6150 Hazeldean Road

Proposed Commercial/Office Development

TIA Report

Presented to:

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APPENDIX MATERIAL

1.0 SCREENING FORM

A screening form is attached to this document for ease of reference (Appendix "A"). The screening form assessment indicated that the development meets all three triggers.

2.0 SCOPING

2.1 EXISTING AND PLANNED CONDITIONS

2.1.1 Proposed Development

Exhibit 2.1 illustrates the proposed commercial/office development located at 6150 Hazeldean Road, bordered by Hazeldean Road to the north, future retirement home to the east, Neil Avenue to the south and vacant lands to the west.

The following provides a brief description of the proposed development:

- **Existing Land Use Permitted**: The existing land is currently zoned as Arterial Mainstreet (AM9) Zone[1].
- **Proposed Land Use**: The development proposes:
  - A single storey 465 m^2 restaurant that is <u>not</u> envisioned to be a fast food/drive-thru restaurant. The site is anticipated to be a pub style restaurant; and
  - A 2-storey medical/office building (~925 m^2) located east of the restaurant.
- **Relevant Planning Regulations**: To best of Castleglenn's knowledge, there are no planning regulations that would need to be used in the traffic analysis.
- **Estimated Date of Occupancy**: The development is expected to be build-out by 2020 horizon year.
- **Planned Phasing of Development**: For the purpose of this traffic study, the site is anticipated to be build-out in a single phase.
- **Access Points**: The proposed site would be served by a right-in/right-out along Hazeldean Road and a full movement along Neil Avenue. Both of these accesses are being currently constructed as part of the retirement home development east of the site.
- **Parking Supply**: The development would accommodate a total of 84 parking stalls (62 new parking stalls on-site and 22 stalls would be used from the adjacent retirement home) and 5 bicycle parking spaces.

1 City of Ottawa Zoning By-law 2008-250

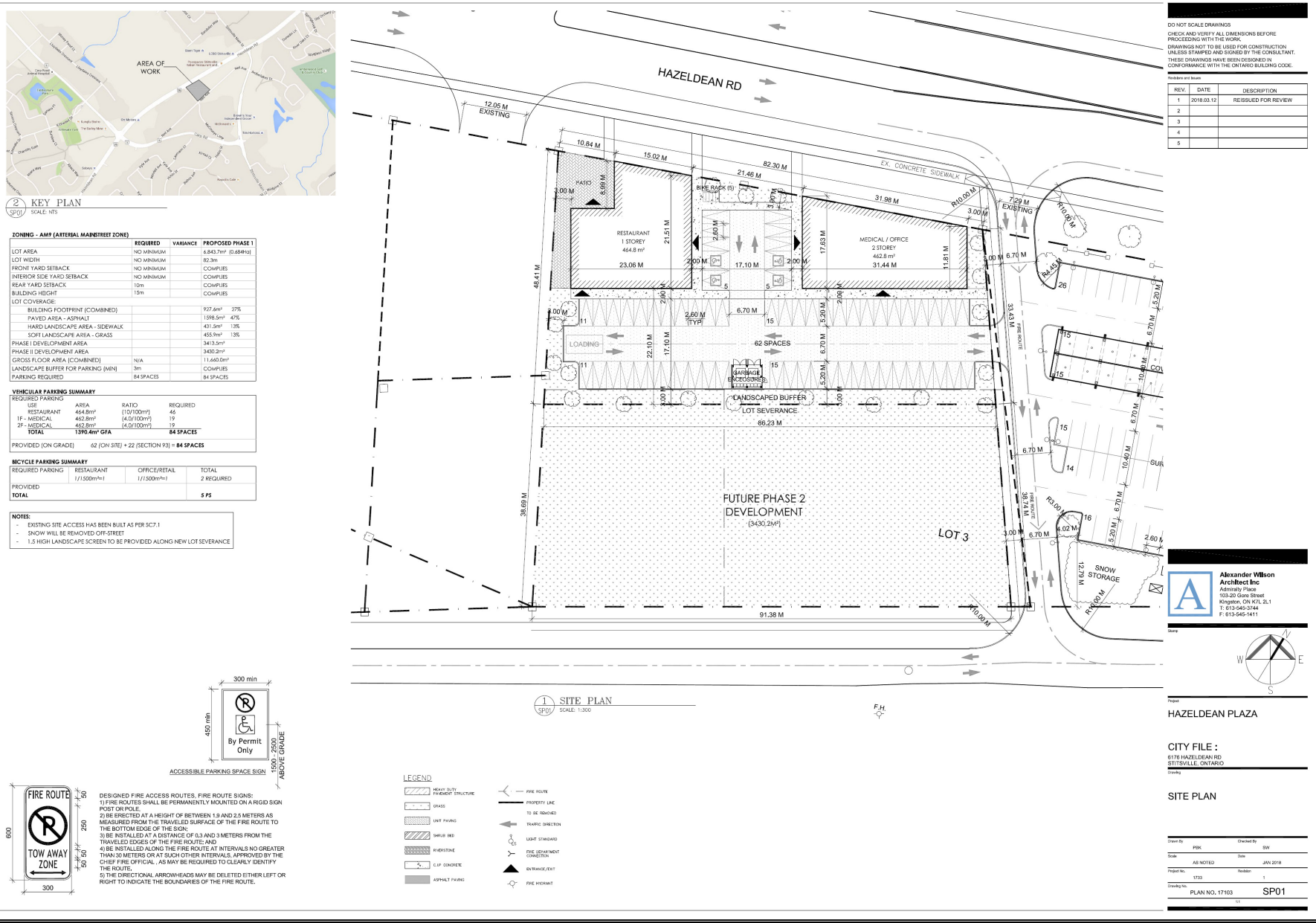

Exhibit 2.1: Proposed Site Plan

2.1.2 Existing Conditions

Study Area Roadways

The City of Ottawa's Transportation Master Plan (2013)[2] outlines the roadway classifications and operational characteristics of the supporting roadway network.

- *Hazeldean Road, Carp Road and Stittsville Main Street (South of Hazeldean Road)* are defined as arterial roadways within the City of Ottawa's Transportation Master Plan. Stittsville Main Street north of Hazeldean Road is classified as a major collector.
    - *Hazeldean Road* is an east-west direction road within the jurisdiction of the City of Ottawa. The road is characterized by 4-lanes of travel (2-lanes in each direction) within the urban area and transitions to 2-lanes of travel west of Carp Road. The posted speed along Hazeldean Road is 60km/hr within the vicinity of the proposed site.
    - *Carp Road* is in the north-south direction within the jurisdiction of the City of Ottawa. The road is characterized by 2-lanes of travel (a single lane in each direction). The posted speed along Carp Road is 60km/hr north of Hazeldean Road and 50 km/hr south of Hazeldean Road.
    - Stittsville Main Street is oriented in a north-south direction and falls within the jurisdiction of the City of Ottawa. The road is characterized by 2-lanes of travel (a single lane in each direction) with a posted speed of 50 km/hr and 40km/hr north of Hazeldean Road in the vicinity of St. Stephen Catholic School.
- *Neil Avenue* is defined as a local roadway (2-lanes of travel – one each direction) within the City's jurisdiction. Neil Avenue is oriented in the east-west direction with a posted speed of 50 km/hr and connects to Carp Road and Stittsville Main Street.

Existing Driveways

The following lists the existing driveways within 200m of the proposed site accesses:

- *Jackson Trails Centre Traffic Control Signal Access* located approximately 85m east of the proposed right-in/right-out access. This access serves the existing Jackson Trails commercial plaza.
- *Mccooeye Lane* located 75m west of the proposed site access along Neil Avenue. Mccooeye Lane serves the few residential units south of Neil Avenue and connects to the commercial plaza at the corner of Stittsville Main Street and Carp Road.

2 Transportation Master Transportation Plan, November 2013 Publication 19-82, Map 5

Existing Area Traffic Management Measures

There are no traffic management measures observed along the short segment of Neil Avenue aside from the stop-controlled signs at either end of the local road connecting with Stittsville Main Street and Carp Road.

Existing Intersection Configurations

- *Carp Road & Neil Avenue:* This intersection is configured as a minor leg STOP-Controlled "T-intersection" located west of the proposed site. This intersection is configured with 2-travel approach lanes (one-lane in each direction) in the north-south direction. Neil Avenue is a 2-lane roadway (one-lane in each direction) and forms the east leg of the intersection.
- *Stittsville Main Street & Neil Avenue:* This intersection is configured as a minor leg STOP-Controlled "T-intersection" located east of the proposed site. This intersection is configured with 2-thru travel approach lanes (one-lane in each direction) in the north-south direction. Neil Avenue is a 2-lane roadway (one-lane in each direction) and forms the west leg of the intersection. The intersection provides for auxiliary lanes along Stittsville Main Street (NB-LT and SB-LT) and on Neil Avenue (EB-RT).
- *Hazeldean Road & Stittsville Main Street:* This traffic signal controlled is located east of the proposed development parcel. The intersection is accommodated by 4-thru travel approach lanes (2-lanes-per-direction) in the east-west direction and two thru travel lanes (one-lane in each direction) in the north-south direction with auxiliary lanes on all directions.
- *Hazeldean Road & Carp Road:* This traffic signal controlled is located west of the proposed development parcel. The intersection is accommodated by 2-thru travel approach lanes in the eastbound direction, a single westbound through lane, a single southbound travel lane and two northbound travel lanes. The intersection accommodates turning lanes on each approach.

Existing Transit Provisions

There are bus stops located south of Neil Avenue along Stittsville Main Street (Route 261 & 301) and along Carp Road (Route 61). Bus stops are also located at the Carp Road and Stittsville Main Street intersections along Hazeldean Road (Routes 61 & 162).

A review of the City of Ottawa's Transportation Master Plan (Nov. 2013)

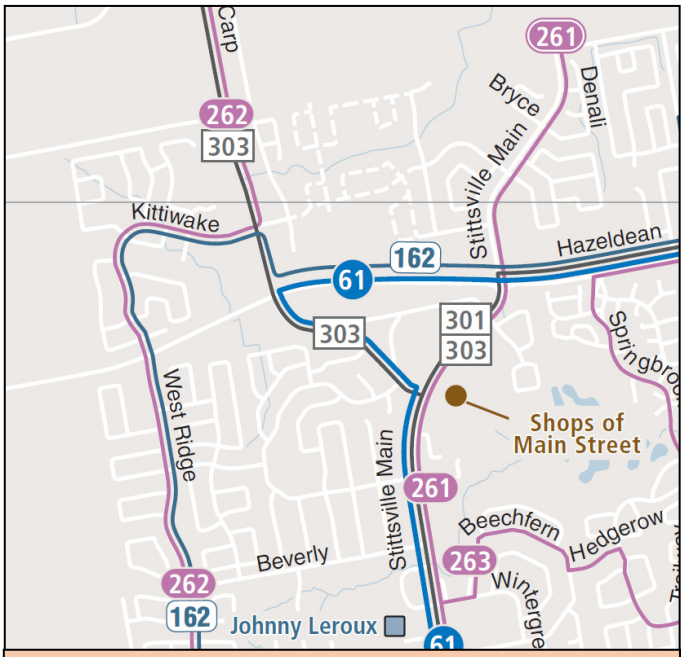

Exhibit 2.2: Existing Transit Provisions

indicated Hazeldean Road (between Stittsville Main Street and Eagleson Road) as a Transit Priority, which include improvements to transit signal priority and queue jump [Map 5 Rapid Transit and Transit Priority Network – Affordable Network].

Existing Cycling Facilities

Hazeldean Road provides for dedicated on-road bike lanes along its 4.5km length between Carp Road and Terry Fox Drive. The bike lanes interconnect with numerous connecting roadways, commercial sites and designated recreational pathways. Carp Road and Stittsville Main Street (south of Hazeldean Road) is classified as "Spine Route" according to the City of Ottawa TMP (2013, Map 1) and as such would also be served by on-road bike lanes.

The proposed site provides for 5 bike parking spaces located throughout the proposed site. This would further encourage those motorists for whom cycling is an option to take advantage of the local cycling facilities.

Existing Pedestrian Facilities

Table 2.1 indicates the pedestrian traffic crossing the various study area intersections within the vicinity of the proposed development. The highest pedestrian movement was observed to occur across the east leg of the Hazeldean Road / Stittsville Mains Street intersection where 18 pedestrians crossed during the afternoon peak period of travel demand.

Table 2.1: Existing Pedestrian Activities

Intersections	AM Peak Period				PM Peak Period			
	North Leg	South Leg	East Leg	West Leg	North Leg	South Leg	East Leg	West Leg
Hazeldean/Stittsville Main (March 2016)	2	0	2	1	5	6	**18**	3
Hazeldean/Carp (Nov. 2017)	9	1	3	1	7	4	5	5
Stittsville Main/Neil (June 2016)			9	6			9	9
Carp/Neil (Dec. 2015)			5				3	

Sidewalks are available along both sides of Stittsville Main Street and Hazeldean Road. Sidewalks are available on the east side of Carp Road (south of Hazeldean Road) to facilitate pedestrian activity.

Collision Analysis

Five (5) year collision information (2012-to-2016) was reviewed for the study area intersections. The collision information provides the date and time of each collision, the environmental condition at the time of the collision, the type of collision (i.e. angle collision, rear-end), the level of damage involved, vehicle path/maneuver characteristics and the number of pedestrians involved (in the collision).

Table 2.2 above provides a summary of the collision information for the study area intersections. The table indicates:

- ***Carp Road / Hazeldean Road***: A total of 63 collisions occurred at this intersection where approximately half (48%) of the collisions were rear-end collisions followed by turning movement collisions (25%) and angle collisions (21%). Approximately 84% resulted in property damage with 16% classified as non-fatal.
- ***Stittsville Main Street / Hazeldean Road***: A total of 60 collisions occurred at this intersection where approximately 32% of the collisions were rear-end collisions followed by turning movement collisions (10%). Angle, sideswipe and single vehicle collisions each represented 3% of the total collisions at the intersection. Approximately 77% resulted in property damage with 23% classified as non-fatal. Two collisions involved pedestrians.

Existing Traffic Volumes

This traffic study would review/analyze the site access serving the proposed development Traffic counts for the study area were obtained from the City of Ottawa at the following intersections:

- Hazeldean Road / Stittsville Main Street (March 23rd, 2016);
- Hazeldean Road / Carp Road (November 23rd, 2017); and
- Stittsville Main Street / Neil Avenue (June 21st, 2016).

Turning movement traffic counts were also undertaken by Castleglenn Consultants on December 2015 at the Carp Road / Neil Avenue. The turning movement counts are not expected to increase in and out of Neil Avenue since 2015. It is understood that the retirement home along Neil Avenue is anticipated to be completed Summer/Fall of 2018; therefore, the site traffic volumes would be accounted for in the forecast traffic volumes. The raw existing traffic counts were updated to reflect current traffic conditions by applying 2 percent annual growth at the two Hazeldean Road traffic-controlled signal intersections (with exception Stittsville Main Street north of Hazeldean, where 1 percent growth was assumed). Exhibit 2.3 illustrates the resulting existing (2018) traffic volumes at the study area intersections.

Table 2.2: Collision Summary (2012-2016)					
Intersection		Hazeldean/Carp[1]	Hazeldean/Stittsville Main[2]	Carp/Neil	Stittsville Main/Neil
Impact Type	Rear End	30	38	1	
	Single Vehicle	4	3		
	Angle	13	4		1
	Sideswipe		3		
	Turning	16	12		
	Approaching				
	Other				1
Class	Property damage only	53	46	1	2
	Non-fatal	10	14		
	Fatal				
Pedestrian involved			2		
No. of Collisions		**63**	**60**	**1**	**2**

1) Hazeldean/ Carp:
- 19 out of 30 rear-end collisions occurred in the WB direction where majority were making a right-turn movement. A dedicated WB right-turn lane is accommodated by the intersection.
- 7 out of 16 turning movement collisions occurred between EB-LT colliding with WB-TH movement.

2) Hazeldean / Stittsville Main:
- 28 out of 38 rear-end collisions occurred in the NB direction where majority were making a right-turn movement. A dedicated NB right-turn lane is accommodated by the intersection.
- 9 out of 12 turning movement collisions occurred between WB-LT colliding with EB-TH movement.

Hazeldean/Carp			*Hazeldean/Stittsville Main*			*Carp/Neil*			*Stittsville Main/Neil*		
Rear End	30	**48%**	Rear End	38	**63%**	Rear End	1	**100%**	Rear End	0	**0%**
Single Vehicle	4	**6%**	Single Vehicle	3	**5%**	Single Vehicle	0	**0%**	Single Vehicle	0	**0%**
Angle	13	**21%**	Angle	4	**7%**	Angle	0	**0%**	Angle	1	**50%**
Sideswipe	0	**0%**	Sideswipe	3	**5%**	Sideswipe	0	**0%**	Sideswipe	0	**0%**
Turning	16	**25%**	Turning	12	**20%**	Turning	0	**0%**	Turning	0	**0%**
Approaching	0	**0%**	Approaching	0	**0%**	Approaching	0	**0%**	Approaching	0	**0%**
Other	0	**0%**	Other	0	**0%**	Other	0	**0%**	Other	1	**50%**
Property Damage	53	84%	Property Damage	46	77%	Property Damag	1	100%	Property Damage	2	**100%**
Non-Fatal	10	16%	Non-Fatal	14	23%	Non-Fatal	0	0%	Non-Fatal	0	**0%**
Fatal	0	0%	Fatal	0	0%	Fatal	0	0%	Fatal	0	**0%**
Pedestrians	0	0%	Pedestrians	2	3%	Pedestrians	0	0%	Pedestrians	0	**0%**

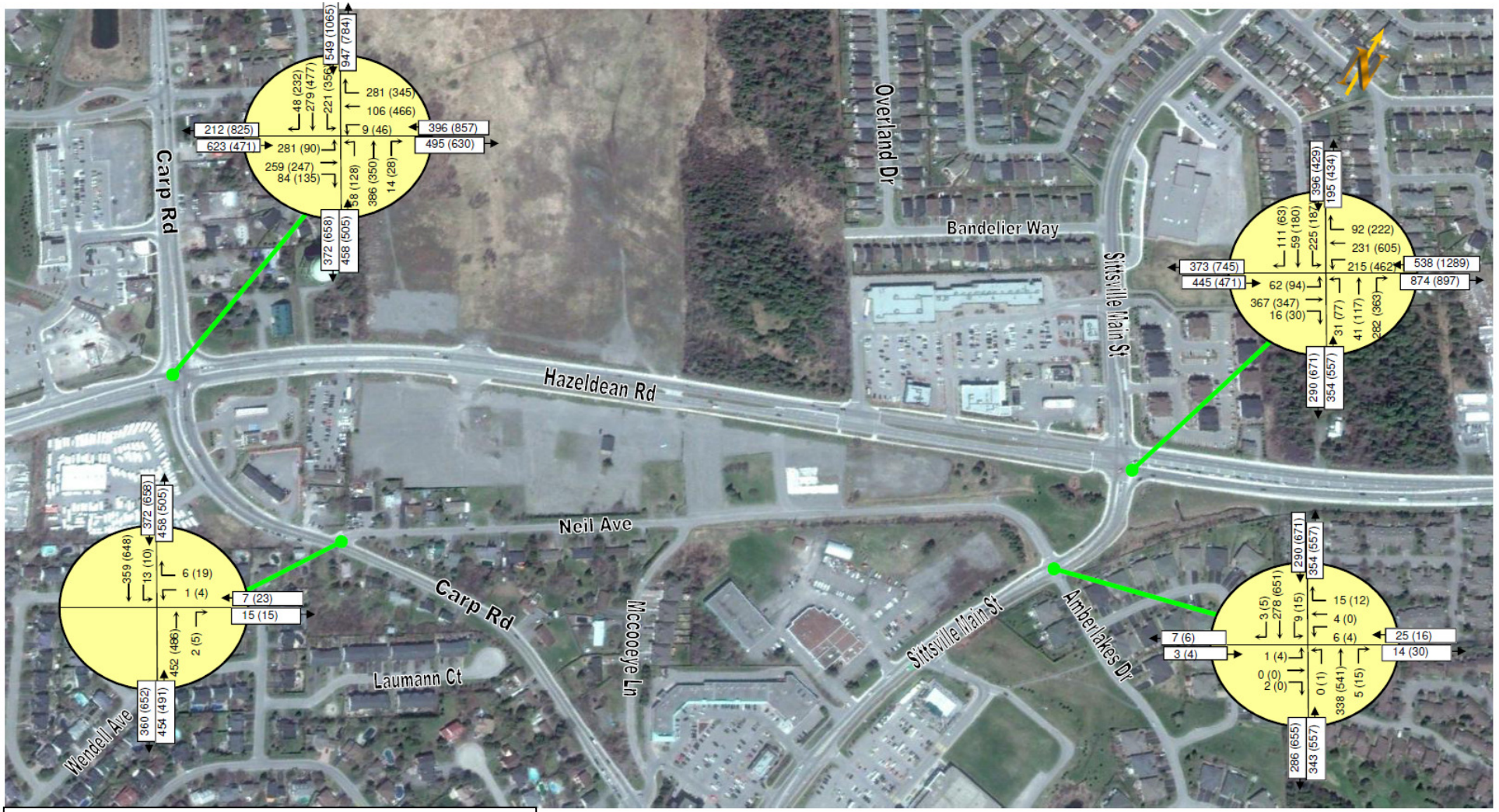

Exhibit 2.3: Existing Traffic Volumes

2.1.3 Planned Conditions

A review of the City of Ottawa's Transportation Master Plan (Nov. 2013) indicated that:

- *Carp Road:* is proposed to be widened from two to four lanes between Highway 417 and Hazeldean Road. The implementation for the widening is proposed to take place between 2020-2025 horizon years.
- *Stittsville Main Street Extension:* is a new two-lane roadway that would extend Stittsville Main Street to the north east (by approximately 1.5 km) to ultimately connect with Palladium Drive. The TMP indicates the timing for this facility is proposed to occur during Phase-3 (2026-2031) of the plan.

Other Adjacent Development Initiatives

A review of other adjacent developments planned within the greater study area was undertaken as part of this scoping report. The following summarizes the adjacent developments within the immediate study area that would be included part of this TIA:

- *6141 Hazeldean Road (Potter's Key):* The proposed development would be located north of Hazeldean Road between Carp Road and Stittsville Main Street. The proposed development envisions approximately 400 residential units. It is understood that the development is currently under construction.
- *6130 Hazeldean Road:* The proposed retirement residence development is located east of the proposed site. The development will accommodate a total of 230 units.

2.2 Study Area and Time Periods

2.2.1 Study Area

The traffic study will analyze the following adjacent study area intersections:

- Hazeldean Road / Stittsville Main Street;
- Hazeldean Road / Carp Road;
- Stittsville Main Street / Neil Avenue;
- Carp Road / Neil Avenue;
- Neil Avenue / Site Access; and
- Hazeldean Road / Site Access.

2.2.2 Time Periods

The study will analyze two-time periods (morning and afternoon peak hours) of travel demand as they were envisioned to represent the "worst-case" scenario in terms of traffic volumes.

2.2.3 Horizon Years

The traffic study will analyze build-out year (assumed to be 2020 horizon year) and 5-year post development (2025).

2.3 EXEMPTION REVIEW

Table 2.3 is an extract from the TIA Guidelines (2017) in regards to possible reduction in scope of work of the traffic study. We would request the City to exempt sections 4.1.3, 4.2.2, 4.5 and 4.8 from the TIA report.

Table 2.3: Extract from TIA Guidelines (2017)

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

3.0 FORECASTING

3.1 DEVELOPMENT-GENERATED TRAVEL DEMAND

The following sections represents the traffic forecasting methodology.

3.1.1 Trip Generation and Mode Shares

The Institute of Transportation Engineers (ITE) Trip Generation rates was used to determine the site traffic volumes for the proposed development.

Table 3.1: Trip Generation Rates

Land use	*Peak Period*	*Rate Per 1,000 SF*	*Split*	
			IN	*OUT*
Medical/Office (Land Use 720)	AM	2.30	79%	21%
	PM	3.46	27%	73%
Sit-Down Restaurant (Land Use 932)[1]				
	PM	11.15	59%	41%

1- The restaurant is anticipated to be a pub style restaurant with opening hours around 10am or 11am. This does not coincide with the morning peak hour of adjacent street; therefore, no rates were assumed for the morning peak hour. Also, Drinking Place (Land Use 925) rates were reviewed that had an afternoon peak hour rate similar to a Sit-Down restaurant.

It is considered good practice to convert the vehicle trips to person trips given that the site surveyed in the ITE trip generation manual are in suburban areas with low non-auto mode share. To convert the vehicle trips to person trips, a factor of 1.3 was used. Table 3.2 depicts the person trips rate for each land use:

Table 3.2 Adjusted Person-Trip

Land use	*Peak Period*	*Rate*
Medical/Office (Land Use 720)	AM	2.99
	PM	4.50
Sit-Down Restaurant (Land Use 932)		
	PM	14.50

The 2011 Trans OD Survey Report was reviewed to get an understanding of the existing travel mode shares for the area of Kanata-Stittsville (within the location of the proposed development). Table 3.3 depicts the existing and future travel demand for the study area. Given the nature of the proposed development, mode share within district was used.

***Table 3.3 Future Travel Mode Share Targets** [Table 5 of the TIA]*

Mode Share	**Existing Mode Share**		**Future Mode Share**	**Rationale**
	AM Peak	**PM Peak**	**AM/PM**	
Auto Driver	45%	57%	57%	Higher end of within district auto mode share was used for the purpose of this TIA.
Auto Passenger	17%	23%	17%	
Transit	4%	2%	4%	Within district, more walking trips than transit.
Walking	19%	12%	19%	Given the nature of the development, it is anticipated to serve the community and therefore, attract walking trips.
Cycling	1%	1%	3%	
Other	15%	6%	--	

The future travel mode share split was applied to the proposed development. Table 3.4 and 3.5 below depicts the restaurant and medical trips generated for each mode share:

Table 3.4: Restaurant Trips by each Mode

Travel Mode	*Future Mode Share*	*PM*		
		In	*Out*	*Total*
Auto Driver	57%	24	17	41
Auto Passenger	17%	7	5	12
Transit	4%	2	1	3
Cycling	3%	1	1	2
Walking	19%	8	6	14
Total Person Trips	***100%***	43	30	72
	Net Auto Trips	***24***	***17***	***41***

Table 3.5: Medical Trips by each Mode

Travel Mode	*Future Mode Share*	*AM*			*PM*		
		In	*Out*	*Total*	*In*	*Out*	*Total*
Auto Driver	57%	13	4	17	7	19	26
Auto Passenger	17%	4	1	5	2	6	8
Transit	4%	1	0	1	0	1	1
Cycling	3%	1	0	1	0	1	0
Walking	19%	5	1	6	2	6	7
Total Person Trips	***100%***	24	6	30	12	33	45
	Net Auto Trips	***13***	***4***	***17***	***7***	***19***	***26***

3.1.2 Trip Distribution & Assignment

The existing travel patterns for the Kanata-Stittsville from the 2011 Trans-OD Survey Report indicates that nearly 60% of trips remain within the Kanata-Stittsville Area. It also should be noted that given the nature of the proposed development, the site is anticipated to attract local trips from the local community. Based on the above rationale, the total trips (restaurant and medical) were distributed and assigned on the road network as illustrated in Exhibit 3.1.

3.2 BACKGROUND NETWORK TRAVEL DEMANDS

This section of the forecasting report outlines the background network travel demand assumptions.

3.2.1 Transportation Network Plans

A review of the City of Ottawa's Transportation Master Plan (Nov. 2013) (TMP) indicated that:

- *Carp Road:* is proposed to be widened from two to four lanes between Highway 417 and Hazeldean Road. The implementation for the widening is proposed to take place between 2020-2025 horizon years.
- *Stittsville Main Street Extension:* is a new two-lane roadway that would extend Stittsville Main Street to the north east (by approximately 1.5 km) to ultimately connect with Palladium Drive. The TMP indicates the timing for this facility is proposed to occur during Phase-3 (2026-2031) of the plan.

Although the Stittsville Main extension could alter the travel patterns, the implementation of the improvement is anticipated to be beyond the horizon years of this TIA report.

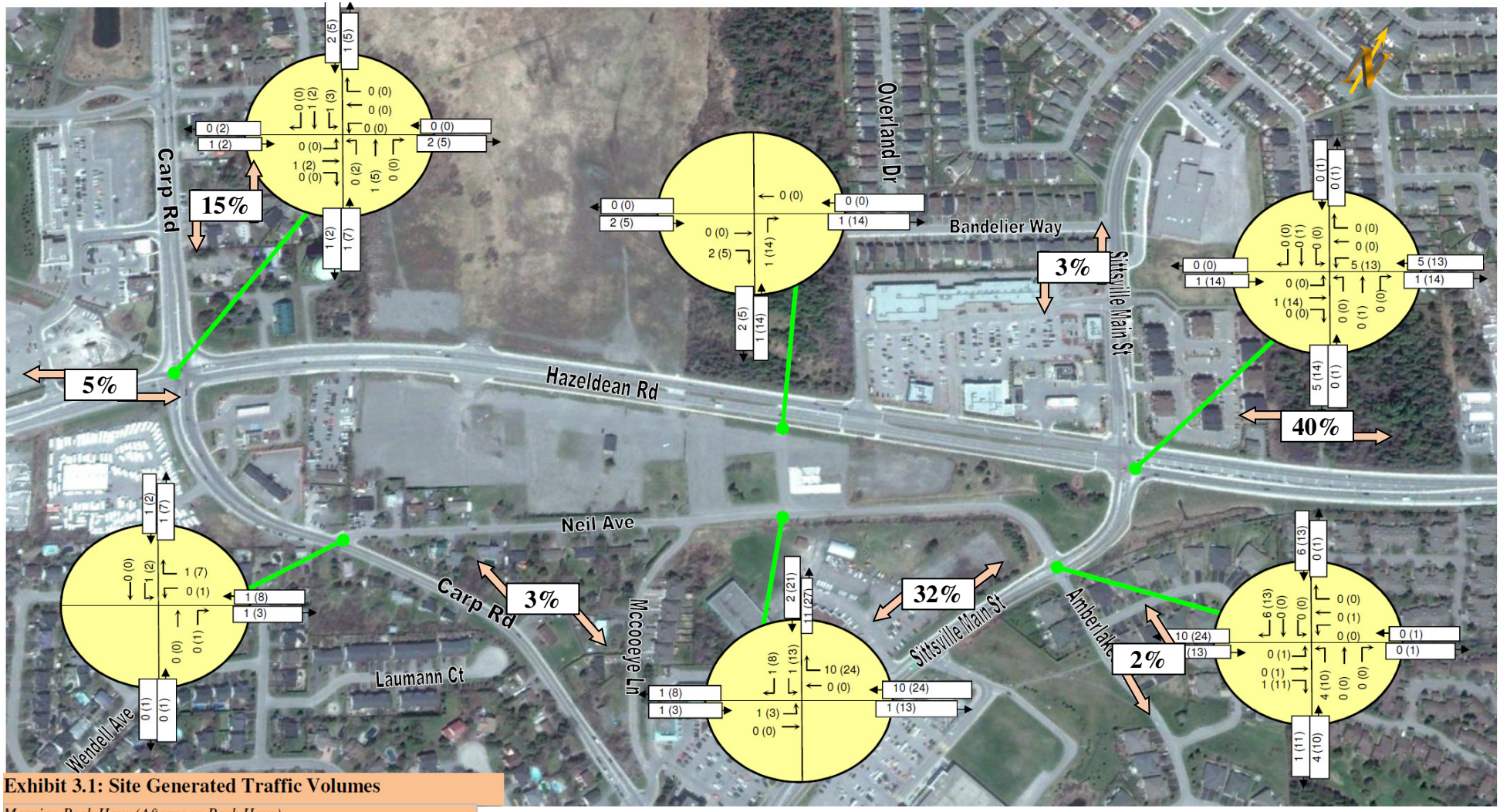

Exhibit 3.1: Site Generated Traffic Volumes

Morning Peak Hour (Afternoon Peak Hour)

3.2.2 General Background Growth

The Transportation Master Plan population growth for the Kanata-Stittsville was reviewed to determine the general growth within the study area. It was determined that on average the annual growth within the Kanata-Stittsville is anticipated to be 2.6 percent. Given the proposed site area is near the urban limit, an annual growth rate of 2 percent was applied on all turning movements at the two Hazeldean Road signalized intersections (Carp Road and Stittsville Main Street) except the movements in and out of Stittsville Main north of Hazeldean Road (given it is predominately residential and Potter's Key development growth was already accounted for). This growth assumption would be applied to the base traffic volumes above and beyond the adjacent development background traffic volumes.

3.2.3 Other Area Development

A review of other adjacent developments planned within the greater study area was undertaken as part of this TIA report. The following summarizes the adjacent developments within the immediate study area that would be included part of this TIA:

- *6141 Hazeldean Road (Potter's Key):* The proposed development would be located north of Hazeldean Road between Carp Road and Stittsville Main Street. The proposed development envisions approximately 400 residential units. It is understood that the development is currently under construction.
- *6130 Hazeldean Road:* The proposed retirement residence development is located east of the proposed site. The development will accommodate a total of 230 units.

3.3 DEMAND RATIONALIZATION

This section rationalizes the assumed future travel demands for the study area to determine if there are any auto capacity limitations of the transportation network. The development projections and background traffic volumes were combined with the base traffic volumes to produce forecast traffic volumes (2020 & 2025) at the study area intersection (See Appendix "B"). Table 4.1 depicts the forecast (2020 and 2025) traffic analysis.

The WB-LT (Forecast 2025 PM volumes = 550 vph) movement from Hazeldean Road onto Stittsville Main Street was determined to operate at congested level of service with v/c ratio above 1.00. It is worthwhile to note:

- The WB-LT (Existing raw 2016 PM volumes = 445 vph) movement does operate at capacity during existing conditions.

- The WB-LT site traffic volumes are forecasted to be less than 15 vph during the afternoon peak hour. This translates on an average to a single vehicle every 4 minutes during the peak hour of travel demand.
- The background traffic growth attribute 85% of growth on this movement (background growth volumes ~ 90 vph that includes annual 2% from 2016 to 2025 resulting in a total of 18% growth).
- The 2% annual background growth could be seen as conservative growth applied to the study area turning movements (albeit estimated annual growth for the greater Kanata-Stittsville area is 2.6% based on TMP population growth). Growth predominately within the Kanata-Stittsville area is occurring east and south-east of the study area and therefore, growth rate could be less in the next 7 years.
- Stittsville Main Street Extension (albeit beyond this TIA horizon year) that would connect to Huntmar/ New N-S arterial road (east of Huntmar) could potentially shift traffic from the WB-LT movement to the SB-TH movement at the intersection.

Optimizing the signal timing (if feasible) at the Hazeldean Road / Stittsville Main Street intersection by accommodating longer cycle length and more green time for the WB-LT movement does result in improvement in LOS from "F" to "D" during the morning peak hour but continues to have high v/c ratio during afternoon peak hour.

4.0 ANALYSIS

4.1 DEVELOPMENT DESIGN

4.1.1 Design for Sustainable Mode

The City of Ottawa's TDM-Supportive Development Design and Infrastructure Checklist was completed for the proposed development (See Appendix "E"). The proposed site fronts Hazeldean Road, which is a transit priority corridor with bus stops located at the Carp Road and Stittsville Main Street intersections with Hazeldean Road. Sidewalks are provided along the study area streets that provide direct route to bus stops with adequate street lights and visibility. It should be appreciated that due to the nature and location of the proposed site, the sustainable mode measures are limited.

4.1.2 Circulation and Access

Loading, short term delivery and garbage pick-ups would be accommodated within the site internal roadway layout.

4.2 PARKING

4.2.1 Parking Supply

The City of Ottawa Zoning By-Law[3] requires the following parking stalls to be provided for the proposed development:

- *Restaurant*: The City's By-law requires a rate of 10 stalls-per-100 m^2, which translates to a parking requirement of 46 stalls.
- *Medical/Office*: The City's By-law requires a rate of 4 stalls-per-100 m^2, which translates to a parking requirement of 38 stalls.

The total parking requirement for the site is estimated to be 84 stalls. The development provides for 62 parking stalls on-site and 22 stalls would be used from the adjacent future retirement home. The adjacent retirement home (which is being currently constructed) accommodates a total of 108 surface stalls with only 59 stalls being required for the development. This results in a surplus of 49 stalls of which 22 stalls would be used for the commercial development. The City of Ottawa By-law indicates that for bicycle parking requirement, a rate of 1-per-250 m^2 is required for the restaurant and 1-per-1,500 m^2 for the medical use. This translates to bicycle requirement of 2 stalls for the restaurant and 1 for the medical office. A total of 5 bicycle stalls are provided by the proposed site, which meets the City of Ottawa By-law requirements.

4.3 BOUNDARY STREET DESIGN

Mobility

The study area corridors for the most part accommodate all modes of transportation that would serve the proposed development:

- *Transit stops and routes along Hazeldean Road;*
- *Sidewalks along the study area corridors; and*
- *Cycling lanes along Hazeldean Road.*

Road Safety

The collision information in the past five years (2012-to-2016) were reviewed for the study area intersections (See section 2.1.2 - Existing Conditions collision analysis Table 2.2). The TIA guidelines indicate that the collision information should be reviewed to identify collision patterns with more than six collisions in five years. A collision pattern involves similar

3 Zoning By-Law 2008-250 – Parking, Queuing and Loading Provisions (Sections 100-114)

directions and impact types. It was determined the following movements exhibited a collision pattern:

- ***Carp Road / Hazeldean Road***:
  - 19 out of 30 rear-end collisions occurred in the WB direction where majority were making a right-turn movement. The intersection currently provides a dedicated channelized WB right-turn lane. The site traffic volumes are anticipated to have negligible impact on this movement.
  - 7 out of 16 turning movement collisions occurred between EB-LT colliding with WB-TH movement. The EB left-turn phase currently operates as a permitted phase. The proposed site is anticipated to have negligible impact on this movement.
- ***Stittsville Main Street / Hazeldean Road***:
  - 28 out of 38 rear-end collisions occurred in the NB direction where majority were making a right-turn movement. The intersection currently provides a dedicated channelized NB right-turn lane. The site traffic volumes are anticipated to have negligible impact on this movement given the site plan offers a right-in/right-out access from Hazeldean Road.
  - 9 out of 12 turning movement collisions occurred between WB-LT colliding with EB-TH movement. The WB left-turn phase operates as a protected/permitted phase. The proposed site is anticipated to add less than 15 vph during the peak hour of travel demand. This translates on an average a single vehicle every 4 minute.

The above collision patterns are pre-existing conditions and the site traffic impacts on the movements noted above are anticipated to be negligible. Mitigation measures for the left-turn collisions with through movements noted above (i.e. EB-LT with WB-TH at Hazeldean Rd/Carp Rd & WB-LT collisions with EB-TH at Hazeldean Rd/Stittsville Main) could include signal phase modification to fully protected left-turn phase. However, this strategy would most likely result in congested intersection operation for the noted left-turn movements above and the intersection as a whole.

Neighbourhood Traffic Management (NTM)

The proposed site is forecasting to add less than 40 vph in the peak direction of travel demand. Approximately 24 vph are forecasted in the peak direction to use Neil Avenue east of the proposed development to connect to Stittsville Main Street. This translates on average to a single vehicle every 2 minutes in the peak direction of peak hour. The proposed site is surrounded by arterial roadway network and the impact on a small section of the local road Neil Avenue is not anticipated to be significant.

4.4 ACCESS INTERSECTION DESIGN

4.4.1 Location and Design of Access

A full movement access would be located along Neil Avenue approximately 260m west of Stittsville Main Street. A right-in/right-out access would be located along Hazeldean Road 60m west of the Jackson Trails Signal Access.

4.4.2 Intersection Control

Both site accesses would be stopped controlled with free flow conditions along Hazeldean Road and Neil Avenue.

4.4.3 Intersection Design

The site accesses are private driveways that would be configured as a single lane in each direction. Synchro analysis is completed below part of Module 4.7 below.

4.5 NEIGHBOURHOOD TRAFFIC MANAGEMENT (NTM)

4.5.1 Adjacent Neighbourhood

The site proposes two access points, a full movement access along Neil Avenue (local road) and another from Hazeldean Road (an arterial roadway). The additional traffic added on the local road Neil Avenue are forecasted to be:

- 13 vph (2 in / 13 out) during the morning peak hour; and
- 48 vph (27 in / 21 out) during the afternoon peak hour.

Approximately 80% of the above traffic are forecasted to head east to connect with Stittsville Main Street (impacting the 265m section of Neil Avenue between the site access and Stittsville Main Street). The additional traffic on Neil Avenue (east of the proposed site access) results on average a single vehicle every 2 minutes during the peak direction of peak hour. Therefore, the proposed development is not anticipated to result in significant auto traffic increase on the local road.

4.6 TRANSIT

4.6.1 Route Capacity

OC Transpo transit service within the vicinity of the site is currently provided with bus stops located south of Neil Avenue along Stittsville Main Street (Route 261 & 301) and Carp Road (Route 61). Bus stops are also located at the Carp Road and Stittsville Main Street intersections along Hazeldean Road (Routes 61 & 162).

For the purpose of this study, the total projected passenger demand generated by the development in both directions were less than 5 passengers during the afternoon peak hour. This

represents a 4% transit mode share for the proposed site given the nature of the development. Therefore, it is reasonable to assume that the current transit service would accommodate the proposed development.

4.6.2 Transit Priority

Transit services are not anticipated to be impacted by the development access and driveways. According to the TMP, Hazeldean Road (between Stittsville Main Street and Eagleson Road) is a Transit Priority corridor, which include improvements to transit signal priority and queue jump [Map 5 Rapid Transit and Transit Priority Network – Affordable Network]. As noted above, the impacts of transit generated demands by the new development is anticipated to be negligible and accommodated by the existing transit provisions offered by the study area.

4.7 INTERSECTION DESIGN

Table 4.1 indicates the overall level-of-service (LOS) for each intersection, critical movements and volume-to-capacity ratio for the existing, 2020 and 2025 horizon years. Forecast traffic volumes were analyzed using Synchro 10™ traffic analysis software to assess the impact of the forecast traffic on the intersections within the study area (See Appendix "C"). It should be noted that a volume to capacity (v/c) ratio of greater than 0.9 was considered unsatisfactory.

All the study area intersections operate at a satisfactory level of service during both peak hours of travel demand. The WB-LT (Existing PM volumes = 462 vph) movement from Hazeldean Road onto Stittsville Main Street was determined to operate at congested level of service with v/c ratio of over 1.00 during existing conditions. This would continue to operate at congested level of service with v/c ratio above 1.00 during the forecast conditions. It is worthwhile to note:

- The WB-LT site traffic volumes are forecasted to be less than 15 vph during the afternoon peak hour. This translates on an average to a single vehicle every 4 minutes during the peak hour of travel demand.
- The background traffic growth attribute 85% of growth on this movement (background growth volumes ~ 90 vph that includes annual 2% from 2016 to 2025 resulting in a total of 18% growth).
- The 2% annual background growth could be seen as conservative growth applied to the study area turning movements (albeit estimated annual growth for the greater Kanata-Stittsville area is 2.6% based on TMP population growth). Growth predominately within the Kanata-Stittsville area is occurring east and south-east of the study area and therefore, growth rate could be less in the next 7 years.
- Stittsville Main Street Extension (albeit beyond this TIA horizon year) that would connect to Huntmar/ New N-S arterial road (east of Huntmar) could potentially shift traffic from the WB-LT movement to the SB-TH movement at the intersection.

Optimizing the signal timing (if feasible) at the Hazeldean Road / Stittsville Main Street intersection by accommodating longer cycle length and more green time for the WB-LT movement does result in improvement in LOS from "F" to "D" during the morning peak hour. However, the WB-LT movement continues to exhibit high v/c ratio during the afternoon peak hour assuming optimized signal timing.

Table 4.1: Intersection Capacity Analysis Results

Intersections		Morning Peak Hour			Afternoon Peak Hour		
		Overall LOS	*Critical Approach*		*Overall LOS*	*Critical Approach*	
			Movement	*LOS, V/C*		*Movement*	*LOS, V/C*
Existing Intersection Capacity Analysis							
Hazeldean / Stittsville Main	Traffic Control Signal	E	**WB-LT**	**F, 1.23**	E	**WB-LT** **WB-TH**	**F, 1.28** **E, 0.94**
Hazeldean / Carp	Traffic Control Signal	C	EB-LT	D, 0.72	C	SB-LT	C, 0.71
Stittsville Main / Neil	Stop-Control	B	EB-T/LT	C, 0.003	C	EB-T/LT	E, 0.04
Carp / Neil	Stop-Control	B	WB	B, 0.02	B	WB	B, 0.06
Forecast (2020) Traffic Analysis							
Hazeldean / Stittsville Main	Existing Signal Timing	E	**WB-LT**	**F, 1.23**	E	**WB-LT** **WB-TH**	**F, 1.28** **E, 0.97**
	Optimized Signal Timing	D	WB-LT	D, 0.81	D	**WB-LT** WB-TH	**F, 1.04** D, 0.86
Hazeldean / Carp	Traffic Control Signal	C	EB-LT	D, 0.72	C	SB-LT	C, 0.67
Stittsville Main / Neil	Stop-Control	B	EB-T/LT	C, 0.01	C	EB-T/LT	E, 0.07
Carp / Neil	Stop-Control	B	WB	B, 0.04	B	WB	B, 0.08
Forecast (2025) Traffic Analysis							
Hazeldean / Stittsville Main	Existing Signal Timing	E	**WB-LT**	**F, 1.33**	**F**	**WB-LT** **WB-TH**	**F, 1.42** **F, 1.03**
	Optimized Signal Timing	D	WB-LT	D, 0.80	D	**WB-LT** WB-TH	**F, 1.09** D, 0.86
Hazeldean / Carp	Traffic Control Signal	C	EB-LT	D, 0.74	C	SB-LT	C, 0.77
Stittsville Main / Neil	Stop-Control	B	EB-T/LT	C, 0.01	C	EB-L/TH	E, 0.08
Carp / Neil	Stop-Control	B	WB	B, 0.04	C	WB	C, 0.10

Table 4.2 also depicts the Multi-Modal Level of Service (MMLOS) estimates for all modes of transportation for the study area traffic-controlled intersections and provides a comparison to the target LOS shown in the MMLOS guidelines. Appendix "D" illustrates the detailed MMLOS analysis for the study area intersections. Please note that the LOS shown in Table 4.2 assume the worst-case approach/crossing leg for all modes of transportation.

Table 4.2: MMLOS Analysis[1]

Intersections	Pedestrian (PLOS)		Bicycle (BLOS)		Transit (TLOS)[2]		Truck (TkLOS)		Vehicle (LOS)[2]	
	PLOS	Target	BLOS	Target	TLOS[3]	Target	TkLOS	Target	LOS	Target
Hazeldean/Stittsville Main	E	C	F	C	F	D	E	D	D	D
Hazeldean/Carp	D	C	F	C	E	D	E	D	C	D

1- Arterial Main Street Land Use Designation/Policy Area was assumed for the proposed development (fronts Hazeldean Road).
2- LOS assumes 2025 horizon year during the worst-case afternoon peak hour of travel demand.
3- Transit LOS was based on Synchro delay estimate for the approach.

The following bullets summaries Table 4.2 above:

- **Pedestrians** – The PLOS is one level of service lower than the target for Hazeldean/Carp intersection and two level lower for Hazeldean/Stittsville Main. PLOS target is difficult to achieve at any intersection given the PLOS is based on multiple factors such as conflicting movements, crossing distance, cycling length, walking time, etc. It should be noted that PLOS "E" at the Hazeldean/Stittsville Main occurs at the east-west approach predominantly due to the wide pavement width (2-lanes at each approach, auxiliary lanes, bike lanes, etc.).
- **Bicycles** – The BLOS results in unsatisfactory level of service due to cyclist crossing a lane or two to make the left-turn movement along Hazeldean Road. The right-turn movement result in BLOS "D" or better. Hazeldean Road has bike lanes, which achieves BLOS "C" along the segment of the road.
- **Transit** – The TLOS are estimates based on the Synchro delay at the approaches of the intersections. Hazeldean Road is a transit priority corridor (isolated measures) within the study area and accommodates transit stops. It is anticipated that isolated measures would reduce travel time and improve TLOS once those measures are implemented.
- **Trucks** – Hazeldean Road, Stittsville Main (south of Hazeldean Rd) and Carp Road are classified as truck routes. The TkLOS "E" is based on worst-case level of service for trucks turning from Hazeldean onto Stittsville Main and Carp Road south. The remaining movement operate at TkLOS "C" or better and Hazeldean Road segment achieves a TkLOS "A".
- **Vehicles** – The auto vehicle LOS is depicted in Table 4.2 are the overall level of service at the intersection. The results indicated that vehicle LOS meet the target LOS "D".

Segment MMLOS for Boundary Streets:

The MMLOS was also assessed for the boundary streets that includes Hazeldean Road, Stittsville Main Street, Carp Road and Neil Avenue.

Pedestrians

- Hazeldean Road offers a sidewalk of at least 2m with boulevard that is wider than 2m. Stittsville Main Street and Carp Road both offer at least 2m wide sidewalk. Using Exhibit 4 of the MMLOS guidelines, all three boundary streets result in PLOS "C", which meet the target PLOS.
- Neil Avenue is a local road that is characterized by low traffic volumes with no sidewalks. This would result in a PLOS "F" as per Exhibit 4 of the MMLOS guidelines. However, given the nature of the existing land uses fronting Neil Avenue and the proposed commercial site fronting Hazeldean Road, pedestrian activities along Neil Avenue are anticipated to be low.

Bicycles – All arterial corridors accommodate bike lanes, which at worst case result in BLOS "C" and meet the target BLOS. Neil Avenue is a local road that falls under mixed traffic scenario and results in a BLOS "B[4]", which meets the MMLOS target (general urban area for local road).

Transit – The segment TLOS is difficult to predict given it is based on qualitative high-level assessment (as per Exhibit 15 of the MMLOS guidelines). However, the arterial roads are mixed traffic facility types and with limited driveways in the vicinity of the site, it can be anticipated that TLOS "D" can be achieved, which meets the target. It should be noted that Hazeldean Road is a transit priority corridor (isolated measures) within the study area. It is anticipated that isolated measures would reduce travel time and improve TLOS once those measures are implemented. There are no transit services along Neil Avenue, therefore no MMLOS segment analysis was undertaken.

Trucks – Hazeldean Road, Stittsville Main (south of Hazeldean Rd) and Carp Road are classified as truck routes. With wide pavement width and Hazeldean Road being a 4-lane facility, a segment TkLOS "A" or "B" can be achieved for the boundary streets, which exceeds the target TkLOS "D". Neil Avenue is a local road and therefore no target level of service is identified in the MMLOS guidelines.

5.0 CONCLUSION

The TIA report yields the following conclusions:

- All the study area intersections operate at a satisfactory level of service during both peak hours of travel demand. The WB-LT movement from Hazeldean Road onto Stittsville Main Street was determined to operate at congested level of service with v/c ratio over the 0.90 threshold.
    a. The failure level of service at the WB left-turn movement is a pre-exiting condition.

4 MMLOS Guidelines Exhibit 11, Mixed Traffic, 2-travel lanes, 50km/hr no marked centerline or classified as residential

b. The proposed development traffic volumes have negligible impact on the WB-LT.
c. Optimizing the signal timing (if feasible) at the Hazeldean Road / Stittsville Main Street intersection by accommodating longer cycle length and more green time for the WB-LT movement does result in improvement in LOS from "F" to "D" during the morning peak hour. However, the WB-LT movement continues to exhibit high v/c ratio during the afternoon peak hour assuming optimized signal timing.

- The proposed vehicular site traffic volumes were determined to result in negligible impact on traffic operations.
- The proposed development is not anticipated to result in significant auto traffic increase on the local road.
- The impacts on non-auto mode by the new development is anticipated to be negligible and accommodated by the existing infrastructure offered by the study area.

The TIA report concluded that no roadway improvements or monitoring plan is required as a result of the proposed development. Therefore, the results indicate that the City of Ottawa should be encouraged to assemble the appropriate conditions that would permit the development application to proceed.

Yours Truly,

Arman Matti

Arman Matti, P. Eng.
Transportation Engineer
March 2019

Appendix A

Screening Form

Castleglenn Consultants
Engineers, Project Managers & Planners

2460 Lancaster Road, Suite 200,
Ottawa, Ontario, K1B 4S5
Tel: 613-731-4052

City of Ottawa 2017 TIA Guidelines Screening Form

Ms. Rosanna Baggs
Project Manager, City of Ottawa
110 Laurier Avenue West,
Ottawa, ON, K1G 6J9

March 8th, 2018

Please see below the completed screening form for the proposed commercial/office development located at south of Hazeldean Road and north of Neil Avenue.

1. Description of Proposed Development

Municipal Address	6150 Hazeldean Road
Description of Location	The proposed site is located south of Hazeldean Road and north of Neil Avenue.
Land Use Classification	Commercial/Offic
Development Size (units)	NA
Development Size (m^2)	Restaurant ~ 465 m^2 & Retail/Office ~ 925 m^2. Total development size ~ 1,390 m^2
Number of Accesses and Locations	Two Access locations, one right-in/right-out by way of Hazeldean Road and the other full-movement from Neil Avenue.
Phase of Development	Unknown at this stage
Buildout Year	Unknown

2. Trip Generation Trigger

The development will consist of:

- A single storey 465 m^2 restaurant that is <u>not</u> envisioned to be fast food/drive-thru restaurant; and
- A 2-storey medical/office building located east of the restaurant.

The medical/office component is less than the minimum threshold size, however, the restaurant (albeit not a fast-food restaurant) exceeds the minimum development size. Therefore, <u>the Trip Generation Trigger is satisfied.</u>

Castleglenn Consultants
Engineers, Project Managers & Planners

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Table 2: Trip Generation Trigger

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

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or **Spine Bicycle Networks**?		X[1]
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone? *	X	

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

1- The proposed site would use the right-in/right-out access from Hazeldean Road that is currently being constructed for the adjacent retirement home east of the proposed site.

The site is within DPA area, **therefore, <u>the Location Trigger is satisfied</u>.**

4. Safety Triggers

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

2460 Lancaster Road, Suite 200,
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Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		X[1]
Does the development include a drive-thru facility?		X

1- To best of Castleglenn's Knowledge, we are not aware at this time of traffic operations or safety concerns within the study area.

Given the above, the Safety Trigger is assumed to be satisfied.

5. Summary

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

Please review the above screening information and let us know your comments or questions before proceeding to the next step of the TIA.

Yours Truly,

Arman Matti

Arman Matti, P.Eng.
Transportation Engineer
Castleglenn Consultants Inc.

Appendix B

Forecast Traffic Volumes

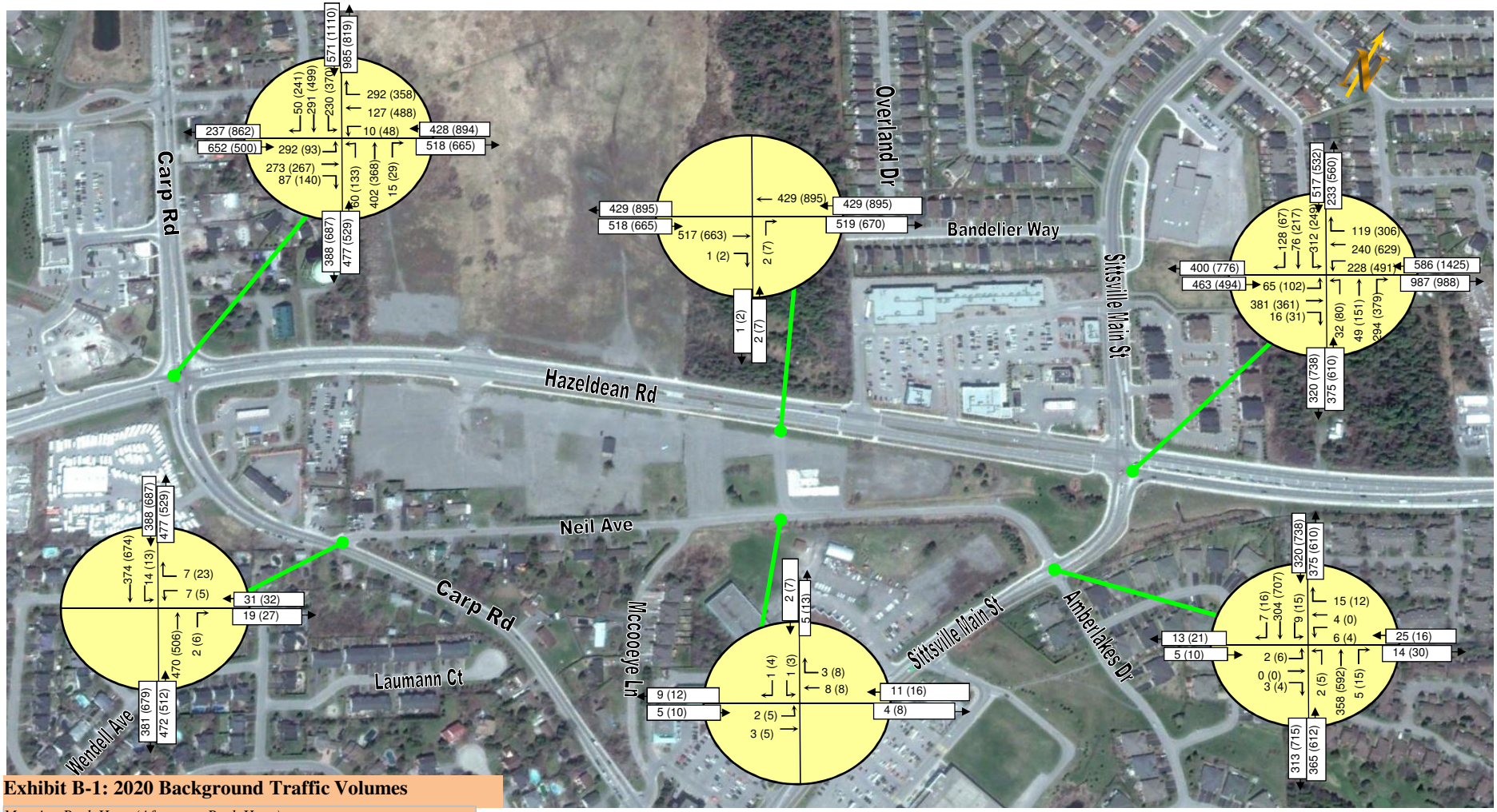


Exhibit B-1: 2020 Background Traffic Volumes

Morning Peak Hour (Afternoon Peak Hour)

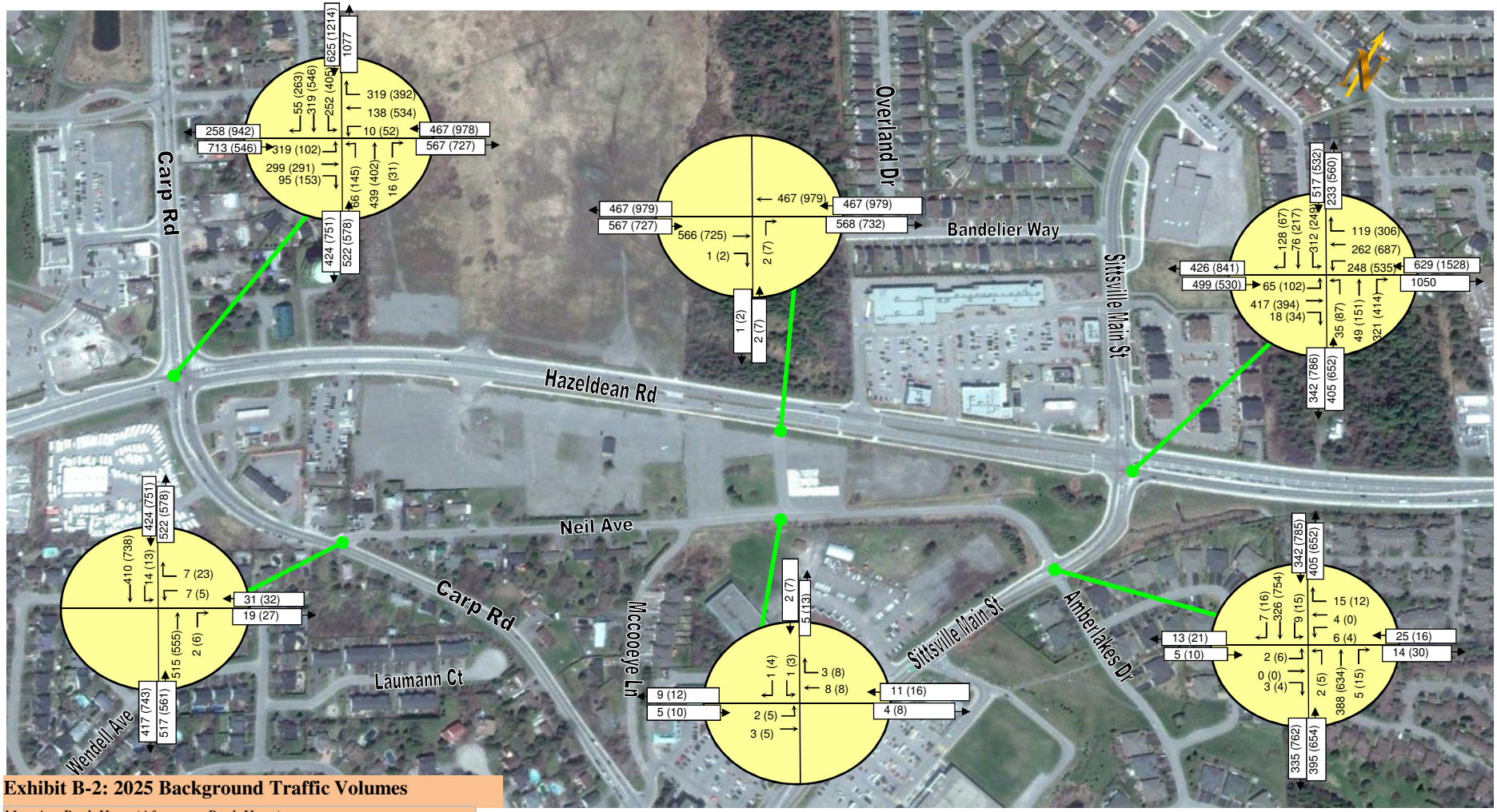


Exhibit B-2: 2025 Background Traffic Volumes

Morning Peak Hour (Afternoon Peak Hour)

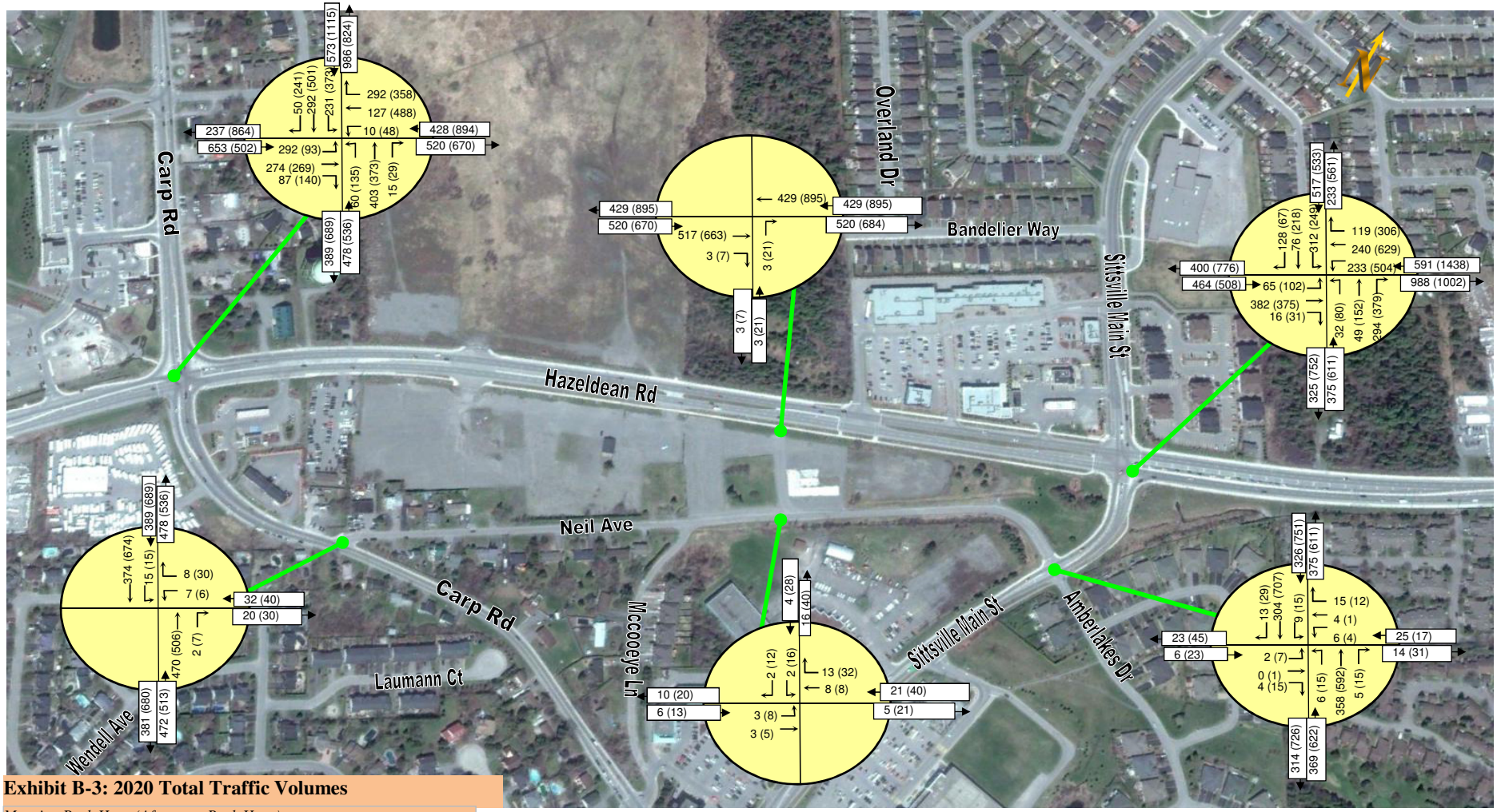


Exhibit B-3: 2020 Total Traffic Volumes

Morning Peak Hour (Afternoon Peak Hour)

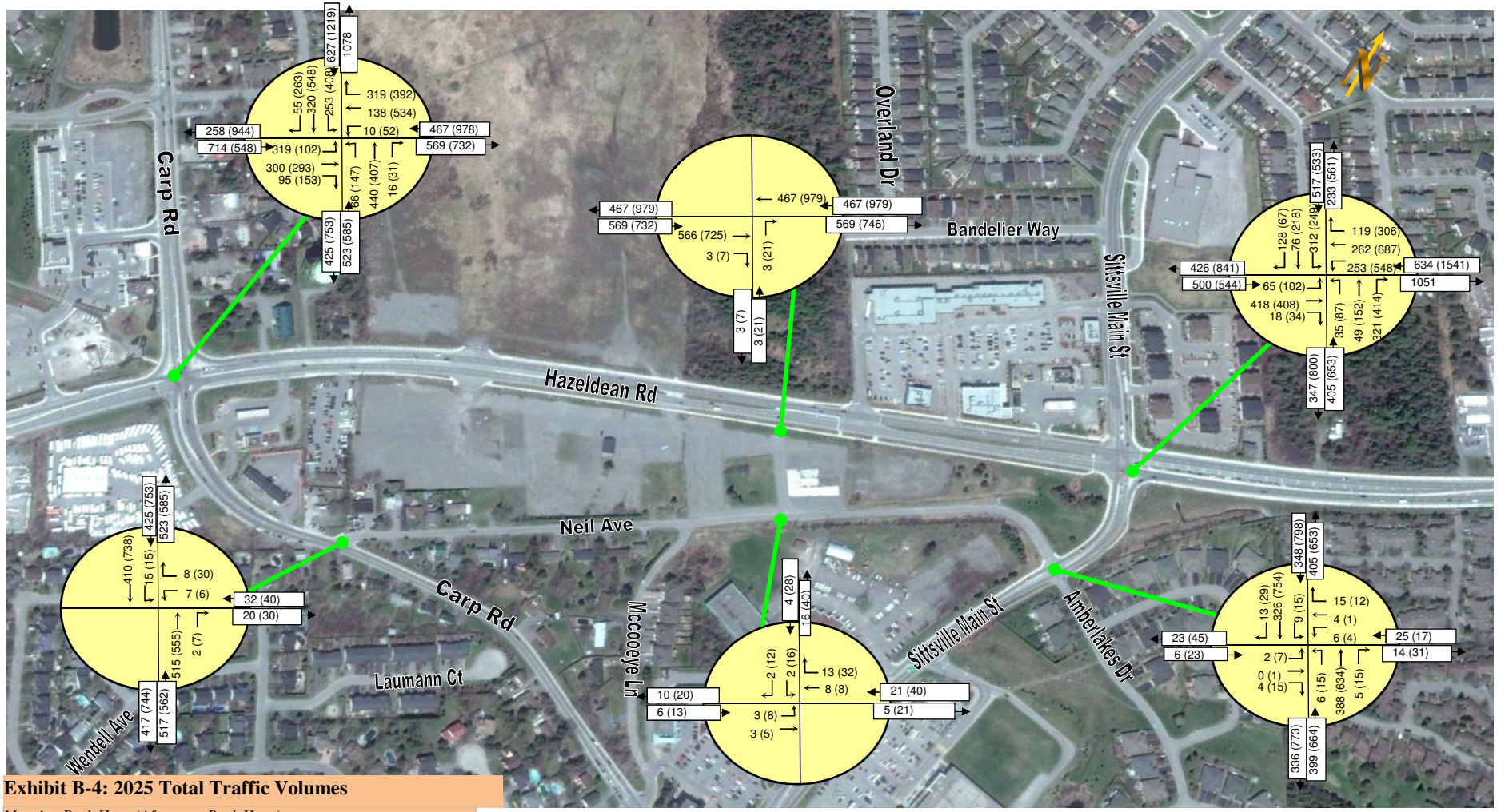


Exhibit B-4: 2025 Total Traffic Volumes

Morning Peak Hour (Afternoon Peak Hour)

Appendix C

Intersection Capacity Analysis

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	6	452	2	13	359
Future Vol, veh/h	1	6	452	2	13	359
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	7	491	2	14	390

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	910	492	0	0	493	0
Stage 1	492	-	-	-	-	-
Stage 2	418	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	305	577	-	-	1071	-
Stage 1	615	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	300	577	-	-	1071	-
Mov Cap-2 Maneuver	300	-	-	-	-	-
Stage 1	605	-	-	-	-	-
Stage 2	664	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.2	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	510	1071	-
HCM Lane V/C Ratio	-	-	0.015	0.013	-
HCM Control Delay (s)	-	-	12.2	8.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

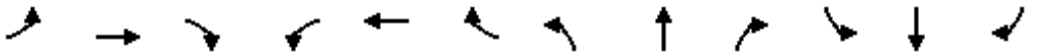
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	2	6	4	15	0	338	5	9	278	3
Future Vol, veh/h	1	0	2	6	4	15	0	338	5	9	278	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	200	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	1	0	2	7	4	16	0	367	5	10	302	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	704	696	304	695	695	370	305	0	0	372	0	0
Stage 1	324	324	-	370	370	-	-	-	-	-	-	-
Stage 2	380	372	-	325	325	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	354	368	740	359	368	680	1267	-	-	1198	-	-
Stage 1	692	653	-	654	624	-	-	-	-	-	-	-
Stage 2	646	622	-	692	653	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	340	365	740	356	365	680	1267	-	-	1198	-	-
Mov Cap-2 Maneuver	340	365	-	356	365	-	-	-	-	-	-	-
Stage 1	692	648	-	654	624	-	-	-	-	-	-	-
Stage 2	626	622	-	684	648	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	12.6	0	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1267	-	-	340	740	501	1198	-	-
HCM Lane V/C Ratio	-	-	-	0.003	0.003	0.054	0.008	-	-
HCM Control Delay (s)	0	-	-	15.6	9.9	12.6	8	-	-
HCM Lane LOS	A	-	-	C	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0.2	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	281	259	84	9	106	281	58	386	14	221	279	48
Future Volume (veh/h)	281	259	84	9	106	281	58	386	14	221	279	48
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1730	1786	1786	1674	1772	1716	1772	1758	1758	1786	1772	1786
Adj Flow Rate, veh/h	305	282	91	10	115	0	63	420	15	240	303	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	1	1	9	2	6	2	3	3	1	2	1
Cap, veh/h	421	841	266	300	587		498	1323	47	536	985	
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.00	0.40	0.40	0.40	0.10	0.56	0.00
Sat Flow, veh/h	1247	2537	802	953	1772	1454	1076	3289	117	1701	1772	1514
Grp Volume(v), veh/h	305	187	186	10	115	0	63	213	222	240	303	0
Grp Sat Flow(s),veh/h/ln	1247	1697	1642	953	1772	1454	1076	1670	1737	1701	1772	1514
Q Serve(g_s), s	25.5	9.1	9.4	0.9	5.1	0.0	4.1	9.6	9.6	8.7	10.1	0.0
Cycle Q Clear(g_c), s	30.6	9.1	9.4	10.3	5.1	0.0	4.1	9.6	9.6	8.7	10.1	0.0
Prop In Lane	1.00		0.49	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	421	563	544	300	587		498	671	698	536	985	
V/C Ratio(X)	0.72	0.33	0.34	0.03	0.20		0.13	0.32	0.32	0.45	0.31	
Avail Cap(c_a), veh/h	570	765	740	414	799		498	671	698	569	985	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.2	27.6	27.7	31.6	26.3	0.0	20.9	22.5	22.5	15.6	13.1	0.0
Incr Delay (d2), s/veh	3.0	0.3	0.4	0.0	0.2	0.0	0.5	1.2	1.2	0.6	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	3.3	3.3	0.2	1.9	0.0	1.0	3.6	3.8	2.9	3.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.2	28.0	28.1	31.6	26.4	0.0	21.4	23.8	23.7	16.2	13.9	0.0
LnGrp LOS	D	C	C	C	C		C	C	C	B	B	
Approach Vol, veh/h		678			125	A		498			543	A
Approach Delay, s/veh		33.5			26.9			23.5			14.9	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	16.9	50.2		42.9		67.1		42.9				
Change Period (Y+Rc), s	6.0	6.0		* 6.4		6.0		* 6.4				
Max Green Setting (Gmax), s	13.0	29.0		* 50		48.0		* 50				
Max Q Clear Time (g_c+I1), s	10.7	11.6		32.6		12.1		12.3				
Green Ext Time (p_c), s	0.2	3.2		3.9		2.4		0.8				

Intersection Summary												
HCM 6th Ctrl Delay			24.9									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	62	367	16	215	231	92	31	41	282	225	59	111
Future Volume (veh/h)	62	367	16	215	231	92	31	41	282	225	59	111
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1786	1772	1772	1800	1772	1786	1800	1800	1730
Adj Flow Rate, veh/h	67	399	17	234	251	100	34	45	0	245	64	121
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	1	2	2	0	2	1	0	0	5
Cap, veh/h	204	526	22	190	385	149	673	810		837	937	763
Arrive On Green	0.04	0.16	0.16	0.05	0.16	0.16	0.03	0.46	0.00	0.09	0.52	0.52
Sat Flow, veh/h	1714	3316	141	1701	2371	919	1714	1772	1514	1714	1800	1466
Grp Volume(v), veh/h	67	204	212	234	176	175	34	45	0	245	64	121
Grp Sat Flow(s),veh/h/ln	1714	1697	1761	1701	1683	1607	1714	1772	1514	1714	1800	1466
Q Serve(g_s), s	3.6	12.6	12.7	5.3	10.8	11.2	1.1	1.6	0.0	7.9	1.9	4.7
Cycle Q Clear(g_c), s	3.6	12.6	12.7	5.3	10.8	11.2	1.1	1.6	0.0	7.9	1.9	4.7
Prop In Lane	1.00		0.08	1.00		0.57	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	204	269	279	190	274	261	673	810		837	937	763
V/C Ratio(X)	0.33	0.76	0.76	1.23	0.64	0.67	0.05	0.06		0.29	0.07	0.16
Avail Cap(c_a), veh/h	211	544	565	190	540	516	814	810		870	937	763
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.0	44.3	44.3	45.8	43.1	43.3	14.8	16.6	0.0	12.1	13.1	13.8
Incr Delay (d2), s/veh	0.9	4.3	4.3	142.6	2.5	3.0	0.0	0.1	0.0	0.2	0.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	5.1	5.3	9.8	4.2	4.2	0.4	0.6	0.0	2.5	0.7	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.9	48.6	48.6	188.4	45.6	46.2	14.8	16.7	0.0	12.2	13.3	14.2
LnGrp LOS	D	D	D	F	D	D	B	B		B	B	B
Approach Vol, veh/h		483			585			79	A		430	
Approach Delay, s/veh		47.1			102.9			15.9			13.0	
Approach LOS		D			F			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	24.1	9.9	63.9	11.5	24.6	16.9	57.0
Change Period (Y+Rc), s	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7
Max Green Setting (Gmax), s	* 5.3	* 35	* 12	* 30	* 5.3	* 35	* 12	* 30
Max Q Clear Time (g_c+I1), s	7.3	14.7	3.1	6.7	5.6	13.2	9.9	3.6
Green Ext Time (p_c), s	0.0	2.7	0.0	1.0	0.0	2.4	0.2	0.2

Intersection Summary	
HCM 6th Ctrl Delay	56.9
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	4	19	486	5	10	648
Future Vol, veh/h	4	19	486	5	10	648
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	21	528	5	11	704

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1257	531	0	0	533	0
Stage 1	531	-	-	-	-	-
Stage 2	726	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	189	548	-	-	1035	-
Stage 1	590	-	-	-	-	-
Stage 2	479	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	186	548	-	-	1035	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	580	-	-	-	-	-
Stage 2	479	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.4	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	409	1035	-
HCM Lane V/C Ratio	-	-	0.061	0.011	-
HCM Control Delay (s)	-	-	14.4	8.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

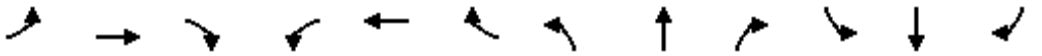
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	0	4	0	12	1	541	15	15	651	5
Future Vol, veh/h	4	0	0	4	0	12	1	541	15	15	651	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	200	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	4	0	0	4	0	13	1	588	16	16	708	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1348	1349	711	1341	1343	596	713	0	0	604	0	0
Stage 1	743	743	-	598	598	-	-	-	-	-	-	-
Stage 2	605	606	-	743	745	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	129	152	436	131	153	507	896	-	-	984	-	-
Stage 1	410	425	-	492	494	-	-	-	-	-	-	-
Stage 2	488	490	-	410	424	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	124	149	436	129	150	507	896	-	-	984	-	-
Mov Cap-2 Maneuver	124	149	-	129	150	-	-	-	-	-	-	-
Stage 1	410	418	-	492	494	-	-	-	-	-	-	-
Stage 2	475	490	-	403	417	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.1	18.1	0	0.2
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	896	-	-	124	-	293	984	-	-
HCM Lane V/C Ratio	0.001	-	-	0.035	-	0.059	0.017	-	-
HCM Control Delay (s)	9	-	-	35.1	0	18.1	8.7	-	-
HCM Lane LOS	A	-	-	E	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	-	0.2	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	247	135	46	466	345	128	350	28	356	477	232
Future Volume (veh/h)	90	247	135	46	466	345	128	350	28	356	477	232
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1730	1786	1786	1674	1772	1716	1772	1758	1758	1786	1772	1786
Adj Flow Rate, veh/h	98	268	147	50	507	0	139	380	30	387	518	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	5	1	1	9	2	6	2	3	3	1	2	1
Cap, veh/h	172	808	430	322	669		327	948	74	546	919	
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.00	0.30	0.30	0.30	0.17	0.52	0.00
Sat Flow, veh/h	871	2139	1138	917	1772	1454	883	3137	247	1701	1772	1514
Grp Volume(v), veh/h	98	211	204	50	507	0	139	201	209	387	518	0
Grp Sat Flow(s),veh/h/ln	871	1697	1581	917	1772	1454	883	1670	1714	1701	1772	1514
Q Serve(g_s), s	13.3	10.6	11.1	4.9	29.9	0.0	15.6	11.5	11.6	18.2	23.9	0.0
Cycle Q Clear(g_c), s	43.2	10.6	11.1	16.0	29.9	0.0	15.6	11.5	11.6	18.2	23.9	0.0
Prop In Lane	1.00		0.72	1.00		1.00	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	172	641	597	322	669		327	505	518	546	919	
V/C Ratio(X)	0.57	0.33	0.34	0.16	0.76		0.43	0.40	0.40	0.71	0.56	
Avail Cap(c_a), veh/h	174	645	601	324	673		327	505	518	546	919	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.4	26.5	26.7	32.4	32.5	0.0	34.7	33.2	33.3	21.8	19.6	0.0
Incr Delay (d2), s/veh	4.3	0.3	0.3	0.2	4.9	0.0	4.0	2.4	2.3	4.2	2.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	3.8	3.7	1.0	12.1	0.0	3.5	4.6	4.8	7.0	9.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.6	26.8	27.0	32.6	37.5	0.0	38.7	35.6	35.6	26.1	22.1	0.0
LnGrp LOS	E	C	C	C	D		D	D	D	C	C	
Approach Vol, veh/h		513			557	A		549			905	A
Approach Delay, s/veh		32.4			37.0			36.4			23.8	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	26.0	42.3		51.7		68.3		51.7				
Change Period (Y+Rc), s	6.0	6.0		* 6.4		6.0		* 6.4				
Max Green Setting (Gmax), s	20.0	36.0		* 46		62.0		* 46				
Max Q Clear Time (g_c+I1), s	20.2	17.6		45.2		25.9		31.9				
Green Ext Time (p_c), s	0.0	3.8		0.2		4.7		3.4				

Intersection Summary			
HCM 6th Ctrl Delay		31.2	
HCM 6th LOS		C	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	94	347	30	462	605	222	77	117	363	187	180	63
Future Volume (veh/h)	94	347	30	462	605	222	77	117	363	187	180	63
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1786	1772	1772	1800	1772	1786	1800	1800	1730
Adj Flow Rate, veh/h	102	377	33	502	658	241	84	127	0	203	196	68
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	1	1	1	2	2	0	2	1	0	0	5
Cap, veh/h	180	706	62	393	700	256	483	588		580	682	555
Arrive On Green	0.06	0.22	0.22	0.13	0.29	0.29	0.05	0.33	0.00	0.09	0.38	0.38
Sat Flow, veh/h	1714	3158	275	1701	2413	883	1714	1772	1514	1714	1800	1466
Grp Volume(v), veh/h	102	202	208	502	459	440	84	127	0	203	196	68
Grp Sat Flow(s),veh/h/ln	1714	1697	1736	1701	1683	1613	1714	1772	1514	1714	1800	1466
Q Serve(g_s), s	5.4	12.6	12.7	15.3	31.9	32.0	3.8	6.2	0.0	9.1	9.1	3.6
Cycle Q Clear(g_c), s	5.4	12.6	12.7	15.3	31.9	32.0	3.8	6.2	0.0	9.1	9.1	3.6
Prop In Lane	1.00		0.16	1.00		0.55	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	180	380	388	393	488	468	483	588		580	682	555
V/C Ratio(X)	0.57	0.53	0.54	1.28	0.94	0.94	0.17	0.22		0.35	0.29	0.12
Avail Cap(c_a), veh/h	293	499	511	393	495	474	579	588		596	682	555
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.4	41.0	41.1	37.8	41.6	41.6	24.4	28.8	0.0	22.1	26.0	24.3
Incr Delay (d2), s/veh	2.8	1.2	1.2	143.5	26.1	27.0	0.2	0.8	0.0	0.4	1.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	4.9	5.1	19.5	15.3	14.8	1.5	2.6	0.0	3.4	3.8	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.2	42.2	42.2	181.3	67.7	68.6	24.6	29.7	0.0	22.5	27.0	24.7
LnGrp LOS	D	D	D	F	E	E	C	C		C	C	C
Approach Vol, veh/h		512			1401			211	A		467	
Approach Delay, s/veh		41.4			108.7			27.7			24.7	
Approach LOS		D			F			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	33.5	12.3	52.2	14.1	41.5	17.9	46.5
Change Period (Y+Rc), s	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7
Max Green Setting (Gmax), s	* 15	* 35	* 12	* 30	* 15	* 35	* 12	* 30
Max Q Clear Time (g_c+I1), s	17.3	14.7	5.8	11.1	7.4	34.0	11.1	8.2
Green Ext Time (p_c), s	0.0	2.7	0.1	1.5	0.2	0.8	0.1	0.7

Intersection Summary	
HCM 6th Ctrl Delay	73.7
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	8	470	2	15	374
Future Vol, veh/h	7	8	470	2	15	374
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	8	470	2	15	374

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	875	471	0	0	472	0
Stage 1	471	-	-	-	-	-
Stage 2	404	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	320	593	-	-	1090	-
Stage 1	628	-	-	-	-	-
Stage 2	674	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	315	593	-	-	1090	-
Mov Cap-2 Maneuver	315	-	-	-	-	-
Stage 1	617	-	-	-	-	-
Stage 2	674	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.9	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	420	1090	-
HCM Lane V/C Ratio	-	-	0.036	0.014	-
HCM Control Delay (s)	-	-	13.9	8.3	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

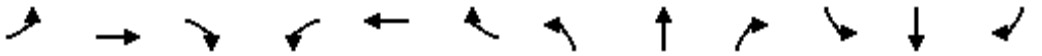
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	4	6	4	15	6	358	5	9	304	13
Future Vol, veh/h	2	0	4	6	4	15	6	358	5	9	304	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	200	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	2	0	4	6	4	15	6	358	5	9	304	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	711	704	311	704	708	361	317	0	0	363	0	0
Stage 1	329	329	-	373	373	-	-	-	-	-	-	-
Stage 2	382	375	-	331	335	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	351	364	734	354	362	688	1255	-	-	1207	-	-
Stage 1	688	650	-	652	622	-	-	-	-	-	-	-
Stage 2	645	621	-	687	646	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	337	360	734	349	358	688	1255	-	-	1207	-	-
Mov Cap-2 Maneuver	337	360	-	349	358	-	-	-	-	-	-	-
Stage 1	685	645	-	649	619	-	-	-	-	-	-	-
Stage 2	624	618	-	678	641	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	12.6	0.1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1255	-	-	337	734	498	1207	-	-
HCM Lane V/C Ratio	0.005	-	-	0.006	0.005	0.05	0.007	-	-
HCM Control Delay (s)	7.9	-	-	15.7	9.9	12.6	8	-	-
HCM Lane LOS	A	-	-	C	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0.2	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	292	274	87	10	127	292	60	403	15	231	292	50
Future Volume (veh/h)	292	274	87	10	127	292	60	403	15	231	292	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1730	1786	1786	1674	1772	1716	1772	1758	1758	1786	1772	1786
Adj Flow Rate, veh/h	292	274	87	10	127	0	60	403	15	231	292	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	1	1	9	2	6	2	3	3	1	2	1
Cap, veh/h	407	837	260	302	582		510	1342	50	546	990	
Arrive On Green	0.33	0.33	0.33	0.33	0.33	0.00	0.41	0.41	0.41	0.10	0.56	0.00
Sat Flow, veh/h	1234	2548	792	964	1772	1454	1087	3284	122	1701	1772	1514
Grp Volume(v), veh/h	292	180	181	10	127	0	60	205	213	231	292	0
Grp Sat Flow(s),veh/h/ln	1234	1697	1643	964	1772	1454	1087	1670	1736	1701	1772	1514
Q Serve(g_s), s	24.7	8.8	9.1	0.9	5.7	0.0	3.8	9.1	9.1	8.3	9.6	0.0
Cycle Q Clear(g_c), s	30.4	8.8	9.1	10.0	5.7	0.0	3.8	9.1	9.1	8.3	9.6	0.0
Prop In Lane	1.00		0.48	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	407	558	540	302	582		510	682	709	546	990	
V/C Ratio(X)	0.72	0.32	0.33	0.03	0.22		0.12	0.30	0.30	0.42	0.30	
Avail Cap(c_a), veh/h	558	765	741	420	799		510	682	709	584	990	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	37.7	27.7	27.8	31.6	26.7	0.0	20.4	21.9	21.9	15.3	12.8	0.0
Incr Delay (d2), s/veh	2.8	0.3	0.4	0.0	0.2	0.0	0.5	1.1	1.1	0.5	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	2.5	2.5	0.1	1.7	0.0	0.7	2.6	2.7	1.8	2.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.5	28.1	28.2	31.7	26.9	0.0	20.8	23.0	23.0	15.8	13.6	0.0
LnGrp LOS	D	C	C	C	C		C	C	C	B	B	
Approach Vol, veh/h		653			137	A		478			523	A
Approach Delay, s/veh		33.7			27.2			22.8			14.6	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	16.5	50.9		42.6		67.4		42.6				
Change Period (Y+Rc), s	6.0	6.0		* 6.4		6.0		* 6.4				
Max Green Setting (Gmax), s	13.0	29.0		* 50		48.0		* 50				
Max Q Clear Time (g_c+I1), s	10.3	11.1		32.4		11.6		12.0				
Green Ext Time (p_c), s	0.3	3.1		3.8		2.3		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		24.7	
HCM 6th LOS		C	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	3	8	13	2	2
Future Vol, veh/h	3	3	8	13	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	3	8	13	2	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	21	0	-	0	24	15
Stage 1	-	-	-	-	15	-
Stage 2	-	-	-	-	9	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1595	-	-	-	992	1065
Stage 1	-	-	-	-	1008	-
Stage 2	-	-	-	-	1014	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1595	-	-	-	990	1065
Mov Cap-2 Maneuver	-	-	-	-	990	-
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	1014	-

Approach	EB	WB	SB
HCM Control Delay, s	3.6	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1595	-	-	-	1026
HCM Lane V/C Ratio	0.002	-	-	-	0.004
HCM Control Delay (s)	7.3	0	-	-	8.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

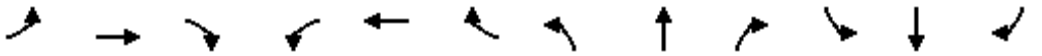
Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	517	3	0	429	0	3
Future Vol, veh/h	517	3	0	429	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	517	3	0	429	0	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	260
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	739
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	739
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.9
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	739	-	-	-
HCM Lane V/C Ratio	0.004	-	-	-
HCM Control Delay (s)	9.9	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	382	16	233	240	119	32	49	294	312	76	128
Future Volume (veh/h)	65	382	16	233	240	119	32	49	294	312	76	128
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1786	1772	1772	1800	1772	1786	1800	1800	1730
Adj Flow Rate, veh/h	65	382	16	233	240	119	32	49	0	312	76	128
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	1	2	2	0	2	1	0	0	5
Cap, veh/h	192	506	21	189	348	167	645	786		847	949	773
Arrive On Green	0.04	0.15	0.15	0.05	0.16	0.16	0.03	0.44	0.00	0.11	0.53	0.53
Sat Flow, veh/h	1714	3319	139	1701	2206	1058	1714	1772	1514	1714	1800	1466
Grp Volume(v), veh/h	65	195	203	233	181	178	32	49	0	312	76	128
Grp Sat Flow(s),veh/h/ln	1714	1697	1761	1701	1683	1581	1714	1772	1514	1714	1800	1466
Q Serve(g_s), s	3.5	12.1	12.2	5.3	11.2	11.7	1.1	1.7	0.0	10.4	2.3	5.0
Cycle Q Clear(g_c), s	3.5	12.1	12.2	5.3	11.2	11.7	1.1	1.7	0.0	10.4	2.3	5.0
Prop In Lane	1.00		0.08	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	192	259	269	189	265	249	645	786		847	949	773
V/C Ratio(X)	0.34	0.75	0.76	1.23	0.68	0.71	0.05	0.06		0.37	0.08	0.17
Avail Cap(c_a), veh/h	201	544	565	189	540	507	788	786		847	949	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.6	44.6	44.7	46.1	43.7	44.0	15.6	17.5	0.0	12.3	12.8	13.5
Incr Delay (d2), s/veh	1.0	4.4	4.3	141.5	3.1	3.8	0.0	0.2	0.0	0.3	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	4.1	4.3	9.1	3.7	3.7	0.3	0.5	0.0	2.0	0.6	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.6	49.0	49.0	187.5	46.8	47.7	15.6	17.7	0.0	12.6	13.0	13.9
LnGrp LOS	D	D	D	F	D	D	B	B		B	B	B
Approach Vol, veh/h		463			592			81	A		516	
Approach Delay, s/veh		47.5			102.5			16.9			13.0	
Approach LOS		D			F			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	23.5	9.8	64.7	11.4	24.0	19.0	55.5
Change Period (Y+Rc), s	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7
Max Green Setting (Gmax), s	* 5.3	* 35	* 12	* 30	* 5.3	* 35	* 12	* 30
Max Q Clear Time (g_c+I1), s	7.3	14.2	3.1	7.0	5.5	13.7	12.4	3.7
Green Ext Time (p_c), s	0.0	2.6	0.0	1.1	0.0	2.4	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	54.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	30	506	7	15	674
Future Vol, veh/h	6	30	506	7	15	674
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	30	506	7	15	674

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1214	510	0	0	513	0
Stage 1	510	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	201	563	-	-	1052	-
Stage 1	603	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	196	563	-	-	1052	-
Mov Cap-2 Maneuver	196	-	-	-	-	-
Stage 1	589	-	-	-	-	-
Stage 2	490	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.2	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	429	1052	-
HCM Lane V/C Ratio	-	-	0.084	0.014	-
HCM Control Delay (s)	-	-	14.2	8.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

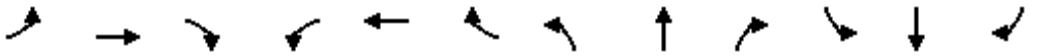
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	1	15	4	1	12	15	592	15	15	707	29
Future Vol, veh/h	7	1	15	4	1	12	15	592	15	15	707	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	200	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	7	1	15	4	1	12	15	592	15	15	707	29

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1388	1389	722	1390	1396	600	736	0	0	607	0	0
Stage 1	752	752	-	630	630	-	-	-	-	-	-	-
Stage 2	636	637	-	760	766	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	121	144	430	121	142	505	879	-	-	981	-	-
Stage 1	405	421	-	473	478	-	-	-	-	-	-	-
Stage 2	469	475	-	401	415	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	115	139	430	113	137	505	879	-	-	981	-	-
Mov Cap-2 Maneuver	115	139	-	113	137	-	-	-	-	-	-	-
Stage 1	398	415	-	465	470	-	-	-	-	-	-	-
Stage 2	449	467	-	380	409	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22	20.1	0.2	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	879	-	-	118	430	256	981	-	-
HCM Lane V/C Ratio	0.017	-	-	0.068	0.035	0.066	0.015	-	-
HCM Control Delay (s)	9.2	-	-	37.7	13.7	20.1	8.7	-	-
HCM Lane LOS	A	-	-	E	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0.2	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	269	140	48	488	358	135	373	29	373	501	241
Future Volume (veh/h)	93	269	140	48	488	358	135	373	29	373	501	241
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1730	1786	1786	1674	1772	1716	1772	1758	1758	1786	1772	1786
Adj Flow Rate, veh/h	93	269	140	48	488	0	135	373	29	373	501	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	1	1	9	2	6	2	3	3	1	2	1
Cap, veh/h	172	800	404	313	650		347	1006	78	558	939	
Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.00	0.32	0.32	0.32	0.16	0.53	0.00
Sat Flow, veh/h	887	2182	1102	922	1772	1454	897	3141	243	1701	1772	1514
Grp Volume(v), veh/h	93	207	202	48	488	0	135	198	204	373	501	0
Grp Sat Flow(s),veh/h/ln	887	1697	1588	922	1772	1454	897	1670	1714	1701	1772	1514
Q Serve(g_s), s	12.3	10.6	11.1	4.8	28.9	0.0	14.4	10.9	11.0	17.0	22.2	0.0
Cycle Q Clear(g_c), s	41.2	10.6	11.1	15.8	28.9	0.0	14.4	10.9	11.0	17.0	22.2	0.0
Prop In Lane	1.00		0.69	1.00		1.00	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	172	622	582	313	650		347	535	549	558	939	
V/C Ratio(X)	0.54	0.33	0.35	0.15	0.75		0.39	0.37	0.37	0.67	0.53	
Avail Cap(c_a), veh/h	183	645	603	326	673		347	535	549	570	939	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	51.2	27.4	27.6	33.3	33.2	0.0	32.6	31.4	31.5	20.6	18.5	0.0
Incr Delay (d2), s/veh	2.8	0.3	0.4	0.2	4.6	0.0	3.3	2.0	1.9	2.9	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.0	2.9	0.8	9.2	0.0	2.7	3.6	3.7	4.7	6.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.0	27.7	27.9	33.5	37.8	0.0	35.9	33.4	33.4	23.5	20.6	0.0
LnGrp LOS	D	C	C	C	D		D	C	C	C	C	
Approach Vol, veh/h		502			536	A		537			874	A
Approach Delay, s/veh		32.7			37.4			34.0			21.9	
Approach LOS		C			D			C			C	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	25.2	44.4		50.4		69.6		50.4				
Change Period (Y+Rc), s	6.0	6.0		* 6.4		6.0		* 6.4				
Max Green Setting (Gmax), s	20.0	36.0		* 46		62.0		* 46				
Max Q Clear Time (g_c+I1), s	19.0	16.4		43.2		24.2		30.9				
Green Ext Time (p_c), s	0.2	3.8		0.8		4.5		3.4				

Intersection Summary			
HCM 6th Ctrl Delay		30.2	
HCM 6th LOS		C	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	5	8	32	16	12
Future Vol, veh/h	8	5	8	32	16	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	5	8	32	16	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	40	0	-	0	45	24
Stage 1	-	-	-	-	24	-
Stage 2	-	-	-	-	21	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1570	-	-	-	965	1052
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	1002	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1570	-	-	-	960	1052
Mov Cap-2 Maneuver	-	-	-	-	960	-
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	1002	-

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1570	-	-	-	997
HCM Lane V/C Ratio	0.005	-	-	-	0.028
HCM Control Delay (s)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

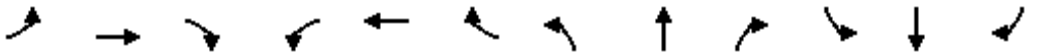
Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	663	7	0	895	0	21
Future Vol, veh/h	663	7	0	895	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	663	7	0	895	0	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	335
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	661
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	661
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	661	-	-	-
HCM Lane V/C Ratio	0.032	-	-	-
HCM Control Delay (s)	10.6	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	375	31	504	629	306	80	152	379	249	218	87
Future Volume (veh/h)	102	375	31	504	629	306	80	152	379	249	218	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1786	1772	1772	1800	1772	1786	1800	1800	1730
Adj Flow Rate, veh/h	102	375	31	504	629	306	80	152	0	249	218	87
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	1	2	2	0	2	1	0	0	5
Cap, veh/h	171	723	59	399	646	314	454	565		556	677	551
Arrive On Green	0.06	0.23	0.23	0.13	0.29	0.29	0.05	0.32	0.00	0.10	0.38	0.38
Sat Flow, veh/h	1714	3174	261	1701	2195	1068	1714	1772	1514	1714	1800	1466
Grp Volume(v), veh/h	102	200	206	504	482	453	80	152	0	249	218	87
Grp Sat Flow(s),veh/h/ln	1714	1697	1739	1701	1683	1580	1714	1772	1514	1714	1800	1466
Q Serve(g_s), s	5.4	12.4	12.5	15.3	34.0	34.0	3.7	7.7	0.0	11.5	10.3	4.7
Cycle Q Clear(g_c), s	5.4	12.4	12.5	15.3	34.0	34.0	3.7	7.7	0.0	11.5	10.3	4.7
Prop In Lane	1.00		0.15	1.00		0.68	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	171	386	396	399	495	465	454	565		556	677	551
V/C Ratio(X)	0.60	0.52	0.52	1.26	0.97	0.97	0.18	0.27		0.45	0.32	0.16
Avail Cap(c_a), veh/h	285	499	512	399	495	465	552	565		556	677	551
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.3	40.6	40.6	37.6	41.9	41.9	25.5	30.4	0.0	22.6	26.6	24.8
Incr Delay (d2), s/veh	3.3	1.1	1.1	137.2	33.7	35.0	0.2	1.2	0.0	0.6	1.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	4.0	4.1	21.6	14.7	14.0	1.1	2.6	0.0	3.2	3.4	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.6	41.6	41.7	174.8	75.6	76.9	25.7	31.6	0.0	23.2	27.8	25.4
LnGrp LOS	D	D	D	F	E	E	C	C		C	C	C
Approach Vol, veh/h		508			1439			232	A		554	
Approach Delay, s/veh		41.0			110.7			29.6			25.4	
Approach LOS		D			F			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	34.0	12.1	51.8	14.0	42.0	19.0	45.0
Change Period (Y+Rc), s	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7
Max Green Setting (Gmax), s	* 15	* 35	* 12	* 30	* 15	* 35	* 12	* 30
Max Q Clear Time (g_c+I1), s	17.3	14.5	5.7	12.3	7.4	36.0	13.5	9.7
Green Ext Time (p_c), s	0.0	2.7	0.1	1.8	0.2	0.0	0.0	0.9

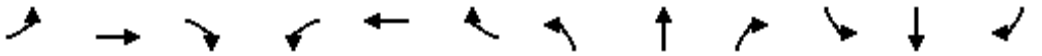
Intersection Summary	
HCM 6th Ctrl Delay	73.6
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	382	16	233	240	119	32	49	294	312	76	128
Future Volume (veh/h)	65	382	16	233	240	119	32	49	294	312	76	128
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1786	1772	1772	1800	1772	1786	1800	1800	1730
Adj Flow Rate, veh/h	65	382	16	233	240	119	32	49	0	312	76	128
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	1	2	2	0	2	1	0	0	5
Cap, veh/h	255	489	20	288	486	233	585	713		797	894	728
Arrive On Green	0.04	0.15	0.15	0.11	0.22	0.22	0.03	0.40	0.00	0.12	0.50	0.50
Sat Flow, veh/h	1714	3319	139	1701	2206	1058	1714	1772	1514	1714	1800	1466
Grp Volume(v), veh/h	65	195	203	233	181	178	32	49	0	312	76	128
Grp Sat Flow(s),veh/h/ln	1714	1697	1761	1701	1683	1581	1714	1772	1514	1714	1800	1466
Q Serve(g_s), s	4.0	13.8	13.9	14.3	11.8	12.3	1.4	2.1	0.0	12.8	2.8	6.0
Cycle Q Clear(g_c), s	4.0	13.8	13.9	14.3	11.8	12.3	1.4	2.1	0.0	12.8	2.8	6.0
Prop In Lane	1.00		0.08	1.00		0.67	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	255	250	260	288	371	348	585	713		797	894	728
V/C Ratio(X)	0.25	0.78	0.78	0.81	0.49	0.51	0.05	0.07		0.39	0.08	0.18
Avail Cap(c_a), veh/h	255	475	493	288	594	558	609	713		826	894	728
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.8	51.3	51.4	39.1	42.6	42.8	20.7	22.9	0.0	16.3	16.5	17.3
Incr Delay (d2), s/veh	0.5	5.2	5.1	15.6	1.0	1.2	0.0	0.2	0.0	0.3	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	5.0	5.2	5.7	3.8	3.8	0.4	0.7	0.0	3.1	0.8	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.3	56.5	56.5	54.7	43.6	44.0	20.8	23.1	0.0	16.6	16.7	17.9
LnGrp LOS	D	E	E	D	D	D	C	C		B	B	B
Approach Vol, veh/h		463			592			81	A		516	
Approach Delay, s/veh		54.6			48.1			22.2			16.9	
Approach LOS		D			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	21.0	25.1	10.1	68.8	11.9	34.2	21.9	57.0
Change Period (Y+Rc), s	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7
Max Green Setting (Gmax), s	* 14	* 35	* 5.1	* 44	* 5.2	* 44	* 17	* 32
Max Q Clear Time (g_c+I1), s	16.3	15.9	3.4	8.0	6.0	14.3	14.8	4.1
Green Ext Time (p_c), s	0.0	2.5	0.0	1.2	0.0	2.7	0.4	0.2

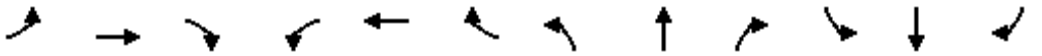
Intersection Summary	
HCM 6th Ctrl Delay	38.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	375	31	504	629	306	80	152	379	249	218	87
Future Volume (veh/h)	102	375	31	504	629	306	80	152	379	249	218	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1786	1772	1772	1800	1772	1786	1800	1800	1730
Adj Flow Rate, veh/h	102	375	31	504	629	306	80	152	0	249	218	87
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	1	2	2	0	2	1	0	0	5
Cap, veh/h	201	587	48	487	732	356	421	594		507	640	521
Arrive On Green	0.06	0.19	0.19	0.21	0.33	0.33	0.04	0.33	0.00	0.06	0.36	0.36
Sat Flow, veh/h	1714	3174	261	1701	2195	1068	1714	1772	1514	1714	1800	1466
Grp Volume(v), veh/h	102	200	206	504	482	453	80	152	0	249	218	87
Grp Sat Flow(s),veh/h/ln	1714	1697	1739	1701	1683	1580	1714	1772	1514	1714	1800	1466
Q Serve(g_s), s	6.2	14.1	14.3	27.3	34.8	34.8	4.0	8.1	0.0	8.3	11.5	5.3
Cycle Q Clear(g_c), s	6.2	14.1	14.3	27.3	34.8	34.8	4.0	8.1	0.0	8.3	11.5	5.3
Prop In Lane	1.00		0.15	1.00		0.68	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	201	314	322	487	561	527	421	594		507	640	521
V/C Ratio(X)	0.51	0.64	0.64	1.04	0.86	0.86	0.19	0.26		0.49	0.34	0.17
Avail Cap(c_a), veh/h	222	461	472	487	686	644	424	594		507	640	521
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.3	48.9	49.0	35.1	40.5	40.5	26.7	31.4	0.0	30.3	30.7	28.7
Incr Delay (d2), s/veh	2.0	2.1	2.1	50.2	9.2	9.7	0.2	1.0	0.0	0.7	1.4	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	4.9	5.1	15.4	11.9	11.2	1.2	2.8	0.0	4.8	4.1	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.3	51.1	51.1	85.3	49.7	50.2	26.9	32.5	0.0	31.1	32.2	29.4
LnGrp LOS	D	D	D	F	D	D	C	C		C	C	C
Approach Vol, veh/h		508			1439			232	A		554	
Approach Delay, s/veh		49.3			62.3			30.6			31.2	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	34.0	30.8	12.3	52.9	14.7	50.0	15.0	50.2
Change Period (Y+Rc), s	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7
Max Green Setting (Gmax), s	* 27	* 35	* 5.9	* 35	* 9.6	* 53	* 8.3	* 32
Max Q Clear Time (g_c+I1), s	29.3	16.3	6.0	13.5	8.2	36.8	10.3	10.1
Green Ext Time (p_c), s	0.0	2.6	0.0	1.9	0.0	6.5	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	50.9
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	7	8	515	2	15	410
Future Vol, veh/h	7	8	515	2	15	410
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	8	515	2	15	410

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	956	516	0	0	517	0
Stage 1	516	-	-	-	-	-
Stage 2	440	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	286	559	-	-	1049	-
Stage 1	599	-	-	-	-	-
Stage 2	649	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	281	559	-	-	1049	-
Mov Cap-2 Maneuver	281	-	-	-	-	-
Stage 1	588	-	-	-	-	-
Stage 2	649	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.8	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	382	1049	-
HCM Lane V/C Ratio	-	-	0.039	0.014	-
HCM Control Delay (s)	-	-	14.8	8.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

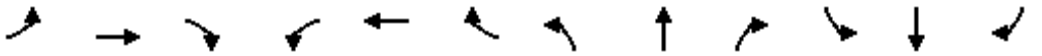
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	4	6	4	15	6	388	5	9	326	13
Future Vol, veh/h	2	0	4	6	4	15	6	388	5	9	326	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	200	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	2	0	4	6	4	15	6	388	5	9	326	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	763	756	333	756	760	391	339	0	0	393	0	0
Stage 1	351	351	-	403	403	-	-	-	-	-	-	-
Stage 2	412	405	-	353	357	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	324	340	713	327	338	662	1231	-	-	1177	-	-
Stage 1	670	636	-	628	603	-	-	-	-	-	-	-
Stage 2	621	602	-	668	632	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	311	336	713	322	334	662	1231	-	-	1177	-	-
Mov Cap-2 Maneuver	311	336	-	322	334	-	-	-	-	-	-	-
Stage 1	667	631	-	625	600	-	-	-	-	-	-	-
Stage 2	600	599	-	659	627	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.3	13.1	0.1	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1231	-	-	311	713	469	1177	-	-
HCM Lane V/C Ratio	0.005	-	-	0.006	0.006	0.053	0.008	-	-
HCM Control Delay (s)	7.9	-	-	16.7	10.1	13.1	8.1	-	-
HCM Lane LOS	A	-	-	C	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0.2	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	319	300	95	10	138	319	66	440	16	253	320	55
Future Volume (veh/h)	319	300	95	10	138	319	66	440	16	253	320	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1730	1786	1786	1674	1772	1716	1772	1758	1758	1786	1772	1786
Adj Flow Rate, veh/h	319	300	95	10	138	0	66	440	16	253	320	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	1	1	9	2	6	2	3	3	1	2	1
Cap, veh/h	433	905	281	315	629		457	1216	44	505	943	
Arrive On Green	0.36	0.36	0.36	0.36	0.36	0.00	0.37	0.37	0.37	0.11	0.53	0.00
Sat Flow, veh/h	1221	2548	792	934	1772	1454	1060	3287	119	1701	1772	1514
Grp Volume(v), veh/h	319	198	197	10	138	0	66	223	233	253	320	0
Grp Sat Flow(s),veh/h/ln	1221	1697	1643	934	1772	1454	1060	1670	1736	1701	1772	1514
Q Serve(g_s), s	27.2	9.4	9.7	0.9	6.0	0.0	4.6	10.7	10.7	9.7	11.3	0.0
Cycle Q Clear(g_c), s	33.2	9.4	9.7	10.5	6.0	0.0	4.6	10.7	10.7	9.7	11.3	0.0
Prop In Lane	1.00		0.48	1.00		1.00	1.00		0.07	1.00		1.00
Lane Grp Cap(c), veh/h	433	603	584	315	629		457	618	642	505	943	
V/C Ratio(X)	0.74	0.33	0.34	0.03	0.22		0.14	0.36	0.36	0.50	0.34	
Avail Cap(c_a), veh/h	550	765	741	405	799		457	618	642	523	943	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.4	25.9	26.0	29.8	24.8	0.0	23.3	25.2	25.2	17.4	14.7	0.0
Incr Delay (d2), s/veh	3.9	0.3	0.3	0.0	0.2	0.0	0.7	1.6	1.6	0.8	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.0	2.5	2.5	0.1	1.7	0.0	0.9	3.2	3.3	2.3	2.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.3	26.2	26.3	29.9	25.0	0.0	23.9	26.8	26.8	18.2	15.7	0.0
LnGrp LOS	D	C	C	C	C		C	C	C	B	B	
Approach Vol, veh/h		714			148	A		522			573	A
Approach Delay, s/veh		32.5			25.3			26.5			16.8	
Approach LOS		C			C			C			B	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	17.8	46.7		45.5		64.5		45.5				
Change Period (Y+Rc), s	6.0	6.0		* 6.4		6.0		* 6.4				
Max Green Setting (Gmax), s	13.0	29.0		* 50		48.0		* 50				
Max Q Clear Time (g_c+I1), s	11.7	12.7		35.2		13.3		12.5				
Green Ext Time (p_c), s	0.1	3.3		3.9		2.5		1.0				

Intersection Summary												
HCM 6th Ctrl Delay			25.8									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	3	8	13	2	2
Future Vol, veh/h	3	3	8	13	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	3	8	13	2	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	21	0	-	0	24	15
Stage 1	-	-	-	-	15	-
Stage 2	-	-	-	-	9	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1595	-	-	-	992	1065
Stage 1	-	-	-	-	1008	-
Stage 2	-	-	-	-	1014	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1595	-	-	-	990	1065
Mov Cap-2 Maneuver	-	-	-	-	990	-
Stage 1	-	-	-	-	1006	-
Stage 2	-	-	-	-	1014	-

Approach	EB	WB	SB
HCM Control Delay, s	3.6	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1595	-	-	-	1026
HCM Lane V/C Ratio	0.002	-	-	-	0.004
HCM Control Delay (s)	7.3	0	-	-	8.5
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

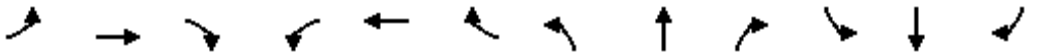
Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	566	3	0	467	0	3
Future Vol, veh/h	566	3	0	467	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	566	3	0	467	0	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	285
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	712
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	712
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	712	-	-	-
HCM Lane V/C Ratio	0.004	-	-	-
HCM Control Delay (s)	10.1	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	418	18	253	262	119	35	49	321	312	76	128
Future Volume (veh/h)	65	418	18	253	262	119	35	49	321	312	76	128
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1786	1772	1772	1800	1772	1786	1800	1800	1730
Adj Flow Rate, veh/h	65	418	18	253	262	119	35	49	0	312	76	128
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	1	2	2	0	2	1	0	0	5
Cap, veh/h	198	547	23	190	387	171	633	764		829	924	753
Arrive On Green	0.04	0.16	0.16	0.05	0.17	0.17	0.03	0.43	0.00	0.11	0.51	0.51
Sat Flow, veh/h	1714	3315	142	1701	2272	1003	1714	1772	1514	1714	1800	1466
Grp Volume(v), veh/h	65	214	222	253	192	189	35	49	0	312	76	128
Grp Sat Flow(s),veh/h/ln	1714	1697	1760	1701	1683	1591	1714	1772	1514	1714	1800	1466
Q Serve(g_s), s	3.4	13.2	13.3	5.3	11.8	12.3	1.2	1.8	0.0	10.7	2.4	5.1
Cycle Q Clear(g_c), s	3.4	13.2	13.3	5.3	11.8	12.3	1.2	1.8	0.0	10.7	2.4	5.1
Prop In Lane	1.00		0.08	1.00		0.63	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	198	280	290	190	287	271	633	764		829	924	753
V/C Ratio(X)	0.33	0.76	0.77	1.33	0.67	0.70	0.06	0.06		0.38	0.08	0.17
Avail Cap(c_a), veh/h	208	544	565	190	540	511	773	764		829	924	753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.6	43.9	43.9	45.5	42.7	42.9	16.3	18.3	0.0	13.0	13.6	14.3
Incr Delay (d2), s/veh	1.0	4.3	4.2	181.2	2.7	3.2	0.0	0.2	0.0	0.3	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	4.5	4.6	11.2	3.8	3.8	0.3	0.5	0.0	2.1	0.6	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.5	48.2	48.1	226.6	45.4	46.1	16.3	18.5	0.0	13.3	13.8	14.8
LnGrp LOS	D	D	D	F	D	D	B	B		B	B	B
Approach Vol, veh/h		501			634			84	A		516	
Approach Delay, s/veh		46.8			117.9			17.6			13.7	
Approach LOS		D			F			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.0	24.8	10.0	63.2	11.4	25.5	19.0	54.2
Change Period (Y+Rc), s	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7
Max Green Setting (Gmax), s	* 5.3	* 35	* 12	* 30	* 5.3	* 35	* 12	* 30
Max Q Clear Time (g_c+I1), s	7.3	15.3	3.2	7.1	5.4	14.3	12.7	3.8
Green Ext Time (p_c), s	0.0	2.9	0.0	1.1	0.0	2.6	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	61.5
HCM 6th LOS	E

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	30	555	7	15	738
Future Vol, veh/h	6	30	555	7	15	738
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	6	30	555	7	15	738

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1327	559	0	0	562	0
Stage 1	559	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	171	529	-	-	1009	-
Stage 1	572	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	167	529	-	-	1009	-
Mov Cap-2 Maneuver	167	-	-	-	-	-
Stage 1	558	-	-	-	-	-
Stage 2	458	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.2	0	0.2
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	389	1009	-
HCM Lane V/C Ratio	-	-	0.093	0.015	-
HCM Control Delay (s)	-	-	15.2	8.6	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

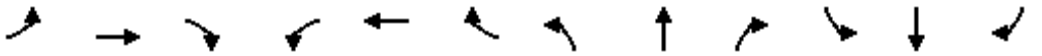
Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	1	15	4	1	12	15	634	15	15	754	29
Future Vol, veh/h	7	1	15	4	1	12	15	634	15	15	754	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	200	-	-	-	200	-	-	200	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	7	1	15	4	1	12	15	634	15	15	754	29

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1477	1478	769	1479	1485	642	783	0	0	649	0	0
Stage 1	799	799	-	672	672	-	-	-	-	-	-	-
Stage 2	678	679	-	807	813	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	105	127	404	105	126	478	844	-	-	947	-	-
Stage 1	382	401	-	449	458	-	-	-	-	-	-	-
Stage 2	445	454	-	378	395	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	99	123	404	98	122	478	844	-	-	947	-	-
Mov Cap-2 Maneuver	99	123	-	98	122	-	-	-	-	-	-	-
Stage 1	375	395	-	441	450	-	-	-	-	-	-	-
Stage 2	425	446	-	357	389	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.5	22	0.2	0.2
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	844	-	-	101	404	229	947	-	-
HCM Lane V/C Ratio	0.018	-	-	0.079	0.037	0.074	0.016	-	-
HCM Control Delay (s)	9.3	-	-	43.7	14.3	22	8.9	-	-
HCM Lane LOS	A	-	-	E	B	C	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.1	0.2	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	293	153	52	534	392	147	407	31	408	548	263
Future Volume (veh/h)	102	293	153	52	534	392	147	407	31	408	548	263
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1730	1786	1786	1674	1772	1716	1772	1758	1758	1786	1772	1786
Adj Flow Rate, veh/h	102	293	153	52	534	0	147	407	31	408	548	0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	5	1	1	9	2	6	2	3	3	1	2	1
Cap, veh/h	156	827	421	310	673		318	944	72	531	915	
Arrive On Green	0.38	0.38	0.38	0.38	0.38	0.00	0.30	0.30	0.30	0.17	0.52	0.00
Sat Flow, veh/h	850	2176	1107	892	1772	1454	859	3146	239	1701	1772	1514
Grp Volume(v), veh/h	102	227	219	52	534	0	147	215	223	408	548	0
Grp Sat Flow(s),veh/h/ln	850	1697	1587	892	1772	1454	859	1670	1715	1701	1772	1514
Q Serve(g_s), s	13.5	11.5	11.9	5.3	32.1	0.0	17.3	12.4	12.5	19.6	26.0	0.0
Cycle Q Clear(g_c), s	45.6	11.5	11.9	17.3	32.1	0.0	17.3	12.4	12.5	19.6	26.0	0.0
Prop In Lane	1.00		0.70	1.00		1.00	1.00		0.14	1.00		1.00
Lane Grp Cap(c), veh/h	156	645	603	310	673		318	501	514	531	915	
V/C Ratio(X)	0.66	0.35	0.36	0.17	0.79		0.46	0.43	0.43	0.77	0.60	
Avail Cap(c_a), veh/h	156	645	603	310	673		318	501	514	531	915	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	53.7	26.6	26.8	33.0	33.0	0.0	35.5	33.8	33.8	22.6	20.3	0.0
Incr Delay (d2), s/veh	9.5	0.3	0.4	0.3	6.5	0.0	4.8	2.7	2.6	6.7	2.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	3.2	3.1	0.9	10.4	0.0	3.1	4.2	4.3	5.9	7.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.2	26.9	27.1	33.2	39.5	0.0	40.3	36.4	36.4	29.3	23.2	0.0
LnGrp LOS	E	C	C	C	D		D	D	D	C	C	
Approach Vol, veh/h		548			586	A		585			956	A
Approach Delay, s/veh		33.8			38.9			37.4			25.8	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	26.0	42.0		52.0		68.0		52.0				
Change Period (Y+Rc), s	6.0	6.0		* 6.4		6.0		* 6.4				
Max Green Setting (Gmax), s	20.0	36.0		* 46		62.0		* 46				
Max Q Clear Time (g_c+I1), s	21.6	19.3		47.6		28.0		34.1				
Green Ext Time (p_c), s	0.0	3.9		0.0		5.0		3.3				

Intersection Summary	
HCM 6th Ctrl Delay	32.8
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [WBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	5	8	32	16	12
Future Vol, veh/h	8	5	8	32	16	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	5	8	32	16	12

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	40	0	-	0	45	24
Stage 1	-	-	-	-	24	-
Stage 2	-	-	-	-	21	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1570	-	-	-	965	1052
Stage 1	-	-	-	-	999	-
Stage 2	-	-	-	-	1002	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1570	-	-	-	960	1052
Mov Cap-2 Maneuver	-	-	-	-	960	-
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	1002	-

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1570	-	-	-	997
HCM Lane V/C Ratio	0.005	-	-	-	0.028
HCM Control Delay (s)	7.3	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

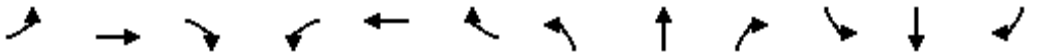
Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	566	7	0	979	0	21
Future Vol, veh/h	566	7	0	979	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	566	7	0	979	0	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	287
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	710
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	710
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	710	-	-	-
HCM Lane V/C Ratio	0.03	-	-	-
HCM Control Delay (s)	10.2	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	408	34	548	687	306	87	152	414	249	218	67
Future Volume (veh/h)	102	408	34	548	687	306	87	152	414	249	218	67
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1786	1772	1772	1800	1772	1786	1800	1800	1730
Adj Flow Rate, veh/h	102	408	34	548	687	306	87	152	0	249	218	67
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	1	2	2	0	2	1	0	0	5
Cap, veh/h	165	722	60	385	666	297	462	565		556	671	547
Arrive On Green	0.06	0.23	0.23	0.13	0.29	0.29	0.05	0.32	0.00	0.10	0.37	0.37
Sat Flow, veh/h	1714	3172	263	1701	2265	1009	1714	1772	1514	1714	1800	1466
Grp Volume(v), veh/h	102	217	225	548	511	482	87	152	0	249	218	67
Grp Sat Flow(s),veh/h/ln	1714	1697	1739	1701	1683	1590	1714	1772	1514	1714	1800	1466
Q Serve(g_s), s	5.4	13.6	13.7	15.3	35.3	35.3	4.1	7.7	0.0	11.5	10.4	3.6
Cycle Q Clear(g_c), s	5.4	13.6	13.7	15.3	35.3	35.3	4.1	7.7	0.0	11.5	10.4	3.6
Prop In Lane	1.00		0.15	1.00		0.63	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	165	386	396	385	495	468	462	565		556	671	547
V/C Ratio(X)	0.62	0.56	0.57	1.42	1.03	1.03	0.19	0.27		0.45	0.32	0.12
Avail Cap(c_a), veh/h	279	499	511	385	495	468	554	565		556	671	547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.4	41.0	41.1	37.3	42.3	42.4	25.3	30.4	0.0	22.8	26.9	24.7
Incr Delay (d2), s/veh	3.8	1.3	1.3	205.3	48.7	49.8	0.2	1.2	0.0	0.6	1.3	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	4.4	4.6	28.1	17.1	16.3	1.2	2.6	0.0	3.2	3.5	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.1	42.3	42.4	242.5	91.0	92.2	25.5	31.6	0.0	23.3	28.1	25.2
LnGrp LOS	D	D	D	F	F	F	C	C		C	C	C
Approach Vol, veh/h		544			1541			239	A		534	
Approach Delay, s/veh		41.8			145.3			29.4			25.5	
Approach LOS		D			F			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	34.0	12.5	51.4	14.0	42.0	19.0	45.0
Change Period (Y+Rc), s	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7
Max Green Setting (Gmax), s	* 15	* 35	* 12	* 30	* 15	* 35	* 12	* 30
Max Q Clear Time (g_c+I1), s	17.3	15.7	6.1	12.4	7.4	37.3	13.5	9.7
Green Ext Time (p_c), s	0.0	2.9	0.1	1.6	0.2	0.0	0.0	0.9

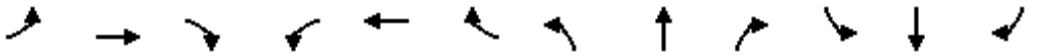
Intersection Summary	
HCM 6th Ctrl Delay	93.5
HCM 6th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	418	18	253	262	119	35	49	321	312	76	128
Future Volume (veh/h)	65	418	18	253	262	119	35	49	321	312	76	128
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1786	1772	1772	1800	1772	1786	1800	1800	1730
Adj Flow Rate, veh/h	65	418	18	253	262	119	35	49	0	312	76	128
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	1	2	2	0	2	1	0	0	5
Cap, veh/h	282	524	22	322	573	253	550	662		761	849	692
Arrive On Green	0.04	0.16	0.16	0.14	0.25	0.25	0.03	0.37	0.00	0.13	0.47	0.47
Sat Flow, veh/h	1714	3315	142	1701	2272	1003	1714	1772	1514	1714	1800	1466
Grp Volume(v), veh/h	65	214	222	253	192	189	35	49	0	312	76	128
Grp Sat Flow(s),veh/h/ln	1714	1697	1760	1701	1683	1591	1714	1772	1514	1714	1800	1466
Q Serve(g_s), s	4.1	15.8	15.8	15.7	12.5	13.1	1.6	2.3	0.0	14.0	3.0	6.6
Cycle Q Clear(g_c), s	4.1	15.8	15.8	15.7	12.5	13.1	1.6	2.3	0.0	14.0	3.0	6.6
Prop In Lane	1.00		0.08	1.00		0.63	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	282	268	278	322	424	401	550	662		761	849	692
V/C Ratio(X)	0.23	0.80	0.80	0.79	0.45	0.47	0.06	0.07		0.41	0.09	0.19
Avail Cap(c_a), veh/h	282	457	474	330	619	585	570	662		787	849	692
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.2	52.7	52.8	38.0	41.0	41.2	23.8	26.2	0.0	18.8	18.9	19.9
Incr Delay (d2), s/veh	0.4	5.4	5.3	11.6	0.8	0.9	0.0	0.2	0.0	0.4	0.2	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	5.7	6.0	5.9	4.1	4.0	0.5	0.8	0.0	3.7	0.9	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.6	58.1	58.0	49.6	41.8	42.1	23.8	26.4	0.0	19.2	19.1	20.5
LnGrp LOS	D	E	E	D	D	D	C	C		B	B	C
Approach Vol, veh/h		501			634			84	A		516	
Approach Delay, s/veh		56.2			45.0			25.4			19.5	
Approach LOS		E			D			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	24.4	27.2	10.3	68.0	12.2	39.5	23.1	55.3
Change Period (Y+Rc), s	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7
Max Green Setting (Gmax), s	* 18	* 35	* 5.1	* 45	* 5.5	* 48	* 18	* 32
Max Q Clear Time (g_c+I1), s	17.7	17.8	3.6	8.6	6.1	15.1	16.0	4.3
Green Ext Time (p_c), s	0.1	2.7	0.0	1.2	0.0	2.9	0.3	0.2

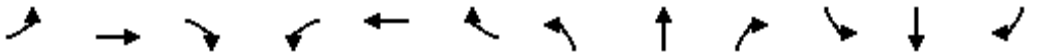
Intersection Summary	
HCM 6th Ctrl Delay	39.7
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	408	34	548	687	306	87	152	414	249	218	67
Future Volume (veh/h)	102	408	34	548	687	306	87	152	414	249	218	67
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1786	1786	1786	1772	1772	1800	1772	1786	1800	1800	1730
Adj Flow Rate, veh/h	102	408	34	548	687	306	87	152	0	249	218	67
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	1	1	1	2	2	0	2	1	0	0	5
Cap, veh/h	201	595	49	503	795	354	405	576		480	601	490
Arrive On Green	0.06	0.19	0.19	0.23	0.35	0.35	0.05	0.32	0.00	0.06	0.33	0.33
Sat Flow, veh/h	1714	3172	263	1701	2265	1009	1714	1772	1514	1714	1800	1466
Grp Volume(v), veh/h	102	217	225	548	511	482	87	152	0	249	218	67
Grp Sat Flow(s),veh/h/ln	1714	1697	1739	1701	1683	1590	1714	1772	1514	1714	1800	1466
Q Serve(g_s), s	6.2	15.5	15.7	29.3	36.7	36.7	4.4	8.2	0.0	7.3	11.9	4.1
Cycle Q Clear(g_c), s	6.2	15.5	15.7	29.3	36.7	36.7	4.4	8.2	0.0	7.3	11.9	4.1
Prop In Lane	1.00		0.15	1.00		0.63	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	201	318	326	503	591	559	405	576		480	601	490
V/C Ratio(X)	0.51	0.68	0.69	1.09	0.86	0.86	0.21	0.26		0.52	0.36	0.14
Avail Cap(c_a), veh/h	224	461	472	503	710	670	409	576		480	601	490
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.1	49.2	49.3	33.2	39.3	39.3	27.5	32.4	0.0	32.8	32.8	30.2
Incr Delay (d2), s/veh	2.0	2.6	2.6	66.9	9.4	9.9	0.3	1.1	0.0	1.0	1.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	5.4	5.6	17.9	12.4	11.8	1.4	2.9	0.0	5.1	4.3	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.1	51.8	51.9	100.0	48.6	49.1	27.8	33.5	0.0	33.8	34.5	30.8
LnGrp LOS	D	D	D	F	D	D	C	C		C	C	C
Approach Vol, veh/h		544			1541			239	A		534	
Approach Delay, s/veh		50.0			67.1			31.4			33.7	
Approach LOS		D			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	36.0	31.1	12.8	50.1	14.7	52.4	14.0	48.9
Change Period (Y+Rc), s	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7	* 6.7
Max Green Setting (Gmax), s	* 29	* 35	* 6.4	* 32	* 9.8	* 55	* 7.3	* 31
Max Q Clear Time (g_c+I1), s	31.3	17.7	6.4	13.9	8.2	38.7	9.3	10.2
Green Ext Time (p_c), s	0.0	2.8	0.0	1.7	0.0	6.9	0.0	0.9

Intersection Summary	
HCM 6th Ctrl Delay	54.6
HCM 6th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Appendix D

MMLOS Analysis

MMLOS Table

Intersections		Hazeldean Rd/Stittsville Main				Hazeldean Rd/Carp Rd			
	Crossing Side	***North***	***South***	***East***	***West***	***North***	***South***	***East***	***West***
Pedestrian	Lanes	4 (88)	3 (105)	5 (72)	5 (72)	4 (88)	4 (88)	4 (88)	4 (88)
	Median	No (-4)	No (-4)	No (-4)	No (-4)	No (-4)	No (-4)	No (-4)	No (-4)
	Conflicting LT	Prot/Perm (-8)	Prot/Perm (-8)	Prot/Perm (-8)	Prot/Perm (-8)	Prot/Perm (-8)	Perm (-8)	Perm (-8)	Perm (-8)
	Conflicting RT	Perm/Yield Control (-5)	Perm/yield control (-5)	Perm/yield control (-5)	Perm/yield control (-5)	Perm/Yield Control (-5)	Perm/Yield Control (-5)	Perm/yield control (-5)	Perm/yield control (-5)
	RTOR	Allowed (-3)	Allowed (-3)	Allowed (-3)	Allowed (-3)	Allowed (-3)	Allowed (-3)	Allowed (-3)	Allowed (-3)
	Leading Ped Interval	No (-2)	No (-2)	No (-2)	No (-2)	No (-2)	No (-2)	No (-2)	No (-2)
	Corner Radius	10m to 15m (-6)	10m to 15m (-6)	10m to 15m (-6)	10m to 15m (-6)	10m to 15m (-6)	15m to 25m (-8)	10m to 15m (-6)	15m to 25m (-8)
	Crosswalk Treatment	Standard transverse markings (-4)	Standard transverse markings (-4)	Standard transverse markings (-4)	Standard transverse markings (-4)	Standard transverse markings (-4)	Standard transverse markings (-4)	Standard transverse markings (-4)	Standard transverse markings (-4)
	PETSI Score	56	73	40	40	56	54	56	54
	Ped. Exposure to traffic LOS	D	C	E	E	D	D	D	D
	Cycle Length	120	120	120	120	120	120	120	120
	Effective Walk Time	30	30	35	35	23	23	30	30
	Avg Ped Delay	34	34	30	30	39	39	34	34
	Ped Delay LOS	D	D	C	C	D	D	D	D
	LOS	D (56)	C (73)	E (40)	E (40)	D (56)	D (54)	D (56)	D (54)
		E				**D**			
	Approach From	***North***	***South***	***East***	***West***	***North***	***South***	***East***	***West***
Bicycle	Bike lane arrangment on approach	Mixed Traffic	Bike Pocket	Bike Lane	Bike Lane	Bike Pocket	Bike Lanes	Bike Pocket	Bike Lanes
	Right-turn lane configuration	Dedicated RT Lane (<50)	Bike pocket to left of RT lane	Shared	Shared	Bike lane shifts to left	Shared		Shared
	Right turning speed							Bike lane shifts to left	
	Cyclists relative to RT motorists	D	D	No dedicated RT lane	No dedicated RT lane	D	No dedicated RT lane	D	No dedicated RT lane
	Left turn approach	One-lane Crossed	One-lane Crossed	2+ lanes crossed	2+ lanes crossed	One lane crossed	2+ lanes crossed	One lane crossed	2+ lanes crossed
	Left-turn Operating speed	<=40km/hr	50 km/hr	>=50 km/hr	>=50 km/hr	>=60 km/hr	>=50 km/hr	>=60 km/hr	>=50 km/hr
	Left turn cyclists - LOS	B	C	F	F	F	E	E	F
Transit	Avg. Delay	<=40 sec	<=40 sec	>40 sec	>=40 sec	<=30 sec	<=40 sec	<=40 sec	<=30 sec
	LOS	E	E	F	E	D	E	E	D
		F				**E**			
Truck	Effective corner radius	10m-to-15m	10m-to-15m	10m-to-15m	10m-to-15m	>15m	10m-to-15m	>15m	10m-to-15m
	No. of receiving lanes on departure from intersection	2	2	1	1	1	2	2	1
	LOS	B	B	E	E	C	B	A	E
		E				**E**			

Appendix E

TDM-Supportive Development Design and Infrastructure Checklist

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

Legend

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

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	1.	**WALKING & CYCLING: ROUTES**	
	1.1	**Building location & access points**	
BASIC	1.1.1	Locate building close to the street, and do not locate parking areas between the street and building entrances	☒
BASIC	1.1.2	Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	☒ Building fronting Hazeldean with bus routes
BASIC	1.1.3	Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	☒
	1.2	**Facilities for walking & cycling**	
REQUIRED	1.2.1	Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations *(see Official Plan policy 4.3.3)*	☒ Building fronting arterial main street (Hazeldean) with bus stops within 600m
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)*	☒ Connection provided from buildings to sidewalk along Hazeldean

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)*	☒ Buildings front Hazeldean Rd, which accommodate sidewalks
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)*	☒ Buildings front Hazeldean Rd, which accomodates sidewalks
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)*	☒ Site fronts Hazeldean Rd which accommodates sidewalks and cycling lanes
BASIC	1.2.6	Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	☒ Building fronts Hazeldean Rd, arterial main street
BASIC	1.2.7	Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	☐
BASIC	1.2.8	Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	☐
	1.3	**Amenities for walking & cycling**	
BASIC	1.3.1	Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	☐
BASIC	1.3.2	Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	☐

		TDM-supportive design & infrastructure measures: *Non-residential developments*	Check if completed & add descriptions, explanations or plan/drawing references
	2.	**WALKING & CYCLING: END-OF-TRIP FACILITIES**	
	2.1	**Bicycle parking**	
REQUIRED	2.1.1	Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible *(see Official Plan policy 4.3.6)*	☒ Bike spaces provided fronting Hazeldean Rd
REQUIRED	2.1.2	Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas *(see Zoning By-law Section 111)*	☒
REQUIRED	2.1.3	Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored *(see Zoning By-law Section 111)*	☒
BASIC	2.1.4	Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	☐
BETTER	2.1.5	Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	☒ Required 3 stalls; provided 5 bike stalls
	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)*	☐ NA
BETTER	2.2.2	Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	☐
	2.3	**Shower & change facilities**	
BASIC	2.3.1	Provide shower and change facilities for the use of active commuters	☐
BETTER	2.3.2	In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	☐
	2.4	**Bicycle repair station**	
BETTER	2.4.1	Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	☐

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

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

Appendix F

Turning Movement Templates

HAZELDEAN RD

EX. CONCRETE SIDEWALK

RESTAURANT
1 STOREY
464.8 m²
FFE 118.07

MEDICAL / OFFICE
2 STOREY
462.8 m²
FFE 117.60

LOADING

FUTURE PHASE 2
DEVELOPMENT
(3430.2M²)

LOT 3

FIRE ROUTE

COVERED PARKING

SURFACE PARKING

SNOW
STORAGE

PART 12

MSU
TAC-1999 (CA)

Appendix G

Pre-Qualification Letter

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 [X] or transportation planning [X].

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

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
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Ville d'Ottawa
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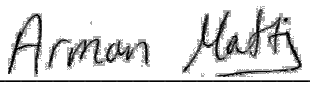
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at _Ottawa_____ this __4th _ day of ___January_____, 2019___.
(City)

Name: _____Arman Matti_____
(Please Print)

Professional Title: ____Transportation Engineer_____



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

Office Contact Information (Please Print)
Address: 2460 Lancaster Road, Suite 200 Ottawa ON
City / Postal Code: K1B 4S5
Telephone / Extension: 613-731-4052
E-Mail Address: amatti@castleglenn.ca