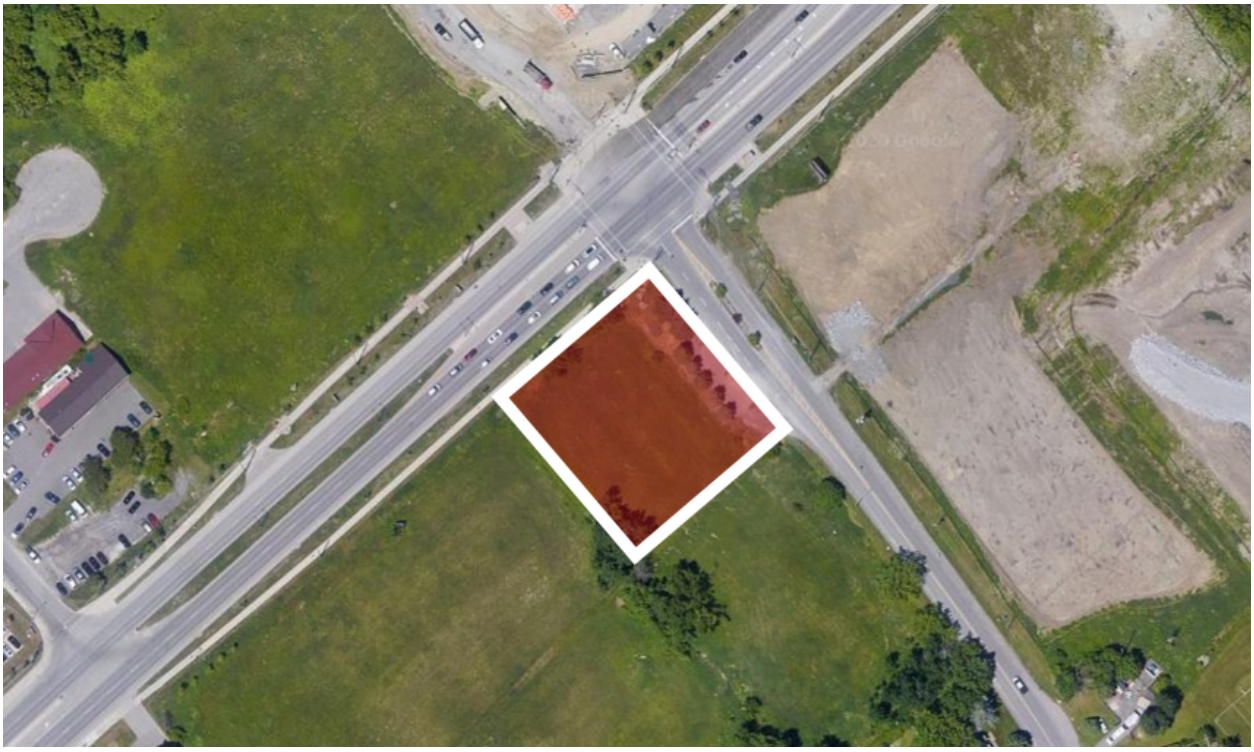
SHELL CANADA

5 ORCHARD DRIVE - SHELL LEASED LAND - TRANSPORTATION IMPACT ASSESSMENT

DRAFT STRATEGY REPORT



5 ORCHARD DRIVE - SHELL LEASED LAND - TRANSPORTATION IMPACT ASSESSMENT

DRAFT STRATEGY REPORT

SHELL CANADA

PROJECT NO.: OUR REF. NO. 19M-00672-00
DATE: APRIL 17, 2020

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1. SCREENING

This Transportation Impact Assessment has been prepared to support the Site Plan Control Application for a proposed gas station, convenience store and car wash situated at 5 Orchard Drive. The Transportation Impact Assessment follows the City of Ottawa's Transportation Impact Assessment Guidelines (2017) which includes five steps:

1. Screening
2. Scoping
3. Forecasting
4. Analysis
5. Transportation Impact Assessment Submission

The Screening Step determines the need to continue with a Transportation Impact Assessment (TIA) study. The development is assessed against three triggers: trip generation, location, and safety to identify the next step of the TIA study. If one of more of the triggers is satisfied, the Scoping Step must be completed. If none of the triggers are satisfied, the TIA is complete. If a trigger is satisfied, there are different components are required in the TIA depending on the combination of triggers (**Table 1-1**).

The proposed development at 5 Orchard Drive **satisfied all three triggers**. As part of the Steps Two through Five of the TIA process, the Design Review and Network Impact components will be addressed. For reference, the completed screening form (Step One) is provided in **Appendix A**.

Table 1-1. Transportation Impact Assessment (TIA) Screening Options

	TIA TRIGGERS		
NEXT STEP OF TIA PROCESS	**TRIP GENERATION**	**LOCATION**	**SAFETY**
Deemed Complete	No	No	No
Step Two: *Design Review Only*	No	Yes (one or both)	
Step Two: *Design Review and Network Impact*	Yes	Yes / No	Yes / No

2. SCOPING

2.1 SCREENING FORM

The completed screening form and draft site plan (dated April 17, 2020) are provided in **Appendix A** and **Appendix B** respectively.

2.2 DESCRIPTION OF PROPOSED DEVELOPMENT

The Site Plan Control Application for 5 Orchard Drive includes a proposed gas station, convenience store and car wash. The proposed development will be leased and operated by Shell Canada on a lease area of 3,065m^2 (33,991 ft^2).

The Site is currently a vacant property in the City of Ottawa, Ontario and is located at the southwest corner of the Fringewood Drive and Hazeldean Road intersection in Stittsville. The proposed development is part of a larger commercial and residential subdivision application (Zoning By-law Amendment application: D02-02-18-0063 and Draft Plan of Subdivision application: D07-16-18-0020).

The Site is designated "Arterial Mainstreet" in the City of Official Plan (May 2003, website consolidation). The Arterial Mainstreet designation permits retail and service commercial uses. New gas bars, service stations, and drive-through facilities are permitted on Arterial Mainstreets and will be evaluated on the basis of the Design Objectives and Principles in Section 2.5.1, any applicable Council-approved design guidelines, and the Compatibility policies set out in Section 4.11.

The proposed development includes a gas station, six pump stations, a convenience store (168 m^2), and a car wash (114 m^2). The car wash includes a 40m long queuing lane that will be adjacent to Fringewood Drive.

The draft site plan (**Appendix B**) includes eleven vehicle parking spaces, including one accessible space and two car care spaces. An additional two bike racks with four bicycle parking spaces have also been provided.

The estimated date of occupancy is December 2021 with construction occurring in a single phase.

Two accesses will be provided as shown in the attached site plan:

- A right-in / right-out access on Hazeldean Road, approximately 50 m west of Fringewood Drive (south side)
- A full movement access on Fringewood Drive, approximately 77 m south of Hazeldean Road (west side)

2.3 EXISTING CONDITIONS

2.3.1 *ROADWAYS AND PEDESTRIAN / CYCLING FACILITIES*

The five existing roads that our Transportation Impact Assessment will consider are Cedarow Court, Fringewood Drive, Hazeldean Road, Huntmar Drive, and Johnwoods Street. These roads are all under the jurisdiction of the City of Ottawa. The road classification for City of Ottawa roadways are defined in the City of Ottawa Official Plan (2003, website consolidation), Volume 1, Section 7, Annex 1 Road Classification and Rights-of-Way. Descriptions for each roadway can be found below:

Cedarow Court is a local road that runs on a north south alignment with no posted speed limit and is assumed to have a speed limit of 40 km/h. It has a single lane of traffic in each direction.

Fringewood Drive is a local road than runs on a north-south alignment with a posted speed limit of 40 km/h. It has a single lane of traffic in each direction.

Hazeldean Road is an urban arterial that runs on an east-west alignment with a posted speed limit of 60 km/h. It has two lanes of traffic in each direction and there is a centre two-way left turn lane for access to residences and businesses between Johnwoods Street/Victor Street and Cedarow Court. The Official Plan reserves a 37.5 metre Right-of-Way in the study area from Main Street North to Fringewood Drive and a 44.5 m Right-of-Way from Fringewood Drive to Terry Fox Drive.

Huntmar Drive / Iber Road is a major collector that runs on a north-south alignment with a posted speed limit of 60 km/h within the study area. South of Hazeldean Road there is a single lane of traffic in each direction; north of Hazeldean Road there are two lanes of traffic in each direction. The Official Plan protects for a 37.5 m Right-of-Way in the study area.

Johnwoods Street / Victor Street is an urban collector that runs on north-south alignment with a posted speed limit of 40 km/h. It has a single lane of traffic in each direction. The Official Plan reserves a 24 m Right-of-Way in the study area.

The existing pedestrian and cycling facilities in this area are shown in **Figure 2-1** and include:

Fringewood Drive:

- Widened gravel shoulder on east side of roadway from Hazeldean Road to approximately 175 m south of the Fringewood Drive/Hazeldean Road intersection

Hazeldean Road:

- Sidewalks on north and south sides of the roadway separated by a grass boulevard from Huntmar/Iber to Cedarow Court
- Sidewalks on north and south sides of the roadway from Cedarow Court to Johnwoods Street
- Shoulder bike lanes on north and south sides of the roadway throughout the study area

Huntmar Drive / Iber Road:

- Sidewalks on east and west sides of the roadway separated by a grass boulevard north of Hazeldean
- Widened Asphalt path on east and west side of road south of Hazeldean Road

Johnwoods Street / Victor Street:

- Sidewalk on west side of the roadway north of Hazeldean Road

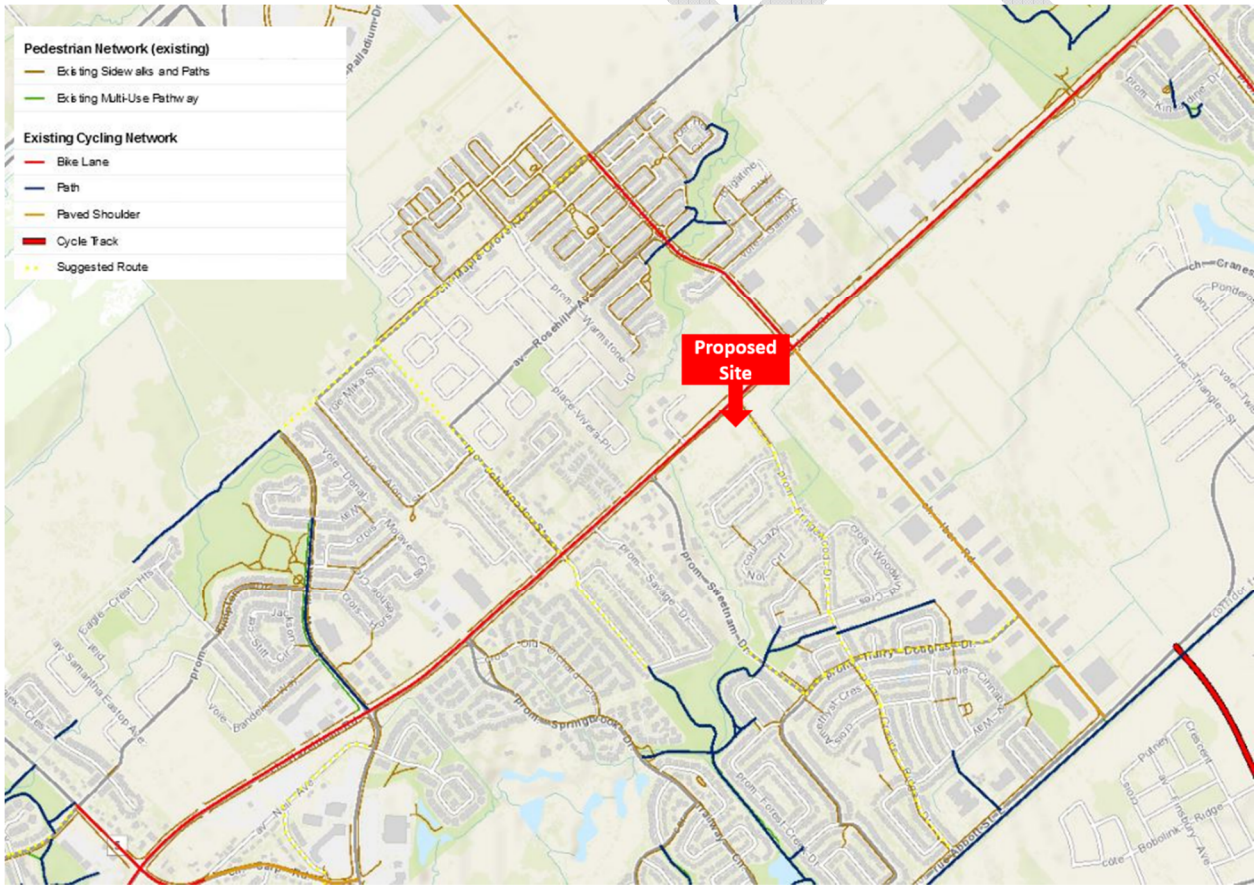


Figure 2-1. Existing Pedestrian and Cycling Facilities

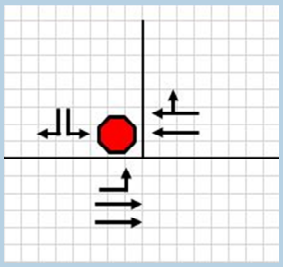
(Source: GeoOttawa)

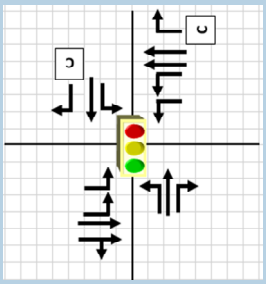
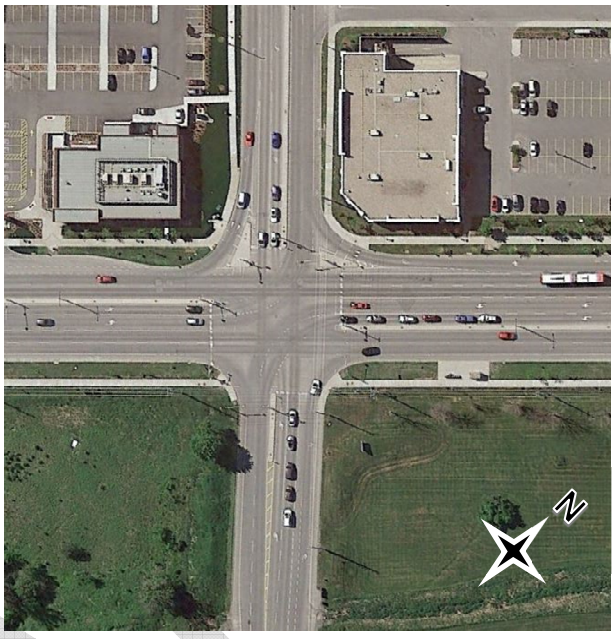
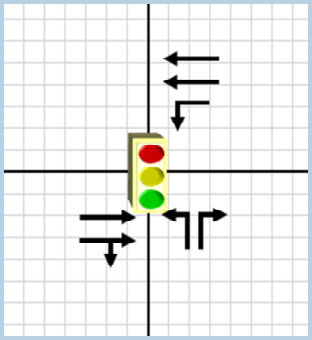
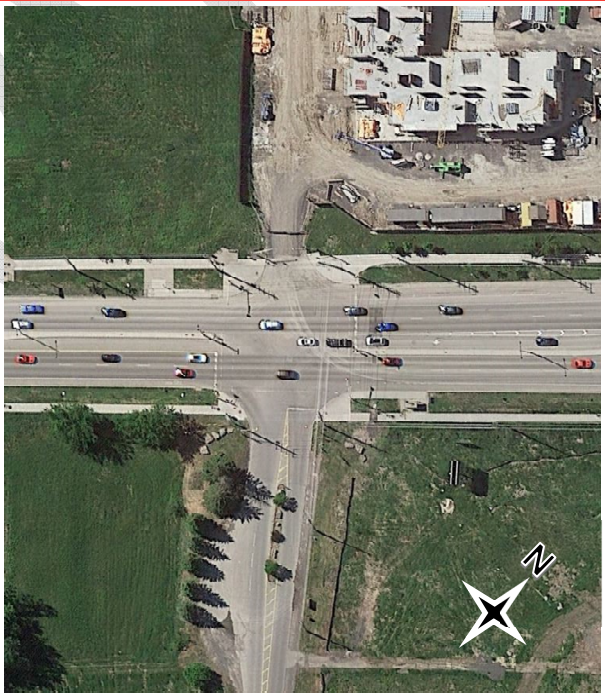
2.3.2 *INTERSECTIONS*

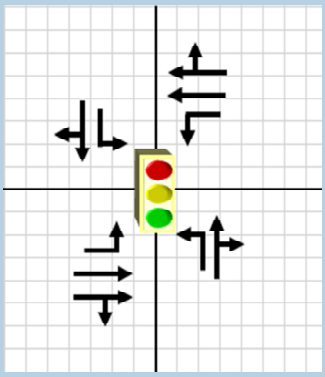
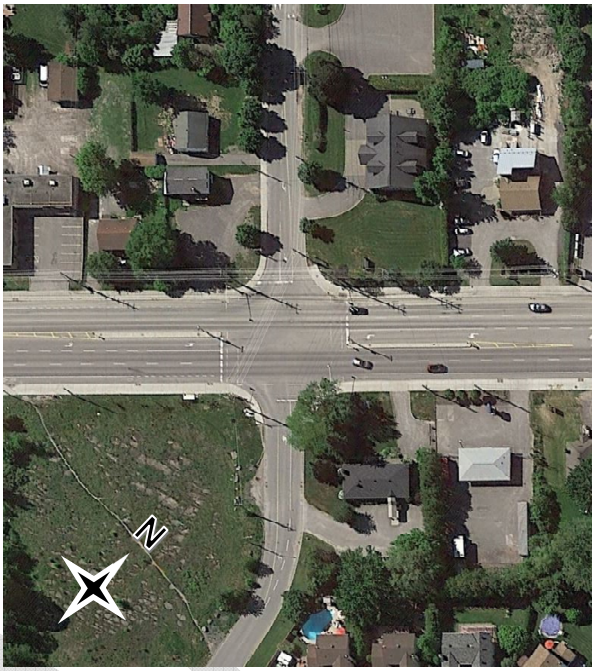
We will consider three signalized intersections and one unsignalized intersection in our Transportation Impact Assessment:

- Hazeldean Road and Huntmar Drive/Iber Road (Signalized)
- Hazeldean Road and Fringewood Drive (Signalized)
- Hazeldean Road and Johnwoods Street/Victor Street (Signalized)
- Hazeldean Road and Cedarow Court (Unsignalized)

Table 2-1. Study Area Intersections

INTERSECTION DESCRIPTION	LANE ARRANGEMENT
Hazedean Road and Cedarow Court is a 3-legged unsignalized intersection with stop control on Cedarow Court and free-flow conditions along Hazeldean Road. There are no turning restrictions. A pedestrian crossing facility is only provided on the southbound approach. Lane Configurations 	

INTERSECTION DESCRIPTION	LANE ARRANGEMENT
Hazeldean Road and Huntmar Drive/Iber Road is a signalized intersection with no turning restrictions. Pedestrian crossing facilities are provided on all approaches. Lane Configurations  **C - Channelized**	
Hazeldean Road and Fringewood Drive is a signalized intersection with no turning restrictions. The southbound approach is not completely developed. Pedestrian crossing facilities are provided on all approaches. Lane Configurations 	

INTERSECTION DESCRIPTION	LANE ARRANGEMENT
Hazeldean Road and Johnwoods Street/Victor Street is a signalized intersection with no turning restrictions. Pedestrian crossing facilities are provided on all approaches. Lane Configurations 	

2.3.3 *DRIVEWAYS*

There are two private driveways within 200 m of the proposed access:

- One park maintenance access at 14 Fringewood Drive 180 m south of the proposed access
- One residential shared driveway at 2 and 4 and Fringewood Drive 190 m south of the proposed access
- One restaurant (Cabotto's) driveway at 5816 Hazeldean Road 200 m west of the proposed access

2.3.4 *TRANSIT*

OC Transpo provides four transit stops in close proximity to 5 Orchard Drive:

- Eastbound Transit Stop 8612 on Hazeldean Road west of Huntmar Drive (Bus 61, 62, 261, 263, and 303), east of property (<50m)
- Westbound Transit Stop 5711 on Hazeldean Road west of Huntmar Drive/Iber Road (Bus 61, 263, and 303), west of property (<50m)
- Westbound Transit Stop 1202 on Hazeldean Road west of Huntmar Drive/Iber Road (Bus 61, 261, 263, 303), east of property (<150m)
- Southbound Transit Stop 0618 on Fringewood Drive north of Cloverloft Court (Bus 62 and 261), south of property (<200m)

The existing OC Transpo routes in this area are showing in **Figure 2-2**.

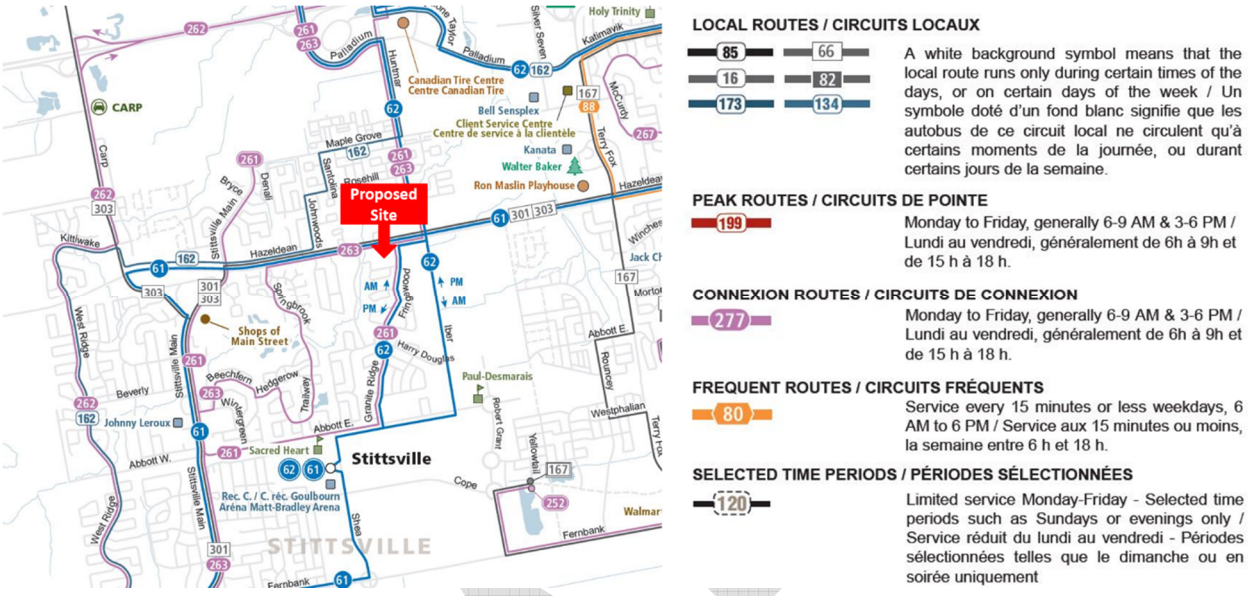


Figure 2-2. OC Transpo Routes

(Source: OC Transpo)

2.3.5 *AREA TRAFFIC MANAGEMENT MEASURES*

There are no existing area traffic management measures near either of the proposed vehicle accesses on Fringewood Drive and Hazeldean Road.

2.3.6 *PEAK HOUR TRAVEL DEMAND*

The TRANS Committee was established to co-ordinate transportation planning efforts among various planning agencies located within the National Capital Region. The proposed development is located in the Kanata/Stittsville TRANS District (500). The complete TRANS O-D results (including a map of the district area) is provided in **Appendix C**. The most recent Origin-Destination (O-D) survey was completed by TRANS in the Fall of 2011. The following table summarizes the TRANS trip data for this district.

Table 2-2. Peak Hour Travel Demand by Mode

MODE	AM PEAK (6 :30AM – 9 :00AM)			PM PEAK (3 :30PM – 6 :00PM)		
	From District	To District	Within District	From District	To District	Within District
Auto Driver	59%	74%	45%	73%	61%	57%
Auto Passenger	9%	7%	17%	17%	15%	23%
Transit	24%	8%	4%	7%	21%	2%
Bicycle	0%	1%	1%	0%	0%	1%
Walk	0%	0%	19%	0%	0%	12%
Other	7%	10%	15%	3%	3%	6%
Total Vehicles	**25,970**	**15,660**	**30,350**	**18,960**	**28,920**	**37,470**

Source: TRANS 2011 O-D Survey, District 500 Kanata/Stittsville

The primary mode of transportation within the district is by vehicle with 62% of all trip being in a vehicle (driver and passenger) in the AM peak period and 80% in the PM peak period. Transit accounts for less than 5% of in district travel, but accounts for almost 25% of all commuter traffic (working outside the district). Active transportation modes (walking and cycling) account for very little commuter traffic, but 12%-19% of all in district transportation.

2.3.7 *BOUNDARY STREET CRASH HISTORY*

The City of Ottawa provided the most recent five years of crash history for the sections of Hazeldean Road and Fringewood Drive adjacent to the site for review (January 2014 through December 2018). A summary of the crash history for the adjacent intersections and road segments is provided in the following table with the complete data set in **Appendix D**.

Table 2-3. Crash History on Boundary Streets between January 2014 and December 2018

LOCATION	SUMMARY	TRENDS
Intersection: Hazeldean Road at Fringewood Drive	Seven crashes with no reported fatalities Two eastbound rear-end crashes adjacent to the site (2015, 2018) Two northbound vehicles conflicting with a vulnerable road user (one pedestrian, one cyclist) while making a turning movement (2014, 2017)	No patterns with more than six crashes in five years
Segment: Hazeldean Road between Cedarow Court and Fringewood Drive	Two crashes with property damage only Both crashes were in the westbound direction on the opposite side of the centre median from the development site access. (2014, 2015)	No patterns with more than six crashes in five years
Segment: Fringewood Drive between Hazeldean Road and Cloverloft Court	One crash with property damage only Southbound "U" Turn (2015) Clear visibility in daylight conditions	No patterns with more than six crashes in five years

2.4 PLANNED CONDITIONS

2.4.1 *CHANGES TO THE STUDY AREA AND TRANSPORTATION NETWORK*

Fringewood Drive Area Traffic Management Study - The City of Ottawa is currently undertaking an Area Traffic Management (ATM) study that will examine traffic conditions and driver behaviour on this roadway. The study was initiated in the Fall of 2018 with the intent of developing potential traffic calming solutions. The Existing Conditions Report has been completed and the City has begun identifying alternative options to meet the community needs.

Fringewood Drive Paved Shoulders and Sidewalks – The City of Ottawa initiated a Road Modifications Approval project (2018) that proposed changes to Fringewood Drive to improve conditions for cycling, bus stop access, and pedestrian safety. Within the Study Area, the project includes a new asphalt paved shoulder on the:

- East side of Fringewood Drive from just north of Azurite Crescent to approximately 180m south of Hazeldean
- West side of Fringewood Drive from just north of Azurite Crescent to approximately 65m south of Hazeldean Road

Hazeldean Road Transit Priority – The City of Ottawa's Transportation Master Plan (2013) identifies Hazeldean Road between Stittsville Main Street and Eagleson Road as a candidate for transit signal priority and queue jump lanes at select intersections as part of the 2031 Affordable Network.

New North-South Arterial – The City of Ottawa's Transportation Master Plan (2013) identifies a new four-lane road between Palladium Drive (at Huntmar) and Abbott Street as part of Phase 2 (2020-2025) of the 2031 Affordable Network.

2.4.2 *OTHER AREA DEVELOPMENTS*

Three developments are listed in the City of Ottawa's Development Application Search tool that could influence our analysis in this Transportation Impact Assessment:

- 5 Orchard Drive Property – 67 Townhomes, 7 detached homes, 45 apartment units, 13,607 sq/ft office, and 34,966 sq/ft retail
- 5731 Hazeldean Road (D07-12-16-0046) – mixed use development consisting of four buildings; two two-storey buildings consisting of commercial uses; a four-storey residential care facility and a five-storey retirement home
- 24 Iber Road, 5734 Hazeldean Road, and 5754 Hazeldean Road (D07-12-13-0168) – Mix of retail, commercial, and office buildings, including six one-story retail buildings and two two-storey office buildings, one with ground floor retail

2.5 STUDY AREA

The limits for the Transportation Impact Assessment study area are shown in **Figure 2-3** and include:

- Hazeldean Road between Cedarow Court and Fringewood Drive
- Fringewood Drive between Hazeldean Road and Cloverloft Court
- The four intersections described in **Section 2.3.2**

Figure 2-3: Study Area

2.6 TIME PERIODS

The time periods identified for the traffic analysis as part of the Transportation Impact Assessment are:

- AM Peak Hour: 9:00am-10:00am
- PM Peak Hour: 4:15pm-5:15pm

They are consistent with the AM and PM peak hours identified in the recent turning movement counts provided by the City of Ottawa at the intersection of Hazeldean Road and Fringewood Drive (July 2019)

2.7 HORIZON YEARS

The proposed development is expected to be completed in a single phase. The target year for occupancy is 2021. Our proposed horizon periods are:

— 2021: anticipated occupancy
— 2026: occupancy plus five years

2.8 EXEMPTIONS REVIEW

Based on our review of the development and network conditions, we have identified that the following elements qualify for an exemption from this Transportation Impact Assessment.

Table 2-4. Exemptions Summary

MODULE	ELEMENT	EXEMPTION
4.1 Development Design	4.1.2 Circulation and Access	**Not Exempted.** This element is required for site plans.
	4.1.3 New Street Networks	**Exempted** This element is only required for plans of subdivision.
4.2 Parking	4.2.1 Parking Supply	**Not Exempted.** This element is required for site plans.
	4.2.2 Spillover Parking	**Exempted**. No spillover parking has been identified.
4.5 Transportation Demand Management	All elements	**Exempted**. Not required for site plans expected to have fewer than 60 employees and/or students on locations at any given time
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	**Exempted.** The City of Ottawa has initiated an Area Traffic Management Study (2018) for Fringewood

MODULE	ELEMENT	EXEMPTION
		Drive which will identify and develop potential traffic calming solutions for the Area.
4.8 Network Concept	-	**Exempted.** This development is not expected to generate more than 200 person-trips during the peak hour in excess of the equivalent volume permitted by establishing zoning.

3. FORECASTING

3.1 DEVELOPMENT GENERATED TRAFFIC

3.1.1 *TRIP GENERATION*

Base Trip Generation Rate. The ITE Trip Generation Manual (10th Edition) was used to determine the base trip generation rate for a *Gas/Service Station with Convenience Market* (Land Use Code 945):

- AM Base Rate: 12.47 vehicle trips per fueling station
- PM Base Rate: 13.99 vehicle trips per fueling station

Total Development-Generated Person-Trips. In accordance with the Transportation Impact Assessment Guidelines (2017), the ITE vehicle trips were multiplied by 1.28 to convert to person trips. The total development-generated person-trips (**Table 3-1**) were estimated using the projected auto trips and the trip generation multiplier.

Table 3-1. Estimated Total Development-Generated Person-Trips (Gas/Service Station with Convenience Market)

PEAK PERIOD	VEHICLE FUELING STATIONS	ITE TRIP RATE	PROJECTED AUTO TRIPS	ITE PERSON TRIP CONVERSION	TOTAL PERSON TRIPS
AM	12	12.47	150	1.28	192
PM		13.99	168		215

Existing Mode Share. The existing peak hour travel demand was identified from the most recent TRANS Origin-Destination Survey (Fall 2011) and presented in **Section 2.3.6**. The existing mode share is based on those values and is shown in the following table.

Table 3-2. Existing Mode Share

PEAK PERIOD	AUTO DRIVER	AUTO PASSENGER	TRANSIT	BICYCLE	WALK	OTHER
AM	59%	9%	24%	0%	0%	7%
PM	61%	15%	21%	0%	0%	0%

Future Mode Share Targets. The mode share targets for this development consider the service being provided: fuel and wash bays for motorized vehicles.

Table 3-3. Future Mode Share Targets for the Development

TRAVEL MODE	MODE SHARE TARGET	RATIONALE
Transit	0%	Employees may access the site using public transit, however that would only account for two person-trips during each peak period.
Walking	0%	A small number of local residents may walk or cycle to the gas station to access the convenience market, however it is anticipated that these trips would be outside the commuter peak periods.
Cycling	0%	
Auto Passenger	15%	The service being provided by the development is fueling and washing for private motorized vehicles. Therefore, the mode share is expected to be primarily auto. These auto mode share targets are consistent with the reported 2011 TRANS Origin-Destination Survey percentages for auto-only modes.
Auto Driver	85%	

Development Trips by Mode and Phase. The proposed development will be constructed in one phase. The development trips by mode and phase are shown in the following table.

Table 3-4. Development Trips by Mode and Phase

PEAK PERIOD	AUTO DRIVER	AUTO PASSENGER	TRANSIT	BICYCLE	WALK	OTHER
AM	163	29	0	0	0	0
PM	183	32	0	0	0	0

Trip Reduction Factors. This is a greenfield development and there are no existing trips to deduct. Since this is a commercial gas station, pass-by trips are anticipated to be a high percentage of the trip composition. A pass-by trip percentage of 56% will be applied in accordance with the ITE Trip

Generation Handbook. The primary trips generated by this development by mode are shown in the following table.

Table 3-5. Development Trips by Mode and Phase After Trip Reduction Factors Applied

PEAK PERIOD	AUTO DRIVER	AUTO PASSENGER	TRANSIT	BICYCLE	WALK	OTHER
AM	72	13	0	0	0	0
PM	81	14	0	0	0	0

3.1.2 *TRIP DISTRIBUTION*

There are two proposed vehicle accesses to the development; one on Hazeldean Road and one on Fringewood Drive. Vehicles will approach and depart from the development following the existing travel patterns. The trip distribution for the proposed development is presented as follows:

- AM: 60% of trips are traveling east and 40% of trips traveling west
- PM: 40% of trips are traveling east and 60% of trips are traveling west

The proposed access on Hazeldean Road is a right-in / right-out access. Therefore, all trips traveling west will enter and exit the Site using Fringewood Drive.

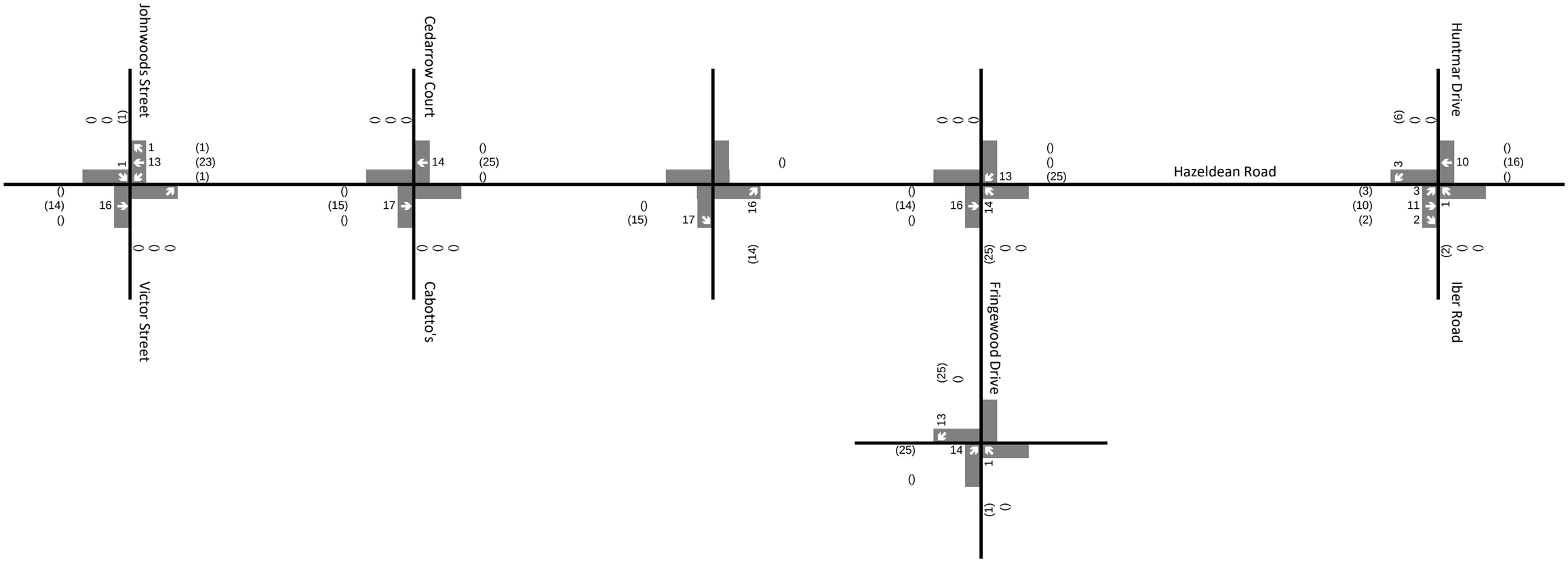
3.1.3 *TRIP ASSIGNMENT*

Trips were assigned to the adjacent transportation network and have been based on existing travel patterns as identified from the intersection turning movement counts; including those at the following locations:

- Hazeldean Road and Huntmar Drive/Iber Road, Wednesday July 3, 2019 (City of Ottawa)
- Hazeldean Road and Fringewood Drive, Wednesday July 3, 2019 (City of Ottawa)
- Hazeldean Road and Johnwoods Street/Victor Street, Wednesday September 11, 2019 (WSP)
- Hazeldean Road and Cedarow Court, Thursday August 1, 2019 (City of Ottawa)

*(source of count)

The peak hour vehicle trip assignment for the peak hour vehicle trips are shown as primary trips (**Figure 3-1**) and pass by trips **(Figure 3-2**).



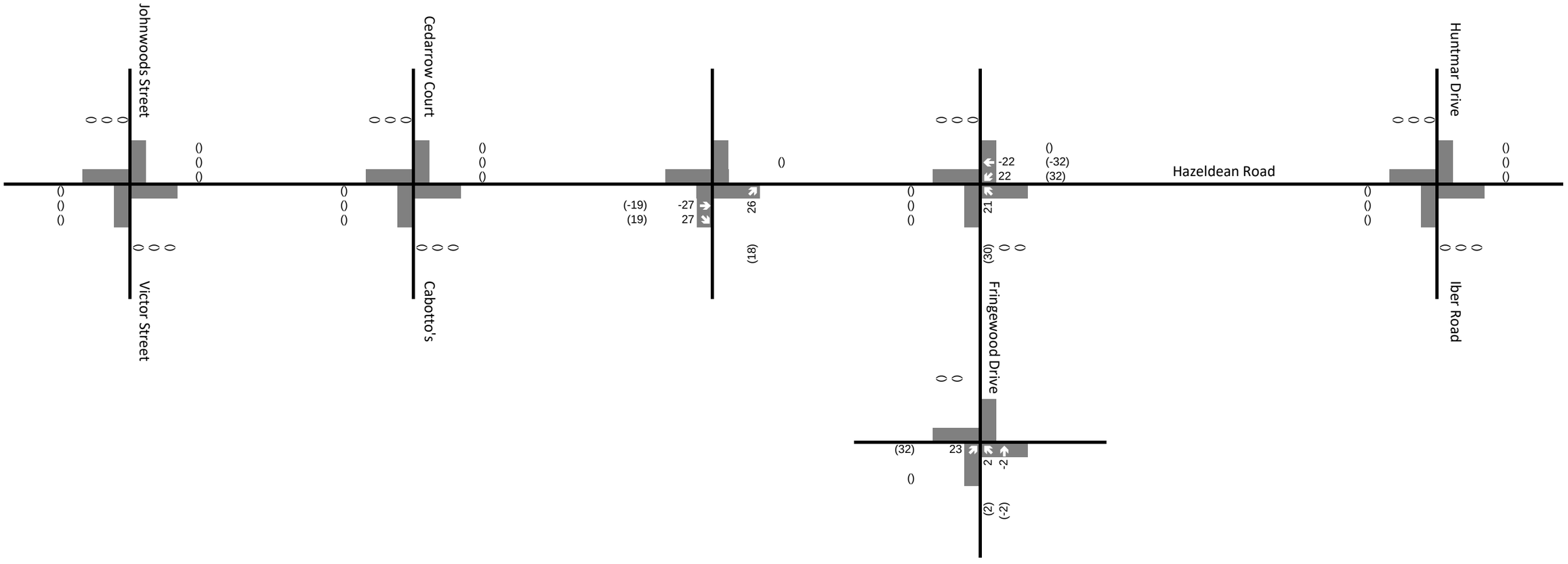
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-1

Site Generated Primary Trips



Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-2

Site Generated Pass By Trips

3.2 BACKGROUND NETWORK TRAFFIC

3.2.1 *CHANGES TO THE BACKGROUND TRANSPORTATION NETWORK*

The City of Ottawa is currently undertaking an Area Traffic Management (ATM) study to examine traffic conditions and driver behaviour on Fringewood Drive. The study was initiated in the Fall of 2018 with the intent of developing potential traffic calming solutions. The results of this study were not published when this TIA was prepared (October 2019).

A second City of Ottawa project has been initiated that proposes changes to Fringewood Drive to improve conditions for cycling, bus stop access and pedestrian safety. Within the Study Area, the project includes a new asphalt paved shoulder on the:

- East side of Fringewood Drive from just north of Azurite Crescent to approximately 180m south of Hazeldean
- West side of Fringewood Drive from just north of Azurite Crescent to approximately 65m south of Hazeldean Road

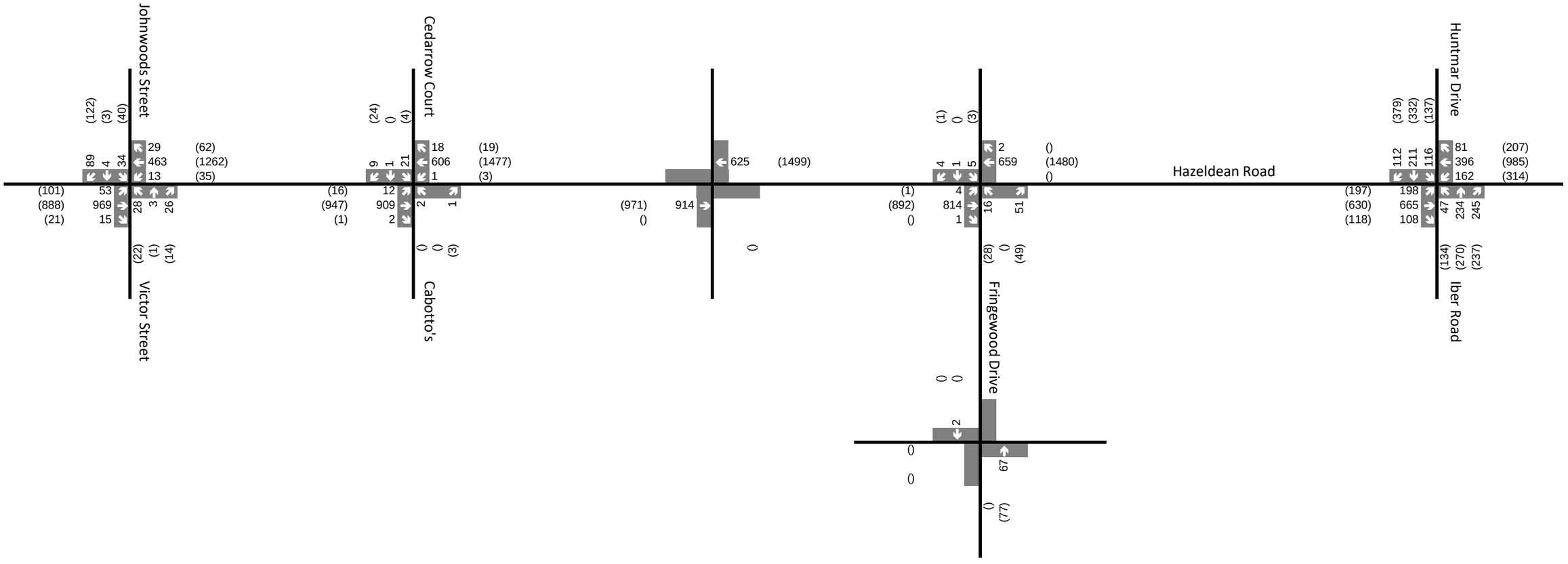
Furthermore, at the pre-consultation meeting with the City of Ottawa on July 16, 2019, the City noted that the following changes to the background transportation network would be beneficial to the neighbourhood:

- Continuous sidewalk on the west side of Fringewood Drive (adjacent to the site) from Hazeldean Road south to the extent of the planned sidewalk noted above.
- Reduction of the southbound driving lane on Fringewood Drive to a minimum width of 3.5m
- All sidewalks across an entrance should be depressed and continuous (City of Ottawa Standard Drawing SC7.1 Curb Return Entrances, March 2017)

3.2.2 *GENERAL BACKGROUND GROWTH RATES*

A 2.0% annual growth rate was selected to account for future development not currently within the development application process (**Section 3.2.3**). The 2.0% increase was based on background development reports that indicated the same growth rates.

The existing conditions (2020) and projected future background (2021 and 2026) traffic volumes are shown in **Figure 3-3** to **Figure 3-5**.



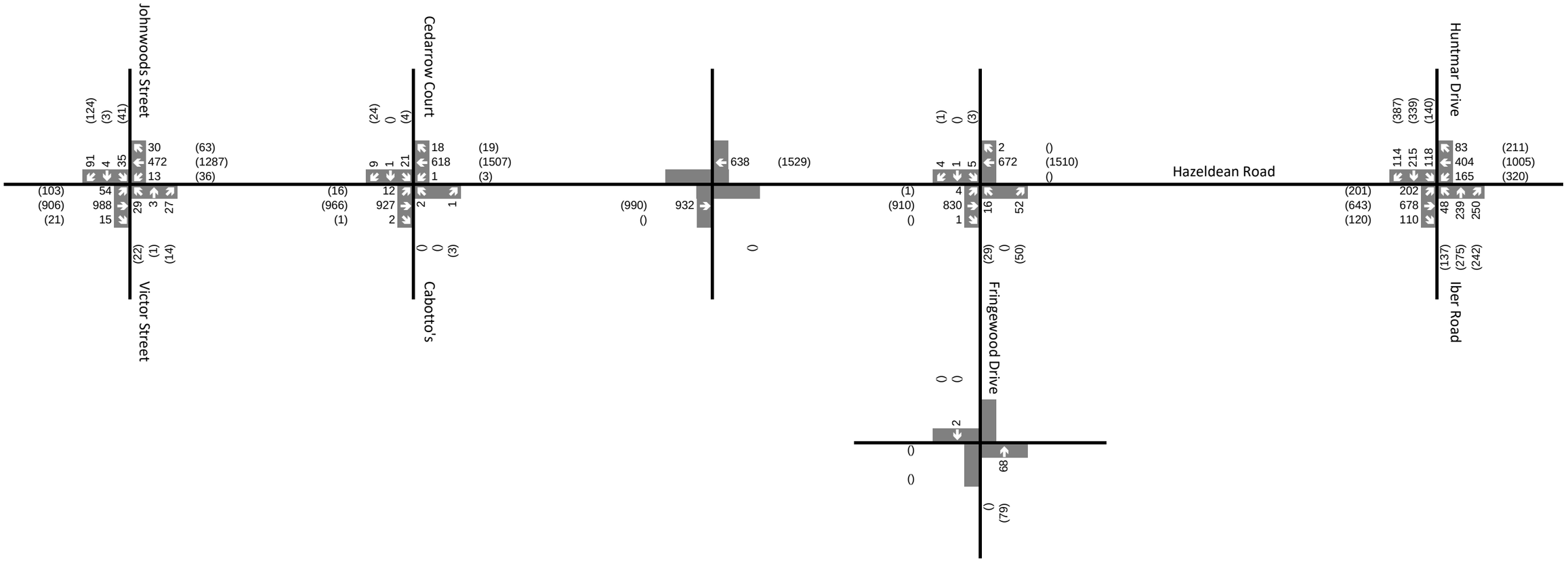
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-3

Existing Traffic Volumes (2020)



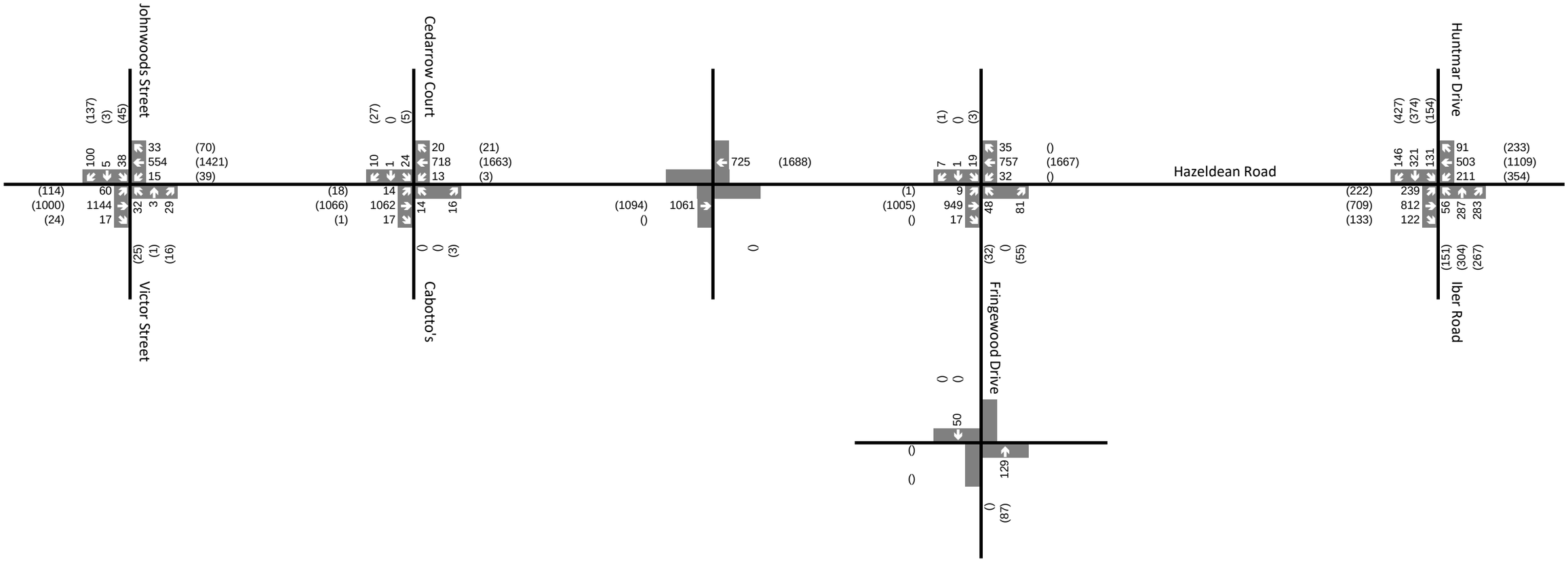
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-4

Future Background Traffic (2021)



Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-5

Future Background Traffic (2026)

3.2.3 *OTHER AREA DEVELOPMENTS*

In **Section 2.4.2** there were three developments identified that could impact the Transportation Impact Assessment:

- 5731 Hazeldean Road (D07-12-16-0046) – mixed use development consisting of four buildings; two two-storey buildings consisting of commercial uses; a four-storey residential care facility and a five-storey retirement home
- 24 Iber Road, 5734 Hazeldean Road, and 5754 Hazeldean Road (D07-12-13-0168) – Mix of retail, commercial, and office buildings, including six one-story retail buildings and two two-storey office buildings, one with ground floor retail

The estimated trips for the above developments were taken from their respective Transportation Impact Assessment Report.

The development for the remaining lands on the 5 Orchard Drive Property (**Figure 3-6**) was estimated at a high level based on the concept plan provided by Campanale Homes dated November 2019. This included: 67 Townhomes, 7 detached homes, 45 apartment units, 13,607 sq/ft office, and 34,966 sq/ft retail.

The estimated trips from other developments were added to the 2026 planning horizon and are shown in **Figure 3-7**.

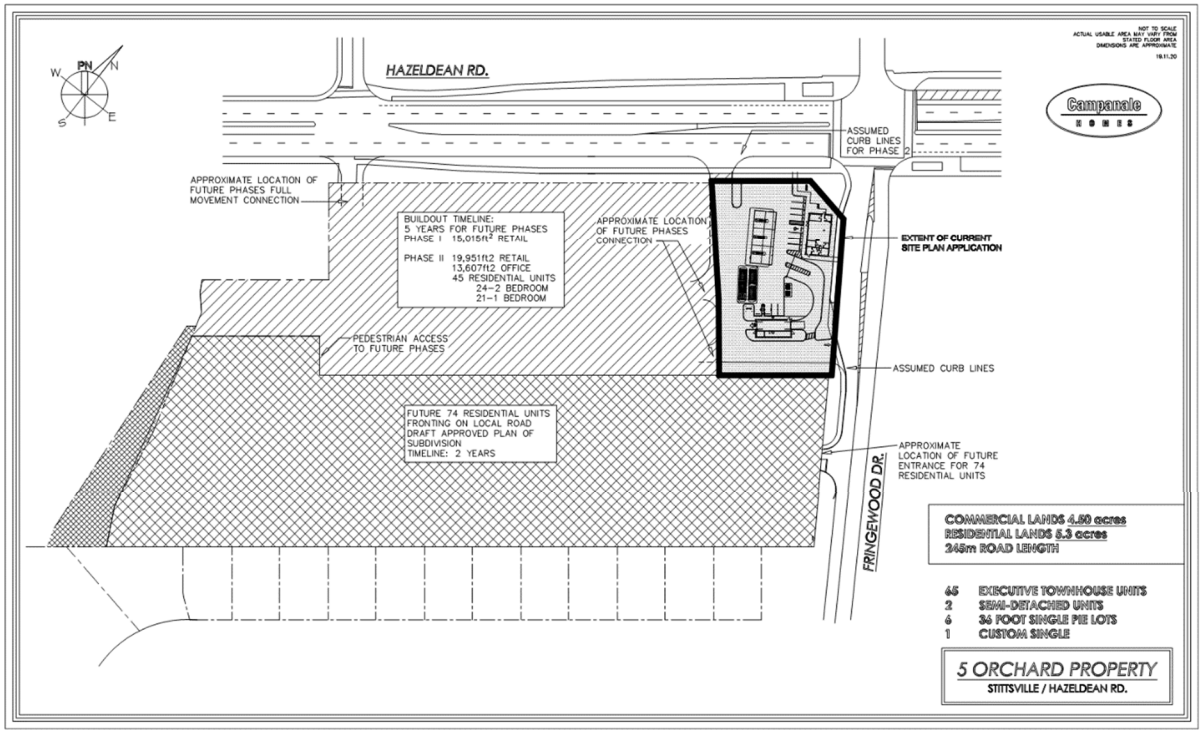
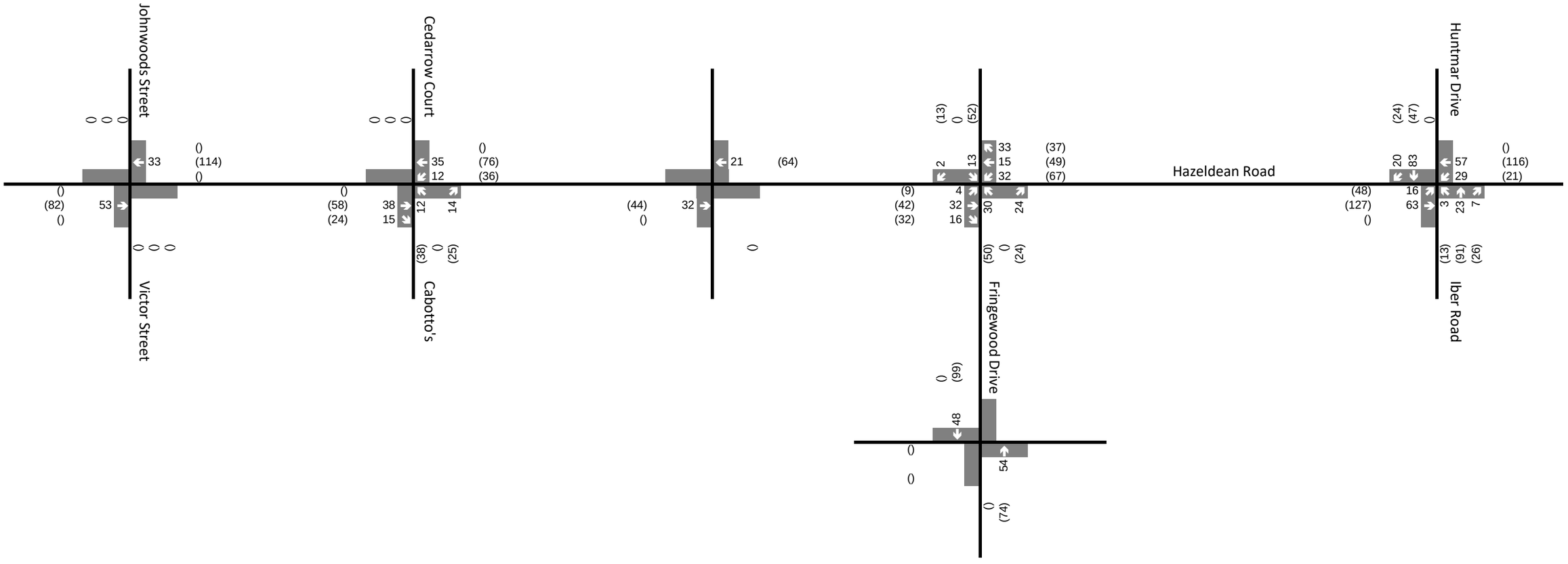


Figure 3-6. 5 Orchard Drive - Development Concept for Balance of Land



Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-7

Background Development Traffic

3.3 DEMAND RATIONALIZATION

3.3.1 *DESCRIPTION OF CAPACITY ISSUES(S)*

Total traffic volumes for the 2026 planning horizon were estimated by:

- Applying a 2% background growth rate to the existing traffic volumes along arterials (**Section 3.2.2**)
- Adding trips generated by other area developments (**Section 3.2.3**)
- Adding trips generated by the proposed development (**Section 3.1.3**)

The estimated total traffic volumes are presented in **Figure 3-8** and **Figure 3-9**.

A cursory review of the results obtained from the application of Synchro (version 10) for the 2026 total traffic volumes suggest that the future auto demands will not add any new over-capacity movements within the study area.

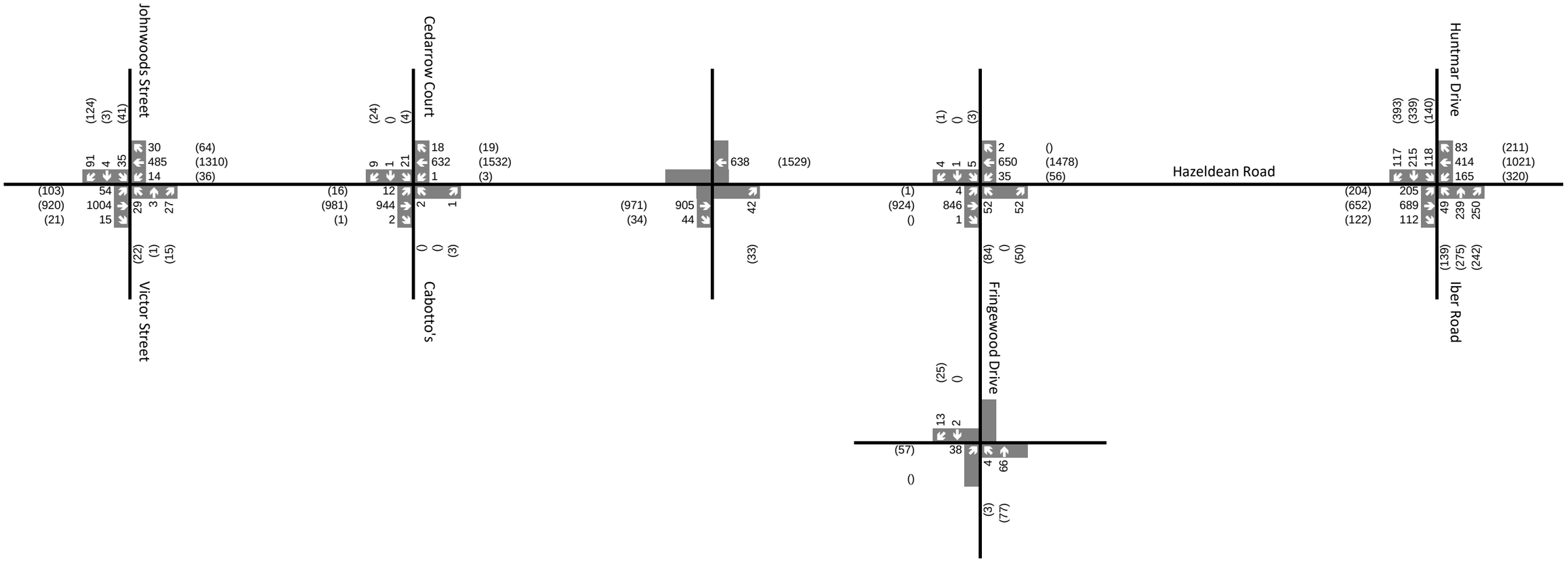
These assumptions will be confirmed in the next stage of the Transportation Impact Assessment process (Step 4, Strategy).

3.3.2 *ADJUSTMENT TO DEVELOPMENT GENERATED TRAVEL DEMANDS*

Adjustments to development generated demands have not been proposed since the trips generated by the development are not expected to adversely impact the adjacent transportation network.

3.3.3 *ADJUSTMENTS TO BACKGROUND NETWORK TRAVEL DEMANDS*

Adjustments to background network demands have not been proposed since the cursory traffic operations analysis indicates that the future transportation roadway network will offer an acceptable Level of Service.



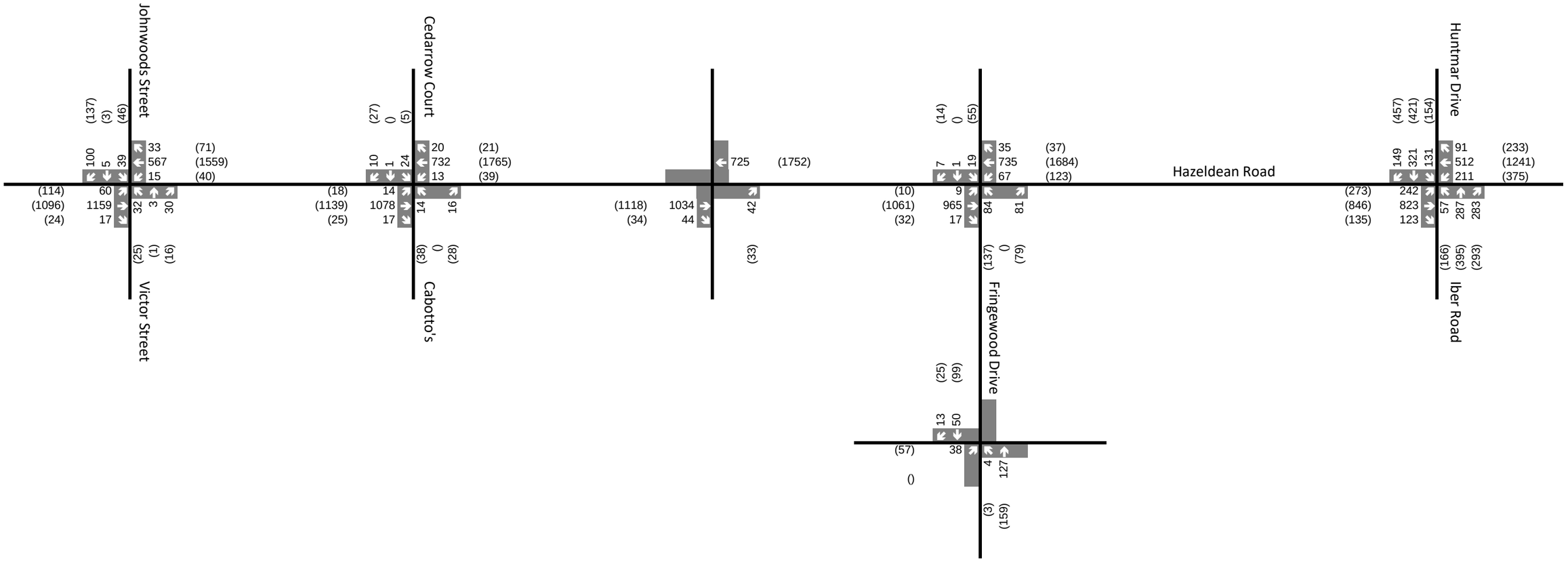
Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-8

Future Total Traffic (2021)



Legend

xx A.M. Peak Hour Traffic Volumes

(xx) P.M. Peak Hour Traffic Volumes

Figure 3-9

Future Total Traffic (2026)

4. ANALYSIS

4.1 DEVELOPMENT DESIGN

4.1.1 *DESIGN FOR SUSTAINABLE MODES*

The TDM-supportive Development Design and Infrastructure Checklist includes two checklists, one for non-residential developments and one for residential developments. The non-residential development checklist was completed to assess the opportunity to implement facilities that are supportive of sustainable modes. The completed checklist is attached as **Appendix E**.

Sustainable modes include cycling, walking, and transit. As indicated in the TDM checklist and shown on the proposed site plan, the proposed development accommodates these modes by providing an improved sidewalk connection along Fringewood Drive for pedestrians and four bicycle parking spaces adjacent to the convenience store.

4.1.2 *CIRCULATION AND ACCESS*

The proposed site plan (**Appendix B**) provides a continuous drive movement through the property between the two access points for fueling trucks that require limited reverse maneuvering. The site circulation was assessed using AutoTURN 10.2 to confirm suitability of the layout for a variety of design vehicles. The results are provided in the following table and the AutoTURN swept paths are provided in **Appendix F**.

Table 4-1. Swept Path Assessment

DESIGN VEHICLE	VEHICLE REPRESENTING	FINDINGS
MSU (*TAC 2017*)	Delivery Vehicle Moving Truck	The proposed entrance configuration on Hazeldean and Fringewood accommodates the movements of an MSU design vehicle without impacting any built features or parking spaces.
HSU (*TAC 2017*)	Municipal Services / Waste Removal	**Circulation:** The proposed entrance configuration on Hazeldean and Fringewood can accommodate the movements of an HSU design vehicle without impacting any built features or parking spaces. The eastbound turn onto Hazeldean will require space on both through lanes. **Access to Waste Containers:** An HSU will be able to maneuver to and from the waste containers without conflicting the nearby parking spaces or gas pump stations.

DESIGN VEHICLE	VEHICLE REPRESENTING	FINDINGS
WB-23 *(Alberta INFTRA-HGDG)*	Fueling Truck	The proposed entrance configuration on Fringewood Avenue can accommodate the movements of a Fueling Truck. The gore along Fringewood is required to accommodate this size of vehicle.
Passenger Vehicle (*TAC 2017*)	Resident's vehicle	**Hazeldean Entrance**: The proposed entrance configuration can accommodate the movements of passenger vehicles. **Fringewood Entrance**: The propose entrance configurations can accommodate the movements of passenger vehicles. **Car Wash:** The proposed layout configurations can accommodate the movements of passenger vehicles.

4.1.3 *NEW STREET NETWORKS*

This section was exempted in the Transportation Impact Assessment Scoping Report submitted on September 5, 2019 and approved by the City of Ottawa on October 11, 2019. The approved exemptions table is found in **Section 2.8**.

4.2 PARKING

4.2.1 *PARKING SUPPLY*

The proposed development parking requirements, based on its location will be assessed in accordance with the Suburban Area (Area 'C') for minimum parking requirements as part of Schedule 1A to the City of Ottawa's Zoning By-Law 2008-250. The Zoning By-Law requires a convenience store in Area 'C', provide a minimum parking rate of 3.4 spaces per 100 m^2 of gross floor area (*Table 101, Row N27, Column IV*). The Zoning By-Law indicates that there is no requirement for parking for car washes (*Table 101, Row N19, Column IV*) or gas bars (*Table 101, Row N39, Column IV*). The Zoning By-Law further requires a minimum bicycle parking rate of 1 spaces per 250 m^2 of gross floor area for a convenience store (*Table 111A, I, e*).

The minimum parking supply requirements for this development compared with the proposed parking supply are highlighted in the following table.

Table 4-2. Minimum Bylaw Requirements for Parking and Proposed Parking Supply

TYPE	REQ'D	CALCULATION	SITE PLAN	COMPLIANCE WITH BY-LAW
Vehicle: Car Wash	0	-	0	Meets the minimum requirements of the Zoning By-Law.
Vehicle: Convenience Store	6	168m^2 * 3.4 spaces per 100m^2 of gross floor area	11	Exceeds the minimum requirements of the Zoning By-Law.
Vehicle: Gas Bar	0	-	0	Meets the minimum requirements of the Zoning By-Law.
Bicycle	1	168m^2 * 1 space per 250m^2 of gross floor area (convenience store) 114 m^2 * 1 space per 1,500m^2 of gross floor area (car wash)	4	Exceeds the minimum requirements of the Zoning By-Law.
Total	**7**		**15**	

The Institute of Transportation Engineers (ITE) publication Parking Generation (4th edition) indicates that the peak period parking demand for a gasoline / service station with a convenience market can be estimated using the following ratio:

Average Parking Demand = 0.75 vehicles per fueling position

This results in an average parking demand of 5 vehicles. The current site plan has 11 total parking spaces which exceeds the estimated peak demand by 6 parking spaces.

4.2.2 *SPILLOVER PARKING*

This section was exempted in the Transportation Impact Assessment Scoping Report submitted on September 5, 2019 and approved by the City of Ottawa on October 11, 2019. The approved exemptions table is found in **Section 2.8**.

4.3 BOUNDARY STREETS

4.3.1 *HAZELDEAN ROAD*

Hazeldean Road is an arterial with a 37.5 metre protected right-of-way in the study area adjacent to the proposed development site. The existing cross-section (**Figure 4-1**) includes separated sidewalks, dedicated bike lanes, and vehicle lanes. The Hazeldean Road cross-section in this area is consistent with the City's complete streets philosophy and the urban design objectives for the area by following the general format of the Current Cross-Section Standard (Bike Lanes) developed as part of the Building Better and Smarter Suburbs initiatives (**Figure 4-2**).

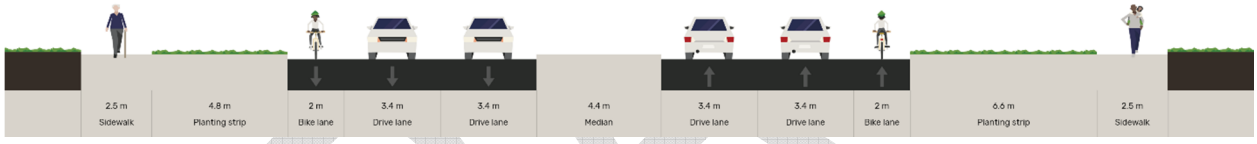


Figure 4-1. Hazeldean Road (west of Fringewood) – Existing Cross-Section

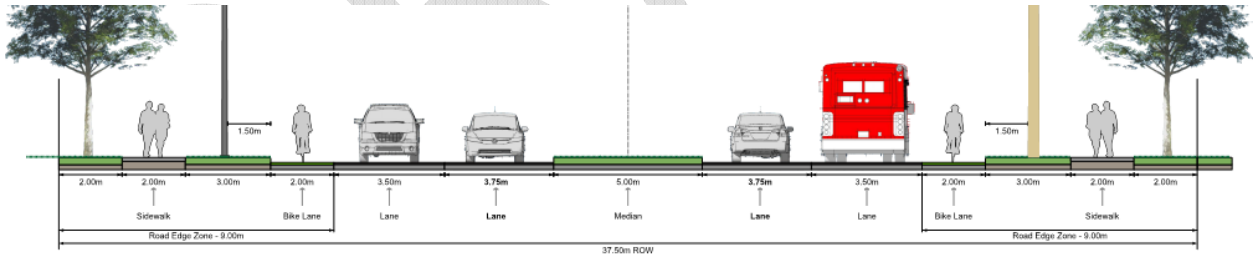


Figure 4-2. City of Ottawa Arterial Road Concept 1 – Current Cross-Section Standard

4.3.1.1 *MOBILITY*

The City's Multi-Modal Level of Service (MMLOS) targets consider road classification, adjacent land-use designation, and special policy areas. The segment of Hazeldean Road within the study area is identified as an Arterial Main Street in the City of Ottawa's Official Plan (2003, website consolidation), Schedule B (Urban Policy Plan). The resulting MMLOS targets and segment scores for the two scenarios are indicated in the table below.

Table 4-3. Hazeldean Road Segment MMLOS (2021)

	PLOS	BLOS	TLOS	TKLOS	VLOS
Target	**C**	**C**	**D**	**D**	VLOS Not Reported for Segments
Status Quo	C	C	D	C	

The **Status Quo** option is based on the existing conditions remaining in place along Hazeldean Road. The MMLOS was assessed as:

- An average daily curb lane traffic volume > 3000vpd and operating speeds > 50km/h = PLOS 'C'
- An operating speed limit > 50km/h = BLOS 'C'
- Transit operating in mixed traffic with limited to no parking = TLOS 'D'
- Bi-directional traffic with travel lanes greater than 3.3m = TKLOS 'C'

4.3.1.2 *SAFETY*

Historical crash records for the study area were obtained from the City of Ottawa for the 5-years between January 2014 through December 2018. The TIA Guidelines indicate that patterns with six or more crashes should be identified. In this timeframe there were two crashes along the roadway segments (excluding the intersections) on Hazeldean Road between Cedarow Court and Fringewood Drive. There were no patterns identified with six or more crashes; therefore, no crash reduction measures have been identified for this section of roadway.

4.3.2 *FRINGEWOOD DRIVE*

Fringewood Drive is a local road in the study area adjacent to the proposed development site. The existing cross-section (**Figure 4-3**) includes one northbound lane and two southbound lanes. There are no formal pedestrian or cycling facilities currently provided; however, the City of Ottawa is currently improving conditions along this section of Fringewood Drive (**Section 2.4.1**) through an Area Traffic Management Study and a Road Modifications Approval project.

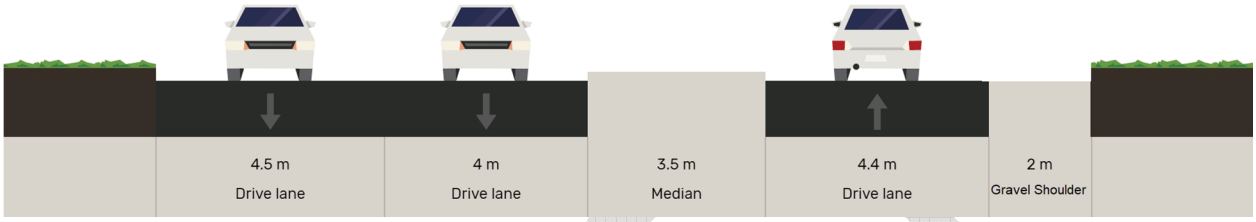


Figure 4-3. Fringewood Drive (adjacent to site) – Existing Cross-Section

As part of the proposed development, improvements are being made to the cross-section of Fringewood Drive adjacent to the site. The proposed cross-section (**Figure 4-4**) includes the following improvements:

- Addition of a 2.0m wide sidewalk with a 1.75m median on the west side of Fringewood Drive
- Removal of one southbound driving lane
- Narrowing of the southbound drive lane from 4.75m at Hazeldean Road to 4.50m at the southern edge of the centre median

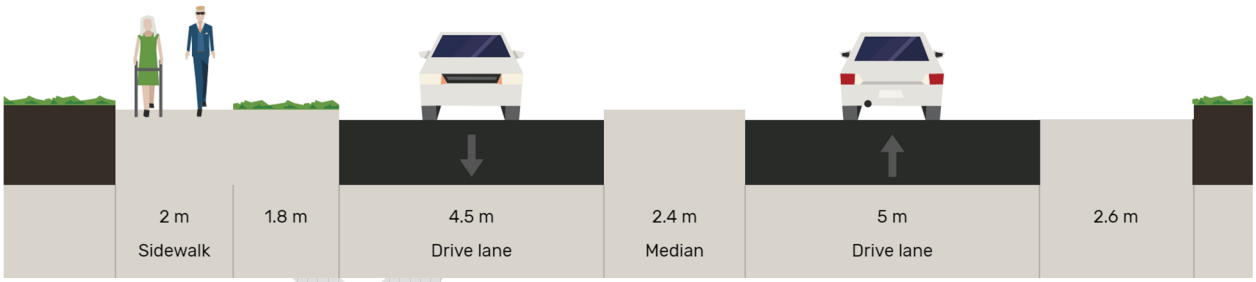


Figure 4-4. Fringewood Drive (adjacent to site) – Proposed Cross-Section

4.3.2.1 *MOBILITY*

The segment of Fringewood Drive within the study area is located within the General Urban Area in the City of Ottawa's Official Plan (2003, website consolidation), Schedule B (Urban Policy Plan). The resulting MMLOS targets and segment scores for the two scenarios are indicated in **Table 4-4.**

Table 4-4. Fringewood Drive Road Segment MMLOS (2021)

	PLOS	BLOS	TLOS	TKLOS	VLOS
Target	**C**	**B**	**D**	**No Target**	VLOS Not Reported for Segments
Status Quo	**F**	**D**	D	B	
Proposed	**F**	**D**	D	B	

The **Status Quo** option is based on the existing conditions remaining in place along Fringewood Drive. The MMLOS was assessed as:

- No sidewalk with an operating speed > 30km/h = PLOS 'F'
- Mixed traffic for bicycles with three travel lanes and a speed limit ≥ 40km/h = BLOS 'D'
- Transit operating in mixed traffic with limited to no parking = TLOS 'D'
- Bi-directional traffic with travel lanes > 3.7m = TKLOS 'B'

The **Proposed** option is based on the proposed cross-section being implemented along Fringewood Drive. The MMLOS was assessed as:

- No sidewalk on the east side of the road with an operating speed > 30km/h = PLOS 'F'
- Mixed traffic for bicycles with two travel lanes and a speed limit ≥ 40km/h = BLOS 'D'
- Transit operating in mixed traffic with limited to no parking = TLOS 'D'
- Bi-directional traffic with travel lanes > 3.7m = TKLOS 'B'

4.3.2.2 *SAFETY*

Historical crash records for the study area were obtained from the City of Ottawa for the 5-years between January 2014 through December 2018. The TIA Guidelines indicate that patterns with six or more crashes should be identified. In this timeframe there was one crash along the roadway segment on Fringewood Drive between Hazeldean Road and Cloverloft Court. There were no patterns identified with six or more crashes; therefore, no crash reduction measures have been identified for this section of roadway.

4.4 ACCESS INTERSECTIONS

4.4.1 *LOCATION AND DESIGN OF ACCESS*

There are two access points proposed for this development and are indicated in the Site Plan (**Appendix B**), one from Hazeldean Drive and one from Fringewood Avenue.

The Hazeldean Drive access is proposed as an eastbound right-in / right-out providing a connection between the road and the parking lot to the west of the proposed gas station. This access will serve both the gas station and the development occurring on the remainder of the 5 Orchard lands.

The Fringewood Avenue is proposed as a full movement access providing access across the south edge of the development.

A design compliance check was carried out for each of the two accesses following guidelines prepared by the City of Ottawa and the Transportation Association of Canada's Geometric Design Guidelines for Canadian Roads (2017). The design compliance check is summarized in **Table 4-5** with elements not in compliance with the requirements in red.

Table 4-5. Access Intersection Design Elements

DESIGN ELEMENTS	MINIMUM REQUIRED	HAZELDEAN ACCESS	FRINGEWOOD ACCESS
Access Type	-	Eastbound Only	Full Movement
One-way vs. Two-way	<25 vpd = one-way driveway <750 vpd = two-way driveway	<100 peak hour trips Two-way	<100 peak hour trips Two -way
Entrance Width	2.0m-7.3m (TAC 2017) 6.7m for a parking lot (Ottawa) 6.0m for parking garage (Ottawa)	9.0m Including two 3.5m drive lanes and a 2.0m flush concrete centre median	9.0m
Right Turn Radius	3.0m – 4.5m (TAC 2017)	9.0 m	9.0 m
Corner Clearance	70m to traffic signals (TAC 2017)	50 m to Fringewood Avenue	75 m from Hazeldean Drive

DESIGN ELEMENTS	MINIMUM REQUIRED	HAZELDEAN ACCESS	FRINGEWOOD ACCESS
Sight Distance (Right turn from Minor)	105m (TAC 2017)	No obstructions	No obstructions
Sight Distance (Left turn from Minor)	105m (TAC 2017)	N/A	No obstructions
Throat Length	25m (TAC 2017) 15m (Ottawa, pre-consultation meeting)	25m from east curb radii to conflict point with vehicle exiting gas station	>25m from north curb radii to conflict point with exiting vehicles
Angle of Intersection	At or near 90°	Access intersects Hazeldean Drive at 90°	Access intersects Fringewood Avenue near 90°
Proximity to Adjacent Driveways	Restrict accesses	No private driveways within 150m west of the access point	No private driveways within 100m of access point
Pedestrian Crossing Consideration	Ottawa Standard Drawing SC7.1 (Curb Return Private Entrance – Unsignalized)	9.0m pedestrian crossing Ottawa Standard Drawing S7.1 (Curb Return Private Entrance)	9.0m pedestrian crossing Ottawa Standard Drawing S7.1 (Curb Return Private Entrance)
Cycling Crossing Consideration	Large curb return radii with narrow driveway to minimize crossing distance	9.0m shoulder bicycle crossing	10.0m shoulder bicycle crossing

Generally, the proposed accesses meet the current best practices and accepted design guidance. However, there are specific areas where specific conditions limit design opportunities, as follows:

1. The entrance widths and right-turn radii exceed the maximum suggestions to allow large fueling vehicles access the site.
2. The corner clearance on the Hazeldean access is less than 70m to the nearest signalized intersection. A review of the intersection operations and queuing is provided in **Section 4.9.2.3**.

4.4.2 *INTERSECTION CONTROL*

Traffic control signal warrants were carried out in accordance with the Ontario Traffic Manual (OTM) Book 12 (2012) for both proposed accesses under the future total planning horizon. Justification 7 (future volumes) were applied and traffic signal warrants were not met. The signal warrant worksheets are provided in **Appendix G.**

Pedestrian accommodation at the accesses should follow the City of Ottawa's Standard Drawing SC7.1 for Curb Return Entrances utilizing the Private / Unsignalized entrance option which includes a continuous depressed sidewalk across the access as shown below.

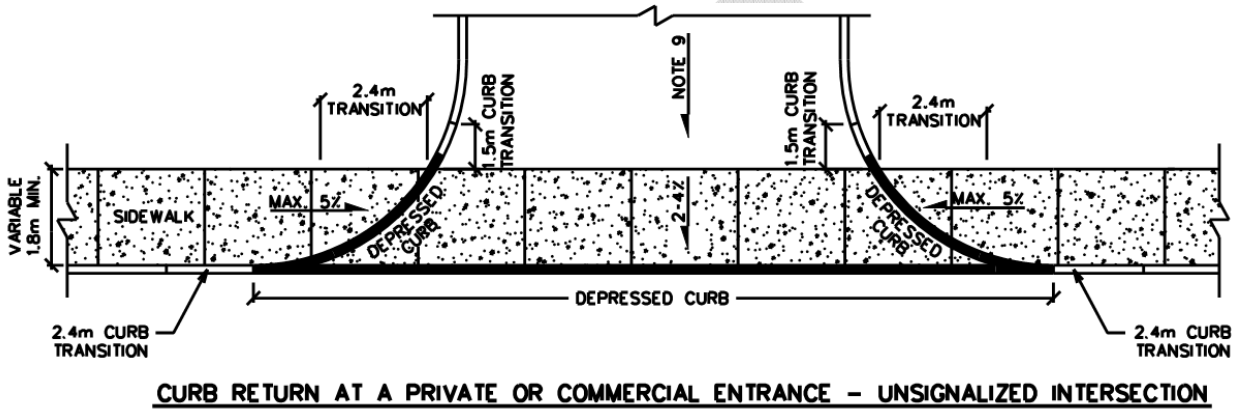


Figure 4-5. City of Ottawa, Standard Drawing SC7.1 Curb Return Entrances, Private / Unsignalized (March 2017)

Signage options for the two driveways are provided below:

Hazeldean Access: The Ontario Traffic Manual (OTM) Book 5 Regulatory Signs (March 2000) suggests using ONE-WAY signage (Rb-21) to prevent traffic from travelling in the wrong direction at the entrance to a one-way road. The DO NOT ENTER (Rb-19) and NO LEFT TURN (Rb-12) signs are often used in conjunction with the Rb-21.

Fringewood Access: Wayfinding signage indicating that this is the entrance for all westbound vehicles would provide positive guidance to all users, including emergency services.

4.4.3 *INTERSECTION DESIGN*

The City of Ottawa's Multi-Modal Level of Service (MMLOS) Guidelines (2015) are to be applied at signalised intersections only. The proposed site accesses are both uncontrolled and do not warrant an MMLOS evaluation.

4.5 TRANSPORTATION DEMAND MANAGEMENT

This section was exempted in the Transportation Impact Assessment Scoping Report submitted on September 5, 2019 and approved by the City of Ottawa on October 11, 2019. The approved exemptions table is found in **Section 2.8**.

4.6 NEIGHBOURHOOD TRAFFIC MANAGEMENT

This section was exempted in the Transportation Impact Assessment Scoping Report submitted on September 5, 2019 and approved by the City of Ottawa on October 11, 2019. The approved exemptions table is found in **Section 2.8**.

4.7 TRANSIT

The trip generation estimates have assumed a 0% transit mode share given the nature and services provided by gas stations. A transit analysis was not completed since there is no anticipated impact (zero new peak hour trips) to transit service resulting from the proposed development.

4.8 REVIEW OF NETWORK CONCEPT

This section was exempted in the Transportation Impact Assessment Scoping Report submitted on September 5, 2019 and approved by the City of Ottawa on October 11, 2019. The approved exemptions table is found in **Section 2.8**.

4.9 INTERSECTION DESIGN

4.9.1 *INTERSECTION CONTROL*

The identification of appropriate intersection controls to serve future background and future total travel demands included a roundabout screening for unsignalized intersections, a traffic signal warrant assessment, and a cursory review of transit priority measures. For this assessment we reviewed the 2026 total traffic volumes which would provide the worst-case scenario in terms of area traffic demands. The results are provided in **Table 4-6**.

The **roundabout screening** followed the siting considerations provided in the TAC Canadian Roundabout Design Guide. The roundabout screening was completed for the unsignalized intersections with consideration given to frequency and type of vehicle crashes, left turn volumes, frequency of U-turn

movements, and minor road delay. Based on these criteria, none of the intersections warrant a roundabout in the future total traffic scenario.

The **traffic signal warrant** was carried out in accordance with the Ontario Traffic Manual Book 12 (2012) methodology for future projected traffic volumes (Justification 7). Based on 2026 total traffic volumes, signal warrants were not met for the unsignalized intersections analysed. The traffic signal warrant sheets are provided in **Appendix G**.

There is limited transit service in this area. Therefore, this area is not a candidate for **transit priority measures**.

Table 4-6. Intersection Control Summary (2026 Total)

INTERSECTION	EXISTING CONTROL	ROUNDABOUT SCREENING	TAC SIGNAL WARRANT	ISOLATED TRANSIT PRIORITY	FUTURE CONTROL
Hazeldean/Huntmar	Traffic Signal	-	-	Not Warranted	No change
Hazeldean/Fringewood	Traffic Signal	-	-	Not Warranted	No change
Hazeldean/Johnwoods/Victor	Traffic Signal	-	-	Not Warranted	No change
Hazeldean / Site Access	-	Not Warranted	Not Warranted	Not Warranted	Right-in / Right-out
Fringewood / Site Access	-	Not Warranted	Not Warranted	Not Warranted	One-Way Stop Control

4.9.2 *INTERSECTION DESIGN*

4.9.2.1 *MULTI-MODAL LEVEL OF SERVICE ANALYSIS*

A Multi-Modal Level of Service (MMLOS) analysis was carried out in accordance with the methodology outlined in the City of Ottawa's MMLOS Guidelines (2015). The Guidelines state that intersection LOS measures are to be evaluated at signalized intersections. We have prepared a MMLOS analysis for the existing conditions (2020) and future total (2026) time horizon to provide a comparison between the baseline and future condition (beyond the development period).

The three intersections along Hazeldean Drive were evaluated as an *Arterial Main Street*. The corresponding LOS targets were taken from Exhibit 22 of the MMLOS Guidelines.

The MMLOS results for the existing conditions and future total conditions (Table 4-7) indicate that pedestrian, bicycle, transit, and truck modes do not meet their target LOS. There is a small change in the forecasted MMLOS (transit and vehicle) between the time horizons.

Table 4-7 Intersection MMLOS - Existing and Future Conditions

		PLOS	BLOS	TLOS	TKLOS	VLOS
Time Horizon	**Intersection with Hazeldean**	**C**	**C**	**D**	**D**	**D**
Existing (2020)	Huntmar	**F**	**F**	**F**	D	**E**
	Fringewood	**F**	**F**	C	B	A
	Johnwoods/Victor	**E**	**F**	C	**E**	B
Future Total (2026)	Huntmar	**F**	**F**	**F**	D	**F**
	Fringewood	**F**	**F**	**F**	B	C
	Johnwoods/Victor	**E**	**F**	C	**E**	C

The **Pedestrian Level of Service** (PLOS) targets were not met. Following, the City of Ottawa's MMLOS Guidelines, the reported PLOS is governed by the worst of the PETSI (Pedestrian Exposure to Traffic) LOS and average pedestrian delay LOS which are reporting the same LOS for all three intersections.

The **Bicycle Level of Service** (BLOS) target of 'C' could be met if separated bicycle facilities were provided on Hazeldean Road. Arterial operating speeds and current lane configuration provide minimal opportunity for BLOS improvements.

The **Transit Level of Service** (TLOS) target of 'D' was met at the Hazeldean/Johnwoods/Victor intersection for existing and future conditions. The other two intersections do not meet the target LOS for the future conditions. The target could be met with adjustments to reduce signal timing along north and southbound approaches to under 40 seconds. However, given that it is the minor street approaches that are not meeting the target, the current LOS is considered acceptable.

The **Truck Level of Service** (TkLOS) target of 'D' was met for the Hazeldean/Huntmar and Hazeldean/ Fringewood intersection. Additionally, the target could be met at the Hazeldean/ Johnwoods/Victor intersection if the minor street (Johnswood and Victor) added an additional traffic lane. However, the minor roads are not designated truck routes and the current LOS is considered acceptable.

The **Vehicle Level of Service** (VLOS) targets of 'D' were met at Fringewood and Johnwoods / Victor. However, the intersection of Hazeldean Road and Huntmar Drive is operating at or near capacity under the existing and future total conditions. The detailed intersection performance analysis is provided in **Section 4.9.2.2**.

4.9.2.2 *DETAILED INTERSECTION PERFORMANCE ANALYSIS*

The existing and future conditions were analyzed based upon the peak hour traffic volumes presented in **Section 3**. The City of Ottawa's MMLOS Guidelines assigns the vehicle level of service (VLOS) based on ranges of volume to capacity ratio, as indicated in **Table 4-8**. The City's MMLOS Guidelines recommend targets for the Vehicle Level of Service (VLOS) based on their Official Plan Policy / Designation and Road Class and is a LOS 'D' for *Arterial Main Streets*.

Table 4-8. City of Ottawa MMLOS Guidelines, V/C Criteria

VLOS	VOLUME TO CAPACITY RATIO
A	0 – 0.60
B	0.61 – 0.70
C	0.71 – 0.80
D	0.81 – 0.90
E	0.91 – 1.00
F	> 1.00

The intersection was analyzed using Synchro 9 following the analysis parameters in the TIA Guidelines. **Appendix H** contains the detailed Synchro analysis sheets.

EXISTING CONDITIONS

The existing (2020) intersection capacity analysis results are summarized in **Table 4-9**. Under existing conditions, most intersections operate with a VLOS that is below the target VLOS of 'D'. However, during the PM peak period, the Hazeldean/ Huntmar/Iber intersection has an intersection VLOS 'E' and two movements (northbound left and southbound left) have a VLOS 'F' which means that drivers are experiencing delay traversing through the intersection.

Table 4-9. Intersection Capacity Summary for Existing Conditions (2020)

INTERSECTION	INTERSECTION CONTROL	AM PEAK HOUR			PM PEAK HOUR		
		V/C Ratio	VLOS	CRITICAL MOVEMENT	V/C Ratio	VLOS	CRITICAL MOVEMENT
Hazeldean/ Johnwoods/ Victor	Signalized	0.48	A	-	0.66	B	-
Hazeldean /Cedarow	Minor Street Stop Controlled	0.40	A	-	0.49	A	-
Hazeldean/ Fringewood	Signalized	0.33	A	-	0.59	A	-
Hazeldean/ Huntmar/ Iber	Signalized	0.66	B	SBL = F	0.95	E	NBL, SBL = F

FUTURE BACKGROUND CONDITIONS

The intersection VLOS and critical movement remain largely unchanged when compared to the existing conditions. In some instances, the 2021 future background conditions are reported more favourably than the existing conditions. This is a result of the change in Peak Hour Factor (PHF) that the City's TIA Guidelines prescribe for existing conditions (0.9) and future conditions (1.0). When volumes do not significantly change, the future VLOS can be reported as improving since the PHF of 1.0 assumes peak spreading.

Overall, the intersections continue to operate at or below the target VLOS. The intersection capacity results are summarized in **Table 4-10**.

Table 4-10. Intersection Capacity Summary for Background Conditions (2021)

INTERSECTION	INTERSECTION CONTROL	AM PEAK HOUR			PM PEAK HOUR		
		V/C RATIO	VLOS	CRITICAL MOVEMENT	V/C RATIO	VLOS	CRITICAL MOVEMENT
Hazeldean/ Johnwoods/ Victor	Signalized	0.44	A	-	0.60	B	-
Hazeldean /Cedarow	Minor Street Stop Controlled	0.36	A	-	0.45	A	-
Hazeldean/ Fringewood	Signalized	0.31	A	-	0.54	A	-
Hazeldean/ Huntmar/ Iber	Signalized	0.61	B	SBL = F	0.88	D	NBL, SBL = F

The intersection capacity results for the 2026 future background conditions are summarized in **Table 4-11**. The notable change is at the Hazeldean/Huntmar/Iber intersection that experiences a PM peak hour increase from a LOS 'D' to a LOS 'E' which exceeds the VLOS target of 'D'. The City of Ottawa's Transportation Master Plan proposes a new north-south arterial road east of Huntmar that would likely alleviate some of the capacity constraints being exhibited at the Hazeldean /Huntmar/ Iber intersection.

Table 4-11. Intersection Capacity Summary for Background Conditions (2026)

INTERSECTION	INTERSECTION CONTROL	AM PEAK HOUR			PM PEAK HOUR		
		V/C RATIO	VLOS	CRITICAL MOVEMENT	V/C RATIO	VLOS	CRITICAL MOVEMENT
Hazeldean/ Johnwoods/ Victor	Signalized	0.50	A	-	0.67	B	-
Hazeldean /Cedarow	Minor Street Stop Controlled	0.42	A	-	0.50	A	-
Hazeldean/ Fringewood	Signalized	0.42	A	-	0.60	B	-
Hazeldean/ Huntmar/ Iber	Signalized	0.75	C	SBL = F	0.97	E	WBL = E NBL, SBL = F

FUTURE TOTAL CONDITIONS

The traffic operation results for the 2021 future total scenario are unchanged compared to the 2021 background scenario with all intersections are at or below the target VLOS 'D'. The intersection capacity results are summarized in **Table 4-12**.

Table 4-12. Intersection Capacity Summary for Total Conditions (2021)

INTERSECTION	INTERSECTION CONTROL	AM PEAK HOUR			PM PEAK HOUR		
		V/C RATIO	VLOS	CRITICAL MOVEMENT	V/C RATIO	VLOS	CRITICAL MOVEMENT
Hazeldean/ Johnwoods/ Victor	Signalized	0.49	A	-	0.61	B	-
Hazeldean /Cedarow	Minor Street Stop Controlled	0.21	A	-	0.46	A	-
Hazeldean/ Fringewood	Signalized	0.40	A	-	0.58	A	-
Hazeldean/ Huntmar/ Iber	Signalized	0.68	B	SBL = F	0.88	D	NBL, SBL = F
Hazeldean / Site Access	Right-in / Right-out	0.39	A	-	0.35	A	-
Fringewood / Site Access	Minor Street Stop Controlled	0.05	A	-	0.04	A	-

The intersection capacity results for the 2026 future total conditions are summarized in **Table 4-13.** The additional traffic generated by the development increases the VLOS during the peak hour at the signalized intersections.

Table 4-13. Intersection Capacity Summary for Total Conditions (2026)

INTERSECTION	INTERSECTION CONTROL	AM PEAK HOUR			PM PEAK HOUR		
		V/C RATIO	VLOS	CRITICAL MOVEMENT	V/C RATIO	VLOS	CRITICAL MOVEMENT
Hazeldean/ Johnwoods/ Victor	Signalized	0.57	A	-	0.72	C	-
Hazeldean /Cedarow	Minor Street Stop Controlled	0.47	A	-	0.53	A	-
Hazeldean/ Fringewood	Signalized	0.55	A	-	0.74	C	-
Hazeldean/ Huntmar/ Iber	Signalized	0.85	D	NBL, SBL = F	1.07	F	EBT = E NBL, SBL = F
Hazeldean / Site Access	Right-in / Right-out	0.45	A	-	0.44	A	-

INTERSECTION	INTERSECTION CONTROL	AM PEAK HOUR			PM PEAK HOUR		
		V/C RATIO	VLOS	CRITICAL MOVEMENT	V/C RATIO	VLOS	CRITICAL MOVEMENT
Fringewood / Site Access	Minor Street Stop Controlled	0.05	A	-	0.08	A	-

4.9.2.3 *DESIGN ELEMENTS*

The site access from Hazeldean Road is located on the approach to the Hazeldean / Fringewood intersection with a corner clearance of 50m (**Section 4.4.1**). To determine the peak hour interaction between the intersection and the access a queueing and blocking analysis was completed using the SimTraffc v9 software. The simulation results considered ten runs of 60-minutes each for each peak hour. The average and maximum eastbound queue lengths for the at both the intersection and site access are summarized in **Table 4-14** and the SimTraffic reports are provided in **Appendix I**.

During the peak hours, the total average queue length on the eastbound approach is estimated to be between 50m and 75m. Vehicles entering and exiting at the Hazeldean site access may have to wait for the queue to clear prior to completing their maneuver. The intersection operates with reserve capacity (**Table 4-13**) during both time periods and there will be sufficient gaps in traffic for this maneuver each cycle of signalization.

There is no impact to the westbound traffic on Hazeldean Road because westbound left turns and northbound left turns are prohibited by the existing 1.8m centre median.

Table 4-14. Future Total (2026) Queue Lengths on Hazeldean Road at Site Access

QUEUE	EASTBOUND APPROACH	AM PEAK HOUR	PM PEAK HOUR
Average	Hazeldean / Fringewood	34m	40m
	Hazeldean / Site Access	15m	33m
	Total Average Queue	**50m**	**73m**
Maximum	Hazeldean / Fringewood	50m	50m
	Hazeldean / Site Access	55m	86m
	Total Maximum Queue	**105m**	**136m**

4.10 SUMMARY OF IMPROVEMENTS INDICATED AND MODIFICATION OPTIONS

A summary of transportation improvements proposed as part of this Transportation Impact Assessment are presented as follows:

1. Development Design

a) Provision for sustainable modes has been provided on-site through the provision of bicycle parking and off-site through the provision of a new sidewalk on the west side of Fringewood Drive.

b) Design vehicles were assessed for the Site Plan and indicate that accesses accommodate these movements without impacting on built features.

Reference: Section 4.1

2. Parking

a) Peak period parking demand is five vehicles (ITE Parking Generation). The proposed parking of ten parking spaces will meet the anticipated demand and exceed the Zoning By-Law requirement of 6 parking spaces.

Reference: Section 4.2

3. Boundary Street Design

a) The Hazeldean Road cross-section adjacent to the proposed development is consistent with the City's complete streets philosophy and urban design objectives for the area.

b) The Fringewood Drive cross-section adjacent to the proposed development is subject to an Area Traffic Management Study being undertaken by the City of Ottawa. As part of the proposed development a new 2.0 m sidewalk with a 1.75 m median is proposed on the west side of the roadway which would improve the pedestrian experience in that area.

Reference: Section 4.3

4. Transit

a) There is no anticipated impact to transit service since the transit mode share for the proposed gas station is 0%.

Reference: Section 4.7

5. Intersection Design

a) Hazeldean Access: This two-way right-in / right-out access is 9.0 m wide to accommodate a large fuel truck. The egress should include signage to provide positive wayfinding guidance to

motorists exiting the site onto Hazeldean Road eastbound. The curb return should follow the City of Ottawa's Standard Drawing 7.1 (Curb Return Entrances).

b) Fringewood Access: This two-way full movement access is 9.0 m wide to accommodate a large fuel truck. The curb return should follow the City of Ottawa's Standard Drawing 7.1 (Curb Return Entrances).

c) Hazeldean Road / Johnwoods Street / Victor Street: No modifications are proposed.

d) Hazeldean Road / Cedarow Court: No modifications are proposed to support the proposed gas station. Improvements should be considered to support the planned commercial and residential development occupying the remainder of the 5 Orchard Drive lands.

e) Hazeldean Road / Fringewood Drive: No modifications are proposed.

f) Hazeldean Road / Huntmar Drive / Iber Road: No modifications are proposed. The Synchro analysis indicates that the intersection is over capacity under existing conditions. The City of Ottawa's Transportation Master Plan identifies a new north-south arterial road in this area which could reduce the demand along Huntmar / Iber and improve operations at this intersection.

Reference: Sections 4.4 and 4.9

6. Summary

Based on the results of this Transportation Impact Assessment, the proposed gas station located at 5 Orchard Drive can be accommodated without adverse impacts to planned transportation network and services associated with the future 2026 planning horizon.

APPENDIX

A SCREENING FORM

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	5 Orchard Drive
Description of Location	Southwest corner of Hazeldean Road / Fringewood Drive
Land Use Classification	Arterial Mainstreet [AM9]
Development Size (units)	211 sq/m Convenience Store, 198 sq/m gas bar canopy, 97 sq/m car wash
Development Size (m^2)	
Number of Accesses and Locations	1 x Fringewood, 70m south of Hazeldean 1 x Hazendean, part of Campanale Future Commercial development
Phase of Development	Single Phase
Buildout Year	2020

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

Estimated 80 -110 peak hour person-trips

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?		
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

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

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

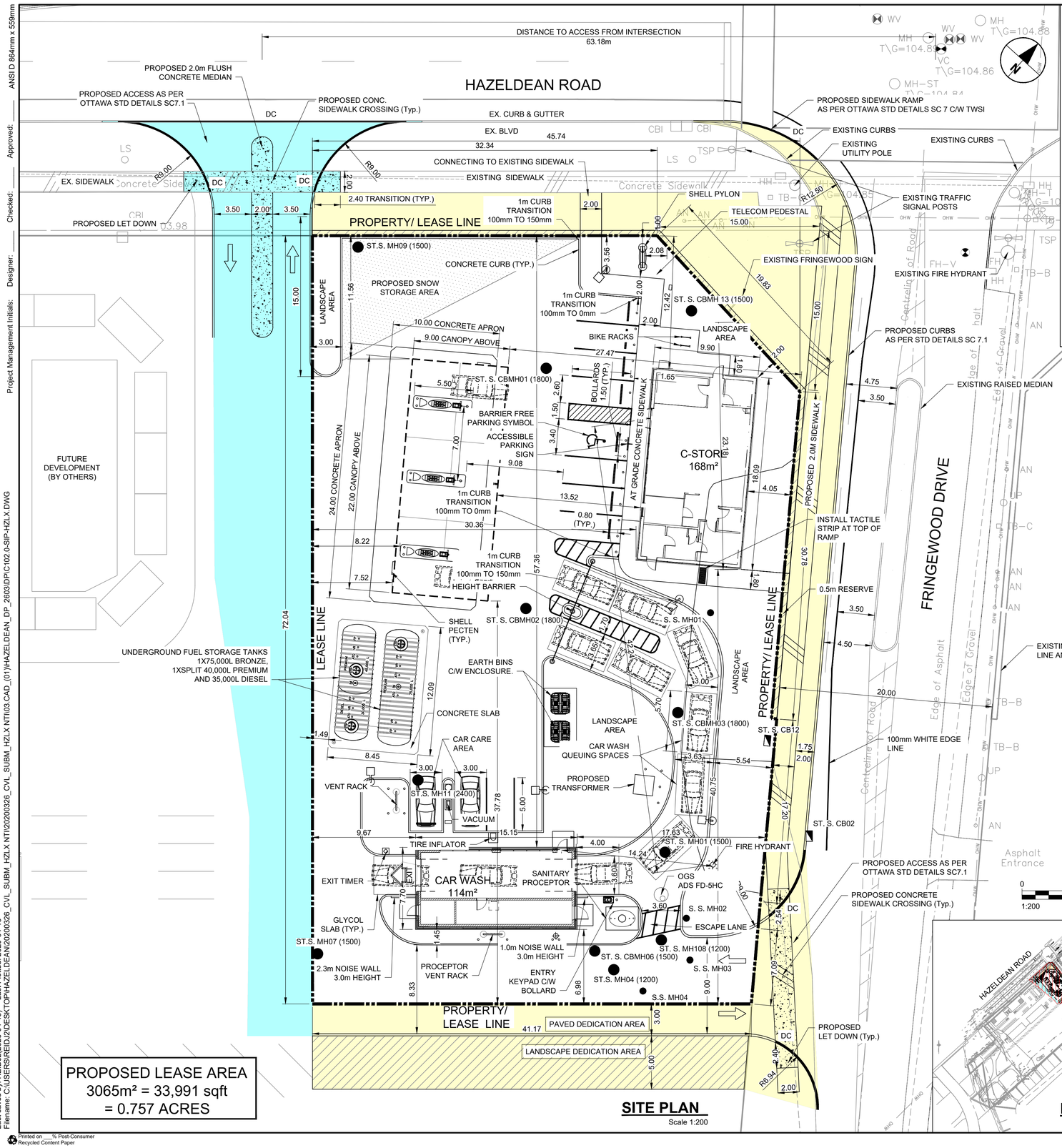
5. Summary

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

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

APPENDIX

B SITE PLAN



SITE PLAN
Scale 1:200

KEY PLAN
Scale 1:5000

NOTES

1. FOR GENERAL NOTES SEE DRAWING C001.0
2. WORKS IN THE MUNICIPAL RIGHT-OF-WAY BEING PERFORMED BY THE CITY'S CONTRACTOR WILL REQUIRE 4 TO 6 WEEK NOTICE PRIOR TO COMMENCEMENT OF CONSTRUCTION AFTER ALL DRAWINGS HAVE BEEN APPROVED AND SECURITIES HAVE BEEN RECEIVED.
3. REFER TO THE SITE GRADING PLAN PREPARED BY AECOM, DRAWING C104.0 FOR THE PURPOSES OF OBTAINING SITE GRADING INFORMATION.
4. EXTERNAL GARBAGE ENCLOSURE TO BE COMPLIANT WITH THE URBAN DESIGN GUIDELINE #39

LEGEND

- EXISTING TRAFFIC SIGNAL
- EXISTING FIRE HYDRANT
- PROPOSED PROPERTY AND LEASE LINE
- LANDSCAPE DEDICATION AREA
- OFF-LEASE AREA, INCLUDING LANDSCAPE, TO BE DESIGNED, PERMITTED, AND BUILT BY SHELL
- OFF-LEASE AREA PAVING TO BE PERMITTED BY SHELL. DESIGN AND CONSTRUCTION BY CAMPANALE
- VACUUM
- TIRE INFLATOR
- EXISTING CURBS
- PROPOSED CURBS
- PROPOSED STORMWATER / CATCH BASIN MANHOLE / MANHOLE — ST.S. CBMH / ST.S MH
- PROPOSED SANITARY MANHOLE — S.S. MH
- PROPOSED STORMWATER CATCH BASIN — ST.S. CB
- PROPOSED OGS ADS FD-5HC
- PROPOSED FIRE HYDRANT — HYD
- GAS METER
- PROPOSED LIGHT STANDARD
- EARTH BIN
- SANITARY PROCEPTOR
- DEPRESSED CURBS — DC

DETAILS OF DEVELOPMENT

DATA	REQUIRED	PROPOSED
ZONING	ARTERIAL MAINSTREET SUBZONE 9 - AM9	
SETBACKS (C-STORE)	Front Yard (Hazeldean Road) - No Min. Corner Yard (Corner Property Line) - No Min. Exterior Side Yard (Fringewood Drive) - N/A Interior Side Yard (West Lease Line) - No Min. Rear Yard (South lease line) - Min. 10 m	12.42 m 2.00 m 4.05 m 30.36 m 40.75 m
SETBACKS (CARWASH)	Front Yard (Hazeldean Road) - No Min. Exterior Side Yard (Fringewood Drive) - N/A Interior Side Yard (West lease line) - No Min. Rear Yard(South lease line) - 10 m	57.36 m 17.63 m 9.67 m 6.98 m
SETBACKS (CANOPY)	Front Yard (Hazeldean Road) - No Min. Exterior Side Yard (Fringewood Drive) - N/A Interior Side Yard (West Lease line) - No Min. Rear Yard (South Lease Line) - Min. 10 m	11.56 m 27.47 m 7.52 m 37.78 m
LOT AREA (sq.m.)	NO MIN.	3065 sq.m.
BUILDING COVERAGE (%)	NO MIN.	9.70%
LOT FRONTAGE - MIN. (m)	N/A	45.74 m
LOT DEPTH (m)	N/A	72.04 m
FLOOR AREA RATIO	NOT SPECIFIED	0.054 (C-STORE)
		0.037 (CARWASH)
LANDSCAPED AREA	NOT SPECIFIED	636 sq.m.
LANDSCAPE COVERAGE	MIN 15.00%	20.75%
BUILDING HEIGHT MAX.(m)	15m	5.14m (C-STORE)
		6.00m (CAR WASH)
		5.30m (CANOPY)
CANOPY	NOT SPECIFIED	198 sq.m.
C-STORE	NOT SPECIFIED	168 sq.m
CARWASH	NOT SPECIFIED	114 sq.m
CARWASH STACKING	10 SPACES	10 SPACES
PAVED AREA	NOT SPECIFIED	1613.50 sq.m.
LOADING SPACES (3.5m WIDE X 9m LONG X 4.2m. VERT CLEARANCE)	0	0
PARKING	REQUIRED	PROVIDED
Barrier-Free — Spaces	1	1
Barrier-Free — Stall Length	5.2 m (MIN)	5.5 m
Barrier-Free — Stall Width	3.4 m (MIN)	3.4 m
Standard Parking — Spaces	6	11
Standard Parking — Stall Length	5.2 m (MIN) 6.7 m (MAX)	5.5 m
Standard Parking — Stall Width	2.6 m (MIN) 3.1 m (MAX)	2.6 m
Overall Number of Spaces	7	12
Aisle Width	6.7 m (MIN)	9.0 m
Bicycle Parking	1	4

LAND USE:
NORTH: AM9, AM9(474), AM7(1894)
SOUTH: AM9
EAST: AM7
WEST: O1R

AECOM

PROJECT

Shell Canada Products
Hazeldean Road and
Fringewood Drive NTI

5 Orchard Drive
Stittsville, Ontario

CLIENT

Shell Canada
400-4th Avenue SW
Calgary, AB T2P 0J4
403.252.4554 tel
www.shell.ca

CONSULTANT

AECOM Canada
4th Floor - 3292 Production Way
Burnaby, BC V5A 4R4
604.444.6400 tel 604.294.8597 fax
www.aecom.com

LICENSED PROFESSIONAL ENGINEER Q. SHAFI 100515409 PROVINCE OF ONTARIO
March 31, 2020

REGISTRATION

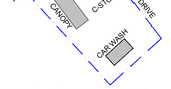
LEGAL DESCRIPTION
PART OF BLOCK 21 OF DRAFT PLAN OF SUBDIVISION OF PARTS OF LOTS 26 AND 27 CONCESSION 11 GEOGRAPHIC TOWNSHIP OF GOULBOURN (CITY OF OTTAWA)

ISSUE/REVISION

A	2020-03-31	ISSUED FOR SPA
I/R	DATE	DESCRIPTION

DRAWN BY
SG

KEY PLAN



GLOBAL PROJECT ID NUMBER
CAN01444

SHEET TITLE
SITE PLAN

AECOM FILE NAME
C102.0-SIP-HZLX

SHEET NUMBER
C102.0

ANSI D 864mm x 559mm
Approved:
Checked:
Designer:
Project Management Initials:
Last Plotted: 2020-04-16
Last saved by: REIDJ2(2020-04-15)
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APPENDIX

C TRANS O-D RESULTS

Kanata - Stittsville

Demographic Characteristics

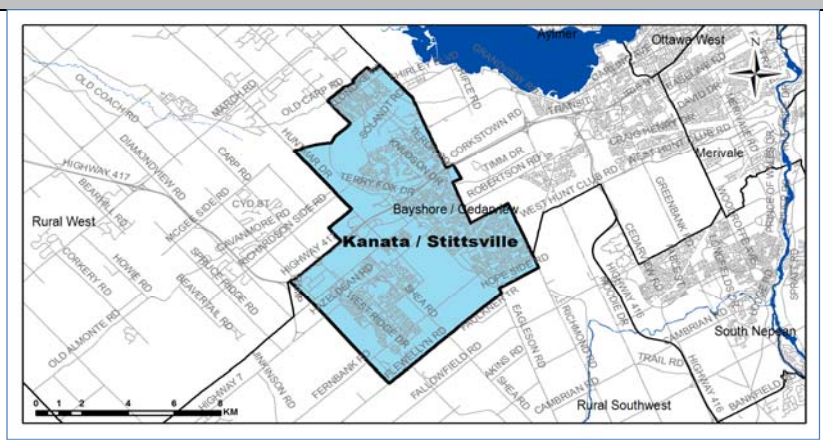
Population	105,210	Actively Travelled	83,460
Employed Population	49,640	Number of Vehicles	64,540
Households	38,010	Area (km^2)	82.6

Occupation

Status (age 5+)	Male	Female	Total
Full Time Employed	24,670	19,590	44,260
Part Time Employed	1,540	3,840	5,380
Student	13,630	13,410	27,040
Retiree	6,480	8,350	14,820
Unemployed	850	940	1,790
Homemaker	160	3,310	3,470
Other	350	1,010	1,360
Total:	47,690	50,440	98,120

Traveller Characteristics	Male	Female	Total
Transit Pass Holders	5,940	6,920	12,860
Licensed Drivers	36,280	36,790	73,070
Telecommuters	200	380	580
Trips made by residents	135,300	143,330	278,630

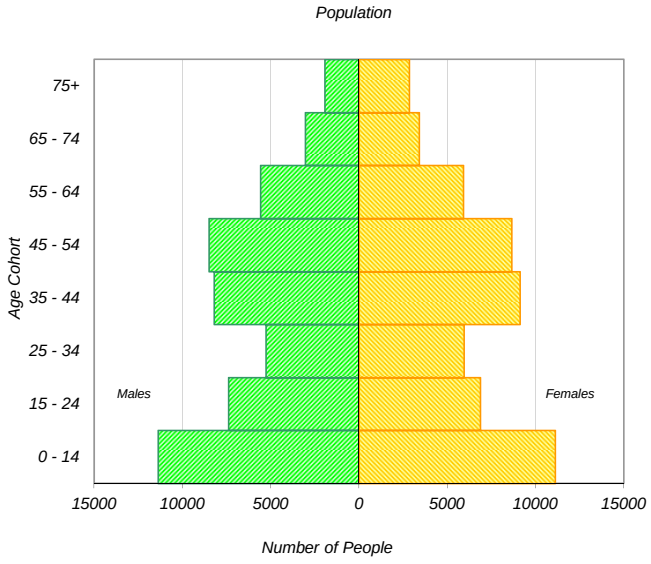
Selected Indicators	
Daily Trips per Person (age 5+)	2.84
Vehicles per Person	0.61
Number of Persons per Household	2.77
Daily Trips per Household	7.33
Vehicles per Household	1.70
Workers per Household	1.31
Population Density (Pop/km2)	1270

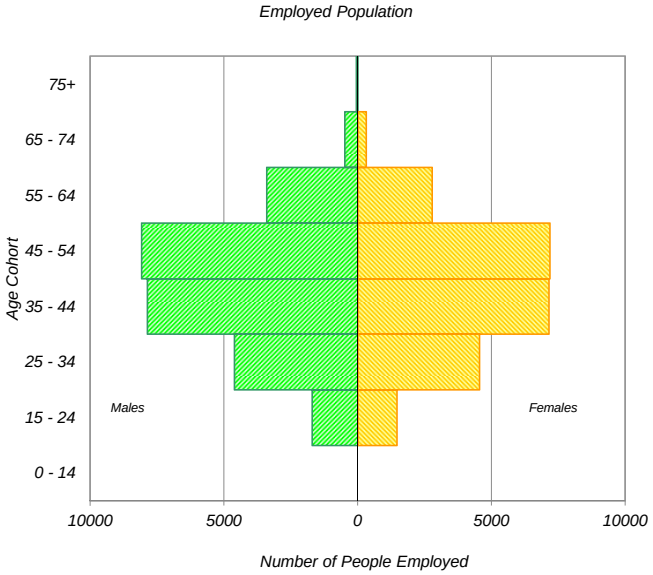


Household Size		
1 person	5,810	15%
2 persons	11,660	31%
3 persons	7,490	20%
4 persons	8,890	23%
5+ persons	4,160	11%
Total:	38,010	100%

Households by Vehicle Availability		
0 vehicles	1,050	3%
1 vehicle	14,090	37%
2 vehicles	19,110	50%
3 vehicles	3,000	8%
4+ vehicles	770	2%
Total:	38,010	100%

Households by Dwelling Type		
Single-detached	21,610	57%
Semi-detached	3,890	10%
Townhouse	10,550	28%
Apartment/Condo	1,960	5%
Total:	38,010	100%



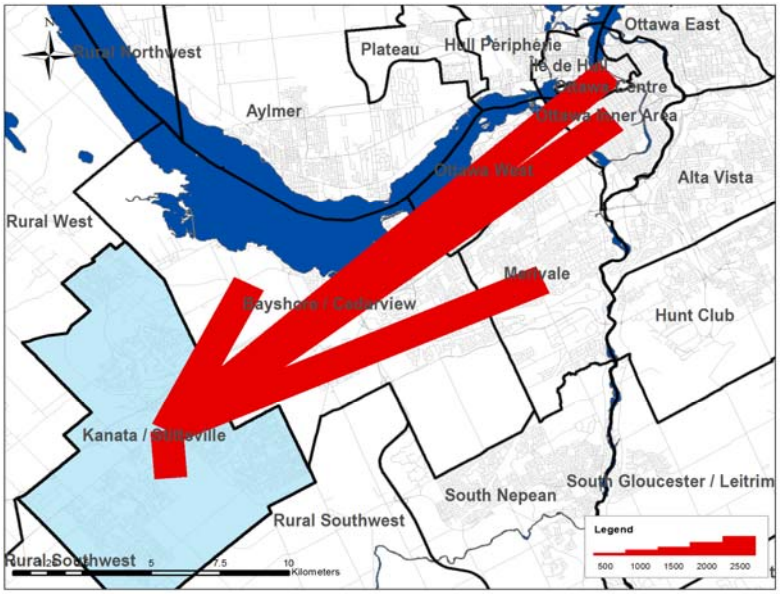


* In 2005 data was only collected for household members aged 11+ therefore these results cannot be compared to the 2011 data.

Travel Patterns

Top Five Destinations of Trips from Kanata - Stittsville

AM Peak Period



Summary of Trips to and from Kanata - Stittsville

AM Peak Period (6:30 - 8:59)	Destinations of Trips From District	% Total	Origins of Trips To District	% Total
Districts				
Ottawa Centre	4,560	8%	140	0%
Ottawa Inner Area	3,350	6%	970	2%
Ottawa East	660	1%	260	1%
Beacon Hill	280	0%	170	0%
Alta Vista	1,810	3%	660	1%
Hunt Club	490	1%	420	1%
Merivale	3,410	6%	1,200	3%
Ottawa West	2,020	4%	840	2%
Bayshore / Cedarview	5,010	9%	2,420	5%
Orléans	290	1%	500	1%
Rural East	100	0%	30	0%
Rural Southeast	50	0%	260	1%
South Gloucester / Leitrim	60	0%	140	0%
South Nepean	690	1%	1,800	4%
Rural Southwest	1,130	2%	1,850	4%
Kanata / Stittsvile	30,360	54%	30,360	66%
Rural West	1,050	2%	3,250	7%
Île de Hull	670	1%	30	0%
Hull Périphérie	160	0%	30	0%
Plateau	100	0%	230	0%
Aylmer	0	0%	190	0%
Rural Northwest	20	0%	60	0%
Pointe Gatineau	20	0%	80	0%
Gatineau Est	0	0%	60	0%
Rural Northeast	30	0%	50	0%
Buckingham / Masson-Angers	30	0%	10	0%
Ontario Sub-Total:	55,320	98%	45,270	98%
Québec Sub-Total:	1,030	2%	740	2%
Total:	56,350	100%	46,010	100%

Trips by Trip Purpose

24 Hours	From District		To District		Within District	
Work or related	27,180	29%	17,020	18%	14,550	9%
School	7,070	7%	2,500	3%	15,110	9%
Shopping	6,070	6%	9,150	10%	22,480	14%
Leisure	8,450	9%	10,590	11%	17,090	11%
Medical	2,520	3%	1,170	1%	2,660	2%
Pick-up / drive passenger	6,570	7%	5,470	6%	15,190	9%
Return Home	33,610	35%	45,620	48%	65,770	41%
Other	3,560	4%	3,590	4%	8,440	5%
Total:	95,030	100%	95,110	100%	161,290	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Work or related	18,030	69%	11,020	70%	7,430	24%
School	4,890	19%	2,280	15%	11,740	39%
Shopping	170	1%	320	2%	760	3%
Leisure	340	1%	400	3%	780	3%
Medical	330	1%	230	1%	350	1%
Pick-up / drive passenger	1,260	5%	580	4%	4,760	16%
Return Home	290	1%	380	2%	1,980	7%
Other	670	3%	430	3%	2,560	8%
Total:	25,980	100%	15,640	100%	30,360	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Work or related	390	2%	350	1%	930	2%
School	370	2%	0	0%	90	0%
Shopping	1,030	5%	1,910	7%	5,100	14%
Leisure	2,140	11%	3,080	11%	4,130	11%
Medical	230	1%	180	1%	400	1%
Pick-up / drive passenger	1,980	10%	1,980	7%	3,410	9%
Return Home	12,130	64%	20,550	71%	21,560	58%
Other	680	4%	860	3%	1,850	5%
Total:	18,950	100%	28,910	100%	37,470	100%

Peak Period (%)	Total:	% of 24 Hours	Within District (%)
24 Hours	351,430		46%
AM Peak Period	71,980	20%	42%
PM Peak Period	85,330	24%	44%

Trips by Primary Travel Mode

24 Hours	From District		To District		Within District	
Auto Driver	63,470	67%	63,830	67%	92,190	57%
Auto Passenger	15,220	16%	14,920	16%	31,880	20%
Transit	12,200	13%	12,270	13%	4,050	3%
Bicycle	360	0%	410	0%	960	1%
Walk	40	0%	50	0%	21,080	13%
Other	3,730	4%	3,660	4%	11,130	7%
Total:	95,020	100%	95,140	100%	161,290	100%

AM Peak (06:30 - 08:59)	From District		To District		Within District	
Auto Driver	15,360	59%	11,530	74%	13,630	45%
Auto Passenger	2,450	9%	1,160	7%	5,050	17%
Transit	6,230	24%	1,290	8%	1,210	4%
Bicycle	30	0%	80	1%	220	1%
Walk	0	0%	40	0%	5,730	19%
Other	1,900	7%	1,560	10%	4,510	15%
Total:	25,970	100%	15,660	100%	30,350	100%

PM Peak (15:30 - 17:59)	From District		To District		Within District	
Auto Driver	13,850	73%	17,660	61%	21,240	57%
Auto Passenger	3,240	17%	4,270	15%	8,570	23%
Transit	1,270	7%	5,980	21%	670	2%
Bicycle	40	0%	100	0%	260	1%
Walk	40	0%	0	0%	4,570	12%
Other	520	3%	910	3%	2,160	6%
Total:	18,960	100%	28,920	100%	37,470	100%

Avg Vehicle Occupancy	From District	To District	Within District
24 Hours	1.24	1.23	1.35
AM Peak Period	1.16	1.10	1.37
PM Peak Period	1.23	1.24	1.40

Transit Modal Split	From District	To District	Within District
24 Hours	13%	13%	3%
AM Peak Period	26%	9%	6%
PM Peak Period	7%	21%	2%

APPENDIX

D CRASH DATA

City Operations - Transportation Services

Collision Details Report - Public Version

From: January 1, 2014 **To:** December 31, 2018

Location: FRINGEWOOD DR btwn HAZELDEAN RD & CLOVERLOFT CRT

Traffic Control: No control **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Jun-04, Thu,12:27	Clear	Turning movement	P.D. only	Dry	South	Making "U" turn	Pick-up truck	Other motor vehicle	
					South	Going ahead	Pick-up truck	Other motor vehicle	

Location: HAZELDEAN RD @ FRINGEWOOD DR

Traffic Control: Stop sign **Total Collisions:** 7

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Sep-08, Mon,18:41	Clear	SMV other	Non-fatal injury	Dry	North	Turning left	Pick-up truck	Pedestrian	1
2015-Jun-22, Mon,16:55	Clear	Rear end	P.D. only	Dry	East	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					East	Stopped	Automobile, station wagon	Other motor vehicle	
2016-Jun-22, Wed,11:50	Clear	SMV other	P.D. only	Dry	North	Slowing or stopping	Pick-up truck	Ran off road	
2015-Aug-29, Sat,16:56	Rain	Turning movement	Non-fatal injury	Wet	West	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Going ahead	Automobile, station wagon	Other motor vehicle	
2017-Jul-21, Fri,16:11	Clear	Angle	Non-fatal injury	Dry	West	Going ahead	Bicycle	Other motor vehicle	
					North	Turning right	Passenger van	Cyclist	

2018-Sep-11, Tue,12:39	Clear	Rear end	P.D. only	Wet	West	Going ahead	Automobile, station wagon	Other motor vehicle	
					West	Stopped	Automobile, station wagon	Other motor vehicle	
2018-Dec-21, Fri,15:10	Rain	Rear end	P.D. only	Wet	East	Turning left	Automobile, station wagon	Other motor vehicle	
					East	Turning left	Automobile, station wagon	Other motor vehicle	

Location: HAZELDEAN RD btwn CEDAROW CRT & FRINGEWOOD DR

Traffic Control: No control

Total Collisions: 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Sep-17, Wed,17:24	Clear	Rear end	P.D. only	Dry	West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
					West	Slowing or stopping	Automobile, station wagon	Other motor vehicle	
2015-Apr-18, Sat,10:47	Clear	Angle	P.D. only	Dry	South	Turning left	Automobile, station wagon	Cyclist	
					East	Going ahead	Bicycle	Other motor vehicle	

Location: HAZELDEAN RD btwn FRINGEWOOD DR & HUNTMAR DR

Traffic Control: No control

Total Collisions: 4

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2014-Jan-09, Thu,17:44	Clear	Angle	P.D. only	Dry	South	Turning right	Unknown	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	
2014-Mar-21, Fri,18:10	Clear	Sideswipe	P.D. only	Dry	West	Changing lanes	Automobile, station wagon	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

2015-Feb-14, Sat,06:08	Snow	SMV other	P.D. only	Ice	East	Going ahead	Automobile, station wagon	Curb
2018-Apr-20, Fri,15:15	Clear	Angle	P.D. only	Dry	South	Turning right	Truck - tank	Other motor vehicle
					West	Going ahead	Pick-up truck	Other motor vehicle

Location: HAZELDEAN RD btwn SWEETNAM DR & CEDAROW CRT

Traffic Control: No control

Total Collisions: 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2016-Dec-20, Tue,15:05	Clear	Rear end	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	
					East	Stopped	School bus	Other motor vehicle	
2018-Jul-19, Thu,13:33	Clear	Sideswipe	P.D. only	Dry	West	Pulling away from shoulder or curb	Pick-up truck	Other motor vehicle	
					West	Going ahead	Automobile, station wagon	Other motor vehicle	

APPENDIX

E TDM CHECKLIST

Introduction

The City of Ottawa's *Transportation Impact Assessment (TIA) Guidelines* (specifically Module 4.1—Development Design) requires proponents of qualifying developments to use the City's **TDM-Supportive Development Design and Infrastructure Checklist** to assess the opportunity to implement design elements that are supportive of sustainable modes. The goal of this assessment is to ensure that the development provides safe and efficient access for all users, while creating an environment that encourages walking, cycling and transit use.

The remaining sections of this document are:

- Using the Checklist
- Glossary
- TDM-Supportive Development Design and Infrastructure Checklist: Non-Residential Developments
- TDM-Supportive Development Design and Infrastructure Checklist: Residential Developments

Readers are encouraged to contact the City of Ottawa's TDM Officer for any guidance and assistance they require to complete this checklist.

Using the Checklist

This **TDM-Supportive Development Design and Infrastructure Checklist** document includes two actual checklists, one for non-residential developments (office, institutional, retail or industrial) and one for residential developments (multi-family or condominium only; subdivisions are exempt). Readers may download the applicable checklist in electronic format and complete it electronically, or print it out and complete it by hand. As an alternative, they may create a freestanding document that lists the design and infrastructure measures being proposed and provides additional detail on them.

Each measure in the checklist is numbered for easy reference. Each measure is also flagged as:

- 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.

Glossary

This glossary defines and describes the following measures that are identified in the **TDM-Supportive Development Design and Infrastructure Checklist**:

Walking & cycling: Routes
- Building location & access points
- Facilities for walking & cycling
- Amenities for walking & cycling

Walking & cycling: End-of-trip facilities
- Bicycle parking
- Secure bicycle parking
- Shower & change facilities
- Bicycle repair station

Transit
- Walking routes to transit
- Customer amenities

Ridesharing
- Pick-up & drop-off facilities
- Carpool parking

Carsharing & bikesharing
- Carshare parking spaces
- Bikeshare station location

Parking
- Number of parking spaces
- Separate long-term & short-term parking areas

Other
- On-site amenities to minimize off-site trips

In addition to specific references made in this glossary, readers should consult the City of Ottawa's design and planning guidelines for a variety of different land uses and contexts, available on the City's website at www.ottawa.ca. Readers may also find the following resources to be helpful:

- *Promoting Sustainable Transportation through Site Design*, Institute of Transportation Engineers, 2004 (www.cite7.org/wpdm-package/iterp-promoting-sustainable-transportation)
- *Bicycle End-of-Trip Facilities: A Guide for Canadian Municipalities and Employers*, Transport Canada, 2010 (www.fcm.ca/Documents/tools/GMF/Transport_Canada/BikeEndofTrip_EN.pdf)

▶ *Walking & cycling: Routes*

Building location & access points. Correctly positioning buildings and their entrances can help make walking convenient, comfortable and safe. Minimizing travel distances and maximizing visibility are key.

Facilities for walking & cycling. The Official Plan gives clear direction on the provision and design of walking and cycling facilities for both access and circulation. On larger, busier sites (e.g. multi-building campuses) the inclusion of sidewalks, pathways, marked crossings, stop signs and traffic calming features can create a safer and more supportive environment for active transportation.

Amenities for walking & cycling. Lighting, landscaping, benches and wayfinding can make walking and cycling safer and more secure, comfortable and accessible.

▶ *Walking & cycling: End-of-trip facilities*

Bicycle parking. The Official Plan and Zoning By-law both address the need for adequate bicycle parking at developments. Weather protection and theft prevention are major concerns for commuters who spend hundreds or thousands of dollars on a quality bicycle. Bicycle racks should have a design that enables secure locking while preventing damage to wheels. They should be located within sight of busy areas such as main building entrances or staffed parking kiosks.

Secure bicycle parking. Ottawa's Zoning By-law requires a secure area for bicycles at office or residential developments having more than 50 bicycle parking spaces. Lockable outdoor bike cages or indoor storage rooms that limit access to registered users are ideal.

Shower & change facilities. Longer-distance cyclists, joggers and even pedestrians can need a place to shower and change at work; the lack of such facilities is a major barrier to active commuting. Lockers and drying racks provide a place to store gear away from workspaces, and showers and grooming stations allow commuters to make themselves presentable for the office.

Bicycle repair station. Cycling commuters can experience maintenance issues that make the homeward trip difficult or impossible. A small supply of tools (e.g. air pump, Allen keys, wrenches) and supplies (e.g. inner tube patches, chain lubricant) in the workplace can help.

▶ *Transit*

Customer amenities. Larger developments that feature an on-site transit stop can make transit use more attractive by providing shelters, lighting and benches. Even better, they could integrate the passenger waiting area into a building entrance.

▶ *Ridesharing*

Pick-up & drop-off facilities. Having a safe place to load or unload passengers (for carpools as well as taxis and ride-hailing services) without obstructing pedestrians, cyclists or other vehicles can help make carpooling work.

Carpool parking. At destinations with large parking lots (or lots that regularly fill to capacity), signed priority carpool parking spaces can be an effective ridesharing incentive. Priority spaces are frequently abused by non-carpoolers, so a system to provide registered users with vehicle identification tags is recommended.

▶ *Carsharing & bikesharing*

Carshare parking spaces. For developments where carsharing could be an attractive option for employees, visitors or residents, ensuring an attractive location for future carshare parking spaces can avoid challenges associated with future retrofits.

Bikeshare station location. For developments where bikesharing could be an attractive option for employees, visitor or residents, ensuring an attractive location for a future bikeshare station can avoid challenges associated with future retrofits.

▶ *Parking*

Number of parking spaces. Parking capacity is an important variable in development design, as it can either support or subvert the mode share targets set during the transportation impact analysis (TIA). While the Zoning By-law establishes any minimum and/or maximum requirements for parking capacity, it also allows a reduction in any minimum to reflect the existence of on-site shower, change and locker rooms provided for cyclists.

Separate long-term & short-term parking areas. Because access to unused parking spaces can be a powerful incentive to drive, developments can better manage their parking supply and travel behaviours by separating long-term from short-term parking through the use of landscaping, gated controls or signs. Doing so makes it difficult for long-term parkers (e.g. commuters) to park in short-term areas (e.g. for visitors) as long as enforcement occurs; it also protects long-term parking capacity for its intended users.

▶ *Other*

On-site amenities to minimize off-site trips. Developments that offer facilities to limit employees' need for a car during their commute (e.g. to drop off children at daycare) or during their workday (e.g. to hit the gym) can free employees to make the commuting decision that otherwise works best for them.

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

Legend

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

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

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

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

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

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

APPENDIX

F AUTOTURN SWEPT PATH

5 ORCHARD DRIVE TRANSPORTATION IMPACT ASSESSMENT

APPENDIX F: SWEPT PATH FIGURES

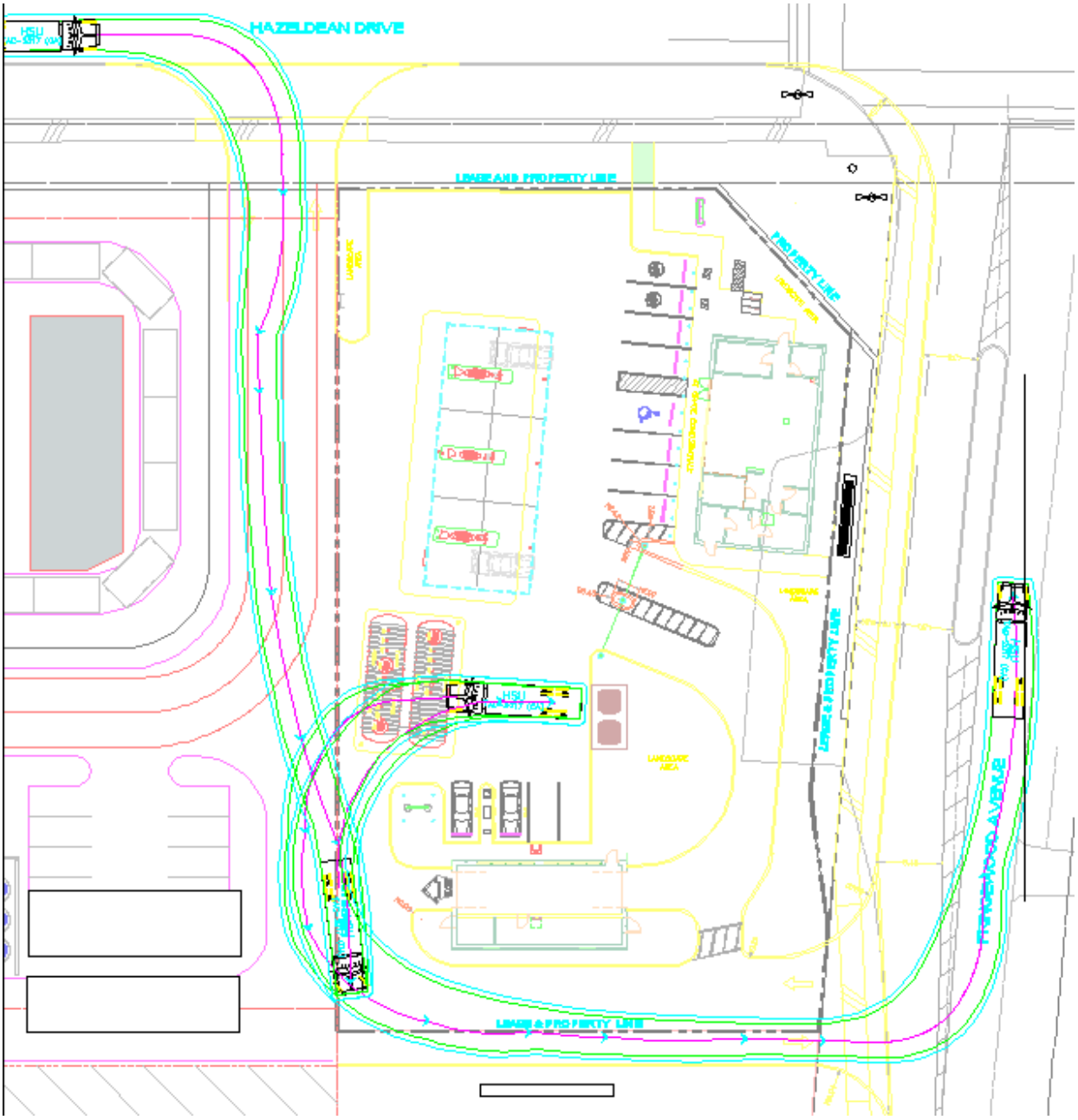


Figure 1. HSU Circulating Through Site (Hazeldean Drive Entrance)

Suite 300
2611 Queensview Drive
Ottawa, ON, Canada K2B 8K2

T: +1 613 829-2800
F: +1 613 829-8299
wsp.com

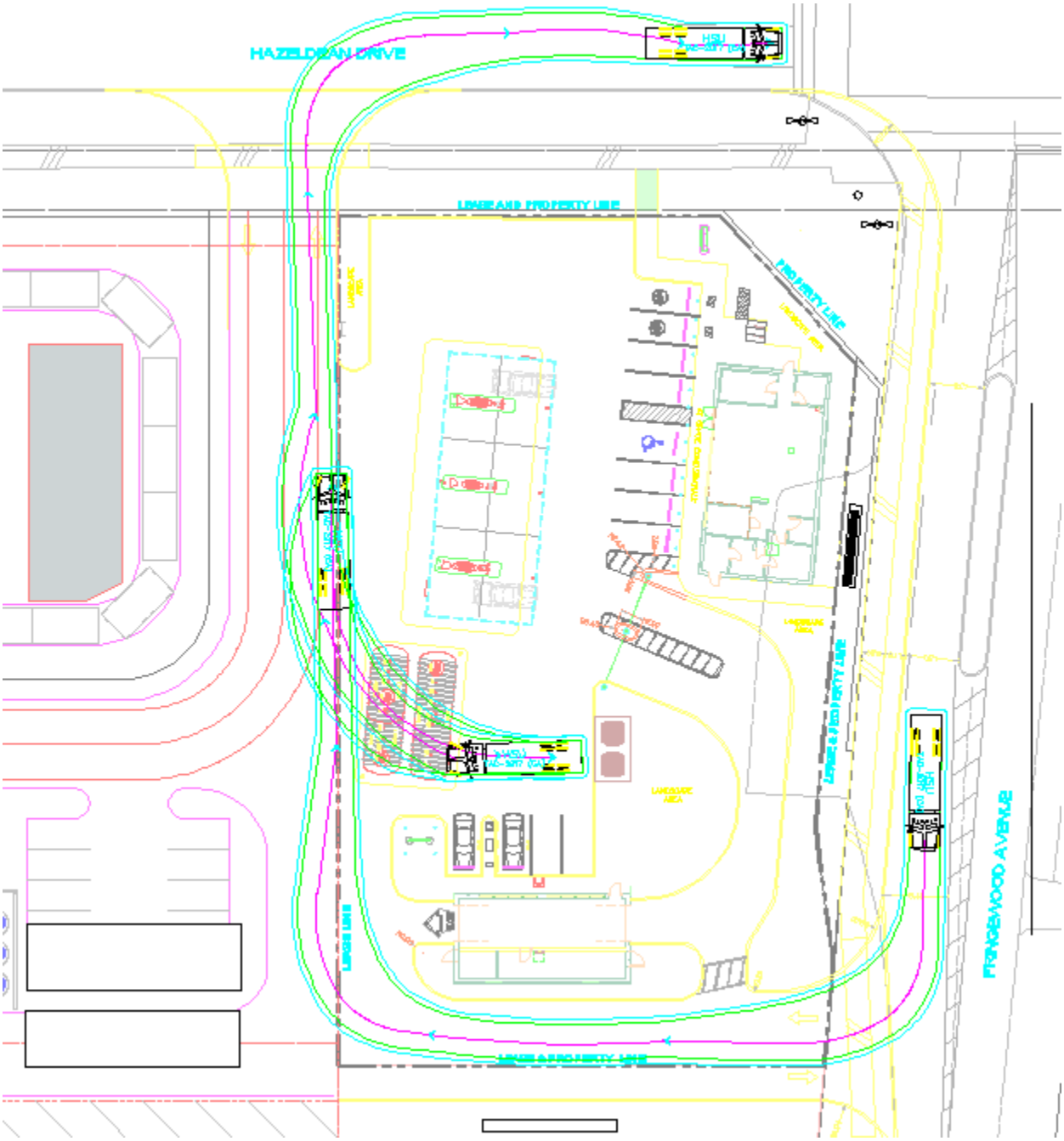


Figure 2. HSU Circulating Through Site (Fringewood Avenue Entrance)

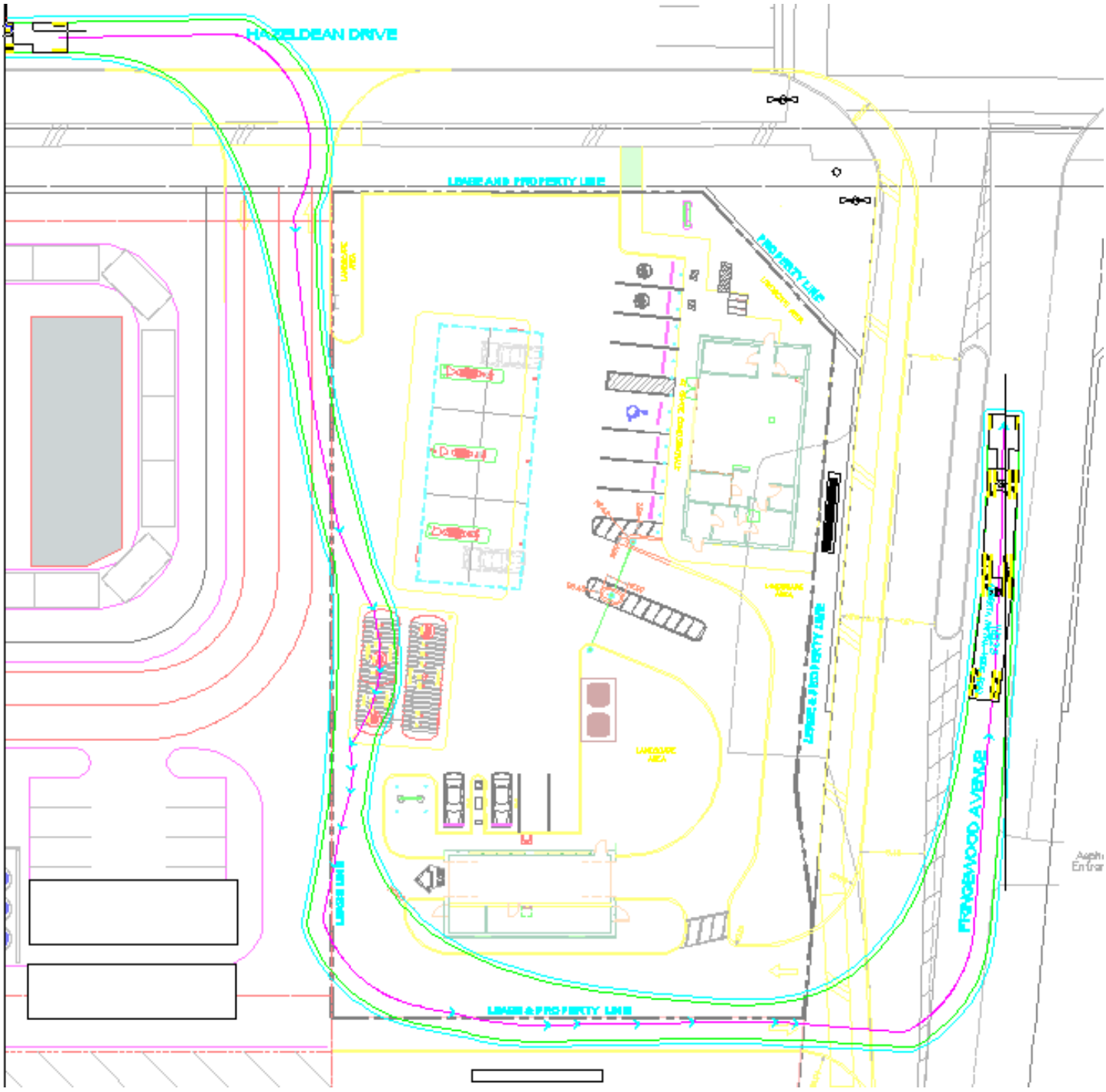


Figure 3. Fueling Truck (Alberta INFTRA-HGDG) Circulating Through Site (Hazeldean Entrance)

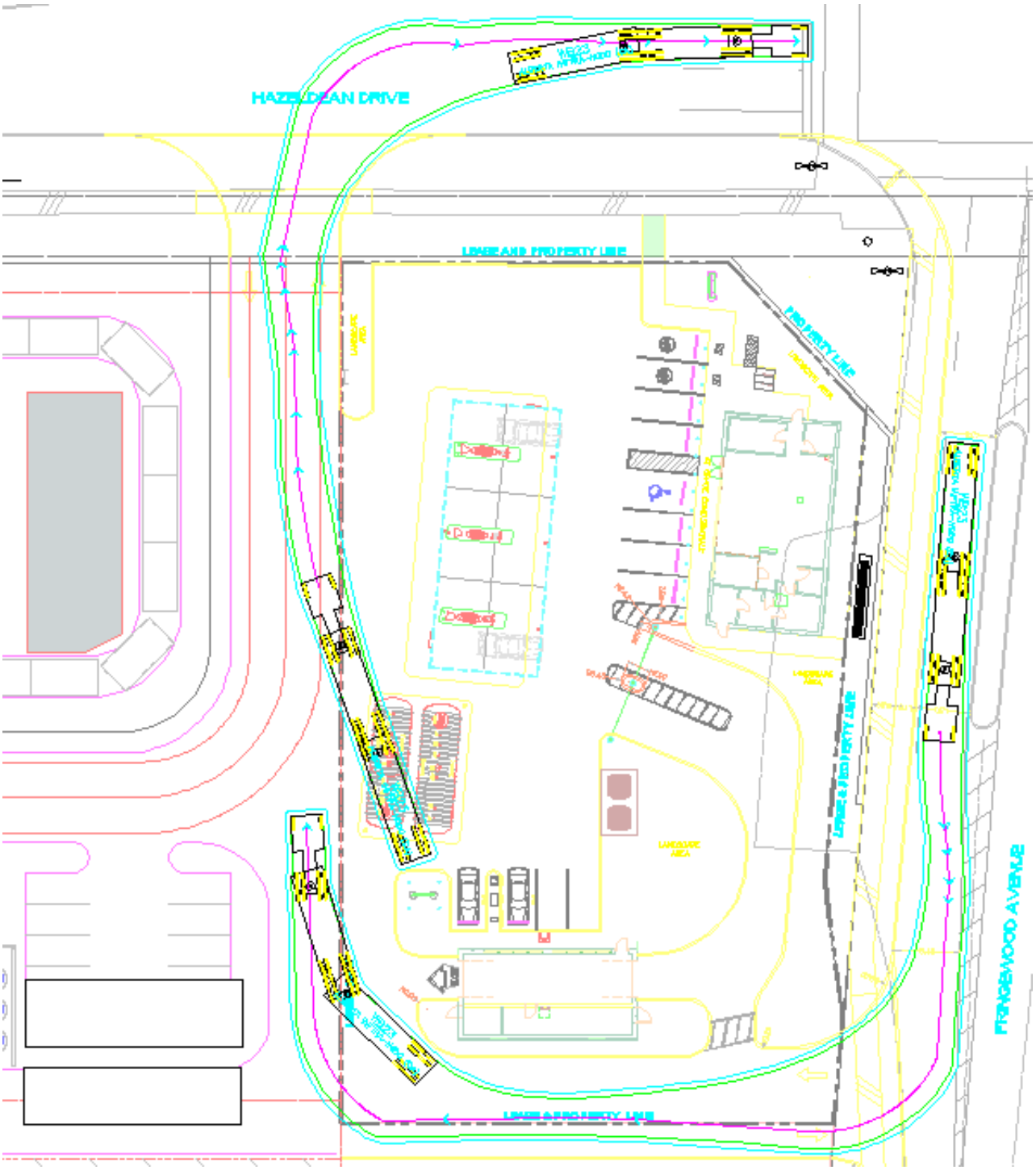


Figure 4. Fueling Truck (Alberta INFTRA-HGDG) Circulating Through Site (Fringewood Entrance)

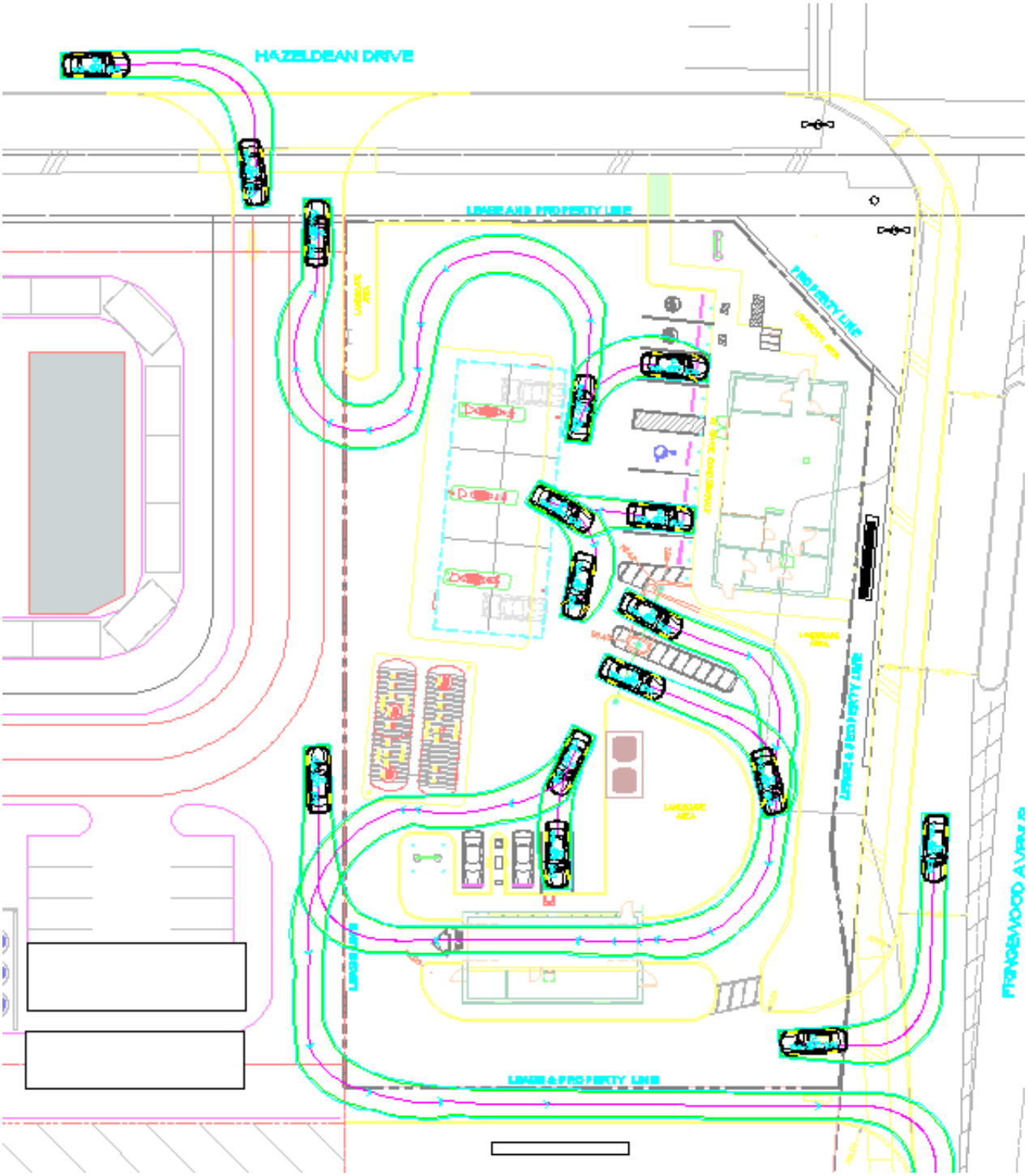


Figure 5. Passenger Vehicle Circulating Through Site (Both Entrances & Car Wash)

APPENDIX

G SIGNAL WORKSHEET

SCENARIO	Future Total	YEAR	2025
MAJOR ROAD	Hazeldean Drive	MINOR ROAD	Shell Access
FLOW TYPE	Restricted	ROAD TYPE	1 Lane
NEW ROAD / INT.	Yes	"T" INT.	Yes

	MINIMUM REQUIREMENT			COMPLIANCE	
JUSTIFICATION 7	FLOW	ADJ. FLOW	AHV	%	OVERALL %
1A - All Approaches	470	705	576	82%	7%
1B - Minor Road	120	270	19	7%	
2A - Major Road	480	720	538	75%	0%
2B - Crossing Major Road	50	75	0	0%	

SCENARIO	Future Total	YEAR	2025
MAJOR ROAD	Fringewood Avenue	MINOR ROAD	Shell Access
FLOW TYPE	Restricted	ROAD TYPE	1 Lane
NEW ROAD / INT.	Yes	"T" INT.	Yes

	MINIMUM REQUIREMENT			COMPLIANCE	
JUSTIFICATION 7	FLOW	ADJ. FLOW	AHV	%	OVERALL %
1A - All Approaches	470	705	144	20%	9%
1B - Minor Road	120	270	24	9%	
2A - Major Road	480	720	120	17%	17%
2B - Crossing Major Road	50	75	24	32%	

APPENDIX

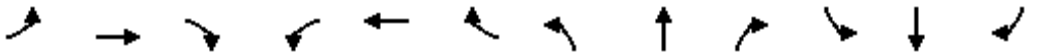
H SYNCHRO

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	969	15	13	463	29	28	3	26	34	4	89
Future Volume (vph)	53	969	15	13	463	29	28	3	26	34	4	89
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
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	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1565	3308		1565	3287		1565	1508		1565	1493	
Flt Permitted	0.95	1.00		0.95	1.00		0.69	1.00		0.74	1.00	
Satd. Flow (perm)	1565	3308		1565	3287		1137	1508		1213	1493	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	59	1077	17	14	514	32	31	3	29	38	4	99
RTOR Reduction (vph)	0	1	0	0	3	0	0	27	0	0	91	0
Lane Group Flow (vph)	59	1093	0	14	543	0	31	5	0	38	12	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	13	1		9	5			3			7	
Permitted Phases							3			7		
Actuated Green, G (s)	8.5	78.6		8.5	78.6		9.1	9.1		9.1	9.1	
Effective Green, g (s)	8.5	78.6		8.5	78.6		9.1	9.1		9.1	9.1	
Actuated g/C Ratio	0.07	0.68		0.07	0.68		0.08	0.08		0.08	0.08	
Clearance Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	115	2260		115	2246		89	119		95	118	
v/s Ratio Prot	c0.04	c0.33		0.01	0.17			0.00			0.01	
v/s Ratio Perm							0.03			c0.03		
v/c Ratio	0.51	0.48		0.12	0.24		0.35	0.04		0.40	0.10	
Uniform Delay, d1	51.3	8.6		49.8	6.9		50.1	48.9		50.4	49.2	
Progression Factor	1.00	1.00		1.14	0.59		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.7		0.5	0.3		2.4	0.2		2.8	0.4	
Delay (s)	55.1	9.4		57.1	4.3		52.5	49.1		53.1	49.5	
Level of Service	E	A		E	A		D	D		D	D	
Approach Delay (s)		11.7			5.7			50.8			50.5	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

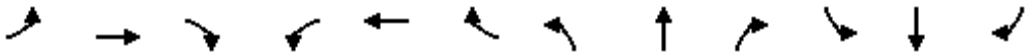
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	814	1	0	659	2	16	0	51	5	1	4
Future Volume (vph)	4	814	1	0	659	2	16	0	51	5	1	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.2	6.2			6.1	6.1		6.9			6.9	
Lane Util. Factor	1.00	0.95			0.95	1.00		1.00			1.00	
Frt	1.00	1.00			1.00	0.85		0.90			0.95	
Flt Protected	0.95	1.00			1.00	1.00		0.99			0.97	
Satd. Flow (prot)	1565	3315			3316	1400		1547			1615	
Flt Permitted	0.37	1.00			1.00	1.00		0.91			0.85	
Satd. Flow (perm)	615	3315			3316	1400		1432			1416	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	904	1	0	732	2	18	0	57	6	1	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	71	0	0	4	0
Lane Group Flow (vph)	4	905	0	0	732	2	0	4	0	0	7	0
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			3			7	
Permitted Phases	6					2	3			7		
Actuated Green, G (s)	96.3	96.3			96.4	96.4		5.6			5.6	
Effective Green, g (s)	96.3	96.3			96.4	96.4		5.6			5.6	
Actuated g/C Ratio	0.84	0.84			0.84	0.84		0.05			0.05	
Clearance Time (s)	6.2	6.2			6.1	6.1		6.9			6.9	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	514	2775			2779	1173		69			68	
v/s Ratio Prot		c0.27			0.22							
v/s Ratio Perm	0.01					0.00		0.00			c0.01	
v/c Ratio	0.01	0.33			0.26	0.00		0.05			0.11	
Uniform Delay, d1	1.5	2.1			1.9	1.5		52.2			52.3	
Progression Factor	0.09	0.65			0.87	1.00		1.00			1.00	
Incremental Delay, d2	0.0	0.3			0.2	0.0		0.3			0.7	
Delay (s)	0.2	1.7			1.9	1.5		52.5			53.0	
Level of Service	A	A			A	A		D			D	
Approach Delay (s)		1.6			1.9			52.5			53.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
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)	198	665	108	162	396	81	47	234	245	116	211	112
Future Volume (vph)	198	665	108	162	396	81	47	234	245	116	211	112
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.5	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3036	3246		3036	3316	1400	1565	1745	1400	1565	1745	1400
Flt Permitted	0.46	1.00		0.24	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1466	3246		753	3316	1400	1565	1745	1400	1565	1745	1400
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	220	739	120	180	440	90	52	260	272	129	234	124
RTOR Reduction (vph)	0	10	0	0	0	50	0	0	164	0	0	97
Lane Group Flow (vph)	220	849	0	180	440	40	52	260	108	129	234	27
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	6	1		2	5		3	8		7	4	
Permitted Phases	1			5		5			8			4
Actuated Green, G (s)	60.1	51.2		58.9	50.5	50.5	4.7	24.2	24.2	5.9	25.4	25.4
Effective Green, g (s)	60.1	51.2		58.9	50.5	50.5	4.7	24.2	24.2	5.9	25.4	25.4
Actuated g/C Ratio	0.52	0.45		0.51	0.44	0.44	0.04	0.21	0.21	0.05	0.22	0.22
Clearance Time (s)	6.5	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	887	1445		552	1456	614	63	367	294	80	385	309
v/s Ratio Prot	0.02	c0.26		c0.02	0.13		0.03	c0.15		c0.08	0.13	
v/s Ratio Perm	0.11			0.14		0.03			0.08			0.02
v/c Ratio	0.25	0.59		0.33	0.30	0.06	0.83	0.71	0.37	1.61	0.61	0.09
Uniform Delay, d1	14.2	24.0		15.6	20.9	18.6	54.7	42.1	38.8	54.5	40.3	35.6
Progression Factor	0.65	0.69		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.7		0.3	0.5	0.2	56.1	6.1	0.8	325.7	2.7	0.1
Delay (s)	9.3	18.2		16.0	21.4	18.8	110.8	48.3	39.6	380.3	43.0	35.7
Level of Service	A	B		B	C	B	F	D	D	F	D	D
Approach Delay (s)		16.4			19.7			49.8			130.5	
Approach LOS		B			B			D			F	

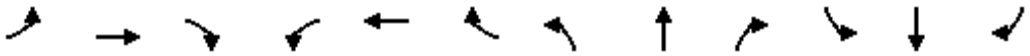
Intersection Summary			
HCM 2000 Control Delay	43.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	909	2	1	606	18	0	0	0	21	1	9
Future Volume (Veh/h)	12	909	2	1	606	18	0	0	0	21	1	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	1010	2	1	673	20	0	0	0	23	1	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)					249							
pX, platoon unblocked	0.99						0.99	0.99		0.99	0.99	0.99
vC, conflicting volume	693			1012			1386	1732	506	1216	1723	346
vC1, stage 1 conf vol							1037	1037		685	685	
vC2, stage 2 conf vol							349	695		531	1038	
vCu, unblocked vol	671			1012			1371	1720	506	1199	1711	321
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	93	100	99
cM capacity (veh/h)	907			681			230	255	512	335	257	668

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	13	673	339	338	356	34
Volume Left	13	0	0	1	0	23
Volume Right	0	0	2	0	20	10
cSH	907	1700	1700	681	1700	388
Volume to Capacity	0.01	0.40	0.20	0.00	0.21	0.09
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	2.2
Control Delay (s)	9.0	0.0	0.0	0.0	0.0	15.2
Lane LOS	A			A		C
Approach Delay (s)	0.1			0.0		15.2
Approach LOS						C

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	36.6%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	888	21	35	1262	62	22	1	14	40	3	122
Future Volume (vph)	101	888	21	35	1262	62	22	1	14	40	3	122
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
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)	1565	3304		1565	3292		1565	1499		1565	1489	
Flt Permitted	0.95	1.00		0.95	1.00		0.49	1.00		0.75	1.00	
Satd. Flow (perm)	1565	3304		1565	3292		802	1499		1229	1489	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	112	987	23	39	1402	69	24	1	16	44	3	136
RTOR Reduction (vph)	0	1	0	0	2	0	0	15	0	0	125	0
Lane Group Flow (vph)	112	1009	0	39	1469	0	24	2	0	44	14	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	13	1		9	5			3			7	
Permitted Phases							3			7		
Actuated Green, G (s)	17.4	74.1		17.4	74.1		9.7	9.7		9.7	9.7	
Effective Green, g (s)	17.4	74.1		17.4	74.1		9.7	9.7		9.7	9.7	
Actuated g/C Ratio	0.14	0.62		0.14	0.62		0.08	0.08		0.08	0.08	
Clearance Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	226	2040		226	2032		64	121		99	120	
v/s Ratio Prot	c0.07	0.31		0.02	c0.45			0.00			0.01	
v/s Ratio Perm							0.03			c0.04		
v/c Ratio	0.50	0.49		0.17	0.72		0.38	0.02		0.44	0.12	
Uniform Delay, d1	47.3	12.6		45.0	15.9		52.3	50.8		52.6	51.2	
Progression Factor	1.00	1.00		1.00	0.39		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	0.9		0.3	1.9		3.7	0.1		3.2	0.4	
Delay (s)	49.0	13.5		45.5	8.0		55.9	50.8		55.7	51.6	
Level of Service	D	B		D	A		E	D		E	D	
Approach Delay (s)		17.0			9.0			53.8			52.6	
Approach LOS		B			A			D			D	

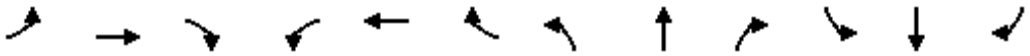
Intersection Summary			
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	892	0	0	1480	0	16	0	51	3	0	1
Future Volume (vph)	1	892	0	0	1480	0	16	0	51	3	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.2	6.2			6.1			6.9			6.9	
Lane Util. Factor	1.00	0.95			0.95			1.00			1.00	
Frt	1.00	1.00			1.00			0.90			0.97	
Flt Protected	0.95	1.00			1.00			0.99			0.96	
Satd. Flow (prot)	1565	3316			3316			1547			1625	
Flt Permitted	0.13	1.00			1.00			0.92			0.79	
Satd. Flow (perm)	220	3316			3316			1435			1327	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1	991	0	0	1644	0	18	0	57	3	0	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	72	0	0	4	0
Lane Group Flow (vph)	1	991	0	0	1644	0	0	4	0	0	0	0
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			3			7	
Permitted Phases	6					2	3			7		
Actuated Green, G (s)	101.3	101.3			101.4			5.6			5.6	
Effective Green, g (s)	101.3	101.3			101.4			5.6			5.6	
Actuated g/C Ratio	0.84	0.84			0.85			0.05			0.05	
Clearance Time (s)	6.2	6.2			6.1			6.9			6.9	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	185	2799			2802			66			61	
v/s Ratio Prot		0.30			c0.50							
v/s Ratio Perm	0.00							c0.00			0.00	
v/c Ratio	0.01	0.35			0.59			0.05			0.00	
Uniform Delay, d1	1.5	2.1			2.9			54.7			54.5	
Progression Factor	0.00	0.30			1.04			1.00			1.00	
Incremental Delay, d2	0.0	0.3			0.3			0.3			0.0	
Delay (s)	0.0	0.9			3.3			55.0			54.6	
Level of Service	A	A			A			E			D	
Approach Delay (s)		0.9			3.3			55.0			54.6	
Approach LOS		A			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	3.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
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)	197	630	118	314	985	207	134	270	237	137	332	379
Future Volume (vph)	197	630	118	314	985	207	134	270	237	137	332	379
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.3	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3036	3237		3036	3316	1400	1565	1745	1400	1565	1745	1400
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3036	3237		3036	3316	1400	1565	1745	1400	1565	1745	1400
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	219	700	131	349	1094	230	149	300	263	152	369	421
RTOR Reduction (vph)	0	12	0	0	0	144	0	0	196	0	0	221
Lane Group Flow (vph)	219	819	0	349	1094	86	149	300	67	152	369	200
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						2			8			4
Actuated Green, G (s)	13.5	41.7		16.7	44.9	44.9	5.9	30.4	30.4	5.9	30.4	30.4
Effective Green, g (s)	13.5	41.7		16.7	44.9	44.9	5.9	30.4	30.4	5.9	30.4	30.4
Actuated g/C Ratio	0.11	0.35		0.14	0.37	0.37	0.05	0.25	0.25	0.05	0.25	0.25
Clearance Time (s)	6.3	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	341	1124		422	1240	523	76	442	354	76	442	354
v/s Ratio Prot	0.07	0.25		c0.11	c0.33		0.10	0.17		c0.10	c0.21	
v/s Ratio Perm						0.06			0.05			0.14
v/c Ratio	0.64	0.73		0.83	0.88	0.16	1.96	0.68	0.19	2.00	0.83	0.56
Uniform Delay, d1	50.9	34.2		50.2	35.1	25.0	57.0	40.4	35.1	57.0	42.4	39.0
Progression Factor	1.40	0.67		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	4.0		12.5	9.3	0.7	476.1	4.1	0.3	493.2	12.8	2.1
Delay (s)	75.0	27.0		62.8	44.3	25.7	533.2	44.5	35.4	550.3	55.2	41.1
Level of Service	E	C		E	D	C	F	D	D	F	E	D
Approach Delay (s)		37.0			45.6			143.4			128.8	
Approach LOS		D			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	77.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.3
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

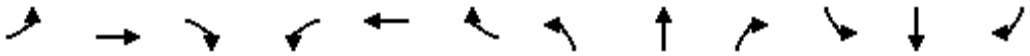


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	947	1	3	1477	19	0	0	3	4	0	24
Future Volume (Veh/h)	16	947	1	3	1477	19	0	0	3	4	0	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	18	1052	1	3	1641	21	0	0	3	4	0	27
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)					249							
pX, platoon unblocked	0.83						0.83	0.83		0.83	0.83	0.83
vC, conflicting volume	1662			1053			1942	2756	526	2222	2746	831
vC1, stage 1 conf vol							1088	1088		1658	1658	
vC2, stage 2 conf vol							854	1668		565	1089	
vCu, unblocked vol	1380			1053			1719	2705	526	2059	2693	375
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			100	100	99	97	100	95
cM capacity (veh/h)	407			657			194	129	496	119	141	515

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	18	701	352	824	842	3	31
Volume Left	18	0	0	3	0	0	4
Volume Right	0	0	1	0	21	3	27
cSH	407	1700	1700	657	1700	496	360
Volume to Capacity	0.04	0.41	0.21	0.00	0.49	0.01	0.09
Queue Length 95th (m)	1.1	0.0	0.0	0.1	0.0	0.1	2.1
Control Delay (s)	14.3	0.0	0.0	0.1	0.0	12.3	16.0
Lane LOS	B			A		B	C
Approach Delay (s)	0.2			0.1		12.3	16.0
Approach LOS						B	C

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	58.2%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
3: Victor St/Johnwoods St & Hazeldean Rd

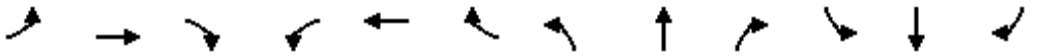


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	988	15	13	472	30	29	3	27	35	4	91
Future Volume (vph)	54	988	15	13	472	30	29	3	27	35	4	91
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
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	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1565	3308		1565	3286		1565	1510		1565	1494	
Flt Permitted	0.95	1.00		0.95	1.00		0.70	1.00		0.74	1.00	
Satd. Flow (perm)	1565	3308		1565	3286		1145	1510		1215	1494	
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)	54	988	15	13	472	30	29	3	27	35	4	91
RTOR Reduction (vph)	0	1	0	0	2	0	0	25	0	0	84	0
Lane Group Flow (vph)	54	1002	0	13	500	0	29	5	0	35	11	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	13	1		9	5			3			7	
Permitted Phases							3			7		
Actuated Green, G (s)	8.2	79.2		8.2	79.2		8.8	8.8		8.8	8.8	
Effective Green, g (s)	8.2	79.2		8.2	79.2		8.8	8.8		8.8	8.8	
Actuated g/C Ratio	0.07	0.69		0.07	0.69		0.08	0.08		0.08	0.08	
Clearance Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	111	2278		111	2263		87	115		92	114	
v/s Ratio Prot	c0.03	c0.30		0.01	0.15			0.00			0.01	
v/s Ratio Perm							0.03			c0.03		
v/c Ratio	0.49	0.44		0.12	0.22		0.33	0.04		0.38	0.10	
Uniform Delay, d1	51.4	8.0		50.0	6.6		50.3	49.2		50.5	49.4	
Progression Factor	1.00	1.00		1.14	0.60		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.3	0.6		0.5	0.2		2.3	0.2		2.6	0.4	
Delay (s)	54.7	8.6		57.4	4.2		52.6	49.4		53.1	49.8	
Level of Service	D	A		E	A		D	D		D	D	
Approach Delay (s)		11.0			5.5			50.9			50.7	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

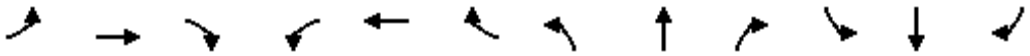
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	830	1	0	672	2	16	0	52	5	1	4
Future Volume (vph)	4	830	1	0	672	2	16	0	52	5	1	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.2	6.2			6.1	6.1		6.9			6.9	
Lane Util. Factor	1.00	0.95			0.95	1.00		1.00			1.00	
Frt	1.00	1.00			1.00	0.85		0.90			0.95	
Flt Protected	0.95	1.00			1.00	1.00		0.99			0.98	
Satd. Flow (prot)	1565	3315			3316	1400		1547			1611	
Flt Permitted	0.40	1.00			1.00	1.00		0.92			0.89	
Satd. Flow (perm)	653	3315			3316	1400		1433			1475	
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)	4	830	1	0	672	2	16	0	52	5	1	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	65	0	0	4	0
Lane Group Flow (vph)	4	831	0	0	672	2	0	3	0	0	6	0
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			3			7	
Permitted Phases	6					2	3			7		
Actuated Green, G (s)	96.5	96.5			96.6	96.6		5.4			5.4	
Effective Green, g (s)	96.5	96.5			96.6	96.6		5.4			5.4	
Actuated g/C Ratio	0.84	0.84			0.84	0.84		0.05			0.05	
Clearance Time (s)	6.2	6.2			6.1	6.1		6.9			6.9	
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	547	2781			2785	1176		67			69	
v/s Ratio Prot		c0.25			0.20							
v/s Ratio Perm	0.01					0.00		0.00			c0.00	
v/c Ratio	0.01	0.30			0.24	0.00		0.05			0.09	
Uniform Delay, d1	1.5	2.0			1.8	1.5		52.3			52.4	
Progression Factor	0.12	0.79			0.87	1.00		1.00			1.00	
Incremental Delay, d2	0.0	0.3			0.2	0.0		0.3			0.6	
Delay (s)	0.2	1.8			1.8	1.5		52.6			53.0	
Level of Service	A	A			A	A		D			D	
Approach Delay (s)		1.8			1.8			52.6			53.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	4.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
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)	202	678	110	165	404	83	48	239	250	118	215	114
Future Volume (vph)	202	678	110	165	404	83	48	239	250	118	215	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.5	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3036	3246		3036	3316	1400	1565	1745	1400	1565	1745	1400
Flt Permitted	0.49	1.00		0.28	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1552	3246		879	3316	1400	1565	1745	1400	1565	1745	1400
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)	202	678	110	165	404	83	48	239	250	118	215	114
RTOR Reduction (vph)	0	10	0	0	0	45	0	0	181	0	0	90
Lane Group Flow (vph)	202	778	0	165	404	38	48	239	69	118	215	24
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	6	1		2	5		3	8		7	4	
Permitted Phases	1			5		5			8			4
Actuated Green, G (s)	61.7	52.8		60.3	52.0	52.0	4.7	22.7	22.7	5.9	23.9	23.9
Effective Green, g (s)	61.7	52.8		60.3	52.0	52.0	4.7	22.7	22.7	5.9	23.9	23.9
Actuated g/C Ratio	0.54	0.46		0.52	0.45	0.45	0.04	0.20	0.20	0.05	0.21	0.21
Clearance Time (s)	6.5	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	947	1490		616	1499	633	63	344	276	80	362	290
v/s Ratio Prot	0.02	c0.24		c0.02	0.12		0.03	c0.14		c0.08	0.12	
v/s Ratio Perm	0.10			0.12		0.03			0.05			0.02
v/c Ratio	0.21	0.52		0.27	0.27	0.06	0.76	0.69	0.25	1.48	0.59	0.08
Uniform Delay, d1	13.3	22.1		14.4	19.7	17.7	54.6	42.9	39.0	54.5	41.2	36.7
Progression Factor	0.65	0.68		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.3		0.2	0.4	0.2	41.2	6.0	0.5	269.2	2.6	0.1
Delay (s)	8.7	16.3		14.7	20.1	17.9	95.8	48.9	39.5	323.8	43.8	36.8
Level of Service	A	B		B	C	B	F	D	D	F	D	D
Approach Delay (s)		14.8			18.4			48.7			115.9	
Approach LOS		B			B			D			F	

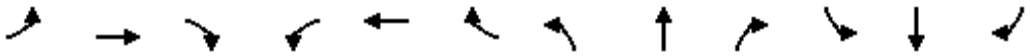
Intersection Summary			
HCM 2000 Control Delay	39.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	927	2	1	618	18	2	0	1	21	1	9
Future Volume (Veh/h)	12	927	2	1	618	18	2	0	1	21	1	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	927	2	1	618	18	2	0	1	21	1	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)					249							
pX, platoon unblocked	1.00						1.00	1.00		1.00	1.00	1.00
vC, conflicting volume	636			929			1272	1590	464	1118	1582	318
vC1, stage 1 conf vol							952	952		629	629	
vC2, stage 2 conf vol							320	638		488	953	
vCu, unblocked vol	634			929			1271	1589	464	1116	1581	316
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	100	94	100	99
cM capacity (veh/h)	944			732			259	279	544	359	281	679

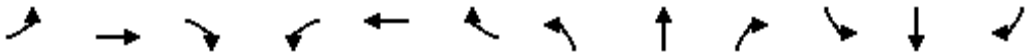
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	12	618	311	310	327	3	31
Volume Left	12	0	0	1	0	2	21
Volume Right	0	0	2	0	18	1	9
cSH	944	1700	1700	732	1700	314	412
Volume to Capacity	0.01	0.36	0.18	0.00	0.19	0.01	0.08
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	0.2	1.8
Control Delay (s)	8.9	0.0	0.0	0.0	0.0	16.6	14.5
Lane LOS	A			A		C	B
Approach Delay (s)	0.1			0.0		16.6	14.5
Approach LOS						C	B

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	37.1%	ICU Level of Service		A
Analysis Period (min)	15			



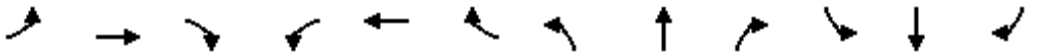
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	906	21	36	1287	63	22	1	14	41	3	124
Future Volume (vph)	103	906	21	36	1287	63	22	1	14	41	3	124
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
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)	1565	3304		1565	3292		1565	1501		1565	1490	
Flt Permitted	0.95	1.00		0.95	1.00		0.55	1.00		0.75	1.00	
Satd. Flow (perm)	1565	3304		1565	3292		903	1501		1232	1490	
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)	103	906	21	36	1287	63	22	1	14	41	3	124
RTOR Reduction (vph)	0	1	0	0	2	0	0	13	0	0	114	0
Lane Group Flow (vph)	103	926	0	36	1348	0	22	2	0	41	13	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	13	1		9	5			3			7	
Permitted Phases							3			7		
Actuated Green, G (s)	15.7	76.0		15.7	76.0		9.5	9.5		9.5	9.5	
Effective Green, g (s)	15.7	76.0		15.7	76.0		9.5	9.5		9.5	9.5	
Actuated g/C Ratio	0.13	0.63		0.13	0.63		0.08	0.08		0.08	0.08	
Clearance Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	204	2092		204	2084		71	118		97	117	
v/s Ratio Prot	c0.07	0.28		0.02	c0.41			0.00			0.01	
v/s Ratio Perm							0.02			c0.03		
v/c Ratio	0.50	0.44		0.18	0.65		0.31	0.02		0.42	0.11	
Uniform Delay, d1	48.5	11.2		46.4	13.7		52.2	50.9		52.6	51.3	
Progression Factor	1.00	1.00		1.06	0.33		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.7		0.4	1.4		2.5	0.1		3.0	0.4	
Delay (s)	50.5	11.9		49.4	5.9		54.6	51.0		55.6	51.7	
Level of Service	D	B		D	A		D	D		E	D	
Approach Delay (s)		15.8			7.1			53.2			52.7	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



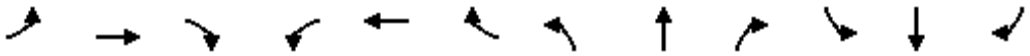
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	910	0	0	1510	0	29	0	50	3	0	1
Future Volume (vph)	1	910	0	0	1510	0	29	0	50	3	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.2	6.2			6.1			6.9			6.9	
Lane Util. Factor	1.00	0.95			0.95			1.00			1.00	
Frt	1.00	1.00			1.00			0.91			0.97	
Flt Protected	0.95	1.00			1.00			0.98			0.96	
Satd. Flow (prot)	1565	3316			3316			1567			1625	
Flt Permitted	0.16	1.00			1.00			0.88			0.77	
Satd. Flow (perm)	258	3316			3316			1400			1293	
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)	1	910	0	0	1510	0	29	0	50	3	0	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	75	0	0	4	0
Lane Group Flow (vph)	1	910	0	0	1510	0	0	4	0	0	0	0
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			3			7	
Permitted Phases	6					2	3			7		
Actuated Green, G (s)	101.1	101.1			101.2			5.8			5.8	
Effective Green, g (s)	101.1	101.1			101.2			5.8			5.8	
Actuated g/C Ratio	0.84	0.84			0.84			0.05			0.05	
Clearance Time (s)	6.2	6.2			6.1			6.9			6.9	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	217	2793			2796			67			62	
v/s Ratio Prot		0.27			c0.46							
v/s Ratio Perm	0.00							c0.00			0.00	
v/c Ratio	0.00	0.33			0.54			0.06			0.00	
Uniform Delay, d1	1.5	2.1			2.7			54.5			54.3	
Progression Factor	0.04	0.61			0.74			1.00			1.00	
Incremental Delay, d2	0.0	0.3			0.4			0.4			0.0	
Delay (s)	0.1	1.5			2.4			54.8			54.4	
Level of Service	A	A			A			D			D	
Approach Delay (s)		1.5			2.4			54.8			54.4	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	3.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
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)	201	643	120	320	1005	211	137	275	242	140	339	387
Future Volume (vph)	201	643	120	320	1005	211	137	275	242	140	339	387
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.3	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3036	3237		3036	3316	1400	1565	1745	1400	1565	1745	1400
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3036	3237		3036	3316	1400	1565	1745	1400	1565	1745	1400
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)	201	643	120	320	1005	211	137	275	242	140	339	387
RTOR Reduction (vph)	0	12	0	0	0	128	0	0	184	0	0	228
Lane Group Flow (vph)	201	751	0	320	1005	83	137	275	58	140	339	159
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						2			8			4
Actuated Green, G (s)	12.9	43.7		16.2	47.0	47.0	5.9	28.9	28.9	5.9	28.9	28.9
Effective Green, g (s)	12.9	43.7		16.2	47.0	47.0	5.9	28.9	28.9	5.9	28.9	28.9
Actuated g/C Ratio	0.11	0.36		0.13	0.39	0.39	0.05	0.24	0.24	0.05	0.24	0.24
Clearance Time (s)	6.3	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	326	1178		409	1298	548	76	420	337	76	420	337
v/s Ratio Prot	0.07	0.23		c0.11	c0.30		0.09	0.16		c0.09	c0.19	
v/s Ratio Perm						0.06			0.04			0.11
v/c Ratio	0.62	0.64		0.78	0.77	0.15	1.80	0.65	0.17	1.84	0.81	0.47
Uniform Delay, d1	51.2	31.6		50.2	31.9	23.6	57.0	41.1	36.1	57.0	42.9	39.0
Progression Factor	1.37	0.67		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	2.6		9.4	4.6	0.6	408.2	3.7	0.2	425.1	10.8	1.0
Delay (s)	73.7	23.6		59.6	36.4	24.2	465.3	44.7	36.3	482.2	53.8	40.1
Level of Service	E	C		E	D	C	F	D	D	F	D	D
Approach Delay (s)		34.1			39.6			129.7			116.9	
Approach LOS		C			D			F			F	

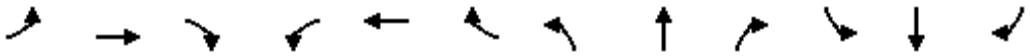
Intersection Summary			
HCM 2000 Control Delay	69.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.3
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	966	1	3	1507	19	0	0	3	4	0	24
Future Volume (Veh/h)	16	966	1	3	1507	19	0	0	3	4	0	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	16	966	1	3	1507	19	0	0	3	4	0	24
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)					249							
pX, platoon unblocked	0.86						0.86	0.86		0.86	0.86	0.86
vC, conflicting volume	1526			967			1782	2530	484	2040	2522	763
vC1, stage 1 conf vol							998	998		1522	1522	
vC2, stage 2 conf vol							784	1532		518	999	
vCu, unblocked vol	1283			967			1581	2453	484	1882	2443	394
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	100	99	97	100	95
cM capacity (veh/h)	461			708			220	153	529	141	163	519

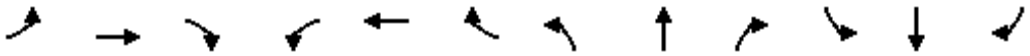
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	16	644	323	756	772	3	28
Volume Left	16	0	0	3	0	0	4
Volume Right	0	0	1	0	19	3	24
cSH	461	1700	1700	708	1700	529	375
Volume to Capacity	0.03	0.38	0.19	0.00	0.45	0.01	0.07
Queue Length 95th (m)	0.8	0.0	0.0	0.1	0.0	0.1	1.8
Control Delay (s)	13.1	0.0	0.0	0.1	0.0	11.8	15.4
Lane LOS	B			A		B	C
Approach Delay (s)	0.2			0.1		11.8	15.4
Approach LOS						B	C

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	59.1%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	1004	15	14	485	30	29	3	27	35	4	91
Future Volume (vph)	54	1004	15	14	485	30	29	3	27	35	4	91
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
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	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1565	3308		1565	3287		1565	1507		1565	1493	
Flt Permitted	0.95	1.00		0.95	1.00		0.69	1.00		0.74	1.00	
Satd. Flow (perm)	1565	3308		1565	3287		1135	1507		1212	1493	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	60	1116	17	16	539	33	32	3	30	39	4	101
RTOR Reduction (vph)	0	1	0	0	3	0	0	28	0	0	93	0
Lane Group Flow (vph)	60	1132	0	16	569	0	32	5	0	39	12	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	13	1		9	5			3			7	
Permitted Phases							3			7		
Actuated Green, G (s)	8.6	78.4		8.6	78.4		9.2	9.2		9.2	9.2	
Effective Green, g (s)	8.6	78.4		8.6	78.4		9.2	9.2		9.2	9.2	
Actuated g/C Ratio	0.07	0.68		0.07	0.68		0.08	0.08		0.08	0.08	
Clearance Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	117	2255		117	2240		90	120		96	119	
v/s Ratio Prot	c0.04	c0.34		0.01	0.17			0.00			0.01	
v/s Ratio Perm							0.03			c0.03		
v/c Ratio	0.51	0.50		0.14	0.25		0.36	0.04		0.41	0.10	
Uniform Delay, d1	51.2	8.9		49.7	7.0		50.1	48.8		50.3	49.1	
Progression Factor	1.00	1.00		1.14	0.60		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.8		0.5	0.3		2.4	0.2		2.8	0.4	
Delay (s)	54.9	9.7		57.0	4.5		52.5	49.0		53.1	49.4	
Level of Service	D	A		E	A		D	D		D	D	
Approach Delay (s)		11.9			5.9			50.7			50.4	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

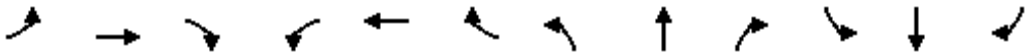


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	846	1	35	650	2	52	0	52	5	1	4
Future Volume (vph)	4	846	1	35	650	2	52	0	52	5	1	4
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.2	6.2		5.9	6.1	6.1		6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.93			0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.97	
Satd. Flow (prot)	1565	3315		1565	3316	1400		1588			1615	
Flt Permitted	0.38	1.00		0.95	1.00	1.00		0.84			0.74	
Satd. Flow (perm)	621	3315		1565	3316	1400		1361			1232	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	940	1	39	722	2	58	0	58	6	1	4
RTOR Reduction (vph)	0	0	0	0	0	0	0	79	0	0	4	0
Lane Group Flow (vph)	4	941	0	39	722	2	0	37	0	0	7	0
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			3			7	
Permitted Phases	6					2	3			7		
Actuated Green, G (s)	81.2	81.2		5.8	93.0	93.0		9.0			9.0	
Effective Green, g (s)	81.2	81.2		5.8	93.0	93.0		9.0			9.0	
Actuated g/C Ratio	0.71	0.71		0.05	0.81	0.81		0.08			0.08	
Clearance Time (s)	6.2	6.2		5.9	6.1	6.1		6.9			6.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	438	2340		78	2681	1132		106			96	
v/s Ratio Prot		c0.28		c0.02	0.22							
v/s Ratio Perm	0.01					0.00		c0.03			0.01	
v/c Ratio	0.01	0.40		0.50	0.27	0.00		0.35			0.08	
Uniform Delay, d1	5.0	6.9		53.2	2.7	2.1		50.2			49.1	
Progression Factor	0.86	1.29		1.10	0.73	1.00		1.00			1.00	
Incremental Delay, d2	0.0	0.5		4.8	0.2	0.0		2.0			0.3	
Delay (s)	4.3	9.4		63.1	2.2	2.1		52.2			49.5	
Level of Service	A	A		E	A	A		D			D	
Approach Delay (s)		9.4			5.3			52.2			49.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
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)	205	689	112	165	414	83	49	239	250	118	215	114
Future Volume (vph)	205	689	112	165	414	83	49	239	250	118	215	114
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.5	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3036	3246		3036	3316	1400	1565	1745	1400	1565	1745	1400
Flt Permitted	0.44	1.00		0.22	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1419	3246		704	3316	1400	1565	1745	1400	1565	1745	1400
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	228	766	124	183	460	92	54	266	278	131	239	127
RTOR Reduction (vph)	0	10	0	0	0	52	0	0	159	0	0	99
Lane Group Flow (vph)	228	880	0	183	460	40	54	266	119	131	239	28
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	6	1		2	5		3	8		7	4	
Permitted Phases	1			5		5			8			4
Actuated Green, G (s)	59.7	50.8		58.5	50.1	50.1	4.7	24.6	24.6	5.9	25.8	25.8
Effective Green, g (s)	59.7	50.8		58.5	50.1	50.1	4.7	24.6	24.6	5.9	25.8	25.8
Actuated g/C Ratio	0.52	0.44		0.51	0.44	0.44	0.04	0.21	0.21	0.05	0.22	0.22
Clearance Time (s)	6.5	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	861	1433		528	1444	609	63	373	299	80	391	314
v/s Ratio Prot	0.02	c0.27		c0.03	0.14		0.03	c0.15		c0.08	0.14	
v/s Ratio Perm	0.12			0.15		0.03			0.09			0.02
v/c Ratio	0.26	0.61		0.35	0.32	0.07	0.86	0.71	0.40	1.64	0.61	0.09
Uniform Delay, d1	14.5	24.6		16.1	21.3	18.9	54.8	41.9	38.8	54.5	40.1	35.3
Progression Factor	0.66	0.51		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	1.9		0.4	0.6	0.2	64.9	6.3	0.9	336.2	2.8	0.1
Delay (s)	9.7	14.3		16.5	21.8	19.1	119.7	48.3	39.7	390.7	42.9	35.4
Level of Service	A	B		B	C	B	F	D	D	F	D	D
Approach Delay (s)		13.4			20.2			50.7			132.7	
Approach LOS		B			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	42.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
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 (veh/h)	12	944	2	1	632	18	2	0	1	21	1	9
Future Volume (Veh/h)	12	944	2	1	632	18	2	0	1	21	1	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	13	1049	2	1	702	20	2	0	1	23	1	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)					249							
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	722			1051			1440	1800	526	1266	1791	361
vC1, stage 1 conf vol							1076	1076		714	714	
vC2, stage 2 conf vol							364	724		552	1077	
vCu, unblocked vol	680			1051			1411	1778	526	1233	1769	312
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	100	100	93	100	99
cM capacity (veh/h)	892			658			219	244	497	325	246	671

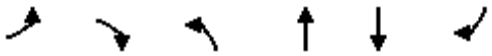
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	13	699	352	352	371	3	34
Volume Left	13	0	0	1	0	2	23
Volume Right	0	0	2	0	20	1	10
cSH	892	1700	1700	658	1700	269	379
Volume to Capacity	0.01	0.41	0.21	0.00	0.22	0.01	0.09
Queue Length 95th (m)	0.3	0.0	0.0	0.0	0.0	0.3	2.2
Control Delay (s)	9.1	0.0	0.0	0.0	0.0	18.5	15.4
Lane LOS	A			A		C	C
Approach Delay (s)	0.1			0.0		18.5	15.4
Approach LOS						C	C

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	37.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	905	44	0	638	0	42
Future Volume (Veh/h)	905	44	0	638	0	42
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1006	49	0	709	0	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				53		
pX, platoon unblocked					0.95	
vC, conflicting volume			1055		1385	528
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1055		1305	528
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	91
cM capacity (veh/h)			656		145	495

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	671	384	354	354	47
Volume Left	0	0	0	0	0
Volume Right	0	49	0	0	47
cSH	1700	1700	1700	1700	495
Volume to Capacity	0.39	0.23	0.21	0.21	0.09
Queue Length 95th (m)	0.0	0.0	0.0	0.0	2.4
Control Delay (s)	0.0	0.0	0.0	0.0	13.0
Lane LOS					B
Approach Delay (s)	0.0		0.0		13.0
Approach LOS					B

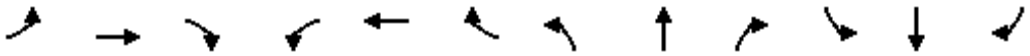
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	0	4	66	2	13
Future Volume (Veh/h)	38	0	4	66	2	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	42	0	4	73	2	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					81	
pX, platoon unblocked						
vC, conflicting volume	90	9	16			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90	9	16			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	100	100			
cM capacity (veh/h)	908	1073	1602			

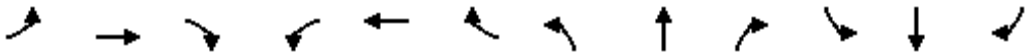
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	42	77	16
Volume Left	42	4	0
Volume Right	0	0	14
cSH	908	1602	1700
Volume to Capacity	0.05	0.00	0.01
Queue Length 95th (m)	1.1	0.1	0.0
Control Delay (s)	9.2	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	0.4	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	17.1%	ICU Level of Service	A
Analysis Period (min)	15		



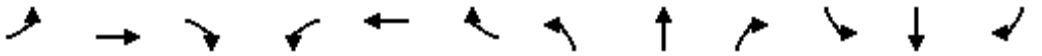
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	920	21	36	1310	64	22	1	15	41	3	124
Future Volume (vph)	103	920	21	36	1310	64	22	1	15	41	3	124
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
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)	1565	3305		1565	3293		1565	1500		1565	1490	
Flt Permitted	0.95	1.00		0.95	1.00		0.55	1.00		0.75	1.00	
Satd. Flow (perm)	1565	3305		1565	3293		903	1500		1230	1490	
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)	103	920	21	36	1310	64	22	1	15	41	3	124
RTOR Reduction (vph)	0	1	0	0	2	0	0	14	0	0	114	0
Lane Group Flow (vph)	103	940	0	36	1372	0	22	2	0	41	13	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	13	1		9	5			3			7	
Permitted Phases							3			7		
Actuated Green, G (s)	15.7	76.0		15.7	76.0		9.5	9.5		9.5	9.5	
Effective Green, g (s)	15.7	76.0		15.7	76.0		9.5	9.5		9.5	9.5	
Actuated g/C Ratio	0.13	0.63		0.13	0.63		0.08	0.08		0.08	0.08	
Clearance Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	204	2093		204	2085		71	118		97	117	
v/s Ratio Prot	c0.07	0.28		0.02	c0.42			0.00			0.01	
v/s Ratio Perm							0.02			c0.03		
v/c Ratio	0.50	0.45		0.18	0.66		0.31	0.02		0.42	0.11	
Uniform Delay, d1	48.5	11.3		46.4	13.8		52.2	51.0		52.6	51.3	
Progression Factor	1.00	1.00		1.08	0.67		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.7		0.4	1.6		2.5	0.1		3.0	0.4	
Delay (s)	50.5	12.0		50.7	10.8		54.6	51.0		55.6	51.7	
Level of Service	D	B		D	B		D	D		E	D	
Approach Delay (s)		15.8			11.9			53.1			52.7	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



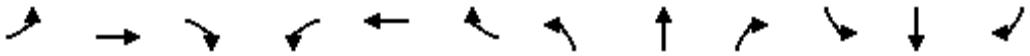
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	924	0	56	1478	0	84	0	50	3	0	1
Future Volume (vph)	1	924	0	56	1478	0	84	0	50	3	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.2	6.2		5.9	6.1			6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.95			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.96	
Satd. Flow (prot)	1565	3316		1565	3316			1607			1625	
Flt Permitted	0.18	1.00		0.95	1.00			0.81			0.77	
Satd. Flow (perm)	292	3316		1565	3316			1338			1299	
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)	1	924	0	56	1478	0	84	0	50	3	0	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	76	0	0	4	0
Lane Group Flow (vph)	1	924	0	56	1478	0	0	58	0	0	0	0
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			3			7	
Permitted Phases	6					2	3			7		
Actuated Green, G (s)	81.7	81.7		8.5	96.2			10.8			10.8	
Effective Green, g (s)	81.7	81.7		8.5	96.2			10.8			10.8	
Actuated g/C Ratio	0.68	0.68		0.07	0.80			0.09			0.09	
Clearance Time (s)	6.2	6.2		5.9	6.1			6.9			6.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	198	2257		110	2658			120			116	
v/s Ratio Prot		0.28		0.04	c0.45							
v/s Ratio Perm	0.00							c0.04			0.00	
v/c Ratio	0.01	0.41		0.51	0.56			0.49			0.00	
Uniform Delay, d1	6.1	8.5		53.7	4.3			52.0			49.7	
Progression Factor	1.17	1.47		1.29	0.45			1.00			1.00	
Incremental Delay, d2	0.0	0.5		1.9	0.4			3.1			0.0	
Delay (s)	7.2	13.0		71.0	2.4			55.1			49.7	
Level of Service	A	B		E	A			E			D	
Approach Delay (s)		13.0			4.9			55.1			49.7	
Approach LOS		B			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
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)	204	652	122	320	1021	211	139	275	242	140	339	393
Future Volume (vph)	204	652	122	320	1021	211	139	275	242	140	339	393
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.3	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3036	3237		3036	3316	1400	1565	1745	1400	1565	1745	1400
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3036	3237		3036	3316	1400	1565	1745	1400	1565	1745	1400
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)	204	652	122	320	1021	211	139	275	242	140	339	393
RTOR Reduction (vph)	0	12	0	0	0	129	0	0	184	0	0	227
Lane Group Flow (vph)	204	762	0	320	1021	82	139	275	58	140	339	166
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						2			8			4
Actuated Green, G (s)	13.0	43.7		16.2	46.9	46.9	5.9	28.9	28.9	5.9	28.9	28.9
Effective Green, g (s)	13.0	43.7		16.2	46.9	46.9	5.9	28.9	28.9	5.9	28.9	28.9
Actuated g/C Ratio	0.11	0.36		0.13	0.39	0.39	0.05	0.24	0.24	0.05	0.24	0.24
Clearance Time (s)	6.3	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	328	1178		409	1296	547	76	420	337	76	420	337
v/s Ratio Prot	0.07	0.24		c0.11	c0.31		0.09	0.16		c0.09	c0.19	
v/s Ratio Perm						0.06			0.04			0.12
v/c Ratio	0.62	0.65		0.78	0.79	0.15	1.83	0.65	0.17	1.84	0.81	0.49
Uniform Delay, d1	51.2	31.7		50.2	32.2	23.7	57.0	41.1	36.1	57.0	42.9	39.2
Progression Factor	1.11	1.07		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	2.6		9.4	4.9	0.6	419.5	3.7	0.2	425.1	10.8	1.1
Delay (s)	60.2	36.7		59.6	37.1	24.2	476.5	44.7	36.3	482.2	53.8	40.4
Level of Service	E	D		E	D	C	F	D	D	F	D	D
Approach Delay (s)		41.6			40.0			133.1			116.5	
Approach LOS		D			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	71.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.3
Intersection Capacity Utilization	84.0%	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 (veh/h)	16	981	1	3	1532	19	0	0	3	4	0	24
Future Volume (Veh/h)	16	981	1	3	1532	19	0	0	3	4	0	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	16	981	1	3	1532	19	0	0	3	4	0	24
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)					249							
pX, platoon unblocked												
vC, conflicting volume	1551			982			1810	2570	491	2073	2562	776
vC1, stage 1 conf vol							1014	1014		1548	1548	
vC2, stage 2 conf vol							796	1557		526	1014	
vCu, unblocked vol	1551			982			1810	2570	491	2073	2562	776
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			100	100	99	96	100	93
cM capacity (veh/h)	423			699			190	135	523	113	146	340

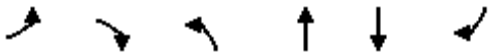
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	16	654	328	769	785	3	28
Volume Left	16	0	0	3	0	0	4
Volume Right	0	0	1	0	19	3	24
cSH	423	1700	1700	699	1700	523	265
Volume to Capacity	0.04	0.38	0.19	0.00	0.46	0.01	0.11
Queue Length 95th (m)	0.9	0.0	0.0	0.1	0.0	0.1	2.7
Control Delay (s)	13.8	0.0	0.0	0.1	0.0	11.9	20.2
Lane LOS	B			A		B	C
Approach Delay (s)	0.2			0.1		11.9	20.2
Approach LOS						B	C

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	59.8%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	905	44	0	638	0	42
Future Volume (Veh/h)	905	44	0	638	0	42
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	905	44	0	638	0	42
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				52		
pX, platoon unblocked						
vC, conflicting volume			949		1246	474
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			949		1246	474
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	92
cM capacity (veh/h)			719		166	536

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	603	346	319	319	42
Volume Left	0	0	0	0	0
Volume Right	0	44	0	0	42
cSH	1700	1700	1700	1700	536
Volume to Capacity	0.35	0.20	0.19	0.19	0.08
Queue Length 95th (m)	0.0	0.0	0.0	0.0	1.9
Control Delay (s)	0.0	0.0	0.0	0.0	12.3
Lane LOS					B
Approach Delay (s)	0.0		0.0		12.3
Approach LOS					B

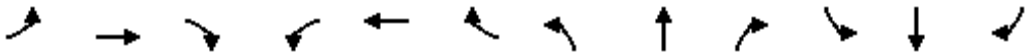
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	0	4	66	13	2
Future Volume (Veh/h)	38	0	4	66	13	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	38	0	4	66	13	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					79	
pX, platoon unblocked						
vC, conflicting volume	88	14	15			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	88	14	15			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	100	100			
cM capacity (veh/h)	911	1066	1603			

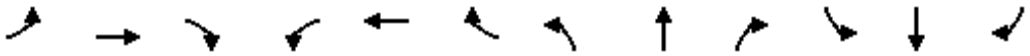
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	38	70	15
Volume Left	38	4	0
Volume Right	0	0	2
cSH	911	1603	1700
Volume to Capacity	0.04	0.00	0.01
Queue Length 95th (m)	1.0	0.1	0.0
Control Delay (s)	9.1	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.1	0.4	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	17.1%	ICU Level of Service	A
Analysis Period (min)	15		



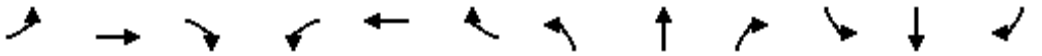
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	1144	17	15	554	33	32	3	29	38	5	100
Future Volume (vph)	60	1144	17	15	554	33	32	3	29	38	5	100
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
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	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1565	3308		1565	3288		1565	1508		1565	1496	
Flt Permitted	0.95	1.00		0.95	1.00		0.69	1.00		0.74	1.00	
Satd. Flow (perm)	1565	3308		1565	3288		1135	1508		1213	1496	
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)	60	1144	17	15	554	33	32	3	29	38	5	100
RTOR Reduction (vph)	0	1	0	0	2	0	0	27	0	0	92	0
Lane Group Flow (vph)	60	1160	0	15	585	0	32	5	0	38	13	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	13	1		9	5			3			7	
Permitted Phases							3			7		
Actuated Green, G (s)	8.6	78.5		8.6	78.5		9.1	9.1		9.1	9.1	
Effective Green, g (s)	8.6	78.5		8.6	78.5		9.1	9.1		9.1	9.1	
Actuated g/C Ratio	0.07	0.68		0.07	0.68		0.08	0.08		0.08	0.08	
Clearance Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	117	2258		117	2244		89	119		95	118	
v/s Ratio Prot	c0.04	c0.35		0.01	0.18			0.00			0.01	
v/s Ratio Perm							0.03			c0.03		
v/c Ratio	0.51	0.51		0.13	0.26		0.36	0.04		0.40	0.11	
Uniform Delay, d1	51.2	8.9		49.7	7.0		50.2	48.9		50.4	49.2	
Progression Factor	1.00	1.00		1.13	0.55		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.8		0.5	0.3		2.5	0.2		2.8	0.4	
Delay (s)	54.9	9.8		56.6	4.2		52.7	49.1		53.1	49.6	
Level of Service	D	A		E	A		D	D		D	D	
Approach Delay (s)		12.0			5.5			50.9			50.5	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



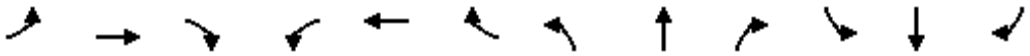
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	949	17	32	757	35	48	0	81	19	1	7
Future Volume (vph)	9	949	17	32	757	35	48	0	81	19	1	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.2	6.2		5.9	6.1	6.1		6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.92			0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.97	
Satd. Flow (prot)	1565	3307		1565	3316	1400		1568			1627	
Flt Permitted	0.36	1.00		0.95	1.00	1.00		0.87			0.62	
Satd. Flow (perm)	600	3307		1565	3316	1400		1383			1044	
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)	9	949	17	32	757	35	48	0	81	19	1	7
RTOR Reduction (vph)	0	1	0	0	0	7	0	79	0	0	6	0
Lane Group Flow (vph)	9	965	0	32	757	28	0	50	0	0	21	0
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			3			7	
Permitted Phases	6					2	3			7		
Actuated Green, G (s)	80.7	80.7		5.5	92.2	92.2		9.8			9.8	
Effective Green, g (s)	80.7	80.7		5.5	92.2	92.2		9.8			9.8	
Actuated g/C Ratio	0.70	0.70		0.05	0.80	0.80		0.09			0.09	
Clearance Time (s)	6.2	6.2		5.9	6.1	6.1		6.9			6.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	421	2320		74	2658	1122		117			88	
v/s Ratio Prot		c0.29		0.02	c0.23							
v/s Ratio Perm	0.01					0.02		c0.04			0.02	
v/c Ratio	0.02	0.42		0.43	0.28	0.03		0.43			0.23	
Uniform Delay, d1	5.2	7.2		53.2	2.9	2.3		49.9			49.1	
Progression Factor	0.87	1.33		1.08	0.76	0.79		1.00			1.00	
Incremental Delay, d2	0.1	0.5		3.9	0.3	0.0		2.5			1.4	
Delay (s)	4.6	10.1		61.4	2.5	1.9		52.5			50.5	
Level of Service	A	B		E	A	A		D			D	
Approach Delay (s)		10.1			4.7			52.5			50.5	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
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)	239	812	122	211	503	91	56	287	283	131	321	146
Future Volume (vph)	239	812	122	211	503	91	56	287	283	131	321	146
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.5	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3036	3251		3036	3316	1400	1565	1745	1400	1565	1745	1400
Flt Permitted	0.41	1.00		0.19	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1316	3251		600	3316	1400	1565	1745	1400	1565	1745	1400
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)	239	812	122	211	503	91	56	287	283	131	321	146
RTOR Reduction (vph)	0	9	0	0	0	53	0	0	148	0	0	110
Lane Group Flow (vph)	239	925	0	211	503	38	56	287	135	131	321	36
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	6	1		2	5		3	8		7	4	
Permitted Phases	1			5		5			8			4
Actuated Green, G (s)	56.9	48.1		56.3	47.7	47.7	4.7	27.1	27.1	5.9	28.3	28.3
Effective Green, g (s)	56.9	48.1		56.3	47.7	47.7	4.7	27.1	27.1	5.9	28.3	28.3
Actuated g/C Ratio	0.49	0.42		0.49	0.41	0.41	0.04	0.24	0.24	0.05	0.25	0.25
Clearance Time (s)	6.5	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	782	1359		475	1375	580	63	411	329	80	429	344
v/s Ratio Prot	0.02	c0.28		c0.03	0.15		0.04	0.16		c0.08	c0.18	
v/s Ratio Perm	0.13			0.18		0.03			0.10			0.03
v/c Ratio	0.31	0.68		0.44	0.37	0.07	0.89	0.70	0.41	1.64	0.75	0.10
Uniform Delay, d1	16.1	27.2		18.0	23.2	20.2	54.9	40.2	37.2	54.5	40.1	33.5
Progression Factor	0.68	0.54		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	2.6		0.7	0.8	0.2	74.3	5.1	0.8	336.2	7.0	0.1
Delay (s)	11.1	17.4		18.6	24.0	20.5	129.2	45.3	38.0	390.7	47.1	33.7
Level of Service	B	B		B	C	C	F	D	D	F	D	C
Approach Delay (s)		16.1			22.2			49.5			119.1	
Approach LOS		B			C			D			F	

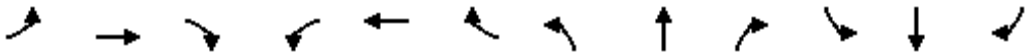
Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	1061	2	1	718	20	2	0	1	24	1	10
Future Volume (Veh/h)	14	1061	2	1	718	20	2	0	1	24	1	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	1061	2	1	718	20	2	0	1	24	1	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)					249							
pX, platoon unblocked	0.97						0.97	0.97		0.97	0.97	0.97
vC, conflicting volume	738			1063			1462	1830	532	1290	1821	369
vC1, stage 1 conf vol							1090	1090		730	730	
vC2, stage 2 conf vol							372	740		560	1091	
vCu, unblocked vol	675			1063			1418	1797	532	1242	1788	295
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			99	100	100	93	100	99
cM capacity (veh/h)	888			651			215	240	492	322	243	682

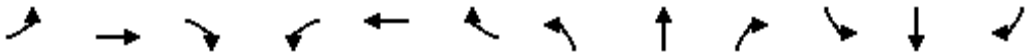
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	14	707	356	360	379	3	35
Volume Left	14	0	0	1	0	2	24
Volume Right	0	0	2	0	20	1	10
cSH	888	1700	1700	651	1700	264	375
Volume to Capacity	0.02	0.42	0.21	0.00	0.22	0.01	0.09
Queue Length 95th (m)	0.4	0.0	0.0	0.0	0.0	0.3	2.3
Control Delay (s)	9.1	0.0	0.0	0.0	0.0	18.8	15.6
Lane LOS	A			A		C	C
Approach Delay (s)	0.1			0.0		18.8	15.6
Approach LOS						C	C

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	41.0%	ICU Level of Service	A	
Analysis Period (min)	15			



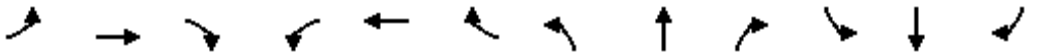
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	1000	24	39	1421	70	25	1	16	45	3	137
Future Volume (vph)	114	1000	24	39	1421	70	25	1	16	45	3	137
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
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)	1565	3304		1565	3292		1565	1499		1565	1489	
Flt Permitted	0.95	1.00		0.95	1.00		0.48	1.00		0.75	1.00	
Satd. Flow (perm)	1565	3304		1565	3292		797	1499		1229	1489	
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)	114	1000	24	39	1421	70	25	1	16	45	3	137
RTOR Reduction (vph)	0	1	0	0	2	0	0	15	0	0	126	0
Lane Group Flow (vph)	114	1023	0	39	1489	0	25	2	0	45	14	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	13	1		9	5			3			7	
Permitted Phases							3			7		
Actuated Green, G (s)	17.8	73.6		17.8	73.6		9.8	9.8		9.8	9.8	
Effective Green, g (s)	17.8	73.6		17.8	73.6		9.8	9.8		9.8	9.8	
Actuated g/C Ratio	0.15	0.61		0.15	0.61		0.08	0.08		0.08	0.08	
Clearance Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	2026		232	2019		65	122		100	121	
v/s Ratio Prot	c0.07	0.31		0.02	c0.45			0.00			0.01	
v/s Ratio Perm							0.03			c0.04		
v/c Ratio	0.49	0.50		0.17	0.74		0.38	0.02		0.45	0.12	
Uniform Delay, d1	46.9	13.0		44.6	16.4		52.2	50.7		52.5	51.1	
Progression Factor	1.00	1.00		1.02	0.40		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.9		0.3	2.0		3.8	0.1		3.2	0.4	
Delay (s)	48.6	13.9		45.7	8.5		56.0	50.7		55.7	51.5	
Level of Service	D	B		D	A		E	D		E	D	
Approach Delay (s)		17.4			9.4			53.9			52.5	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



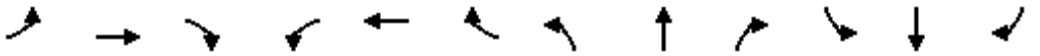
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1005	0	0	1667	0	32	0	55	3	0	1
Future Volume (vph)	1	1005	0	0	1667	0	32	0	55	3	0	1
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.2	6.2			6.1			6.9			6.9	
Lane Util. Factor	1.00	0.95			0.95			1.00			1.00	
Frt	1.00	1.00			1.00			0.91			0.97	
Flt Protected	0.95	1.00			1.00			0.98			0.96	
Satd. Flow (prot)	1565	3316			3316			1567			1625	
Flt Permitted	0.13	1.00			1.00			0.88			0.72	
Satd. Flow (perm)	209	3316			3316			1400			1222	
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)	1	1005	0	0	1667	0	32	0	55	3	0	1
RTOR Reduction (vph)	0	0	0	0	0	0	0	78	0	0	4	0
Lane Group Flow (vph)	1	1005	0	0	1667	0	0	9	0	0	0	0
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			3			7	
Permitted Phases	6					2	3			7		
Actuated Green, G (s)	99.6	99.6			99.7			7.3			7.3	
Effective Green, g (s)	99.6	99.6			99.7			7.3			7.3	
Actuated g/C Ratio	0.83	0.83			0.83			0.06			0.06	
Clearance Time (s)	6.2	6.2			6.1			6.9			6.9	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	173	2752			2755			85			74	
v/s Ratio Prot		0.30			c0.50							
v/s Ratio Perm	0.00							c0.01			0.00	
v/c Ratio	0.01	0.37			0.61			0.11			0.00	
Uniform Delay, d1	1.7	2.5			3.5			53.3			52.9	
Progression Factor	0.00	0.44			0.92			1.00			1.00	
Incremental Delay, d2	0.1	0.3			0.3			0.6			0.0	
Delay (s)	0.1	1.4			3.5			53.8			53.0	
Level of Service	A	A			A			D			D	
Approach Delay (s)		1.4			3.5			53.8			53.0	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	4.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
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)	222	709	133	354	1109	233	151	304	267	154	374	427
Future Volume (vph)	222	709	133	354	1109	233	151	304	267	154	374	427
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.3	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3036	3237		3036	3316	1400	1565	1745	1400	1565	1745	1400
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3036	3237		3036	3316	1400	1565	1745	1400	1565	1745	1400
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)	222	709	133	354	1109	233	151	304	267	154	374	427
RTOR Reduction (vph)	0	12	0	0	0	147	0	0	198	0	0	220
Lane Group Flow (vph)	222	830	0	354	1109	86	151	304	69	154	374	207
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						2			8			4
Actuated Green, G (s)	13.6	41.3		16.7	44.4	44.4	5.9	30.8	30.8	5.9	30.8	30.8
Effective Green, g (s)	13.6	41.3		16.7	44.4	44.4	5.9	30.8	30.8	5.9	30.8	30.8
Actuated g/C Ratio	0.11	0.34		0.14	0.37	0.37	0.05	0.26	0.26	0.05	0.26	0.26
Clearance Time (s)	6.3	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	344	1114		422	1226	518	76	447	359	76	447	359
v/s Ratio Prot	0.07	0.26		c0.12	c0.33		0.10	0.17		c0.10	c0.21	
v/s Ratio Perm						0.06			0.05			0.15
v/c Ratio	0.65	0.74		0.84	0.90	0.17	1.99	0.68	0.19	2.03	0.84	0.58
Uniform Delay, d1	50.9	34.7		50.3	35.8	25.4	57.0	40.2	34.9	57.0	42.2	38.9
Progression Factor	1.39	0.66		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	4.3		13.6	11.1	0.7	487.5	4.2	0.3	504.6	12.8	2.2
Delay (s)	74.5	27.2		63.9	46.9	26.1	544.6	44.4	35.1	561.7	55.0	41.2
Level of Service	E	C		E	D	C	F	D	D	F	E	D
Approach Delay (s)		37.1			47.6			145.6			130.5	
Approach LOS		D			D			F			F	

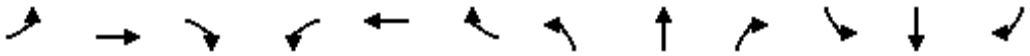
Intersection Summary			
HCM 2000 Control Delay	78.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.3
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	1066	1	3	1663	21	0	0	3	5	0	27
Future Volume (Veh/h)	18	1066	1	3	1663	21	0	0	3	5	0	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	18	1066	1	3	1663	21	0	0	3	5	0	27
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)					249							
pX, platoon unblocked	0.81						0.81	0.81		0.81	0.81	0.81
vC, conflicting volume	1684			1067			1967	2792	534	2252	2782	842
vC1, stage 1 conf vol							1102	1102		1680	1680	
vC2, stage 2 conf vol							864	1690		572	1103	
vCu, unblocked vol	1370			1067			1720	2743	534	2073	2731	327
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			100			100	100	99	96	100	95
cM capacity (veh/h)	401			649			192	127	491	118	139	540

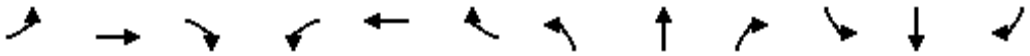
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	18	711	356	834	852	3	32
Volume Left	18	0	0	3	0	0	5
Volume Right	0	0	1	0	21	3	27
cSH	401	1700	1700	649	1700	491	346
Volume to Capacity	0.04	0.42	0.21	0.00	0.50	0.01	0.09
Queue Length 95th (m)	1.1	0.0	0.0	0.1	0.0	0.1	2.3
Control Delay (s)	14.4	0.0	0.0	0.1	0.0	12.4	16.5
Lane LOS	B			A		B	C
Approach Delay (s)	0.2			0.1		12.4	16.5
Approach LOS						B	C

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	65.0%	ICU Level of Service	C	
Analysis Period (min)	15			



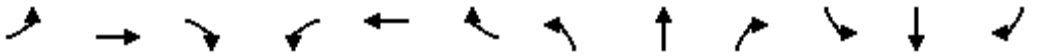
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	1159	17	15	567	33	32	3	30	39	5	100
Future Volume (vph)	60	1159	17	15	567	33	32	3	30	39	5	100
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
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	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1565	3308		1565	3288		1565	1505		1565	1497	
Flt Permitted	0.95	1.00		0.95	1.00		0.63	1.00		0.73	1.00	
Satd. Flow (perm)	1565	3308		1565	3288		1038	1505		1208	1497	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	67	1288	19	17	630	37	36	3	33	43	6	111
RTOR Reduction (vph)	0	1	0	0	2	0	0	30	0	0	102	0
Lane Group Flow (vph)	67	1306	0	17	665	0	36	6	0	43	15	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	13	1		9	5			3			7	
Permitted Phases							3			7		
Actuated Green, G (s)	9.1	77.5		9.1	77.5		9.6	9.6		9.6	9.6	
Effective Green, g (s)	9.1	77.5		9.1	77.5		9.6	9.6		9.6	9.6	
Actuated g/C Ratio	0.08	0.67		0.08	0.67		0.08	0.08		0.08	0.08	
Clearance Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	123	2229		123	2215		86	125		100	124	
v/s Ratio Prot	c0.04	c0.39		0.01	0.20			0.00			0.01	
v/s Ratio Perm							0.03			c0.04		
v/c Ratio	0.54	0.59		0.14	0.30		0.42	0.05		0.43	0.12	
Uniform Delay, d1	51.0	10.1		49.3	7.7		50.0	48.5		50.1	48.8	
Progression Factor	1.00	1.00		1.06	0.56		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	1.1		0.5	0.3		3.3	0.2		3.0	0.4	
Delay (s)	55.8	11.2		52.7	4.6		53.3	48.6		53.1	49.3	
Level of Service	E	B		D	A		D	D		D	D	
Approach Delay (s)		13.4			5.8			51.0			50.3	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



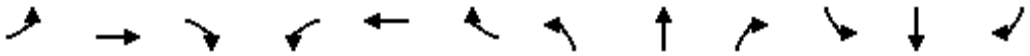
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	965	17	67	735	35	84	0	81	19	1	7
Future Volume (vph)	9	965	17	67	735	35	84	0	81	19	1	7
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.2	6.2		5.9	6.1	6.1		6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.93			0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.97	
Satd. Flow (prot)	1565	3307		1565	3316	1400		1589			1625	
Flt Permitted	0.34	1.00		0.95	1.00	1.00		0.82			0.65	
Satd. Flow (perm)	566	3307		1565	3316	1400		1343			1088	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	1072	19	74	817	39	93	0	90	21	1	8
RTOR Reduction (vph)	0	1	0	0	0	9	0	75	0	0	7	0
Lane Group Flow (vph)	10	1090	0	74	817	30	0	108	0	0	23	0
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			3			7	
Permitted Phases	6					2	3			7		
Actuated Green, G (s)	72.2	72.2		9.6	87.8	87.8		14.2			14.2	
Effective Green, g (s)	72.2	72.2		9.6	87.8	87.8		14.2			14.2	
Actuated g/C Ratio	0.63	0.63		0.08	0.76	0.76		0.12			0.12	
Clearance Time (s)	6.2	6.2		5.9	6.1	6.1		6.9			6.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	355	2076		130	2531	1068		165			134	
v/s Ratio Prot		c0.33		c0.05	0.25							
v/s Ratio Perm	0.02					0.02		c0.08			0.02	
v/c Ratio	0.03	0.53		0.57	0.32	0.03		0.65			0.17	
Uniform Delay, d1	8.1	11.9		50.7	4.3	3.3		48.0			45.1	
Progression Factor	0.93	1.31		1.19	0.66	0.64		1.00			1.00	
Incremental Delay, d2	0.1	0.8		5.3	0.3	0.0		8.9			0.6	
Delay (s)	7.7	16.4		65.5	3.2	2.2		57.0			45.7	
Level of Service	A	B		E	A	A		E			D	
Approach Delay (s)		16.3			8.1			57.0			45.7	
Approach LOS		B			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
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)	242	823	123	211	512	91	57	287	283	131	321	149
Future Volume (vph)	242	823	123	211	512	91	57	287	283	131	321	149
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.5	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3036	3251		3036	3316	1400	1565	1745	1400	1565	1745	1400
Flt Permitted	0.36	1.00		0.13	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1163	3251		421	3316	1400	1565	1745	1400	1565	1745	1400
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	269	914	137	234	569	101	63	319	314	146	357	166
RTOR Reduction (vph)	0	10	0	0	0	61	0	0	133	0	0	123
Lane Group Flow (vph)	269	1041	0	234	569	40	63	319	181	146	357	43
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	6	1		2	5		3	8		7	4	
Permitted Phases	1			5		5			8			4
Actuated Green, G (s)	55.1	46.4		54.5	46.0	46.0	4.7	28.9	28.9	5.9	30.1	30.1
Effective Green, g (s)	55.1	46.4		54.5	46.0	46.0	4.7	28.9	28.9	5.9	30.1	30.1
Actuated g/C Ratio	0.48	0.40		0.47	0.40	0.40	0.04	0.25	0.25	0.05	0.26	0.26
Clearance Time (s)	6.5	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	698	1311		392	1326	560	63	438	351	80	456	366
v/s Ratio Prot	0.03	c0.32		c0.04	0.17		0.04	0.18		c0.09	c0.20	
v/s Ratio Perm	0.16			0.24		0.03			0.13			0.03
v/c Ratio	0.39	0.79		0.60	0.43	0.07	1.00	0.73	0.51	1.82	0.78	0.12
Uniform Delay, d1	17.5	30.1		20.6	25.0	21.3	55.1	39.5	37.0	54.5	39.4	32.3
Progression Factor	1.03	0.73		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	4.6		2.4	1.0	0.2	113.4	6.0	1.3	415.7	8.5	0.1
Delay (s)	18.2	26.6		23.0	26.0	21.6	168.5	45.4	38.3	470.3	48.0	32.5
Level of Service	B	C		C	C	C	F	D	D	F	D	C
Approach Delay (s)		24.9			24.7			53.4			136.3	
Approach LOS		C			C			D			F	

Intersection Summary			
HCM 2000 Control Delay	51.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	79.2%	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 (veh/h)	14	1078	17	13	732	20	14	0	16	24	1	10
Future Volume (Veh/h)	14	1078	17	13	732	20	14	0	16	24	1	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	16	1198	19	14	813	22	16	0	18	27	1	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (m)					249							
pX, platoon unblocked	0.95						0.95	0.95		0.95	0.95	0.95
vC, conflicting volume	835			1217			1686	2102	608	1501	2101	418
vC1, stage 1 conf vol							1240	1240		852	852	
vC2, stage 2 conf vol							446	863		649	1249	
vCu, unblocked vol	730			1217			1622	2059	608	1428	2057	292
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			91	100	96	90	99	98
cM capacity (veh/h)	830			569			173	201	438	264	194	672

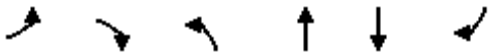
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	SB 1
Volume Total	16	799	418	420	428	34	39
Volume Left	16	0	0	14	0	16	27
Volume Right	0	0	19	0	22	18	11
cSH	830	1700	1700	569	1700	255	315
Volume to Capacity	0.02	0.47	0.25	0.02	0.25	0.13	0.12
Queue Length 95th (m)	0.4	0.0	0.0	0.6	0.0	3.5	3.2
Control Delay (s)	9.4	0.0	0.0	0.7	0.0	21.3	18.0
Lane LOS	A			A		C	C
Approach Delay (s)	0.1			0.4		21.3	18.0
Approach LOS						C	C

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	42.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1034	44	0	725	0	42
Future Volume (Veh/h)	1034	44	0	725	0	42
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1149	49	0	806	0	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				53		
pX, platoon unblocked					0.93	
vC, conflicting volume			1198		1576	599
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1198		1469	599
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	89
cM capacity (veh/h)			578		110	445

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	766	432	403	403	47
Volume Left	0	0	0	0	0
Volume Right	0	49	0	0	47
cSH	1700	1700	1700	1700	445
Volume to Capacity	0.45	0.25	0.24	0.24	0.11
Queue Length 95th (m)	0.0	0.0	0.0	0.0	2.7
Control Delay (s)	0.0	0.0	0.0	0.0	14.0
Lane LOS					B
Approach Delay (s)	0.0		0.0		14.0
Approach LOS					B

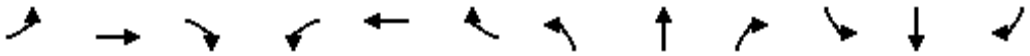
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	41.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	0	4	127	50	13
Future Volume (Veh/h)	38	0	4	127	50	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	42	0	4	141	56	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					81	
pX, platoon unblocked						
vC, conflicting volume	212	63	70			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	212	63	70			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	100	100			
cM capacity (veh/h)	774	1002	1531			

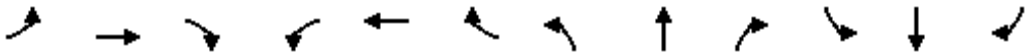
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	42	145	70
Volume Left	42	4	0
Volume Right	0	0	14
cSH	774	1531	1700
Volume to Capacity	0.05	0.00	0.04
Queue Length 95th (m)	1.3	0.1	0.0
Control Delay (s)	9.9	0.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.9	0.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		



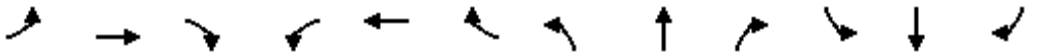
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	1096	24	40	1559	71	25	1	16	46	3	137
Future Volume (vph)	114	1096	24	40	1559	71	25	1	16	46	3	137
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
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)	1565	3305		1565	3294		1565	1499		1565	1489	
Flt Permitted	0.95	1.00		0.95	1.00		0.49	1.00		0.75	1.00	
Satd. Flow (perm)	1565	3305		1565	3294		801	1499		1229	1489	
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)	114	1096	24	40	1559	71	25	1	16	46	3	137
RTOR Reduction (vph)	0	1	0	0	2	0	0	15	0	0	126	0
Lane Group Flow (vph)	114	1119	0	40	1628	0	25	2	0	46	14	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	13	1		9	5			3			7	
Permitted Phases							3			7		
Actuated Green, G (s)	17.8	73.5		17.8	73.5		9.9	9.9		9.9	9.9	
Effective Green, g (s)	17.8	73.5		17.8	73.5		9.9	9.9		9.9	9.9	
Actuated g/C Ratio	0.15	0.61		0.15	0.61		0.08	0.08		0.08	0.08	
Clearance Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	2024		232	2017		66	123		101	122	
v/s Ratio Prot	c0.07	0.34		0.03	c0.49			0.00			0.01	
v/s Ratio Perm							0.03			c0.04		
v/c Ratio	0.49	0.55		0.17	0.81		0.38	0.02		0.46	0.12	
Uniform Delay, d1	46.9	13.6		44.7	17.8		52.1	50.6		52.5	51.0	
Progression Factor	1.00	1.00		1.06	0.73		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	1.1		0.3	3.5		3.6	0.1		3.2	0.4	
Delay (s)	48.6	14.7		47.6	16.4		55.7	50.6		55.7	51.4	
Level of Service	D	B		D	B		E	D		E	D	
Approach Delay (s)		17.8			17.2			53.7			52.5	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	20.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.8
Intersection Capacity Utilization	89.0%	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)	10	1061	32	123	1684	37	137	0	79	55	0	14
Future Volume (vph)	10	1061	32	123	1684	37	137	0	79	55	0	14
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.2	6.2		5.9	6.1	6.1		6.9			6.9	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.95			0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97			0.96	
Satd. Flow (prot)	1565	3301		1565	3316	1400		1608			1632	
Flt Permitted	0.13	1.00		0.95	1.00	1.00		0.79			0.67	
Satd. Flow (perm)	220	3301		1565	3316	1400		1314			1132	
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)	10	1061	32	123	1684	37	137	0	79	55	0	14
RTOR Reduction (vph)	0	1	0	0	0	10	0	70	0	0	58	0
Lane Group Flow (vph)	10	1092	0	123	1684	27	0	146	0	0	11	0
Turn Type	Perm	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6		5	2			3			7	
Permitted Phases	6					2	3			7		
Actuated Green, G (s)	68.6	68.6		13.8	88.4	88.4		18.6			18.6	
Effective Green, g (s)	68.6	68.6		13.8	88.4	88.4		18.6			18.6	
Actuated g/C Ratio	0.57	0.57		0.12	0.74	0.74		0.16			0.16	
Clearance Time (s)	6.2	6.2		5.9	6.1	6.1		6.9			6.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	125	1887		179	2442	1031		203			175	
v/s Ratio Prot		0.33		0.08	c0.51							
v/s Ratio Perm	0.05					0.02		c0.11			0.01	
v/c Ratio	0.08	0.58		0.69	0.69	0.03		0.72			0.06	
Uniform Delay, d1	11.5	16.4		51.0	8.5	4.2		48.2			43.3	
Progression Factor	1.13	1.39		1.44	0.49	0.08		1.00			1.00	
Incremental Delay, d2	1.1	1.2		1.0	0.1	0.0		11.5			0.1	
Delay (s)	14.1	24.0		74.3	4.3	0.3		59.7			43.4	
Level of Service	B	C		E	A	A		E			D	
Approach Delay (s)		23.9			8.9			59.7			43.4	
Approach LOS		C			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	82.8%	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)	273	846	135	375	1241	233	166	395	293	154	421	457
Future Volume (vph)	273	846	135	375	1241	233	166	395	293	154	421	457
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Width	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0	3.0	3.5	3.0
Total Lost time (s)	6.3	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3036	3247		3036	3316	1400	1565	1745	1400	1565	1745	1400
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3036	3247		3036	3316	1400	1565	1745	1400	1565	1745	1400
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)	273	846	135	375	1241	233	166	395	293	154	421	457
RTOR Reduction (vph)	0	10	0	0	0	153	0	0	213	0	0	213
Lane Group Flow (vph)	273	971	0	375	1241	80	166	395	80	154	421	244
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases						2			8			4
Actuated Green, G (s)	14.5	39.3		16.6	41.4	41.4	5.9	32.9	32.9	5.9	32.9	32.9
Effective Green, g (s)	14.5	39.3		16.6	41.4	41.4	5.9	32.9	32.9	5.9	32.9	32.9
Actuated g/C Ratio	0.12	0.33		0.14	0.34	0.34	0.05	0.27	0.27	0.05	0.27	0.27
Clearance Time (s)	6.3	6.3		6.3	6.3	6.3	6.1	6.6	6.6	6.1	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	366	1063		419	1144	483	76	478	383	76	478	383
v/s Ratio Prot	0.09	0.30		c0.12	c0.37		c0.11	0.23		0.10	c0.24	
v/s Ratio Perm						0.06			0.06			0.17
v/c Ratio	0.75	0.91		0.89	1.08	0.17	2.18	0.83	0.21	2.03	0.88	0.64
Uniform Delay, d1	51.0	38.7		50.8	39.3	27.3	57.0	40.9	33.5	57.0	41.7	38.3
Progression Factor	0.95	1.46		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.9	11.7		20.9	52.7	0.7	573.5	11.2	0.3	504.6	17.1	3.5
Delay (s)	55.3	68.2		71.8	92.0	28.1	630.5	52.0	33.8	561.7	58.7	41.8
Level of Service	E	E		E	F	C	F	D	C	F	E	D
Approach Delay (s)		65.4			79.9			158.2			126.3	
Approach LOS		E			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	99.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	25.3
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX

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Intersection: 3: Victor St/Johnwoods St & Hazeldean Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	40.8	88.9	77.7	17.0	36.9	38.1	22.6	19.9	29.2	36.1
Average Queue (m)	16.2	43.8	31.6	4.4	13.7	16.8	7.3	6.5	10.6	13.2
95th Queue (m)	31.4	75.9	64.2	13.2	29.2	33.6	18.1	15.6	22.9	26.6
Link Distance (m)		171.5	171.5		609.8	609.8		270.9		281.6
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	75.0			70.0			40.0		35.0	
Storage Blk Time (%)		1							0	1
Queuing Penalty (veh)		0							0	0

Intersection: 6: Hazeldean Rd & Cedarow Crt

Movement	EB	EB	EB	WB	NB	SB
Directions Served	L	T	TR	LT	LTR	LTR
Maximum Queue (m)	8.8	0.6	0.6	16.3	15.0	18.9
Average Queue (m)	1.2	0.0	0.0	2.4	6.8	6.7
95th Queue (m)	6.1	0.6	0.6	10.6	14.4	15.3
Link Distance (m)		609.8	609.8	182.0	70.6	101.8
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	75.0					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 9: Fringewood Dr & Hazeldean Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	LTR
Maximum Queue (m)	18.8	47.2	50.5	37.0	21.8	106.2	9.6	58.7	15.3
Average Queue (m)	2.0	33.0	34.0	16.3	7.7	13.1	1.1	31.9	4.4
95th Queue (m)	10.9	51.9	54.5	31.8	17.8	60.3	5.9	54.9	11.8
Link Distance (m)		38.6	38.6		275.1	275.1		59.0	101.5
Upstream Blk Time (%)	0	6	7			0		1	
Queuing Penalty (veh)	0	33	38			0		2	
Storage Bay Dist (m)	55.0			100.0			180.0		
Storage Blk Time (%)	0	6							
Queuing Penalty (veh)	0	1							

Intersection: 12: Iber Rd/Huntmar Dr & Hazeldean Rd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	T	R	L	T	R
Maximum Queue (m)	27.9	31.4	87.0	91.7	44.5	53.5	68.8	64.2	3.4	37.3	97.8	78.7
Average Queue (m)	10.8	16.5	47.6	51.5	11.3	29.3	41.0	33.9	0.2	15.4	50.4	28.6
95th Queue (m)	22.0	27.1	78.5	82.8	32.0	47.3	63.9	57.0	2.9	31.5	82.7	58.3
Link Distance (m)			275.1	275.1			281.2	281.2			198.4	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	90.0	90.0			115.0	115.0			245.0	70.0		65.0
Storage Blk Time (%)			0								4	0
Queuing Penalty (veh)			1								13	1

Intersection: 12: Iber Rd/Huntmar Dr & Hazeldean Rd

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (m)	114.9	226.0	220.0
Average Queue (m)	101.8	168.1	112.0
95th Queue (m)	140.2	281.8	288.5
Link Distance (m)		213.9	213.9
Upstream Blk Time (%)		53	20
Queuing Penalty (veh)		0	0
Storage Bay Dist (m)	85.0		
Storage Blk Time (%)	77	3	
Queuing Penalty (veh)	249	4	

Intersection: 16: Site Access & Hazeldean Rd

Movement	EB	EB	NB
Directions Served	T	TR	R
Maximum Queue (m)	52.8	54.9	23.2
Average Queue (m)	12.6	14.9	8.5
95th Queue (m)	39.5	43.7	18.0
Link Distance (m)	182.0	182.0	50.1
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 18: Fringewood Dr & Site Access

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	16.8	9.7
Average Queue (m)	7.3	0.5
95th Queue (m)	14.7	5.8
Link Distance (m)	31.6	29.4
Upstream Blk Time (%)		0
Queuing Penalty (veh)		0
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 341

Intersection: 3: Victor St/Johnwoods St & Hazeldean Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	66.5	91.8	82.4	67.2	128.6	132.6	26.0	11.6	36.0	45.6
Average Queue (m)	28.2	50.4	38.5	12.2	61.5	66.1	7.4	3.4	12.4	20.6
95th Queue (m)	52.0	81.1	72.7	36.8	106.7	112.5	18.7	10.3	28.0	36.7
Link Distance (m)		171.5	171.5		609.8	609.8		270.9		281.6
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	75.0			70.0			40.0		35.0	
Storage Blk Time (%)	0	1			6				0	2
Queuing Penalty (veh)	0	1			2				0	1

Intersection: 6: Hazeldean Rd & Cedarow Crt

Movement	EB	EB	EB	WB	WB	NB	SB
Directions Served	L	T	TR	LT	TR	LTR	LTR
Maximum Queue (m)	11.6	1.0	2.6	92.4	79.0	38.8	76.1
Average Queue (m)	3.4	0.0	0.1	22.6	11.1	13.4	39.3
95th Queue (m)	10.5	1.0	1.3	69.9	48.5	33.1	95.6
Link Distance (m)		609.8	609.8	182.1	182.1	70.7	101.8
Upstream Blk Time (%)							8
Queuing Penalty (veh)							0
Storage Bay Dist (m)	75.0						
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 9: Fringewood Dr & Hazeldean Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	T	R	LTR	LTR
Maximum Queue (m)	20.7	49.5	49.6	55.2	44.4	198.3	10.1	60.8	34.8
Average Queue (m)	2.9	39.3	40.1	28.3	17.5	29.7	1.1	45.0	14.1
95th Queue (m)	11.9	51.2	51.6	47.5	38.0	110.0	5.8	65.4	28.7
Link Distance (m)		38.7	38.7		275.1	275.1		56.6	101.5
Upstream Blk Time (%)	0	12	13			0		5	
Queuing Penalty (veh)	0	70	74			0		10	
Storage Bay Dist (m)	55.0			100.0			180.0		
Storage Blk Time (%)	0	12							
Queuing Penalty (veh)	0	1							

Intersection: 12: Iber Rd/Huntmar Dr & Hazeldean Rd

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	L	T	TR	L	L	T	T	R	L	T	R
Maximum Queue (m)	52.8	94.9	158.3	162.6	69.3	195.0	294.0	294.8	275.0	99.9	212.4	90.0
Average Queue (m)	31.8	37.9	101.7	107.0	39.9	165.2	255.3	251.4	135.9	96.0	190.8	31.4
95th Queue (m)	47.5	78.2	146.0	150.9	64.3	259.2	351.0	348.5	359.2	115.6	253.8	80.6
Link Distance (m)			275.1	275.1			281.2	281.2			198.4	
Upstream Blk Time (%)							42	21			68	
Queuing Penalty (veh)							0	0			0	
Storage Bay Dist (m)	90.0	90.0			115.0	115.0			245.0	70.0		65.0
Storage Blk Time (%)			23			0	65	37		89	14	0
Queuing Penalty (veh)			61			0	242	86		610	62	3

Intersection: 12: Iber Rd/Huntmar Dr & Hazeldean Rd

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (m)	114.9	216.7	207.5
Average Queue (m)	74.5	128.5	86.8
95th Queue (m)	136.0	237.3	214.9
Link Distance (m)		213.9	213.9
Upstream Blk Time (%)		19	9
Queuing Penalty (veh)		0	0
Storage Bay Dist (m)	85.0		
Storage Blk Time (%)	32	16	
Queuing Penalty (veh)	134	25	

Intersection: 16: Site Access & Hazeldean Rd

Movement	EB	EB	NB
Directions Served	T	TR	R
Maximum Queue (m)	76.9	86.6	25.0
Average Queue (m)	29.7	32.5	8.2
95th Queue (m)	67.1	71.1	18.5
Link Distance (m)	182.1	182.1	27.7
Upstream Blk Time (%)			0
Queuing Penalty (veh)			0
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 18: Fringewood Dr & Site Access

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	22.8	23.7
Average Queue (m)	9.1	3.1
95th Queue (m)	17.9	14.9
Link Distance (m)	26.0	64.3
Upstream Blk Time (%)	0	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1385