

Metro Ontario Inc.

3831 Cambrian Road



**Transportation
Impact
Assessment**



3831 Cambrian Road

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Forecasting Report

Step 4 Strategy Report

Prepared for:

Metro Ontario Inc.
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April 2021

PN: 2019-54

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1 Screening

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

2 Existing and Planned Conditions

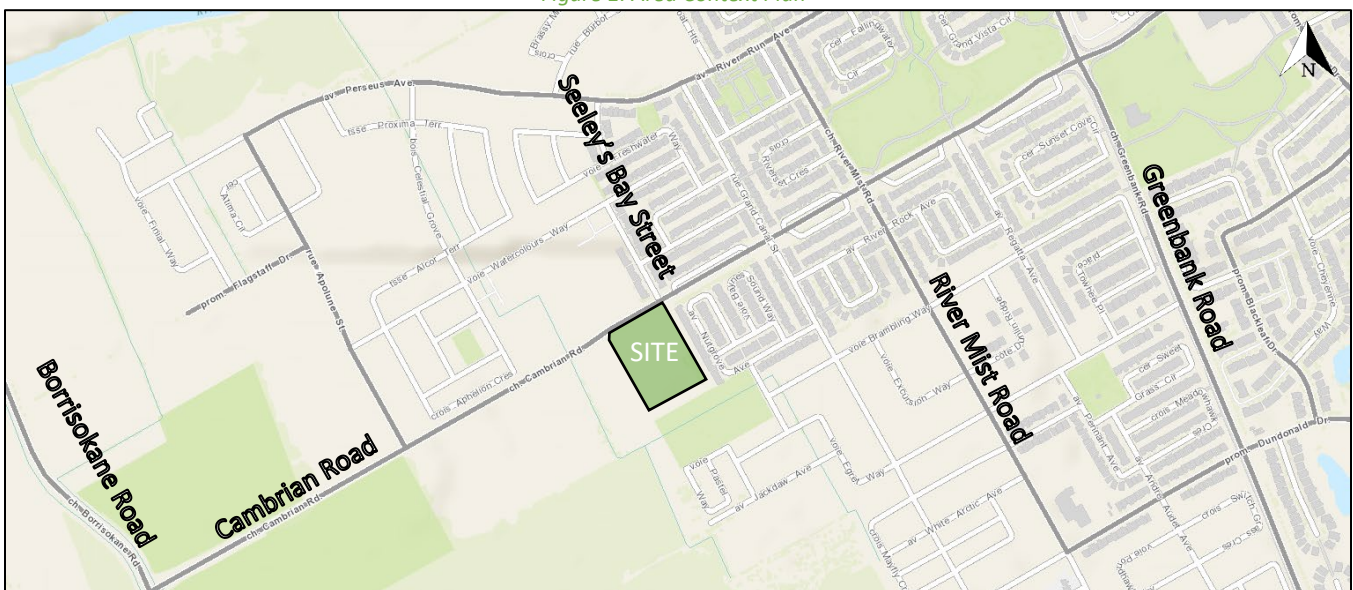
2.1 Proposed Development

The subject property, located at 3831 Cambrian Road, is zoned as General Mixed Use [GM] and is currently undeveloped. The proposed development consists of a 4,024 square metre supermarket, an attached 929 square metre retail store, an 830 square metre retail building, and a 1,060 square metre mixed-use building. Based on the site plan, the subject property contains a total of 275 surface parking spaces and no drive-through.

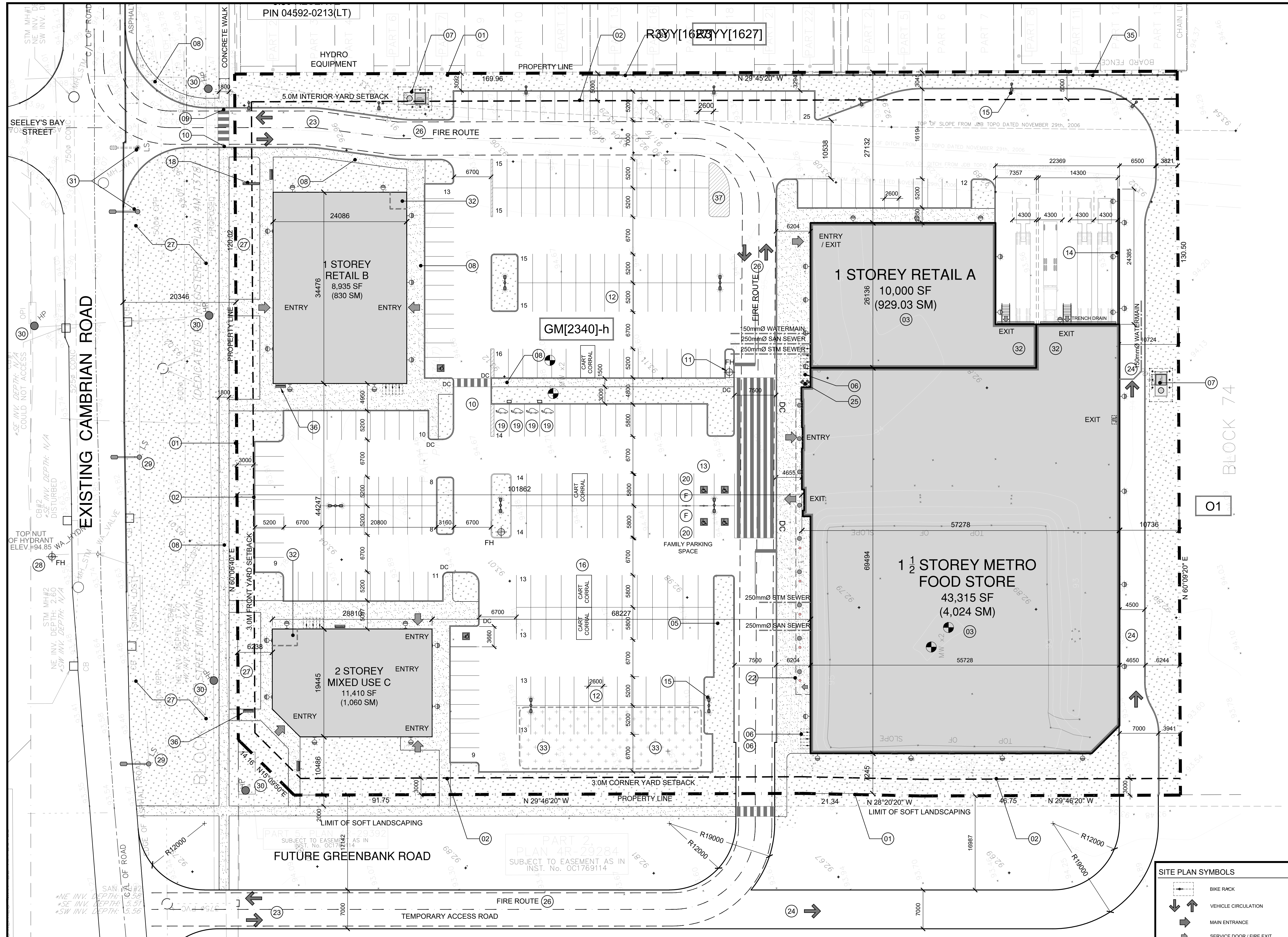
Access to the site will be accommodated for general traffic via Cambrian Road (140 metres east of future Greenbank Road) and future Greenbank Road (120 metres south of Cambrian Road). Trucks would enter the site via the third access at the future Greenbank Road (190 metres south of Cambrian Road) and exit the site via the Cambrian Road access. The Cambrian Road access is anticipated to be a full movement access and the configuration of this access will be confirmed as part of this TIA. As future Greenbank Road is a conceptual future BRT corridor, the accesses on this road would be restricted to right in / right out only once realigned Greenbank Road is constructed. Due to the spatial limitations, the access 190 metres south of Cambrian Road will be a one-directional driveway and will provide truck access to the supermarket and retail store loading docks. In the interim, the two accesses south of Cambrian Road would be accommodated via a Temporary Driveway that will run along the west edge of the development property line.

For the purposes of this TIA, the projected full build-out and occupancy horizon is 2023, and the plus five-year horizon is 2028. Figure 1 illustrates the Study Area Context. Figure 2 and Figure 3 illustrate the proposed interim and ultimate concept plans.

Figure 1: Area Context Plan



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: March 28, 2021



PROJECT INFORMATION	
ZONING	GM[2340]-h
SITE AREA	22,083 sq. m. (237,484 sq. ft.)
BUILDING HEIGHT	6 Storeys or 24.0 M
FRONT YARD SETBACK	3.0 M
CORNER YARD SETBACK	3.0 M
INTERIOR YARD SETBACK	5.0 M
REAR YARD SETBACK	0.0 M
LANDSCAPE BUFFER AROUND A PARKING LOT	3.0 M
LOADING SPACE - METRO	1
LOADING SPACE - RETAIL 'A'	0
PARKING - FOOD STORE	-3.4 PER 100m ² OF G.F.A. 99
PARKING - RETAIL	-3.4 PER 100m ² OF G.F.A. 24
GROSS BUILDING - AREAS	
GFA - CITY OF OTTAWA'S DEFINITION	2,821.3 sq. m. (31,445 sq. ft.)
RETAIL FOOD - METRO	696.8 sq. m. (7,500 sq. ft.)
RETAIL STORE 'A' (ESTIMATE)	622.5 sq. m. (6,700 sq. ft.)
RETAIL STORE 'B' (ESTIMATE)	795.0 sq. m. (8,557 sq. ft.)
MIXED USE 'C' (ESTIMATE)	5,008.0 sq. m. (54,197 sq. ft.)
TOTAL AREA	5,008.0 sq. m. (54,197 sq. ft.)
GFA - BUILDING FOOTPRINT	
RETAIL FOOD - METRO	4,024.0 sq. m. (43,315 sq. ft.)
RETAIL STORE 'A'	929.0 sq. m. (10,000 sq. ft.)
RETAIL STORE 'B'	830.0 sq. m. (8,935 sq. ft.)
MIXED USE 'C'	2 x 5,000 sq. m. 2 x 5,700 sq. m. (11,410 sq. ft.)
TOTAL AREA	6,843.0 sq. m. (73,650 sq. ft.)
CAR PARKING	
REQUIRED	
METRO - RETAIL FOOD	-3.4 PER 100 m ² OF G.F.A. 99
RETAIL - BLDG 'A'	-3.4 PER 100 m ² OF G.F.A. 24
RESTAURANT - BLDG 'B'	-3.4 PER 100 m ² OF G.F.A. 21
1st FL. RETAIL - BLDG 'C'	-3.4 PER 100 m ² OF G.F.A. 13
2nd FL. OFFICE - BLDG 'C'	-3.4 PER 100 m ² OF G.F.A. 14
TOTAL	171
PROVIDED	
METRO - RETAIL FOOD	-4.15 PER 1,000 m ² OF FOOTPRINT AREA 190
RETAIL - BLDG 'A'	30
RETAIL - BLDG 'B'	25
1st FL. RETAIL - BLDG 'C'	15
2nd FL. OFFICE - BLDG 'C'	15
TOTAL	275
METRO PARKING SPACE	2.74 x 5.75 m 64
STANDARD PARKING SPACE	2.5 x 5.2 m 204
SMALL CAR PARKING SPACE	2.4 x 4.8 m 0
BARRIER FREE SPACE	3.66 x 5.2 m 7
BICYCLE PARKING	
REQUIRED	
COMMERCIAL RETAIL	-1.0 PER 250m ² OF G.F.A. 20
PROVIDED	
COMMERCIAL RETAIL	-2,000m ² & OVER OF G.F.A. 2
COMMERCIAL CAFE	-0m ² TO 350m ² OF G.F.A. 1
TOTAL	3
LOADING	
PROVIDED	
COMMERCIAL RETAIL	-2,000m ² & OVER OF G.F.A. 2
COMMERCIAL CAFE	-0m ² TO 350m ² OF G.F.A. 1
TOTAL	3
LOT COVERAGE	
PAVED SURFACE =	10,464.1 sq. m. 47.4%
BUILDING FOOTPRINT =	6,281.0 sq. m. 28.5%
LANDSCAPE OPEN SPACE =	5,317.9 sq. m. 24.1%
TOTAL =	22,063.0 sq. m. 100.0%

NOTATION SYMBOLS:	
(01)	INDICATES DRAWING NOTES, LISTED ON EACH SHEET.
(02)	INDICATES ASSEMBLY TYPE; REFER TO TYPICAL ASSEMBLY SCHEDULE.
(03)	INDICATES WINDOW TYPE; REFER TO WINDOW ELEVATIONS AND DETAILS ON A300 SERIES.
(04)	INDICATES DOOR TYPE; REFER TO DOOR SCHEDULE AND DETAILS ON A300 SERIES.
(05)	INDICATES DETAIL NUMBER.
(06)	TITLE
(07)	SCHEMATIC
(08)	DETAIL REFERENCE PAGE
(09)	DETAIL CROSS REFERENCE PAGE

DRAWING NOTES	
1	PROPERTY LINE
2	BUILDING SETBACK LINE
3	PROPOSED COMMERCIAL BUILDING
4	FUTURE DEVELOPMENT AREA
5	LANDSCAPE ISLAND WITH 150mm BARRIER CURB
6	BICYCLE PARKING SPACES (0.6 x 1.8M) WITH RACK
7	HYDRO EQUIPMENT
8	CONCRETE SIDEWALK, WIDTH AS NOTED
9	TWSI TO BE LOCATED AND INSTALLED AS PER CITY REQUIREMENTS
10	PEDESTRIAN CROSS WALK WITH DEPRESSED CURBS
11	FIRE HYDRANT
12	STANDARD PARKING SPACE (2.6 x 5.2 M)
13	BARRIER FREE PAVING SPACE
14	DROPPED GARBAGE / LOADING BAYS WITH SCREEN WALL
15	LIGHT STANDARD - LOCATION TO BE CONFIRMED
16	CART CORRAL
17	PAINTED ISLAND AND/OR CURBS
18	PYLON SIGN
19	ELECTRIC VEHICLE SPACE WITH CHARGING STATION AND SIGNAGE
20	FAMILY PARKING SPACE WITH SIGNAGE
21	WATER STORAGE TANK, SEE CIVIL
22	BUILDING CANOPY
23	2 WAY ACCESS DRIVEWAY / ROAD
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25	SIAMSE CONNECTION
26	FIRE ROUTE
27	SOFT LANDSCAPING
28	EXISTING FIRE HYDRANT
29	EXISTING LIGHT STANDARD
30	EXISTING HYDRO POLE
31	RELOCATE EXISTING LIGHT STANDARD
32	INTERNAL GARBAGE / RECYCLING AREA
33	TEMPORARY SNOW STORAGE AREA
34	MOUNTABLE CURB WITH CONCRETE TRUCK APRON
35	3.0m HT. SOUND BARRIER FENCE
36	BENCH
37	PAINTED ISLAND

REVISIONS:		
1	REVISED FOR 1st ROUND OF COMMENTS	Mar. 23, 21
2	ISSUED FOR SITE PLAN CONTROL	Aug. 31, 20
3	ISSUED FOR CONSULTANT REVIEW	July 9, 20
4	ISSUED FOR CONSULTANT REVIEW	June 25, 20

ARCHITECT SEAL	

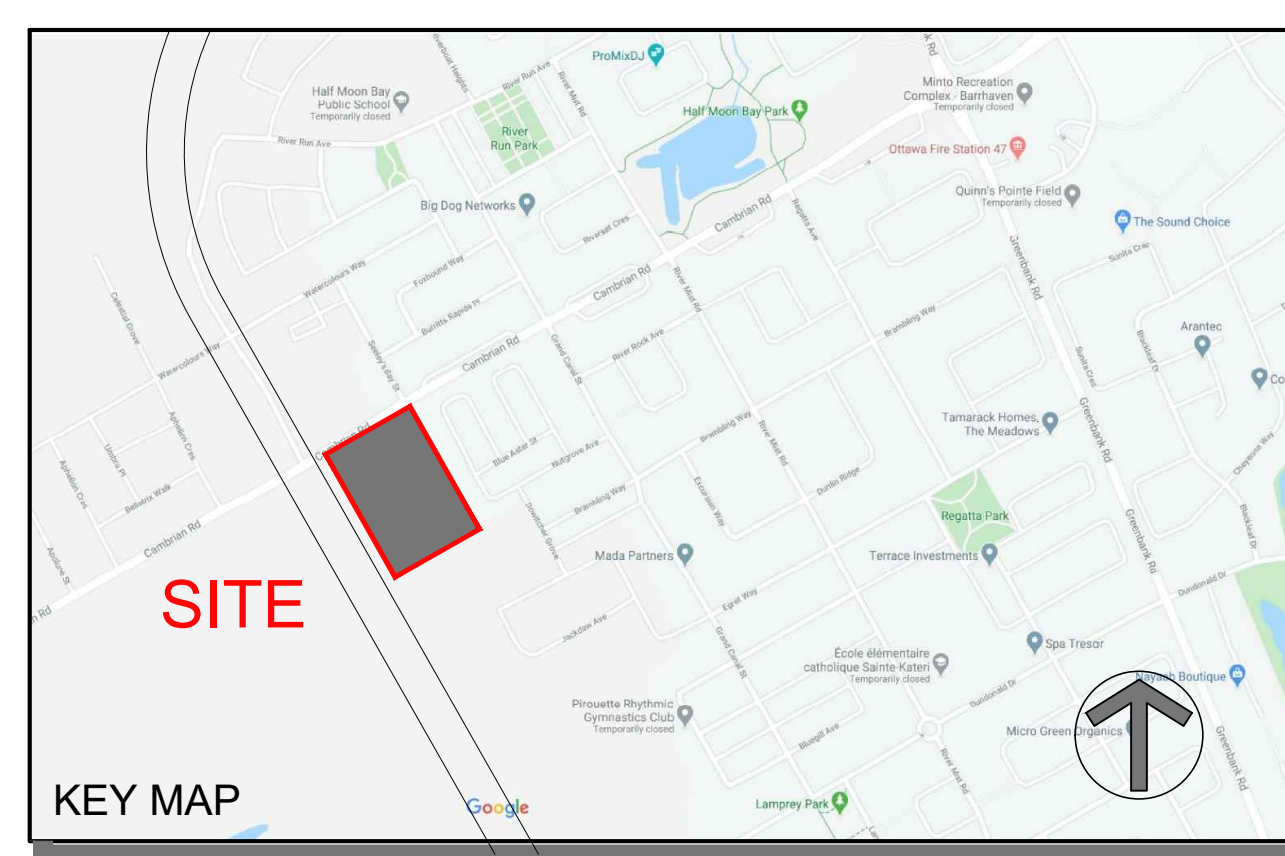
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METRO - BARRHAVEN
GREENBANK ROAD @
CAMBRIAN ROAD
OTTAWA ONTARIO

SHEET TITLE:	
SITE PLAN	
DRAWN: RV	CHECKED: R.V.
SCALE: 1:300	SHEET No. SP-1
PROJECT No. 1949	

1 SITE PLAN
SP-1
SCALE = 1 : 300



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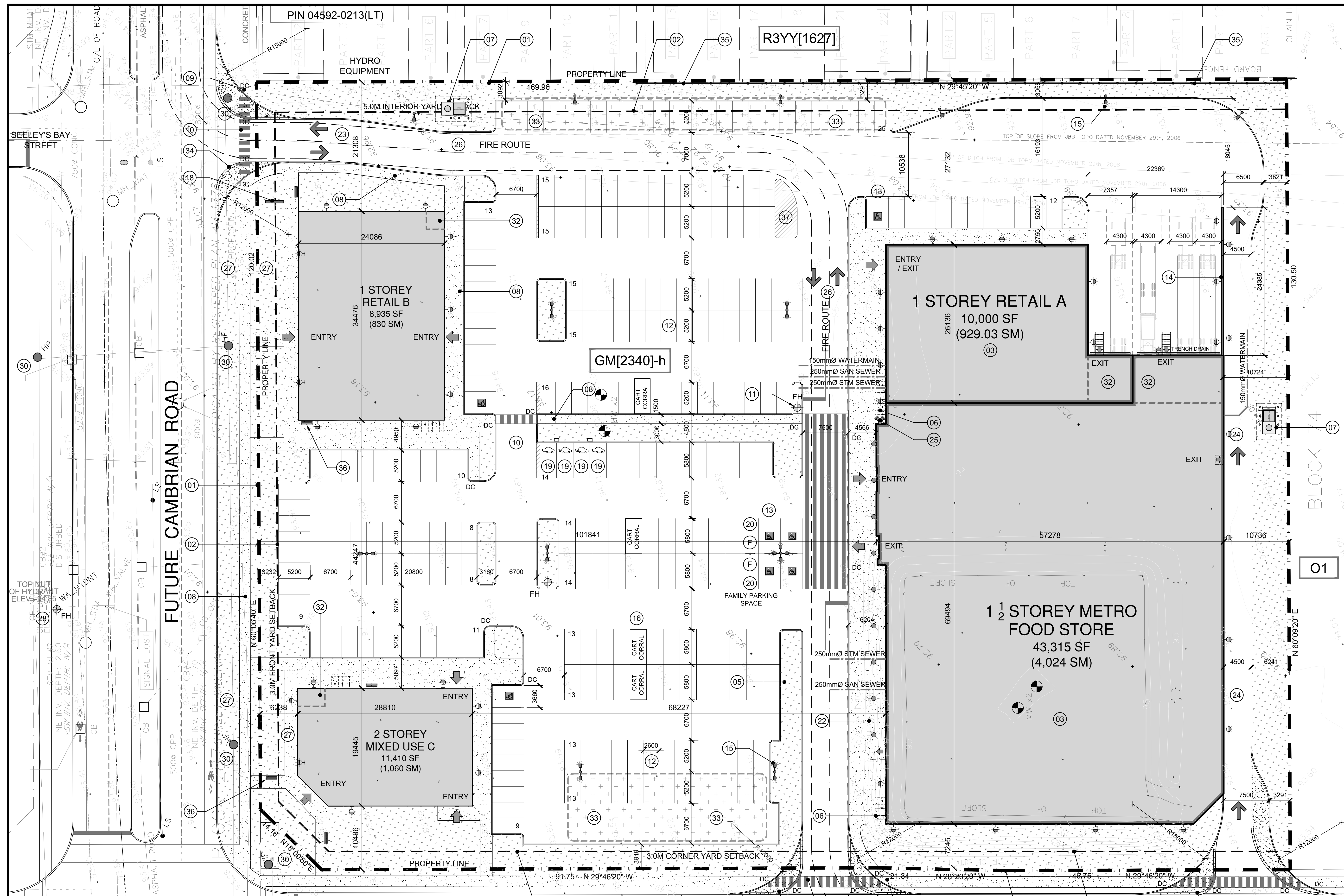
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Ottawa, Ontario, K1H 1E1
Tel: (613) 731-7244
Fax: (613) 731-8955
Cell: (613) 852-9260
E-Mail: cfox@jdbarnes.com

LEGAL DESCRIPTION
PLAN OF SURVEY SHOWING
TOPOGRAPHIC DETAIL OF
PART OF LOT 10
CONCESSION 3 (RIDEAU FRONT)
CITY OF OTTAWA



PROJECT INFORMATION	
ZONING	GM[2340]-h
SITE AREA	22,063.0 sq. m. (237,484 sq. ft.)
BUILDING HEIGHT	6 Storeys or 24.0 M
FRONT YARD SETBACK	3.0 M
CORNER YARD SETBACK	3.0 M
INTERIOR YARD SETBACK	5.0 M
REAR YARD SETBACK	0.0 M
LANDSCAPE BUFFER AROUND A PARKING LOT	3.0 M
LOADING SPACE - METRO	1.0 M
LOADING SPACE - RETAIL 'A'	0
PARKING - FOOD STORE	-3.4 PER 100m ² OF G.F.A.
PARKING - RETAIL	-3.4 PER 100m ² OF G.F.A.
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GFA - CITY OF OTTAWA'S DEFINITION	2,821.3 sq. m. (31,445 sq. ft.)
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35	3.0m HT. SOUND BARRIER FENCE
36	BENCH
37	PAINTED ISLAND

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3	ISSUED FOR CONSULTANT REVIEW	July 9, 20
No.	DESCRIPTION	DATE

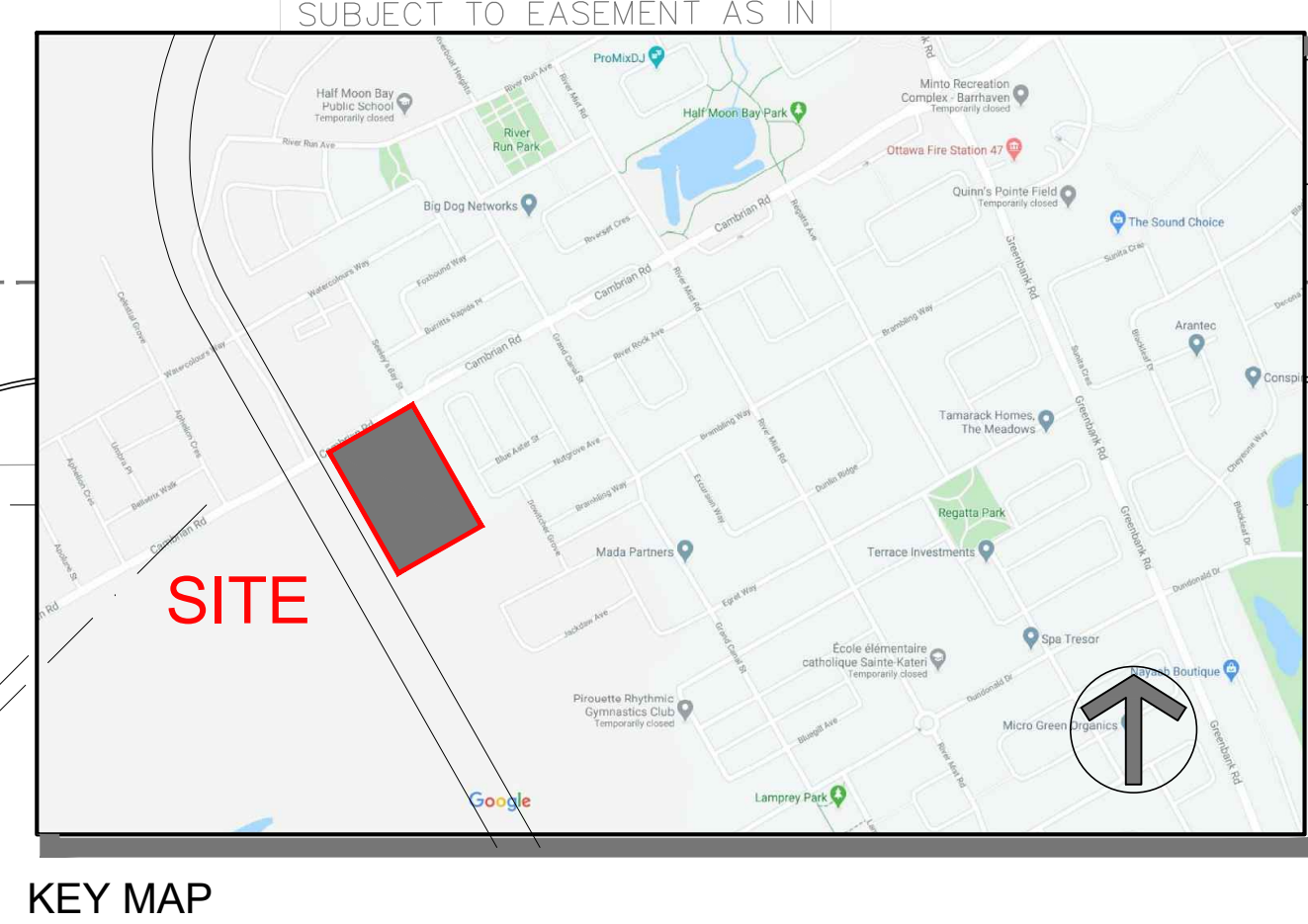
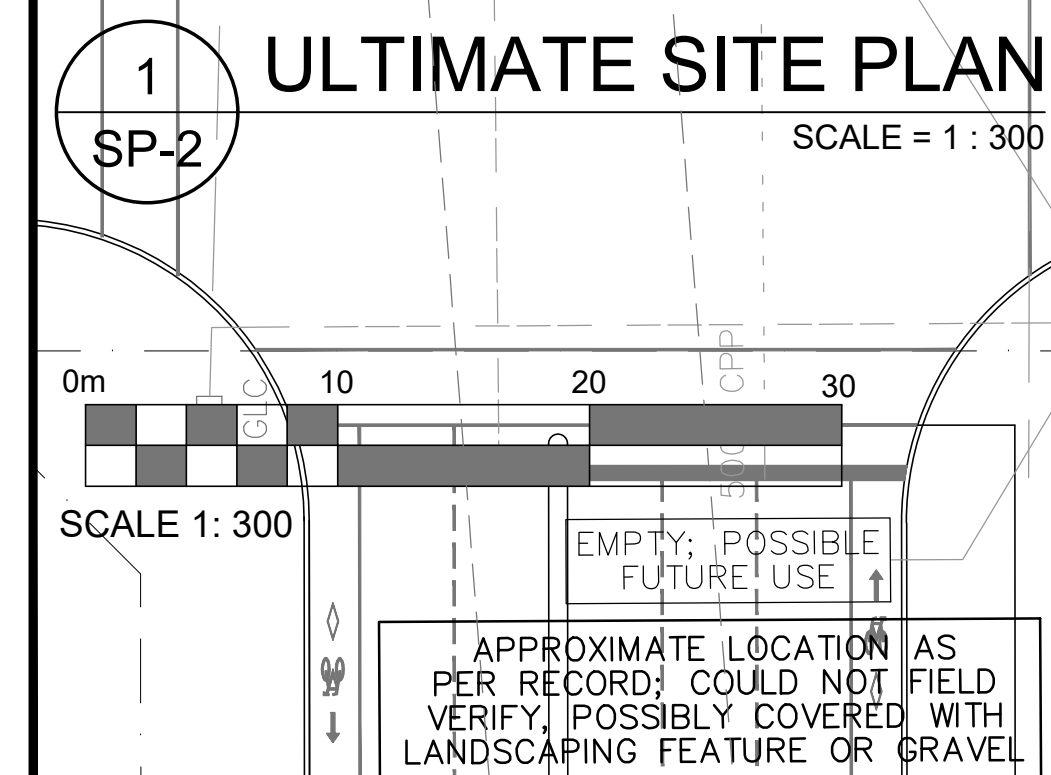


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PROJECT TITLE:
METRO - BARRHAVEN
GREENBANK ROAD @
CAMBRIAN ROAD
 OTTAWA ONTARIO

SHEET TITLE:
ULTIMATE
SITE PLAN

DRAWN: RV	CHECKED: R.V.
SCALE: 1:300	SHEET No.:
PROJECT No.:	SP-2
1949	



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SURVEYOR
 J.D. Barnes Limited
 2430 Don Reid Drive, Suite 204,
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 Cell: (613) 852-9260
 E-Mail: cfox@jdbarnes.com

LEGAL DESCRIPTION
 PLAN OF SURVEY SHOWING
 TOPOGRAPHIC DETAIL OF
 PART OF LOT 10
 CONCESSION 3 (RIDEAU FRONT)
 CITY OF OTTAWA

2.2 Existing Conditions

2.2.1 Area Road Network

Borrisokane Road

Borrisokane Road is a Ministry of Ontario road with a two-lane cross-section and a posted speed limit of 80 km/h. Gravel shoulders are present on both sides of the road. No sidewalks are provided. North of Cambrian Road, Borrisokane Road is an arterial road, and south of Cambrian Road it is a collector road. Borrisokane is part of the Veterans Memorial Highway (Highway 416) corridor to the south of Cambrian Road and has a measured 37.5 metre right of way to the north of Cambrian Road.

Cambrian Road

Cambrian Road is a City of Ottawa arterial road with a two-lane cross-section and a posted speed limit of 70 km/h for approximately 700 metres east of Borrisokane Road and 50 km/h in the remaining Study Area. To the west of Seeley's Bay Street, Cambrian Road has gravel shoulders and no sidewalks. To the east of Seeley's Bay Street, Cambrian Road has curbs, gutters, parking lanes, and sidewalks. The Ottawa Official Plan reserves a 37.5 metre right-of-way for this road.

Seeley's Bay Street

Seeley's Bay Street is a City of Ottawa local road with a two-lane urban cross-section including gutters, parking lanes and a sidewalk on the west side. The unposted speed limit is assumed to be 50 km/hr. The measured right-of-way is approximately 16 metres.

River Mist Road

River Mist Road is a City of Ottawa collector road with a two-lane urban cross-section including gutters, parking lanes and sidewalks on both sides of the road. The unposted speed limit is assumed to be 50 km/hr. The measured right-of-way is approximately 24 metres.

Greenbank Road

Greenbank Road is a City of Ottawa arterial road with a two-lane cross-section with pedestrian and cyclist path on the west side and a sidewalk on the east side. The posted speed limit is 60 km/hr. The Ottawa Official Plan reserves a 37.5 metre right-of-way for this road south of Cambrian Road and the measured right-of-way north of Cambrian Road is approximately 26.5 metres.

2.2.2 Existing Intersections

A description and accompanying aerial photographs of the existing intersections within one kilometre of the Study Area can be found below.

Borrisokane Road at Cambrian Road

Borrisokane Road at Cambrian Road is an unsignalized T-intersection. The westbound approach is stop-controlled and consists of a shared left-turn/right-turn lane. The northbound approach consists of a shared through/right-turn lane and the southbound approach consists of a shared left-turn/through lane. No turn restrictions were noted.



Seeley's Bay Street at Cambrian Road

Seeley's Bay Street at Cambrian Road is an unsignalized T-intersection. The southbound approach is stop-controlled and consists of a shared left-turn/right-turn lane. The westbound approach consists of a shared through/right-turn lane and the eastbound approach consists of a shared left-turn/through lane. No turn restrictions were noted.



River Mist Road at Cambrian Road

The intersection of River Mist Road and Cambrian Road is an all-way stop-controlled intersection with shared movement lanes on all approaches. No turn restrictions were noted.



Greenbank Road at Cambrian Road

Greenbank Road at Cambrian Road is a single-lane roundabout intersection. Each roundabout approach consists of a single lane.



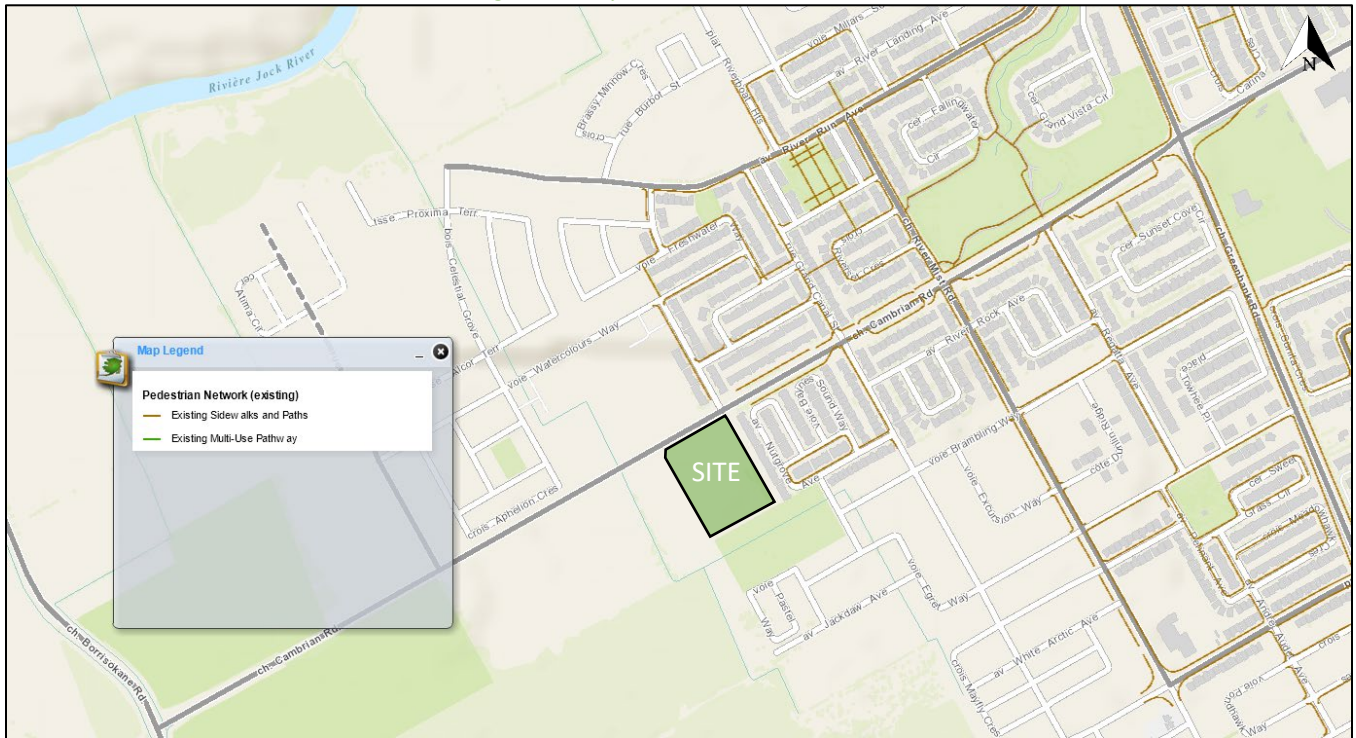
2.2.3 Existing Driveways

There is a driveway within 200 metres of the proposed site access that runs parallel to Cambrian Road. This driveway is located to the northeast of the Subject Site and provides a one-way access to four triplex dwellings on the north side of Cambrian Road. The proposed Cambrian Road access to the Subject Site is located 200 metres west of the existing driveway entrance and 35 metres west of the existing driveway exit.

2.2.4 Cycling and Pedestrian Facilities

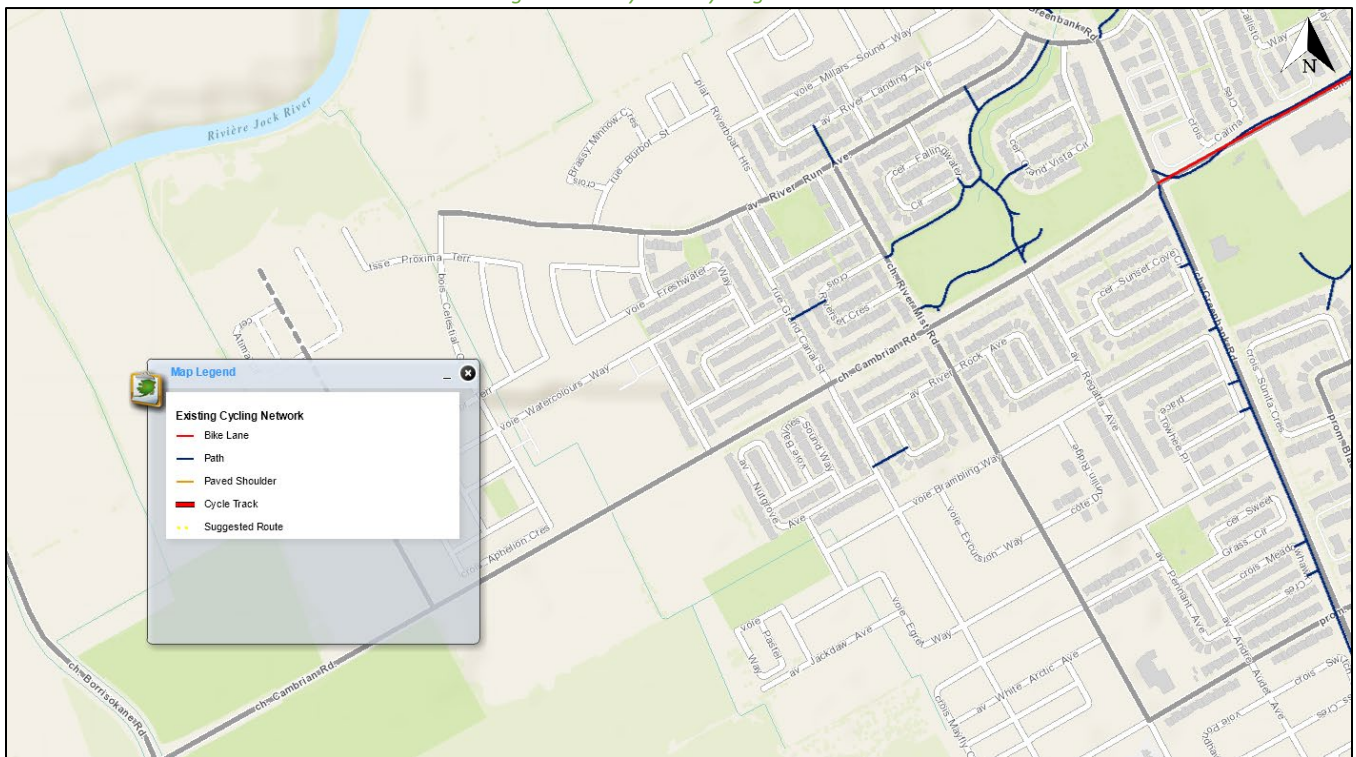
There are sidewalks on both sides of Cambrian Road which start at approximately 40 metres east of the proposed site and can be seen in Figure 4. Additionally, the sidewalks extend 50 metres west of the east edge of the proposed development on the south and to the east edge of the proposed site on the north. These sidewalk segments are not shown on the geoOttawa map. The cycling network consists of bike paths along Greenbank Road and at the Half Moon Bay Park. Figure 4 illustrates the pedestrian facilities in the vicinity of the proposed site and Figure 5 illustrates the cycling facilities.

Figure 4: Study Area Pedestrian Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: July 14, 2020

Figure 5: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: July 14, 2020

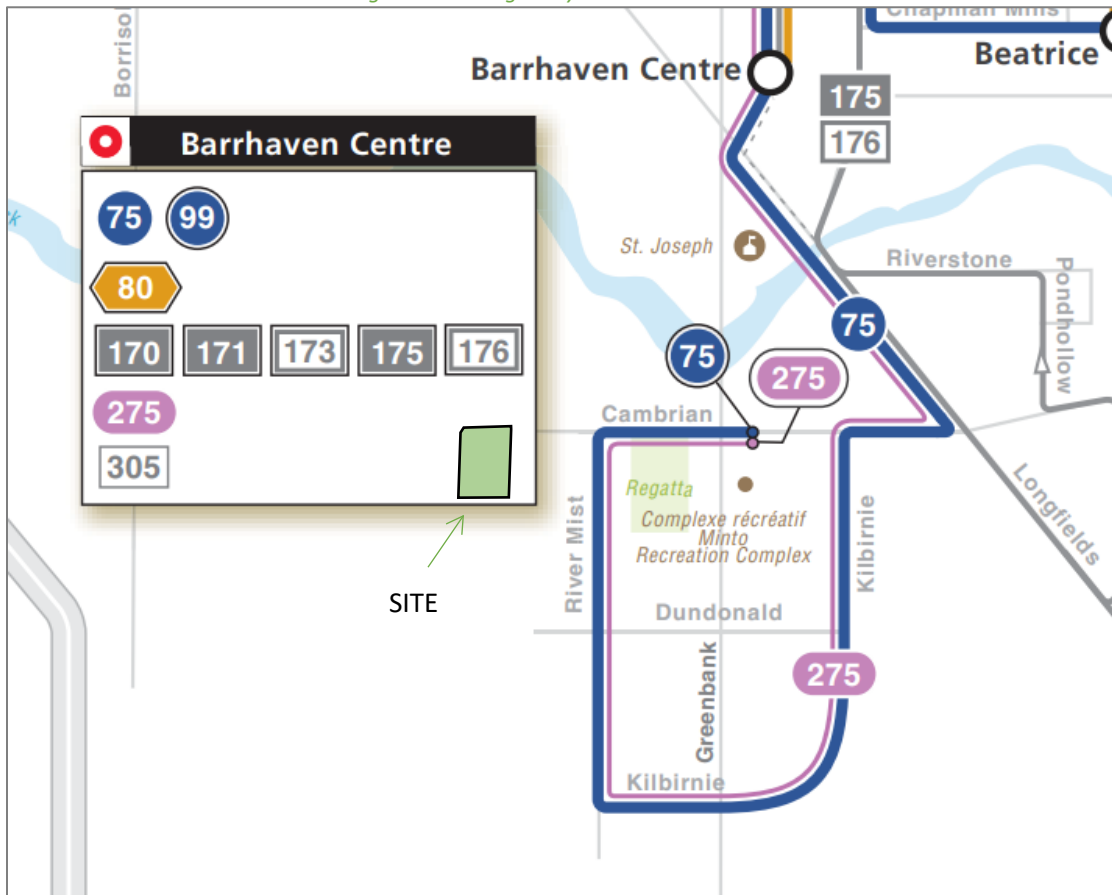
2.2.5 Existing Transit

There is no existing transit service along the subject development boundary on Cambrian Road. East of the Subject Site, Route 75, and Route 275 run along River Mist Road and Cambrian Road. These routes share the same path, with Route 75 stopping at all stops along the path and Route 275 providing an express service. The existing Study Area transit service is presented in Figure 6. In this Figure, the map legend covers the location of the subject development. The transit stops in the Study Area can be seen in Figure 7. While all transit stops in the area are shown, the highlighted stops appear to not be in use. Both figures are excerpts from the OCTranspo Network Map. The frequency of these routes within proximity of the proposed site currently are:

- Route # 75 – every 15 minutes during AM and PM weekday peak hours and mid-day weekend peak hours, and every 30 to 60 minutes during all other times.
- Route # 275 – every 5 to 25 minutes from approximately 4PM to 6PM on weekdays and with no operations on Saturdays and Sundays.

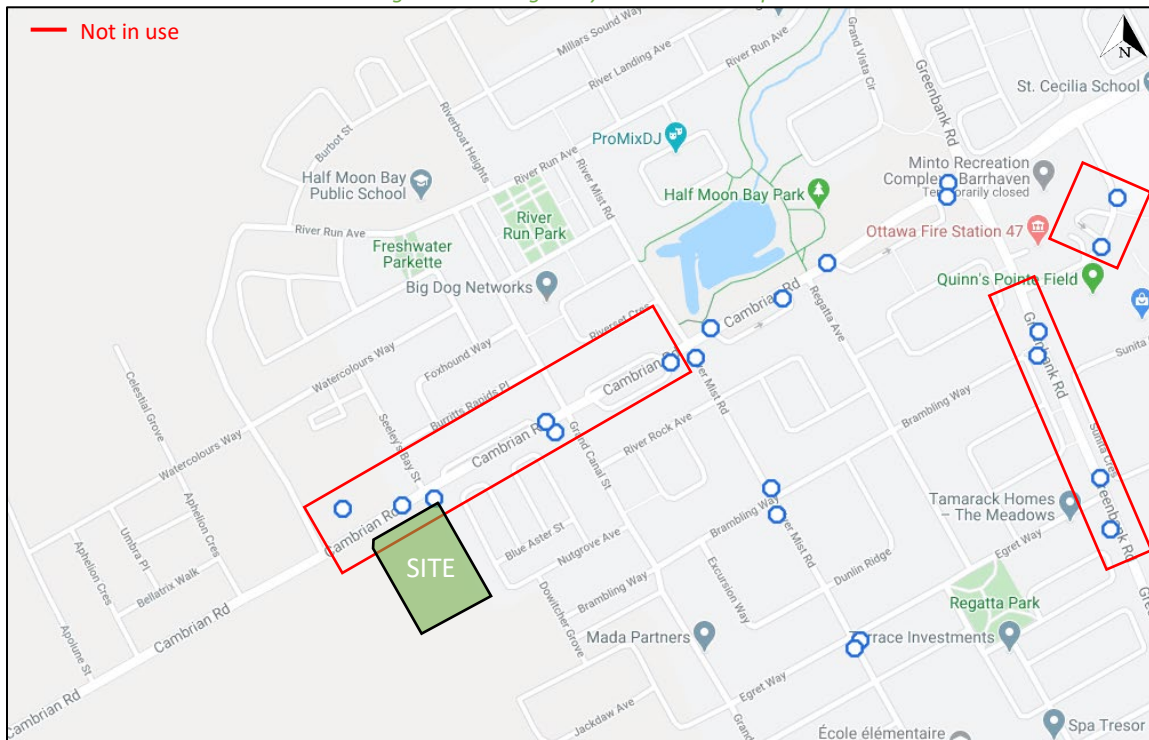
Figure 6 illustrates the transit system map in the Study Area and Figure 7 illustrates nearby transit stops.

Figure 6: Existing Study Area Transit Service



Source: <http://www.octranspo.com/> Accessed: July 9, 2020

Figure 7: Existing Study Area Transit Stops



Source: <http://www.octranspo.com/> Accessed: July 10, 2020

2.2.6 Existing Area Traffic Management Measures

Within the Study Area, traffic management measures are present on River Mist Road. Using Google Streetview, a desktop review of these measures was undertaken. These measures include a radar feedback sign north of Cambrian Road and centreline collapsible bollards south of Cambrian Road.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from City of Ottawa for the existing Study Area intersections for both the AM and PM peak hours. No Saturday peak hour turning movement counts for the Study Area intersections are available and as a result of the current lockdown measures due to the COVID-19 pandemic, no counts can be collected. As such, PM peak period turning movement counts will also be used as Saturday peak hour volumes. This conservative estimation method has been approved by the City of Ottawa. Table 1 summarizes the intersection count date and data source.

Table 1: Intersection Count Date

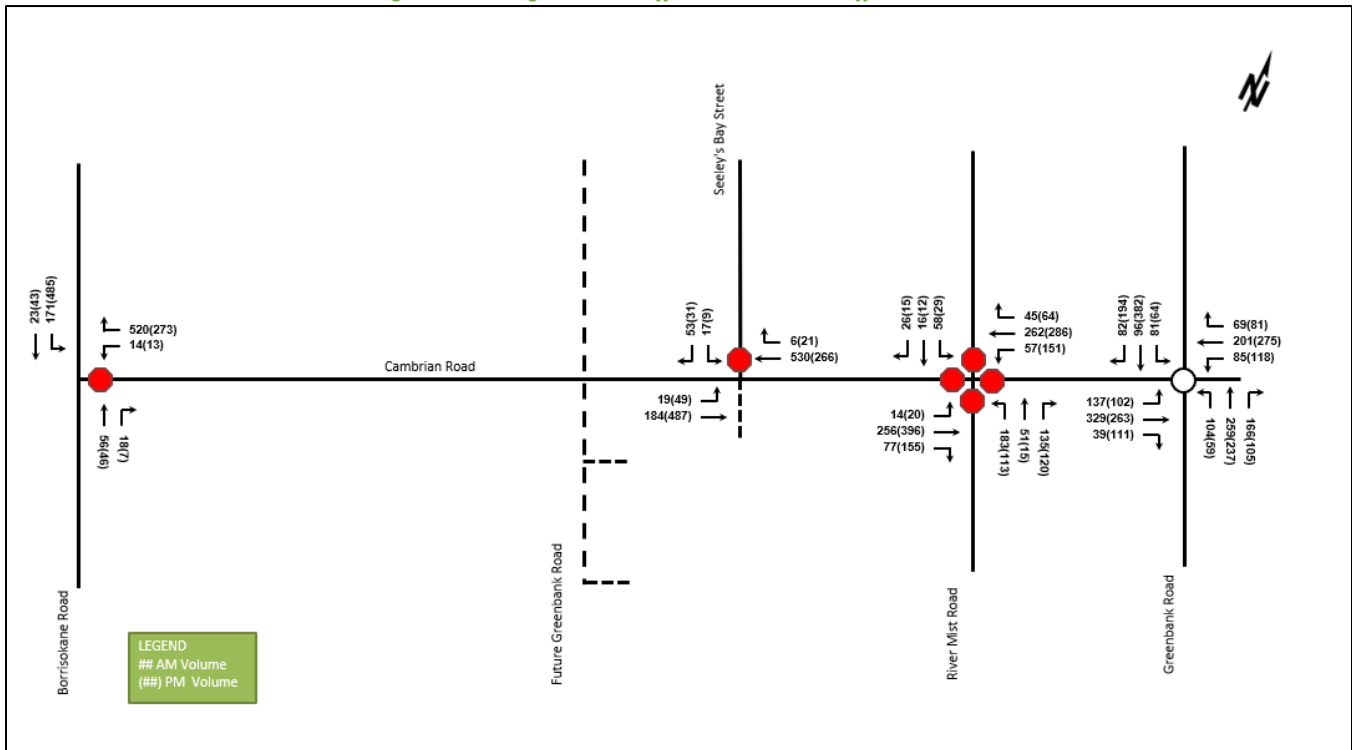
Intersection	Count Date	Data Source
Borrisokane Road at Cambrian Road	Tuesday, February 15, 2018	Meadows Phase 5 TIA
Seeley's Bay Street at Cambrian Road	Wednesday, November 22, 2017	City of Ottawa
River Mist Road at Cambrian Road	Wednesday, October 23, 2019	City of Ottawa
Greenbank Road at Cambrian Road	Wednesday, September 13, 2017	City of Ottawa

Figure 8 illustrates the 2020 existing horizon traffic volumes and Table 2 summarizes the existing intersection operations. As shown above, the turning movement count data has been collected in several different years. Due to the ongoing COVID-19 health crisis undertaking turning movement counts is not possible as the counted volumes would not reflect typical traffic conditions. To understand traffic conditions historical traffic counts have been acquired from the City of Ottawa. Since no turning movement counts were obtained by the City of Ottawa

for the Borrisokane Road at Cambrian Road in the last five years, the 2018 turning movement counts from the Tamarack Meadows Phase 5 TIA by IBI are used for this intersection.

To reflect a constant horizon, a 2% background growth rate has been used. This growth rate is consistent with surrounding development Traffic Impact Assessments such as *3285 Borrisokane Road Commercial Development Transportation Impact Study (Parsons, 2018)*, *3640 Greenbank Road Transportation Impact Assessment (CGH Transportation, 2018)*, *Half Moon Bay North Apartment Block Transportation Impact Assessment (Stantec, 2018)*, *The Meadows Phase 5 Transportation Impact Assessment Report (IBI Group 2018)*, and *Quinn’s Pointe 2 Transportation Impact Assessment (Stantec, 2018)*. Additionally, volume balancing has been applied within the Study Area and site-traffic generated by adjacent developments built-out during 2019 and 2020 has been considered. Detailed turning movement count data is included in Appendix B.

Figure 8: Existing Horizon Traffic Volumes and Traffic Controls



Additionally, the collected intersection counts also provided existing pedestrian and cyclist demands at the four Study Area intersections for both AM and PM peak periods. As discussed above, PM peak counts will also be used as Saturday peak hour counts. Figure 9 illustrates the existing pedestrian volumes and Figure 10 illustrates the existing cyclist volumes at the Study Area.

Figure 9: Existing Pedestrian Volumes

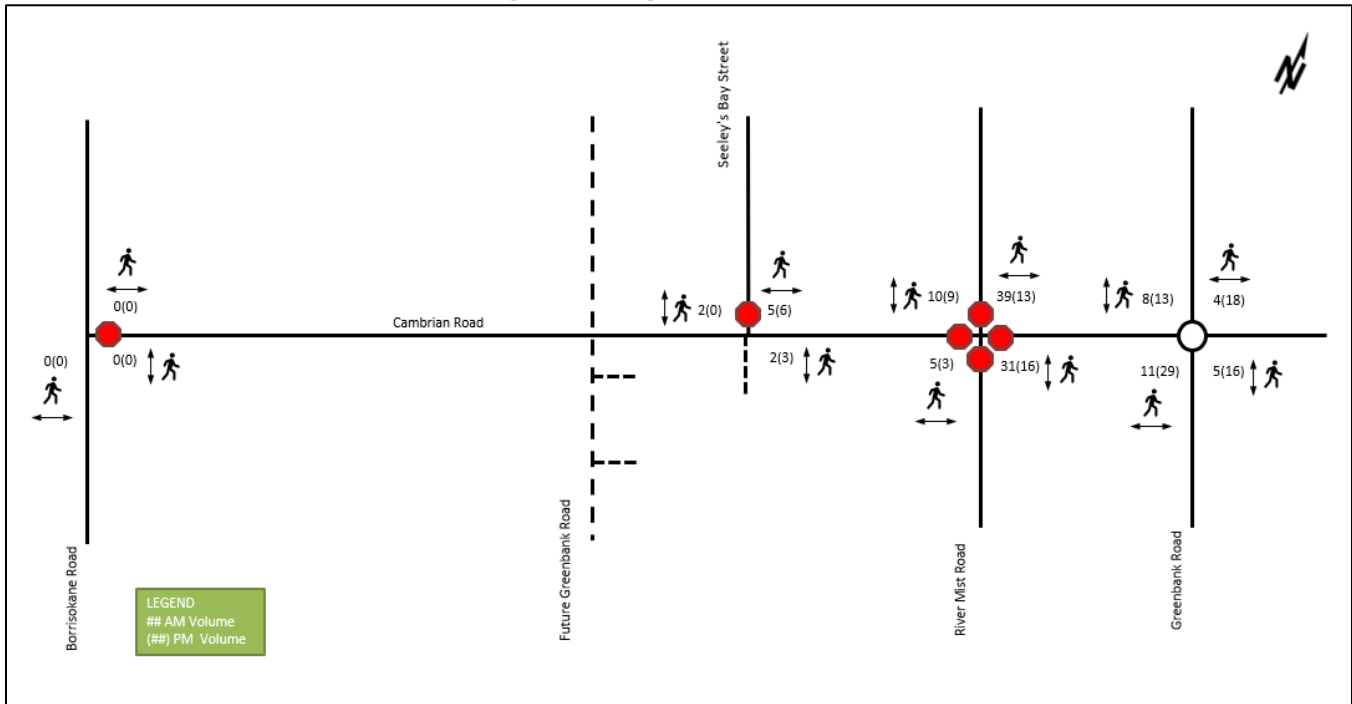
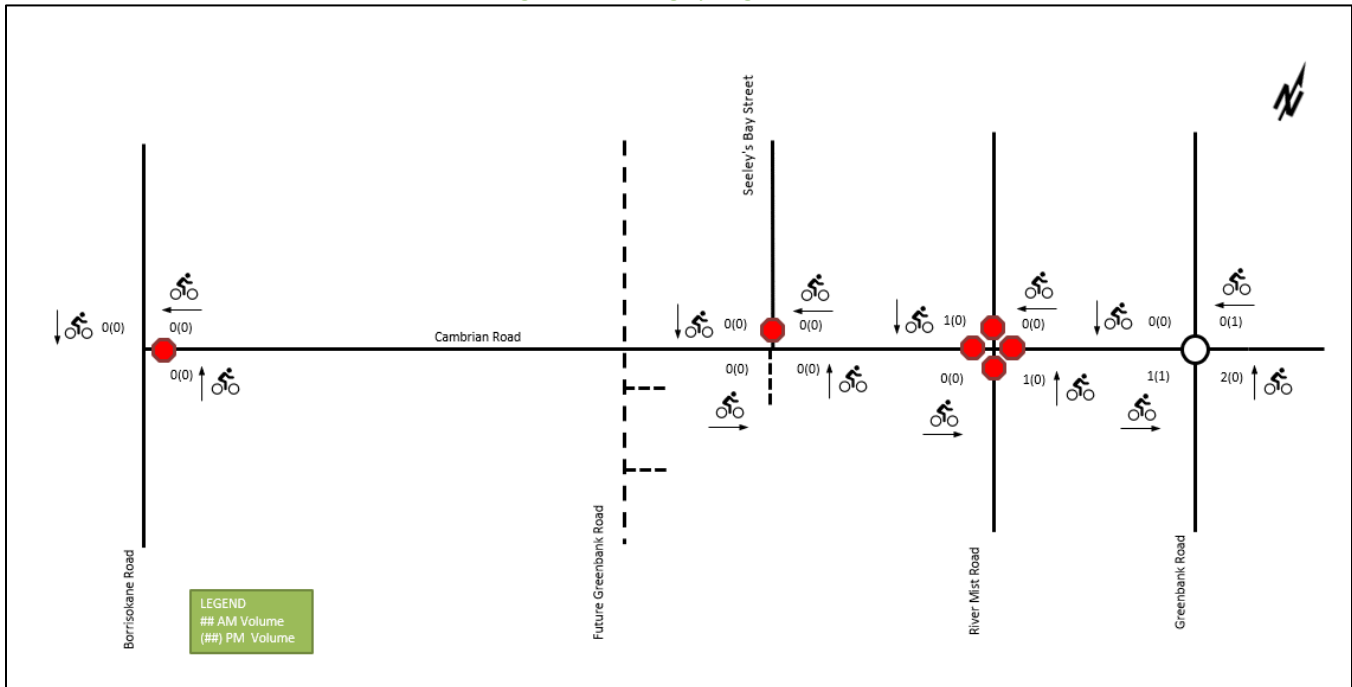


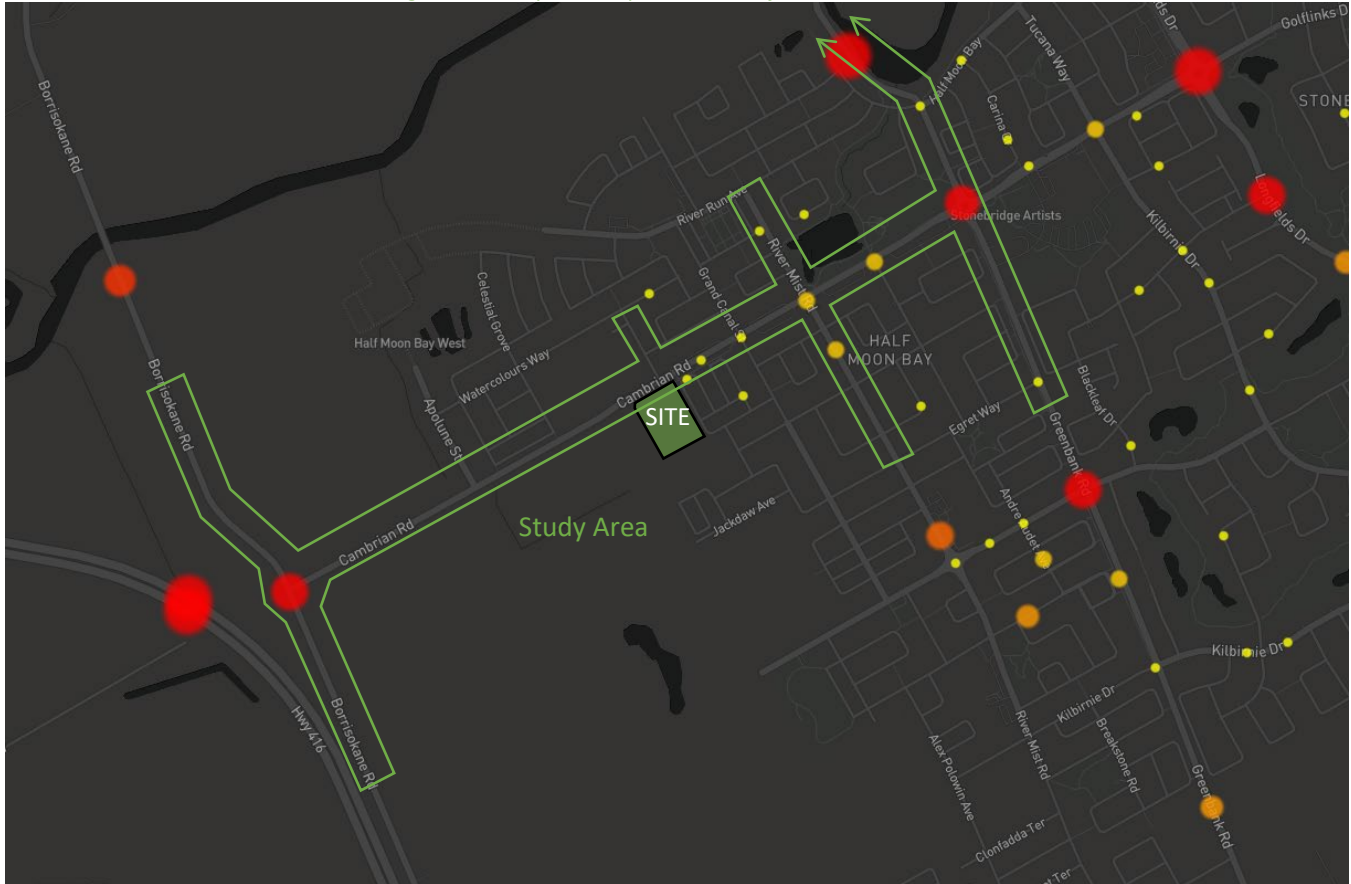
Figure 10: Existing Cycling Volumes



2.2.8 Collision Analysis

Collision data has been acquired from the City of Ottawa for five years (2014-2018) prior to the commencement of this TIA for the surrounding Study Area road network. Table 2 illustrates the collisions at the intersections and road segments within the Study Area, and Table 4 summarizes the collision types and conditions of the 105 collisions recorded in the Study Area. Collision data is included in Appendix C.

Figure 11: Study Area Representation of Collision Locations



Source: <https://maps.bikeottawa.ca/collisions/> Accessed: July 13, 2020

Table 2: Summary of Collision Locations, 2014-2018

Intersections / Segments	Number	%
	105	100%
Borrisokane Road (formerly Cedarview) between Barnsdale Road and Cambrian Road	3	3%
Borrisokane Road (formerly Cedarview) between Cambrian Road and Standherd Drive	20	19%
Cambrian Road between Borrisokane (formerly Cedarview) Road and Grand Canal Street	3	3%
Cambrian Road between Grand Canal Street and Seeley's Bay Street	1	1%
Seeley's Bay Street between Burritts Rapids Place and Watercolour Way	1	1%
Cambrian Road between Regatta Avenue and Greenbank Road	1	1%
Cambrian Road at Borrisokane (formerly Cedarview) Road	10	10%
Cambrian Road at River Mist Road	5	5%
River Mist Road between Brambling Way and River Rock Avenue	3	3%
Cambrian Road at Grand Canal Street	3	3%
Cambrian Road at Regatta Avenue	2	2%
Cambrian Road at Greenbank Road	11	10%
Greenbank Road between Jockvale Road and Cambrian Road	37	35%
Greenbank Road between Cambrian Road and Dundonald Drive	5	5%

Table 3: Collision Summary

		Number	%
Total Collisions		105	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	23	22%
	Property Damage Only	82	78%
Initial Impact Type	Approaching	8	8%
	Angle	10	10%
	Rear End	25	24%
	Sideswipe	2	2%
	Turning Movement	4	4%
	SMV Unattended Vehicle	6	6%
	SMV Other	49	47%
	Other	1	1%
Road Surface Condition	Dry	58	55%
	Wet	16	15%
	Loose Snow	10	10%
	Slush	3	3%
	Packed Snow	3	3%
	Ice	14	13%
	Loose Sand or Gravel	1	1%
Pedestrian Involved		0	0%
Cyclists Involved		3	3%

The Study Area had a total of 105 collisions during the 2014-2018 time period, with 78% involving property damage only and the remaining 22% having non-fatal injuries. The collision types are most represented by SMV Other impact type with 47% of collisions in this category. Weather/road conditions are a contributing factor for 42% of the collisions in this area.

Three of the collisions involved cyclists, one occurring at the intersection of Cambrian Road and Greenbank Road, another occurring along Greenbank Road between Jockvale Road and Cambrian Road and the third collision occurring along Greenbank Road between Cambrian Road and Dundonald Drive. There were no pedestrian collisions in the Study Area.

The segment of Greenbank Road between Jockvale Road and Cambrian Road is noted to have experienced higher collisions than other segments and intersections. This may be attributed to the fact that the Greenbank Road segment north of Cambrian road is the longest (approximately 1.7 km) road segment in the Study Area to which the collision data is assigned to. Sharp turns leading to the Jock River overpass from both north and south approaches could also be a contributing factor to a higher than average collision rate.

Currently, no intersection has been noted to require an in-depth collision analysis.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The subject development is within the Barrhaven South Community Design Plan (CDP) Area. As such, it is subject to the planning policies outlined in the CDP. The CDP provides target population and employment densities in the four Sub-Planning Areas along with the plans for infrastructure to support the community growth. As part of this plan, the right-of-way along the following roads has been protected to accommodate an expansion to a four-lane arterial:

- Re-Aligned Greenbank Road rapid transit corridor north and south of Cambrian Road with a protected right-of-way of 41.5 metres
- Existing Greenbank Road south of Cambrian Road with a protected right-of-way of 37.5 metres
- Borrisokane Road north of Cambrian Road with a protected right-of-way of 37.5 metres
- Cambrian Road between Borrisokane Road and Jockvale Road with a protected right-of-way of 37.5 metres

Re-Aligned Greenbank Road will be located on the west side of the proposed development. While listed within the Transportation Master Plan Affordable Network, it is unknown if Re-Aligned Greenbank Road will be completed to Cambrian Road by 2031. Beyond 2031, Re-Aligned Greenbank Road will extend south of Cambrian Road to Barnsdale Road. The proposed cross-section of Re-Aligned Greenbank Road is a divided 4-lane cross-section including sidewalks, cycletracks, and centre median bus lanes.

Intersection Control Measures outlined in the 2019 Ottawa Development Charges By-Law are expected to be implemented at the following intersections:

- Cambrian Road and Borrisokane Road at a gross project cost of \$1,300,000 (2020-2031)
- Cambrian Road and Apolune Way at a gross project cost of \$1,300,000 (2020-2031)

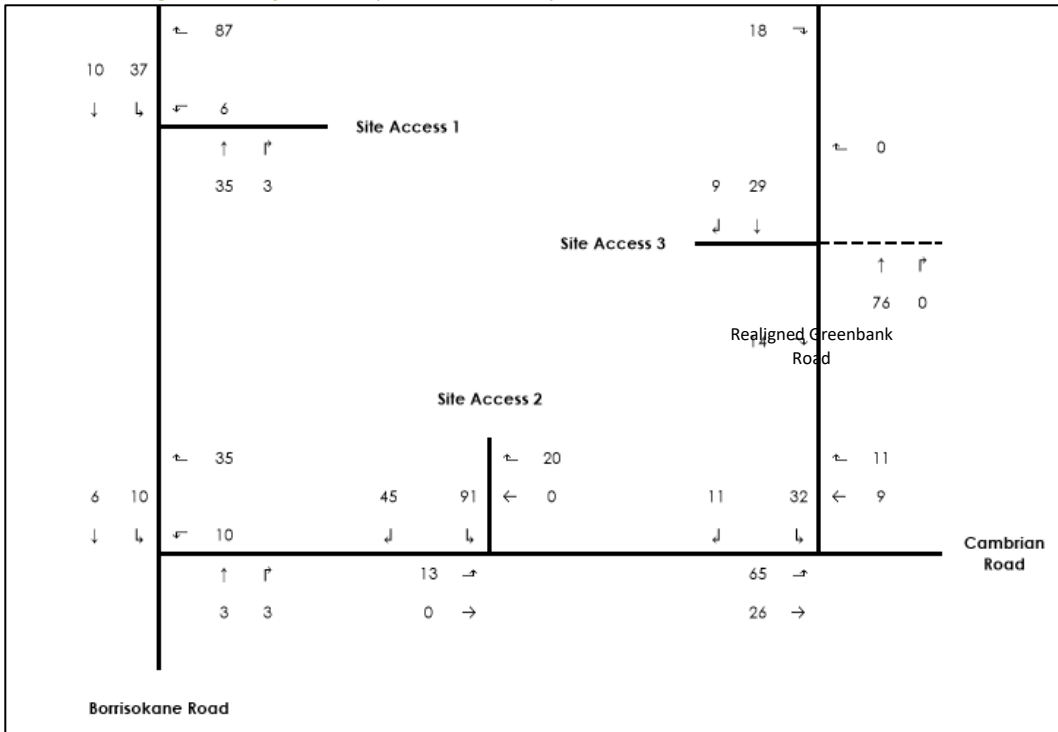
2.3.2 Other Study Area Developments

Several development applications were available for the adjacent properties as listed on the City's Development Application Search tool:

Half Moon Bay West Community

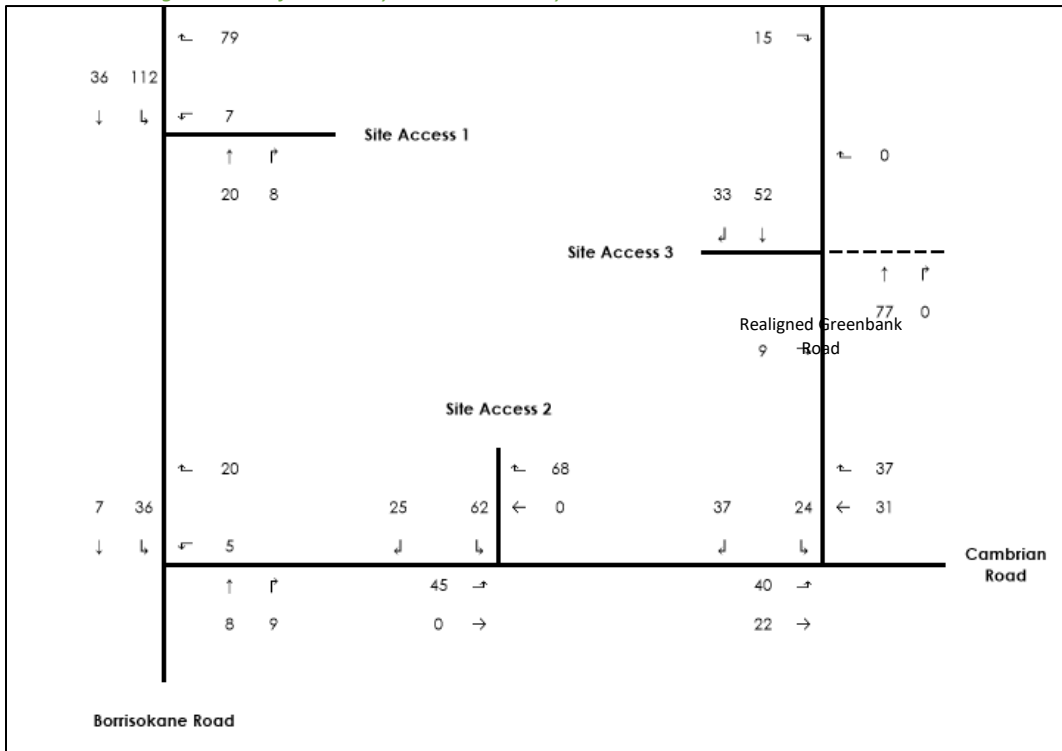
Half Moon Bay West Community is a proposed five-phase residential development located on a 57.42 hectare area north of the Subject Site. According to the 2016 Community Transportation Study (CTS), this site was planned to include 552 single family homes, 464 townhouses and a 5.3 acre commercial land. The projected trip generation is 589 and 725 two-way auto trips during the AM and PM peak hours, respectively. The community full build-out year is 2024. In the 2019 update, the plan was revised to include 154 back-to-back townhouse dwellings, 300 wide lot townhouse dwellings, 447 detached dwellings, and 72 apartment units. The anticipated trip generation from the new plan is 536 and 659 two-way auto trips during the AM and PM peak hours, respectively. The revised plan does not include traffic distribution, however, since the updated plan results in a decrease in community-generated traffic volume, the original site traffic volume diagrams will be used. This will create a conservative estimate of the future background traffic volumes. The generated traffic volume from this community for AM and PM peak periods can be seen in Figure 12 and Figure 13 respectively and are excerpt from the Half Moon Bay West Community Transportation Study by Stantec.

Figure 12: Half Moon Bay West Community Generated Volumes – AM Peak Hour



Source: Half Moon Bay West Community Transportation Study (Stantec, 2016)

Figure 13: Half Moon Bay West Community Generated Volumes – PM Peak Hour

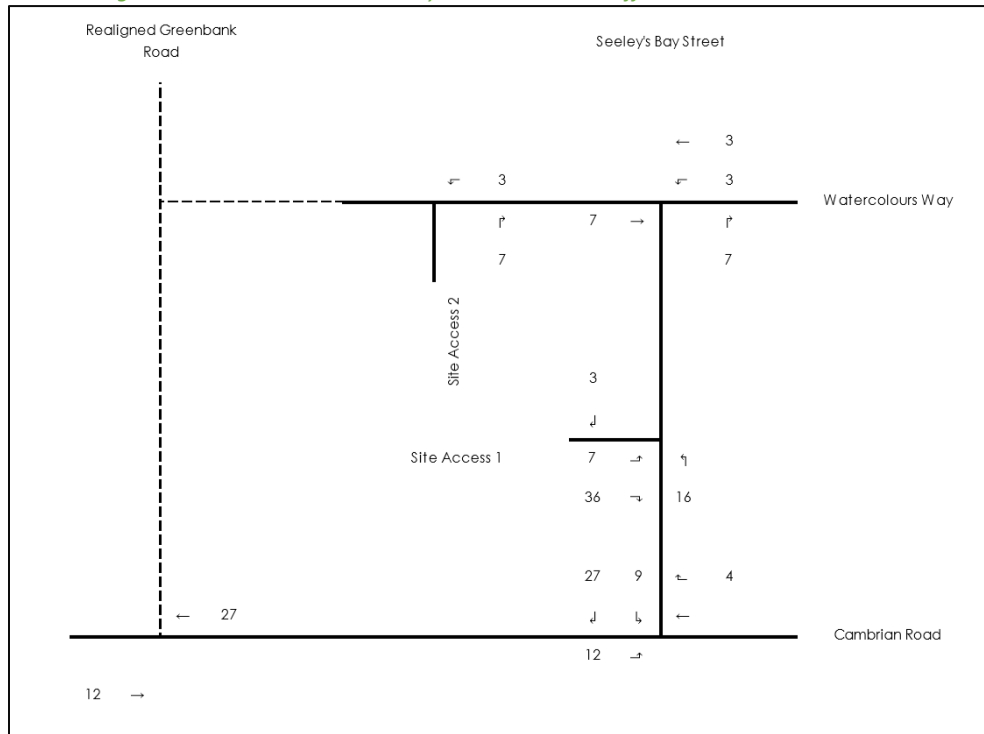


Source: Half Moon Bay West Community Transportation Study (Stantec, 2016)

2444 Watercolours Way

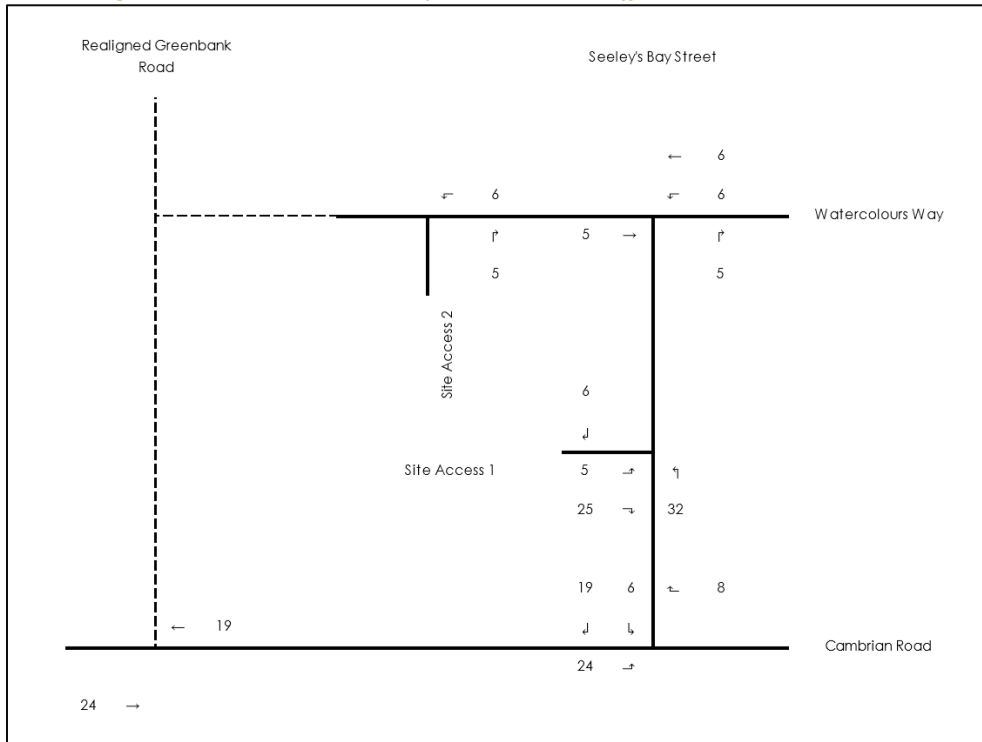
2444 Watercolours Way (Half Moon Bay North Phase 9) is a proposed residential development consisting of 60 stacked house units. This development was completed in 2019. However, this development was not captured in the available TMCs and therefore it has been accounted for explicitly herein. 2444 Watercolours Way is located approximately 250 metres north of the Subject Site and is expected to generate 74 and 80 two-way auto trips during the AM and PM peak hours, respectively. The anticipated trip generation from this site can be seen in Figure 14 and Figure 15 respectively and are excerpt from the Half Moon Bay North Apartment Block Transportation Impact Assessment by Stantec. This study also includes anticipated trip generation for when the future Greenbank Road is built that can be seen in Appendix D.

Figure 14: 2444 Watercolours Way Site Generated Traffic Volumes – AM Peak Hour



Source: Half Moon Bay North Apartment Block Transportation Impact Assessment (Stantec, 2018)

Figure 15: 2444 Watercolours Way Site Generated Traffic Volumes - PM Peak Hour

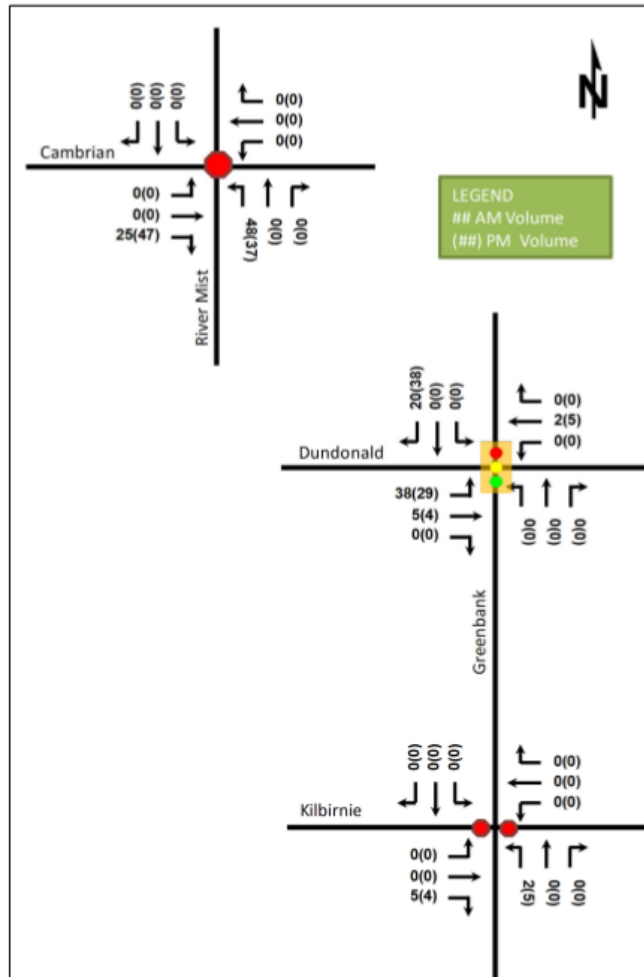


Source: Half Moon Bay North Apartment Block Transportation Impact Assessment (Stantec, 2018)

3718 Greenbank Road

3718 Greenbank Road is Phase 5 of Mattamy Half Moon Bay South, which is located southeast of the Subject Site and is expected to be built-out in 2020. The development will consist of 67 single detached home units and 97 townhouse units. This development is expected to produce 144 two-way AM peak period auto trips and 165 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen Figure 16 and is an excerpt from the 3718 Greenbank Road – Half Moon Bay South – Phase 5 Transportation Impact Assessment by CGH Transportation.

Figure 16: 3718 Greenbank Road Site Generated Traffic Volumes



Source: 3718 Greenbank Road – Half Moon Bay South – Phase 5 Transportation Impact Assessment (CGH, 2019)

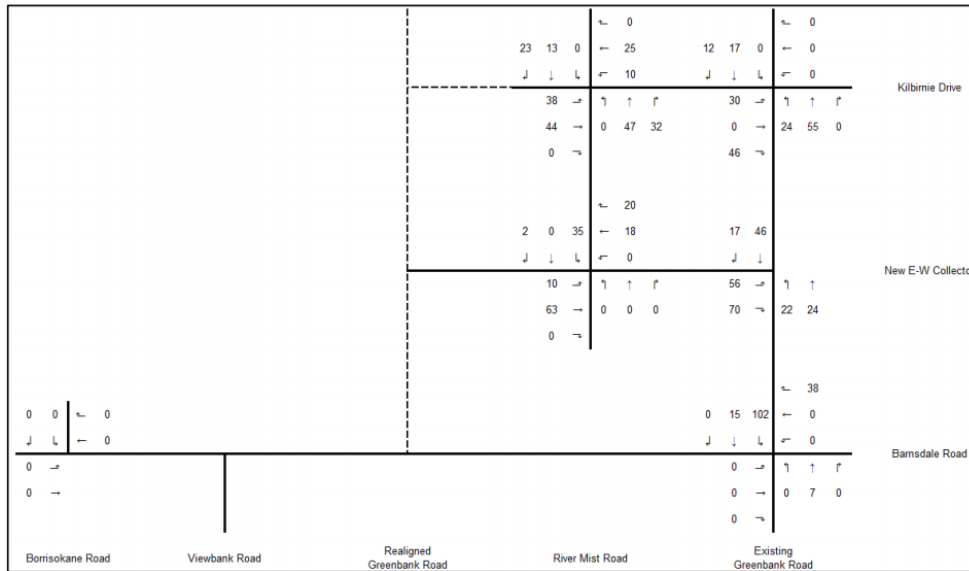
3802/3812 Greenbank Road

3802 and 3812 Greenbank Road is a proposed commercial development located southwest of the Subject Site, with an approximate area of 850 metres squared and 26 surface parking lots. The anticipated build-out year is 2020. This development does not meet trip generation trigger according to the 3802/3812 Greenbank Road Transportation Impact Study by CGH Transportation. Therefore, the impacts of this development are anticipated to be minimal and will be captured within the background growth rate.

3882 Barnsdale Road and 3960 Greenbank Road

3882 Barnsdale Road and 3960 Greenbank Road (Quinn’s Pointe 2) is a proposed two-phase residential development that will include 536 single-family dwelling units, 493 townhomes, 100 apartment units, and two elementary schools. A total of 749 two-way AM peak period auto trips and 813 two-way PM peak period auto trips are expected from this development upon full build-out. The anticipated trip generation from this site for Phase 1 (2022) can be seen in Figure 17 and Figure 18 and are excerpts from Quinn’s Pointe 2 Transportation Impact Assessment prepared by Stantec. The above-mentioned TIA also includes 2025 background and total traffic volume diagrams, which will be subtracted as part of this study to obtain the 2025 Quinn’s Pointe 2 site generated volume and can be seen in Appendix D.

Figure 17: 3882 Barnsdale and 3960 Greenbank Road 2022 Site Generated Traffic Volumes – AM Peak Hour



Source: Quinn’s Pointe 2 Transportation Impact Assessment (Stantec, 2018)

Figure 18: 3882 Barnsdale and 3960 Greenbank Road 2022 Site Generated Traffic Volumes – PM Peak Hour

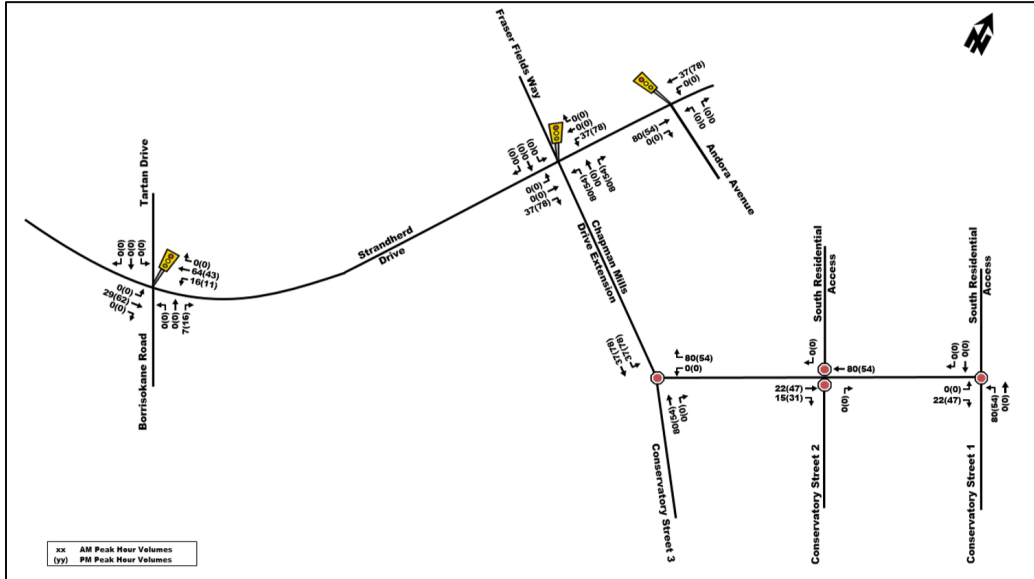


Source: 3718 Greenbank Road – Half Moon Bay South – Phase 5 Transportation Impact Assessment (CGH, 2019)

3285 Borriskane Road

3285 Borriskane Road is a proposed residential development located north of the Subject Site and is expected to be built-out in 2020. This development will include 125 single family homes and 75 townhouses. This development is expected to produce 129 two-way AM peak period auto trips and 146 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen Figure 19 and is an excerpt from the 3285 Borriskane Road Phase 1 Transportation Impact Study by Parsons.

Figure 19: 3285 Borriskane Road Site Generated Traffic Volumes

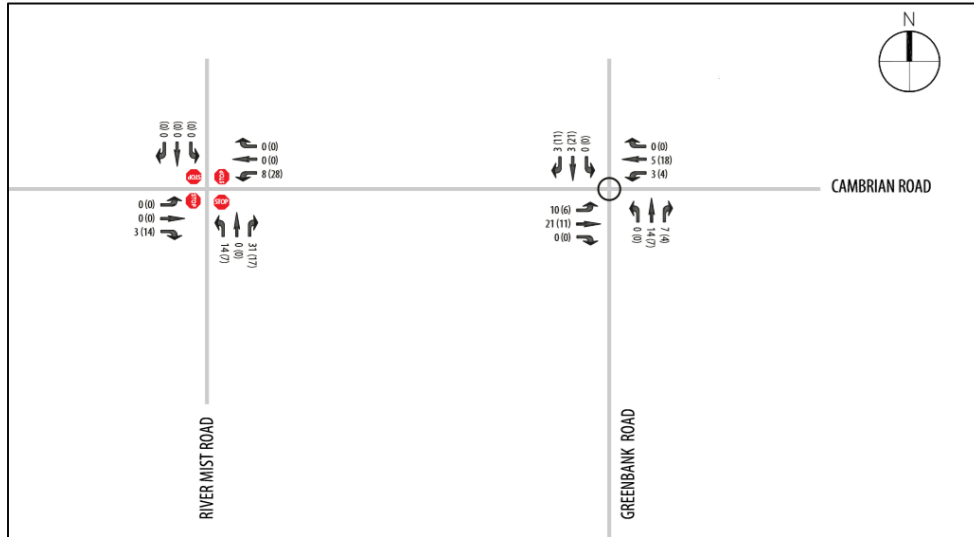


Source: 3285 Borriskane Road Phase 1 Transportation Impact Study (Parsons, 2018)

The Meadows Phase 4

The Meadows Phase 4 is a residential development located south of the Subject Site and was built out in 2019. This development includes 136 townhouse units and 50 single family units. This development is expected to produce 86 two-way AM peak period auto trips and 107 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen Figure 20 and is excerpt from the Meadows Phase 4 TIA Report by IBI.

Figure 20: The Meadows Phase 4 Site Generated Traffic Volumes

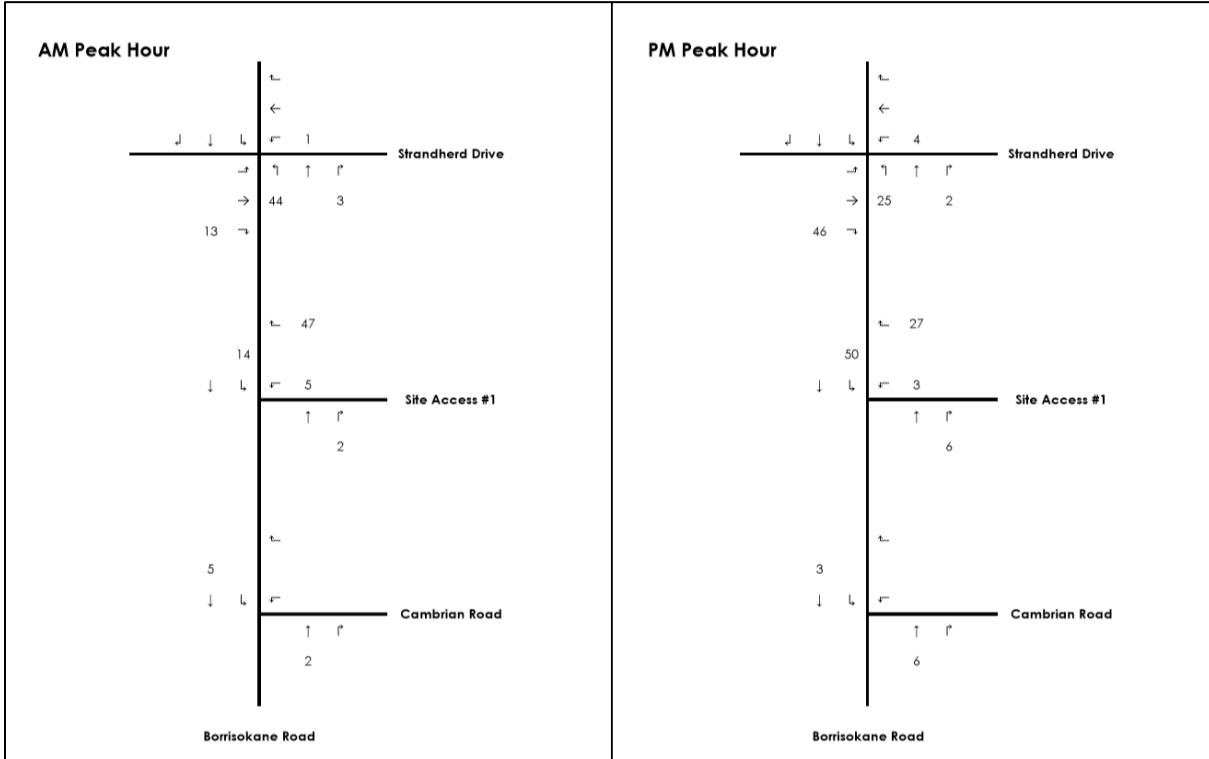


Source: The Meadows Phase 4 TIA Report (IBI, 2018)

3387 Borriskane Road

The Glenview Development of 3387 Borriskane Road is located northwest of the Subject Site and is expected to be built-out in 2022. The development is expected to have 179 single family units and 109 townhouses. The development is anticipated to produce 137 two-way AM peak period auto trips and 174 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen in Figure 21 which is an excerpt from the 3387 Borriskane Road Community Transportation Study by Stantec.

Figure 21: 3387 Borriskane Site Generated Traffic Volumes

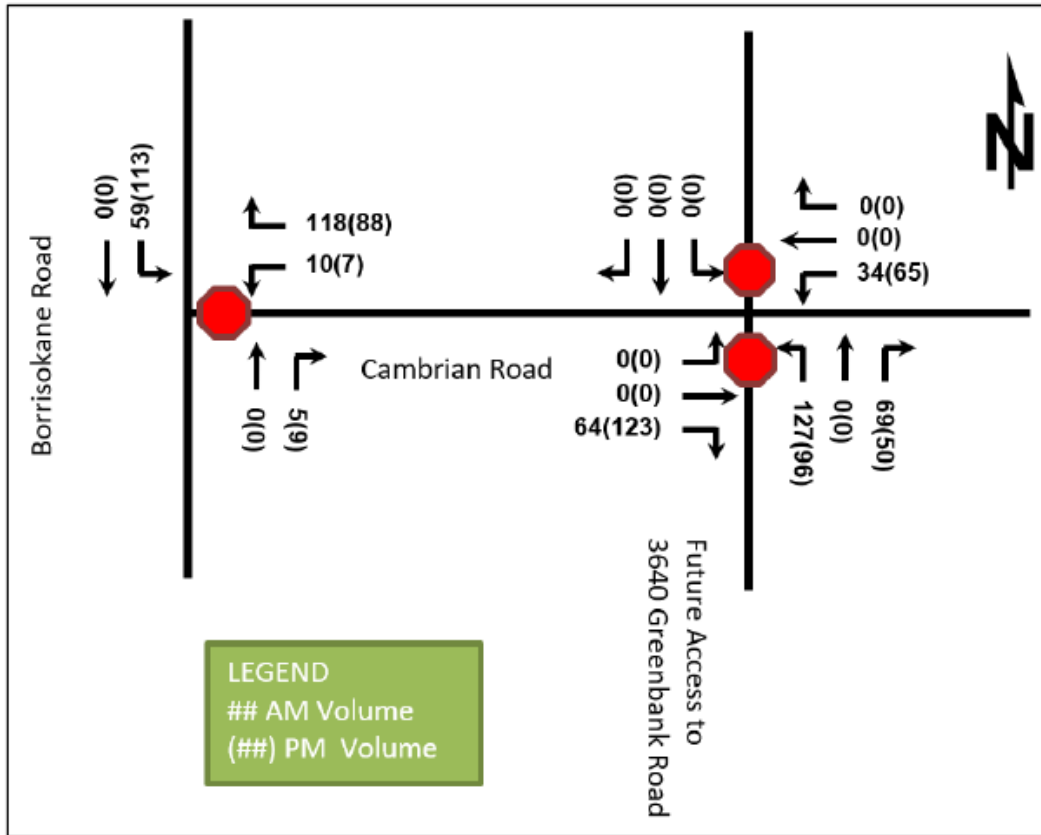


Source: 3387 Borriskane Road Community Transportation Study (Stantec, 2016)

3640 Greenbank Road

3640 Greenbank Road (Meadow’s Phase 5) is a proposed two-phase residential development located west of the Subject Site. The concept plan considers a total of approximately 350 units, split between townhouse and detached units (221 townhouses and 125 detached homes). The anticipated full build-out and occupancy horizon is 2022. The development is anticipated to produce 294 two-way AM peak period auto trips and 334 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen in Figure 22 and is an excerpt from the 3640 Greenbank Road Transportation Impact Assessment by CGH Transportation.

Figure 22: 3640 Greenbank Road Site Generated Traffic Volumes

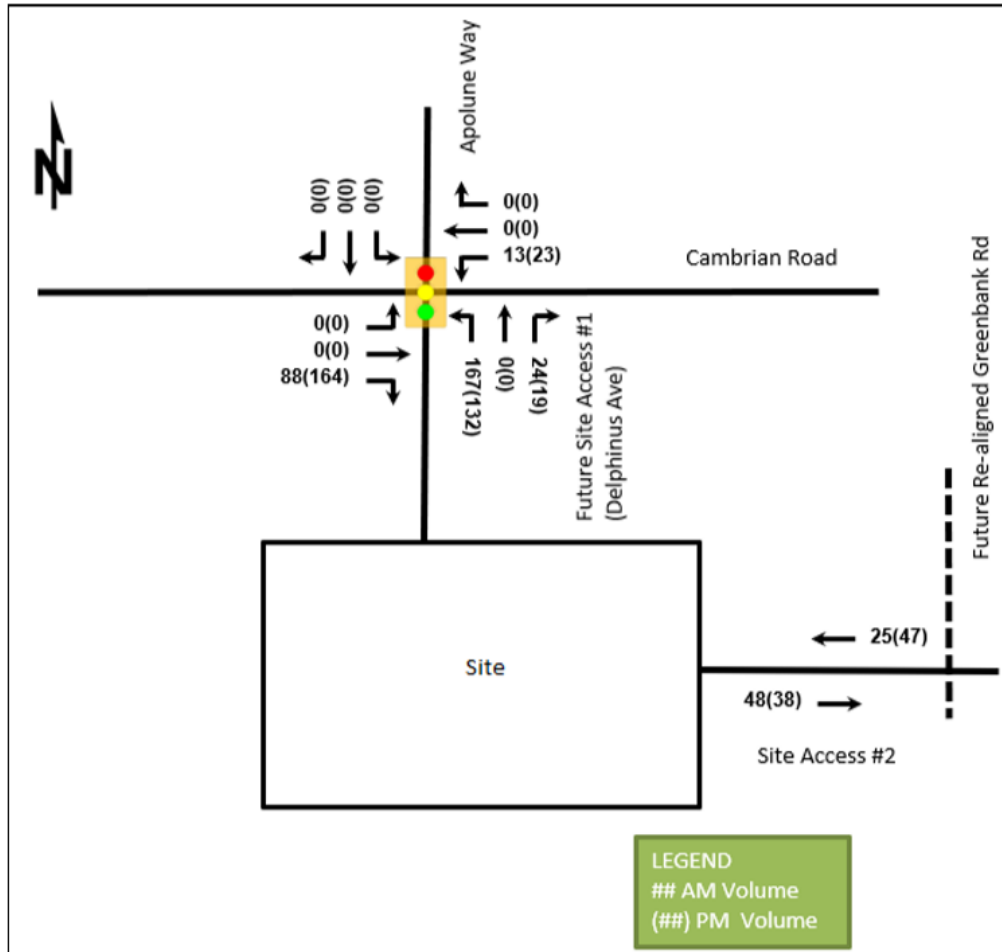


Source: 3640 Greenbank Road Transportation Impact Assessment (CGH, 2018)

3713 Borriskane Road – Residential Component

3713 Borriskane Road is a proposed residential development located southwest of the Subject Site and is expected to be built-out during 2024. This development will include 141 detached homes and 439 townhouses. 3713 Borriskane Road will include a connection to 3809 Borriskane Road and both developments will share an access to Borriskane Road. This development is expected to produce 364 two-way AM peak period auto trips and 423 two-way PM peak period auto trips. The anticipated trip generation from this site can be seen in Figure 23 and is an excerpt from the 3713 Borriskane Road Transportation Impact Assessment by CGH Transportation.

Figure 23: 3713 Borriskane Road (Residential Component) Site Generated Traffic Volumes

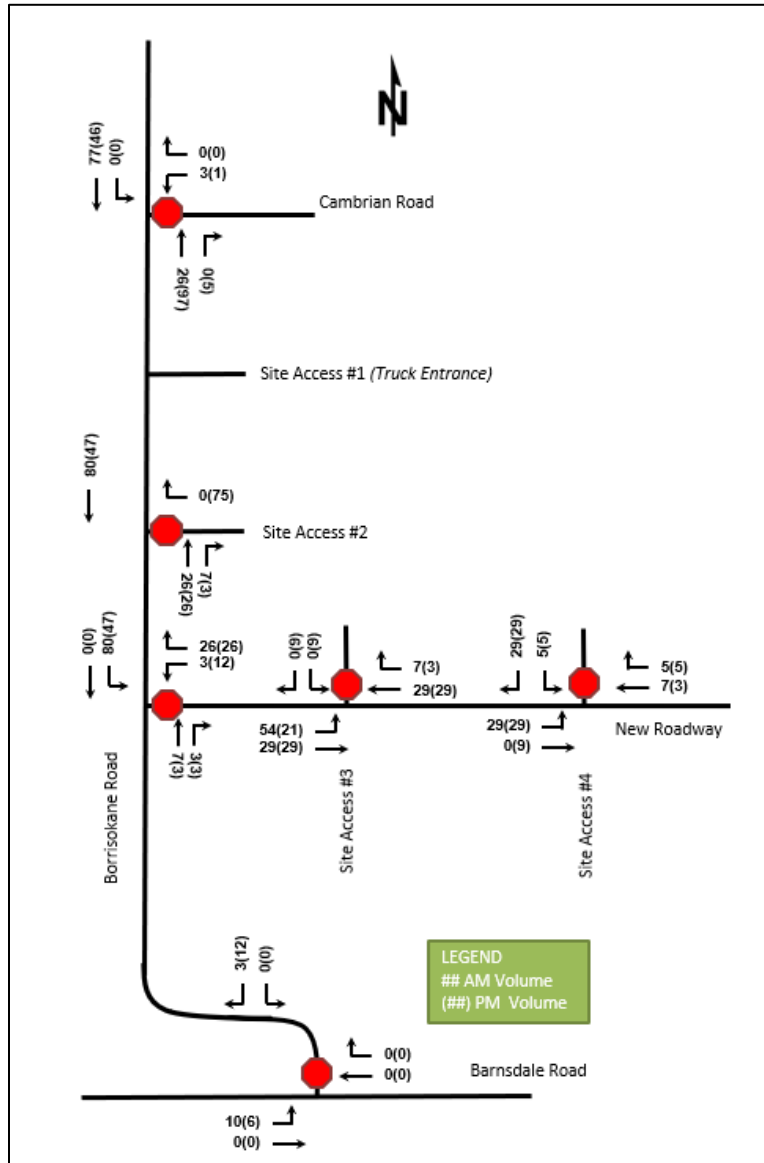


Source: 3713 Borriskane Road Transportation Impact Assessment (CGH, 2020)

3713 Borrisokane Road-Industrial Component

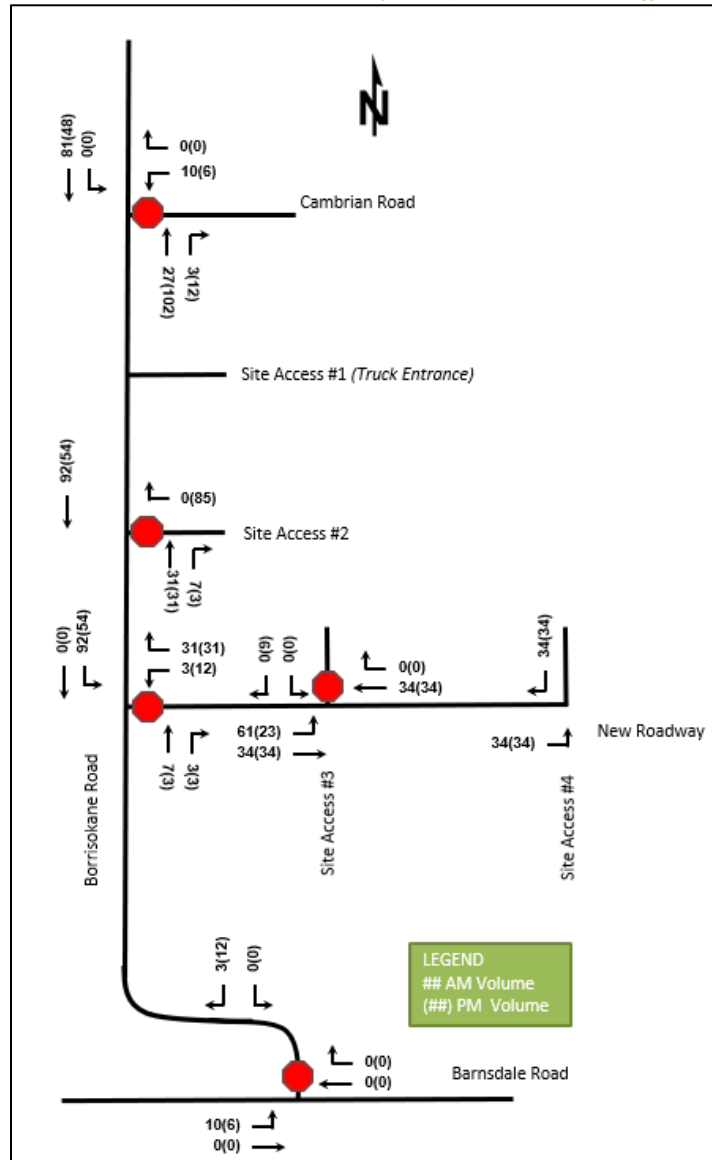
The industrial component of 3713 Borrisokane Road will be built-out in 2 phases, Phase 1 in 2022 and Phase 2 in 2027. The development will include approximately 3,250 square metres of general office space and 9,385 square metres of industrial buildings. This development is expected to produce 112 two-way AM peak period auto trips and 117 two-way PM peak period auto trips. The anticipated trip generation from this site after the completion of Phase 1 and Phase 2 can be seen in Figure 24 and Figure 25 respectively and are excerpts from the 3713 Borrisokane Road – ABIC Manufacturing Facility Transportation Impact Assessment by CGH Transportation.

Figure 24: 3713 Borrisokane Road (Industrial Component) Site Generated Traffic Volumes - 2022



Source: 3713 Borrisokane Road – ABIC Manufacturing Facility Transportation Impact Assessment (CGH, 2020)

Figure 25: 3713 Borriskane Road (Industrial Component) Site Generated Traffic Volumes – 2027



Source: 3713 Borriskane Road – ABIC Manufacturing Facility Transportation Impact Assessment (CGH, 2020)

3809 Borriskane Road

3809 Borriskane Road is a proposed residential development, which is located southwest of the Subject Site and is expected to be built-out in 2025. This development will include approximately 590 residential units, split between townhouse units and detached home units. The eastern parcel of 3713 Borriskane Road will include a connection to 3809 Borriskane Road and both developments will share an access to Borriskane Road as part of an interim phase only. Approximately 300 units will use this connection prior to the full build-out in 2025 at which time the connection to Borriskane Road will be closed. This development is expected to produce 401 two-way AM peak period auto trips and 457 two-way PM peak period auto trips. Based on the City of Ottawa comments, the TIA report for this development is being revised and is currently underway. The most recent update to the 2023 and 2025 3809 Borriskane Road generated volumes is included in the Appendix D.

3 Study Area and Time Periods

3.1 Study Area

The Study Area will include the following intersections:

- Borrisokane Road at Cambrian Road
- Seeley's Bay Street at Cambrian Road
- River Mist Road at Cambrian Road
- Greenbank Road at Cambrian Road

The boundary road of the proposed development is Cambrian Road.

3.2 Time Periods

As the proposed development is composed entirely of commercial developments, the AM, PM, and Saturday peak hours will be examined.

3.3 Horizon Years

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

4 Exemption Review

Table 5 summarizes the exemptions for this TIA.

Table 4: Exemption Review

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

5 Development-Generated Travel Demand

5.1 Trip Generation and Mode Shares

This TIA has been prepared using the vehicle trip rates from the ITE Trip Generation Manual (10th Edition). Where possible, fitted curve rates were used to estimate the trip generation. This included the PM and Saturday peak hour Supermarket trip generation. The ITE Trip Generation Manual did not provide a fitted curve equation for the AM peak hour Supermarket trip generation, therefore an average trip rate was used for this time period. The fitted curve equation for the Retail Store land use was found to produce values beyond expected average rate for all of the studied time periods. This can be explained by high variance of data at low values of GFA that the fitted curve equations were based on. Thus, average trip rates were also used for retail trip generation for all peak hour periods. To estimate person trip generation, a factor of 1.28 has been applied to the ITE rates. Table 5 summarizes the person trip rates for the proposed land uses.

Table 5: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates	Estimation Method
Supermarket	850	AM	3.82	4.89	Average
		PM	9.66	12.36	Fitted Curve
		SAT	11.49	14.71	Fitted Curve
Retail Store	820	AM	0.94	1.2	Average
		PM	3.81	4.88	Average
		SAT	4.5	5.76	Average

Using the above Person Trip rates, the total person trip generation has been estimated. Table 6 below illustrates the total person trip generation by land use.

Table 6: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Supermarket	43,315 sq. ft.	127	85	212	273	262	535	325	312	637
Retail Stores	30,345 sq. ft. *	22	14	36	71	77	148	91	84	175
Total Person Trips		149	99	248	344	339	683	416	396	812

*includes Retail Building 'A', Retail Building 'B', and a Mixed-Use Building 'C'

To account for trips that are made to the site for more than one purpose (i.e. a patron getting groceries and then visiting the retail store before leaving the site), an internal capture rate has been applied to the total person trip generation of the retail uses. The ITE Trip Generation Handbook (3^d Edition) provides the internal trip capture rates for trip origins and destinations within a mixed-use development and can be found in Appendix E. As no retail to retail capture rate is provided in this handbook, a 10% capture rate is assumed for the subject development and applied to the trips generated by the mixed-use building and the two retail buildings. This is considered a conservative estimate, as the values in the Trip Generation Handbook range from 0 to 75%.

Table 7: Total Net Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Supermarket	43,315 sq. ft.	127	85	212	273	262	535	325	312	637
Retail Stores	30,345 sq. ft. *	20	13	32	64	69	133	82	76	157
Total Person Trips		147	98	244	337	331	668	407	388	794

*includes Retail Building 'A', Retail Building 'B', and a Mixed-Use Building 'C'

Using the most recent National Capital Region Origin-Destination (OD Survey), the existing weighted average mode shares for From, To, and Within trips in South Nepean have been summarized in Table 8. The mode shares in the Study Area are expected to align with the OD Survey values, as the Subject Site is located in a typical suburban area with sidewalks connecting to adjacent residential developments. This will allow the closest residents to make frequent non-auto trips to the grocery store. Further, as part of the Strategy Report comments, the north-south pedestrian walkway on site will be extended to connect directly to Cambrian Road. The City's Transit Services staff have indicated that "this would connect to a future bus stop; the existing eastbound bus stop at Cambrian/Seeley's Bay (although not currently in use) will likely be shifted west to serve this site frontage and to reduce walk distance to/from future pedestrian crosswalk at re-aligned Greenbank and Cambrian". As majority of the residential communities in the vicinity of the subject site are expected to be built out by 2023, it is assumed that the relocation of the transit stop and modification to the route will be implemented by the future horizons of this study, further increasing the competitiveness of transit in the Study Area.

Table 8: Mode Shares

Travel Mode	South Nepean Mode Share
Auto Driver	60%
Auto Passenger	15%
Transit	15%
Cycling	1%
Walking	9%
Total	100%

Using the above mode shares and person trip rates, the person trips by mode have been forecasted during the peak hours. Where applicable, pass-by and diverted link trips have been accounted for, and the rates used for each land-use have been summarized in Table 9, as per the ITE Trip Generation Manual (3^d Edition).

Table 9: Land Use Pass-by and Diverted Link Rates

Land Use	Pass-by Rate			Diverted Link Rate		
	AM	PM	SAT	AM	PM	SAT
Supermarket	-	36%	28%	-	38%	41%
Retail Store	-	34%	26%	-	32%	35%

As no Saturday peak pass-by rates were available for the Supermarket, the ratio of PM to Saturday pass-by rates of a similar land use (Retail Store) were used in combination with the PM Supermarket pas-by rate to estimate the Saturday Supermarket pass-by rate. This is considered conservative as it is likely that the pass-by rates of a Supermarket during the Saturday peak hour could be higher. The Saturday peak hour diverted link rates were also calculated using the same methodology. Once the total pass-by and diverted link trips were estimated using the rates outlined above, the In and Out trips were determined by dividing the total peak hour pass-by and diverted link volumes by two. This is based on the assumption that trips coming into the proposed development will leave the site within the same hour. The pass-by and diverted link reduction rates by land use can be seen in Appendix F and the total pass-by and diverted link reduction can be seen in Table 10 below.

Using the above mode shares and person trip rates, the person trips by mode have been projected. Table 10 summarizes the trip generation by mode.

Table 10: Trip Generation by Mode

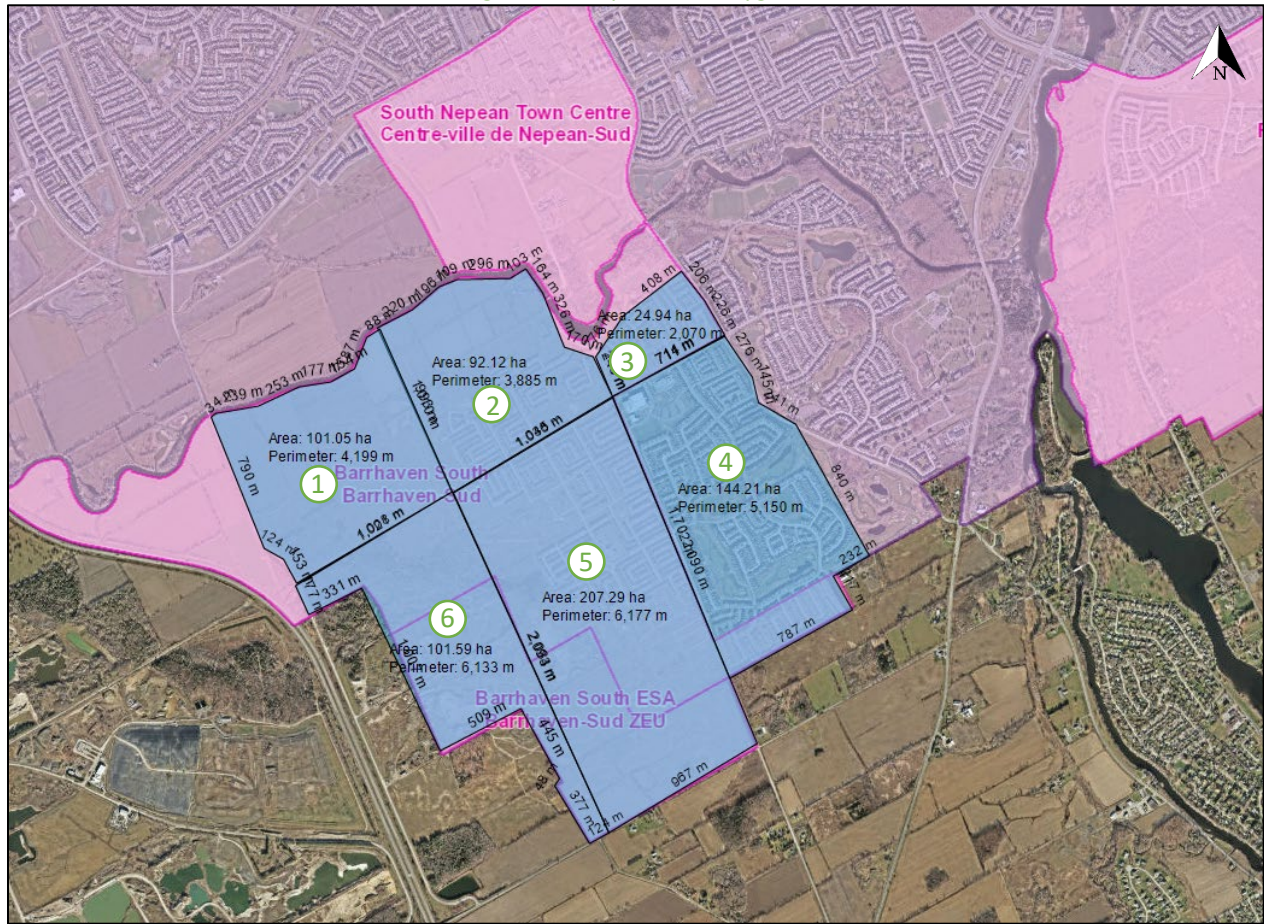
Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Auto Driver	60%	88	59	146	202	198	401	244	233	476
<i>Supermarket Pass-by</i>	-	-	-	-	-58	-58	-116	-53	-54	-107
<i>Retail Store Pass-by</i>	-	-	-	-	-13	-14	-27	-12	-12	-24
<i>Total Pass-by</i>	-	-	-	-	-71	-72	-143	-65	-66	-131
<i>Supermarket Diverted Link</i>	-	-	-	-	-61	-61	-122	-78	-79	-157
<i>Retail Store Diverted Link</i>	-	-	-	-	-13	-13	-26	-16	-17	-33
<i>Total Diverted Link</i>	-	-	-	-	-74	-74	-148	-94	-96	-190
<i>Net New Auto Driver</i>	-	88	59	146	57	52	110	85	71	155
Auto Passenger	15%	22	15	37	51	49	100	61	58	120
Transit	15%	22	15	37	51	49	100	61	58	120
Cycling	1%	1	1	2	4	4	6	4	4	8
Walking	9%	14	8	22	29	31	61	37	35	70
Total	100%	147	98	244	337	331	668	407	388	794

As shown above, 244 AM, 668 PM and 794 Saturday new peak hour two-way person trips are projected as a result of the proposed development out of which 146 AM, 110 PM and 155 Saturday peak hour two way trips are net new auto trips.

5.2 Trip Distribution

To understand the future travel patterns to the subject development, the location of competing retail plazas along with the Barrhaven South CDP boundary and Ottawa Official Plan Urban boundary have been reviewed to determine the anticipated travel patterns in the Study Area. A majority of the trips to the subject development are expected to be generated in an area bound by Jock River to the north, Borrisokane Road to the west, the Urban Boundary to the south, and Longfields Drive to the east. To determine the flow of traffic to and from the subject development, this area was broken down into six polygons and the trips were distributed according to the polygon size. The polygon areas were measured using the advanced tools in geoOttawa website and the OD map along with the area calculation can be seen in Figure 26 and Table 11 , respectively.

Figure 26: Study Area OD Polygons



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: July 24, 2020

Table 11: OD Polygon Area % Calculation

Polygon	Area (ha)	Area (%)
1	101.05	15
2	92.12	14
3	24.94	4
4	144.21	21
5	207.29	31
6	101.59	15
Total	671.2	100

5.3 Trip Assignment

Using the percentages shown in Table 11 the primary, or net new, auto trips were distributed to the Study Area road network. The new site generated volumes are illustrated in Figure 27.

In addition to the primary auto trips it is expected that both pass-by and diverted link trips will also make up a significant portion of the site trip generation.

To assign the pass-by trips to the accesses, a ratio of eastbound trips as a portion of all traffic on Cambrian Road, and westbound trips as a portion of all traffic on Cambrian Road was developed. It was determined that 60% of the total traffic is eastbound and 40% is westbound in both the 2023 PM and 2023 Saturday peak periods. It was

also determined that 60% of the total traffic is eastbound and 40% is westbound in both the 2028 PM and 2028 Saturday peak periods. Using these percentages, the traffic volumes have been logically distributed to the access points. Figure 28 illustrates the site pass-by trip volumes.

To assign the diverted link trips to the accesses, a ratio of southbound trips as a portion of all traffic on Greenbank Road, and northbound trips as a portion of all traffic on Greenbank Road was developed. Based on the minimal number of residential accesses on Borrissokane Road, and the internal road network of those developments, people destined to residential areas outlined in Figure 26 are already captured in pass-by trips. Therefore, southbound and northbound trips on Borrissokane Road were not considered in the diverted link trip assignment. When assigning the diverted link trips from Greenbank Road, it was determined that 60% of the total traffic is southbound and 40% is northbound in both the 2023 PM and 2023 Saturday peak periods. It was also determined that 60% of the total traffic is southbound and 40% is northbound in both the 2028 PM and 2028 Saturday peak periods. Using these percentages, the traffic volumes have been logically distributed to the access points. Figure 29 illustrates the site diverted link trip volumes.

Figure 30 illustrates the combined impact of the net new site trip generation, pass-by trips, and diverted link trips.

Figure 27: New Site Generation Auto Volumes

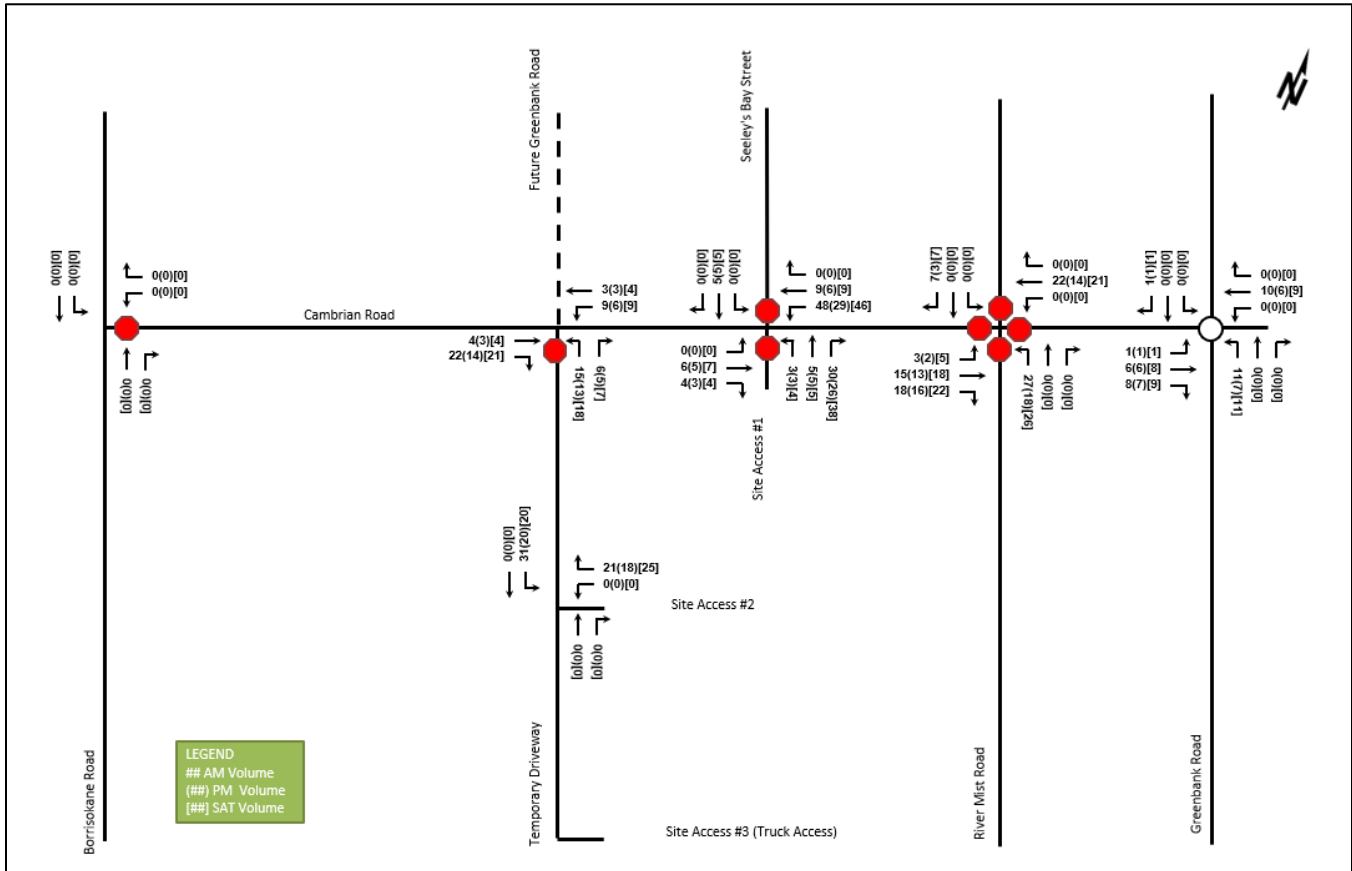


Figure 28: Forecasted Site Pass-by Trip Volumes

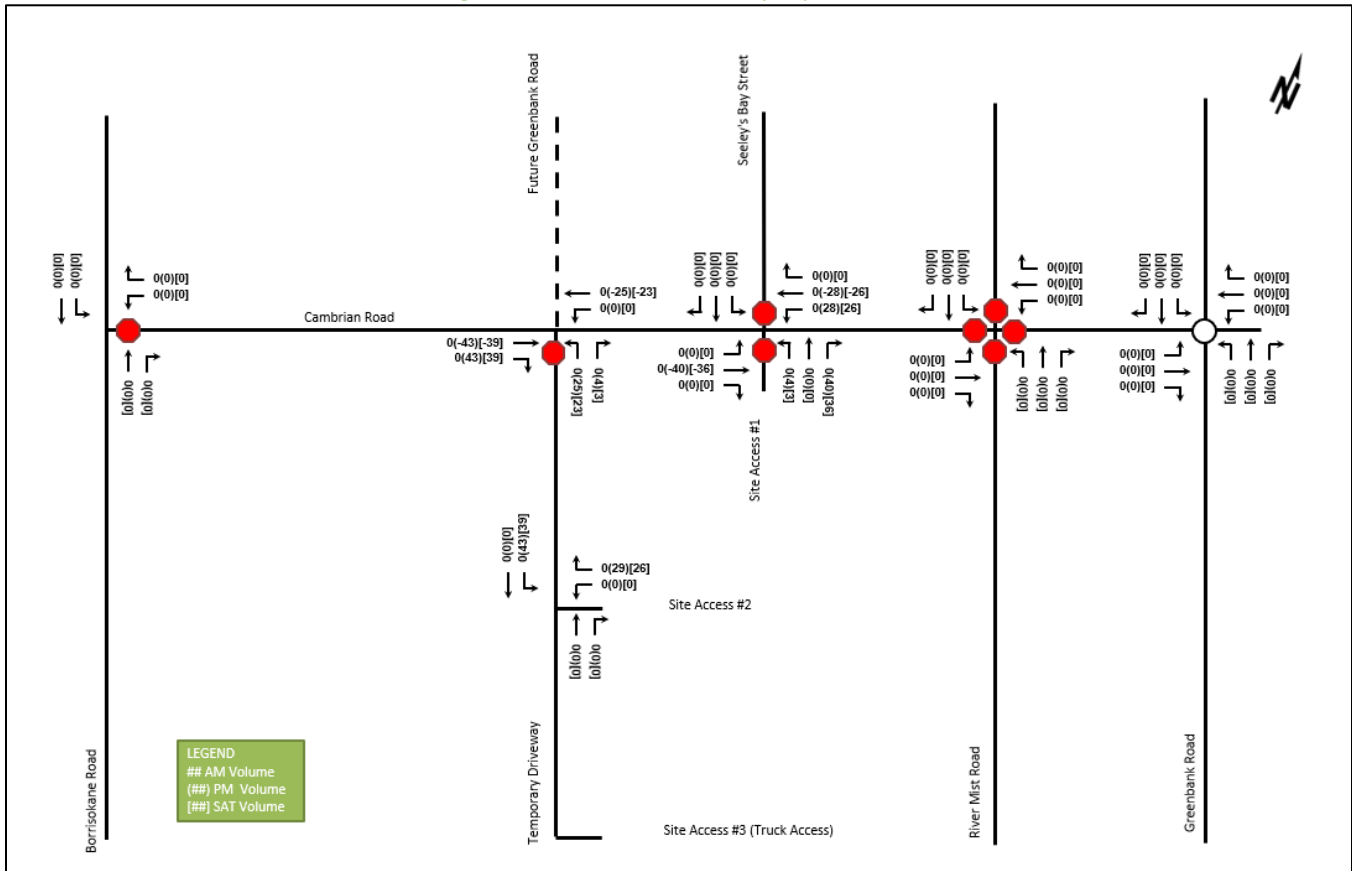


Figure 29: Forecasted Site Diverted Link Volumes

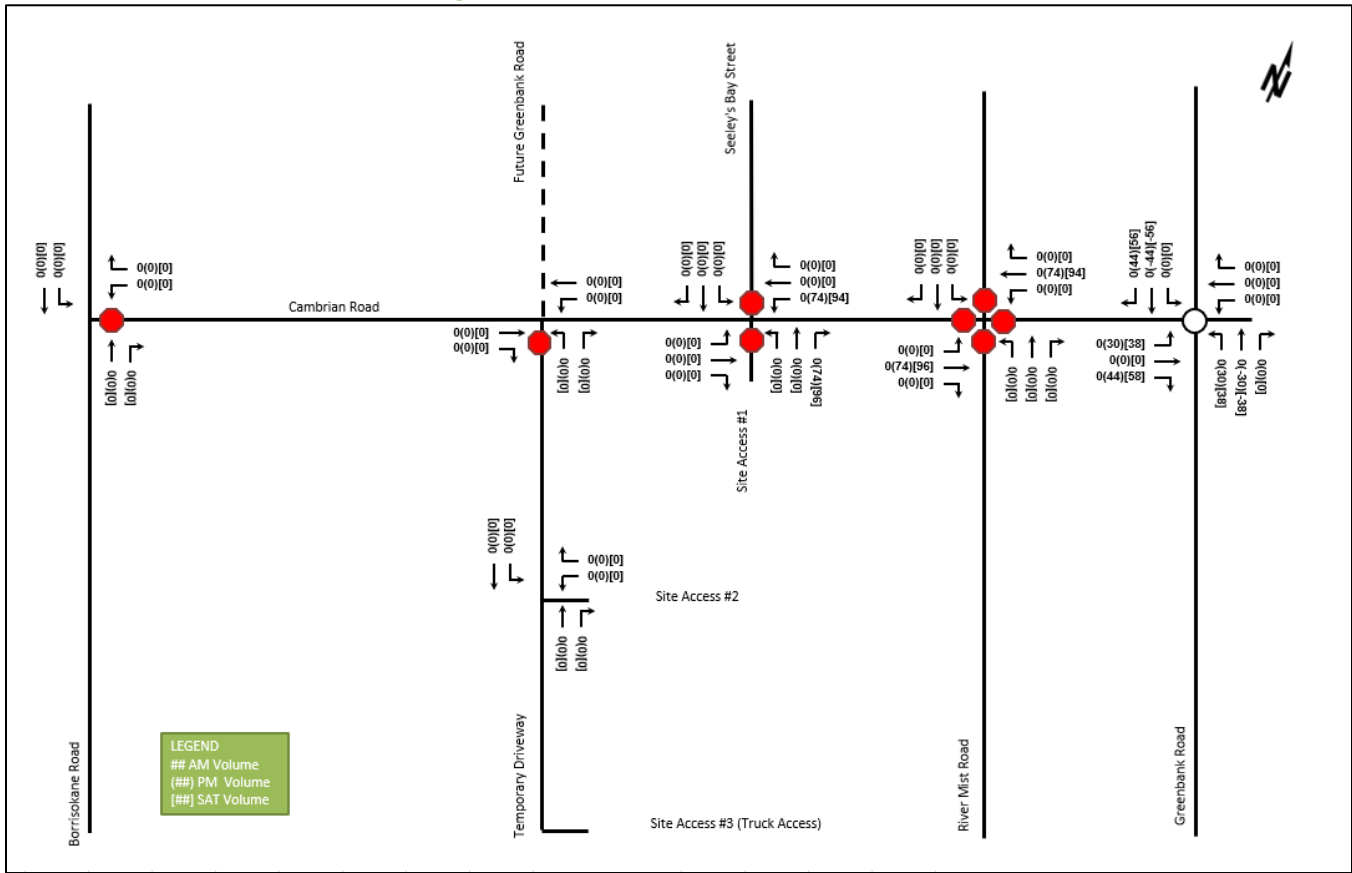
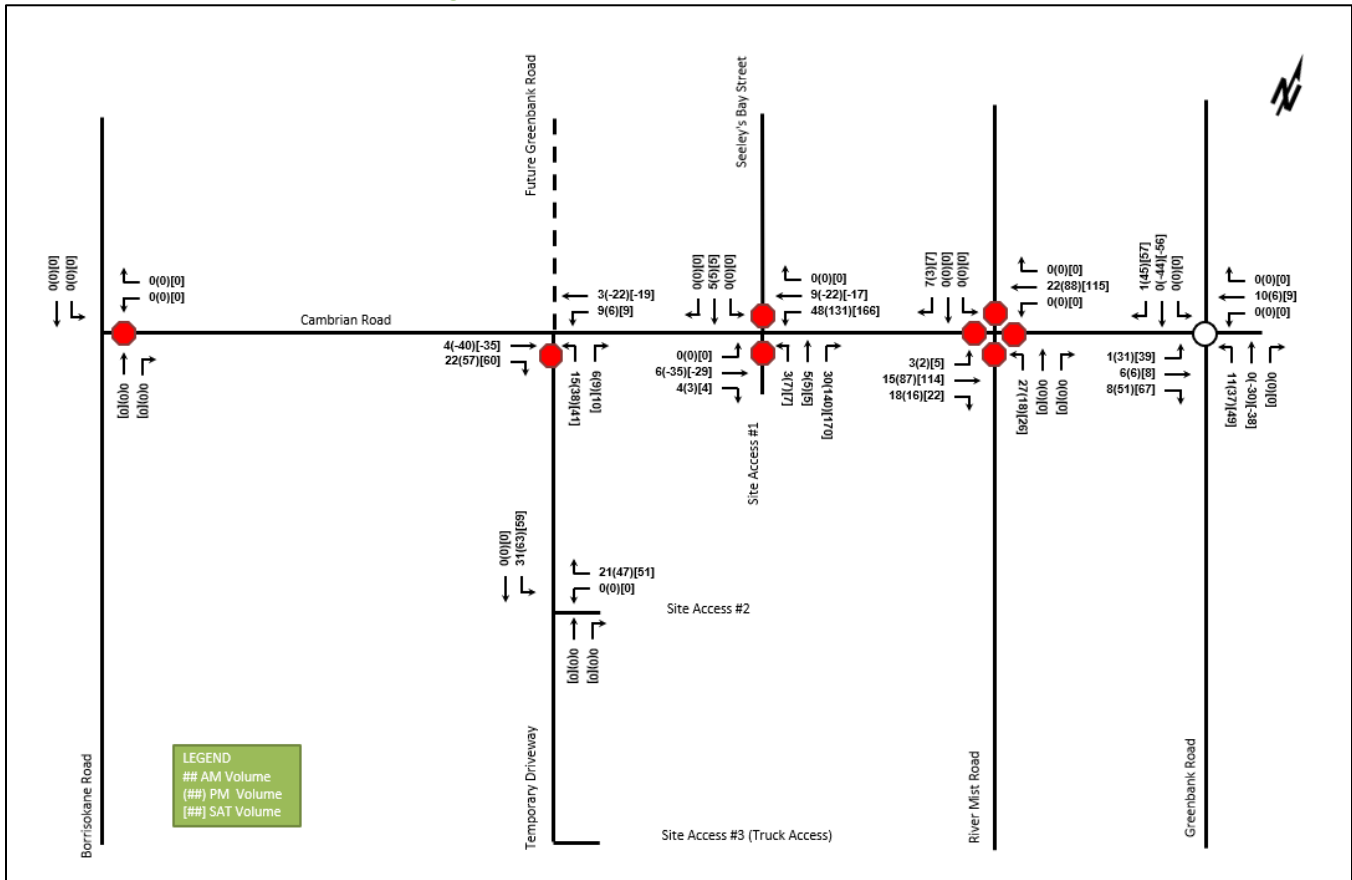


Figure 30: Net New Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3.1. The additional capacity provided by these plans will improve the level of service in the Study Area road network, but these changes are not part of the 10-year affordable network. As such, the 2023 and 2028 Synchro model of the Study Area will be based on the existing roadway configuration. Additionally, plans for Intersection Control Measures at Cambrian Road and Borrissokane Road have been outlined in the 2019 Ottawa Development Charges By-Law and will be discussed in Step 4 of this TIA.

6.2 Background Growth and Other Developments

Surrounding development Traffic Impact Assessments have used a 2% traffic growth within the Study Area of this report. As such, an annual background growth of 2% will be used in order to remain consistent with these studies.

The background developments explicitly considered in both the 2023 and 2028 background conditions include:

- Half Moon Bay West Community
- 2444 Watercolours Way
- 3718 Greenbank Road
- 3882 Barnsdale Road and 3960 Greenbank Road
- 3285 Borrissokane Road Meadows Phase 4

- 3387 Borrisokane Road
- 3640 Greenbank Road
- 3713 Borrisokane Road Residential Component
- 3713 Borrisokane Road Industrial Component
- 3809 Borrisokane Road

All of these developments are discussed in Section 2.3.2.

Figure 31 illustrates the 2023 future background volumes and Figure 32 illustrates the 2028 future background volumes.

Figure 31: Future Background 2023 Volumes

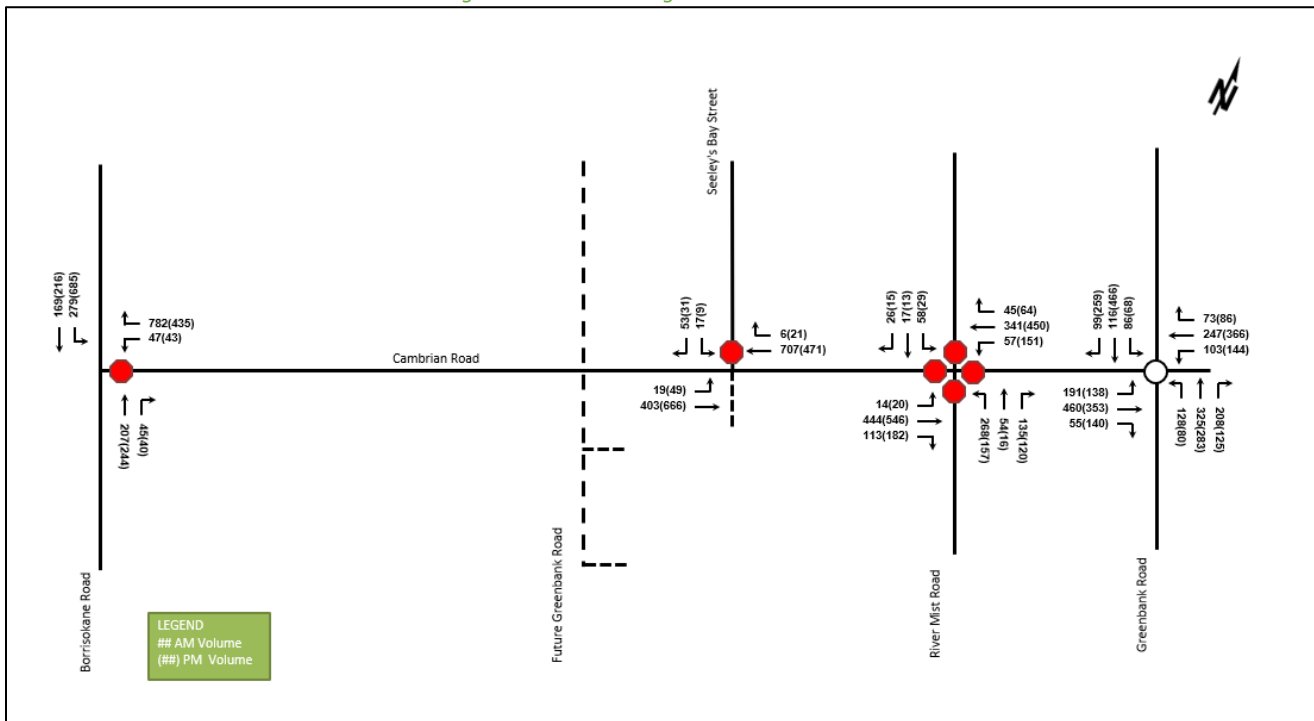
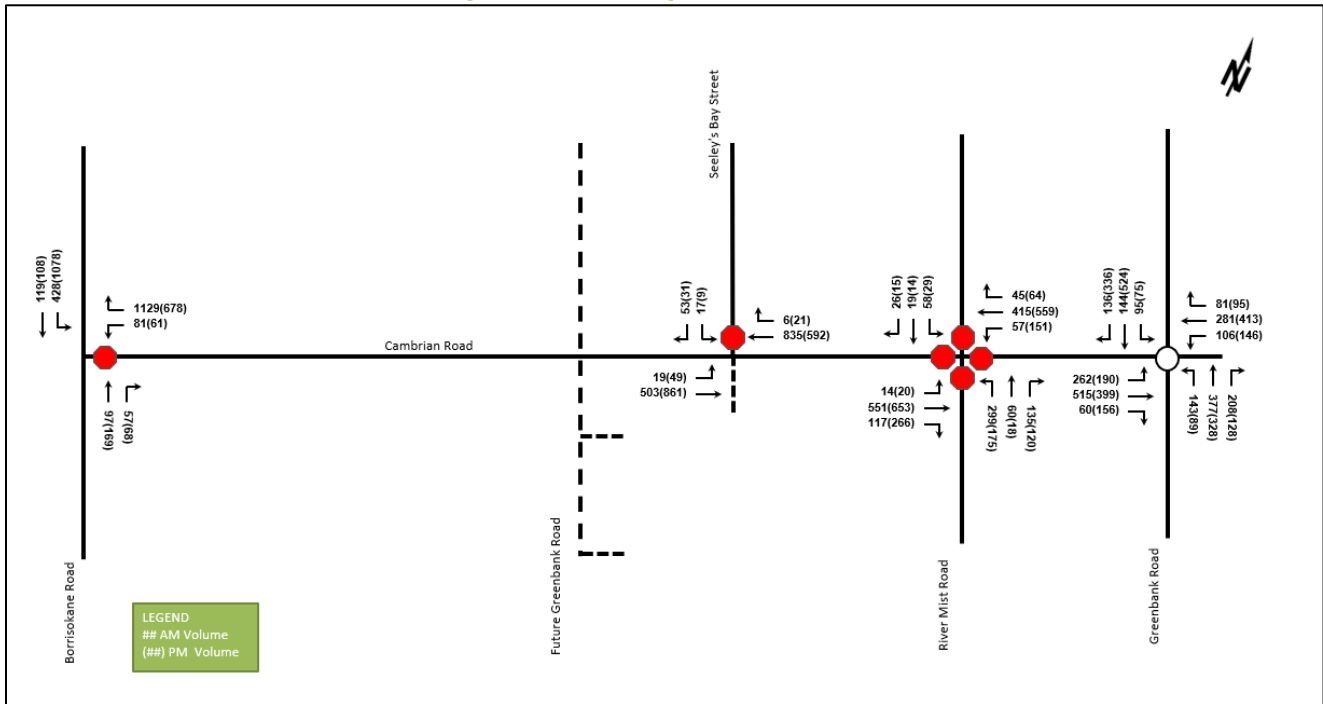


Figure 32: Future Background 2028 Volumes



7 Demand Rationalization

Based on the Synchro analysis of existing conditions and the CGH’s experience with other nearby developments, Borrisokane Road at Cambrian Road intersection is anticipated to experience capacity constraints in the near future. It has also been noted that River Mist Road at Cambrian Road intersection is experiencing capacity constraints and high delays. As multiple residential communities are anticipated to be built in the Study Area within next five years, the demand generated by these developments will outgrow the capacity that the current road configuration can provide. This can be seen when looking at the current volumes in Figure 8 and future total background volumes in Figure 32, which show that the total traffic at Borrisokane Road at Cambrian Road intersection will increase by nearly 140% and the total traffic at River Mist Road at Cambrian Road intersection will increase by an estimated 50%. Taking into account this, the existing poor LOS, and a lack of alternative routes, the demand determined in the previous sections of this report was carried forward into the next step of this TIA to highlight the need for the infrastructure upgrades outlined in the City’s Transportation Master Plan.

As part of the Strategy Report comments, shown in Appendix G, the City of Ottawa has requested that additional analysis to “quantify the amount of volume that requires rationalization at the Study Area intersections without the proposed future infrastructure”, and “identify how the required reductions are expected to be attributed to background and development-related trips” is undertaken. As such, a sensitivity analysis will be conducted in Section 15.2.6. The sensitivity analysis will identify the volume required to be diverted from the over-capacity movements in order to maintain a V/C ratio <1.0, and attribute the diverted trips to growth, background developments, and the subject development.

The future total 2023 volumes are illustrated in Figure 33 and the future total 2028 volumes are illustrated in Figure 34.

Figure 33: Future Total 2023 Volumes

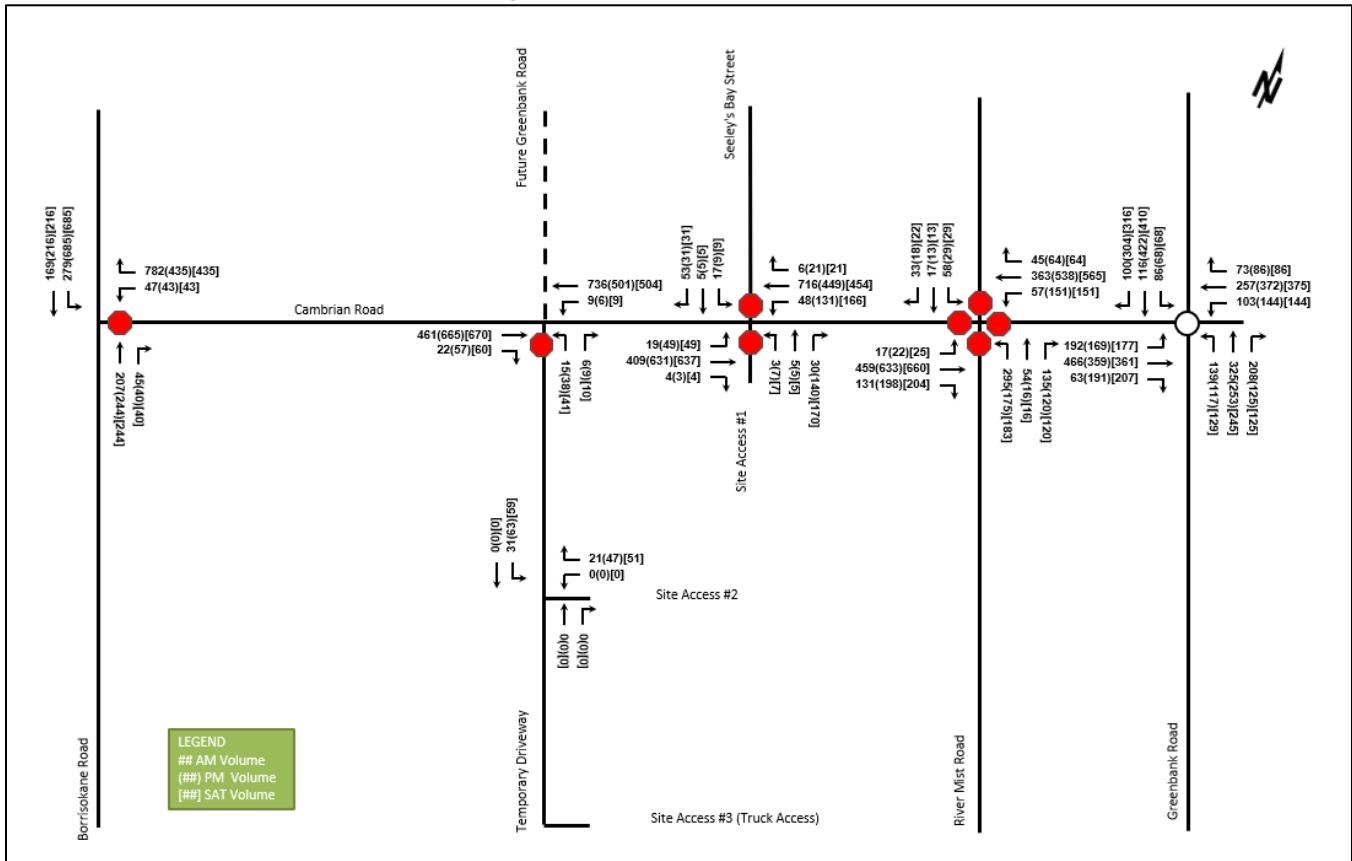
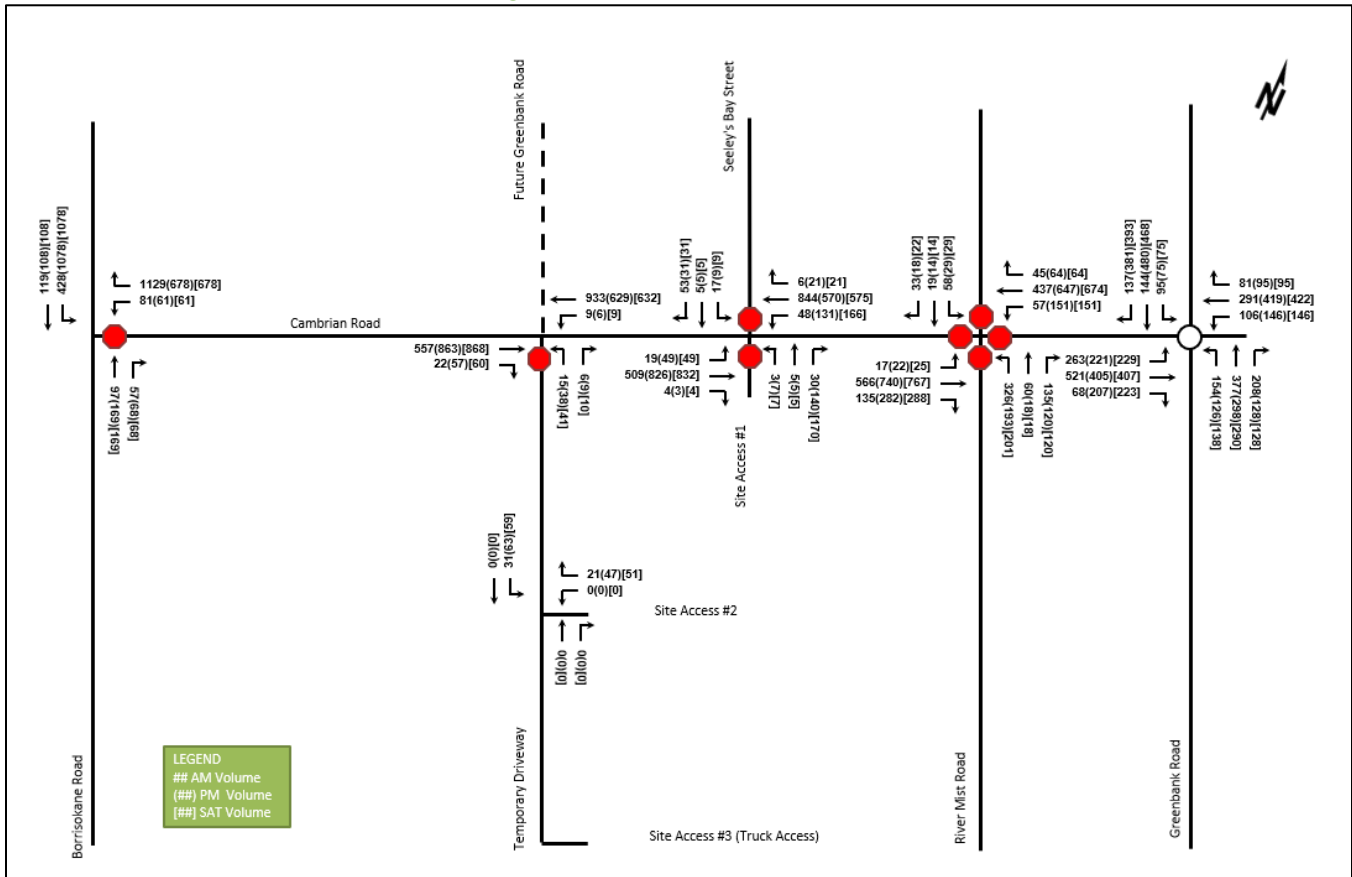


Figure 34: Future Total 2028 Volumes



8 Development Design

8.1 Design for Sustainable Modes

The proposed development is a retail development with surface parking for both automobiles and bicycles.

Pedestrian facilities have been proposed within the development site plan will connect pedestrians to bike parking, internal surface vehicle parking, and pedestrian network on Cambrian Road and include:

- A sidewalk along site frontage on the south side of Cambrian Road
- A sidewalk along the Temporary Driveway
- Pedestrian walkways surrounding buildings A, B, and C, and a sidewalk along the frontage of Metro store
- A north-south central pedestrian walkway, providing direct connection between the Metro entrance and Cambrian Road. As part of the Strategy Report comments, the City’s Transit Services team has indicated that the existing eastbound bus stop at Cambrian Road and Seeley’s Bay intersection could be relocated to be in line with this walkway to accommodate the site users and reduce the distance between the eastbound bus stop on Cambrian Road and the intersection of Cambrian Road and future Greenbank Road

No cycling facilities or connections within the development have been proposed at this time due to the lack of cycling facilities in the surrounding area road network. However, future local and spine cycling routes along Cambrian Road, and future Greenbank Road, respectively, have been approved as part of the City of Ottawa’s Ultimate Cycling Network. These local cycling routes will provide cycling access to the development beyond our study horizon.

Additionally, the planned future Bus Rapid Transit facilities along future Greenbank Road are anticipated to improve transit access to and from the proposed development beyond the future study horizons.

Facilities that are supportive of sustainable modes in the City of Ottawa’s TDM-supportive Development Design and Infrastructure Checklist, which are applicable to the proposed development and required for zoning and standard site design will be implemented. The following additional measures will also be implemented:

- Locate building entrances in order to minimize walking distances to sidewalks and transit facilities
- Locate building doors and windows to ensure visibility of pedestrians from buildings
- Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets or sidewalks

TDM Checklists can be found in Appendix H.

8.2 Circulation and Access

Access #1 and Access #2 will accommodate passenger vehicles accessing the surface automobile parking. Access #3 is considered the primary entrance to the shipping and loading area and as such will be used exclusively by trucks. Site Access #1 will also serve as a truck exit. Truck volumes entering and exiting the site are expected to be minimal and during off-peak periods. Access #3 and Access #1 are also expected to be used by garbage trucks to access the development.

Turning templates for delivery trucks and garbage trucks can be found in Appendix I.

8.3 New Street Networks

This TIA is exempt from this Module (see Table 4).

9 Parking

9.1 Parking Supply

The parking requirements and provisions for the proposed development are summarized in Table 12.

Table 12: Parking Provisions

Land Use	Parking Rate	Parking Required	Parking Provided
Supermarket	3.4 / 100 m ² GFA	99	262*
Retail Stores	3.4 / 100 m ² GFA	72	
Total Vehicle Parking		171	
Supermarket & Retail Stores (Bicycle)	1 / 250 m ² GFA	20	24
Total Bicycle Parking		20	

*this excludes additional 13 parking stalls provided on site, which will serve as a temporary snow storage area during the winter months

Based on the City of Ottawa Zoning By-laws, a minimum of 171 automobile parking spaces are required and a minimum of 20 bicycle parking spaces are required. As can be seen in Table 12, automobile parking space requirements are met in excess of 88 parking spaces. Four of the auto parking spaces will be equipped with electrical vehicle charging stations. The bicycle parking requirements are met in excess of four parking spaces.

9.2 Spillover Parking

This TIA is exempt from this Module (see Table 4).

10 Boundary Street Design

Cambrian Road is noted as boundary road for the site in both the 2023 and 2028 future horizons. Cambrian Road is not considered a Complete Street and no plans currently exist to upgrade Cambrian Road within the proposed development’s future analysis horizons. The existing pedestrian facilities which terminate east of Seeley’s Bay Street will be extended along the frontage of the proposed development along the south side of Cambrian Road upon full-build out of the development. It is expected that the existing pedestrian facilities will also be extended towards the west on the north side of Cambrian Road across from the proposed development in conjunction with the development of the Mattamy’s Half Moon Bay West and Half Moon Bay North before the 2028 future horizon.

Cambrian Road Intersection Control Measures outlined in the 2019 Ottawa Development Charges By-Law are expected to be implemented at the following intersections:

- Cambrian Road and Borrisokane Road at a gross project cost of \$1,300,000 (2020-2031)
- Cambrian Road and Apolune Way at a gross project cost of \$1,300,000 (2020-2031)

Additionally, the City of Ottawa TMP and the Barrhaven South CDP indicate that Cambrian Road will be widened to four lanes and future Greenbank Road rapid transit corridor will be built along the west side of the proposed development. The proposed cross-section of Cambrian Road is a divided 4-lane cross-section including sidewalks, bike lanes, boulevards, and a landscaped centre median and can be seen in Appendix J. The proposed cross-section of Re-Aligned Greenbank Road is a divided 4-lane cross-section including sidewalks, cycletracks, and centre median bus lanes and can be seen in Appendix J. As the timing of these infrastructure upgrades is unknown and neither transportation infrastructure upgrade is included in the City of Ottawa’s 2031 Affordable Network, it has been assumed that they will occur beyond the proposed development’s future analysis horizons. This assumption has been confirmed by the City of Ottawa as part of the comments provided on the Scoping Report for the proposed development. These comments can be found in Appendix K.

The Segment Multi-Modal Level of Service (MMLOS) is broken down into the Pedestrian Level of Service (PLOS), Bicycle Level of Service (BLOS), Transit Level of Service (TLOS), and Truck Level of Service (TkLOS) and are all recorded in Table 13. As the existing, future background, and future total scenarios are all different, they have been evaluated in their own MMLOS worksheets. The results however are the same across all horizons. Cambrian Road has been evaluated against the target for a general urban area. The MMLOS Worksheets for each horizon can be found in Appendix L.

Table 13: Boundary Street MMLOS

Road Segment	Horizon	MMLOS							
		PLOS		BLOS		TLOS		TkLOS	
		Actual	Target	Actual	Target	Actual	Target	Actual	Target
Cambrian Road btw Borrisokane Road & Seeley’s Bay Street	Existing					-	-		
	2023 FB								
	2023 FT	F	C	F	D	D	D	E	E
	2028 FB								
	2028 FT								

Cambrian Road overall MMLOS was based on the worst-performing Cambrian Road segment in the Study Area, between Borrisokane Road and Seeley's Bay Street.

This segment does not meet the Pedestrian LOS target due to narrow gravel shoulders, lack of boulevard, and relatively high vehicular volumes and posted speed limit. Future development of residential communities along Cambrian Road as mentioned above, are expected to improve the pedestrian LOS by providing sidewalks along both sides of Cambrian Road. A sidewalk will also be provided along the frontage of the proposed development, on the south side of Cambrian Road. East of Seeley's Bay Street, Cambrian Road has improved pedestrian facilities with boulevards or lawn areas separating the sidewalks for the vehicular traffic. However, a short section of the road that runs along the 2771 Grand Canal Street property parcel was noticed to have a lower pedestrian LOS. The sidewalk along this section is 1.5 metres wide and is directly adjacent to the roadway with high traffic volumes. This sidewalk section remains unaltered in the proposed Cambrian Road widening and can be seen in Appendix J. It is not clear why this section of Cambrian Road sidewalk was not constructed according to current standards and will not be improved as part of the Cambrian Road widening. It is recommended that City of Ottawa revisits the proposed Cambrian Road widening plan to improve the above-mentioned sidewalk section.

The Bike LOS on Cambrian Road is also at LOS F due to mixed traffic conditions and speed limit above 60 km/hr between Borrisokane Road and Seeley's Bay Street. If the speed limit along this segment was reduced to 60 km/hr, the Cambrian Road BLOS will improve to LOS D.

Transit routes #75 and #275 do not run along the entirety of Cambrian Road segment in the Study Area. As such, the existing Transit LOS has not been evaluated. To evaluate the future Transit LOS, it was assumed that OC Transpo will adjust the paths and schedules of routes #75 and #275 once the new residential developments are built along Cambrian Road, west of Seeley's Bay Street. As City of Ottawa's MMLOS Guidelines do not provide Transit LOS targets for roadways that are neither a Rapid Transit Corridor nor a Transit Priority Corridor, a target LOS for Transit Priority Corridor with isolated measures was used as a conservative target for Cambrian Road. The Transit LOS target for general urban area is met.

The Truck LOS targets in the Study Area have been met.

As mentioned above, future developments along Cambrian Road are anticipated to improve the Pedestrian LOS in the Study Area within the study horizon. Beyond the proposed development's study horizon, cycling infrastructure will be provided along Cambrian Road as part of the City's Ultimate Cycling Network. As such, no further improvements to Cambrian Road, beyond the extension of pedestrian facilities along the frontage of the site, are recommended as a result of the boundary street MMLOS analysis.

11 Access Intersections Design

11.1 Location and Design of Access

The site is proposed to have three accesses. Site Access #1, and a Temporary Driveway leading to Site Access #2 and Site Access #3, are located along Cambrian Road. As a grocery store is a convenience-based trip, providing a full-movement access is critical to the viability of this site. Once the future Greenbank Road centre median bus lanes are built, Site Access #2 and Site Access #3 will be restricted to right-in/right-out access only. Thus, Site Access #1 must be a full-movement access. To maximize the distance between Site Access #1 and future intersection of re-aligned Greenbank Road and Cambrian Road, Access #1 has been located directly across Seeley's Bay Street, approximately 140 metres east of future Greenbank Road, measured from intersection centreline to

intersection centerline. The future detailed design of re-aligned Greenbank Road at Cambrian Road will have to further refine the interaction of this access and future Greenbank Road intersection.

The Temporary Driveway at Cambrian Road will operate as a full-movement access and is located along the centreline of future Greenbank Road. The Temporary Driveway leads to Site Access #2, located approximately 120 metres south of Cambrian Road, and Site Access #3, located approximately 190 metres south of Cambrian Road, measured from centreline to centreline. Site Access #2 is a left-in/right-out access and Site Access #3 is one-way left-in truck access. As mentioned above, once re-aligned Greenbank Road is built, Site Access #2 and Site Access #3 will have to be restricted to right-in/right-out access only.

11.2 Intersection Control

Using OTM Book 12 Justification 7, and the volume projections herein, the traffic control signal warrant for Access #1 and Temporary Driveway at Cambrian Road has been examined for 2028 future total horizon. It has been found that signals are not warranted using Justification 7. The signalization warrants for Access #1 and Temporary Driveway can be found in Appendix M. Taking this into account as well as the proximity of this intersection to the future intersection of Cambrian Road and realigned Greenbank Road, traffic control signals at this intersection are not recommended.

As a result, the Site Access #1 and the Temporary Driveway will have stop-controls on the minor approach for both future total horizons.

11.3 Intersection Design

A functional design is anticipated for Site Access #1. For the purposes of this report, the following assumptions surrounding the intersection design of both site accesses have been made:

Left-turn lane warrants for unsignalized intersections were examined at Site Access #1 and Temporary Driveway for both 2023 and 2028 total future horizons. To determine if a left-turn lane is warranted, the MTO Geometric Design Standards for Ontario Highways, Section E, left-turn lane warrant nomographs were examined.

A westbound left-turn lane at Site Access #1 was found to be warranted during the 2023 and 2028 future total horizons. An eastbound left-turn lane at Site Access #1 was found to be warranted using the existing 2020 traffic volumes. Left-turn lane warrants have been provided in Appendix N.

At the Temporary Driveway and Cambrian Road, a westbound left-turn lane warrant is also met in future total horizons. To evaluate the warrant, a ratio of westbound left turning traffic to the total approach volume was found to be 1%. Following this, the 5% nomograph was examined to determine if a technical warrant is met, as 5% is the lowest ratio for which an MTO graph is available. It should be noted, however, that the numerical equivalent of 1% of the westbound approach volume at Temporary Driveway intersection is 9 vehicles per hour. The small percentage of site-generated trips have been assigned to the westbound left turn movement to obtain a conservative estimate of performance parameters at the Temporary Driveway intersection in rare occasions when a patron may miss a more convenient westbound left turn at Site Access #1. Therefore, the estimated one percent of the westbound traffic volume turning left at the Temporary Driveway and Cambrian Road intersection is likely conservative. Considering this as well as the plans for Greenbank Road re-alignment, an auxiliary left-turn lane has not been proposed or modeled at this location. The requirement for a westbound left turn lane at the Temporary Driveway and Cambrian Road will be revisited in later sections as part of the 2023 and 2028 future total analysis of the shared westbound through / left turn movement at this intersection.

The intersection of Site Access #1 and Cambrian Road is an unsignalized four-legged intersection with stop signs on minor approaches. The Seeley's Bay Street will form the north leg of the intersection and serve as an access to

the residential area directly north of the proposed development. The Seeley's Bay Street has a sidewalk on the west side. The westbound and eastbound approaches will consist of an auxiliary left-turn lane and a shared through / right turn lane, and the southbound and northbound approaches will consist of a single shared movement lane. Additionally, pedestrian facilities are anticipated to be extended along the proposed development's frontage on the south side of Cambrian Road as well as on the north side in conjunction with the development of Mattamy's Half Moon Bay West community.

The preliminary storage and taper lengths for the proposed westbound left-turn lane at Cambrian Road and Seeley's Bay Street/Site Access #1 are summarized in Table 14 and further discussed below.

Table 14: 2023 and 2028 Site Access #1 at Cambrian Road WBL - Preliminary Design Criteria

Design Standard	Design Speed	Storage	Parallel Lane	Taper Ratio	Taper	Total Lane Length
TAC	60 km/h	30 m	45 m	36:1	130 m	205 m

Using Transportation Association of Canada's Geometric Design Guide for Canadian Roads (TAC) the storage, parallel lane, and taper lengths were determined for a 60 km/h design speed. For the purposes of determining the taper length it was assumed that this left-turn lane would be constructed as a left-turn on the right side of the centreline with a 3.5 metre turning lane width. The storage length was calculated based on the following formula (TAC Formula 9.14.1):

$$S = \frac{NL}{30}$$

Where:

S = Storage Length (m)

N = Design volume of turning vehicles $\left(\frac{v}{h}\right)$

L = Length (m) occupied by each vehicle = 6 m

The parallel lane length was calculated based on the following formula (TAC Formula 2.5.1):

$$d_b = 0.039 \frac{V^2}{a}$$

Where:

d_b = Braking Distance (m)

V = Design Speed ($\frac{km}{h}$)

a = Deceleration rate ($\frac{m}{s^2}$) = 3.4 $\frac{m}{s^2}$

The preliminary storage and taper lengths for the eastbound left-turn lane warranted during the 2020 existing traffic volumes at Cambrian Road and Seeley's Bay Street/Site Access #1 were calculated using methodology outlined above and are summarized in Table 15.

Table 15: 2023 and 2028 Site Access #1 at Cambrian Road EBL - Preliminary Design Criteria

Design Standard	Design Speed	Storage	Parallel Lane	Taper Ratio	Taper	Total Lane Length
TAC	60 km/h	15 m (min.)	45 m	17:1	60 m	120 m

Due to geometric constraints imposed by future intersection of realigned Greenbank Road and Cambrian Road, a 17:1 eastbound left-turn lane taper ratio was used, resulting in a 60-metre-long taper.

As such, the westbound auxiliary left-turn lane at Cambrian Road and Seeley’s Bay Street/Site Access #1 should be 205 metres long with a storage lane of 30 metres, a parallel lane of 45 metres and a taper of 130 metres. The eastbound auxiliary left-turn lane at Site Access #1 should be 120 metres long with a storage lane of 15 metres, a parallel lane of 45 metres and a taper of 60 metres.

The intersection of the Temporary Driveway and Cambrian Road is an unsignalized three-legged intersection with a stop sign on the northbound approach. All approaches at this intersection will be made up of a single shared movement lane. The Temporary Driveway will form the south leg of the intersection and will be located along the future Greenbank Road centreline, serving as an interim connection to Site Access #2 and Site Access #3. Once the future Greenbank Road is built, beyond our study horizon, Site Access #2 and Site Access #3 will be restricted to right-in/right-out access only.

According to Transportation Association of Canada’s Geometric Design Guide for Canadian Roads (TAC), Table 8.9.3, the suggested minimum clear throat length for major driveways, for a development of this size, would require a throat length based on each land use and is summarized in the Table 16 below.

Table 16: Throat Length by Land Use

Land Use*	Development Size (s.m.)	Required Clear Throat Length (m)
Supermarket	4,024	40
Shopping Centre	2,819	15

*Note: Not all land uses are represented in Table 8.9.3. Where an exact match was not available, a reasonable assumption of a comparable land use was used. (i.e. for the proposed retail store Shopping Centre was used).

The throat length of Site Access #1 is 44 metres in the interim site plan, and 42 metres once Cambrian Road is widened. Thus, the throat length requirements at Site Access #1 are met. The throat length of Site Access #2 in the interim is significantly longer than the required clear throat length as a result of the Temporary Driveway serving as a buffer between parking traffic and through traffic on Cambrian Road. Once the realigned Greenbank Road is constructed, the throat length of Site Access #2 will be equal to 39 metres. As Site Access #2 is a minor access, it is expected that the throat length one metre below the requirement will provide adequate space for inbound vehicles to queue without impacting the adjacent street traffic.

12 Transportation Demand Management

Transportation Demand Management measures are implemented to encourage the use of non-auto modes of travel. This is aimed at reducing the reliance on single occupant auto trips in the City of Ottawa.

The following measures, consistent with the TDM Checklist included in Appendix H, will be implemented to ensure that the travel mode shares meet the TOD targets:

- Provide online links to OC Transpo and STO information
- Provide a multimodal travel option package to new/relocating employees

In addition to these measures, providing more than the minimum bicycle parking required, will help in achieving the mode shares for the proposed development and is recommended.

13 Neighbourhood Traffic Management

13.1 Seeley’s Bay Street

Table 17 summarizes Seeley’s Bay Street peak hour volumes, estimated AADT in the peak direction for the proposed development as well as future background volumes.

Table 17: Seeley’s Bay Street Volumes - NTM Review

Contributing Volumes	North of Cambrian Road					
	AM Peak		PM Peak		Saturday Peak	
	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
3831 Cambrian Road	5	5 (50 AADT)	5 (50 AADT)	5	5	5
2028 FB Volumes	25	70 (700 AADT)	70 (700 AADT)	40	70 (700 AADT)	40
Total	30	75 (750 AADT)	75 (750 AADT)	45	75 (750 AADT)	45

The TIA guidelines outline a local road threshold of 1,000 vehicles per day (AADT), or 120 vehicles in a given peak hour for Neighbourhood Traffic Management review. As illustrated above, this threshold is not exceeded along the examined segment of Seeley’s Bay Street, and the volume contribution of the proposed development is less than 7% of the overall volume. Further, it is likely that the grocery store trips from residential communities already utilize Seeley’s Bay Street and its intersection with Cambrian Road and are captured within existing traffic counts. As choice of a grocery store is somewhat convenience-based, it is likely that some of the southbound left-turn and southbound right-turn movements will be redirected to the subject site, resulting in even lower impact of 3831 Cambrian Road development on Seeley’s Bay Street. Therefore, no mitigation measures are proposed on this road.

14 Transit

In Section Table 18, the trip generation by mode was estimated, including the number of transit trips that will be generated by the proposed development. Table 18 summarizes the transit trip generation for both the 2023 and 2028 future horizons.

Table 18: Trip Generation by Transit Mode

Travel Mode	Mode Share	AM Peak Hour			PM Peak Hour			Sat Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
Transit	15%	22	15	37	51	49	100	61	58	120

Overall, the forecasted new transit trips would result in approximately one bus capacity equivalent (single bus, 55-person capacity) per hour in the peak direction to accommodate the transit trips generated from the subject site. It is assumed that as the Study Area builds out, OC Transpo will evaluate the new demand and provide service along Cambrian Road, west of River Mist Road once it is sustainable to do so. Additionally, as part of the Strategy Report comments, the City's Transit Services staff have indicated that the existing eastbound bus stop at Seeley’s Bay Street and Cambrian Road may be relocated to be in line with the central north-south pedestrian walkway at the subject site. This will further reduce the walking distance from the grocery store to the OC Transpo bus stop, increasing transit mode competitiveness.

Construction of the Greenbank Road BRT is also expected to increase transit trips generated by the proposed development beyond this study's horizons. This change in transit mode share has not been examined herein as the BRT is not included in the City of Ottawa TMP 2031 Affordable Network.

15 Intersection Design

15.1 Intersection Control

A signal warrant analysis was performed for the intersection of Cambrian Road and Borrisokane Road as well as Cambrian Road and River Mist Road for the 2023 and 2028 horizons using the OTM Book 12 Justification 7 criteria. Using these criteria, it was found that a signal is warranted at the Cambrian Road and Borrisokane Road intersection during the 2028 future background horizon. It was also found that a signal is warranted at the Cambrian Road and River Mist Road intersection during the 2023 future total horizon. Appendix M includes the signal warrant calculation sheets. However, as a result of 2023 future background Synchro analysis, the signalization at these intersections was implemented in the 2023 future background scenarios as a mitigation measure to bring these intersections to an acceptable level of service.

Intersection Control Measures for the Cambrian Road and Borrisokane Road intersection are outlined in the 2019 Ottawa Development Charges By-Law, and the Cambrian Road Widening EA includes signalization of Cambrian Road and River Mist Road intersection, however, no detailed designs are available at this point in time. As such, several assumptions were made about the potential solutions at these intersections for the purpose of this TIA, however the final solution is to be determined by the City.

As per the Strategy Report comments, the intersection of Cambrian Road and River Mist Road was also evaluated using the roundabout feasibility screening tool and the results indicate that a roundabout is not feasible at this location due to spatial limitations. Appendix M includes the roundabout screening form for Cambrian Road and River Mist intersection. Further, as the future signalization of this intersection has been indicated in the Cambrian Road Widening EA, a signal control method at Cambrian Road and River Mist Road intersection has been carried forward for the operational analysis of this TIA.

The intersections of Site Access #1/Seeley's Bay Street at Cambrian Road, and the Temporary Driveway at Cambrian Road will be unsignalized intersections with stop-controls on minor approaches in future horizons.

The intersection method of control for Cambrian Road at Greenbank Road will remain consistent with existing methods of control at all future horizons.

15.2 Intersection Design

To understand the intersection design, an MMLOS analysis of existing, 2023 future horizon, and 2028 future horizon demands is required. The existing and future segment MMLOS has been discussed in Section 10. The following sections will discuss the vehicle LOS at Study Area intersections which is based on the HCM criteria for average delay at unsignalized intersections. At signalized intersections, the level of service is based on the V/C ratio as required by the City of Ottawa. This will be followed by a sensitivity analysis and a discussion of the intersection MMLOS for other modes.

Synchro (Version 11) and Sidra (Version 8.0) were used to model the Study Area intersection. The Heavy Vehicle percentage (HV %) has been calculated for each turning movement at the Study Area intersection. All Heavy Vehicle percentages calculated to be less than 2% were entered into the Synchro model as 2% in order to produce a conservative analysis. These calculations are shown in Appendix O. All parameters have been coded using the City of Ottawa's TIA Guidelines and default parameters.

Additionally, left-turn lane warrants for unsignalized intersections were examined at Cambrian Road and Borrisokane Road intersection as well as Cambrian Road and River Mist Road intersection. To determine if a left-turn lane is warranted, the MTO Geometric Design Standards for Ontario Highways, Section E, left-turn lane warrant nomographs were examined. Southbound left-turn lane and eastbound left-turn lane were found to be warranted at the intersection of Cambrian Road and Borrisokane Road, and Cambrian Road and River Mist Road, respectively, in the 2023 future background horizon. These left-turn lanes are warranted as a result of the significant volumes generated by future surrounding developments. As such, these left-turn lanes have been developed for 2023 and 2028 future background and future total scenario operational analysis purposes only and the intersection is required to be designed by others. Left-turn lane warrants have been provided in Appendix N.

Based on the right-turning volumes at westbound approach of Cambrian Road and Borrisokane Road intersection, as well as at westbound, eastbound, and northbound approaches of Cambrian Road and River Mist Road intersection, right turn lanes are warranted at these approaches in the 2023 future background scenario. A northbound right-turn lane is also warranted at Cambrian Road and Borrisokane Road intersection during the 2028 future background scenario. All the above mentioned right-turn lanes, with the exception of northbound right-turn lane at Cambrian Road and River Mist Road, were modeled in the area network starting from the scenario when the warrant was met and carried over to future scenarios. The northbound right-turn lane was not added to the area network model as the preliminary Synchro analysis indicated that the northbound right turn is not needed for the Cambrian Road and River Mist Road intersection to operate within acceptable range of values in all future scenarios.

Eastbound and westbound right-turn lanes as well as left-turn lanes on all approaches at Cambrian Road and River Mist Road intersection are shown in the Cambrian Road widening EA and can be seen in Appendix J. As these as well as other auxiliary lanes discussed above were needed during future background scenarios to accommodate the background traffic growth, these lanes are required to be designed by others and have been developed for operational analysis purposed only.

15.2.1 Existing Conditions

The existing intersection volumes have been analyzed to establish a baseline condition and determine the impact of the subject development as well as the surrounding background developments on the Study Area road network. Table 19 summarizes the operational analysis of the 2020 existing conditions. Appendix P contains the 2020 Existing Conditions Synchro Sheets.

Table 19: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Borrisokane Road & Cambrian Road <i>Unsignalized</i>	WBL/R	B	0.62	15	34	B	0.43	14	17	B	0.43	14	17
	NBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	SBL/T	A	0.13	8	4	A	0.35	9	12	A	0.35	9	12
Seeley's Bay Street & Cambrian Road <i>Unsignalized</i>	EBL/T	A	0.02	9	1	A	0.04	8	1	A	0.04	8	1
	WBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	SBL/R	B	0.18	15	5	B	0.09	13	2	B	0.09	13	2

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour				
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	
River Mist Road & Cambrian Road <i>Unsignalized</i>	EBL/T/R	D	0.76	30	50	F	1.09	90	144	F	1.09	90	144	
	WBL/T/R	D	0.80	33	56	E	1.00	55	96	E	1.00	55	96	
	SBL/T/R	B	0.25	14	8	B	0.15	13	4	B	0.15	13	4	
	NBL/T/R	D	0.79	31	55	C	0.57	19	25	C	0.57	19	25	
	Mitigation Measure: All-way Stop Control Replaced by Two-way Stop Control on the Minor (north/south) Approaches													
	EBL/T/R	A	0.02	9	0	A	0.02	8	1	A	0.02	8	1	
	WBL/T/R	A	0.06	9	1.5	A	0.17	10	5	A	0.17	10	5	
	SBL/T/R	F	0.62	54	26	F	0.64	91	23	F	0.64	91	23	
NBL/T/R	F	1.32	200	151	F	1.65	366	143	F	1.65	366	143		
Greenbank Road & Cambrian Road <i>Roundabout</i>	EBL/T/R	C	0.68	17	63	E	0.88	38	96	E	0.88	38	96	
	WBL/T/R	C	0.63	18	36	C	0.74	22	66	C	0.74	22	66	
	SBL/T/R	B	0.41	11	15	F	1.06	76	273	F	1.06	76	273	
	NBL/T/R	F	0.98	57	159	C	0.65	18	43	C	0.65	18	43	
	Overall	D	0.98	29	159	E	1.06	42	273	E	1.06	42	273	
Notes:	Saturation flow rate of 1800 veh/h/lane PHF = 0.90													

As a result of high eastbound and westbound volumes at the intersection of River Mist Road and Cambrian Road, the east approach is performing at LOS F during the PM and Saturday peak hours. Using the OTM Book 5 methodology, the warrant for an all-way stop-controlled intersection (AWSC) has been reviewed. It has been found that an AWSC is not warranted, using 2020 volumes. The traffic signal warrant is also not met by the existing traffic volumes according to OTM Book 12 Justification 7 and is shown in Appendix M. Traffic signals are included in the Cambrian Road widening EA plan, however the Cambrian Road widening is not part of the Transportation Master Plan 2031 Affordable Network. Therefore, a two-way stop control is recommended in the interim to enable the east and westbound traffic to flow freely. Synchro scenarios for both AM and PM peak hours were created to quantify the operational improvements as a result of this change. The summary of this analysis can be seen in Table 2 and the complete calculations are shown in Appendix P.

The north and southbound approaches at the intersection of Greenbank Road and Cambrian road are also experiencing poor LOS, with the northbound and southbound approach performing at LOS F during the AM peak hour PM peak hour respectively. The low performance of this intersection in north and south directions is expected and can be explained by the location of the Ottawa CBD relative to the Study Area. The vehicle trips originating in the Study Area are directed towards the CBD (north) during the AM peak hour and back towards the residential communities in the Study Area (south) during the PM peak hour. However, the future realigned Greenbank Road will relieve the pressures from the current Greenbank Road and improve the north and southbound LOS at the intersection of Greenbank Road at Cambrian Road.

15.2.2 2023 Future Background

The 2023 future background intersection volumes and other development traffic have been analyzed to allow a comparison between the future volumes with and without the proposed development. As previously mentioned, a southbound left-turn lane warrant and an eastbound left-turn lane warrant were met at Cambrian Road and Borrisokane Road intersection and Cambrian Road and Seeley’s Bay Street intersection, respectively. Right-turn lane warrants were met at eastbound and westbound approaches of Cambrian Road and River Mist Road intersection, and at the westbound approach of Cambrian Road and Borrisokane Road intersection. These as well as additional improvements resulting from the operational analysis on the Study Area network were applied to the Synchro model in the 2023 future background horizon and are discussed below. Table 20 summarizes the

operational analysis of 2023 future background conditions. Appendix Q contains the 2023 future background Synchro sheets.

Table 20: 2023 Future Background Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour				
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	
Borrisokane Road & Cambrian Road <i>Unsignalized</i>	WBL	D	0.23	27	6	F	1.34	467	36	F	1.34	467	36	
	WBR	E	0.97	48	119	C	0.57	16	27	C	0.57	16	27	
	NBT/R	-	-	-	-	-	-	-	-	-	-	-	-	
	SBL	A	0.23	9	7	B	0.57	12	29	B	0.57	12	29	
	SBT	-	-	-	-	-	-	-	-	-	-	-	-	
	Mitigation Measure: Signalization, SBL Protected and Permissive Phase, WBR Permissive and Overlap Phase													
	WBL	A	0.23	34	16	A	0.21	33	15	A	0.21	33	15	
	WBR	D	0.88	20	88	C	0.74	12	25	C	0.74	12	25	
	NBT/R	A	0.40	21	52	B	0.64	33	#72	B	0.64	33	#72	
	SBL	A	0.31	3	17	D	0.87	22	#140	D	0.87	22	#140	
SBT	A	0.19	4	14	A	0.28	6	26	A	0.28	6	26		
Overall	C	0.66	26	-	D	0.83	20	-	D	0.83	20	-		
Seeley's Bay Street & Cambrian Road <i>Unsignalized</i>	EBL	A	0.02	9	1	A	0.05	9	1	A	0.05	9	1	
	EBT	-	-	-	-	-	-	-	-	-	-	-	-	
	WBT/R	-	-	-	-	-	-	-	-	-	-	-	-	
	SBL/R	C	0.21	18	6	C	0.10	16	2	C	0.10	16	2	
River Mist Road & Cambrian Road <i>Unsignalized</i>	EBL	B	0.04	13	1	B	0.05	12	1	B	0.05	12	1	
	EBT	F	1.07	80	99	F	1.16	97	125	F	1.16	97	125	
	EBR	B	0.25	13	7	B	0.35	13	11	B	0.35	13	11	
	WBL/T	F	1.04	82	92	F	1.41	210	208	F	1.41	210	208	
	WBR	B	0.11	12	2	B	0.14	12	3	B	0.14	12	3	
	NBL/T/R	F	1.08	90	110	D	0.70	26	34	D	0.70	26	34	
	SBL/T/R	C	0.29	17	8	B	0.16	15	4	B	0.16	15	4	
	Mitigation Measure: Signalization													
	EBL	A	0.07	15	5	A	0.10	16	6	A	0.10	16	6	
	EBT	D	0.85	37	89	D	0.90	42	#133	D	0.90	42	#133	
	EBR	A	0.21	4	9	A	0.28	4	11	A	0.28	4	11	
	WBL	A	0.35	23	15	E	0.98	97	#58	E	0.98	97	#58	
	WBT	B	0.65	25	63	C	0.73	28	90	C	0.73	28	90	
	WBTR	A	0.10	5	6	A	0.12	5	7	A	0.12	5	7	
	NBL	A	0.50	19	53	A	0.32	18	29	A	0.32	18	29	
NBT/R	A	0.28	6	17	A	0.22	5	11	A	0.22	5	11		
SBL	A	0.13	14	13	A	0.07	14	7	A	0.07	14	7		
SBT/R	A	0.07	8	7	A	0.05	9	6	A	0.05	9	6		
Overall	B	0.65	22	-	B	0.65	31	-	B	0.65	31	-		
Greenbank Road & Cambrian Road <i>Roundabout</i>	EBL/T/R	D	0.87	31	160	F	1.00	62	193	F	1.00	62	193	
	WBL/T/R	C	0.67	20	43	E	0.89	37	118	E	0.89	37	118	
	SBL/T/R	B	0.44	11	17	F	1.29	165	523	F	1.29	165	523	
	NBL/T/R	F	1.25	153	398	C	0.75	24	62	C	0.75	24	62	
	Overall	F	1.25	64	-	F	1.29	81	-	F	1.29	81	-	
Notes:	Saturation flow rate of 1800 veh/h/lane													
	PHF = 1.00													
	# - 95% percentile exceeds capacity													

It has been noted that the 95th percentile cycle exceeds capacity at several approaches and time periods at Cambrian Road and Borrisokane Road intersection and Cambrian Road and River Mist Road intersection. However, as V/C ratio for these movements is less than one, it can be assumed that the 95th percentile queue will rarely be exceeded.

With the addition of background growth to reflect the 2023 horizon as well as traffic generated from surrounding developments, the westbound approach at the Cambrian Road and Borrisokane Road intersection is experiencing high delays and poor LOS. To reduce the westbound delays and improve the overall LOS, this intersection was signalized. This improved the westbound left approach from LOS F to LOS A during all peak periods. To improve the traffic flow in the southbound left-turn and westbound right turn lanes, the southbound left-turn movement will operate as a protected and permissive turn and the westbound right turn movement will operate with permissive and overlap phasing.

The Cambrian Road and River Mist Road intersection was also signalised as the LOS of several conflicting approaches was F using the 2023 future background volumes and an all-way stop intersection control method. As part of signalization, left turn lanes were added to all approaches of this intersection. As a result, the LOS of previously failing approaches was brought to acceptable thresholds.

The eastbound approach at Greenbank Road and Cambrian Road roundabout has also failed during the PM and Saturday peak periods as a result of background growth and future developments. The southbound and northbound approaches have remained at LOS F. The northbound delay has increased by 170 percent during the AM peak hour and the southbound approach delay has increased by 115 percent during the PM and Saturday peak hours. As high north-south volumes at this roundabout are primarily driven by the location of Ottawa CBD relative to the Study Area, the LOS at these approaches will improve when the realigned Greenbank Road is built. The eastbound and westbound LOS at this roundabout will improve beyond our study horizon as a result of Cambrian Road widening.

15.2.3 2028 Future Background

The 2028 future background intersection volumes and other development traffic have been analyzed to allow a comparison between the future volumes with and without the proposed development. The mitigation measures outlined in 2023 future background scenario analysis were carried over to this scenario. Additionally, a right-turn lane warrant at the northbound approach of Cambrian Road and Borrisokane Road intersection was met during this horizon. Table 21 summarizes the operational analysis of the 2028 future background conditions. Appendix R contains the 2028 future background Synchro sheets.

Table 21: 2028 Future Background Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour				
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	
Borrisokane Road & Cambrian Road Signalized	WBL	A	0.53	64	35	A	0.37	56	27	A	0.37	56	27	
	WBR	E	0.94	23	#311	D	0.88	18	#52	D	0.88	18	#52	
	NBT	A	0.32	46	38	A	0.57	54	64	A	0.57	54	64	
	NBR	A	0.18	12	12	A	0.22	12	13	A	0.22	12	13	
	SBL	A	0.39	4	38	F	1.07	64	#352	F	1.07	64	#352	
	SBT	A	0.13	3	12	A	0.13	4	12	A	0.13	4	12	
	Overall	D	0.84	31	-	F	1.04	59	-	F	1.04	59	-	
	Mitigation Measure: Westbound Right-Turn Overlap Phase – PM and SAT													
	WBL	-	-	-	-	A	0.44	62	28	A	0.44	62	28	
	WBR	-	-	-	-	A	0.60	6	54	A	0.60	6	54	
	NBT	-	-	-	-	A	0.55	51	61	A	0.55	51	61	
	NBR	-	-	-	-	A	0.21	12	12	A	0.21	12	12	
	SBL	-	-	-	-	F	1.01	44	#322	F	1.01	44	#322	
	SBT	-	-	-	-	A	0.12	3	10	A	0.12	3	10	
Overall	-	-	-	-	F	1.03	37	-	F	1.03	37	-		

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Seeley's Bay Street & Cambrian Road <i>Unsignalized</i>	EBL	A	0.02	10	1	A	0.05	9	2	A	0.05	9	2
	EBT	-	-	-	-	-	-	-	-	-	-	-	-
	WBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	SBL/R	C	0.26	23	8	C	0.14	20	4	C	0.14	20	4
River Mist Road & Cambrian Road <i>Signalized</i>	EBL	A	0.07	15	5	A	0.10	14	6	A	0.10	14	6
	EBT	E	0.93	47	#135	E	0.92	42	#172	E	0.92	42	#172
	EBR	A	0.20	4	9	A	0.35	3	12	A	0.35	3	12
	WBL	A	0.40	27	17	E	1.00	102	#64	E	1.00	102	#64
	WBT	B	0.70	26	80	C	0.78	29	#124	C	0.78	29	#124
	WBR	A	0.09	5	6	A	0.10	4	6	A	0.10	4	6
	NBL	B	0.61	24	61	A	0.41	24	40	A	0.41	24	40
	NBT/R	A	0.30	7	18	A	0.25	6	13	A	0.25	6	13
	SBL	A	0.14	15	13	A	0.08	19	9	A	0.08	19	9
	SBT/R	A	0.07	8	7	A	0.05	12	7	A	0.05	12	7
Overall	C	0.76	27	-	C	0.74	32	-	C	0.74	32	-	
Greenbank Road & Cambrian Road <i>Roundabout</i>	EBL/T/R	F	1.08	77	380	F	1.14	102	356	F	1.14	102	356
	WBL/T/R	D	0.77	27	62	F	1.06	78	239	F	1.06	78	239
	SBL/T/R	B	0.56	15	30	F	1.57	284	873	F	1.57	284	873
	NBL/T/R	F	1.50	258	629	E	0.86	35	97	E	0.86	35	97
	Overall	F	1.50	113	629	F	1.57	143	873	F	1.57	143	873
Notes:	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												
	# - 95% percentile exceeds capacity; queue may be longer												

The 95th percentile cycle exceeds capacity at several approaches and time periods at Cambrian Road and Borrisokane Road intersection and Cambrian Road and River Mist Road intersection. At all approaches except southbound left approach at Cambrian Road and Borrisokane Road intersection, V/C ratio is less than one during the PM and Saturday peak hours. Thus, it can be assumed that the 95th percentile queue will rarely be exceeded at these approaches.

The signals at Cambrian Road and Borrisokane Road intersection were optimized using the 2028 future background AM, PM, and Saturday peak hour volumes. To improve the 95th percentile queues at this intersection, the westbound right turn was set to have a protected and overlap phases during the PM and Saturday peak periods. This improved both the westbound right turn queues as well as the V/C ratio at southbound left turn movement.

At the intersection of Cambrian Road and River Mist Road, the overall LOS decreases from B to C. Most of approaches at this intersection operate well. The westbound left turn movement is at capacity at this intersection during the PM and Saturday peak periods. This is expected with addition of background growth as the V/C ratio at this approach during 2023 future background horizon is 0.98. A protected and permissive phase has been recommended at this approach during the 2023 future total horizon and will be carried forward in the 2028 future total analysis. As such, no additional mitigation measures have been proposed at this intersection.

The Cambrian Road at Greenbank Road intersection performance has further deteriorated as a result of growth in background traffic. As previously mentioned, the future realigned Greenbank Road will relieve the pressures from the current Greenbank Road beyond our study horizon and improve the northbound and southbound LOS

at the intersection of Greenbank Road at Cambrian Road. The eastbound and westbound LOS at this roundabout will improve beyond our study horizon as a result of Cambrian Road widening.

15.2.4 2023 Future Total

The 2023 total future intersection volumes, including the site generated traffic and other development traffic, have been analyzed to understand the impact of the subject development on the Study Area intersections. Table 22 summarizes the operational analysis of the 2023 total future conditions. Appendix S contains the 2023 future total Synchro sheets.

Table 22: 2023 Total Future Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour				
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	
Borrisokane Road & Cambrian Road <i>Signalized</i>	WBL	A	0.23	34	16	A	0.21	33	15	A	0.21	33	15	
	WBR	D	0.88	20	88	C	0.74	12	25	C	0.74	12	25	
	NBT/R	A	0.40	21	52	B	0.64	33	#72	B	0.64	32	#72	
	SBL	A	0.31	3	17	D	0.87	22	#140	D	0.87	22	#140	
	SBT	A	0.19	4	14	A	0.28	6	26	A	0.28	6	26	
	Overall	C	0.66	26	-	D	0.83	20	-	D	0.83	20	-	
Temporary Driveway & Cambrian Road <i>Unsignalized</i>	EBT/R	-	-	-	-	-	-	-	-	-	-	-	-	
	WBL/T	A	0.01	8	0	A	0.01	9	0	A	0.01	9	0	
	NBL/R	C	0.09	21	2	D	0.21	25	6	D	0.23	26	7	
Seeley's Bay Street / Site Access #1 & Cambrian Road <i>Unsignalized</i>	EBL	A	0.02	9	1	A	0.05	9	1	A	0.05	9	1	
	EBT/R	-	-	-	-	-	-	-	-	-	-	-	-	
	WBL	A	0.04	8	1	A	0.15	10	4	B	0.19	10	5	
	WBT/R	-	-	-	-	-	-	-	-	-	-	-	-	
	NBL/T/R	C	0.11	16	3	D	0.48	26	18	D	0.59	32	26	
River Mist Road & Cambrian Road <i>Signalized</i>	SBL/T/R	D	0.30	26	9	E	0.29	38	8	F	0.38	53	12	
	EBL	A	0.08	15	5	A	0.12	15	7	A	0.13	15.0	7	
	EBT	D	0.86	38	#95	E	0.92	43	#16	E	0.93	43.8	#174	
	EBR	A	0.23	4	9	A	0.28	3	10	A	0.28	3.0	11	
	WBL	A	0.36	23	15	F	1.01	105	#63	F	1.03	110.0	#64	
	WBT	B	0.67	26	67	C	0.78	28	114	C	0.79	29.0	#128	
	WBR	A	0.09	5	6	A	0.11	4	6	A	0.10	3.9	6	
	NBL	A	0.56	21	60	A	0.39	24	40	A	0.43	24.6	42	
	NBT/R	A	0.28	6	17	A	0.24	6	13	A	0.25	6.1	13	
	SBL	A	0.13	14	13	A	0.07	19	9	A	0.08	18.8	9	
	SBT/R	A	0.08	7	7	A	0.06	11	7	A	0.07	10.5	7	
	Overall	B	0.69	22	-	C	0.73	33	-	C	0.76	33	-	
	Mitigation Measure: Westbound Left-Turn Protected and Permissive Phase – PM and SAT													
		EBL	-	-	-	-	A	0.09	17	7	A	0.10	17	8
		EBT	-	-	-	-	E	0.95	52	#194	E	0.97	56	#207
	EBR	-	-	-	-	A	0.28	3	12	A	0.28	3	12	
	WBL	-	-	-	-	C	0.74	37	#33	C	0.77	40	#35	
	WBT	-	-	-	-	B	0.66	21	110	B	0.68	22	119	
	WBR	-	-	-	-	A	0.09	3	6	A	0.09	3	6	
	NBL	-	-	-	-	A	0.46	34	51	A	0.50	36	54	
	NBT/R	-	-	-	-	A	0.28	8	16	A	0.28	8	16	
	SBL	-	-	-	-	A	0.09	27	11	A	0.09	27	11	
	SBT/R	-	-	-	-	A	0.07	16	9	A	0.08	15	9	
	EBL	-	-	-	-	C	0.75	31	-	C	0.78	33	-	

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Greenbank Road & Cambrian Road Roundabout	EBL/T/R	D	0.89	33	176	F	1.09	84	298	F	1.11	92	333
	WBL/T/R	C	0.69	21	46	E	0.92	43	133	E	0.93	45	140
	SBL/T/R	B	0.45	12	18	F	1.35	191	575	F	1.38	200	592
	NBL/T/R	F	1.28	165	429	D	0.76	25	65	D	0.77	25	66
	Overall	F	1.28	69	-	F	1.35	96	-	F	1.38	101	-
Notes:	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												
	# - 95% percentile exceeds capacity												

With the addition of the site generated traffic, the Study Area is expected to operate with similar operational characteristics as the 2023 future background conditions. The performance of Cambrian Road and Borrisokane Road intersection does not change from the 2023 future background horizon, as this intersection is not affected by the site-generated traffic.

It has been noted that the 95th percentile cycle exceeds capacity at several approaches and time periods at Cambrian Road and Borrisokane Road intersection and Cambrian Road and River Mist Road intersection. However, as V/C ratio for these movements is less than one, it can be assumed that the 95th percentile queue will rarely be exceeded.

On the westbound left turn approach at the intersection of Cambrian Road and River Mist Road, the V/C ratio has increased from 0.98 to 1.01 during PM peak period, and 1.03 during Saturday peak period. Protected and permissive phasing for the westbound left turn lane was proposed to improve the operational performance at this intersection. As a result, the LOS at westbound left turn movement improved from LOS F to a LOS C during PM and Saturday peak periods.

All movements at the intersection of Temporary Driveway at Cambrian Road operate within acceptable level of service and V/C ratios below 0.25. At Site Access #1 / Seeley's Bay Street and Cambrian Road, the Saturday Peak hour LOS of the southbound approach is F based on the HCM criteria for average delay at unsignalized intersections. It should be noted, however, that the V/C ratio is 0.29 and 0.38 at this approach during the PM and Saturday peak periods, respectively. Using the OTM Book 12 Justification 7, the signal warrant has been reviewed and is shown in Appendix M. It has been found that traffic signals are not warranted using the 2023 total future volumes. Taking this into account as well as the proximity of this intersection to the future intersection of Cambrian Road and realigned Greenbank Road, traffic control signals at this intersection are not recommended at this time.

15.2.5 2028 Future Total

The 2028 total future intersection volumes, including the site generated traffic and other development traffic, have been analyzed to understand the impact of the subject development on the Study Area intersections. The mitigation measures outlined in 2023 future total scenario analysis were carried over to this scenario. Table 23 summarizes the operational analysis of the 2028 future total conditions. Appendix T contains the 2028 future total Synchro Sheets.

Table 23: 2028 Total Future Conditions Operational Analysis

Intersection	Lane	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)	LOS	V/C	Delay	Q (95 th)
Borrisokane Road & Cambrian Road <i>Signalized</i>	WBL	A	0.53	64	35	A	0.44	62	28	A	0.44	62	28
	WBR	E	0.94	23	#311	A	0.60	6	54	A	0.60	6	54
	NBT	A	0.32	46	38	A	0.55	51	61	A	0.55	51	61
	NBR	A	0.18	12	12	A	0.21	12	12	A	0.21	12	12
	SBL	A	0.39	4	38	F	1.01	44	#322	F	1.01	44	#322
	SBT	A	0.13	3	12	A	0.12	3	10	A	0.12	3	10
Overall	D	0.84	31	-	-	F	1.03	37	-	F	1.03	37	-
Temporary Driveway & Cambrian Road <i>Unsignalized</i>	EBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	WBL/T	A	0.01	9	0	A	0.01	10	0	A	0.01	10	0
	NBL/R	D	0.13	30	3	E	0.33	42	10	E	0.31	41	9
Seeley's Bay Street / Site Access #1 & Cambrian Road <i>Unsignalized</i>	EBL	A	0.03	10	1	A	0.05	9	2	A	0.05	9	2
	EBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	WBL	A	0.05	9	1	B	0.17	11	5	B	0.22	11	6
	WBT/R	-	-	-	-	-	-	-	-	-	-	-	-
	NBL/T/R	C	0.14	21	4	E	0.68	49	32	F	0.85	74	49
SBL/T/R	E	0.41	38	14	F	0.53	87	17	F	0.78	172	26	
River Mist Road & Cambrian Road <i>Unsignalized</i>	EBL	A	0.08	14	5	A	0.09	14	7	A	0.10	14	8
	EBT	D	0.90	40	#137	E	0.95	49	#247	E	0.96	51	#262
	EBR	A	0.21	3	9	A	0.34	3	12	A	0.34	3	12
	WBL	A	0.37	23	16	C	0.75	35	#30	C	0.77	38	#32
	WBT	B	0.69	25	83	C	0.71	21	141	C	0.73	21	153
	WBR	A	0.08	4	5	A	0.09	2	5	A	0.08	2	5
	NBL	B	0.70	32	#91	B	0.61	50	71	B	0.65	53	75
	NBT/R	A	0.32	8	21	A	0.32	11	20	A	0.32	11	20
	SBL	A	0.15	19	15	A	0.11	38	14	A	0.11	38	14
	SBT/R	A	0.09	10	9	A	0.08	22	11	A	0.09	20	11
Overall	C	0.80	25	-	-	C	0.84	32	-	C	0.86	33	-
Greenbank Road & Cambrian Road <i>Roundabout</i>	EBL/T/R	F	1.10	84	408	F	1.22	132	490	F	1.24	141	531
	WBL/T/R	D	0.79	29	66	F	1.09	89	268	F	1.10	94	280
	SBL/T/R	C	0.57	15	31	F	1.62	305	907	F	1.63	311	917
	NBL/T/R	F	1.51	264	648	E	0.87	37	102	E	0.88	37	105
	Overall	F	1.51	117	648	F	1.62	159	907	F	1.63	164	917
Notes:	Saturation flow rate of 1800 veh/h/lane												
	PHF = 1.00												
	# - 95% percentile exceeds capacity; queue may be longer												

The volume for the 95th percentile cycle exceeds capacity at several approaches and time periods at Cambrian Road and Borrisokane Road intersection and Cambrian Road and River Mist Road intersection. At all approaches except southbound left approach at Cambrian Road and Borrisokane Road intersection, V/C ratio is less than one. Thus, it can be assumed that the 95th percentile queue will rarely be exceeded at these approaches.

With the addition of site generated traffic, the Study Area mostly operates similarly to 2028 future background conditions. The unsignalized intersection of Temporary Driveway at Cambrian Road is within the City of Ottawa's operational thresholds. At the intersection of Site Access #1 / Seeley's Bay Street and Cambrian Road, there are high delays in PM and Saturday peak periods on the southbound approach and Saturday peak period on the northbound approach. Based on the HCM criteria for average delay at unsignalized intersections, the V/C ratios at these approaches and time periods are 0.85 or lower. Using the OTM Book 12 Justification 7, the signal warrant has been reviewed and is shown in Appendix M. It has been found that traffic signals are not warranted using the

2028 total future volumes. Taking this into account as well as the proximity of this intersection to the future intersection of Cambrian Road and realigned Greenbank Road, traffic control signals at this intersection are not recommended. It is likely that when a queue at the southbound approach of this intersection is observed, drivers will naturally reroute to other links such as River Mist Road to get onto Cambrian Road. Once the realigned Greenbank Road is built beyond this study’s horizon, more opportunities will become available to get from the residential neighbourhoods north of Cambrian Road and onto an arterial road. It should also be noted that PM peak hour volumes were used as a base for Saturday peak hour analyses herein, as no Saturday counts could be collected as a result of the current lockdown measures due to the COVID-19 pandemic. Thus, the Saturday peak hour analysis results are likely conservative, as unlike the Saturday peak hour, the PM peak hour includes a large fraction of commuting trips.

The signalized intersection of River Mist Road at Cambrian Road operates well with an overall LOS C. The performance of Cambrian Road and Borrisokane Road intersection does not change from the 2028 future background horizon, as this intersection is not affected by the site-generated traffic. Operational performance of Cambrian Road at Greenbank Road intersection decreases marginally with the addition of site-generated volumes. The future construction of realigned Greenbank Road and widening of Cambrian Road are expected to alleviate capacity issues at this intersection in all directions and time periods.

15.2.6 Sensitivity Analysis

As discussed in Section 7, as the result of a comment received from the City of Ottawa requesting analysis to “quantify the amount of volume that requires rationalization at the Study Area intersections without the proposed future infrastructure”, and “identify how the required reductions are expected to be attributed to background and development-related trips”, a sensitivity analysis has been undertaken. The volumes at Cambrian Road and Borrisokane Road, Cambrian Road at Seeley’s Bay Street / Site Access #1, and Cambrian Road at Greenbank Road have been evaluated. The sensitivity analysis performed identified the volume required to be diverted from over-capacity movements in order to maintain a V/C ratio <1.0. The required reduction has then been attributed to growth, background developments, and the subject development based on the total number of trips added to a particular movement since 2020 by each category. Table 24 summarizes the results of the sensitivity analysis and Table 22 attributes the reduction to growth, background developments, and the subject site.

Table 24: Sensitivity Analysis Summary

Analysis Period	Intersection	Lane with V/C <1	Volume		
			Original	New	Reduction
AM Peak Hour	Greenbank Road & Cambrian Road	EBL/T/R	852	767	85 (10%)
		NBL/T/R	739	488	251 (34%)
PM Peak Hour	Borrisokane Road & Cambrian Road	SBL	1078	1063	15 (1%)
	Greenbank Road & Cambrian Road	EBL/T/R	833	683	150 (18%)
		WBL/T/R	660	594	66 (10%)
		SBL/T/R	936	571	365 (39%)
Saturday Peak Hour	Borrisokane Road & Cambrian Road	SBL	1078	1063	15 (1%)
	Greenbank Road & Cambrian Road	EBL/T/R	859	687	172 (20%)
		WBL/T/R	663	591	72 (11%)
		SBL/T/R	936	571	365 (39%)

Table 25: Reduction by Attribute

Analysis Period	Intersection	Lane with V/C <1	Reduction			
			Growth	Background Developments	3831 Cambrian Road	Total
AM Peak Hour	Greenbank Road & Cambrian Road	EBL/T/R	19	63	3	85
		NBL/T/R	95	143	13	251
PM Peak Hour	Borrisokane Road & Cambrian Road	SBL	2	13	0	15
	Greenbank Road & Cambrian Road	EBL/T/R	33	80	37	150
		WBL/T/R	26	38	2	66
		SBL/T/R	100	265	0	365
Saturday Peak Hour	Borrisokane Road & Cambrian Road	SBL	2	13	0	15
	Greenbank Road & Cambrian Road	EBL/T/R	34	86	52	172
		WBL/T/R	28	40	4	72
		SBL/T/R	100	265	0	365

As this analysis shows, the over capacity movements are predominantly influenced by background developments. The 3831 Cambrian site contributes a maximum of 52 peak hour trips to an over capacity movement, which is equivalent to 6% of the total approach volume. This is less than the average daily traffic volume fluctuation, which is generally considered to be 10 %.

It should also be noted that although grocery and retail stores generate vehicular trips, part of these trips may already be captured in existing turning movement counts as the residents of the Study Area make trips to a grocery store or a commercial plaza elsewhere. Therefore, it is possible that portion of the site-generated trips in the Study Area are double counted. Further, the proposed development will bring the grocery and retail trip destinations into the Study Area, reducing the net total vehicle kilometers traveled by the Study Area residents, which benefits the overall network performance.

15.2.7 Intersection MMLOS

Intersection MMLOS is only undertaken at signalized intersections. The two signalized intersections considered in this study are Cambrian Road at Borrisokane Road, and Cambrian Road at River Mist Road. These intersections are currently stop-controlled and have been signalized in Synchro analysis as an improvement measure. As such, several conservative assumptions about the intersection configuration were made to evaluate the intersection MMLOS and can be seen in MMLOS worksheets in Appendix L. Table 26 summarizes the MMLOS analysis for these intersections in the Study Area for the existing and future horizons. The analysis is based on the general urban area targets.

Table 26: Study Area Intersection MMLOS Analysis—All Horizons

Intersection	Horizon	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
		PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Cambrian Road & Borrisokane Road	2023 FB	C	C	D	D	-	D	E	E	C(D)[D]	D
	2028 FB									E(F)[F]	
	2023 FT									C(D)[D]	
	2028 FT									E(F)[F]	
Cambrian Road & River Mist Road	2023 FB	D	C	F	D	E(F)[F]	E	E	B(B)[B]	D	
	2028 FB								F(F)[F]		
	2023 FT								E(F)[F]		
	2028 FT								F(F)[F]		
Notes:	AM(PM)[SAT]										

Based on the new intersection configuration assumptions, the pedestrian LOS target is not met at Cambrian Road and River Mist Road intersection as a result of the future crossing distances at east and west legs of the intersection. The bicycle LOS is also not met at this intersection as a result of auxiliary right-turn lanes introduced in 2023 future background horizon.

To evaluate the future Transit LOS, it was assumed that OC Transpo will adjust the paths and schedules of routes #75 and #275 once the new residential developments are built along Cambrian Road, west of Seeley’s Bay Street. As City of Ottawa’s MMLOS Guidelines do not provide Transit LOS targets for roadways that are not a Rapid Transit Corridor or a Transit Priority Corridor, a target LOS for Transit Priority Corridor with isolated measures was used as a conservative target for Cambrian Road. This target is not met using future background and total horizons due to intersection delays.

Truck LOS is met at both Study Area intersections. Auto LOS targets are met at Cambrian Road and River Mist Road and are performing below the target LOS at Cambrian Road and Borrisokane Road intersection. Auto LOS has been discussed in greater detail in previous sections of this report.

General urban area targets should inform the future design process for Cambrian Road and Borrisokane Road as well as Cambrian Road and River Mist Road intersections to ensure that these intersections operate safely and efficiently for various types of travel modes in the future.

16 Recommendations

Based on Synchro analysis, it is recommended that the City of Ottawa revisit the timelines of the Cambrian Road widening and construction of realigned Greenbank Road to support the proposed/approved developments in the Study Area.

The Temporary Driveway west of the proposed development is located along the centreline of future Greenbank Road and connects the site traffic to Cambrian Road. Both signalization warrants and left-turn lane warrants were examined at the Temporary Driveway and Cambrian Road intersection. It was found that signals are not warranted at this access in 2023 and 2028 future total horizons. The technical warrant for the westbound left turn lane has been met at this location in both future total horizons. It should be noted, however, that the 5% (the lowest increment for which graphs are available) nomograph was used to determine whether an auxiliary turn lane is warranted, while the ratio of westbound left turning vehicles to traffic on this approach is 1% in the 2028 future total horizon. This is equivalent to 9 vehicles per hour, or one vehicle per every 7 minutes on average turning left into the subject site at Temporary Driveway and Cambrian Road. This movement was analysed in Synchro as a

shared westbound through / left turn in future horizons, and the results have shown that average delay at this movement is 10 seconds without implementation of an auxiliary left turn lane. Further, the 9 trips turning left into the site at Temporary Driveway accounts for trips that pass by / miss the dedicated westbound left turn lane at Site Access #1 to turn into the Site at Temporary Driveway and thus it is likely a conservative estimate. Considering this as well as the plans for signalization at this intersection as part of the future Greenbank Road re-alignment, a left-turn lane has not been proposed at this intersection within this study's horizons.

The 2023 and 2028 future total operational analysis showed that there are high delays at Site Access #1 / Seeley's Bay Street and Cambrian Road intersection during PM peak period on the southbound approach, and Saturday peak period on the southbound and northbound approaches. It should be noted, however, that there is sufficient capacity at these approaches to move traffic from site access / Seeley's Bay Street and onto Cambrian Road, as the V/C ratios at these approaches and time periods are 0.85 or lower. The signal warrant has been reviewed at this intersection and it has been found that traffic signals are not warranted using the 2028 total future volumes. Taking this into account as well as the proximity of this intersection to the future intersection of Cambrian Road and realigned Greenbank Road, traffic control signals at this intersection are not recommended. Once the realigned Greenbank Road is built beyond this study's horizon, more opportunities will become available to get from residential neighbourhoods north of Cambrian Road and onto an arterial road.

Turning lane warrants were also examined at Cambrian Road and Site Access #1/Seeley's Bay Street intersection. It was found that a westbound left-turn lane is required at this intersection during the 2023 and 2028 total future horizons. It was also found that an eastbound left-turn lane is warranted using the Existing 2020 traffic volumes. In addition to the turning lane warrants, a minimum of one full movement is required to make a commercial development viable. Considering the fact that Site Access #2 will be restricted to right-in/right-out access only once the realigned Greenbank Road is built, a full movement access needs to be located along Cambrian Road. The location of future Greenbank Road as well as Seeley's Bay Street further constrain the location of the full-movement access. The access should be located as far as possible from future Greenbank Road to have minimum effect on operations of this intersection yet result in a favourable lane alignment with Seeley's Bay Street. As such, the only logical location for Site Access #1 is directly across from Seeley's Bay Street.

The existing pavement cross-section on Cambrian Road is wide enough to accommodate painted left-turn lanes without widening the existing roadway. A conceptual drawing of the eastbound and westbound turning lanes can be seen in Appendix U. Once this concept is approved through the review of this TIA, a functional design will be prepared showing the proposed painted left-turn lanes.

Based on the foregoing, it was established through a consultation with the City of Ottawa staff that an RMA and functional design could follow the approval of this TIA and be undertaken after the development application has been deemed complete.

17 Conclusions

- A. The proposed development, located at 3831 Cambrian Road, is a commercial development consisting of 4,024 square metre supermarket, an attached 929 square metre retail store, an 830 square metre retail building, and a 1,060 square metre mixed-use building. Approximately 275 vehicle parking spaces and 24 bicycle parking spaces will be provided.
- B. The site is proposed to have three accesses. Site Access #1 is located directly across Seeley's Bay Street and approximately 140 metres east of future Greenbank Road, measured from intersection centreline to intersection centreline. Site Access #2 and Site Access #3 are located 120 metres and 190 metres south of Cambrian Road, respectively. The second and the third site access will connect to a Temporary Driveway located along the centreline of future Greenbank Road. Once Greenbank Road is built beyond this study horizon, Site Access #2 and Site Access #3 will be restricted to right in / right out access only.
- C. Site Access #1 will be a full movement access with westbound and eastbound left-turn lanes. This intersection will be subject to a future functional design.
- D. The existing Study Area is currently served by bus routes #75, and #275.
- E. The previous five years of collision history at the existing Study Area intersections has been reviewed. No patterns emerged that indicated that mitigation measures or further monitoring was required.
- F. Using the ITE Trip Generation Manual, the supermarket and retail store trip rates were identified. The South Nepean mode shares were used to determine the trip generation by mode. Internal capture, pass by trips, and diverted link trips were accounted for.
- G. It was found that the proposed development can be anticipated to generate 146 AM, 110 PM, and 155 Saturday net new peak hour two-way vehicle trips.
- H. Minimum vehicle parking space requirements are met with an excess of 88 spaces and bicycle parking space requirements are met with an excess of four spaces.
- I. It was found that the road segments of Cambrian Road do not meet the pedestrian and bicycle LOS targets. As future changes to the road network are anticipated to improve the MMLoS of these segments, no resulting improvements to the boundary road, beyond the extension of pedestrian facilities along the frontage of the site, are recommended.
- J. Both signalization warrants and left-turn lane warrants were evaluated at Site Access #1 at Cambrian Road and the Temporary Driveway at Cambrian Road. Signalization was not warranted at either intersection, however a westbound left-turn lane was warranted at Site Access #1 for both future total horizons. An eastbound left-turn lane was also found to be warranted during the 2020 existing horizon. Preliminary storage and taper lengths have been designed for the eastbound and westbound left-turn lanes for operational analysis purposes, however this design will be further refined in the RMA and functional design. At the Temporary Driveway and Cambrian Road, a westbound left turn lane was also warranted in both future total horizons. As the traffic turning left at this movement is 9 vehicles per hour and no operational constraints were noted in Synchro analysis when modeling this movement as a shared through / left turn lane, a left turn lane at this location was not proposed as part of this TIA.
- K. In the existing conditions operational analysis, eastbound approach fails at Cambrian Road and River Mist Road during the PM and Saturday peak periods. An alternative control configuration at this intersection was modeled as part of the analysis for comparison:
 - i. Two-way stop control on the minor approaches replacing the all-way stop control currently in place


Cambrian Road and Greenbank Road southbound and northbound approaches also experience poor LOS. It is expected that the future realigned Greenbank Road will relieve the pressures from the current Greenbank Road and Cambrian Road intersection beyond this study horizon.

- L. In the 2023 future background horizon, warrants were met for southbound left- and westbound right-turn lanes at Cambrian Road and Borrisokane Road intersection, as well as for westbound right-, eastbound right-, and eastbound left-turn lanes at Cambrian Road and River Mist Road intersections. To bring the LOS at both of the above-mentioned intersection to the City of Ottawa operational thresholds, these intersections were signalised, and left-turn lanes were added to previously shared-movement approaches. As a result of the warranted and recommended changes to the Study Area network, most of the Study Area intersections operate satisfactorily during the peak hours in 2023 future background operational analysis. The LOS at Cambrian Road and Greenbank Road roundabout remains poor.
- M. In the 2023 future total horizon, the V/C ratio of the westbound left turn movement at River Mist Road and Cambrian Road intersection increased by 5% or less. As the V/C ratio of this movement was 0.98 in 2023 future background horizon, this resulted in a V/C ratio above one. As a mitigation measure, permissive and protected phasing was proposed on the westbound left turn movement. At Site Access #1 / Seeley's Bay Street and Cambrian Road, the LOS of the southbound approach is F, while the V/C ratio is 0.38 or lower. Using the OTM Book 12 Justification 7, the signal warrant has been reviewed at this intersection. It has been found that traffic signals are not warranted using the 2023 total future volumes.
- N. In the 2028 future background horizon, the westbound right turn permissive and overlap phase was proposed to reduce the 95th percentile queues at this movement. This improved both the westbound right turn queues as well as the V/C ratio at southbound left turn movement. At the intersection of Cambrian Road and River Mist Road, the westbound left turn movement is at capacity during PM and Saturday peak periods. As protected and permissive phasing has been recommended at this approach during the 2023 future total horizon and was carried forward in the 2028 future total analysis, no additional mitigation measures have been proposed at this intersection. The Cambrian Road at Greenbank Road intersection performance has further deteriorated as a result of growth in background traffic. It is expected that the widening of Cambrian Road to a four-lane arterial beyond the study horizon will improve the operations of the existing Cambrian Road at Greenbank Road intersection in all directions and time periods.
- O. The Study Area intersections are expected to operate with similar operational characteristics as the 2028 future background conditions during the 2028 future total horizon. The unsignalized intersection of Temporary Driveway at Cambrian Road is within the City of Ottawa's operational thresholds. At the intersection of Site Access #1 / Seeley's Bay Street and Cambrian Road, there are high delays in PM and Saturday peak periods on the southbound approach and Saturday peak period on the northbound approach. The V/C ratios at these approaches and time periods are 0.85 or lower. It has been found that traffic signals are not warranted at this intersection using the 2028 total future volumes. Considering this and the proximity of this intersection to the future intersection of Cambrian Road and realigned Greenbank Road, traffic control signals at this intersection are not recommended.
- P. Sensitivity analysis shows that the over capacity movements are predominantly influenced by background developments.
- Q. It is difficult to quantify how much of the existing traffic is passing through the Study Area intersections to reach a retail store or a supermarket elsewhere. While this study is showing an increase in traffic, the overall vehicle kilometres traveled by the residents from the nearby communities is expected to decrease, as this development will result in shorter trip distances between trip origins (home) and trip destinations (supermarket/retail).

- R. The PLOS, BLOS, TLOS, and TkLOS were evaluated at two signalized Study Area intersections. No intersection alterations or mitigation measures are suggested as it is expected that general urban area MMLOS targets will inform the design of the widened Cambrian Road and intersections of Cambrian Road and River Mist Road as well as Cambrian Road and Borrisokane Road.

The proposed development will function within the Study Area Road Network. It is recommended that, from a transportation perspective, the proposed development application process proceeds.

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Appendix A

TIA Screening Form and PM Certification Form

City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: 28-Mar-21
Project Number: 2019-54
Project Reference: Metro Greenbank Road

1.1 Description of Proposed Development	
Municipal Address	3831 Cambrian Road
Description of Location	Located at the North-East corner of Cambrian Rd. and future Greenbank Road
Land Use Classification	GM[2340]-h
Development Size	6,843 Square Metres
Accesses	One access on Cambrian Road and two accesses on future Greenbank Road
Phase of Development	Assumed 1 Phase for TIA
Buildout Year	2023
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger	
Land Use Type	Destination retail
Development Size	6,843.00 G.F.A
Trip Generation Trigger	Yes

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

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



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 licensed¹ or registered² professional in good standing, whose field of expertise [check appropriate field(s)] is either transportation engineering or transportation planning .

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

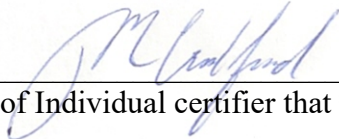
City Of Ottawa
Infrastructure Services and Community
Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

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

Dated at Newmarket this 28 day of June, 2019.
(City)

Name: Mark Crockford
(Please Print)

Professional Title: Professional Engineer



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

Office Contact Information (Please Print)
Address: 628 Haines Road
City / Postal Code: Newmarket / L3Y 6V5
Telephone / Extension: (905) 251-4070
E-Mail Address: Mark.Crockford@CGHTransportation.com



Appendix B

Traffic Data

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

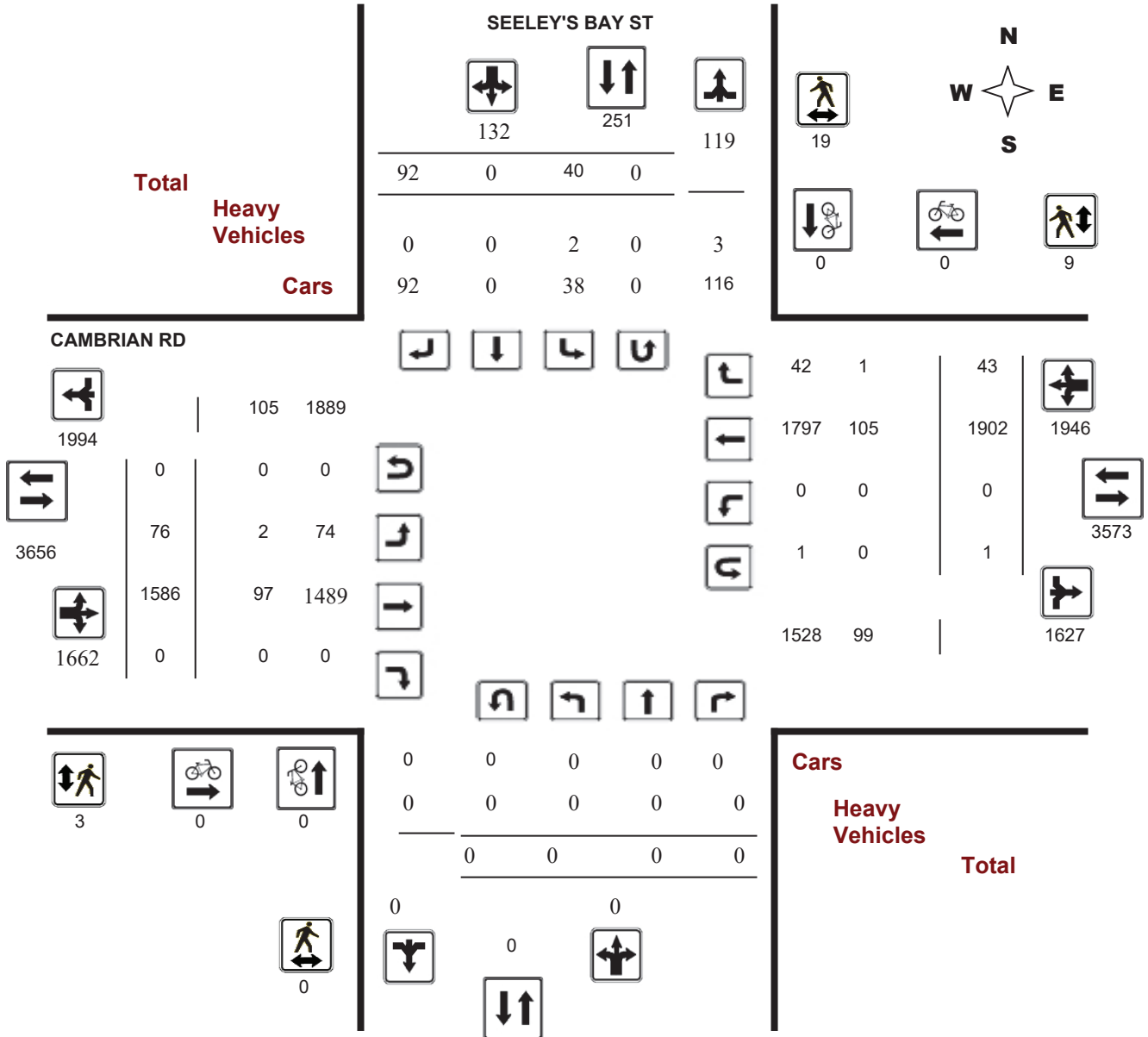
Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Diagram



Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

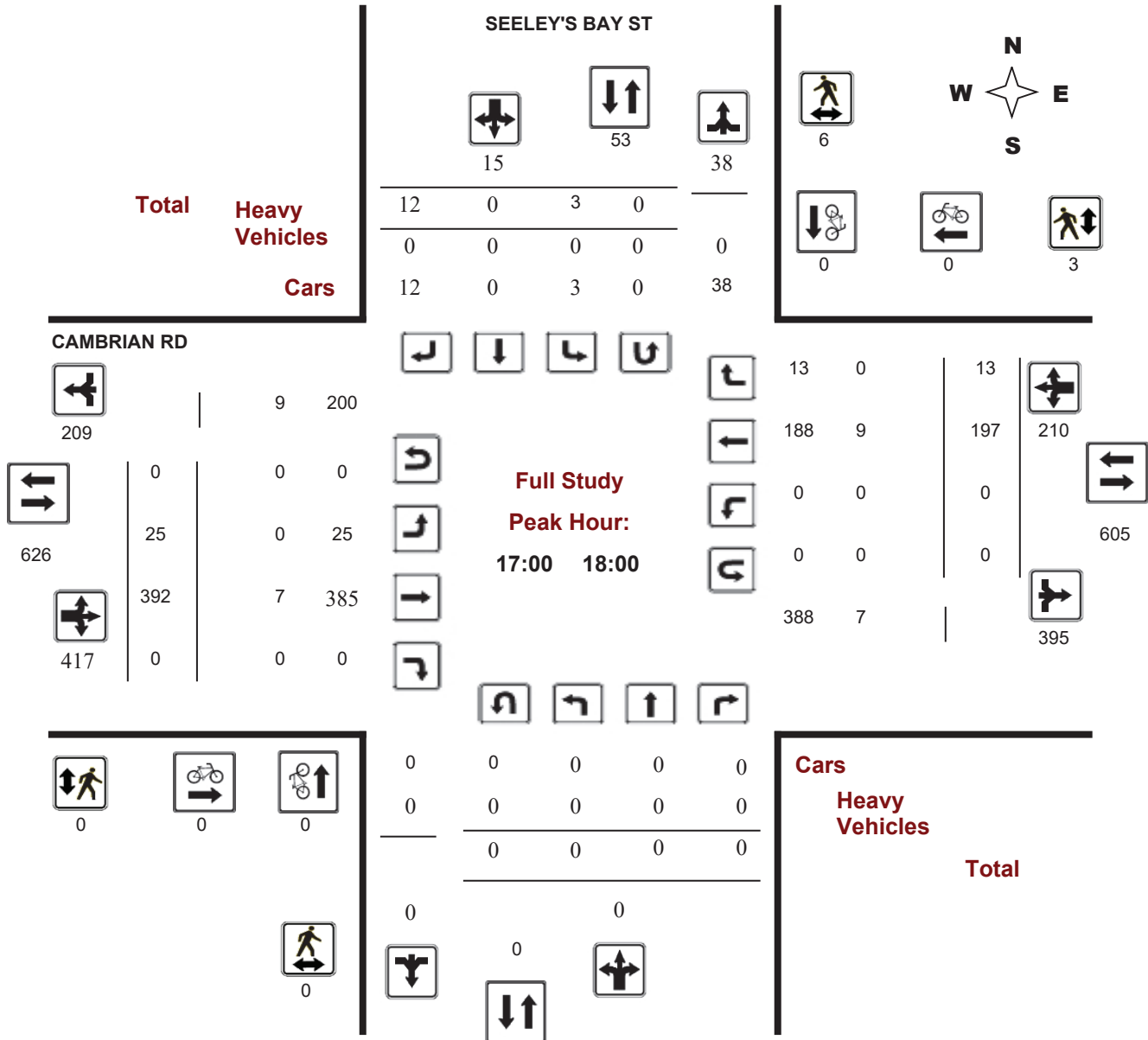
Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

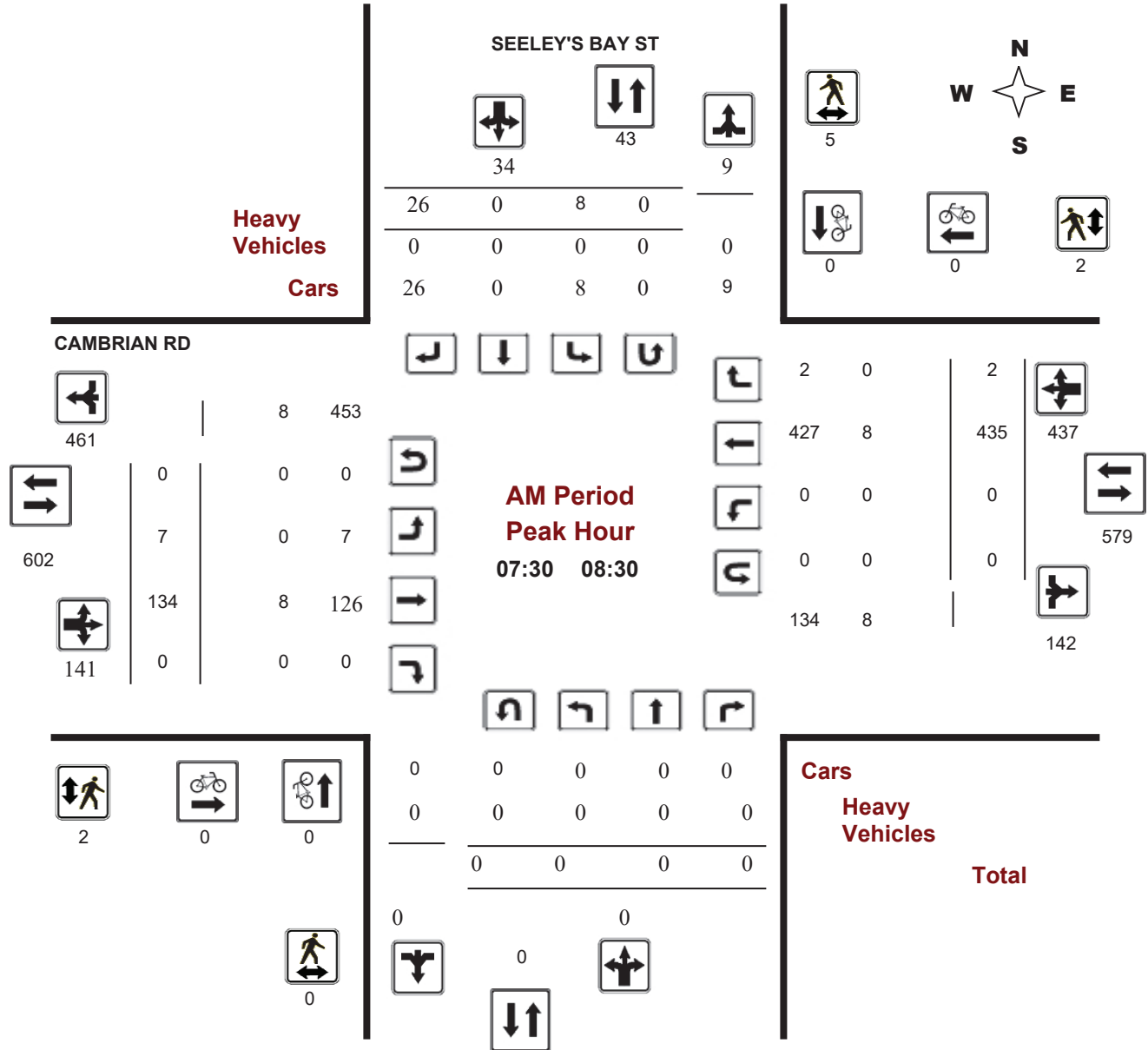
CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

Start Time: 07:00

WO No: 37283

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

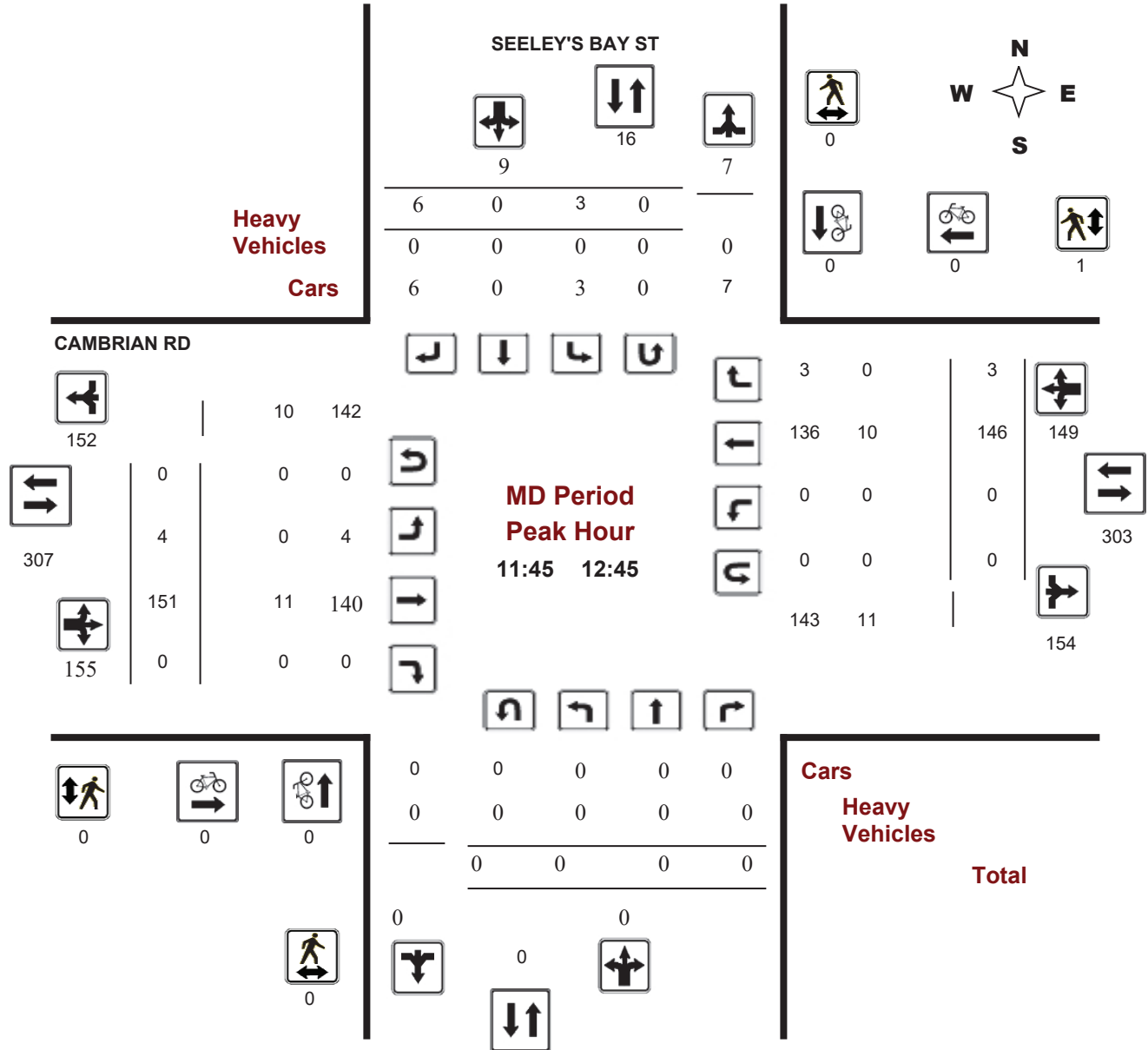
CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

Start Time: 07:00

WO No: 37283

Device: Miovision



Turning Movement Count - Peak Hour Diagram

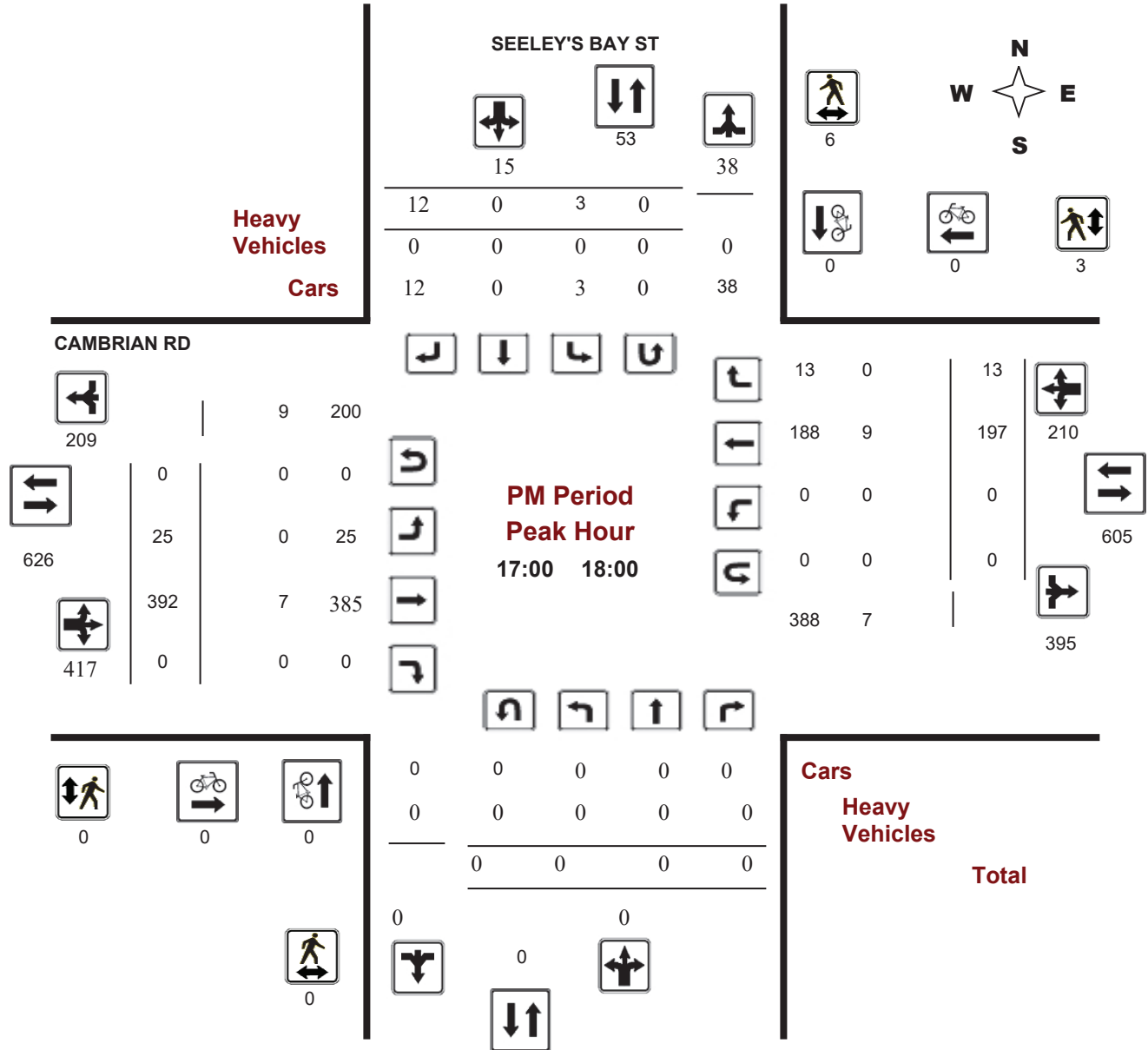
CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, November 22, 2017

Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 0 Westbound: 1

AADT Factor

.90

SEELEY'S BAY ST

CAMBRIAN RD

Period	SEELEY'S BAY ST Northbound					SEELEY'S BAY ST Southbound					CAMBRIAN RD Eastbound					CAMBRIAN RD Westbound					Grand Total
	LT	ST	RT	NB TOT	STR TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	STR TOT	LT	ST	RT	WB TOT	STR TOT	
07:00 08:00	0	0	0	0	29	6	0	23	29	29	9	113	0	122	122	0	357	3	360	482	511
08:00 09:00	0	0	0	0	33	10	0	23	33	33	4	127	0	131	131	0	398	3	401	532	565
09:00 10:00	0	0	0	0	13	3	0	10	13	13	1	101	0	102	102	0	248	2	250	352	365
11:30 12:30	0	0	0	0	11	3	0	8	11	11	2	134	0	136	136	0	146	2	148	284	295
12:30 13:30	0	0	0	0	6	3	0	3	6	6	3	148	0	151	151	0	133	4	137	288	294
15:00 16:00	0	0	0	0	9	3	0	6	9	9	18	241	0	259	259	0	178	8	186	445	454
16:00 17:00	0	0	0	0	16	9	0	7	16	16	14	330	0	344	344	0	245	8	253	597	613
17:00 18:00	0	0	0	0	15	3	0	12	15	15	25	392	0	417	417	0	197	13	210	627	642
Sub Total	0	0	0	0	132	40	0	92	132	132	76	1586	0	1662	1662	0	1902	43	1945	3607	3739
U Turns				0	0				0	0				0	0				1	1	1
Total	0	0	0	0	132	40	0	92	132	132	76	1586	0	1662	1662	0	1902	43	1946	3608	3740
EQ 12Hr	0	0	0	0	183	56	0	128	183	183	106	2205	0	2310	2310	0	2644	60	2705	5015	5199
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																	1.39				
AVG 12Hr	0	0	0	0	165	47	0	108	165	165	90	1870	0	1959	1959	0	2242	51	2294	4514	4679
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																	0.9				
AVG 24Hr	0	0	0	0	204	62	0	142	204	204	117	2450	0	2567	2567	0	2938	66	3006	5573	5777

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

SEELEY'S BAY ST

CAMBRIAN RD

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	0	0	0	0	2	0	7	9	0	1	17	0	18	0	80	1	81	0	108
07:15 07:30	0	0	0	0	1	0	4	5	0	3	32	0	35	0	72	1	73	0	113
07:30 07:45	0	0	0	0	2	0	8	10	0	2	31	0	33	0	102	1	103	0	146
07:45 08:00	0	0	0	0	1	0	4	5	0	3	33	0	36	0	103	0	103	0	144
08:00 08:15	0	0	0	0	3	0	8	11	0	2	30	0	32	0	111	0	111	0	154
08:15 08:30	0	0	0	0	2	0	6	8	0	0	40	0	40	0	119	1	120	0	168
08:30 08:45	0	0	0	0	1	0	6	7	0	1	39	0	40	0	89	1	90	0	137
08:45 09:00	0	0	0	0	4	0	3	7	2	1	18	0	19	0	79	1	80	2	106
09:00 09:15	0	0	0	0	2	0	1	3	0	0	21	0	21	0	92	0	92	0	116
09:15 09:30	0	0	0	0	0	0	2	2	0	1	33	0	34	0	56	1	57	0	93
09:30 09:45	0	0	0	0	0	0	4	4	0	0	24	0	24	0	47	0	47	0	75
09:45 10:00	0	0	0	0	1	0	3	4	0	0	23	0	23	0	53	1	54	0	81
11:30 11:45	0	0	0	0	2	0	3	5	0	0	24	0	24	0	37	0	37	0	66
11:45 12:00	0	0	0	0	1	0	2	3	0	1	32	0	33	0	31	0	31	0	67
12:00 12:15	0	0	0	0	0	0	1	1	0	1	41	0	42	0	44	1	45	0	88
12:15 12:30	0	0	0	0	0	0	2	2	0	0	37	0	37	0	34	1	35	0	74
12:30 12:45	0	0	0	0	2	0	1	3	0	2	41	0	43	0	37	1	38	0	84
12:45 13:00	0	0	0	0	0	0	0	0	0	1	32	0	33	0	30	0	30	0	63
13:00 13:15	0	0	0	0	0	0	2	2	0	0	39	0	39	0	43	1	44	0	85
13:15 13:30	0	0	0	0	1	0	0	1	0	0	36	0	36	0	23	2	25	0	62
15:00 15:15	0	0	0	0	0	0	1	1	0	3	53	0	56	0	44	2	47	0	104
15:15 15:30	0	0	0	0	0	0	0	0	0	5	63	0	68	0	34	3	37	0	105
15:30 15:45	0	0	0	0	3	0	5	8	0	9	60	0	69	0	43	2	45	0	122
15:45 16:00	0	0	0	0	0	0	0	0	0	1	65	0	66	0	57	1	58	0	124
16:00 16:15	0	0	0	0	1	0	0	1	0	3	62	0	65	0	59	1	60	0	126
16:15 16:30	0	0	0	0	4	0	3	7	0	5	92	0	97	0	68	2	70	0	174
16:30 16:45	0	0	0	0	3	0	2	5	0	4	93	0	97	0	63	2	65	0	167
16:45 17:00	0	0	0	0	1	0	2	3	0	2	83	0	85	0	55	3	58	0	146
17:00 17:15	0	0	0	0	0	0	2	2	0	3	87	0	90	0	51	1	52	0	144
17:15 17:30	0	0	0	0	1	0	0	1	0	7	83	0	90	0	46	1	47	0	138
17:30 17:45	0	0	0	0	0	0	7	7	0	7	108	0	115	0	46	7	53	0	175
17:45 18:00	0	0	0	0	2	0	3	5	0	8	114	0	122	0	54	4	58	0	185
Total:	0	0	0	0	40	0	92	132	2	76	1586	0	1662	0	1902	43	1946	2	3,740

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

SEELEY'S BAY ST

CAMBRIAN RD

Time Period		SEELEY'S BAY ST			CAMBRIAN RD			Grand Total
		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0
Total		0	0	0	0	0	0	0



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

SEELEY'S BAY ST

CAMBRIAN RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	0	3	3	0	3	3	6
07:30 07:45	0	4	4	1	1	2	6
07:45 08:00	0	0	0	1	1	2	2
08:00 08:15	0	1	1	0	0	0	1
08:15 08:30	0	0	0	0	0	0	0
08:30 08:45	0	1	1	0	0	0	1
08:45 09:00	0	1	1	0	0	0	1
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	1	1	1
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	1	1	0	0	0	1
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	0	0	0	1	0	1	1
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	2	2	0	0	0	2
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	0	0	0	0	0	0
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	1	1	0	0	0	1
17:30 17:45	0	5	5	0	3	3	8
17:45 18:00	0	0	0	0	0	0	0
Total	0	19	19	3	9	12	31



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

SEELEY'S BAY ST

CAMBRIAN RD

Northbound Southbound Eastbound Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	0	0	0	0	0	0	0	0	0	1	8	0	9	0	1	0	1	10	10
07:15 07:30	0	0	0	0	0	0	0	0	0	0	4	0	4	0	1	0	1	5	5
07:30 07:45	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4
07:45 08:00	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4
08:00 08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1
08:15 08:30	0	0	0	0	0	0	0	0	0	0	3	0	3	0	4	0	4	7	7
08:30 08:45	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5
08:45 09:00	0	0	0	0	2	0	0	2	2	0	3	0	3	0	7	0	7	10	12
09:00 09:15	0	0	0	0	0	0	0	0	0	0	1	0	1	0	8	0	8	9	9
09:15 09:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	4	0	4	6	6
09:30 09:45	0	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3	3
09:45 10:00	0	0	0	0	0	0	0	0	0	0	5	0	5	0	3	0	3	8	8
11:30 11:45	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3	0	3	4	4
11:45 12:00	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3
12:00 12:15	0	0	0	0	0	0	0	0	0	0	4	0	4	0	5	0	5	9	9
12:15 12:30	0	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4	4
12:30 12:45	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5
12:45 13:00	0	0	0	0	0	0	0	0	0	0	3	0	3	0	3	0	3	6	6
13:00 13:15	0	0	0	0	0	0	0	0	0	0	6	0	6	0	3	0	3	9	9
13:15 13:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4
15:00 15:15	0	0	0	0	0	0	0	0	0	0	4	0	4	0	5	0	5	9	9
15:15 15:30	0	0	0	0	0	0	0	0	0	0	4	0	4	0	2	0	2	6	6
15:30 15:45	0	0	0	0	0	0	0	0	0	0	3	0	3	0	7	0	7	10	10
15:45 16:00	0	0	0	0	0	0	0	0	0	0	6	0	6	0	3	0	3	9	9
16:00 16:15	0	0	0	0	0	0	0	0	0	0	7	0	7	0	6	1	7	14	14
16:15 16:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	11	0	11	13	13
16:30 16:45	0	0	0	0	0	0	0	0	0	1	2	0	3	0	4	0	4	7	7
16:45 17:00	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5
17:00 17:15	0	0	0	0	0	0	0	0	0	0	3	0	3	0	2	0	2	5	5
17:15 17:30	0	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4	4
17:30 17:45	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3	3
17:45 18:00	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3	0	3	4	4
Total: None	0	0	0	0	2	0	0	2	2	2	97	0	99	0	105	1	106	205	207



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ SEELEY'S BAY ST

Survey Date: Wednesday, November 22, 2017

WO No: 37283

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

SEELEY'S BAY ST

CAMBRIAN RD

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

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

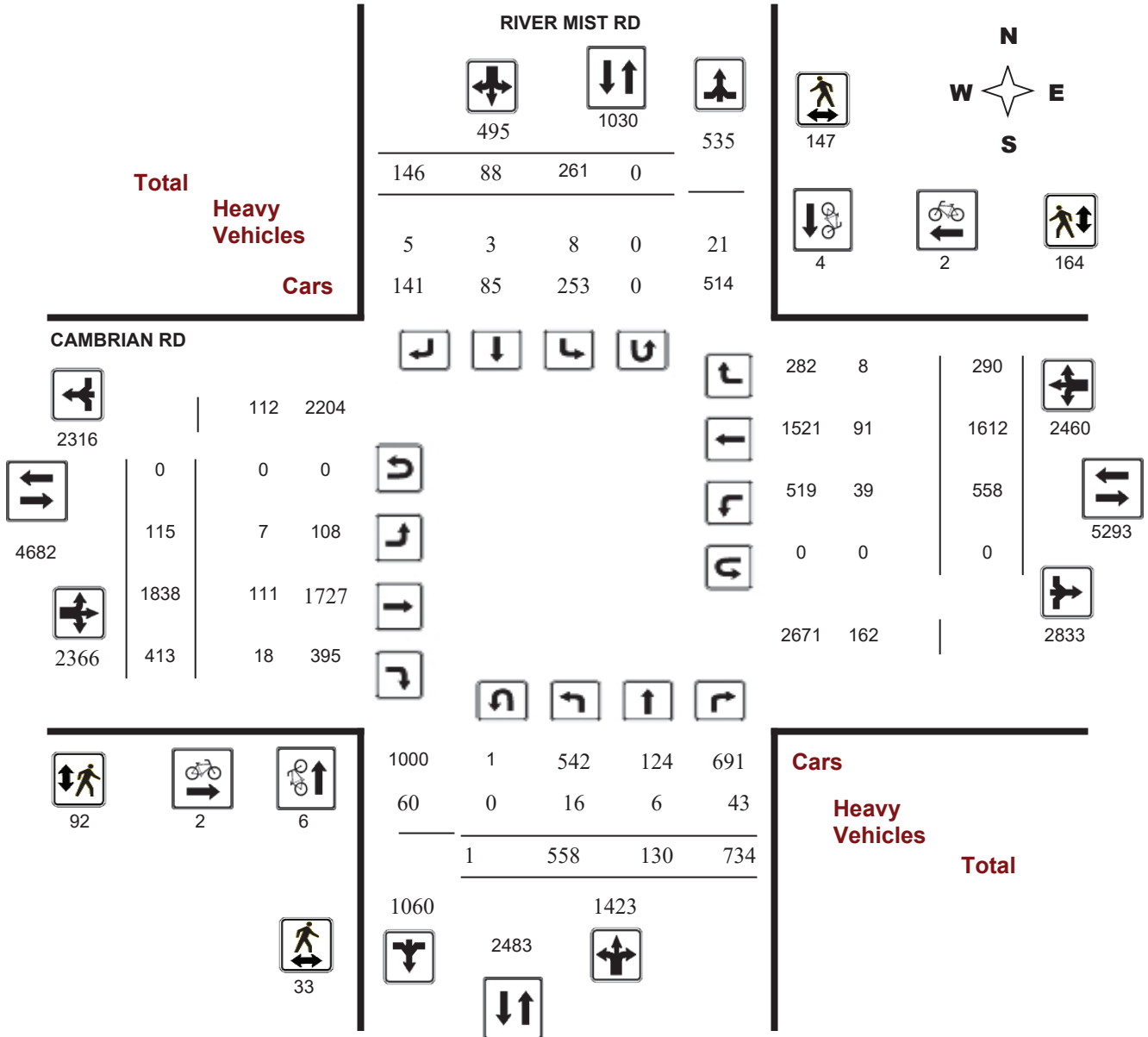
Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Diagram



Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

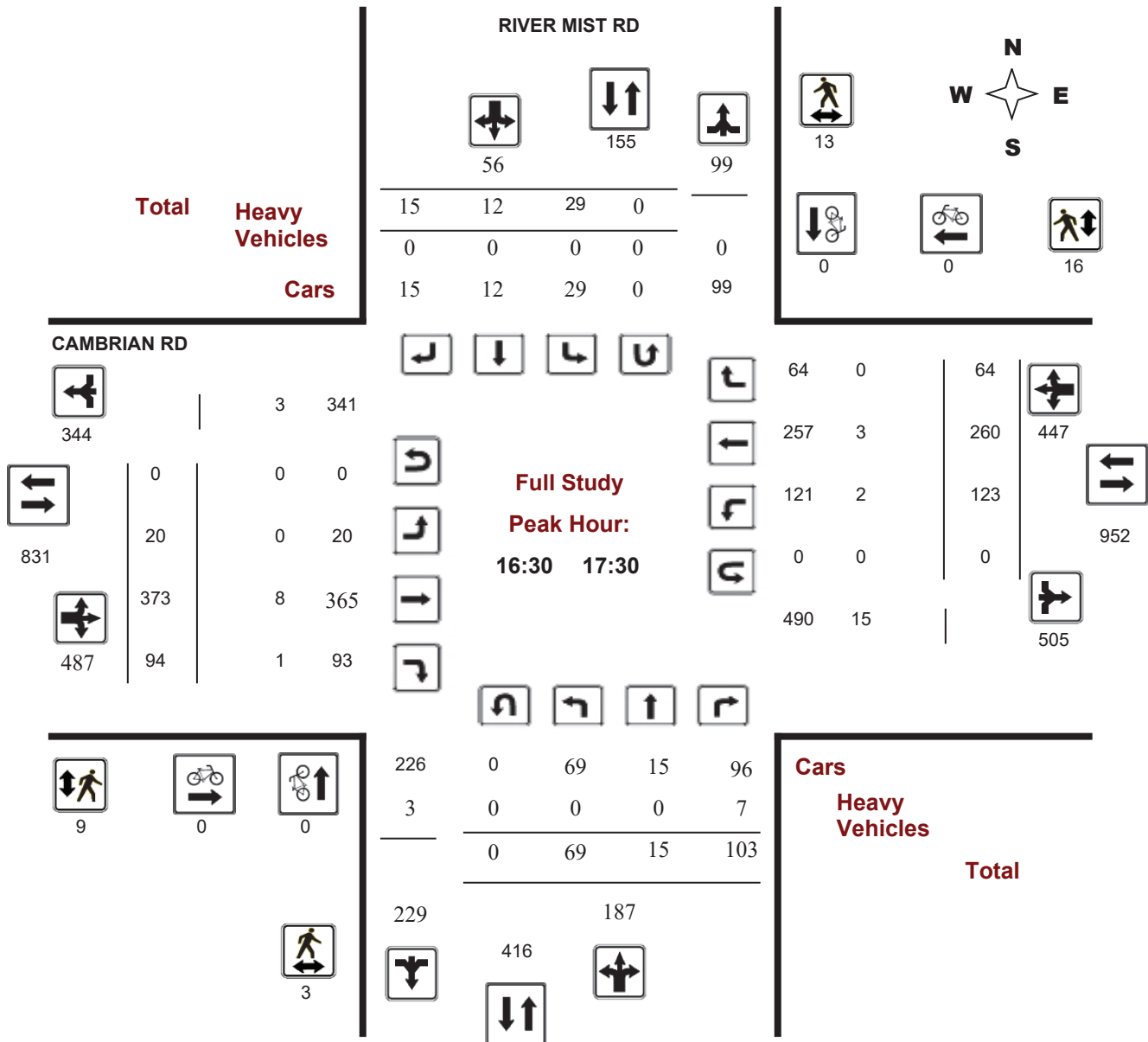
Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

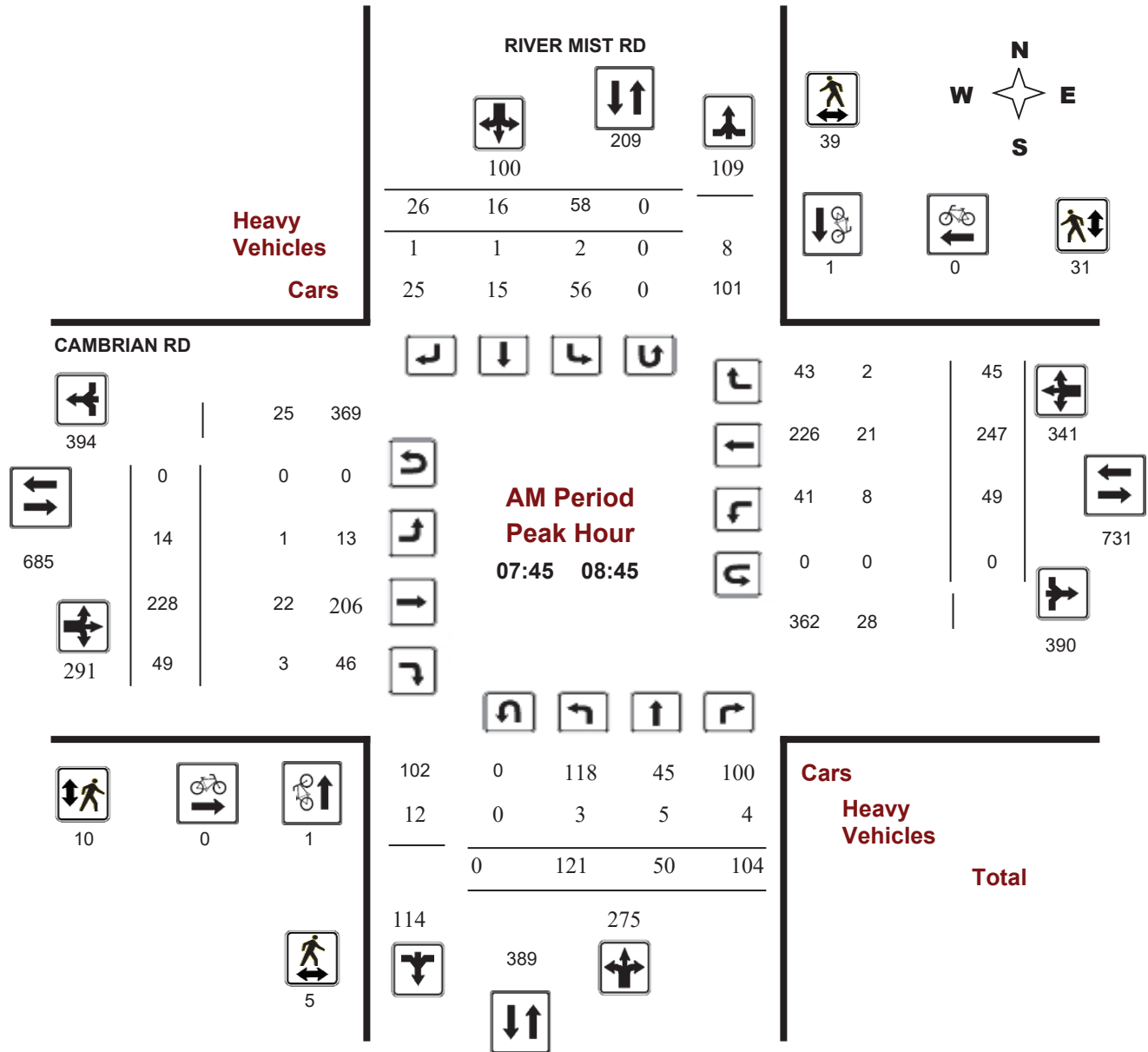
CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

Start Time: 07:00

WO No: 38918

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

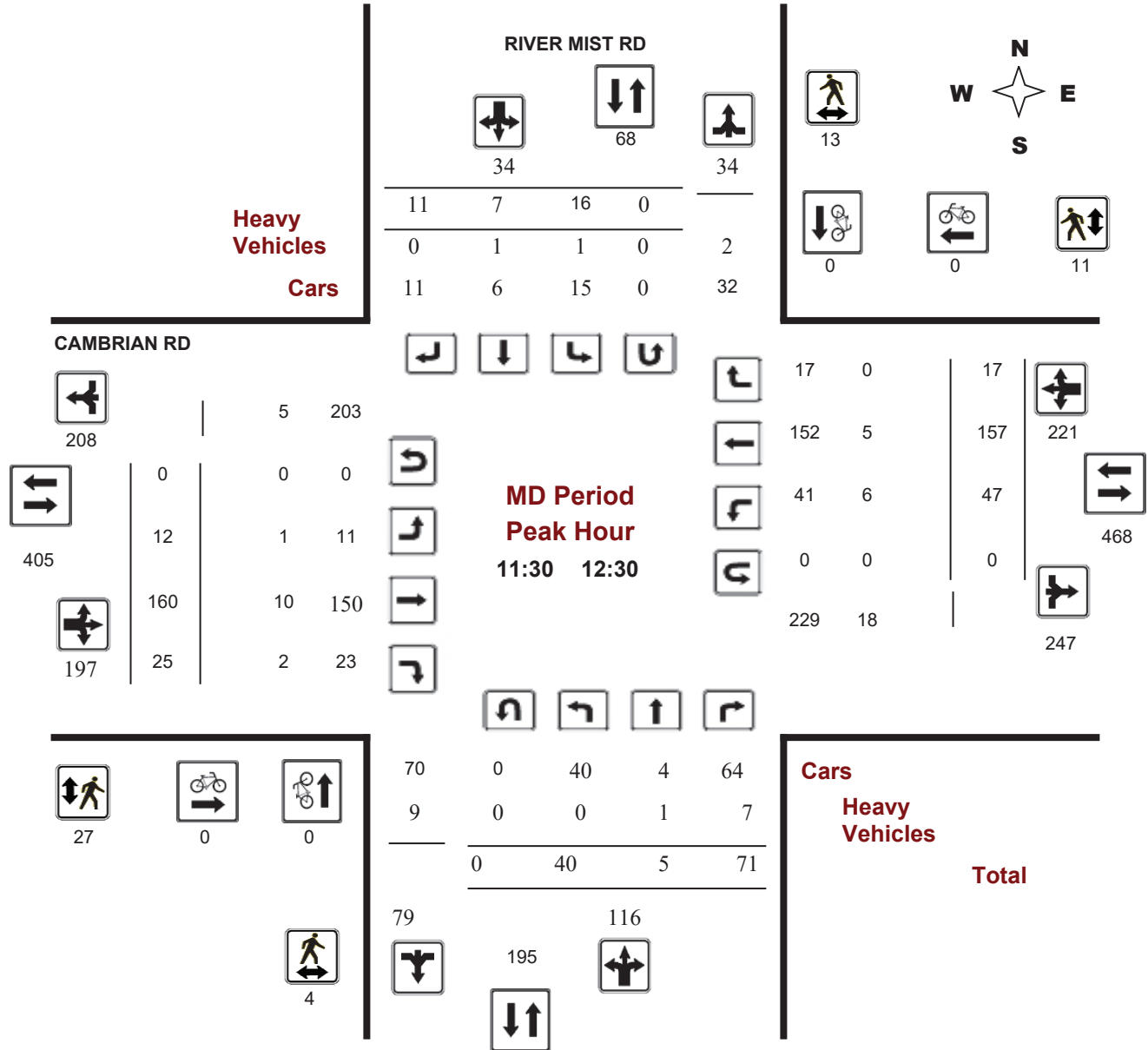
CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

Start Time: 07:00

WO No: 38918

Device: Miovision



Turning Movement Count - Peak Hour Diagram

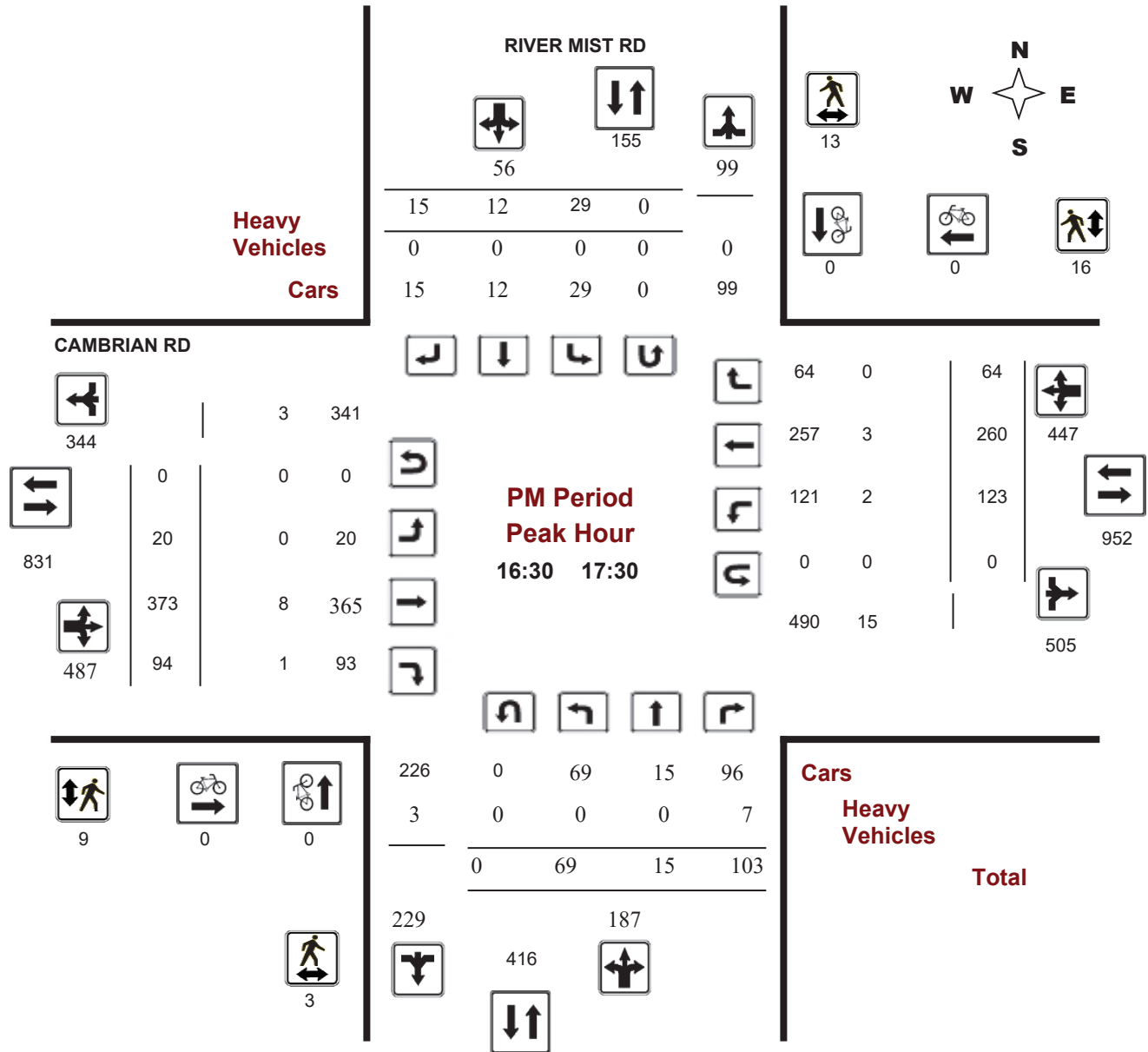
CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

Start Time: 07:00

WO No: 38918

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, October 23, 201

Total Observed U-Turns

AADT Factor

Northbound: 1 Southbound: 0
 Eastbound: 0 Westbound: 0

.90

RIVER MIST RD

CAMBRIAN RD

Period	RIVER MIST RD Northbound					RIVER MIST RD Southbound					CAMBRIAN RD Eastbound					CAMBRIAN RD Westbound					Grand Total
	LT	ST	RT	NB TOT	STR TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	STR TOT	LT	ST	RT	WB TOT	STR TOT	
07:00 08:00	112	19	133	264	337	42	6	25	73	337	12	198	38	248	35	227	35	297	545	882	
08:00 09:00	113	47	100	260	358	54	19	25	98	358	13	226	45	284	56	246	36	338	622	980	
09:00 10:00	82	9	107	198	246	22	10	16	48	246	9	149	28	186	46	173	21	240	426	672	
11:30 12:30	40	5	71	116	150	16	7	11	34	150	12	160	25	197	47	157	17	221	418	568	
12:30 13:30	24	6	55	85	111	11	1	14	26	111	8	150	34	192	41	140	26	207	399	510	
15:00 16:00	57	17	80	154	239	50	15	20	85	239	17	229	65	311	85	167	38	290	601	840	
16:00 17:00	61	13	87	161	223	32	15	15	62	223	20	371	76	467	121	254	54	429	896	1119	
17:00 18:00	69	14	101	184	253	34	15	20	69	253	24	355	102	481	127	248	63	438	919	1172	
Sub Total	558	130	734	1422	1917	261	88	146	495	1917	115	1838	413	2366	558	1612	290	2460	4826	6743	
U Turns				1	0				0	1				0				0	0	1	
Total	558	130	734	1423	1918	261	88	146	495	1918	115	1838	413	2366	558	1612	290	2460	4826	6744	
EQ 12Hr	776	181	1020	1978	2666	363	122	203	688	2666	160	2555	574	3289	776	2241	403	3419	6708	9374	
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																	1.39				
AVG 12Hr	658	153	865	1678	2399	308	104	172	584	2399	136	2167	487	2790	658	1901	342	2900	6037	8437	
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																	0.9				
AVG 24Hr	862	201	1134	2198	2963	403	136	225	765	2963	178	2839	638	3654	862	2490	448	3799	7453	10416	
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																	1.31				

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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

RIVER MIST RD

CAMBRIAN RD

Northbound

Southbound

Eastbound

Westbound

Time Period	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00 07:15	24	4	33	61	10	0	4	14	1	3	50	7	60	9	57	2	68	1	203
07:15 07:30	22	5	37	64	10	2	7	19	3	2	53	9	64	11	46	8	65	3	212
07:30 07:45	28	5	30	63	13	2	7	22	2	4	43	11	58	7	61	12	80	2	223
07:45 08:00	38	5	33	76	9	2	7	18	2	3	52	11	66	8	63	13	84	2	244
08:00 08:15	32	12	28	72	9	1	10	20	5	5	57	12	74	12	65	14	91	5	257
08:15 08:30	33	28	22	83	26	6	6	38	5	4	56	10	70	10	58	15	83	5	274
08:30 08:45	18	5	21	44	14	7	3	24	4	2	63	16	81	19	61	3	83	4	232
08:45 09:00	30	2	29	61	5	5	6	16	1	2	50	7	59	15	62	4	81	1	217
09:00 09:15	32	7	52	91	9	5	4	18	4	1	49	12	62	13	66	5	84	4	255
09:15 09:30	18	0	18	36	9	2	3	14	0	5	38	3	46	13	38	5	56	0	152
09:30 09:45	14	1	26	41	2	1	3	6	1	1	37	3	41	13	34	7	54	1	142
09:45 10:00	18	1	11	30	2	2	6	10	1	2	25	10	37	7	35	4	46	1	123
11:30 11:45	16	0	21	37	2	3	5	10	3	2	38	10	50	13	46	2	61	3	158
11:45 12:00	7	1	8	16	5	1	5	11	1	2	39	4	45	10	41	5	56	1	128
12:00 12:15	9	3	20	32	7	2	1	10	1	2	47	5	54	12	41	4	57	1	153
12:15 12:30	8	1	22	31	2	1	0	3	5	6	36	6	48	12	29	6	47	5	129
12:30 12:45	10	2	16	29	2	0	5	7	1	2	41	6	49	8	38	7	53	1	138
12:45 13:00	7	0	7	14	6	1	4	11	1	1	40	12	53	12	36	2	50	1	128
13:00 13:15	2	3	17	22	2	0	4	6	3	3	33	8	44	10	30	6	46	3	118
13:15 13:30	5	1	15	21	1	0	1	2	2	2	36	8	46	11	36	11	58	2	127
15:00 15:15	10	2	11	23	21	3	4	28	7	4	61	11	76	18	37	10	65	7	192
15:15 15:30	7	5	14	26	12	4	10	26	2	3	52	16	71	25	40	9	74	2	197
15:30 15:45	12	2	23	37	8	7	2	17	4	6	67	18	91	16	45	7	68	4	213
15:45 16:00	28	8	32	68	9	1	4	14	3	4	49	20	73	26	45	12	83	3	238
16:00 16:15	18	3	24	45	11	4	3	18	2	7	91	17	115	30	63	14	107	2	285
16:15 16:30	8	3	18	29	8	5	5	18	5	3	75	21	99	27	63	12	102	5	248
16:30 16:45	16	3	23	42	7	5	5	17	0	5	119	18	142	29	65	14	108	0	309
16:45 17:00	19	4	22	45	6	1	2	9	3	5	86	20	111	35	63	14	112	3	277
17:00 17:15	13	5	40	58	8	4	5	17	2	6	83	31	120	24	67	14	105	2	300
17:15 17:30	21	3	18	42	8	2	3	13	2	4	85	25	114	35	65	22	122	2	291
17:30 17:45	12	3	21	36	10	5	9	24	3	5	105	23	133	36	58	16	110	3	303
17:45 18:00	23	3	22	48	8	4	3	15	2	9	82	23	114	32	58	11	101	2	278
Total:	558	130	734	1423	261	88	146	495	81	115	1838	413	2366	558	1612	290	2460	81	6,744

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

Time Period	RIVER MIST RD			CAMBRIAN RD			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 07:15	0	0	0	0	1	1	1
07:15 07:30	0	0	0	0	0	0	0
07:30 07:45	1	0	1	1	0	1	2
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	0	1	1	0	0	0	1
08:15 08:30	1	0	1	0	0	0	1
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	1	0	1	1
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	1	1	1
09:30 09:45	1	0	1	0	0	0	1
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	0	0	0
12:30 12:45	0	0	0	0	0	0	0
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	2	2	0	0	0	2
15:15 15:30	1	0	1	0	0	0	1
15:30 15:45	0	0	0	0	0	0	0
15:45 16:00	2	0	2	0	0	0	2
16:00 16:15	0	1	1	0	0	0	1
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	0	0	0	0	0	0
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	0	0	0	0	0	0
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	0	0	0	0
Total	6	4	10	2	2	4	14



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

RIVER MIST RD

CAMBRIAN RD

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	1	2	3	1	4	5	8
07:15 07:30	0	3	3	7	1	8	11
07:30 07:45	0	5	5	1	4	5	10
07:45 08:00	0	6	6	0	0	0	6
08:00 08:15	1	19	20	3	11	14	34
08:15 08:30	0	8	8	0	13	13	21
08:30 08:45	4	6	10	7	7	14	24
08:45 09:00	4	8	12	2	8	10	22
09:00 09:15	0	0	0	0	1	1	1
09:15 09:30	0	1	1	0	3	3	4
09:30 09:45	0	1	1	0	2	2	3
09:45 10:00	1	1	2	0	3	3	5
11:30 11:45	2	2	4	23	4	27	31
11:45 12:00	0	2	2	0	0	0	2
12:00 12:15	2	5	7	2	4	6	13
12:15 12:30	0	4	4	2	3	5	9
12:30 12:45	1	1	2	0	1	1	3
12:45 13:00	2	2	4	1	3	4	8
13:00 13:15	0	4	4	4	3	7	11
13:15 13:30	0	1	1	0	0	0	1
15:00 15:15	3	9	12	6	30	36	48
15:15 15:30	0	3	3	8	5	13	16
15:30 15:45	2	8	10	0	8	8	18
15:45 16:00	1	12	13	8	3	11	24
16:00 16:15	3	6	9	3	6	9	18
16:15 16:30	2	7	9	1	4	5	14
16:30 16:45	1	2	3	4	0	4	7
16:45 17:00	1	9	10	4	4	8	18
17:00 17:15	1	2	3	1	6	7	10
17:15 17:30	0	0	0	0	6	6	6
17:30 17:45	1	6	7	3	10	13	20
17:45 18:00	0	2	2	1	7	8	10
Total	33	147	180	92	164	256	436



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

RIVER MIST RD

CAMBRIAN RD

Northbound

Southbound

Eastbound

Westbound

Time Period	Northbound			N TOT	Southbound			S TOT	STR TOT	Eastbound			E TOT	Westbound			W TOT	STR TOT	Grand Total
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT			
07:00 07:15	0	0	1	1	0	0	0	0	1	1	2	1	4	3	4	0	7	11	12
07:15 07:30	0	0	3	3	0	0	0	0	3	0	7	2	9	2	4	1	7	16	19
07:30 07:45	1	0	1	2	0	0	0	0	2	0	3	0	3	1	4	1	6	9	11
07:45 08:00	2	0	0	2	0	0	0	0	2	1	7	2	10	2	5	0	7	17	19
08:00 08:15	0	3	1	4	0	0	1	1	5	0	3	1	4	2	4	1	7	11	16
08:15 08:30	1	2	0	3	2	0	0	2	5	0	5	0	5	1	4	1	6	11	16
08:30 08:45	0	0	3	3	0	1	0	1	4	0	7	0	7	3	8	0	11	18	22
08:45 09:00	1	0	0	1	0	0	0	0	1	1	4	2	7	1	8	0	9	16	17
09:00 09:15	3	0	1	4	0	0	0	0	4	0	0	1	1	1	8	0	9	10	14
09:15 09:30	0	0	0	0	0	0	0	0	0	0	3	0	3	1	1	0	2	5	5
09:30 09:45	0	0	1	1	0	0	0	0	1	0	5	0	5	2	2	1	5	10	11
09:45 10:00	0	0	1	1	0	0	0	0	1	0	4	0	4	2	2	0	4	8	9
11:30 11:45	0	0	2	2	1	0	0	1	3	0	6	1	7	2	1	0	3	10	13
11:45 12:00	0	0	1	1	0	0	0	0	1	0	0	0	0	2	1	0	3	3	4
12:00 12:15	0	0	1	1	0	0	0	0	1	1	3	1	5	1	1	0	2	7	8
12:15 12:30	0	1	3	4	0	1	0	1	5	0	1	0	1	1	2	0	3	4	9
12:30 12:45	0	0	1	1	0	0	0	0	1	0	4	0	4	1	1	1	3	7	8
12:45 13:00	0	0	0	0	0	0	1	1	1	1	4	1	6	1	2	1	4	10	11
13:00 13:15	0	0	2	2	0	0	1	1	3	0	4	1	5	1	0	0	1	6	9
13:15 13:30	1	0	1	2	0	0	0	0	2	1	5	0	6	1	4	0	5	11	13
15:00 15:15	1	0	1	2	5	0	0	5	7	1	4	2	7	1	1	0	2	9	16
15:15 15:30	0	0	1	1	0	0	1	1	2	0	2	1	3	1	2	0	3	6	8
15:30 15:45	1	0	3	4	0	0	0	0	4	0	2	1	3	1	5	0	6	9	13
15:45 16:00	1	0	1	2	0	0	1	1	3	0	7	0	7	1	3	0	4	11	14
16:00 16:15	1	0	1	2	0	0	0	0	2	0	6	0	6	1	3	1	5	11	13
16:15 16:30	2	0	2	4	0	1	0	1	5	0	1	0	1	0	6	0	6	7	12
16:30 16:45	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2	0	3	4	4
16:45 17:00	0	0	3	3	0	0	0	0	3	0	2	1	3	0	0	0	0	3	6
17:00 17:15	0	0	2	2	0	0	0	0	2	0	2	0	2	1	1	0	2	4	6
17:15 17:30	0	0	2	2	0	0	0	0	2	0	3	0	3	0	0	0	0	3	5
17:30 17:45	1	0	2	3	0	0	0	0	3	0	2	0	2	1	1	0	2	4	7
17:45 18:00	0	0	2	2	0	0	0	0	2	0	2	0	2	0	1	0	1	3	5
Total: None	16	6	43	65	8	3	5	16	81	7	111	18	136	39	91	8	138	274	355



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ RIVER MIST RD

Survey Date: Wednesday, October 23, 2019

WO No: 38918

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

RIVER MIST RD

CAMBRIAN RD

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

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

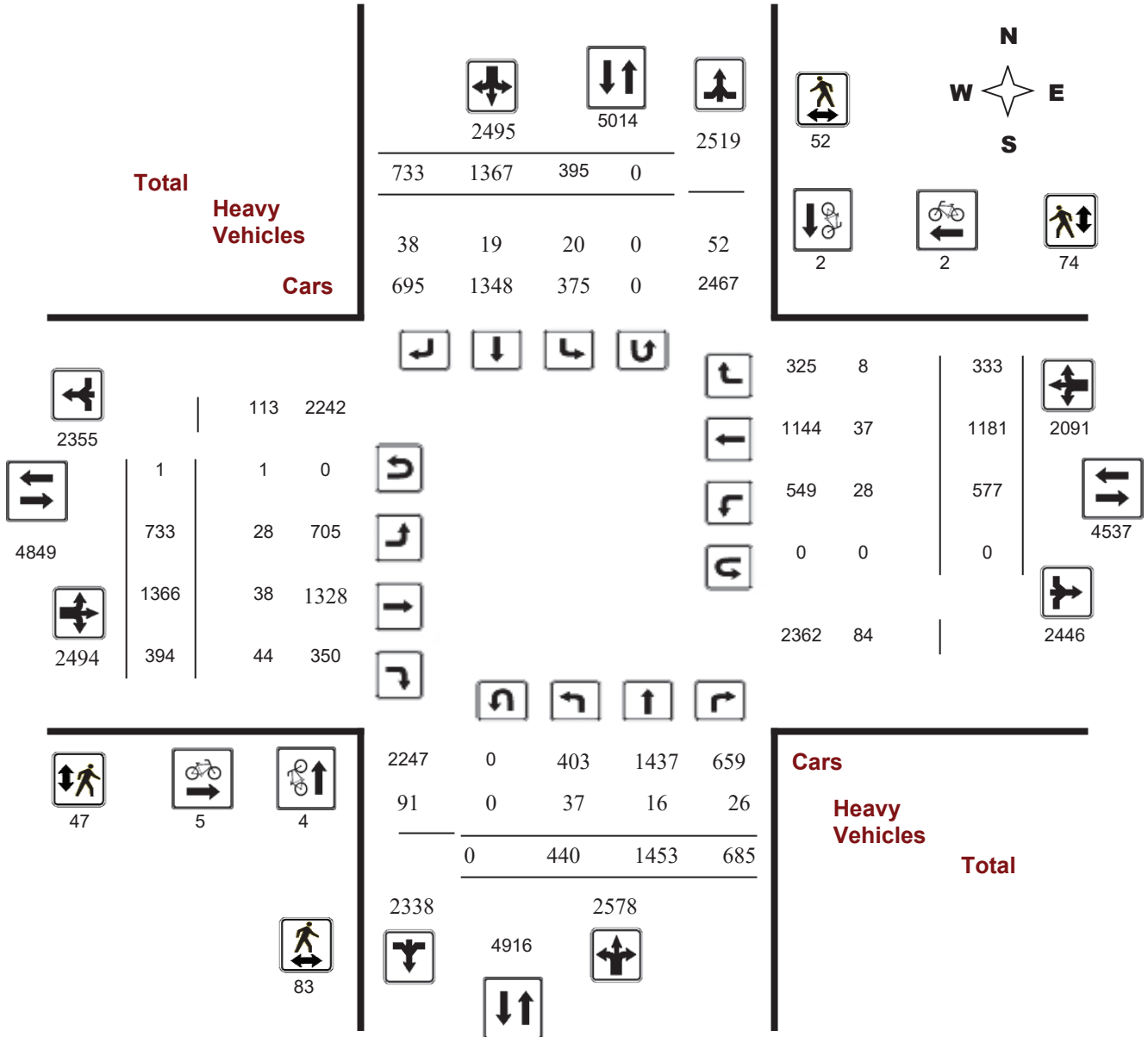
Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Diagram



Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

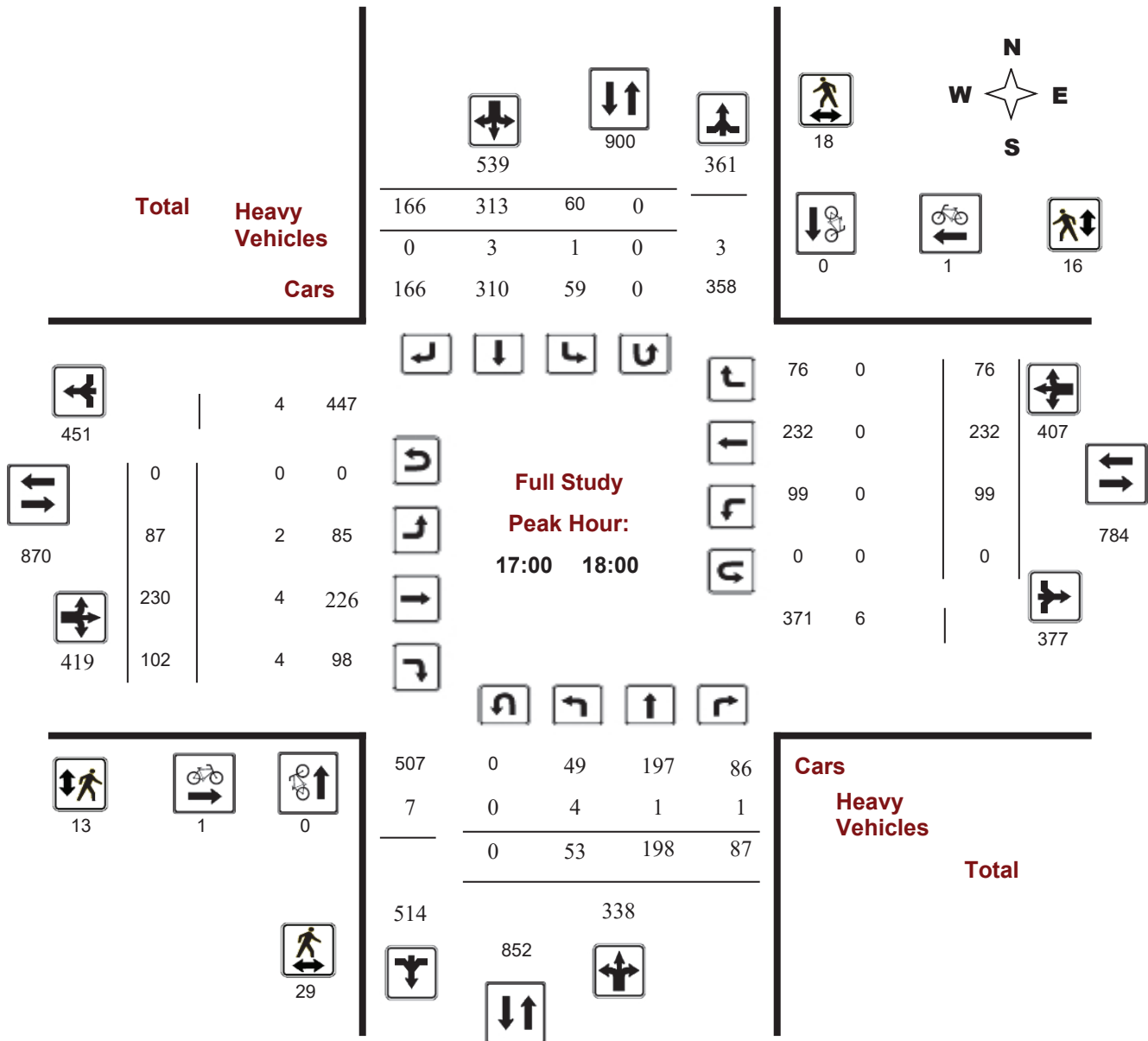
Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Peak Hour Diagram





Transportation Services - Traffic Services

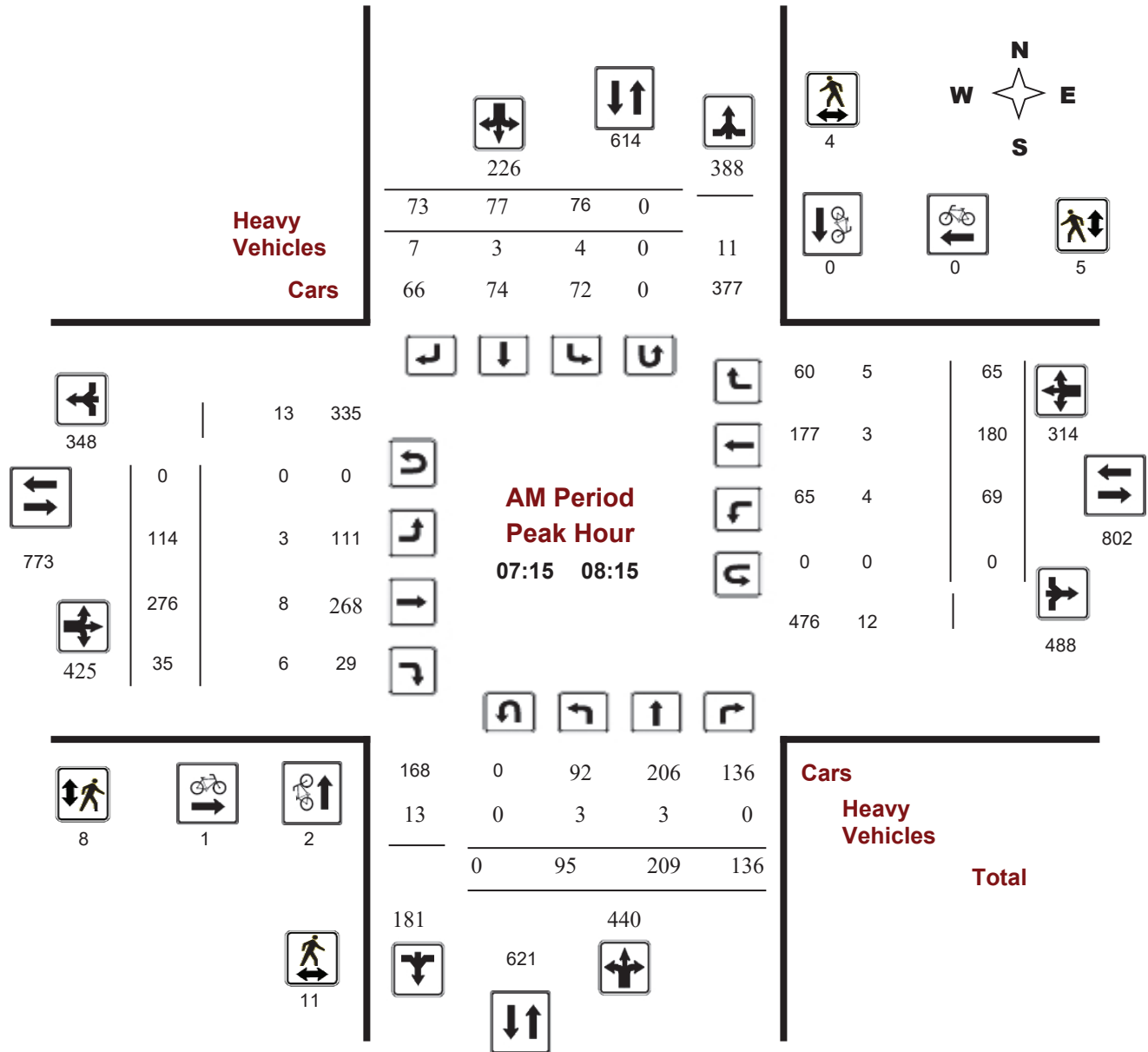
Turning Movement Count - Peak Hour Diagram CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

Start Time: 07:00

WO No: 37240

Device: Miovision



Comments

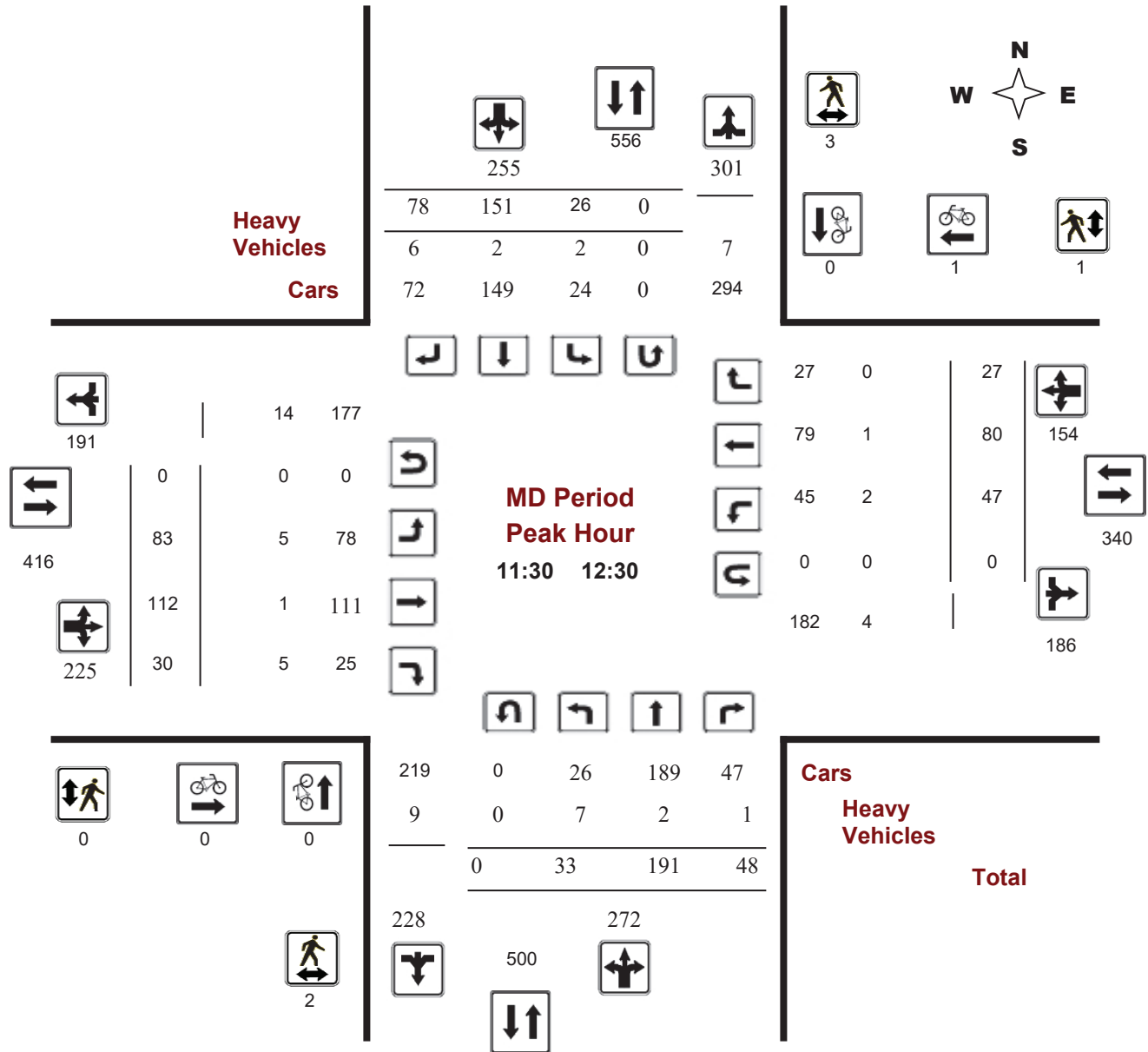
Turning Movement Count - Peak Hour Diagram CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

Start Time: 07:00

WO No: 37240

Device: Miovision



Turning Movement Count - Peak Hour Diagram

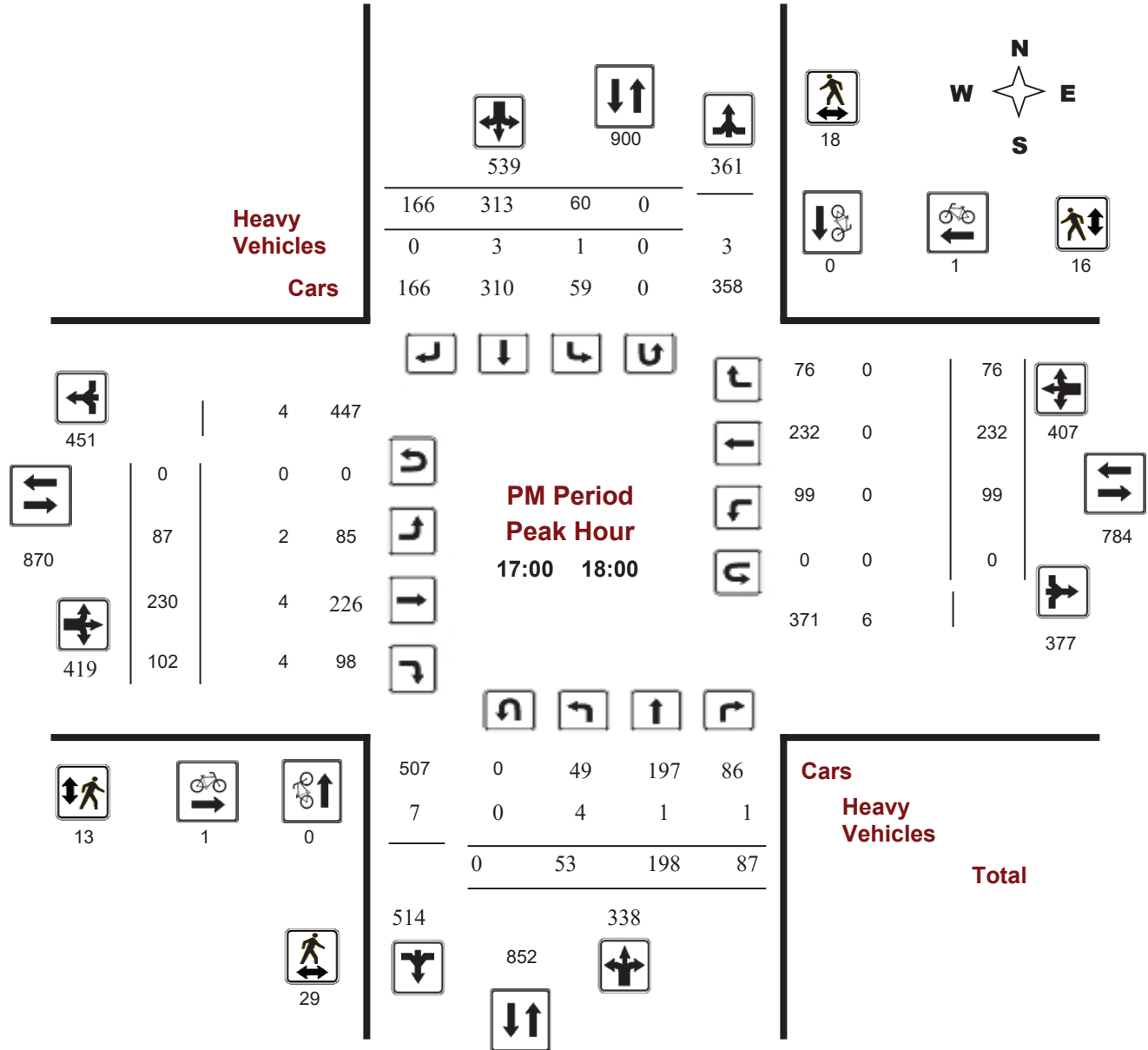
CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

Start Time: 07:00

WO No: 37240

Device: Miovision



Comments



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, September 13, 2017

Total Observed U-Turns
 Northbound: 0 Southbound: 0
 Eastbound: 1 Westbound: 0

AADT Factor
 1.00

Period	Northbound				Southbound				Eastbound				Westbound				STR TOT	Grand Total	
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT			
07:00 08:00	80	242	147	469	69	81	68	218	687	136	254	32	422	65	144	60	269	691	1378
08:00 09:00	89	198	117	404	73	101	78	252	656	86	232	46	364	66	190	37	293	657	1313
09:00 10:00	70	174	64	308	33	95	57	185	493	104	110	20	234	56	81	34	171	405	898
11:30 12:30	33	191	48	272	26	151	78	255	527	83	112	30	225	47	80	27	154	379	906
12:30 13:30	25	123	52	200	36	145	63	244	444	58	102	29	189	55	103	13	171	360	804
15:00 16:00	52	148	84	284	47	223	89	359	643	73	146	71	290	83	145	38	266	556	1199
16:00 17:00	38	179	86	303	51	258	134	443	746	106	180	64	350	106	206	48	360	710	1456
17:00 18:00	53	198	87	338	60	313	166	539	877	87	230	102	419	99	232	76	407	826	1703
Sub Total	440	1453	685	2578	395	1367	733	2495	5073	733	1366	394	2493	577	1181	333	2091	4584	9657
U Turns				0				0	0				1				0	1	1
Total	440	1453	685	2578	395	1367	733	2495	5073	733	1366	394	2494	577	1181	333	2091	4585	9658
EQ 12Hr	612	2020	952	3583	549	1900	1019	3468	7051	1019	1899	548	3467	802	1642	463	2906	6373	13425
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																1.39			
AVG 12Hr	576	1903	897	3377	517	1791	960	3268	7051	960	1789	516	3267	756	1547	436	2739	6373	13425
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																1			
AVG 24Hr	755	2493	1176	4424	678	2346	1258	4282	8706	1258	2344	676	4280	990	2027	571	3588	7868	16574
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																1.31			

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



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study 15 Minute Increments

Time Period	Northbound				Southbound				Eastbound				Westbound				Grand Total			
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT		W TOT	STR TOT	
07:00	07:15	11	75	41	127	11	30	13	54	2	35	49	8	92	18	16	8	42	2	315
07:15	07:30	24	71	38	133	26	12	12	50	6	43	64	6	113	17	33	9	59	6	355
07:30	07:45	25	49	35	109	19	17	20	56	8	30	70	11	111	17	41	24	82	8	358
07:45	08:00	20	47	33	100	13	22	23	58	5	28	71	7	106	13	54	19	86	5	350
08:00	08:15	26	42	30	98	18	26	18	62	1	13	71	11	95	22	52	13	87	1	342
08:15	08:30	30	53	30	113	19	23	18	60	10	28	62	9	99	18	52	8	78	10	350
08:30	08:45	17	45	31	93	18	21	24	63	11	21	55	13	89	11	42	9	62	11	307
08:45	09:00	16	58	26	100	18	31	18	67	10	24	44	13	82	15	44	7	66	10	315
09:00	09:15	22	41	15	78	7	29	14	50	2	43	30	3	76	12	21	14	47	2	251
09:15	09:30	22	38	14	74	8	24	18	50	2	32	28	5	65	15	18	12	45	2	234
09:30	09:45	17	55	18	90	9	20	5	34	4	13	29	5	47	15	17	3	35	4	206
09:45	10:00	9	40	17	66	9	22	20	51	2	16	23	7	46	14	25	5	44	2	207
11:30	11:45	12	36	20	68	5	45	18	68	3	16	23	8	47	12	18	8	38	3	221
11:45	12:00	7	49	13	69	3	31	16	50	4	25	26	8	59	17	19	6	42	4	220
12:00	12:15	9	55	7	71	11	42	21	74	5	25	32	9	66	6	16	6	28	5	239
12:15	12:30	5	51	8	64	7	33	23	63	8	17	31	5	53	12	27	7	46	8	226
12:30	12:45	10	30	12	52	14	37	21	72	4	21	22	5	48	18	23	4	45	4	217
12:45	13:00	3	32	10	45	13	42	18	73	9	12	23	9	44	11	28	2	41	9	203
13:00	13:15	6	35	13	54	6	33	13	52	5	10	26	8	44	17	29	2	48	5	198
13:15	13:30	6	26	17	49	3	33	11	47	5	15	31	7	53	9	23	5	37	5	186
15:00	15:15	9	27	22	58	8	41	16	65	5	18	35	19	72	24	32	8	64	5	259
15:15	15:30	11	39	25	75	13	47	25	85	10	14	37	19	70	21	39	8	68	10	298
15:30	15:45	17	36	16	69	15	77	24	116	5	17	35	16	68	14	41	12	67	5	320
15:45	16:00	15	46	21	82	11	58	24	93	6	24	39	17	80	24	33	10	67	6	322
16:00	16:15	12	37	22	71	11	59	32	102	6	28	42	12	82	32	47	11	90	6	345
16:15	16:30	7	41	18	66	13	71	29	113	4	22	47	16	85	28	60	18	106	4	370
16:30	16:45	10	52	20	82	17	57	27	101	1	30	37	24	91	16	54	6	76	1	350
16:45	17:00	9	49	26	84	10	71	46	127	3	26	54	12	92	30	45	13	88	3	391
17:00	17:15	13	40	20	73	14	72	38	124	5	23	63	26	112	31	64	19	114	5	423
17:15	17:30	14	56	24	94	14	73	45	132	1	19	62	27	108	29	58	16	103	1	437
17:30	17:45	11	46	24	81	15	97	38	150	2	24	48	23	95	17	62	21	100	2	426
17:45	18:00	15	56	19	90	17	71	45	133	2	21	57	26	104	22	48	20	90	2	417
Total:		440	1453	685	2578	395	1367	733	2495	156	733	1366	394	2494	577	1181	333	2091	156	9,658

Note: U-Turns are included in Totals.



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Cyclist Volume

Time Period	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	1	0	1	0	0	0	1
07:30 07:45	1	0	1	0	0	0	1
07:45 08:00	0	0	0	0	0	0	0
08:00 08:15	0	0	0	1	0	1	1
08:15 08:30	0	0	0	0	0	0	0
08:30 08:45	0	0	0	0	0	0	0
08:45 09:00	0	0	0	0	0	0	0
09:00 09:15	0	0	0	0	0	0	0
09:15 09:30	0	0	0	0	0	0	0
09:30 09:45	0	0	0	0	0	0	0
09:45 10:00	0	0	0	0	0	0	0
11:30 11:45	0	0	0	0	0	0	0
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	0	0	0	0	0	0
12:15 12:30	0	0	0	0	1	1	1
12:30 12:45	0	0	0	2	0	2	2
12:45 13:00	0	0	0	0	0	0	0
13:00 13:15	0	0	0	0	0	0	0
13:15 13:30	0	0	0	0	0	0	0
15:00 15:15	0	0	0	0	0	0	0
15:15 15:30	0	0	0	0	0	0	0
15:30 15:45	0	0	0	1	0	1	1
15:45 16:00	2	0	2	0	0	0	2
16:00 16:15	0	0	0	0	0	0	0
16:15 16:30	0	0	0	0	0	0	0
16:30 16:45	0	0	0	0	0	0	0
16:45 17:00	0	2	2	0	0	0	2
17:00 17:15	0	0	0	0	0	0	0
17:15 17:30	0	0	0	0	1	1	1
17:30 17:45	0	0	0	0	0	0	0
17:45 18:00	0	0	0	1	0	1	1
Total	4	2	6	5	2	7	13



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Pedestrian Volume

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	0	0	0	0	0
07:15 07:30	7	0	7	1	0	1	8
07:30 07:45	3	1	4	1	2	3	7
07:45 08:00	1	3	4	1	3	4	8
08:00 08:15	0	0	0	5	0	5	5
08:15 08:30	2	1	3	2	0	2	5
08:30 08:45	1	0	1	3	0	3	4
08:45 09:00	9	2	11	4	5	9	20
09:00 09:15	4	0	4	1	12	13	17
09:15 09:30	0	1	1	0	6	6	7
09:30 09:45	1	1	2	2	1	3	5
09:45 10:00	0	0	0	2	1	3	3
11:30 11:45	2	1	3	0	1	1	4
11:45 12:00	0	0	0	0	0	0	0
12:00 12:15	0	1	1	0	0	0	1
12:15 12:30	0	1	1	0	0	0	1
12:30 12:45	1	0	1	0	2	2	3
12:45 13:00	1	1	2	0	0	0	2
13:00 13:15	0	1	1	0	1	1	2
13:15 13:30	1	0	1	0	0	0	1
15:00 15:15	0	0	0	0	3	3	3
15:15 15:30	0	4	4	4	3	7	11
15:30 15:45	0	5	5	4	6	10	15
15:45 16:00	7	0	7	4	1	5	12
16:00 16:15	3	2	5	0	1	1	6
16:15 16:30	2	4	6	0	2	2	8
16:30 16:45	5	3	8	0	8	8	16
16:45 17:00	4	2	6	0	0	0	6
17:00 17:15	16	11	27	4	7	11	38
17:15 17:30	1	2	3	3	5	8	11
17:30 17:45	2	1	3	0	4	4	7
17:45 18:00	10	4	14	6	0	6	20
Total	83	52	135	47	74	121	256



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study Heavy Vehicles

Time Period	Northbound				Southbound				Eastbound				Westbound				Grand Total		
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT		W TOT	STR TOT
07:00 07:15	0	0	0	0	1	0	1	2	2	0	3	5	8	1	0	0	1	9	11
07:15 07:30	2	2	0	4	0	1	1	2	6	3	1	1	5	2	0	1	3	8	14
07:30 07:45	0	1	0	1	3	2	2	7	8	0	2	1	3	0	1	1	2	5	13
07:45 08:00	1	0	0	1	1	0	3	4	5	0	2	2	4	2	0	1	3	7	12
08:00 08:15	0	0	0	0	0	0	1	1	1	0	3	2	5	0	2	2	4	9	10
08:15 08:30	4	0	2	6	1	1	2	4	10	1	2	1	4	3	3	0	6	10	20
08:30 08:45	0	1	2	3	2	1	5	8	11	2	2	1	5	1	1	0	2	7	18
08:45 09:00	2	0	4	6	1	2	1	4	10	2	4	1	8	3	3	0	6	14	24
09:00 09:15	1	0	1	2	0	0	0	0	2	4	0	0	4	1	1	2	4	8	10
09:15 09:30	1	0	0	1	0	0	1	1	2	0	0	1	1	2	1	0	3	4	6
09:30 09:45	0	0	1	1	2	1	0	3	4	1	0	0	1	0	0	0	0	1	5
09:45 10:00	1	1	0	2	0	0	0	0	2	1	1	2	4	2	1	0	3	7	9
11:30 11:45	1	1	0	2	0	1	0	1	3	1	0	1	2	0	0	0	0	2	5
11:45 12:00	2	0	0	2	0	0	2	2	4	0	0	2	2	1	0	0	1	3	7
12:00 12:15	3	0	0	3	0	0	2	2	5	3	0	1	4	1	0	0	1	5	10
12:15 12:30	1	1	1	3	2	1	2	5	8	1	1	1	3	0	1	0	1	4	12
12:30 12:45	1	0	0	1	0	1	2	3	4	1	0	1	2	1	1	0	2	4	8
12:45 13:00	1	2	1	4	1	0	4	5	9	0	1	2	3	0	4	0	4	7	16
13:00 13:15	1	1	1	3	0	0	2	2	5	1	1	2	4	1	2	0	3	7	12
13:15 13:30	1	1	2	4	0	1	0	1	5	2	1	1	4	2	1	0	3	7	12
15:00 15:15	2	0	2	4	0	0	1	1	5	0	2	3	5	0	2	0	2	7	12
15:15 15:30	4	1	3	8	1	1	0	2	10	0	3	1	4	1	1	0	2	6	16
15:30 15:45	0	3	0	3	1	0	1	2	5	0	0	0	0	1	2	0	3	3	8
15:45 16:00	1	0	1	2	2	1	1	4	6	1	0	4	5	1	3	0	4	9	15
16:00 16:15	1	0	1	2	1	0	3	4	6	1	2	1	4	0	1	1	2	6	12
16:15 16:30	1	0	1	2	0	1	1	2	4	1	2	0	3	0	4	0	4	7	11
16:30 16:45	0	0	1	1	0	0	0	0	1	0	1	2	3	1	1	0	2	5	6
16:45 17:00	1	0	1	2	0	1	0	1	3	0	0	1	1	1	1	0	2	3	6
17:00 17:15	1	1	1	3	1	1	0	2	5	1	2	1	4	0	0	0	0	4	9
17:15 17:30	1	0	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	1	2
17:30 17:45	1	0	0	1	0	1	0	1	2	1	1	1	3	0	0	0	0	3	5
17:45 18:00	1	0	0	1	0	1	0	1	2	0	1	1	2	0	0	0	0	2	4
Total: None	37	16	26	79	20	19	38	77	156	28	38	44	111	28	37	8	73	184	340



Transportation Services - Traffic Services

Turning Movement Count - Study Results

CAMBRIAN RD @ GREENBANK RD

Survey Date: Wednesday, September 13, 2017

WO No: 37240

Start Time: 07:00

Device: Miovision

Full Study 15 Minute U-Turn Total

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

Survey Date: Tuesday February 15 2018
 Weather: Cloudy

TURNING MOVEMENT COUNT SUMMARY - ALL MODES



AM Peak Hour: 7:30 AM to 8:30 AM
 MD Peak Hour: 11:30 AM to 12:30 PM
 PM Peak Hour: 4:45 PM to 5:45 PM

AADT FACTOR: 1.0

Turning Movement Count - Full Study Summary Report (Vehicles)																							
Time Period	Borrisokane Road Northbound					Borrisokane Road Southbound					N/S STREET TOTAL	0 Eastbound					Cambrian Road Westbound					E/W STREET TOTAL	Grand TOTAL
	LT	ST	RT	U-Turns	NB TOTAL	LT	ST	RT	U-Turns	SB TOTAL		LT	ST	RT	U-Turns	EB TOTAL	LT	ST	RT	U-Turns	WB TOTAL		
	7:00 8:00	0	28	10	0	38	72	15	0	0		87	125	0	0	0	0	0	8	0	350		
8:00 9:00	0	48	13	0	61	123	22	0	0	145	206	0	0	0	0	0	5	0	346	0	351	351	557
9:00 10:00	0	24	1	0	25	60	22	0	0	82	107	0	0	0	0	0	1	0	209	0	210	210	317
AVG AM Pk HR	0	33	8	0	41	85	20	0	0	105	146	0	0	0	0	0	5	0	302	0	306	306	452
11:30 12:30	0	54	9	0	63	105	26	0	0	131	194	0	0	0	0	0	4	0	139	0	143	143	337
12:30 13:30	0	48	6	0	54	87	23	0	0	110	164	0	0	0	0	0	2	0	117	0	119	119	283
AVG MD Pk HR	0	51	8	0	59	96	25	0	0	121	179	0	0	0	0	0	3	0	128	0	131	131	310
15:00 16:00	0	40	1	0	41	58	51	0	0	109	150	0	0	0	0	0	13	0	159	0	172	172	322
16:00 17:00	0	25	0	0	25	344	43	0	0	387	412	0	0	0	0	0	11	0	162	0	173	173	585
17:00 18:00	0	22	0	0	22	352	36	0	0	388	410	0	0	0	0	0	14	0	198	0	212	212	622
AVG PM Pk HR	0	29	0	0	29	251	43	0	0	295	324	0	0	0	0	0	13	0	173	0	186	186	510
TOTAL	0	373	56	0	429	1,382	282	0	0	1,664	2,093	0	0	0	0	0	66	0	2,110	0	2,175	2,175	4,268
EQ 12Hr	0	519	77	0	596	1921	392	0	0	2313	2909	0	0	0	0	0	91	0	2932	0	3024	3024	5933
Note: These volumes are calculated by multiplying the totals by the appropriate expansion factor.											1.39												
AVG 12Hr	0	519	77	0	596	1921	392	0	0	2313	2909	0	0	0	0	0	91	0	2932	0	3024	3024	5933
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.											1.0												
AVG 24Hr	0	680	101	0	781	2516	514	0	0	3030	3811	0	0	0	0	0	120	0	3841	0	3961	3961	7772
Note: These volumes are calculated by multiplying the Average Daily 12hr. totals by the 12 to 24 expansion factor.											1.31												

Turning Movement Count - Full Study Summary Report (Pedestrians)															
Time Period	Borrisokane Road				N/S STREET TOTAL	0				E/W STREET TOTAL	Grand TOTAL				
	NB Approach (East or West Crossing)					SB Approach (East or West Crossing)						EB Approach (North or South Crossing)			
7:00 8:00	0				0	0				0	0				
8:00 9:00	0				0	0				0	0				
9:00 10:00	0				0	0				1	1				
11:30 12:30	0				0	0				0	0				
12:30 13:30	0				0	0				0	0				
15:00 16:00	0				0	0				0	0				
16:00 17:00	0				228	0				0	228				
17:00 18:00	0				0	0				0	0				
TOTAL:	0				228	228				0	1				

Turning Movement Count - Full Study Summary Report (Cyclists)

Time Period	Borrisokane Road				N/S STREET TOTAL	0				Cambrian Road				E/W STREET TOTAL	Grand TOTAL
	Northbound		Southbound			Eastbound		Westbound							
7:00 8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:00 10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:30 12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:30 13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
15:00 16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:00 17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
17:00 18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Turning Movement Count - Full Study Summary Report (Heavy Vehicles)

Time Period	Borrisokane Road					N/S STREET TOTAL	0					Cambrian Road					E/W STREET TOTAL	Grand TOTAL					
	Northbound		Southbound				Eastbound		Westbound														
	LT	ST	RT	U-Turns	NB TOTAL	LT	ST	RT	U-Turns	SB TOTAL	LT	ST	RT	U-Turns	EB TOTAL	LT	ST	RT	U-Turns	WB TOTAL			
7:00 8:00	0	9	0	0	9	16	8	0	0	24	33	0	0	0	0	0	0	0	5	0	5	5	38
8:00 9:00	0	10	2	0	12	4	10	0	0	14	26	0	0	0	0	0	2	0	16	0	18	18	44
9:00 10:00	0	12	0	0	12	7	13	0	0	20	32	0	0	0	0	0	0	0	10	0	10	10	42
11:30 12:30	0	11	1	0	12	2	11	0	0	13	25	0	0	0	0	0	1	0	5	0	6	6	31
12:30 13:30	0	10	3	0	13	2	11	0	0	13	26	0	0	0	0	0	0	0	5	0	5	5	31
15:00 16:00	0	2	0	0	2	10	2	0	0	12	14	0	0	0	0	0	1	0	11	0	12	12	26
16:00 17:00	0	1	5	0	6	6	2	0	0	8	14	0	0	0	0	0	4	0	17	0	21	21	35
17:00 18:00	0	2	1	0	3	1	1	0	0	2	5	0	0	0	0	0	2	0	5	0	7	7	12
TOTAL:	0	57	12	0	69	48	58	0	0	106	175	0	0	0	0	0	10	0	74	0	84	84	259

Appendix C

Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2015-06-04	2015	15:22	CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2016-04-04	2016	19:59	CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-05-05	2018	9:15	CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD (3ZA1T5)	06 - Strong wind	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2017-05-23	2017	14:40	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	99 - Other	01 - Dry
2017-10-07	2017	10:28	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2017-09-23	2017	21:27	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2017-12-06	2017	8:10	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2017-02-10	2017	22:39	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	04 - Freezing Rain	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2017-02-06	2017	20:11	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR	03 - Snow	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2018-03-07	2018	8:37	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2018-05-15	2018	8:26	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2018-08-02	2018	16:36	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-08-15	2018	11:11	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-08-24	2018	17:17	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2018-09-15	2018	17:30	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-10-08	2018	13:45	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	02 - Rain	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	02 - Wet
2018-12-01	2018	22:45	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	07 - Dark	10 - No control	03 - P.D. only	07 - SMV other	01 - Dry
2018-12-27	2018	12:27	BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (3ZA1CC)	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	07 - Rear end	06 - Ice
2014-03-22	2014	11:54	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	03 - Snow	01 - Daylight	10 - No control	03 - P.D. only	07 - SMV other	03 - Loose snow
2015-04-03	2015	20:09	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-01-09	2015	7:21	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	03 - Dawn	10 - No control	03 - P.D. only	07 - SMV other	06 - Ice
2015-01-09	2015	7:14	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	03 - Snow	03 - Dawn	10 - No control	03 - P.D. only	07 - SMV other	05 - Packed snow
2016-09-28	2016	13:17	CEDARVIEW RD btwn CAMBRIAN RD & STRANDHERD DR	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	07 - SMV other	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-03-15	2014	16:05	CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	01 - Approaching	01 - Dry
2015-10-09	2015	0:00	CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST	01 - Clear	00 - Unknown	10 - No control	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry
2016-01-30	2016	4:40	CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST	03 - Snow	07 - Dark	10 - No control	02 - Non-fatal injury	07 - SMV other	03 - Loose snow

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2016-10-03	2016	17:18	CAMBRIAN RD btwn GRAND CANAL ST & SEELEY'S BAY ST	01 - Clear	01 - Daylight	10 - No control	02 - Non-fatal injury	06 - SMV unattended vehicle	01 - Dry

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2016-11-23	2016	0:00	SEELEY'S BAY ST btwn BURRITTS RAPIDS PL & WATERCOLOURS WAY	01 - Clear	00 - Unknown	10 - No control	03 - P.D. only	06 - SMV unattended vehicle	06 - Ice

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2016-12-13	2016	15:00	CAMBRIAN RD btwn REGATTA AVE & GREENBANK RD	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	05 - Turning movement	02 - Wet

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-08-08	2014	15:30	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	07 - SMV other	01 - Dry
2015-07-10	2015	8:58	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2015-01-25	2015	16:43	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	05 - Dusk	02 - Stop sign	03 - P.D. only	07 - SMV other	06 - Ice
2016-06-23	2016	17:10	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	03 - Rear end	01 - Dry
2016-07-29	2016	3:27	CAMBRIAN RD @ CEDARVIEW RD	07 - Fog, mist, smoke, dust	07 - Dark	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2016-07-22	2016	20:56	CAMBRIAN RD @ CEDARVIEW RD	02 - Rain	05 - Dusk	02 - Stop sign	03 - P.D. only	07 - SMV other	02 - Wet
2016-12-11	2016	9:30	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	07 - SMV other	06 - Ice
2017-08-29	2017	13:57	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	03 - Rear end	01 - Dry
2017-12-17	2017	8:33	CAMBRIAN RD @ CEDARVIEW RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	07 - SMV other	01 - Dry
2018-06-26	2018	11:51	CAMBRIAN RD @ CEDARVIEW RD (0001571)	01 - Clear	01 - Daylight	02 - Stop sign	02 - Non-fatal injury	07 - SMV other	08 - Loose sand or gravel

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-06-07	2014	7:48	CAMBRIAN RD @ RIVER MIST RD	01 - Clear	01 - Daylight		03 - P.D. only	05 - Turning movement	01 - Dry
2015-09-04	2015	7:15	CAMBRIAN RD @ RIVER MIST RD	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	02 - Angle	01 - Dry
2017-01-05	2017	7:34	CAMBRIAN RD @ RIVER MIST RD	01 - Clear	03 - Dawn	02 - Stop sign	03 - P.D. only	02 - Angle	06 - Ice
2018-05-12	2018	14:50	CAMBRIAN RD @ RIVER MIST RD (0014647)	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	04 - Sideswipe	01 - Dry
2018-12-25	2018	15:26	CAMBRIAN RD @ RIVER MIST RD (0014647)	01 - Clear	01 - Daylight	02 - Stop sign	03 - P.D. only	02 - Angle	01 - Dry

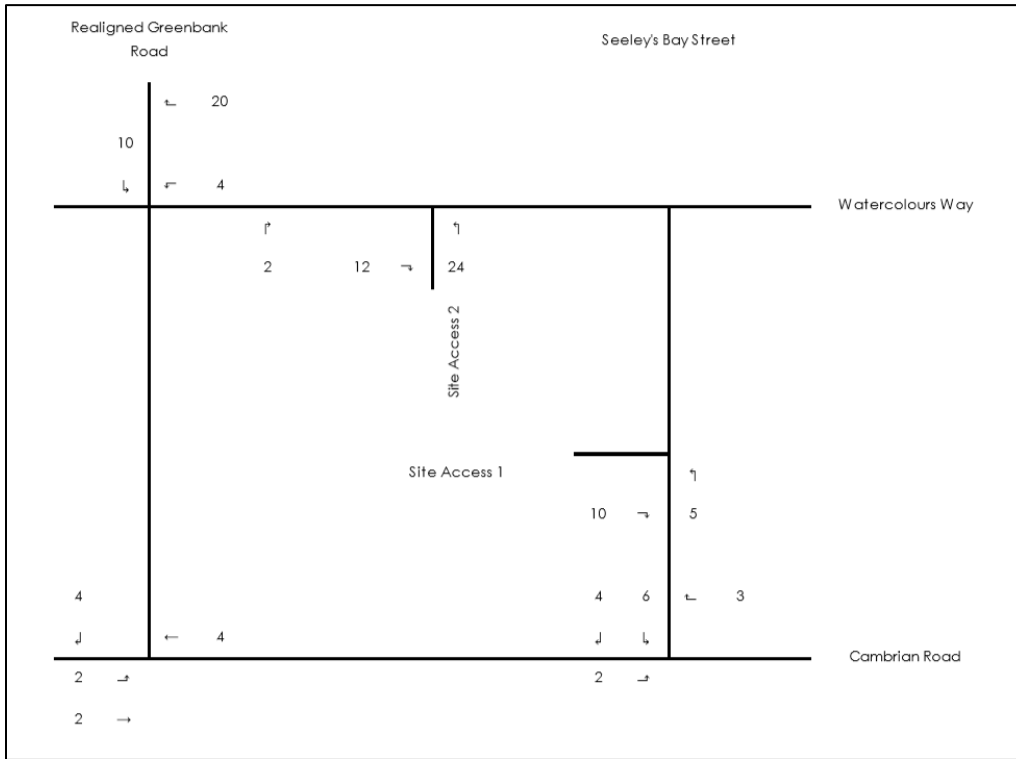
Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Classification Of Accident	Initial Impact Type	Road Surface Condition
2014-11-19	2014	9:53	RIVER MIST RD btwn BRAMBLING WAY & RIVER ROCK AVE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	03 - Rear end	06 - Ice
2015-06-24	2015	11:06	RIVER MIST RD btwn BRAMBLING WAY & RIVER ROCK AVE	01 - Clear	01 - Daylight	10 - No control	03 - P.D. only	06 - SMV unattended vehicle	01 - Dry

LOCATION & GEOID	TOTAL_COLLISIONS	TOTAL_CYCLIST_COLLISIONS	TOTAL_PEDESTRIAN_COLLISIONS
BORRISOKANE RD btwn CAMBRIAN RD & STRANDHERD DR (_3ZA1CC)	20	0	0
CEDARVIEW RD btwn CAMBRIAN RD & BARNSDALE RD (_3ZA1T5)	3	0	0
CAMBRIAN RD btwn BORRISOKANE RD & GRAND CANAL ST (_7N36UU)	3	0	0
CAMBRIAN RD btwn GRAND CANAL ST & SEELEY'S BAY ST (_8IAYUK)	1	0	0
CAMBRIAN RD btwn REGATTA AVE & GREENBANK RD (_3ZA1YL)	1	0	0
CAMBRIAN RD @ CEDARVIEW RD (0001571)	10	0	0
CAMBRIAN RD @ RIVER MIST RD (0014647)	5	0	0
CAMBRIAN RD @ GRAND CANAL ST (0014646)	3	0	0
CAMBRIAN RD @ REGATTA AVE (0013606)	2	0	0
CAMBRIAN RD @ GREENBANK RD (0001095)	11	1	0
GREENBANK RD btwn JOCKVALE RD & CAMBRIAN RD (_3ZA2WE)	37	1	0
GREENBANK RD btwn CAMBRIAN RD & DUNDONALD DR (_5DCY38)	5	1	0

Appendix D

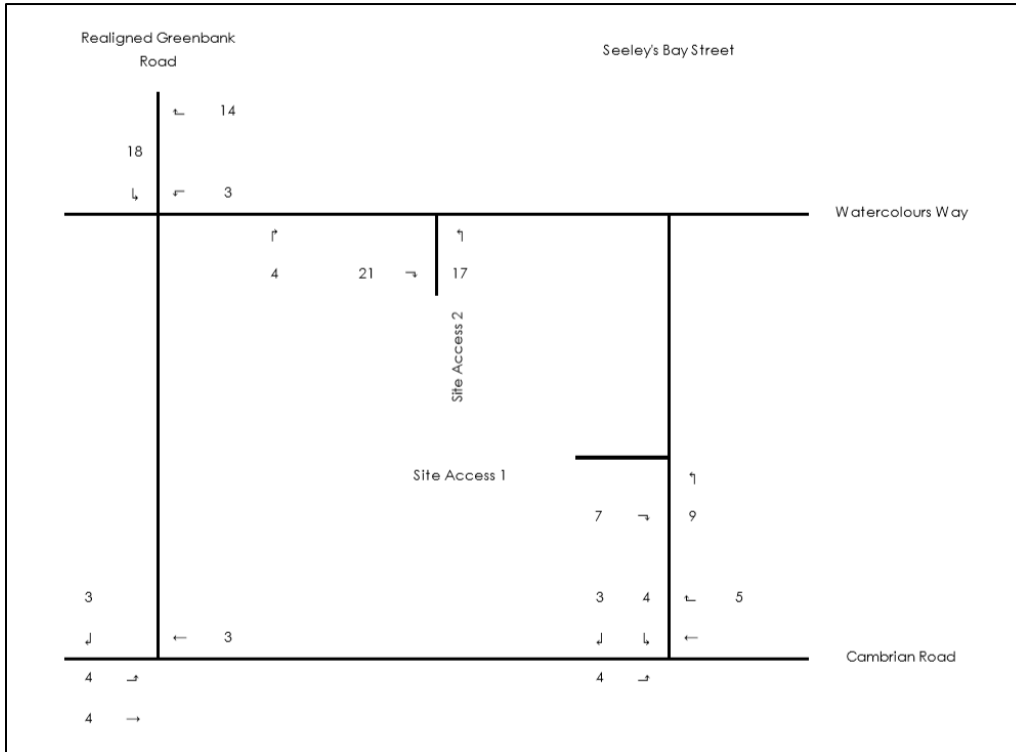
Study Area Developments

2444 Watercolours Way Site Generated Traffic Volumes, Realigned Greenbank Road Scenario, AM Peak Hour



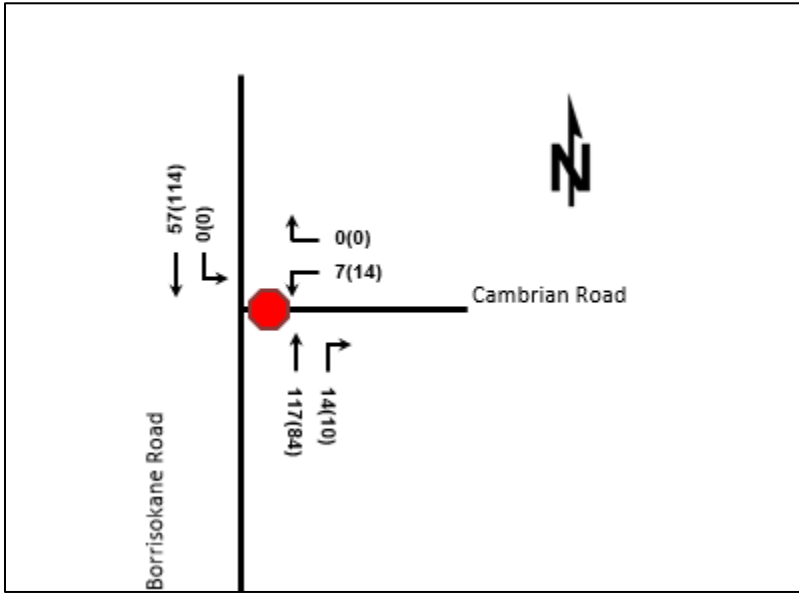
Source: Half Moon Bay North Apartment Block Transportation Impact Assessment (Stantec, 2018)

2444 Watercolours Way Site Generated Traffic Volumes, Realigned Greenbank Road Scenario, PM Peak Hour



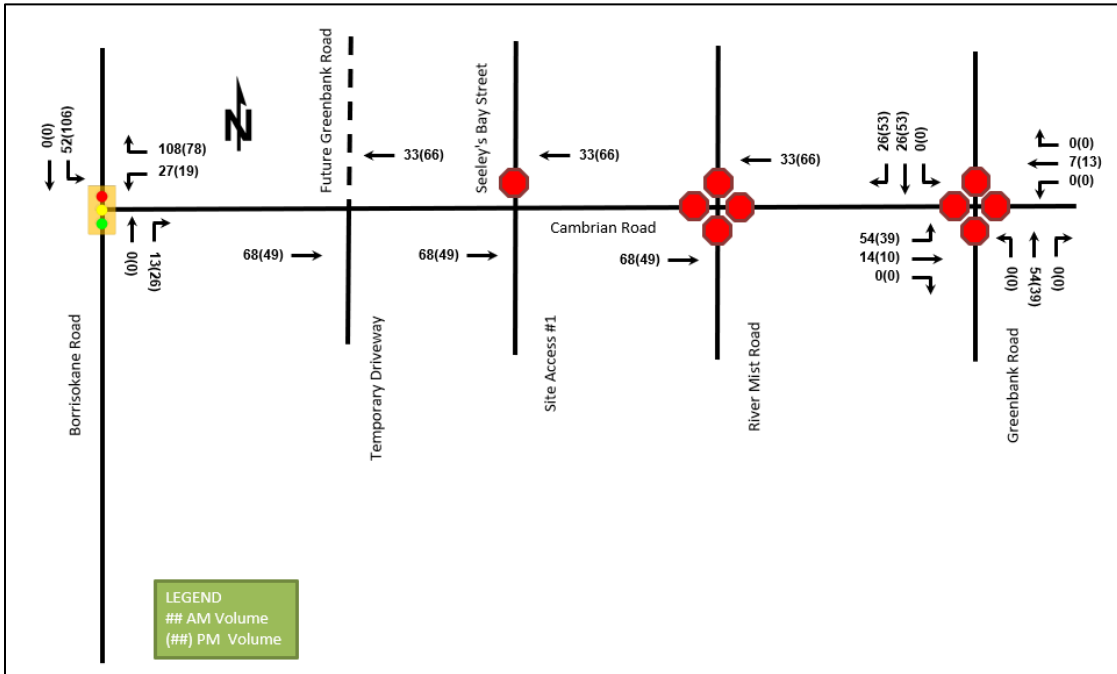
Source: Half Moon Bay North Apartment Block Transportation Impact Assessment (Stantec, 2018)

3809 Borriskane Road Site Generated Traffic Volumes - 2023



Source: 3809 Borriskane Road Transportation Impact Assessment (CGH, 2020)

3809 Borriskane Road Site Generated Traffic Volumes - 2025



Source: 3809 Borriskane Road Transportation Impact Assessment (CGH, 2020)

3882 Barnsdale and 3960 Greenbank Road 2025 Total Future Traffic Volumes – AM Peak Hour

					26			107			
		45 50 39			72			59 274 29			6
		J ↓ L			← 25			J ↓ L			← 66
		105 →			↑ ↑ ↑			138 →			↑ ↑ ↑
		145 →			2 147 64			6 →			70 294 11
		4 →						166 →			
					20						
		23 11 35			← 47			31 494			
		J ↓ L			← 16			J ↓			
		88 →			↑ ↑ ↑			92 →			↑
		170 →			0 9 12			155 →			53 289
		0 →									
											134
45 34		← 27						42 179 428			← 87
J L		← 124						J ↓ L			← 3
35 →								38 →			↑ ↑ ↑
112 →								90 →			19 170 0
								15 →			
Borrisokane Road		Viewbank Road			Realigned Greenbank Road			River Mist Road			Existing Greenbank Road

Source: Quinn's Pointe 2 Transportation Impact Assessment (Stantec, 2018)

3882 Barnsdale and 3960 Greenbank Road 2025 Total Future Traffic Volumes – PM Peak Hour

					45			61			
		97 142 30			139			140 365 89			5
		J ↓ L			← 58			J ↓ L			← 23
		55 →			↑ ↑ ↑			82 →			↑ ↑ ↑
		78 →			0 82 30			2 →			174 333 66
		1 →						88 →			
					38						
		89 2 28			← 169			90 393			
		J ↓ L			← 3			J ↓			
		49 →			↑ ↑ ↑			50 →			↑
		93 →			0 2 4			83 →			148 544
		0 →									
											448
65 32		← 60						38 245 192			← 141
J L		← 153						J ↓ L			← 0
39 →								43 →			↑ ↑ ↑
113 →								93 →			32 199 0
								8 →			
Borrisokane Road		Viewbank Road			Realigned Greenbank Road			River Mist Road			Existing Greenbank Road

Source: Quinn's Pointe 2 Transportation Impact Assessment (Stantec, 2018)

3882 Barnsdale and 3960 Greenbank Road 2025 Site Generated Traffic Volumes

Kilbirne/River Mist	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	0	87	0	0	9	0	0	32	8	29	31	0
PM	0	46	0	0	33	0	0	81	30	16	17	0
SAT	0	46	0	0	33	0	0	81	30	16	17	0
	0(0)[0]	87(46)[46]	0(0)[0]	0(0)[0]	9(33)[33]	0(0)[0]	0(0)[0]	32(81)[81]	8(30)[30]	29(16)[16]	31(17)[17]	0(0)[0]

Kilbirne/Greenbank	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM	7	36	0	0	0	0	0	14	2	7	0	25
PM	26	19	0	0	0	0	0	34	8	4	0	14
SAT	26	19	0	0	0	0	0	34	8	4	0	14
	7(26)[26]	36(19)[19]	0(0)[0]	0(0)[0]	0(0)[0]	0(0)[0]	0(0)[0]	14(34)[34]	2(8)[8]	7(4)[4]	0(0)[0]	5(14)[14]

Appendix E

Internal Capture Rates

Table 6.2 Unconstrained Internal Person Trip Capture Rates for Trip Destinations within a Mixed-Use Development

		Weekday	
		AM Peak Hour	PM Peak Hour
To OFFICE	From Retail	4%	31%
	From Restaurant	14%	30%
	From Cinema/Entertainment	0%	6%
	From Residential	3%	57%
	From Hotel	3%	0%
To RETAIL	From Office	32%	8%
	From Restaurant	8%	50%
	From Cinema/Entertainment	0%	4%
	From Residential	17%	10%
	From Hotel	4%	2%
To RESTAURANT	From Office	23%	2%
	From Retail	50%	29%
	From Cinema/Entertainment	0%	3%
	From Residential	20%	14%
	From Hotel	6%	5%
To CINEMA/ENTERTAINMENT	From Office	0%	1%
	From Retail	0%	26%
	From Restaurant	0%	32%
	From Residential	0%	0%
	From Hotel	0%	0%
To RESIDENTIAL	From Office	0%	4%
	From Retail	2%	46%
	From Restaurant	5%	16%
	From Cinema/Entertainment	0%	4%
	From Hotel	0%	0%
To HOTEL	From Office	0%	0%
	From Retail	0%	17%
	From Restaurant	4%	71%
	From Cinema/Entertainment	0%	1%
	From Residential	0%	12%

Source: Bochner, B., K. Hooper, B. Sperry, and R. Dunphy. NCHRP Report 684: *Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. Washington, DC: Transportation Research Board, Tables 101 and 102, 2011.



Table 6.1 Unconstrained Internal Person Trip Capture Rates for Trip Origins within a Mixed-Use Development

		WEEKDAY	
		AM Peak Hour	PM Peak Hour
From OFFICE	To Retail	28%	20%
	To Restaurant	63%	4%
	To Cinema/Entertainment	0%	0%
	To Residential	1%	2%
	To Hotel	0%	0%
From RETAIL	To Office	29%	2%
	To Restaurant	13%	29%
	To Cinema/Entertainment	0%	4%
	To Residential	14%	26%
	To Hotel	0%	5%
From RESTAURANT	To Office	31%	3%
	To Retail	14%	41%
	To Cinema/Entertainment	0%	8%
	To Residential	4%	18%
	To Hotel	3%	7%
From CINEMA/ENTERTAINMENT	To Office	0%	2%
	To Retail	0%	21%
	To Restaurant	0%	31%
	To Residential	0%	8%
	To Hotel	0%	2%
From RESIDENTIAL	To Office	2%	4%
	To Retail	1%	42%
	To Restaurant	20%	21%
	To Cinema/Entertainment	0%	0%
	To Hotel	0%	3%
From HOTEL	To Office	75%	0%
	To Retail	14%	16%
	To Restaurant	9%	68%
	To Cinema/Entertainment	0%	0%
	To Residential	0%	2%

Source: Bochner, B., K. Hooper, B. Sperry, and R. Dunphy. NCHRP Report 684: *Enhancing Internal Trip Capture Estimation for Mixed-Use Developments*. Washington, DC: Transportation Research Board, Tables 99 and 100, 2011.

Appendix F

Pass-by and Diverted Link Reduction Rates

Supermarket										
Travel Mode	Mode Share	In	Out	Total	In	Out	Total	In	Out	Total
Auto Driver	60%	76	51	127	164	157	321	195	187	382
Pass by %	-	-			36%			28%		
Pass by	-				-58	-58	-116	-53	-54	-107
Diverted Link %	-	-			38.00%			41.00%		
Diverted link	-				-61	-61	-122	-78	-79	-157
Net Auto Driver	60%	76	51	127	45	38	83	64	54	118
Auto Passenger	15%	19	13	32	41	39	80	49	47	96
Transit	15%	19	13	32	41	39	80	49	47	96
Bicycle	1%	1	1	2	3	3	5	3	3	6
Walk	9%	12	7	19	24	24	49	29	28	57
Total	100.00%	127	85	212	273	262	535	325	312	637

Shopping Center										
Travel Mode	Mode Share	In	Out	Total	In	Out	Total	In	Out	Total
Auto Driver	60%	12	8	19	38	41	80	49	46	94
Pass by %	-	-			34%			26%		
Pass by	-				-13	-14	-27	-12	-12	-24
Diverted Link %	-	-			32%			35.00%		
Diverted link	-				-13	-13	-26	-16	-17	-33
Net Auto Driver	60%	12	8	19	12	14	27	21	17	37
Auto Passenger	15%	3	2	5	10	10	20	12	11	24
Transit	15%	3	2	5	10	10	20	12	11	24
Bicycle	1%	0	0	0	1	1	1	1	1	2
Walk	9%	2	1	3	5	7	12	8	7	13
Total	100%	20	13	32	64	69	133	82	76	157

**Table E.9 (Cont'd) Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 820—Shopping Center**

SIZE (1,000 SQ. FT. GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIP (%)			ADJ. STREET PEAK HOUR VOLUME	AVERAGE 24-HOUR TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL			
237	W. Windsor Twp, NJ	Winter 1988/89	—	4:00–6:00 p.m.	48	—	—	52	—	46,000	Booz Allen & Hamilton
242	Willow Grove, PA	Winter 1988/89	—	4:00–6:00 p.m.	37	—	—	63	—	26,000	McMahon Associates
297	Whitehall, PA	Winter 1988/89	—	4:00–6:00 p.m.	33	—	—	67	—	26,000	Orth-Rodgers & Assoc. Inc.
360	Broward Cnty., FL	Winter 1988/89	—	4:00–6:00 p.m.	44	—	—	56	—	73,000	McMahon Associates
370	Pittsburgh, PA	Winter 1988/89	—	4:00–6:00 p.m.	19	—	—	81	—	33,000	Wilbur Smith
150	Portland, OR	—	519	4:00–6:00 p.m.	68	6	26	32	—	25,000	Kittelson and Associates
150	Portland, OR	—	655	4:00–6:00 p.m.	65	7	28	35	—	30,000	Kittelson and Associates
760	Calgary, Alberta	Oct.-Dec. 1987	15,436	4:00–6:00 p.m.	20	39	41	80	—	—	City of Calgary DOT
178	Bordentown, NJ	Apr. 1989	154	2:00–6:00 p.m.	35	—	—	65	—	37,980	Raymond Keyes Assoc.
144	Manalapan, NJ	July 1990	176	3:30–6:15 p.m.	32	44	24	68	—	69,347	Raymond Keyes Assoc.
549	Natick, MA	Feb. 1989	—	4:45–5:45 p.m.	33	26	41	67	—	48,782	Raymond Keyes Assoc.

Average Pass-By Trip Percentage: 34
 “—” means no data were provided

**Table E.10 Pass-By and Non-Pass-By Trips Saturday, Mid-Day Peak Period
Land Use Code 820—Shopping Center**

SIZE (1,000 SQ. FT. GFA)	LOCATION	SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			ADJ. STREET PEAK HOUR VOLUME	SOURCE
						PRIMARY	DIVERTED	TOTAL		
720	Framingham, MA	Feb. 1984	258	11:00 a.m.–4:00 p.m.	23	34	43	77	—	Raymond Keyes Assoc.
600	Brandywine, DE	Apr. 1983	256	10:00 a.m.–3:00 p.m.	17	50	33	83	—	Raymond Keyes Assoc.
880	Christiana, DE	July 1984	198	11:00 a.m.–4:00 p.m.	5	55	40	95	—	Raymond Keyes Assoc.
234	Huntington LI, NY	Nov. 1985	223	11:00 a.m.–3:00 p.m.	39	22	39	61	—	Raymond Keyes Assoc.
658	Wayne, NJ	Sept. 1984	329	11:00 a.m.–4:00 p.m.	46	44	10	54	—	Raymond Keyes Assoc.
622	Ramsey Cnty, MN	Nov. 1985	119	11:00 a.m.–3:00 p.m.	23	21	56	77	—	Raymond Keyes Assoc.
736	Pensacola, FL	Oct. 1985	680	11:00 a.m.–3:00 p.m.	20	31	49	80	—	Raymond Keyes Assoc.
430	Ross, PA	June 1980	425	11:00 a.m.–4:00 p.m.	22	—	—	78	—	Raymond Keyes Assoc.
176	Tampa Springs, FL	May 1986	188	11:00 a.m.–3:00 p.m.	31	42	27	69	—	Raymond Keyes Assoc.
144	Manalapan, NJ	July 1990	264	11:00 a.m.–3:15 p.m.	31	47	22	69	63,362	Raymond Keyes Assoc.
549	Natick, MA	Feb. 1989	—	2:15–3:15 p.m.	28	39	33	72	48,782	Raymond Keyes Assoc.

Average Pass-By Trip Percentage: 26

“—” means no data were provided

**Table E.13 Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 850—Supermarket**

SIZE (1,000 SQ. FT. GFA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIPS (%)			AVERAGE DAILY TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL		
30	Overland Park, KS	1987	40	4:30–5:30 p.m.	32	48	20	68	—	—
<25	Chicago suburbs, IL	1987	155	3:00–6:00 p.m.	56	—	—	44	—	Kenig, O'Hara, Humes, Flock
<25	Chicago suburbs, IL	1987	191	3:00–6:00 p.m.	57	—	—	43	—	Kenig, O'Hara, Humes, Flock
<25	Chicago suburbs, IL	1987	113	3:00–6:00 p.m.	56	—	—	44	—	Kenig, O'Hara, Humes, Flock
34	Omaha, NE	—	—	4:00–6:00 p.m.	44	29	27	56	15,200	University of Nebraska— Lincoln
66	Omaha, NE	—	—	4:00–6:00 p.m.	23	30	47	77	63,000	University of Nebraska— Lincoln
70	Omaha, NE	—	—	4:00–6:00 p.m.	26	30	44	74	34,300	University of Nebraska— Lincoln
31	Omaha, NE	—	—	4:00–6:00 p.m.	19	36	45	81	48,700	University of Nebraska— Lincoln
31	Omaha, NE	—	—	4:00–6:00 p.m.	28	40	32	72	23,500	University of Nebraska— Lincoln
55	Omaha, NE	—	—	4:00–6:00 p.m.	27	35	38	73	27,200	University of Nebraska— Lincoln
65	Omaha, NE	—	—	4:00–6:00 p.m.	25	25	50	75	44,700	University of Nebraska— Lincoln
31	Orlando, FL	1993	440	2:00–6:00 p.m.	35	—	—	65	—	TPD Inc.

Average Pass-By Trip Percentage: 36

“—” means no data were provided

Appendix G

City of Ottawa Strategy Report Comments



File No. D07-12-20-0080

UPDATED - November 16, 2020

Jaime Posen
FoTenn Consultants
396 Cooper St. Suite 300
Ottawa, ON
K2P 2H7

Attention: Jaime Posen

Dear Mr. Posen:

Subject: Technical Circulation Comments
Site Plan Control Application: 3831 Cambrian Road

The following comments are provided in response to the submission received by the City on August 5, 2020 and deemed complete on October 1, 2020:

Planning Comments:

1. All plans must show the noise barrier as per the Stationary Noise Assessment. Please note that the 5m noise wall is higher than what is typically permitted in the Noise By-law. Please suggest other mitigation measures to lower the wall height to 3m while maintaining an acceptable noise level for the residential properties. Options may include enclosing rooftop equipment, redesigning some areas of plan...

Site Plan

2. Show depressed curb locations along internal sidewalks.
3. Show size of each loading space and show width of aisle accessing loading spaces.
4. Show the location of the refuse collection area.
5. Increase size of the landscaped islands within the parking lot and add trees.
6. The Ultimate Site Plan shows the buildings along Cambrian Rd. Is it your intent that these buildings (B and C) be reviewed and approved? If not, the Ultimate Site Plan should show the same building footprint and parking layout as the Site Plan but with the future Greenbank Rd design and connections. Please note that any site elements required when realigned Greenbank is built must be approved through this Site Plan, hence the requirement for the Ultimate Site Plan.

7. Provide a location for snow storage. Snow storage shall not interfere with approved grading and drainage patterns or servicing. If snow is to be removed from the site, then please make a note of that on the Site Plan and include where the snow will be placed in the interim. Temporary snow storage areas should not conflict with utility box, landscaping, required parking, and site circulation.
8. Please show all building-mounted lights and light standards. All exterior lighting proposed for the subject lands shall be installed only in the location that will minimize the impacts on the adjacent properties.
 - a. Typically, sharp cut-off fixtures or an alternative fixture design approved by the General Manager, Planning and Growth Management Department are used to minimize possible lighting glare onto adjacent properties.
 - b. Further, a certificate from an acceptable professional engineer, licensed in the Province of Ontario, which certificate shall state that the exterior site lighting has been designed to meet the following criteria:
 - it must be designed using only fixtures that meet the criteria for full cut-off (sharp cut-off) classification, as recognized by the Illuminating Engineering Society of North America (IESNA or IES); and
 - it must result in minimal light spillage onto adjacent properties. As a guideline, 0.5 fc is normally the maximum allowable spillage.

Landscape Plan

9. Provide details for bicycle racks.
10. Increase size of the landscaped islands within the parking lot to be able to add trees.

Elevations Plan

11. Provide architectural building elevations, showing all 4 sides, for approval with the site plan package.
12. Elevations must show the 1.2m parapet wall as per the Stationary Noise Assessment.

License of occupation

13. Please fill out and submit the attached CREO form to leasing-location@ottawa.ca to initiate the license of occupation.
14. A draft 4R plan will be required for the license of occupation.

Urban Design Comments

Site Plan

15. Please provide a means of pedestrian access for those accessing the store from the south. They will not utilize the pedestrian connection at the north end of the site. This could be by way of an interim sidewalk within the Greenbank R.O.W.

16. Please extend a pedestrian connection from the concrete area in the front of the store to the western property line to ensure that this connection occurs when Greenbank Road is built.
17. The proposed Pylon sign location on Cambrian Road should be re-considered and shifted to the west away from the rear property line of the abutting residential dwelling.
18. Please ensure all depressed curbs are shown and labelled.

Landscape Plan

19. Please provide larger landscaped islands at the end of parking runs with tree planting. Tree planting should also be provided on both sides of the centralized walkway.
Barrhaven South Community Core Concept Plan and Design Strategy - 2.6 Canopy trees and landscaping should also be designed and located within and around the surface parking areas to provide shade and mitigate "heat island" impacts. Landscaped parking islands will help to mitigate heat island impacts.
20. Please provide trees along the western end of the store abutting future Greenbank Road alignment.

Elevations

21. Detailed elevations for all four sides of the proposed building(s) are required with a detailed materials legend for review and comment.
22. Please remove reference to Lincoln Fields.

Engineering Comments – Jeff Shillington

Water

23. Please provide revised water modeling according to the boundary conditions that were provided.

Sanitary

24. What is the purpose of the catchbasin connected to the sanitary sewer in the loading bay? During a storm event, stormwater will get into the sanitary sewer system unless there is a gate valve. Please provide discussion of this in the Servicing Report.

Stormwater Management

25. Please confirm that there will be no surface ponding during the 2-year storm event and provide a statement in the text.
26. Please provide additional discussion/calculations to identify sub surface and surface storage individually for each Area ID. Also, please include the ponding areas and volumes on either the Grading Plan or SWM Plan.

27. Please provide confirmation from the structural engineer that the buildings are designed to withstand the stormwater storage on the roof.
28. Please provide additional discussion/calculations regarding the release rate for each ICD using the orifice equation.
29. The calculations for the Est 100-year storage elevation and maximum ponding elevation do not match the grading plan for area A110A, A110B, A104A, A104B, A108, A103A, A103B. Please provide additional discussion.
30. The Sewer Data calculation table shows Area ID A105A, and A105B. Please provide revised Area ID's to match the Stormwater Management Plan.
31. It is noted that there are both sanitary and storm maintenance holes within ponding areas. Please include a note on the plans to ensure that these sanitary MH's are designed with solid and sealed maintenance hole covers. Also, if the storm maintenance holes are not designed specifically to collect drainage, they should also have solid and sealed covers.
32. The 100-year HGL is listed to be 93.09. For drainage area U2, the TG for the trench drain is less than 93.09 which will create ponding and the sanitary CB104 is less than 93.09. Please review and revise this area.

Temporary Access Road

33. Please provide a cross section for the Temporary Access Road. The road bed structure of the Temporary Access Road is to be built to the standard of future Greenbank.
34. Please extend the line work of Future Greenbank Road up to the Cambrian Road intersection.
35. Please provide a DGN drawing as the ROW width of Future Greenbank Road needs to be checked that the proper width has been accounted for.
36. A license of occupation will be required for the construction of the temporary access road within the Future Greenbank Road ROW.

Parks Planner

Parkland Dedication

37. The Parkland Dedication requirement is to be calculated as per the City of Ottawa Parkland Dedication By-law No 2009-95. Section 3 of the By-law specifies that the requirement for commercial / industrial development is to be calculated at the rate of two percent (2%) of the gross land area of the site being developed. Therefore, for this Site Plan Control Application, the preliminary calculation is as follows:
 - Gross Land Area (approx): 22,048 sq.m.
 - Calculation rate: 2%
 - Parkland Dedication required (prelim calculation): 441 sq.m.

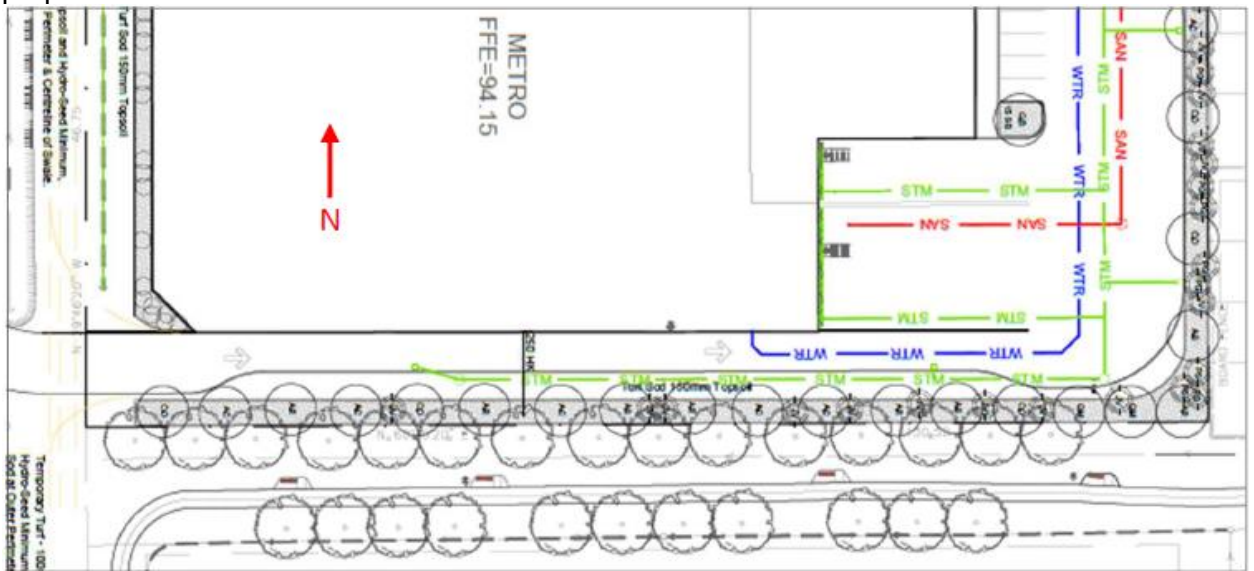
38. Please note that the Applicant is to provide a surveyor's certificate / memo identifying the exact gross area (in square meters) of the property. The Parkland Dedication requirement will be reviewed again as the final Agreement is being prepared and will be calculated using the exact gross land area and the active parkland dedication rate at that time.

Form of Parkland Dedication:

39. Parks & Facilities Planning is requesting that the dedication requirement be fulfilled through Cash-in-Lieu of Parkland.

Landscape Plan

40. Please shift the tree plantings near the southern property boundary further north in order to provide as much separation as possible between the existing park trees and the proposed Site Plan trees.



Erosion Control Plan

41. Please include a temporary 6ft high, metal, modular construction fence along the southern boundary of the development site for the duration of the construction period. The location is as identified by the red dashed line in the image below. This will help protect the park property from construction encroachment – both activity and materials storage.

Environmental Planner

42. Waiting for comments.

Planning Forester

43. No comments.

Transportation

Transportation Engineering Services

Section 5.1 Trip Generation and Mode Shares: (comments provided on Forecasting Report, but no response provided).

- 44.** Correct Table 7. The report states that the fitted curve equation is to be used for PM Peak and Saturday Peak hours for the supermarket, however the numbers produced in this table reflect those of the average rate. This difference is approximately 20 additional trips in the PM Peak and 64 additional trips with the fitted curve equation.
- 45.** Given the local context and that the Re-Aligned Greenbank Road with transit lanes is not expected by the ultimate horizon year of this study, the existing 15% transit mode share is likely overstated. The OD transit mode share for the South Nepean TAZ in the AM Peak for to/within district trips is 5%, and the to/within district trips in the PM peak is 15% with many of those trips comprised of workers returning home from north of the district. In the future, when significant disparities exist, use different mode shares for AM and PM Peaks.
- 46.** Justify the differences between Saturday pass-by and diverted trip rates for the retail and supermarket land uses. The report states that the unpublished rates were based on the shopping centre land use and that this was conservative, but the rates used for the supermarket are higher.

Section 7 Demand Rationalization

- 47.** Quantify the amount of volume that requires rationalization at the study area intersections without the proposed future infrastructure.
- 48.** Identify how the required reductions are expected to be attributed to background and development-related trips.

Section 8.1 Design for Sustainable Modes and Section 12 Transportation Demand Management

- 49.** Provide internal connections for pedestrians and cyclists for connections to future pedestrian and cycling infrastructure proposed on boundary streets. Suggest that the proposed center pedestrian sidewalk be extended directly to Cambrian Road. This central connection could also connect cyclists if designed appropriately.
- 50.** Provide route plans indicating how pedestrians and cyclists will travel from both Cambrian Road and future Greenbank Road to the store entrances and bike parking on site.
- 51.** Clarify the language surrounding the proposed TDM Measures, ensure that the "recommended" measures are measures that will be implemented.

Section 8.2 Circulation and Access

- 52.** Ensure that access radii are minimized as much as possible to control entry and exit speeds. Accommodate trucks with aprons if required. Trucks should not use opposing lanes to complete turns.

Section 10 Boundary Street Design

53. Re-evaluate BLOS achievement. Gravel shoulders should be evaluated as mixed traffic instead of curbside bike lane. Downgrading BLOS achievement with mechanisms not outlined in the MMLOS Guidelines is not supported.
54. Ensure that the proposed pedestrian facility along the frontage of the site is constructed in alignment with the sidewalk east of Seeley's Bay.

Section 11.1 Location and Design of Access

55. Ensure that the sidewalk is depressed and continuous through Access 1 as per SC7.1.
56. Confirm the truck route for post realignment of Greenbank Road. Confirm that access from the south along Greenbank Road to Access 3 will be the most appropriate route for trucks accessing the site. If this route does not meet the requirements of approved truck routes at all stages of reconstruction following restriction to right in and out at Access 3, ensure that Access 1 is a viable option.

Section 11.3 Intersection Design

57. Consider widening for EB and WB LT lanes at Access #1/Seeley's Bay on both sides of the center line as was developed for the intersection of Cambrian and Apolune.
58. Especially, given that the corridor is protected for widening on the south side. With this arrangement, the tapers can be reduced to 50m for development of the left turn lanes.
59. Accommodating cycling infrastructure through this intersection will be required in the design.
60. The Cambrian Road and Site Access #1/Seeley's Bay intersection design will require the development of the EB LT lane required to accommodate background traffic.
61. The proposed storage lengths and parallel lane lengths are accepted for Access #1.
62. The requirement for a left turn lane or slip around must be further explored for the Cambrian Road and access road (realigned Greenbank Road) intersection.
63. The throat length of Access #2 will not meet TAC recommendations when Greenbank Road is realigned. Consider modifying the site parking to provide the recommended throat length.
64. Consider clarifying in the site plan agreement that Access 2 and 3 will be restricted to right in and out following realignment of Greenbank Road.
65. We reserve the right to make further comments on a submitted functional road design.

Section 13 Neighbourhood Traffic Management

66. With the main access aligned with Seeley's Bay Street, consider completing the TIA module 4.6 to provide content on any potential impacts to the neighbourhood to the north of the site access.

Section 15.1 Intersection Control

- 67.** Confirm that traffic signals are not required at site Access #1 when Cambrian Road is widened, and Greenbank Road is realigned.
- 68.** The intersection of Cambrian Road and Borrisokane Road also meets warrants with 2023 total traffic volumes. Note that the City has not yet designed the intersection, but it is currently envisioned as a roundabout.
- 69.** Include a roundabout screening form for the intersection of River Mist and Cambrian.

Section 15.2.6 Intersection MMLOS

- 70.** Correct BLOS achievement in the figurative future Cambrian and Borrisokane intersection. Since there is no through movement, the right-turn lane failure should be discounted, and the left-turning BLOS should govern.

Section 16 Recommendations

- 71.** Site plan submission should include a complete TIA submission which includes the functional design and the RMA sketches. Without this complete submission, the timeline for site plan review is at risk. Ensure that all utilities have been confirmed when developing the functional design.

Traffic Signal Operations

- 72.** Borrisokane and Cambrian 2023 AM SBL may need to be modelled with protected + permissive phasing to prevent the queue length exceeding storage capacity.
- 73.** Borrisokane and Cambrian WBR overlap phase should be considered.
- 74.** Seeley's Bay and Cambrian pedestrian volumes will likely increase. Future files only include existing pedestrian volumes.

Traffic Signal Design

- 75.** No comments to this TSR for this circulation. Traffic Signal Design and Specification reserves the right to make future comments based on subsequent submissions.

Future considerations:

- 76.** If there are any future proposed changes in the existing roadway geometry for the purpose of construction of a new TCS(s) or modifications to existing TCS(s) the City of Ottawa Traffic Signal Design and Specification Unit is required to complete a review for traffic signal plant re-design and provide the actual re-design to the proponent or involved consultant.
- 77.** If the proposed traffic signals are warranted/approved for installation or modifications to existing TCS are approved, and RMA approved, please forward an approved geometry

detail design drawings (dwg digital format in NAD 83 coordinates) including following: base mapping, existing and new underground utilities and sewers, new/existing catch basins locations, AutoTurn-Radius Modeling for approved vehicles and approved pavement marks drawings in separate files , no Xref files attached in master file(s), for detail traffic plant design lay out.

- 78.** Please send all digital (CADD) design files to Peter.Grajcar@ottawa.ca 613-580-2424x23035. If not sure as per above request and more detail info needed as per input files, (i.e. format, etc.) please ask for our Dispatch checklist document and it will be gladly provided.

Street Lighting

- 79.** No comments with initial TIA for this circulation. Street Lighting reserves the right to make future comments based on subsequent submissions.

Future considerations are as follows:

- 80.** If there are any proposed changes to the existing roadway geometry, the City of Ottawa streetlight Asset Management Group is required to provide a full streetlight design. Upon completion of proposed roadway geometry design changes, please submit digital Micro Station drawings with proposed roadway geometry changes to the Street Lighting Department, so that we may proceed with the detailed streetlight design and coordination with the streetlight maintenance provider and all necessary parties. Be advised that the applicant will be 100% responsible for all costs associated with any streetlight design as a result of the roadway geometry change.
- 81.** Alterations and/or repairs are required where the existing streetlight plant is directly, indirectly or adversely affected by the scope of work under this circulation, due to the proposed road reconstruction process. All streetlight plant alterations and/or repairs must be performed by the City of Ottawa's streetlight maintenance provider.
- 82.** Be advised that the applicant will be 100% responsible for all costs associated with any relocations/modifications to the existing streetlight plant.

Transit Services

- 83.** No comments on the TIA for this circulation. Transit Services reserves the right to make future comments based on subsequent submissions.
- 84.** Site plan consideration: extend the central north-south pedestrian walkway further north to provide a continuous pedestrian link to the future east-west sidewalk along widened Cambrian. This would also connect to a future bus stop; the existing eastbound bus stop at Cambrian / Seeley's Bay (though not currently in use) will likely be shifted west to serve this site frontage and to reduce walk distance to/from future pedestrian crosswalks at re-aligned Greenbank and Cambrian.

Building Code Services

- 85.** No comments.

Fire Services

86. Waiting for comments.

RVCA

87. No comments.

Barrhaven South Landowners Group

88. No comments.

Hydro Ottawa

- 89.** The Owner is advised that there are medium voltage overhead lines along the North side of the property.
- a. Should any activity, such as tree trimming or working on the sides of a building, be anticipated within three meters (3m) of Hydro Ottawa's overhead lines, contact Hydro Ottawa to discuss arrangements before any activity is undertaken. In line with the Ministry of Labour's Occupational Health & Safety Act, only a Hydro Ottawa employee or Hydro Ottawa approved contractor can work in proximity of these lines.
 - b. The Owner is advised that permanent structures located within the "restricted zone" surrounding overhead lines are prohibited. This zone is defined by Hydro Ottawa's standard OLS0002 "Overhead High Voltage Clearances to Adjacent Building", which can be found at <https://hydroottawa.com/accounts-services/accounts/contractors-developers/clearances>. This standard complies with the requirements of the Ministry of Labour's Occupational Health & Safety Act, the Ontario Building Code, and the Ontario Electrical Safety Code. Permanent structures include buildings, signs (even lit signs when open for maintenance), antennas, pools, and fences.
- 90.** The Owner shall ensure that any landscaping or surface finishing does not encroach into existing or proposed Hydro Ottawa overhead or underground assets or easement. When proposing to plant trees in proximity of existing power lines, the Owner shall refer to Hydro Ottawa's free publication "Tree Planting Advice" which can be found at <https://hydroottawa.com/outages-safety/safety-home/outside-home/planting-trees>. The shrub or tree location and expected growth must be considered. If any Hydro Ottawa related activity requires the trimming, cutting or removal of vegetation, or removal of other landscaping or surface finishing, the activity and the re-instatement shall be at the owner's expense.
- 91.** If the change in grade is more than three tenths of a meter (0.3m) in the vicinity of proposed or existing electric utility equipment. Hydro Ottawa requests to be consulted to prevent damages to its equipment.

- 92.** The Owner shall enter an Installation and Service agreement with Hydro Ottawa.
- 93.** The Owner is to contact Hydro Ottawa if the electrical servicing of the site is to change in location or in size. A load summary will be needed for the technical evaluation.
- 94.** The Owner shall be responsible for servicing the buildings within the property. Only one service entrance per property shall be permitted.
- 95.** The Owner shall convey, at their cost, all required easements as determined by Hydro Ottawa.
- 96.** The Owner shall be responsible for all costs for feasible relocations, protection or encasement of any existing Hydro Ottawa plant.
- 97.** The Owner is advised that Hydro Ottawa does not provide servicing through rear lanes.
- 98.** The Owner has the obligation to ensure that power quality problems, either steady state or transient, do not arise on the distribution system per Hydro Ottawa's Conditions of Service Section 2.3.2 "Power Quality." If a power quality problem arises on the distribution system that originates from the Owner's property, the Owner shall be responsible for rectification to Hydro Ottawa's satisfaction.
- 99.** The Owner shall comply with Hydro Ottawa's Conditions of Service and thus should be consulted for the servicing terms. The document, including referenced standards, guidelines and drawings, may be found at <https://hydroottawa.com/about-us/policies/conditions-service>. The Owner should consult Hydro Ottawa prior to commencing engineering designs to ensure compliance with these documents.
- 100.** The Owner is advised that there is limited capacity to service the proposed development at this time. The Owner may be responsible for a Capital Contribution payment(s) towards a distribution system expansion if the proposed development requires electrical servicing greater than can be provided by the existing distribution system in the vicinity, either in capacity or in extension limit. This amount shall be in accordance with Hydro Ottawa's Contributed Capital Policy and Conditions of Service.
- 101.** Hydro Ottawa reserves the right to raise conditions throughout the development of this proposal should the revisions contain non-conformances with, for example, Hydro Ottawa's Conditions of Service or Standards. To ensure the best outcome, Hydro Ottawa welcomes an early discussion on the proposal.
- 102.** Hydro Ottawa requests to be included in all future circulations concerning this proposal.
- 103.** For more information on electrical servicing, the following link outlines Hydro Ottawa's services for Commercial, Overhead and Underground, and Residential projects, together with contact information for Hydro Ottawa representatives.
<https://hydroottawa.com/accounts-services/accounts/contractors-developers/distribution-system-design>

Bell

104. We have reviewed the circulation regarding the above noted application and have no objections to the application as this time. However, we hereby advise the Owner to contact Bell Canada at planninganddevelopment@bell.ca during detailed design to confirm the provisioning of communication/telecommunication infrastructure needed to service the development. We would also ask that the following paragraph be included as a condition of approval:

“The Owner agrees that should any conflict arise with existing Bell Canada facilities or easements within the subject area, the Owner shall be responsible for the relocation of any such facilities or easements at their own cost.”

105. It shall also be noted that it is the responsibility of the Owner to provide entrance/service duct(s) from Bell Canada’s existing network infrastructure to service this development. In the event that no such network infrastructure exists, in accordance with the Bell Canada Act, the Owner may be required to pay for the extension of such network infrastructure.

106. If the Owner elects not to pay for the above noted connection, Bell Canada may decide not to provide service to this development.

Rogers

107. No comments or concerns.

Please provide a resubmission that addresses each of the comments in the form of a cover letter stating how each were addressed on the resubmission. Co-ordinate the numbering of each resubmission comment or issue with the above noted comment number. As part of your resubmission, provide all plans and reports as pdf. Ensure that all plans are revised where necessary to ensure consistency.

Please contact me at Melanie.Gervais@Ottawa.ca if you have any questions regarding design, site plan or landscaping comments. The Senior Engineer, Jeff Shillington, may be contacted directly for questions regarding engineering comments at Jeff.Shillington@ottawa.ca.

Regards,



Mélanie Gervais
Planner II
Development Review, South
Planning, Infrastructure, and Economic Development

Attachments:
CREO form

Appendix H

TDM Checklists

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

Legend	
BASIC	The measure is generally feasible and effective, and in most cases would benefit the development and its users
BETTER	The measure could maximize support for users of sustainable modes, and optimize development performance
★	The measure is one of the most dependably effective tools to encourage the use of sustainable modes

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

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

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

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

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: <i>Non-residential developments</i>		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	<input type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input checked="" type="checkbox"/>
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 <i>(see Official Plan policy 4.3.3)</i>	<input type="checkbox"/>
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 <i>(see Official Plan policy 4.3.12)</i>	<input checked="" type="checkbox"/>

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 (<i>see Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
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 (<i>see Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
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 (<i>see Official Plan policy 4.3.11</i>)	<input checked="" type="checkbox"/>
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	<input type="checkbox"/>
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	<input type="checkbox"/>
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	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>
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)	<input type="checkbox"/>

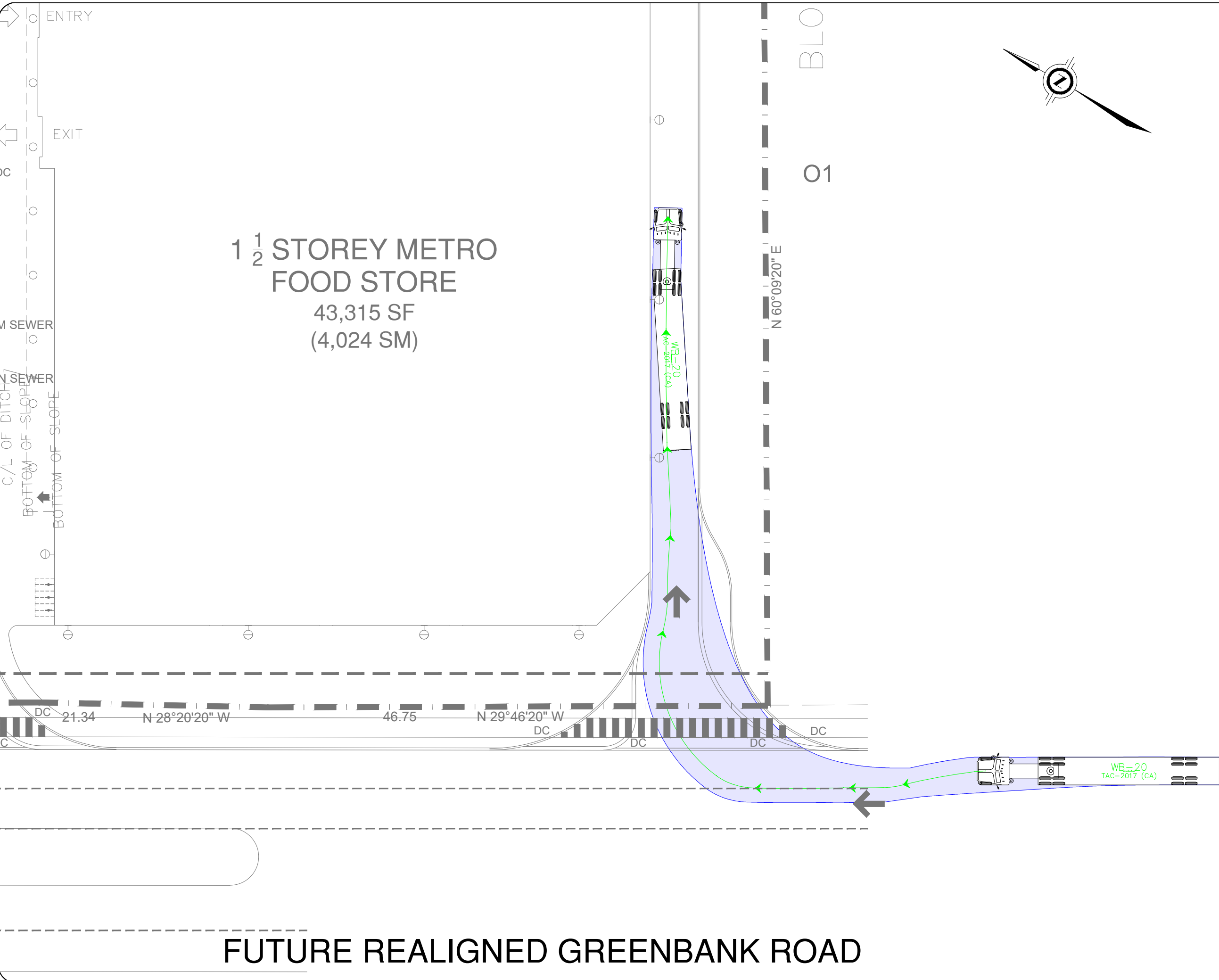
TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i>)	<input checked="" type="checkbox"/>
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 <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
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 <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
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	<input type="checkbox"/>
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	<input type="checkbox"/>
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 <i>Zoning By-law Section 111</i>)	<input type="checkbox"/>
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)	<input type="checkbox"/>
2.3 Shower & change facilities		
BASIC	2.3.1 Provide shower and change facilities for the use of active commuters	<input type="checkbox"/>
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	<input type="checkbox"/>
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)	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		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	<input type="checkbox"/>
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	<input type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input type="checkbox"/>
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	<input type="checkbox"/>
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	<input type="checkbox"/>
BETTER	4.2.2 At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	<input type="checkbox"/>
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 (<i>see Zoning By-law Section 94</i>)	<input type="checkbox"/>
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	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Non-residential developments</i>		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	<input type="checkbox"/>
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	<input type="checkbox"/>
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (<i>see Zoning By-law Section 104</i>)	<input type="checkbox"/>
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 (<i>see Zoning By-law Section 111</i>)	<input type="checkbox"/>
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)	<input type="checkbox"/>
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	<input type="checkbox"/>

Appendix I

Turning Templates



1 1/2 STOREY METRO
FOOD STORE
43,315 SF
(4,024 SM)

FUTURE REALIGNED GREENBANK ROAD

Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
13 Markham Ave
Ottawa, ON
K2G 3Z1
(343) 999-9117

CLIENT: Metro Ontario Inc.
25 Vickers Road Building A, 2nd Floor
Etobicoke, ON
M9B 1C1

ARCHITECT: RLA Architecture
56 Beech Street
Ottawa, ON
K1S 3J6

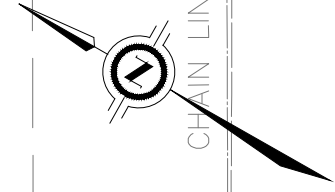
SITE: Metro Cambrian Road

TITLE: South Access

SCALE AT A3: NTS	DATE: 2021-04-13	DRAWN: JK	CHECKED: MC
PROJECT NO: 2019-54	DRAWING NO: 001	REVISION: 03	

R3YY[1627]

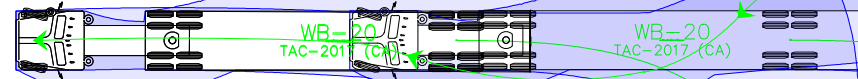
N 29°45'20" W



CHAIN LINK FENCE

BOARD FENCE

25



C/L OF DITCH FROM JDB TOPO DATED NOVEMBER 29th, 2006

12

ENTRY / EXIT

1 STOREY RETAIL A
10,000 SF
(929.03 SM)

EXIT

EXIT

TRENCH DRAIN

EXIT

150mmØ WATERMAIN

130.50



FIRE ROUTE

150mmØ WATERMAIN
250mmØ SAN SEWER
250mmØ STM SEWER

FH

DC

DC

ENTRY

BLOCK 74

Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
 13 Markham Ave
 Ottawa, ON
 K2G 3Z1
 (343) 999-9117

CLIENT: Metro Ontario Inc.
 25 Vickers Road Building A, 2nd Floor
 Etobicoke, ON
 M9B 1C1

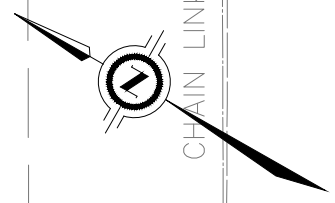
ARCHITECT: RLA Architecture
 56 Beech Street
 Ottawa, ON
 K1S 3J6

SITE: Metro Cambrian Road

TITLE: Loading Bay Entry

SCALE AT A3: NTS	DATE: 2021-04-13	DRAWN: JK	CHECKED: MC
PROJECT NO: 2019-54	DRAWING NO: 003	REVISION: 03	

R3YY[1627]

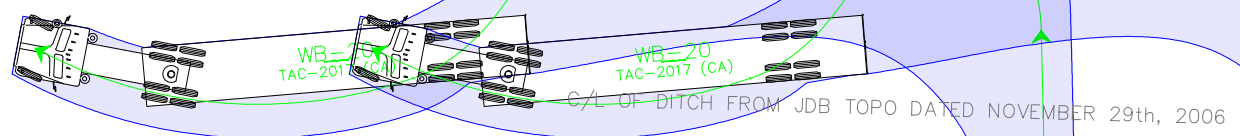


BOARD FENCE

N 29°45'20" W

25

12



ENTRY / EXIT

1 STOREY RETAIL A
10,000 SF
(929.03 SM)

EXIT

EXIT

EXIT



FIRE ROUTE

150mmØ WATERMAIN
250mmØ SAN SEWER
250mmØ STM SEWER

FH

DC

DC

ENTRY



150mmØ WATERMAIN

130.50

BLOCK 74

Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
13 Markham Ave
Ottawa, ON
K2G 3Z1
(343) 999-9117

CLIENT: Metro Ontario Inc.
25 Vickers Road Building A, 2nd Floor
Etobicoke, ON
M9B 1C1

ARCHITECT: RLA Architecture
56 Beech Street
Ottawa, ON
K1S 3J6

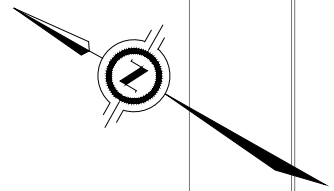
SITE: Metro Cambrian Road

TITLE: Loading Bay Exit

SCALE AT A3: NTS	DATE: 2021-04-13	DRAWN: JK	CHECKED: MC
PROJECT NO: 2019-54	DRAWING NO: 004	REVISION: 03	



01



Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
13 Markham Ave
Ottawa, ON
K2G 3Z1
(343) 999-9117

CLIENT: Metro Ontario Inc.
25 Vickers Road Building A, 2nd Floor
Etobicoke, ON
M9B 1C1

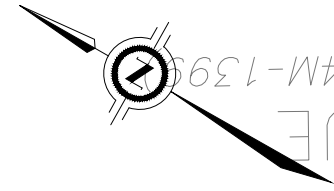
ARCHITECT: RLA Architecture
56 Beech Street
Ottawa, ON
K1S 3J6

SITE: Metro Cambrian Road

TITLE: South Access (Interim)

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2020-08-27	JK	MC
PROJECT NO:	DRAWING NO:	REVISION:	
2019-54	.005	03	

4M-1399



VENUE
PLAN 4M-1399

EXISTING CAMBRIAN ROAD

SEELEY'S BAY STREET

C/L OF ROAD

ASPHALT WALK

DITCH

CONCRETE WALK

BLOCK 82
0.30 RESERVE
PIN 04592-0213(LT)

BLOCK 69

BLOCK 70

HYDRO EQUIPMENT

PROPERTY LINE

169.96

5.0M INTERIOR YARD SETBACK

WB-20
TAC-2017 (CA)

REGISTERED PLAN 4M-1378

PROPOSED

120.02

**1 STOREY
RETAIL B**
8,935 SF
(830 SM)

ENTRY

ENTRY

13

15

15

15

15

Notes:

A	description	by	xx/xx/xx
REV:	DESCRIPTION:	BY:	DATE:
STATUS:			

CGH Transportation
13 Markham Ave
Ottawa, ON
K2G 3Z1
(343) 999-9117

CLIENT: Metro Ontario Inc.
25 Vickers Road Building A, 2nd Floor
Etobicoke, ON
M9B 1C1

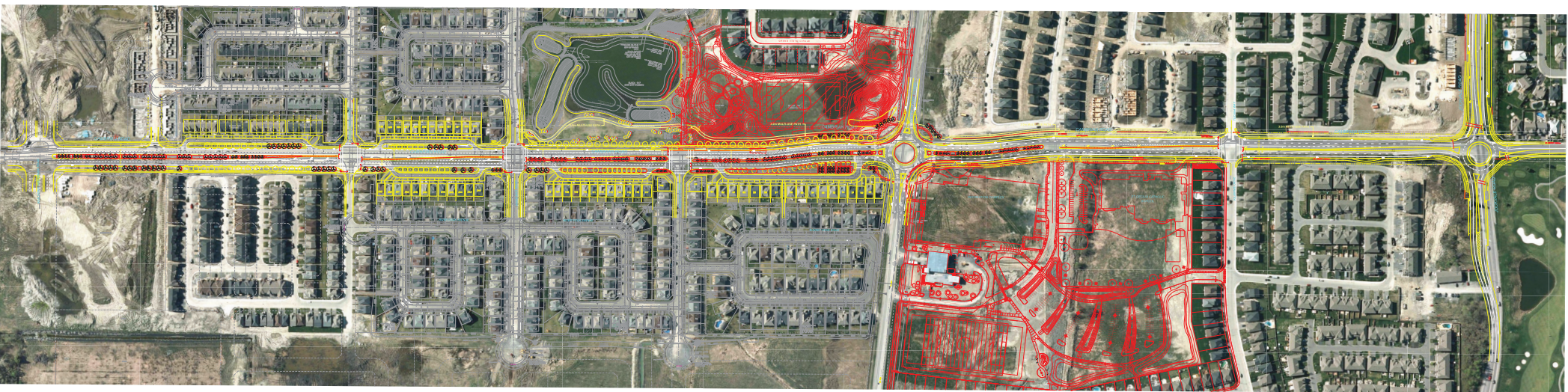
ARCHITECT: RLA Architecture
56 Beech Street
Ottawa, ON
K1S 3J6

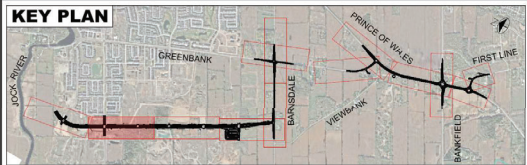
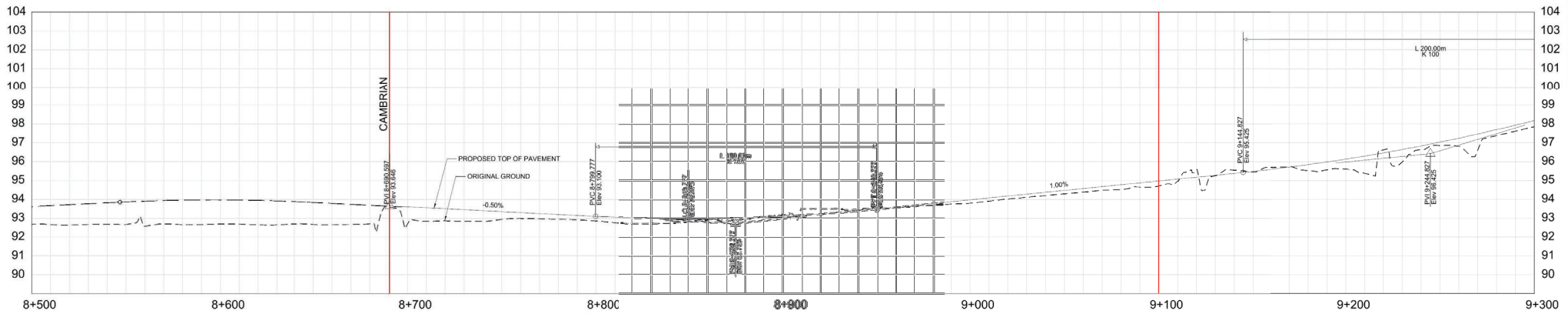
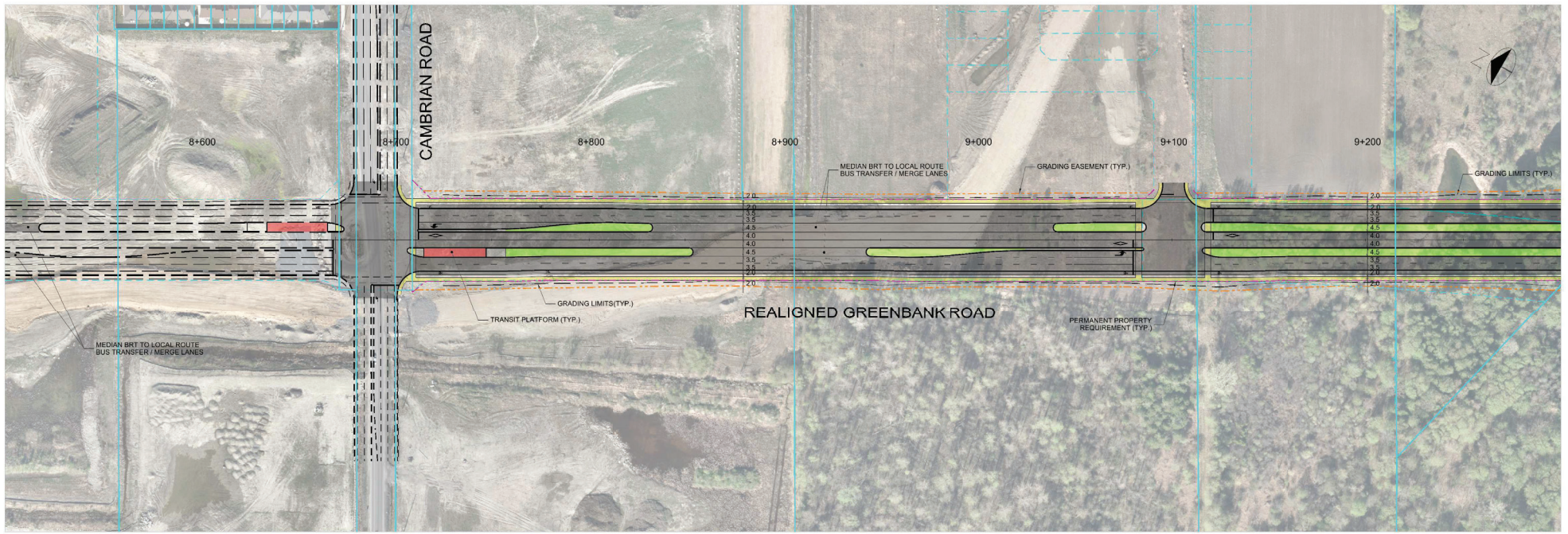
SITE: Metro Cambrian Road
TITLE: Northeast Access
(Interim)

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2020-08-27	JK	MC
PROJECT NO:	DRAWING NO:	REVISION:	
2019-54	006	03	

Appendix J

Future Cambrian Road and Re-aligned Greenbank Road Cross-Sections





REALIGNED GREENBANK ROAD AND SOUTH WEST TRANSITWAY EXTENSION

RE-ALIGNED GREENBANK ROAD

PLAN AND PROFILE
STA. 8+500 TO STA. 9+300

PLATE NO.
PP2



PLANNING AND GROWTH MANAGEMENT DEPARTMENT

Date:	J.Z.	Check:	P.H.	Date:	JUNE 2004
Date:	M.S.	Check:	P.H.		

Scale:	HORIZONTAL	1" = 20'
	VERTICAL	1" = 4'

Appendix K

City of Ottawa Scoping Report Comments

Viktoriya Zaytseva

From: Giampa, Mike <Mike.Giampa@ottawa.ca>
Sent: July 22, 2020 9:48 AM
To: Mark Crockford
Cc: Viktoriya Zaytseva; Christopher Gordon
Subject: RE: 3831 Cambrian Road - Step 1/2 TIA

Hi Mark,
Nothing has changed regarding the timing of these roads- they are not on the 10-year affordable plan. Any work on these roads will be considered temporary and not DC eligible.
Regarding 541 Chimney Court, there was a part lot control in 2019 but its part of the HMB West 2016 CTS, so you're covered.

Please proceed to step 3, thanks.

Mike

From: Mark Crockford <mark.crockford@cghtransportation.com>
Sent: July 21, 2020 3:20 PM
To: Giampa, Mike <Mike.Giampa@ottawa.ca>
Cc: Viktoriya Zaytseva <viktoriya.zaytseva@cghtransportation.com>; Christopher Gordon <christopher.gordon@cghtransportation.com>
Subject: 3831 Cambrian Road - Step 1/2 TIA

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Attached is our Step 1/2 document for 3831 Cambrian Road.

We do have a few questions that will help inform our Step 3.

As this project is right at the corner of Cambrian Road and future realigned Greenbank Road, we would like to know if there is anymore information, beyond what is in the TMP, regarding the timing of the widening of Cambrian, and the construction of Greenbank Road. The timing of these and how we discuss these relative to our site will be an important aspect of this project.

We also have one development that we believe has been built, but won't be accounted for in our traffic counts, which is 541 Chimney Corner Terrace. This report is not listed on Devapps, but we are hoping you can provide us with a copy.

Thanks and we look forward to your comments.

Thanks,
Mark



Mark Crockford, P.Eng.
CGH Transportation Inc.
P:905-251-4070
E:Mark.Crockford@CGHTransportation.com

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Appendix L

MMLOS Worksheets

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation
Scenario	2023 Future Background AM
Comments	

Project Date	2019-54
	08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	70	53	53
Ped. Exposure to Traffic LoS	B	B	C	-	C	C	D	D	
Cycle Length									
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	C	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	C	C	C	-	B	B	B	B	
Level of Service	D	D	C	-	D	D	F	F	
	D				F				
Transit	Average Signal Delay					≤ 10 sec	≤ 30 sec	≤ 40 sec	
	Level of Service	-	-	-	-	-	B	D	E
	-				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
Level of Service	E	E	E	-	E	E	E	E	
	E				E				
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.61 - 0.70			
	Level of Service	C				B			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation
Scenario	2023 Future Background PM
Comments	

Project	2019-54
Date	08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	70	53	53
Ped. Exposure to Traffic LoS	B	B	C	-	C	C	D	D	
Cycle Length									
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	C	D	D	
		C			D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	C	C	C	-	B	B	B	B	
Level of Service	D	D	C	-	D	D	F	F	
		D			F				
Transit	Average Signal Delay					≤ 10 sec	≤ 40 sec	> 40 sec	
	Level of Service	-	-	-	-	-	B	E	F
		-			F				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
Level of Service	E	E	E	-	E	E	E	E	
		E			E				
Auto	Volume to Capacity Ratio	0.81 - 0.90			0.61 - 0.70				
	Level of Service	D			B				

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation
Scenario	2023 Future Background SAT
Comments	

Project	2019-54
Date	08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	70	53	53
	Ped. Exposure to Traffic LoS	B	B	C	-	C	C	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	C	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	D	C	-	D	D	F	F	
	D				F				
Transit	Average Signal Delay					≤ 10 sec	≤ 40 sec	> 40 sec	
	Level of Service	-	-	-	-	-	B	E	F
	-				F				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio	0.81 - 0.90				0.61 - 0.70			
	Level of Service	D				B			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation
Scenario	2023 Future Total AM
Comments	

Project Date	2019-54
	08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	70	53	53
Ped. Exposure to Traffic LoS	B	B	C	-	C	C	D	D	
Cycle Length									
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	C	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	C	C	C	-	B	B	B	B	
Level of Service	D	D	C	-	D	D	F	F	
	D				F				
Transit	Average Signal Delay					≤ 10 sec	≤ 30 sec	≤ 40 sec	
	Level of Service	-	-	-	-	-	B	D	E
	-				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
Level of Service	E	E	E	-	E	E	E	E	
	E				E				
Auto	Volume to Capacity Ratio	0.71 - 0.80				0.61 - 0.70			
	Level of Service	C				B			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation
Scenario	2023 Future Total PM
Comments	

Project Date	2019-54
	08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTorR) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	70	53	53
Ped. Exposure to Traffic LoS	B	B	C	-	C	C	D	D	
Cycle Length									
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	C	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	C	C	C	-	B	B	B	B	
Level of Service	D	D	C	-	D	D	F	F	
	D				F				
Transit	Average Signal Delay					≤ 10 sec	> 40 sec	> 40 sec	
	Level of Service	-	-	-	-	-	B	F	F
	-				F				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio	0.81 - 0.90				0.71 - 0.80			
	Level of Service	D				C			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2023 Future Total SAT		08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	3	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Permissive or yield control	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	83	70		70	70	53	53
Ped. Exposure to Traffic LoS	B	B	C	-	C	C	D	D	
Cycle Length									
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	B	C	-	C	C	D	D	
		C				D			
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	C	C	C	-	B	B	B	B	
Level of Service	D	D	C	-	D	D	F	F	
		D				F			
Transit	Average Signal Delay					≤ 10 sec	> 40 sec	> 40 sec	
	Level of Service	-	-	-	-	-	B	F	F
		-				F			
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
Level of Service	E	E	E	-	E	E	E	E	
		E				E			
Auto	Volume to Capacity Ratio	0.81 - 0.90				0.71 - 0.80			
	Level of Service	D				C			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation
Scenario	2028 Future Background AM
Comments	

Project	2019-54
Date	08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Protected/ Permissive	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	70	53	53
Ped. Exposure to Traffic LoS	B	C	C	-	C	C	D	D	
Cycle Length									
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	C	C	-	C	C	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	> 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	F	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	C	C	C	-	B	B	B	B	
Level of Service	D	D	C	-	D	F	F	F	
	D				F				
Transit	Average Signal Delay					≤ 20 sec	≤ 30 sec	> 40 sec	
	Level of Service	-	-	-	-	-	C	D	F
	-				F				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
Level of Service	E	E	E	-	E	E	E	E	
	E				E				
Auto	Volume to Capacity Ratio	0.91 - 1.00				0.81 - 0.90			
	Level of Service	E				D			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation
Scenario	2028 Future Background PM
Comments	

Project Date	2019-54
	08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Protected/ Permissive	Permissive	Permissive
	Conflicting Right Turns	Protected/ Permissive	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	70	53	53
	Ped. Exposure to Traffic LoS	B	C	C	-	C	C	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS									
Level of Service	B	C	C	-	C	C	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	D	C	-	D	D	F	F	
	D				F				
Transit	Average Signal Delay					≤ 40 sec	≤ 30 sec	> 40 sec	
	Level of Service	-	-	-	-	-	E	D	F
	-				F				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio		> 1.00			0.71 - 0.80			
	Level of Service	F				C			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation
Scenario	2028 Future Background SAT
Comments	

Project	2019-54
Date	08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Protected/ Permissive	Permissive	Permissive
	Conflicting Right Turns	Protected/ Permissive	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	70	53	53
Ped. Exposure to Traffic LoS	B	C	C	-	C	C	D	D	
Cycle Length									
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS									
Level of Service	B	C	C	-	C	C	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	C	C	C	-	B	B	B	B	
Level of Service	D	D	C	-	D	D	F	F	
	D				F				
Transit	Average Signal Delay					≤ 40 sec	≤ 30 sec	> 40 sec	
	Level of Service	-	-	-	-	-	E	D	F
	-				F				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
Level of Service	E	E	E	-	E	E	E	E	
	E				E				
Auto	Volume to Capacity Ratio		> 1.00			0.71 - 0.80			
	Level of Service		F			C			

Multi-Modal Level of Service - Intersections Form

Consultant Scenario Comments	CGH Transportation	Project Date	2019-54
	2028 Future Total AM		08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Permissive	Permissive	Permissive
	Conflicting Right Turns	Protected/ Permissive	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	70	53	53
	Ped. Exposure to Traffic LoS	B	C	C	-	C	C	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS									
Level of Service	B	C	C	-	C	C	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	D	C	-	D	D	F	F	
	D				F				
Transit	Average Signal Delay					≤ 10 sec	≤ 30 sec	≤ 40 sec	
	Level of Service	-	-	-	-	-	B	D	E
	-				E				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
Level of Service	E	E	E	-	E	E	E	E	
	E				E				
Auto	Volume to Capacity Ratio	0.91 - 1.00				0.81 - 0.90			
	Level of Service	E				D			

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation
Scenario	2028 Future Total PM
Comments	

Project Date	2019-54
	08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Protected/ Permissive	Permissive	Permissive
	Conflicting Right Turns	Protected/ Permissive	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor)?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	70	53	53
	Ped. Exposure to Traffic LoS	B	C	C	-	C	C	D	D
	Cycle Length								
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS									
Level of Service	B	C	C	-	C	C	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
	Left Turning Cyclist	C	C	C	-	B	B	B	B
Level of Service	D	D	C	-	D	D	F	F	
	D				F				
Transit	Average Signal Delay					≤ 10 sec	> 40 sec	> 40 sec	
	Level of Service	-	-	-	-	-	B	F	F
	-				F				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio		> 1.00				0.81 - 0.90		
	Level of Service		F				D		

Multi-Modal Level of Service - Intersections Form

Consultant	CGH Transportation
Scenario	2028 Future Total SAT
Comments	

Project	2019-54
Date	08-Apr-21

INTERSECTIONS		Borrisokane Rd & Cambrian Rd				River Mist Rd & Cambrian Rd			
Crossing Side		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Pedestrian	Lanes	3	4	3		3	3	4	4
	Median	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m		No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m	No Median - 2.4 m
	Conflicting Left Turns	No left turn / Prohib.	Protected	Protected/ Permissive		Permissive	Protected/ Permissive	Permissive	Permissive
	Conflicting Right Turns	Protected/ Permissive	No right turn	Permissive or yield control		Permissive or yield control	Permissive or yield control	Permissive or yield control	Permissive or yield control
	Right Turns on Red (RTor) ?	RTOR allowed	RTOR allowed	RTOR allowed		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Signal Leading Interval?	No	No	No		No	No	No	No
	Right Turn Channel	No Channel	No Channel	No Channel		No Channel	No Channel	No Channel	No Channel
	Corner Radius	10-15m	10-15m	10-15m		10-15m	10-15m	10-15m	10-15m
	Crosswalk Type	Std transverse markings	Std transverse markings	Std transverse markings		Std transverse markings	Std transverse markings	Std transverse markings	Std transverse markings
	PETSI Score	78	66	70		70	70	53	53
Ped. Exposure to Traffic LoS	B	C	C	-	C	C	D	D	
Cycle Length									
Effective Walk Time									
Average Pedestrian Delay									
Pedestrian Delay LoS	-	-	-	-	-	-	-	-	
Level of Service	B	C	C	-	C	C	D	D	
	C				D				
Approach From		NORTH	SOUTH	EAST	WEST	NORTH	SOUTH	EAST	WEST
Bicycle	Bicycle Lane Arrangement on Approach	Mixed Traffic	Mixed Traffic	Mixed Traffic		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Right Turn Lane Configuration	≤ 50 m	≤ 50 m	> 50 m		≤ 50 m	≤ 50 m	> 50 m	> 50 m
	Right Turning Speed	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h		≤ 25 km/h	≤ 25 km/h	≤ 25 km/h	≤ 25 km/h
	Cyclist relative to RT motorists	D	D	F	-	D	D	F	F
	Separated or Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	-	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Left Turn Approach	No lane crossed	No lane crossed	No lane crossed		No lane crossed	No lane crossed	No lane crossed	No lane crossed
	Operating Speed	≥ 60 km/h	≥ 60 km/h	≥ 60 km/h		> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h	> 40 to ≤ 50 km/h
Left Turning Cyclist	C	C	C	-	B	B	B	B	
Level of Service	D	D	C	-	D	D	F	F	
	D				F				
Transit	Average Signal Delay					≤ 10 sec	> 40 sec	> 40 sec	
	Level of Service	-	-	-	-	-	B	F	F
	-				F				
Truck	Effective Corner Radius	10 - 15 m	10 - 15 m	10 - 15 m		10 - 15 m	10 - 15 m	10 - 15 m	10 - 15 m
	Number of Receiving Lanes on Departure from Intersection	1	1	1		1	1	1	1
	Level of Service	E	E	E	-	E	E	E	E
	E				E				
Auto	Volume to Capacity Ratio		> 1.00				0.81 - 0.90		
	Level of Service		F				D		

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation
Scenario	2020 Existing
Comments	

Project	2019-54
Date	04-Dec-20

SEGMENTS		Street A	Cambrian Road - Borrisokane Road to Seeley's Bay Street	Cambrian Road - Seeley's Bay Street to Greenbank Road	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9
			1	2							
Pedestrian	Sidewalk Width	F	< 1.5 m	1.5 m							
	Boulevard Width		n/a	< 0.5 m							
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000							
	Operating Speed		> 60 km/h	> 30 to 50 km/h							
	On-Street Parking		no	no							
	Exposure to Traffic PLoS		F	E	-	-	-	-	-	-	-
	Effective Sidewalk Width		1.2 m	1.5 m							
Pedestrian Volume	250 ped/hr	250 ped/hr									
Crowding PLoS	B	B	-	-	-	-	-	-	-		
Level of Service	F	E	-	-	-	-	-	-	-		
Bicycle	Type of Cycling Facility	F	Mixed Traffic	Mixed Traffic							
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)							
	Operating Speed		≥ 60 km/h	≥ 50 to 60 km/h							
	# of Lanes & Operating Speed LoS		F	D	-	-	-	-	-	-	-
	Bike Lane (+ Parking Lane) Width										
	Bike Lane Width LoS		-	-	-	-	-	-	-	-	-
	Bike Lane Blockages										
	Blockage LoS		-	-	-	-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge							
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes							
Sidestreet Operating Speed	>40 to 50 km/h	>40 to 50 km/h									
Unsignalized Crossing - Lowest LoS	B	A	-	-	-	-	-	-	-		
Level of Service	F	D	-	-	-	-	-	-	-		
Transit	Facility Type	-									
	Friction or Ratio Transit:Posted Speed										
Level of Service	-	-	-	-	-	-	-	-	-		
Truck	Truck Lane Width	E	≤ 3.2 m	> 3.7 m							
	Travel Lanes per Direction		1	1							
	Level of Service		E	B	-	-	-	-	-	-	

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation
Scenario	2023 Future Background
Comments	

Project	2019-54
Date	04-Dec-20

SEGMENTS		Street A	Cambrian Road - Borrisokane Road to Seeley's Bay Street	Cambrian Road - Seeley's Bay Street to Greenbank Road	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9
			1	2							
Pedestrian	Sidewalk Width	F	< 1.5 m	1.5 m							
	Boulevard Width		n/a	< 0.5 m							
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000							
	Operating Speed		> 60 km/h	> 30 to 50 km/h							
	On-Street Parking		no	no							
	Exposure to Traffic PLoS		F	E	-	-	-	-	-	-	-
Effective Sidewalk Width	F	1.2 m	1.5 m								
Pedestrian Volume		250 ped/hr	250 ped/hr								
Crowding PLoS		B	B	-	-	-	-	-	-	-	
Level of Service		F	E	-	-	-	-	-	-	-	
Type of Cycling Facility		F	Mixed Traffic	Mixed Traffic							
Number of Travel Lanes			≤ 2 (no centreline)	≤ 2 (no centreline)							
Operating Speed	≥ 60 km/h		≥ 50 to 60 km/h								
# of Lanes & Operating Speed LoS	F		D	-	-	-	-	-	-	-	
Bike Lane (+ Parking Lane) Width											
Bike Lane Width LoS	-		-	-	-	-	-	-	-	-	
Bike Lane Blockages											
Blockage LoS	-		-	-	-	-	-	-	-	-	
Median Refuge Width (no median = < 1.8 m)	< 1.8 m refuge		< 1.8 m refuge								
No. of Lanes at Unsignalized Crossing	≤ 3 lanes		≤ 3 lanes								
Sidestreet Operating Speed	>40 to 50 km/h	>40 to 50 km/h									
Unsignalized Crossing - Lowest LoS	B	A	-	-	-	-	-	-	-		
Level of Service	F	D	-	-	-	-	-	-	-		
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic							
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8							
Level of Service	D	D	-	-	-	-	-	-	-		
Truck	Truck Lane Width	E	≤ 3.2 m	> 3.7 m							
	Travel Lanes per Direction		1	1							
Level of Service	E	B	-	-	-	-	-	-	-		

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation
Scenario	2023 Future Total
Comments	

Project	2019-54
Date	04-Dec-20

SEGMENTS		Street A	Cambrian Road - Borrisokane Road to Seeley's Bay Street	Cambrian Road - Seeley's Bay Street to Greenbank Road	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9
Pedestrian	Sidewalk Width	F	1 < 1.5 m	2 1.5 m							
	Boulevard Width		n/a	< 0.5 m							
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000							
	Operating Speed		> 60 km/h	> 30 to 50 km/h							
	On-Street Parking		no	no							
	Exposure to Traffic PLoS		F	E	-	-	-	-	-	-	-
	Effective Sidewalk Width		1.2 m	1.5 m							
Pedestrian Volume	250 ped/hr	250 ped/hr									
Crowding PLoS	B	B	-	-	-	-	-	-	-		
Level of Service	F	E	-	-	-	-	-	-	-		
Bicycle	Type of Cycling Facility	F	Mixed Traffic	Mixed Traffic							
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)							
	Operating Speed		≥ 60 km/h	≥ 50 to 60 km/h							
	# of Lanes & Operating Speed LoS		F	D	-	-	-	-	-	-	
	Bike Lane (+ Parking Lane) Width										
	Bike Lane Width LoS		-	-	-	-	-	-	-	-	
	Bike Lane Blockages										
	Blockage LoS		-	-	-	-	-	-	-	-	
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge							
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes							
Sidestreet Operating Speed	>40 to 50 km/h	>40 to 50 km/h									
Unsignalized Crossing - Lowest LoS	B	A	-	-	-	-	-	-	-		
Level of Service	F	D	-	-	-	-	-	-	-		
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic							
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8							
Level of Service	D	D	-	-	-	-	-	-	-		
Truck	Truck Lane Width	E	≤ 3.2 m	> 3.7 m							
	Travel Lanes per Direction		1	1							
Level of Service	E	B	-	-	-	-	-	-	-		

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation
Scenario	2028 Future Background
Comments	

Project	2019-54
Date	04-Dec-20

SEGMENTS		Street A	Cambrian Road - Borrisokane Road to Seeley's Bay Street	Cambrian Road - Seeley's Bay Street to Greenbank Road	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9
Pedestrian	Sidewalk Width	F	< 1.5 m	1.5 m							
	Boulevard Width		n/a	< 0.5 m							
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000							
	Operating Speed		> 60 km/h	> 30 to 50 km/h							
	On-Street Parking		no	no							
	Exposure to Traffic PLoS		F	E	-	-	-	-	-	-	-
	Effective Sidewalk Width		1.2 m	1.5 m							
Pedestrian Volume	250 ped/hr	250 ped/hr									
Crowding PLoS	B	B	-	-	-	-	-	-	-		
Level of Service	F	E	-	-	-	-	-	-	-		
Bicycle	Type of Cycling Facility	F	Mixed Traffic	Mixed Traffic							
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)							
	Operating Speed		≥ 60 km/h	≥ 50 to 60 km/h							
	# of Lanes & Operating Speed LoS		F	D	-	-	-	-	-	-	
	Bike Lane (+ Parking Lane) Width										
	Bike Lane Width LoS		-	-	-	-	-	-	-	-	
	Bike Lane Blockages										
	Blockage LoS		-	-	-	-	-	-	-	-	
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge							
	No. of Lanes at Unsignalized Crossing		≤ 3 lanes	≤ 3 lanes							
Sidestreet Operating Speed	>40 to 50 km/h	>40 to 50 km/h									
Unsignalized Crossing - Lowest LoS	B	A	-	-	-	-	-	-			
Level of Service	F	D	-	-	-	-	-	-			
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic							
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8							
Level of Service	D	D	-	-	-	-	-	-			
Truck	Truck Lane Width	E	≤ 3.2 m	> 3.7 m							
	Travel Lanes per Direction		1	1							
Level of Service	E	B	-	-	-	-	-	-			

Multi-Modal Level of Service - Segments Form

Consultant	CGH Transportation
Scenario	2028 Future Total
Comments	

Project	2019-54
Date	04-Dec-20

SEGMENTS		Street A	Cambrian Road - Borrisokane Road to Seeley's Bay Street	Cambrian Road - Seeley's Bay Street to Greenbank Road	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8	Section 9
Pedestrian	Sidewalk Width	F	< 1.5 m	1.5 m							
	Boulevard Width		n/a	< 0.5 m							
	Avg Daily Curb Lane Traffic Volume		> 3000	> 3000							
	Operating Speed		> 60 km/h	> 30 to 50 km/h							
	On-Street Parking		no	no							
	Exposure to Traffic PLoS		F	E	-	-	-	-	-	-	-
	Effective Sidewalk Width		1.2 m	1.5 m							
Pedestrian Volume	250 ped/hr	250 ped/hr									
Crowding PLoS	B	B	-	-	-	-	-	-	-	-	
Level of Service	F	E	-	-	-	-	-	-	-	-	
Bicycle	Type of Cycling Facility	F	Mixed Traffic	Mixed Traffic							
	Number of Travel Lanes		≤ 2 (no centreline)	≤ 2 (no centreline)							
	Operating Speed		≥ 60 km/h	≥ 50 to 60 km/h							
	# of Lanes & Operating Speed LoS		F	D	-	-	-	-	-	-	-
	Bike Lane (+ Parking Lane) Width										
	Bike Lane Width LoS		-	-	-	-	-	-	-	-	-
	Bike Lane Blockages										
	Blockage LoS		-	-	-	-	-	-	-	-	-
	Median Refuge Width (no median = < 1.8 m)		< 1.8 m refuge	< 1.8 m refuge							
No. of Lanes at Unsignalized Crossing	≤ 3 lanes	≤ 3 lanes									
Sidestreet Operating Speed	>40 to 50 km/h	>40 to 50 km/h									
Unsignalized Crossing - Lowest LoS	B	A	-	-	-	-	-	-	-		
Level of Service	F	D	-	-	-	-	-	-	-		
Transit	Facility Type	D	Mixed Traffic	Mixed Traffic							
	Friction or Ratio Transit:Posted Speed		Vt/Vp ≥ 0.8	Vt/Vp ≥ 0.8							
Level of Service	D	D	-	-	-	-	-	-	-		
Truck	Truck Lane Width	E	≤ 3.2 m	> 3.7 m							
	Travel Lanes per Direction		1	1							
	Level of Service		E	B	-	-	-	-	-	-	

Appendix M

Signal Warrants and Roundabout Screening Form

Cambrian Rd at Borrisokane Road
2023 FB

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	798	111%	111%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	490	288%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	471	65%	65%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	143	191%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Cambrian Rd at Borrisokane Road
2023 FT

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	798	111%	111%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	490	288%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	471	65%	65%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	143	191%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Cambrian Rd at Borrisokane Road
2028 FB

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1018	141%	141%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	731	430%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	531	74%	74%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	224	298%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Cambrian Rd at Borrisokane Road
2028 FT

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1018	141%	141%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	731	430%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	531	74%	74%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	224	298%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Temporary Driveway @ Cambrian Road
 FT 2028

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	793	110%	15%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	26	15%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	776	108%	18%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	13	18%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

River Mist Road @ Cambrian Road
2023 Future Background

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	757	105%	105%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	227	134%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	530	74%	74%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	146	194%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2 \text{ or } (AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

River Mist Road @ Cambrian Road
2023 Future Total Conditions

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	910	126%	126%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	241	142%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	670	93%	93%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	157	209%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

River Mist Road @ Cambrian Road
 2028 Future Background Conditions

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	970	135%	135%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	242	142%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	728	101%	101%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	160	213%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

River Mist Road @ Cambrian Road
2028 Future Total Conditions

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	1047	145%	145%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	256	150%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	791	110%	110%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	171	228%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

River Mist Road @ Cambrian Road
2020 Existing Conditions

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	614	85%	85%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	193	114%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	421	58%	58%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	112	150%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, $AHV = PM/2$ or $(AM + PM) / 4$
4. T-intersection factor corrected, applies only to 1B

Site Access #1/Seeley's Bay Street @ Cambrian Road
 FT 2023

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	699	78%	46%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	78	46%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	622	69%	15%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	12	15%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

Site Access #1/Seeley's Bay Street @ Cambrian Road
 FT 2028

Justification #7

Justification	Description	Minimum Requirement		Minimum Requirement		Compliance		Signal	
		1 Lane Highway		2 or More Lanes		Sectional			Entire %
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	835	93%	46%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	78	46%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	758	84%	15%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	12	15%		

Notes

1. Refer to OTM Book 12, pg 88, Nov 2007
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4
4. T-intersection factor corrected, applies only to 1B

3. Roundabout Implementation Policy

The following sections describe a roundabout implementation policy developed for the City of Ottawa, in consultation with a Project Working Group, that is consistent with existing Ottawa City Council policy.

3.1 Background

There are a number of roundabout implementation policies in place in certain Canadian provinces, U.S. states, and other jurisdictions. The most common type is a policy that simply states a roundabout should be “considered” when a new road or highway is built or an existing facility is widening or reconstructed. It is usually left to the service provider to determine in what manner a roundabout is considered.

Another is a “roundabouts first” policy, where a roundabout is deemed preferred unless it can be demonstrated that another alternative is preferred because it will operate better or be significantly less costly. This type of policy is in place in the provinces of British Columbia and Alberta, and in several U.S. states.

Another type is a policy that has been approved by Council in the Region of Waterloo, where roundabouts are considered under the following conditions:

- At any new Regional Road intersection.
- Where traffic signals are warranted.
- Where capacity or safety problems are being experienced.

If one or more of the conditions is met then the location is subjected to an initial screening. Should a roundabout pass the initial screening then an Intersection Control Study (ICS) is undertaken that compares a roundabout and one or more alternatives in terms of several economic and non-economic criteria. The economic criteria comprise construction costs and study period costs (which include maintenance costs and the human capital costs of motor vehicle collisions). The non-economic criteria may include peak hour traffic operations, speed control, access management, conditions for pedestrians and cyclists, impacts to transit services, environmental benefits, etc. After comparing the economic and non-economic evaluation the technically preferred alternative is recommended for implementation.

Similar Intersection Control Studies have been undertaken elsewhere, although they may not necessarily be a requirement of the road authority.

In consultation with the Project Working Group it was decided that a roundabout policy similar to the one in the Region of Waterloo would be most appropriate for the City of Ottawa.

3.2 The Roundabout Screening Tool

Similar to the Region of Waterloo, an initial screening tool was developed for the City. The intent of the tool is to provide a relatively quick assessment of the feasibility of a roundabout at a particular intersection in comparison to other appropriate forms of traffic control or road modifications. The intended outcome is to provide enough information to assist City staff in deciding whether or not to proceed with an ICS to investigate the feasibility of a roundabout in more detail.

The Roundabout Initial Feasibility Screening Tool asks some questions about the intersection, what traditional modifications are being proposed (i.e. installation of traffic signals, addition of auxiliary lanes, etc.), the type of roundabout that would be implemented, and why a roundabout is being considered. It then asks a series of questions related to suitability factors and contra-indications for roundabouts to aid in the decision-making process.

The suitability factor questions are:

- Does the intersection currently experience an average collision frequency of more than 1.5 injury crashes per year, or a collision rate in excess of 1 injury crash per 1 million vehicles entering (MVE)?
- Has there been a fatal crash at the intersection in the last 10 years?
- Are capacity problems currently being experienced, or expected in the future?
- Are traffic signals warranted, or expected to be warranted in the future?
- Does the intersection have more than 4 legs, or unusual geometry?
- Will planned modifications to the intersection require that nearby structures be widened (i.e. to accommodate left-turn lanes)?
- Is the intersection located at a transition between rural and urban environments (i.e. an urban boundary) such that a roundabout could act as a means of speed transition?

If “Yes” is indicated for two or more of the suitability factors, then the tool states that a roundabout should be technically feasible at the subject intersection.

The contra-indication questions are:

- Is there insufficient property at the intersection (i.e. less than 44 metres diameter if considering a single-lane roundabout, and less than 60 metres if considering a two-lane roundabout) or property constraints that would require demolition of adjacent structures?
- Are there any instances where stopping sight distance (SSD) of a roundabout yield line may not be attainable (i.e. the intersection is on a crest vertical curve)?
- Is there an existing uncontrolled approach with a grade in excess of 4 percent?
- Is the intersection located within a coordinated signal system?
- Is there a closely-spaced traffic signal or railway crossing that could not be controlled with a nearby roundabout?
- Are significant differences in directional flows or any situations of sudden high demand expected?
- Are there known visually-impaired pedestrians that cross this intersection?

If “Yes” is indicated for one or more of the contra-indications, then the tool states that a roundabout may be problematic at the subject intersection. That is not to say that a roundabout is not possible, just that there may be difficulties or high costs.

At its conclusion the tool asks for a recommendation whether to proceed with an ICS. An example of the City of Ottawa Roundabout Initial Feasibility Screening Tool, as of May 14, 2013, is provided in **Appendix A**.

3.3 Intersection Control Studies

3.3.1 The Decision Matrix

The means of conducting an Intersection Control Study in the City of Ottawa was discussed with the Project Working Group. It was decided to go with a matrix style approach that would compare economic and non-economic criteria, and be responsive to the needs of individual locations. The rationale for this was brought forward in a memo dated May 16, 2013, which is included in **Appendix B**.

The criteria to be examined should be relevant to the general environment, although additional criteria relevant to the specific location could be incorporated. The base criteria for rural, semi-urban/suburban and urban intersections are listed in **Table 1**.

Table 1 Roundabout Evaluation Criteria

Rural Intersections	Semi-Urban/Suburban Intersections	Urban Intersections
Construction Cost	Construction Cost	Construction Cost
Safety	Safety	Safety
Capacity	Capacity	Capacity
	Pedestrians and Cyclists	Pedestrians and Cyclists
	Environmental	Environmental
	Property Impacts	Access Management
		Transit
		Property Impacts

It was decided that each criteria would be assigned a weight from 1 to 4 based on its subjective importance to the particular location (with 1 being “important enough that the criteria must be considered”, and 4 being “very important for intersection control selection”). The weights would be established by a project team at the start of the ICS. Then, during the course of the ICS each criteria would be assigned a score from 1 to 5, such that the score for both alternatives would have to add to 6.

An example of this evaluation for an urban intersection is seen in **Table 2**.

Table 2 Roundabout Evaluation Matrix – Example Urban Intersection

Criteria	Weight	Signalized Intersection	Roundabout
Construction Cost	2	5	1
Safety	4	3	3
Capacity	3	2	4
Pedestrians and Cyclists	4	4	2
Environmental	1	2	4
Access Management	2	2	4
Transit	2	4	2
Property Impacts	4	5	1
Total		78	54

3.3.2 Evaluating the Criteria

Some of the criteria, namely Construction Cost, Property Impacts and Capacity, can be evaluated objectively using cost estimation techniques and intersection capacity analysis software.

The Safety criterion should be evaluated using models to predict the frequency and severity of collisions that would occur at the intersection during a specified study period following implementation of the alternatives. A score between 1 and 5 would be assigned based on their performance relative to each other. It is suggested that the scores be based on “fatal+injury” collisions only, or be weighted to account for injury severity. The collision predictions could be further weighted by assigning human capital costs to motor vehicle collisions, as is done by the MTO and some other agencies.

The Environmental criterion could be evaluated subjectively, although reasons for assigning collective scores for components of the criterion (such as vehicle noise, fuel consumption and emissions, quantity of impermeable pavement, and area available for landscaping) should be documented.

The Pedestrians & Cyclists criterion would also need to be evaluated subjectively. Collisions involving pedestrians and cyclists are infrequent, as is information regarding statistical levels of safety at roundabouts. Perceived level of safety would be difficult to incorporate into a comparison. Therefore this criterion should be scored based on the “quality” of the facilities for pedestrians and cyclists proposed for each alternative. Quality should be considered a combination of convenience and accessibility. Again, reasons for assigning scores should be documented.

In urban locations the criteria of Access Management and Transit could be evaluated subjectively based on locations of existing or proposed driveways, corridor operating speeds, the type and frequency of transit service, locations for bus stops, and whether there is or are plans for transit priority.

3.3.3 The Roundabout Implementation Process

Similar to the Region of Waterloo, a roundabout should be considered in the City of Ottawa under the following conditions:

- At any new City intersection.
- Where traffic signals are warranted.
- At intersections where capacity or safety problems are being experienced.

If any of these conditions are met then screening for the possibility of a roundabout should be undertaken using the Roundabout Initial Feasibility Screening Tool. If the tool indicates that the feasibility of a roundabout should be investigated in more detail, City staff should proceed with an Intersection Control Study (ICS) to determine whether a roundabout or another alternative is preferred at the subject intersection.

City of Ottawa Roundabout Initial Feasibility Screening Tool

The intent of this screening tool is to provide a relatively quick assessment of the feasibility of a roundabout at a particular intersection in comparison to other appropriate forms of traffic control or road modifications including all-way stop control, traffic signals, auxiliary lanes, etc. The intended outcome of this tool is to provide enough information to assist staff in deciding whether or not to proceed with an Intersection Control Study to investigate the feasibility of a roundabout in more detail.

1	Project Name:	<input type="text"/>
2	Intersection:	<input type="text"/>
3	Location and Description of Intersection: Lane configuration, total or approach AADT, distance to nearby intersection(s), etc. Attach or sketch a diagram and include existing and/or horizon-year turning movements. If an existing intersection then indicate type of control.	<input type="text"/>
4	What traditional modifications are proposed? All-way stop control, traffic signals, auxiliary lanes, etc. Attach or sketch a diagram if necessary.	<input type="text"/>
5	What size of roundabout is being considered? Describe, and attach a Roundabout Traffic Flow Worksheet.	<input type="text"/>
6	Why is a roundabout being considered?	<input type="text"/>

- 7 Are there contra-indications for a roundabout? If “Yes” is indicated for one or more of the contra-indications then a roundabout may be problematic at the subject intersection. That is not to say that a roundabout is not possible, just that there may be difficulties or high costs.

No.	Contra-Indication	Outcome
1	Is there insufficient property at the intersection (i.e. less than 44 metres diameter if considering a single-lane roundabout, and less than 60 metres if considering a two-lane roundabout) or property constraints that would require demolition of adjacent structures?	Yes <input type="checkbox"/> No <input type="checkbox"/>
2	Are there any instances where stopping sight distance (SSD) of a roundabout yield line may not be attainable (i.e. the intersection is on a crest vertical curve)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
3	Is there an existing uncontrolled approach with a grade in excess of 4 percent?	Yes <input type="checkbox"/> No <input type="checkbox"/>
4	Is the intersection located within a coordinated signal system?	Yes <input type="checkbox"/> No <input type="checkbox"/>
5	Is there a closely-spaced traffic signal or railway crossing that could not be controlled with a nearby roundabout?	Yes <input type="checkbox"/> No <input type="checkbox"/>
6	Are significant differences in directional flows or any situations of sudden high demand expected?	Yes <input type="checkbox"/> No <input type="checkbox"/>
7	Are there known visually-impaired pedestrians that cross this intersection?	Yes <input type="checkbox"/> No <input type="checkbox"/>

- 8 Are there suitability factors for a roundabout? If “Yes” is indicated for two or more of the suitability factors then a roundabout should be technically feasible at the subject intersection.

No.	Suitability Factor	Outcome
1	Does the intersection currently experience an average collision frequency of more than 1.5 injury crashes per year, or a collision rate in excess of 1 injury crash per 1 million vehicles entering (MVE)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
2	Has there been a fatal crash at the intersection in the last 10 years?	Yes <input type="checkbox"/> No <input type="checkbox"/>
3	Are capacity problems currently being experienced, or expected in the future?	Yes <input type="checkbox"/> No <input type="checkbox"/>
4	Are traffic signals warranted, or expected to be warranted in the future?	Yes <input type="checkbox"/> No <input type="checkbox"/>
5	Does the intersection have more than 4 legs, or unusual geometry?	Yes <input type="checkbox"/> No <input type="checkbox"/>
6	Will planned modifications to the intersection require that nearby structures be widened (i.e. to accommodate left-turn lanes)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
7	Is the intersection located at a transition between rural and urban environments (i.e. an urban boundary) such that a roundabout could act as a means of speed transition?	Yes <input type="checkbox"/> No <input type="checkbox"/>

- 9 Conclusions/recommendation whether to proceed with an Intersection Control Study:

DRAFT

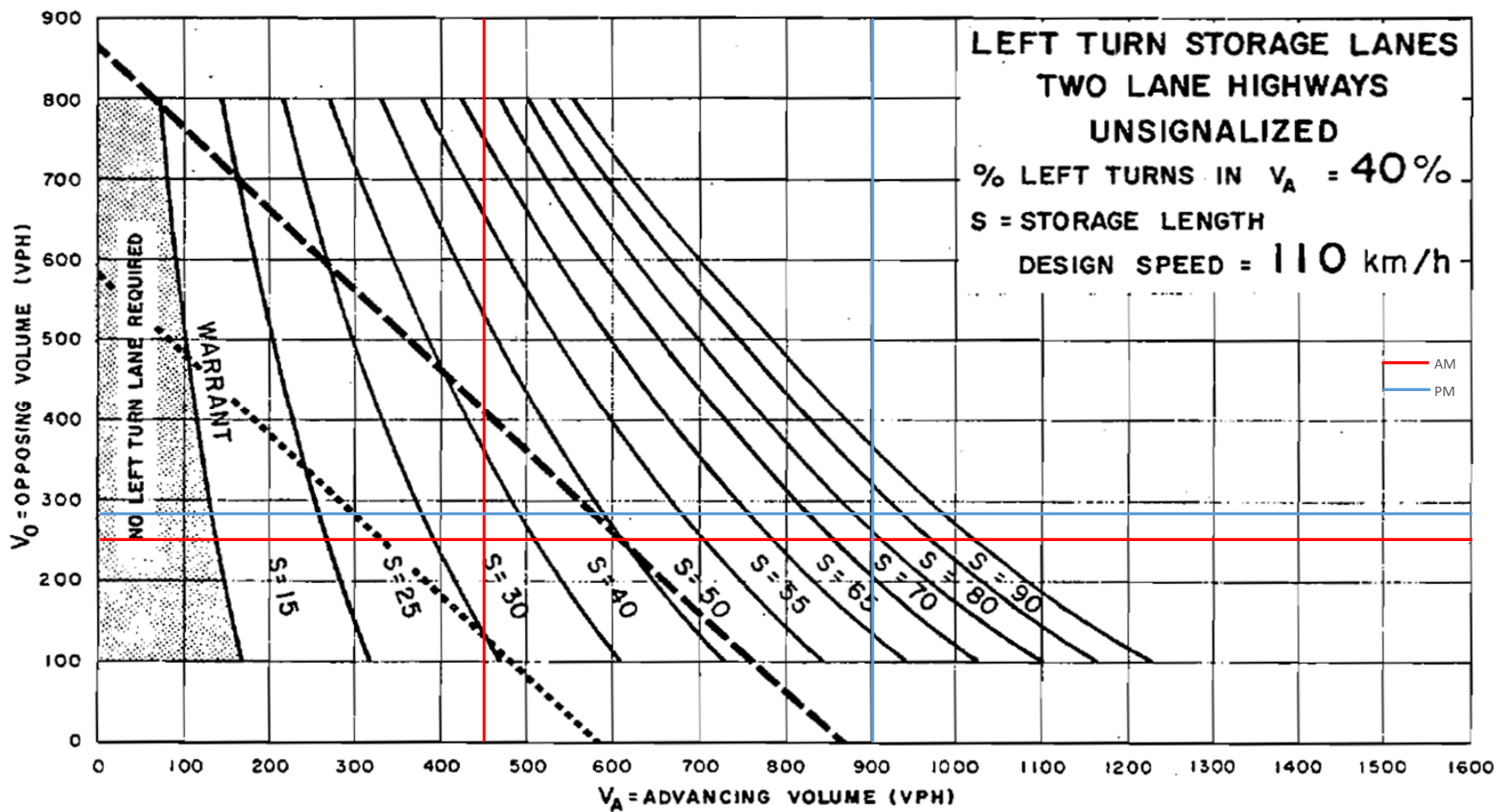
Appendix N

Left-turn Lane Warrants

Cambrian Rd @ Borrisokane Rd

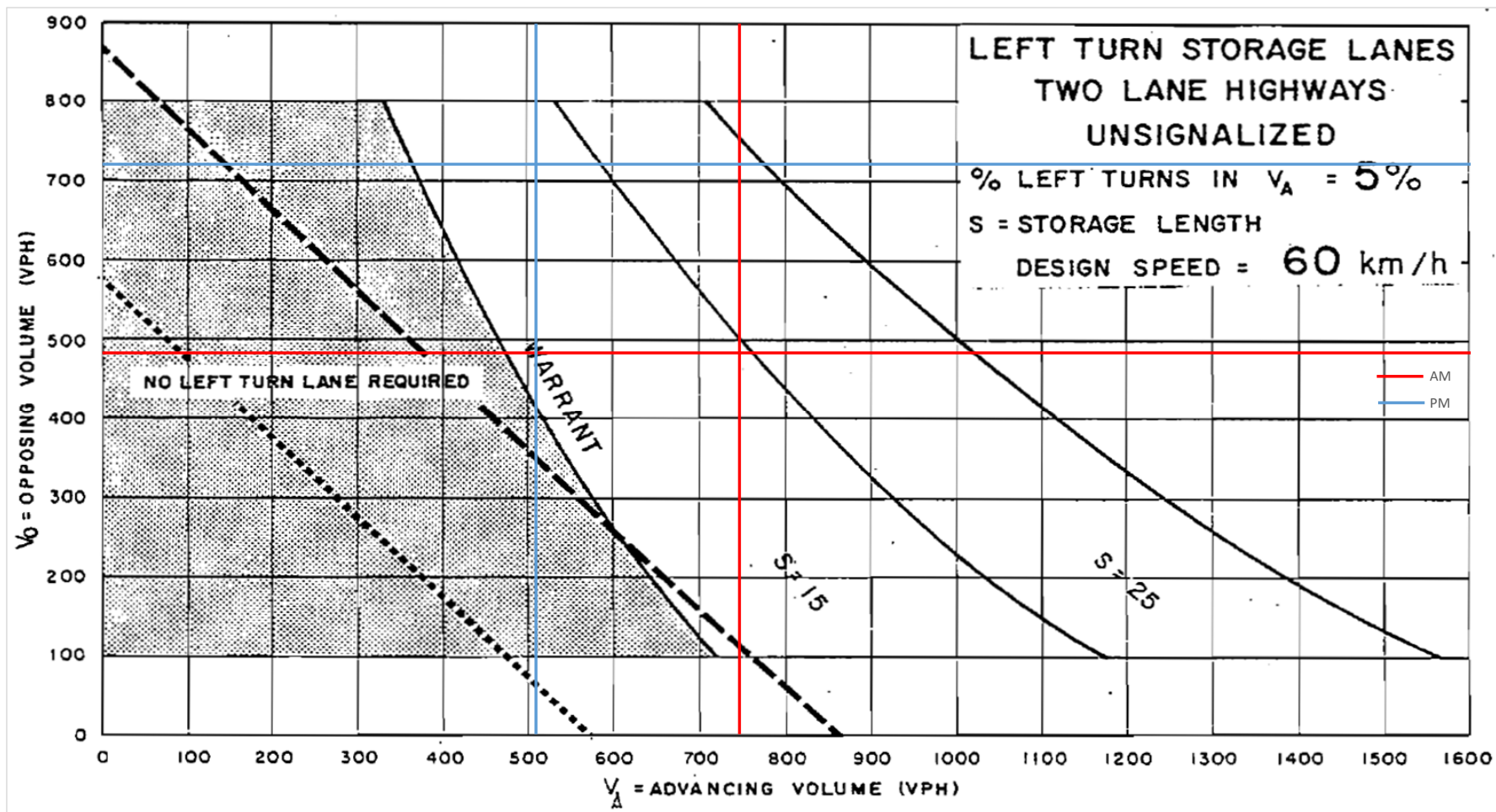
FB 2023

Design Speed	Southbound Left													Yes	%Left Turn	Volume Advancing	Volume Opposing
100 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR					
AM	0	0	0	47	0	782	0	207	45	279	169	0	62.3%	448	252		
PM	0	0	0	43	0	435	0	244	40	685	216	0	76.0%	901	284		



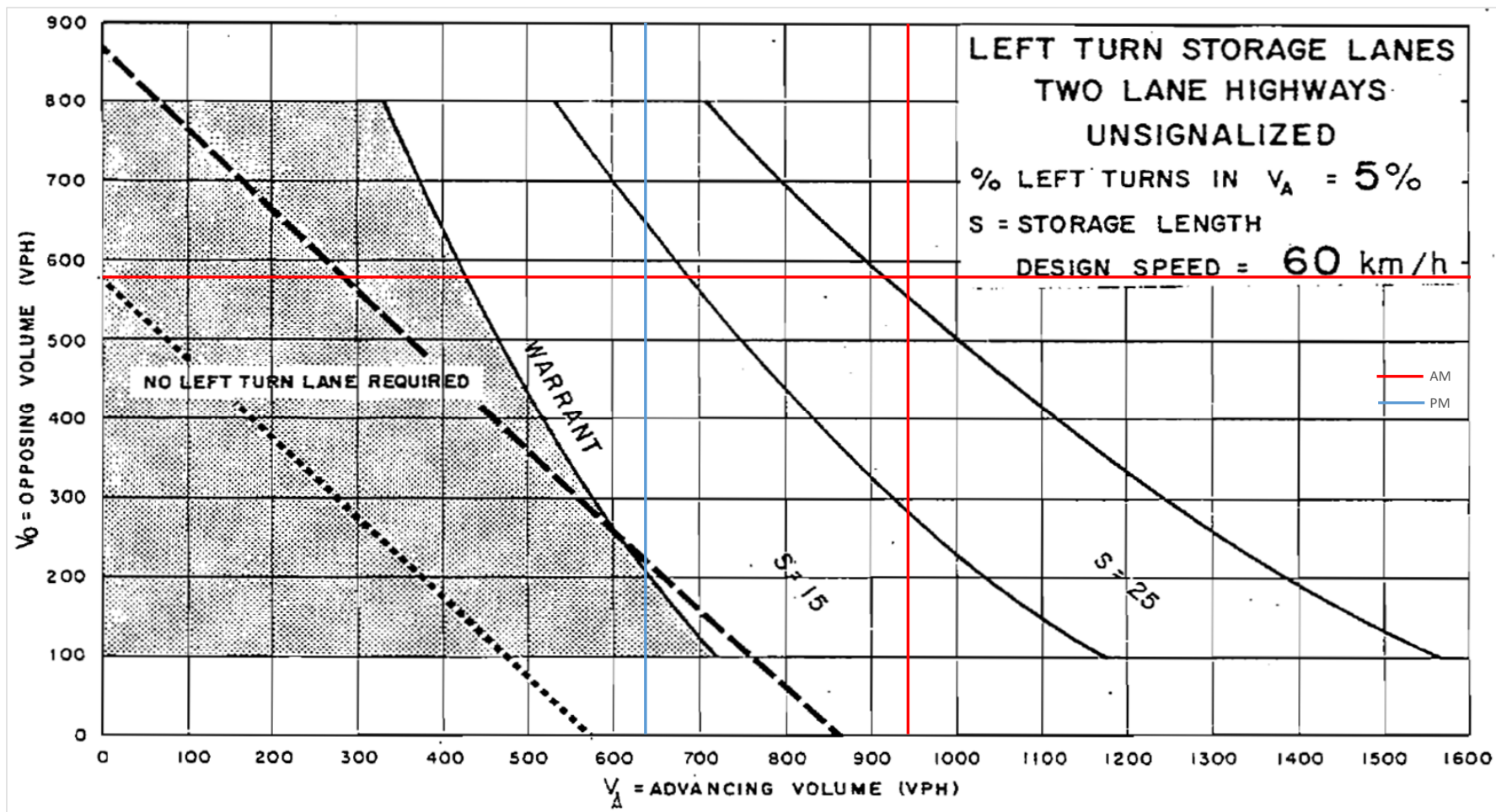
Cambrian Rd @ temporary Driveway
 2023 FT

Design Speed	Westbound Left													%Left Turn	Volume Advancing	Volume Opposing
60 km/h		EBL	EBT	EBR	Yes WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
AM		0	461	22	9	736	0	15	0	6	0	0	0	1.2%	745	483
PM		0	665	57	6	501	0	38	0	9	0	0	0	1.2%	507	722

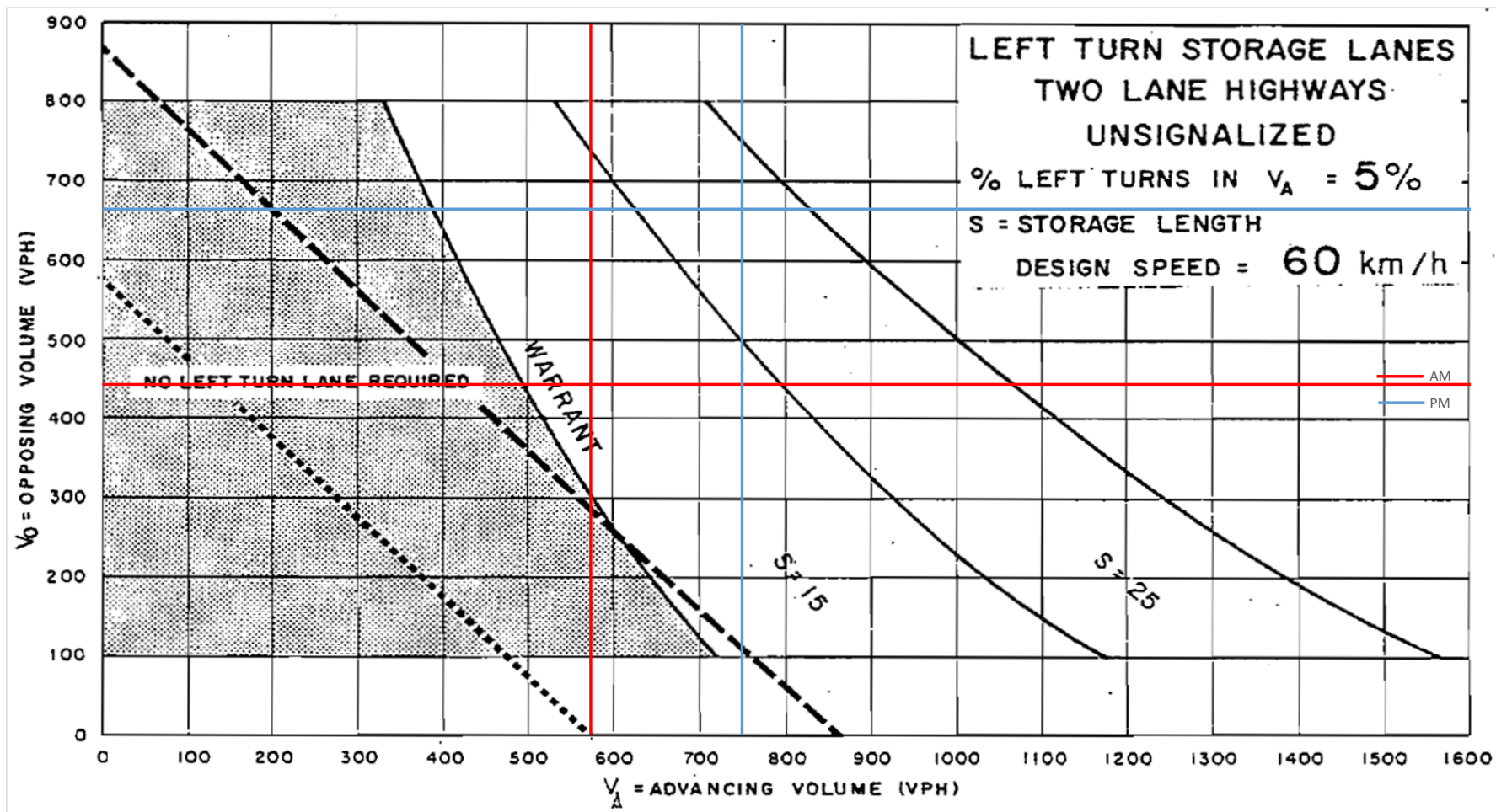


Cambrian Rd @ temporary Driveway
 FT 2028

Design Speed	Westbound Left	Yes											%Left Turn	Volume Advancing	Volume Opposing
60 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
AM	0	557	22	9	933	0	15	0	6	0	0	0	1.0%	942	579
PM	0	863	57	6	629	0	38	0	9	0	0	0	0.9%	635	920

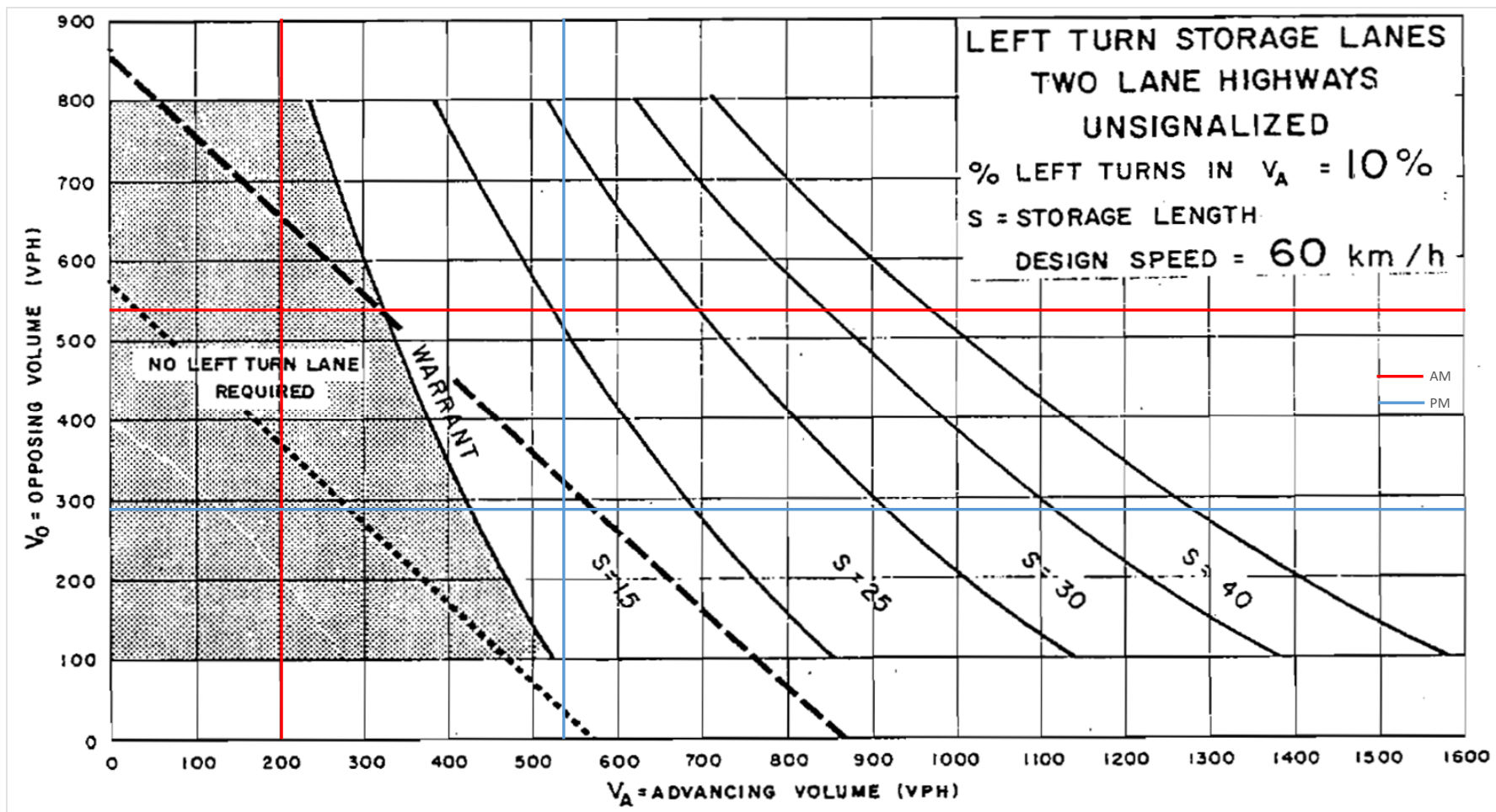


Design Speed	Eastbound Left	Yes																	
60 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing			
	AM		14	444	113	57	341	45	268	54	135	58	17	26	2.5%	571	443		
	PM		20	546	182	151	450	64	157	16	120	29	13	15	2.7%	748	665		



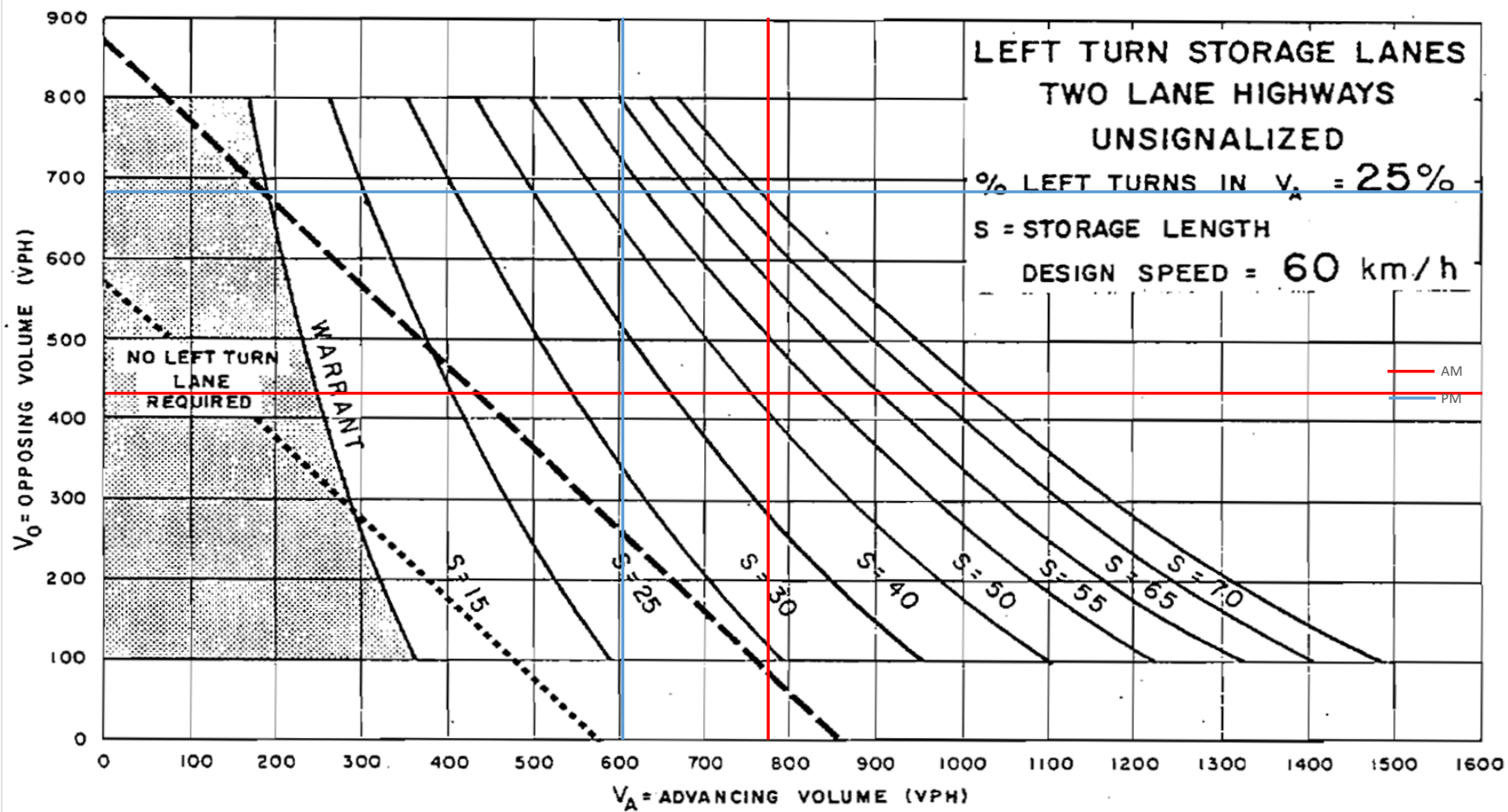
Cambrian Rd @ Seeley's Bay St/Site Access #1
 Existing 2020

Design Speed	Eastbound Left	Yes	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
60 km/h																	
	AM		19	184	0	0	530	6	0	0	0	17	0	53	9.4%	203	536
	PM		49	487	0	0	266	21	0	0	0	9	0	31	9.1%	536	287



Cambrian Rd @ Seeley's Bay St/Site Access #1
 FT 2023

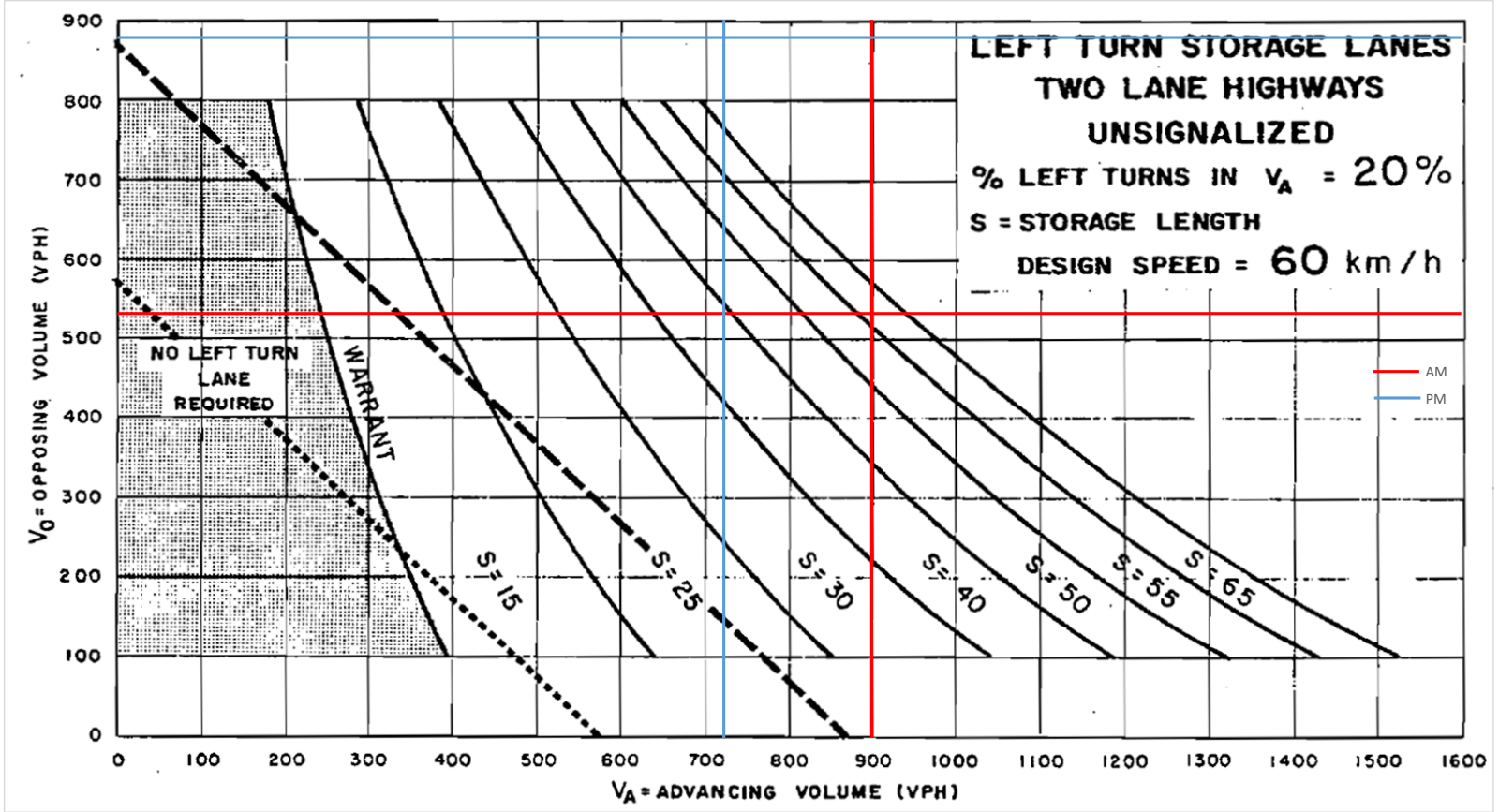
Design Speed 60 km/h	Westbound Left			Yes									%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
AM	19	409	4	48	716	6	3	5	30	17	5	53	6.2%	770	432
PM	49	631	3	131	449	21	7	5	140	9	5	31	21.8%	601	683



Cambrian RRd @ Seeley's Bay St/Site Access #1

FT 2028

Design Speed 60 km/h	Westbound Left			Yes									%Left Turn	Volume Advancing	Volume Opposing
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
AM	19	509	4	48	844	6	3	5	30	17	5	53	5.3%	898	532
PM	49	826	3	131	570	21	7	5	140	9	5	31	18.1%	722	878



Appendix O

Heavy Vehicle % Calculation

[1] Borrisokane Road / Cambrian Road												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	10	2	16	13	0	0	0	0	2	0	16
Total Volume	0	53	12	103	20	0	0	0	0	11	0	373
HV%	#DIV/0!	19%	17%	16%	65%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	18%	#DIV/0!	4%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	2	5	10	2	0	0	0	0	4	0	17
Total Volume	0	41	6	362	40	0	0	0	0	10	0	192
HV%	#DIV/0!	5%	83%	3%	5%	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	40%	#DIV/0!	9%

[2] Seeley's Bay Street / Cambrian Road												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	0	0	0	0	0	0	8	0	0	8	0
Total Volume	0	0	0	8	0	26	7	134	0	0	435	2
HV%	#DIV/0!	#DIV/0!	#DIV/0!	0%	#DIV/0!	0%	0%	6%	#DIV/0!	#DIV/0!	2%	0%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	0	0	0	0	0	0	7	0	0	9	0
Total Volume	0	0	0	3	0	12	25	392	0	0	197	13
HV%	#DIV/0!	#DIV/0!	#DIV/0!	0%	#DIV/0!	0%	0%	2%	#DIV/0!	#DIV/0!	5%	0%

[3] River Mist Road / Cambrian Road												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	3	5	4	2	1	1	3	22	1	8	21	2
Total Volume	121	50	104	58	16	26	14	228	49	49	247	45
HV%	2%	10%	4%	3%	6%	4%	21%	10%	2%	16%	9%	4%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	0	0	7	0	0	0	0	8	1	2	3	0
Total Volume	69	15	103	29	12	15	20	373	94	123	260	64
HV%	0%	0%	7%	0%	0%	0%	0%	2%	1%	2%	1%	0%

[4] Greenbank Road / Cambrian Road												
AM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	3	3	0	4	3	7	3	8	6	4	3	5
Total Volume	95	209	136	76	77	73	114	276	35	69	180	65
HV%	3%	1%	0%	5%	4%	10%	3%	3%	17%	6%	2%	8%
PM												
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
HV Volume	4	1	1	1	3	0	2	4	4	0	0	0
Total Volume	53	198	87	60	313	166	87	230	102	99	232	76
HV%	8%	1%	1%	2%	1%	0%	2%	2%	4%	0%	0%	0%

Appendix P

Synchro and Sidra Intersection Worksheets – Existing Conditions and Mitigation Measures

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2020 Existing - AM
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	14	520	56	18	171	23
Future Volume (vph)	14	520	56	18	171	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.869		0.967			
Flt Protected	0.999					0.958
Satd. Flow (prot)	1480	0	1452	0	0	1399
Flt Permitted	0.999					0.958
Satd. Flow (perm)	1480	0	1452	0	0	1399
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	16	578	62	20	190	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	594	0	82	0	0	216
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.4%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	11.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	T		T		T	
Traffic Vol, veh/h	14	520	56	18	171	23
Future Vol, veh/h	14	520	56	18	171	23
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	90	90	90	90	90	90
Heavy Vehicles, %	18	4	19	17	16	65
Mvmt Flow	16	578	62	20	190	26

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	478	72	0	0	82
Stage 1	72	-	-	-	-
Stage 2	406	-	-	-	-
Critical Hdwy	6.58	6.24	-	-	4.26
Critical Hdwy Stg 1	5.58	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-
Follow-up Hdwy	3.662	3.336	-	-	2.344
Pot Cap-1 Maneuver	518	985	-	-	1431
Stage 1	912	-	-	-	-
Stage 2	640	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	448	985	-	-	1431
Mov Cap-2 Maneuver	448	-	-	-	-
Stage 1	912	-	-	-	-
Stage 2	554	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.7	0	7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	955	1431
HCM Lane V/C Ratio	-	-	0.621	0.133
HCM Control Delay (s)	-	-	14.7	7.9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	4.5	0.5

Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2020 Existing - AM
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	184	530	6	17	53
Future Volume (vph)	19	184	530	6	17	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.898	
Flt Protected		0.995			0.988	
Satd. Flow (prot)	0	1677	1567	0	1393	0
Flt Permitted		0.995			0.988	
Satd. Flow (perm)	0	1677	1567	0	1393	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	21	204	589	7	19	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	225	596	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	41.7%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	19	184	530	6	17	53
Future Vol, veh/h	19	184	530	6	17	53
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	21	204	589	7	19	59

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	601	0	-	0	846 600
Stage 1	-	-	-	-	598 -
Stage 2	-	-	-	-	248 -
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	976	-	-	-	333 501
Stage 1	-	-	-	-	549 -
Stage 2	-	-	-	-	793 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	971	-	-	-	322 498
Mov Cap-2 Maneuver	-	-	-	-	322 -
Stage 1	-	-	-	-	533 -
Stage 2	-	-	-	-	789 -

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	971	-	-	-	440
HCM Lane V/C Ratio	0.022	-	-	-	0.177
HCM Control Delay (s)	8.8	0	-	-	14.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	14	256	77	57	262	45	183	51	135	58	16	26
Future Volume (vph)	14	256	77	57	262	45	183	51	135	58	16	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.970			0.983			0.951			0.965	
Flt Protected		0.998			0.992			0.976			0.972	
Satd. Flow (prot)	0	1427	0	0	1427	0	0	1432	0	0	1448	0
Flt Permitted		0.998			0.992			0.976			0.972	
Satd. Flow (perm)	0	1427	0	0	1427	0	0	1432	0	0	1448	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	16	284	86	63	291	50	203	57	150	64	18	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	386	0	0	404	0	0	410	0	0	111	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	76.7%
ICU Level of Service	D
Analysis Period (min)	15

Intersection	
Intersection Delay, s/veh	30
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	14	256	77	57	262	45	183	51	135	58	16	26
Future Vol, veh/h	14	256	77	57	262	45	183	51	135	58	16	26
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	21	10	2	16	9	4	2	10	4	3	6	4
Mvmt Flow	16	284	86	63	291	50	203	57	150	64	18	29
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	30.2	32.9	31.3	13.9
HCM LOS	D	D	D	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	50%	4%	16%	58%
Vol Thru, %	14%	74%	72%	16%
Vol Right, %	37%	22%	12%	26%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	369	347	364	100
LT Vol	183	14	57	58
Through Vol	51	256	262	16
RT Vol	135	77	45	26
Lane Flow Rate	410	386	404	111
Geometry Grp	1	1	1	1
Degree of Util (X)	0.789	0.767	0.799	0.251
Departure Headway (Hd)	6.932	7.161	7.113	8.133
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	521	505	510	440
Service Time	4.985	5.22	5.17	6.217
HCM Lane V/C Ratio	0.787	0.764	0.792	0.252
HCM Control Delay	31.3	30.2	32.9	13.9
HCM Lane LOS	D	D	D	B
HCM 95th-tile Q	7.3	6.7	7.5	1

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	137	329	39	85	201	69	104	259	166	81	96	82
Future Volume (vph)	137	329	39	85	201	69	104	259	166	81	96	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.990			0.974			0.958			0.957	
Flt Protected		0.987			0.988			0.990			0.985	
Satd. Flow (prot)	0	1504	0	0	1481	0	0	1652	0	0	1580	0
Flt Permitted		0.987			0.988			0.990			0.985	
Satd. Flow (perm)	0	1504	0	0	1481	0	0	1652	0	0	1580	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	152	366	43	94	223	77	116	288	184	90	107	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	561	0	0	394	0	0	588	0	0	288	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	83.4%
ICU Level of Service	E
Analysis Period (min)	15

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2020 Existing - AM - River Mist Improvements
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	14	520	56	18	171	23
Future Volume (vph)	14	520	56	18	171	23
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.869		0.967			
Flt Protected	0.999					0.958
Satd. Flow (prot)	1480	0	1452	0	0	1399
Flt Permitted	0.999					0.958
Satd. Flow (perm)	1480	0	1452	0	0	1399
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	16	578	62	20	190	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	594	0	82	0	0	216
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.4%
	ICU Level of Service B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	11.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	14	520	56	18	171	23
Future Vol, veh/h	14	520	56	18	171	23
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	90	90	90	90	90	90
Heavy Vehicles, %	18	4	19	17	16	65
Mvmt Flow	16	578	62	20	190	26

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	478	72	0	0	82
Stage 1	72	-	-	-	-
Stage 2	406	-	-	-	-
Critical Hdwy	6.58	6.24	-	-	4.26
Critical Hdwy Stg 1	5.58	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-
Follow-up Hdwy	3.662	3.336	-	-	2.344
Pot Cap-1 Maneuver	518	985	-	-	1431
Stage 1	912	-	-	-	-
Stage 2	640	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	448	985	-	-	1431
Mov Cap-2 Maneuver	448	-	-	-	-
Stage 1	912	-	-	-	-
Stage 2	554	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.7	0	7
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	955	1431
HCM Lane V/C Ratio	-	-	0.621	0.133
HCM Control Delay (s)	-	-	14.7	7.9
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	4.5	0.5

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2020 Existing - AM - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	184	530	6	17	53
Future Volume (vph)	19	184	530	6	17	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.898	
Flt Protected		0.995			0.988	
Satd. Flow (prot)	0	1677	1567	0	1393	0
Flt Permitted		0.995			0.988	
Satd. Flow (perm)	0	1677	1567	0	1393	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	21	204	589	7	19	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	225	596	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	41.7%			ICU Level of Service A		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	19	184	530	6	17	53
Future Vol, veh/h	19	184	530	6	17	53
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	21	204	589	7	19	59

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	601	0	-	0	846 600
Stage 1	-	-	-	-	598 -
Stage 2	-	-	-	-	248 -
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	976	-	-	-	333 501
Stage 1	-	-	-	-	549 -
Stage 2	-	-	-	-	793 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	971	-	-	-	322 498
Mov Cap-2 Maneuver	-	-	-	-	322 -
Stage 1	-	-	-	-	533 -
Stage 2	-	-	-	-	789 -

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	971	-	-	-	440
HCM Lane V/C Ratio	0.022	-	-	-	0.177
HCM Control Delay (s)	8.8	0	-	-	14.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - AM - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	14	256	77	57	262	45	183	51	135	58	16	26
Future Volume (vph)	14	256	77	57	262	45	183	51	135	58	16	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.970			0.983			0.951			0.965	
Flt Protected		0.998			0.992			0.976			0.972	
Satd. Flow (prot)	0	1427	0	0	1427	0	0	1432	0	0	1448	0
Flt Permitted		0.998			0.992			0.976			0.972	
Satd. Flow (perm)	0	1427	0	0	1427	0	0	1432	0	0	1448	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	16	284	86	63	291	50	203	57	150	64	18	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	386	0	0	404	0	0	410	0	0	111	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	76.7%
ICU Level of Service	D
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	67.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	14	256	77	57	262	45	183	51	135	58	16	26
Future Vol, veh/h	14	256	77	57	262	45	183	51	135	58	16	26
Conflicting Peds, #/hr	39	0	5	5	0	39	10	0	31	31	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	21	10	2	16	9	4	2	10	4	3	6	4
Mvmt Flow	16	284	86	63	291	50	203	57	150	64	18	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	380	0	0	375	0	0	840	870	363	975	888	365
Stage 1	-	-	-	-	-	-	364	364	-	481	481	-
Stage 2	-	-	-	-	-	-	476	506	-	494	407	-
Critical Hdwy	4.31	-	-	4.26	-	-	7.12	6.6	6.24	7.13	6.56	6.24
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.6	-	6.13	5.56	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.6	-	6.13	5.56	-
Follow-up Hdwy	2.389	-	-	2.344	-	-	3.518	4.09	3.336	3.527	4.054	3.336
Pot Cap-1 Maneuver	1082	-	-	1111	-	-	285	281	677	230	279	676
Stage 1	-	-	-	-	-	-	655	610	-	564	547	-
Stage 2	-	-	-	-	-	-	570	527	-	555	590	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1043	-	-	1106	-	-	236	245	654	127	244	645
Mov Cap-2 Maneuver	-	-	-	-	-	-	236	245	-	127	244	-
Stage 1	-	-	-	-	-	-	639	595	-	532	490	-
Stage 2	-	-	-	-	-	-	483	472	-	368	575	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			1.3			199.6			53.9		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	310	1043	-	-	1106	-	-	178
HCM Lane V/C Ratio	1.323	0.015	-	-	0.057	-	-	0.624
HCM Control Delay (s)	199.6	8.5	0	-	8.5	0	-	53.9
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	20.1	0	-	-	0.2	-	-	3.5

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - AM - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	137	329	39	85	201	69	104	259	166	81	96	82
Future Volume (vph)	137	329	39	85	201	69	104	259	166	81	96	82
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.990			0.974			0.958			0.957	
Flt Protected		0.987			0.988			0.990			0.985	
Satd. Flow (prot)	0	1504	0	0	1481	0	0	1652	0	0	1580	0
Flt Permitted		0.987			0.988			0.990			0.985	
Satd. Flow (perm)	0	1504	0	0	1481	0	0	1652	0	0	1580	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	152	366	43	94	223	77	116	288	184	90	107	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	561	0	0	394	0	0	588	0	0	288	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	83.4%
ICU Level of Service	E
Analysis Period (min)	15

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2020 Existing - PM
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	273	46	7	485	43
Future Volume (vph)	13	273	46	7	485	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.871		0.982			
Flt Protected	0.998					0.956
Satd. Flow (prot)	1402	0	1512	0	0	1649
Flt Permitted	0.998					0.956
Satd. Flow (perm)	1402	0	1512	0	0	1649
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1551.9
Travel Time (s)	58.5		13.1			69.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	40%	9%	5%	83%	3%	5%
Adj. Flow (vph)	14	303	51	8	539	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	0	59	0	0	587
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.7%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	9.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	273	46	7	485	43
Future Vol, veh/h	13	273	46	7	485	43
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	90	90	90	90	90	90
Heavy Vehicles, %	40	9	5	83	3	5
Mvmt Flow	14	303	51	8	539	48

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1181	55	0	0	59
Stage 1	55	-	-	-	-
Stage 2	1126	-	-	-	-
Critical Hdwy	6.8	6.29	-	-	4.13
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.86	3.381	-	-	2.227
Pot Cap-1 Maneuver	177	992	-	-	1538
Stage 1	879	-	-	-	-
Stage 2	262	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	113	992	-	-	1538
Mov Cap-2 Maneuver	113	-	-	-	-
Stage 1	879	-	-	-	-
Stage 2	168	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	7.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	733	1538
HCM Lane V/C Ratio	-	-	0.434	0.35
HCM Control Delay (s)	-	-	13.6	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	2.2	1.6

Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2020 Existing - PM
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	487	266	21	9	31
Future Volume (vph)	49	487	266	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.990		0.896	
Flt Protected		0.995			0.989	
Satd. Flow (prot)	0	1736	1514	0	1392	0
Flt Permitted		0.995			0.989	
Satd. Flow (perm)	0	1736	1514	0	1392	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	6			6	3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	54	541	296	23	10	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	595	319	0	44	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.4%			ICU Level of Service B		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	49	487	266	21	9	31
Future Vol, veh/h	49	487	266	21	9	31
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	5	2	2	2
Mvmt Flow	54	541	296	23	10	34

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	325	0	-	0	966 314
Stage 1	-	-	-	-	314 -
Stage 2	-	-	-	-	652 -
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	1235	-	-	-	282 726
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	518 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1228	-	-	-	261 722
Mov Cap-2 Maneuver	-	-	-	-	261 -
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	515 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1228	-	-	-	517
HCM Lane V/C Ratio	0.044	-	-	-	0.086
HCM Control Delay (s)	8.1	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Future Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.963			0.983			0.935			0.963	
Flt Protected		0.998			0.985			0.978			0.975	
Satd. Flow (prot)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Flt Permitted		0.998			0.985			0.978			0.975	
Satd. Flow (perm)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	13		3	3		13	9		16	16		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	7%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	440	172	168	318	71	126	17	133	32	13	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	634	0	0	557	0	0	276	0	0	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	91.0%						ICU Level of Service F					
Analysis Period (min)	15											

Intersection	
Intersection Delay, s/veh	61.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Future Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	7	2	2	2
Mvmt Flow	22	440	172	168	318	71	126	17	133	32	13	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	90.1	54.9	19.1	13.1
HCM LOS	F	F	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	46%	4%	30%	52%
Vol Thru, %	6%	69%	57%	21%
Vol Right, %	48%	27%	13%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	248	571	501	56
LT Vol	113	20	151	29
Through Vol	15	396	286	12
RT Vol	120	155	64	15
Lane Flow Rate	276	634	557	62
Geometry Grp	1	1	1	1
Degree of Util (X)	0.548	1.095	0.962	0.144
Departure Headway (Hd)	7.428	6.215	6.545	8.681
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	488	584	557	416
Service Time	5.428	4.242	4.545	6.681
HCM Lane V/C Ratio	0.566	1.086	1	0.149
HCM Control Delay	19.1	90.1	54.9	13.1
HCM Lane LOS	C	F	F	B
HCM 95th-tile Q	3.3	19.2	12.8	0.5

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Future Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.969			0.977			0.965			0.959	
Flt Protected		0.989			0.988			0.993			0.995	
Satd. Flow (prot)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Flt Permitted		0.989			0.988			0.993			0.995	
Satd. Flow (perm)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	18		29	29		18	13		16	16		13
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	113	292	123	131	306	90	66	263	117	71	424	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	0	0	527	0	0	446	0	0	711	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	91.5%
ICU Level of Service	F
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2020 Existing - PM - River Mist Improvements
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	273	46	7	485	43
Future Volume (vph)	13	273	46	7	485	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.871		0.982			
Flt Protected	0.998					0.956
Satd. Flow (prot)	1402	0	1512	0	0	1649
Flt Permitted	0.998					0.956
Satd. Flow (perm)	1402	0	1512	0	0	1649
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1551.9
Travel Time (s)	58.5		13.1			69.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	40%	9%	5%	83%	3%	5%
Adj. Flow (vph)	14	303	51	8	539	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	0	59	0	0	587
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.7%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	9.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	273	46	7	485	43
Future Vol, veh/h	13	273	46	7	485	43
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	90	90	90	90	90	90
Heavy Vehicles, %	40	9	5	83	3	5
Mvmt Flow	14	303	51	8	539	48

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1181	55	0	0	59
Stage 1	55	-	-	-	-
Stage 2	1126	-	-	-	-
Critical Hdwy	6.8	6.29	-	-	4.13
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.86	3.381	-	-	2.227
Pot Cap-1 Maneuver	177	992	-	-	1538
Stage 1	879	-	-	-	-
Stage 2	262	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	113	992	-	-	1538
Mov Cap-2 Maneuver	113	-	-	-	-
Stage 1	879	-	-	-	-
Stage 2	168	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	7.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	733	1538
HCM Lane V/C Ratio	-	-	0.434	0.35
HCM Control Delay (s)	-	-	13.6	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	2.2	1.6

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2020 Existing - PM - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	487	266	21	9	31
Future Volume (vph)	49	487	266	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.990		0.896	
Flt Protected		0.995			0.989	
Satd. Flow (prot)	0	1736	1514	0	1392	0
Flt Permitted		0.995			0.989	
Satd. Flow (perm)	0	1736	1514	0	1392	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	6			6	3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	54	541	296	23	10	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	595	319	0	44	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.4%			ICU Level of Service B		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	49	487	266	21	9	31
Future Vol, veh/h	49	487	266	21	9	31
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	5	2	2	2
Mvmt Flow	54	541	296	23	10	34

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	325	0	-	0	966 314
Stage 1	-	-	-	-	314 -
Stage 2	-	-	-	-	652 -
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	1235	-	-	-	282 726
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	518 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1228	-	-	-	261 722
Mov Cap-2 Maneuver	-	-	-	-	261 -
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	515 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1228	-	-	-	517
HCM Lane V/C Ratio	0.044	-	-	-	0.086
HCM Control Delay (s)	8.1	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - PM - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Future Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.963			0.983			0.935			0.963	
Flt Protected		0.998			0.985			0.978			0.975	
Satd. Flow (prot)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Flt Permitted		0.998			0.985			0.978			0.975	
Satd. Flow (perm)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	13		3	3		13	9		16	16		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	7%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	440	172	168	318	71	126	17	133	32	13	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	634	0	0	557	0	0	276	0	0	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	91.0%						ICU Level of Service F					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	70.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Future Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Conflicting Peds, #/hr	13	0	3	3	0	13	9	0	16	16	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	7	2	2	2
Mvmt Flow	22	440	172	168	318	71	126	17	133	32	13	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	402	0	0	615	0	0	1287	1311	545	1364	1362	376
Stage 1	-	-	-	-	-	-	573	573	-	703	703	-
Stage 2	-	-	-	-	-	-	714	738	-	661	659	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.27	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.363	3.518	4.018	3.318
Pot Cap-1 Maneuver	1157	-	-	965	-	-	141	159	529	125	148	670
Stage 1	-	-	-	-	-	-	505	504	-	428	440	-
Stage 2	-	-	-	-	-	-	422	424	-	452	461	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1143	-	-	962	-	-	~100	118	520	66	110	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	~100	118	-	66	110	-
Stage 1	-	-	-	-	-	-	488	487	-	410	337	-
Stage 2	-	-	-	-	-	-	304	325	-	310	446	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			2.9			\$ 366.2			90.9		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	167	1143	-	-	962	-	-	98
HCM Lane V/C Ratio	1.65	0.019	-	-	0.174	-	-	0.635
HCM Control Delay (s)	\$ 366.2	8.2	0	-	9.5	0	-	90.9
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	19	0.1	-	-	0.6	-	-	3.1

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - PM - River Mist Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Future Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.969			0.977			0.965			0.959	
Flt Protected		0.989			0.988			0.993			0.995	
Satd. Flow (prot)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Flt Permitted		0.989			0.988			0.993			0.995	
Satd. Flow (perm)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	18		29	29		18	13		16	16		13
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	113	292	123	131	306	90	66	263	117	71	424	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	0	0	527	0	0	446	0	0	711	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	91.5%
ICU Level of Service	F
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2020 Existing - Saturday
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	273	46	7	485	43
Future Volume (vph)	13	273	46	7	485	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.871		0.982			
Flt Protected	0.998					0.956
Satd. Flow (prot)	1402	0	1512	0	0	1649
Flt Permitted	0.998					0.956
Satd. Flow (perm)	1402	0	1512	0	0	1649
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1551.9
Travel Time (s)	58.5		13.1			69.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	40%	9%	5%	83%	3%	5%
Adj. Flow (vph)	14	303	51	8	539	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	0	59	0	0	587
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.7%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	9.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	273	46	7	485	43
Future Vol, veh/h	13	273	46	7	485	43
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	90	90	90	90	90	90
Heavy Vehicles, %	40	9	5	83	3	5
Mvmt Flow	14	303	51	8	539	48

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1181	55	0	0	59
Stage 1	55	-	-	-	-
Stage 2	1126	-	-	-	-
Critical Hdwy	6.8	6.29	-	-	4.13
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.86	3.381	-	-	2.227
Pot Cap-1 Maneuver	177	992	-	-	1538
Stage 1	879	-	-	-	-
Stage 2	262	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	113	992	-	-	1538
Mov Cap-2 Maneuver	113	-	-	-	-
Stage 1	879	-	-	-	-
Stage 2	168	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	7.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	733	1538
HCM Lane V/C Ratio	-	-	0.434	0.35
HCM Control Delay (s)	-	-	13.6	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	2.2	1.6

Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2020 Existing - Saturday
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	487	266	21	9	31
Future Volume (vph)	49	487	266	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.990		0.896	
Flt Protected		0.995			0.989	
Satd. Flow (prot)	0	1736	1514	0	1392	0
Flt Permitted		0.995			0.989	
Satd. Flow (perm)	0	1736	1514	0	1392	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	6			6	3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	54	541	296	23	10	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	595	319	0	44	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.4%			ICU Level of Service B		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	49	487	266	21	9	31
Future Vol, veh/h	49	487	266	21	9	31
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	5	2	2	2
Mvmt Flow	54	541	296	23	10	34

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	325	0	-	0	966 314
Stage 1	-	-	-	-	314 -
Stage 2	-	-	-	-	652 -
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	1235	-	-	-	282 726
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	518 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1228	-	-	-	261 722
Mov Cap-2 Maneuver	-	-	-	-	261 -
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	515 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1228	-	-	-	517
HCM Lane V/C Ratio	0.044	-	-	-	0.086
HCM Control Delay (s)	8.1	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

2020 Existing - Saturday
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Future Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.963			0.983			0.935			0.963	
Flt Protected		0.998			0.985			0.978			0.975	
Satd. Flow (prot)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Flt Permitted		0.998			0.985			0.978			0.975	
Satd. Flow (perm)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	13		3	3		13	9		16	16		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	7%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	440	172	168	318	71	126	17	133	32	13	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	634	0	0	557	0	0	276	0	0	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	91.0%						ICU Level of Service F					
Analysis Period (min)	15											

Intersection	
Intersection Delay, s/veh	61.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Future Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	7	2	2	2
Mvmt Flow	22	440	172	168	318	71	126	17	133	32	13	17
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	90.1	54.9	19.1	13.1
HCM LOS	F	F	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	46%	4%	30%	52%
Vol Thru, %	6%	69%	57%	21%
Vol Right, %	48%	27%	13%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	248	571	501	56
LT Vol	113	20	151	29
Through Vol	15	396	286	12
RT Vol	120	155	64	15
Lane Flow Rate	276	634	557	62
Geometry Grp	1	1	1	1
Degree of Util (X)	0.548	1.095	0.962	0.144
Departure Headway (Hd)	7.428	6.215	6.545	8.681
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	488	584	557	416
Service Time	5.428	4.242	4.545	6.681
HCM Lane V/C Ratio	0.566	1.086	1	0.149
HCM Control Delay	19.1	90.1	54.9	13.1
HCM Lane LOS	C	F	F	B
HCM 95th-tile Q	3.3	19.2	12.8	0.5

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - Saturday
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Future Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.969			0.977			0.965			0.959	
Flt Protected		0.989			0.988			0.993			0.995	
Satd. Flow (prot)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Flt Permitted		0.989			0.988			0.993			0.995	
Satd. Flow (perm)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	18		29	29		18	13		16	16		13
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	113	292	123	131	306	90	66	263	117	71	424	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	0	0	527	0	0	446	0	0	711	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary
 Area Type: Other
 Control Type: Roundabout
 Intersection Capacity Utilization 91.5% ICU Level of Service F
 Analysis Period (min) 15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2020 Existing - Saturday - River Mist Improvements

3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	273	46	7	485	43
Future Volume (vph)	13	273	46	7	485	43
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.871		0.982			
Flt Protected	0.998					0.956
Satd. Flow (prot)	1402	0	1512	0	0	1649
Flt Permitted	0.998					0.956
Satd. Flow (perm)	1402	0	1512	0	0	1649
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1551.9
Travel Time (s)	58.5		13.1			69.8
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	40%	9%	5%	83%	3%	5%
Adj. Flow (vph)	14	303	51	8	539	48
Shared Lane Traffic (%)						
Lane Group Flow (vph)	317	0	59	0	0	587
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.7%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	9.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	273	46	7	485	43
Future Vol, veh/h	13	273	46	7	485	43
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	90	90	90	90	90	90
Heavy Vehicles, %	40	9	5	83	3	5
Mvmt Flow	14	303	51	8	539	48

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1181	55	0	0	59
Stage 1	55	-	-	-	-
Stage 2	1126	-	-	-	-
Critical Hdwy	6.8	6.29	-	-	4.13
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.86	3.381	-	-	2.227
Pot Cap-1 Maneuver	177	992	-	-	1538
Stage 1	879	-	-	-	-
Stage 2	262	-	-	-	-
Platoon blocked, %					
Mov Cap-1 Maneuver	113	992	-	-	1538
Mov Cap-2 Maneuver	113	-	-	-	-
Stage 1	879	-	-	-	-
Stage 2	168	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	7.9
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT
Capacity (veh/h)	-	-	733	1538
HCM Lane V/C Ratio	-	-	0.434	0.35
HCM Control Delay (s)	-	-	13.6	8.6
HCM Lane LOS	-	-	B	A
HCM 95th %tile Q(veh)	-	-	2.2	1.6

Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2020 Existing - Saturday - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	487	266	21	9	31
Future Volume (vph)	49	487	266	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.990		0.896	
Flt Protected		0.995			0.989	
Satd. Flow (prot)	0	1736	1514	0	1392	0
Flt Permitted		0.995			0.989	
Satd. Flow (perm)	0	1736	1514	0	1392	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	6			6	3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	5%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	54	541	296	23	10	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	595	319	0	44	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.4%			ICU Level of Service B		
Analysis Period (min)	15					

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	49	487	266	21	9	31
Future Vol, veh/h	49	487	266	21	9	31
Conflicting Peds, #/hr	6	0	0	6	3	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	5	2	2	2
Mvmt Flow	54	541	296	23	10	34

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	325	0	-	0	966 314
Stage 1	-	-	-	-	314 -
Stage 2	-	-	-	-	652 -
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	1235	-	-	-	282 726
Stage 1	-	-	-	-	741 -
Stage 2	-	-	-	-	518 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1228	-	-	-	261 722
Mov Cap-2 Maneuver	-	-	-	-	261 -
Stage 1	-	-	-	-	690 -
Stage 2	-	-	-	-	515 -

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1228	-	-	-	517
HCM Lane V/C Ratio	0.044	-	-	-	0.086
HCM Control Delay (s)	8.1	0	-	-	12.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2020 Existing - Saturday - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Future Volume (vph)	20	396	155	151	286	64	113	15	120	29	12	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.963			0.983			0.935			0.963	
Flt Protected		0.998			0.985			0.978			0.975	
Satd. Flow (prot)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Flt Permitted		0.998			0.985			0.978			0.975	
Satd. Flow (perm)	0	1509	0	0	1521	0	0	1403	0	0	1475	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	13		3	3		13	9		16	16		9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	7%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	440	172	168	318	71	126	17	133	32	13	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	634	0	0	557	0	0	276	0	0	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	91.0%						ICU Level of Service F					
Analysis Period (min)	15											

Intersection												
Int Delay, s/veh	70.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Future Vol, veh/h	20	396	155	151	286	64	113	15	120	29	12	15
Conflicting Peds, #/hr	13	0	3	3	0	13	9	0	16	16	0	9
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	7	2	2	2
Mvmt Flow	22	440	172	168	318	71	126	17	133	32	13	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	402	0	0	615	0	0	1287	1311	545	1364	1362	376
Stage 1	-	-	-	-	-	-	573	573	-	703	703	-
Stage 2	-	-	-	-	-	-	714	738	-	661	659	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.27	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.363	3.518	4.018	3.318
Pot Cap-1 Maneuver	1157	-	-	965	-	-	141	159	529	125	148	670
Stage 1	-	-	-	-	-	-	505	504	-	428	440	-
Stage 2	-	-	-	-	-	-	422	424	-	452	461	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1143	-	-	962	-	-	~ 100	118	520	66	110	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 100	118	-	66	110	-
Stage 1	-	-	-	-	-	-	488	487	-	410	337	-
Stage 2	-	-	-	-	-	-	304	325	-	310	446	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			2.9			\$ 366.2			90.9		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	167	1143	-	-	962	-	-	98
HCM Lane V/C Ratio	1.65	0.019	-	-	0.174	-	-	0.635
HCM Control Delay (s)	\$ 366.2	8.2	0	-	9.5	0	-	90.9
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	19	0.1	-	-	0.6	-	-	3.1

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2020 Existing - Saturday - River Mist Improvements

3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Future Volume (vph)	102	263	111	118	275	81	59	237	105	64	382	194
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.969			0.977			0.965			0.959	
Flt Protected		0.989			0.988			0.993			0.995	
Satd. Flow (prot)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Flt Permitted		0.989			0.988			0.993			0.995	
Satd. Flow (perm)	0	1498	0	0	1516	0	0	1658	0	0	1665	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	18		29	29		18	13		16	16		13
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	2%	2%	2%	8%	2%	2%	2%	2%	2%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	113	292	123	131	306	90	66	263	117	71	424	216
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	528	0	0	527	0	0	446	0	0	711	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	91.5%
ICU Level of Service	F
Analysis Period (min)	15

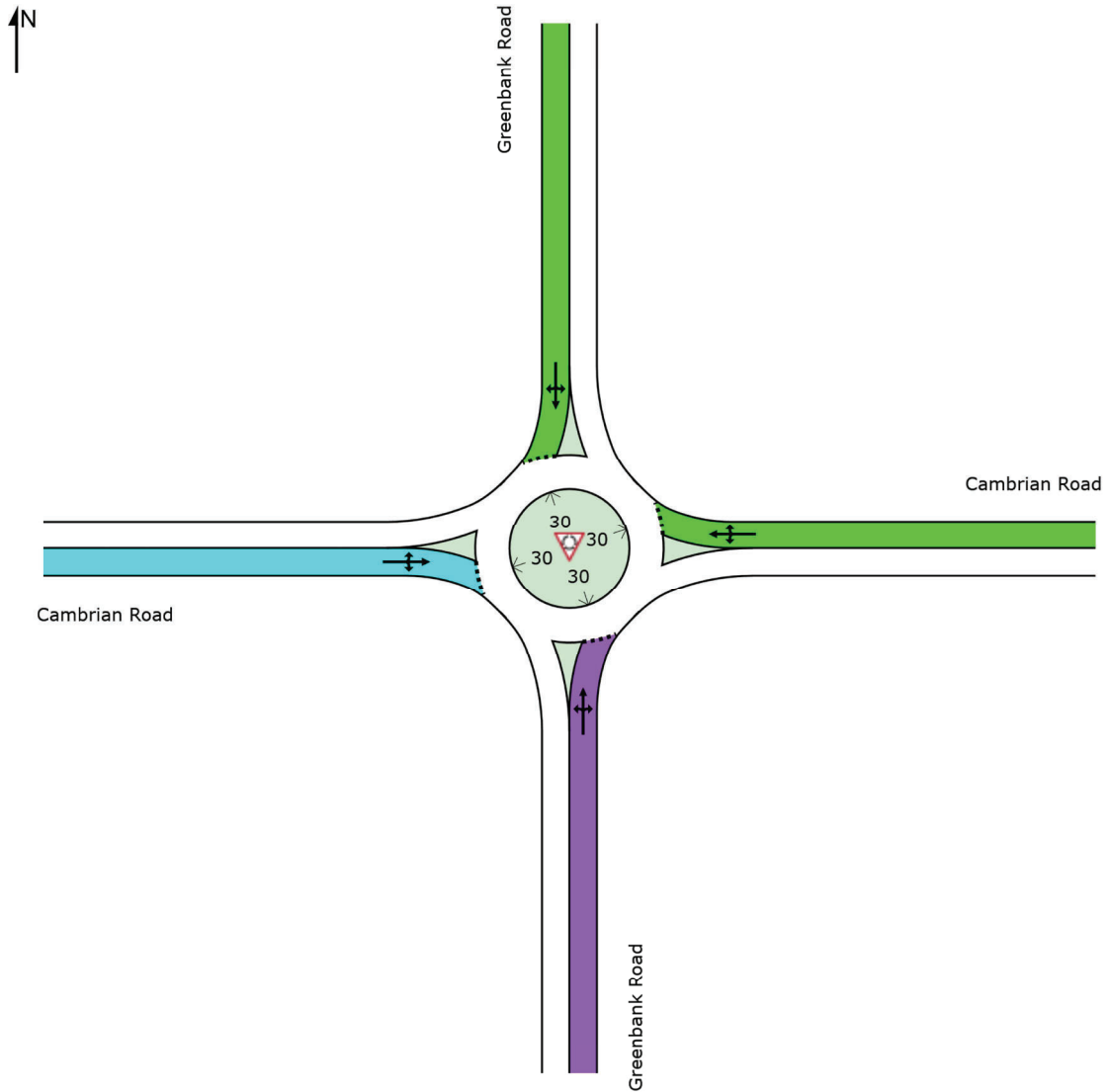
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

 Site: 101 [Cambrian and Greenbank 2020 Existing AM]

New Site
 Site Category: (None)
 Roundabout

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.89	0.57	0.38	0.63	0.89



Colour code based on Degree of Saturation



DELAY (CONTROL)

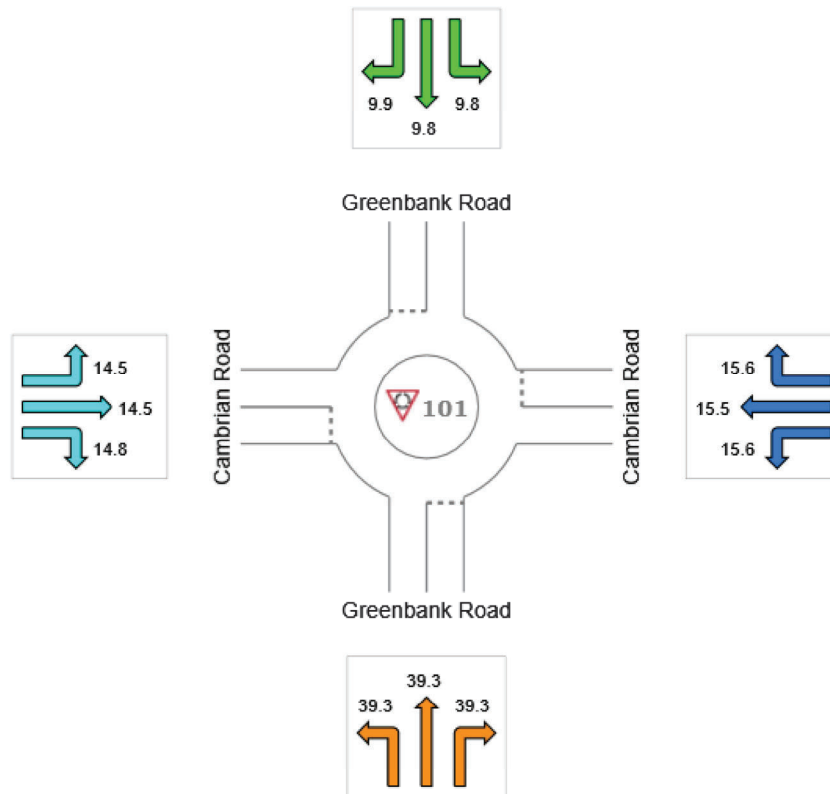
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Cambrian and Greenbank 2020 Existing AM]**

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	39.3	15.5	9.8	14.5	22.0
LOS	E	C	A	B	C



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

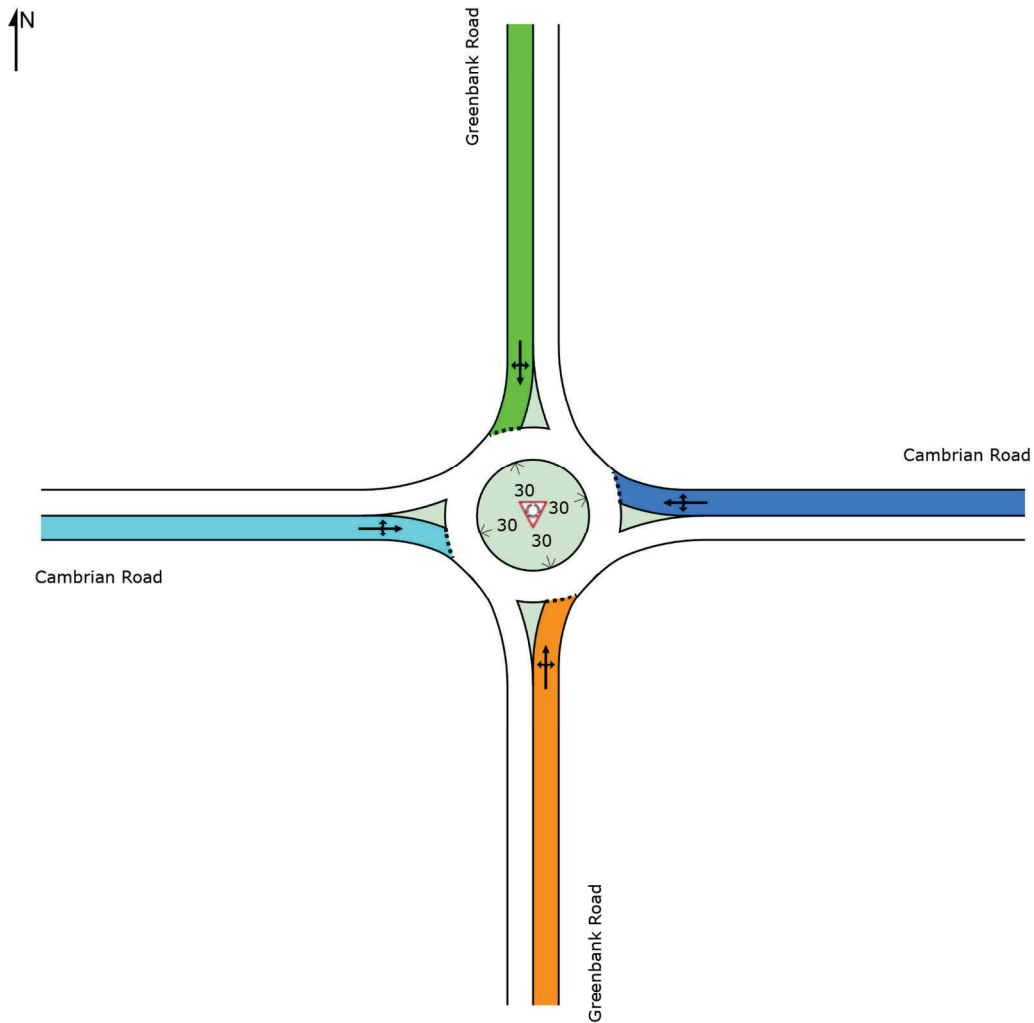
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2020 Existing AM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	C	A	B	C



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2020 Existing AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	108	3.0	0.889	39.3	LOS E	15.1	107.4	0.97	1.60	2.83	22.5
2	T1	273	2.0	0.889	39.3	LOS E	15.1	107.4	0.97	1.60	2.83	23.4
3	R2	175	2.0	0.889	39.3	LOS E	15.1	107.4	0.97	1.60	2.83	19.0
Approach		556	2.2	0.889	39.3	LOS E	15.1	107.4	0.97	1.60	2.83	21.9
East: Cambrian Road												
4	L2	89	6.0	0.572	15.6	LOS C	4.1	29.9	0.70	0.90	1.18	31.0
5	T1	211	2.0	0.572	15.5	LOS C	4.1	29.9	0.70	0.90	1.18	33.0
6	R2	73	8.0	0.572	15.6	LOS C	4.1	29.9	0.70	0.90	1.18	32.9
Approach		373	4.1	0.572	15.5	LOS C	4.1	29.9	0.70	0.90	1.18	32.6
North: Greenbank Road												
7	L2	85	5.0	0.375	9.8	LOS A	1.6	11.9	0.56	0.55	0.58	39.9
8	T1	101	4.0	0.375	9.8	LOS A	1.6	11.9	0.56	0.55	0.58	40.0
9	R2	85	10.0	0.375	9.9	LOS A	1.6	11.9	0.56	0.55	0.58	39.0
Approach		272	6.2	0.375	9.8	LOS A	1.6	11.9	0.56	0.55	0.58	39.6
West: Cambrian Road												
10	L2	142	3.0	0.630	14.5	LOS B	6.7	48.8	0.65	0.79	1.05	37.3
11	T1	342	3.0	0.630	14.5	LOS B	6.7	48.8	0.65	0.79	1.05	33.7
12	R2	41	17.0	0.630	14.8	LOS B	6.7	48.8	0.65	0.79	1.05	32.1
Approach		525	4.1	0.630	14.5	LOS B	6.7	48.8	0.65	0.79	1.05	34.6
All Vehicles		1725	3.8	0.889	22.0	LOS C	15.1	107.4	0.75	1.04	1.58	29.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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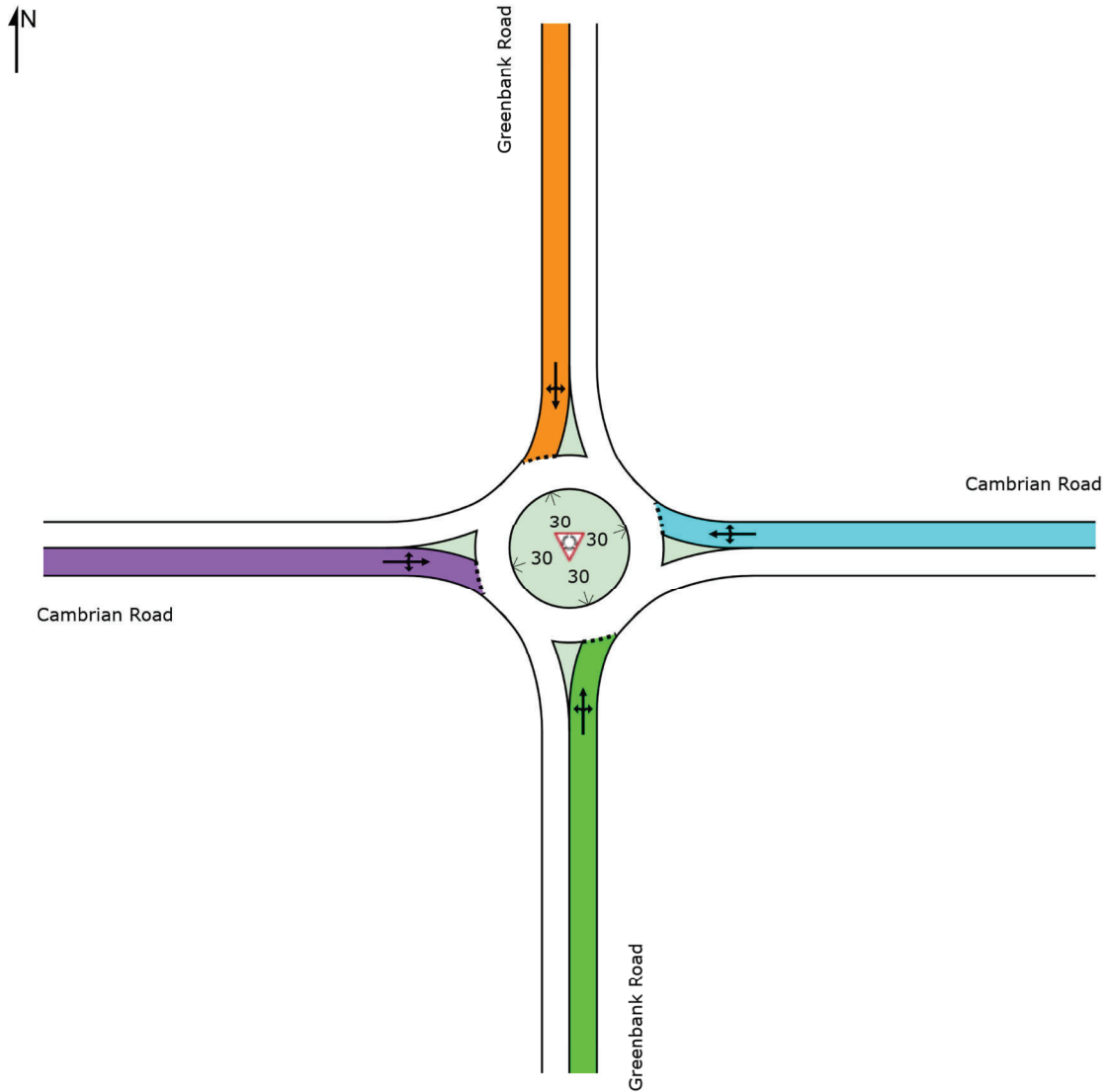
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

 Site: 101 [Cambrian and Greenbank 2020 Existing PM]

New Site
 Site Category: (None)
 Roundabout

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.60	0.68	0.97	0.81	0.97



Colour code based on Degree of Saturation



DELAY (CONTROL)

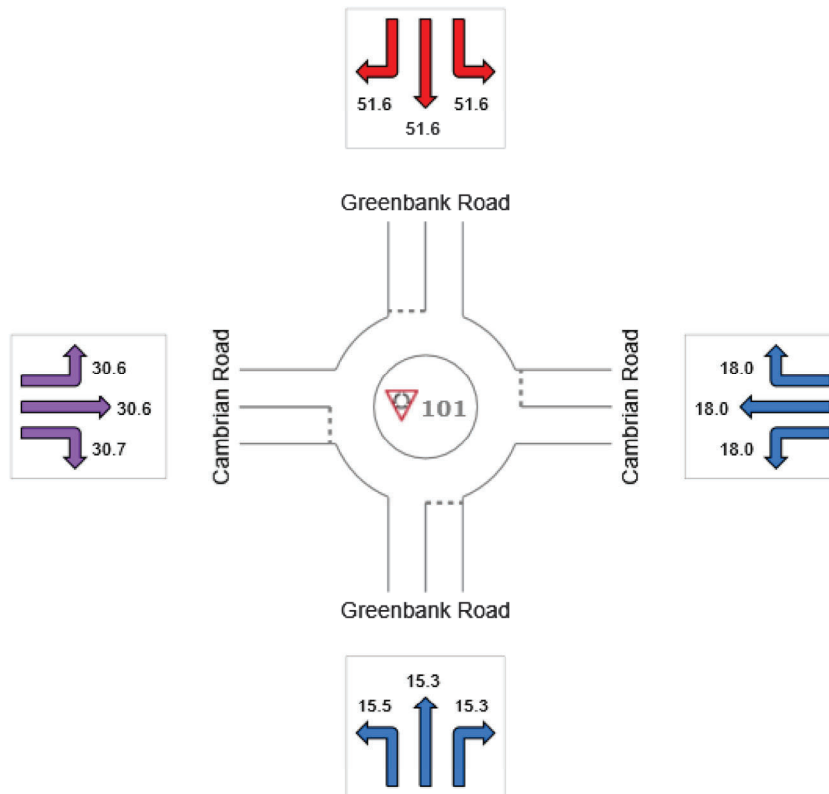
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Cambrian and Greenbank 2020 Existing PM]**

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	15.4	18.0	51.6	30.6	31.3
LOS	C	C	F	D	D



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

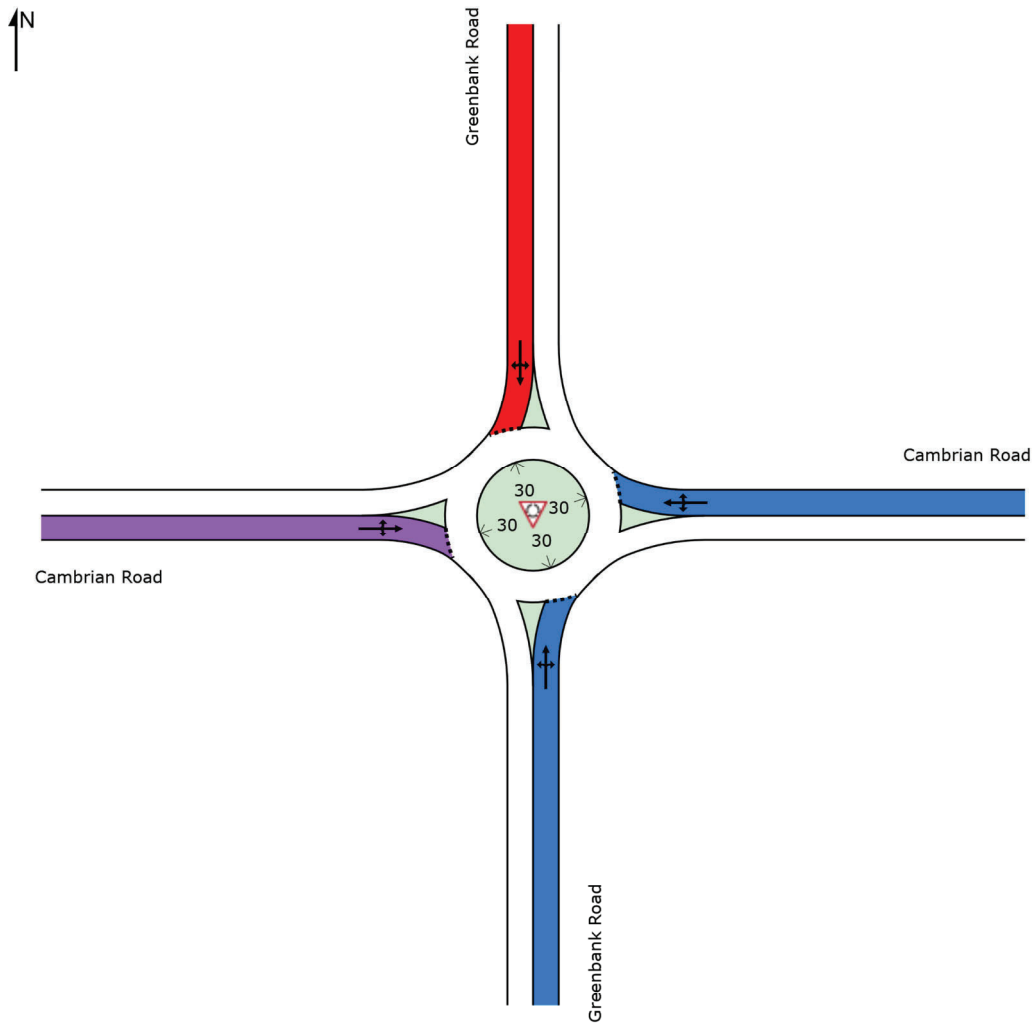
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2020 Existing PM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	F	D	D



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2020 Existing PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	61	8.0	0.597	15.5	LOS C	4.9	35.3	0.70	0.88	1.19	34.6
2	T1	249	2.0	0.597	15.3	LOS C	4.9	35.3	0.70	0.88	1.19	36.0
3	R2	111	2.0	0.597	15.3	LOS C	4.9	35.3	0.70	0.88	1.19	30.0
Approach		421	2.9	0.597	15.4	LOS C	4.9	35.3	0.70	0.88	1.19	34.3
East: Cambrian Road												
4	L2	124	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	29.5
5	T1	286	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.3
6	R2	85	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.8
Approach		496	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.0
North: Greenbank Road												
7	L2	67	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.0
8	T1	402	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.0
9	R2	202	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	21.4
Approach		672	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.4
West: Cambrian Road												
10	L2	105	2.0	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	28.6
11	T1	276	2.0	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	25.0
12	R2	117	4.0	0.814	30.7	LOS D	10.3	73.8	0.89	1.40	2.21	24.5
Approach		498	2.5	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	25.7
All Vehicles		2086	2.3	0.971	31.3	LOS D	26.6	189.7	0.86	1.40	2.30	25.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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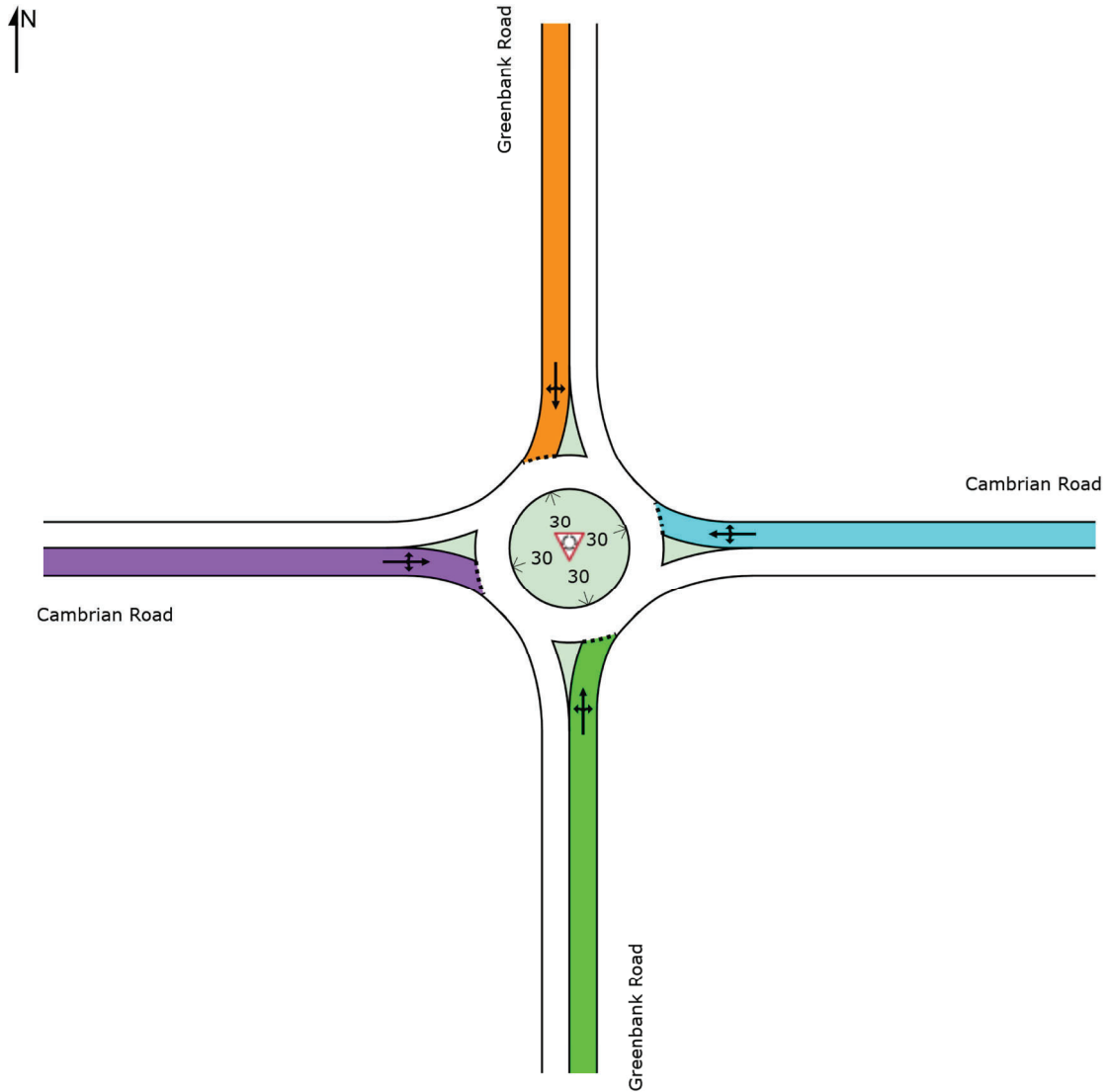
DEGREE OF SATURATION

Ratio of Demand Volume to Capacity, v/c ratio per lane

 Site: 101 [Cambrian and Greenbank 2020 Existing Sat]

New Site
 Site Category: (None)
 Roundabout

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.60	0.68	0.97	0.81	0.97



Colour code based on Degree of Saturation



DELAY (CONTROL)

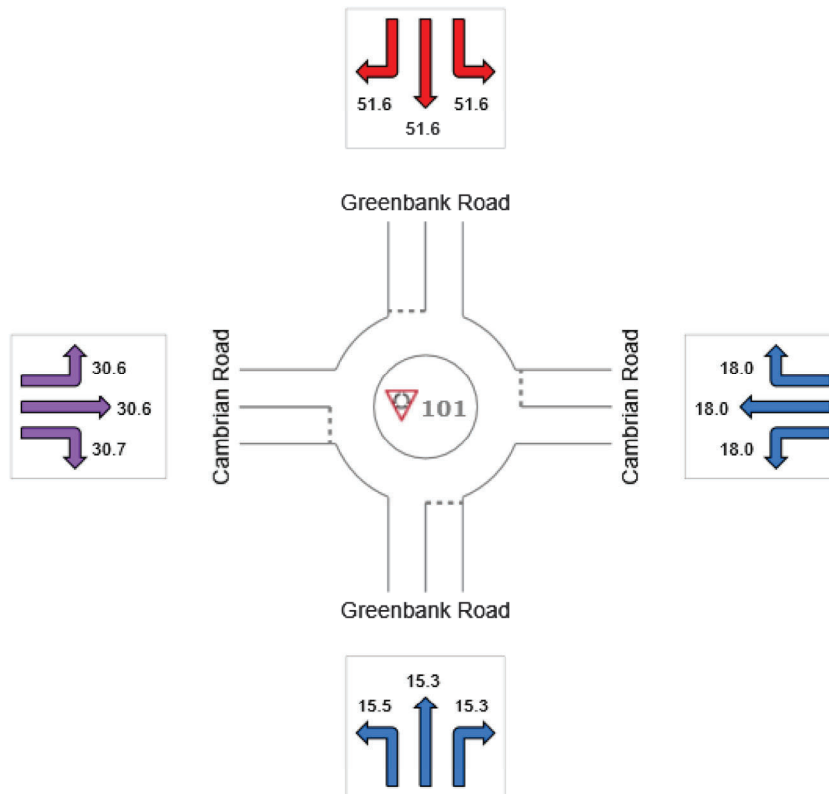
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Cambrian and Greenbank 2020 Existing Sat]**

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	15.4	18.0	51.6	30.6	31.3
LOS	C	C	F	D	D



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

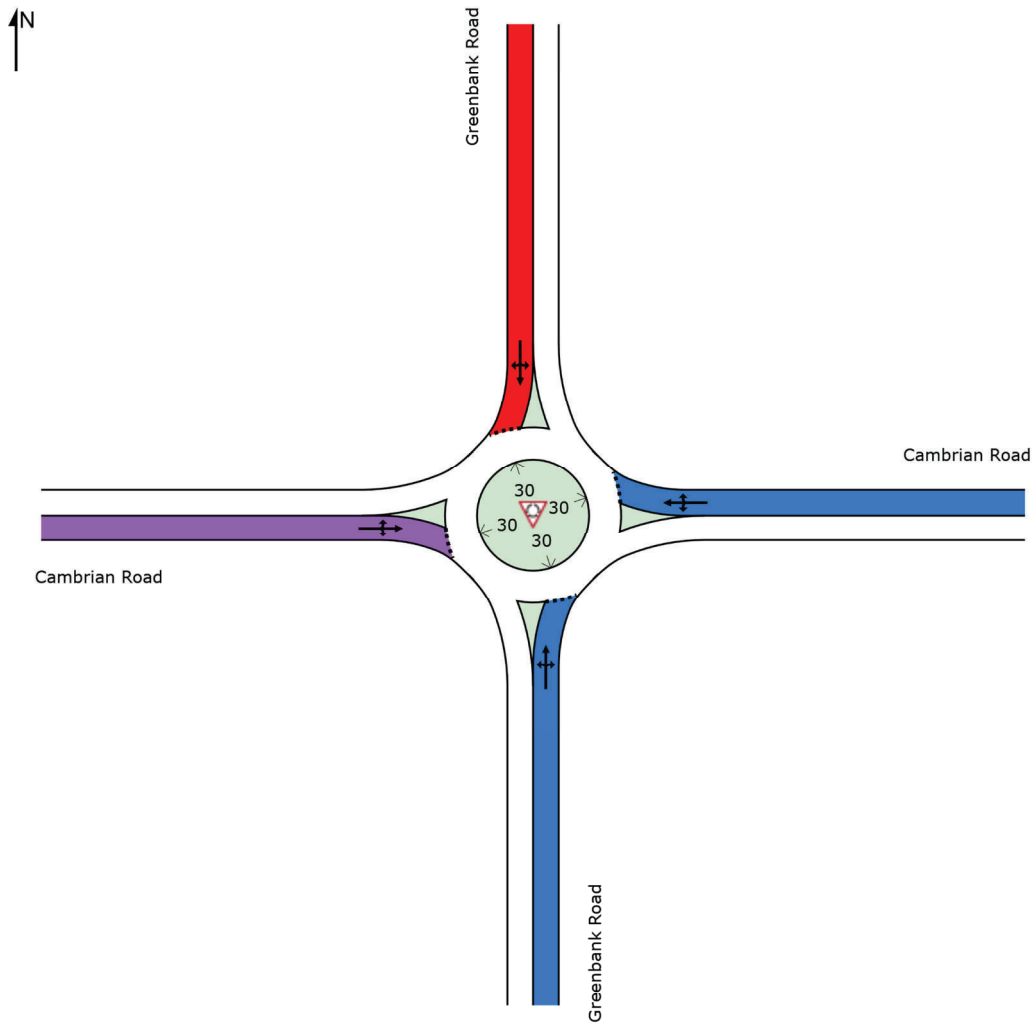
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2020 Existing Sat]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	C	F	D	D



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2020 Existing Sat]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	61	8.0	0.597	15.5	LOS C	4.9	35.3	0.70	0.88	1.19	34.6
2	T1	249	2.0	0.597	15.3	LOS C	4.9	35.3	0.70	0.88	1.19	36.0
3	R2	111	2.0	0.597	15.3	LOS C	4.9	35.3	0.70	0.88	1.19	30.0
Approach		421	2.9	0.597	15.4	LOS C	4.9	35.3	0.70	0.88	1.19	34.3
East: Cambrian Road												
4	L2	124	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	29.5
5	T1	286	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.3
6	R2	85	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.8
Approach		496	2.0	0.677	18.0	LOS C	7.3	51.8	0.76	1.05	1.43	31.0
North: Greenbank Road												
7	L2	67	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.0
8	T1	402	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.0
9	R2	202	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	21.4
Approach		672	2.0	0.971	51.6	LOS F	26.6	189.7	1.00	1.97	3.70	20.4
West: Cambrian Road												
10	L2	105	2.0	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	28.6
11	T1	276	2.0	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	25.0
12	R2	117	4.0	0.814	30.7	LOS D	10.3	73.8	0.89	1.40	2.21	24.5
Approach		498	2.5	0.814	30.6	LOS D	10.3	73.8	0.89	1.40	2.21	25.7
All Vehicles		2086	2.3	0.971	31.3	LOS D	26.6	189.7	0.86	1.40	2.30	25.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix Q

Synchro and Sidra Intersection Worksheets – 2023 Future Background Conditions and Mitigation Measures

Intersection						
Int Delay, s/veh	27					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	47	782	207	45	279	169
Future Vol, veh/h	47	782	207	45	279	169
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	1800	-	-	2750	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	18	4	19	17	16	65
Mvmt Flow	47	782	207	45	279	169

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	957	230	0	0	252
Stage 1	230	-	-	-	-
Stage 2	727	-	-	-	-
Critical Hdwy	6.58	6.24	-	-	4.26
Critical Hdwy Stg 1	5.58	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-
Follow-up Hdwy	3.662	3.336	-	-	2.344
Pot Cap-1 Maneuver	267	804	-	-	1236
Stage 1	772	-	-	-	-
Stage 2	451	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	207	804	-	-	1236
Mov Cap-2 Maneuver	207	-	-	-	-
Stage 1	772	-	-	-	-
Stage 2	349	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	46.8	0	5.5
HCM LOS	E		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	207	804	1236	-
HCM Lane V/C Ratio	-	-	0.227	0.973	0.226	-
HCM Control Delay (s)	-	-	27.4	48	8.8	-
HCM Lane LOS	-	-	D	E	A	-
HCM 95th %tile Q(veh)	-	-	0.8	15.8	0.9	-

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	19	403	707	6	17	53
Future Vol, veh/h	19	403	707	6	17	53
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	19	403	707	6	17	53

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	718	0	-	0	1158 717
Stage 1	-	-	-	-	715 -
Stage 2	-	-	-	-	443 -
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	883	-	-	-	217 430
Stage 1	-	-	-	-	485 -
Stage 2	-	-	-	-	647 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	879	-	-	-	210 427
Mov Cap-2 Maneuver	-	-	-	-	210 -
Stage 1	-	-	-	-	472 -
Stage 2	-	-	-	-	644 -

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	18.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	879	-	-	-	341
HCM Lane V/C Ratio	0.022	-	-	-	0.205
HCM Control Delay (s)	9.2	-	-	-	18.3
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8












Intersection	
Intersection Delay, s/veh	72
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗		↖	↗		↕			↕	
Traffic Vol, veh/h	14	444	113	57	341	45	268	54	135	58	17	26
Future Vol, veh/h	14	444	113	57	341	45	268	54	135	58	17	26
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
Heavy Vehicles, %	21	10	2	16	9	4	2	10	4	3	6	4
Mvmt Flow	14	444	113	57	341	45	268	54	135	58	17	26
Number of Lanes	1	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	3
HCM Control Delay	65.2	74.5	90.1	16.9
HCM LOS	F	F	F	C

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1
Vol Left, %	59%	100%	0%	0%	14%	0%	57%
Vol Thru, %	12%	0%	100%	0%	86%	0%	17%
Vol Right, %	30%	0%	0%	100%	0%	100%	26%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	457	14	444	113	398	45	101
LT Vol	268	14	0	0	57	0	58
Through Vol	54	0	444	0	341	0	17
RT Vol	135	0	0	113	0	45	26
Lane Flow Rate	457	14	444	113	398	45	101
Geometry Grp	7	7	7	7	8	8	7
Degree of Util (X)	1.06	0.035	1.023	0.233	1.013	0.103	0.274
Departure Headway (Hd)	8.567	9.449	8.732	7.859	9.617	8.677	10.329
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	425	381	417	460	382	415	350
Service Time	6.267	7.149	6.432	5.559	7.317	6.377	8.029
HCM Lane V/C Ratio	1.075	0.037	1.065	0.246	1.042	0.108	0.289
HCM Control Delay	90.1	12.5	80.2	12.9	81.5	12.4	16.9
HCM Lane LOS	F	B	F	B	F	B	C
HCM 95th-tile Q	14.6	0.1	13.2	0.9	12.2	0.3	1.1

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	782	207	45	279	169
Future Volume (vph)	47	782	207	45	279	169
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.976			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1464	0	1458	1079
Flt Permitted	0.950				0.534	
Satd. Flow (perm)	1433	1455	1464	0	819	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		423	12			
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	47	782	207	45	279	169
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	782	252	0	279	169
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	pm+ov	NA		pm+pt	NA
Protected Phases	8	1	2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8			6	
Detector Phase	8	1	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	5.0	10.0		5.0	10.0
Minimum Split (s)	26.2	8.0	29.9		8.0	29.9
Total Split (s)	26.2	32.0	31.8		32.0	63.8
Total Split (%)	29.1%	35.6%	35.3%		35.6%	70.9%
Maximum Green (s)	20.5	29.0	25.4		29.0	57.4
Yellow Time (s)	4.2	2.0	4.6		2.0	4.6
All-Red Time (s)	1.5	1.0	1.8		1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	3.0	6.4		3.0	6.4
Lead/Lag		Lead	Lag		Lead	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0		7.0			7.0
Flash Dont Walk (s)	13.5		16.5			16.5
Pedestrian Calls (#/hr)	0		0			0
Act Effct Green (s)	10.3	32.9	31.0		61.5	61.0
Actuated g/C Ratio	0.14	0.45	0.42		0.84	0.83
v/c Ratio	0.23	0.88	0.40		0.31	0.19
Control Delay	34.0	19.9	20.5		3.2	3.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	34.0	19.9	20.5		3.2	3.7
LOS	C	B	C		A	A
Approach Delay	20.7		20.5			3.4
Approach LOS	C		C			A
Queue Length 50th (m)	6.5	44.6	26.0		9.3	6.8
Queue Length 95th (m)	16.0	87.7	52.1		17.0	13.7
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		180.0			275.0	
Base Capacity (vph)	404	960	625		941	897
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.12	0.81	0.40		0.30	0.19

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	73.4
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	15.6
Intersection LOS:	B
Intersection Capacity Utilization:	74.2%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	403	707	6	17	53
Future Volume (vph)	19	403	707	6	17	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.898	
Flt Protected	0.950				0.988	
Satd. Flow (prot)	1658	1679	1569	0	1393	0
Flt Permitted	0.950				0.988	
Satd. Flow (perm)	1658	1679	1569	0	1393	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	19	403	707	6	17	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	403	713	0	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.5%
Analysis Period (min)	15
	ICU Level of Service A

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	19	403	707	6	17	53
Future Vol, veh/h	19	403	707	6	17	53
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	19	403	707	6	17	53

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	718	0	-	0	1158 717
Stage 1	-	-	-	-	715 -
Stage 2	-	-	-	-	443 -
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	883	-	-	-	217 430
Stage 1	-	-	-	-	485 -
Stage 2	-	-	-	-	647 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	879	-	-	-	210 427
Mov Cap-2 Maneuver	-	-	-	-	210 -
Stage 1	-	-	-	-	472 -
Stage 2	-	-	-	-	644 -

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	18.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	879	-	-	-	341
HCM Lane V/C Ratio	0.022	-	-	-	0.205
HCM Control Delay (s)	9.2	-	-	-	18.3
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	444	113	57	341	45	268	54	135	58	17	26
Future Volume (vph)	14	444	113	57	341	45	268	54	135	58	17	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.97		0.97	1.00		0.93	0.99	0.96		0.97	0.98	
Frt			0.850			0.850		0.893			0.909	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1296	0	1478	1362	0
Flt Permitted	0.455			0.330			0.729			0.639		
Satd. Flow (perm)	584	1456	1300	454	1470	1215	1132	1296	0	964	1362	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			113			45		135			26	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	14	444	113	57	341	45	268	54	135	58	17	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	444	113	57	341	45	268	189	0	58	43	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	33.9	33.9	33.9	33.9	33.9	33.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	5	5	5	39	39	39	31	31		10	10	
Act Effct Green (s)	26.2	26.2	26.2	26.2	26.2	26.2	34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36	0.36	0.47	0.47		0.47	0.47	
v/c Ratio	0.07	0.85	0.21	0.35	0.65	0.10	0.50	0.28		0.13	0.07	
Control Delay	15.0	37.1	4.2	23.0	25.2	5.2	19.3	6.1		14.1	7.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	15.0	37.1	4.2	23.0	25.2	5.2	19.3	6.1		14.1	7.9	
LOS	B	D	A	C	C	A	B	A		B	A	
Approach Delay		30.1			22.9			13.9			11.4	
Approach LOS		C			C			B			B	
Queue Length 50th (m)	1.2	54.1	0.0	5.5	37.6	0.0	24.5	3.9		4.3	1.2	
Queue Length 95th (m)	4.6	88.6	8.6	14.8	62.5	5.5	53.1	16.8		12.5	7.0	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	274	685	671	213	691	595	534	682		454	656	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.05	0.65	0.17	0.27	0.49	0.08	0.50	0.28		0.13	0.07	

Intersection Summary

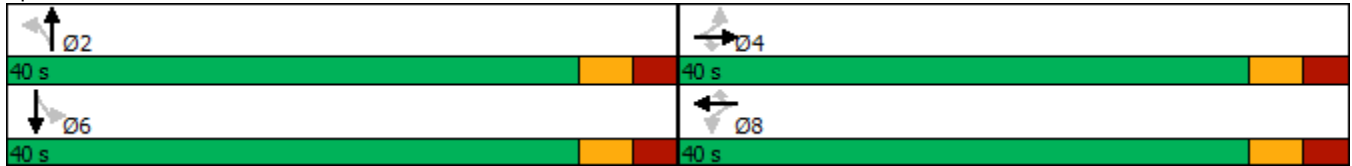
Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 72.7
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.85

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road

Intersection Signal Delay: 22.1	Intersection LOS: C
Intersection Capacity Utilization 97.3%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	191	460	55	103	247	73	128	325	208	86	116	99
Future Volume (vph)	191	460	55	103	247	73	128	325	208	86	116	99
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.989			0.977			0.958			0.956	
Flt Protected		0.987			0.988			0.990			0.986	
Satd. Flow (prot)	0	1502	0	0	1487	0	0	1652	0	0	1579	0
Flt Permitted		0.987			0.988			0.990			0.986	
Satd. Flow (perm)	0	1502	0	0	1487	0	0	1652	0	0	1579	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	191	460	55	103	247	73	128	325	208	86	116	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	706	0	0	423	0	0	661	0	0	301	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	109.0%
ICU Level of Service	G
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	21					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖		↖	↗
Traffic Vol, veh/h	43	435	244	40	685	216
Future Vol, veh/h	43	435	244	40	685	216
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	1800	-	-	2750	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	18	4	19	17	16	65
Mvmt Flow	43	435	244	40	685	216

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1850	264	0	0	284
Stage 1	264	-	-	-	-
Stage 2	1586	-	-	-	-
Critical Hdwy	6.58	6.24	-	-	4.26
Critical Hdwy Stg 1	5.58	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-
Follow-up Hdwy	3.662	3.336	-	-	2.344
Pot Cap-1 Maneuver	74	770	-	-	1202
Stage 1	745	-	-	-	-
Stage 2	169	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 32	770	-	-	1202
Mov Cap-2 Maneuver	~ 32	-	-	-	-
Stage 1	745	-	-	-	-
Stage 2	73	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	56.2	0	9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	32	770	1202
HCM Lane V/C Ratio	-	-	1.344	0.565	0.57
HCM Control Delay (s)	-	-	\$ 466.9	15.6	11.9
HCM Lane LOS	-	-	F	C	B
HCM 95th %tile Q(veh)	-	-	4.8	3.6	3.8

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	666	471	21	9	31
Future Vol, veh/h	49	666	471	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	666	471	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	497	0	-	0	1253 489
Stage 1	-	-	-	-	487 -
Stage 2	-	-	-	-	766 -
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	1067	-	-	-	190 579
Stage 1	-	-	-	-	618 -
Stage 2	-	-	-	-	459 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1062	-	-	-	179 575
Mov Cap-2 Maneuver	-	-	-	-	179 -
Stage 1	-	-	-	-	586 -
Stage 2	-	-	-	-	457 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1062	-	-	-	384
HCM Lane V/C Ratio	0.046	-	-	-	0.104
HCM Control Delay (s)	8.6	-	-	-	15.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Intersection	
Intersection Delay, s/veh	108.1
Intersection LOS	F












Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑	↗		↖	↗		↕			↕	
Traffic Vol, veh/h	20	546	182	151	450	64	157	16	120	29	13	15
Future Vol, veh/h	20	546	182	151	450	64	157	16	120	29	13	15
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
Heavy Vehicles, %	21	10	2	16	9	4	2	10	4	3	6	4
Mvmt Flow	20	546	182	151	450	64	157	16	120	29	13	15
Number of Lanes	1	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	3
HCM Control Delay	73.9	190.6	26.3	14.5
HCM LOS	F	F	D	B

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1
Vol Left, %	54%	100%	0%	0%	25%	0%	51%
Vol Thru, %	5%	0%	100%	0%	75%	0%	23%
Vol Right, %	41%	0%	0%	100%	0%	100%	26%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	293	20	546	182	601	64	57
LT Vol	157	20	0	0	151	0	29
Through Vol	16	0	546	0	450	0	13
RT Vol	120	0	0	182	0	64	15
Lane Flow Rate	293	20	546	182	601	64	57
Geometry Grp	7	7	7	7	8	8	7
Degree of Util (X)	0.652	0.044	1.092	0.322	1.381	0.13	0.144
Departure Headway (Hd)	8.708	8.507	7.797	6.932	8.608	7.63	10.087
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	419	423	470	522	427	473	358
Service Time	6.408	6.207	5.497	4.632	6.308	5.33	7.787
HCM Lane V/C Ratio	0.699	0.047	1.162	0.349	1.407	0.135	0.159
HCM Control Delay	26.3	11.6	96.5	12.9	209.7	11.5	14.5
HCM Lane LOS	D	B	F	B	F	B	B
HCM 95th-tile Q	4.5	0.1	16.7	1.4	27.7	0.4	0.5

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FB - PM Improvements
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	435	244	40	685	216
Future Volume (vph)	43	435	244	40	685	216
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.981			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1471	0	1458	1079
Flt Permitted	0.950				0.428	
Satd. Flow (perm)	1433	1455	1471	0	657	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		435	9			
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	43	435	244	40	685	216
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	435	284	0	685	216
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0
Minimum Split (s)	26.2	26.2	29.9		9.5	29.9
Total Split (s)	26.2	26.2	30.6		33.2	63.8
Total Split (%)	29.1%	29.1%	34.0%		36.9%	70.9%
Maximum Green (s)	20.5	20.5	24.2		30.2	57.4
Yellow Time (s)	4.2	4.2	4.6		2.0	4.6
All-Red Time (s)	1.5	1.5	1.8		1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	6.4		3.0	6.4
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0	7.0	7.0			7.0
Flash Dont Walk (s)	13.5	13.5	16.5			16.5
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	11.9	11.9	24.3		60.9	57.5
Actuated g/C Ratio	0.15	0.15	0.30		0.75	0.70
v/c Ratio	0.21	0.74	0.64		0.87	0.28
Control Delay	32.5	12.0	32.7		22.1	6.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	32.5	12.0	32.7		22.1	6.2
LOS	C	B	C		C	A
Approach Delay	13.9		32.7			18.3
Approach LOS	B		C			B
Queue Length 50th (m)	5.9	0.0	35.4		38.2	9.2
Queue Length 95th (m)	14.6	25.2	#72.3		#140.0	26.3
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		180.0			275.0	
Base Capacity (vph)	360	692	443		787	761
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.12	0.63	0.64		0.87	0.28

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	81.6
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.87
Intersection Signal Delay:	19.5
Intersection LOS:	B
Intersection Capacity Utilization:	77.9%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2023 FB - PM Improvements
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	666	471	21	9	31
Future Volume (vph)	49	666	471	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.994		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1561	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1561	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	666	471	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	666	492	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.6%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	666	471	21	9	31
Future Vol, veh/h	49	666	471	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	666	471	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	497	0	-	0	1253 489
Stage 1	-	-	-	-	487 -
Stage 2	-	-	-	-	766 -
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	1067	-	-	-	190 579
Stage 1	-	-	-	-	618 -
Stage 2	-	-	-	-	459 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1062	-	-	-	179 575
Mov Cap-2 Maneuver	-	-	-	-	179 -
Stage 1	-	-	-	-	586 -
Stage 2	-	-	-	-	457 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1062	-	-	-	384
HCM Lane V/C Ratio	0.046	-	-	-	0.104
HCM Control Delay (s)	8.6	-	-	-	15.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	546	182	151	450	64	157	16	120	29	13	15
Future Volume (vph)	20	546	182	151	450	64	157	16	120	29	13	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.98		0.97	1.00		0.93	0.99	0.95		0.97	0.98	
Frt			0.850			0.850		0.868			0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1259	0	1478	1380	0
Flt Permitted	0.363			0.267			0.739			0.670		
Satd. Flow (perm)	469	1456	1300	368	1470	1215	1148	1259	0	1009	1380	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			64			120			15
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	546	182	151	450	64	157	16	120	29	13	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	546	182	151	450	64	157	136	0	29	28	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	33.9	33.9	33.9	33.9	33.9	33.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3	13	13	13	16	16		9	9	
Act Effct Green (s)	33.3	33.3	33.3	33.3	33.3	33.3	34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.42	0.42	0.43	0.43		0.43	0.43	
v/c Ratio	0.10	0.90	0.28	0.98	0.73	0.12	0.32	0.22		0.07	0.05	
Control Delay	15.7	41.5	3.7	97.1	27.7	4.6	17.6	4.9		14.3	9.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	15.7	41.5	3.7	97.1	27.7	4.6	17.6	4.9		14.3	9.1	
LOS	B	D	A	F	C	A	B	A		B	A	
Approach Delay		31.6			41.2			11.7			11.8	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	1.8	74.0	0.0	21.7	55.0	0.0	15.4	1.4		2.5	1.1	
Queue Length 95th (m)	6.1	#133.4	10.8	#57.8	89.8	6.6	29.2	11.1		7.3	5.5	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	199	621	658	156	627	555	491	607		431	599	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.10	0.88	0.28	0.97	0.72	0.12	0.32	0.22		0.07	0.05	

Intersection Summary

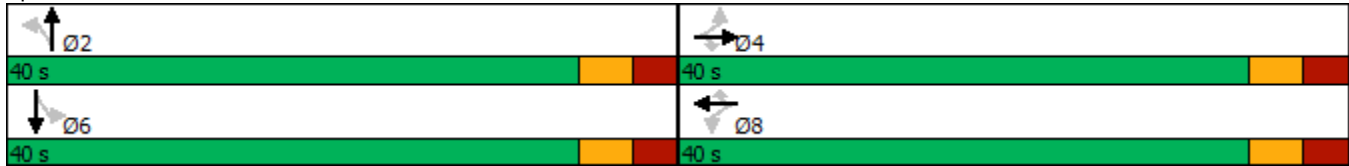
Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 79.4
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.98

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

2023 FB - PM Improvements
 3831 Cambrian Road

Intersection Signal Delay: 31.3	Intersection LOS: C
Intersection Capacity Utilization 82.7%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FB - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	138	353	140	144	366	86	80	283	125	68	466	259
Future Volume (vph)	138	353	140	144	366	86	80	283	125	68	466	259
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.970			0.981			0.965			0.956	
Flt Protected		0.989			0.988			0.992			0.996	
Satd. Flow (prot)	0	1448	0	0	1495	0	0	1668	0	0	1598	0
Flt Permitted		0.989			0.988			0.992			0.996	
Satd. Flow (perm)	0	1448	0	0	1495	0	0	1668	0	0	1598	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	138	353	140	144	366	86	80	283	125	68	466	259
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	631	0	0	596	0	0	488	0	0	793	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	108.4%
ICU Level of Service	G
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	21					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙	↗	↖		↙	↗
Traffic Vol, veh/h	43	435	244	40	685	216
Future Vol, veh/h	43	435	244	40	685	216
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	1800	-	-	2750	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	18	4	19	17	16	65
Mvmt Flow	43	435	244	40	685	216

Major/Minor	Minor1	Major1	Major2		
Conflicting Flow All	1850	264	0	0	284
Stage 1	264	-	-	-	-
Stage 2	1586	-	-	-	-
Critical Hdwy	6.58	6.24	-	-	4.26
Critical Hdwy Stg 1	5.58	-	-	-	-
Critical Hdwy Stg 2	5.58	-	-	-	-
Follow-up Hdwy	3.662	3.336	-	-	2.344
Pot Cap-1 Maneuver	74	770	-	-	1202
Stage 1	745	-	-	-	-
Stage 2	169	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	~ 32	770	-	-	1202
Mov Cap-2 Maneuver	~ 32	-	-	-	-
Stage 1	745	-	-	-	-
Stage 2	73	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	56.2	0	9
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBRWBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	32	770	1202
HCM Lane V/C Ratio	-	-	1.344	0.565	0.57
HCM Control Delay (s)	-	-	\$ 466.9	15.6	11.9
HCM Lane LOS	-	-	F	C	B
HCM 95th %tile Q(veh)	-	-	4.8	3.6	3.8

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	666	471	21	9	31
Future Vol, veh/h	49	666	471	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	666	471	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	497	0	-	0	1253 489
Stage 1	-	-	-	-	487 -
Stage 2	-	-	-	-	766 -
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	1067	-	-	-	190 579
Stage 1	-	-	-	-	618 -
Stage 2	-	-	-	-	459 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1062	-	-	-	179 575
Mov Cap-2 Maneuver	-	-	-	-	179 -
Stage 1	-	-	-	-	586 -
Stage 2	-	-	-	-	457 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1062	-	-	-	384
HCM Lane V/C Ratio	0.046	-	-	-	0.104
HCM Control Delay (s)	8.6	-	-	-	15.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3












Intersection	
Intersection Delay, s/veh	108.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑	↗		↘	↗		↕			↕	
Traffic Vol, veh/h	20	546	182	151	450	64	157	16	120	29	13	15
Future Vol, veh/h	20	546	182	151	450	64	157	16	120	29	13	15
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
Heavy Vehicles, %	21	10	2	16	9	4	2	10	4	3	6	4
Mvmt Flow	20	546	182	151	450	64	157	16	120	29	13	15
Number of Lanes	1	1	1	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	3	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	3	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	3
HCM Control Delay	73.9	190.6	26.3	14.5
HCM LOS	F	F	D	B

Lane	NBLn1	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBLn1
Vol Left, %	54%	100%	0%	0%	25%	0%	51%
Vol Thru, %	5%	0%	100%	0%	75%	0%	23%
Vol Right, %	41%	0%	0%	100%	0%	100%	26%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	293	20	546	182	601	64	57
LT Vol	157	20	0	0	151	0	29
Through Vol	16	0	546	0	450	0	13
RT Vol	120	0	0	182	0	64	15
Lane Flow Rate	293	20	546	182	601	64	57
Geometry Grp	7	7	7	7	8	8	7
Degree of Util (X)	0.652	0.044	1.092	0.322	1.381	0.13	0.144
Departure Headway (Hd)	8.708	8.507	7.797	6.932	8.608	7.63	10.087
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	419	423	470	522	427	473	358
Service Time	6.408	6.207	5.497	4.632	6.308	5.33	7.787
HCM Lane V/C Ratio	0.699	0.047	1.162	0.349	1.407	0.135	0.159
HCM Control Delay	26.3	11.6	96.5	12.9	209.7	11.5	14.5
HCM Lane LOS	D	B	F	B	F	B	B
HCM 95th-tile Q	4.5	0.1	16.7	1.4	27.7	0.4	0.5

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	435	244	40	685	216
Future Volume (vph)	43	435	244	40	685	216
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.981			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1471	0	1458	1079
Flt Permitted	0.950				0.428	
Satd. Flow (perm)	1433	1455	1471	0	657	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		435	9			
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	43	435	244	40	685	216
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	435	284	0	685	216
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0
Minimum Split (s)	26.2	26.2	29.9		9.5	29.9
Total Split (s)	26.2	26.2	30.6		33.2	63.8
Total Split (%)	29.1%	29.1%	34.0%		36.9%	70.9%
Maximum Green (s)	20.5	20.5	24.2		30.2	57.4
Yellow Time (s)	4.2	4.2	4.6		2.0	4.6
All-Red Time (s)	1.5	1.5	1.8		1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	6.4		3.0	6.4
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0	7.0	7.0			7.0
Flash Dont Walk (s)	13.5	13.5	16.5			16.5
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	11.9	11.9	24.3		60.9	57.5
Actuated g/C Ratio	0.15	0.15	0.30		0.75	0.70
v/c Ratio	0.21	0.74	0.64		0.87	0.28
Control Delay	32.5	12.0	32.7		22.1	6.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	32.5	12.0	32.7		22.1	6.2
LOS	C	B	C		C	A
Approach Delay	13.9		32.7			18.3
Approach LOS	B		C			B
Queue Length 50th (m)	5.9	0.0	35.4		38.2	9.2
Queue Length 95th (m)	14.6	25.2	#72.3		#140.0	26.3
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		180.0			275.0	
Base Capacity (vph)	360	692	443		787	761
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.12	0.63	0.64		0.87	0.28

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	81.6
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.87
Intersection Signal Delay:	19.5
Intersection LOS:	B
Intersection Capacity Utilization:	77.9%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2023 FB - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	666	471	21	9	31
Future Volume (vph)	49	666	471	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.994		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1561	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1561	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	666	471	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	666	492	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.6%
Analysis Period (min)	15
	ICU Level of Service A

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	666	471	21	9	31
Future Vol, veh/h	49	666	471	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	666	471	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	497	0	-	0	1253 489
Stage 1	-	-	-	-	487 -
Stage 2	-	-	-	-	766 -
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	1067	-	-	-	190 579
Stage 1	-	-	-	-	618 -
Stage 2	-	-	-	-	459 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1062	-	-	-	179 575
Mov Cap-2 Maneuver	-	-	-	-	179 -
Stage 1	-	-	-	-	586 -
Stage 2	-	-	-	-	457 -

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1062	-	-	-	384
HCM Lane V/C Ratio	0.046	-	-	-	0.104
HCM Control Delay (s)	8.6	-	-	-	15.5
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	546	182	151	450	64	157	16	120	29	13	15
Future Volume (vph)	20	546	182	151	450	64	157	16	120	29	13	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.98		0.97	1.00		0.93	0.99	0.95		0.97	0.98	
Frt			0.850			0.850		0.868			0.920	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1259	0	1478	1380	0
Flt Permitted	0.363			0.267			0.739			0.670		
Satd. Flow (perm)	469	1456	1300	368	1470	1215	1148	1259	0	1009	1380	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			64			120			15
Link Speed (k/h)		50			50			50				50
Link Distance (m)		449.3			477.1			575.8				329.8
Travel Time (s)		32.3			34.4			41.5				23.7
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	546	182	151	450	64	157	16	120	29	13	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	546	182	151	450	64	157	136	0	29	28	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0		40.0	40.0	
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%	50.0%	
Maximum Green (s)	33.9	33.9	33.9	33.9	33.9	33.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3	13	13	13	16	16		9	9	
Act Effct Green (s)	33.3	33.3	33.3	33.3	33.3	33.3	34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.42	0.42	0.43	0.43		0.43	0.43	
v/c Ratio	0.10	0.90	0.28	0.98	0.73	0.12	0.32	0.22		0.07	0.05	
Control Delay	15.7	41.5	3.7	97.1	27.7	4.6	17.6	4.9		14.3	9.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	15.7	41.5	3.7	97.1	27.7	4.6	17.6	4.9		14.3	9.1	
LOS	B	D	A	F	C	A	B	A		B	A	
Approach Delay		31.6			41.2			11.7			11.8	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	1.8	74.0	0.0	21.7	55.0	0.0	15.4	1.4		2.5	1.1	
Queue Length 95th (m)	6.1	#133.4	10.8	#57.8	89.8	6.6	29.2	11.1		7.3	5.5	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	199	621	658	156	627	555	491	607		431	599	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.10	0.88	0.28	0.97	0.72	0.12	0.32	0.22		0.07	0.05	

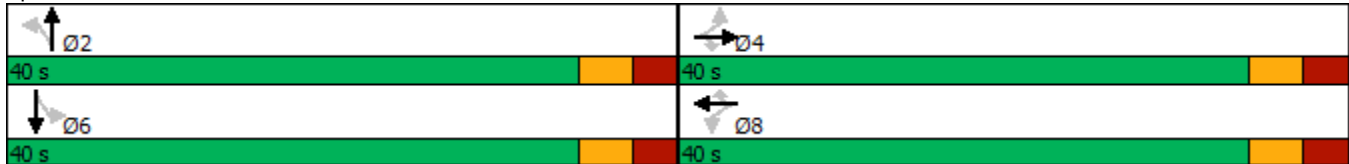
Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 79.4
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.98

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

Intersection Signal Delay: 31.3	Intersection LOS: C
Intersection Capacity Utilization 82.7%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FB - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	138	353	140	144	366	86	80	283	125	68	466	259
Future Volume (vph)	138	353	140	144	366	86	80	283	125	68	466	259
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.970			0.981			0.965			0.956	
Flt Protected		0.989			0.988			0.992			0.996	
Satd. Flow (prot)	0	1448	0	0	1495	0	0	1668	0	0	1598	0
Flt Permitted		0.989			0.988			0.992			0.996	
Satd. Flow (perm)	0	1448	0	0	1495	0	0	1668	0	0	1598	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	138	353	140	144	366	86	80	283	125	68	466	259
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	631	0	0	596	0	0	488	0	0	793	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	108.4%
ICU Level of Service	G
Analysis Period (min)	15

DEGREE OF SATURATION

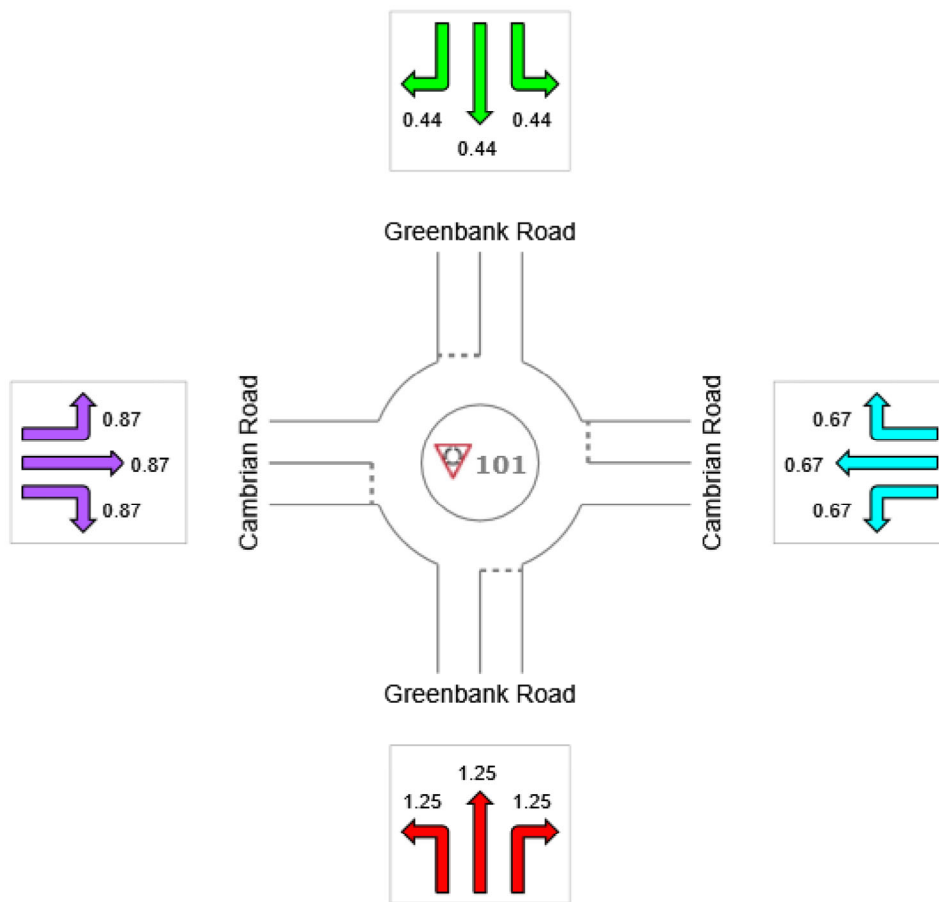
Ratio of Demand Volume to Capacity, v/c ratio per movement

 **Site: 101 [Cambrian and Greenbank 2023 FB AM]**

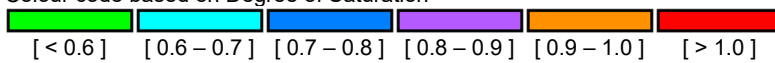
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	1.25	0.67	0.44	0.87	1.25



Colour code based on Degree of Saturation



DELAY (CONTROL)

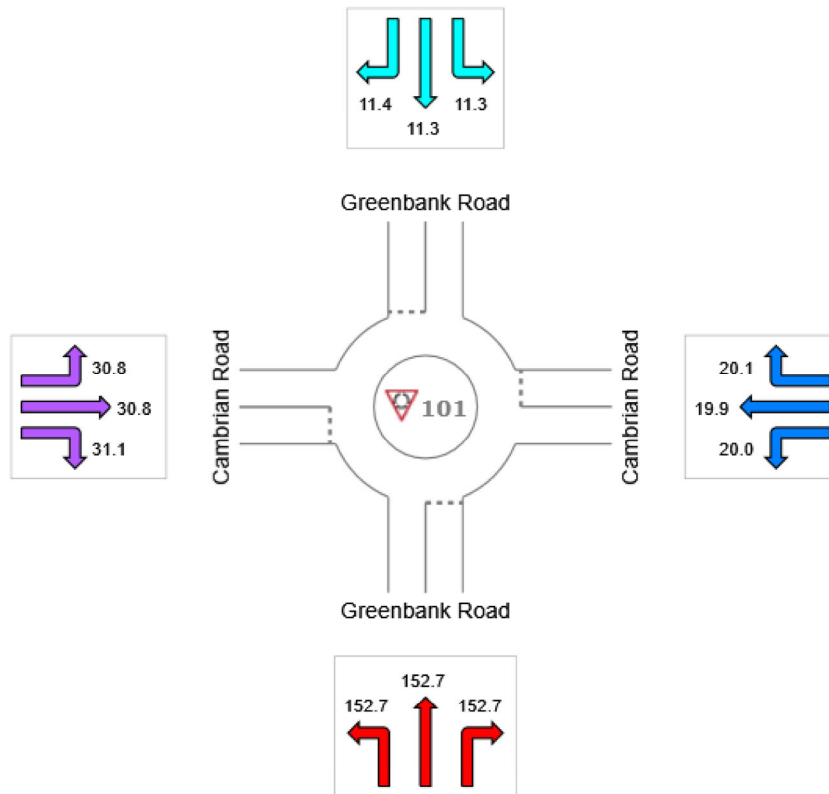
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FB AM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	152.7	20.0	11.3	30.8	64.4
LOS	F	C	B	D	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

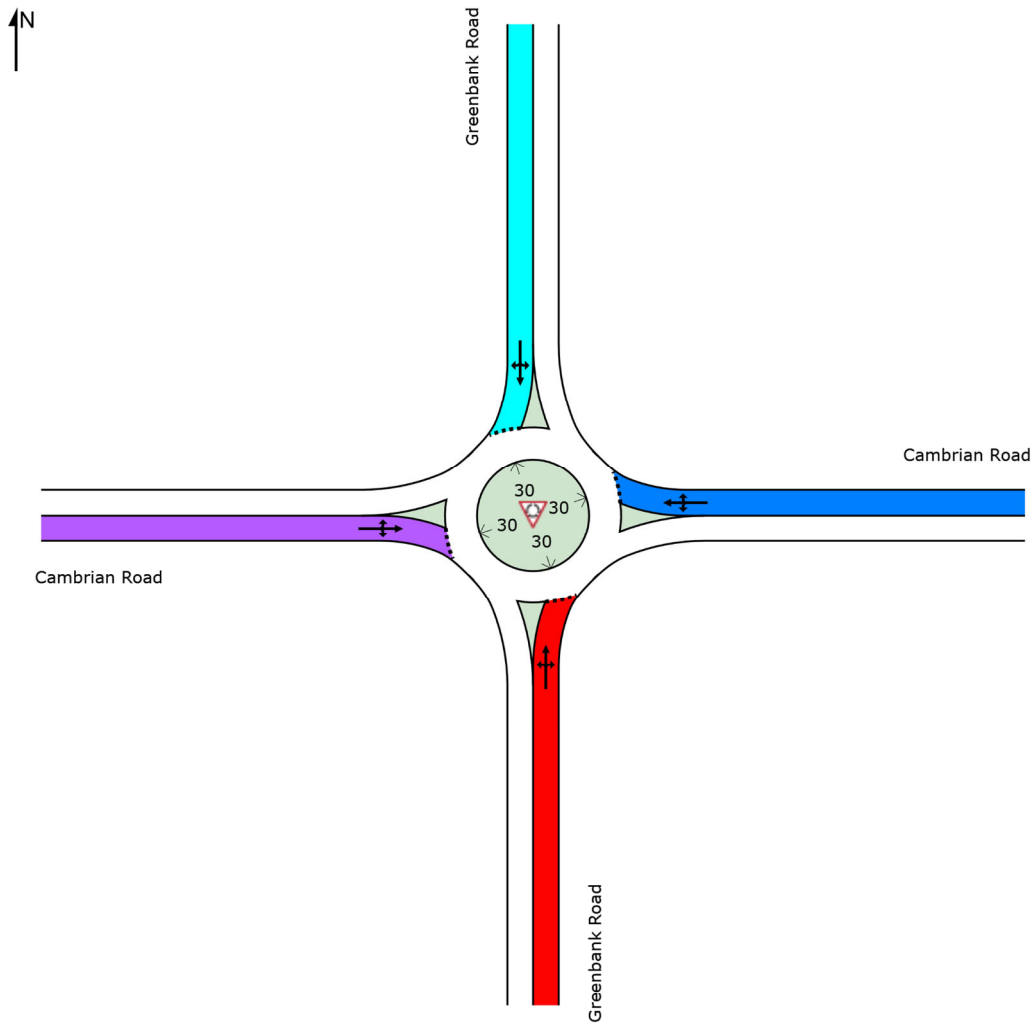
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2023 FB AM]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	C	B	D	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FB AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	128	3.0	1.252	152.7	LOS F	55.9	398.4	1.00	3.45	8.89	8.5
2	T1	325	2.0	1.252	152.7	LOS F	55.9	398.4	1.00	3.45	8.89	8.9
3	R2	208	2.0	1.252	152.7	LOS F	55.9	398.4	1.00	3.45	8.89	7.0
Approach		661	2.2	1.252	152.7	LOS F	55.9	398.4	1.00	3.45	8.89	8.2
East: Cambrian Road												
4	L2	103	6.0	0.672	20.0	LOS C	5.9	43.0	0.77	1.06	1.50	28.0
5	T1	247	2.0	0.672	19.9	LOS C	5.9	43.0	0.77	1.06	1.50	30.2
6	R2	73	8.0	0.672	20.1	LOS C	5.9	43.0	0.77	1.06	1.50	30.2
Approach		423	4.0	0.672	20.0	LOS C	5.9	43.0	0.77	1.06	1.50	29.7
North: Greenbank Road												
7	L2	86	5.0	0.436	11.3	LOS B	2.3	16.9	0.60	0.67	0.78	38.6
8	T1	116	4.0	0.436	11.3	LOS B	2.3	16.9	0.60	0.67	0.78	38.7
9	R2	99	10.0	0.436	11.4	LOS B	2.3	16.9	0.60	0.67	0.78	37.9
Approach		301	6.3	0.436	11.3	LOS B	2.3	16.9	0.60	0.67	0.78	38.4
West: Cambrian Road												
10	L2	191	3.0	0.872	30.8	LOS D	22.0	159.7	0.98	1.67	2.45	28.5
11	T1	460	3.0	0.872	30.8	LOS D	22.0	159.7	0.98	1.67	2.45	25.0
12	R2	55	17.0	0.872	31.1	LOS D	22.0	159.7	0.98	1.67	2.45	24.1
Approach		706	4.1	0.872	30.8	LOS D	22.0	159.7	0.98	1.67	2.45	25.9
All Vehicles		2091	3.8	1.252	64.4	LOS F	55.9	398.4	0.89	1.96	4.05	16.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DEGREE OF SATURATION

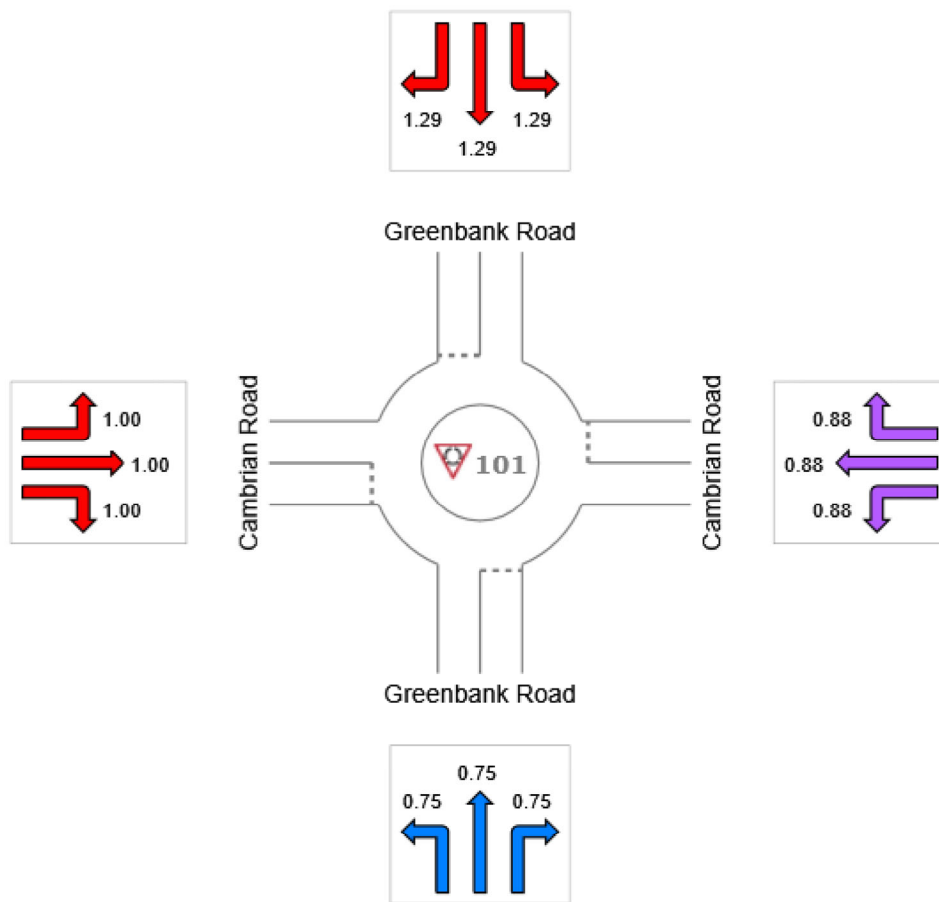
Ratio of Demand Volume to Capacity, v/c ratio per movement

 Site: 101 [Cambrian and Greenbank 2023 FB PM]

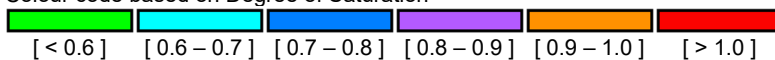
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.75	0.88	1.29	1.00	1.29



Colour code based on Degree of Saturation



DELAY (CONTROL)

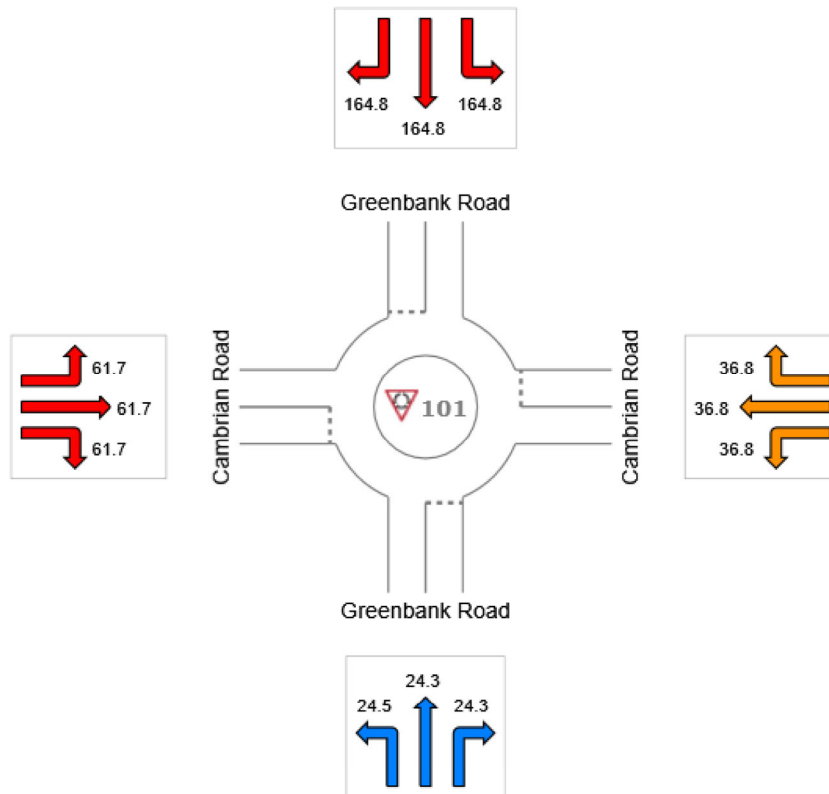
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FB PM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	24.4	36.8	164.8	61.7	81.1
LOS	C	E	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

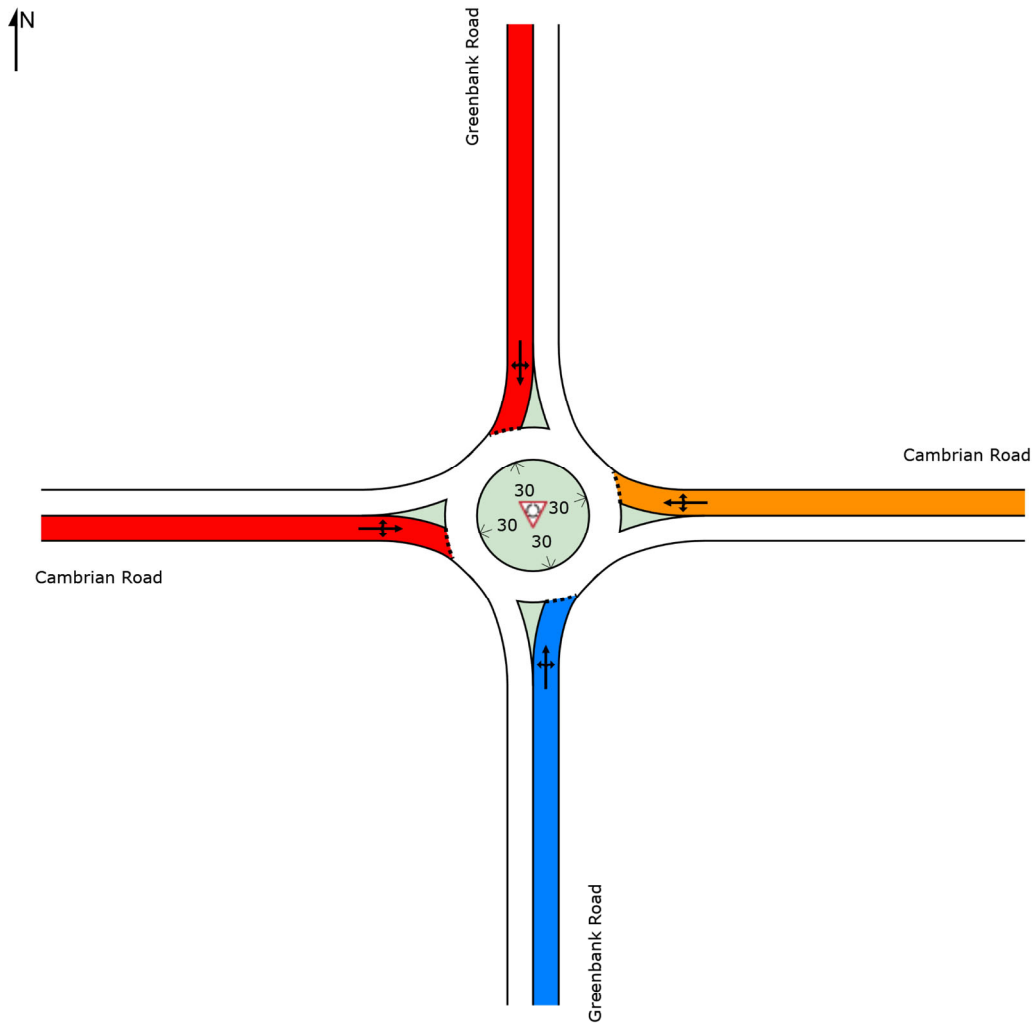
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2023 FB PM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	E	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FB PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	80	8.0	0.754	24.5	LOS C	8.6	61.6	0.84	1.19	1.84	28.8
2	T1	283	2.0	0.754	24.3	LOS C	8.6	61.6	0.84	1.19	1.84	30.0
3	R2	125	2.0	0.754	24.3	LOS C	8.6	61.6	0.84	1.19	1.84	24.6
Approach		488	3.0	0.754	24.4	LOS C	8.6	61.6	0.84	1.19	1.84	28.5
East: Cambrian Road												
4	L2	144	2.0	0.885	36.8	LOS E	16.5	117.8	0.98	1.71	2.76	20.5
5	T1	366	2.0	0.885	36.8	LOS E	16.5	117.8	0.98	1.71	2.76	22.8
6	R2	86	2.0	0.885	36.8	LOS E	16.5	117.8	0.98	1.71	2.76	23.4
Approach		596	2.0	0.885	36.8	LOS E	16.5	117.8	0.98	1.71	2.76	22.4
North: Greenbank Road												
7	L2	68	2.0	1.293	164.8	LOS F	73.5	523.0	1.00	3.81	9.42	8.3
8	T1	466	2.0	1.293	164.8	LOS F	73.5	523.0	1.00	3.81	9.42	8.3
9	R2	259	2.0	1.293	164.8	LOS F	73.5	523.0	1.00	3.81	9.42	9.5
Approach		793	2.0	1.293	164.8	LOS F	73.5	523.0	1.00	3.81	9.42	8.7
West: Cambrian Road												
10	L2	138	2.0	1.001	61.7	LOS F	27.0	193.0	1.00	2.28	4.22	19.6
11	T1	353	2.0	1.001	61.7	LOS F	27.0	193.0	1.00	2.28	4.22	16.7
12	R2	140	4.0	1.001	61.7	LOS F	27.0	193.0	1.00	2.28	4.22	16.5
Approach		631	2.4	1.001	61.7	LOS F	27.0	193.0	1.00	2.28	4.22	17.3
All Vehicles		2508	2.3	1.293	81.1	LOS F	73.5	523.0	0.96	2.42	5.06	14.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DEGREE OF SATURATION

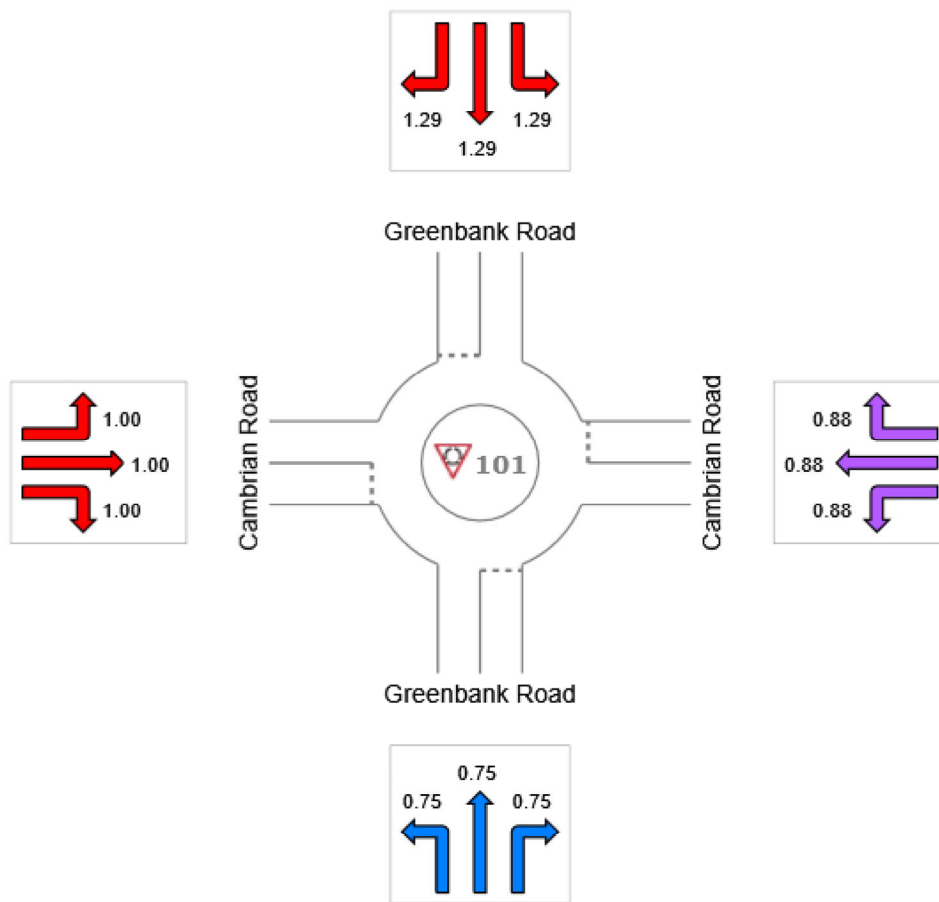
Ratio of Demand Volume to Capacity, v/c ratio per movement

 Site: 101 [Cambrian and Greenbank 2023 FB Sat]

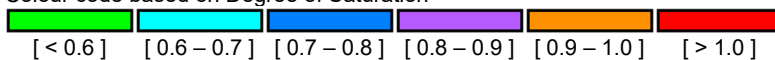
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.75	0.88	1.29	1.00	1.29



Colour code based on Degree of Saturation



DELAY (CONTROL)

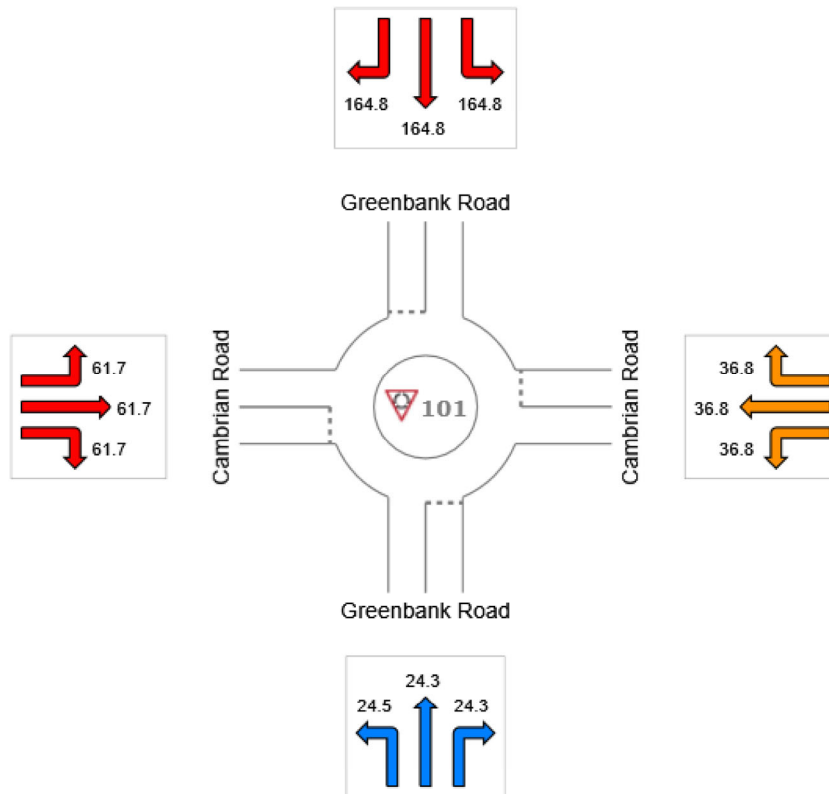
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Cambrian and Greenbank 2023 FB Sat]**

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	24.4	36.8	164.8	61.7	81.1
LOS	C	E	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

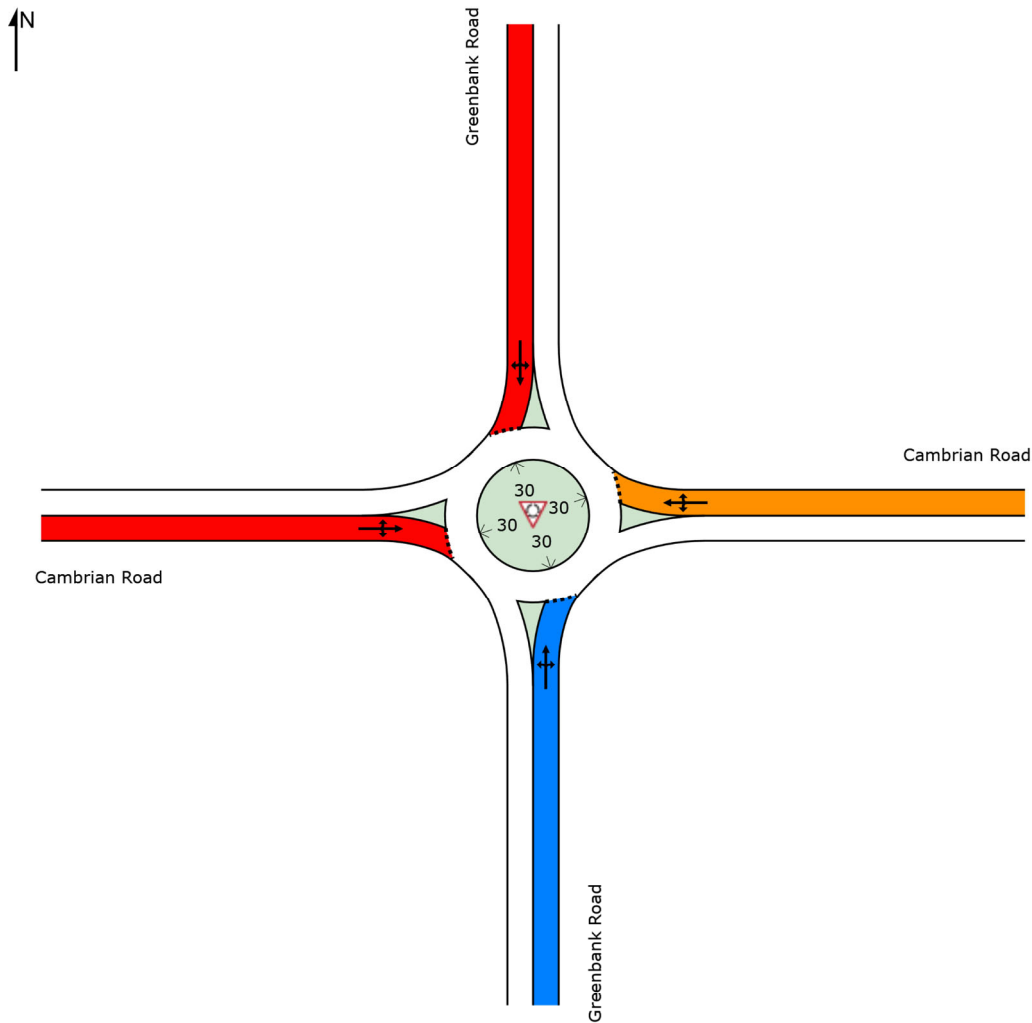
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2023 FB Sat]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	C	E	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FB Sat]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	80	8.0	0.754	24.5	LOS C	8.6	61.6	0.84	1.19	1.84	28.8
2	T1	283	2.0	0.754	24.3	LOS C	8.6	61.6	0.84	1.19	1.84	30.0
3	R2	125	2.0	0.754	24.3	LOS C	8.6	61.6	0.84	1.19	1.84	24.6
Approach		488	3.0	0.754	24.4	LOS C	8.6	61.6	0.84	1.19	1.84	28.5
East: Cambrian Road												
4	L2	144	2.0	0.885	36.8	LOS E	16.5	117.8	0.98	1.71	2.76	20.5
5	T1	366	2.0	0.885	36.8	LOS E	16.5	117.8	0.98	1.71	2.76	22.8
6	R2	86	2.0	0.885	36.8	LOS E	16.5	117.8	0.98	1.71	2.76	23.4
Approach		596	2.0	0.885	36.8	LOS E	16.5	117.8	0.98	1.71	2.76	22.4
North: Greenbank Road												
7	L2	68	2.0	1.293	164.8	LOS F	73.5	523.0	1.00	3.81	9.42	8.3
8	T1	466	2.0	1.293	164.8	LOS F	73.5	523.0	1.00	3.81	9.42	8.3
9	R2	259	2.0	1.293	164.8	LOS F	73.5	523.0	1.00	3.81	9.42	9.5
Approach		793	2.0	1.293	164.8	LOS F	73.5	523.0	1.00	3.81	9.42	8.7
West: Cambrian Road												
10	L2	138	2.0	1.001	61.7	LOS F	27.0	193.0	1.00	2.28	4.22	19.6
11	T1	353	2.0	1.001	61.7	LOS F	27.0	193.0	1.00	2.28	4.22	16.7
12	R2	140	4.0	1.001	61.7	LOS F	27.0	193.0	1.00	2.28	4.22	16.5
Approach		631	2.4	1.001	61.7	LOS F	27.0	193.0	1.00	2.28	4.22	17.3
All Vehicles		2508	2.3	1.293	81.1	LOS F	73.5	523.0	0.96	2.42	5.06	14.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix R

Synchro and Sidra Intersection Worksheets – 2028 Future Background Conditions

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	81	1129	97	57	428	119
Future Volume (vph)	81	1129	97	57	428	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		30.0	275.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.618	
Satd. Flow (perm)	1433	1455	1496	1293	948	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		562		57		
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	81	1129	97	57	428	119
Shared Lane Traffic (%)						
Lane Group Flow (vph)	81	1129	97	57	428	119
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	pm+ov	NA	Perm	pm+pt	NA
Protected Phases	8	1	2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	26.2	8.0	29.9	29.9	8.0	29.9
Total Split (s)	26.2	73.0	30.8	30.8	73.0	103.8
Total Split (%)	20.2%	56.2%	23.7%	23.7%	56.2%	79.8%
Maximum Green (s)	20.5	70.0	24.4	24.4	70.0	97.4
Yellow Time (s)	4.2	2.0	4.6	4.6	2.0	4.6
All-Red Time (s)	1.5	1.0	1.8	1.8	1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	3.0	6.4	6.4	3.0	6.4
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0		7.0	7.0		7.0
Flash Dont Walk (s)	13.5		16.5	16.5		16.5
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	12.8	85.2	24.5	24.5	101.3	99.3
Actuated g/C Ratio	0.11	0.71	0.21	0.21	0.85	0.83
v/c Ratio	0.53	0.94	0.32	0.18	0.39	0.13
Control Delay	64.4	23.4	45.7	12.3	3.8	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.4	23.4	45.7	12.3	3.8	3.4
LOS	E	C	D	B	A	A
Approach Delay	26.1		33.4			3.7
Approach LOS	C		C			A
Queue Length 50th (m)	18.8	117.3	20.0	0.0	19.0	5.2
Queue Length 95th (m)	35.0	#310.5	38.0	11.5	38.0	11.9
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		180.0		30.0	275.0	
Base Capacity (vph)	247	1200	307	311	1106	899
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.94	0.32	0.18	0.39	0.13

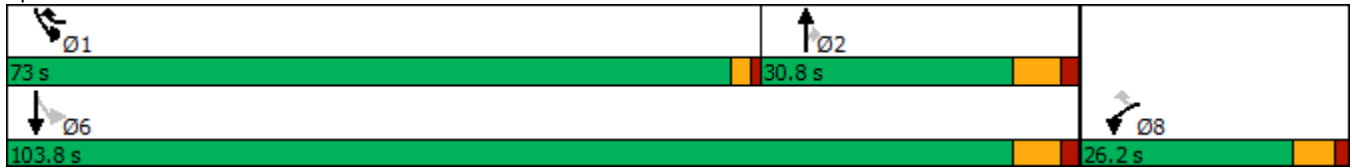
Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	119.2
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	20.3
Intersection LOS:	C
Intersection Capacity Utilization:	90.8%
ICU Level of Service:	E
Analysis Period (min):	15

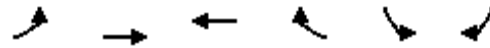
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	19	503	835	6	17	53
Future Volume (vph)	19	503	835	6	17	53
Ideal Flow (vphp)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.898	
Flt Protected	0.950				0.988	
Satd. Flow (prot)	1658	1679	1569	0	1393	0
Flt Permitted	0.950				0.988	
Satd. Flow (perm)	1658	1679	1569	0	1393	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	19	503	835	6	17	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	19	503	841	0	70	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.6%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	1.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	19	503	835	6	17	53
Future Vol, veh/h	19	503	835	6	17	53
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	19	503	835	6	17	53

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	846	0	-	0	1386 845
Stage 1	-	-	-	-	843 -
Stage 2	-	-	-	-	543 -
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	791	-	-	-	158 363
Stage 1	-	-	-	-	422 -
Stage 2	-	-	-	-	582 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	787	-	-	-	153 361
Mov Cap-2 Maneuver	-	-	-	-	153 -
Stage 1	-	-	-	-	410 -
Stage 2	-	-	-	-	579 -

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	22.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	787	-	-	-	271
HCM Lane V/C Ratio	0.024	-	-	-	0.258
HCM Control Delay (s)	9.7	-	-	-	22.8
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	551	117	57	415	45	299	60	135	58	19	26
Future Volume (vph)	14	551	117	57	415	45	299	60	135	58	19	26
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.97		0.97	1.00		0.93	0.99	0.96		0.97	0.98	
Frt			0.850			0.850		0.896			0.913	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1301	0	1478	1369	0
Flt Permitted	0.392			0.252			0.728			0.635		
Satd. Flow (perm)	506	1456	1300	347	1470	1215	1131	1301	0	958	1369	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			117			45		135			26	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	14	551	117	57	415	45	299	60	135	58	19	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	551	117	57	415	45	299	195	0	58	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road



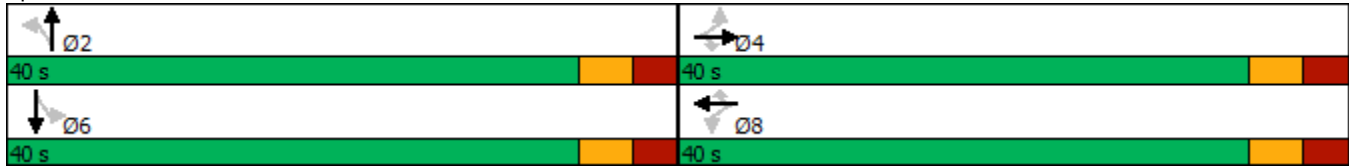
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0		10.0
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0		40.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0		40.0		40.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	33.9	33.9	33.9	33.9	33.9	33.9	34.0	34.0		34.0		34.0
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3		3.3
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7		2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0
Recall Mode	None	None	None	None	None	None	Max	Max		Max		Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0		7.0
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0		27.0
Pedestrian Calls (#/hr)	5	5	5	39	39	39	31	31		10		10
Act Effct Green (s)	31.7	31.7	31.7	31.7	31.7	31.7	34.1	34.1		34.1		34.1
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41	0.44	0.44		0.44		0.44
v/c Ratio	0.07	0.93	0.20	0.40	0.70	0.09	0.61	0.30		0.14		0.07
Control Delay	14.9	47.3	3.9	26.6	26.2	5.1	23.9	6.8		15.2		8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	14.9	47.3	3.9	26.6	26.2	5.1	23.9	6.8		15.2		8.3
LOS	B	D	A	C	C	A	C	A		B		A
Approach Delay		39.2			24.4			17.1				12.2
Approach LOS		D			C			B				B
Queue Length 50th (m)	1.2	75.1	0.0	5.8	49.0	0.0	34.4	5.3		5.2		1.6
Queue Length 95th (m)	4.7	#135.0	8.7	16.8	80.3	5.5	61.1	17.7		12.5		7.3
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	220	635	633	151	641	555	494	645		419		613
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0		0
Reduced v/c Ratio	0.06	0.87	0.18	0.38	0.65	0.08	0.61	0.30		0.14		0.07

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 77.9
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.93

Intersection Signal Delay: 27.3	Intersection LOS: C
Intersection Capacity Utilization 104.9%	ICU Level of Service G
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FB - AM Improvements
3831 Cambrian Road















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	262	515	60	106	281	81	143	377	208	95	144	136
Future Volume (vph)	262	515	60	106	281	81	143	377	208	95	144	136
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.990			0.977			0.961			0.951	
Flt Protected		0.985			0.989			0.990			0.987	
Satd. Flow (prot)	0	1502	0	0	1489	0	0	1657	0	0	1570	0
Flt Permitted		0.985			0.989			0.990			0.987	
Satd. Flow (perm)	0	1502	0	0	1489	0	0	1657	0	0	1570	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	262	515	60	106	281	81	143	377	208	95	144	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	837	0	0	468	0	0	728	0	0	375	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	132.3%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	61	678	169	68	1078	108
Future Volume (vph)	61	678	169	68	1078	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		30.0	275.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.491	
Satd. Flow (perm)	1433	1455	1496	1293	753	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		678		68		
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	61	678	169	68	1078	108
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	678	169	68	1078	108
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	26.2	26.2	29.9	29.9	9.5	29.9
Total Split (s)	27.0	27.0	31.0	31.0	72.0	103.0
Total Split (%)	20.8%	20.8%	23.8%	23.8%	55.4%	79.2%
Maximum Green (s)	21.3	21.3	24.6	24.6	69.0	96.6
Yellow Time (s)	4.2	4.2	4.6	4.6	2.0	4.6
All-Red Time (s)	1.5	1.5	1.8	1.8	1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	6.4	6.4	3.0	6.4
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	13.5	13.5	16.5	16.5		16.5
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	14.2	14.2	24.7	24.7	100.2	96.8
Actuated g/C Ratio	0.12	0.12	0.20	0.20	0.81	0.79
v/c Ratio	0.37	0.88	0.57	0.22	1.07	0.13
Control Delay	56.2	18.1	53.7	12.0	64.4	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.2	18.1	53.7	12.0	64.4	4.1
LOS	E	B	D	B	E	A
Approach Delay	21.2		41.8			58.9
Approach LOS	C		D			E
Queue Length 50th (m)	13.8	0.0	35.6	0.0	~222.2	4.2
Queue Length 95th (m)	27.4	#51.9	64.2	12.5	#351.8	12.3
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		180.0		30.0	275.0	
Base Capacity (vph)	248	812	299	313	1009	848
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.83	0.57	0.22	1.07	0.13

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	123.1
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.07
Intersection Signal Delay:	44.2
Intersection LOS:	D
Intersection Capacity Utilization:	94.2%
ICU Level of Service:	F
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

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

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2028 FB - PM
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	861	592	21	9	31
Future Volume (vph)	49	861	592	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1563	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1563	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	861	592	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	861	613	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.5%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	861	592	21	9	31
Future Vol, veh/h	49	861	592	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	861	592	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	618	0	-	0	1569 610
Stage 1	-	-	-	-	608 -
Stage 2	-	-	-	-	961 -
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	962	-	-	-	122 494
Stage 1	-	-	-	-	543 -
Stage 2	-	-	-	-	371 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	958	-	-	-	115 491
Mov Cap-2 Maneuver	-	-	-	-	115 -
Stage 1	-	-	-	-	513 -
Stage 2	-	-	-	-	369 -

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	958	-	-	-	283
HCM Lane V/C Ratio	0.051	-	-	-	0.141
HCM Control Delay (s)	9	-	-	-	19.8
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Future Volume (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99	0.94		0.96	0.98	
Frt			0.850			0.850		0.870			0.922	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1256	0	1478	1382	0
Flt Permitted	0.303			0.226			0.738			0.669		
Satd. Flow (perm)	393	1456	1299	311	1470	1207	1144	1256	0	1003	1382	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266			64		120			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	653	266	151	559	64	175	138	0	29	29	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3	13	13	13	16	16		9	9	
Act Effct Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.38	0.38		0.38	0.38	
v/c Ratio	0.10	0.92	0.35	1.00	0.78	0.10	0.41	0.25		0.08	0.05	
Control Delay	14.3	42.3	3.1	101.8	28.5	3.9	24.1	6.2		18.8	11.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	14.3	42.3	3.1	101.8	28.5	3.9	24.1	6.2		18.8	11.9	
LOS	B	D	A	F	C	A	C	A		B	B	
Approach Delay		30.6			40.8			16.2			15.3	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	1.8	100.3	0.0	24.9	76.4	0.0	21.8	1.9		3.2	1.5	
Queue Length 95th (m)	6.0	#171.5	11.8	#63.6	#123.9	6.1	39.6	13.3		8.8	6.9	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	191	710	769	151	717	621	432	549		378	531	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.10	0.92	0.35	1.00	0.78	0.10	0.41	0.25		0.08	0.05	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Natural Cycle: 90

Control Type: Semi Act-Uncoord

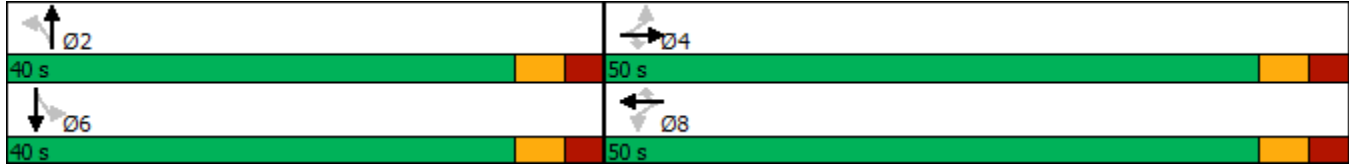
Maximum v/c Ratio: 1.00

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road

Intersection Signal Delay: 31.8	Intersection LOS: C
Intersection Capacity Utilization 88.6%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FB - PM
3831 Cambrian Road















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Future Volume (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.972			0.980			0.968			0.951	
Flt Protected		0.987			0.989			0.992			0.996	
Satd. Flow (prot)	0	1451	0	0	1496	0	0	1673	0	0	1587	0
Flt Permitted		0.987			0.989			0.992			0.996	
Satd. Flow (perm)	0	1451	0	0	1496	0	0	1673	0	0	1587	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	745	0	0	654	0	0	545	0	0	935	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	131.1%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FB - PM Improvements
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	61	678	169	68	1078	108
Future Volume (vph)	61	678	169	68	1078	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		30.0	275.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.499	
Satd. Flow (perm)	1433	1455	1496	1293	766	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		339		68		
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	61	678	169	68	1078	108
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	678	169	68	1078	108
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	pm+ov	NA	Perm	pm+pt	NA
Protected Phases	8	1	2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	26.2	9.5	29.9	29.9	9.5	29.9
Total Split (s)	26.2	73.0	30.8	30.8	73.0	103.8
Total Split (%)	20.2%	56.2%	23.7%	23.7%	56.2%	79.8%
Maximum Green (s)	20.5	70.0	24.4	24.4	70.0	97.4
Yellow Time (s)	4.2	2.0	4.6	4.6	2.0	4.6
All-Red Time (s)	1.5	1.0	1.8	1.8	1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	3.0	6.4	6.4	3.0	6.4
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0		7.0	7.0		7.0
Flash Dont Walk (s)	13.5		16.5	16.5		16.5
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	11.5	84.0	24.5	24.5	101.2	99.2
Actuated g/C Ratio	0.10	0.71	0.21	0.21	0.86	0.84
v/c Ratio	0.44	0.60	0.55	0.21	1.01	0.12
Control Delay	61.7	6.0	50.8	11.5	43.6	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	6.0	50.8	11.5	43.6	3.0
LOS	E	A	D	B	D	A
Approach Delay	10.6		39.5			39.9
Approach LOS	B		D			D
Queue Length 50th (m)	13.9	29.4	36.0	0.0	~221.7	4.2
Queue Length 95th (m)	27.9	54.4	61.4	12.3	#322.3	9.7
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		180.0		30.0	275.0	
Base Capacity (vph)	250	1133	310	322	1069	908
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.60	0.55	0.21	1.01	0.12

Intersection Summary	
Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	117.9
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	29.8
Intersection LOS:	C
Intersection Capacity Utilization:	94.2%
ICU Level of Service:	F
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

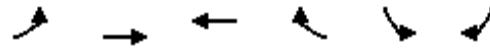
Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
2: Cambrian Road & Seeley's Bay Street

2028 FB - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	861	592	21	9	31
Future Volume (vph)	49	861	592	21	9	31
Ideal Flow (vphp)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1563	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1563	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	861	592	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	861	613	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.5%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	861	592	21	9	31
Future Vol, veh/h	49	861	592	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	861	592	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	618	0	-	0	1569 610
Stage 1	-	-	-	-	608 -
Stage 2	-	-	-	-	961 -
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	962	-	-	-	122 494
Stage 1	-	-	-	-	543 -
Stage 2	-	-	-	-	371 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	958	-	-	-	115 491
Mov Cap-2 Maneuver	-	-	-	-	115 -
Stage 1	-	-	-	-	513 -
Stage 2	-	-	-	-	369 -

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	958	-	-	-	283
HCM Lane V/C Ratio	0.051	-	-	-	0.141
HCM Control Delay (s)	9	-	-	-	19.8
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Future Volume (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99	0.94		0.96	0.98	
Frt			0.850			0.850		0.870			0.922	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1256	0	1478	1382	0
Flt Permitted	0.303			0.226			0.738			0.669		
Satd. Flow (perm)	393	1456	1299	311	1470	1207	1144	1256	0	1003	1382	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266			64		120			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	653	266	151	559	64	175	138	0	29	29	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3	13	13	13	16	16		9	9	
Act Effct Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.38	0.38		0.38	0.38	
v/c Ratio	0.10	0.92	0.35	1.00	0.78	0.10	0.41	0.25		0.08	0.05	
Control Delay	14.3	42.3	3.1	101.8	28.5	3.9	24.1	6.2		18.8	11.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	14.3	42.3	3.1	101.8	28.5	3.9	24.1	6.2		18.8	11.9	
LOS	B	D	A	F	C	A	C	A		B	B	
Approach Delay		30.6			40.8			16.2			15.3	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	1.8	100.3	0.0	24.9	76.4	0.0	21.8	1.9		3.2	1.5	
Queue Length 95th (m)	6.0	#171.5	11.8	#63.6	#123.9	6.1	39.6	13.3		8.8	6.9	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	191	710	769	151	717	621	432	549		378	531	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.10	0.92	0.35	1.00	0.78	0.10	0.41	0.25		0.08	0.05	

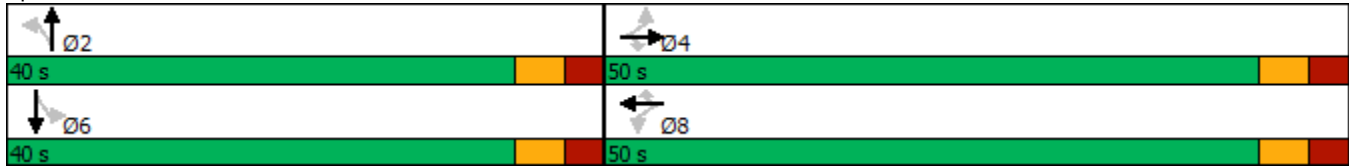
Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.00

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

Intersection Signal Delay: 31.8	Intersection LOS: C
Intersection Capacity Utilization 88.6%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FB - PM Improvements
3831 Cambrian Road















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Future Volume (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.972			0.980			0.968			0.951	
Flt Protected		0.987			0.989			0.992			0.996	
Satd. Flow (prot)	0	1451	0	0	1496	0	0	1673	0	0	1587	0
Flt Permitted		0.987			0.989			0.992			0.996	
Satd. Flow (perm)	0	1451	0	0	1496	0	0	1673	0	0	1587	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	745	0	0	654	0	0	545	0	0	935	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	131.1%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	61	678	169	68	1078	108
Future Volume (vph)	61	678	169	68	1078	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		30.0	275.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.491	
Satd. Flow (perm)	1433	1455	1496	1293	753	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		678		68		
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	61	678	169	68	1078	108
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	678	169	68	1078	108
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA	Perm	pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2028 FB - SAT
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	26.2	26.2	29.9	29.9	9.5	29.9
Total Split (s)	27.0	27.0	31.0	31.0	72.0	103.0
Total Split (%)	20.8%	20.8%	23.8%	23.8%	55.4%	79.2%
Maximum Green (s)	21.3	21.3	24.6	24.6	69.0	96.6
Yellow Time (s)	4.2	4.2	4.6	4.6	2.0	4.6
All-Red Time (s)	1.5	1.5	1.8	1.8	1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	6.4	6.4	3.0	6.4
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	13.5	13.5	16.5	16.5		16.5
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	14.2	14.2	24.7	24.7	100.2	96.8
Actuated g/C Ratio	0.12	0.12	0.20	0.20	0.81	0.79
v/c Ratio	0.37	0.88	0.57	0.22	1.07	0.13
Control Delay	56.2	18.1	53.7	12.0	64.4	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.2	18.1	53.7	12.0	64.4	4.1
LOS	E	B	D	B	E	A
Approach Delay	21.2		41.8			58.9
Approach LOS	C		D			E
Queue Length 50th (m)	13.8	0.0	35.6	0.0	~222.2	4.2
Queue Length 95th (m)	27.4	#51.9	64.2	12.5	#351.8	12.3
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		180.0		30.0	275.0	
Base Capacity (vph)	248	812	299	313	1009	848
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.83	0.57	0.22	1.07	0.13

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	123.1
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.07
Intersection Signal Delay:	44.2
Intersection LOS:	D
Intersection Capacity Utilization:	94.2%
ICU Level of Service:	F
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

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

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street

2028 FB - SAT
 3831 Cambrian Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	861	592	21	9	31
Future Volume (vph)	49	861	592	21	9	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1563	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1563	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	861	592	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	861	613	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.5%
Analysis Period (min)	15
	ICU Level of Service B

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	861	592	21	9	31
Future Vol, veh/h	49	861	592	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	861	592	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	618	0	-	0	1569 610
Stage 1	-	-	-	-	608 -
Stage 2	-	-	-	-	961 -
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	962	-	-	-	122 494
Stage 1	-	-	-	-	543 -
Stage 2	-	-	-	-	371 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	958	-	-	-	115 491
Mov Cap-2 Maneuver	-	-	-	-	115 -
Stage 1	-	-	-	-	513 -
Stage 2	-	-	-	-	369 -

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	958	-	-	-	283
HCM Lane V/C Ratio	0.051	-	-	-	0.141
HCM Control Delay (s)	9	-	-	-	19.8
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Future Volume (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99	0.94		0.96	0.98	
Frt			0.850			0.850		0.870			0.922	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1256	0	1478	1382	0
Flt Permitted	0.303			0.226			0.738			0.669		
Satd. Flow (perm)	393	1456	1299	311	1470	1207	1144	1256	0	1003	1382	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266			64		120			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	653	266	151	559	64	175	138	0	29	29	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3	13	13	13	16	16		9	9	
Act Effct Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.38	0.38		0.38	0.38	
v/c Ratio	0.10	0.92	0.35	1.00	0.78	0.10	0.41	0.25		0.08	0.05	
Control Delay	14.3	42.3	3.1	101.8	28.5	3.9	24.1	6.2		18.8	11.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	14.3	42.3	3.1	101.8	28.5	3.9	24.1	6.2		18.8	11.9	
LOS	B	D	A	F	C	A	C	A		B	B	
Approach Delay		30.6			40.8			16.2			15.3	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	1.8	100.3	0.0	24.9	76.4	0.0	21.8	1.9		3.2	1.5	
Queue Length 95th (m)	6.0	#171.5	11.8	#63.6	#123.9	6.1	39.6	13.3		8.8	6.9	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	191	710	769	151	717	621	432	549		378	531	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.10	0.92	0.35	1.00	0.78	0.10	0.41	0.25		0.08	0.05	

Intersection Summary

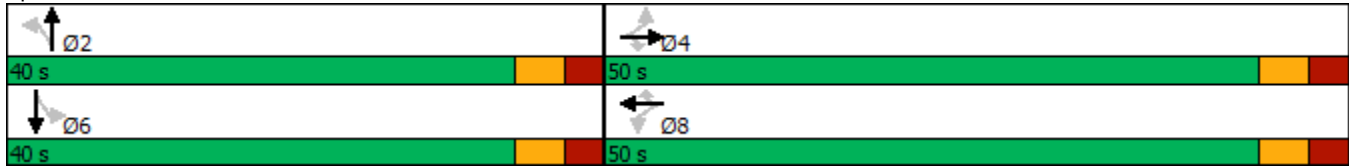
Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.00

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road

Intersection Signal Delay: 31.8	Intersection LOS: C
Intersection Capacity Utilization 88.6%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FB - SAT
3831 Cambrian Road















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Future Volume (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.972			0.980			0.968			0.951	
Flt Protected		0.987			0.989			0.992			0.996	
Satd. Flow (prot)	0	1451	0	0	1496	0	0	1673	0	0	1587	0
Flt Permitted		0.987			0.989			0.992			0.996	
Satd. Flow (perm)	0	1451	0	0	1496	0	0	1673	0	0	1587	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	745	0	0	654	0	0	545	0	0	935	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	131.1%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FB - SAT Improvements
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	61	678	169	68	1078	108
Future Volume (vph)	61	678	169	68	1078	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		30.0	275.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.499	
Satd. Flow (perm)	1433	1455	1496	1293	766	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		339		68		
Link Speed (k/h)	70		80			80
Link Distance (m)	1137.3		291.4			1557.5
Travel Time (s)	58.5		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	61	678	169	68	1078	108
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	678	169	68	1078	108
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	pm+ov	NA	Perm	pm+pt	NA
Protected Phases	8	1	2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2028 FB - SAT Improvements
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	26.2	9.5	29.9	29.9	9.5	29.9
Total Split (s)	26.2	73.0	30.8	30.8	73.0	103.8
Total Split (%)	20.2%	56.2%	23.7%	23.7%	56.2%	79.8%
Maximum Green (s)	20.5	70.0	24.4	24.4	70.0	97.4
Yellow Time (s)	4.2	2.0	4.6	4.6	2.0	4.6
All-Red Time (s)	1.5	1.0	1.8	1.8	1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	3.0	6.4	6.4	3.0	6.4
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0		7.0	7.0		7.0
Flash Dont Walk (s)	13.5		16.5	16.5		16.5
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	11.5	84.0	24.5	24.5	101.2	99.2
Actuated g/C Ratio	0.10	0.71	0.21	0.21	0.86	0.84
v/c Ratio	0.44	0.60	0.55	0.21	1.01	0.12
Control Delay	61.7	6.0	50.8	11.5	43.6	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	6.0	50.8	11.5	43.6	3.0
LOS	E	A	D	B	D	A
Approach Delay	10.6		39.5			39.9
Approach LOS	B		D			D
Queue Length 50th (m)	13.9	29.4	36.0	0.0	~221.7	4.2
Queue Length 95th (m)	27.9	54.4	61.4	12.3	#322.3	9.7
Internal Link Dist (m)	1113.3		267.4			1533.5
Turn Bay Length (m)		180.0		30.0	275.0	
Base Capacity (vph)	250	1133	310	322	1069	908
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.60	0.55	0.21	1.01	0.12

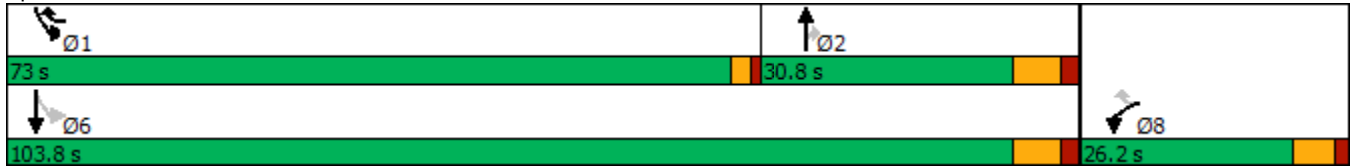
Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	117.9
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	29.8
Intersection LOS:	C
Intersection Capacity Utilization:	94.2%
ICU Level of Service:	F
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

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

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Cambrian Road & Seeley's Bay Street



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	49	861	592	21	9	31
Future Volume (vph)	49	861	592	21	9	31
Ideal Flow (vphp)	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0			0.0	0.0	0.0
Storage Lanes	1			0	1	0
Taper Length (m)	100.0				15.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.995		0.895	
Flt Protected	0.950				0.989	
Satd. Flow (prot)	1658	1679	1563	0	1390	0
Flt Permitted	0.950				0.989	
Satd. Flow (perm)	1658	1679	1563	0	1390	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		1137.3	449.3		208.1	
Travel Time (s)		81.9	32.3		15.0	
Confl. Peds. (#/hr)	5			5	2	2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%
Parking (#/hr)			0	0	0	0
Adj. Flow (vph)	49	861	592	21	9	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	861	613	0	40	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.5	3.5		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		3.0	3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.24	1.09	1.24	1.09
Turning Speed (k/h)	25			15	25	15
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.5%
ICU Level of Service	B
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	49	861	592	21	9	31
Future Vol, veh/h	49	861	592	21	9	31
Conflicting Peds, #/hr	5	0	0	5	2	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	600	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	2	2	2	2
Mvmt Flow	49	861	592	21	9	31

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	618	0	-	0	1569 610
Stage 1	-	-	-	-	608 -
Stage 2	-	-	-	-	961 -
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	962	-	-	-	122 494
Stage 1	-	-	-	-	543 -
Stage 2	-	-	-	-	371 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	958	-	-	-	115 491
Mov Cap-2 Maneuver	-	-	-	-	115 -
Stage 1	-	-	-	-	513 -
Stage 2	-	-	-	-	369 -

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	958	-	-	-	283
HCM Lane V/C Ratio	0.051	-	-	-	0.141
HCM Control Delay (s)	9	-	-	-	19.8
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.5

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Future Volume (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99	0.94		0.96	0.98	
Frt			0.850			0.850		0.870			0.922	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1256	0	1478	1382	0
Flt Permitted	0.303			0.226			0.738			0.669		
Satd. Flow (perm)	393	1456	1299	311	1470	1207	1144	1256	0	1003	1382	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266			64		120			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	20	653	266	151	559	64	175	18	120	29	14	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	20	653	266	151	559	64	175	138	0	29	29	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FB - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3	13	13	13	16	16		9	9	
Act Effct Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.38	0.38		0.38	0.38	
v/c Ratio	0.10	0.92	0.35	1.00	0.78	0.10	0.41	0.25		0.08	0.05	
Control Delay	14.3	42.3	3.1	101.8	28.5	3.9	24.1	6.2		18.8	11.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	14.3	42.3	3.1	101.8	28.5	3.9	24.1	6.2		18.8	11.9	
LOS	B	D	A	F	C	A	C	A		B	B	
Approach Delay		30.6			40.8			16.2			15.3	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	1.8	100.3	0.0	24.9	76.4	0.0	21.8	1.9		3.2	1.5	
Queue Length 95th (m)	6.0	#171.5	11.8	#63.6	#123.9	6.1	39.6	13.3		8.8	6.9	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	191	710	769	151	717	621	432	549		378	531	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.10	0.92	0.35	1.00	0.78	0.10	0.41	0.25		0.08	0.05	

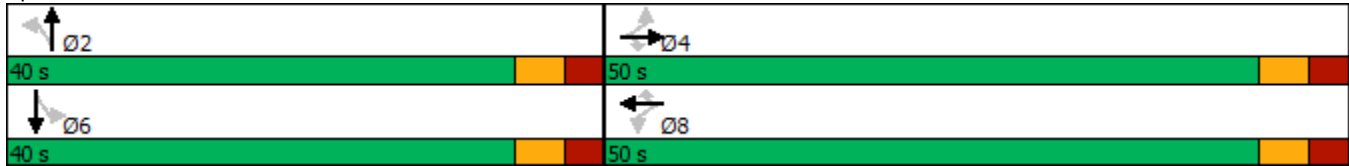
Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.00

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

Intersection Signal Delay: 31.8	Intersection LOS: C
Intersection Capacity Utilization 88.6%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FB - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Future Volume (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.972			0.980			0.968			0.951	
Flt Protected		0.987			0.989			0.992			0.996	
Satd. Flow (prot)	0	1451	0	0	1496	0	0	1673	0	0	1587	0
Flt Permitted		0.987			0.989			0.992			0.996	
Satd. Flow (perm)	0	1451	0	0	1496	0	0	1673	0	0	1587	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	190	399	156	146	413	95	89	328	128	75	524	336
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	745	0	0	654	0	0	545	0	0	935	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	131.1%
ICU Level of Service	H
Analysis Period (min)	15

DEGREE OF SATURATION

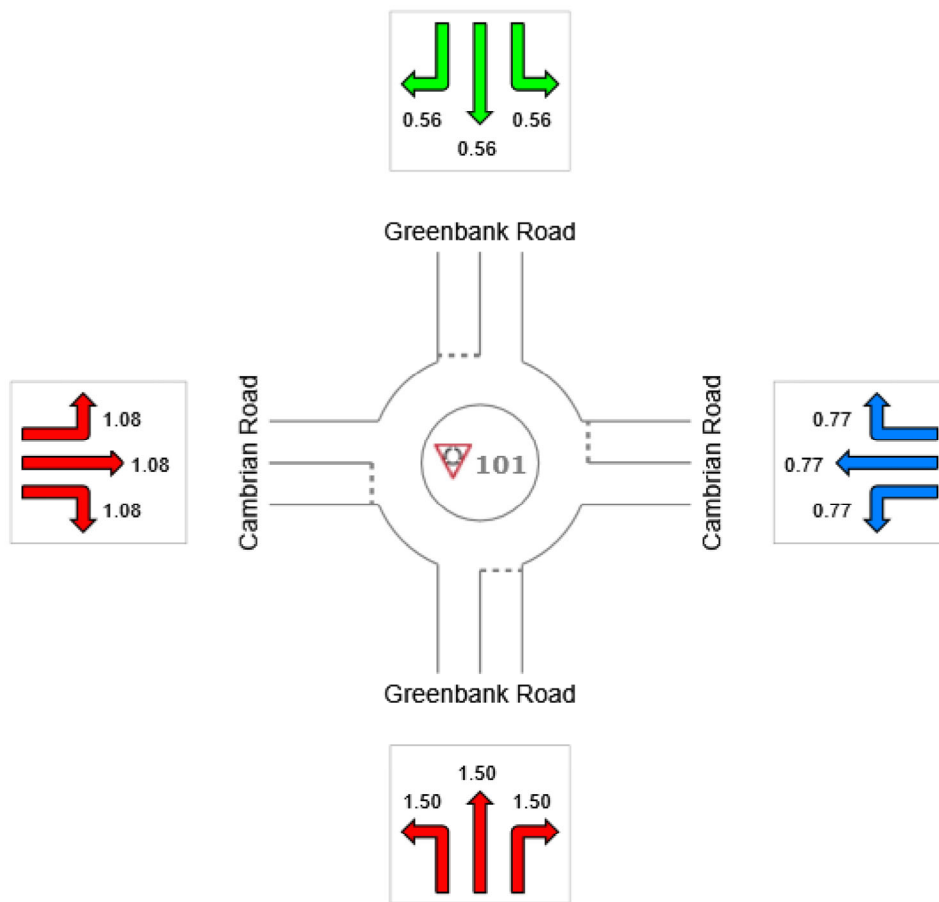
Ratio of Demand Volume to Capacity, v/c ratio per movement

 **Site: 101 [Cambrian and Greenbank 2028 FB AM]**

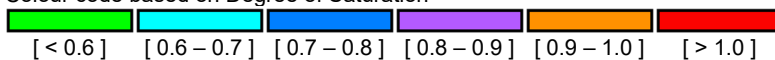
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	1.50	0.77	0.56	1.08	1.50



Colour code based on Degree of Saturation



DELAY (CONTROL)

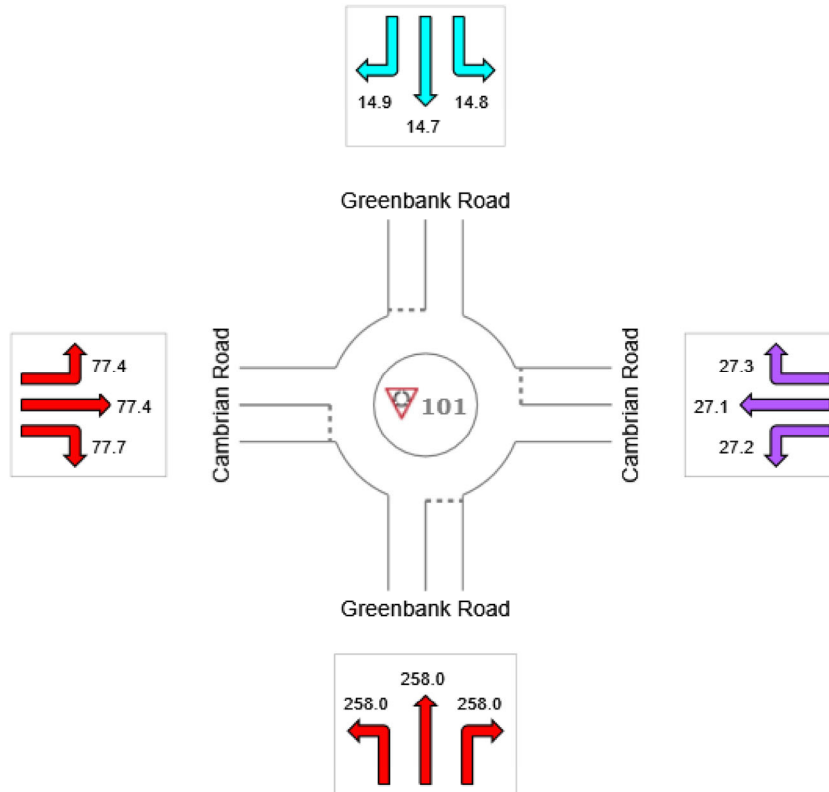
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2028 FB AM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	258.0	27.2	14.8	77.4	112.5
LOS	F	D	B	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

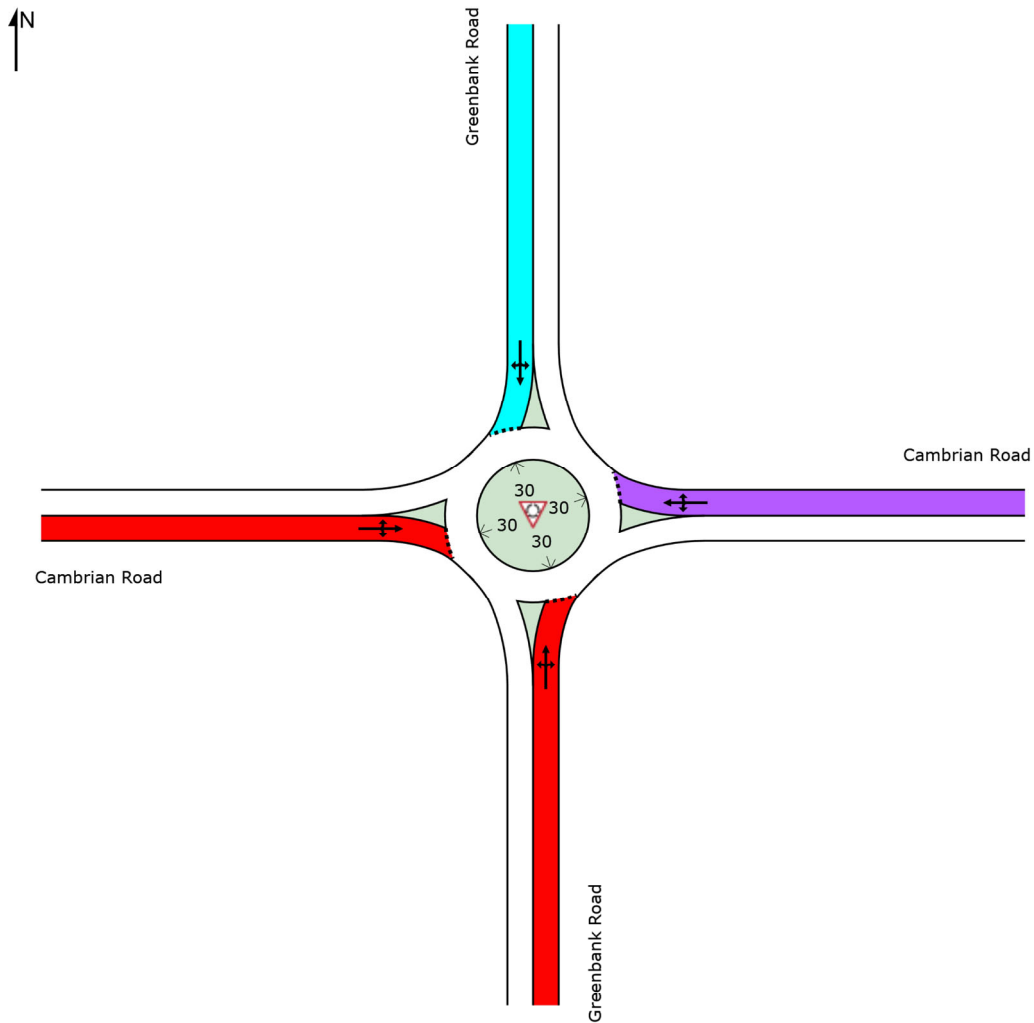
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2028 FB AM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	D	B	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FB AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	143	3.0	1.500	258.0	LOS F	88.3	629.4	1.00	4.52	12.73	5.4
2	T1	377	2.0	1.500	258.0	LOS F	88.3	629.4	1.00	4.52	12.73	5.7
3	R2	208	2.0	1.500	258.0	LOS F	88.3	629.4	1.00	4.52	12.73	4.4
Approach		728	2.2	1.500	258.0	LOS F	88.3	629.4	1.00	4.52	12.73	5.2
East: Cambrian Road												
4	L2	106	6.0	0.774	27.2	LOS D	8.5	61.8	0.85	1.28	1.96	24.2
5	T1	281	2.0	0.774	27.1	LOS D	8.5	61.8	0.85	1.28	1.96	26.6
6	R2	81	8.0	0.774	27.3	LOS D	8.5	61.8	0.85	1.28	1.96	26.7
Approach		468	3.9	0.774	27.2	LOS D	8.5	61.8	0.85	1.28	1.96	26.1
North: Greenbank Road												
7	L2	95	5.0	0.560	14.8	LOS B	4.0	29.5	0.68	0.84	1.12	35.8
8	T1	144	4.0	0.560	14.7	LOS B	4.0	29.5	0.68	0.84	1.12	35.9
9	R2	136	10.0	0.560	14.9	LOS B	4.0	29.5	0.68	0.84	1.12	35.6
Approach		375	6.4	0.560	14.8	LOS B	4.0	29.5	0.68	0.84	1.12	35.7
West: Cambrian Road												
10	L2	262	3.0	1.077	77.4	LOS F	52.4	379.6	1.00	2.84	4.92	17.0
11	T1	515	3.0	1.077	77.4	LOS F	52.4	379.6	1.00	2.84	4.92	14.4
12	R2	60	17.0	1.077	77.7	LOS F	52.4	379.6	1.00	2.84	4.92	14.1
Approach		837	4.0	1.077	77.4	LOS F	52.4	379.6	1.00	2.84	4.92	15.2
All Vehicles		2408	3.8	1.500	112.5	LOS F	88.3	629.4	0.92	2.74	6.11	11.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DEGREE OF SATURATION

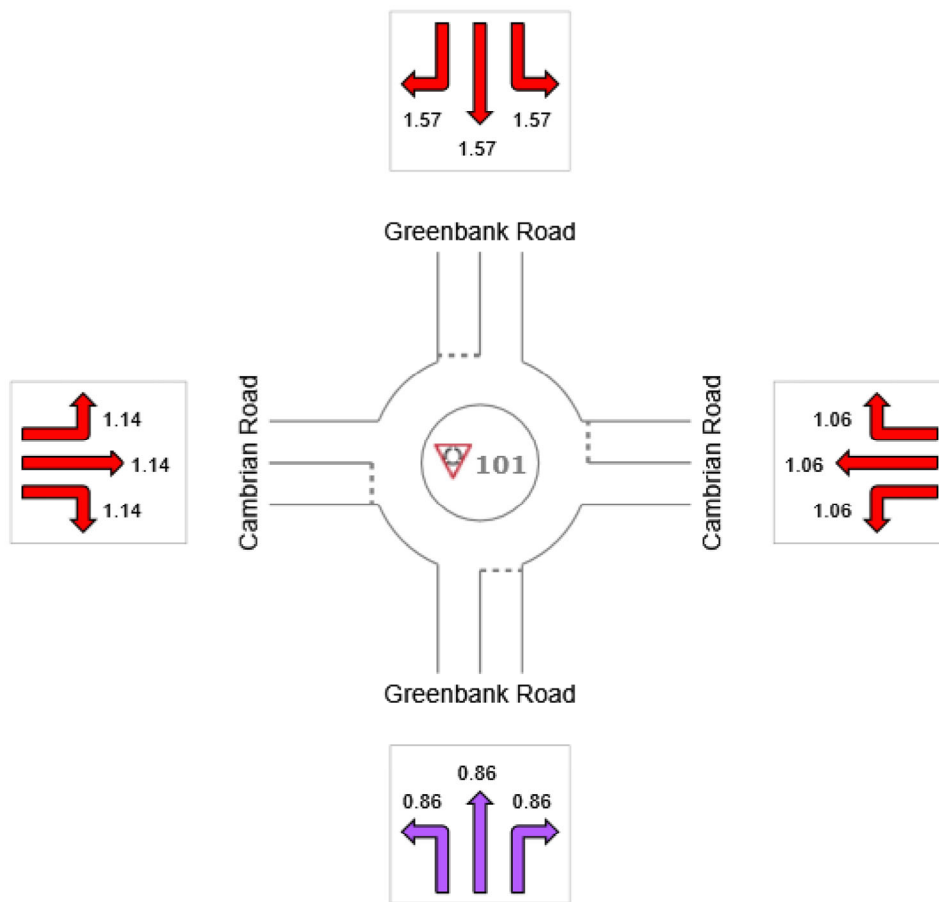
Ratio of Demand Volume to Capacity, v/c ratio per movement

 **Site: 101 [Cambrian and Greenbank 2028 FB Sat]**

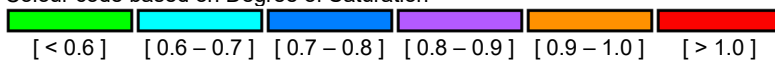
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.86	1.06	1.57	1.14	1.57



Colour code based on Degree of Saturation



DELAY (CONTROL)

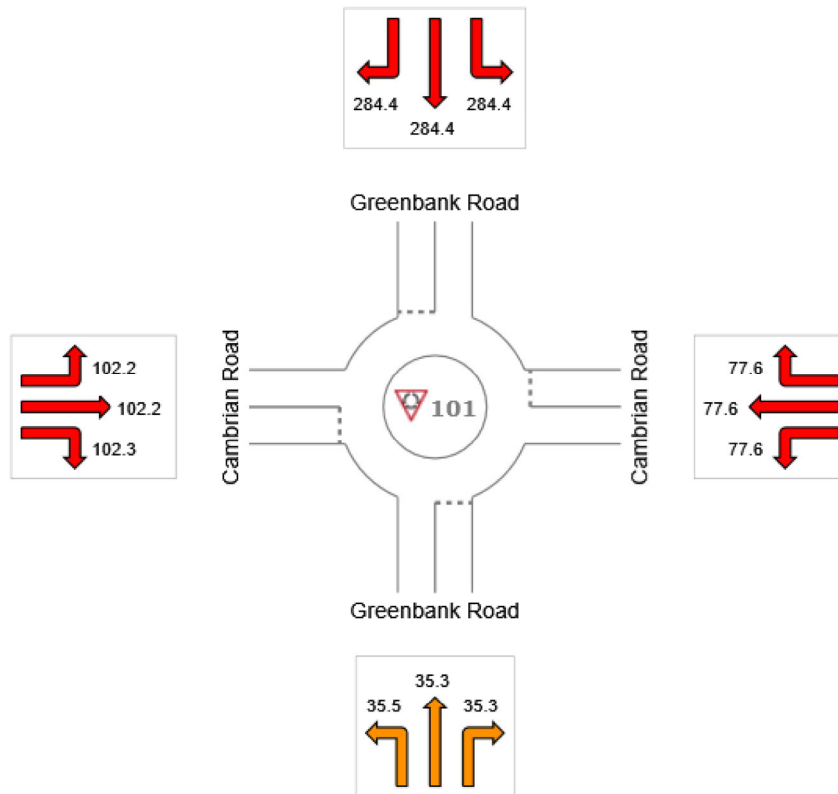
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2028 FB Sat]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	35.3	77.6	284.4	102.3	143.1
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

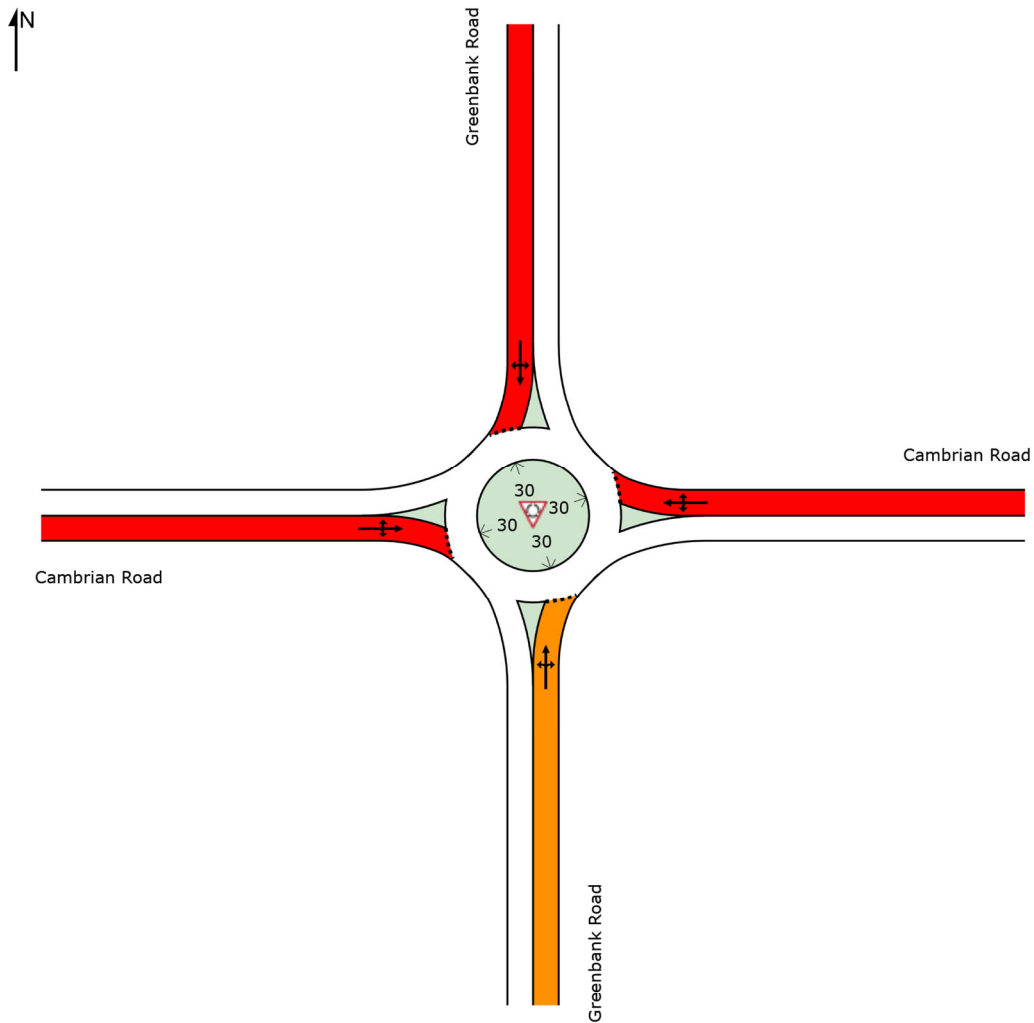
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2028 FB Sat]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FB Sat]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	89	8.0	0.862	35.5	LOS E	13.5	96.7	0.94	1.50	2.58	24.0
2	T1	328	2.0	0.862	35.3	LOS E	13.5	96.7	0.94	1.50	2.58	24.9
3	R2	128	2.0	0.862	35.3	LOS E	13.5	96.7	0.94	1.50	2.58	20.3
Approach		545	3.0	0.862	35.3	LOS E	13.5	96.7	0.94	1.50	2.58	23.7
East: Cambrian Road												
4	L2	146	2.0	1.056	77.6	LOS F	33.6	238.9	1.00	2.61	5.16	12.4
5	T1	413	2.0	1.056	77.6	LOS F	33.6	238.9	1.00	2.61	5.16	14.3
6	R2	95	2.0	1.056	77.6	LOS F	33.6	238.9	1.00	2.61	5.16	14.8
Approach		654	2.0	1.056	77.6	LOS F	33.6	238.9	1.00	2.61	5.16	14.0
North: Greenbank Road												
7	L2	75	2.0	1.573	284.4	LOS F	122.6	873.0	1.00	5.13	13.56	5.1
8	T1	524	2.0	1.573	284.4	LOS F	122.6	873.0	1.00	5.13	13.56	5.1
9	R2	336	2.0	1.573	284.4	LOS F	122.6	873.0	1.00	5.13	13.56	5.9
Approach		935	2.0	1.573	284.4	LOS F	122.6	873.0	1.00	5.13	13.56	5.4
West: Cambrian Road												
10	L2	190	2.0	1.136	102.2	LOS F	49.8	355.8	1.00	3.22	6.47	13.9
11	T1	399	2.0	1.136	102.2	LOS F	49.8	355.8	1.00	3.22	6.47	11.7
12	R2	156	4.0	1.136	102.3	LOS F	49.8	355.8	1.00	3.22	6.47	11.6
Approach		745	2.4	1.136	102.3	LOS F	49.8	355.8	1.00	3.22	6.47	12.2
All Vehicles		2879	2.3	1.573	143.1	LOS F	122.6	873.0	0.99	3.38	7.74	9.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix S

Synchro and Sidra Intersection Worksheets – 2023 Future Total Conditions

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	782	207	45	279	169
Future Volume (vph)	47	782	207	45	279	169
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.976			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1464	0	1458	1079
Flt Permitted	0.950				0.534	
Satd. Flow (perm)	1433	1455	1464	0	819	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		423	12			
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	47	782	207	45	279	169
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	782	252	0	279	169
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	pm+ov	NA		pm+pt	NA
Protected Phases	8	1	2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	1	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	5.0	10.0		5.0	10.0
Minimum Split (s)	26.2	8.0	29.9		8.0	26.9
Total Split (s)	26.2	32.0	31.8		32.0	63.8
Total Split (%)	29.1%	35.6%	35.3%		35.6%	70.9%
Maximum Green (s)	20.5	29.0	25.4		29.0	57.4
Yellow Time (s)	4.2	2.0	4.6		2.0	4.6
All-Red Time (s)	1.5	1.0	1.8		1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	3.0	6.4		3.0	6.4
Lead/Lag		Lead	Lag		Lead	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0		7.0			7.0
Flash Dont Walk (s)	13.5		16.5			13.5
Pedestrian Calls (#/hr)	0		0			0
Act Effct Green (s)	10.3	32.9	31.0		61.5	61.0
Actuated g/C Ratio	0.14	0.45	0.42		0.84	0.83
v/c Ratio	0.23	0.88	0.40		0.31	0.19
Control Delay	34.0	19.9	20.5		3.2	3.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	34.0	19.9	20.5		3.2	3.7
LOS	C	B	C		A	A
Approach Delay	20.7		20.5			3.4
Approach LOS	C		C			A
Queue Length 50th (m)	6.5	44.6	26.0		9.3	6.8
Queue Length 95th (m)	16.0	87.7	52.1		17.0	13.7
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		180.0			275.0	
Base Capacity (vph)	404	960	625		941	897
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.12	0.81	0.40		0.30	0.19

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	73.4
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	15.6
Intersection Capacity Utilization:	74.2%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	D

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2023 FT - AM
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	409	4	48	716	6	3	5	30	17	5	53
Future Volume (vph)	19	409	4	48	716	6	3	5	30	17	5	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. 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
Ped Bike Factor												
Fr _t		0.999			0.999			0.893			0.905	
Fl _t Protected	0.950			0.950				0.996			0.989	
Satd. Flow (prot)	1658	1678	0	1658	1569	0	0	1552	0	0	1562	0
Fl _t Permitted	0.950			0.950				0.996			0.989	
Satd. Flow (perm)	1658	1678	0	1658	1569	0	0	1552	0	0	1562	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	11		12	12		11	8		8	8		8
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
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	19	409	4	48	716	6	3	5	30	17	5	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	413	0	48	722	0	0	38	0	0	75	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.7%
ICU Level of Service	B
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	2.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	19	409	4	48	716	6	3	5	30	17	5	53
Future Vol, veh/h	19	409	4	48	716	6	3	5	30	17	5	53
Conflicting Peds, #/hr	11	0	12	12	0	11	8	0	8	8	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
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, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	409	4	48	716	6	3	5	30	17	5	53

Major/Minor	Major1		Major2		Minor1			Minor2				
Conflicting Flow All	733	0	0	425	0	0	1313	1290	431	1301	1289	738
Stage 1	-	-	-	-	-	-	461	461	-	826	826	-
Stage 2	-	-	-	-	-	-	852	829	-	475	463	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	872	-	-	1134	-	-	135	163	624	138	164	418
Stage 1	-	-	-	-	-	-	581	565	-	366	387	-
Stage 2	-	-	-	-	-	-	354	385	-	570	564	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	863	-	-	1121	-	-	107	149	612	120	150	411
Mov Cap-2 Maneuver	-	-	-	-	-	-	107	149	-	120	150	-
Stage 1	-	-	-	-	-	-	562	546	-	354	366	-
Stage 2	-	-	-	-	-	-	289	365	-	521	545	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.4		0.5		16.8		25.8	
HCM LOS					C		D	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	344	863	-	-	1121	-	-	247
HCM Lane V/C Ratio	0.11	0.022	-	-	0.043	-	-	0.304
HCM Control Delay (s)	16.8	9.3	-	-	8.4	-	-	25.8
HCM Lane LOS	C	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0.1	-	-	1.2

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	459	131	57	363	45	295	54	135	58	17	33
Future Volume (vph)	17	459	131	57	363	45	295	54	135	58	17	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.97		0.97	1.00		0.93	0.99	0.96		0.97	0.98	
Frt			0.850			0.850		0.893			0.901	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1296	0	1478	1349	0
Flt Permitted	0.431			0.318			0.724			0.639		
Satd. Flow (perm)	554	1456	1300	438	1470	1215	1125	1296	0	964	1349	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131			45		135			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	17	459	131	57	363	45	295	54	135	58	17	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	459	131	57	363	45	295	189	0	58	50	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0		10.0
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0		40.0
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0		40.0		40.0
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%		50.0%		50.0%
Maximum Green (s)	33.9	33.9	33.9	33.9	33.9	33.9	34.0	34.0		34.0		34.0
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3		3.3
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7		2.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0		6.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0		3.0
Recall Mode	None	None	None	None	None	None	Max	Max		Max		Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0		7.0
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0		27.0
Pedestrian Calls (#/hr)	5	5	5	39	39	39	31	31		10		10
Act Effct Green (s)	27.0	27.0	27.0	27.0	27.0	27.0	34.3	34.3		34.3		34.3
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37	0.37	0.47	0.47		0.47		0.47
v/c Ratio	0.08	0.86	0.23	0.36	0.67	0.09	0.56	0.28		0.13		0.08
Control Delay	15.3	38.1	4.1	23.3	26.0	5.2	21.2	6.2		14.3		7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	15.3	38.1	4.1	23.3	26.0	5.2	21.2	6.2		14.3		7.4
LOS	B	D	A	C	C	A	C	A		B		A
Approach Delay		30.1			23.7			15.3				11.1
Approach LOS		C			C			B				B
Queue Length 50th (m)	1.5	56.8	0.0	5.5	40.9	0.0	29.1	4.1		4.5		1.3
Queue Length 95th (m)	5.3	#95.4	9.2	15.0	67.4	5.5	60.4	16.8		12.5		7.4
Internal Link Dist (m)		425.3			453.1			551.8				305.8
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0			60.0		
Base Capacity (vph)	257	677	674	203	683	589	525	676		449		646
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0		0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0		0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0		0
Reduced v/c Ratio	0.07	0.68	0.19	0.28	0.53	0.08	0.56	0.28		0.13		0.08

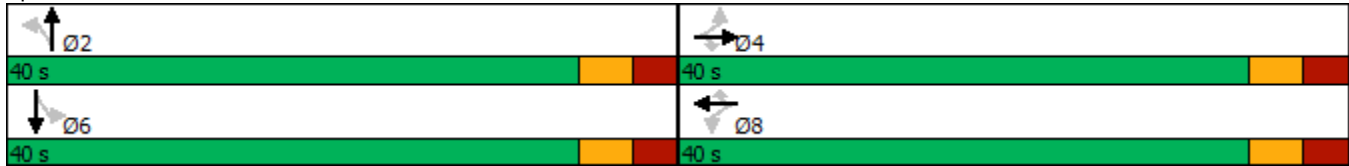
Intersection Summary	
Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	73.5
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.86

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road

Intersection Signal Delay: 22.8	Intersection LOS: C
Intersection Capacity Utilization 99.6%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	192	466	63	103	257	73	139	325	208	86	116	100
Future Volume (vph)	192	466	63	103	257	73	139	325	208	86	116	100
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.988			0.977			0.958			0.955	
Flt Protected		0.987			0.988			0.990			0.986	
Satd. Flow (prot)	0	1499	0	0	1487	0	0	1652	0	0	1577	0
Flt Permitted		0.987			0.988			0.990			0.986	
Satd. Flow (perm)	0	1499	0	0	1487	0	0	1652	0	0	1577	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	192	466	63	103	257	73	139	325	208	86	116	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	721	0	0	433	0	0	672	0	0	302	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	112.0%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2023 FT - AM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	21	0	0	31	0
Future Volume (vph)	0	21	0	0	31	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	21	0	0	31	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	0	0	0	31
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 6.7%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2023 FT - AM
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	461	22	9	736	15	6
Future Volume (vph)	461	22	9	736	15	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.994			0.961		
Fl _t Protected				0.999	0.966	
Satd. Flow (prot)	1735	0	0	1743	1620	0
Fl _t Permitted				0.999	0.966	
Satd. Flow (perm)	1735	0	0	1743	1620	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	461	22	9	736	15	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	483	0	0	745	21	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	58.5%
Analysis Period (min)	15
	ICU Level of Service B

Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	461	22	9	736	15	6
Future Vol, veh/h	461	22	9	736	15	6
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	461	22	9	736	15	6

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	483	0	1226 472
Stage 1	-	-	-	-	472 -
Stage 2	-	-	-	-	754 -
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	-	-	1080	-	197 592
Stage 1	-	-	-	-	628 -
Stage 2	-	-	-	-	465 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1080	-	194 592
Mov Cap-2 Maneuver	-	-	-	-	194 -
Stage 1	-	-	-	-	628 -
Stage 2	-	-	-	-	458 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	21.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	240	-	-	1080	-
HCM Lane V/C Ratio	0.088	-	-	0.008	-
HCM Control Delay (s)	21.4	-	-	8.4	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	435	244	40	685	216
Future Volume (vph)	43	435	244	40	685	216
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.981			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1471	0	1458	1079
Flt Permitted	0.950				0.428	
Satd. Flow (perm)	1433	1455	1471	0	657	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		435	9			
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	43	435	244	40	685	216
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	435	284	0	685	216
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2023 FT - PM
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0
Minimum Split (s)	26.2	26.2	29.9		10.7	29.9
Total Split (s)	26.2	26.2	30.6		33.2	63.8
Total Split (%)	29.1%	29.1%	34.0%		36.9%	70.9%
Maximum Green (s)	20.5	20.5	24.2		30.2	57.4
Yellow Time (s)	4.2	4.2	4.6		2.0	4.6
All-Red Time (s)	1.5	1.5	1.8		1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	6.4		3.0	6.4
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0	7.0	7.0			7.0
Flash Dont Walk (s)	13.5	13.5	16.5			16.5
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	11.9	11.9	24.3		60.9	57.5
Actuated g/C Ratio	0.15	0.15	0.30		0.75	0.70
v/c Ratio	0.21	0.74	0.64		0.87	0.28
Control Delay	32.5	12.0	32.7		22.1	6.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	32.5	12.0	32.7		22.1	6.2
LOS	C	B	C		C	A
Approach Delay	13.9		32.7			18.3
Approach LOS	B		C			B
Queue Length 50th (m)	5.9	0.0	35.4		38.2	9.2
Queue Length 95th (m)	14.6	25.2	#72.3		#140.0	26.3
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		180.0			275.0	
Base Capacity (vph)	360	692	443		787	761
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.12	0.63	0.64		0.87	0.28

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	81.6
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.87
Intersection Signal Delay:	19.5
Intersection LOS:	B
Intersection Capacity Utilization:	77.9%
ICU Level of Service:	D
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2023 FT - PM
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	631	3	131	449	21	7	5	140	9	5	31
Future Volume (vph)	49	631	3	131	449	21	7	5	140	9	5	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. 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
Ped Bike Factor												
Frt		0.999			0.993			0.876			0.907	
Flt Protected	0.950			0.950				0.998			0.990	
Satd. Flow (prot)	1658	1678	0	1658	1560	0	0	1526	0	0	1567	0
Flt Permitted	0.950			0.950				0.998			0.990	
Satd. Flow (perm)	1658	1678	0	1658	1560	0	0	1526	0	0	1567	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	21		30	30		21	17		18	18		17
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
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	49	631	3	131	449	21	7	5	140	9	5	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	634	0	131	470	0	0	152	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.5%
ICU Level of Service	C
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	49	631	3	131	449	21	7	5	140	9	5	31
Future Vol, veh/h	49	631	3	131	449	21	7	5	140	9	5	31
Conflicting Peds, #/hr	21	0	30	30	0	21	17	0	18	18	0	17
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
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, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	631	3	131	449	21	7	5	140	9	5	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	491	0	0	664	0	0	1518	1514	681	1564	1505	498
Stage 1	-	-	-	-	-	-	761	761	-	743	743	-
Stage 2	-	-	-	-	-	-	757	753	-	821	762	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1072	-	-	925	-	-	98	120	450	91	121	572
Stage 1	-	-	-	-	-	-	398	414	-	407	422	-
Stage 2	-	-	-	-	-	-	400	417	-	369	414	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1051	-	-	899	-	-	73	93	430	49	94	552
Mov Cap-2 Maneuver	-	-	-	-	-	-	73	93	-	49	94	-
Stage 1	-	-	-	-	-	-	369	383	-	381	353	-
Stage 2	-	-	-	-	-	-	313	349	-	230	383	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			2.1			26			37.8		
HCM LOS							D			E		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	320	1051	-	-	899	-	-	154
HCM Lane V/C Ratio	0.475	0.047	-	-	0.146	-	-	0.292
HCM Control Delay (s)	26	8.6	-	-	9.7	-	-	37.8
HCM Lane LOS	D	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	2.4	0.1	-	-	0.5	-	-	1.1

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	633	198	151	538	64	175	16	120	29	13	18
Future Volume (vph)	22	633	198	151	538	64	175	16	120	29	13	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99	0.94		0.96	0.98	
Frt			0.850			0.850		0.868			0.913	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1253	0	1478	1368	0
Flt Permitted	0.311			0.230			0.737			0.670		
Satd. Flow (perm)	403	1456	1299	317	1470	1207	1143	1253	0	1004	1368	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			198			64		120			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	633	198	151	538	64	175	16	120	29	13	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	633	198	151	538	64	175	136	0	29	31	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3	13	13	13	16	16		9	9	
Act Effct Green (s)	41.4	41.4	41.4	41.4	41.4	41.4	34.1	34.1		34.1	34.1	
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.39	0.39		0.39	0.39	
v/c Ratio	0.12	0.92	0.28	1.01	0.78	0.11	0.39	0.24		0.07	0.06	
Control Delay	14.5	42.6	3.1	105.3	28.2	3.9	23.6	6.1		18.8	11.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	14.5	42.6	3.1	105.3	28.2	3.9	23.6	6.1		18.8	11.1	
LOS	B	D	A	F	C	A	C	A		B	B	
Approach Delay		32.7			41.6			16.0			14.8	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	2.0	94.8	0.0	24.4	71.9	0.0	21.8	1.7		3.2	1.4	
Queue Length 95th (m)	6.5	#163.8	10.4	#63.1	113.6	6.1	39.6	12.9		8.8	6.9	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0			60.0		
Base Capacity (vph)	202	732	751	159	739	638	444	561		391	543	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.11	0.86	0.26	0.95	0.73	0.10	0.39	0.24		0.07	0.06	

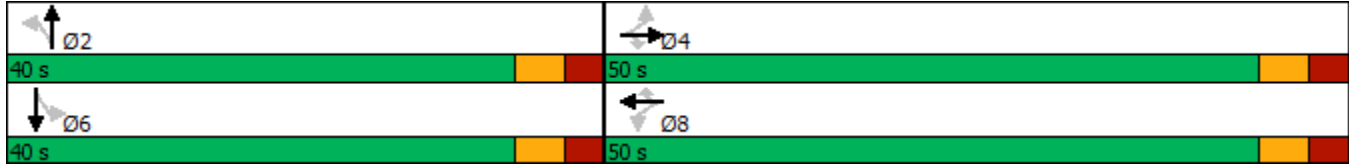
Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	87.6
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.01

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road

Intersection Signal Delay: 32.9	Intersection LOS: C
Intersection Capacity Utilization 87.5%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	169	359	191	144	372	86	117	253	125	68	422	304
Future Volume (vph)	169	359	191	144	372	86	117	253	125	68	422	304
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.964			0.981			0.966			0.948	
Flt Protected		0.988			0.988			0.988			0.996	
Satd. Flow (prot)	0	1430	0	0	1496	0	0	1662	0	0	1580	0
Flt Permitted		0.988			0.988			0.988			0.996	
Satd. Flow (perm)	0	1430	0	0	1496	0	0	1662	0	0	1580	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	169	359	191	144	372	86	117	253	125	68	422	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	719	0	0	602	0	0	495	0	0	794	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	121.3%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2023 FT - PM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗				↘
Traffic Volume (vph)	0	47	0	0	63	0
Future Volume (vph)	0	47	0	0	63	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.865				
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30			30
Link Distance (m)	77.1		61.5			112.7
Travel Time (s)	9.3		7.4			13.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	47	0	0	63	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	47	0	0	0	63
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	7.0%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2023 FT - PM
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	665	57	6	501	38	9
Future Volume (vph)	665	57	6	501	38	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989			0.974		
Flt Protected				0.999	0.961	
Satd. Flow (prot)	1726	0	0	1743	1633	0
Flt Permitted				0.999	0.961	
Satd. Flow (perm)	1726	0	0	1743	1633	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	665	57	6	501	38	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	722	0	0	507	47	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.6%
Analysis Period (min)	15
	ICU Level of Service A

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	665	57	6	501	38	9
Future Vol, veh/h	665	57	6	501	38	9
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	665	57	6	501	38	9












Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	722	0	1207
Stage 1	-	-	-	-	694
Stage 2	-	-	-	-	513
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	880	-	203
Stage 1	-	-	-	-	496
Stage 2	-	-	-	-	601
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	880	-	201
Mov Cap-2 Maneuver	-	-	-	-	201
Stage 1	-	-	-	-	496
Stage 2	-	-	-	-	596

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	25.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	224	-	-	880	-
HCM Lane V/C Ratio	0.21	-	-	0.007	-
HCM Control Delay (s)	25.3	-	-	9.1	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0	-

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - PM Improvements
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	435	244	40	685	216
Future Volume (vph)	43	435	244	40	685	216
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.981			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1471	0	1458	1079
Flt Permitted	0.950				0.428	
Satd. Flow (perm)	1433	1455	1471	0	657	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		435	9			
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	43	435	244	40	685	216
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	435	284	0	685	216
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road



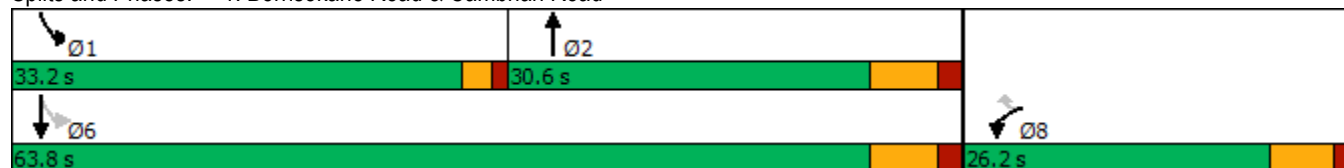
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0
Minimum Split (s)	26.2	26.2	29.9		10.7	29.9
Total Split (s)	26.2	26.2	30.6		33.2	63.8
Total Split (%)	29.1%	29.1%	34.0%		36.9%	70.9%
Maximum Green (s)	20.5	20.5	24.2		30.2	57.4
Yellow Time (s)	4.2	4.2	4.6		2.0	4.6
All-Red Time (s)	1.5	1.5	1.8		1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	6.4		3.0	6.4
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0	7.0	7.0			7.0
Flash Dont Walk (s)	13.5	13.5	16.5			16.5
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	11.9	11.9	24.3		60.9	57.5
Actuated g/C Ratio	0.15	0.15	0.30		0.75	0.70
v/c Ratio	0.21	0.74	0.64		0.87	0.28
Control Delay	32.5	12.0	32.7		22.1	6.2
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	32.5	12.0	32.7		22.1	6.2
LOS	C	B	C		C	A
Approach Delay	13.9		32.7			18.3
Approach LOS	B		C			B
Queue Length 50th (m)	5.9	0.0	35.4		38.2	9.2
Queue Length 95th (m)	14.6	25.2	#72.3		#140.0	26.3
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		180.0			275.0	
Base Capacity (vph)	360	692	443		787	761
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.12	0.63	0.64		0.87	0.28

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	81.6
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.87
Intersection Signal Delay:	19.5
Intersection LOS:	B
Intersection Capacity Utilization:	77.9%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2023 FT - PM Improvements
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	631	3	131	449	21	7	5	140	9	5	31
Future Volume (vph)	49	631	3	131	449	21	7	5	140	9	5	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. 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
Ped Bike Factor												
Fr _t		0.999			0.993			0.876			0.907	
Fl _t Protected	0.950			0.950				0.998			0.990	
Satd. Flow (prot)	1658	1678	0	1658	1560	0	0	1526	0	0	1567	0
Fl _t Permitted	0.950			0.950				0.998			0.990	
Satd. Flow (perm)	1658	1678	0	1658	1560	0	0	1526	0	0	1567	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	21		30	30		21	17		18	18		17
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
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0					0	0
Adj. Flow (vph)	49	631	3	131	449	21	7	5	140	9	5	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	634	0	131	470	0	0	152	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.5%
ICU Level of Service	C
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷			↕			↕	
Traffic Vol, veh/h	49	631	3	131	449	21	7	5	140	9	5	31
Future Vol, veh/h	49	631	3	131	449	21	7	5	140	9	5	31
Conflicting Peds, #/hr	21	0	30	30	0	21	17	0	18	18	0	17
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
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, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	631	3	131	449	21	7	5	140	9	5	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	491	0	0	664	0	0	1518	1514	681	1564	1505	498
Stage 1	-	-	-	-	-	-	761	761	-	743	743	-
Stage 2	-	-	-	-	-	-	757	753	-	821	762	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1072	-	-	925	-	-	98	120	450	91	121	572
Stage 1	-	-	-	-	-	-	398	414	-	407	422	-
Stage 2	-	-	-	-	-	-	400	417	-	369	414	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1051	-	-	899	-	-	73	93	430	49	94	552
Mov Cap-2 Maneuver	-	-	-	-	-	-	73	93	-	49	94	-
Stage 1	-	-	-	-	-	-	369	383	-	381	353	-
Stage 2	-	-	-	-	-	-	313	349	-	230	383	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			2.1			26			37.8		
HCM LOS							D			E		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	320	1051	-	-	899	-	-	154
HCM Lane V/C Ratio	0.475	0.047	-	-	0.146	-	-	0.292
HCM Control Delay (s)	26	8.6	-	-	9.7	-	-	37.8
HCM Lane LOS	D	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	2.4	0.1	-	-	0.5	-	-	1.1

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	633	198	151	538	64	175	16	120	29	13	18
Future Volume (vph)	22	633	198	151	538	64	175	16	120	29	13	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.97		0.97	1.00		0.91	0.98	0.94		0.96	0.98	
Frt			0.850			0.850		0.868			0.913	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1242	0	1478	1365	0
Flt Permitted	0.425			0.189			0.737			0.670		
Satd. Flow (perm)	545	1456	1297	261	1470	1190	1140	1242	0	996	1365	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			198			64			120			18
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	633	198	151	538	64	175	16	120	29	13	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	633	198	151	538	64	175	136	0	29	31	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	9.5	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	59.0	59.0	59.0	10.0	69.0	69.0	41.0	41.0		41.0	41.0	
Total Split (%)	53.6%	53.6%	53.6%	9.1%	62.7%	62.7%	37.3%	37.3%		37.3%	37.3%	
Maximum Green (s)	52.9	52.9	52.9	5.5	62.9	62.9	35.0	35.0		35.0	35.0	
Yellow Time (s)	3.3	3.3	3.3	3.5	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	1.0	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	4.5	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5		22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3		13	13	16	16		9	9	
Act Effct Green (s)	48.6	48.6	48.6	60.2	58.6	58.6	35.1	35.1		35.1	35.1	
Actuated g/C Ratio	0.46	0.46	0.46	0.57	0.55	0.55	0.33	0.33		0.33	0.33	
v/c Ratio	0.09	0.95	0.28	0.74	0.66	0.09	0.46	0.28		0.09	0.07	
Control Delay	16.8	52.4	3.4	36.7	21.2	3.1	34.2	8.3		27.2	15.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.8	52.4	3.4	36.7	21.2	3.1	34.2	8.3		27.2	15.8	
LOS	B	D	A	D	C	A	C	A		C	B	
Approach Delay		40.1			22.8			22.9			21.3	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	2.5	120.9	0.0	14.2	73.7	0.0	30.1	2.4		4.4	1.9	
Queue Length 95th (m)	7.1	#193.9	11.6	#33.0	109.9	5.6	51.3	16.1		11.3	8.7	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0			60.0		
Base Capacity (vph)	273	730	749	203	876	735	378	492		330	465	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.08	0.87	0.26	0.74	0.61	0.09	0.46	0.28		0.09	0.07	

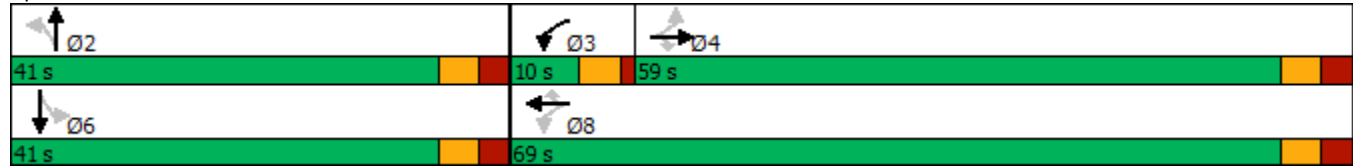
Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 105.9
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.95

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

Intersection Signal Delay: 30.2	Intersection LOS: C
Intersection Capacity Utilization 86.2%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FT - PM Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	169	359	191	144	372	86	117	253	125	68	422	304
Future Volume (vph)	169	359	191	144	372	86	117	253	125	68	422	304
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.964			0.981			0.966			0.948	
Flt Protected		0.988			0.988			0.988			0.996	
Satd. Flow (prot)	0	1430	0	0	1496	0	0	1662	0	0	1580	0
Flt Permitted		0.988			0.988			0.988			0.996	
Satd. Flow (perm)	0	1430	0	0	1496	0	0	1662	0	0	1580	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	169	359	191	144	372	86	117	253	125	68	422	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	719	0	0	602	0	0	495	0	0	794	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	121.3%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗				↘
Traffic Volume (vph)	0	47	0	0	63	0
Future Volume (vph)	0	47	0	0	63	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	47	0	0	63	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	47	0	0	0	63
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	7.0% ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	665	57	6	501	38	9
Future Volume (vph)	665	57	6	501	38	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989			0.974		
Flt Protected				0.999	0.961	
Satd. Flow (prot)	1726	0	0	1743	1633	0
Flt Permitted				0.999	0.961	
Satd. Flow (perm)	1726	0	0	1743	1633	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	665	57	6	501	38	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	722	0	0	507	47	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.6%
Analysis Period (min)	15
	ICU Level of Service A

Intersection						
Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	665	57	6	501	38	9
Future Vol, veh/h	665	57	6	501	38	9
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	665	57	6	501	38	9

Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	722	0	1207
Stage 1	-	-	-	-	694
Stage 2	-	-	-	-	513
Critical Hdwy	-	-	4.12	-	6.42
Critical Hdwy Stg 1	-	-	-	-	5.42
Critical Hdwy Stg 2	-	-	-	-	5.42
Follow-up Hdwy	-	-	2.218	-	3.518
Pot Cap-1 Maneuver	-	-	880	-	203
Stage 1	-	-	-	-	496
Stage 2	-	-	-	-	601
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	880	-	201
Mov Cap-2 Maneuver	-	-	-	-	201
Stage 1	-	-	-	-	496
Stage 2	-	-	-	-	596

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	25.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	224	-	-	880	-
HCM Lane V/C Ratio	0.21	-	-	0.007	-
HCM Control Delay (s)	25.3	-	-	9.1	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.8	-	-	0	-

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	435	244	40	685	216
Future Volume (vph)	43	435	244	40	685	216
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.981			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1471	0	1458	1079
Flt Permitted	0.950				0.422	
Satd. Flow (perm)	1433	1455	1471	0	648	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		435	9			
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	43	435	244	40	685	216
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	435	284	0	685	216
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2023 FT - SAT
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0
Minimum Split (s)	26.2	26.2	29.9		10.7	29.2
Total Split (s)	26.2	26.2	30.8		33.0	63.8
Total Split (%)	29.1%	29.1%	34.2%		36.7%	70.9%
Maximum Green (s)	20.5	20.5	24.4		29.2	58.1
Yellow Time (s)	4.2	4.2	4.6		2.0	4.6
All-Red Time (s)	1.5	1.5	1.8		1.8	1.1
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	6.4		3.8	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0	7.0	7.0			7.0
Flash Dont Walk (s)	13.5	13.5	16.5			16.5
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	11.9	11.9	24.5		60.1	58.2
Actuated g/C Ratio	0.15	0.15	0.30		0.74	0.71
v/c Ratio	0.21	0.74	0.64		0.89	0.28
Control Delay	32.5	12.0	32.3		25.0	5.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	32.5	12.0	32.3		25.0	5.9
LOS	C	B	C		C	A
Approach Delay	13.9		32.3			20.5
Approach LOS	B		C			C
Queue Length 50th (m)	5.9	0.0	35.2		41.5	8.8
Queue Length 95th (m)	14.6	25.2	#71.2		#143.7	25.6
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		180.0			275.0	
Base Capacity (vph)	360	692	446		768	769
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.12	0.63	0.64		0.89	0.28

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	81.6
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.89
Intersection Signal Delay:	20.6
Intersection LOS:	C
Intersection Capacity Utilization:	77.9%
ICU Level of Service:	D
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2023 FT - SAT
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	637	4	166	454	21	7	5	170	9	5	31
Future Volume (vph)	49	637	4	166	454	21	7	5	170	9	5	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. 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
Ped Bike Factor												
Frt		0.999			0.993			0.874			0.907	
Flt Protected	0.950			0.950				0.998			0.990	
Satd. Flow (prot)	1658	1678	0	1658	1560	0	0	1522	0	0	1567	0
Flt Permitted	0.950			0.950				0.998			0.990	
Satd. Flow (perm)	1658	1678	0	1658	1560	0	0	1522	0	0	1567	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	22		36	36		22	18		21	21		18
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
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	49	637	4	166	454	21	7	5	170	9	5	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	641	0	166	475	0	0	182	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 69.6% ICU Level of Service C
 Analysis Period (min) 15

Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	49	637	4	166	454	21	7	5	170	9	5	31
Future Vol, veh/h	49	637	4	166	454	21	7	5	170	9	5	31
Conflicting Peds, #/hr	22	0	36	36	0	22	18	0	21	21	0	18
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
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, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	637	4	166	454	21	7	5	170	9	5	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	497	0	0	677	0	0	1606	1602	696	1665	1594	505
Stage 1	-	-	-	-	-	-	773	773	-	819	819	-
Stage 2	-	-	-	-	-	-	833	829	-	846	775	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1067	-	-	915	-	-	85	106	442	77	107	567
Stage 1	-	-	-	-	-	-	392	409	-	369	389	-
Stage 2	-	-	-	-	-	-	363	385	-	357	408	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1045	-	-	884	-	-	60	78	419	35	78	546
Mov Cap-2 Maneuver	-	-	-	-	-	-	60	78	-	35	78	-
Stage 1	-	-	-	-	-	-	361	377	-	345	310	-
Stage 2	-	-	-	-	-	-	269	306	-	196	376	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			2.6			31.9			52.6		
HCM LOS							D			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	310	1045	-	-	884	-	-	119
HCM Lane V/C Ratio	0.587	0.047	-	-	0.188	-	-	0.378
HCM Control Delay (s)	31.9	8.6	-	-	10	-	-	52.6
HCM Lane LOS	D	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	3.5	0.1	-	-	0.7	-	-	1.6

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	660	204	151	565	64	183	16	120	29	13	22
Future Volume (vph)	25	660	204	151	565	64	183	16	120	29	13	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.98		0.97	1.00		0.92	0.99	0.94		0.96	0.98	
Frt			0.850			0.850		0.868			0.906	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1253	0	1478	1356	0
Flt Permitted	0.298			0.220			0.734			0.670		
Satd. Flow (perm)	387	1456	1299	303	1470	1207	1138	1253	0	1004	1356	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			204			64			120			22
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	25	660	204	151	565	64	183	16	120	29	13	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	660	204	151	565	64	183	136	0	29	35	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3	13	13	13	16	16		9	9	
Act Effct Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.38	0.38		0.38	0.38	
v/c Ratio	0.13	0.93	0.28	1.03	0.79	0.10	0.43	0.25		0.08	0.07	
Control Delay	15.0	43.8	3.0	110.0	29.0	3.9	24.6	6.1		18.8	10.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	15.0	43.8	3.0	110.0	29.0	3.9	24.6	6.1		18.8	10.5	
LOS	B	D	A	F	C	A	C	A		B	B	
Approach Delay		33.7			42.6			16.7			14.3	
Approach LOS		C			D			B			B	
Queue Length 50th (m)	2.3	102.3	0.0	~26.6	77.7	0.0	23.0	1.7		3.2	1.4	
Queue Length 95th (m)	7.1	#174.0	10.6	#64.4	#128.1	6.1	41.5	12.9		8.8	7.2	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0			60.0		
Base Capacity (vph)	188	710	738	147	717	621	429	548		379	525	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.13	0.93	0.28	1.03	0.79	0.10	0.43	0.25		0.08	0.07	

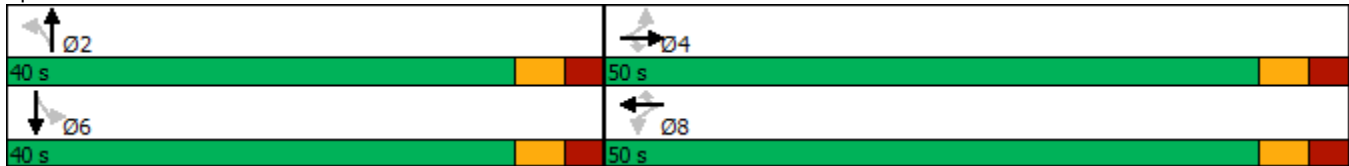
Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.03

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

2023 FT - SAT
 3831 Cambrian Road

Intersection Signal Delay: 33.8	Intersection LOS: C
Intersection Capacity Utilization 89.0%	ICU Level of Service E
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	177	361	207	144	375	86	129	245	125	68	410	316
Future Volume (vph)	177	361	207	144	375	86	129	245	125	68	410	316
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.962			0.981			0.966			0.946	
Flt Protected		0.988			0.988			0.987			0.996	
Satd. Flow (prot)	0	1424	0	0	1496	0	0	1660	0	0	1575	0
Flt Permitted		0.988			0.988			0.987			0.996	
Satd. Flow (perm)	0	1424	0	0	1496	0	0	1660	0	0	1575	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	177	361	207	144	375	86	129	245	125	68	410	316
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	745	0	0	605	0	0	499	0	0	794	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	127.7%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2023 FT - SAT
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗				↘
Traffic Volume (vph)	0	51	0	0	59	0
Future Volume (vph)	0	51	0	0	59	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected	0.950					
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted	0.950					
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	51	0	0	59	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	51	0	0	0	59
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.8% ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2023 FT - SAT
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	670	60	9	504	41	10
Future Volume (vph)	670	60	9	504	41	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989			0.974		
Flt Protected				0.999	0.961	
Satd. Flow (prot)	1726	0	0	1743	1633	0
Flt Permitted				0.999	0.961	
Satd. Flow (perm)	1726	0	0	1743	1633	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	670	60	9	504	41	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	730	0	0	513	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.1% ICU Level of Service A
Analysis Period (min)	15












Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	670	60	9	504	41	10
Future Vol, veh/h	670	60	9	504	41	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	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	670	60	9	504	41	10

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	730	0	1222 700
Stage 1	-	-	-	-	700 -
Stage 2	-	-	-	-	522 -
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	-	-	874	-	198 439
Stage 1	-	-	-	-	493 -
Stage 2	-	-	-	-	595 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	874	-	195 439
Mov Cap-2 Maneuver	-	-	-	-	195 -
Stage 1	-	-	-	-	493 -
Stage 2	-	-	-	-	587 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	26.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	219	-	-	874	-
HCM Lane V/C Ratio	0.233	-	-	0.01	-
HCM Control Delay (s)	26.4	-	-	9.2	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0	-

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	435	244	40	685	216
Future Volume (vph)	43	435	244	40	685	216
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		0.0	275.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.981			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1471	0	1458	1079
Flt Permitted	0.950				0.422	
Satd. Flow (perm)	1433	1455	1471	0	648	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		435	9			
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	43	435	244	40	685	216
Shared Lane Traffic (%)						
Lane Group Flow (vph)	43	435	284	0	685	216
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		pm+pt	NA
Protected Phases	8		2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8			6	
Detector Phase	8	8	2		1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0		5.0	10.0
Minimum Split (s)	26.2	26.2	29.9		10.7	29.2
Total Split (s)	26.2	26.2	30.8		33.0	63.8
Total Split (%)	29.1%	29.1%	34.2%		36.7%	70.9%
Maximum Green (s)	20.5	20.5	24.4		29.2	58.1
Yellow Time (s)	4.2	4.2	4.6		2.0	4.6
All-Red Time (s)	1.5	1.5	1.8		1.8	1.1
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.7	5.7	6.4		3.8	5.7
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	Max		None	Max
Walk Time (s)	7.0	7.0	7.0			7.0
Flash Dont Walk (s)	13.5	13.5	16.5			16.5
Pedestrian Calls (#/hr)	0	0	0			0
Act Effct Green (s)	11.9	11.9	24.5		60.1	58.2
Actuated g/C Ratio	0.15	0.15	0.30		0.74	0.71
v/c Ratio	0.21	0.74	0.64		0.89	0.28
Control Delay	32.5	12.0	32.3		25.0	5.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	32.5	12.0	32.3		25.0	5.9
LOS	C	B	C		C	A
Approach Delay	13.9		32.3			20.5
Approach LOS	B		C			C
Queue Length 50th (m)	5.9	0.0	35.2		41.5	8.8
Queue Length 95th (m)	14.6	25.2	#71.2		#143.7	25.6
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		180.0			275.0	
Base Capacity (vph)	360	692	446		768	769
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.12	0.63	0.64		0.89	0.28

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	81.6
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.89
Intersection Signal Delay:	20.6
Intersection LOS:	C
Intersection Capacity Utilization:	77.9%
ICU Level of Service:	D
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2023 FT - SAT Improvements
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	637	4	166	454	21	7	5	170	9	5	31
Future Volume (vph)	49	637	4	166	454	21	7	5	170	9	5	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. 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
Ped Bike Factor												
Frt		0.999			0.993			0.874			0.907	
Flt Protected	0.950			0.950				0.998			0.990	
Satd. Flow (prot)	1658	1678	0	1658	1560	0	0	1522	0	0	1567	0
Flt Permitted	0.950			0.950				0.998			0.990	
Satd. Flow (perm)	1658	1678	0	1658	1560	0	0	1522	0	0	1567	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	22		36	36		22	18		21	21		18
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
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0					0	0
Adj. Flow (vph)	49	637	4	166	454	21	7	5	170	9	5	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	641	0	166	475	0	0	182	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 69.6% ICU Level of Service C
 Analysis Period (min) 15

Intersection												
Int Delay, s/veh	6.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	49	637	4	166	454	21	7	5	170	9	5	31
Future Vol, veh/h	49	637	4	166	454	21	7	5	170	9	5	31
Conflicting Peds, #/hr	22	0	36	36	0	22	18	0	21	21	0	18
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
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, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	637	4	166	454	21	7	5	170	9	5	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	497	0	0	677	0	0	1606	1602	696	1665	1594	505
Stage 1	-	-	-	-	-	-	773	773	-	819	819	-
Stage 2	-	-	-	-	-	-	833	829	-	846	775	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1067	-	-	915	-	-	85	106	442	77	107	567
Stage 1	-	-	-	-	-	-	392	409	-	369	389	-
Stage 2	-	-	-	-	-	-	363	385	-	357	408	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1045	-	-	884	-	-	60	78	419	35	78	546
Mov Cap-2 Maneuver	-	-	-	-	-	-	60	78	-	35	78	-
Stage 1	-	-	-	-	-	-	361	377	-	345	310	-
Stage 2	-	-	-	-	-	-	269	306	-	196	376	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.6			2.6			31.9			52.6		
HCM LOS							D			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	310	1045	-	-	884	-	-	119
HCM Lane V/C Ratio	0.587	0.047	-	-	0.188	-	-	0.378
HCM Control Delay (s)	31.9	8.6	-	-	10	-	-	52.6
HCM Lane LOS	D	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	3.5	0.1	-	-	0.7	-	-	1.6

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	660	204	151	565	64	183	16	120	29	13	22
Future Volume (vph)	25	660	204	151	565	64	183	16	120	29	13	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	105.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.97		0.97			0.91	0.98	0.94		0.96	0.98	
Frt			0.850			0.850		0.868			0.906	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1242	0	1478	1353	0
Flt Permitted	0.403			0.178			0.734			0.670		
Satd. Flow (perm)	517	1456	1297	246	1470	1190	1135	1242	0	996	1353	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			204			64			120			22
Link Speed (k/h)		50			50			50				50
Link Distance (m)		449.3			477.1			575.8				329.8
Travel Time (s)		32.3			34.4			41.5				23.7
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	25	660	204	151	565	64	183	16	120	29	13	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	660	204	151	565	64	183	136	0	29	35	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5				3.5
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		3.0			3.0			3.0				3.0
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4				9.4
Detector 2 Size(m)		0.6			0.6			0.6				0.6
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2023 FT - SAT Improvements
3831 Cambrian Road



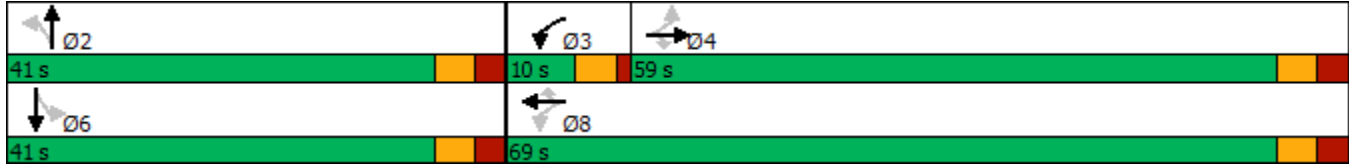
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	9.5	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	59.0	59.0	59.0	10.0	69.0	69.0	41.0	41.0		41.0	41.0	
Total Split (%)	53.6%	53.6%	53.6%	9.1%	62.7%	62.7%	37.3%	37.3%		37.3%	37.3%	
Maximum Green (s)	52.9	52.9	52.9	5.5	62.9	62.9	35.0	35.0		35.0	35.0	
Yellow Time (s)	3.3	3.3	3.3	3.5	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	1.0	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	4.5	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5		22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3		13	13	16	16		9	9	
Act Effct Green (s)	50.6	50.6	50.6	62.2	60.6	60.6	35.0	35.0		35.0	35.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.58	0.56	0.56	0.32	0.32		0.32	0.32	
v/c Ratio	0.10	0.97	0.28	0.77	0.68	0.09	0.50	0.28		0.09	0.08	
Control Delay	17.1	55.7	3.3	40.1	21.9	3.0	35.7	8.3		27.4	14.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	17.1	55.7	3.3	40.1	21.9	3.0	35.7	8.3		27.4	14.7	
LOS	B	E	A	D	C	A	D	A		C	B	
Approach Delay		42.6			23.9			24.0			20.5	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	2.8	130.3	0.0	14.2	79.7	0.0	31.8	2.4		4.4	1.9	
Queue Length 95th (m)	8.0	#206.8	11.7	#35.0	119.2	5.6	53.9	16.1		11.3	9.2	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	105.0			60.0		
Base Capacity (vph)	253	715	740	196	858	721	369	485		323	454	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.10	0.92	0.28	0.77	0.66	0.09	0.50	0.28		0.09	0.08	

Intersection Summary	
Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	107.8
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.97

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

Intersection Signal Delay: 31.9 Intersection LOS: C
 Intersection Capacity Utilization 87.7% ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2023 FT - SAT Improvements
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	177	361	207	144	375	86	129	245	125	68	410	316
Future Volume (vph)	177	361	207	144	375	86	129	245	125	68	410	316
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.962			0.981			0.966			0.946	
Flt Protected		0.988			0.988			0.987			0.996	
Satd. Flow (prot)	0	1424	0	0	1496	0	0	1660	0	0	1575	0
Flt Permitted		0.988			0.988			0.987			0.996	
Satd. Flow (perm)	0	1424	0	0	1496	0	0	1660	0	0	1575	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	177	361	207	144	375	86	129	245	125	68	410	316
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	745	0	0	605	0	0	499	0	0	794	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	127.7%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗				↘
Traffic Volume (vph)	0	51	0	0	59	0
Future Volume (vph)	0	51	0	0	59	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	51	0	0	59	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	51	0	0	0	59
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.8%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	670	60	9	504	41	10
Future Volume (vph)	670	60	9	504	41	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.989			0.974		
Flt Protected				0.999	0.961	
Satd. Flow (prot)	1726	0	0	1743	1633	0
Flt Permitted				0.999	0.961	
Satd. Flow (perm)	1726	0	0	1743	1633	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	670	60	9	504	41	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	730	0	0	513	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.1% ICU Level of Service A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	670	60	9	504	41	10
Future Vol, veh/h	670	60	9	504	41	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	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	670	60	9	504	41	10

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	730	0	1222 700
Stage 1	-	-	-	-	700 -
Stage 2	-	-	-	-	522 -
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	-	-	874	-	198 439
Stage 1	-	-	-	-	493 -
Stage 2	-	-	-	-	595 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	874	-	195 439
Mov Cap-2 Maneuver	-	-	-	-	195 -
Stage 1	-	-	-	-	493 -
Stage 2	-	-	-	-	587 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	26.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	219	-	-	874	-
HCM Lane V/C Ratio	0.233	-	-	0.01	-
HCM Control Delay (s)	26.4	-	-	9.2	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.9	-	-	0	-

DEGREE OF SATURATION

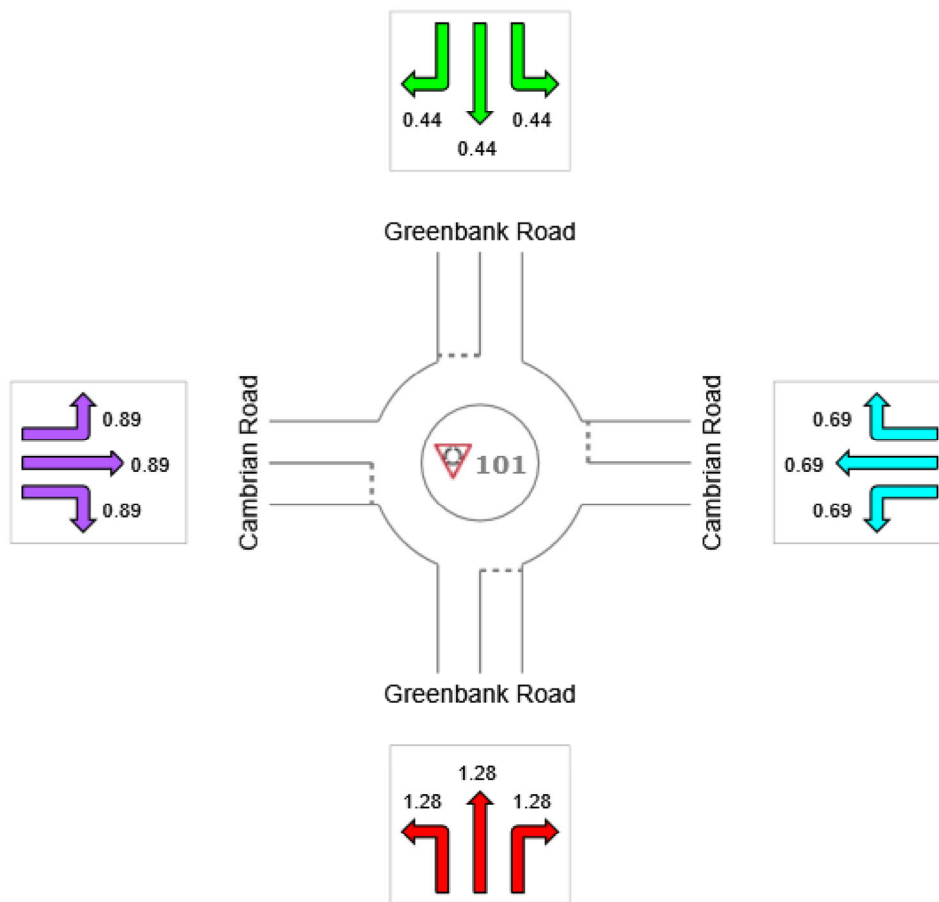
Ratio of Demand Volume to Capacity, v/c ratio per movement

 **Site: 101 [Cambrian and Greenbank 2023 FT AM]**

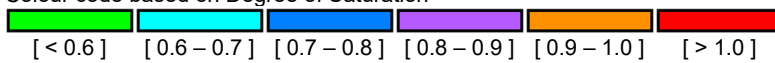
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	1.28	0.69	0.44	0.89	1.28



Colour code based on Degree of Saturation



DELAY (CONTROL)

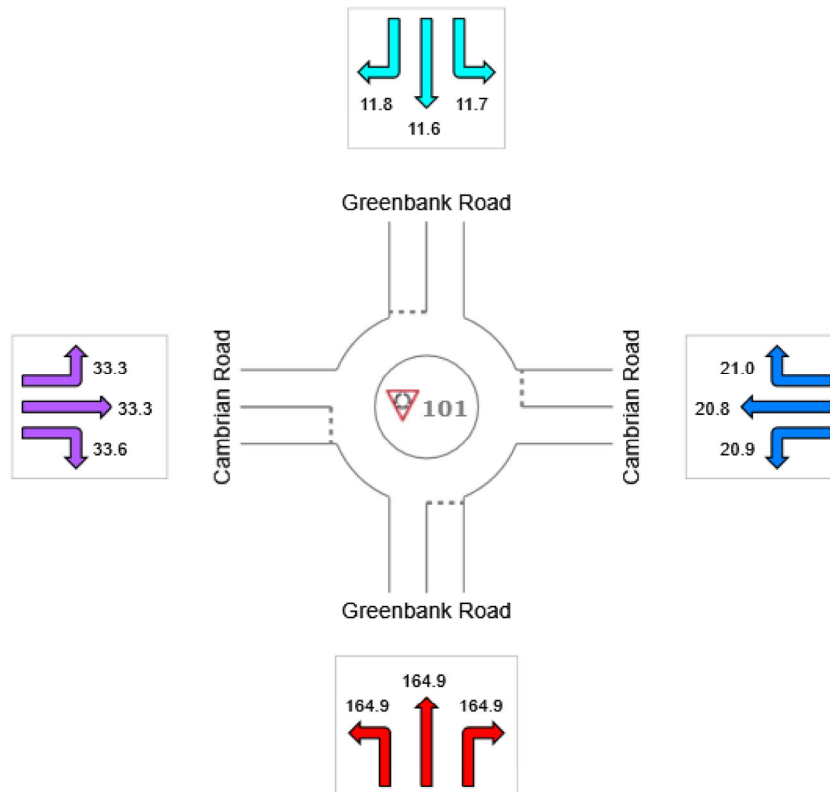
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FT AM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	164.9	20.9	11.7	33.3	69.3
LOS	F	C	B	D	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

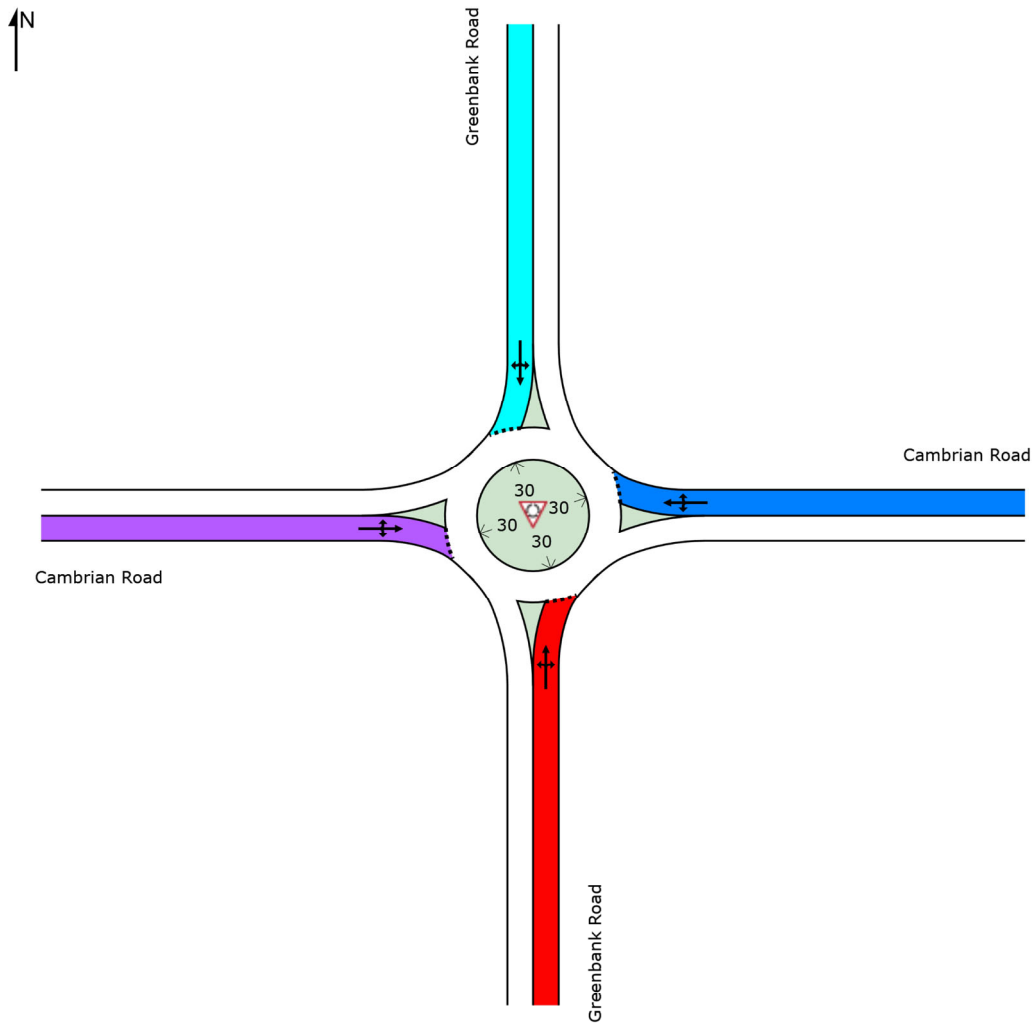
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2023 FT AM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	C	B	D	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FT AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	139	3.0	1.282	164.9	LOS F	60.2	429.0	1.00	3.60	9.41	8.0
2	T1	325	2.0	1.282	164.9	LOS F	60.2	429.0	1.00	3.60	9.41	8.3
3	R2	208	2.0	1.282	164.9	LOS F	60.2	429.0	1.00	3.60	9.41	6.5
Approach		672	2.2	1.282	164.9	LOS F	60.2	429.0	1.00	3.60	9.41	7.7
East: Cambrian Road												
4	L2	103	6.0	0.689	20.9	LOS C	6.3	45.9	0.79	1.10	1.57	27.5
5	T1	257	2.0	0.689	20.8	LOS C	6.3	45.9	0.79	1.10	1.57	29.7
6	R2	73	8.0	0.689	21.0	LOS C	6.3	45.9	0.79	1.10	1.57	29.7
Approach		433	4.0	0.689	20.9	LOS C	6.3	45.9	0.79	1.10	1.57	29.2
North: Greenbank Road												
7	L2	86	5.0	0.445	11.7	LOS B	2.4	17.6	0.61	0.69	0.82	38.3
8	T1	116	4.0	0.445	11.6	LOS B	2.4	17.6	0.61	0.69	0.82	38.4
9	R2	100	10.0	0.445	11.8	LOS B	2.4	17.6	0.61	0.69	0.82	37.7
Approach		302	6.3	0.445	11.7	LOS B	2.4	17.6	0.61	0.69	0.82	38.1
West: Cambrian Road												
10	L2	192	3.0	0.892	33.3	LOS D	24.3	176.1	1.00	1.76	2.61	27.5
11	T1	466	3.0	0.892	33.3	LOS D	24.3	176.1	1.00	1.76	2.61	24.1
12	R2	63	17.0	0.892	33.6	LOS D	24.3	176.1	1.00	1.76	2.61	23.2
Approach		721	4.2	0.892	33.3	LOS D	24.3	176.1	1.00	1.76	2.61	25.0
All Vehicles		2128	3.8	1.282	69.3	LOS F	60.2	429.0	0.90	2.06	4.29	15.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DEGREE OF SATURATION

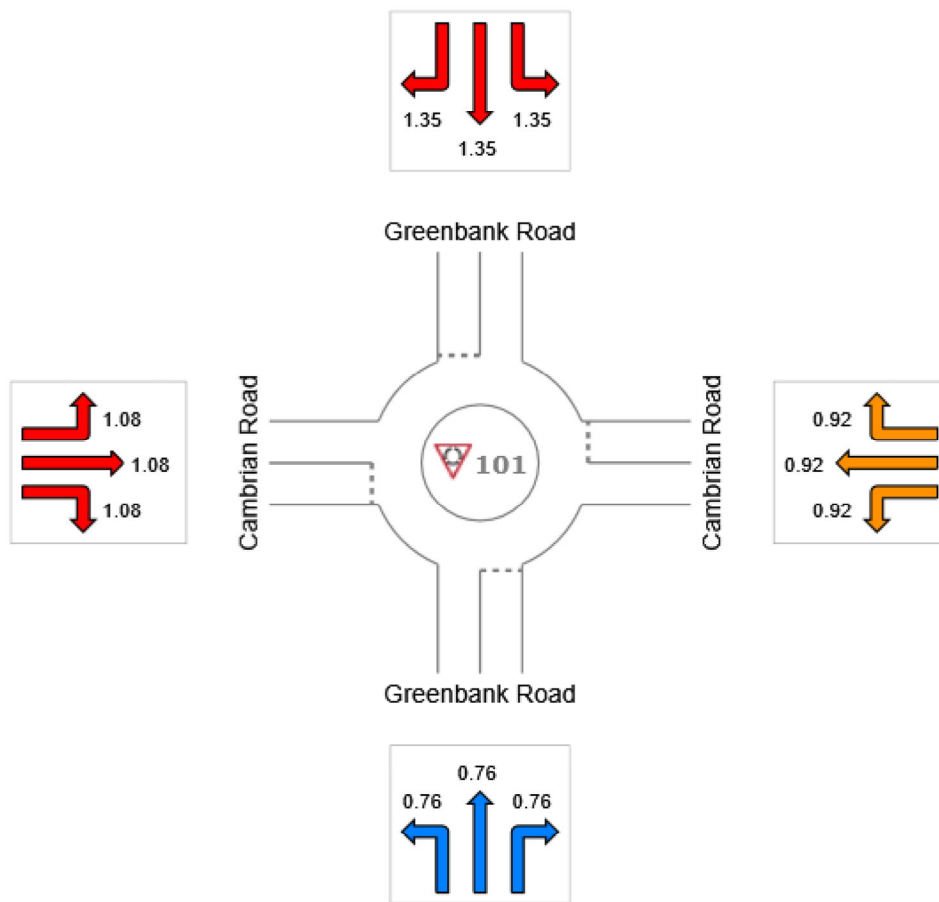
Ratio of Demand Volume to Capacity, v/c ratio per movement

 **Site: 101 [Cambrian and Greenbank 2023 FT PM]**

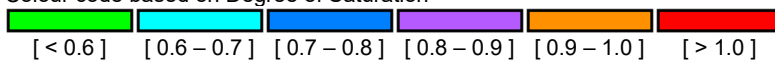
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.76	0.92	1.35	1.08	1.35



Colour code based on Degree of Saturation



DELAY (CONTROL)

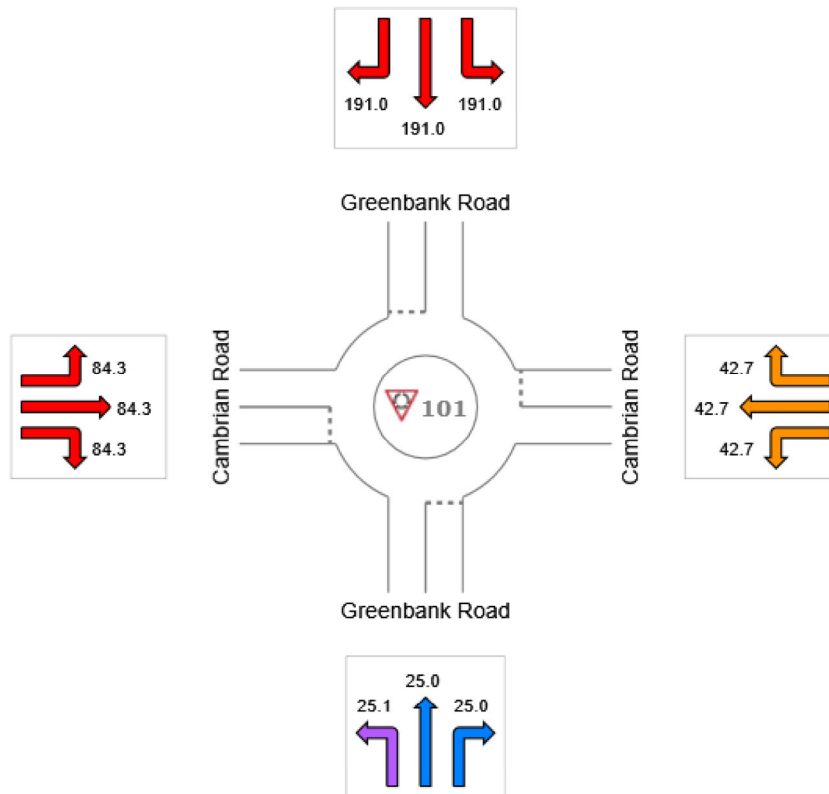
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FT PM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	25.0	42.7	191.0	84.3	95.9
LOS	D	E	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

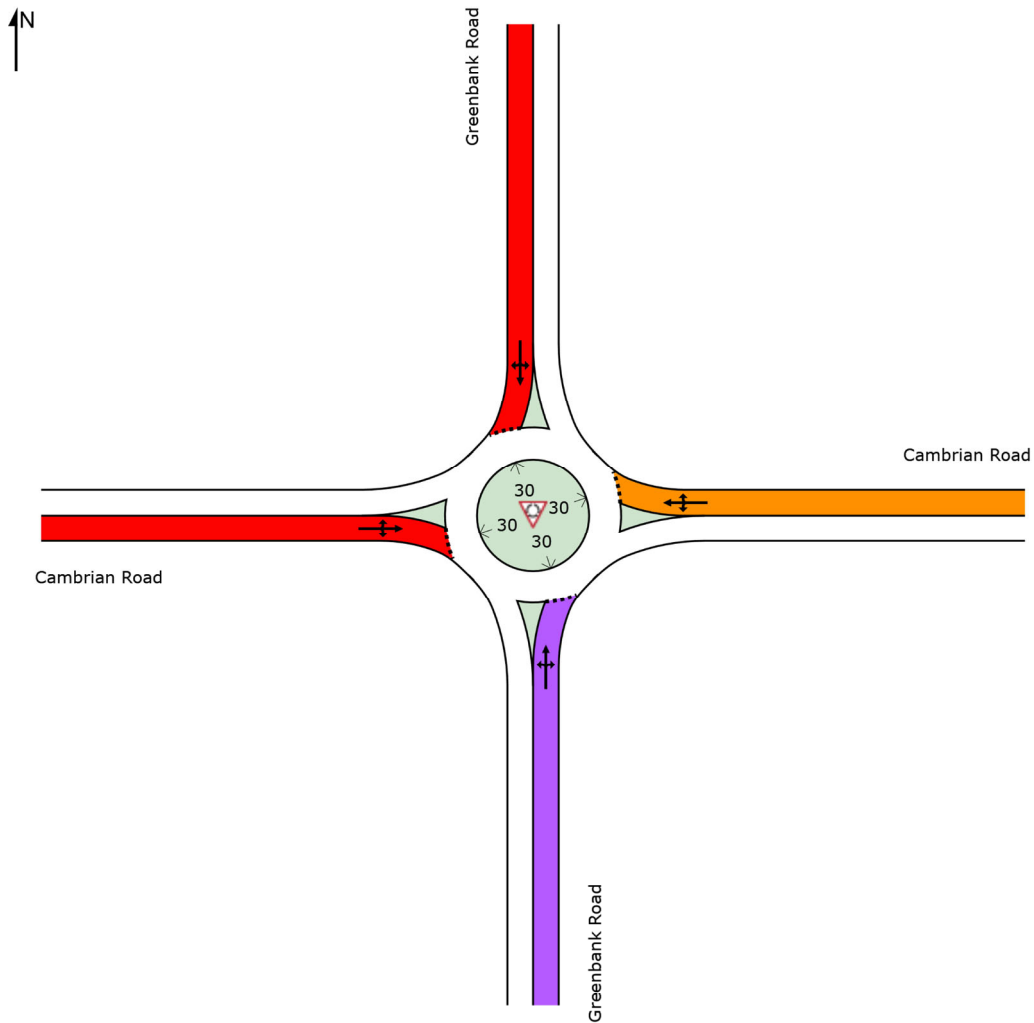
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2023 FT PM]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	E	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FT PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	117	8.0	0.764	25.1	LOS D	9.0	64.5	0.85	1.21	1.89	28.3
2	T1	253	2.0	0.764	25.0	LOS C	9.0	64.5	0.85	1.21	1.89	29.4
3	R2	125	2.0	0.764	25.0	LOS C	9.0	64.5	0.85	1.21	1.89	24.2
Approach		495	3.4	0.764	25.0	LOS D	9.0	64.5	0.85	1.21	1.89	27.9
East: Cambrian Road												
4	L2	144	2.0	0.918	42.7	LOS E	18.7	133.1	1.00	1.85	3.12	18.7
5	T1	372	2.0	0.918	42.7	LOS E	18.7	133.1	1.00	1.85	3.12	21.0
6	R2	86	2.0	0.918	42.7	LOS E	18.7	133.1	1.00	1.85	3.12	21.6
Approach		602	2.0	0.918	42.7	LOS E	18.7	133.1	1.00	1.85	3.12	20.6
North: Greenbank Road												
7	L2	68	2.0	1.353	191.0	LOS F	80.7	574.5	1.00	4.10	10.51	7.3
8	T1	422	2.0	1.353	191.0	LOS F	80.7	574.5	1.00	4.10	10.51	7.3
9	R2	304	2.0	1.353	191.0	LOS F	80.7	574.5	1.00	4.10	10.51	8.4
Approach		794	2.0	1.353	191.0	LOS F	80.7	574.5	1.00	4.10	10.51	7.7
West: Cambrian Road												
10	L2	169	2.0	1.085	84.3	LOS F	41.7	298.0	1.00	2.85	5.53	16.0
11	T1	359	2.0	1.085	84.3	LOS F	41.7	298.0	1.00	2.85	5.53	13.4
12	R2	191	4.0	1.085	84.3	LOS F	41.7	298.0	1.00	2.85	5.53	13.3
Approach		719	2.5	1.085	84.3	LOS F	41.7	298.0	1.00	2.85	5.53	14.0
All Vehicles		2610	2.4	1.353	95.9	LOS F	80.7	574.5	0.97	2.69	5.80	12.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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DEGREE OF SATURATION

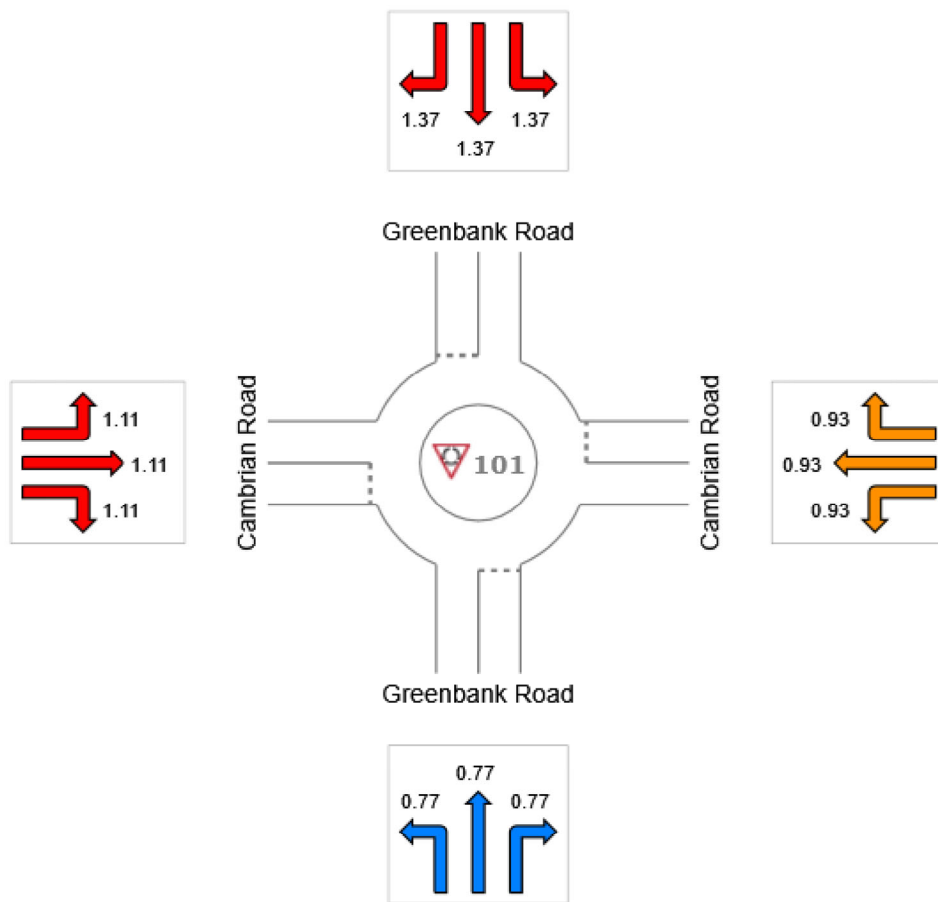
Ratio of Demand Volume to Capacity, v/c ratio per movement

 Site: 101 [Cambrian and Greenbank 2023 FT Sat]

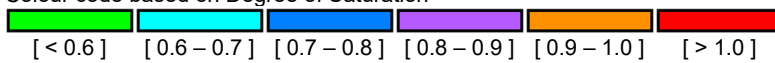
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.77	0.93	1.37	1.11	1.37



Colour code based on Degree of Saturation



DELAY (CONTROL)

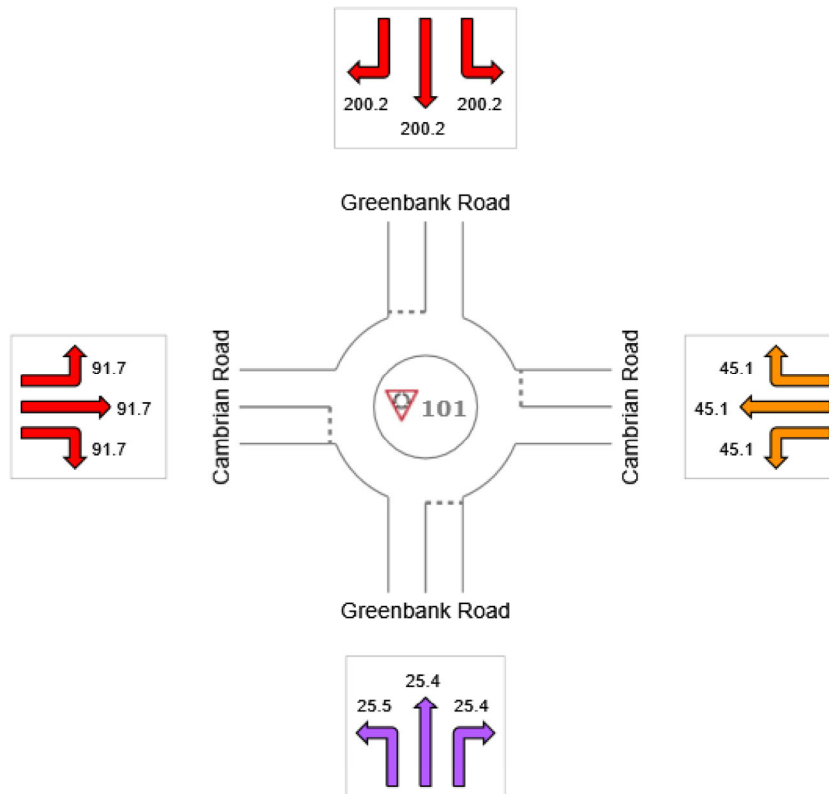
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2023 FT Sat]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	25.4	45.1	200.2	91.7	101.1
LOS	D	E	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

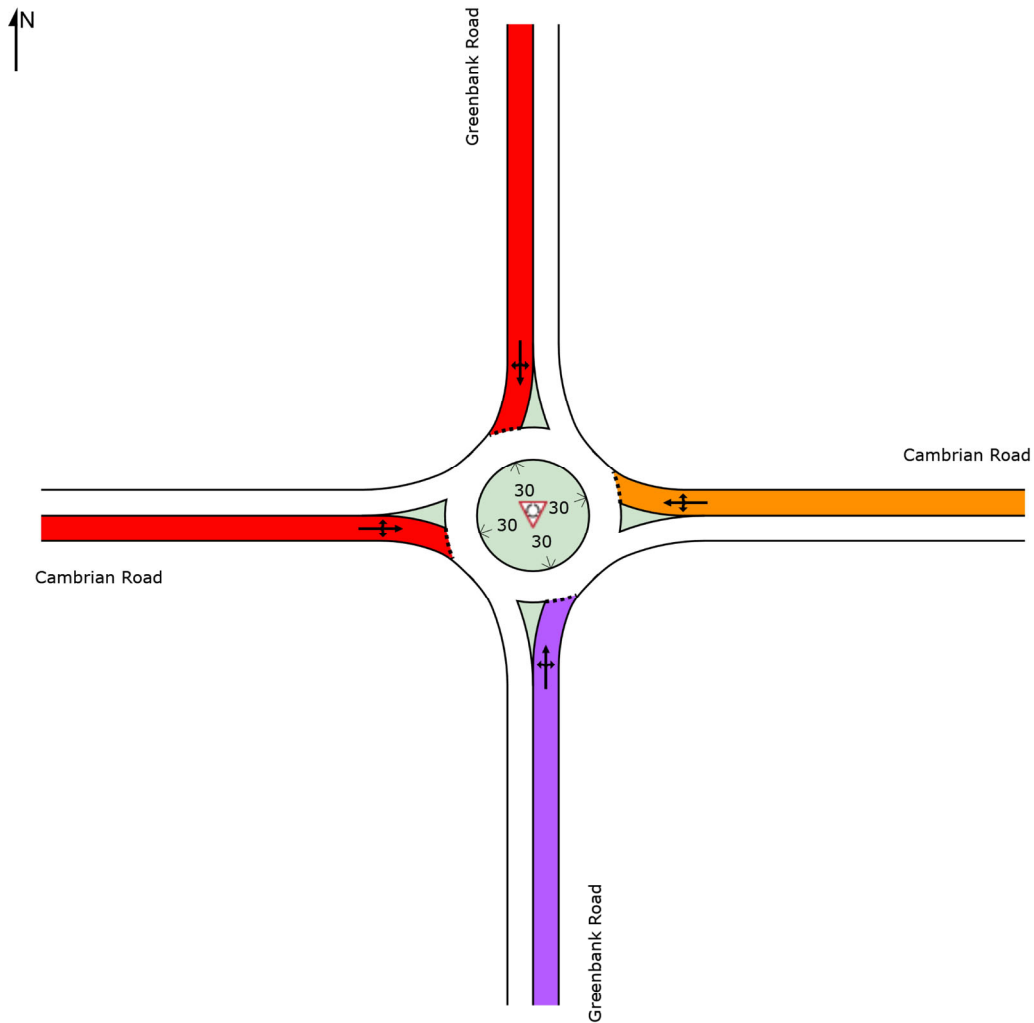
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2023 FT Sat]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	D	E	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2023 FT Sat]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	129	8.0	0.769	25.5	LOS D	9.2	66.2	0.85	1.22	1.92	28.1
2	T1	245	2.0	0.769	25.4	LOS D	9.2	66.2	0.85	1.22	1.92	29.2
3	R2	125	2.0	0.769	25.4	LOS D	9.2	66.2	0.85	1.22	1.92	24.0
Approach		499	3.6	0.769	25.4	LOS D	9.2	66.2	0.85	1.22	1.92	27.7
East: Cambrian Road												
4	L2	144	2.0	0.930	45.1	LOS E	19.6	139.8	1.00	1.90	3.26	18.1
5	T1	375	2.0	0.930	45.1	LOS E	19.6	139.8	1.00	1.90	3.26	20.4
6	R2	86	2.0	0.930	45.1	LOS E	19.6	139.8	1.00	1.90	3.26	20.9
Approach		605	2.0	0.930	45.1	LOS E	19.6	139.8	1.00	1.90	3.26	19.9
North: Greenbank Road												
7	L2	68	2.0	1.375	200.2	LOS F	83.1	591.7	1.00	4.19	10.87	7.0
8	T1	410	2.0	1.375	200.2	LOS F	83.1	591.7	1.00	4.19	10.87	7.0
9	R2	316	2.0	1.375	200.2	LOS F	83.1	591.7	1.00	4.19	10.87	8.0
Approach		794	2.0	1.375	200.2	LOS F	83.1	591.7	1.00	4.19	10.87	7.4
West: Cambrian Road												
10	L2	177	2.0	1.108	91.7	LOS F	46.5	333.0	1.00	3.03	5.91	15.0
11	T1	361	2.0	1.108	91.7	LOS F	46.5	333.0	1.00	3.03	5.91	12.6
12	R2	207	4.0	1.108	91.7	LOS F	46.5	333.0	1.00	3.03	5.91	12.5
Approach		745	2.6	1.108	91.7	LOS F	46.5	333.0	1.00	3.03	5.91	13.2
All Vehicles		2643	2.4	1.375	101.1	LOS F	83.1	591.7	0.97	2.78	6.04	12.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix T

Synchro and Sidra Intersection Worksheets – 2028 Future Total Conditions

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	81	1129	97	57	428	119
Future Volume (vph)	81	1129	97	57	428	119
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		30.0	275.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.618	
Satd. Flow (perm)	1433	1455	1496	1293	948	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		562		57		
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	81	1129	97	57	428	119
Shared Lane Traffic (%)						
Lane Group Flow (vph)	81	1129	97	57	428	119
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	pm+ov	NA	Perm	pm+pt	NA
Protected Phases	8	1	2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	26.2	8.0	29.9	29.9	8.0	29.9
Total Split (s)	26.2	73.0	30.8	30.8	73.0	103.8
Total Split (%)	20.2%	56.2%	23.7%	23.7%	56.2%	79.8%
Maximum Green (s)	20.5	70.0	24.4	24.4	70.0	97.4
Yellow Time (s)	4.2	2.0	4.6	4.6	2.0	4.6
All-Red Time (s)	1.5	1.0	1.8	1.8	1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	3.0	6.4	6.4	3.0	6.4
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0		7.0	7.0		7.0
Flash Dont Walk (s)	13.5		16.5	16.5		16.5
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	12.8	85.2	24.5	24.5	101.3	99.3
Actuated g/C Ratio	0.11	0.71	0.21	0.21	0.85	0.83
v/c Ratio	0.53	0.94	0.32	0.18	0.39	0.13
Control Delay	64.4	23.4	45.7	12.3	3.8	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.4	23.4	45.7	12.3	3.8	3.4
LOS	E	C	D	B	A	A
Approach Delay	26.1		33.4			3.7
Approach LOS	C		C			A
Queue Length 50th (m)	18.8	117.3	20.0	0.0	19.0	5.2
Queue Length 95th (m)	35.0	#310.5	38.0	11.5	38.0	11.9
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		180.0		30.0	275.0	
Base Capacity (vph)	247	1200	307	311	1106	899
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.94	0.32	0.18	0.39	0.13

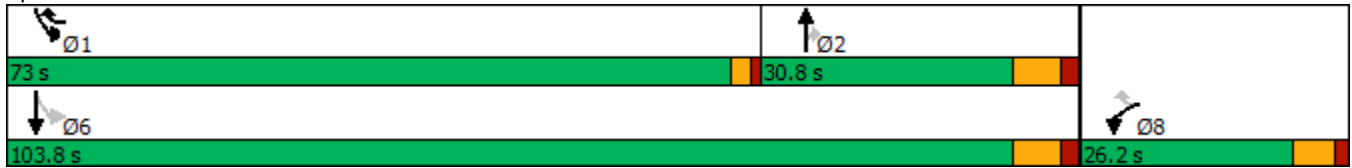
Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	119.2
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	20.3
Intersection LOS:	C
Intersection Capacity Utilization:	90.8%
ICU Level of Service:	E
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2028 FT - AM
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	509	4	48	844	6	3	5	30	17	5	53
Future Volume (vph)	19	509	4	48	844	6	3	5	30	17	5	53
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. 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
Ped Bike Factor												
Fr _t		0.999			0.999			0.893			0.905	
Fl _t Protected	0.950			0.950				0.996			0.989	
Satd. Flow (prot)	1658	1678	0	1658	1569	0	0	1552	0	0	1562	0
Fl _t Permitted	0.950			0.950				0.996			0.989	
Satd. Flow (perm)	1658	1678	0	1658	1569	0	0	1552	0	0	1562	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	11		12	12		11	8		8	8		8
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
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	19	509	4	48	844	6	3	5	30	17	5	53
Shared Lane Traffic (%)												
Lane Group Flow (vph)	19	513	0	48	850	0	0	38	0	0	75	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary
 Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 64.9% ICU Level of Service C
 Analysis Period (min) 15

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	19	509	4	48	844	6	3	5	30	17	5	53
Future Vol, veh/h	19	509	4	48	844	6	3	5	30	17	5	53
Conflicting Peds, #/hr	11	0	12	12	0	11	8	0	8	8	0	8
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
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, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	509	4	48	844	6	3	5	30	17	5	53

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	861	0	0	525	0	0	1541	1518	531	1529	1517	866
Stage 1	-	-	-	-	-	-	561	561	-	954	954	-
Stage 2	-	-	-	-	-	-	980	957	-	575	563	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	781	-	-	1042	-	-	94	119	548	96	119	353
Stage 1	-	-	-	-	-	-	512	510	-	311	337	-
Stage 2	-	-	-	-	-	-	301	336	-	503	509	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	773	-	-	1030	-	-	71	108	538	81	108	347
Mov Cap-2 Maneuver	-	-	-	-	-	-	71	108	-	81	108	-
Stage 1	-	-	-	-	-	-	494	492	-	300	318	-
Stage 2	-	-	-	-	-	-	238	317	-	455	491	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.5			21			37.7		
HCM LOS							C			E		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	263	773	-	-	1030	-	-	183
HCM Lane V/C Ratio	0.144	0.025	-	-	0.047	-	-	0.41
HCM Control Delay (s)	21	9.8	-	-	8.7	-	-	37.7
HCM Lane LOS	C	A	-	-	A	-	-	E
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.1	-	-	1.8

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	566	135	57	437	45	326	60	135	58	19	33
Future Volume (vph)	17	566	135	57	437	45	326	60	135	58	19	33
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.97		0.97	1.00		0.92	0.99	0.96		0.97	0.98	
Frt			0.850			0.850		0.896			0.905	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1296	0	1478	1355	0
Flt Permitted	0.384			0.260			0.723			0.635		
Satd. Flow (perm)	494	1456	1299	358	1470	1207	1122	1296	0	955	1355	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			135			45		135			33	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	17	566	135	57	437	45	326	60	135	58	19	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	566	135	57	437	45	326	195	0	58	52	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	35.6	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	50.0	50.0	50.0	50.0	50.0	50.0	40.0	40.0		40.0	40.0	
Total Split (%)	55.6%	55.6%	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%		44.4%	44.4%	
Maximum Green (s)	43.9	43.9	43.9	43.9	43.9	43.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	2.8	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5	22.5	22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	5	5	5	39	39	39	31	31		10	10	
Act Effct Green (s)	35.6	35.6	35.6	35.6	35.6	35.6	34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.43	0.43	0.42	0.42		0.42	0.42	
v/c Ratio	0.08	0.90	0.21	0.37	0.69	0.08	0.70	0.32		0.15	0.09	
Control Delay	13.7	39.9	3.3	22.8	24.6	4.3	31.8	8.3		18.9	9.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	13.7	39.9	3.3	22.8	24.6	4.3	31.8	8.3		18.9	9.7	
LOS	B	D	A	C	C	A	C	A		B	A	
Approach Delay		32.4			22.7			23.0			14.6	
Approach LOS		C			C			C			B	
Queue Length 50th (m)	1.5	78.5	0.0	5.7	52.7	0.0	43.4	5.9		5.8	1.8	
Queue Length 95th (m)	5.2	#137.3	8.7	15.7	83.2	5.3	#91.2	21.4		14.9	9.1	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	266	785	762	192	793	671	468	619		398	585	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.06	0.72	0.18	0.30	0.55	0.07	0.70	0.32		0.15	0.09	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 82.2

Natural Cycle: 80

Control Type: Semi Act-Uncoord

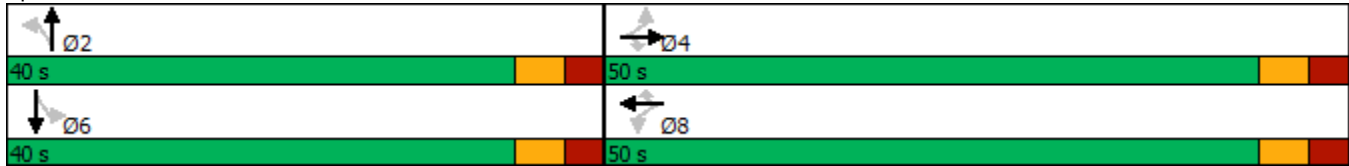
Maximum v/c Ratio: 0.90

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road

Intersection Signal Delay: 26.0	Intersection LOS: C
Intersection Capacity Utilization 105.8%	ICU Level of Service G
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	263	521	68	106	291	81	154	377	208	95	144	137
Future Volume (vph)	263	521	68	106	291	81	154	377	208	95	144	137
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.989			0.977			0.962			0.951	
Flt Protected		0.985			0.989			0.990			0.988	
Satd. Flow (prot)	0	1499	0	0	1490	0	0	1659	0	0	1571	0
Flt Permitted		0.985			0.989			0.990			0.988	
Satd. Flow (perm)	0	1499	0	0	1490	0	0	1659	0	0	1571	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0						
Adj. Flow (vph)	263	521	68	106	291	81	154	377	208	95	144	137
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	852	0	0	478	0	0	739	0	0	376	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	135.6%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2028 FT - AM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	21	0	0	31	0
Future Volume (vph)	0	21	0	0	31	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	21	0	0	31	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	0	0	0	31
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 6.7%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2028 FT - AM
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	557	22	9	933	15	6
Future Volume (vph)	557	22	9	933	15	6
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.995			0.961		
Fl _t Protected				0.966		
Satd. Flow (prot)	1736	0	0	1745	1620	0
Fl _t Permitted				0.966		
Satd. Flow (perm)	1736	0	0	1745	1620	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	557	22	9	933	15	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	579	0	0	942	21	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	69.4%
Analysis Period (min)	15
	ICU Level of Service C

Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	557	22	9	933	15	6
Future Vol, veh/h	557	22	9	933	15	6
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	557	22	9	933	15	6













Major/Minor	Major1	Major2	Minor1	Minor2	Minor3
Conflicting Flow All	0	0	579	0	1519 568
Stage 1	-	-	-	-	568 -
Stage 2	-	-	-	-	951 -
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	-	-	995	-	131 522
Stage 1	-	-	-	-	567 -
Stage 2	-	-	-	-	375 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	995	-	129 522
Mov Cap-2 Maneuver	-	-	-	-	129 -
Stage 1	-	-	-	-	567 -
Stage 2	-	-	-	-	368 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	30.1
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	164	-	-	995	-
HCM Lane V/C Ratio	0.128	-	-	0.009	-
HCM Control Delay (s)	30.1	-	-	8.7	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	61	678	169	68	1078	108
Future Volume (vph)	61	678	169	68	1078	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		30.0	275.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.499	
Satd. Flow (perm)	1433	1455	1496	1293	766	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		339		68		
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	61	678	169	68	1078	108
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	678	169	68	1078	108
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	pm+ov	NA	Perm	pm+pt	NA
Protected Phases	8	1	2		1	6

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	26.2	8.0	29.9	29.9	8.0	29.9
Total Split (s)	26.2	73.0	30.8	30.8	73.0	103.8
Total Split (%)	20.2%	56.2%	23.7%	23.7%	56.2%	79.8%
Maximum Green (s)	20.5	70.0	24.4	24.4	70.0	97.4
Yellow Time (s)	4.2	2.0	4.6	4.6	2.0	4.6
All-Red Time (s)	1.5	1.0	1.8	1.8	1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	3.0	6.4	6.4	3.0	6.4
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0		7.0	7.0		7.0
Flash Dont Walk (s)	13.5		16.5	16.5		16.5
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	11.5	84.0	24.5	24.5	101.2	99.2
Actuated g/C Ratio	0.10	0.71	0.21	0.21	0.86	0.84
v/c Ratio	0.44	0.60	0.55	0.21	1.01	0.12
Control Delay	61.7	6.0	50.8	11.5	43.6	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	6.0	50.8	11.5	43.6	3.0
LOS	E	A	D	B	D	A
Approach Delay	10.6		39.5			39.9
Approach LOS	B		D			D
Queue Length 50th (m)	13.9	29.4	36.0	0.0	~221.7	4.2
Queue Length 95th (m)	27.9	54.4	61.4	12.3	#322.3	9.7
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		180.0		30.0	275.0	
Base Capacity (vph)	250	1133	310	322	1069	908
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.60	0.55	0.21	1.01	0.12

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	117.9
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	29.8
Intersection LOS:	C
Intersection Capacity Utilization:	94.2%
ICU Level of Service:	F
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

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

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2028 FT - PM
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	826	3	131	570	21	7	5	140	9	5	31
Future Volume (vph)	49	826	3	131	570	21	7	5	140	9	5	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. 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
Ped Bike Factor												
Frt		0.999			0.995			0.876			0.907	
Flt Protected	0.950			0.950				0.998			0.990	
Satd. Flow (prot)	1658	1678	0	1658	1563	0	0	1526	0	0	1567	0
Flt Permitted	0.950			0.950				0.998			0.990	
Satd. Flow (perm)	1658	1678	0	1658	1563	0	0	1526	0	0	1567	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	21		30	30		21	17		18	18		17
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
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	49	826	3	131	570	21	7	5	140	9	5	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	829	0	131	591	0	0	152	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	76.4%
ICU Level of Service	D
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	7.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	49	826	3	131	570	21	7	5	140	9	5	31
Future Vol, veh/h	49	826	3	131	570	21	7	5	140	9	5	31
Conflicting Peds, #/hr	21	0	30	30	0	21	17	0	18	18	0	17
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
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, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	826	3	131	570	21	7	5	140	9	5	31

Major/Minor	Major1		Major2		Minor1		Minor2					
Conflicting Flow All	612	0	0	859	0	0	1834	1830	876	1880	1821	619
Stage 1	-	-	-	-	-	-	956	956	-	864	864	-
Stage 2	-	-	-	-	-	-	878	874	-	1016	957	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	967	-	-	782	-	-	59	76	348	54	77	489
Stage 1	-	-	-	-	-	-	310	336	-	349	371	-
Stage 2	-	-	-	-	-	-	343	367	-	287	336	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	948	-	-	760	-	-	41	57	333	24	58	472
Mov Cap-2 Maneuver	-	-	-	-	-	-	41	57	-	24	58	-
Stage 1	-	-	-	-	-	-	286	309	-	325	301	-
Stage 2	-	-	-	-	-	-	257	298	-	153	309	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	0.5		1.9		49.4		87.4	
HCM LOS					E		F	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	224	948	-	-	760	-	-	85
HCM Lane V/C Ratio	0.679	0.052	-	-	0.172	-	-	0.529
HCM Control Delay (s)	49.4	9	-	-	10.7	-	-	87.4
HCM Lane LOS	E	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	4.3	0.2	-	-	0.6	-	-	2.3

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	740	282	151	647	64	193	18	120	29	14	18
Future Volume (vph)	22	740	282	151	647	64	193	18	120	29	14	18
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.97		0.97			0.90	0.98	0.93		0.95	0.98	
Frt			0.850			0.850		0.870			0.916	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1234	0	1478	1368	0
Flt Permitted	0.355			0.176			0.736			0.645		
Satd. Flow (perm)	456	1456	1294	243	1470	1173	1135	1234	0	953	1368	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			282			64			120			18
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	22	740	282	151	647	64	193	18	120	29	14	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	740	282	151	647	64	193	138	0	29	32	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	9.5	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	80.0	80.0	80.0	10.0	90.0	90.0	40.0	40.0		40.0	40.0	
Total Split (%)	61.5%	61.5%	61.5%	7.7%	69.2%	69.2%	30.8%	30.8%		30.8%	30.8%	
Maximum Green (s)	73.9	73.9	73.9	5.5	83.9	83.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.5	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	1.0	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	4.5	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5		22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3		13	13	16	16		9	9	
Act Effct Green (s)	65.1	65.1	65.1	76.8	75.2	75.2	34.3	34.3		34.3	34.3	
Actuated g/C Ratio	0.53	0.53	0.53	0.63	0.62	0.62	0.28	0.28		0.28	0.28	
v/c Ratio	0.09	0.95	0.34	0.75	0.71	0.09	0.61	0.32		0.11	0.08	
Control Delay	14.1	49.1	2.7	34.8	20.7	2.3	49.6	11.2		37.5	21.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	14.1	49.1	2.7	34.8	20.7	2.3	49.6	11.2		37.5	21.6	
LOS	B	D	A	C	C	A	D	B		D	C	
Approach Delay		35.8			21.8			33.6			29.2	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	2.5	159.3	0.0	13.9	97.9	0.0	43.9	3.4		5.7	2.7	
Queue Length 95th (m)	6.9	#247.0	11.7	#30.3	140.9	5.0	71.3	20.3		13.9	10.9	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	279	891	901	202	1021	834	319	433		268	398	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.08	0.83	0.31	0.75	0.63	0.08	0.61	0.32		0.11	0.08	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 121.7

Natural Cycle: 110

Control Type: Semi Act-Uncoord

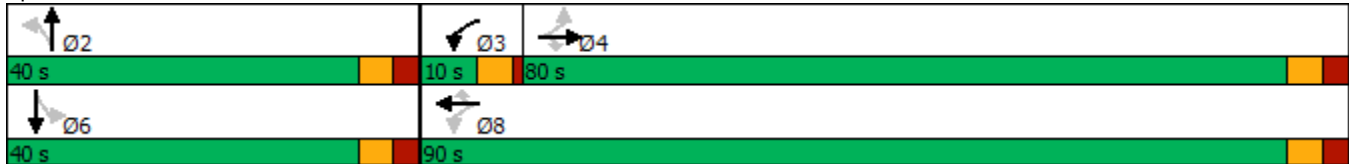
Maximum v/c Ratio: 0.95

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

2028 FT - PM
 3831 Cambrian Road

Intersection Signal Delay: 30.1	Intersection LOS: C
Intersection Capacity Utilization 92.1%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	221	405	207	146	419	95	126	298	128	75	480	381
Future Volume (vph)	221	405	207	146	419	95	126	298	128	75	480	381
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.966			0.981			0.969			0.945	
Flt Protected		0.987			0.989			0.989			0.996	
Satd. Flow (prot)	0	1434	0	0	1498	0	0	1669	0	0	1573	0
Flt Permitted		0.987			0.989			0.989			0.996	
Satd. Flow (perm)	0	1434	0	0	1498	0	0	1669	0	0	1573	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	221	405	207	146	419	95	126	298	128	75	480	381
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	833	0	0	660	0	0	552	0	0	936	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	142.0%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Temporary Driveway & Site Access #2

2028 FT - PM
3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗				↘
Traffic Volume (vph)	0	47	0	0	63	0
Future Volume (vph)	0	47	0	0	63	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected	0.950					
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted	0.950					
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	47	0	0	63	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	47	0	0	0	63
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	7.0% ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2028 FT - PM
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	863	57	6	629	38	9
Future Volume (vph)	863	57	6	629	38	9
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992			0.974		
Flt Protected				0.961		
Satd. Flow (prot)	1731	0	0	1745	1633	0
Flt Permitted				0.961		
Satd. Flow (perm)	1731	0	0	1745	1633	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	863	57	6	629	38	9
Shared Lane Traffic (%)						
Lane Group Flow (vph)	920	0	0	635	47	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.6%
Analysis Period (min)	15
	ICU Level of Service B

Intersection						
Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	863	57	6	629	38	9
Future Vol, veh/h	863	57	6	629	38	9
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	863	57	6	629	38	9













Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	920	0	1533 892
Stage 1	-	-	-	-	892 -
Stage 2	-	-	-	-	641 -
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	-	-	742	-	128 341
Stage 1	-	-	-	-	400 -
Stage 2	-	-	-	-	525 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	742	-	126 341
Mov Cap-2 Maneuver	-	-	-	-	126 -
Stage 1	-	-	-	-	400 -
Stage 2	-	-	-	-	519 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	42
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	143	-	-	742	-
HCM Lane V/C Ratio	0.329	-	-	0.008	-
HCM Control Delay (s)	42	-	-	9.9	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	1.3	-	-	0	-

Lanes, Volumes, Timings
1: Borrisokane Road & Cambrian Road

2028 FT - SAT
3831 Cambrian Road

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	61	678	169	68	1078	108
Future Volume (vph)	61	678	169	68	1078	108
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Storage Length (m)	0.0	180.0		30.0	275.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	15.0				100.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1433	1455	1496	1293	1458	1079
Flt Permitted	0.950				0.499	
Satd. Flow (perm)	1433	1455	1496	1293	766	1079
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		339		68		
Link Speed (k/h)	70		80			80
Link Distance (m)	995.6		291.4			1557.5
Travel Time (s)	51.2		13.1			70.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	4%	19%	17%	16%	65%
Adj. Flow (vph)	61	678	169	68	1078	108
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	678	169	68	1078	108
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.5			3.5
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	3.0		3.0			3.0
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2	1	1	2
Detector Template	Left	Right	Thru	Right	Left	Thru
Leading Detector (m)	2.0	2.0	10.0	2.0	2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6	2.0	2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	pm+ov	NA	Perm	pm+pt	NA
Protected Phases	8	1	2		1	6

Lanes, Volumes, Timings
 1: Borrisokane Road & Cambrian Road

2028 FT - SAT
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases	8	8		2	6	
Detector Phase	8	1	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	5.0	10.0	10.0	5.0	10.0
Minimum Split (s)	26.2	8.0	29.9	29.9	8.0	29.9
Total Split (s)	26.2	73.0	30.8	30.8	73.0	103.8
Total Split (%)	20.2%	56.2%	23.7%	23.7%	56.2%	79.8%
Maximum Green (s)	20.5	70.0	24.4	24.4	70.0	97.4
Yellow Time (s)	4.2	2.0	4.6	4.6	2.0	4.6
All-Red Time (s)	1.5	1.0	1.8	1.8	1.0	1.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	3.0	6.4	6.4	3.0	6.4
Lead/Lag		Lead	Lag	Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	None	Max
Walk Time (s)	7.0		7.0	7.0		7.0
Flash Dont Walk (s)	13.5		16.5	16.5		16.5
Pedestrian Calls (#/hr)	0		0	0		0
Act Effct Green (s)	11.5	84.0	24.5	24.5	101.2	99.2
Actuated g/C Ratio	0.10	0.71	0.21	0.21	0.86	0.84
v/c Ratio	0.44	0.60	0.55	0.21	1.01	0.12
Control Delay	61.7	6.0	50.8	11.5	43.6	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.7	6.0	50.8	11.5	43.6	3.0
LOS	E	A	D	B	D	A
Approach Delay	10.6		39.5			39.9
Approach LOS	B		D			D
Queue Length 50th (m)	13.9	29.4	36.0	0.0	~221.7	4.2
Queue Length 95th (m)	27.9	54.4	61.4	12.3	#322.3	9.7
Internal Link Dist (m)	971.6		267.4			1533.5
Turn Bay Length (m)		180.0		30.0	275.0	
Base Capacity (vph)	250	1133	310	322	1069	908
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.60	0.55	0.21	1.01	0.12

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	117.9
Natural Cycle:	150
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	29.8
Intersection LOS:	C
Intersection Capacity Utilization:	94.2%
ICU Level of Service:	F
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

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

Splits and Phases: 1: Borrisokane Road & Cambrian Road



Lanes, Volumes, Timings
 2: Site Access #1/Seeley's Bay Street & Cambrian Road

2028 FT - SAT
 3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	832	4	166	575	21	7	5	170	9	5	31
Future Volume (vph)	49	832	4	166	575	21	7	5	170	9	5	31
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		0.0	75.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	100.0			100.0			15.0			15.0		
Lane Util. 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
Ped Bike Factor												
Fr _t		0.999			0.995			0.874			0.907	
Fl _t Protected	0.950			0.950				0.998			0.990	
Satd. Flow (prot)	1658	1678	0	1658	1563	0	0	1522	0	0	1567	0
Fl _t Permitted	0.950			0.950				0.998			0.990	
Satd. Flow (perm)	1658	1678	0	1658	1563	0	0	1522	0	0	1567	0
Link Speed (k/h)		50			50			30			50	
Link Distance (m)		141.7			449.3			169.6			208.1	
Travel Time (s)		10.2			32.3			20.4			15.0	
Confl. Peds. (#/hr)	22		36	36		22	18		21	21		18
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
Heavy Vehicles (%)	2%	6%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Parking (#/hr)					0	0				0		0
Adj. Flow (vph)	49	832	4	166	575	21	7	5	170	9	5	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	836	0	166	596	0	0	182	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	80.4%
ICU Level of Service	D
Analysis Period (min)	15

Intersection												
Int Delay, s/veh	12.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↕	
Traffic Vol, veh/h	49	832	4	166	575	21	7	5	170	9	5	31
Future Vol, veh/h	49	832	4	166	575	21	7	5	170	9	5	31
Conflicting Peds, #/hr	22	0	36	36	0	22	18	0	21	21	0	18
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	600	-	-	750	-	-	-	-	-	-	-	-
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, %	2	6	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	832	4	166	575	21	7	5	170	9	5	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	618	0	0	872	0	0	1922	1918	891	1981	1910	626
Stage 1	-	-	-	-	-	-	968	968	-	940	940	-
Stage 2	-	-	-	-	-	-	954	950	-	1041	970	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	962	-	-	773	-	-	51	67	341	46	68	484
Stage 1	-	-	-	-	-	-	305	332	-	316	342	-
Stage 2	-	-	-	-	-	-	311	339	-	278	331	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	942	-	-	747	-	-	33	47	323	15	47	466
Mov Cap-2 Maneuver	-	-	-	-	-	-	33	47	-	15	47	-
Stage 1	-	-	-	-	-	-	279	304	-	294	261	-
Stage 2	-	-	-	-	-	-	218	258	-	120	303	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.5			2.4			74.2			172.2		
HCM LOS							F			F		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	215	942	-	-	747	-	-	58
HCM Lane V/C Ratio	0.847	0.052	-	-	0.222	-	-	0.776
HCM Control Delay (s)	74.2	9	-	-	11.2	-	-	172.2
HCM Lane LOS	F	A	-	-	B	-	-	F
HCM 95th %tile Q(veh)	6.5	0.2	-	-	0.8	-	-	3.4

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	767	288	151	674	64	201	18	120	29	14	22
Future Volume (vph)	25	767	288	151	674	64	201	18	120	29	14	22
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Storage Length (m)	60.0		85.0	80.0		60.0	100.0		75.0	60.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. 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
Ped Bike Factor	0.97		0.97			0.90	0.98	0.93		0.95	0.98	
Frt			0.850			0.850		0.870			0.908	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1258	1456	1335	1312	1470	1309	1492	1234	0	1478	1354	0
Flt Permitted	0.339			0.168			0.734			0.639		
Satd. Flow (perm)	437	1456	1294	232	1470	1173	1132	1234	0	944	1354	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			288			64			120			22
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		449.3			477.1			575.8			329.8	
Travel Time (s)		32.3			34.4			41.5			23.7	
Confl. Peds. (#/hr)	39		5	5		39	10		31	31		10
Confl. Bikes (#/hr)									1			1
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
Heavy Vehicles (%)	21%	10%	2%	16%	9%	4%	2%	10%	4%	3%	6%	4%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	25	767	288	151	674	64	201	18	120	29	14	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	767	288	151	674	64	201	138	0	29	36	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.09	1.24	1.24	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings
3: River Mist Road & Cambrian Road

2028 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	36.6	36.6	36.6	9.5	35.6	35.6	38.0	38.0		40.0	40.0	
Total Split (s)	80.0	80.0	80.0	10.0	90.0	90.0	40.0	40.0		40.0	40.0	
Total Split (%)	61.5%	61.5%	61.5%	7.7%	69.2%	69.2%	30.8%	30.8%		30.8%	30.8%	
Maximum Green (s)	73.9	73.9	73.9	5.5	83.9	83.9	34.0	34.0		34.0	34.0	
Yellow Time (s)	3.3	3.3	3.3	3.5	3.3	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.8	2.8	2.8	1.0	2.8	2.8	2.7	2.7		2.7	2.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1	6.1	4.5	6.1	6.1	6.0	6.0		6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None	None	Max	Max		Max	Max	
Walk Time (s)	7.0	7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	23.5	23.5	23.5		22.5	22.5	25.0	25.0		27.0	27.0	
Pedestrian Calls (#/hr)	3	3	3		13	13	16	16		9	9	
Act Effct Green (s)	68.2	68.2	68.2	79.9	78.3	78.3	34.2	34.2		34.2	34.2	
Actuated g/C Ratio	0.55	0.55	0.55	0.64	0.63	0.63	0.27	0.27		0.27	0.27	
v/c Ratio	0.10	0.96	0.34	0.77	0.73	0.08	0.65	0.32		0.11	0.09	
Control Delay	14.4	51.4	2.6	37.6	21.4	2.3	52.8	11.2		37.9	20.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	14.4	51.4	2.6	37.6	21.4	2.3	52.8	11.2		37.9	20.1	
LOS	B	D	A	D	C	A	D	B		D	C	
Approach Delay		37.5			22.8			35.9			28.1	
Approach LOS		D			C			D			C	
Queue Length 50th (m)	2.8	171.6	0.0	13.9	105.5	0.0	46.5	3.5		5.7	2.7	
Queue Length 95th (m)	7.5	#261.9	12.0	#32.3	152.6	5.0	74.7	20.3		13.9	11.3	
Internal Link Dist (m)		425.3			453.1			551.8			305.8	
Turn Bay Length (m)	60.0		85.0	80.0		60.0	100.0			60.0		
Base Capacity (vph)	260	867	887	196	994	814	310	425		258	387	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.10	0.88	0.32	0.77	0.68	0.08	0.65	0.32		0.11	0.09	

Intersection Summary

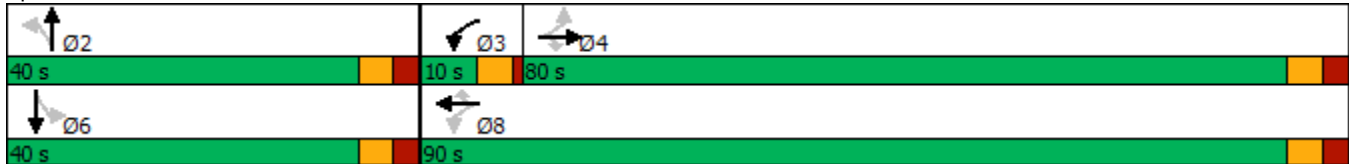
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 124.6
 Natural Cycle: 120
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.96

Lanes, Volumes, Timings
 3: River Mist Road & Cambrian Road

2028 FT - SAT
 3831 Cambrian Road

Intersection Signal Delay: 31.5	Intersection LOS: C
Intersection Capacity Utilization 93.6%	ICU Level of Service F
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: River Mist Road & Cambrian Road



Lanes, Volumes, Timings
4: Greenbank Road & Cambrian Road

2028 FT - SAT
3831 Cambrian Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	229	407	223	146	422	95	138	290	128	75	468	393
Future Volume (vph)	229	407	223	146	422	95	138	290	128	75	468	393
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Lane Util. 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
Ped Bike Factor												
Frt		0.965			0.981			0.969			0.943	
Flt Protected		0.987			0.989			0.988			0.996	
Satd. Flow (prot)	0	1431	0	0	1498	0	0	1667	0	0	1568	0
Flt Permitted		0.987			0.989			0.988			0.996	
Satd. Flow (perm)	0	1431	0	0	1498	0	0	1667	0	0	1568	0
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		477.1			190.0			630.7			335.6	
Travel Time (s)		34.4			13.7			37.8			20.1	
Confl. Peds. (#/hr)	4		11	11		4	8		5	5		8
Confl. Bikes (#/hr)			1						2			
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
Heavy Vehicles (%)	3%	3%	17%	6%	2%	8%	3%	2%	2%	5%	4%	10%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Adj. Flow (vph)	229	407	223	146	422	95	138	290	128	75	468	393
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	859	0	0	663	0	0	556	0	0	936	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		3.0			3.0			3.0			3.0	
Two way Left Turn Lane												
Headway Factor	1.09	1.24	1.09	1.09	1.24	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	148.6%
ICU Level of Service	H
Analysis Period (min)	15

Lanes, Volumes, Timings
 5: Temporary Driveway & Site Access #2

2028 FT - SAT
 3831 Cambrian Road



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	0	51	0	0	59	0
Future Volume (vph)	0	51	0	0	59	0
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.865					
Fl _t Protected						0.950
Satd. Flow (prot)	0	1510	0	0	0	1658
Fl _t Permitted						0.950
Satd. Flow (perm)	0	1510	0	0	0	1658
Link Speed (k/h)	30		30		30	
Link Distance (m)	77.1		61.5		112.7	
Travel Time (s)	9.3		7.4		13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	51	0	0	59	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	51	0	0	0	59
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	3.0		3.0		3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	25	15		15	25	
Sign Control	Free		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 6.8%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Temporary Driveway & Cambrian Road

2028 FT - SAT
3831 Cambrian Road



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	868	60	9	632	41	10
Future Volume (vph)	868	60	9	632	41	10
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.991			0.974		
Flt Protected				0.999	0.961	
Satd. Flow (prot)	1729	0	0	1743	1633	0
Flt Permitted				0.999	0.961	
Satd. Flow (perm)	1729	0	0	1743	1633	0
Link Speed (k/h)	50			50	30	
Link Distance (m)	995.6			141.7	112.7	
Travel Time (s)	71.7			10.2	13.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	868	60	9	632	41	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	928	0	0	641	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.5			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	3.0			3.0	3.0	
Two way Left Turn Lane						
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (k/h)	15		25	25		15
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.1%
Analysis Period (min)	15
	ICU Level of Service B

Intersection						
Int Delay, s/veh	1.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	868	60	9	632	41	10
Future Vol, veh/h	868	60	9	632	41	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	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	868	60	9	632	41	10

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	928	0	1548 898
Stage 1	-	-	-	-	898 -
Stage 2	-	-	-	-	650 -
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	-	-	737	-	126 338
Stage 1	-	-	-	-	398 -
Stage 2	-	-	-	-	520 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	737	-	124 338
Mov Cap-2 Maneuver	-	-	-	-	124 -
Stage 1	-	-	-	-	398 -
Stage 2	-	-	-	-	510 -

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	43.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	142	-	-	737	-
HCM Lane V/C Ratio	0.359	-	-	0.012	-
HCM Control Delay (s)	43.9	-	-	9.9	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	1.5	-	-	0	-

DEGREE OF SATURATION

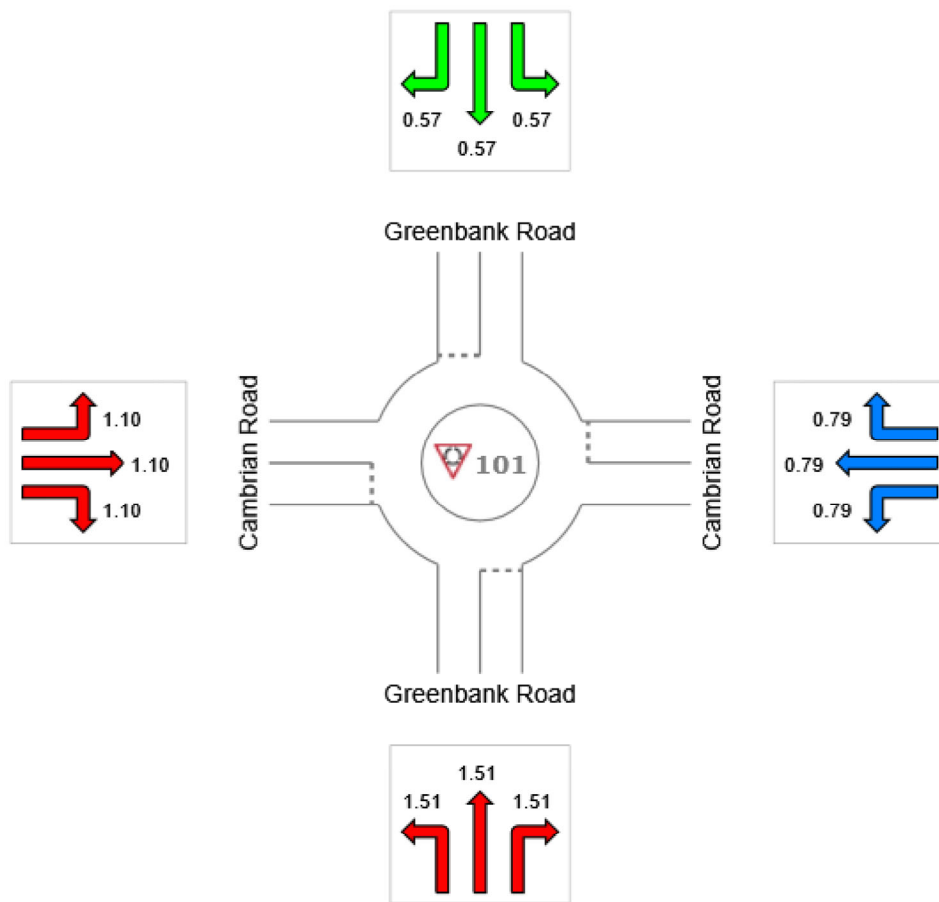
Ratio of Demand Volume to Capacity, v/c ratio per movement

 Site: 101 [Cambrian and Greenbank 2028 FT AM]

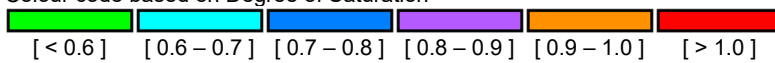
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	1.51	0.79	0.57	1.10	1.51



Colour code based on Degree of Saturation



DELAY (CONTROL)

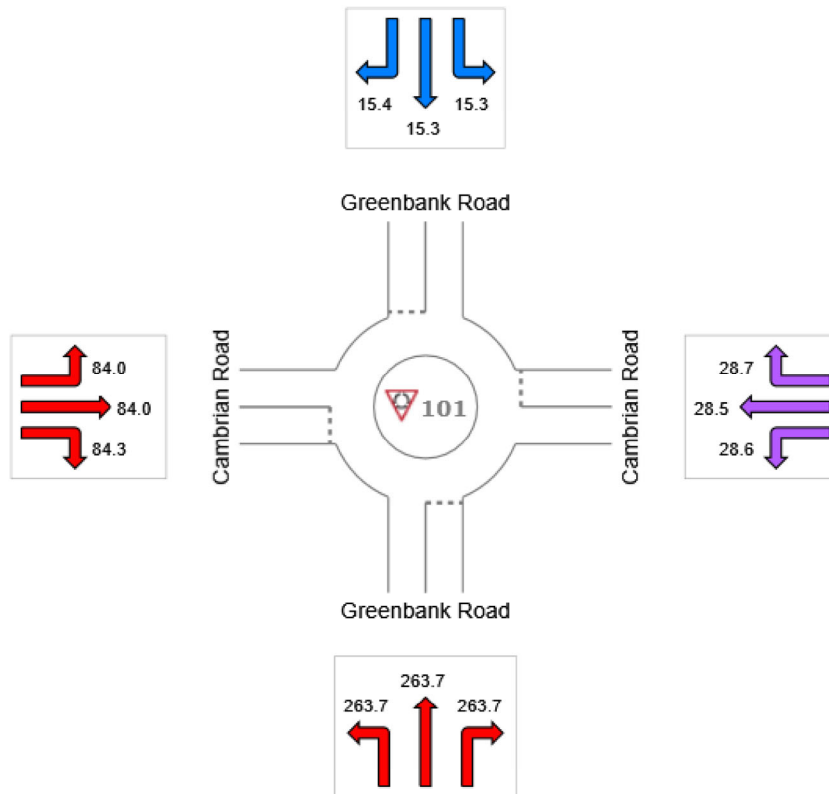
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2028 FT AM]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	263.7	28.6	15.3	84.0	116.9
LOS	F	D	C	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

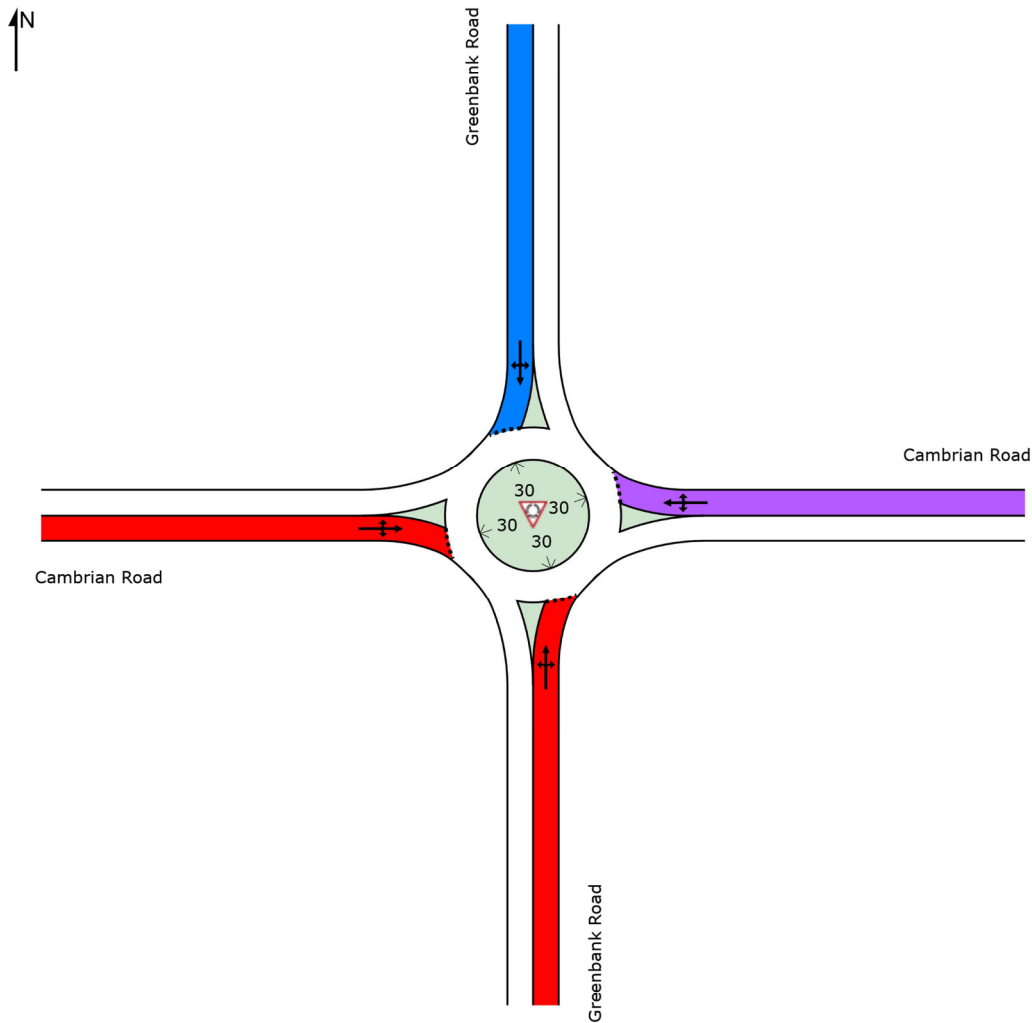
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2028 FT AM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	F	D	C	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FT AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	154	3.0	1.514	263.7	LOS F	90.9	648.3	1.00	4.59	12.92	5.3
2	T1	377	2.0	1.514	263.7	LOS F	90.9	648.3	1.00	4.59	12.92	5.5
3	R2	208	2.0	1.514	263.7	LOS F	90.9	648.3	1.00	4.59	12.92	4.3
Approach		739	2.2	1.514	263.7	LOS F	90.9	648.3	1.00	4.59	12.92	5.2
East: Cambrian Road												
4	L2	106	6.0	0.790	28.6	LOS D	9.2	66.2	0.86	1.33	2.06	23.6
5	T1	291	2.0	0.790	28.5	LOS D	9.2	66.2	0.86	1.33	2.06	25.9
6	R2	81	8.0	0.790	28.7	LOS D	9.2	66.2	0.86	1.33	2.06	26.1
Approach		478	3.9	0.790	28.6	LOS D	9.2	66.2	0.86	1.33	2.06	25.5
North: Greenbank Road												
7	L2	95	5.0	0.571	15.3	LOS C	4.1	30.5	0.69	0.86	1.16	35.3
8	T1	144	4.0	0.571	15.3	LOS C	4.1	30.5	0.69	0.86	1.16	35.4
9	R2	137	10.0	0.571	15.4	LOS C	4.1	30.5	0.69	0.86	1.16	35.3
Approach		376	6.4	0.571	15.3	LOS C	4.1	30.5	0.69	0.86	1.16	35.3
West: Cambrian Road												
10	L2	263	3.0	1.097	84.0	LOS F	56.3	408.2	1.00	2.98	5.22	16.1
11	T1	521	3.0	1.097	84.0	LOS F	56.3	408.2	1.00	2.98	5.22	13.6
12	R2	68	17.0	1.097	84.3	LOS F	56.3	408.2	1.00	2.98	5.22	13.3
Approach		852	4.1	1.097	84.0	LOS F	56.3	408.2	1.00	2.98	5.22	14.4
All Vehicles		2445	3.9	1.514	116.9	LOS F	90.9	648.3	0.93	2.82	6.30	10.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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\Cambrian Greenbank 20210408.sip8

DEGREE OF SATURATION

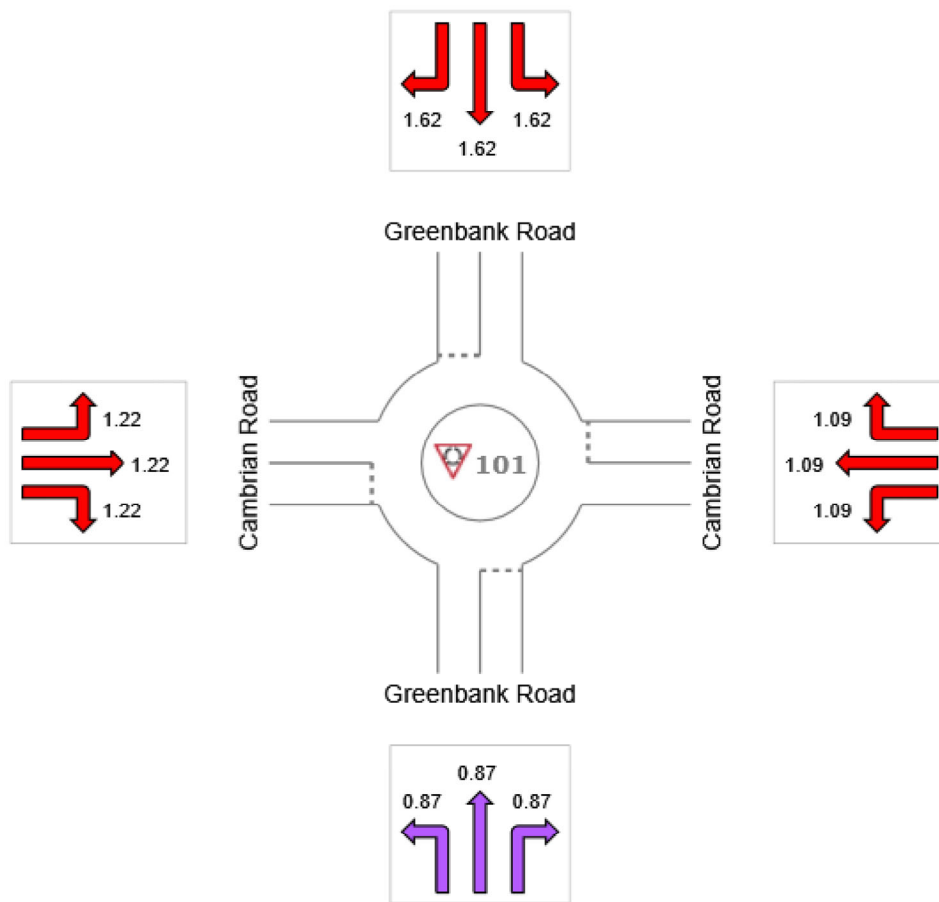
Ratio of Demand Volume to Capacity, v/c ratio per movement

 **Site: 101 [Cambrian and Greenbank 2028 FT PM]**

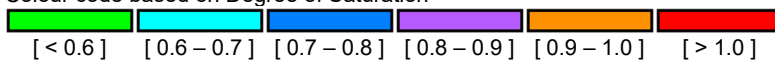
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.87	1.09	1.62	1.22	1.62



Colour code based on Degree of Saturation



DELAY (CONTROL)

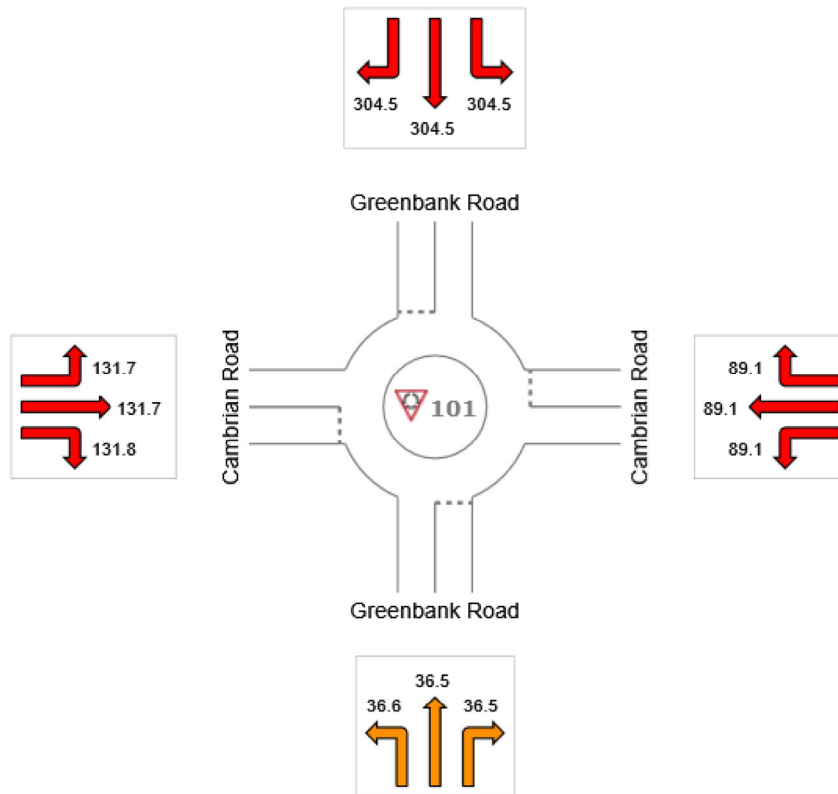
Average control delay per vehicle, or average pedestrian delay (seconds)

 **Site: 101 [Cambrian and Greenbank 2028 FT PM]**

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	36.5	89.1	304.5	131.7	158.9
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

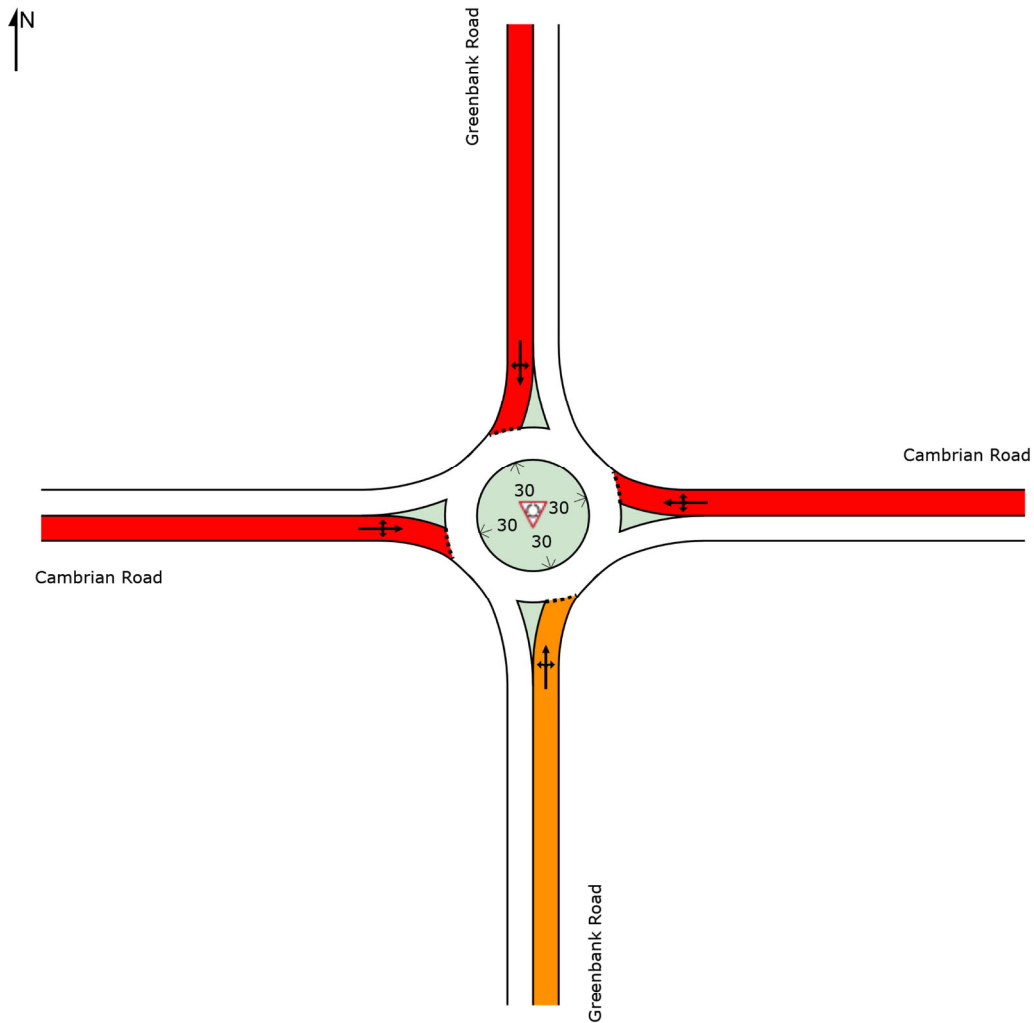
LANE LEVEL OF SERVICE

Lane Level of Service

 **Site: 101 [Cambrian and Greenbank 2028 FT PM]**

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FT PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	126	8.0	0.872	36.6	LOS E	14.1	101.8	0.95	1.54	2.66	23.5
2	T1	298	2.0	0.872	36.5	LOS E	14.1	101.8	0.95	1.54	2.66	24.4
3	R2	128	2.0	0.872	36.5	LOS E	14.1	101.8	0.95	1.54	2.66	19.8
Approach		552	3.4	0.872	36.5	LOS E	14.1	101.8	0.95	1.54	2.66	23.2
East: Cambrian Road												
4	L2	146	2.0	1.091	89.1	LOS F	37.6	267.8	1.00	2.84	5.80	11.1
5	T1	419	2.0	1.091	89.1	LOS F	37.6	267.8	1.00	2.84	5.80	13.0
6	R2	95	2.0	1.091	89.1	LOS F	37.6	267.8	1.00	2.84	5.80	13.4
Approach		660	2.0	1.091	89.1	LOS F	37.6	267.8	1.00	2.84	5.80	12.6
North: Greenbank Road												
7	L2	75	2.0	1.617	304.5	LOS F	127.3	906.7	1.00	5.27	14.17	4.8
8	T1	480	2.0	1.617	304.5	LOS F	127.3	906.7	1.00	5.27	14.17	4.8
9	R2	381	2.0	1.617	304.5	LOS F	127.3	906.7	1.00	5.27	14.17	5.6
Approach		936	2.0	1.617	304.5	LOS F	127.3	906.7	1.00	5.27	14.17	5.1
West: Cambrian Road												
10	L2	221	2.0	1.217	131.7	LOS F	68.5	489.5	1.00	3.82	7.75	11.5
11	T1	405	2.0	1.217	131.7	LOS F	68.5	489.5	1.00	3.82	7.75	9.6
12	R2	207	4.0	1.217	131.8	LOS F	68.5	489.5	1.00	3.82	7.75	9.5
Approach		833	2.5	1.217	131.7	LOS F	68.5	489.5	1.00	3.82	7.75	10.1
All Vehicles		2981	2.4	1.617	158.9	LOS F	127.3	906.7	0.99	3.64	8.39	8.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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\Cambrian Greenbank 20210408.sip8

DEGREE OF SATURATION

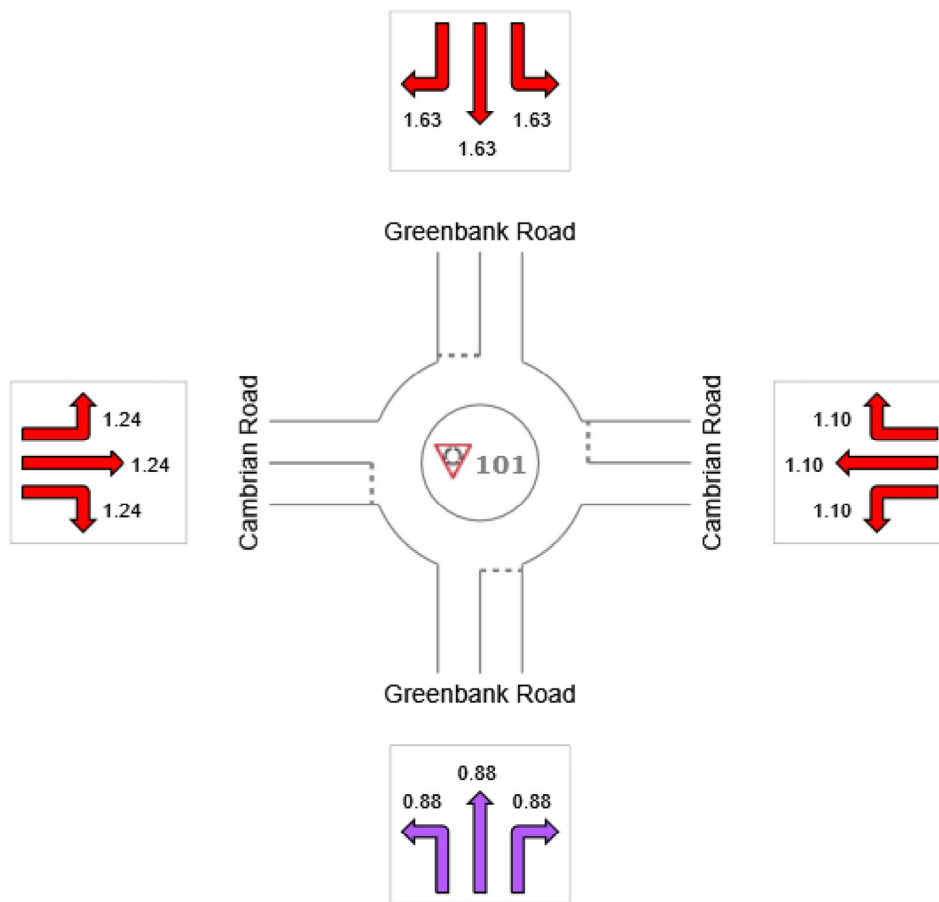
Ratio of Demand Volume to Capacity, v/c ratio per movement

 **Site: 101 [Cambrian and Greenbank 2028 FT Sat]**

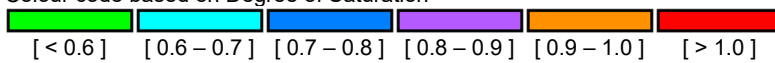
New Site
 Site Category: (None)
 Roundabout

All Movement Classes

Degree of Saturation	Approaches				Intersection
	South	East	North	West	
Degree of Saturation	0.88	1.10	1.63	1.24	1.63



Colour code based on Degree of Saturation



DELAY (CONTROL)

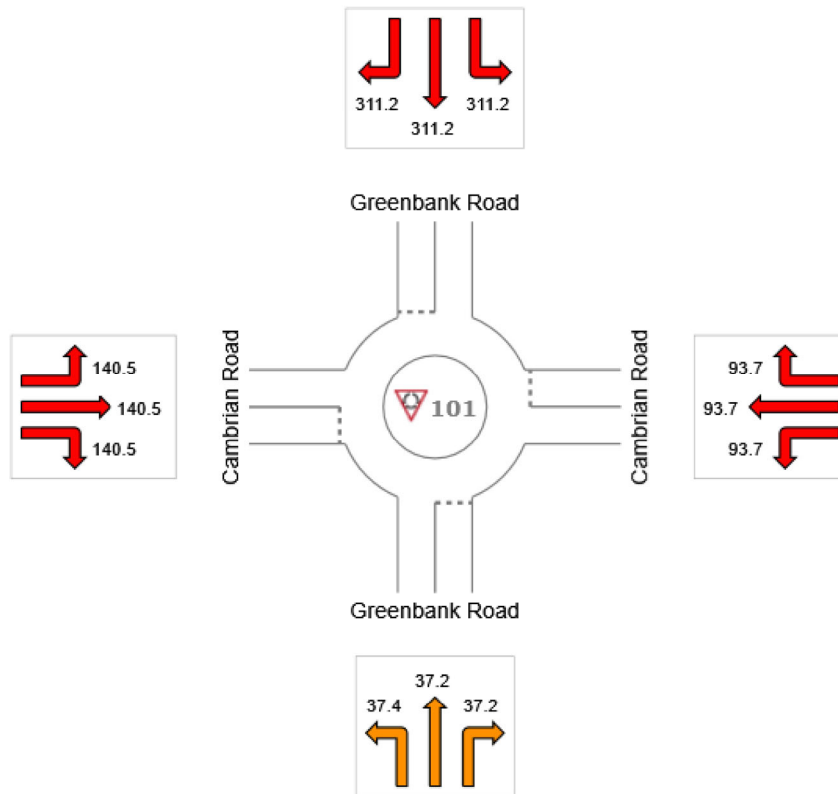
Average control delay per vehicle, or average pedestrian delay (seconds)

 Site: 101 [Cambrian and Greenbank 2028 FT Sat]

New Site
 Site Category: (None)
 Roundabout

All Movement Classes

	Approaches				Intersection
	South	East	North	West	
Delay (Control)	37.3	93.7	311.2	140.5	164.2
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

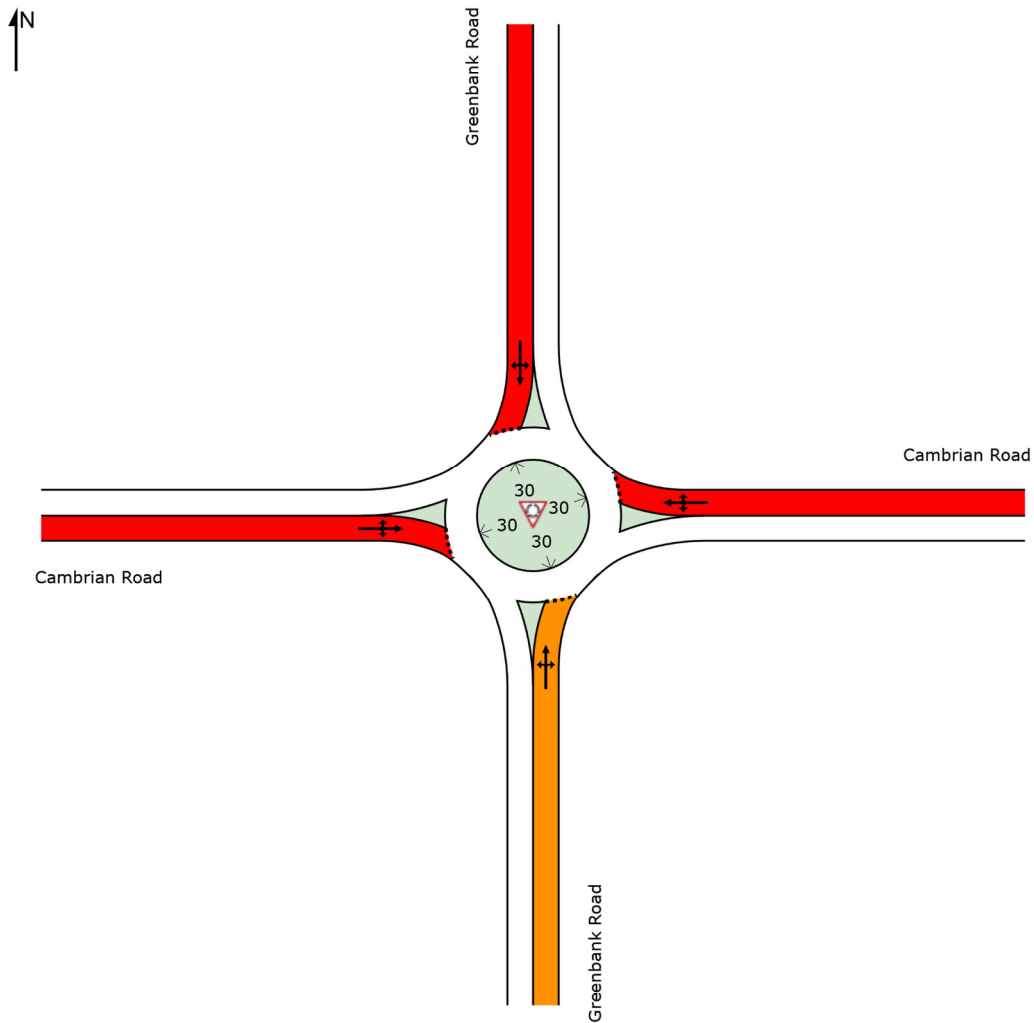
LANE LEVEL OF SERVICE

Lane Level of Service

 Site: 101 [Cambrian and Greenbank 2028 FT Sat]

New Site
 Site Category: (None)
 Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	E	F	F	F	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Roundabout Level of Service Method: Same as Sign Control

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

MOVEMENT SUMMARY

 Site: 101 [Cambrian and Greenbank 2028 FT Sat]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Greenbank Road												
1	L2	138	8.0	0.877	37.4	LOS E	14.5	104.9	0.95	1.56	2.71	23.2
2	T1	290	2.0	0.877	37.2	LOS E	14.5	104.9	0.95	1.56	2.71	24.1
3	R2	128	2.0	0.877	37.2	LOS E	14.5	104.9	0.95	1.56	2.71	19.6
Approach		556	3.5	0.877	37.3	LOS E	14.5	104.9	0.95	1.56	2.71	22.9
East: Cambrian Road												
4	L2	146	2.0	1.104	93.7	LOS F	39.3	279.6	1.00	2.93	6.04	10.7
5	T1	422	2.0	1.104	93.7	LOS F	39.3	279.6	1.00	2.93	6.04	12.5
6	R2	95	2.0	1.104	93.7	LOS F	39.3	279.6	1.00	2.93	6.04	12.9
Approach		663	2.0	1.104	93.7	LOS F	39.3	279.6	1.00	2.93	6.04	12.2
North: Greenbank Road												
7	L2	75	2.0	1.632	311.2	LOS F	128.8	917.4	1.00	5.31	14.36	4.7
8	T1	468	2.0	1.632	311.2	LOS F	128.8	917.4	1.00	5.31	14.36	4.7
9	R2	393	2.0	1.632	311.2	LOS F	128.8	917.4	1.00	5.31	14.36	5.5
Approach		936	2.0	1.632	311.2	LOS F	128.8	917.4	1.00	5.31	14.36	5.0
West: Cambrian Road												
10	L2	229	2.0	1.240	140.5	LOS F	74.2	530.6	1.00	3.98	8.08	10.9
11	T1	407	2.0	1.240	140.5	LOS F	74.2	530.6	1.00	3.98	8.08	9.1
12	R2	223	4.0	1.240	140.5	LOS F	74.2	530.6	1.00	3.98	8.08	9.0
Approach		859	2.5	1.240	140.5	LOS F	74.2	530.6	1.00	3.98	8.08	9.6
All Vehicles		3014	2.4	1.632	164.2	LOS F	128.8	917.4	0.99	3.72	8.59	8.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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\Cambrian Greenbank 20210408.sip8

Appendix U

Painted Left-Turn Lanes Conceptual Drawing



Notes:

A	description	by	xx/xx/xx
REV	DESCRIPTION	BY	DATE
STATUS: Draft			

CGH Transportation
 13 Markham Ave
 Ottawa, ON
 K2G 3Z1
 (343) 999-9117

CLIENT: Metro Ontario Inc.
 25 Vickers Road Building A, 2nd Floor
 Etobicoke, ON
 M9B 1C1

ARCHITECT: RLA Architecture
 56 Beech Street
 Ottawa, ON
 K1S 3J6

SITE: Cambrian Road at
 Seeley's Bay Road

TITLE: Left-Turn Lanes

SCALE AT A3: scale	DATE: 2020-08-19	DRAWN: JK	CHECKED: MC
PROJECT NO: 2019-54	DRAWING NO: 001	REVISION: -	