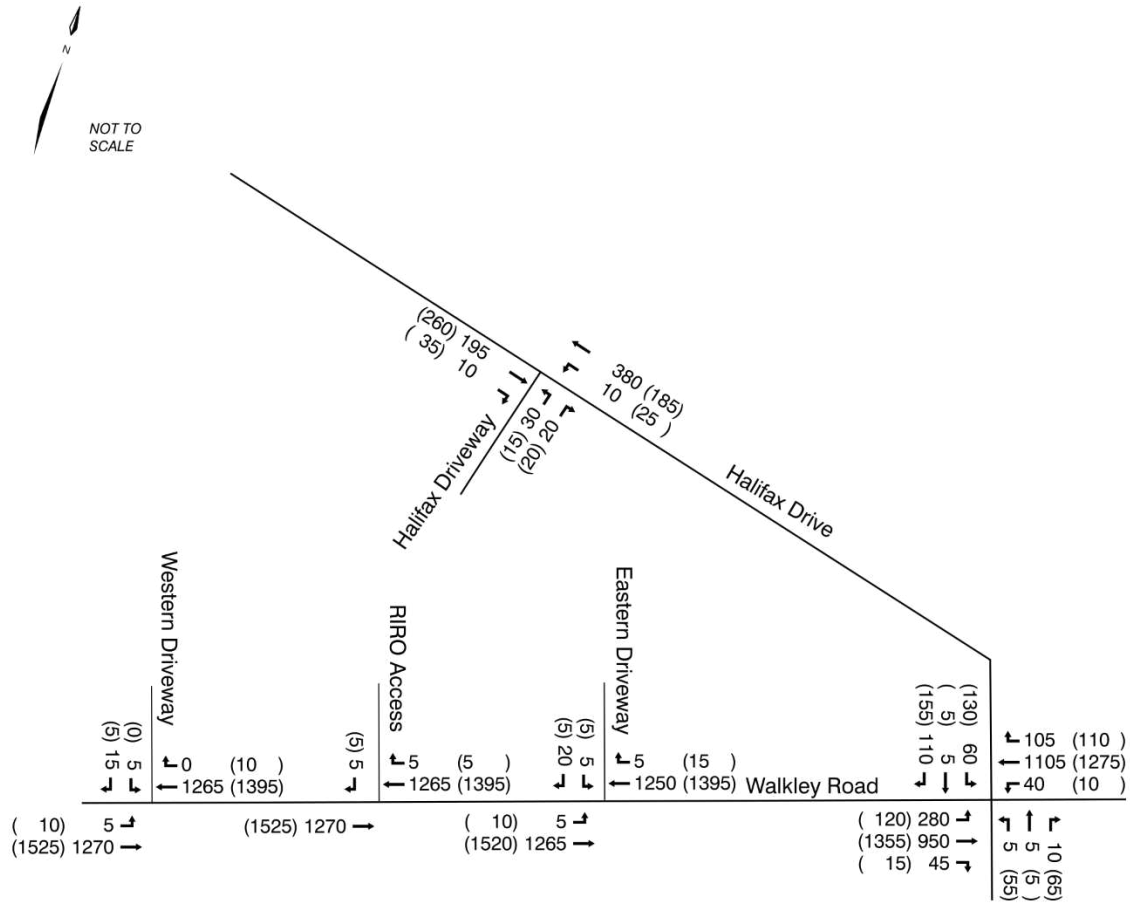
The total traffic volumes were calculated by adding the background traffic volumes and the site generated traffic volumes.

Figure 15 illustrates the total future traffic volumes with the new apartment tower being fully constructed and occupied in the 2021 occupancy year. **Figure 16** illustrates the total traffic volumes 5 years post occupancy in 2026.

3.3.1 Demand Rationalization

Based on the forecasted traffic volumes on the adjacent roadways and the volume of traffic proposed to be generated by the development, we do not anticipate capacity limitations in the transportation network. Therefore, no adjustments to projected background or development-generated travel demands have been undertaken.

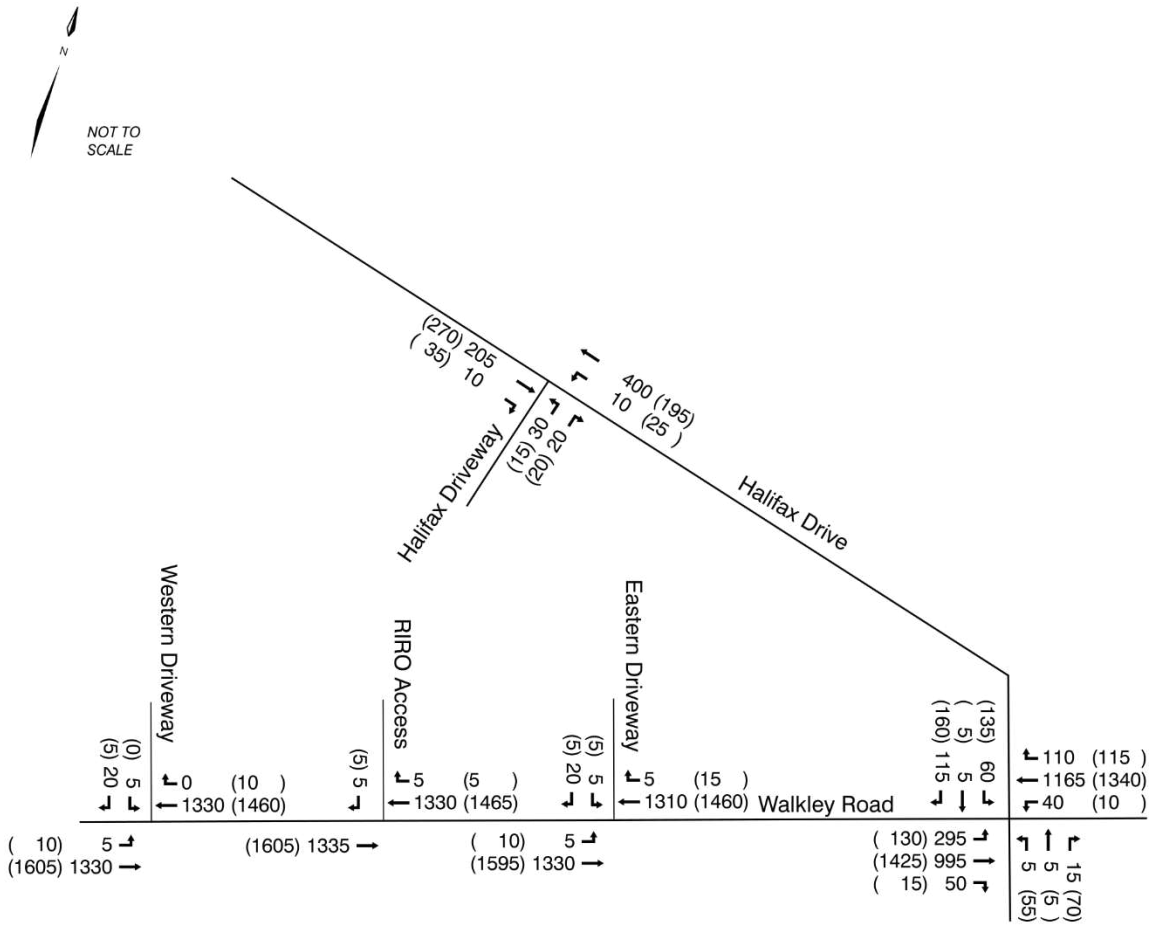
Figure 15: 2021 Total Traffic Volumes



Legend:

- AM (PM)
- peak hour turning
- movement volumes

Figure 16: 2026 Total Traffic Volumes



Legend:

- AM (PM)
- peak hour turning
- movement volumes

4.0 Analysis

4.1 Development Design

4.1.1 Design for Sustainable Modes

The proposed development consists of a single apartment tower facing onto Walkley Road. All of the required TDM – Supportive Development Design and Infrastructure Checklist items and many of the other items that relate to the site plan are met, while some of the items of the checklist are not relevant for the site. The following are some of the other items to be included within the site design:

- the apartment tower is located close to Walkley Road, with no parking in-between the road and the building;
- the building access is open and faces the street, with good visibility;
- the building is located close to the transit stop on Walkley Road;
- wayfinding signage will be included on the site;
- a bike share and repair station is currently being considered by the developer; and,
- a pickup-drop-off area is provided at the front door of the proposed development.

Appendix C contains the TDM-supportive Development Design and Infrastructure checklist.

4.1.2 Circulation and Access

Guest parking, loading zones, and short-stay deliveries will be accommodated on-site. Access is provided to Walkley Road, at a drop-off / pickup area in front of the building, and at two driveways (one for access to the underground garage and one to the above ground parking area). Vehicles parked within the parking structure will also have access to Halifax Drive.

4.1.3 New Street Networks

Exempted during Screening and Scoping.

4.2 Parking

4.2.1 Parking Supply

Auto Parking

The proposed development includes modifications to existing on-site parking. The new development will result in a net increase of 177 parking spaces, achieved by:

- Removing 56 surface parking spaces; and,
- Adding 233 new underground parking spaces.

Table 8 provides a summary of the parking spaces on the site.

Table 8: Parking Space Summary

Parking Type	Existing Parking Spaces (Excluding Garden Homes)	Proposed Change in Parking Spaces	Future Parking Supply (Excluding Garden Homes)
Surface	375	-56	319
Underground	169	+233	402
Total	**544**	**+177**	**721**

The existing site includes 50 Garden Homes which have separate dedicated underground parking totaling 65 parking spaces, and therefore have been excluded from the parking supply calculation of the residential tower buildings.

Table 9 indicates the parking requirements for the existing apartment towers on site based on Part 4 of the City of Ottawa Zoning by-law 2008-250. For the purpose of this analysis, given the row houses have separate designated parking, only the apartment towers were considered.

Table 9: City of Ottawa By-law Vehicle Parking Requirements

Type	Parking space requirement per dwelling unit	Number of dwelling units	Number of parking spaces required	Notes
Tenants	0.5	562	275	First 12 dwelling units exempt
Visitors	0.2	562	60	First 12 dwelling units exempt, maximum 60 parking spaces required
Total No. of Parking Spaces Required by Zoning By-Law			**335**	**721 parking spaces provided**

Bicycle Parking

The City of Ottawa By-law, Section 111, indicates that residential developments are to provide 0.5 bicycle parking spaces per dwelling unit, which equates to 101 bicycle parking spaces. Of these at least 25% of the bicycle parking spaces must be located in the building or other secure structure. The new tower will contain 120 indoor parking spots for bicycles, which exceeds this requirement.

4.2.2 Spillover Parking

Exempted during screening and scoping report.

4.3 Boundary Street Design

On Walkley Road, the existing centre median is proposed to be modified to accommodate the new driveway access locations. **Appendix C** contains the Road Modification Approvals (RMA) Drawing and

Cost Estimate, and **Appendix E** contains the Functional Design Drawing for this work. The proposed development will not require any modifications to Halifax Drive.

Table 10 summarizes the results of Multi-Modal Levels of Service (MMLOS) analysis for 'segments' (i.e. between signalized intersections). There are no planned network modifications within the horizon of this study, and the development is not anticipated to change the MMLOS analysis results; the MMLOS analysis results are the same for existing conditions and future conditions.

Halifax Drive and Walkley Road are within 300 metres of the Canterbury High School of Arts and therefore the MMLOS targets are higher for pedestrians, cyclists, and transit. Since Walkley Road is a spine cycling route, the cycling target is LOS B, and since Halifax Drive is a local cycling route, the cycling target is LOS B. Walkley Road is a truck route and therefore the truck LOS target is D; there is no target for Halifax Drive.

Table 10: MMLOS Analysis – Segments

	Criteria	Target	Walkley Road	Halifax Drive
Pedestrian LOS	Sidewalk width	A	1.5m	1.5m
	Boulevard width		1.5m	1.5m
	AADT > 3000?		Yes	Yes
	On-Street Parking		No	Yes
	Operating Speed		60 km/h	51 – 60 km/h
	Level of Service		**E**	**D**
Cycling LOS	Type of facility	C for Walkley B for Halifax	Mixed traffic	Mixed traffic
	Number of travel lanes		4, with median	2
	Bike lane width		n/a	n/a
	Operating speed		60 km/h	51 – 60 km/h
	Centreline (yes/no)		yes	yes
	Bike lane blockage freq.		n/a	n/a
	Level of Service		**F**	**D**
Transit LOS	Type of facility	D	Mixed traffic	Mixed traffic
	Parking/driveway friction		Limited/Low	Moderate
	Level of Service		**D**	**E**
Truck LOS	Number of lanes	D for Walkley No Target for Halifax Drive	2	1
	Lane width		3.4m - 3.5m	3.4m - 3.5m
	Level of Service		**A**	**C**

The pedestrian and cycling LOS is below the target for Walkley Road and Halifax Drive, and the transit LOS is below the target for Halifax Drive. These are existing issues that are not be made worse by the proposed development. These issues will be resolved when Walkley Road is widened in the future to accommodate median BRT lanes. When Walkley Road is widened, it is anticipated that the new pedestrian and cycling facilities will meet the MMLOS targets, and the median BRT lanes will meet the transit targets.

4.4 Access Intersections Design

4.4.1 Location and Design of Access

The existing driveway on Halifax Drive is not being modified. The proposed new driveways to Walkley Road will be designed to meet the City of Ottawa Private Access By-law requirements. These driveways will require modifications of the Walkley Road median to allow left turns into and out of the western and eastern site driveways.

The western driveway on Walkley Road conflicts with an existing bus stop location. After consulting with OC Transpo, the decision was made to move the bus stop west of the proposed driveway.

There is a driveway to the Government of Canada office complex located on the south side of Walkley Road, across from the proposed development. The office complex driveway is offset to the east of the proposed site's eastern driveway, thus eliminating left turning vehicle conflicts between the two sites.

The driveway located in between the east and west driveways, immediately in front of the building, will operate as a right in/out (RIRO) access only, enforced by the median design.

4.4.2 Intersection Control

The anticipated traffic volumes at the proposed site driveways warrant single lane approaches with Stop control in advance of the public sidewalks, consistent with the Highway Traffic Act.

4.4.3 Intersection Design

Table 11 and **Table 12**, respectively, summarize the driveway access intersection performance for future background traffic volumes and total future traffic volumes. **Appendix F** contains the Synchro reports.

Based on the proposed access design and the existing lane geometry, all accesses were found to be operating at an acceptable LOS. The east driveway which will experience some delays during the weekday PM peak hour; however, the traffic volume is very low and the volume/capacity (v/c) ratio is acceptable at $v/c < 0.2$.

All driveway accesses are to be stop controlled on the minor approach (the driveway), therefore, an MMLOS has not been undertaken at the driveways.

Table 11: Intersection Performance - Driveway Accesses – Future Background Traffic Volumes

Intersection	Horizon Year	Peak Hour	Movement	LOS	Delay (s)	v/c	95th %tile Queue (veh)
Walkley Road West Driveway	2021	AM	EBL	B	11.5	0.01	0
			SBL/R	D	33.3	0.11	0.3
		PM	EBL	B	12.3	0.01	0
			SBL/R	C	14.4	0.01	0
	2026	AM	EBL	B	11.9	0.01	0
			SBL/R	E	37.4	0.12	0.4
		PM	EBL	B	12.8	0.01	0
			SBL/R	B	14.9	0.01	0
Walkley Road Right In/Right Out Access	2021	AM	SBR	A	0	-	-
		PM	SBR	A	0	-	-
	2026	AM	SBR	A	0	-	-
		PM	SBR	A	0	-	-
Walkley Road East Driveway	2021	AM	EBL	B	11.4	0.01	0
			SBL/R	D	32.7	0.10	0.3
		PM	EBL	B	12.4	0.01	0
			SBL/R	F	61.1	0.14	0.4
	2026	AM	EBL	B	11.8	0.01	0
			SBL/R	D	31.2	0.13	0.4
		PM	EBL	B	12.8	0.01	0
			SBL/R	F	71.4	0.16	0.5
Halifax Driveway	2021	AM	NBL	A	7.6	0.01	0
			NBT	A	0	-	-
			EBL/R	B	11.6	0.06	0.2
		PM	NBL	A	7.8	0.01	0
			NBT	A	0	-	-
			EBL/R	B	10.9	0.04	0.1
	2026	AM	NBL	A	7.6	0.01	0
			NBT	A	0	-	-
			EBL/R	B	11.8	0.06	0.2
		PM	NBL	A	7.8	0.01	0
			NBT	A	0	-	-
			EBL/R	B	11	0.03	0.1

Table 12: Intersection Performance - Driveway Accesses - Total Future Traffic Volumes

Intersection	Horizon Year	Peak Hour	Approach	LOS	Delay (s)	v/c	95th %'ile Queue (veh)
Walkley Road West Driveway	2021	AM	EBL	B	11.5	0.01	0
			SBL/R	D	29.1	0.12	0.4
		PM	EBL	B	12.5	0.02	0.1
			SBL/R	C	14.5	0.01	0
	2026	AM	EBL	B	11.9	0.01	0
			SBL/R	D	29.5	0.15	0.5
		PM	EBL	B	12.9	0.02	0.1
			SBL/R	B	14.9	0.01	0
Walkley Road RI/RO Access	2021	AM	SBR	B	13.6	0.01	0
		PM	SBR	B	14.4	0.01	0
	2026	AM	SBR	B	14.0	0.01	0
		PM	SBR	B	14.9	0.01	0
Walkley Road East Driveway	2021	AM	EBL	B	11.5	0.01	0
			SBLR	D	25.9	0.13	0.4
		PM	EBL	B	12.5	0.02	0.1
			SBL/R	F	63.8	0.14	0.5
	2026	AM	EBL	B	11.8	0.01	0
			SBL/R	D	28.7	0.14	0.5
		PM	EBL	B	12.9	0.02	0.1
			SBL/R	F	75.3	0.16	0.5
Halifax Driveway	2021	AM	NBL	A	7.6	0.01	0
			NBT	A	0	-	-
			EBL/R	B	12.0	0.09	0.3
		PM	NBL	A	7.9	0.02	0.1
			NBT	A	0	-	-
			EBL/R	B	11.0	0.06	0.2
	2026	AM	NBL	A	7.7	0.01	0
			NBT	A	0	-	-
			EBL/R	B	12.2	0.09	0.3
		PM	NBL	A	7.9	0.02	0.1
			NBT	A	0	-	-
			EBL/R	B	11.2	0.06	0.2

4.5 Transportation Demand Management

4.5.1 Transportation Demand Management (TDM) Context

Development Location and Involved Parties

The development is not located within a Transit-Oriented Development zone. The property is owned and is anticipated to be operated by LS GP INC.

Development Operation

The proposed residential building is anticipated to contain a total of 202 dwelling units. The unit breakdown is anticipates as:

- 32 three bedroom units;
- 32 two bedroom units; and,
- 138 one bedroom units.

This is not a retirement or adult living facility and there are no age restrictions for tenants.

4.5.2 Need and Opportunity

The proposed development will be in keeping with the existing development on the site, where the auto trip rate is similar to that identified for the TAZ. Therefore, the risk of not achieving the target is low.

4.5.3 Transportation Demand Management

The City of Ottawa's Transportation Demand Management (TDM) checklists were reviewed and some of the recommended TDM measures are listed below:

- Providing local area maps with walking/cycling access routes at major entrances;
- Displaying relevant transit schedules and route maps at entrances;
- Provision of real-time transit arrival information;
- LS GP INC. is currently reviewing opportunities to work with on-site car share services;
- Unbundle parking costs from purchase or rental costs; and,
- Provide multimodal travel option information package to new residents.

Appendix C contains the TDM measures checklists.

4.6 Neighbourhood Traffic Management

Exempted during Scoping and Screening.

4.7 Transit

4.7.1 Route Capacity

The proposed development is forecasted to generate an additional 50 transit trips during the AM peak hour, and 53 transit trips during the PM peak hour. OC Transpo routes #48 and #112 service the site. During the weekday peak hours, 12 buses (six per direction) service the site between the two routes.

Given the low number of persons generated by the site, the proposed development is not anticipated to have a significant impact on transit route capacity.

4.7.2 Transit Priority

Walkley Road is already identified as a future BRT route (as mentioned in **Section 2.1.3.1**).

4.8 Review of Network Concept

Exempted during Scoping and Screening.

4.9 Intersection Design

4.9.1 Intersection Control

The intersection of Walkley Road and Halifax Drive will be maintained as a signalized intersection. No modifications are required as a result of the proposed site development.

Table 13 and **Table 14**, respectively, summarize the intersection performance for future background traffic volumes and total future traffic volumes for network intersections (i.e. non driveway intersections). **Appendix G** contains the Synchro reports.

Table 13: Intersection Performance – Network Intersections – Future Background Traffic

Intersection	Horizon	Analysis Period	Overall LOS	Overall V/C	Critical Movements	Critical Movement		
						LOS	Delay (s)	V/C
Walkley Road / Halifax Drive	2021	AM	B	0.68	WBT/R	C	26.3	0.86
		PM	C	0.76	WBT/R	C	22.6	0.85
	2026	AM	C	0.71	WBT/R	C	26.2	0.85
		PM	C	0.78	WBT/R	C	24.2	0.87

Table 14: Intersection Performance - Network Intersections – Total Future Traffic

Intersection	Horizon	Analysis Period	Overall LOS	Overall V/C	Critical Movements	Critical Movement		
						LOS	Delay (s)	V/C
Walkley Road / Halifax Drive	2021	AM	B	0.69	WBT/R	C	26.6	0.86
		PM	C	0.76	WBT/R	C	23.2	0.85
	2026	AM	C	0.72	WBT/R	C	26.4	0.85
		PM	C	0.79	WBT/R	C	24.7	0.87

The addition of site generated traffic has a negligible impact on intersection operations. The shared westbound through/right turning movement will experience a V/C > 0.85 but the LOS and delay are acceptable. The intersection should remain as a signalized intersection and no modifications are required.

4.9.2 Intersection Design

Table 15 summarizes the MMLOS performance for signalized intersections and **Appendix G** lists the MMLOS assumptions.

Table 15: MMLOS Analysis – Signalized Intersections

Intersection	Pedestrian LOS	Bicycle LOS	Transit LOS	Truck LOS	Auto LOS
Walkley Road @ Halifax Drive	F	F	C	F	C
Target	A	C for Walkley B for Halifax	D	D for Walkley No Target for Halifax	E

The Walkley Road and Halifax Drive intersection fails to meet the MMLOS targets for pedestrians, cyclists, and trucks. This is due to six lanes for pedestrians to cross, the lack of infrastructure for cyclists approaching the intersection, and small turning radiuses for trucks to/from Halifax Drive.

These are existing issues that are not made worse by the proposed development. It is anticipated that the MMLOS for pedestrians, cyclists and trucks will be improved when Walkley Road is widened in the future for the median BRT. The timing for median BRT is unknown at this time since it was not included in the City's 2031 "Affordable" network.

5.0 Conclusions

Based on the transportation assessment presented in this study, LS GP INC's proposed apartment building located at 2190 Halifax Drive should be permitted to proceed from a transportation impact perspective.

Appendix A

Traffic Counts

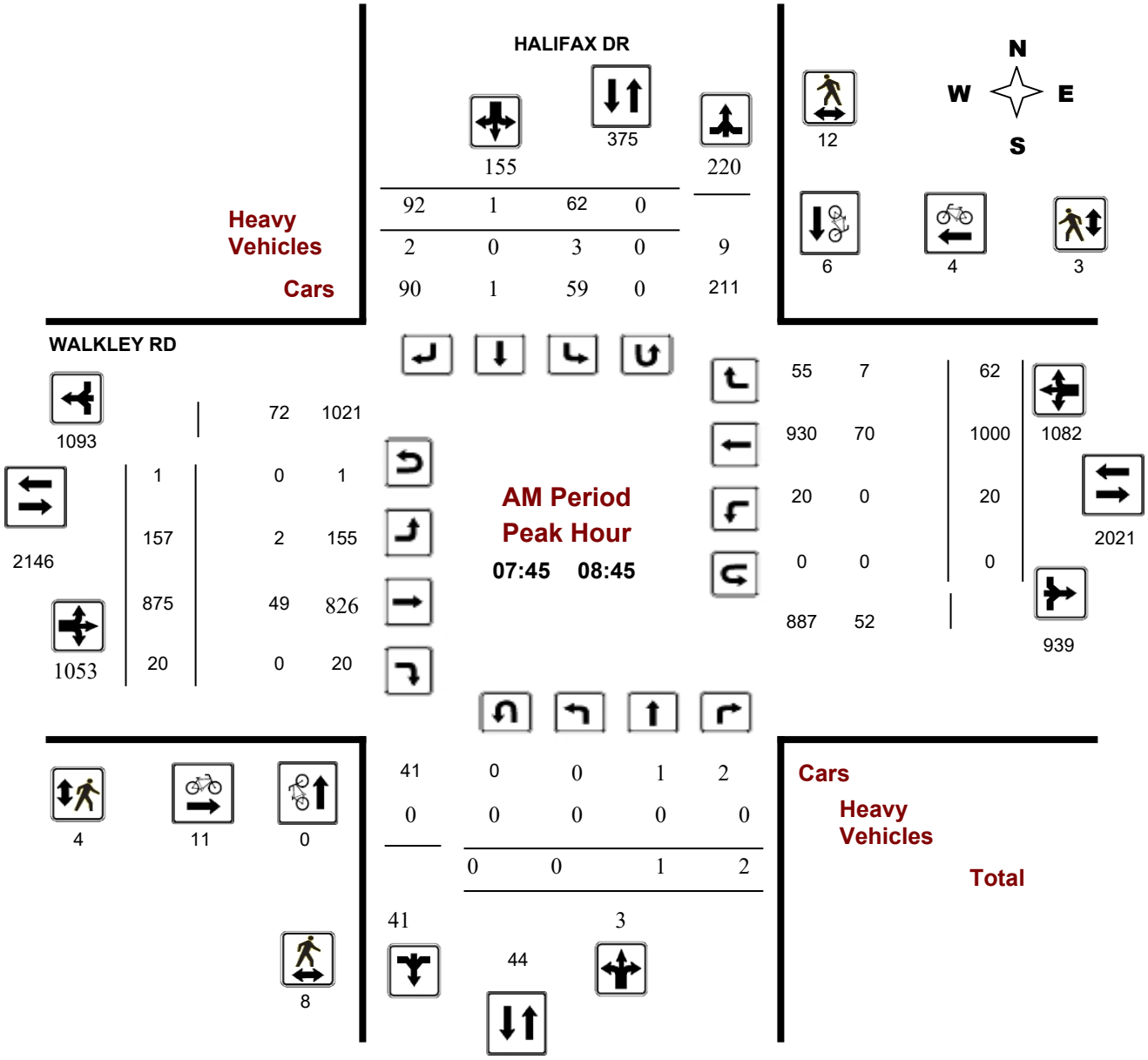
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

HALIFAX DR @ WALKLEY RD

Survey Date: Monday, July 23, 2007 **WO No:** 22685

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



Comments

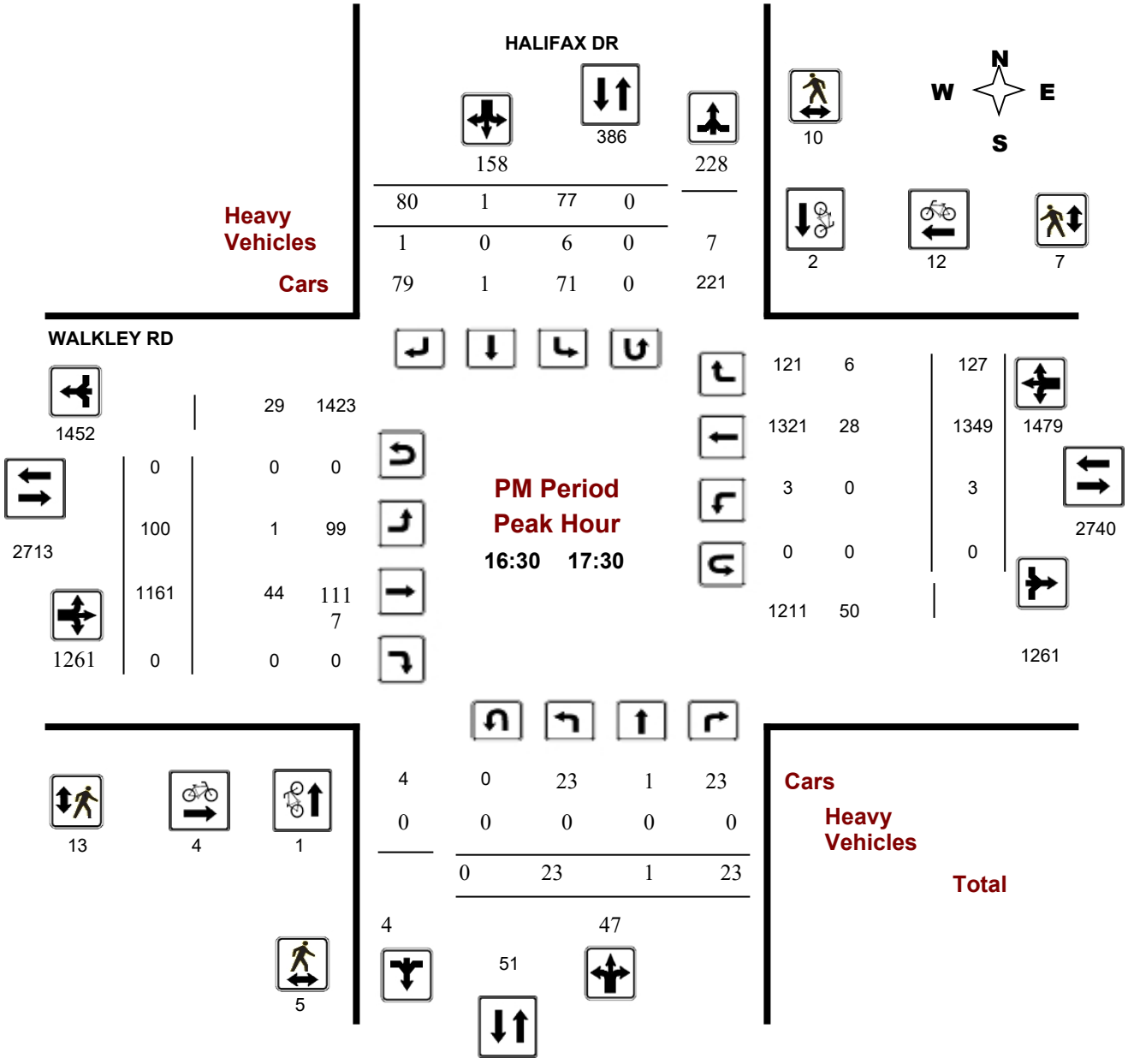
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

HALIFAX DR @ WALKLEY RD

Survey Date: Monday, July 23, 2007 **WO No:** 22685

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



Comments

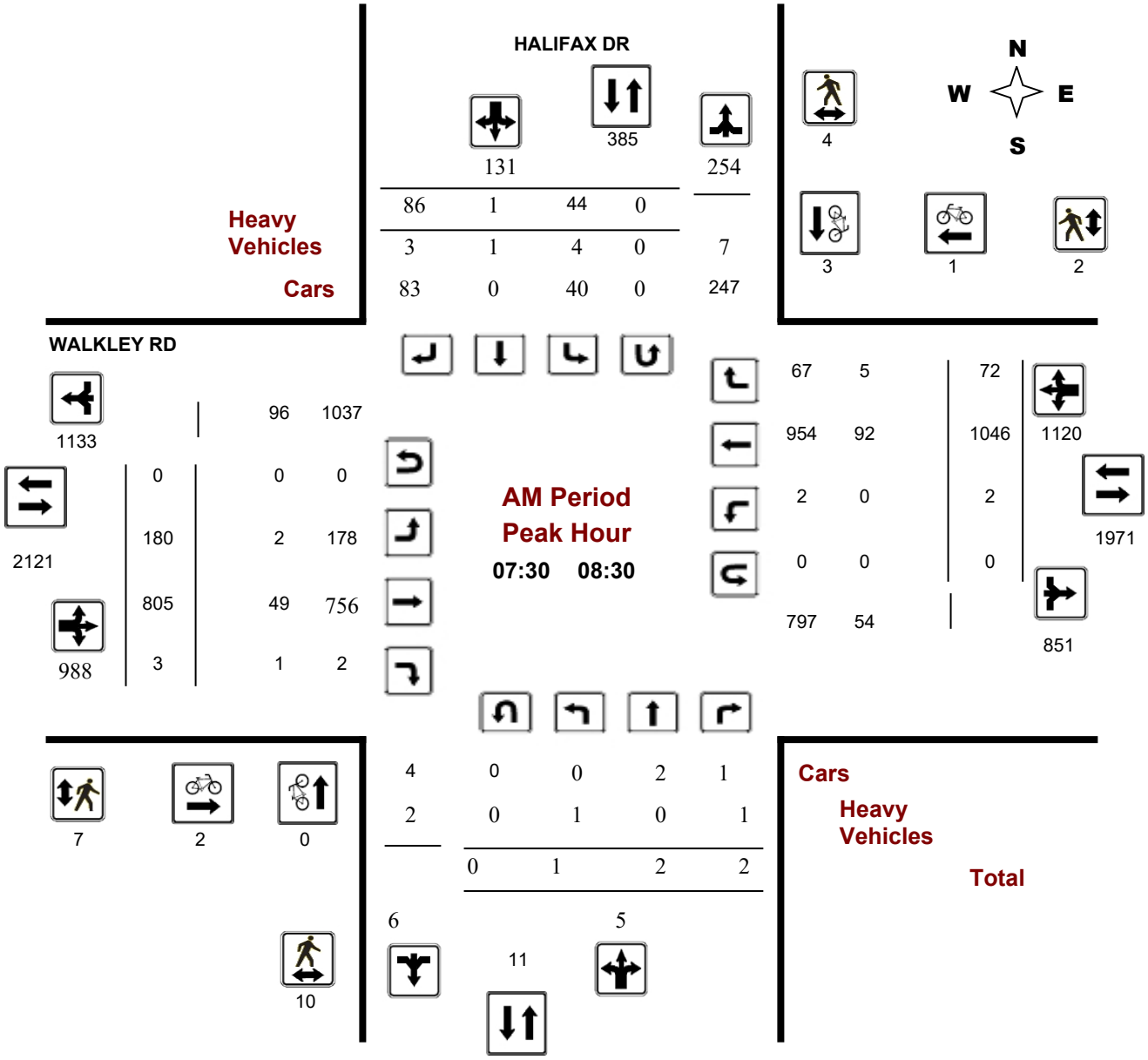
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

HALIFAX DR @ WALKLEY RD

Survey Date: Wednesday, June 23, 2010 **WO No:** 27070

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



Comments

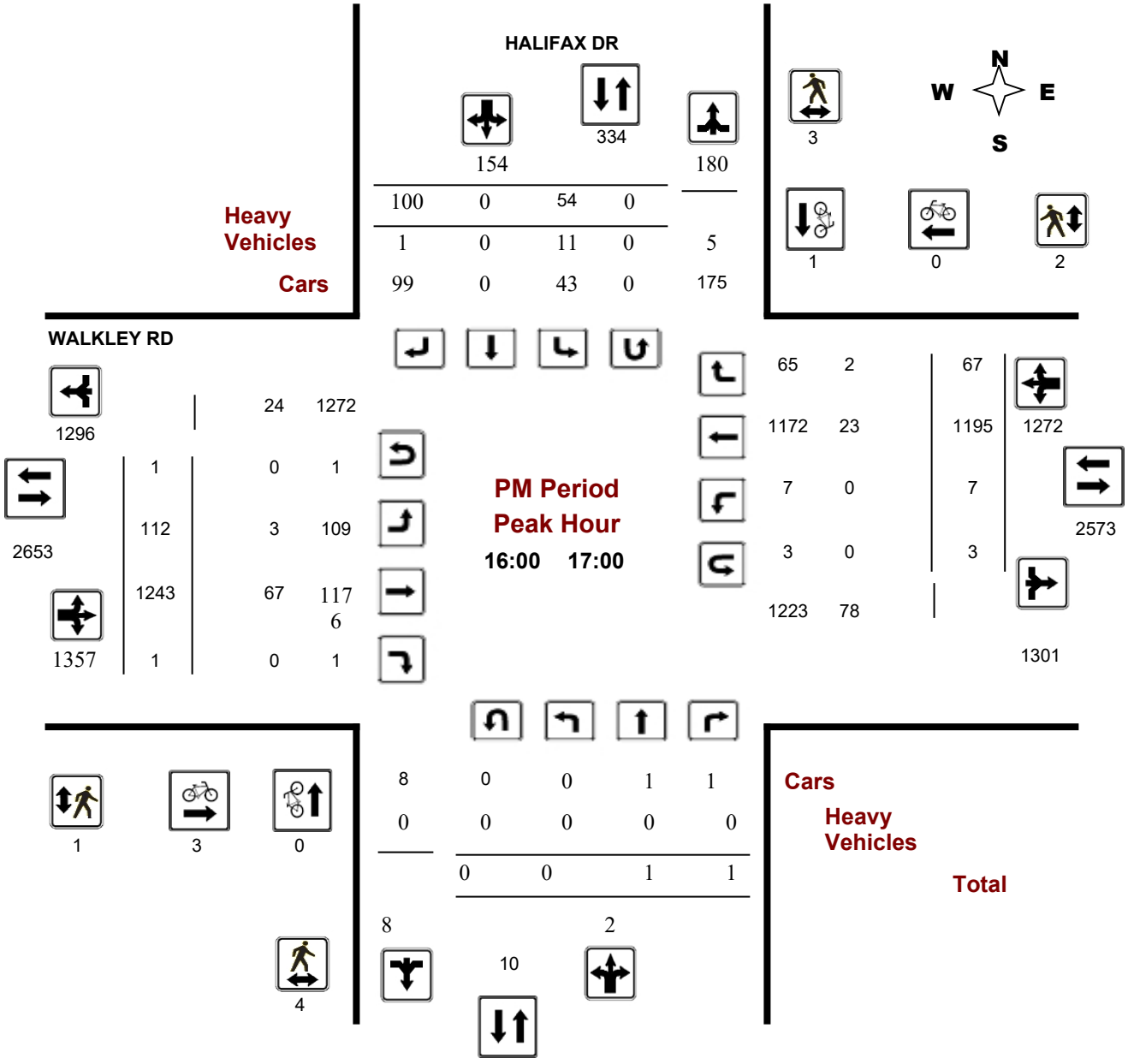
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

HALIFAX DR @ WALKLEY RD

Survey Date: Wednesday, June 23, 2010 **WO No:** 27070

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



Comments

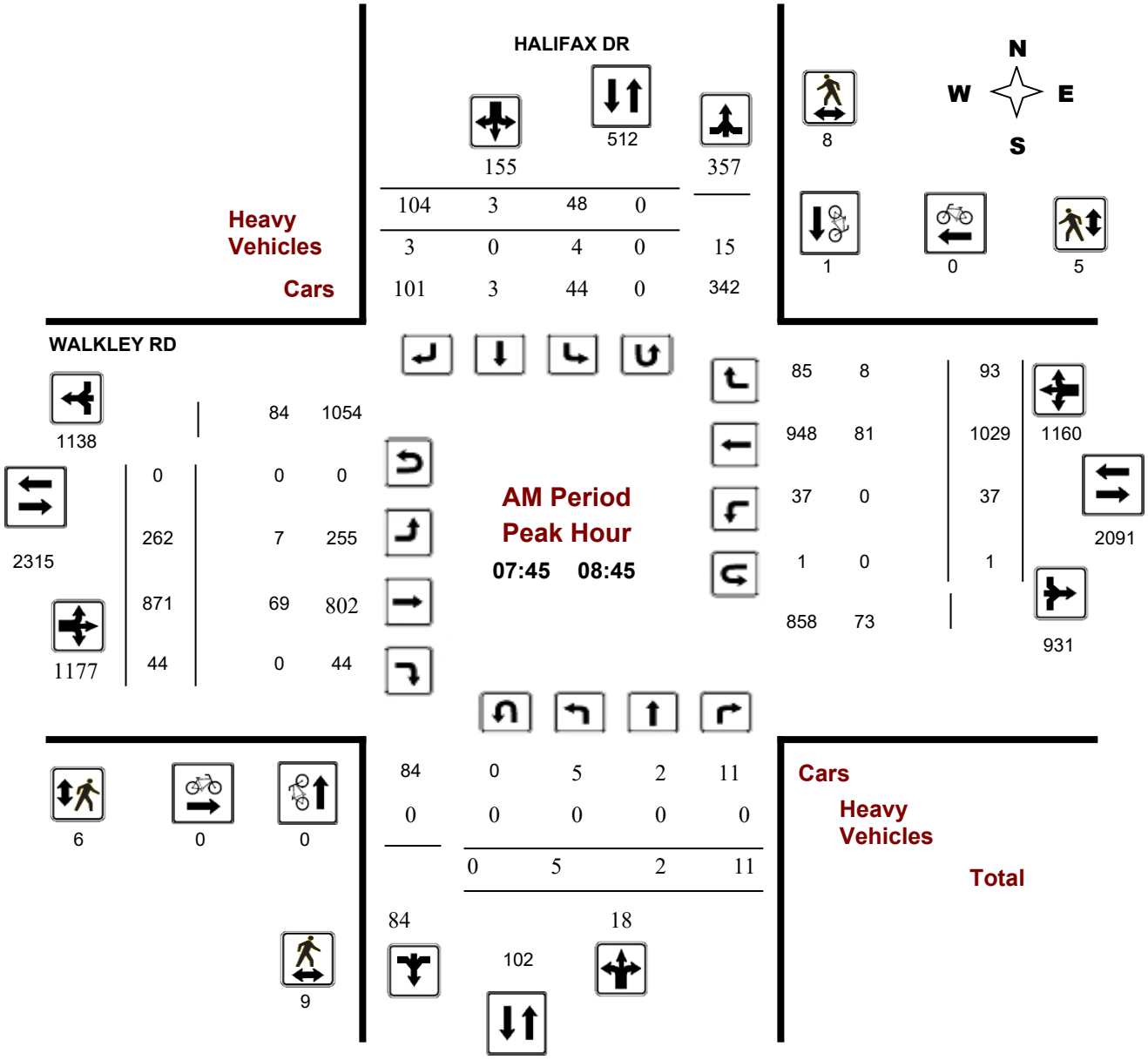
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

HALIFAX DR @ WALKLEY RD

Survey Date: Wednesday, December 07, 2016 **WO No:** 36597

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



Comments

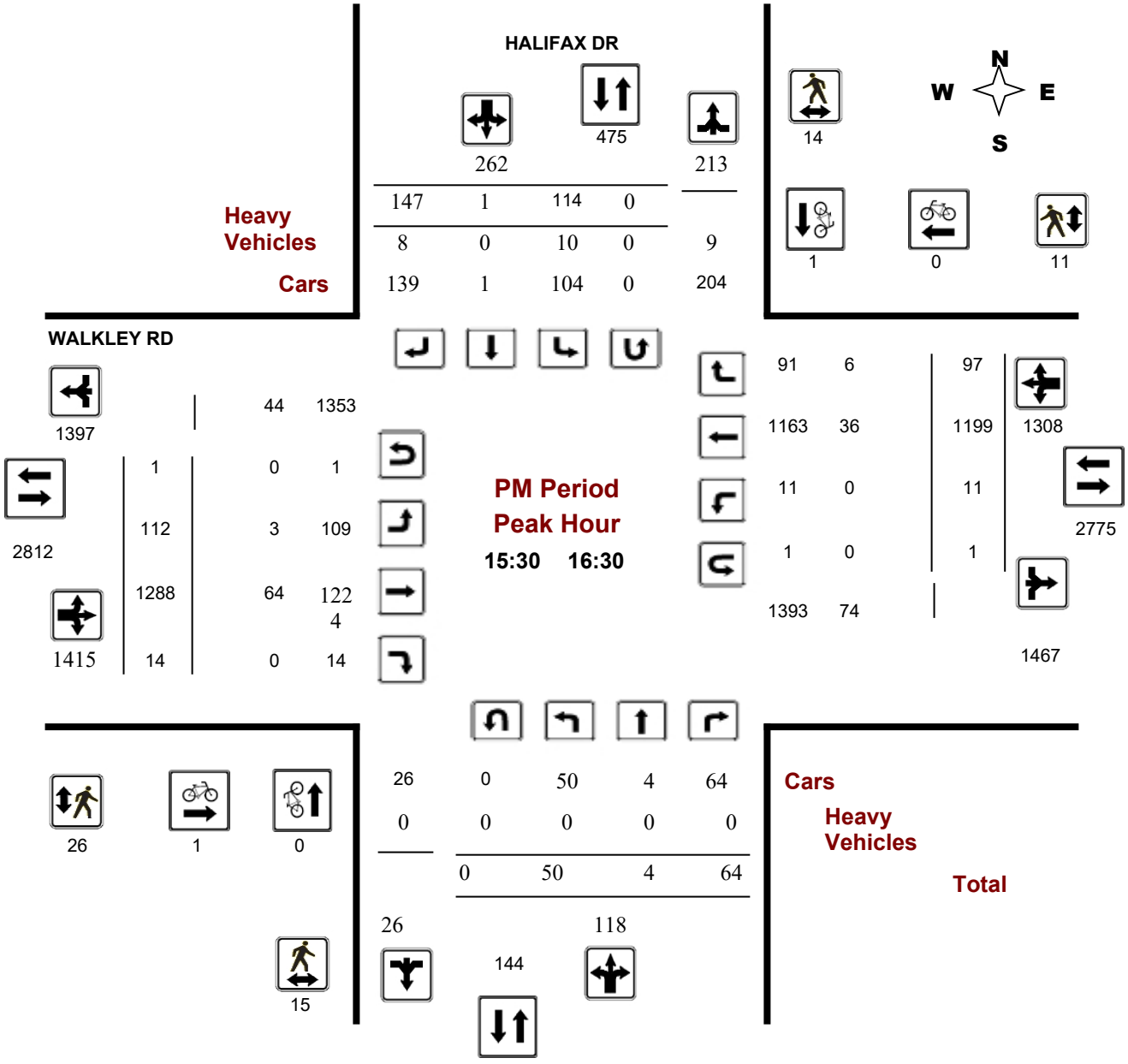
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

HALIFAX DR @ WALKLEY RD

Survey Date: Wednesday, December 07, 2016 **WO No:** 36597

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



Comments

Appendix B

TRANS Tables

Table 3.18: Recommended Vehicle Trip Generation Rates without Transit Bonus

Recommended Vehicle Trip Generation Rates AM and PM Peak Hours							
ITE Land Use Code	Dwelling Unit Type / Geographic Area		Vehicle Trip Rates				
			Core	Urban (Inside the Greenbelt)	Suburban (Outside the Greenbelt)	Rural	All Areas
210	Single-detached dwellings	AM	0.40	0.67	0.70	0.62	0.66
		PM	0.60	0.76	0.90	0.92	0.81
224	Semi-detached dwellings, townhouses, rowhouses	AM	0.34	0.51	0.54	0.62	0.52
		PM	0.39	0.51	0.71	0.67	0.61
231	Low-rise condominiums (1 or 2 floors)	AM	0.34	0.50	0.60	0.71	0.47
		PM	0.29	0.49	0.66	0.72	0.46
232	High-rise condominiums (3+ floors)	AM	0.26	0.38	0.46	0.54	0.36
		PM	0.20	0.34	0.46	0.50	0.32
233	Luxury condominiums	AM	0.31	0.45	0.55	0.65	0.43
		PM	0.24	0.40	0.55	0.59	0.38
221	Low-rise apartments (2 floors)	AM	0.21	0.31	0.37	0.44	0.29
		PM	0.20	0.34	0.46	0.50	0.32
223	Mid-rise apartments (3-10 floors)	AM	0.17	0.24	0.29	0.35	0.23
		PM	0.16	0.28	0.37	0.41	0.26
222	High-rise apartments (10+ floors)	AM	0.17	0.24	0.29	0.35	0.23
		PM	0.16	0.27	0.36	0.39	0.25

Note: See Table 6.3 for recommended vehicle trip rates with transit bonus

Table 4.1: Transit Mode Splits – Home Trip-ends Proximity to Rapid Transit Stations

Transit Mode Splits: Home Trip-ends					
Distance to/from Rapid Transit Station (meters)	Percent of All Trips	AM Transit Mode Splits (Trip Origins)		PM Transit Mode Splits (Trip Destinations)	
		Peak Hour	Peak Period	Peak Hour	Peak Period
<400	3 to 6%	39%	39%	32%	26%
400 to <800	9 to 10%	36%	34%	23%	23%
800 to <1,200	9 to 10%	39%	34%	27%	25%
1,200 to <1,600	8%	39%	34%	23%	26%
1,600 to <2,000	7 to 8%	36%	33%	23%	22%
2,000 to 2,400	7 to 8%	35%	32%	21%	21%
>2,400	52 to 55%	30%	27%	16%	18%

The trend lines prepared for each of the AM and PM peak period and hour provide an appropriate means to apply adjustment factors for residential developments located for example within 2.4 kilometres of access to a rapid transit station. It is also noted that the selection of a trip distance interval of approximately 400 meters results in each of the intervals capturing similar proportions of origins or destinations between 6 to 10% of the total for the time period analysed.

4.2 Transit Mode Splits – Non-Home Trip Ends (Commercial Land Uses)

The analysis of the non-home trip ends was undertaken to assess the impact of rapid transit station location and transit mode splits reported for i) trip destinations for the AM peaks and ii) trip origins for the PM peaks. Similar to the previous section, trip data was organized to assess the proportion of travel attracted to transit based on the distance to the trip end location (for predominately work/school trip ends) from access to rapid transit (i.e. station location). Overall the methodology used in assembling the trip data from the TRANS OD Survey is the same however the other trip end – trip destinations in the AM and trip origins in the PM were used in determining the distance for access to the rapid transit system. Exhibit 4.3: Proximity to Rapid Transit Stations - AM Trip Destinations and Exhibit 4.4: Proximity to Rapid Transit Stations - PM Trip Origins highlight the proportion of travel accommodated by transit based on an assessment of trip destinations for the AM and trip origins for the PM peaks.

Table 6.1: Vehicle Trip Generation Rates

Vehicle Trip Generation Rates AM and PM Peak Hours						
ITE Land Use Code	Dwelling Unit Type / Data Source		Vehicle Trip Generation Rate			
			2008 Count Data	ITE	OD Survey	Blended Rate
210	Single-detached dwellings	AM	0.66	0.75	0.56	0.66
		PM	0.89	1.01	0.53	0.81
224	Semi-detached dwellings, townhouses, rowhouses	AM	0.40	0.70	0.46	0.52
		PM	0.64	0.72	0.46	0.61
231	Low-rise condominiums (1 or 2 floors)	AM	0.53	0.67	0.21	0.47
		PM	0.41	0.78	0.18	0.46
232	High-rise condominiums (3+ floors)	AM	0.53	0.34	0.21	0.36
		PM	0.41	0.38	0.18	0.32
233	Luxury condominiums	AM	0.53	0.56	0.21	0.43
		PM	0.41	0.55	0.18	0.38
221	Low-rise apartments (2 floors)	AM	0.19	0.46	0.21	0.29
		PM	0.21	0.58	0.18	0.32
223	Mid-rise apartments (3-10 floors)	AM	0.19	0.30	0.21	0.23
		PM	0.21	0.39	0.18	0.26
222	High-rise apartments (10+ floors)	AM	0.19	0.30	0.21	0.23
		PM	0.21	0.35	0.18	0.25

Table 6.2: Recommended Vehicle Trip Directional Splits

Comparison of Directional Splits (Inbound/Outbound) AM and PM Peak Hours								
ITE Land Use Code	Area Dwelling Unit Type / Data Source		2008 Count Data		ITE		Blended Rate	
			Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
210	Single-detached dwellings	AM	33%	67%	25%	75%	29%	71%
		PM	60%	40%	63%	37%	62%	39%
224	Semi-detached dwellings, townhouses, rowhouses	AM	40%	60%	33%	67%	37%	64%
		PM	55%	45%	51%	49%	53%	47%
231	Low-rise condominiums (1 or 2 floors)	AM	36%	64%	25%	75%	31%	70%
		PM	54%	46%	58%	42%	56%	44%
232	High-rise condominiums (3+ floors)	AM	36%	64%	19%	81%	28%	73%
		PM	54%	46%	62%	38%	58%	42%
233	Luxury condominiums	AM	36%	64%	23%	77%	30%	71%
		PM	54%	46%	63%	37%	59%	42%
221	Low-rise apartments (2 floors)	AM	22%	78%	21%	79%	22%	79%
		PM	62%	38%	65%	35%	64%	37%
223	Mid-rise apartments (3-10 floors)	AM	22%	78%	25%	75%	24%	77%
		PM	62%	38%	61%	39%	62%	39%
222	High-rise apartments (10+ floors)	AM	22%	78%	25%	75%	24%	77%
		PM	62%	38%	61%	39%	62%	39%

Appendix C

TDM Checklists

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
☒	Checked box indicates that the design will include this item

		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	☐ Not applicable
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)	☐ LS GP Inc is reviewing the option
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐ Shelters are already in place on the street, transit will not be on-site
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	☐ Not Applicable
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ Not Applicable

		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)*	☐ Designated spaces will not be provided at this time
	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	☐ LS GP Inc is reviewing the option
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☒
BASIC	6.1.2	Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	☐
BASIC	6.1.3	Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly *(see Zoning By-law Section 104)*	☐
BETTER	6.1.4	Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking *(see Zoning By-law Section 111)*	☐
	6.2	**Separate long-term & short-term parking areas**	
BETTER	6.2.1	Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	☐

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

Legend

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

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

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

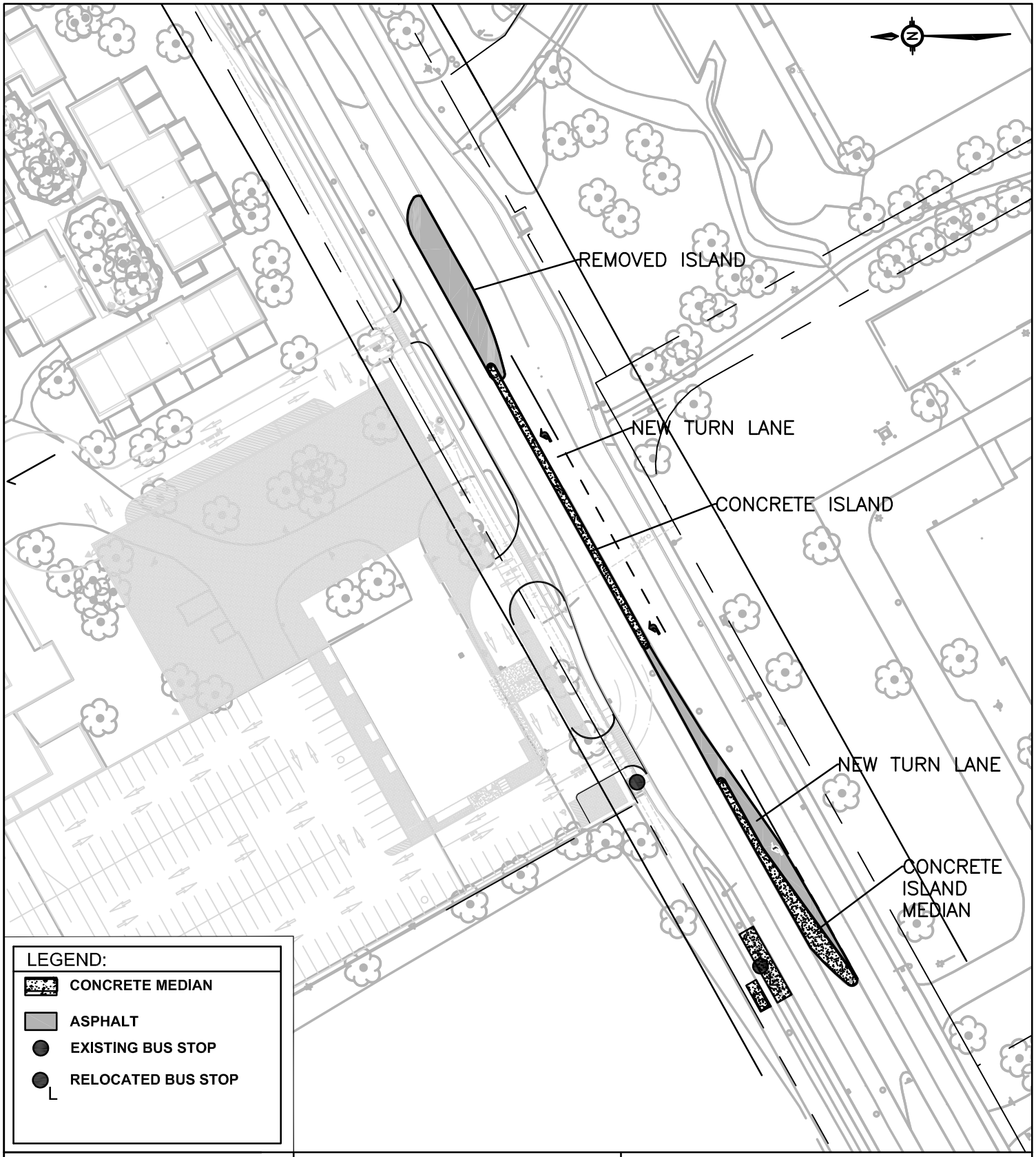
		TDM measures: *Residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☐ Not to be provided
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐ Not to be provided
	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	☐ Not to be provided

			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	☐ Not to be provided
		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)*	☐ Transit service is already servicing the property
		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)	☐ Not applicable
		4.	**CARSHARING & BIKESHARING**	
		4.1	**Bikeshare stations & memberships**	
BETTER		4.1.1	Contract with provider to install on-site bikeshare station (*multi-family)*	☐ Not to be provided
BETTER		4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐ Not to be provided
		4.2	**Carshare vehicles & memberships**	
BETTER		4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐ LS GP Inc is reviewing this option
BETTER		4.2.2	Provide residents with carshare memberships, either free or subsidized	☐ Not to be provided
		5.	**PARKING**	
		5.1	**Priced parking**	
BASIC	★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐ LS GP Inc is reviewing this option
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	☐ Not to be provided

Appendix D

RMA Drawing and Cost Estimate



TRANSPORTATION SERVICES DEPARTMENT

PROPOSED ROADWAY MODIFICATIONS

WALKLEY ROAD WEST OF HALIFAX DRIVE

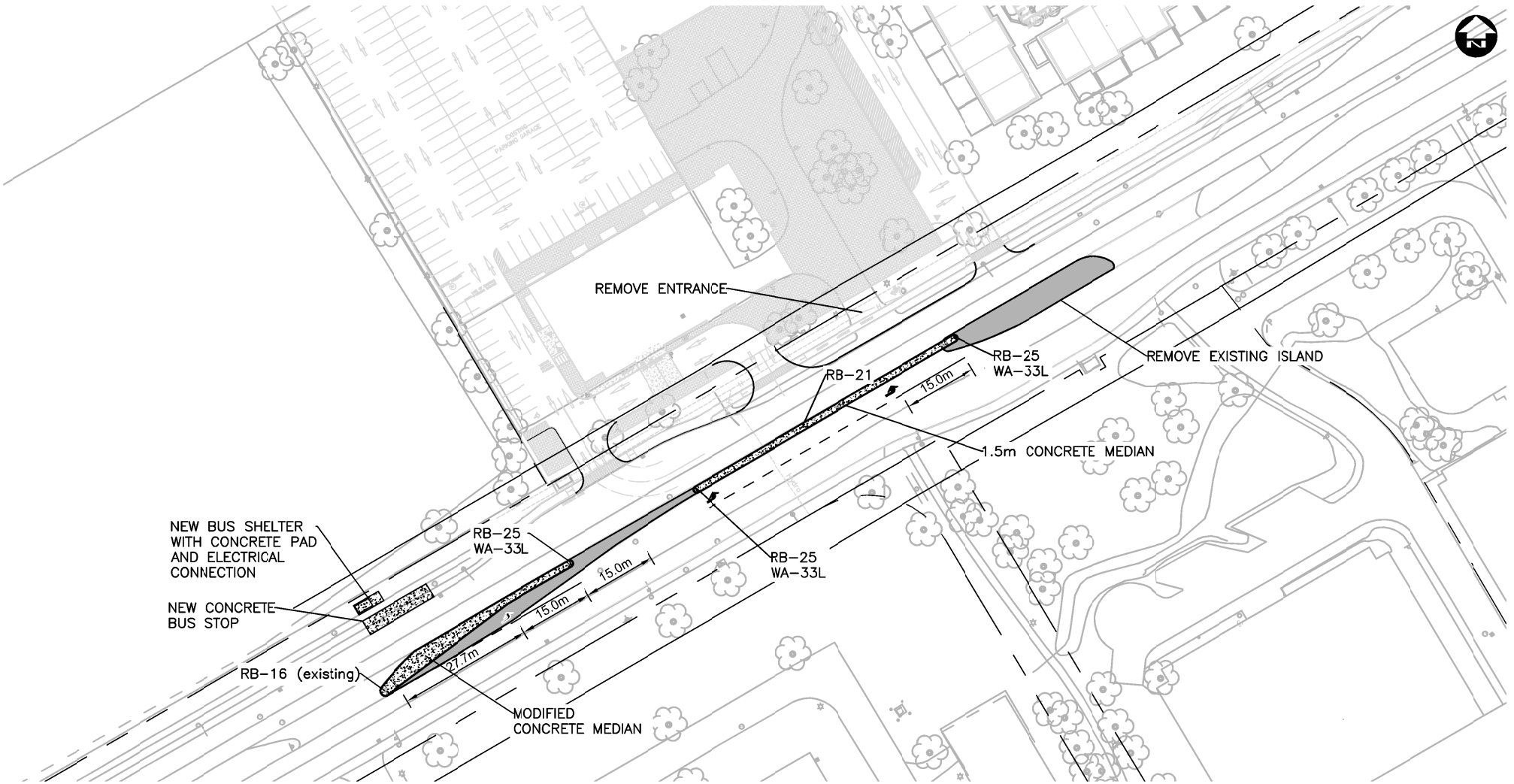
TRANSPORTATION ENGINEERING SERVICES

Approved By: X. XXX		Drawing No.: RMA-201x-XXX-XXXX
Completed By: DILLON CONSULTING LTD		
Scale: 1:1000	Date: MAR 2019	

Walkkley Road Apartments CLASS D - CONSTRUCTION COST ESTIMATE						
No.	**Description**	**Spec**	**Unit**	**Quantity**	**Unit Price**	**Estimated Cost**
ROADWAY						
1	Traffic and Pedestrian Control		LS	1	$10,000	$10,000.00
2	Erosion and Sediment Control	805, F-1005	LS	1	$1,800	$1,800.00
3	Contract Initiation	F-1006	LS	1	$3,000	$3,000.00
4	Earth Excavation - Including Removals	L120.02, 2206, 510, F-2060, F-4104	m3	312	$40	$12,480.00
5	Earth Fill - Borrow	212	m3		$38	$0.00
6	Granular A	N280.01, 314, F-	t	334	$30	$10,032.12
7	Granular B	N280.03, 314, F-	t	272	$41	$11,161.51
8	Top Lift Asphalt	F-3101, F-3106, F-3130	t	55	$285	$15,545.84
9	Bottom Lift Asphalt	F-3101, F-3106, F-3130	t	93	$230	$21,392.90
10	Saw Cutting	510	m	353	$7	$2,471.00
11	Monolithic Concrete Median	351, 904, F-3510, F-9040, F-9045	m^2	266	$115	$30,590.00
12	Asphalt removal - Partial Depth	510	m^2	53	$25	$1,327.50
13	Pavement marking and signage		LS	1	$4,000	$4,000.00
					ROAD SUB-TOTAL	**$123,800.87**
BUS STOP RELOCATION						
1	Shelter Relocation		LS	1		$0.00
2	Conduit w/ Trenching	106, 603	m	50	$25	$1,250.00
3	Electrical Wiring					
4	Concrete Pad	351, F-3150	LS	1	$2,120	$2,120.00
5	Sidewalk	351, F3510, F-9040, F-9045	m^2	47	$170	$7,990.00
					BUS STOP RELOCATION SUB-TOTAL	**$11,360.00**
					CONSTRUCTION TOTAL	**$135,160.87**
					Engineering and Architectural Services 20.0%	$27,032.17
					Utilities 10.0%	$13,516.09
					Miscellaneous 5.0%	$6,758.04
					SUB-TOTAL	**$182,467.17**
					Contingency 40.0%	$72,986.87
					TOTAL PRELIMINARY COST ESTIMATE (PLUS HST)	**$255,454**

Appendix E

Functional Design Drawing



LEGEND

PROPERTY LINE

CONCRETE

NEW PAVEMENT

SCALE 1:750

0m 10m 20m

DILLON CONSULTING

LS GP INC

2190 HALIFAX ROAD APARTMENTS

FUNCTIONAL DESIGN

MEDIAN MODIFICATION

DATE: MARCH 2019

PROJECT: 19-9285

STATUS: DRAFT

CREATED BY: ETG

CHECKED BY: LDG

SHEET: 1

Ottawa

Appendix F

Site Driveway Intersections - Synchro Performance Worksheets

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1265	1260	0	5	10
Future Vol, veh/h	5	1265	1260	0	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	4	7	0	0	0
Mvmt Flow	5	1265	1260	0	5	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1260	0	-	0	1903	630
Stage 1	-	-	-	-	1260	-
Stage 2	-	-	-	-	643	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	559	-	-	-	62	429
Stage 1	-	-	-	-	234	-
Stage 2	-	-	-	-	491	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	559	-	-	-	61	429
Mov Cap-2 Maneuver	-	-	-	-	61	-
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	491	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	33.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	559	-	-	-	142
HCM Lane V/C Ratio	0.009	-	-	-	0.106
HCM Control Delay (s)	11.5	-	-	-	33.3
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1265	1260	0	0	0
Future Vol, veh/h	0	1265	1260	0	0	0
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, %	0	4	7	0	0	0
Mvmt Flow	0	1265	1260	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	630
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	429
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	429
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	-	0
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1265	1245	5	5	10
Future Vol, veh/h	5	1265	1245	5	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	4	7	0	0	0
Mvmt Flow	5	1265	1245	5	5	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1250	0	-	0	1891	625
Stage 1	-	-	-	-	1248	-
Stage 2	-	-	-	-	643	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	564	-	-	-	63	433
Stage 1	-	-	-	-	238	-
Stage 2	-	-	-	-	491	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	564	-	-	-	62	433
Mov Cap-2 Maneuver	-	-	-	-	62	-
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	491	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	32.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	564	-	-	-	145
HCM Lane V/C Ratio	0.009	-	-	-	0.103
HCM Control Delay (s)	11.4	-	-	-	32.7
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	15	5	380	195	5
Future Vol, veh/h	20	15	5	380	195	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	6	8	0
Mvmt Flow	20	15	5	380	195	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	588	198	200	0	-	0
Stage 1	198	-	-	-	-	-
Stage 2	390	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	475	848	1384	-	-	-
Stage 1	840	-	-	-	-	-
Stage 2	689	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	473	848	1384	-	-	-
Mov Cap-2 Maneuver	473	-	-	-	-	-
Stage 1	836	-	-	-	-	-
Stage 2	689	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1384	-	584	-	-
HCM Lane V/C Ratio	0.004	-	0.06	-	-
HCM Control Delay (s)	7.6	0	11.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1525	1390	5	0	5
Future Vol, veh/h	5	1525	1390	5	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	2	0	0	0
Mvmt Flow	5	1525	1390	5	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1395	0	-	0	2166	698
Stage 1	-	-	-	-	1393	-
Stage 2	-	-	-	-	773	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	497	-	-	-	41	388
Stage 1	-	-	-	-	199	-
Stage 2	-	-	-	-	421	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	497	-	-	-	41	388
Mov Cap-2 Maneuver	-	-	-	-	41	-
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	421	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	497	-	-	-	388
HCM Lane V/C Ratio	0.01	-	-	-	0.013
HCM Control Delay (s)	12.3	-	-	-	14.4
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1525	1390	0	0	0
Future Vol, veh/h	0	1525	1390	0	0	0
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, %	0	5	2	0	0	0
Mvmt Flow	0	1525	1390	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	695
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	389
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	389
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	-	0
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1520	1390	10	5	5
Future Vol, veh/h	5	1520	1390	10	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	2	22	0	0
Mvmt Flow	5	1520	1390	10	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1400	0	-	0	2165	700
Stage 1	-	-	-	-	1395	-
Stage 2	-	-	-	-	770	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	494	-	-	-	41	386
Stage 1	-	-	-	-	199	-
Stage 2	-	-	-	-	423	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	494	-	-	-	41	386
Mov Cap-2 Maneuver	-	-	-	-	41	-
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	423	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	61.1
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	494	-	-	-	74
HCM Lane V/C Ratio	0.01	-	-	-	0.135
HCM Control Delay (s)	12.4	-	-	-	61.1
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	10	15	185	260	20
Future Vol, veh/h	10	10	15	185	260	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	4	9	0
Mvmt Flow	10	10	15	185	260	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	485	270	280	0	-	0
Stage 1	270	-	-	-	-	-
Stage 2	215	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	545	774	1294	-	-	-
Stage 1	780	-	-	-	-	-
Stage 2	826	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	538	774	1294	-	-	-
Mov Cap-2 Maneuver	538	-	-	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	826	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.9	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1294	-	635	-	-
HCM Lane V/C Ratio	0.012	-	0.031	-	-
HCM Control Delay (s)	7.8	0	10.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1330	1325	0	5	10
Future Vol, veh/h	5	1330	1325	0	5	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	4	7	0	0	0
Mvmt Flow	5	1330	1325	0	5	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1325	0	-	0	2000	663
Stage 1	-	-	-	-	1325	-
Stage 2	-	-	-	-	675	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	528	-	-	-	53	409
Stage 1	-	-	-	-	216	-
Stage 2	-	-	-	-	473	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	528	-	-	-	53	409
Mov Cap-2 Maneuver	-	-	-	-	53	-
Stage 1	-	-	-	-	214	-
Stage 2	-	-	-	-	473	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	37.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	528	-	-	-	126
HCM Lane V/C Ratio	0.009	-	-	-	0.119
HCM Control Delay (s)	11.9	-	-	-	37.4
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1330	1325	0	0	0
Future Vol, veh/h	0	1330	1325	0	0	0
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, %	0	4	7	0	0	0
Mvmt Flow	0	1330	1325	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	663
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	409
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	409
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	-	0
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1325	1310	5	5	15
Future Vol, veh/h	5	1325	1310	5	5	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	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	4	7	0	0	0
Mvmt Flow	5	1325	1310	5	5	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1315	0	-	0	1986	658
Stage 1	-	-	-	-	1313	-
Stage 2	-	-	-	-	673	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	533	-	-	-	55	412
Stage 1	-	-	-	-	220	-
Stage 2	-	-	-	-	474	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	533	-	-	-	55	412
Mov Cap-2 Maneuver	-	-	-	-	55	-
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	474	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	31.2
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	533	-	-	-	157
HCM Lane V/C Ratio	0.009	-	-	-	0.127
HCM Control Delay (s)	11.8	-	-	-	31.2
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	20	15	5	400	205	5
Future Vol, veh/h	20	15	5	400	205	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	6	8	0
Mvmt Flow	20	15	5	400	205	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	618	208	210	0	-	0
Stage 1	208	-	-	-	-	-
Stage 2	410	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	456	837	1373	-	-	-
Stage 1	832	-	-	-	-	-
Stage 2	674	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	454	837	1373	-	-	-
Mov Cap-2 Maneuver	454	-	-	-	-	-
Stage 1	828	-	-	-	-	-
Stage 2	674	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.8	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1373	-	565	-	-
HCM Lane V/C Ratio	0.004	-	0.062	-	-
HCM Control Delay (s)	7.6	0	11.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1600	1460	5	0	5
Future Vol, veh/h	5	1600	1460	5	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	2	0	0	0
Mvmt Flow	5	1600	1460	5	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1465	0	-	0	2273	733
Stage 1	-	-	-	-	1463	-
Stage 2	-	-	-	-	810	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	467	-	-	-	35	368
Stage 1	-	-	-	-	183	-
Stage 2	-	-	-	-	403	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	467	-	-	-	35	368
Mov Cap-2 Maneuver	-	-	-	-	35	-
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	403	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	467	-	-	-	368
HCM Lane V/C Ratio	0.011	-	-	-	0.014
HCM Control Delay (s)	12.8	-	-	-	14.9
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1600	1460	0	0	0
Future Vol, veh/h	0	1600	1460	0	0	0
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, %	0	5	2	0	0	0
Mvmt Flow	0	1600	1460	0	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	730
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	369
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	369
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	-	-	0
HCM Lane LOS	-	-	-	A
HCM 95th %tile Q(veh)	-	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1595	1460	10	5	5
Future Vol, veh/h	5	1595	1460	10	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	2	20	0	0
Mvmt Flow	5	1595	1460	10	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1470	0	-	0	2273	735
Stage 1	-	-	-	-	1465	-
Stage 2	-	-	-	-	808	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	465	-	-	-	35	367
Stage 1	-	-	-	-	182	-
Stage 2	-	-	-	-	404	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	465	-	-	-	35	367
Mov Cap-2 Maneuver	-	-	-	-	35	-
Stage 1	-	-	-	-	180	-
Stage 2	-	-	-	-	404	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	71.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	465	-	-	-	64
HCM Lane V/C Ratio	0.011	-	-	-	0.156
HCM Control Delay (s)	12.8	-	-	-	71.4
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	10	15	195	270	25
Future Vol, veh/h	10	10	15	195	270	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	5	9	0
Mvmt Flow	10	10	15	195	270	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	508	283	295	0	-	0
Stage 1	283	-	-	-	-	-
Stage 2	225	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	528	761	1278	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	817	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	521	761	1278	-	-	-
Mov Cap-2 Maneuver	521	-	-	-	-	-
Stage 1	760	-	-	-	-	-
Stage 2	817	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0.6	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1278	-	619	-	-
HCM Lane V/C Ratio	0.012	-	0.032	-	-
HCM Control Delay (s)	7.8	0	11	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1270	1265	0	5	15
Future Vol, veh/h	5	1270	1265	0	5	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	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	4	7	0	0	0
Mvmt Flow	5	1270	1265	0	5	15

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1265	0	-	0	1910	633
Stage 1	-	-	-	-	1265	-
Stage 2	-	-	-	-	645	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	556	-	-	-	61	427
Stage 1	-	-	-	-	233	-
Stage 2	-	-	-	-	490	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	556	-	-	-	60	427
Mov Cap-2 Maneuver	-	-	-	-	60	-
Stage 1	-	-	-	-	231	-
Stage 2	-	-	-	-	490	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	29.1
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	556	-	-	-	169
HCM Lane V/C Ratio	0.009	-	-	-	0.118
HCM Control Delay (s)	11.5	-	-	-	29.1
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1270	1265	5	0	5
Future Vol, veh/h	0	1270	1265	5	0	5
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, %	0	4	7	0	0	0
Mvmt Flow	0	1270	1265	5	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	635
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	426
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	426
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	426
HCM Lane V/C Ratio	-	-	-	0.012
HCM Control Delay (s)	-	-	-	13.6
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1265	1250	5	5	20
Future Vol, veh/h	5	1265	1250	5	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	4	7	0	0	0
Mvmt Flow	5	1265	1250	5	5	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1255	0	-	0	1896	628
Stage 1	-	-	-	-	1253	-
Stage 2	-	-	-	-	643	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	561	-	-	-	63	431
Stage 1	-	-	-	-	236	-
Stage 2	-	-	-	-	491	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	561	-	-	-	62	431
Mov Cap-2 Maneuver	-	-	-	-	62	-
Stage 1	-	-	-	-	234	-
Stage 2	-	-	-	-	491	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	25.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	561	-	-	-	197
HCM Lane V/C Ratio	0.009	-	-	-	0.127
HCM Control Delay (s)	11.5	-	-	-	25.9
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	20	10	380	195	10
Future Vol, veh/h	30	20	10	380	195	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	6	8	0
Mvmt Flow	30	20	10	380	195	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	600	200	205	0	-	0
Stage 1	200	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	467	846	1378	-	-	-
Stage 1	838	-	-	-	-	-
Stage 2	681	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	463	846	1378	-	-	-
Mov Cap-2 Maneuver	463	-	-	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	681	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1378	-	565	-	-
HCM Lane V/C Ratio	0.007	-	0.088	-	-
HCM Control Delay (s)	7.6	0	12	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	1525	1395	10	0	5
Future Vol, veh/h	10	1525	1395	10	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	2	0	0	0
Mvmt Flow	10	1525	1395	10	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1405	0	-	0	2183	703
Stage 1	-	-	-	-	1400	-
Stage 2	-	-	-	-	783	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	492	-	-	-	40	385
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	416	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	492	-	-	-	39	385
Mov Cap-2 Maneuver	-	-	-	-	39	-
Stage 1	-	-	-	-	193	-
Stage 2	-	-	-	-	416	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	492	-	-	-	385
HCM Lane V/C Ratio	0.02	-	-	-	0.013
HCM Control Delay (s)	12.5	-	-	-	14.5
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1525	1395	5	0	5
Future Vol, veh/h	0	1525	1395	5	0	5
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, %	0	5	2	0	0	0
Mvmt Flow	0	1525	1395	5	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	700
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	386
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	386
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	14.4
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	386
HCM Lane V/C Ratio	-	-	-	0.013
HCM Control Delay (s)	-	-	-	14.4
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	1520	1395	15	5	5
Future Vol, veh/h	10	1520	1395	15	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	2	15	0	0
Mvmt Flow	10	1520	1395	15	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1410	0	-	0	2183	705
Stage 1	-	-	-	-	1403	-
Stage 2	-	-	-	-	780	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	490	-	-	-	40	383
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	418	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	490	-	-	-	39	383
Mov Cap-2 Maneuver	-	-	-	-	39	-
Stage 1	-	-	-	-	193	-
Stage 2	-	-	-	-	418	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	63.8
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	490	-	-	-	71
HCM Lane V/C Ratio	0.02	-	-	-	0.141
HCM Control Delay (s)	12.5	-	-	-	63.8
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	20	25	185	260	35
Future Vol, veh/h	15	20	25	185	260	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	4	9	0
Mvmt Flow	15	20	25	185	260	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	513	278	295	0	-	0
Stage 1	278	-	-	-	-	-
Stage 2	235	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	525	766	1278	-	-	-
Stage 1	774	-	-	-	-	-
Stage 2	809	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	513	766	1278	-	-	-
Mov Cap-2 Maneuver	513	-	-	-	-	-
Stage 1	757	-	-	-	-	-
Stage 2	809	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1278	-	632	-	-
HCM Lane V/C Ratio	0.02	-	0.055	-	-
HCM Control Delay (s)	7.9	0	11	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1330	1330	0	5	20
Future Vol, veh/h	5	1330	1330	0	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	4	7	0	0	0
Mvmt Flow	5	1330	1330	0	5	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1330	0	-	0	2005	665
Stage 1	-	-	-	-	1330	-
Stage 2	-	-	-	-	675	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	526	-	-	-	53	407
Stage 1	-	-	-	-	215	-
Stage 2	-	-	-	-	473	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	526	-	-	-	52	407
Mov Cap-2 Maneuver	-	-	-	-	52	-
Stage 1	-	-	-	-	213	-
Stage 2	-	-	-	-	473	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	29.5
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	526	-	-	-	172
HCM Lane V/C Ratio	0.01	-	-	-	0.145
HCM Control Delay (s)	11.9	-	-	-	29.5
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1335	1330	5	0	5
Future Vol, veh/h	0	1335	1330	5	0	5
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, %	0	4	7	0	0	0
Mvmt Flow	0	1335	1330	5	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	668
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	405
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	405
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	14
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	405
HCM Lane V/C Ratio	-	-	-	0.012
HCM Control Delay (s)	-	-	-	14
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	1330	1310	5	5	20
Future Vol, veh/h	5	1330	1310	5	5	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	4	7	0	0	0
Mvmt Flow	5	1330	1310	5	5	20

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1315	0	-	0	1988	658
Stage 1	-	-	-	-	1313	-
Stage 2	-	-	-	-	675	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	533	-	-	-	54	412
Stage 1	-	-	-	-	220	-
Stage 2	-	-	-	-	473	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	533	-	-	-	54	412
Mov Cap-2 Maneuver	-	-	-	-	54	-
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	473	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	28.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	533	-	-	-	177
HCM Lane V/C Ratio	0.009	-	-	-	0.141
HCM Control Delay (s)	11.8	-	-	-	28.7
HCM Lane LOS	B	-	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	20	10	400	205	10
Future Vol, veh/h	30	20	10	400	205	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	6	8	0
Mvmt Flow	30	20	10	400	205	10

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	630	210	215	0	-	0
Stage 1	210	-	-	-	-	-
Stage 2	420	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	449	835	1367	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	667	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	445	835	1367	-	-	-
Mov Cap-2 Maneuver	445	-	-	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	667	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.2	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1367	-	547	-	-
HCM Lane V/C Ratio	0.007	-	0.091	-	-
HCM Control Delay (s)	7.7	0	12.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	1605	1460	10	0	5
Future Vol, veh/h	10	1605	1460	10	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	2	0	0	0
Mvmt Flow	10	1605	1460	10	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1470	0	-	0	2288	735
Stage 1	-	-	-	-	1465	-
Stage 2	-	-	-	-	823	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	465	-	-	-	34	367
Stage 1	-	-	-	-	182	-
Stage 2	-	-	-	-	397	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	465	-	-	-	33	367
Mov Cap-2 Maneuver	-	-	-	-	33	-
Stage 1	-	-	-	-	178	-
Stage 2	-	-	-	-	397	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	465	-	-	-	367
HCM Lane V/C Ratio	0.022	-	-	-	0.014
HCM Control Delay (s)	12.9	-	-	-	14.9
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1605	1465	5	0	5
Future Vol, veh/h	0	1605	1465	5	0	5
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, %	0	5	2	0	0	0
Mvmt Flow	0	1605	1465	5	0	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	735
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	-	0	367
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	367
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	367
HCM Lane V/C Ratio	-	-	-	0.014
HCM Control Delay (s)	-	-	-	14.9
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	10	1595	1460	15	5	5
Future Vol, veh/h	10	1595	1460	15	5	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	300	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	5	2	14	0	0
Mvmt Flow	10	1595	1460	15	5	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1475	0	-	0	2286	738
Stage 1	-	-	-	-	1468	-
Stage 2	-	-	-	-	818	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	463	-	-	-	34	365
Stage 1	-	-	-	-	181	-
Stage 2	-	-	-	-	399	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	463	-	-	-	33	365
Mov Cap-2 Maneuver	-	-	-	-	33	-
Stage 1	-	-	-	-	177	-
Stage 2	-	-	-	-	399	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	75.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	463	-	-	-	61
HCM Lane V/C Ratio	0.022	-	-	-	0.164
HCM Control Delay (s)	12.9	-	-	-	75.3
HCM Lane LOS	B	-	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	15	20	25	195	270	35
Future Vol, veh/h	15	20	25	195	270	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	5	9	0
Mvmt Flow	15	20	25	195	270	35

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	533	288	305	0	-	0
Stage 1	288	-	-	-	-	-
Stage 2	245	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	511	756	1267	-	-	-
Stage 1	766	-	-	-	-	-
Stage 2	800	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	500	756	1267	-	-	-
Mov Cap-2 Maneuver	500	-	-	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	800	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.2	0.9	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1267	-	620	-	-
HCM Lane V/C Ratio	0.02	-	0.056	-	-
HCM Control Delay (s)	7.9	0	11.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-

Appendix G

Network Intersections - Synchro Performance Worksheets and MMLOS Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	945	45	40	1105	100	5	5	10	50	5	110
Future Volume (vph)	280	945	45	40	1105	100	5	5	10	50	5	110
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1695	3191		1729	3162		1729	1638		1601	1515	
Flt Permitted	0.10	1.00		0.29	1.00		0.68	1.00		0.75	1.00	
Satd. Flow (perm)	174	3191		527	3162		1243	1638		1260	1515	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	945	45	40	1105	100	5	5	10	50	5	110
RTOR Reduction (vph)	0	2	0	0	5	0	0	9	0	0	95	0
Lane Group Flow (vph)	280	988	0	40	1200	0	5	6	0	50	20	0
Heavy Vehicles (%)	2%	8%	0%	0%	8%	8%	0%	0%	0%	8%	0%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	61.5	61.5		37.2	37.2		11.2	11.2		11.2	11.2	
Effective Green, g (s)	61.5	61.5		37.2	37.2		11.2	11.2		11.2	11.2	
Actuated g/C Ratio	0.73	0.73		0.44	0.44		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	486	2339		233	1401		165	218		168	202	
v/s Ratio Prot	c0.14	0.31			c0.38			0.00			0.01	
v/s Ratio Perm	0.29			0.08			0.00			c0.04		
v/c Ratio	0.58	0.42		0.17	0.86		0.03	0.03		0.30	0.10	
Uniform Delay, d1	16.6	4.3		14.1	21.0		31.6	31.6		32.8	31.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.1		0.4	5.4		0.1	0.1		1.0	0.2	
Delay (s)	18.3	4.5		14.4	26.3		31.7	31.7		33.8	32.1	
Level of Service	B	A		B	C		C	C		C	C	
Approach Delay (s)		7.5			26.0			31.7			32.6	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	83.9	Sum of lost time (s)	15.7
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	1355	15	10	1270	105	55	5	65	120	5	155
Future Volume (vph)	120	1355	15	10	1270	105	55	5	65	120	5	155
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1631	3290		1729	3311		1729	1566		1601	1484	
Flt Permitted	0.09	1.00		0.20	1.00		0.62	1.00		0.71	1.00	
Satd. Flow (perm)	155	3290		360	3311		1127	1566		1199	1484	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	1355	15	10	1270	105	55	5	65	120	5	155
RTOR Reduction (vph)	0	1	0	0	5	0	0	53	0	0	126	0
Lane Group Flow (vph)	120	1369	0	10	1370	0	55	17	0	120	34	0
Heavy Vehicles (%)	6%	5%	0%	0%	3%	6%	0%	0%	0%	8%	0%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.9	54.9		39.7	39.7		15.3	15.3		15.3	15.3	
Effective Green, g (s)	54.9	54.9		39.7	39.7		15.3	15.3		15.3	15.3	
Actuated g/C Ratio	0.67	0.67		0.49	0.49		0.19	0.19		0.19	0.19	
Clearance Time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	298	2218		175	1614		211	294		225	278	
v/s Ratio Prot	0.05	c0.42			c0.41			0.01			0.02	
v/s Ratio Perm	0.22			0.03			0.05			c0.10		
v/c Ratio	0.40	0.62		0.06	0.85		0.26	0.06		0.53	0.12	
Uniform Delay, d1	11.0	7.4		11.0	18.2		28.2	27.1		29.8	27.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.5		0.1	4.4		0.7	0.1		2.4	0.2	
Delay (s)	11.9	7.9		11.1	22.6		28.9	27.2		32.3	27.7	
Level of Service	B	A		B	C		C	C		C	C	
Approach Delay (s)		8.2			22.5			28.0			29.6	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	81.4	Sum of lost time (s)	15.7
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	990	50	40	1160	105	5	5	15	55	5	115
Future Volume (vph)	295	990	50	40	1160	105	5	5	15	55	5	115
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1679	3190		1729	3160		1729	1615		1616	1515	
Flt Permitted	0.09	1.00		0.28	1.00		0.67	1.00		0.74	1.00	
Satd. Flow (perm)	165	3190		501	3160		1222	1615		1266	1515	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	295	990	50	40	1160	105	5	5	15	55	5	115
RTOR Reduction (vph)	0	2	0	0	5	0	0	13	0	0	101	0
Lane Group Flow (vph)	295	1038	0	40	1260	0	5	7	0	55	19	0
Heavy Vehicles (%)	3%	8%	0%	0%	8%	9%	0%	0%	0%	7%	0%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	69.2	69.2		43.1	43.1		11.3	11.3		11.3	11.3	
Effective Green, g (s)	69.2	69.2		43.1	43.1		11.3	11.3		11.3	11.3	
Actuated g/C Ratio	0.75	0.75		0.47	0.47		0.12	0.12		0.12	0.12	
Clearance Time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	481	2407		235	1485		150	199		156	186	
v/s Ratio Prot	c0.14	0.33			c0.40			0.00			0.01	
v/s Ratio Perm	0.32			0.08			0.00			c0.04		
v/c Ratio	0.61	0.43		0.17	0.85		0.03	0.03		0.35	0.10	
Uniform Delay, d1	19.6	4.1		14.0	21.4		35.4	35.4		36.8	35.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	0.1		0.3	4.7		0.1	0.1		1.4	0.2	
Delay (s)	21.9	4.2		14.3	26.2		35.5	35.5		38.2	35.9	
Level of Service	C	A		B	C		D	D		D	D	
Approach Delay (s)		8.1			25.8			35.5			36.7	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	91.7	Sum of lost time (s)	15.7
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	1425	15	10	1335	110	55	5	70	125	5	160
Future Volume (vph)	130	1425	15	10	1335	110	55	5	70	125	5	160
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1631	3290		1729	3312		1729	1565		1586	1470	
Flt Permitted	0.08	1.00		0.18	1.00		0.59	1.00		0.71	1.00	
Satd. Flow (perm)	142	3290		335	3312		1073	1565		1182	1470	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	130	1425	15	10	1335	110	55	5	70	125	5	160
RTOR Reduction (vph)	0	1	0	0	5	0	0	50	0	0	130	0
Lane Group Flow (vph)	130	1439	0	10	1440	0	55	25	0	125	35	0
Heavy Vehicles (%)	6%	5%	0%	0%	3%	6%	0%	0%	0%	9%	0%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	59.9	59.9		43.9	43.9		16.3	16.3		16.3	16.3	
Effective Green, g (s)	59.9	59.9		43.9	43.9		16.3	16.3		16.3	16.3	
Actuated g/C Ratio	0.69	0.69		0.50	0.50		0.19	0.19		0.19	0.19	
Clearance Time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	293	2254		168	1663		200	291		220	274	
v/s Ratio Prot	0.06	c0.44			c0.43			0.02			0.02	
v/s Ratio Perm	0.25			0.03			0.05			c0.11		
v/c Ratio	0.44	0.64		0.06	0.87		0.28	0.09		0.57	0.13	
Uniform Delay, d1	12.8	7.7		11.2	19.2		30.5	29.4		32.3	29.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.6		0.1	5.0		0.7	0.1		3.3	0.2	
Delay (s)	13.9	8.3		11.3	24.2		31.2	29.5		35.7	29.8	
Level of Service	B	A		B	C		C	C		D	C	
Approach Delay (s)		8.8			24.1			30.2			32.4	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	87.4	Sum of lost time (s)	15.7
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	280	950	45	40	1105	105	5	5	10	60	5	110
Future Volume (vph)	280	950	45	40	1105	105	5	5	10	60	5	110
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1695	3191		1729	3160		1729	1638		1616	1515	
Flt Permitted	0.10	1.00		0.29	1.00		0.68	1.00		0.75	1.00	
Satd. Flow (perm)	173	3191		524	3160		1243	1638		1272	1515	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	950	45	40	1105	105	5	5	10	60	5	110
RTOR Reduction (vph)	0	2	0	0	6	0	0	9	0	0	95	0
Lane Group Flow (vph)	280	993	0	40	1204	0	5	6	0	60	20	0
Heavy Vehicles (%)	2%	8%	0%	0%	8%	8%	0%	0%	0%	7%	0%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	63.1	63.1		38.3	38.3		11.6	11.6		11.6	11.6	
Effective Green, g (s)	63.1	63.1		38.3	38.3		11.6	11.6		11.6	11.6	
Actuated g/C Ratio	0.73	0.73		0.45	0.45		0.14	0.14		0.14	0.14	
Clearance Time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	486	2344		233	1408		167	221		171	204	
v/s Ratio Prot	c0.14	0.31			c0.38			0.00			0.01	
v/s Ratio Perm	0.29			0.08			0.00			c0.05		
v/c Ratio	0.58	0.42		0.17	0.86		0.03	0.03		0.35	0.10	
Uniform Delay, d1	17.1	4.4		14.3	21.3		32.3	32.3		33.7	32.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.1		0.4	5.3		0.1	0.1		1.2	0.2	
Delay (s)	18.7	4.5		14.6	26.6		32.3	32.3		35.0	32.8	
Level of Service	B	A		B	C		C	C		C	C	
Approach Delay (s)		7.6			26.3			32.3			33.5	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	85.9	Sum of lost time (s)	15.7
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	120	1355	15	10	1275	110	55	5	65	130	5	155
Future Volume (vph)	120	1355	15	10	1275	110	55	5	65	130	5	155
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1631	3290		1729	3312		1729	1566		1601	1484	
Flt Permitted	0.09	1.00		0.20	1.00		0.62	1.00		0.71	1.00	
Satd. Flow (perm)	151	3290		360	3312		1121	1566		1199	1484	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	1355	15	10	1275	110	55	5	65	130	5	155
RTOR Reduction (vph)	0	1	0	0	5	0	0	52	0	0	125	0
Lane Group Flow (vph)	120	1369	0	10	1380	0	55	18	0	130	35	0
Heavy Vehicles (%)	6%	5%	0%	0%	3%	5%	0%	0%	0%	8%	0%	5%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	56.2	56.2		40.9	40.9		16.2	16.2		16.2	16.2	
Effective Green, g (s)	56.2	56.2		40.9	40.9		16.2	16.2		16.2	16.2	
Actuated g/C Ratio	0.67	0.67		0.49	0.49		0.19	0.19		0.19	0.19	
Clearance Time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	292	2211		176	1620		217	303		232	287	
v/s Ratio Prot	0.05	c0.42			c0.42			0.01			0.02	
v/s Ratio Perm	0.22			0.03			0.05			c0.11		
v/c Ratio	0.41	0.62		0.06	0.85		0.25	0.06		0.56	0.12	
Uniform Delay, d1	11.6	7.7		11.2	18.7		28.6	27.5		30.5	27.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.5		0.1	4.5		0.6	0.1		3.1	0.2	
Delay (s)	12.5	8.2		11.4	23.2		29.2	27.6		33.6	28.0	
Level of Service	B	A		B	C		C	C		C	C	
Approach Delay (s)		8.6			23.2			28.3			30.5	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	15.7
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	995	50	40	1165	110	5	5	15	60	5	115
Future Volume (vph)	295	995	50	40	1165	110	5	5	15	60	5	115
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1679	3190		1729	3160		1729	1615		1631	1515	
Flt Permitted	0.09	1.00		0.27	1.00		0.67	1.00		0.74	1.00	
Satd. Flow (perm)	162	3190		499	3160		1216	1615		1278	1515	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	295	995	50	40	1165	110	5	5	15	60	5	115
RTOR Reduction (vph)	0	2	0	0	5	0	0	13	0	0	101	0
Lane Group Flow (vph)	295	1043	0	40	1270	0	5	7	0	60	19	0
Heavy Vehicles (%)	3%	8%	0%	0%	8%	8%	0%	0%	0%	6%	0%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	70.0	70.0		43.8	43.8		11.5	11.5		11.5	11.5	
Effective Green, g (s)	70.0	70.0		43.8	43.8		11.5	11.5		11.5	11.5	
Actuated g/C Ratio	0.76	0.76		0.47	0.47		0.12	0.12		0.12	0.12	
Clearance Time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	477	2408		235	1493		150	200		158	187	
v/s Ratio Prot	c0.14	0.33			c0.40			0.00			0.01	
v/s Ratio Perm	0.32			0.08			0.00			c0.05		
v/c Ratio	0.62	0.43		0.17	0.85		0.03	0.03		0.38	0.10	
Uniform Delay, d1	20.1	4.1		14.0	21.6		35.7	35.7		37.3	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.1		0.3	4.9		0.1	0.1		1.5	0.2	
Delay (s)	22.5	4.3		14.4	26.4		35.8	35.8		38.8	36.3	
Level of Service	C	A		B	C		D	D		D	D	
Approach Delay (s)		8.3			26.1			35.8			37.1	
Approach LOS		A			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	92.7	Sum of lost time (s)	15.7
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	1425	15	10	1340	115	55	5	70	135	5	160
Future Volume (vph)	130	1425	15	10	1340	115	55	5	70	135	5	160
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.86		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1631	3290		1729	3312		1729	1565		1601	1470	
Flt Permitted	0.08	1.00		0.18	1.00		0.59	1.00		0.71	1.00	
Satd. Flow (perm)	139	3290		335	3312		1071	1565		1193	1470	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	130	1425	15	10	1340	115	55	5	70	135	5	160
RTOR Reduction (vph)	0	1	0	0	5	0	0	49	0	0	129	0
Lane Group Flow (vph)	130	1439	0	10	1450	0	55	26	0	135	36	0
Heavy Vehicles (%)	6%	5%	0%	0%	3%	5%	0%	0%	0%	8%	0%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	61.0	61.0		45.0	45.0		17.1	17.1		17.1	17.1	
Effective Green, g (s)	61.0	61.0		45.0	45.0		17.1	17.1		17.1	17.1	
Actuated g/C Ratio	0.68	0.68		0.50	0.50		0.19	0.19		0.19	0.19	
Clearance Time (s)	4.5	5.6		5.6	5.6		5.6	5.6		5.6	5.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	287	2247		168	1668		205	299		228	281	
v/s Ratio Prot	0.06	c0.44			c0.44			0.02			0.02	
v/s Ratio Perm	0.25			0.03			0.05			c0.11		
v/c Ratio	0.45	0.64		0.06	0.87		0.27	0.09		0.59	0.13	
Uniform Delay, d1	13.4	8.0		11.3	19.6		30.8	29.7		32.9	29.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.6		0.1	5.1		0.7	0.1		4.1	0.2	
Delay (s)	14.5	8.6		11.5	24.7		31.5	29.8		37.0	30.1	
Level of Service	B	A		B	C		C	C		D	C	
Approach Delay (s)		9.1			24.6			30.5			33.2	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	89.3	Sum of lost time (s)	15.7
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

	Intersection	Walkley Road / Halifax Drive			
	Intersection Leg	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	6	6
	Median	Median 0 - 2.4 m	Median 0 - 2.4 m	Median 0 - 2.4 m	Median 0 - 2.4 m
	Conflicting Left Turns	Protected/ Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	RTOR?	RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval?	No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel	No Channel
	Right Turn Radius (largest)	10-15m	5-10m	10-15m	5-10m
	Crosswalk Type	Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
	PETSI Score	**70**	**71**	**20**	**21**
	Ped. Exposure to Traffic LoS	**C**	**C**	**F**	**F**
	Pedestrian Delay	43	46	37	38
	Avg. Pedestrian Delay LoS	**E**	**E**	**D**	**D**
	Level of Service	**E**	**E**	**F**	**F**
		F			
Bicycle	Bicycle Position on Approach to Intersection	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right-turn Lane Attributes	25 - 50 m	25 - 50 m	25 - 50 m	25 - 50 m
	Right-turn Lane Design Speed	<= 25 km/h	<= 25 km/h	<= 25 km/h	<= 25 km/h
	Cyclist relative to RT motorists	**D**	**D**	**D**	**D**
	Bikeway or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane cross	No lane cross	No lane cross	One lane cross
	Operating Speed	<= 50 km/h	<= 50 km/h	>=60 km/h	>=60 km/h
	Left Turning Cyclist	**B**	**B**	**D**	**F**
	Level of Service	**D**	**D**	**D**	**F**
		F			
Transit	Average Signal Delay	11-20 sec	11-20 sec	11-20 sec	11-20 sec
	Level of Service	**C**	**C**	**C**	**C**
		C			
Truck	Effective Corner Radius	10-15 m	< 10 m	10-15 m	< 10 m
	Number of Receiving Lanes on Departure from Intersection	1	1	2+	2+
	Level of Service	**E**	**F**	**B**	**D**
		F			
Auto	Volume to Capacity Ratio	0.81 - 0.90			
	Level of Service	**D**			