5872 Hazeldean Rd

TIA Step 3 Report – Strategy

Draft

September 2025

TIA Plan Reports

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

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

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

CERTIFICATION

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

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

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5872 Hazeldean Rd

TIA Step 3 Strategy

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TIA STEP 3 – STRATEGY REPORT

Parsons has been retained by Hazeldean Heights Inc. to prepare a TIA in support of a Zoning By-Law Amendment (ZBLA) and a Site Plan Control Application (SPA) for a proposed residential development located at the combined municipal addresses of 5872, 5880, 5884 Hazeldean Rd and 7 Savage Dr, referred to as 5872 Hazeldean Rd herein. This document follows the TIA process as outlined in the City of Ottawa Transportation Impact Assessment (TIA) Guidelines (2017). The following report represents Step 3 – Strategy Report.

1.0 SCREENING FORM

The screening form confirmed the need for a TIA Report based on the Trip Generation trigger, given that the proposed development consists of more than 150 high rise units; The Location trigger given that the development is located within a transit priority network within the Official Plan; and Safety trigger given that the development is located within 150m of Victor/Hazeldean signalized intersection. The Screening Form and Site Plan have been provided in **Appendix A**.

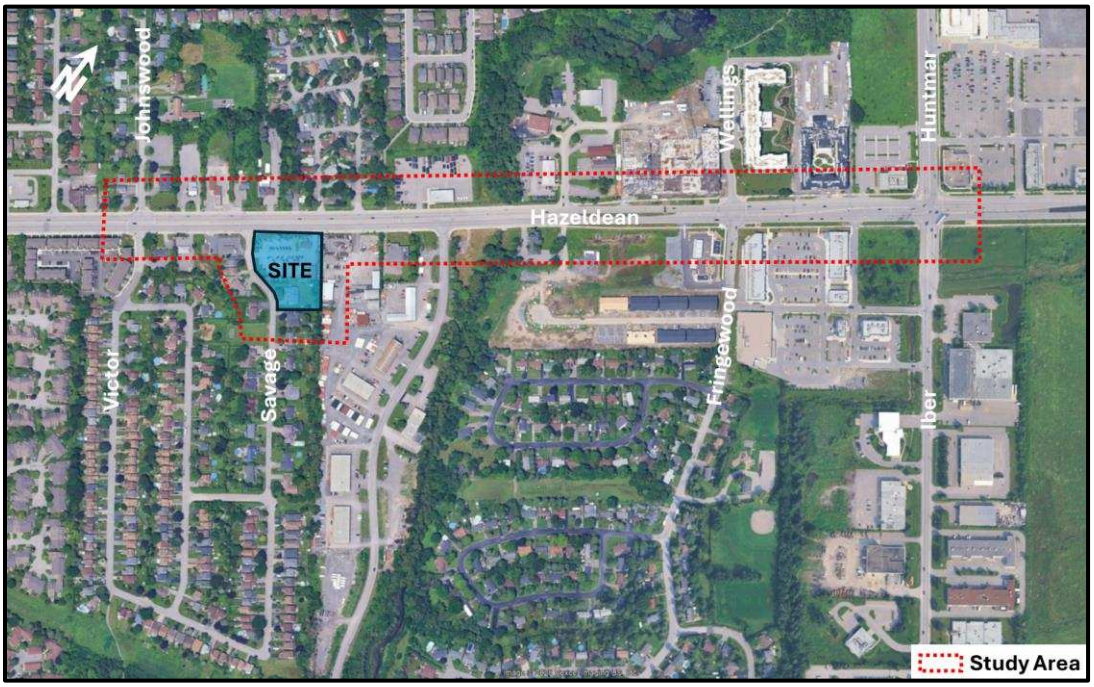
2.0 SCOPING REPORT

2.1. Existing and Planned Conditions

2.1.1. Proposed Development

The proposed development is located at the south-east corner of the Savage/Hazeldean intersection and is currently occupied by a car dealership and a single detached home. The site is currently zoned general mixed-use zone GM14 H(11) and residential first density R1D, which allows residential uses up to a height of 11m for the GM zone and single detached low-rise homes for the R1D zone. Based on the existing zoning, a Zoning By-Law Amendment (ZBLA) to allow higher density and building heights of up to 25-storeys is required (estimated to be approximately 75m tall based on 3m per floor). The site context is illustrated in **Figure 1**.

Figure 1: Local Context



The development will consist of three apartment buildings ranging from 4 to 25-storeys high, connected by a pedestrian courtyard and a shared underground parking garage. The proposed building heights and unit count have been summarized in **Table 1**. For the purposes of this study, full buildout of the site has been assumed by 2028. Note, this estimate is highly dependent on market forces but is considered the earliest likely date.

Table 1: Summary of Proposed Land Uses, Size and Location

Building	# of Floors	Residential Units
A	19	174
B	25	247
C	4	35
Combined	-	**456**

The proposed plan provides full access off Savage Dr approximately 75m south of Hazeldean Rd and a right-out only access at the eastmost extent of the site on Hazeldean Rd, approximately 80m east of Savage Dr. North of the parking garage ramp, the laneway will operate as one-way traffic flow to provide convenient circulation of larger vehicles and general vehicle exit from the site.

Vehicle parking is proposed predominantly within an underground parking garage, consisting of 230 underground parking spaces and 4 surface spaces, with 86 of the spaces reserved for residential and commercial visitor parking and 319 bike parking spaces. Garbage pick-up is proposed at grade level internal to the site. It will be assumed that the site will be built out in a single phase by 2028. The site plan has been illustrated in **Figure 2** with a high-quality image in **Appendix A**.

2.1.2. Existing Conditions

Area Road Network

A description for each road within the study area included in the TIA has been provided below.

Hazeldean Road is classified as an arterial roadway which extends from Spruce Ridge Rd in the west to Eagleson Rd in the east, where it continues as Roberston Rd. Within the study area, Hazeldean Rd has a five-lane cross section consisting of two eastbound lanes, two westbound lanes and a median shared two-way left-turn lane. According to the Official Plan Schedule C16, the protected right-of-way is 37.5m. The posted speed limit is 60km/h. Hazeldean Rd is classified as a full loads truck route.

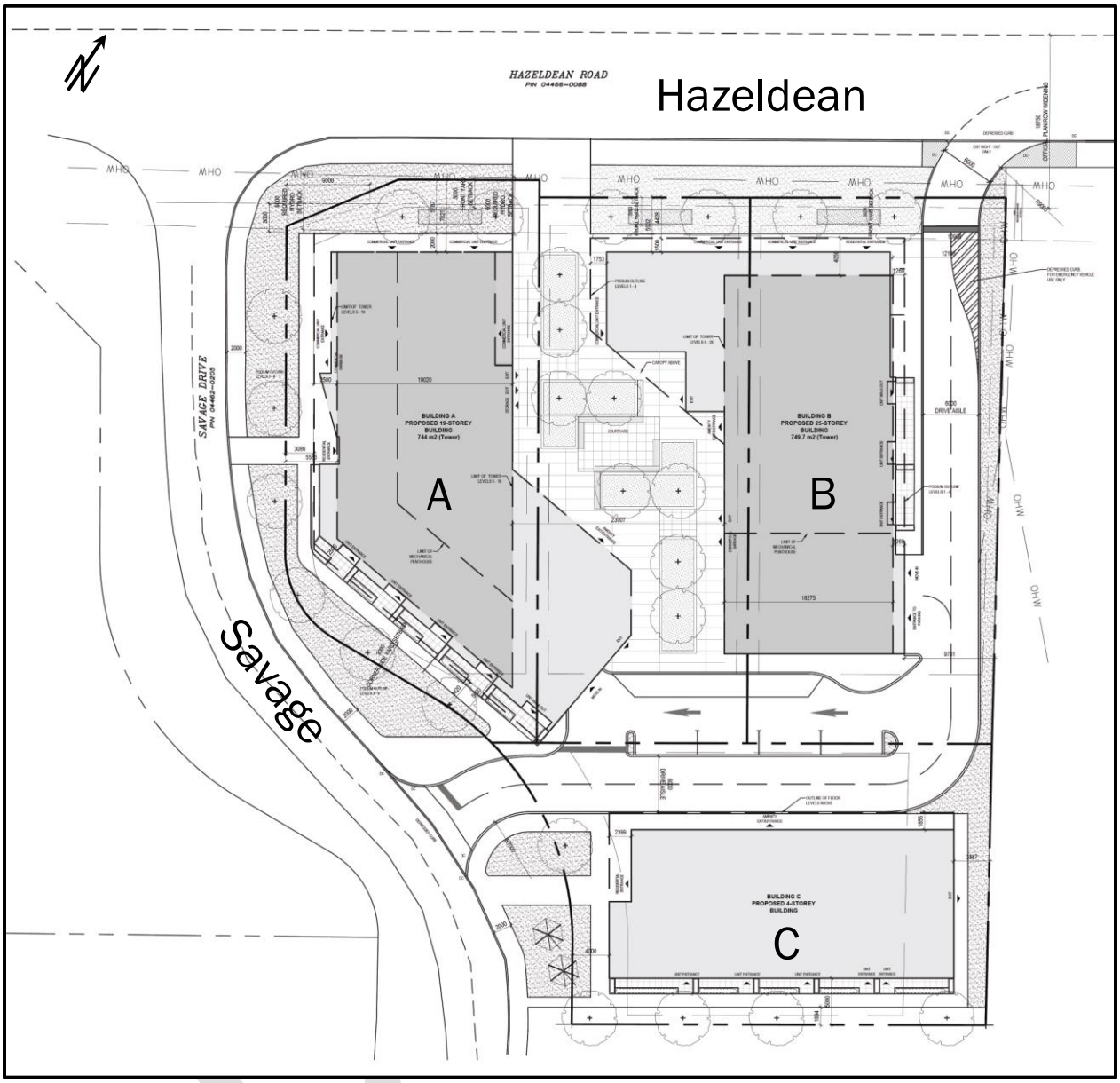
Huntmar Road is classified as a major collector roadway which extends from March Rd in the north to Hazeldean Rd in the south, where it continues as Iber Rd. Within the study area, Huntmar Rd has a four-lane cross section north of Hazeldean Rd and two-lane cross section south of Hazeldean Rd. According to the Official Plan Schedule C16, the protected right-of-way is 37.5m. The posted speed limit is 60km/h.

Victor Street is classified as a local roadway which extends from Hazeldean Rd in the north to a 90-degree bend to the east, in the south, where it continues as Greer St. North of Hazeldean Rd, Victor St continues as Johnwoods St which is classified as a collector road. The posted speed limit is 40km/h.

Savage Drive is classified as a local roadway which extends from Hazeldean Rd in the north to a 90-degree bend to the west, in the south, where it continues as Greer St. The posted speed limit is 40km/h.

Fringewood Drive is classified as a local roadway which extends from Hazeldean Rd in the north where it continues as Wellings Pvt to Harry Douglas Dr to the south, where it continues as Granite Ridge Dr. The posted speed limit is 40km/h.

Figure 2: Proposed Site Plan

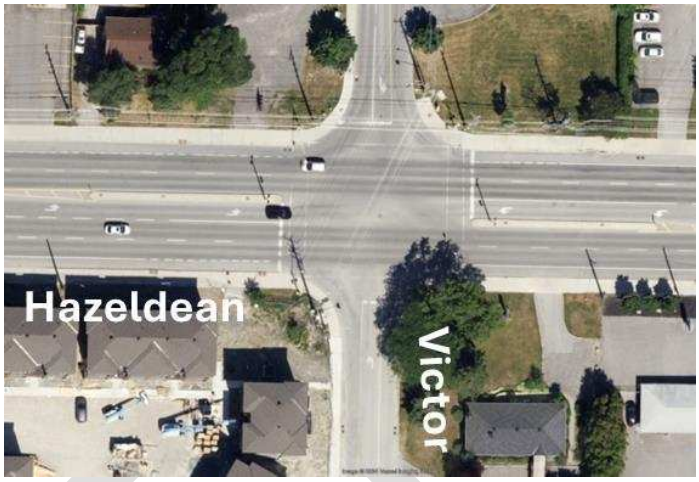


Existing Study Area Intersections

The following provides a description of study area intersections:

Victor/Hazeldean

The Victor/Hazeldean intersection is a four-legged signalized intersection. The eastbound and westbound movements consist of a left-turn lane, a through lane and a shared through-right lane. The northbound and southbound approaches consist of a left-turn lane and a shared through-right lane. A curbside bike lane is provided on Hazeldean Rd. All movements are permitted at this location.

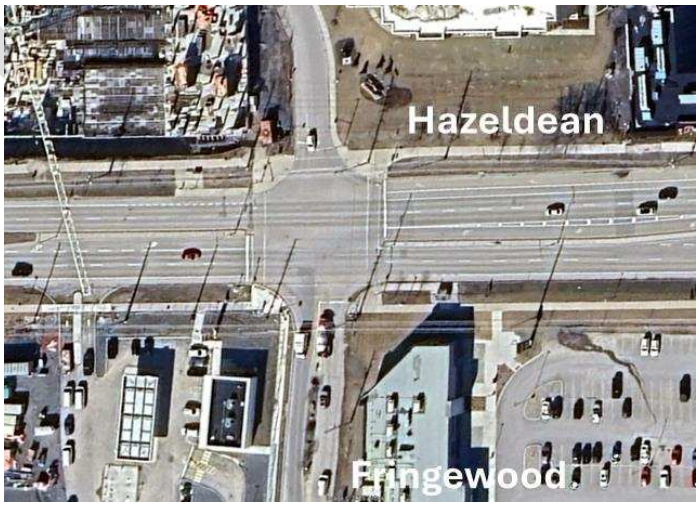


Savage/Hazeldean

The Savage/Hazeldean intersection is a three-legged intersection with STOP control on Savage Dr. The eastbound and westbound movements consist of two through lanes with permissive right-turns off the curbside through lane. A median two-way left-turn lane is available as the center lane. The northbound movement consists of a shared all movement lane. A curbside bike lane is provided on Hazeldean Rd. All movements are permitted at this location.

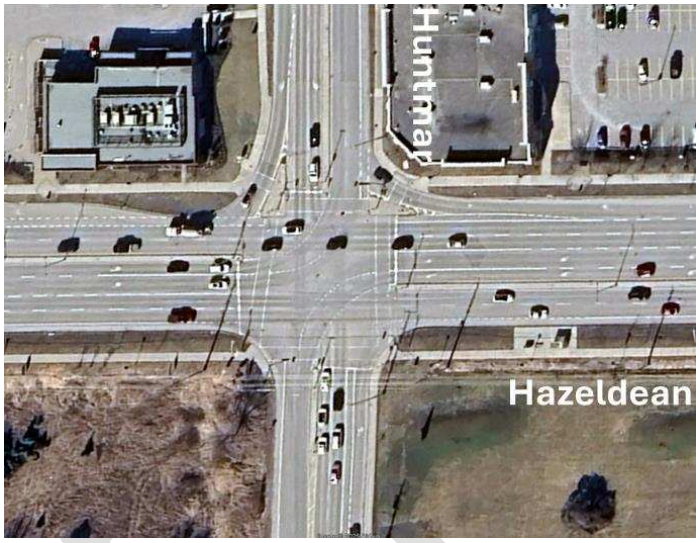
Fringewood/Hazeldean

The Fringewood/Hazeldean intersection is a four-legged signalized intersection. The eastbound approach consists of a left-turn lane, a through lane and a shared through-right lane. The westbound approach consists of a left-turn lane, double through lanes and a right-turn lane. The northbound and southbound approaches consist of a wide single all-movement lane. A curbside bike lane is provided on the eastbound direction on Hazeldean Rd and a pocket bike lane on the westbound direction. All movements are permitted at this location.



Huntmar/Hazeldean

The Huntmar/Hazeldean intersection is a four-legged signalized intersection. The eastbound approach consists of a double left-turn lane, a through lane and a shared through-right lane. The westbound approach consists of a double left-turn lane, double through lanes and a channelized right-turn lane. The northbound approach consists of a left-turn lane, a through lane and a right-turn lane. The southbound approach consists of a left-turn lane, a through lane and a channelized right-turn lane. A curbside bike lane is provided on the eastbound direction on Hazeldean Rd and a pocket bike lane on the westbound direction. Huntmar Rd provides pocket bike lanes. Trucks are not allowed to proceed north of Hazeldean Rd on Huntmar Rd.

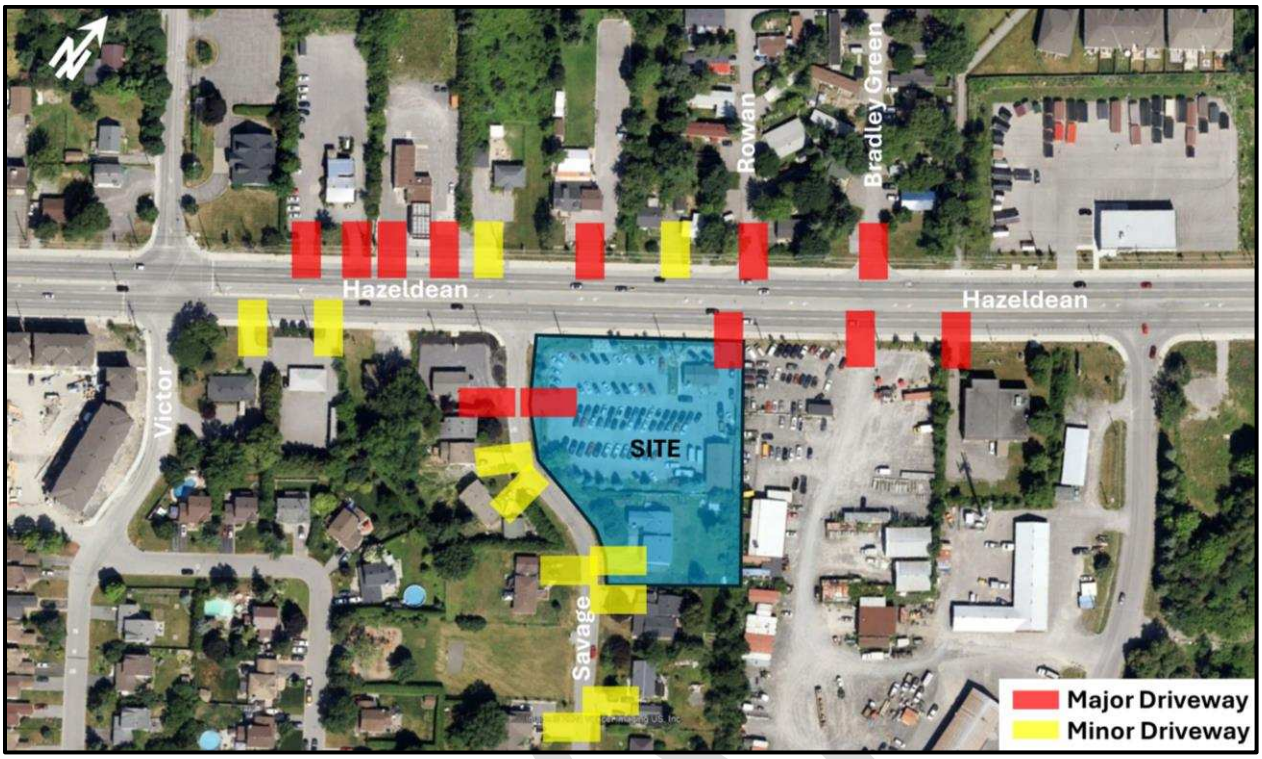


Existing Driveways to Adjacent Developments

Driveway accesses near to the development as shown in red boxes for major accesses and yellow boxes for minor accesses in **Figure 3** include:

- On the north side of Hazeldean Rd:
  - 5903: two accesses to a dental office, approximately 70 and 90m west of the site.
  - 5899: two accesses to a convenience store, approximately 30 and 55m west of the site.
  - 5891: single access to a daycare, across from Savage Dr.
  - 5883: single access to a town hall, across the street from the site.
  - 5879 and 5877: two private driveways to homes, across the street from the site.
  - Rowan Rd and Bradley Green Ct: private streets to approximately 60 stationary motorhomes.
- On the south side of Hazeldean Rd:
  - 5912 and 5906: two driveways to a massage place and retail, approximately 85 and 120m west of the site.
  - 5872: access to the site, located on the far east edge of the property line. This access is proposed to be retrofitted into a right-out only access by the site in future conditions.
  - 5862: single access to an auto center, approximately 50m east of the site.
  - 5854: single access to a bell utility building, approximately 85m east of the site.
- On Savage Dr:
  - 5884 (Hazeldean): access to the site, located approximately 30m south of Hazeldean Rd. This access will be removed as part of this redevelopment.
  - 7: single access to a private home. The future site proposes a new access within this parcel.
  - 2: single access to a chiropractor, directly across from the site.
  - 4 to 30 on even numbers and 9 to 29 on odd number: various single accesses to private homes.

Figure 3: Existing Driveways Adjacent to Development



Existing Area Traffic Management Measures

Below are the existing area traffic management measures within the study area:

- "This Lane" bike lane indicator sign on Hazeldean Rd.
- Various stop for school bus with flashers sign for both directions on Hazeldean Rd.
- Children playing sign on Savage Rd.
- 40km/h posted speed limit on Savage Rd and Victor St.
- No trucks allowed on Huntmar Rd north of Hazeldean Rd.

Existing Pedestrian/Cycling Network

Approximate 2.8m wide sidewalk facilities are provided on both sides of Hazeldean Rd near the site, with varying widths further away. Huntmar Dr provides 2.0m or greater sidewalk facilities north of Hazeldean Rd on both sides of the road and on the east side of Iber St only. Victor St has a 1.8m wide sidewalk on the west side of the road only, while Savage Rd does not have any existing sidewalk facilities. At Fringewood, it appears that there's only a sidewalk on the north side of Hazeldean Rd on the east side of Wellings Pvt. Approximate 2.0m wide unidirectional curbside bike lanes are provided on both sides of Hazeldean Rd and Huntmar Dr. South of Hazeldean Rd, the curbside bike lanes on Huntmar Dr become 2.0m wide paved shoulders for both directions of travel. None of the study roads are part of the Crosstown Bikeway Network (March 1, 2023)[1] from the new TMP.

Transit Network

The transit network (New Ways to Bus) for the study area is illustrated in **Figure 4** with **Figure 5** illustrating the bus stop locations near to the site.

[1] Crosstown Bikeway Network, March 1, 2023

Figure 4: Area Transit Network

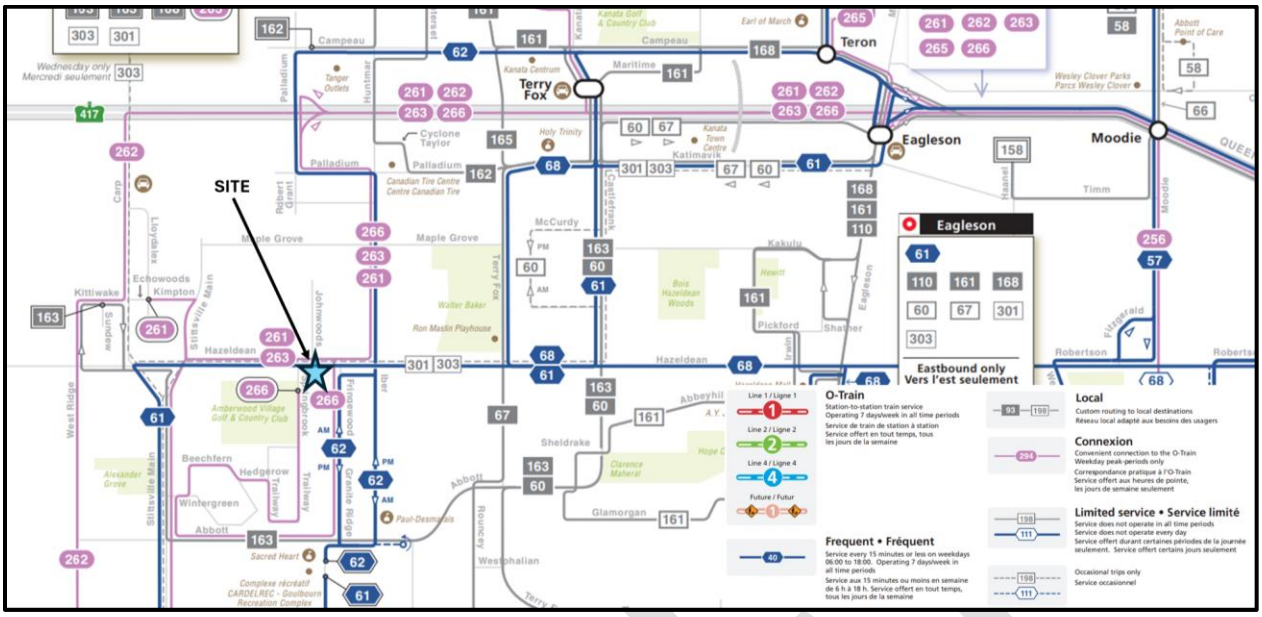
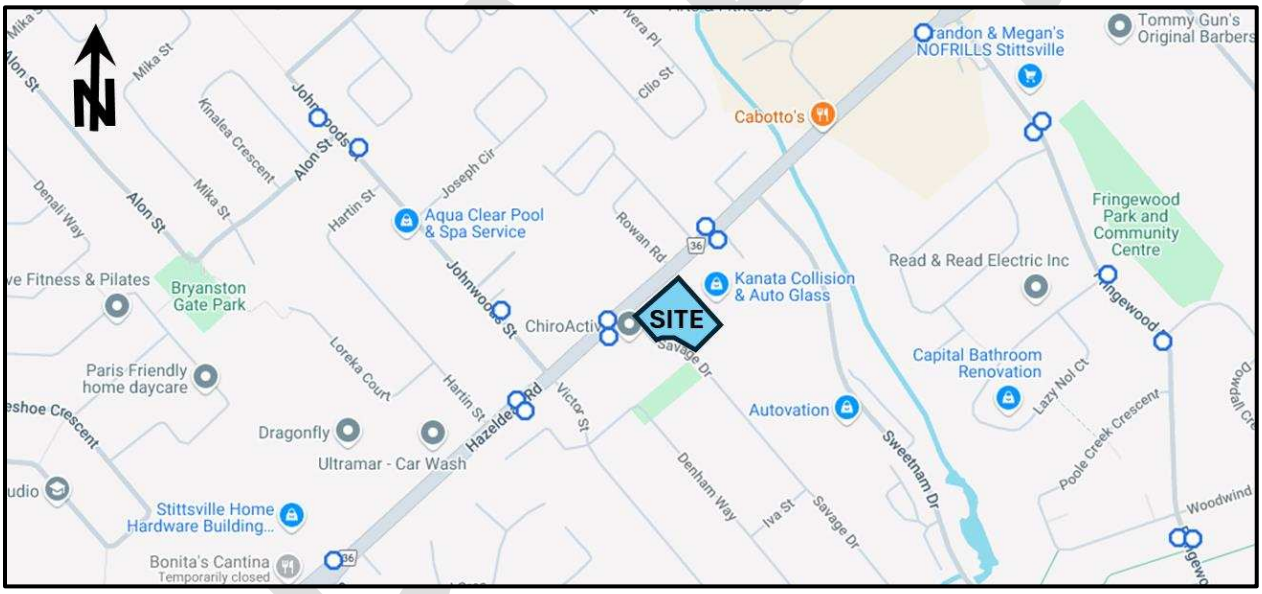


Figure 5: Bus Stop Locations



The following description of OC Transpo routes within 600m walk reflect the current transit operations (note that routes #92 and #263 operate further than a 600m walk):

- **Route #61 (Tunney's Pasture <-> Stittsville)**: identified by OC Transpo as a "frequent", this route operates 7 days a week in all time periods, with headways of approximately 30-minutes during the day. This route provides connectivity to the Confederation LRT Line at Tunney's Pasture, Lincoln Fields, Bayshore Shopping Center, and various destinations within Kanata/Stittsville. Bus stops for this route are available on both sides of Hazeldean Rd, just west of Savage/Hazeldean intersection (stops #5479 and #5480).
- **Route #261 (Tunney's Pasture <-> Kimpton)**: identified by OC Transpo as a "Connexion Route", this route provides 4 buses in the morning peak hour towards downtown and 4 buses returning from downtown in the afternoon peak hour. This route provides connectivity to the Confederation LRT Line at Tunney's Pasture, Lincoln Fields, Moodie, and various destinations within Kanata/Stittsville. Bus

stops for this route are available on both sides of Hazeldean Rd, just west of Savage/Hazeldean intersection (stops #5479 and #5480).

- **Route #263 (Tunney's Pasture <-> Richmond)**: identified by OC Transpo as a "Connexion Route", this route provides 3 buses in the morning peak hour towards downtown and 3 buses returning from downtown in the afternoon peak hour. This route provides connectivity to the Confederation LRT Line at Tunney's Pasture, Lincoln Fields, Moodie, and various destinations within Kanata/Stittsville. Bus stops for this route are available on both sides of Hazeldean Rd, just west of Savage/Hazeldean intersection (stops #5479 and #5480).
- **Routes #301 and 303**: provide special, limited service to destinations such as Carlingwood Shopping Center, the Town of Richmond and the Town of Dunrobin and Carp. These bus routes do not operate on a daily basis. Bus stops for this route are available on both sides of Hazeldean Rd, just west of Savage/Hazeldean intersection (stops #5479 and #5480).

Peak Hour Travel Demands

Traffic count data was obtained from the City of Ottawa. The vehicle traffic volumes at study area intersections are illustrated in **Figure 6** and active transportation volumes in **Figure 7**, with raw traffic count data provided in **Appendix B**. Note that minor volume balancing was performed and active transportation volumes may reflect lower at Victor/Hazeldean due to the winter count performed.

Figure 6: Existing Peak Hour Vehicle Traffic Volumes

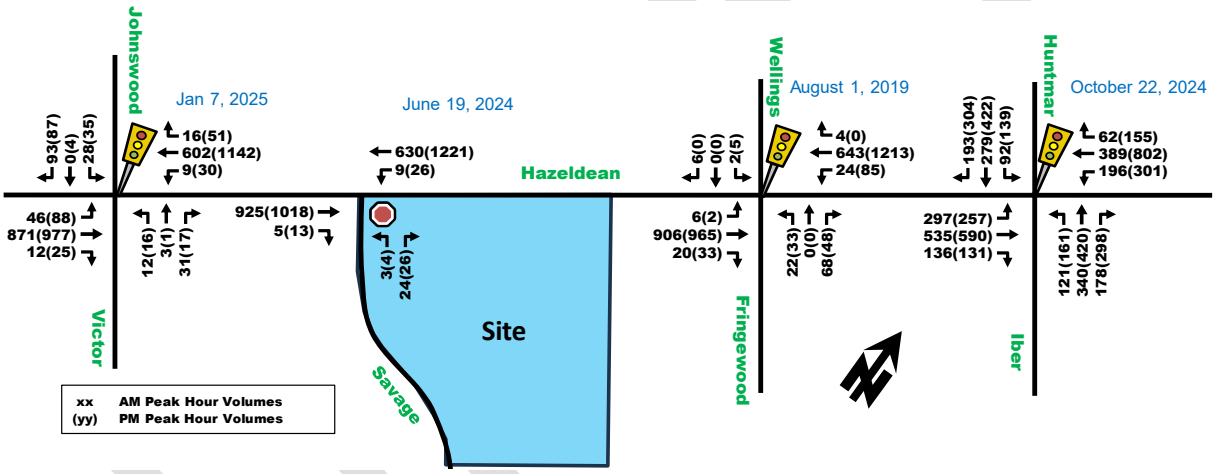
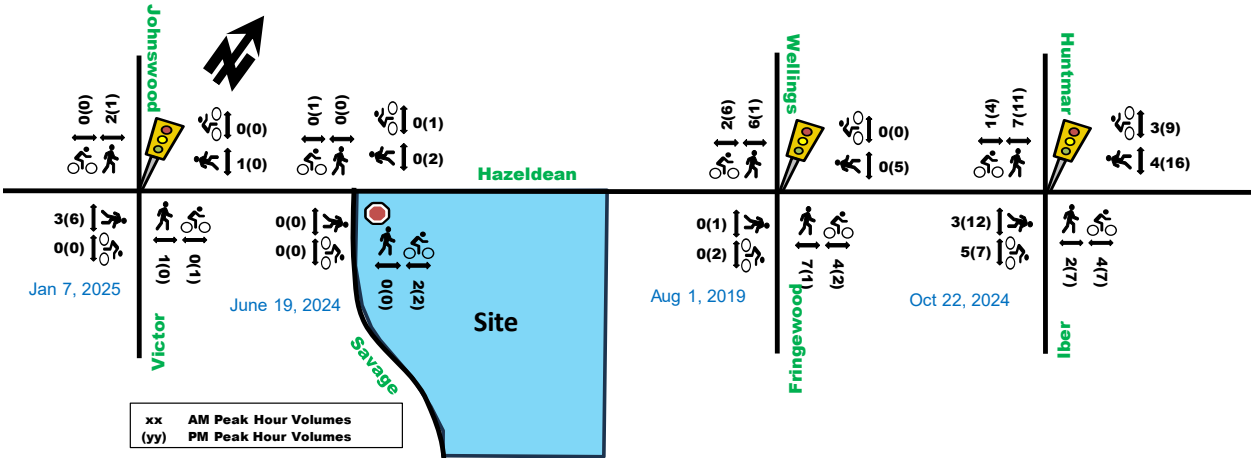


Figure 7: Existing Pedestrian and Cyclists Peak Hour Volumes



Existing Road Safety Conditions

A five-year collision history data (2018-2022, inclusive) was obtained from the City of Ottawa Open Data for the study area intersections and road segments within the study area. The data was analyzed as an initial screening. Detailed collision analysis has been provided in **Appendix C**.

Upon analyzing the collision data, the total number of collisions observed within the study area was determined to be 17 collisions within the past five-years. Of the collisions, 10 of 17 (59%) resulted in property-damage-only (PDO), while the remaining incidents (7 or 41%) resulted in non-fatal injury collisions. There were no fatal collisions recorded within the study area. While this shows a relatively high propensity for non-fatal injuries, the quantity of collisions is quite low, so a further review will be performed below.

Table 2: Collision Summary by Type and Severity

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV Other	SMV Unattended	Other	Total
Property-Damage-Only (PDO)	2	1	1	5	0	1	0	0	**10 (59%)**
Non-fatal injury	2	2	1	1	0	1	0	0	**7 (41%)**
Fatal Incidents	0	0	0	0	0	0	0	0	**0 (0%)**
Total	**4 (24%)**	**3 (18%)**	**2 (12%)**	**6 (35%)**	**0 (0%)**	**2 (12%)**	**0 (0%)**	**0 (0%)**	**17 (100%)**

Angle collisions made up approximately one third of all recorded collisions, likely associated with vehicles crossing a through lane on Hazeldean Rd to either enter/exiting a driveway midblock or a turning manouver to/from Savage Dr and crossing the eastbound Hazeldean Rd lane. Rear end (24%) and turning movement (18%) make up the next two most common types of collisions.

Table 3 summarizes the collision history by intersection, including the total number of collisions, percent causing injury, number of collisions with vulnerable road users, and the most frequent collision type. Similarly, the mid-block collisions are summarized in **Table 4**.

Table 3: Collision Summary at Study Area Intersections, Vulnerable Road Users

Intersection Location	# Collisions in 5 Years	% Causing Injury	# Collisions with Peds	# Collisions with Bikes	Most frequent type of collision and % of total collision at that location
Victor/Hazeldean	7	57%	0	0	Rear End, Turning, Angle (29%)
Savage/Hazeldean	4	0%	0	1	Angle (75%)

Table 4: Collision Summary at Study Area Mid-Block Locations

Midblock Location on Hazeldean Between	# Collisions in 5 Years	Length of Segment	% Causing Injury	# Collisions with AT	Most frequent type of collision and % of total collision at that location
Victor and Savage	5	110m	60%	1 ped, 1 bike	Angle (40%)
Savage and Rowan	1	70m	0%	0	Single Vehicle (100%)

In review of intersection patterns fronting and surrounding the site, the two intersections and adjacent street segments are not observed to have notable vehicle collision patterns in the 5-year period. Savage/Hazeldean recorded a vulnerable road user collision, but it did not result in injuries. The midblock section between Victor St and Savage Rd recorded a collision with a pedestrian and one with a cyclist, both resulting in minor injuries. Of the remaining 3 other collisions between Victor St and Savage Rd, one resulted in minor injuries while the remainder resulted in property damage only.

The intersection of Victor/Hazeldean recorded 7 collisions, with 4 of them causing injury. Of the injury causing collisions, 2 were attributed from turning movements, one from a rear end and another from a sideswipe. While these collisions differed in type and make finding a specific pattern harder, it can likely be assumed that

the higher rate of injury causing collisions may be associated with the 60km/h posted speed on Hazeldean Rd and the high quantity of driveways and possible turning movements/decision making in a short distance. A reduction in the posted speed or a reduction in quantity of driveways (by consolidating accesses) could result in reduced number of collisions and collisions resulting in injury.

Of the 17 recorded collisions, 2 (12%) involved a cyclist. Hazeldean Rd has a curbside bike lane which lacks physical protection from vehicles. Hazeldean Rd is one of the only available continuous east-west cycling route options within the neighbourhood and area. Based on traffic volumes and operating speeds, the Ontario Traffic Manual Book 18 Figure 5.5 recommends that these facilities should be physically separated.

2.1.3. Planned Conditions

Future Transportation Network Changes

Within the Official Plan, Hazeldean Rd is identified as a future Transit Priority Corridor and is part of a Mainstreet Corridor. Phase 2 of the new Transportation Master Plan (TMP) was approved on July 24, 2025 which identifies Hazeldean Rd as a transit priority corridor within the "Needs Based Transit Network" and "Transit Network Priority" adjacent to the site. No plans for this future transit priority corridor were found and construction of this transit priority corridor is not forecasted within the study horizon years. The Official Plan and TMP show a potential extension of the LRT along future Robert Grant Ave, located 450m east of Huntmar Dr, extending all the way south to Hazeldean Rd, and identified as "funded by others" such as the Federal Government.

The new TMP identified Hazeldean Rd as part of the "cycling network". The latest Crosstown Bikeway Network from the 2023 TMP does not identify Hazeldean Rd as a Crosstown Bikeway Route and there are no proposed cycling projects within the July 2025 TMP "Cycling Projects Proposed Priority".

The July 2025 TMP update identified a few road extensions and widenings proposed, as well as committed projects within the "Needs Based Road Network" and the "Priority Road Network". Some of the extensions and widenings within Stittsville which may influence future traffic routes and distributions have been illustrated in **Figure 8** for the New TMP Schedule D4 and include:

- A recently built new collector street connection from Stittsville Main St to Carp Rd north of Hazeldean Rd (Echowoods Ave and Kimpton Dr).
- A new collector street, Rosehill Ave which has already been built.
- The extension of Stittsville Main St to Robert Grant Ave, which already has some segments complete has been identified based on the "Priority Road Network".
- The extension of Robert Grant Ave from Palladium Dr to Abbott St, which already has some segments complete. The segment from Abbott St to Hazeldean Rd is under construction. The segment from Hazeldean Rd to Palladium Dr has been identified based on the "Priority Road Network".
- Carp Rd has been identified as a road to be widened in the future and has been committed based on the "Priority Road Network".
- Road urbanization and mainstreet improvements on Stittsville Main, Hazeldean Rd west of Carp Rd, Maple Grove among others based on the "Priority Road Network".
- Huntmar Dr is planned to be widened from Campeau Dr to Maple Grove Rd, with off-road cycle tracks proposed in each direction as shown in the preferred design below[2]. This widening has been identified within the TMP "Priority Road Network".

[2] https://documents.ottawa.ca/sites/default/files/huntmar_boards_en.pdf

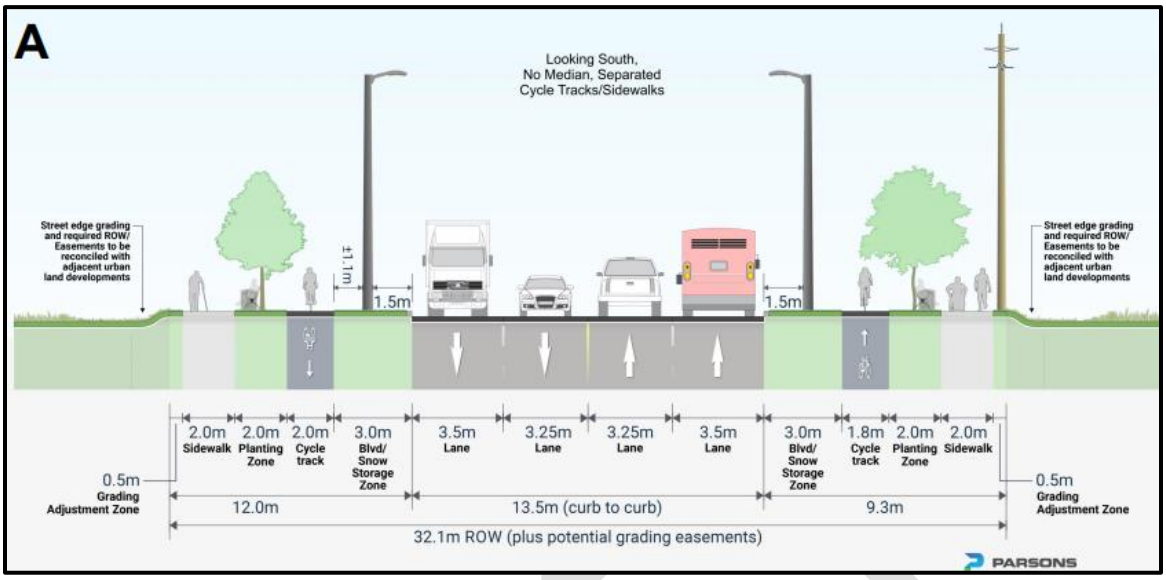


Figure 8: July 2025 TMP – Schedule D4 Urban Road Network

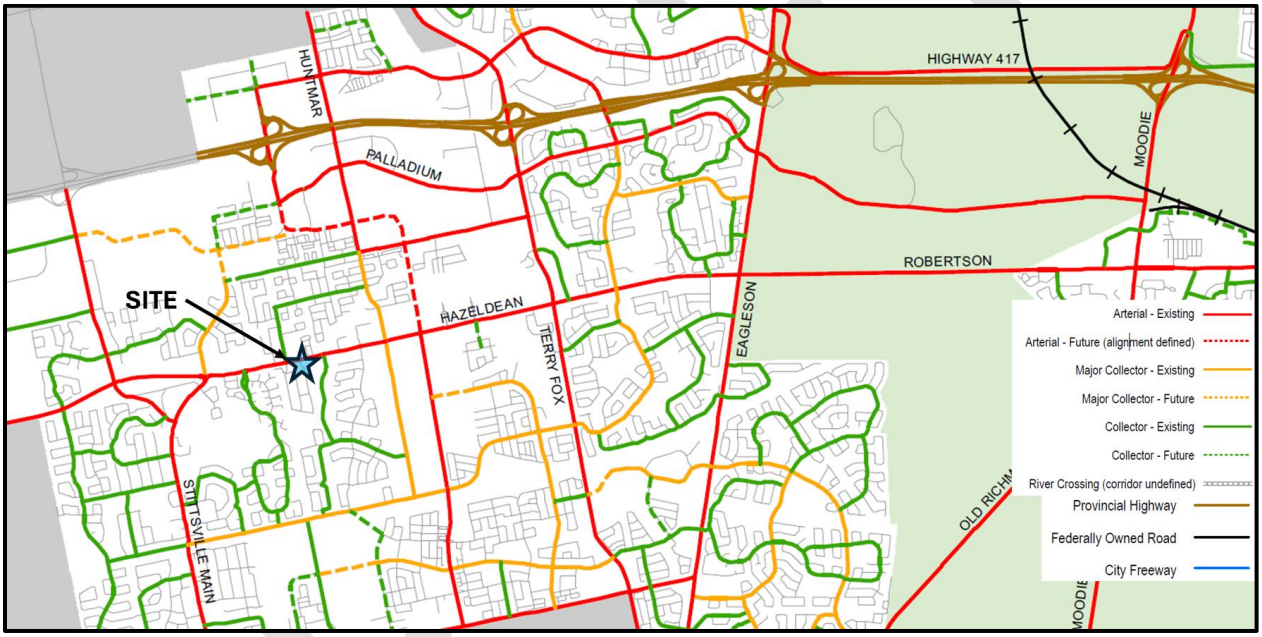
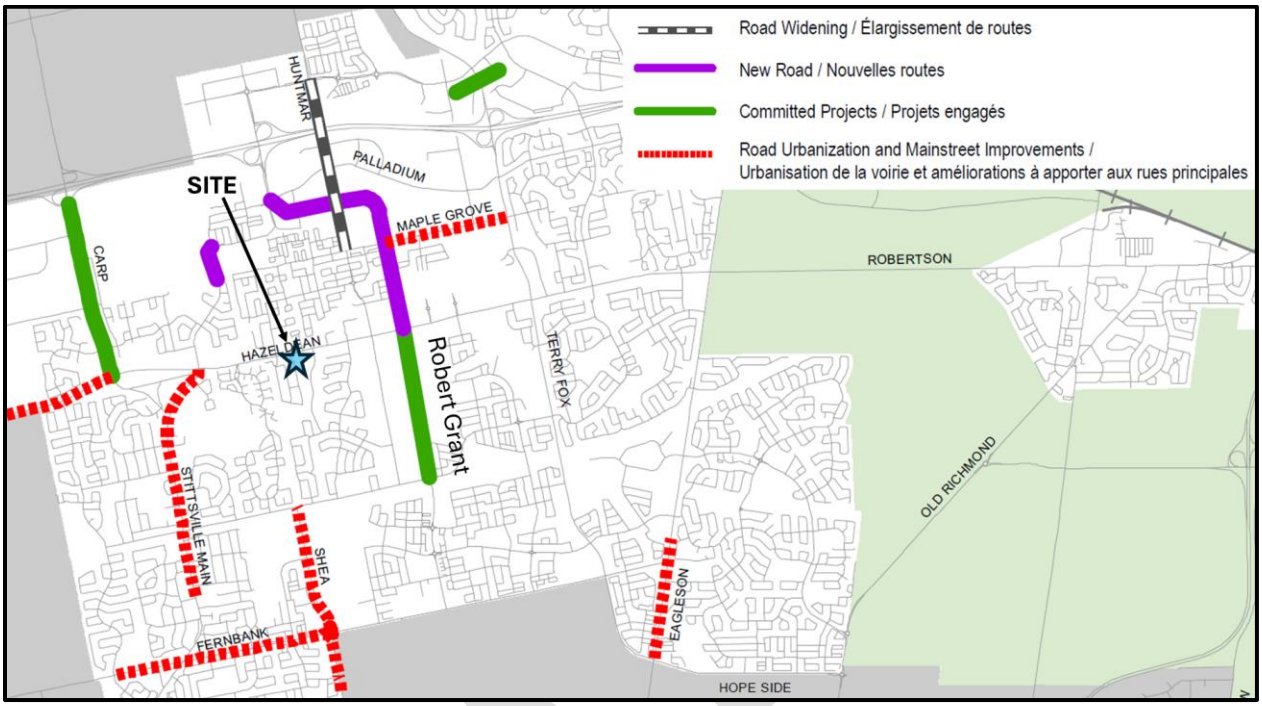


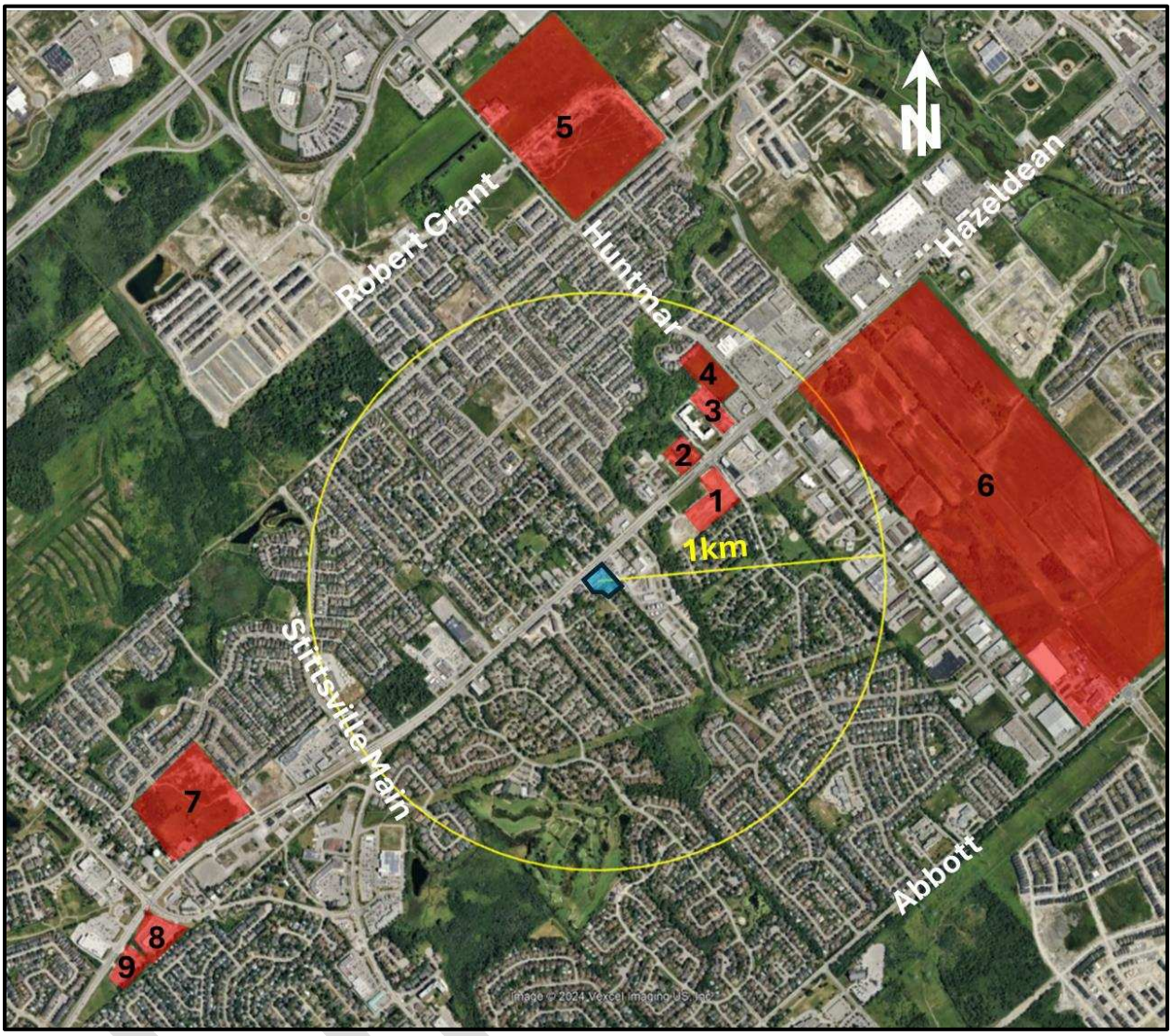
Figure 9: Priority Road Network – New TMP (July 2025)



Other Area Developments

The following section outlines adjacent developments in the general area that were considered in the TIA. The criteria for inclusion of other area developments are either approved developments or developments that have an active planning application that are generally within a 1-km radius of the subject site. **Figure 10** illustrates the location and relative size of other area developments.

Figure 10: Other Area Developments



1-5 Orchard Dr

This site consists of two distinct land uses: a gas station and a residential development. The gas station has already been built and is operational since the date of available traffic counts. For this reason, no future background volumes will be added from the gas station. The residential development is currently under construction and consists of 67 townhomes and 7 single family homes. The anticipated buildout year for the development will be assumed 2025 as it is currently under construction based on aerial imagery. Based on the TIA prepared by Parsons on July 30, 2018, the development is expected to generate an increase of 35 and 50 veh/h during the morning and afternoon peak hours, respectively, which will be added to background volumes.

2-20 Cedarow Ct

A 6-storey senior's residency is currently being built, consisting of approximately 344 dwelling units. The anticipated buildout year for the development will be assumed 2025 as it is currently under construction based on aerial imagery. No TIA was found, but based on the ITE Trip Generation Manual, the development is expected to generate an increase of 45 and 55 veh/h during the morning and afternoon peak hours, respectively, which will be added to background volumes.

3-2510 Wellings Pvt

A 4-storey assisted living residence is currently being built, consisting of approximately 256 long-term care beds. The anticipated buildout year for the development will be assumed 2025 as it is currently under construction based on aerial imagery. No TIA was found, but based on the ITE Trip Generation Manual, the development is expected to generate an increase of 30 and 40 veh/h during the morning and afternoon peak hours, respectively, which will be added to background volumes.

4-21 Huntmar Dr

Two 6-storey residential buildings are proposed, consisting of approximately 344 dwelling units. The anticipated buildout year for the development was 2024, however it has not been built yet. Based on the TIA prepared by D.J. Halpenny & Associates on June 14, 2021, the development is expected to generate an increase of 125 and 160 veh/h during the morning and afternoon peak hours, respectively, which will be added to background volumes.

5-130 Huntmar Dr

A residential plan of subdivision, consisting of approximately 742 dwelling units, 30,000 ft^2 of commercial and a new school has been proposed. The anticipated buildout year for the development was 2024, however it has not been built yet, except for the school. Based on the TIA prepared by Dillon in September, 2020, the development is expected to generate an increase of 695 and 610 veh/h during the morning and afternoon peak hours, respectively. The report by Dillon does not assign any vehicles east-west on Hazeldean Rd, and thus, no traffic volumes will be added to background volumes from this development.

6-5618 Hazeldean Rd (Kizell Lands)

A residential plan of subdivision, consisting of approximately 1,635 low-rise dwelling units, 1,120 high-rise apartments, 350,000 ft^2 of retail, a school and a park and ride lot has been proposed. The anticipated buildout year for the development is 2028. Based on the TIA prepared by Novatech in November 2016, the development is expected to generate an increase of 1,269 and 1,839 veh/h during the morning and afternoon peak hours, respectively (more conservative scenario 2 used), which will be added to background volumes.

7-6171 Hazeldean Rd

A residential plan of subdivision, consisting of approximately 529 dwelling units has been proposed. The anticipated buildout year for the development was 2024, however it has not been built yet. Based on the TIA prepared by EXP on September 14, 2020, the development is expected to generate an increase of 230 and 275 veh/h during the morning and afternoon peak hours, respectively, which will be added to background volumes.

8-1174 Carp Rd

A 12-storey senior's residency is currently being built, consisting of approximately 414 dwelling units. The anticipated buildout year for the development was not found but will be anticipated to be by 2026. No TIA was found for this development. Based on the site's location, negligible trips are forecasted to operate within the study area. Volumes from this development will be captured under the general yearly background traffic growth.

9-6310 Hazeldean Rd

A 12- and 21-storey residential building has recently been approved, consisting of 431 residential units. No TIA was found. No TIA was found for this development. Based on the site's location, negligible trips are forecasted to operate within the study area. Volumes from this development will be captured under the general yearly background traffic growth.

2.2. Study Area and Time Periods

For the purposes of this report, the proposed development is assumed to be fully constructed by 2028. The full buildout scenario and five-years after development buildout will be analyzed, 2028 and 2033. The future horizon years analyzed will use the weekday morning and afternoon peak hour traffic volumes. Proposed study area intersections are listed below and illustrated in **Figure 11**.

- Savage/Hazeldean
- Victor/Hazeldean
- Fringewood/Hazeldean
- Huntmar/Hazeldean
- Site Access/Savage
- Site Access/Hazeldean

Figure 11: Study Area and Intersections to be Analyzed

2.3. Exemption Review

The following modules/elements of the TIA process provided in **Table 5** are recommended to be exempt in the subsequent steps of the TIA process, based on the City's TIA guidelines and the subject site:

Table 5: Exemptions Review Summary

Module	Element	Exemption Consideration
4.1 Development Design	4.1.3 New Street Network	Only required for plans of subdivision
4.6 Neighbourhood Traffic Calming	All Elements	Site trip infiltration is not expected as Savage Rd does not connect to the regional road network and Hazeldean Rd is an arterial road
4.7 Transit	4.7.1 Transit Route Capacity	Less than 75 transit trips per hour anticipated

3.0 FORECASTING

3.1. Development Generated Travel Demand

3.1.1. Trip Generation Sources

The proposed development will consist of approximately 456 residential units and approximately 4,700 ft² of ground floor retail space located in three building blocks ranging from 4- to 25-storeys. The retail space is considered small, intended for local active trips and internal trip capture, resulting in minimal vehicle trip generation. The existing site is occupied by a car dealership (retail) which is anticipated to produce slightly more trips than what the new proposed retail uses would generate. For this reason, the net effect of vehicle trips to be removed by demolishing the car dealership will balance the new trips generated by the retail component. Since the car dealership is anticipated to produce slightly more trips than the future retail uses, by not zeroing these trips out, it may be considered as a slightly more conservative scenario, but in general expected to have negligible effects throughout the study area intersections.

The appropriate trip generation rates for high-rise residential units were obtained from the 2020 TRANS Trip Generation Manual. The Manual provides person-trip rates during the peak AM and PM periods (i.e. 7am-9:30am and 3:30pm-6pm). The trip rates are summarized in **Table 6** below.

Table 6: Proposed Development Trip Rates

Land Use	ITE TRANS Source	Data Source	Trip Rates	
			AM Peak	PM Peak
Residential	"High-Rise Residential"	TRANS	T = 0.80(du);	T = 0.90(du);
Note: T = Average Vehicle Trip Ends; du = Dwelling unit				

Using the TRANS Trip Generation rates from **Table 6**, the total amount of person trips generated by the approximate 456 residential units was calculated by multiplying the rate by the number of units, for the morning and afternoon peak periods, as shown in **Table 7**.

Table 7: Residential Units Peak Period Person Trip Generation

Land Use	Dwelling Units	AM Peak Period Person Trips	PM Peak Period Person Trips
High-Rise Residential	456	365	410

The proposed residential units are anticipated to generate approximately 365 and 410 total person trips during the morning and afternoon peak hours respectively. The total peak period person trips in **Table 7** are then divided into different travel modes using mode share percentages obtained from the 2020 TRANS Manual for the "Ottawa West" district. **Table 8** provides the travel mode breakdown for the proposed high-rise apartments.

Table 8: High-Rise Apartments Peak Period Trips Mode Shares Breakdown

Travel Mode	Mode Share	AM Peak Period Person Trip	Mode Share	PM Peak Period Person Trips
Auto Driver	43%	156	55%	225
Auto Passenger	26%	93	19%	79
Transit	28%	101	21%	88
Cycling	0%	0	0%	0
Walking	4%	15	5%	19
Total Person Trips	**100%**	**365**	**100%**	**410**

Standard traffic analysis is usually conducted using the morning and afternoon peak hour trips as they represent a worst-case scenario. In the 2020 TRANS Manual, Table 4 provides conversions rates from peak period to peak hours for different mode shares. The conversion rates are provided in **Table 9** below.

Table 9: Peak Period to Peak Hour Conversion Factors (2020 TRANS Manual)

Travel Mode	Peak Period to Peak Hour Conversion Factors	
	AM	PM
Auto Driver and Passenger	0.48	0.44
Transit	0.55	0.47
Bike	0.58	0.48
Walk	0.58	0.52

Using the conversion rates in **Table 9** and the peak period person trips for different travel modes in **Table 8**, the peak hour trips for different travel modes can be calculated as shown in **Table 10**.

Table 10: Residential Peak Hour Trips Generated - TRANS Mode Share

Travel Mode	Mode Share	AM Peak Hour (Trips/h)			Mode Share	PM Peak Hour (Trips/h)		
		In	Out	Total		In	Out	Total
Auto Driver	43%	23	52	75	55%	57	42	99
Auto Passenger	26%	14	31	45	19%	20	15	35
Transit	28%	17	38	55	21%	24	17	41
Active Transportation (walk / bike)	4%	3	6	9	5%	6	4	10
Total Person Trips	**100%**	**57**	**127**	**184**	**100%**	**107**	**78**	**185**

Since the development is not within 600m walk of a major LRT Station but is still located adjacent to a rapid transit route (#61) with 30-minute headways, then the mode shares for Kanata-Stittsville by TRANS suggesting between 21% and 28% transit use for the peak hours seems reasonable. The low cycling and walking rate also seem appropriate based on the site's location, with few major walkable destinations nearby or high-quality cycling facilities. No changes to the TRANS mode share are proposed for this development.

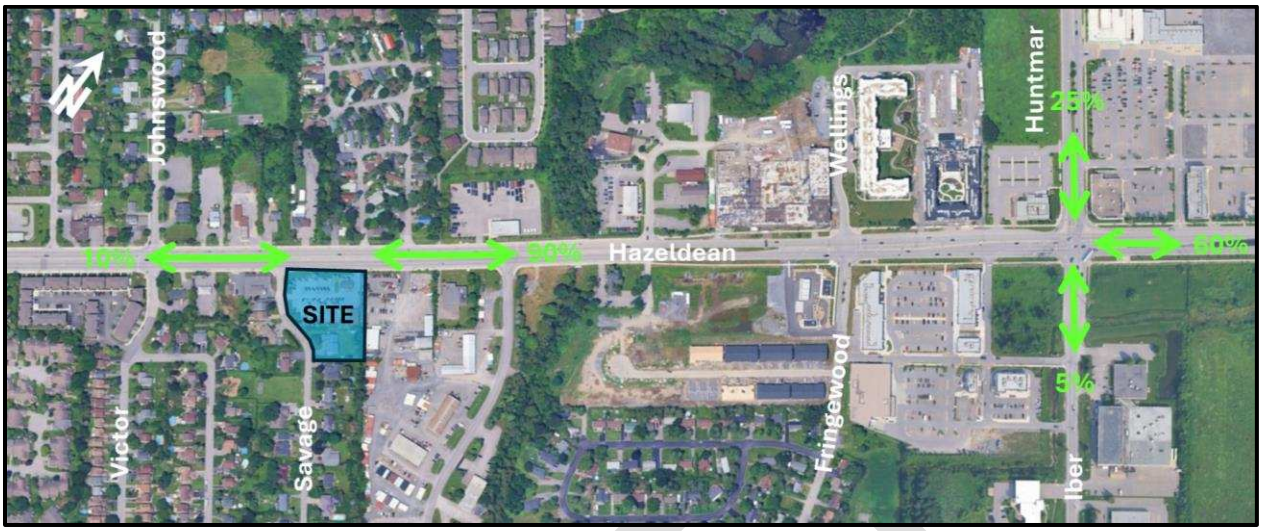
Therefore, the proposed development is anticipated to generate approximately 185 total person trips, 75 to 100 vehicle trips, 55 to 40 total transit trips, and 10 walking trips during the AM and PM peak hours respectively. Cycling commuting trips by this development are considered negligible.

It is acknowledged that if improvements to transit facilities along Hazeldean Rd, as outlined within the Official Plan with future transit priority, and possible cycling improvements, that mode shares may shift to favour transit and cycling with a reduction in auto mode share. Therefore, given the lack of supporting studies and plans available for this corridor, it is unclear whether these changes will occur in the foreseeable future, and thus, the analysis moving forward will only consider the more conservative TRANS mode shares where transit improvements are not completed within the study horizon years.

3.1.2. Trip Distribution and Assignment

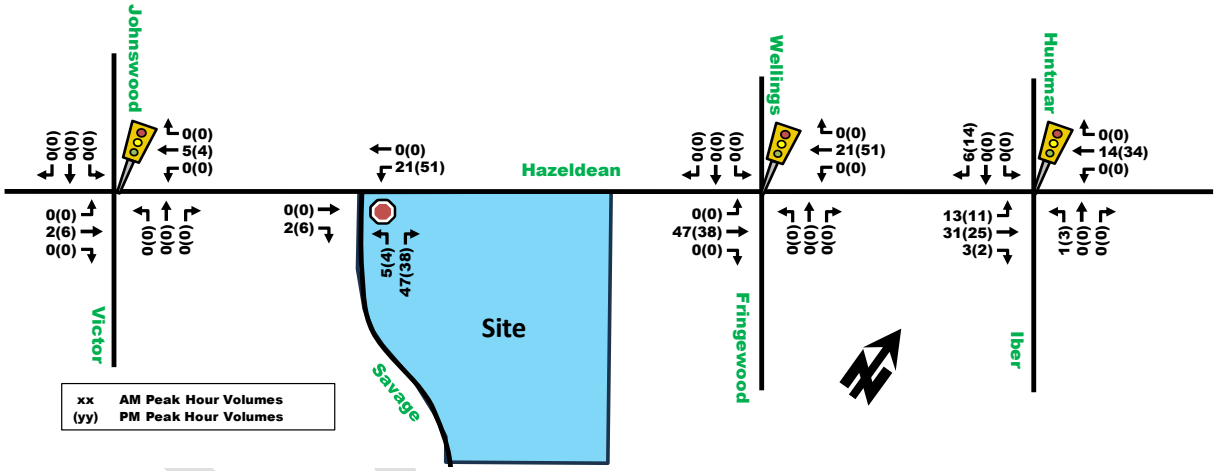
Based on the OD Mode Share Survey, existing traffic volume counts and the location of adjacent arterial roadways and neighborhoods, the distribution of site-generated traffic volumes has been illustrated in **Figure 12**. Note that it is assumed that general traffic will all use the Savage Dr access (more conservative approach), and the right-out access to Hazeldean Rd will only be used infrequently by large vehicles.

Figure 12: Site Generated Vehicle Traffic Percent Distribution



The anticipated 'new' auto trips for the proposed development from **Table 10** were then assigned to the road network with the distribution shown above, as shown in **Figure 13**, for the total site-generated traffic for custom mode share.

Figure 13: Site-Generated Traffic Using Custom Mode Shares



3.2. Background Network Traffic

3.2.1. Transportation Network Plans

Refer to **Section 2.1.3: Planned Conditions**.

3.2.2. Background Growth and Other Area Developments

The following background traffic growth (summarized in **Table 11**) was calculated based on historical traffic count data (years 2006, 2013 and 2025) provided by the City of Ottawa at the Victor/Hazeldean intersection near the site. Detailed background traffic growth analysis is included as **Appendix D**.

Table 11: Victor/Hazeldean Historical Background Growth (2006-2025)

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
8 hrs	-1.67%	0.14%	2.32%	2.10%	**2.00%**
AM Peak	-1.33%	0.50%	2.48%	2.26%	**2.15%**
PM Peak	-1.50%	-1.66%	2.37%	2.05%	**1.95%**

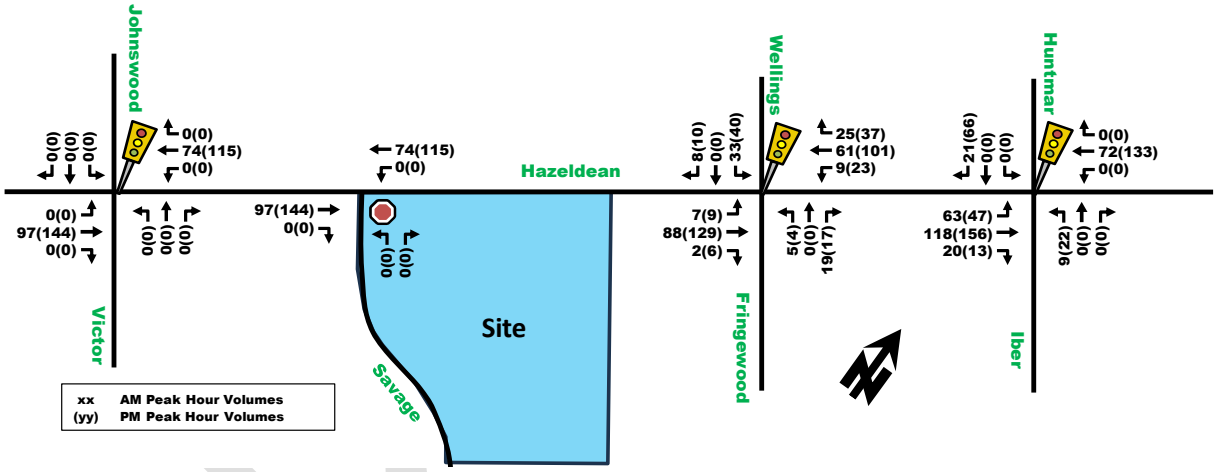
As shown in **Table 11**, the Victor/Hazeldean intersection has experienced an overall growth rate of approximately 2% annually, particularly along the east-west corridor on Hazeldean Rd. The community of Stittsville is anticipated to continue growing through the following years, predominantly within the farmlands to the south. New collector and arterial roads will be constructed or widened to support this growth and likely shift vehicle travel away from Hazeldean Rd, such as the continuation of Robert Grant Ave, the Stittsville Main extension, Huntmar Dr widening and Carp Rd widening to name a few.

Based on the extensive inclusion of other area developments, a 1% annual background growth was considered appropriate, along Hazeldean Rd and Huntmar Dr through movements only. No background growth will be applied to minor side-streets, known other area development volumes will be layered on individually.

3.2.3. Future Background Volumes

As described in **Section 2.1.3**, there are various new developments proposed which will be layered on individually to background traffic volumes. The total number of new other area development vehicle trips projected to use study area intersections have been illustrated in **Figure 14** and will be layered on for the 2028 horizon year and beyond.

Figure 14: Other Area Development Trip Generation – All Horizon Years



These other area development volumes were then layered on background traffic volumes which include a % annual growth rate on east-west through movements on Hazeldean Rd. The resultant background volumes have been provided in **Figure 15** and **Figure 16** for the 2030 and 2035 horizon years respectively.

Figure 15: Future Background Traffic Volumes – 2028 Horizon

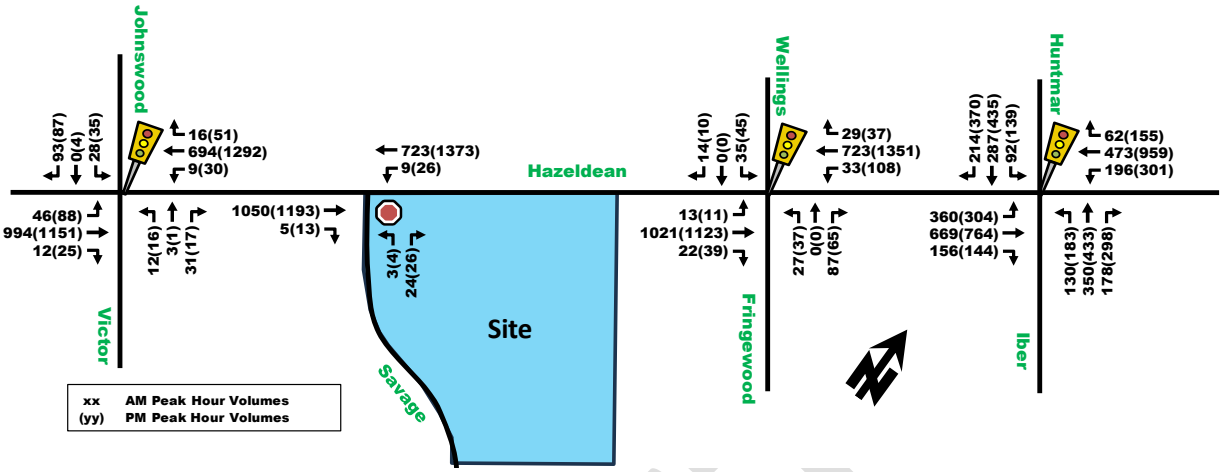


Figure 16: Future Background Traffic Volumes – 2033 Horizon

3.3. Demand Rationalization

The suburbs of Stittsville and Kanata have been rapidly growing over the past few years. The background traffic growth as discussed in **Section 3.2.2** used historic traffic volumes to develop a future annual traffic growth rate based on previous trends. A 1% annual growth rate along Hazeldean Rd for eastbound and westbound movements plus a 1% annual growth rate for Huntmar Dr northbound and southbound movements was considered in developing background traffic volumes, plus the addition of other known area developments. This growth equates to approximately 20% to 25% growth in just 8 years.

Furthermore, as discussed in **Section 2.1.3**, there are various new arterial and collector roads planned for construction or to be widened within the regional network, and transit projects which will likely affect existing travel patterns and likely reduce travel demands on Hazeldean Rd. This includes: Hazeldean Rd which is classified as a transit priority corridor; Stage 2 LRT West Expansion to come online in 2027; potential Stage 3 LRT Extension to Kanata and Stittsville; Robert Grant Ave extension; Stittsville Main extension; Huntmar Rd widening; among other identified infrastructure investments.

Based on the above, existing traffic volumes and number of lanes on Hazeldean Rd, then sufficient capacity to accommodate the forecasted growth is anticipated.

4.0 ANALYSIS

4.1. Development Design

4.1.1. Design for Sustainable Modes

Location of Transit Facilities

The subject site has bus stops (#5479 and #5480) located less than 100m walk, just west of the Savage/Hazeldean intersection for rapid route #62, connexion route #263 and special routes #301 and #303. Additionally, local route #162 has bus stops located within 300m walk, located near the intersection of Victor/Hazeldean. Routes #62 and #263 provide connectivity to the Confederation LRT Line at Tunney's Pasture and once Stage 2 LRT West Expansion is completed (estimated 2027), then these routes will likely connect to the LRT at Moodie Station.

The Official Plan shows Hazeldean Rd as a future transit priority corridor. The new TMP update from July 2025 identified Hazeldean Rd as part of the "Transit Priority Network" from Fernbank St to Eagleson Rd, though it is acknowledged that no plans are currently available and it is not anticipated that any major improvements to transit infrastructure will be provided for this area within the study horizon years.

Pedestrian/Cycling Routes and Facilities

The site proposes new sidewalks of at least 2.0m wide from all building entrances to Savage Dr and Hazeldean Rd. A courtyard between Building A and B also provides pedestrian routes to the municipal sidewalk facilities. Cyclists can use the building elevators to go to the ground floor and can then join the curbside bike lanes on Hazeldean Rd or use local roads such as Savage Dr and Greer St to get to the pathway facilities adjacent to 2 Greer St or continue up Johnswood St to other destinations.

Bicycle Parking

A combined total of 319 bicycle parking spaces are currently proposed. All bike parking is proposed within the 1st and 2nd underground parking garage. Bike parking is loosely spread out within the parking garage structure where room is available, normally found in conglomerates of parking areas. Residents can use the elevators to access the ground floor.

4.1.2. Circulation and Access

There are two vehicle access points for this site. The main access to the site is off Savage Dr, providing a full movement two-way driveway which has been narrowed and angled to as close to 90 degrees as possible to improve sightlines and reduce pedestrian crossing distances. The second access is a one-way only outbound driveway to Hazeldean Rd. **Figure 17** below illustrates the internal circulation.

All vehicles will enter the site via the Savage Dr access. General passenger vehicles can exit the site either via the Savage Dr access or use the one-way right-out only at Hazeldean Rd. Vehicles wanting to leave westbound would need to use the Savage Dr access. The drive aisle between Savage Dr and Hazeldean Rd one-way right-out has been designed as 6.0m wide with a radius to accommodate larger vehicles such as MSU and HSU for garbage and emergency vehicles. This drive aisle also provides access to the underground parking garage ramp (located on the southeast corner of Building B). The parking garage ramp has been proposed as 6.0m wide and is completely located indoors, with grade transitions to ensure adequate vehicle circulation. The main private driveway is designed for low operating speeds and presents a low risk for vehicle circulation conflict.

Directly north of the main drive aisle, a one-way counterclockwise loop is proposed which provides access to four parallel parking spaces to the south and a 2.5m wide layby to the north. The layby has a pedestrian receiving zone of 2.0m wide or more. The one-way lane is proposed as 3.65m wide which provides sufficient buffer from both proposed uses and exceeds the minimum 3.5m guidance from the Zoning By-Law Part 4,

Table 107. To dissuade vehicles from travelling against the one-way traffic, the outer western corner of the loop has been extended out, a stop bar placed across the entire lane and signage is proposed.

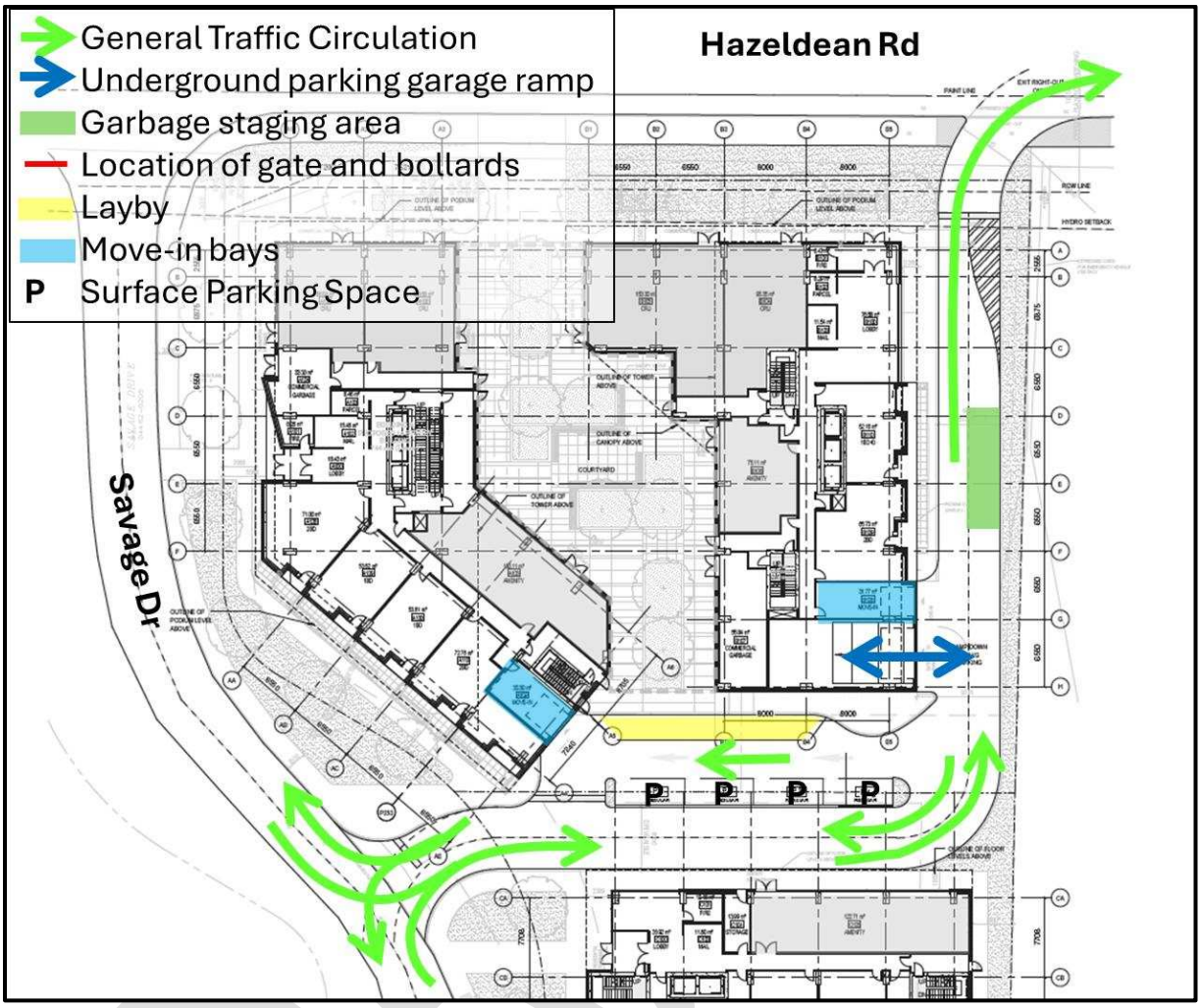
The turning movements of an LSU (assumed standard move in vehicle/design vehicle) can enter and exit the site simultaneously without overlapping. Larger vehicles such as an MSU for garbage pick-up or HSU for emergency vehicles would utilize part or both lanes internal to the site upon entry, but is considered acceptable given the low frequency of use, shortened pedestrian crossing distance and access from a local road with low traffic volumes where a larger vehicle can wait until they have an opening to enter the site utilizing both lanes. Both MSU and HSU sized vehicles would then depart the site via the Hazeldean Rd outbound access which will be open to general traffic. Garbage will be wheeled outside on pick-up days and will be placed on ground level on the east side of the Hazeldean Rd egress lane. The truck turning templates have been provided in **Appendix E.**

Signage will be provided at Hazeldean Rd to advise of the one-way northbound traffic with a sign such as “do not enter” or “wrong way”. Vehicles using this egress driveway will reach Hazeldean Rd where they can turn right-out only. Early public consultation revealed a strong concern from the local community about the perception of traffic and congestion at the Savage/Hazeldean intersection. In an attempt to mitigate this concern, the applicant is proposing a right-out only egress, designed to dissuade vehicles from turning inbound while reducing outbound traffic on Savage/Hazeldean. While this approach does not fully align with access management policy on arterial streets, the unique context and intended operation (as a one-way outbound only access) reduces the traffic implications to the adjacent neighbourhood. The proposed design is a preliminary iteration and refinements through city staff and anticipated throughout the approvals process.

Moving bays are provided on both Buildings A and B and can accommodate an LSU vehicle (standard for 1–2-bedroom apartments).

Figure 17 illustrates the internal circulation, proposed garbage pick-up location, layby location and parking garage ramp location. A higher quality of the proposed curblines has been provided in **Appendix A.**

Figure 17: Internal Driveway Circulation and Parking Garage Access Location



4.1.3. New Streets Network

Exempt. See Table 5.

4.2. Parking

According to Part 4 – Parking, Queueing and Loading Provisions for the City of Ottawa By-Laws, the site is located in Area C based on Schedule 1A and is not within Rapid Transit Stations within Schedule 2A. Table 12 summarizes the vehicle parking minimum allowed within the parking by-law and the quantities proposed, based on R15 residential rate for dwellings in a mixed-use building.

Table 12: Proposed Vehicle Parking Space Supply

Rate per Unit/Size	Land Use	Required Vehicle Spaces			Proposed Spaces[1]		
		Residents	Res. Visitor	Commercial	Residents	Res. Visitor	Commercial
1.0 base residential per unit; 0.2 visitor parking per unit; 3.4 spaces per 100 m² retail	456 units 438 m² retail	456	91	15	148[1]	86	0
Total Combined		562			234		

1. The client is investigating the feasibility of adding an extra floor of underground parking which would increase the residential parking to approximately 270 spaces.

The city parking by-law requires a minimum of 456 residential vehicle parking spaces, 91 residential visitor spaces and 9 commercial spaces. The development proposes 86 residential visitor spaces including 4 surface spaces and 82 underground parking spaces, which is slightly short of the minimum requirements.

Given the site's small retail space which is predominantly catered to local residents and likely will result in few vehicle trips, plus the peak parking demand between residential visitors and commercial visitors likely being offset, then a shared parking provisions for both visitor and commercial uses are considered acceptable.

The applicant is proposing a reduced residential parking rate of approximately 0.32 spaces per unit. While this rate is lower than the current by-law minimum, the current draft of the new Zoning By-Law (May 2024), Section 601, effectively exempt the minimum parking rate[3]. The decision to provide a reduced residential tenant parking space also aligns with the new Official Plan (OP) for higher density with minimal parking near rapid transit corridors, such as the Hazeldean Transit Priority Corridor as identified by Schedule C2 and "arterial mainstreet" as identified within Schedule B5. "Frequent" bus routes already operate adjacent to the site. Therefore, the proposed residential parking rate is considered acceptable.

During the public consultation, concerns regarding spillover parking onto the neighbourhood were raised.

- Short term parking for visitors and commercial customers are unlikely to occur at the same time. The commercial space is small and unlikely to attract many regional trips (likelier walking trips from nearby or this development itself, negating the need for much commercial parking). While still short 5 parking spaces for visitors, it is unlikely that they will all be used at the same time. The adjacent on-street parking could accommodate short-term demand if needed.
- The shortfall in parking at the site compared to the parking bylaws is for residential tenant parking. Long-term on-street parking by tenants is undesirable. For this reason, it is believed that most tenants who move to this development will not own vehicles and will choose to live at this location knowing that they will not have a personal vehicle. Should tenants still decide to park on-street, City By-Law is equipped to respond with enforcement for vehicles parked for longer than the 3-hour city wide limit. City By-Law can be engaged during early occupancy to set a precedent to new residents.
- Savage Dr provides on-street parking starting approximately 120m south of Hazeldean Rd in the event of spillover. Assuming the typical vehicle length plus separation between other vehicles and driveways, it is estimated that Savage Dr has approximately 45 parking spaces available between Iva St and Hazeldean Rd.
- Should local residents have additional concerns with on-street parking, there is a formal procedure with the City of Ottawa to adjust on-street parking provisions if there is continued non-compliance.

The proposed parking rate aligns with the direction the City of Ottawa is headed, towards reduced dependency on private motor vehicle trips.

Table 13 summarizes the bicycle parking requirements as per City of Ottawa Zoning By-Law-Part 4, sections 100-114.

Table 13: Bicycle Parking Requirements

Land Use		Rate per Unit/Size	Required Bicycle Spaces	Proposed Spaces
Residential	456 units	0.5 per unit	228	319
Retail	438 m²	1 per 250 m²	2	
		Totals	230	Exceeds mins.

The parking by-law requires a minimum of 230 bike parking spaces. The proposed development proposes a total of 319 bike parking spaces which exceeds the minimum required rate of 0.5 bike parking spaces per unit

[3] Draft New Zoning By-Law

with a proposed rate of 0.7 bike parking spaces per unit (~40% more than minimum). Bike parking is proposed inside of the parking garage within the two underground levels.

4.3. Boundary Street Design

It is understood that the New MMLOS Tool has been adopted by the city, and it will be used for this report.

4.3.1. Existing and Future Conditions

The boundary street for the development is Hazeldean Rd and Savage Dr. There are no planned roadway modifications in the future. The existing and future roadway geometries consist of the following features:

- *Hazeldean Rd:*
  - 2 vehicle travel lanes in each direction plus a shared two-way left-turn lane
  - 2.8m sidewalk with 2.0m curbside bike lane separation on both sides of roadway
  - More than 3,000 vehicles per day
  - Posted speed limit is 60km/h
  - Classified as "mainstreet" arterial roadway (OP – Schedule B5)
  - Identified as a transit priority corridor
  - Not part of the Crosstown Bikeway Network
- *Savage Dr:*
  - 1 vehicle travel lane in each direction
  - No sidewalks or cycling facilities; proposed future 2m sidewalk fronting site
  - Less than 3,000 vehicles per day
  - Posted speed limit is 40km/h
  - Classified as local roadway
  - Not part of a transit priority corridor or Crosstown Bikeway Network

Multi-modal Level of Service analysis for the subject road segments adjacent to the site is summarized in **Table 14** with detail analysis provided in **Appendix F**. Note that the truck level of service is no longer calculated, but rather confirmed as part of the geometrics checks and truck turning templates.

Table 14: MMLOS – Boundary Street Segment Existing and Future Conditions

Road Segment	Level of Service							
	Pedestrian		Bicycle		Transit		Public Realm	
	PLoS	Target	BLoS	Target	TLoS	Target	PR	Target
Existing and Future Conditions								
Hazeldean Rd (Both Sides)	C	B	C	C	C	C	D	N/A
Savage Dr (Both Sides)	F	C	B	C	-	N/A	C	N/A
Changes to Future Conditions								
Savage Dr (East Side)	B	C	B	C	-	N/A	A	N/A

<u>Pedestrian</u>

- Neither Hazeldean Rd nor Savage Dr met the pedestrian level of service for existing conditions. Hazeldean Rd could meet the target if a larger offset from motor vehicle travel lanes was provided (at least 3m or more). Savage Dr does not currently have pedestrian facilities, resulting in the poor level of service. In the future, the addition of a 2.0m wide sidewalk facility on the east side of Savage Dr results in significant improvements to the PLoS that exceeds the minimum desired MMLOS target.

<u>Bicycle</u>

- All road segments meet the desired bike level of service for existing and future conditions.

Transit

- Only Hazeldean Rd has active transit services. The transit level of service target was met.

Public Realm

- The public realm scored level of service D or better. Providing the proposed sidewalk facility on the east side of Savage Dr improves the public realm score from a "C" to an "A".

4.4. Access Intersection Design

4.4.1. Location and Design of Access

As described in Section 4.1.2, the site proposes two private accesses to the municipal road network:

1. Right-out only to Hazeldean Rd accessible to both general public (based on feedback from the public to reduce development generated traffic on Savage Dr) and for emergency vehicles and large trucks such as garbage trucks to accommodate internal circulation, located approximately 80m east of Savage/Hazeldean intersection
2. Full movement access from Savage Dr, approximately 75m south of Savage/Hazeldean intersection

The Private Approach By-Law Section 25 m(ii) suggests that for residential developments with 200 to 299 parking spaces (i.e. the Savage Dr access), then the distance between a private approach and the nearest intersecting street line should be 45m and the distance between a two-way private approach and any other private approach shall be at least 45m.

The Savage Dr access exceeds a 45m separation from the nearest intersection and two-way private approach (though noted that it is slightly below 45m to a minor private driveway to a single detached home). There are no concerns of conflict between the proposed access and nearby single home driveways.

The right-out access to Hazeldean Rd is proposed using a curvature to the right to incentivize right-turns out of the site only and make it harder for vehicles to perform any other manouver. The access is accompanied by signage stating that only right-turns out are allowed.

4.4.2. Intersection Control

The site accesses are both proposed as STOP-controlled for the site access and free-flow on the city roads (Hazeldean Rd and Savage Dr). Forecasted traffic volumes at proposed access intersections are relatively low; traffic signals or all-way-stop-control (AWSC) were not warranted. Section 4.9.2 will confirm operational capacity of proposed access intersection and if the need for alternate intersection controls is recommended.

For the purpose of providing a conservative view of the long-term road network capacity, it was assumed that all trip generated traffic will use the Savage Dr access to create a more conservative analysis. It is fully expected that the Hazeldean Rd right-out will likely attract a notable number of outbound trips.

4.4.3. Intersection Design

The Private Approach By-Law requirements for the City of Ottawa were reviewed, with the following observations:

- The site has two frontages (approximately 100m and 80m long) which permits having up to two two-way private approach per frontage. This limit has not been exceeded.
- The proposed access off Savage Dr is proposed at 6.0m wide with a wider flaring at the curbline to accommodate truck turning movements (slightly wider than 9m but for a very short segment), which is consistent with the city's desired range between 6.0 to 9.0m wide. This access has been narrowed to provide pedestrian priority and shorten their walk. Should an HSU sized vehicle enter the site, it will need to manouver through both inbound and outbound lanes at the access (internal to the site). Once inside the site, the protected emergency route dimensions have been provided.

- Both accesses propose a grade that does not exceed 2% within the private property for a distance of 9.0m to the curbline, thus meeting the bylaw.
- Part m section ii for private approaches is not applicable as Savage Dr is classified as a local road and access on Hazeldean Rd is controlled to outbound right only.
- Both accesses are located more than 3m from the property line.
- Clear throat checks are not required as the right-out to Hazeldean Rd does not have inbound traffic and the Savage Dr access is to a local street.
- Hazeldean Dr currently provides a westbound left-turn lane. A northbound left-turn lane is not anticipated based on the low turning volumes; northbound left-turning vehicles can use the median two-way-left-turn-lane on Hazeldean Rd to perform a two-stage left-turn if required. **Section 4.9.2** will confirm if any access has sub-par operation and if storage lanes are recommended.
- The City of Ottawa Standard Detail SC7.1 for a sidewalk crossing an access has been provided on both driveways.

4.5. Transportation Demand Management

4.5.1. Context for TDM

Based on the type of development, it is assumed that most trips generated by the proposed site will be residents leaving the site in the AM peak to go to work and returning from work to the proposed site in the PM peak. Sections 3.1.1 and 3.1.2 describe how many trips are anticipated per travel mode and anticipates the likely locations that they will travel to and from based on the OD-Survey 2011 for Ottawa. The site is not located within 600m of rapid transit; however, it is located in a transit priority corridor.

4.5.2. Need and Opportunity

Since the development is located in a transit priority corridor, measures to provide sustainable active mode shares are encouraged, though it is acknowledged that no plans for transit measures are anticipated in the near future. Such measures are described in more detail in Section 4.5.3 below and include reduced parking ratios (proposed 0.32/unit for residents), more aggressive Multi-Modal Levels of Service (MMLOS) as described in Section 4.3 and 4.9 and safe and efficient connectivity to public transit as described in Section 4.7, to name a few.

4.5.3. TDM Program

The TDM infrastructure checklist and TDM Measures are attached as **Appendix G**.

Regarding the TDM Supportive Development Design and Infrastructure Checklist:

- Ten (10) out of the ten (10) “Required” measures have been satisfied, with the exception of providing less vehicle parking than required by zoning.
- At least thirteen (13) of fourteen (14) Basic measures related to Walking and Cycling, Transit, Ridesharing and Parking have been satisfied or are not applicable
- Two (2) of the of the seven (7) candidate Better measures are also proposed or are non-applicable, including:
  - Separate long-term and short-term parking areas

Regarding the TDM Measures Checklist:

- Six (6) out of seven (7) “Basic” measures related to Walking and Cycling, Transit, Parking and TDM Marketing have been satisfied. Three (3) of those, which have been designated by an asterisk (*), are

considered by the TDM Measures to be some of the most dependably effective tools to encourage sustainable travel modes. This includes:

- Display walking and cycling information at major entrances.
- Display transit information at major entrances.
- *Designate an internal coordinator or contract with one.
- * Unbundle parking costs from monthly rent.
- * Provide multi-modal travel information package to new residents.

- Three (3) out of eleven (11) “Better” measures related to Walking and Cycling, Transit, Carsharing and Bikesharing, Parking and TDM Marketing have been satisfied. One (1) of those, which has been designated by an asterisk (*), is considered by the TDM Measures to be some of the most dependably effective tools to encourage sustainable travel modes. This includes:
  - *Offer personalized trip planning to new residents.

4.6. Neighborhood Traffic Management

Exempt. See **Table 5**.

4.7. Transit

4.7.1. Route Capacity

Exempt. See **Table 5**.

4.7.2. Transit Priority

While Hazeldean Rd is a future transit priority corridor according to the Official Plan, there are no active plans or designs for this corridor, insinuating that no changes are anticipated within the study horizon years. Should new bus lanes or transit priority measures be implemented on Hazeldean Rd, it could provide reduced transit times and increased frequencies improving the appeal of choosing transit over other modes of transportation. **Section 4.9.2** will examine the anticipated delays from a high-level perspective for east-west through travel on Hazeldean Rd.

4.8. Review of Network Concept

The site is currently zoned as GM14 H(11) and R1D which allows residential uses up to a height of 11m for the GM zone and single detached low-rise homes for the R1D zone. Based on the existing zoning, a Zoning By-Law Amendment (ZBLA) to allow higher density and building heights of up to 25-storeys is required (estimated to be approximately 75m tall based on 3m per floor). Commercial uses are allowed within the GM zone.

The developer is proposing a 19- and a 25-storey tower within the GM zone and a 4-storey building within the R1D zone. For the 19 and 25-storey towers, the first floor will be assumed occupied by a lobby and commercial uses, with no units on the first floor. Additionally, it will be assumed that each floor has the same number of units, disregarding setbacks which would probably have a smaller GFA and fewer units on higher floors for a more conservative analysis. The building within the RD1 zone will be compared based on the proposed number of units minus the existing density allowed which is 1-unit. Using the above assumptions, a base calculation for how many projected units above existing zoning can be derived as seen in **Table 15**.

Table 15: Projected Number of Units Above Existing Zoning

Tower	Storeys Allowed	Storeys Proposed	Floors Above Existing Zoning	Units Proposed	Units / Storey Proposed[2]	Units Above Permitted Height
A	4	19	15	174	9.7	146
B	4	25	21	247	10.3	216
C[1]	-	-	-	35	-	34
			Totals	456	-	396

1. Build C calculated as the net difference in allowable number of units (1) minus proposed number of units.
2. Units per storey was calculated by dividing number of units by number of storeys minus 1 floor.

Based on **Table 15**, approximately 396 units will be located above allowable zoning which would create approximate 160 more peak hour person trips than the equivalent volume permitted by established zoning (refer to **Appendix H** for calculations).

Since 200 peak hour person trips or more above the equivalent volume permitted by established zoning is the trigger according to the TIA Guidelines, the remainder of this step can be exempt.

4.9. Intersection Design

4.9.1. Intersection Control

The site access on Savage Rd is forecasted to remain as an unsignalized all movement driveway given the low traffic volumes. The Savage/Hazeldean intersection is unlikely to ever be upgraded into a signalized traffic controlled intersection given its distance to existing signalized Victor/Hazeldean intersection (less than 200m separation). The unsignalized Savage/Hazeldean intersection is therefore proposed to remain as unsignalized, with the following subsections evaluating the intersection performance based on forecasted traffic volumes. Storage lanes for the site access at Savage Dr are not anticipated based on the low turning volumes, while Savage/Hazeldean intersection already provides a westbound left-turn lane.

Hazeldean Rd is classified as a transit priority corridor. While no plans are available for its ultimate design, the corridor is identified within the "Priority Transit Network", it can be envisioned that future transit lanes may be considered such as median transit lanes. In this scenario, a median curb would likely divide the road in two hemispheres, limiting or fully restricting left-turns at locations which are not currently traffic signalized. Should this occur, residents using the Savage/Hazeldean intersection would either have to continue to Victor/Hazeldean and perform a U-turn to enter the site, or if wanting to depart the site to the west would have to turn right on Hazeldean and perform a U-turn at Fringewood/Hazeldean. Some residents would also likely opt to adjust their route altogether. For the meantime, no changes in intersection controls are proposed at any of the study area intersections.

4.9.2. Intersection Design

Multi-Modal Level of Service

It is understood that the New MMLOS Tool has been adopted by the city, and it will be used for this report. Only signalized intersections are considered for the intersection Level of Service measures in the MMLOS Guidelines. Note that truck level of service has been removed and rather tested as part of the truck turning checks. The MMLOS analysis is summarized in **Table 16**, with detailed analyses provided in **Appendix I**.

Table 16: MMLOS – Existing and Future Adjacent Signalized Intersections

Intersection	Level of Service					
	Pedestrian		Bicycle		Transit	
	PLoS	Target	BLoS	Target	TLoS	Target
Victor/Hazeldean	B	B	D	C	B	C
Fringewood/Hazeldean	C	B	D	C	A	C
Huntmar/Hazeldean	D	A	F	B	E	C

Pedestrian

- Only Victor/Hazeldean intersection met the pedestrian desired level of service. Fringewood and Huntmar intersections with Hazeldean did not meet the pedestrian desired level of service given the number of lanes required to cross. Providing a fully protected intersection could improve the PLoS but would result in longer queues and delays.

Bicycle

- The bicycle BLoS target was not met at any intersection due to the lack of cycling infrastructure, crossrides and left-turn treatments.

Transit

- The transit desired level of service was met at Victor and Fringewood intersections with Hazeldean. The Huntmar/Hazeldean intersection did not meet the desired level of service given the anticipated delays for bus movements.

Existing Conditions

The existing traffic volumes were illustrated in **Figure 6** with projected operation outputs in **Table 18**. The detailed Synchro results can be found in **Appendix J**.

Table 17: Existing Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Victor/Hazeldean (S)	A(C)	0.59(0.75)	EBT(WBT)	20.0(23.4)	A(B)	0.55(0.69)
Fringewood/Hazeldean (S)	A(A)	0.44(0.52)	EBT(WBT)	9.1(9.2)	A(A)	0.42(0.51)
Huntmar/Hazeldean (S)	D(E)	0.87(0.93)	NBT(SBT)	37.7(47.5)	B(D)	0.67(0.86)
Savage/Hazeldean (U)	B(C)	14(15)	NB(NB)	0(0)	A(A)	-

Note: Analysis of signalized intersections assumes a PHF of 0.9 and a saturation flow rate of 1800 veh/h/lane. S = Signalized, U = Unsignalized

As seen in **Table 18**, all intersections operate overall at very good level of service (LoS) 'B' or better with critical movements operating at LoS 'C' or better, with the exception of Huntmar/Hazeldean (major collector to arterial road intersection) which operates at good overall LoS 'D' and acceptable critical LoS 'E' in the PM peak hour for the southbound through movement.

Background Conditions 2033

Since 2028 background has the same intersection layouts as 2033 and is the more critical of the two scenarios, only 2033 will be analyzed. The future projected 2033 background volumes were illustrated in **Figure 16** with projected operation outputs in **Table 18**. The detailed Synchro results can be found in **Appendix K**.

Table 18: 2033 Background Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Victor/Hazeldean (S)	B(C)	0.63(0.79)	EBT(WBT)	19.2(18.4)	A(C)	0.59(0.73)
Fringewood/Hazeldean (S)	A(A)	0.47(0.56)	EBT(EBT)	4.8(6.4)	A(A)	0.45(0.52)
Huntmar/Hazeldean (S)	D(E)	0.86(0.95)	NBT(WBT)	38.1(50.5)	B(E)	0.68(0.91)
Savage/Hazeldean (U)	B(C)	14(17)	NB(NB)	0(0)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. S = Signalized, U = Unsignalized						

As seen in **Table 18**, all intersections continue to operate within acceptable City of Ottawa performance. Some intersections showed a minor worsening in performance due to increased background traffic from other area developments and the additional 1% annual growth rate to account for other potential growth.

Future Conditions 2033 – Full Buildout + 5 Years

Since 2028 background has the same intersection layouts as 2033 and is the more critical of the two scenarios, only 2033 will be analyzed. The future projected 2033 volumes are illustrated in **Figure 18** with projected operation outputs in **Table 19**. The detailed Synchro results can be found in **Appendix L**.

Figure 18: 2033 Total Projected Volumes

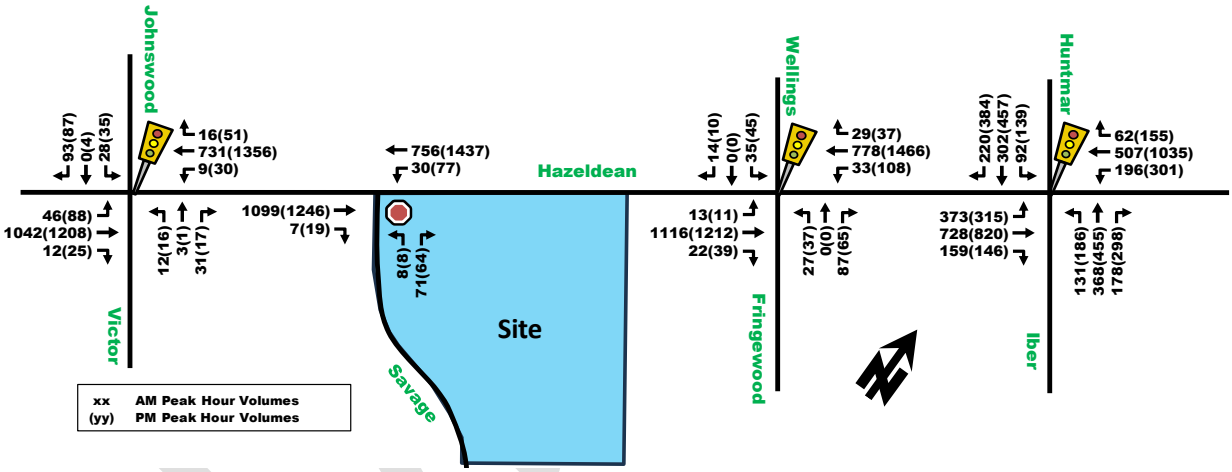


Table 19: 2033 Full Build-out Intersection Performance

Intersection	Weekday AM Peak (PM Peak)					
	Critical Movement			Intersection		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Victor/Hazeldean (S)	B(C)	0.63(0.80)	EBT(WBT)	19.1(18.6)	A(C)	0.59(0.74)
Fringewood/Hazeldean (S)	A(A)	0.49(0.58)	EBT(EBT)	5.0(7.2)	A(A)	0.46(0.54)
Huntmar/Hazeldean (S)	D(E)	0.86(0.98)	NBT(WBT)	38.5(52.9)	B(E)	0.70(0.93)
Savage/Hazeldean (U)	C(C)	18(20)	NB(NB)	1(1)	A(A)	-
Note: Analysis of signalized intersections assumes a PHF of 1.0 and a saturation flow rate of 1800 veh/h/lane. S = Signalized, U = Unsignalized						

As seen in **Table 19**, all study area intersections are expected to operate similarly to existing conditions and future background 2033 conditions, implying that the site generated traffic had minor to negligible effects to intersection performance along the study area corridor.

Queuing Assessment

The 2033 future projected scenario was used to determine the most critical queues within the study area. Using SimTraffic software, the intersections of Victor/Hazeldean, Savage/Hazeldean and Fringewood/Hazeldean demonstrated that the network operated well with minimal queueing, all within the existing available auxiliary turn lane storage or without spilling over to the nearest upstream signalized intersection/major access. The intersection of Huntmar/Hazeldean showed on average queues staying within their available storage, but various movements exceeding their storage lanes during the PM peak hour for the 95th percentile queue. This is not atypical for large intersections such as Huntmar/Hazeldean. A sensitivity test demonstrated that extending the Huntmar Dr widening from currently proposed Campeau Dr to Maple Grove further south to just south of Hazeldean Rd would result in adequate performance and all 95th percentile queues within available storage capacity. Lastly, the future volumes used assumed large background growth which may be overly conservative. No modifications are proposed at this time.

An assessment of queuing at Savage/Hazeldean intersection showed no queueing implications at full buildout.

The SimTraffic outputs have been provided in **Appendix M.**

Savage/Hazeldean Access Sensitivity

Due to community feedback, and concerns with traffic delays at the Savage/Hazeldean intersection, a sensitivity scenario was tested to determine impacts of increasing the number of critical left-turns in and out of Savage Dr (westbound left-turn and northbound left-turn) using the 2033 future projected scenario as background. The sensitivity used the City of Ottawa operational level of service (LoS) standards as a benchmark. The City of Ottawa uses an alphabetical grading scale, with F being a failure and A to E considered acceptable.

The sensitivity showed that to achieve a critical LoS 'F', an additional 125 and 75 more left-turning vehicles than currently forecasted are required during the AM and PM peaks respectively, which equates to triple and double the forecasted 2033 total turning volumes at Savage/Hazeldean (including existing traffic, background growth and forecasted site generated traffic). For right-turns, the required number of vehicles would be even higher. If all site generated trips forecasted decided to depart via a left-turn to the west (total of 50 outbound trips forecasted in the morning) and return from via a left turn from the east (total of 55 inbound trips forecasted in the afternoon), it would still not be enough traffic to meet the threshold to result in a LoS 'F'. It is very unlikely to achieve the noted traffic volumes to result in poor operations.

Additionally, the morning outbound traffic is anticipated to be distributed between the Savage/Hazeldean intersection and the right-out only access to Hazeldean Rd from this development. As a reminder, the analysis above and sensitivity assumed that all traffic would utilize the Savage Dr access only for a more conservative analysis, and it proved that the need for the right-out is not crucial for operations, rather proposed to satisfy neighbourhood concerns.

Should congestion or queueing become an issue (very unlikely), residents have an option to detour towards the signalized intersection at Victor/Hazeldean. Should the City of Ottawa deem the inbound and outbound manouvers undesirable at Savage/Hazeldean, the city could consider providing a center median curb to prohibit left-turns along the corridor. This would result in reduced access to residents from this development as well as the surrounding neighborhoods, but would likely result in fewer collisions and a safer corridor. Those formerly turning left could then use the adjacent signalized intersections at Victor St and Fringewood Dr to perform U-turns and continue their routes as they previously did, adding minor delays. Both adjacent signalized intersections have ample capacity to accommodate an increase in U-turn traffic. For the time being, it is recommended that the median two-way-left-turn-lane be maintained as existing conditions.

Future Transit Priority Corridor on Hazeldean Rd

The TMP update from July 2025 identified Hazeldean Rd fronting the site as a transit priority corridor within the "Needs Based Road Network" and "Priority Transit Network" adjacent to the site; however, since there are no plans or studies done yet, it is not forecasted that any transit measures will be implemented any time soon.

5.0 FINDINGS AND RECOMMENDATIONS

Based on the results summarized herein the following findings and recommendations are provided:

Existing Conditions

- The site is currently occupied by a car dealership and a single residential home. The lots are zoned as GM14 H(11) and R1D.
- The site is located in a transit priority corridor with isolated measures based on the Official Plan and the Transportation Master Plan "Needs Based Transit Network" and "Priority Transit Network". It is not forecasted that the project will be built within the study horizon years.
- Overall, there were 17 collisions recorded in five years within the study area. No areas were flagged as high risk or requiring imminent modifications, though the posted speed on Hazeldean Rd may attributed to higher injury causing collisions.
- Existing intersections operate at good overall LoS 'B' or better with the exception of Huntmar/Hazeldean in the PM peak period which operates overall at LoS 'D'. All critical movements operate at LoS 'C' or better during the weekday peak hours with the exception of Huntmar/Hazeldean in the PM peak period which has the southbound through movement operating at LoS 'E'.

Proposed Development

- The site proposes approximately 456 residential units and 4,700 ft^2 of commercial space within three buildings 4 to 25-storeys tall.
- The site proposes two accesses as follows:
    - A full movement access from Savage Dr located approximately 75m south of Savage/Hazeldean intersection, intended for all users.
    - A right-out only access at Hazeldean Rd for all vehicle types, in response to community desire to reduce traffic on Savage Dr exiting on to Hazeldean Rd. A curved outbound access with signage is proposed to dissuade any other movement from entering against traffic flow or exiting the site westbound. This driveway will be located approximately 80m east of Savage/Hazeldean intersection.
- Site circulation has been designed to allow larger vehicles such as emergency vehicles and garbage trucks to enter from Savage Dr and exit via the one-way outbound right-turn at Hazeldean Rd without needing to reverse or complete a turn-around. An internal loop has been provided to facilitate drop-offs near the main entrances, access to a loading bay for Building A and four short-term parking spaces. Building B has a separate loading bay directly north of the ramp into the underground parking lot. North of the loading bay on Building B, the drive aisle becomes one-way to northbound traffic only leading to the Hazeldean Rd right-out only access.
- Site generated trips from other area developments have been layered on to background traffic volumes plus an additional 1% annual growth rate along Hazeldean Rd and Huntmar Rd for through volumes.
- The site is projected to generate approximately 185 total person trips, 75 to 100 vehicle trips, 55 to 40 total transit trips, and 10 active transportation trips during the AM and PM peak hours respectively.
- The developer proposes 319 bike parking spaces which exceeds the minimum by-law requirements of 0.5 bike parking spaces per unit, with a rate of approximately 0.7 bike parking spaces per unit. Bike parking is proposed inside of the parking garage within the two underground levels.
- The applicant is requesting a variance for the parking ratios proposed. In total, the site requires 562 parking spaces based on the Parking By-Laws, but only 234 parking spaces will be provided. The site is

currently supported by frequent route #61 and connection routes #261 and #263. The site is also located near a future BRT corridor on a mainstreet corridor. Visitor parking is close to the required by-law minimums, with the offset in parking requirements coming predominantly from tenant parking.

- A strong TDM plan is recommended for this development to encourage the use of more sustainable modes of transportation and reduce the need for vehicular reliance. Refer to **Section 4.5** for further details.

Future Conditions

- The 2033 background intersection performance showed all study area intersections to operate overall with LoS 'E' or better and with critical movement of 'E' or better which is more congested than existing conditions but within acceptable performance.
- The MMLOS road segment analysis showed that pedestrian targets were not met on any of the existing road segments due to lack of offset from motorway or lack of facilities but would be met on the east side of Savage Dr once the development adds a new sidewalk. Cycling and transit target level of services were met. The public realm improves from a PRLoS "C" to "A" on the east side of Savage Dr in the future.
- The MMLOS intersection analysis showed that the pedestrian level of service is only met at Victor/Hazeldean. Other intersections did not meet their targets given the number of lanes required for pedestrians to cross. The bike level of service was not met at any intersection given the lack of cycling facilities and protected turning movements. The transit level of service were met at all intersections except Huntmar/Hazeldean due to the anticipated movement delays.
- Future conditions with the addition of pedestrians, cyclists, transit users modelled crossing Savage Dr and using the nearby Victor/Hazeldean intersection performed at acceptable levels of service with respect to v/c and delay resulting in overall LoS 'E' or better and with critical movement of 'E' or better, operating similarly to background 2033 conditions.
    - Minimal queuing was observed within the study area with the exception of Huntmar/Hazldean in the future. Should the background growth occur at a slower rate or Huntmar Dr widening be extended to Hazeldean, then the queueing would be reduced to within available storage lengths. Due to the uncertainties of which developments may be built in the future and which roads end up being widened as per the TMP update, a "do nothing" and monitor approach is recommended at this time.
    - The Savage/Hazeldean intersection showed resiliency and available capacity should more vehicles perform critical left-turning movements than forecasted. The additional traffic generated from the site can be entirely accommodated at this intersection and doubling the forecasted number of vehicles generated by the site and all placed on left turns would still operate acceptably. Queues were minimal.
- The site will provide a network of interconnected pathways within the site and will add a new municipal sidewalk on the east side of Savage Dr, improving accessibility and pedestrian permeability surrounding the site.

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Appendix A:

TIA Screening Form and Site Plan

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City of Ottawa 2017 TIA Guidelines

TIA Screening Form

Date	13-Dec-24
Project	5872 Hazeldean Rd
Project Number	479294

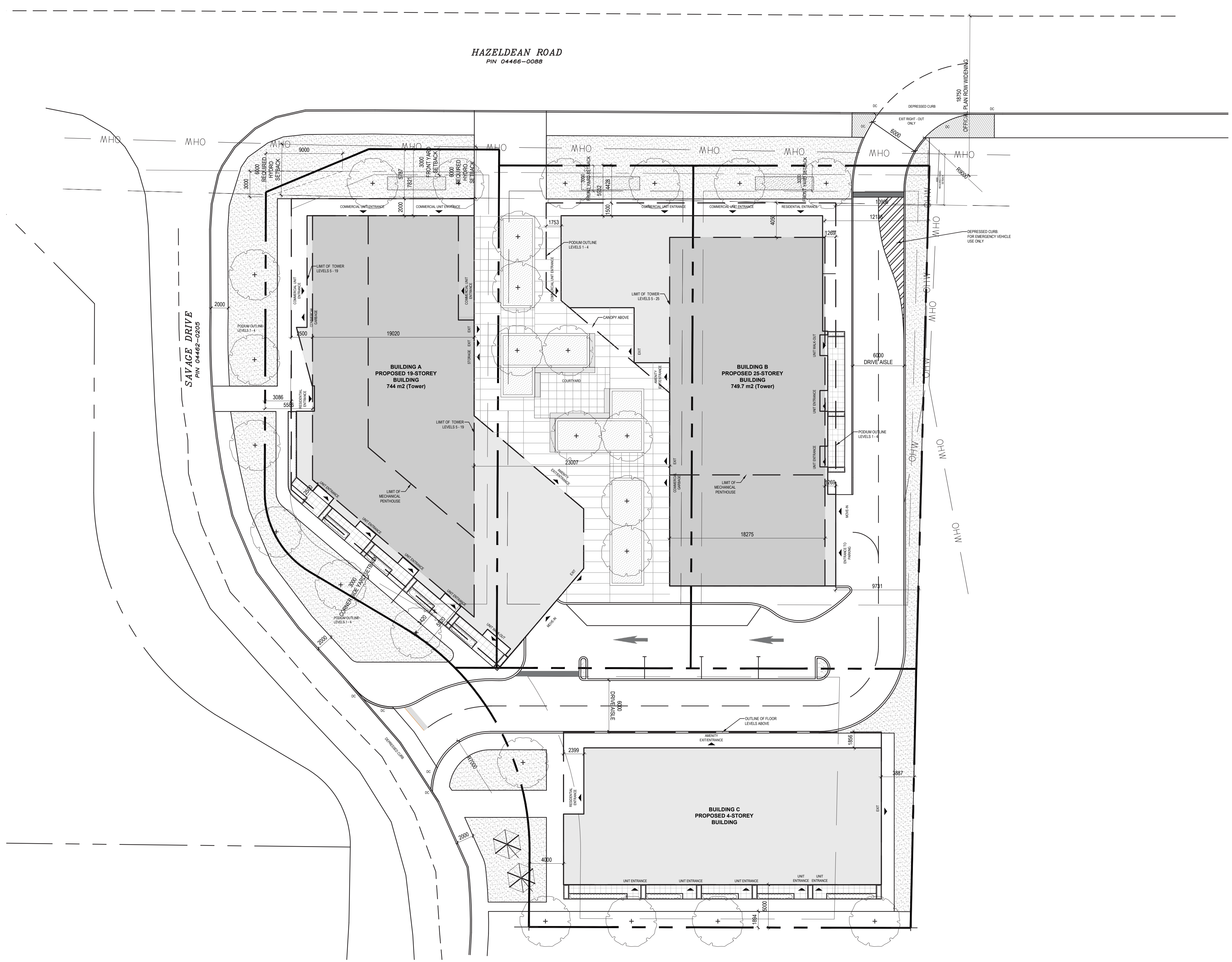
Results of Screening	Yes/No
Development Satisfies the Trip Generation Trigger	Yes
Development Satisfies the Location Trigger	Yes
Development Satisfies the Safety Trigger	Yes

Module 1.1 - Description of Proposed Development	
Municipal Address	5872, 5880, 5884 Hazeldean and 7 Savage Dr
Description of location	Currently a dealership and a house. Zoned GM14 H(11) and R1D
Land Use	Proposed residential, consisting of a 4, 19 and 25-storey building.
Development Size	Proposed approximately 455 units
Number of Accesses and Locations	One full access to Savage Dr and a right-out only access to Hazeldean Rd. To be confirmed.
Development Phasing	Single Phase
Buildout Year	2028
Sketch Plan / Site Plan	See attached

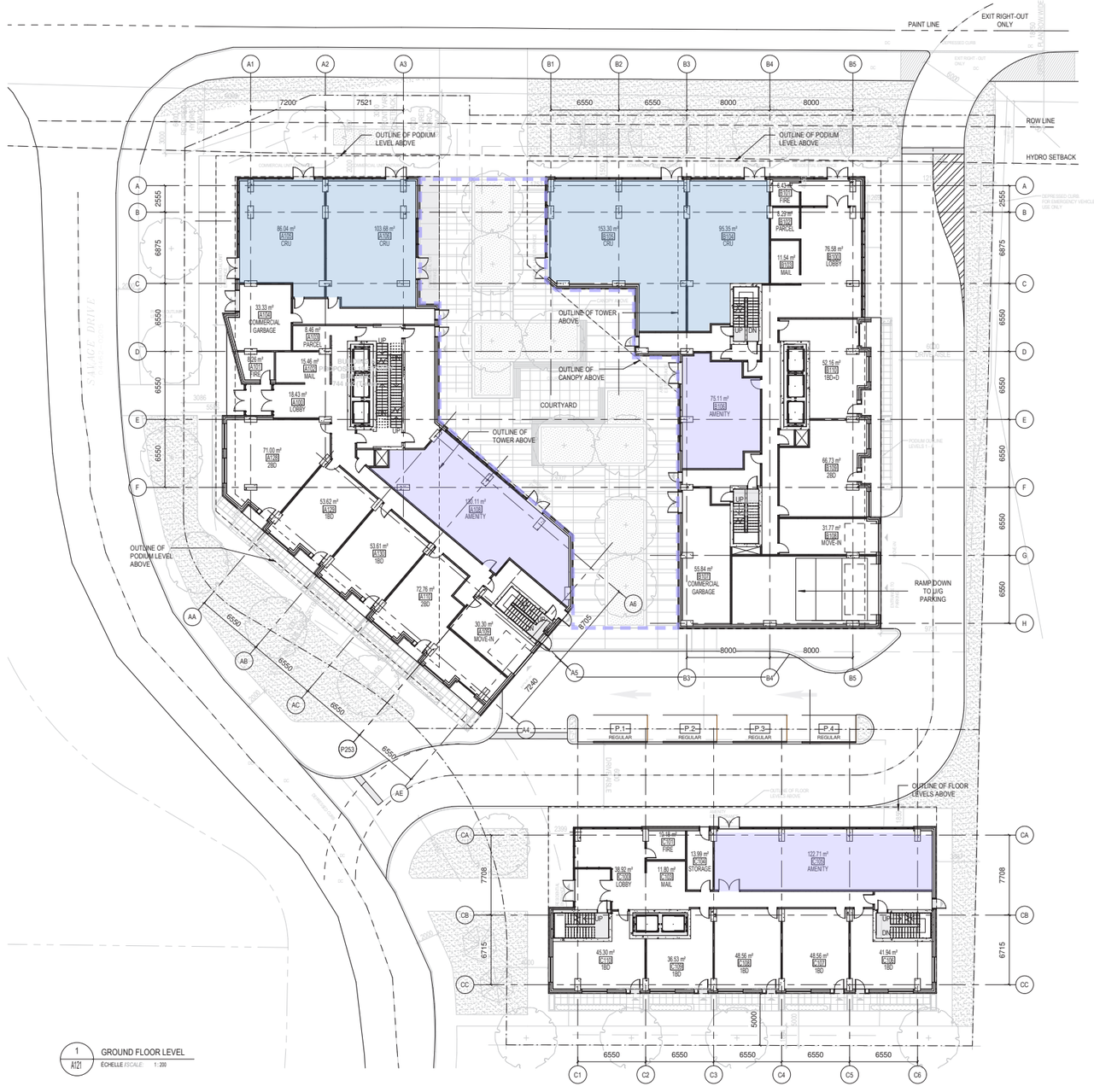
Module 1.2 - Trip Generation Trigger		
Land Use Type	Multi-High Rise Res (3+ Storeys)	
Development Size	456	Units
Trip Generation Trigger Met?	Yes	

Module 1.3 - Location Triggers		
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority Network, Rapid Transit network or Cross-Town Bikeways?	Yes	Transit priority within OP Schedule C2.
Is the development in a Hub, a Protected Major Transit Station Area (PMTSA), or a Design Priority Area (DPA)?	No	
Location Trigger Met?	Yes	

Module 1.4 - Safety Triggers		
Posted Speed Limit on any boundary road	<80	km/h
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No	
A proposed driveway is 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) or within auxiliary lanes of an intersection?	Yes	Within 135m from Victor/Hazeldean signalized intersection.
Does the proposed driveway make use of an existing median break that serves an existing site?	No	
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No	
Does the development include a drive-thru facility?	No	
Safety Trigger Met?	Yes	



Figurr - Proposed Concept Site Plan



Amenity

Commercial

Outdoor GF Amenity

N

Appendix B:

Existing Peak Hour Volumes

Transportation Services - Traffic Services

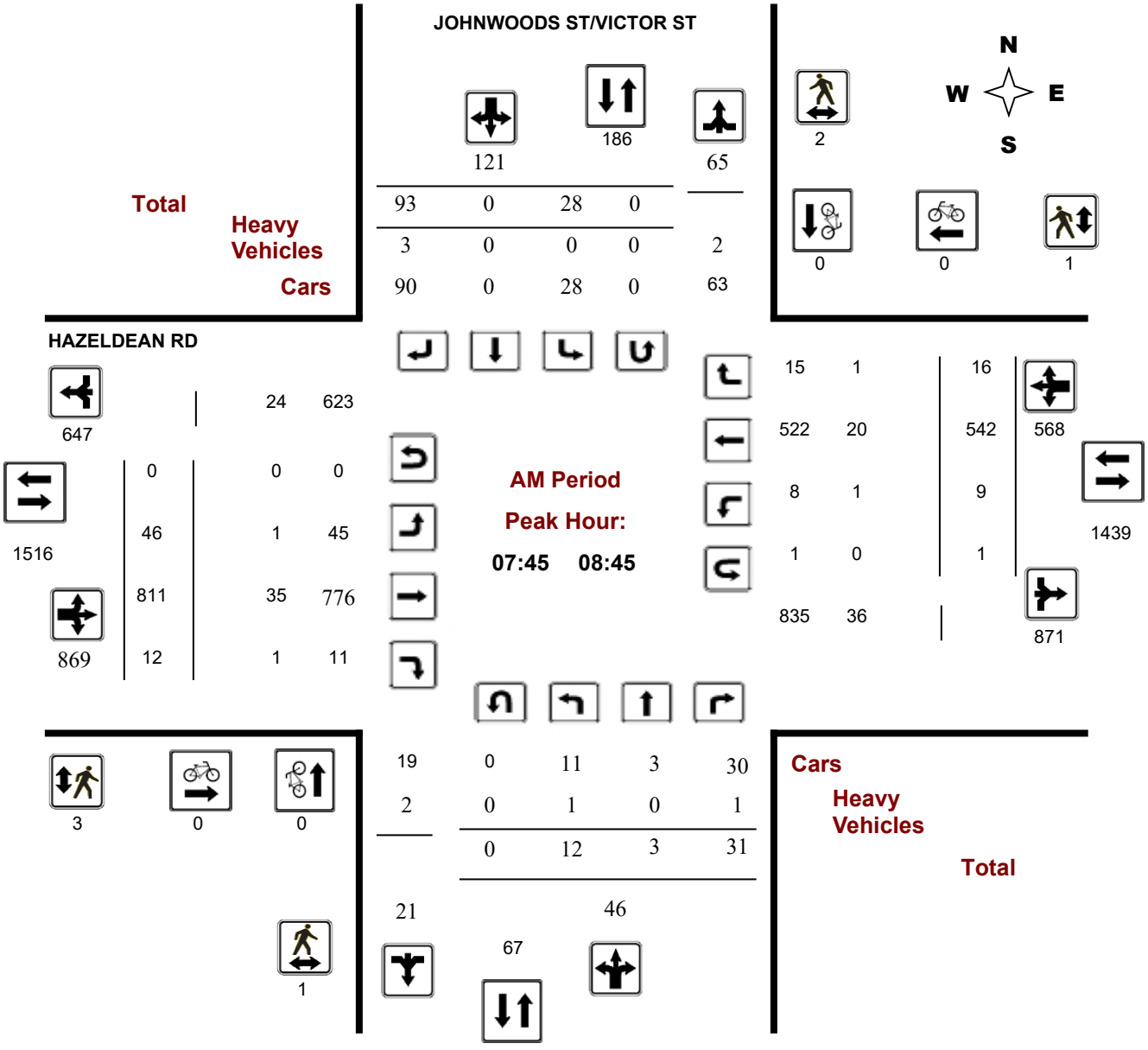
Turning Movement Count - Study Results

HAZELDEAN RD @ JOHNWOODS ST/VICTOR ST

Survey Date: Tuesday, January 07, 2025 **WO No:** 42385

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

AM Period Peak Hour Diagram



Transportation Services - Traffic Services

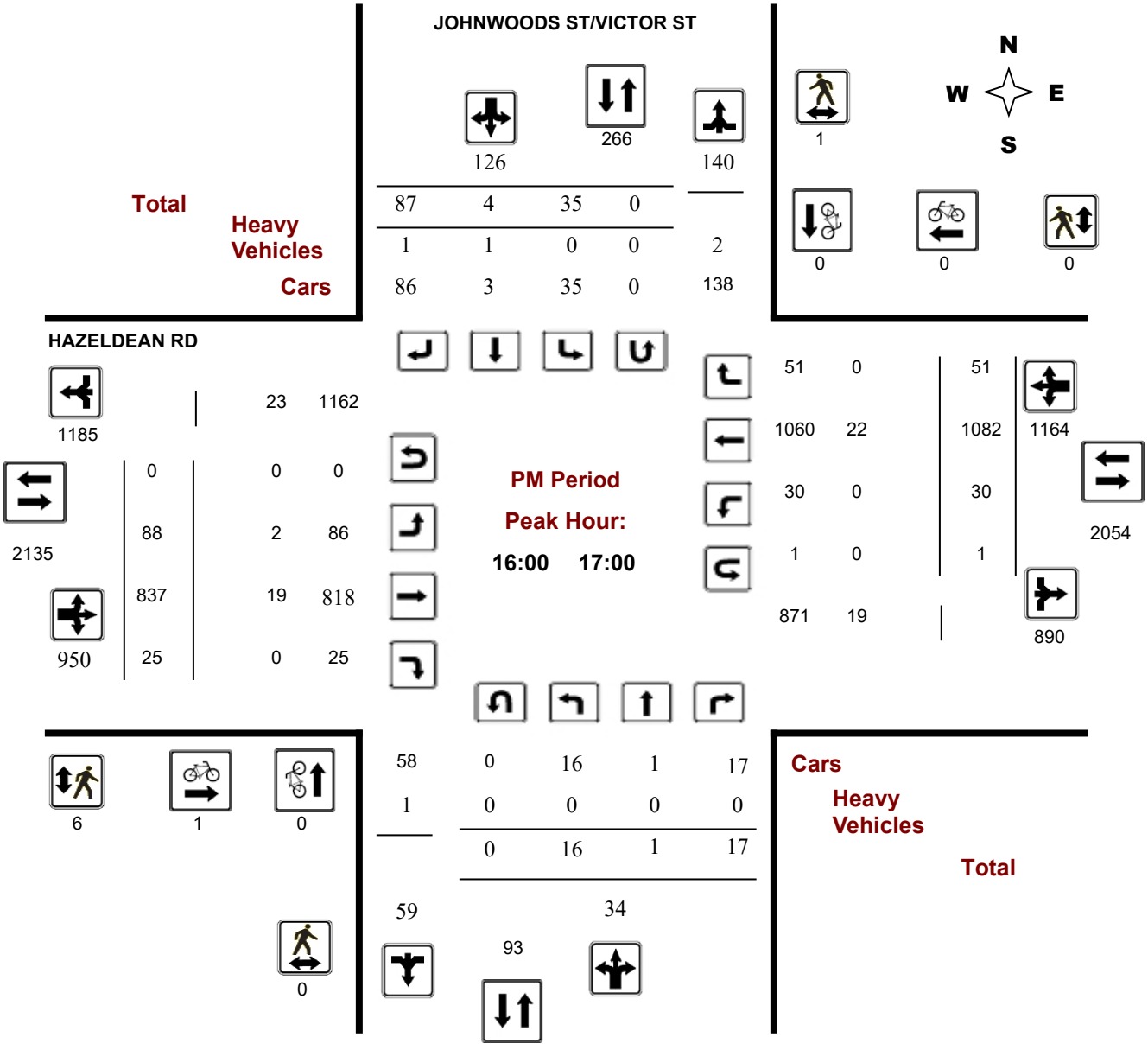
Turning Movement Count - Study Results

HAZELDEAN RD @ JOHNWOODS ST/VICTOR ST

Survey Date: Tuesday, January 07, 2025 **WO No:** 42385

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

PM Period Peak Hour Diagram



5666547 - SAVAGE DR & HAZELDEAN RD - JUN 19 ... - TMC

Wed Jun 19, 2024
AM Peak (7:45 AM - 8:45 AM)
All Classes (Lights and Motorcycles, Heavy, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1218921, Location: 45.277913, -75.920197, Site Code: 41967103

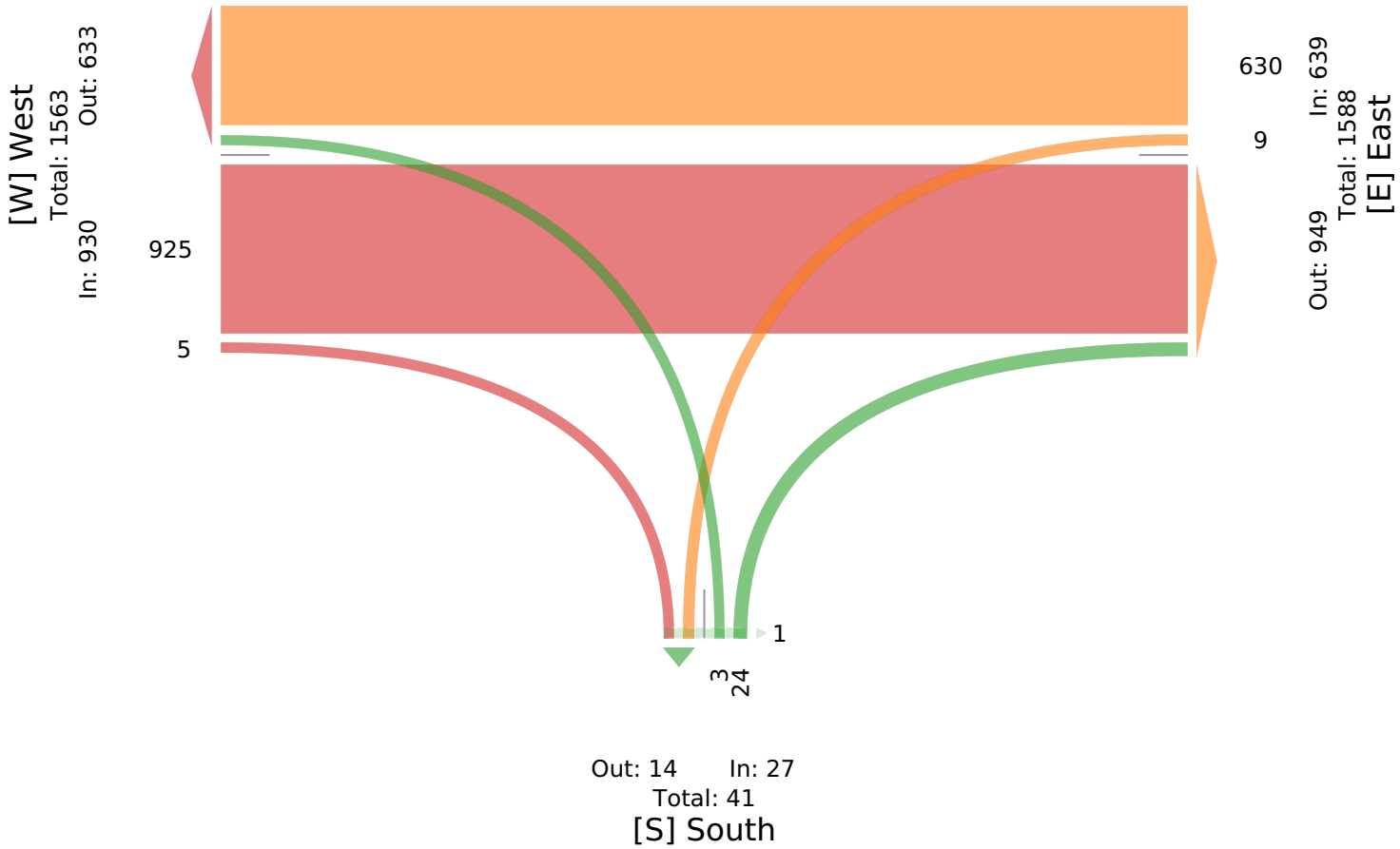
Provided by: City of Ottawa
100 Constellation Dr,
Nepean, ON, K2G 5J9, CA

Leg Direction	East Westbound					South Northbound					West Eastbound					
Time	T	L	U	**App**	Ped*	R	L	U	**App**	Ped*	R	T	U	**App**	Ped*	**Int**
2024-06-19 7:45AM	142	1	0	**143**	0	7	1	0	**8**	0	2	253	0	**255**	0	**406**
8:00AM	161	2	0	**163**	0	2	0	0	**2**	1	1	212	0	**213**	0	**378**
8:15AM	159	4	0	**163**	0	6	1	0	**7**	0	1	226	0	**227**	0	**397**
8:30AM	168	2	0	**170**	0	9	1	0	**10**	0	1	234	0	**235**	0	**415**
Total	630	9	0	**639**	0	24	3	0	**27**	1	5	925	0	**930**	0	**1596**
% Approach	98.6%	1.4%	0%	**-**	-	88.9%	11.1%	0%	**-**	-	0.5%	99.5%	0%	**-**	-	-
% Total	39.5%	0.6%	0%	**40.0%**	-	1.5%	0.2%	0%	**1.7%**	-	0.3%	58.0%	0%	**58.3%**	-	-
PHF	0.938	0.563	-	**0.940**	-	0.667	0.750	-	**0.675**	-	0.625	0.912	-	**0.910**	-	0.963
Lights and Motorcycles	589	7	0	**596**	-	21	3	0	**24**	-	5	877	0	**882**	-	1502
% Lights and Motorcycles	93.5%	77.8%	0%	**93.3%**	-	87.5%	100%	0%	**88.9%**	-	100%	94.8%	0%	**94.8%**	-	94.1%
Heavy	41	2	0	**43**	-	3	0	0	**3**	-	0	46	0	**46**	-	92
% Heavy	6.5%	22.2%	0%	**6.7%**	-	12.5%	0%	0%	**11.1%**	-	0%	5.0%	0%	**4.9%**	-	5.8%
Bicycles on Road	0	0	0	**0**	-	0	0	0	**0**	-	0	2	0	**2**	-	2
% Bicycles on Road	0%	0%	0%	**0%**	-	0%	0%	0%	**0%**	-	0%	0.2%	0%	**0.2%**	-	0.1%
Pedestrians	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	100%	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	0%	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

5666547 - SAVAGE DR & HAZELDEAN RD - JUN 19 ... - TMC
Wed Jun 19, 2024
AM Peak (7:45 AM - 8:45 AM)
All Classes (Lights and Motorcycles, Heavy, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1218921, Location: 45.277913, -75.920197, Site Code: 41967103

Provided by: City of Ottawa
100 Constellation Dr,
Nepean, ON, K2G 5J9, CA



5666547 - SAVAGE DR & HAZELDEAN RD - JUN 19 ... - TMC

Wed Jun 19, 2024
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights and Motorcycles, Heavy, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1218921, Location: 45.277913, -75.920197, Site Code: 41967103

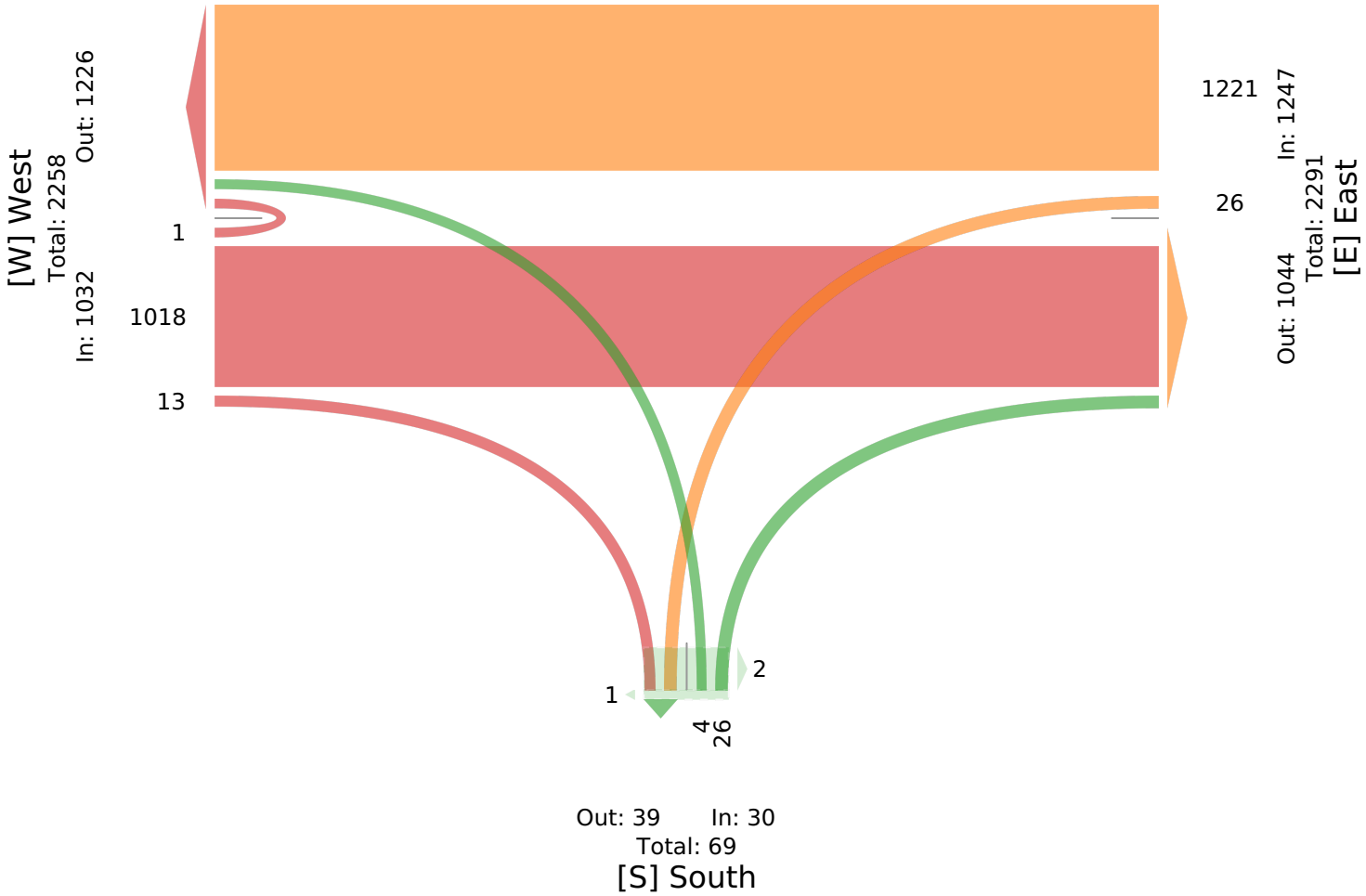
Provided by: City of Ottawa
100 Constellation Dr,
Nepean, ON, K2G 5J9, CA

Leg Direction	East Westbound					South Northbound					West Eastbound					
Time	T	L	U	**App**	Ped*	R	L	U	**App**	Ped*	R	T	U	**App**	Ped*	**Int**
2024-06-19 4:00PM	303	10	0	**313**	0	6	2	0	**8**	1	4	238	0	**242**	0	**563**
4:15PM	295	7	0	**302**	0	6	2	0	**8**	0	2	265	0	**267**	0	**577**
4:30PM	313	3	0	**316**	0	7	0	0	**7**	2	4	244	1	**249**	0	**572**
4:45PM	310	6	0	**316**	0	7	0	0	**7**	0	3	271	0	**274**	0	**597**
Total	1221	26	0	**1247**	0	26	4	0	**30**	3	13	1018	1	**1032**	0	**2309**
% Approach	97.9%	2.1%	0%	**-**	-	86.7%	13.3%	0%	**-**	-	1.3%	98.6%	0.1%	**-**	-	**-**
% Total	52.9%	1.1%	0%	**54.0%**	-	1.1%	0.2%	0%	**1.3%**	-	0.6%	44.1%	0%	**44.7%**	-	**-**
PHF	0.975	0.650	-	**0.987**	-	0.893	0.500	-	**0.906**	-	0.813	0.941	0.250	**0.943**	-	0.969
Lights and Motorcycles	1192	26	0	**1218**	-	24	4	0	**28**	-	13	993	1	**1007**	-	2253
% Lights and Motorcycles	97.6%	100%	0%	**97.7%**	-	92.3%	100%	0%	**93.3%**	-	100%	97.5%	100%	**97.6%**	-	97.6%
Heavy	29	0	0	**29**	-	1	0	0	**1**	-	0	23	0	**23**	-	53
% Heavy	2.4%	0%	0%	**2.3%**	-	3.8%	0%	0%	**3.3%**	-	0%	2.3%	0%	**2.2%**	-	2.3%
Bicycles on Road	0	0	0	**0**	-	1	0	0	**1**	-	0	2	0	**2**	-	3
% Bicycles on Road	0%	0%	0%	**0%**	-	3.8%	0%	0%	**3.3%**	-	0%	0.2%	0%	**0.2%**	-	0.1%
Pedestrians	-	-	-	-	0	-	-	-	-	2	-	-	-	-	0	
% Pedestrians	-	-	-	-	-	-	-	-	-	66.7%	-	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	1	-	-	-	-	0	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	33.3%	-	-	-	-	-	-

*Pedestrians and Bicycles on Crosswalk. L: Left, R: Right, T: Thru, U: U-Turn

5666547 - SAVAGE DR & HAZELDEAN RD - JUN 19 ... - TMC
Wed Jun 19, 2024
PM Peak (4 PM - 5 PM) - Overall Peak Hour
All Classes (Lights and Motorcycles, Heavy, Pedestrians, Bicycles on Road, Bicycles on Crosswalk)
All Movements
ID: 1218921, Location: 45.277913, -75.920197, Site Code: 41967103

Provided by: City of Ottawa
100 Constellation Dr,
Nepean, ON, K2G 5J9, CA



Appendix C:

Historic Collision Data

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	2	1	1	5	0	1	0	0	10	59%
Non-fatal injury	2	2	1	1	0	1	0	0	7	41%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**4**	**3**	**2**	**6**	**0**	**2**	**0**	**0**	**17**	100%
	#2 or 24%	#3 or 18%	#4 or 12%	#1 or 35%	#6 or 0%	#4 or 12%	#6 or 0%	#6 or 0%		

HAZELDEAN RD/JOHNWOODS ST/VICTOR ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2018-2022	7	28,262	1825	**0.14**

Peds	Cyclists
0	**0**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	1	0	1	1	0	0	0	0	3	43%
Non-fatal injury	1	2	1	0	0	0	0	0	4	57%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**2**	**2**	**2**	**1**	**0**	**0**	**0**	**0**	**7**	100%
	29%	29%	29%	14%	0%	0%	0%	0%		

HAZELDEAN RD/SAVAGE DR

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2018-2022	4	28,200	1825	**0.08**

Peds	Cyclists
0	**1**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	1	0	0	3	0	0	0	0	4	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**1**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**4**	100%
	25%	0%	0%	75%	0%	0%	0%	0%		

MIDBLOCK COLLISIONS

HAZELDEAN RD, JOHNWOODS ST to SAVAGE DR

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2018-2022	5	n/a	1825	**n/a**

Peds	Cyclists
1	**1**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	0	1	0	1	0	0	0	0	2	40%
Non-fatal injury	1	0	0	1	0	1	0	0	3	60%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**1**	**1**	**0**	**2**	**0**	**1**	**0**	**0**	**5**	100%
	20%	20%	0%	40%	0%	20%	0%	0%		

HAZELDEAN RD, SAVAGE DR to ROWAN RD

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2018-2022	1	n/a	1825	**n/a**

Peds	Cyclists
0	**0**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	SMV other	SMV unattended vehicle	Other	Total	
P.D. only	0	0	0	0	0	1	0	0	1	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non-reportable	0	0	0	0	0	0	0	0	0	0%
Total	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	100%
	0%	0%	0%	0%	0%	100%	0%	0%		

Appendix D:

Background Growth Calculations

Hazeldean/Victor
8 hrs

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2006	3-Aug	1214	920	300	292	3819	4160	4509	4470	19684
2013	1-Aug	519	460	238	231	4947	5853	5773	4933	22954
2025	7-Jan	779	716	303	283	6415	6346	6613	6765	28220

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2006	920	1214	2134	19684				
2013	460	519	979	22954	-50.0%	-57.2%	-54.1%	16.6%
2025	716	779	1495	28220	55.7%	50.1%	52.7%	22.9%

Regression Estimate	2006	762	994	1756
Regression Estimate	2025	624	651	1274
Average Annual Change		**-1.05%**	**-2.21%**	**-1.67%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2006	4509	4470	8979	19684				
2013	5773	4933	10706	22954	28.0%	10.4%	19.2%	16.6%
2025	6613	6765	13378	28220	14.6%	37.1%	25.0%	22.9%

Regression Estimate	2006	4710	4313	9023
Regression Estimate	2025	6730	6673	13404
Average Annual Change		**1.90%**	**2.32%**	**2.10%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2006	4160	3819	7979	19684				
2013	5853	4947	10800	22954	40.7%	29.5%	35.4%	16.6%
2025	6346	6415	12761	28220	8.4%	29.7%	18.2%	22.9%

Regression Estimate	2006	4525	3890	8415
Regression Estimate	2025	6559	6456	13015
Average Annual Change		**1.97%**	**2.70%**	**2.32%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2006	300	292	592	19684				
2013	238	231	469	22954	-20.7%	-20.9%	-20.8%	16.6%
2025	303	283	586	28220	27.3%	22.5%	24.9%	22.9%

Regression Estimate	2006	274	268	542
Regression Estimate	2025	288	269	557
Average Annual Change		**0.26%**	**0.02%**	**0.14%**

Hazeldean/Victor
AM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2006	3-Aug	101	151	42	23	326	549	619	365	2176
2013	1-Aug	63	45	29	16	469	720	716	496	2554
2025	7-Jan	121	65	46	21	568	871	869	647	3208

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2006	151	101	252	2176				
2013	45	63	108	2554	-70.2%	-37.6%	-57.1%	17.4%
2025	65	121	186	3208	44.4%	92.1%	72.2%	25.6%

Regression Estimate	2006	120	82	203
Regression Estimate	2025	47	110	157
Average Annual Change		**-4.81%**	**1.54%**	**-1.33%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2006	619	365	984	2176				
2013	716	496	1212	2554	15.7%	35.9%	23.2%	17.4%
2025	869	647	1516	3208	21.4%	30.4%	25.1%	25.6%

Regression Estimate	2006	621	376	997
Regression Estimate	2025	870	654	1524
Average Annual Change		**1.79%**	**2.95%**	**2.26%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2006	549	326	875	2176				
2013	720	469	1189	2554	31.1%	43.9%	35.9%	17.4%
2025	871	568	1439	3208	21.0%	21.1%	21.0%	25.6%

Regression Estimate	2006	571	348	919
Regression Estimate	2025	884	581	1464
Average Annual Change		**2.33%**	**2.73%**	**2.48%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2006	42	23	65	2176				
2013	29	16	45	2554	-31.0%	-30.4%	-30.8%	17.4%
2025	46	21	67	3208	58.6%	31.3%	48.9%	25.6%

Regression Estimate	2006	36	20	56
Regression Estimate	2025	43	19	62
Average Annual Change		**0.87%**	**-0.24%**	**0.50%**

Hazeldean/Victor
PM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2006	3-Aug	246	122	58	71	714	533	554	846	3144
2013	1-Aug	90	92	46	54	1061	754	794	1091	3982
2025	7-Jan	126	140	34	59	1164	890	950	1185	4548

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2006	122	246	368	3144				
2013	92	90	182	3982	-24.6%	-63.4%	-50.5%	26.7%
2025	140	126	266	4548	52.2%	40.0%	46.2%	14.2%

Regression Estimate	2006	107	200	307
Regression Estimate	2025	131	99	230
Average Annual Change		**1.08%**	**-3.62%**	**-1.50%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2006	554	846	1400	3144				
2013	794	1091	1885	3982	43.3%	29.0%	34.6%	26.7%
2025	950	1185	2135	4548	19.6%	8.6%	13.3%	14.2%

Regression Estimate	2006	593	895	1488
Regression Estimate	2025	973	1214	2186
Average Annual Change		**2.64%**	**1.61%**	**2.05%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2006	533	714	1247	3144				
2013	754	1061	1815	3982	41.5%	48.6%	45.5%	26.7%
2025	890	1164	2054	4548	18.0%	9.7%	13.2%	14.2%

Regression Estimate	2006	570	789	1358
Regression Estimate	2025	911	1208	2119
Average Annual Change		**2.50%**	**2.27%**	**2.37%**

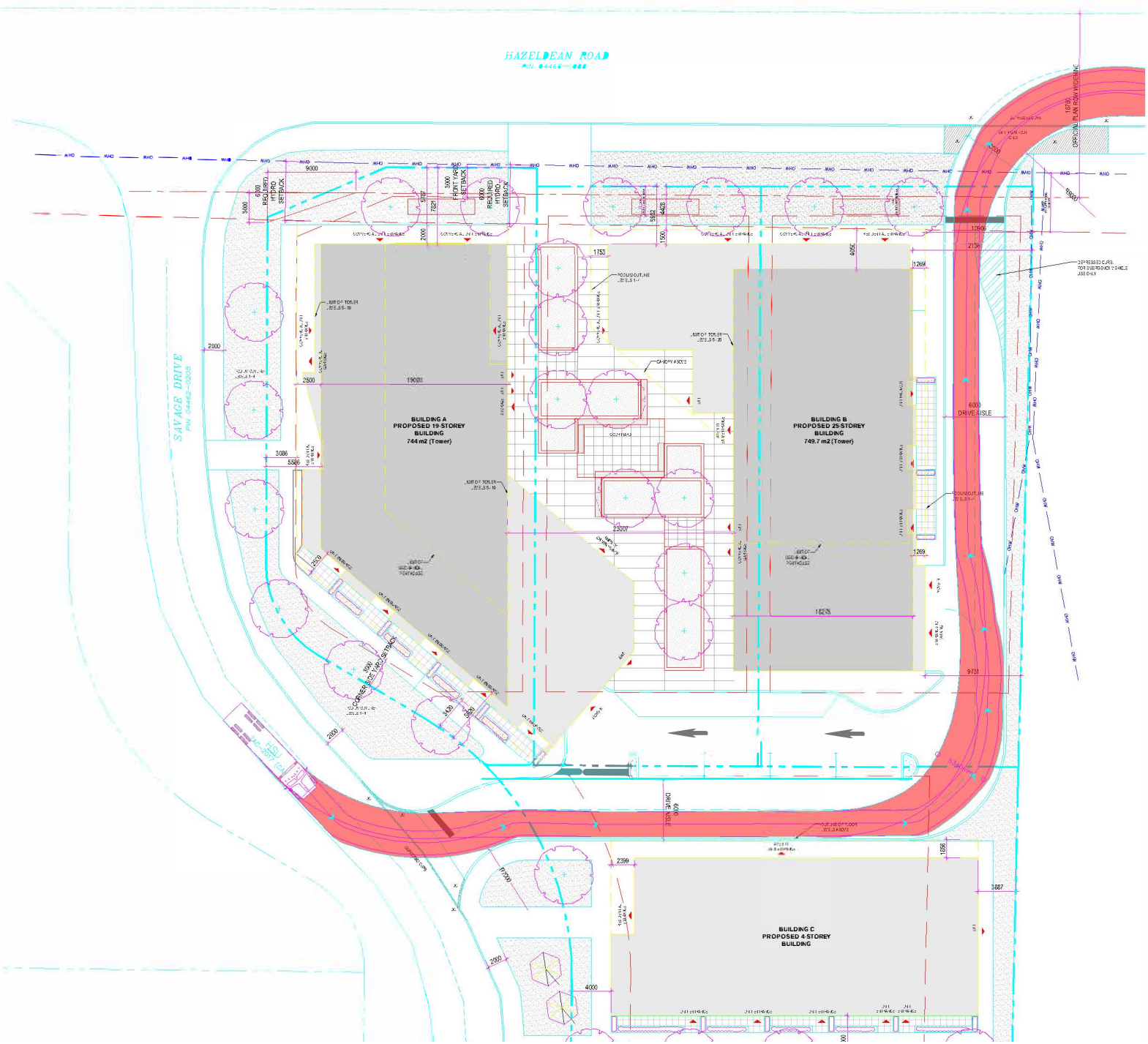
South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2006	58	71	129	3144				
2013	46	54	100	3982	-20.7%	-23.9%	-22.5%	26.7%
2025	34	59	93	4548	-26.1%	9.3%	-7.0%	14.2%

Regression Estimate	2006	57	66	123
Regression Estimate	2025	33	56	89
Average Annual Change		**-2.77%**	**-0.85%**	**-1.66%**

Appendix E:

Truck Turning Templates



PARSONS

Note: The location of utilities is approximate only, the exact location should be determined by consulting the municipal authorities and utility companies concerned. The contractor shall provide the location of utilities and shall be responsible for adequate protection from damage.

N

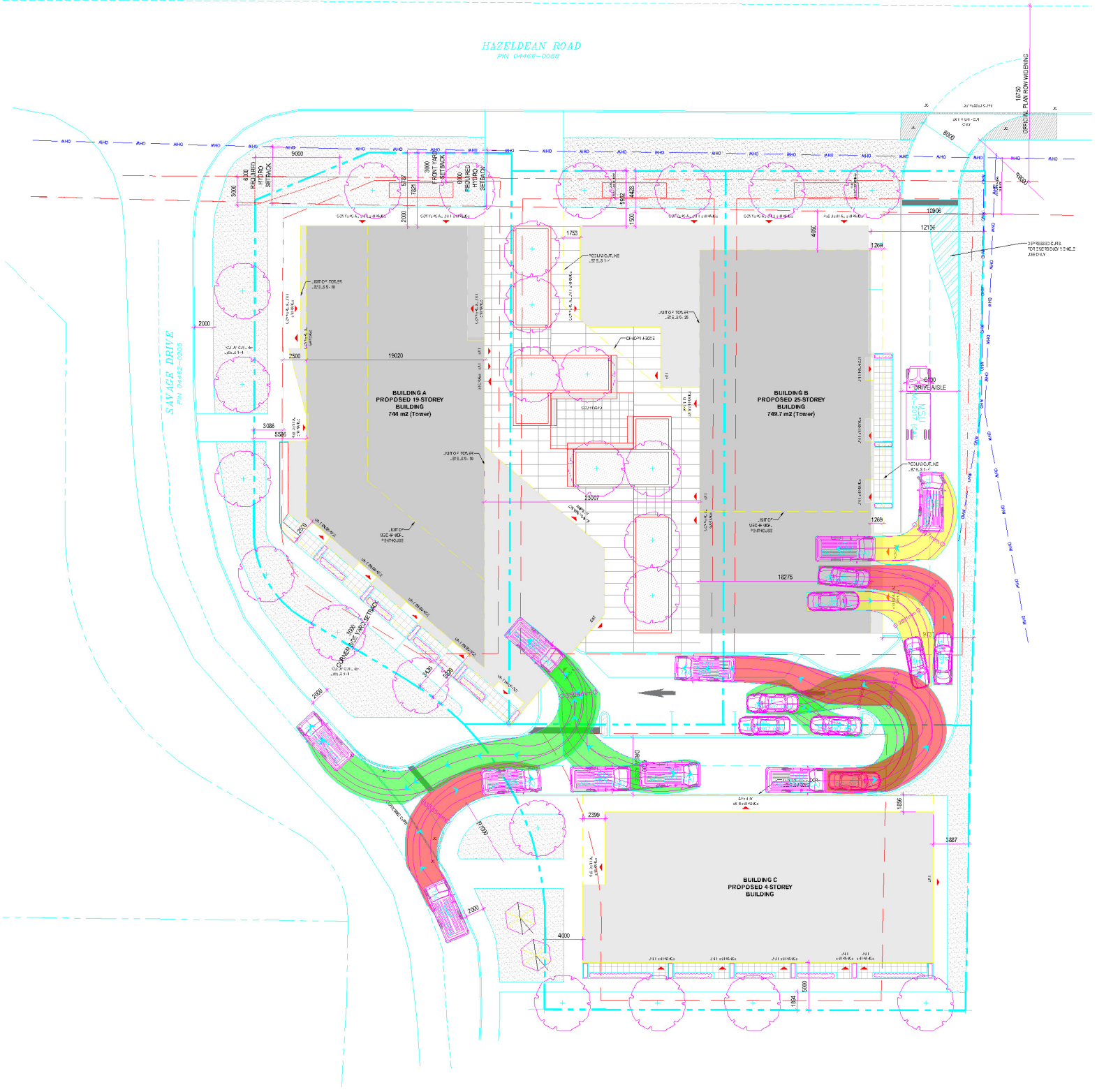
Legend

HSU

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

Not to Scale

Drawing Description	5872 Hazeldean Rd		
Client	Hazeldean Heights	Date	Sept 2025
Project Number	479294	Figure Number	1/2
		Project Description	HSU Circulation


HAZELDEAN ROAD
PIN 04466-0088
SAVAGE DRIVE
PIN 04462-0205
BUILDING A
PROPOSED 19-STOREY
BUILDING
744 m2 (Tower)
BUILDING B
PROPOSED 25-STOREY
BUILDING
749.7 m2 (Tower)
BUILDING C
PROPOSED 4-STOREY
BUILDING
DRIVE AISLE
OPTIONAL PLAN R/W WIDENING
DEPRESSED CURB FOR EMERGENCY VEHICLE USE ONLY
CROSSWALK SETBACK
REQUIRED HYDRO SETBACK
FIRE ROUTE
19020
23007
18275
12136
12906
9000
6000

Appendix F:

MMLOS Analysis: Road Segments

Multi-Modal Level of Service - Segments Form

Project: 5872 Hazeldean
Consultant: Parsons
Date: Jul 17, 2025
Scenario: 479294

	Segment Name	Hazeldean Rd				Savage Dr (existing)				Savage Dr (future)			
	OP Transect / Policy Area	Mainstreet Corridor (outside a Hub)				Outer Urban or Suburban				Outer Urban or Suburban			
	Segment Component	Majority (>50%)		Critical		Majority (>50%)		Critical		Majority (>50%)		Critical	
	Side of Street	W or N	E or S	W or N	E or S	W or N	E or S	W or N	E or S	W or N	E or S	W or N	E or S
Pedestrian	**PLOS Inputs**												
	Posted Speed (km/h)	60 km/h		60 km/h		40 km/h		40 km/h		40 km/h		40 km/h	
	Two-Way ADT	26,000		26,000		1,000		1,000		1,000		1,000	
	Pedestrian Facility	Sidewalk	Sidewalk			None	None			None	Sidewalk		
	Does the facility meet the TMP Sidewalk or MUP Policy? If not, for MUPs, does the location have a low volume of peak daily users AND are pedestrian volumes likely less than 20% of total users?	Yes	Yes			No	No			No	Yes		
	Facility Width (m)	2.80m	2.80m			-	-			-	2.00m		
	Offset from Motor Vehicle Travel Lanes (m)	1.5-2.99m	1.5-2.99m			-	-			-	< 0.5m		
	Presence of Adjacent Parking?	-	-			-	-			-	-		
	General Purpose Curb Lane ADT	> 3000	> 3000			-	-			-	≤ 3000		
	Max. Distance between Controlled Crossings (m)	291-400m	291-400m			-	-	-	-	-	-	-	-
	Score	**3.25**	**3.25**	-	-	**0.00**	**0.00**	-	-	**0.00**	**4.25**	-	-
	PLOS	**C**	**C**	-	-	**F**	**F**	-	-	**F**	**B**	-	-
	Target PLOS	**B**				**C**				**C**			
Bicycle	**BLOS Inputs**												
	Cycling Route Classification	**Elsewhere**				**Elsewhere**				**Elsewhere**			
	Cycling Facility	Painted or Physically Separated Bike Lanes	Painted or Physically Separated Bike Lanes	Input PLOS First	Input PLOS First	Shared Operating Space	Shared Operating Space	Input PLOS First	Input PLOS First	Shared Operating Space	Shared Operating Space	Input PLOS First	Input PLOS First
	Is the minimum level of separation provided according to OTM Book 18 Pre-Selection Nomograph - Rural Context (Figure 5.6)? (for paved shoulders)	-	-			-	-			-	-		
	Facility Operation	Unidirectional	Unidirectional			-	-			-	-		
	Pedestrian/Cyclist Volume	-	-			-	-			-	-		
	Facility Width	2.0-2.5m	2.0-2.5m			-	-			-	-		
	Boulevard/Buffer Width (excluding curb)	< 1.0m and no vertical measure or < 0.6m with adjacent parking	< 1.0m and no vertical measure or < 0.6m with adjacent parking			-	-			-	-		
	Unsignalized Roadway Crossing Type (where cyclists are required to yield)	None	None			None	None			None	None		
	Number of Travel Lanes at Crossing	-	-			-	-			-	-		
	Crossing includes Median Refuge (≥ 2.7m)	-	-			-	-			-	-		
	Cross-street Posted Speed (km/h)	-	-			-	-			-	-		
	Cycling Path Blockages (e.g. bus stops and/or loading zones)	Frequent, Short Duration	Frequent, Short Duration			Rare	Rare			Rare	Rare		
	Score	**2.58**	**2.58**	-	-	**4.15**	**4.15**	-	-	**4.15**	**4.15**	-	-
	BLOS	**C**	**C**	-	-	**B**	**B**	-	-	**B**	**B**	-	-
	Target BLOS	**C**				**C**				**C**			
Transit	**TLOS Inputs**												
	Transit Facility	**TP - Isolated Measures**				**Select Transit Designation**				**Select Transit Designation**			
	Facility Type	Mixed Traffic	Mixed Traffic										
	Expected Transit Running Time	Slightly Impeded	Slightly Impeded										
	Transit Travel Speed (if available)	Enter Speed (if available)	Enter Speed (if available)										
	TLOS	**C**	**C**			-	-			-	-		
	Target TLOS	**C**				-				-			
Public Realm	**PRLOS Inputs**												
	Context	Mainstreet or active frontage street within a Hub, Special District, or Village	Mainstreet or active frontage street within a Hub, Special District, or Village			Other Streets	Other Streets			Other Streets	Other Streets		
	Inner Boulevard Width	≤ 0.6m	≤ 0.6m			≤ 0.6m	≤ 0.6m			≤ 0.6m	≤ 0.6m		
	Middle Boulevard Width	≤ 0.5m	≤ 0.5m			≤ 0.5m	≤ 0.5m			≤ 0.5m	≤ 0.5m		
	Outer Boulevard (Frontage) Width	-	-			≥ 3.0m	≥ 3.0m			≥ 3.0m	≥ 3.0m		
	Transit Route on Segment?	Yes	Yes			No	No			No	No		
	Bus Stop Elements	Curbside landing zone with no shelter	Curbside landing zone with no shelter			-	-			-	-		
	Number of Midblock Traffic Lanes (both travel directions)	5				≤ 2				≤ 2			
	Score	**13.50**	**13.50**			**19.50**	**19.50**			**19.50**	**25.50**		
	PRLOS	**D**	**D**			**C**	**C**			**C**	**A**		
		D				**C**				**B**			

Appendix G:

TDM Checklists

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

Legend

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

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☑ Fronting street.
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑ Entrance fronting streets.
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑ Modern design.
	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)*	☑ Sidewalks available from buildings to bus stops on Hazeldean. Internal courtyard provides connectivity to municipal facilities.
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)*	☑ Refer to 1.2.1.

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3	Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks *(see Official Plan policy 4.3.10)*	☑ Refer to 1.2.1.
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)*	☑ Built to meet specs.
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)*	☑ Provided.
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑ Refer to 1.2.1.
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☑ Street lighting already exists on both boundary streets.
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	☑ Street lighting already exists.
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)	☑ Route maps and locations proposed at front entrance.

		TDM-supportive design & infrastructure measures: *Residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☑ Bike parking provided in secure parking in P1 and P2.
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)*	☑ Site exceeds minimum bike parking.
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)*	☑ Will meet by-law.
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	☑ Proposed rate of approximately 0.70/unit.
	2.2	**Secure bicycle parking**	
REQUIRED	2.2.1	Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers *(see Zoning By-law Section 111)*	☑ Will meet by-law.
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	☐ Proposed rate of approximately 0.70/unit.
	2.3	**Bicycle repair station**	
BETTER	2.3.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐
	3.	**TRANSIT**	
	3.1	**Customer amenities**	
BASIC	3.1.1	Provide shelters, lighting and benches at any on-site transit stops	☐ No 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	☐ Not applicable.
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ Not applicable.

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

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

Legend

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

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

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

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

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		3.	**TRANSIT**	
		3.1	**Transit information**	
BASIC		3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☑
BETTER		3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
		3.2	**Transit fare incentives**	
BASIC	★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☐
BETTER		3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☐
		3.3	**Enhanced public transit service**	
BETTER	★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☐ not applicable to this site
		3.4	**Private transit service**	
BETTER		3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐ not applicable to this site
		4.	**CARSHARING & BIKESHARING**	
		4.1	**Bikeshare stations & memberships**	
BETTER		4.1.1	Contract with provider to install on-site bikeshare station (*multi-family)*	☐
BETTER		4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
		4.2	**Carshare vehicles & memberships**	
BETTER		4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER		4.2.2	Provide residents with carshare memberships, either free or subsidized	☐
		5.	**PARKING**	
		5.1	**Priced parking**	
BASIC	★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐ not applicable
BASIC	★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☑

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

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	☑ Fronting street.
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☑ Entrance fronting streets.
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☑ Modern design.
	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)*	☑ Sidewalks available from buildings to bus stops on Hazeldean. Internal courtyard provides connectivity to municipal facilities.
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)*	☑ Refer to 1.2.1.

		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)*	☑ Refer to 1.2.1.
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)*	☑ Built to meet specs.
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)*	☑ Provided.
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☑ Refer to 1.2.1.
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☑ Street lighting already exists on both boundary roads.
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	☑ Street lighting already exists.
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)	☑ Route maps and locations proposed at front entrance.

		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)*	☑ Secure bike parking provided indoors in P1 and P2.
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)*	☑ Site exceeds minimum bike parking.
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)*	☑ Will meet by-law.
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	☑ By-law minimums exceeded.
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	☑ approximately 39% more bike parking than the minimum required by by-law.
	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)*	☑ Only 2 spaces required for commercial uses.
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	☐ No 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	☐ No on-site transit stops.
BETTER	3.1.3	Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	☐ No on-site transit stops.
	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	☐ very few employees anticipated.
	4.2	**Carpool parking**	
BASIC	4.2.1	Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	☐ very few employees anticipated.
BETTER	4.2.2	At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	☐ very few employees anticipated.
	5.	**CARSHARING & BIKESHARING**	
	5.1	**Carshare parking spaces**	
BETTER	5.1.1	Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces *(see Zoning By-law Section 94)*	☐
	5.2	**Bikeshare station location**	
BETTER	5.2.1	Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	6.	**PARKING**	
	6.1	**Number of parking spaces**	
REQUIRED	6.1.1	Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	☑ Rationale provided for less than minimum proposed.
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	☑ short term available at surface level. Underground long term parking available.
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)*	☑ Residential visitor proposed shared with commercial visitor parking.
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)	☑ short term available at surface level. Underground long term parking available..
	7.	**OTHER**	
	7.1	**On-site amenities to minimize off-site trips**	
BETTER	7.1.1	Provide on-site amenities to minimize mid-day or mid-commute errands	☐

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

Legend

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

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

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

		TDM measures: *Non-residential developments*	Check if proposed & add descriptions
		1. TDM PROGRAM MANAGEMENT	
		1.1 Program coordinator	
BASIC	*	1.1.1 Designate an internal coordinator, or contract with an external coordinator	☑
		1.2 Travel surveys	
BETTER		1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
		2. WALKING AND CYCLING	
		2.1 Information on walking/cycling routes & destinations	
BASIC		2.1.1 Display local area maps with walking/cycling access routes and key destinations at major entrances	☑
		2.2 Bicycle skills training	
		Commuter travel	
BETTER	*	2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses	☐
		2.3 Valet bike parking	
		Visitor travel	
BETTER		2.3.1 Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	☐ not applicable to this site

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

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

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

Appendix H:

Trip Gen Calculations Above Allowable Zoning

Time	Number of Units	Type of Unit	District
Peak Hour	396	High-Rise	Kanata - Stittsville

	AM peak			PM peak			AM peak	PM peak
	In	Out	Total	In	Out	Total	Mode Share	Mode Share
Auto Driver	20	45	65	50	36	86	43%	55%
Auto Passenger	12	27	39	17	13	30	26%	19%
Transit	15	33	48	21	15	36	28%	21%
Cycling	0	0	0	0	0	0	0%	0%
Pedestrian	2	5	8	5	4	8	4%	5%
Total	49	110	160	93	67	160	100%	100%

Appendix I:

MMLOS Analysis: Intersections

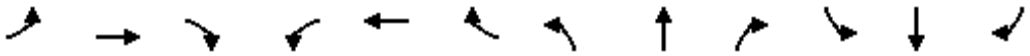
Multi-Modal Level of Service - Intersections Form

Project: 5872 Hazeldean
Consultant: Parsons
Date: Jul 17, 2025
Scenario: 479294

	Intersection Name	Victor/Hazeldean				Fringewood/Hazeldean				Huntmar/Hazeldean			
	OP Transect / Policy Area	Mainstreet Corridor (outside a Hub)				Mainstreet Corridor (outside a Hub)				Within 600m of a rapid transit station			
Pedestrian	PLOS Inputs												
	Pedestrians Crossing the	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg
	Number of Travel Lanes Crossed	1-3	1-3	5	5	1-3	1-3	6	5	6	5	7	6
	Median Refuge (≥2.7m)	No	No	No	No	No	No	No	No	No	No	No	No
	Crosswalk Treatment	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings	Std Transverse Markings
	Signal Cycle Length (sec)	120.0				120.0				120.0			
	Effective Walk Time (sec)	48.9	48.9	13.4	13.4	46.8	26.8	7.1	7.1	7.7	19.7	7.4	7.4
	Conflict with Right-Turn Vehicles (For PLOS & BLOS)	WBR	EBR	NBR	SBR	WBR	EBR	NBR	SBR	WBR	EBR	NBR	SBR
	Right-Turn Geometry	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Right-Turn With No Channel	Conventional Right-Turn Channel	Right-Turn With No Channel	Right-Turn With No Channel	Conventional Right-Turn Channel
	Right-Turn Signal Phasing	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive (with LPI/LBI)	Permissive (with LPI/LBI)	-	Permissive	Permissive	-
	Right-Turn Volume	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	≤ 150 veh/h	> 150 to 300 veh/h	> 150 to 300 veh/h	> 300 veh/h	> 300 veh/h
	Right-Turn Effective Corner Radius	> 8m	> 8m	> 8m	> 8m	> 8m	> 8m	> 8m	> 8m	-	> 8m	> 8m	-
	Cross-street Posted Speed (km/h)	40 km/h		60 km/h		40 km/h		60 km/h		60 km/h		60 km/h	
	Conflict with Left-Turn Vehicles (For PLOS & BLOS)	EBL	WBL	SBL	NBL	EBL	WBL	SBL	NBL	EBL	WBL	SBL	NBL
	Left-Turn Signal Phasing	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm	Perm or Prot+Perm (with LPI)	Perm or Prot+Perm (with LPI)	Fully Protected	Fully Protected	Perm or Prot+Perm	Perm or Prot+Perm
	Left-Turn Volume	> 50 to 100 veh/h	≤ 50 veh/h	≤ 50 veh/h	≤ 50 veh/h	≤ 50 veh/h	> 100 veh/h	≤ 50 veh/h	≤ 50 veh/h	-	-	> 100 veh/h	> 100 veh/h
	Left-Turn Opposing Lanes	≥ 2	-	-	-	-	-	-	-	-	-	-	-
	Score	4.25	4.45	2.80	2.80	4.45	4.10	2.35	2.95	1.90	2.50	0.95	1.55
	PLOS	B	B	C	C	B	B	D	C	D	C	E	D
		B				C				D			
	Target PLOS	B				B				A			
Bicycle	BLOS Inputs												
	Cycling Route Classification	Elsewhere				Elsewhere				Elsewhere			
	Cyclists Crossing the	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg
	Type of Cycling Facility Across Leg	Bike Lane Through Intersection	Bike Lane Through Intersection	Mixed Traffic	Mixed Traffic	Bike Lane Through Intersection	Bike Lane Through Intersection	Mixed Traffic	Mixed Traffic	Bike Lane Through Intersection	Bike Lane Through Intersection	Bike Lane Through Intersection	Bike Lane Through Intersection
	Two-Way ADT (in Cyclist Travel Direction)	26,000		2,100		26,000		1,100		26,000		17,000	
	Floating Bike Lane or Right-Turn Lane Crossover Approaching the Crossing?	No	No	No	No	No	No	No	No	Yes	No	Yes	Yes
	Crossride Operation	-	-	-	-	-	-	-	-	-	-	-	-
	Target Crossride Setback Met?	-	-	-	-	-	-	-	-	-	-	-	-
	Right-Turn Vehicle Volume from Adjacent Roadway > 100 veh/h?	-	-	-	-	-	-	-	-	-	-	-	-
	Cyclist Left-Turn Operation	WBL	EBL	NBL	SBL	WBL	EBL	NBL	SBL	WBL	EBL	NBL	SBL
	Cyclist Left-Turn Treatment Type	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane	General Purpose Through-Left or Single Left-Turn Lane
	Vehicle Lanes Crossed by Cyclists	Two or More Lanes Crossed	Two or More Lanes Crossed	One Lane Crossed	One Lane Crossed	Two or More Lanes Crossed	Two or More Lanes Crossed	No Lane Crossed	No Lane Crossed	Two or More Lanes Crossed	Two or More Lanes Crossed	Two or More Lanes Crossed	Two or More Lanes Crossed
	Score	25	65	40	40	65	25	60	60	25	35	-15	-15
	BLOS	E	C	D	D	C	E	D	D	E	D	F	F
		D				D				F			
	Target BLOS	C				C				B			
Transit	TLOS Inputs												
	Transit Facility	TP - Isolated Measures				TP - Isolated Measures				TP - Isolated Measures			
	Vehicles Travelling	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound
	Average Transit Delay (if available)			11-20 sec	21-35 sec		11-20 sec	≤ 10 sec	≤ 10 sec	56-80 sec	56-80 sec	56-80 sec	56-80 sec
	Example Transit Priority Treatment			-	-		-	-	-	-	-	-	-
	TLOS	-	-	B	C	-	B	A	A	E	E	E	E
		B				A				E			
	Target TLOS	C				C				C			
Auto	AutoLOS Inputs												
	Overall Intersection Volume to Capacity Ratio	0.71 to 0.80				0 to 0.60				0.91 to 1.00			
	Individual Movements V/C Ratios and Queue Lengths	See Separate Traffic Operations Table				See Separate Traffic Operations Table				See Separate Traffic Operations Table			
	AutoLOS	C				A				E			
	Target AutoLOS	E				E				E			

Appendix J:

Synchro Analysis: Existing Conditions



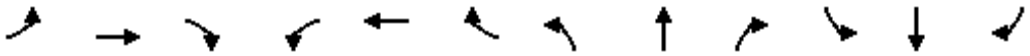
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	871	12	9	602	16	12	3	31	28	0	93
Future Volume (vph)	46	871	12	9	602	16	12	3	31	28	0	93
Satd. Flow (prot)	1695	3382	0	1695	3374	0	1695	1519	0	1695	1492	0
Flt Permitted	0.332			0.203			0.690			0.733		
Satd. Flow (perm)	591	3382	0	362	3374	0	1227	1519	0	1306	1492	0
Satd. Flow (RTOR)		2			3			34			306	
Lane Group Flow (vph)	51	981	0	10	687	0	13	37	0	31	103	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	11.1	27.1		11.1	27.1		30.6	30.6		30.6	30.6	
Total Split (s)	15.0	63.0		15.0	63.0		37.0	37.0		37.0	37.0	
Total Split (%)	13.0%	54.8%		13.0%	54.8%		32.2%	32.2%		32.2%	32.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.4	2.4		2.4	2.4		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	83.4	56.9		83.4	56.9		12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.73	0.49		0.73	0.49		0.11	0.11		0.11	0.11	
v/c Ratio	0.07	0.59		0.02	0.41		0.10	0.19		0.21	0.24	
Control Delay	4.3	22.4		4.4	19.3		44.3	17.2		47.8	1.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.3	22.4		4.4	19.3		44.3	17.2		47.8	1.3	
LOS	A	C		A	B		D	B		D	A	
Approach Delay		21.5			19.1			24.3			12.0	
Approach LOS		C			B			C			B	
Queue Length 50th (m)	1.9	79.8		0.4	49.6		2.8	0.6		6.7	0.0	
Queue Length 95th (m)	7.3	99.6		2.3	63.9		7.6	9.3		14.1	0.0	
Internal Link Dist (m)		472.7			114.0			393.1			258.4	
Turn Bay Length (m)	75.0			55.0			30.0			40.0		
Base Capacity (vph)	683	1674		569	1670		324	426		345	619	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.59		0.02	0.41		0.04	0.09		0.09	0.17	

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 105 (91%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 20.0	Intersection LOS: C
Intersection Capacity Utilization 55.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	906	20	24	643	4	22	0	68	2	0	6
Future Volume (vph)	6	906	20	24	643	4	22	0	68	2	0	6
Satd. Flow (prot)	1695	3377	0	1695	3386	0	0	1581	0	0	1579	0
Flt Permitted	0.379			0.221				0.915			0.933	
Satd. Flow (perm)	674	3377	0	394	3386	0	0	1464	0	0	1490	0
Satd. Flow (RTOR)		2			1			107			107	
Lane Group Flow (vph)	7	1029	0	27	718	0	0	100	0	0	9	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	38.2	38.2		11.1	38.2		36.9	36.9		36.9	36.9	
Total Split (s)	58.0	58.0		15.0	73.0		37.0	37.0		37.0	37.0	
Total Split (%)	50.4%	50.4%		13.0%	63.5%		32.2%	32.2%		32.2%	32.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.4	2.5		3.9	3.9		3.9	3.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.2	6.2		6.1	6.2			6.9			6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	79.4	79.4		87.0	86.9			14.0			14.0	
Actuated g/C Ratio	0.69	0.69		0.76	0.76			0.12			0.12	
v/c Ratio	0.02	0.44		0.07	0.28			0.37			0.03	
Control Delay	11.8	11.3		6.3	5.9			10.2			0.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	11.8	11.3		6.3	5.9			10.2			0.2	
LOS	B	B		A	A			B			A	
Approach Delay		11.3			5.9			10.2			0.3	
Approach LOS		B			A			B			A	
Queue Length 50th (m)	0.4	47.6		1.0	17.3			0.0			0.0	
Queue Length 95th (m)	3.4	113.3		6.3	54.6			11.5			0.0	
Internal Link Dist (m)		192.6			229.2			250.3			159.7	
Turn Bay Length (m)	50.0			100.0								
Base Capacity (vph)	465	2332		398	2559			462			468	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.02	0.44		0.07	0.28			0.22			0.02	

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 52 (45%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

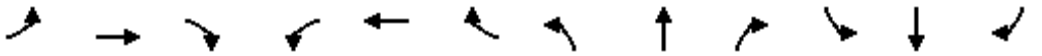
Lane Group	Ø3	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	4%	4%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 9.1	Intersection LOS: A
Intersection Capacity Utilization 46.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Fringewood & Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	297	535	136	196	389	62	121	340	178	92	279	193
Future Volume (vph)	297	535	136	196	389	62	121	340	178	92	279	193
Satd. Flow (prot)	3288	3277	0	3288	3390	1517	1695	1784	1517	1695	1784	1517
Flt Permitted	0.950			0.950			0.329			0.219		
Satd. Flow (perm)	3263	3277	0	3284	3390	1485	586	1784	1488	390	1784	1488
Satd. Flow (RTOR)		29				210			207			214
Lane Group Flow (vph)	330	745	0	218	432	69	134	378	198	102	310	214
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5 9	2		1	6		3	8		7	4	
Permitted Phases						6	8		8	4		4
Detector Phase	5 9	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)		10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)		36.3		11.5	36.3	36.3	11.3	39.6	39.6	11.5	39.6	39.6
Total Split (s)		49.0		16.0	37.0	37.0	15.0	40.0	40.0	15.0	40.0	40.0
Total Split (%)		40.8%		13.3%	30.8%	30.8%	12.5%	33.3%	33.3%	12.5%	33.3%	33.3%
Yellow Time (s)		3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)		2.6		2.8	2.6	2.6	2.6	2.9	2.9	2.8	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3		6.5	6.3	6.3	6.3	6.6	6.6	6.5	6.6	6.6
Lead/Lag		Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?		Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode		C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	15.7	45.8		10.8	34.3	34.3	38.2	29.3	29.3	37.5	29.2	29.2
Actuated g/C Ratio	0.13	0.38		0.09	0.29	0.29	0.32	0.24	0.24	0.31	0.24	0.24
v/c Ratio	0.77	0.59		0.74	0.45	0.12	0.50	0.87	0.38	0.49	0.72	0.41
Control Delay	39.9	31.4		69.1	37.9	0.4	32.3	63.4	6.2	32.5	50.9	6.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	31.4		69.1	37.9	0.4	32.3	63.4	6.2	32.5	50.9	6.9
LOS	D	C		E	D	A	C	E	A	C	D	A
Approach Delay		34.0			43.8			41.6			32.9	
Approach LOS		C			D			D			C	
Queue Length 50th (m)	21.0	73.2		25.8	45.8	0.0	20.9	84.2	0.0	15.6	65.9	0.0
Queue Length 95th (m)	#40.4	93.6		#46.9	61.6	0.0	33.8	#118.1	15.5	26.8	94.1	17.7
Internal Link Dist (m)		229.2			333.5			339.0			251.9	
Turn Bay Length (m)	95.0			125.0		240.0	65.0		80.0	85.0		
Base Capacity (vph)	433	1267		295	969	574	267	496	563	214	496	568
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.59		0.74	0.45	0.12	0.50	0.76	0.35	0.48	0.63	0.38

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 62 (52%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Lane Group	Ø5	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	5	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	11.5	11.5
Total Split (s)	16.0	12.0
Total Split (%)	13%	10%
Yellow Time (s)	3.7	3.7
All-Red Time (s)	2.8	2.8
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

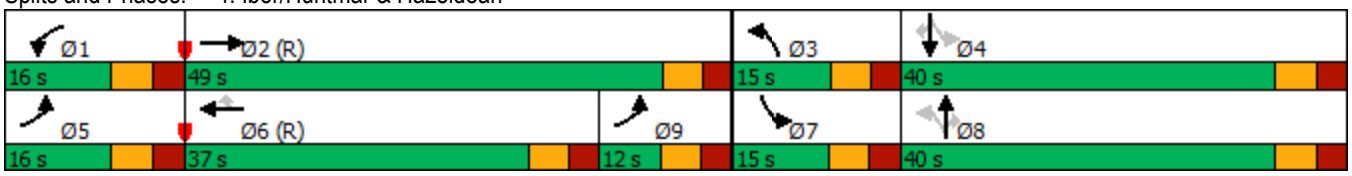
Intersection Summary

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 37.7	Intersection LOS: D
Intersection Capacity Utilization 80.9%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 4: Iber/Huntmar & Hazeldean



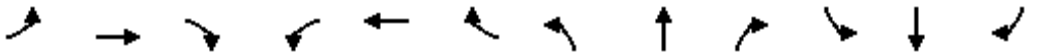
Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	925	5	9	630	3	24
Future Vol, veh/h	925	5	9	630	3	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	15	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1028	6	10	700	3	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1034	0	1401	517
Stage 1	-	-	-	-	1031	-
Stage 2	-	-	-	-	370	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	668	-	131	503
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	669	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	668	-	129	503
Mov Cap-2 Maneuver	-	-	-	-	238	-
Stage 1	-	-	-	-	305	-
Stage 2	-	-	-	-	659	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	13.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	448	-	-	668	-
HCM Lane V/C Ratio	0.067	-	-	0.015	-
HCM Control Delay (s)	13.6	-	-	10.5	-
HCM Lane LOS	B	-	-	B	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-



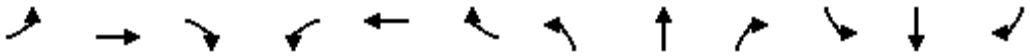
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	977	25	30	1142	51	16	1	17	35	4	87
Future Volume (vph)	88	977	25	30	1142	51	16	1	17	35	4	87
Satd. Flow (prot)	1695	3375	0	1695	3367	0	1695	1529	0	1695	1497	0
Flt Permitted	0.108			0.168			0.692			0.744		
Satd. Flow (perm)	193	3375	0	300	3367	0	1225	1529	0	1328	1497	0
Satd. Flow (RTOR)		3			6			19			97	
Lane Group Flow (vph)	98	1114	0	33	1326	0	18	20	0	39	101	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	11.1	27.1		11.1	27.1		30.6	30.6		30.6	30.6	
Total Split (s)	14.0	69.0		14.0	69.0		37.0	37.0		37.0	37.0	
Total Split (%)	11.7%	57.5%		11.7%	57.5%		30.8%	30.8%		30.8%	30.8%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.4	2.4		2.4	2.4		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	88.3	62.9		88.3	62.9		12.9	12.9		12.9	12.9	
Actuated g/C Ratio	0.74	0.52		0.74	0.52		0.11	0.11		0.11	0.11	
v/c Ratio	0.21	0.63		0.06	0.75		0.14	0.11		0.27	0.41	
Control Delay	5.3	22.2		4.2	25.7		48.0	19.3		52.1	14.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	5.3	22.2		4.2	25.7		48.0	19.3		52.1	14.7	
LOS	A	C		A	C		D	B		D	B	
Approach Delay		20.8			25.1			32.9			25.1	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	3.7	94.2		1.2	123.5		4.0	0.2		8.8	0.9	
Queue Length 95th (m)	12.1	115.9		5.2	150.9		9.9	6.8		17.5	15.2	
Internal Link Dist (m)		472.7			114.0			393.1			258.4	
Turn Bay Length (m)	75.0			55.0			30.0			40.0		
Base Capacity (vph)	459	1770		515	1767		310	401		336	451	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.21	0.63		0.06	0.75		0.06	0.05		0.12	0.22	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 88 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 23.4	Intersection LOS: C
Intersection Capacity Utilization 66.6%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	965	33	85	1213	0	33	0	48	5	0	0
Future Volume (vph)	2	965	33	85	1213	0	33	0	48	5	0	0
Satd. Flow (prot)	1695	3371	0	1695	3390	0	0	1592	0	0	1695	0
Flt Permitted	0.202			0.193				0.864			0.706	
Satd. Flow (perm)	360	3371	0	344	3390	0	0	1403	0	0	1253	0
Satd. Flow (RTOR)		4						103				
Lane Group Flow (vph)	2	1109	0	94	1348	0	0	90	0	0	6	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	38.2	38.2		11.1	38.2		36.9	36.9		36.9	36.9	
Total Split (s)	58.0	58.0		20.0	78.0		37.0	37.0		37.0	37.0	
Total Split (%)	48.3%	48.3%		16.7%	65.0%		30.8%	30.8%		30.8%	30.8%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.4	2.5		3.9	3.9		3.9	3.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.2	6.2		6.1	6.2			6.9			6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	78.5	78.5		92.0	91.9			14.0			14.0	
Actuated g/C Ratio	0.65	0.65		0.77	0.77			0.12			0.12	
v/c Ratio	0.01	0.50		0.27	0.52			0.35			0.04	
Control Delay	13.0	13.7		5.8	5.5			9.6			42.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	13.0	13.7		5.8	5.5			9.6			42.4	
LOS	B	B		A	A			A			D	
Approach Delay		13.7			5.5			9.6			42.4	
Approach LOS		B			A			A			D	
Queue Length 50th (m)	0.1	54.8		2.8	26.1			0.0			1.3	
Queue Length 95th (m)	1.8	132.1		m7.7	m58.4			10.2			4.5	
Internal Link Dist (m)		192.6			229.2			250.3			159.7	
Turn Bay Length (m)	50.0			100.0								
Base Capacity (vph)	235	2205		420	2596			429			314	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.01	0.50		0.22	0.52			0.21			0.02	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 35 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Lane Group	Ø3	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	4%	4%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

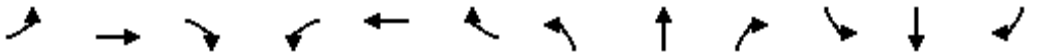
Intersection Summary

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 3: Fringewood & Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	257	590	131	301	802	155	161	420	298	139	422	304
Future Volume (vph)	257	590	131	301	802	155	161	420	298	139	422	304
Satd. Flow (prot)	3288	3283	0	3288	3390	1517	1695	1784	1517	1695	1784	1517
Flt Permitted	0.950			0.950			0.150			0.152		
Satd. Flow (perm)	3268	3283	0	3273	3390	1474	266	1784	1463	270	1784	1471
Satd. Flow (RTOR)		22				172			331			319
Lane Group Flow (vph)	286	802	0	334	891	172	179	467	331	154	469	338
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6	8		8	4		4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.5	36.3		11.5	36.3	36.3	11.3	39.6	39.6	11.5	39.6	39.6
Total Split (s)	22.0	41.0		22.0	41.0	41.0	15.0	42.0	42.0	15.0	42.0	42.0
Total Split (%)	18.3%	34.2%		18.3%	34.2%	34.2%	12.5%	35.0%	35.0%	12.5%	35.0%	35.0%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	2.6		2.8	2.6	2.6	2.6	2.9	2.9	2.8	2.9	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.3		6.5	6.3	6.3	6.3	6.6	6.6	6.5	6.6	6.6
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	14.4	36.5		15.1	37.2	37.2	43.0	34.0	34.0	42.6	34.0	34.0
Actuated g/C Ratio	0.12	0.30		0.13	0.31	0.31	0.36	0.28	0.28	0.36	0.28	0.28
v/c Ratio	0.73	0.79		0.81	0.85	0.30	0.90	0.92	0.51	0.79	0.93	0.52
Control Delay	78.5	40.9		67.1	48.4	6.2	69.6	66.9	6.4	52.0	67.5	7.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.5	40.9		67.1	48.4	6.2	69.6	66.9	6.4	52.0	67.5	7.7
LOS	E	D		E	D	A	E	E	A	D	E	A
Approach Delay		50.8			47.7			46.9			44.0	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	33.8	90.8		39.8	106.5	0.0	26.7	105.0	0.0	22.7	105.6	3.2
Queue Length 95th (m)	51.1	83.3		#59.7	#142.8	15.9	#63.3	#163.1	21.4	#47.7	#164.1	26.7
Internal Link Dist (m)		229.2			333.5			339.0			251.9	
Turn Bay Length (m)	95.0			125.0		240.0	65.0		80.0	85.0		
Base Capacity (vph)	424	1013		425	1051	575	199	526	664	196	526	658
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.79		0.79	0.85	0.30	0.90	0.89	0.50	0.79	0.89	0.51

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 47.5	Intersection LOS: D
Intersection Capacity Utilization 89.7%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 4: Iber/Huntmar & Hazeldean

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1018	13	26	1221	4	26
Future Vol, veh/h	1018	13	26	1221	4	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	15	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1131	14	29	1357	4	29

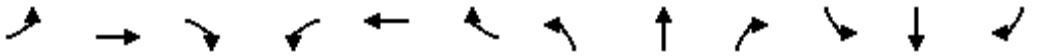
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1145	0	1875	573
Stage 1	-	-	-	-	1138	-
Stage 2	-	-	-	-	737	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	606	-	63	463
Stage 1	-	-	-	-	268	-
Stage 2	-	-	-	-	434	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	606	-	60	463
Mov Cap-2 Maneuver	-	-	-	-	174	-
Stage 1	-	-	-	-	268	-
Stage 2	-	-	-	-	413	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	15.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	379	-	-	606	-
HCM Lane V/C Ratio	0.088	-	-	0.048	-
HCM Control Delay (s)	15.4	-	-	11.2	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Appendix K:

Synchro Analysis: Background Conditions 2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	1040	12	9	726	16	12	3	31	28	0	93
Future Volume (vph)	46	1040	12	9	726	16	12	3	31	28	0	93
Satd. Flow (prot)	1695	3383	0	1695	3378	0	1695	1521	0	1695	1492	0
Flt Permitted	0.305			0.178			0.697			0.735		
Satd. Flow (perm)	543	3383	0	318	3378	0	1239	1521	0	1310	1492	0
Satd. Flow (RTOR)		1			3			31			283	
Lane Group Flow (vph)	46	1052	0	9	742	0	12	34	0	28	93	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	11.1	27.1		11.1	27.1		30.6	30.6		30.6	30.6	
Total Split (s)	15.0	63.0		15.0	63.0		37.0	37.0		37.0	37.0	
Total Split (%)	13.0%	54.8%		13.0%	54.8%		32.2%	32.2%		32.2%	32.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.4	2.4		2.4	2.4		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	83.4	56.9		83.4	56.9		12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.73	0.49		0.73	0.49		0.11	0.11		0.11	0.11	
v/c Ratio	0.07	0.63		0.02	0.44		0.09	0.17		0.19	0.22	
Control Delay	4.3	23.4		1.0	15.3		44.0	17.6		47.2	1.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.3	23.4		1.0	15.3		44.0	17.6		47.2	1.2	
LOS	A	C		A	B		D	B		D	A	
Approach Delay		22.6			15.1			24.5			11.9	
Approach LOS		C			B			C			B	
Queue Length 50th (m)	1.7	88.2		0.1	56.0		2.5	0.6		6.0	0.0	
Queue Length 95th (m)	6.7	109.8		m0.2	72.6		7.4	8.9		13.1	0.0	
Internal Link Dist (m)		472.7			114.0			393.1			258.4	
Turn Bay Length (m)	75.0			55.0			30.0			40.0		
Base Capacity (vph)	659	1674		548	1672		327	424		346	602	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.63		0.02	0.44		0.04	0.08		0.08	0.15	

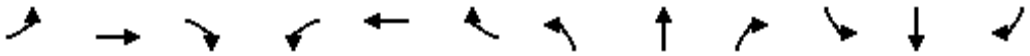
Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 105 (91%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 19.2	Intersection LOS: B
Intersection Capacity Utilization 60.0%	ICU Level of Service B
Analysis Period (min) 15	

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

Splits and Phases: 1: Victor & Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	1069	22	33	757	29	27	0	87	35	0	14
Future Volume (vph)	13	1069	22	33	757	29	27	0	87	35	0	14
Satd. Flow (prot)	1695	3378	0	1695	3366	0	0	1581	0	0	1656	0
Flt Permitted	0.354			0.202				0.904			0.676	
Satd. Flow (perm)	629	3378	0	360	3366	0	0	1447	0	0	1159	0
Satd. Flow (RTOR)		2			6			107			107	
Lane Group Flow (vph)	13	1091	0	33	786	0	0	114	0	0	49	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	38.2	38.2		11.1	38.2		36.9	36.9		36.9	36.9	
Total Split (s)	58.0	58.0		15.0	73.0		37.0	37.0		37.0	37.0	
Total Split (%)	50.4%	50.4%		13.0%	63.5%		32.2%	32.2%		32.2%	32.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.4	2.5		3.9	3.9		3.9	3.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.2	6.2		6.1	6.2			6.9			6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	79.3	79.3		87.0	86.9			14.0			14.0	
Actuated g/C Ratio	0.69	0.69		0.76	0.76			0.12			0.12	
v/c Ratio	0.03	0.47		0.10	0.31			0.42			0.21	
Control Delay	2.2	3.0		6.4	6.1			13.6			2.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	2.2	3.0		6.4	6.1			13.6			2.0	
LOS	A	A		A	A			B			A	
Approach Delay		3.0			6.1			13.6			2.0	
Approach LOS		A			A			B			A	
Queue Length 50th (m)	0.1	5.7		1.2	19.3			1.5			0.0	
Queue Length 95th (m)	m0.4	22.4		7.1	60.6			14.9			0.0	
Internal Link Dist (m)		192.6			229.2			250.3			159.7	
Turn Bay Length (m)	50.0			100.0								
Base Capacity (vph)	433	2330		375	2545			457			382	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.03	0.47		0.09	0.31			0.25			0.13	

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 52 (45%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Lane Group	Ø3	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	4%	4%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

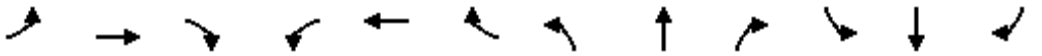
Intersection Summary

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 4.8	Intersection LOS: A
Intersection Capacity Utilization 51.2%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 3: Fringewood & Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	360	697	156	196	493	62	130	368	178	92	302	214
Future Volume (vph)	360	697	156	196	493	62	130	368	178	92	302	214
Satd. Flow (prot)	3288	3289	0	3288	3390	1517	1695	1784	1517	1695	1784	1517
Flt Permitted	0.950			0.950			0.335			0.227		
Satd. Flow (perm)	3265	3289	0	3284	3390	1485	597	1784	1488	404	1784	1488
Satd. Flow (RTOR)		25				210			207			214
Lane Group Flow (vph)	360	853	0	196	493	62	130	368	178	92	302	214
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5 9	2		1	6		3	8		7	4	
Permitted Phases						6	8		8	4		4
Detector Phase	5 9	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)		10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)		36.3		11.5	36.3	36.3	11.3	39.6	39.6	11.5	39.6	39.6
Total Split (s)		49.0		16.0	37.0	37.0	15.0	40.0	40.0	15.0	40.0	40.0
Total Split (%)		40.8%		13.3%	30.8%	30.8%	12.5%	33.3%	33.3%	12.5%	33.3%	33.3%
Yellow Time (s)		3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)		2.6		2.8	2.6	2.6	2.6	2.9	2.9	2.8	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3		6.5	6.3	6.3	6.3	6.6	6.6	6.5	6.6	6.6
Lead/Lag		Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?		Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode		C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	16.4	46.6		10.5	34.2	34.2	37.7	28.8	28.8	36.9	28.6	28.6
Actuated g/C Ratio	0.14	0.39		0.09	0.28	0.28	0.31	0.24	0.24	0.31	0.24	0.24
v/c Ratio	0.80	0.66		0.68	0.51	0.11	0.49	0.86	0.35	0.44	0.71	0.41
Control Delay	42.8	33.2		66.1	39.1	0.4	32.0	63.0	4.6	31.1	51.0	7.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	33.2		66.1	39.1	0.4	32.0	63.0	4.6	31.1	51.0	7.0
LOS	D	C		E	D	A	C	E	A	C	D	A
Approach Delay		36.0			43.0			41.6			32.5	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	22.8	87.9		22.9	53.3	0.0	20.5	82.4	0.0	14.2	64.6	0.0
Queue Length 95th (m)	#48.6	111.4		#40.3	70.8	0.0	33.1	114.1	10.8	24.5	91.4	17.7
Internal Link Dist (m)		229.2			333.5			339.0			251.9	
Turn Bay Length (m)	95.0			125.0		240.0	65.0		80.0	85.0		
Base Capacity (vph)	448	1293		288	967	573	267	496	563	216	496	568
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.66		0.68	0.51	0.11	0.49	0.74	0.32	0.43	0.61	0.38

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 62 (52%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Lane Group	Ø5	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	5	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	11.5	11.5
Total Split (s)	16.0	12.0
Total Split (%)	13%	10%
Yellow Time (s)	3.7	3.7
All-Red Time (s)	2.8	2.8
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

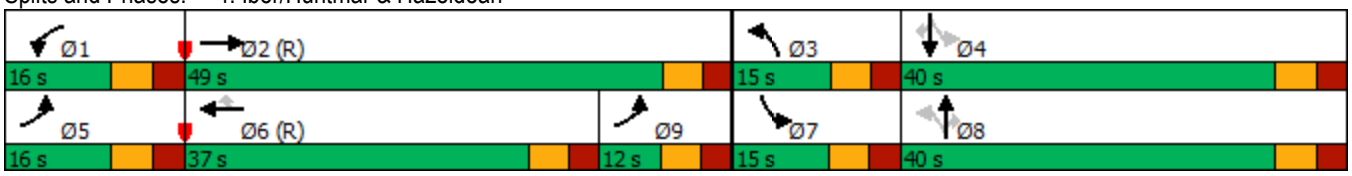
Intersection Summary

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 38.1	Intersection LOS: D
Intersection Capacity Utilization 84.1%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 4: Iber/Huntmar & Hazeldean



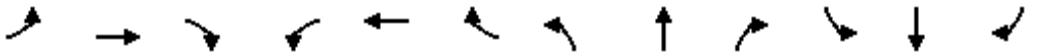
Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1099	5	9	756	3	24
Future Vol, veh/h	1099	5	9	756	3	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	15	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1099	5	9	756	3	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1104	0	1498	552
Stage 1	-	-	-	-	1102	-
Stage 2	-	-	-	-	396	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	628	-	113	477
Stage 1	-	-	-	-	280	-
Stage 2	-	-	-	-	649	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	628	-	111	477
Mov Cap-2 Maneuver	-	-	-	-	218	-
Stage 1	-	-	-	-	280	-
Stage 2	-	-	-	-	640	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	14.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	421	-	-	628	-
HCM Lane V/C Ratio	0.064	-	-	0.014	-
HCM Control Delay (s)	14.1	-	-	10.8	-
HCM Lane LOS	B	-	-	B	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	1202	25	30	1352	51	16	1	17	35	4	87
Future Volume (vph)	88	1202	25	30	1352	51	16	1	17	35	4	87
Satd. Flow (prot)	1695	3379	0	1695	3370	0	1695	1531	0	1695	1499	0
Flt Permitted	0.089			0.135			0.698			0.746		
Satd. Flow (perm)	159	3379	0	241	3370	0	1236	1531	0	1331	1499	0
Satd. Flow (RTOR)		3			5			17			87	
Lane Group Flow (vph)	88	1227	0	30	1403	0	16	18	0	35	91	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	11.1	27.1		11.1	27.1		30.6	30.6		30.6	30.6	
Total Split (s)	14.0	69.0		14.0	69.0		37.0	37.0		37.0	37.0	
Total Split (%)	11.7%	57.5%		11.7%	57.5%		30.8%	30.8%		30.8%	30.8%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.4	2.4		2.4	2.4		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	88.4	62.9		88.4	62.9		12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.74	0.52		0.74	0.52		0.11	0.11		0.11	0.11	
v/c Ratio	0.20	0.69		0.06	0.79		0.12	0.10		0.25	0.38	
Control Delay	6.4	23.9		1.0	13.9		47.7	20.0		51.4	14.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.4	23.9		1.0	13.9		47.7	20.0		51.4	14.9	
LOS	A	C		A	B		D	B		D	B	
Approach Delay		22.7			13.6			33.0			25.0	
Approach LOS		C			B			C			C	
Queue Length 50th (m)	3.3	109.1		0.2	55.3		3.6	0.2		7.9	0.9	
Queue Length 95th (m)	12.6	133.6		m0.3	88.2		9.3	6.4		16.0	14.4	
Internal Link Dist (m)		472.7			114.0			393.1			258.4	
Turn Bay Length (m)	75.0			55.0			30.0			40.0		
Base Capacity (vph)	443	1772		486	1768		313	400		337	444	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.20	0.69		0.06	0.79		0.05	0.04		0.10	0.20	

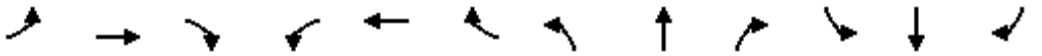
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 88 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 18.4	Intersection LOS: B
Intersection Capacity Utilization 72.7%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 1: Victor & Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1174	39	108	1415	37	37	0	65	45	0	10
Future Volume (vph)	11	1174	39	108	1415	37	37	0	65	45	0	10
Satd. Flow (prot)	1695	3371	0	1695	3374	0	0	1583	0	0	1667	0
Flt Permitted	0.179			0.164				0.857			0.682	
Satd. Flow (perm)	319	3371	0	293	3374	0	0	1381	0	0	1178	0
Satd. Flow (RTOR)		3			4			103			103	
Lane Group Flow (vph)	11	1213	0	108	1452	0	0	102	0	0	55	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	38.2	38.2		11.1	38.2		36.9	36.9		36.9	36.9	
Total Split (s)	58.0	58.0		20.0	78.0		37.0	37.0		37.0	37.0	
Total Split (%)	48.3%	48.3%		16.7%	65.0%		30.8%	30.8%		30.8%	30.8%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.4	2.5		3.9	3.9		3.9	3.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.2	6.2		6.1	6.2			6.9			6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	77.6	77.6		92.0	91.9			14.0			14.0	
Actuated g/C Ratio	0.65	0.65		0.77	0.77			0.12			0.12	
v/c Ratio	0.05	0.56		0.34	0.56			0.40			0.24	
Control Delay	3.2	4.6		10.5	7.3			12.5			3.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	3.2	4.6		10.5	7.3			12.5			3.0	
LOS	A	A		B	A			B			A	
Approach Delay		4.6			7.5			12.5			3.0	
Approach LOS		A			A			B			A	
Queue Length 50th (m)	0.1	7.3		2.9	31.9			0.0			0.0	
Queue Length 95th (m)	m0.4	157.8		m8.4	m67.8			13.3			1.3	
Internal Link Dist (m)		192.6			229.2			250.3			159.7	
Turn Bay Length (m)	50.0			100.0								
Base Capacity (vph)	206	2181		387	2585			423			372	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.05	0.56		0.28	0.56			0.24			0.15	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 35 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Lane Group	Ø3	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	4%	4%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

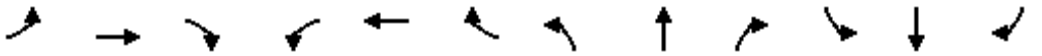
Intersection Summary

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 6.4	Intersection LOS: A
Intersection Capacity Utilization 77.8%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 3: Fringewood & Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	304	795	144	301	1001	155	183	455	298	139	457	370
Future Volume (vph)	304	795	144	301	1001	155	183	455	298	139	457	370
Satd. Flow (prot)	3288	3299	0	3288	3390	1517	1695	1784	1517	1695	1784	1517
Flt Permitted	0.950			0.950			0.160			0.165		
Satd. Flow (perm)	3270	3299	0	3276	3390	1474	284	1784	1463	293	1784	1471
Satd. Flow (RTOR)		17				155			298			315
Lane Group Flow (vph)	304	939	0	301	1001	155	183	455	298	139	457	370
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6	8		8	4		4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.5	36.3		11.5	36.3	36.3	11.3	39.6	39.6	11.5	39.6	39.6
Total Split (s)	22.0	41.0		22.0	41.0	41.0	15.0	42.0	42.0	15.0	42.0	42.0
Total Split (%)	18.3%	34.2%		18.3%	34.2%	34.2%	12.5%	35.0%	35.0%	12.5%	35.0%	35.0%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	2.6		2.8	2.6	2.6	2.6	2.9	2.9	2.8	2.9	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.3		6.5	6.3	6.3	6.3	6.6	6.6	6.5	6.6	6.6
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	14.6	37.5		14.5	37.4	37.4	42.6	33.6	33.6	42.1	33.6	33.6
Actuated g/C Ratio	0.12	0.31		0.12	0.31	0.31	0.36	0.28	0.28	0.35	0.28	0.28
v/c Ratio	0.76	0.90		0.76	0.95	0.27	0.90	0.91	0.48	0.69	0.92	0.58
Control Delay	72.8	49.9		63.7	58.7	6.3	69.7	65.1	6.4	42.5	66.2	10.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.8	49.9		63.7	58.7	6.3	69.7	65.1	6.4	42.5	66.2	10.4
LOS	E	D		E	E	A	E	E	A	D	E	B
Approach Delay		55.5			54.2			47.3			41.4	
Approach LOS		E			D			D			D	
Queue Length 50th (m)	37.6	64.6		35.5	~131.7	0.0	27.4	101.4	0.0	20.3	102.0	9.5
Queue Length 95th (m)	54.0	#150.8		50.3	#172.0	15.1	#62.1	#156.3	20.4	#35.7	#157.7	37.3
Internal Link Dist (m)		229.2			333.5			339.0			251.9	
Turn Bay Length (m)	95.0			125.0		240.0	65.0		80.0	85.0		
Base Capacity (vph)	424	1042		424	1057	566	203	526	641	202	526	656
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.90		0.71	0.95	0.27	0.90	0.87	0.46	0.69	0.87	0.56

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

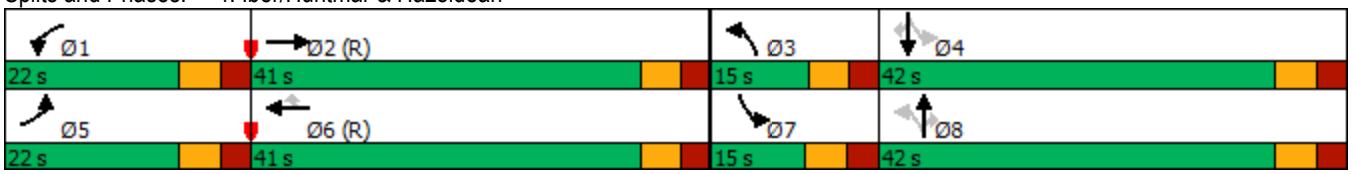
Maximum v/c Ratio: 0.95

Intersection Signal Delay: 50.5	Intersection LOS: D
Intersection Capacity Utilization 96.6%	ICU Level of Service F
Analysis Period (min) 15	

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

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

Splits and Phases: 4: Iber/Huntmar & Hazeldean



Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1246	13	26	1437	4	26
Future Vol, veh/h	1246	13	26	1437	4	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	15	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1246	13	26	1437	4	26

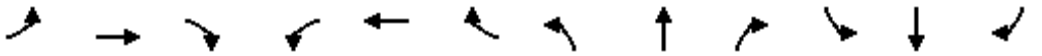
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1259	0	2024	630
Stage 1	-	-	-	-	1253	-
Stage 2	-	-	-	-	771	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	548	-	50	424
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	417	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	548	-	48	424
Mov Cap-2 Maneuver	-	-	-	-	154	-
Stage 1	-	-	-	-	232	-
Stage 2	-	-	-	-	397	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	16.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	344	-	-	548	-
HCM Lane V/C Ratio	0.087	-	-	0.047	-
HCM Control Delay (s)	16.5	-	-	11.9	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-

Appendix L:

Synchro Analysis: Full Buildout Conditions 2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	1042	12	9	731	16	12	3	31	28	0	93
Future Volume (vph)	46	1042	12	9	731	16	12	3	31	28	0	93
Satd. Flow (prot)	1695	3383	0	1695	3378	0	1695	1444	0	1695	1492	0
Flt Permitted	0.303			0.177			0.697			0.735		
Satd. Flow (perm)	540	3383	0	316	3378	0	1239	1444	0	1240	1492	0
Satd. Flow (RTOR)		1			3			31			281	
Lane Group Flow (vph)	46	1054	0	9	747	0	12	34	0	28	93	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	11.1	27.1		11.1	27.1		30.6	30.6		30.6	30.6	
Total Split (s)	15.0	63.0		15.0	63.0		37.0	37.0		37.0	37.0	
Total Split (%)	13.0%	54.8%		13.0%	54.8%		32.2%	32.2%		32.2%	32.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.4	2.4		2.4	2.4		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	77.8	56.9		77.8	56.9		18.4	18.4		18.4	18.4	
Actuated g/C Ratio	0.68	0.49		0.68	0.49		0.16	0.16		0.16	0.16	
v/c Ratio	0.08	0.63		0.02	0.45		0.06	0.13		0.14	0.20	
Control Delay	6.2	23.4		2.4	15.3		37.8	15.2		39.9	0.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	6.2	23.4		2.4	15.3		37.8	15.2		39.9	0.9	
LOS	A	C		A	B		D	B		D	A	
Approach Delay		22.7			15.1			21.1			10.0	
Approach LOS		C			B			C			A	
Queue Length 50th (m)	3.1	88.5		0.6	56.5		2.2	0.5		5.2	0.0	
Queue Length 95th (m)	6.7	110.1		m0.1	72.8		7.4	8.9		13.1	0.0	
Internal Link Dist (m)		472.7			114.0			393.1			258.4	
Turn Bay Length (m)	75.0			55.0			30.0			40.0		
Base Capacity (vph)	575	1674		464	1672		327	404		327	601	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.08	0.63		0.02	0.45		0.04	0.08		0.09	0.15	

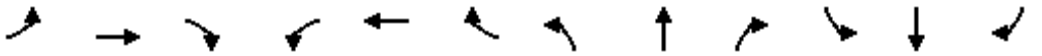
Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 105 (91%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 19.1	Intersection LOS: B
Intersection Capacity Utilization 67.6%	ICU Level of Service C
Analysis Period (min) 15	

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

Splits and Phases: 1: Victor & Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	1116	22	33	778	29	27	0	87	35	0	14
Future Volume (vph)	13	1116	22	33	778	29	27	0	87	35	0	14
Satd. Flow (prot)	1695	3378	0	1695	3369	0	0	1581	0	0	1656	0
Flt Permitted	0.347			0.189				0.904			0.676	
Satd. Flow (perm)	617	3378	0	337	3369	0	0	1447	0	0	1159	0
Satd. Flow (RTOR)		2			5			107			107	
Lane Group Flow (vph)	13	1138	0	33	807	0	0	114	0	0	49	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	38.2	38.2		11.1	38.2		36.9	36.9		36.9	36.9	
Total Split (s)	58.0	58.0		15.0	73.0		37.0	37.0		37.0	37.0	
Total Split (%)	50.4%	50.4%		13.0%	63.5%		32.2%	32.2%		32.2%	32.2%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.4	2.5		3.9	3.9		3.9	3.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.2	6.2		6.1	6.2			6.9			6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	79.3	79.3		87.0	86.9			14.0			14.0	
Actuated g/C Ratio	0.69	0.69		0.76	0.76			0.12			0.12	
v/c Ratio	0.03	0.49		0.10	0.32			0.42			0.21	
Control Delay	2.7	3.5		6.4	6.1			13.6			2.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	2.7	3.5		6.4	6.1			13.6			2.0	
LOS	A	A		A	A			B			A	
Approach Delay		3.5			6.2			13.6			2.0	
Approach LOS		A			A			B			A	
Queue Length 50th (m)	0.1	7.3		1.2	20.0			1.5			0.0	
Queue Length 95th (m)	m0.4	70.8		7.1	62.4			14.9			0.0	
Internal Link Dist (m)		192.6			229.2			250.3			159.7	
Turn Bay Length (m)	50.0			100.0								
Base Capacity (vph)	425	2330		359	2547			457			382	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.03	0.49		0.09	0.32			0.25			0.13	

Intersection Summary
Cycle Length: 115
Actuated Cycle Length: 115
Offset: 52 (45%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Lane Group	Ø3	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	4%	4%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

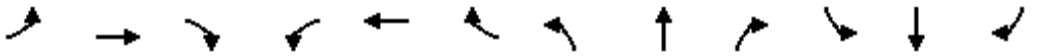
Intersection Summary

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 5.0	Intersection LOS: A
Intersection Capacity Utilization 52.6%	ICU Level of Service A
Analysis Period (min) 15	

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

Splits and Phases: 3: Fringewood & Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	373	728	159	196	507	62	131	368	178	92	302	220
Future Volume (vph)	373	728	159	196	507	62	131	368	178	92	302	220
Satd. Flow (prot)	3288	3289	0	3288	3390	1517	1695	1784	1517	1695	1784	1517
Flt Permitted	0.950			0.950			0.335			0.227		
Satd. Flow (perm)	3266	3289	0	3285	3390	1485	597	1784	1488	404	1784	1488
Satd. Flow (RTOR)		24				210			207			220
Lane Group Flow (vph)	373	887	0	196	507	62	131	368	178	92	302	220
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5 9	2		1	6		3	8		7	4	
Permitted Phases						6	8		8	4		4
Detector Phase	5 9	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)		10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)		36.3		11.5	36.3	36.3	11.3	39.6	39.6	11.5	39.6	39.6
Total Split (s)		49.0		16.0	37.0	37.0	15.0	40.0	40.0	15.0	40.0	40.0
Total Split (%)		40.8%		13.3%	30.8%	30.8%	12.5%	33.3%	33.3%	12.5%	33.3%	33.3%
Yellow Time (s)		3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)		2.6		2.8	2.6	2.6	2.6	2.9	2.9	2.8	2.9	2.9
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		6.3		6.5	6.3	6.3	6.3	6.6	6.6	6.5	6.6	6.6
Lead/Lag		Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?		Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode		C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	16.6	46.6		10.5	34.0	34.0	37.7	28.8	28.8	36.8	28.6	28.6
Actuated g/C Ratio	0.14	0.39		0.09	0.28	0.28	0.31	0.24	0.24	0.31	0.24	0.24
v/c Ratio	0.82	0.69		0.68	0.53	0.11	0.49	0.86	0.35	0.44	0.71	0.42
Control Delay	44.3	34.0		66.1	39.6	0.4	32.1	63.0	4.6	31.1	51.1	7.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.3	34.0		66.1	39.6	0.4	32.1	63.0	4.6	31.1	51.1	7.0
LOS	D	C		E	D	A	C	E	A	C	D	A
Approach Delay		37.0			43.2			41.6			32.3	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	24.0	93.0		22.9	55.2	0.0	20.6	82.4	0.0	14.2	64.6	0.0
Queue Length 95th (m)	#52.1	117.5		#40.3	72.8	0.0	33.3	114.1	10.8	24.5	91.4	18.1
Internal Link Dist (m)		229.2			333.5			339.0			251.9	
Turn Bay Length (m)	95.0			125.0		240.0	65.0		80.0	85.0		
Base Capacity (vph)	455	1292		288	960	571	267	496	563	216	496	572
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.69		0.68	0.53	0.11	0.49	0.74	0.32	0.43	0.61	0.38

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 62 (52%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Lane Group	Ø5	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	5	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	11.5	11.5
Total Split (s)	16.0	12.0
Total Split (%)	13%	10%
Yellow Time (s)	3.7	3.7
All-Red Time (s)	2.8	2.8
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

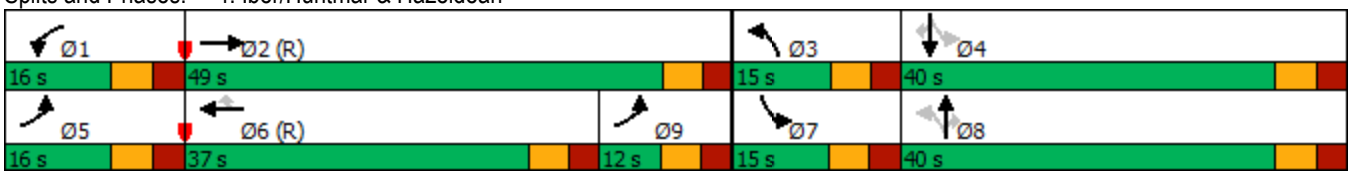
Intersection Summary

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 38.5	Intersection LOS: D
Intersection Capacity Utilization 84.5%	ICU Level of Service E
Analysis Period (min) 15	

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

Splits and Phases: 4: Iber/Huntmar & Hazeldean



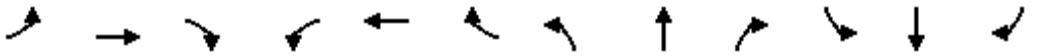
Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1099	7	30	756	8	71
Future Vol, veh/h	1099	7	30	756	8	71
Conflicting Peds, #/hr	0	60	60	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	15	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1099	7	30	756	8	71

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1166	0	1601	613
Stage 1	-	-	-	-	1163	-
Stage 2	-	-	-	-	438	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	595	-	97	435
Stage 1	-	-	-	-	260	-
Stage 2	-	-	-	-	618	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	562	-	87	411
Mov Cap-2 Maneuver	-	-	-	-	189	-
Stage 1	-	-	-	-	246	-
Stage 2	-	-	-	-	585	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	17.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	367	-	-	562	-
HCM Lane V/C Ratio	0.215	-	-	0.053	-
HCM Control Delay (s)	17.5	-	-	11.8	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.8	-	-	0.2	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	1208	25	30	1356	51	16	1	17	35	4	87
Future Volume (vph)	88	1208	25	30	1356	51	16	1	17	35	4	87
Satd. Flow (prot)	1695	3379	0	1695	3370	0	1695	1471	0	1695	1499	0
Flt Permitted	0.088			0.133			0.698			0.746		
Satd. Flow (perm)	157	3379	0	237	3370	0	1236	1471	0	1292	1499	0
Satd. Flow (RTOR)		3			5			17			87	
Lane Group Flow (vph)	88	1233	0	30	1407	0	16	18	0	35	91	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	5	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	11.1	27.1		11.1	27.1		30.6	30.6		30.6	30.6	
Total Split (s)	14.0	69.0		14.0	69.0		37.0	37.0		37.0	37.0	
Total Split (%)	11.7%	57.5%		11.7%	57.5%		30.8%	30.8%		30.8%	30.8%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.4	2.4		2.4	2.4		3.6	3.6		3.6	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1		6.6	6.6		6.6	6.6	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Recall Mode	Max	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	85.6	62.9		85.6	62.9		15.6	15.6		15.6	15.6	
Actuated g/C Ratio	0.71	0.52		0.71	0.52		0.13	0.13		0.13	0.13	
v/c Ratio	0.22	0.70		0.07	0.80		0.10	0.09		0.21	0.34	
Control Delay	7.8	24.0		2.0	14.4		43.3	18.2		46.5	12.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.8	24.0		2.0	14.4		43.3	18.2		46.5	12.8	
LOS	A	C		A	B		D	B		D	B	
Approach Delay		22.9			14.1			30.0			22.2	
Approach LOS		C			B			C			C	
Queue Length 50th (m)	3.3	110.0		0.2	60.3		3.6	0.2		7.9	0.9	
Queue Length 95th (m)	12.9	134.4		m0.3	92.4		9.3	6.4		16.0	14.4	
Internal Link Dist (m)		472.7			114.0			393.1			258.4	
Turn Bay Length (m)	75.0			55.0			30.0			40.0		
Base Capacity (vph)	403	1772		444	1768		313	385		327	444	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.22	0.70		0.07	0.80		0.05	0.05		0.11	0.20	

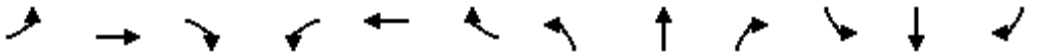
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 88 (73%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 18.6	Intersection LOS: B
Intersection Capacity Utilization 76.1%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 1: Victor & Hazeldean



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	1212	39	108	1466	37	37	0	65	45	0	10
Future Volume (vph)	11	1212	39	108	1466	37	37	0	65	45	0	10
Satd. Flow (prot)	1695	3371	0	1695	3375	0	0	1583	0	0	1667	0
Flt Permitted	0.167			0.153				0.857			0.682	
Satd. Flow (perm)	298	3371	0	273	3375	0	0	1381	0	0	1178	0
Satd. Flow (RTOR)		3			4			103			103	
Lane Group Flow (vph)	11	1251	0	108	1503	0	0	102	0	0	55	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		5.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	38.2	38.2		11.1	38.2		36.9	36.9		36.9	36.9	
Total Split (s)	58.0	58.0		20.0	78.0		37.0	37.0		37.0	37.0	
Total Split (%)	48.3%	48.3%		16.7%	65.0%		30.8%	30.8%		30.8%	30.8%	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.5	2.5		2.4	2.5		3.9	3.9		3.9	3.9	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	6.2	6.2		6.1	6.2			6.9			6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes	Yes	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Act Effct Green (s)	77.2	77.2		92.0	91.9			14.0			14.0	
Actuated g/C Ratio	0.64	0.64		0.77	0.77			0.12			0.12	
v/c Ratio	0.06	0.58		0.35	0.58			0.40			0.24	
Control Delay	3.6	5.3		11.6	8.2			12.5			3.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	3.6	5.3		11.6	8.2			12.5			3.0	
LOS	A	A		B	A			B			A	
Approach Delay		5.3			8.4			12.5			3.0	
Approach LOS		A			A			B			A	
Queue Length 50th (m)	0.2	8.7		2.9	39.5			0.0			0.0	
Queue Length 95th (m)	m0.6	167.3		m9.6	m69.8			13.3			1.3	
Internal Link Dist (m)		192.6			229.2			250.3			159.7	
Turn Bay Length (m)	50.0			100.0								
Base Capacity (vph)	191	2170		374	2585			423			372	
Starvation Cap Reductn	0	0		0	29			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.06	0.58		0.29	0.59			0.24			0.15	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 35 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

Lane Group	Ø3	Ø7
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Satd. Flow (RTOR)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	3	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	4%	4%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 7.2	Intersection LOS: A
Intersection Capacity Utilization 79.3%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 3: Fringewood & Hazeldean

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	315	820	146	301	1035	155	186	455	298	139	457	384
Future Volume (vph)	315	820	146	301	1035	155	186	455	298	139	457	384
Satd. Flow (prot)	3288	3299	0	3288	3390	1517	1695	1784	1517	1695	1784	1517
Flt Permitted	0.950			0.950			0.160			0.165		
Satd. Flow (perm)	3271	3299	0	3276	3390	1474	284	1784	1463	293	1784	1471
Satd. Flow (RTOR)		17				155			298			313
Lane Group Flow (vph)	315	966	0	301	1035	155	186	455	298	139	457	384
Turn Type	Prot	NA		Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6	8		8	4		4
Detector Phase	5	2		1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	5.0	10.0		5.0	10.0	10.0	5.0	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	11.5	36.3		11.5	36.3	36.3	11.3	39.6	39.6	11.5	39.6	39.6
Total Split (s)	22.0	41.0		22.0	41.0	41.0	15.0	42.0	42.0	15.0	42.0	42.0
Total Split (%)	18.3%	34.2%		18.3%	34.2%	34.2%	12.5%	35.0%	35.0%	12.5%	35.0%	35.0%
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	2.8	2.6		2.8	2.6	2.6	2.6	2.9	2.9	2.8	2.9	2.9
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.5	6.3		6.5	6.3	6.3	6.3	6.6	6.6	6.5	6.6	6.6
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	14.8	37.5		14.5	37.3	37.3	42.6	33.6	33.6	42.1	33.6	33.6
Actuated g/C Ratio	0.12	0.31		0.12	0.31	0.31	0.36	0.28	0.28	0.35	0.28	0.28
v/c Ratio	0.78	0.93		0.76	0.98	0.27	0.92	0.91	0.48	0.69	0.92	0.60
Control Delay	73.6	52.8		63.7	65.9	6.3	72.7	65.1	6.4	42.5	66.2	11.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.6	52.8		63.7	65.9	6.3	72.7	65.1	6.4	42.5	66.2	11.8
LOS	E	D		E	E	A	E	E	A	D	E	B
Approach Delay		57.9			59.3			48.0			41.5	
Approach LOS		E			E			D			D	
Queue Length 50th (m)	38.7	~74.6		35.5	~140.5	0.0	28.0	101.4	0.0	20.3	102.0	12.4
Queue Length 95th (m)	#56.3	#158.0		50.3	#181.2	15.1	#63.5	#156.3	20.4	#35.7	#157.7	42.6
Internal Link Dist (m)		229.2			333.5			339.0			251.9	
Turn Bay Length (m)	95.0			125.0		240.0	65.0		80.0	85.0		
Base Capacity (vph)	424	1042		424	1052	564	203	526	641	202	526	654
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.93		0.71	0.98	0.27	0.92	0.87	0.46	0.69	0.87	0.59

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 32 (27%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

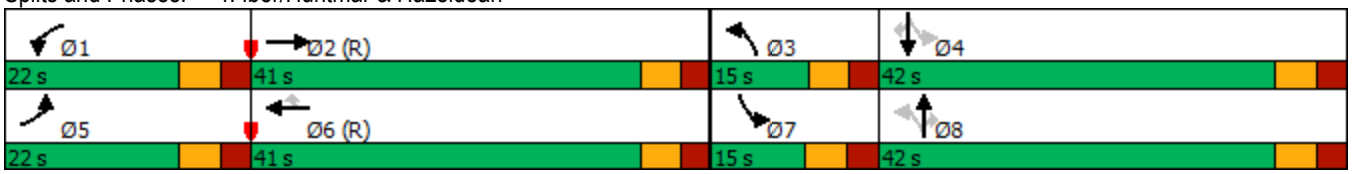
Maximum v/c Ratio: 0.98

Intersection Signal Delay: 52.9	Intersection LOS: D
Intersection Capacity Utilization 98.1%	ICU Level of Service F
Analysis Period (min) 15	

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

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

Splits and Phases: 4: Iber/Huntmar & Hazeldean



Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1246	19	77	1437	8	64
Future Vol, veh/h	1246	19	77	1437	8	64
Conflicting Peds, #/hr	0	40	40	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	15	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1246	19	77	1437	8	64

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1305	0	2169	673
Stage 1	-	-	-	-	1296	-
Stage 2	-	-	-	-	873	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	526	-	40	398
Stage 1	-	-	-	-	220	-
Stage 2	-	-	-	-	369	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	507	-	33	383
Mov Cap-2 Maneuver	-	-	-	-	130	-
Stage 1	-	-	-	-	212	-
Stage 2	-	-	-	-	313	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	315	-	-	507	-
HCM Lane V/C Ratio	0.229	-	-	0.152	-
HCM Control Delay (s)	19.8	-	-	13.4	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0.9	-	-	0.5	-

Appendix M:

SimTraffic Analysis: Queueing Forecast

Intersection: 1: Victor & Hazeldean

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)	15.1	100.8	101.2	8.0	83.8	82.2	14.8	21.0	29.2	30.2
Average Queue (m)	4.4	65.7	63.3	1.8	38.8	42.7	2.7	6.8	7.3	12.5
95th Queue (m)	13.5	95.6	96.3	7.1	72.9	72.3	9.2	17.8	20.6	20.7
Link Distance (m)		489.8	489.8		119.5	119.5		403.9		271.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	75.0			55.0			30.0		40.0	
Storage Blk Time (%)		4			2					
Queuing Penalty (veh)		2			0					

Intersection: 2: Savage & Hazeldean

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	14.3	21.3
Average Queue (m)	2.9	11.0
95th Queue (m)	10.3	19.3
Link Distance (m)		301.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	1	
Queuing Penalty (veh)	4	

Intersection: 3: Fringewood & Hazeldean

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (m)	8.9	46.6	46.8	22.0	78.4	84.8	40.1	29.2
Average Queue (m)	1.1	13.5	17.6	3.8	19.7	24.8	16.7	13.0
95th Queue (m)	6.0	36.5	36.5	13.5	56.4	62.9	30.3	27.3
Link Distance (m)		205.6	205.6		236.1	236.1	261.3	170.7
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	50.0			100.0				
Storage Blk Time (%)		0						
Queuing Penalty (veh)		0						

Intersection: 4: Iber/Huntmar & Hazeldean

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	L	T	TR	L	L	T	T	L	T	R	L
Maximum Queue (m)	82.4	102.4	126.5	129.2	43.6	65.2	75.8	65.6	72.4	220.9	87.5	53.7
Average Queue (m)	29.5	43.1	68.7	75.0	19.8	34.9	45.1	40.4	44.9	89.9	30.8	19.5
95th Queue (m)	58.5	89.2	112.7	116.4	43.5	53.4	64.3	58.7	88.1	159.0	77.6	40.6
Link Distance (m)			236.1	236.1			346.4	346.4		350.0		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	95.0	95.0			125.0	125.0			65.0		80.0	85.0
Storage Blk Time (%)		0	3							18	0	
Queuing Penalty (veh)		0	11							54	0	

Intersection: 4: Iber/Huntmar & Hazeldean

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	97.2	44.3
Average Queue (m)	60.1	1.5
95th Queue (m)	85.9	14.6
Link Distance (m)	263.0	263.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)	1	
Queuing Penalty (veh)	1	

Network Summary

Network wide Queuing Penalty: 73

Intersection: 1: Victor & Hazeldean

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)	82.2	117.4	112.2	62.2	101.8	103.8	15.0	15.5	27.5	31.8
Average Queue (m)	18.8	72.2	72.3	8.1	58.8	65.7	4.4	4.3	9.5	13.4
95th Queue (m)	53.0	104.4	103.8	31.9	90.1	96.3	12.1	12.2	21.6	25.8
Link Distance (m)		489.8	489.8		119.5	119.5		403.9		271.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	75.0			55.0			30.0		40.0	
Storage Blk Time (%)	0	6		0	8					0
Queuing Penalty (veh)	0	5		0	3					0

Intersection: 2: Savage & Hazeldean

Movement	EB	EB	WB	WB	WB	NB
Directions Served	T	TR	L	T	T	LR
Maximum Queue (m)	1.3	3.1	20.9	27.0	5.8	30.1
Average Queue (m)	0.0	0.1	10.5	1.1	0.2	11.3
95th Queue (m)	0.9	2.2	20.0	10.0	4.1	21.9
Link Distance (m)	119.5	119.5		396.1	396.1	301.6
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)			15.0			
Storage Blk Time (%)			8			
Queuing Penalty (veh)			59			

Intersection: 3: Fringewood & Hazeldean

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (m)	22.0	74.9	79.7	38.3	140.5	255.8	44.7	34.4
Average Queue (m)	3.2	29.5	31.2	16.0	54.2	77.5	18.4	11.1
95th Queue (m)	13.2	62.0	65.0	28.6	96.3	179.3	35.8	25.5
Link Distance (m)		205.6	205.6		236.1	236.1	261.3	170.7
Upstream Blk Time (%)						1		
Queuing Penalty (veh)						12		
Storage Bay Dist (m)	50.0			100.0				
Storage Blk Time (%)		3						
Queuing Penalty (veh)		0						

Intersection: 4: Iber/Huntmar & Hazeldean

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)	57.7	102.4	225.9	226.9	78.6	132.5	354.1	347.1	247.5	72.4	360.3	87.5
Average Queue (m)	39.0	72.8	130.4	133.9	37.7	117.0	273.6	263.6	113.0	59.5	214.8	64.7
95th Queue (m)	55.2	126.8	218.4	221.1	60.7	173.7	419.1	409.6	314.7	91.8	402.9	115.5
Link Distance (m)			236.1	236.1			346.4	346.4			350.0	
Upstream Blk Time (%)			1	1			25	16			10	
Queuing Penalty (veh)			5	7			0	0			0	
Storage Bay Dist (m)	95.0	95.0			125.0	125.0			240.0	65.0		80.0
Storage Blk Time (%)		0	30		0	0	53	29	0	5	36	0
Queuing Penalty (veh)		0	94		0	0	160	45	1	37	176	3

Intersection: 4: Iber/Huntmar & Hazeldean

Movement	SB	SB	SB
Directions Served	L	T	R
Maximum Queue (m)	92.4	201.1	73.6
Average Queue (m)	44.2	99.1	20.6
95th Queue (m)	94.1	174.9	62.5
Link Distance (m)		263.0	263.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	85.0		
Storage Blk Time (%)	0	18	
Queuing Penalty (veh)	0	25	

Network Summary

Network wide Queuing Penalty: 632

Intersection: 1: Victor & Hazeldean

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)	41.8	98.0	97.6	30.9	75.9	80.6	10.9	22.1	20.0	30.3
Average Queue (m)	6.5	62.4	61.2	2.9	36.6	41.8	2.3	6.0	7.2	12.5
95th Queue (m)	26.3	89.9	90.6	17.9	65.9	71.5	8.3	15.9	17.7	22.6
Link Distance (m)		489.8	489.8		119.5	119.5		403.9		271.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	75.0			55.0			30.0		40.0	
Storage Blk Time (%)		3			2			0		0
Queuing Penalty (veh)		1			0			0		0

Intersection: 2: Savage & Hazeldean

Movement	EB	WB	NB
Directions Served	TR	L	LR
Maximum Queue (m)	1.3	16.8	27.3
Average Queue (m)	0.0	3.4	11.0
95th Queue (m)	0.9	12.1	20.2
Link Distance (m)	119.5		301.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		15.0	
Storage Blk Time (%)		1	
Queuing Penalty (veh)		5	

Intersection: 3: Fringewood & Hazeldean

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (m)	8.9	42.4	39.6	17.8	99.0	139.5	43.1	31.7
Average Queue (m)	1.7	15.0	15.1	5.9	20.0	27.5	19.0	12.2
95th Queue (m)	7.2	35.9	35.1	15.0	60.7	86.3	34.9	26.1
Link Distance (m)		205.6	205.6		236.1	236.1	261.3	170.7
Upstream Blk Time (%)						0		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)	50.0			100.0				
Storage Blk Time (%)		0						
Queuing Penalty (veh)		0						

Intersection: 4: Iber/Huntmar & Hazeldean

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	T
Maximum Queue (m)	51.0	101.6	116.6	121.7	49.7	56.2	71.5	69.4	6.6	49.5	65.8	60.8
Average Queue (m)	27.3	37.9	63.3	71.0	17.3	32.2	44.1	37.9	0.2	22.9	42.6	36.1
95th Queue (m)	44.0	71.2	106.1	111.2	42.2	50.9	65.6	60.7	3.3	42.6	59.5	54.1
Link Distance (m)			236.1	236.1			343.2	343.2			350.0	350.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	95.0	95.0			125.0	125.0			240.0	65.0		
Storage Blk Time (%)		0	1							0	0	
Queuing Penalty (veh)		0	5							0	0	

Intersection: 4: Iber/Huntmar & Hazeldean

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	T	T	R
Maximum Queue (m)	35.7	45.4	59.6	51.9	8.4
Average Queue (m)	16.6	16.4	38.9	29.0	0.3
95th Queue (m)	28.5	32.4	55.5	50.5	5.9
Link Distance (m)			263.0	263.0	263.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	80.0	85.0			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 12

Intersection: 1: Victor & Hazeldean

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)	82.3	119.8	117.1	61.6	111.2	116.9	20.3	12.6	28.5	39.1
Average Queue (m)	24.9	72.5	71.8	9.0	71.2	75.2	4.1	4.2	9.1	14.0
95th Queue (m)	66.7	107.6	105.1	35.6	109.0	111.2	13.2	11.7	22.4	27.7
Link Distance (m)		489.8	489.8		119.5	119.5		403.9		271.3
Upstream Blk Time (%)					0	0				
Queuing Penalty (veh)					0	1				
Storage Bay Dist (m)	75.0			55.0			30.0		40.0	
Storage Blk Time (%)	0	7		0	12		0			0
Queuing Penalty (veh)	0	6		0	4		0			0

Intersection: 2: Savage & Hazeldean

Movement	EB	WB	WB	WB	NB
Directions Served	TR	L	T	T	LR
Maximum Queue (m)	30.3	22.0	40.9	33.0	61.3
Average Queue (m)	1.0	11.8	4.1	1.4	27.9
95th Queue (m)	18.6	21.6	22.9	14.2	54.0
Link Distance (m)	119.5		396.1	396.1	301.6
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (m)		15.0			
Storage Blk Time (%)		9	0		
Queuing Penalty (veh)		66	0		

Intersection: 3: Fringewood & Hazeldean

Movement	EB	EB	EB	WB	WB	WB	NB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LTR
Maximum Queue (m)	11.1	53.1	59.3	36.5	147.6	252.6	53.1	31.8
Average Queue (m)	2.7	23.9	25.5	17.5	58.7	73.9	18.6	10.7
95th Queue (m)	9.4	45.3	47.8	31.9	104.6	155.6	38.1	25.9
Link Distance (m)		205.6	205.6		236.1	236.1	261.3	170.7
Upstream Blk Time (%)					0	1		
Queuing Penalty (veh)					0	5		
Storage Bay Dist (m)	50.0			100.0				
Storage Blk Time (%)		0			0			
Queuing Penalty (veh)		0			0			

Intersection: 4: Iber/Huntmar & Hazeldean

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	T
Maximum Queue (m)	58.9	96.5	138.0	145.5	53.4	116.2	154.0	139.1	16.7	72.0	78.1	68.4
Average Queue (m)	40.0	49.5	74.8	81.1	33.7	47.8	94.5	90.0	1.6	34.0	44.0	37.8
95th Queue (m)	58.2	82.9	119.4	125.5	52.7	82.7	134.4	127.3	9.8	61.3	67.0	60.9
Link Distance (m)			236.1	236.1			343.2	343.2			350.0	350.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	95.0	95.0			125.0	125.0			240.0	65.0		
Storage Blk Time (%)		0	4				2			1	1	
Queuing Penalty (veh)		0	12				5			3	2	

Intersection: 4: Iber/Huntmar & Hazeldean

Movement	NB	SB	SB	SB	SB
Directions Served	R	L	T	T	R
Maximum Queue (m)	65.0	60.3	87.1	80.7	65.9
Average Queue (m)	27.2	24.3	49.7	40.9	21.2
95th Queue (m)	49.2	45.5	73.1	67.2	60.0
Link Distance (m)			263.0	263.0	263.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	80.0	85.0			
Storage Blk Time (%)	0		0		
Queuing Penalty (veh)	0		0		

Network Summary

Network wide Queuing Penalty: 104