Kresin Engineering Corporation

Traffic Impact Study

0 Chippewa Avenue Development

B001618

CIMA+ file number: B001618
04 01 2024 – Review 1.0

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1. Introduction and Background

CIMA+ was retained by Kresin Engineering to undertake a Traffic Impact Study (TIS) as part of a development application for a 363-unit mixed use development at 0 Chippewa Street with direct access to Chippewa Street, Atwater Street, and Amherst Street as shown in **Figure 1**. The proposed development is located on the northwest corner of the City of Sault Ste. Marie (the City) and is planned to include mostly residential homes and a retail store.

The study objective is to determine the expected traffic volumes to be generated by the proposed development during the AM, and PM peak hours, and to assess the impact of development traffic on the surrounding transportation network. Finally, mitigation measures will be recommended to accommodate the projected development traffic if the operational analysis indicates they are necessary.

The content of this TIS follows the approach and methodology presented in the Terms of Reference (TOR) submitted to the City for review on March 27th, 2023. **Appendix A** contains the TOR documentation.

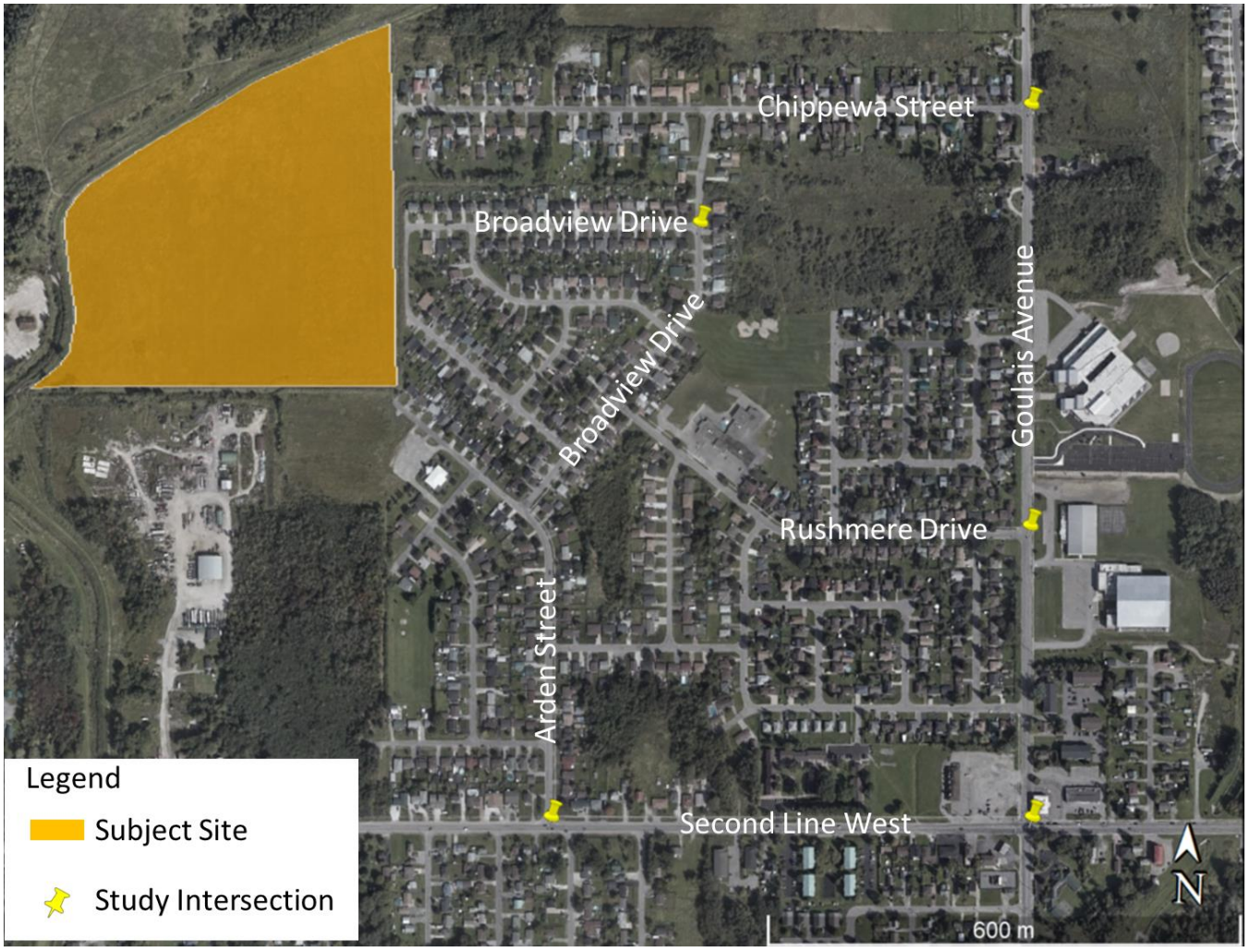


Figure 1: Proposed Development Area Map

1.1 Study Area

Figure 1 illustrates the subject site along with the surroundings lands, which together, represents the study area. The subject site is located adjacent to residential neighbourhoods.

Second Line West is classified as a major urban arterial in the City's Transportation Master Plan, with a posted speed limit of 60 km/h. Within the study area Second Line West is a two-lane road (one lane per direction) oriented in an east-west direction. The only other non-local road in the study area is Goulais Avenue, which is classified as an urban collector road with posted speed of 50 km/h. Goulais Avenue is currently a 4-lane road (two lanes per direction) however, we are aware that the City is currently investigating the implementation of a road diet. At the time of this TIS, there is no formal standing for the road diet and for this reason Goulais Avenue will maintain its current configuration for all future scenarios.

The following intersections were analyzed as part of the road network impacted by the proposed development:

- Chippewa Street and Goulais Avenue (Unsignalized)
- Atwater Street and Broadview Drive (Unsignalized)
- Rushmere Drive and Goulais Avenue (Unsignalized)
- Arden Street and Second Line West (Unsignalized), and
- Goulais Avenue and Second Line West (Signalized).

The turning movement count (TMC) provided by the City, for Goulais Avenue and Second Line West was conducted in October 2022. TMCs for the other four intersections were provided by Kresin Engineering and conducted on December 14th, 2023. It should be noted that for another CIMA assignment, a TMC was provided for Goulais Avenue and Second Line West. The TMC was conducted by the City on December 15th 2023and its volumes were found to have greater similarity to the Kresin TMCs compared to the TMC conducted in October 2022. For this study, the December 2023 TMC at Goulais Avenue and Second Line West was used. The existing traffic counts are provided in **Appendix B**.

1.2 Development Context

The proposed mixed used development is bounded by Chippewa Street and Broadview Street to the east, a construction yard to the south and a creek to the north and west. Accesses are provided via Chippewa Street, Atwater Street, and Amherst Street. **Figure 2** and **Appendix C** showcase the site plan. Through consultations with Kresin Engineering, Parcel A, comprising of detached homes, semi-detached homes and a plaza, is expected to be fully built out by 2035 while Parcel B and C comprising of town homes, apartments, an amenity building, and a park are expected to be fully built out by 2032.

DESCRIPTION		BLOCK/MODEL NAME	NO. OF UNIT	PARKING
TOTAL PROPOSED UNITS	PARCEL - A	DETACH HOMES	65	65
		SEMI DETACH HOMES	16	16
	PARCEL - B ADULT COMMUNITY LIFE STYLE	TOWN HOMES	102	102
	PARCEL - C SENIOR'S COMMUNITY	APARTMENTS (2 BUILDINGS X 90)	180	57 (SURFACE PARKING)
				123 (UNDER GROUND PARKING)
		VISITOR PARKING		15
		PLAZA PARKING		10
		TOTAL	363	398

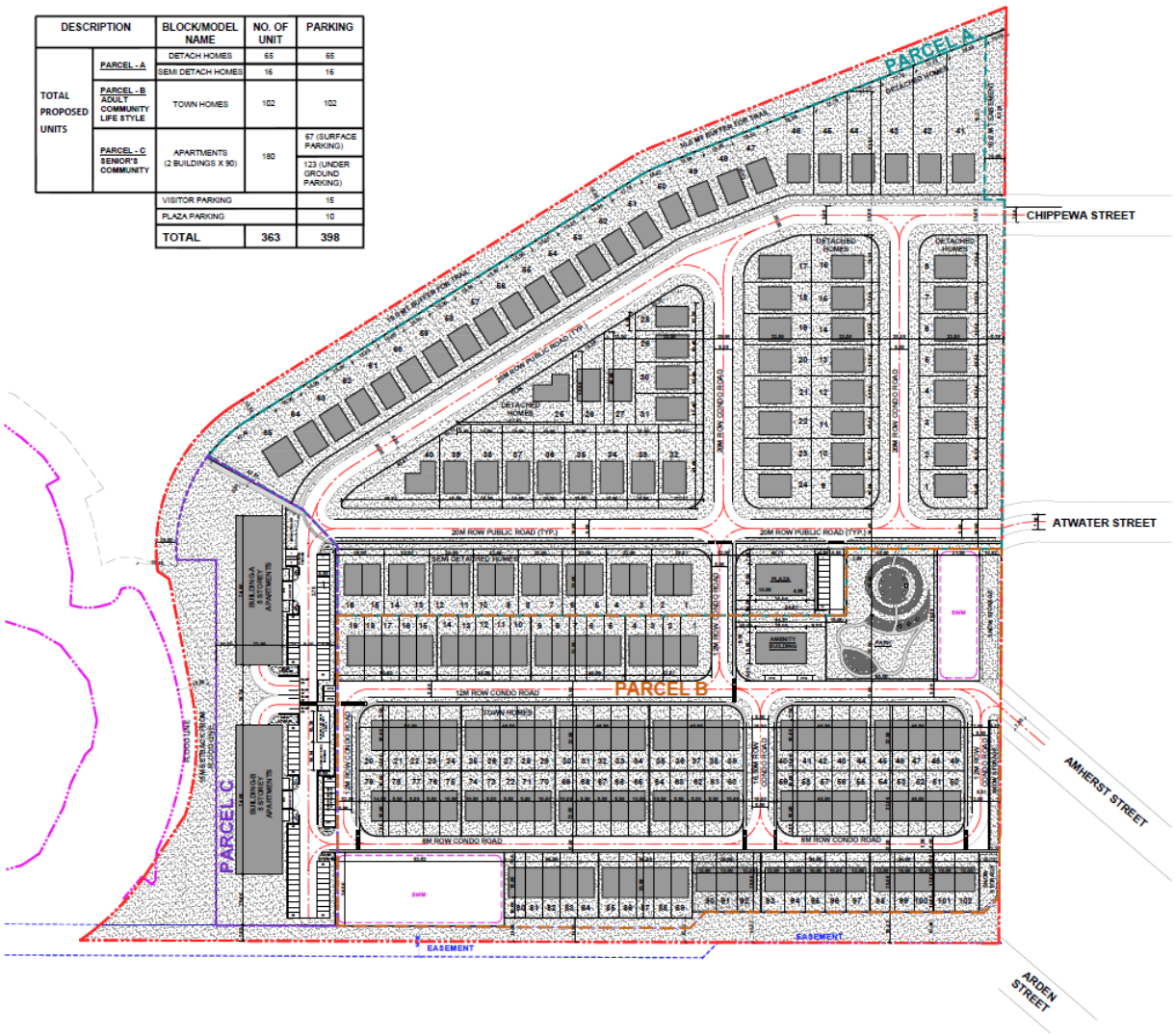


Figure 2: Site Plan

2. Study Methodology

2.1 Horizon Years

This study evaluates existing and future traffic operations at study area intersections for the weekday AM peak hour, and weekday PM peak hour. The development is expected to be built in phases. The horizon year for the completion of each phase was selected to fully evaluate the effects of the development on the transportation network.

The study assessed traffic operations under existing (2023) conditions and the following future horizon years:

- Opening Year for Parcels B and C (2032) Background Conditions;
- Full Build-Out (2035) Background Conditions;
- Opening Year for Parcels B and C Future (2032) Total Conditions; and,
- Full Build-Out Future (2035) Total Conditions.

2.2 Traffic Operational Analysis

Intersection operations were assessed using the Synchro 11 software which utilizes the Highway Capacity Manual (HCM) 2000 methodology published by the Transportation Research Board National Research Council. Synchro 11 can analyze both signalized and unsignalized intersections in a road corridor or network considering the spacing, interaction, queues, and operations between intersections. Intersection operations performance metrics are reported in terms of Level of Service (LOS), volume to capacity (v/c) ratios.

Level of Service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay.

Table 1 summarizes the LOS criteria for signalized and unsignalized intersections.

Table 1: Intersection Level of Service Criteria

Level of Service	Average Control Delay per Vehicle (second/vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	≤10	≤10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

SimTraffic software was used to calculate the 95th percentile queue length to analyze and assess the available storage capacity and whether queue spillback or lane blockages occur due to long queues. The available storage capacity was based on the best available data collected from aerial imagery.

The City does not have a Traffic Impact Study Guidelines. Therefore, for this study, critical movements are established based on the following criteria:

- Level of Service of E or F;
- Volume to Capacity ratio of 1.00 or greater; and
- 95%th percentile queue exceeds the available storage length.

It should be noted that the peak hour factor (PHF) was calculated from the provided turning movement counts (TMC's) and was used for all existing and future scenarios.

3. Existing Conditions

3.1 Collision Data

A collision analysis was conducted to identify any potential safety issues within the study area. The most recent five years' worth of historical collision data was provided by the city. The data provided is dated between January 2018 and May 2023 for the three busiest study area intersections, which are Second Line West & Goulais Avenue, Second Line West & Arden Street and Chippewa Street & Goulais Avenue. This section summarizes the results of the collision data analysis.

Second Line West & Arden Street

The unsignalized T-intersection had only one reported collision. It was a rear-end collision that occurred in June of 2019, during a rain event and one of the drivers was found to be following too close. No collision patterns or safety issues identified.

Chippewa Street & Goulais Avenue

The unsignalized T-intersection had only three reported collisions where two occurred in 2018 and one in 2021. The two 2018 collisions occurred while the roads were snow covered and involved a driver going too fast for road conditions. No collision patterns or safety issues identified.

Second Line West & Goulais Avenue

A total of 42 collisions were reported at Goulais Avenue and Second Line West intersection. The collision data was further examined for patterns that might point to underlying safety issues. The collision summary by severity, prevailing driver action and impact type is shown below in **Table 2**. The following collision characteristics were reviewed to find possible collision patterns:

- Classification
- Prevailing Driver Action
- Prevailing Impact Type
- Lighting
- Environment Conditions
- Road Surface Conditions
- Direction

Table 2: Collision Summary

Intersection	Total	Severity		

		Fatal	Non-Fatal	PDO	Prevailing Driver Action	Prevailing Impact Type
Second Line West and Goulais Avenue	**42 (1 reported as intentional)**	**0**	**3**	**38**	**43% (18/42) Following Too Close**	**52% (22/42) Rear End**

Table 3: Environmental Conditions

Intersection	Lighting		Environment Condition		Road Surface Condition	
	Daylight	Non-daylight	Clear	Other	Dry	Other
Second Line West and Goulais Avenue	**86% (36/42)**	**14% (6/42)**	**88% (37/42)**	**12% (5/42)**	**62% (26/42)**	**52% (22/42) Rear End**

The following collision trends were observed:

- All 18 instances where drivers were following too close resulted in a rear end collision.
- 68% (15/22) of rear end collisions occurred during dry road conditions.
- Westbound vehicles were involved in 59% (13/22) of rear end collisions followed by 27% (6/22) for southbound vehicles and only 9% (2/22) for eastbound vehicles and 5% northbound vehicles.
  - Of the 13 westbound vehicles involved in rear end collisions 85% (11/13) occurred during the afternoon between 12:00 and 7:00 PM.

There is a pattern of vehicle heading westbound in the afternoon being involved in rear end collisions.

3.2 Sightline Assessment

Kresin Engineering conducted a sightline analysis for the proposed site access located at Amherst Street. The sightline assessment aimed to determine if the curve of Amherst Street, where a proposed access to the development will be located, may cause any sightline issues as illustrated in **Figure 3**. It should be noted that the sightline analysis was conducted during the winter, and it was difficult to know where the proposed condo road would be located.

Based on the Transportation Association of Canada Geometric Design Guide for Canadian Road (TAC-2017), the required stopping sight distance is 85 metres (based on 60 km/h design speed). The design speed is based on the posted speed plus 10 km/h, where in this case a 50 km/h posted speed is assumed. Additionally, the TAC-2017 manual outlines a recommended 110 metre intersection sight distance based on the design speed.

The sightline assessment results (pictures provided in **Appendix D)**, showcases the minimum sight distance can be achieved based on the existing road profile and configuration. No sightline obstructions were found during the assessment. The pictures show a clear sightline for well over 110 metres looking down Amherst Street.

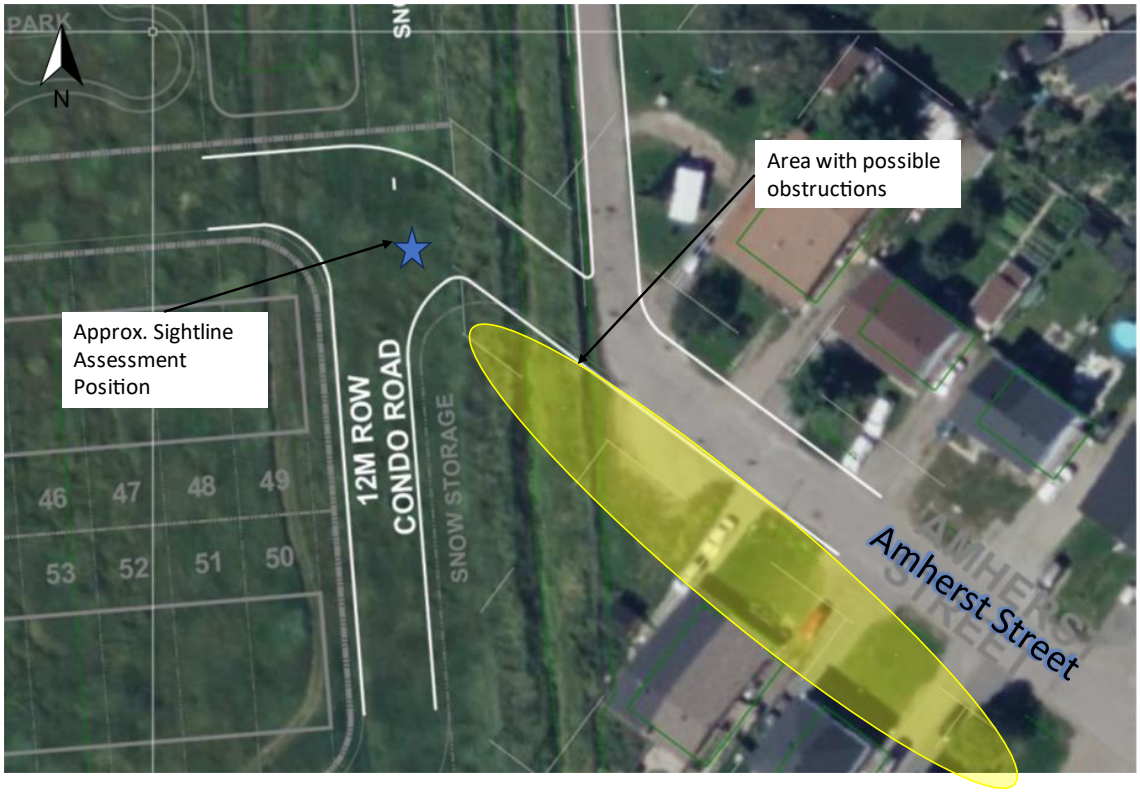


Figure 3: Sightline Assessment

3.3 Traffic Operations

The following section outlines existing conditions. Existing intersection operations were analyzed using the lane configurations illustrated in **Figure 4**.

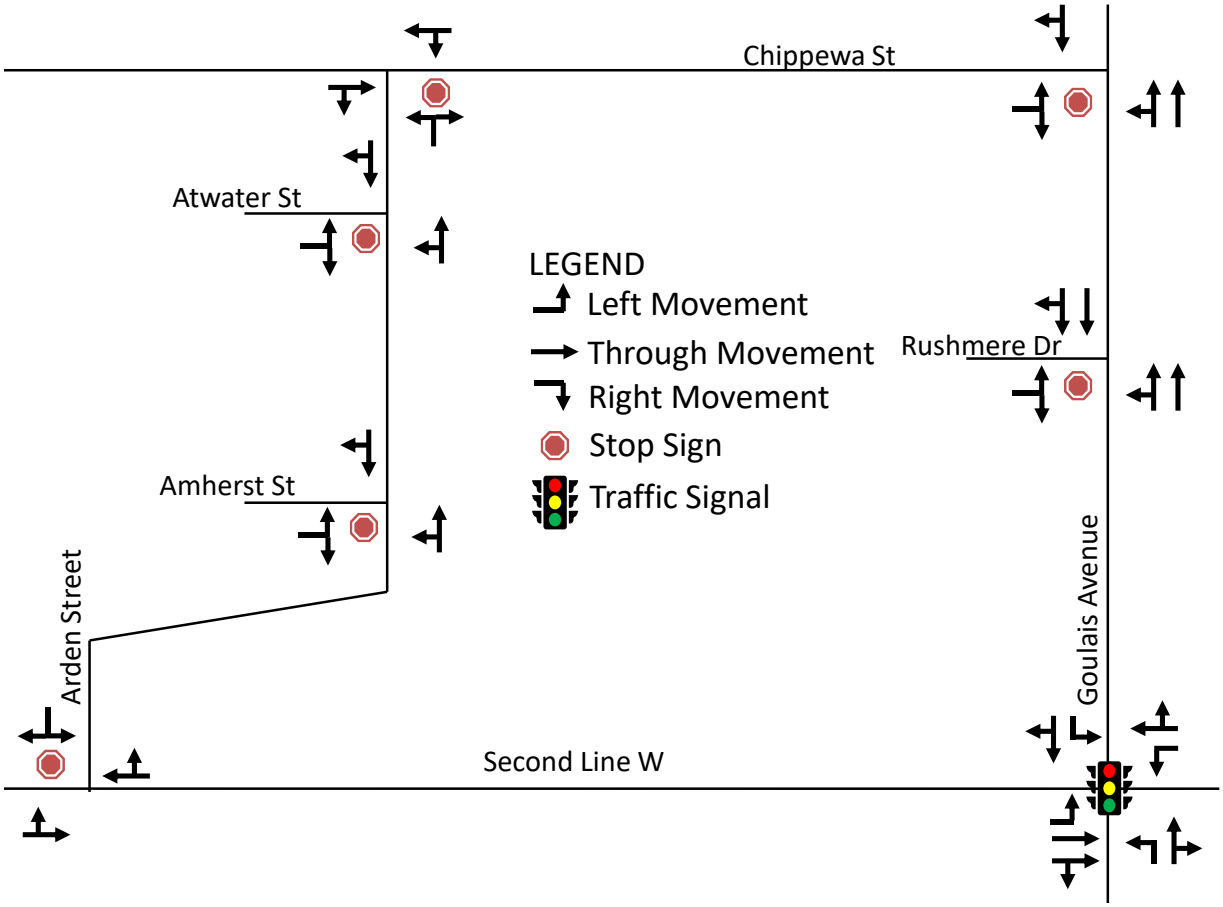


Figure 4: Existing Lane Configuration

As previously mentioned in Section 1.1, CIMA+ received the collection of turning movement counts (TMC) for the study area network from the City and Kresin Engineering.

Volume balancing was conducted due to the TMCs being conducted on different days. As a conservative approach, the balancing resulted in additional volume to be place on the through movements along Goulais Avenue. Volume balancing was only necessary for the PM peak hour with the goal of maintaining a similar ratio of leaving and departing volumes between the three study area intersections along Goulais Avenue. This resulted in vehicles being added to the northbound and southbound through movements for Chippewa Street & Goulais Avenue and Rushmere Drive & Goulais Avenue intersections. The resulting volume balanced existing traffic volumes are shown in **Figure 5**.

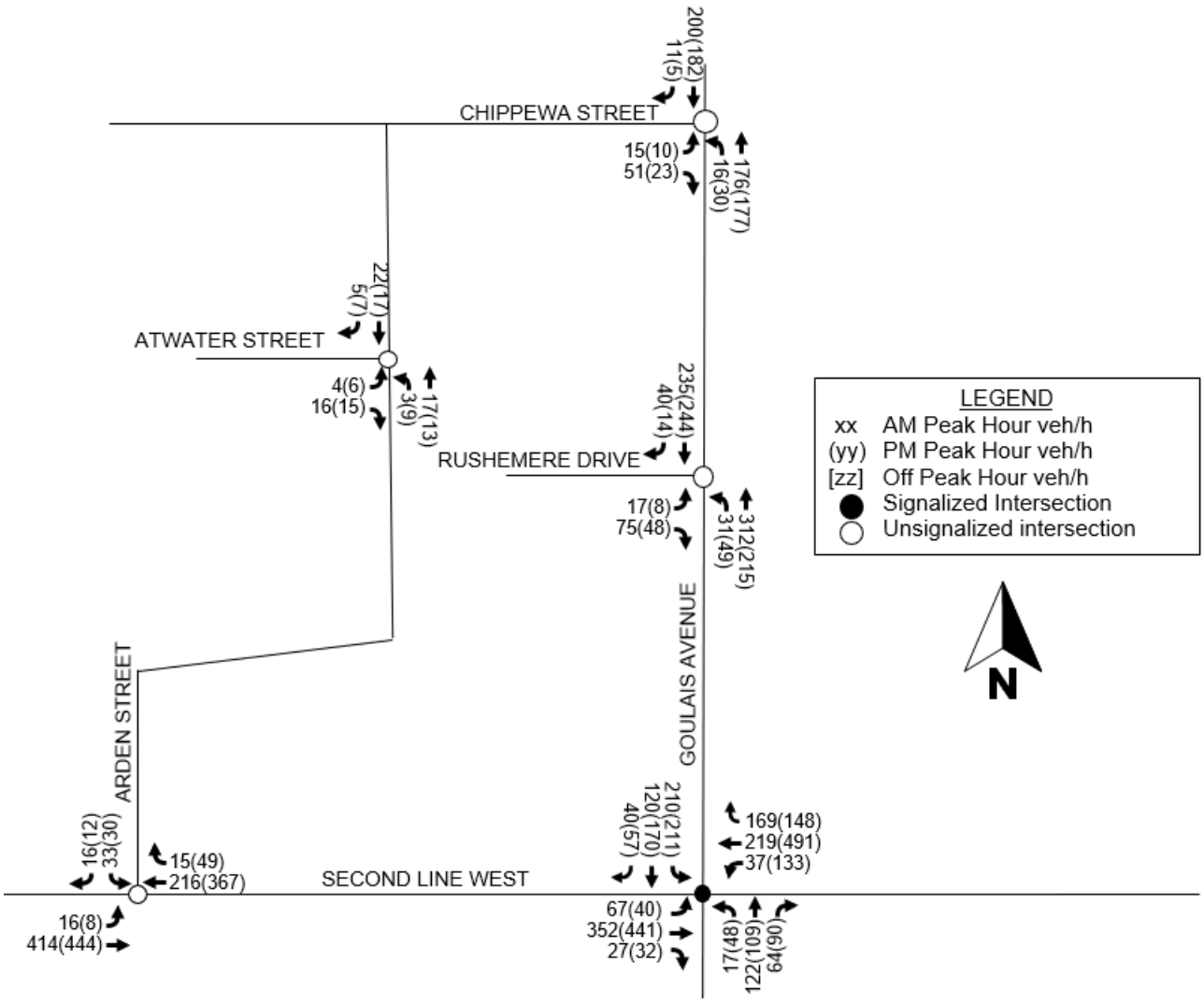


Figure 5: Existing 2023 Volume

Traffic operations were analyzed using Synchro 11 and SimTraffic software. Volume to capacity ratio (v/c), level of service (LOS) and delay, and 95th percentile queues were reviewed. The results are summarized in **Table 4**. It should be noted that the available storage capacity is based on aerial imagery to measure storage lane length. Synchro and SimTraffic outputs are available in **Appendix E**.

Table 4: Existing 2023 Traffic Operations

Direction / Movement		Storage (m)	v/c	Delay	LOS	95%ile Queue (m)
Goulais Avenue at Second Line W (Signalized)						
EB	L	75	0.17 (0.20)	11 (14)	B (B)	23 (21)
	TR	>500	0.22 (0.28)	11 (11)	B (B)	33 (44)
WB	L	>950	0.09 (0.37)	15 (19)	B (B)	13 (62)
	TR	>950	0.53 (0.86)	21 (34)	C (C)	67 (163)
NB	L	45	0.08 (0.26)	31 (32)	C (C)	16 (27)
	TR	>250	0.56 (0.57)	36 (36)	D (D)	51 (48)
SB	L	>250	0.74 (0.77)	36 (39)	D (D)	52 (49)
	TR	>250	0.29 (0.43)	24 (26)	C (C)	38 (48)
Intersection Summary			**0.62 (0.83)**	**22 (27)**	**C (C)**	**-**
Broadview Drive at Atwater Street (Unsignalized)						
EB	LR	>250	0.02 (0.02)	9 (9)	A (A)	13 (15)
NB	LT	>100	0.00 (0.00)	1 (3)	A (A)	<7 (<7)
SB	TR	>100	0.02 (0.02)	0 (0)	A (A)	<7 (<7)
Goulais Avenue at Chippewa Street (Unsignalized)						
EB	LR	>300	0.11 (0.08)	11 (11)	B (B)	15 (13)
NB	LT	>500	0.08 (0.10)	2 (3)	A (A)	<7 (12)
SB	TR	>500	0.14 (0.16)	0 (0)	A (A)	<7 (<7)
Goulais Avenue at Rushmere Drive (Unsignalized)						
EB	LR	>200	0.15 (0.10)	11 (10)	B (B)	17 (16)
NB	LT	>200	0.14 (0.10)	2 (4)	A (A)	9 (10)
SB	TR	>300	0.10 (0.11)	0 (0)	A (A)	<7 (<7)
Arden Street at Second Line W (Unsignalized)						
EB	TR	>500	0.02 (0.01)	1 (0)	A (A)	9 (12)
WB	TR	>500	0.19 (0.27)	0 (0)	A (A)	<7 (15)
SB	LR	>200	0.16 (0.18)	16 (20)	C (C)	18 (17)

Legend: AM (PM)

The results indicate that all movements are operating at an acceptable level of service. All 95th percentile queues can be accommodated within existing storage capacity.

4. Future Background Conditions

Future background traffic volumes were estimated using a 1% compound annual growth rate for the opening year for Parcel B and Parcel C (2032) and the Full Build-Out (2035). It is assumed background developments are accounted for by the growth rate.

4.1 Future Road Improvements

The City does not have any planned road improvements within the study area. However, as previously mentioned in Section 1.1, the City is planning a possible road diet on Goulais Avenue between Second Line West and Chippewa Street. At the time of this TIS, there is no formal standing for the road diet and for this reason Goulais Avenue will maintain its current configuration for all future scenarios.

4.2 2032 Traffic Volume and Operations

The 2032 future background traffic volumes are shown in **Figure 6**.

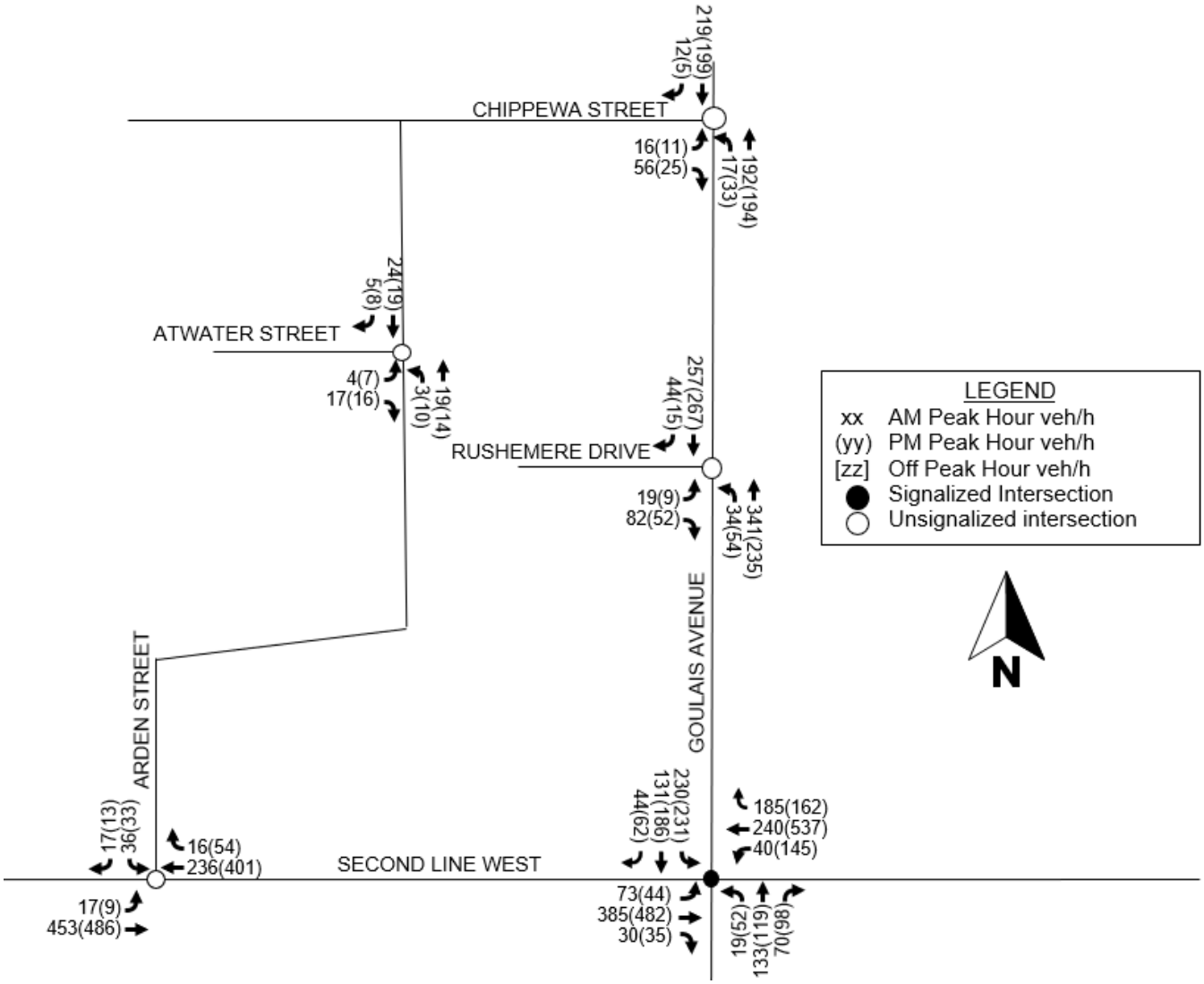


Figure 6: 2032 Future Background Volume

The 2032 future background traffic operations results are summarized in **Table 5**. Synchro and SimTraffic outputs are available in **Appendix G**.

Table 5: 2032 Future Background Traffic Operations

Direction / Movement		Storage (m)	v/c	Delay	LOS	95%^{ile} Queue (m)
Goulais Avenue at Second Line W (Signalized)						
EB	L	75	0.20 (0.29)	11 (17)	B (B)	27 (21)
	TR	>500	0.24 (0.31)	11 (12)	B (B)	40 (46)
WB	L	>950	0.11 (0.43)	16 (20)	B (C)	15 (71)
	TR	>950	0.59 (0.96)	23 (47)	C (D)	72 (206)
NB	L	45	0.10 (0.28)	30 (32)	C (C)	16 (28)
	TR	>250	0.60 (0.61)	36 (37)	D (D)	63 (62)
SB	L	>250	0.83 (0.86)	45 (51)	D (D)	56 (53)
	TR	>250	0.32 (0.46)	24 (25)	C (C)	42 (59)
Intersection Summary			**0.69 (0.93)**	**24 (33)**	**C (C)**	**-**
Broadview Drive at Atwater Street (Unsignalized)						
EB	LR	>250	0.03 (0.03)	9 (9)	A (A)	13 (14)
NB	LT	>100	0.00 (0.01)	1 (3)	A (A)	<7 (<7)
SB	TR	>100	0.02 (0.02)	0 (0)	A (A)	<7 (<7)
Goulais Avenue at Chippewa Street (Unsignalized)						
EB	LR	>300	0.12 (0.10)	11 (12)	B (B)	14 (12)
NB	LT	>500	0.08 (0.11)	2 (3)	A (A)	8 (12)
SB	TR	>500	0.15 (0.17)	0 (0)	A (A)	<7 (<7)
Goulais Avenue at Rushmere Drive (Unsignalized)						
EB	LR	>200	0.17 (0.11)	11 (11)	B (B)	17 (16)
NB	LT	>200	0.15 (0.10)	2 (4)	A (A)	11 (11)
SB	TR	>300	0.11 (0.12)	0 (0)	A (A)	<7 (<7)
Arden Street at Second Line W (Unsignalized)						
EB	TR	>500	0.02 (0.01)	1 (0)	A (A)	8 (24)
WB	TR	>500	0.20 (0.30)	0 (0)	A (A)	<7 (18)
SB	LR	>200	0.18 (0.22)	18 (23)	C (C)	18 (18)

Legend: AM (PM)

The results indicate that all study area intersections are expected to operate well. The individual movements are also expected to operate at an acceptable LOS D or better. All 95th percentile turning movement queues are expected to be able to be accommodated within the existing storage capacity. However, 95th percentile westbound through/right queue at Goulais Avenue and Second Line West is expected to extend to the Walters Street intersection, 200 metres upstream during the PM peak hour.

4.3 2035 Traffic Volume and Operations

The 2035 future background traffic volumes are shown in **Figure 7**.

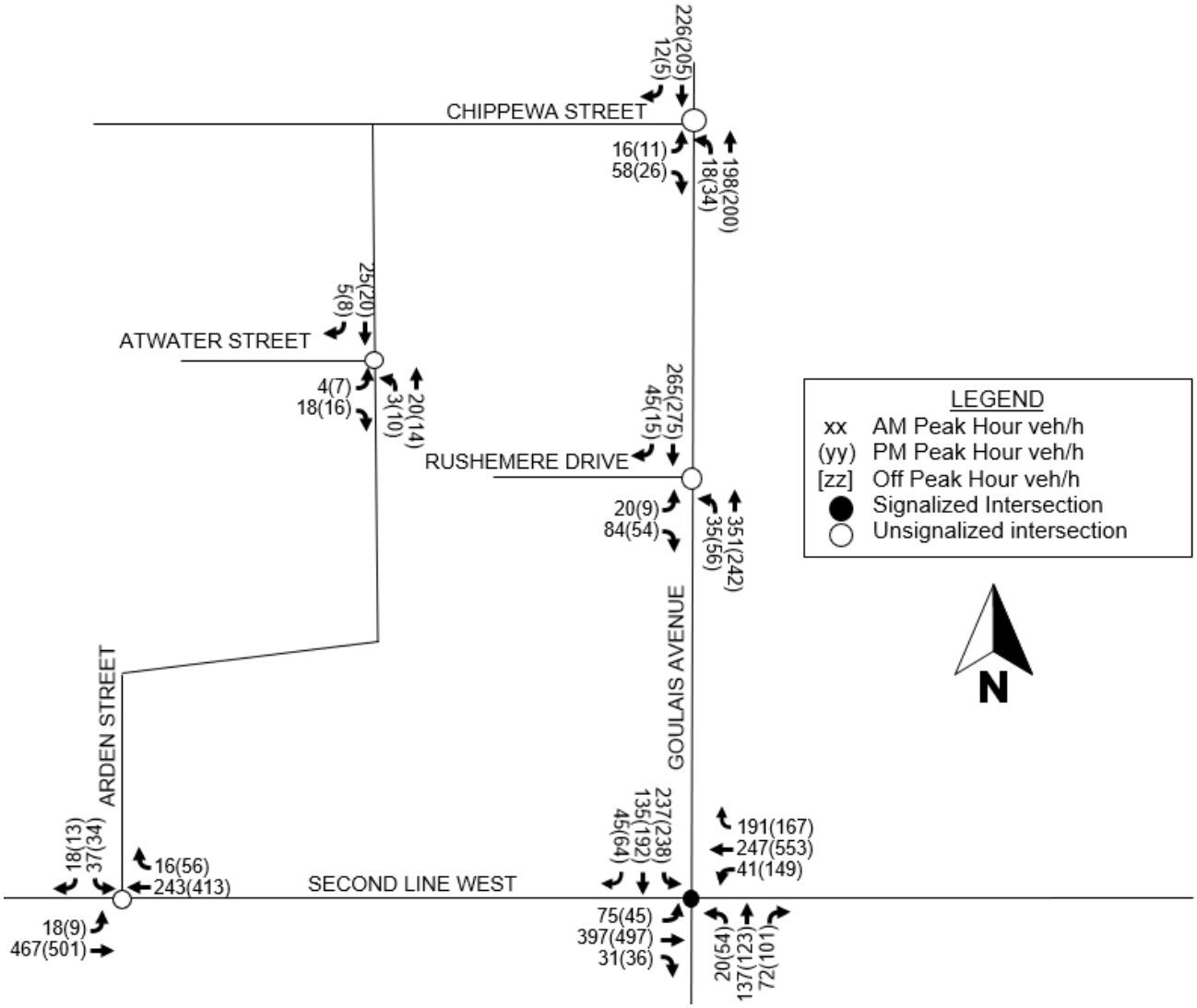


Figure 7: 2035 Future Background Volume

The 2035 future background traffic operations results are summarized in **Table 6**. Synchro and SimTraffic outputs are available in **Appendix H**.

Table 6: 2035 Future Background Traffic Operations

Direction / Movement		Storage (m)	v/c	Delay	LOS	95%^{ile} Queue (m)
Goulais Avenue at Second Line W (Signalized)						
EB	L	75	0.22 (0.31)	12 (18)	B (B)	26 (22)
	TR	>500	0.25 (0.32)	11 (12)	B (B)	41 (48)
WB	L	>950	0.11 (0.45)	16 (21)	B (C)	17 (138)
	TR	>950	0.61 (0.99)	23 (55)	C (D)	70 (320)
NB	L	45	0.10 (0.29)	30 (32)	C (C)	20 (30)
	TR	>250	0.61 (0.63)	37 (37)	D (D)	61 (61)
SB	L	>250	0.86 (0.90)	50 (57)	D (E)	62 (50)
	TR	>250	0.33 (0.48)	24 (25)	C (C)	44 (56)

Intersection Summary			**0.72 (0.96)**	**25 (36)**	**C (D)**	**-**
Broadview Drive at Atwater Street (Unsignalized)						
EB	LR	>250	0.03 (0.03)	9 (9)	A (A)	14 (15)
NB	LT	>100	0.00 (0.01)	1 (3)	A (A)	<7 (<7)
SB	TR	>100	0.02 (0.02)	0 (0)	A (A)	<7 (<7)
Goulais Avenue at Chippewa Street (Unsignalized)						
EB	LR	>300	0.13 (0.10)	11 (12)	B (B)	17 (13)
NB	LT	>500	0.09 (0.11)	2 (3)	A (A)	11 (11)
SB	TR	>500	0.16 (0.18)	0 (0)	A (A)	<7 (<7)
Goulais Avenue at Rushmere Drive (Unsignalized)						
EB	LR	>200	0.18 (0.11)	11 (11)	B (B)	18 (18)
NB	LT	>200	0.16 (0.11)	2 (4)	A (A)	10 (12)
SB	TR	>300	0.12 (0.13)	0 (0)	A (A)	<7 (<7)
Arden Street at Second Line W (Unsignalized)						
EB	TR	>500	0.02 (0.01)	1 (0)	A (A)	10 (17)
WB	TR	>500	0.21 (0.31)	0 (0)	A (A)	<7 (14)
SB	LR	>200	0.20 (0.23)	18 (24)	C (C)	18 (17)

Legend: AM (PM)

The results indicate that all study area intersections are expected to operate well. The individual movements are also expected to operate at an acceptable LOS D or better except for the southbound left-turn movement at Goulais Avenue and Second Line West during the PM peak hour, which is expected to operate at LOS E.

All 95th percentile turning movement queues are expected to be able to be accommodated within the existing storage capacity. However, 95th percentile westbound through/right queue at Goulais Avenue and Second Line West is expected to extend well past the Walters Street intersection during the PM peak hour.

5. Future Total Conditions

5.1 Trip Generation

As previously mentioned in Section 1.2, Parcels B and C are expected to be built out by 2032 and Parcel A is expected to be built out by 2035.

The trip generation estimates for Parcel A are based on the Single Family Detached Housing land use code (LUC 210), Single Family Attached Housing (LUC 215), and Variety Store (LUC 814) from the Institute of Transportation Engineers (ITE), Trip Generation Manual (11th Edition).

The trip generation estimates for Parcels B and C are based on the Multifamily Housing (Low-Rise) land use code (LUC 220), Multifamily Housing (Mid-Rise) (LUC 221), Public Park (LUC 411), and Utility Building (LUC 170) from the ITE, Manual.

The projected trip generation for the proposed development during the weekday AM and PM peak hours is summarized in **Table 7** for Parcel A and **Table 8** Parcel B.

Table 7: Parcel A Trip Generation Summary

ITE Land Use	Units/GFA	Parameter	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Single Family Detached Housing (ITE LU Code 210)	65	Equation	T=0.71(x)+7.23			Ln(T)=0.93 Ln(x)+0.36		
		Gross Trips	14	39	53	45	25	70
Single Family Attached Housing (ITE LU Code 215)	16	Equation	Ln(T)=0.92 Ln(x)-0.26			Ln(T)=0.88 Ln(x)+0.06		
		Gross Trips	3	7	10	7	5	12
Variety Store (ITE LU Code 814)	4,036.46 ft^2	Equation	Average Rate=4.51			Average Rate=7.42		
		Gross Trips	9	9	18	15	15	30
Total Trips			**26**	**55**	**81**	**67**	**45**	**112**

As detailed in **Table 7**, Parcel A is expected to generate 81 two-way trips during the weekday AM peak hour (26 trips in / 55 trips out) and 112 two-way trips during the weekday PM peak hour (67 trips in / 45 trips out).

Table 8: Parcel B and Parcel C Trip Generation Summary

ITE Land Use	Units/GFA	Parameter	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Multifamily Housing (Low-Rise) (ITE LU Code 220)	102	Equation	T=0.35(x)+28.13			T=0.42(x)+34.78		
		Gross Trips	15	49	64	48	30	78
Multifamily Housing (Mid-Rise) (ITE LU Code 221)	180	Equation	T=0.32(x)+5.84			T=0.32(x)+15.57		
		Gross Trips	16	47	63	44	29	73
Public Park (ITE LU Code 411)	35,224.86 ft^2	Equation	T=0.05(x)+12.67			T=0.08(x)+15.36		
		Gross Trips	9	5	14	7	11	18
Utility (ITE LU Code 170)	4,171.011 ft^2	Equation	Ln(T)=0.67 Ln(x)+1.44			T=2.00(x)+3.49		
		Gross Trips	9	2	11	2	10	12
Total Trips			**49**	**103**	**152**	**101**	**80**	**181**

As detailed in **Table 8**, Parcels B and C are expected to generate 152 two-way trips during the weekday AM peak hour (49 trips in / 103 trips out) and 181 two-way trips during the weekday PM peak hour (101 trips in / 80 trips out).

5.2 Trip Distribution

The trip distribution for the proposed development is based on the existing travel patterns. The resulting trip distribution is summarized in **Table 9**.

Table 9: Trip Distribution Summary

From/To	Via	AM	PM
North	Goulais Avenue	16%	12%
South	Goulais Avenue	27%	15%
East	Second Line West	27%	44%
West	Second Line West	30%	29%
Total		100%	100%

The resulting site generated trips and distribution is illustrated in **Figure 8** and **Figure 9**.

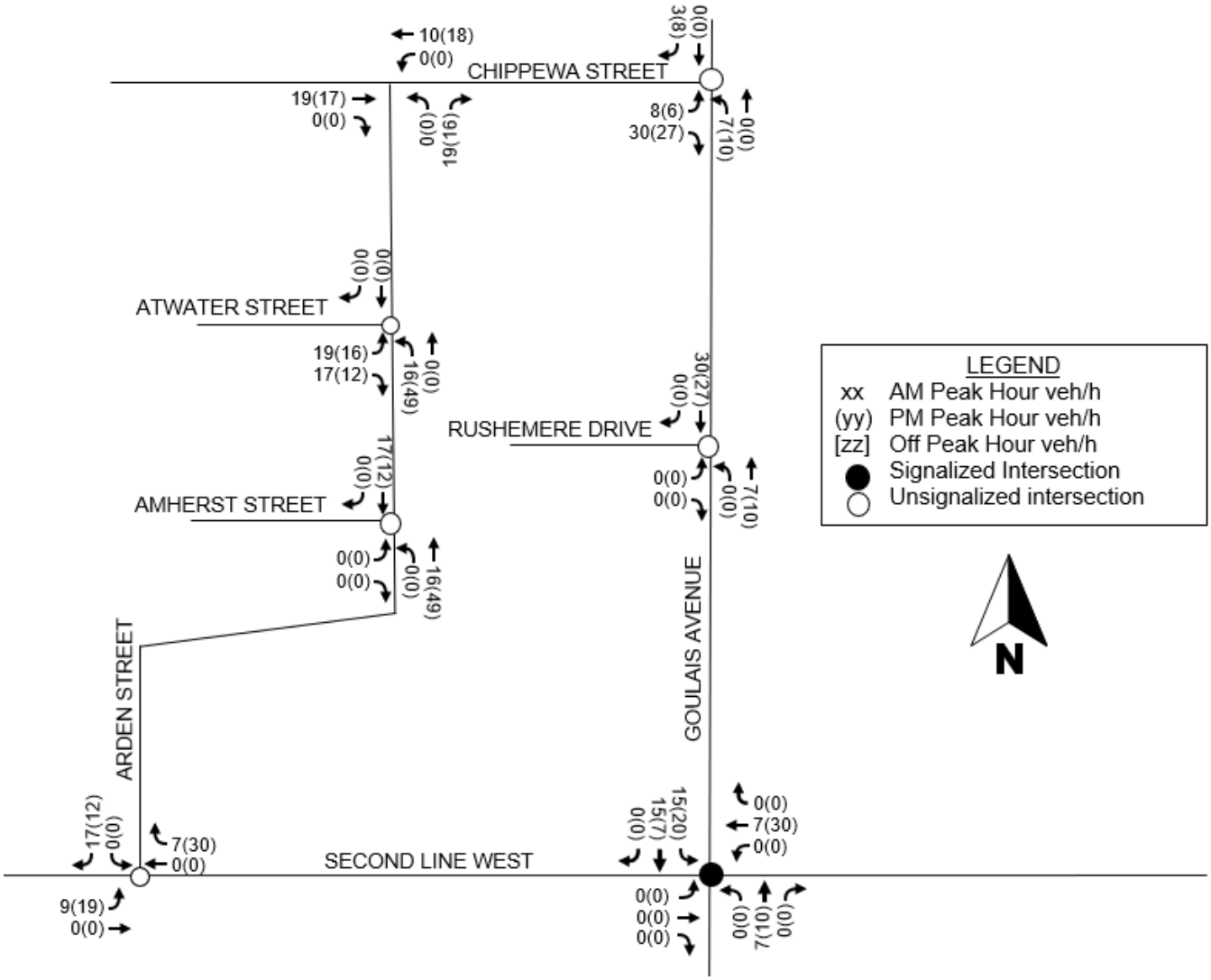


Figure 8: Parcel A Site Traffic

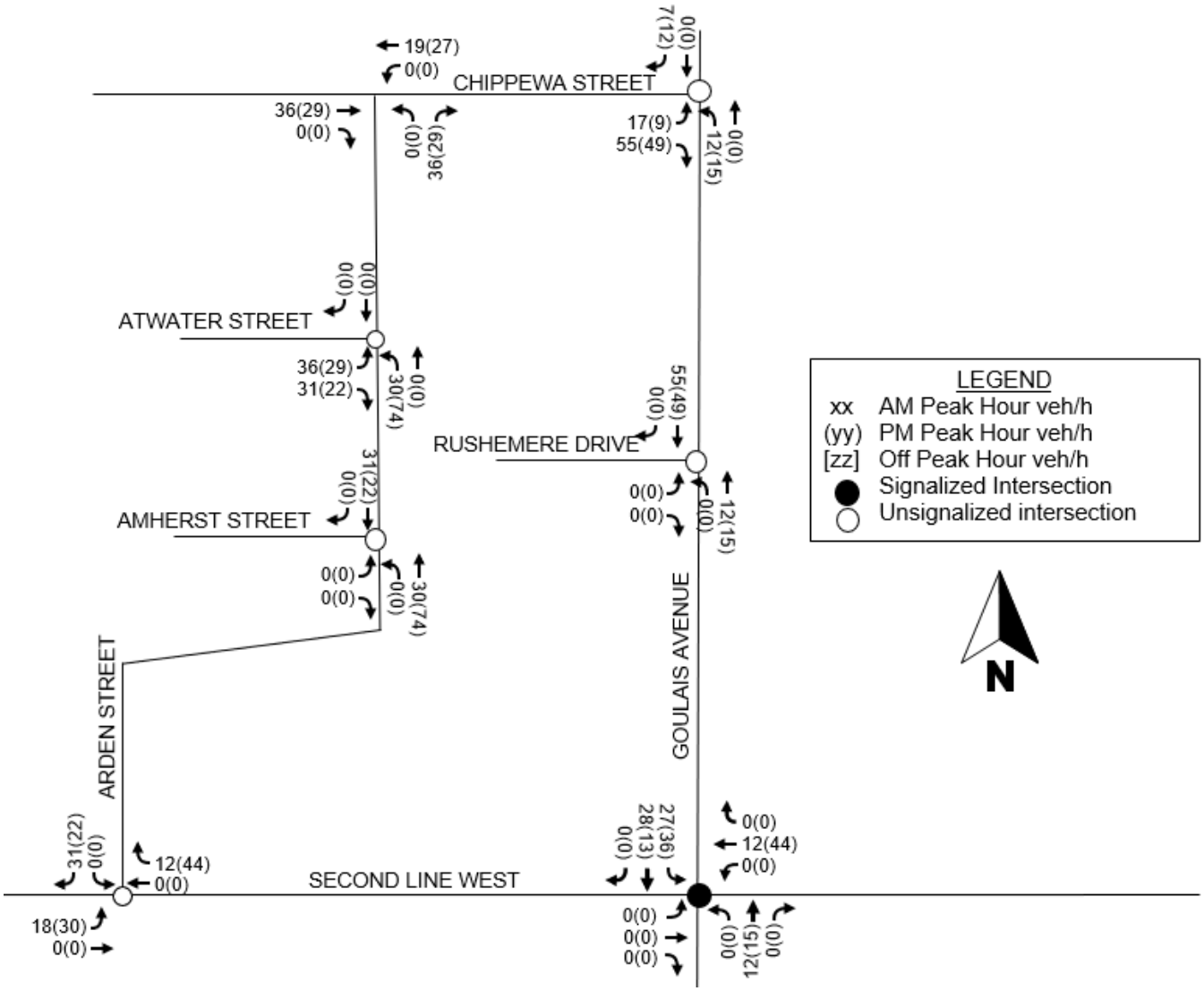


Figure 9: Parcel B and Parcel C Site Traffic

5.3 2032 Future Total Conditions

Traffic operations under future 2032 total conditions were analyzed for the weekday AM and PM peak hours. The traffic operational analysis and results for the future total conditions are discussed in this section.

2032 future total intersection operations were assessed using the existing lane configurations shown in **Figure 4**. The 2032 future total traffic volumes were estimated by adding the Parcel B and Parcel C site traffic (**Figure 9**) to 2032 future background volumes (**Figure 6**) and the resulting 2032 future total traffic volumes are illustrated in **Figure 10**. The operational analysis results are provided in **Table 10** and the Synchro and SimTraffic outputs are provided in **Appendix I**.

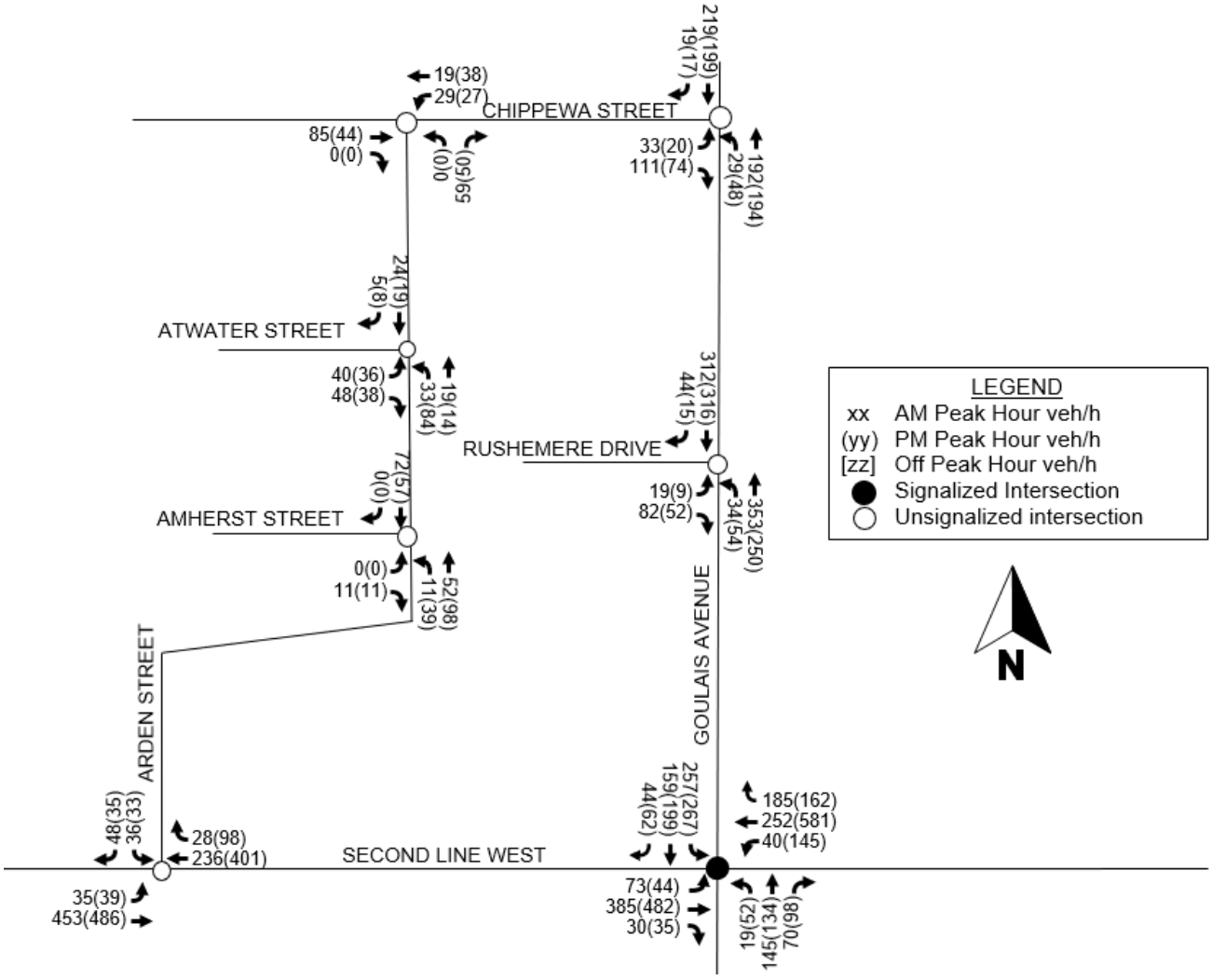


Figure 10: 2032 Future Total Traffic Volumes

Table 10: 2032 Future Total Traffic Operations

Direction / Movement		Storage (m)	v/c	Delay	LOS	95%ile Queue (m)
Goulais Avenue at Second Line W (Signalized)						
EB	L	75	0.21 (0.31)	12 (19)	B (B)	26 (22)
	TR	>500	0.25 (0.31)	11 (12)	B (B)	42 (47)
WB	L	>950	0.11 (0.44)	16 (21)	B (C)	16 (189)
	TR	>950	0.62 (**1.03**)	24 (66)	C (E)	74 (366)
NB	L	45	0.10 (0.27)	30 (31)	C (C)	16 (33)
	TR	>250	0.63 (0.65)	37 (38)	D (D)	61 (65)
SB	L	>250	0.94 (**1.01**)	66 (87)	E (F)	57 (58)
	TR	>250	0.37 (0.48)	24 (25)	C (C)	49 (56)
Intersection Summary			**0.75 (1.03)**	**28 (44)**	**C (D)**	**-**
Broadview Drive at Atwater Street (Unsignalized)						
EB	LR	>250	0.11 (0.13)	10 (10)	A (B)	19 (20)
NB	LT	>100	0.03 (0.07)	5 (7)	A (A)	<7 (8)

SB	TR	>100	0.02 (0.02)	0 (0)	A (A)	<7 (<7)
Goulais Avenue at Chippewa Street (Unsignalized)						
EB	LR	>300	0.25 (0.25)	12 (13)	B (B)	19 (15)
NB	LT	>500	0.08 (0.11)	3 (4)	A (A)	10 (13)
SB	TR	>500	0.16 (0.19)	0 (0)	A (A)	<7 (<7)
Goulais Avenue at Rushmere Drive (Unsignalized)						
EB	LR	>200	0.18 (0.11)	12 (11)	B (B)	17 (17)
NB	LT	>200	0.16 (0.11)	2 (4)	A (A)	11 (14)
SB	TR	>300	0.14 (0.14)	0 (0)	A (A)	<7 (<7)
Arden Street at Second Line W (Unsignalized)						
EB	TR	>500	0.04 (0.04)	1 (1)	A (A)	17 (36)
WB	TR	>500	0.21 (0.33)	0 (0)	A (A)	<7 (19)
SB	LR	>200	0.26 (0.31)	17 (24)	C (C)	22 (20)
Broadview Drive at Amherst Street (Unsignalized)						
EB	LR	>250	0.01 (0.01)	9 (9)	A (A)	8 (8)
NB	LT	>75	0.01 (0.03)	1 (2)	A (A)	<7 (<7)
SB	TR	>450	0.05 (0.04)	0 (0)	A (A)	<7 (<7)
Broadview Drive at Chippewa Street (Unsignalized)						
EB	TR	350	0.05 (0.03)	0 (0)	A (A)	<7 (<7)
WB	LT	350	0.02 (0.02)	5 (3)	A (A)	<7 (<7)
NB	LR	>500	0.07 (0.05)	9 (9)	A (A)	13 (13)

Legend: AM (PM)

During the PM peak hour, Goulais Avenue and Second Line West intersection is expected to operate slightly over capacity. The results indicate that all movements are expected to operate at an acceptable level of service except for the following movements at Goulais Avenue and Second Line West:

- Westbound Through-Right (v/c ratio of 1.03 and LOS E during PM peak hour).
- Southbound Left (v/c ratio of 0.94 & 1.01 and LOS E & F during AM & PM peak hours respectively).

All 95th percentile turning movement queues are expected to be able to be accommodated within the existing storage capacity. However, 95th percentile westbound through/right queue at Goulais Avenue and Second Line West is expected to extend well past the Walters Street intersection during the PM peak hour.

5.3.1 2032 Total Traffic Mitigation Measures

Goulais Avenue at Second Line West intersection is expected to experience long delays and capacity issues that occur during the PM peak hour. To address these issues, the cycle length was increased to 110 seconds. The traffic operational results for the 2032 future total scenario with updated signal timings and cycle length is summarized in **Table 11** . Synchro and SimTraffic outputs are available in **Appendix I**.

Table 11: 2032 Future Total Traffic Operations – Updated Signal Timing

Direction /	Storage	v/c	Delay	LOS	95%^{ile} Queue

Movement		(m)				(m)
Goulais Avenue at Second Line W (Signalized)						
EB	L	75	0.32	22	C	22
	TR	>500	0.30	13	B	51
WB	L	>950	0.41	22	C	70
	TR	>950	0.98	55	E	219
NB	L	45	0.30	40	D	36
	TR	>250	0.75	52	D	69
SB	L	>250	0.96	73	E	73
	TR	>250	0.48	30	C	65
Intersection Summary			**0.96**	**42**	**D**	**-**

Legend: PM

The results indicate that the intersection is projected to operate slightly below capacity. Delays for both critical movements have improved by over 10 seconds and v/c ratios are now below capacity. The 95th percentile queues for the westbound movements have also been significantly reduced with the updated signal timing plan.

5.4 2035 Future Total Conditions (Full Build-Out)

2035 future total intersection operations were assessed using the existing lane configurations. The 2035 future total traffic volumes were estimated by adding the Parcel A site traffic (**Figure 8**) and Parcel's B and C site traffic (**Figure 9**) to 2035 future background volumes (**Figure 7**). The resulting 2035 future total traffic volumes are illustrated in **Figure 11**. The operational analysis results are provided in **Table 12** and the Synchro and SimTraffic outputs are provided in **Appendix J**.

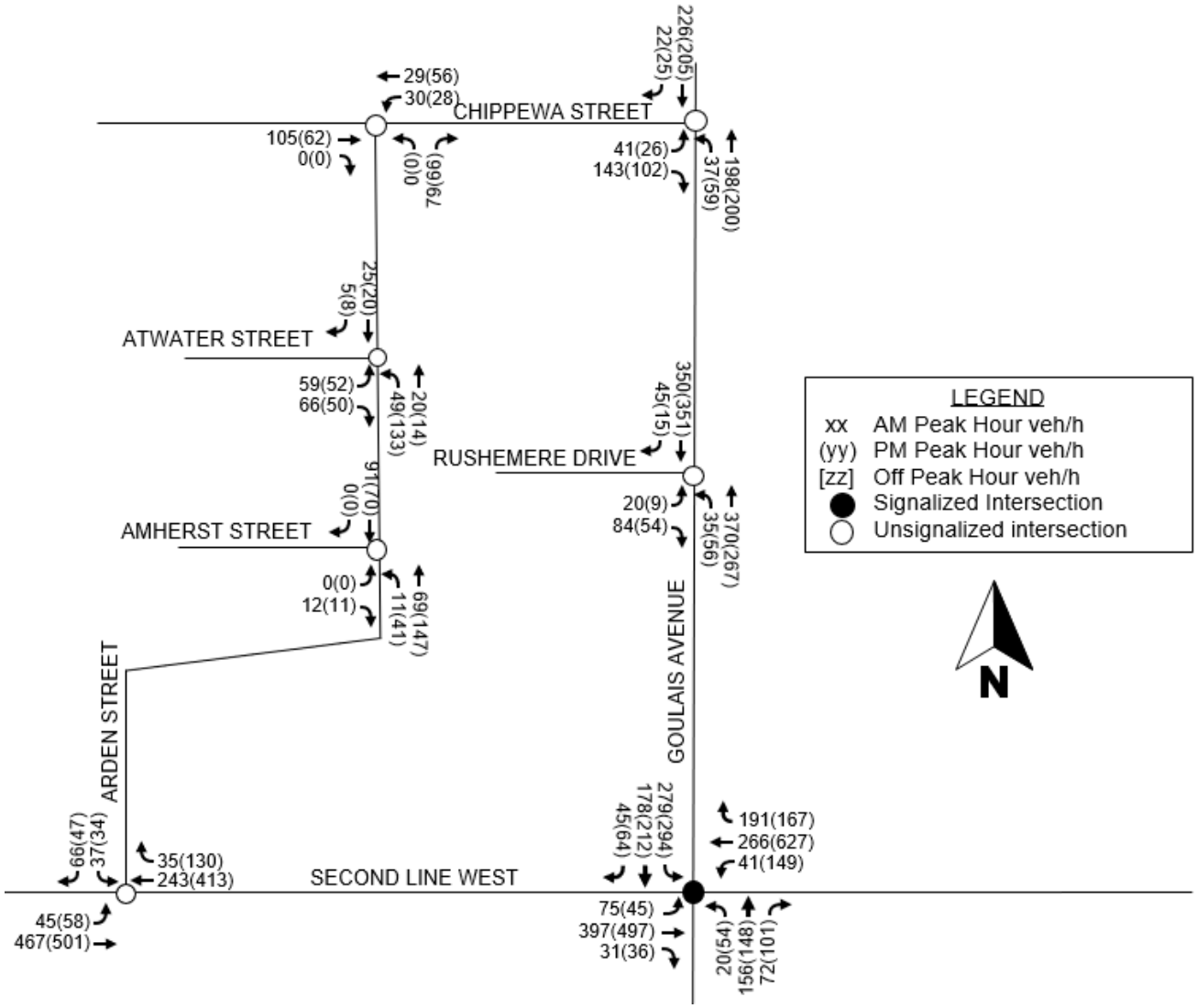


Figure 11: 2035 Future Total Traffic Volumes

Table 12: 2035 Future Total Traffic Operations

Direction / Movement		Storage (m)	v/c	Delay	LOS	95%^{ile} Queue (m)
Goulais Avenue at Second Line W (Signalized)						
EB	L	75	0.23 (0.31)	12 (20)	B (C)	25 (24)
	TR	>500	0.26 (0.32)	12 (13)	B (B)	44 (50)
WB	L	>950	0.12 (0.46)	16 (22)	B (C)	16 (492)
	TR	>950	0.65 (**1.12**)	25 (98)	C (**F**)	81 (677)
NB	L	45	0.10 (0.27)	30 (31)	C (C)	25 (33)
	TR	>250	0.65 (0.68)	38 (39)	D (D)	65 (65)
SB	L	>250	**1.04** (**1.14**)	93 (126)	**F** (**F**)	61 (77)
	TR	>250	0.40 (0.49)	24 (25)	C (C)	51 (60)
Intersection Summary			**0.81 (1.14)**	**33 (60)**	**C (E)**	-
Broadview Drive at Atwater Street (Unsignalized)						
EB	LR	>250	0.17 (0.21)	10 (12)	B (B)	22 (20)

NB	LT	>100	0.04 (0.11)	6 (7)	A (A)	<7 (7)
SB	TR	>100	0.02 (0.02)	0 (0)	A (A)	<7 (<7)
Goulais Avenue at Chippewa Street (Unsignalized)						
EB	LR	>300	0.33 (0.35)	13 (15)	B (B)	20 (19)
NB	LT	>500	0.09 (0.11)	3 (5)	A (A)	11 (19)
SB	TR	>500	0.17 (0.20)	0 (0)	A (A)	<7 (<7)
Goulais Avenue at Rushmere Drive (Unsignalized)						
EB	LR	>200	0.20 (0.12)	12 (11)	B (B)	18 (17)
NB	LT	>200	0.16 (0.12)	2 (4)	A (A)	12 (13)
SB	TR	>300	0.15 (0.16)	0 (0)	A (A)	<7 (<7)
Arden Street at Second Line W (Unsignalized)						
EB	TR	>500	0.05 (0.06)	1 (2)	A (A)	19 (41)
WB	TR	>500	0.22 (0.36)	0 (0)	A (A)	7 (22)
SB	LR	>200	0.32 (0.39)	18 (27)	C (D)	23 (26)
Broadview Drive at Amherst Street (Unsignalized)						
EB	LR	>250	0.01 (0.01)	9 (9)	A (A)	9 (9)
NB	LT	>75	0.01 (0.03)	1 (2)	A (A)	<7 (7)
SB	TR	>450	0.06 (0.04)	0 (0)	A (A)	<7 (<7)
Broadview Drive at Chippewa Street (Unsignalized)						
EB	TR	350	0.07 (0.04)	0 (0)	A (A)	<7 (<7)
WB	LT	350	0.02 (0.02)	4 (3)	A (A)	<7 (<7)
NB	LR	>500	0.09 (0.07)	9 (9)	A (A)	14 (13)

Legend: AM (PM)

During the PM peak hour, Goulais Avenue and Second Line West intersection is expected to operate over capacity. The results indicate that all movements are expected to operate at an acceptable level of service except for the following movements at Goulais Avenue and Second Line West:

- Westbound Through-Right (v/c ratio of 1.12 and LOS F during PM peak hour).
- Southbound Left (v/c ratio of 1.04 & 1.14 and LOS F during AM & PM peak hours respectively).

All 95th percentile turning movement queues are expected to be able to be accommodated within the existing storage capacity. However, 95th percentile westbound through/right queue at Goulais Avenue and Second Line West is expected to extend well past the Edison Avenue intersection during the PM peak hour.

5.4.1 2035 Total Traffic Mitigation Measures

Goulais Avenue at Second Line West intersection is expected to experience long delays and capacity issues that occur during the AM and PM peak hours. To address these issues, the cycle length was increased to 110 seconds for the AM peak hour, 140 seconds for the PM peak hour. The traffic operational results for the 2035 future total scenario with updated signal timings and cycle length is summarized in **Table 13**. Synchro and SimTraffic outputs are available in **Appendix J**.

Table 13: 2035 Future Total Traffic Operations – Updated Signal Timing

Direction / Movement		Storage (m)	v/c	Delay	LOS	95%ile Queue (m)
Goulais Avenue at Second Line W (Signalized)						
EB	L	75	0.24 (0.42)	15 (32)	B (C)	31 (24)
	TR	>500	0.26 (0.31)	14 (17)	B (B)	44 (52)
WB	L	>950	0.11 (0.42)	19 (26)	B (C)	17 (106)
	TR	>950	0.64 (**1.01**)	28 (70)	C (E)	93 (284)
NB	L	45	0.11 (0.33)	38 (52)	D (D)	26 (57)
	TR	>250	0.74 (0.86)	51 (78)	D (E)	68 (122)
SB	L	>250	0.85 (0.94)	46 (71)	D (E)	71 (93)
	TR	>250	0.37 (0.47)	27 (36)	C (D)	56 (81)
Intersection Summary			**0.73 (0.98)**	**30 (51)**	**C (D)**	**-**

Legend: AM (PM)

The results indicate that all movements are operating at an acceptable level of service for the AM peak hour. During the PM peak hour, the intersection is projected to operate slightly below capacity. Delays for both critical movements have greatly improved, and v/c ratios are now at or below capacity. The 95th percentile queues for the westbound movements have also been significantly reduced with the updated signal timing plan.

6. Auxiliary Lanes Review

To help address long PM peak hour at Goulais Avenue and Second Line West, westbound through/right queues that were shown to begin in the 2032 future background scenario and extend over 200 metres to the Walters Street intersection, a westbound right auxiliary lane may be considered. However, it should be noted that the City is expected to implement a road diet on Goulais Avenue. The results from the traffic impacts from the road diet should be analyzed before considering any auxiliary lanes to address the background traffic volume queues.

7. Conclusion

Based on the analysis results, the following conclusions can be made:

Existing Conditions

- The analysis results indicate that all movements at study intersections are operating with acceptable level of service and residual capacity during the weekday AM and PM peak hours.
- A pattern of westbound vehicles in the afternoon involved in rear end collisions was identified. This may be attributed to long queues and delay for the existing westbound traffic. Recommend the City monitor volumes and optimize the signal timing plan to reduce queues and delays.
- The sightline assessment did not reveal any obstructions. Sight distance meets recommended intersection sight distance.

Future Background Conditions

- The analysis results indicate that all movements at study intersections are expected to operate with acceptable level of service and residual capacity during the weekday AM and weekday PM peak hours under both future 2032 and 2035 background conditions.
- The 95th percentile westbound through/right queue (320 metres) at Goulais Avenue and Second Line West is expected to extend well past the Walters Street intersection during the PM peak hour.

Trip Generation

- Parcel A of the subject site is expected to generate 81 new auto trips during the weekday AM peak hour and 112 new auto trips during the weekday PM peak hour.
- Parcel B and Parcel of the subject site is expected to generate 152 new auto trips during the weekday AM peak hour and 181 new auto trips during the weekday PM peak hour.

Future Total Conditions

- Under future 2032, 2035 total conditions, the traffic operational analysis results indicate that all movements at study intersections are expected to operate with an acceptable LOS D or better with updated signal timing plan; and
- At Goulais Avenue and Second Line West, the 95th percentile queue lengths during the weekday AM can be accommodated by existing storage capacity.
- At Goulais Avenue and Second Line West, the 95th percentile queue lengths during the weekday PM peak hour is expected to extend past Walters Avenue. However, by updating the signal timing plan queue length were reduced from 320 metres for 2035 future background, to 284 metres for 2035 future total.

A

Appendix A
Terms of Reference Document

March 27, 2023

Maggie McAuley, P.Eng.
Municipal Services Engineer
City of Sault Ste. Marie
99 Foster Drive, Sault Ste. Marie

Attention: **Maggie McAuley, P.Eng.**

RE: **Terms of Reference for the Preparation of a Traffic Impact Study – 0 Chippewa Avenue**

Dear Maggie

As part our collaboration with Kresin Engineering Corp. we would like to present for your consideration the following Terms of Reference for the completion of a Traffic Impact Study supporting the development of 0 Chippewa Avenue. The outline of this document follows standard practices for the preparation of Traffic Impact Studies, but please let us know if an outline specific to the City should be followed.

Background and Understanding

We were advised that Kresin Engineering's client is planning the development of a 374-unit mixed use development at Chippewa Street with a direct access to Chippewa Street, Atwater Street, and Amherst Street (**Figure 1**).

Based on the information provided we understand that the developer already engaged the City of Sault Ste. Marie and due to the location of the proposed development the preparation of a Traffic Impact Study that complies with the requirements of the City needs to be completed.

We also understand that the City does not have a formal Traffic Impact Study Guidelines and as such, we are presenting for your consideration this Terms of Reference to ensure that all concerns are identified in advance of the preparation of the Traffic Impact Study.

Based on the location of the proposed development and the information provided by our client it is our understanding that the TIS will not be circulated to any other road authority aside of the City for review.

Terms of Reference

Task 1: Pre-Consultation Teleconference Meeting with MTO

CIMA+ will attend a pre-submission consultation (virtual) meeting with the City to review and approve the scope of work and discuss any project-specific concerns, as well as verify the availability of data required to complete the review.

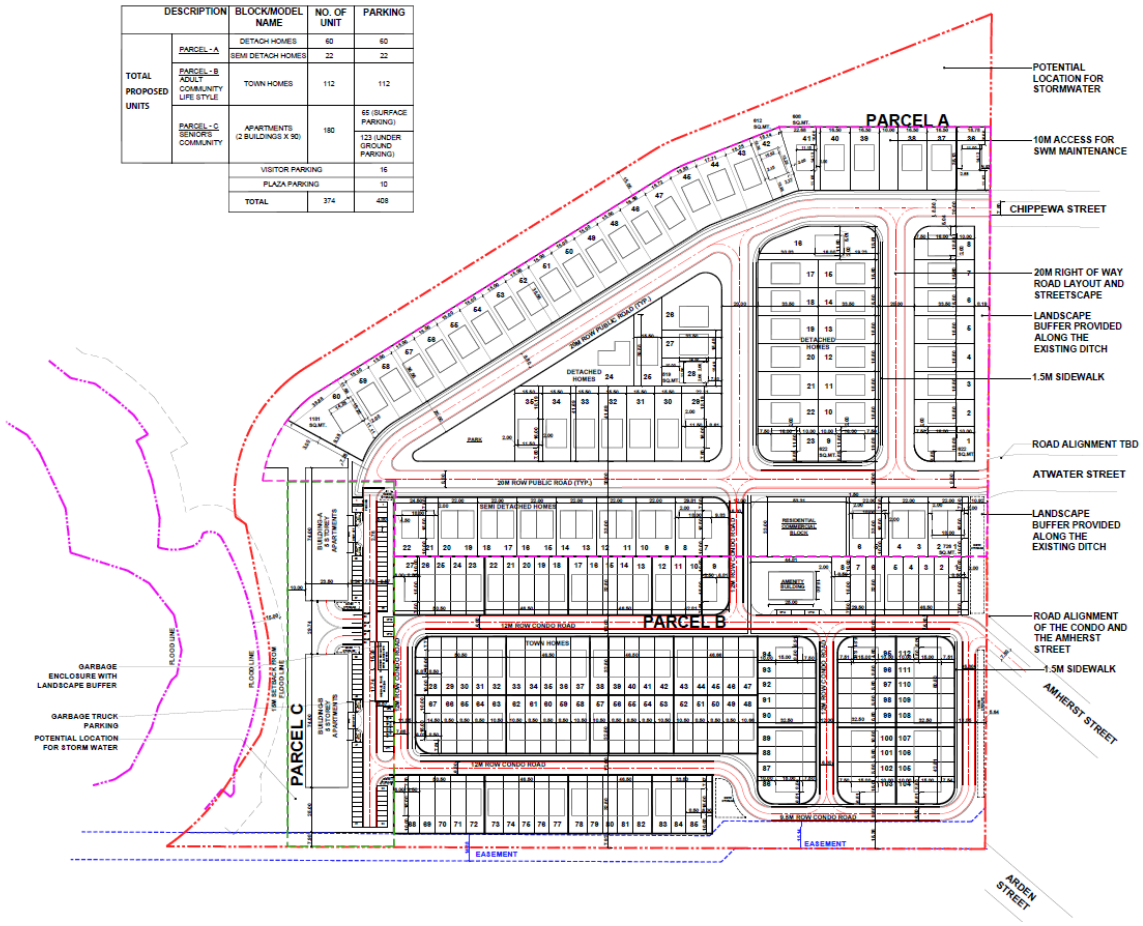


Figure 1 Proposed Development – 0 Chippewa Avenue

Task 2: Review of Background Information and Estimation of Volumes

CIMA+ will review all relevant background information related to the proposed development and estimated traffic volumes at the proposed accesses. In order to complete this task, it is expected that availability of the following information will be discussed/confirmed as part of the pre-consultation teleconference with the City.

- Turning movement counts (TMC), signal timing data, historical and recent AADT volume information for the following roads:
    - Chippewa Street and Goulais Avenue
    - Atwater Street and Broadview Drive
    - Rushmere Drive and Goulais Avenue
    - Arden Street and Second Line West, and
    - Goulais Avenue and Second Line West
- Collision records for the past 5 years;
- Lot area and type of development (number, type and size of units, GFA of commercial development, etc.).
- Opening year (if multiple phases, opening year of each phase); and

Task 3: Sight Distance Assessment and Field Review

Although the proposed accesses are assumed to front existing roadways (Chippewa Street, Atwater Street and Amherst Street) – CIMA+ will rely on information collected by Kresin Engineering during a site visit to assess sight distances at the proposed site accesses.

Task 4: Trip Generation, Distribution, Assignment & Traffic Control Assessment

CIMA+ will undertake trip generation calculations, distribution and assignment for the proposed development based on the information to be provided by the developer. Trip generation will be conducted using the Institute of Transportation (ITE) Trip Generation manual, 10th edition.

CIMA+ will evaluate necessary changes to the existing control at the aforementioned intersections of Goulais Avenue and Second Line West. Similarly, the potential effects on the existing traffic control, auxiliary lanes, and tapers at the aforementioned intersections will be identified. The traffic control assessment will consider the increased volume of traffic associated with the proposed development and the surrounding area for the future horizon of 5 years from the date of the TIS. A growth rate for future background traffic of 1% is expected to be confirmed during our discussion with the City.

Considerations for other modes of transportation as well as the use of Traffic Demand Management will be included as part of our analysis.

Task 5: Review for Additional Roadway Improvements

CIMA+ will evaluate the need for any improvements at the aforementioned intersections in accordance with the TAC Road Design Guide, and other applicable City design standards.

Task 6: Prepare Draft and Final TIS Report

CIMA+ will prepare a draft report summarizing Tasks 2 through 5 that will be submitted to the City for formal approval. Any comments provided by the City will be addressed as part of the Final TIS Report.

It is assumed that the design of any necessary improvements to support the City's approval will be conducted as part of the next phase of the development approval process.

Closing

Should you have any questions or concerns regarding this Terms of Reference, do not hesitate to contact the undersigned.

Sincerely,

CIMA Canada Inc.

Jaime Garcia, P.Eng., Ph.D.
Senior Project Manager, Transportation
jaime.garcia@cima.ca

B

Appendix B
Turning Movement Counts

Turning Movements Report

Location: Goulais @ Chippewa
Municipality: Sault Ste. Marie
Count Date: Thursday December 14, 2023
Time: 8:00am - 8:15am

Goulais

49	4%	2	47		41	4	10%	45
3	0%	0	3		3	1	33%	4

4	12	Cars
0	0	Trucks
0%	0%	Truck %
4	12	Total

Pedestrians 0

Chippewa

Turning Movements Report

Location: Goulais @ Chippewa
Municipality: Sault Ste. Marie
Count Date: Thursday December 14, 2023
Time: 8:15am - 8:30am

Goulais

56	6%	3	53		46	3	7%	49
4	33%	1	3		4	1	25%	5

Pedestrians	1
Cars	4 14
Trucks	0 1
Truck %	0% 7%
Total	4 15

Chippewa

Turning Movements Report

Location: Goulais @ Chippewa
Municipality: Sault Ste. Marie
Count Date: Thursday December 14, 2023
Time: 8:30am - 8:45am

Goulais

53	6%	3	50		44	1	2%	45
3	0%	0	3		4	1	25%	5

Pedestrians 5		
Cars	13	4
Trucks	1	0
Truck %	8%	0%
Total	14	4

Chippewa

Turning Movements Report

Location: Goulais @ Chippewa
Municipality: Sault Ste. Marie
Count Date: Thursday December 14, 2023
Time: 8:45am - 9:00am

Goulais

42	5%	2	40		35	2	6%	37
1	0%	0	1		2	0	0%	2

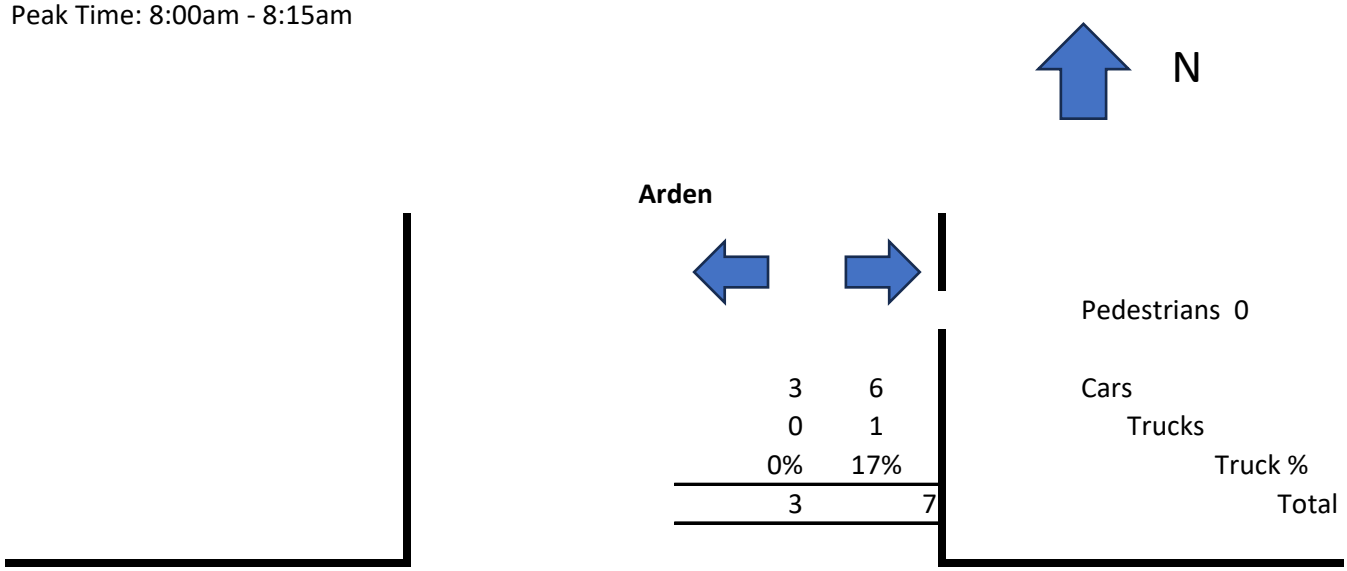
Pedestrians 0

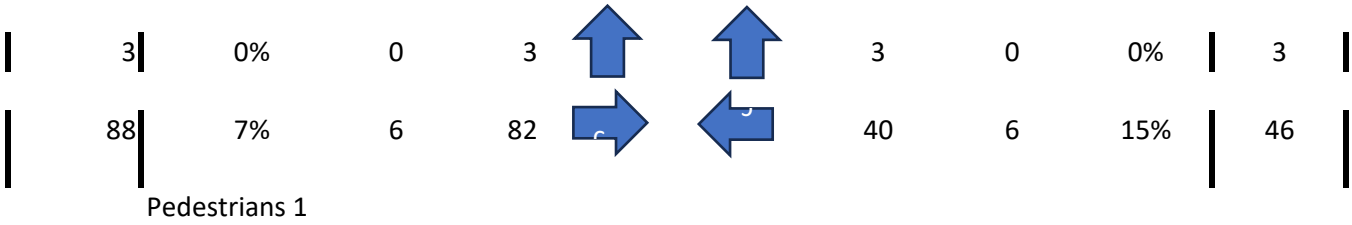
3	10	Cars
0	0	Trucks
0%	0%	Truck %
3	10	Total

Chippewa

Turning Movements Report

Location: Second Line W @ Arden
Municipality: Sault Ste. Marie
Count Date: Friday December 15, 2023
Peak Time: 8:00am - 8:15am

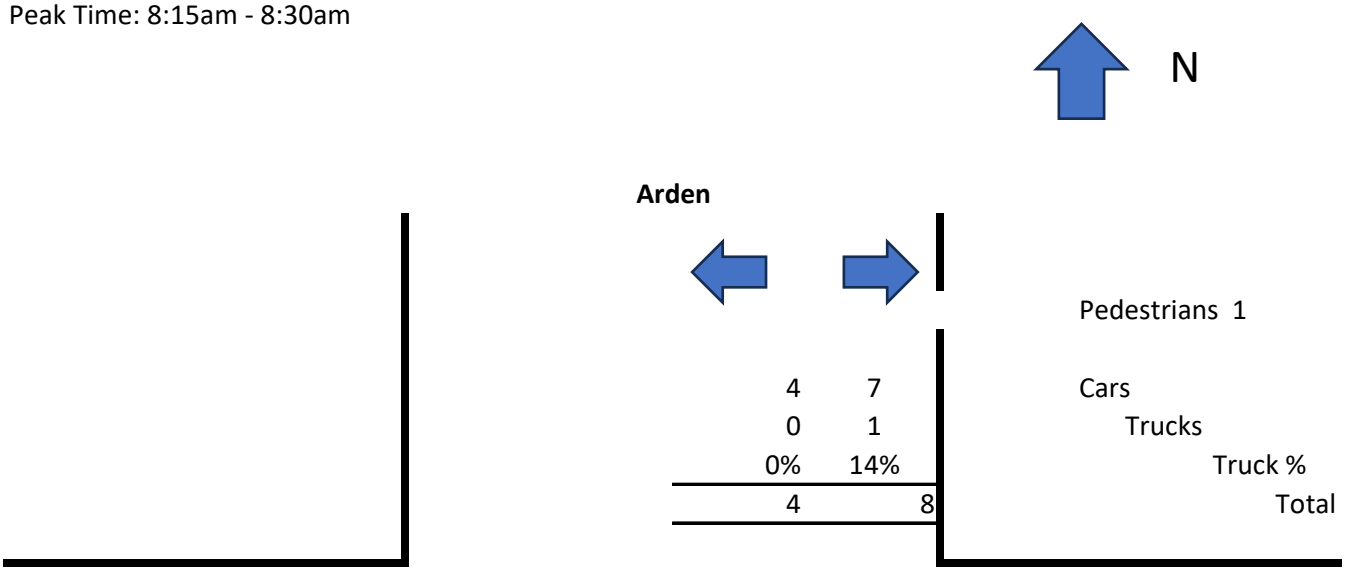




Second Line West

Turning Movements Report

Location: Second Line W @ Arden
Municipality: Sault Ste. Marie
Count Date: Friday December 15, 2023
Peak Time: 8:15am - 8:30am



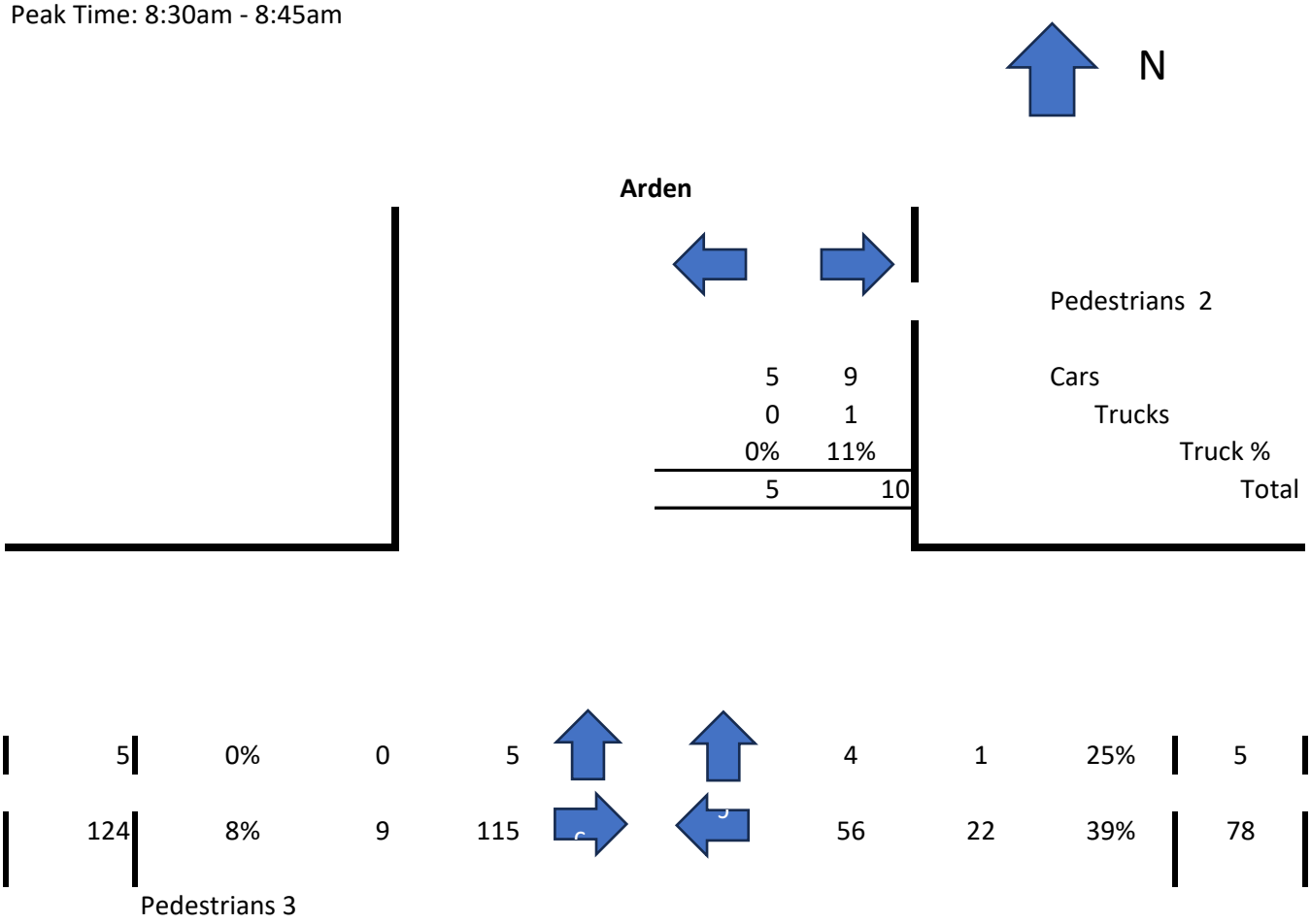
4	0%	0	4	4	0	0%	4	
104	8%	8	96	47	7	15%	54	

Pedestrians 1

Second Line West

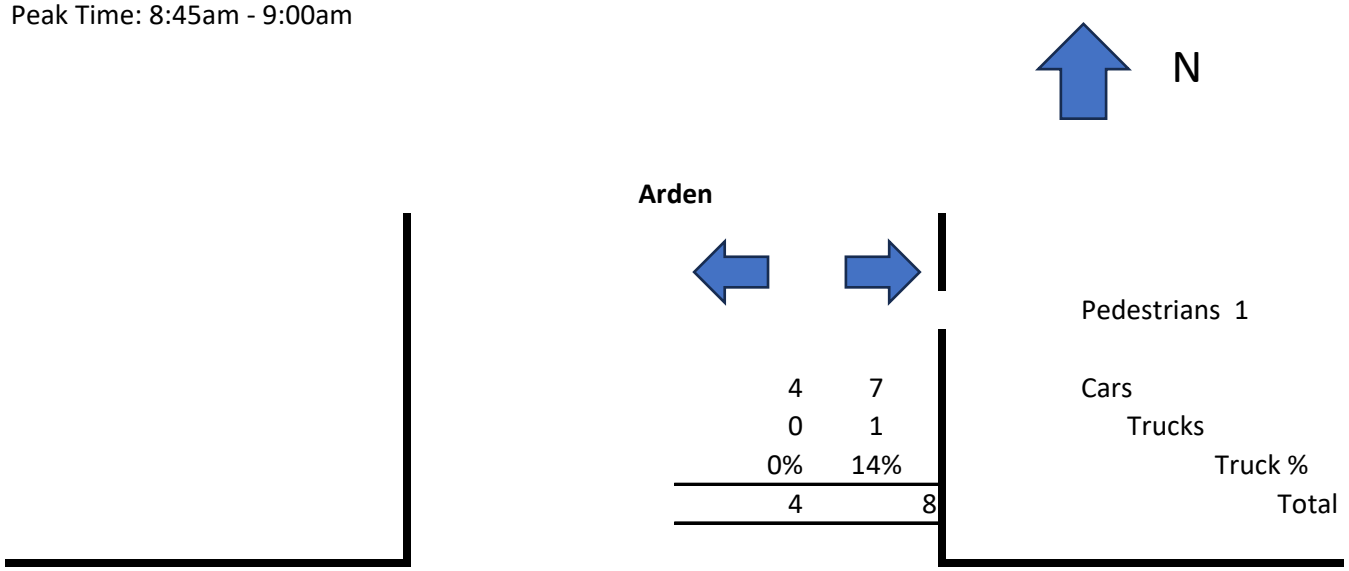
Turning Movements Report

Location: Second Line W @ Arden
Municipality: Sault Ste. Marie
Count Date: Friday December 15, 2023
Peak Time: 8:30am - 8:45am



Turning Movements Report

Location: Second Line W @ Arden
Municipality: Sault Ste. Marie
Count Date: Friday December 15, 2023
Peak Time: 8:45am - 9:00am



4	0%	0	4	3	0	0%	3	
98	8%	7	91	44	7	16%	51	

Pedestrian 0

Second Line West

Turning Movements Report

Location: Broadview @ Atwater
Municipality: Sault Ste. Marie
Count Date: Monday December 19, 2023
Time: 8:00am - 8:15am

Broadview

5	25%	1	4	4	0	0%	4
1	0%	0	1	1	0	0%	1

Pedestrians 1

Pedestrians	4
Cars	1 4
Trucks	0 0
Truck %	0% 0%
Total	1 4

Atwater

Turning Movements Report

Location: Broadview @ Atwater
Municipality: Sault Ste. Marie
Count Date: Monday December 19, 2023
Time: 8:15am - 8:30am

Broadview

7	40%	2	5	5	0	0%	5
2	0%	0	2	1	0	0%	1

1	5	Cars
0	0	Trucks
0%	0%	Truck %
1	5	Total

Pedestrians 4

Atwater

Turning Movements Report

Location: Broadview @ Atwater
Municipality: Sault Ste. Marie
Count Date: Monday December 19, 2023
Time: 8:30am - 8:45am

Broadview

6	50%	2	4	5	0	0%	5
1	0%	0	1	1	0	0%	1

Pedestrians 2

Pedestrians 4

1	4
0	0
0%	0%
1	4

Cars
Trucks
Truck %
Total

Atwater

Turning Movements Report

Location: Broadview @ Atwater
Municipality: Sault Ste. Marie
Count Date: Monday December 19, 2023
Time: 8:45am - 9:00am

Broadview

4	33%	1	3	3	0	0%	3
1	0%	0	1	0	0	0%	0

Pedestrians	4
Cars	1 3
Trucks	0 0
Truck %	0% 0%
Total	1 3

Atwater

Turning Movements Report

Location: Goulais @ Rushmere
Municipality: Sault Ste. Marie
Count Date: Monday December 18, 2023
Time: 8:00am - 8:15am

Goulais

55	6%	3	52		67	5	7%	72
9	0%	0	9		7	0	0%	7

67

Total	4	16
Truck %	0	1
Trucks	0%	6%
Cars	4	17

Cars
Trucks
Truck %
Total

Rushmere

Turning Movements Report

Location: Goulais @ Rushmere
Municipality: Sault Ste. Marie
Count Date: Monday December 18, 2023
Time: 8:15am - 8:30am

Goulais

61	5%	3	58		75	6	8%	81
10	0%	0	10		8	0	0%	8

Total	4	18	Cars	
Truck %	0	1	Trucks	
Trucks	0%	6%	Truck %	
Cars	4	19	Total	

Rushmere

Turning Movements Report

Location: Goulais @ Rushmere
Municipality: Sault Ste. Marie
Count Date: Monday December 18, 2023
Time: 8:30am - 8:45am

Goulais

66	5%	3	63		83	6	7%	89
12	9%	1	11		8	1	13%	9

Total		5	20	Cars	
Truck %		0	2	Trucks	
Trucks		0%	10%	Truck %	
Cars		5	22	Total	

Rushmere

Turning Movements Report

Location: Goulais @ Rushmere
Municipality: Sault Ste. Marie
Count Date: Monday December 18, 2023
Time: 8:45am - 9:00am

Goulais

53	6%	3	50		65	5	8%	70
9	0%	0	9		7	0	0%	7

Total	4	16	Cars	
Truck %	0	1	Trucks	
Trucks	0%	6%	Truck %	
Cars	4	17	Total	

Rushmere

Turning Movements Report

Location: Goulais @ Chippewa
Municipality: Sault Ste. Marie
Count Date: Thursday December 14, 2023
Time: 4:15pm - 4:30pm

Goulais

14	17%	2	12	14	2	14%	16
1	0%	0	1	4	1	25%	5

Pedestrians 3

Pedestrians	1
Cars	2 4
Trucks	0 0
Truck %	0% 0%
Total	2 4

Chippewa

Turning Movements Report

Location: Goulais @ Chippewa
Municipality: Sault Ste. Marie
Count Date: Thursday December 14, 2023
Time: 4:30pm - 4:45pm

Goulais

30	15%	4	26		32	4	13%	36
2	0%	0	2		8	3	38%	11

Pedestrians 1

Pedestrians 5		
Cars	8	3
Trucks	1	1
Truck %	13%	33%
Total	9	4

Chippewa

Turning Movements Report

Location: Goulais @ Chippewa
Municipality: Sault Ste. Marie
Count Date: Thursday December 14, 2023
Time: 4:45pm - 5:00pm

Goulais

29	16%	4	25		30	4	13%	34
1	0%	0	1		8	2	25%	10

Pedestrians 1

Pedestrians 5		
Cars	7	3
Trucks	0	0
Truck %	0%	0%
Total	7	3

Chippewa

Turning Movements Report

Location: Goulais @ Chippewa
Municipality: Sault Ste. Marie
Count Date: Thursday December 14, 2023
Time: 5:00pm - 5:15pm

Goulais

10	11%	1	9		11	2	18%	13
1	0%	0	1		3	1	33%	4

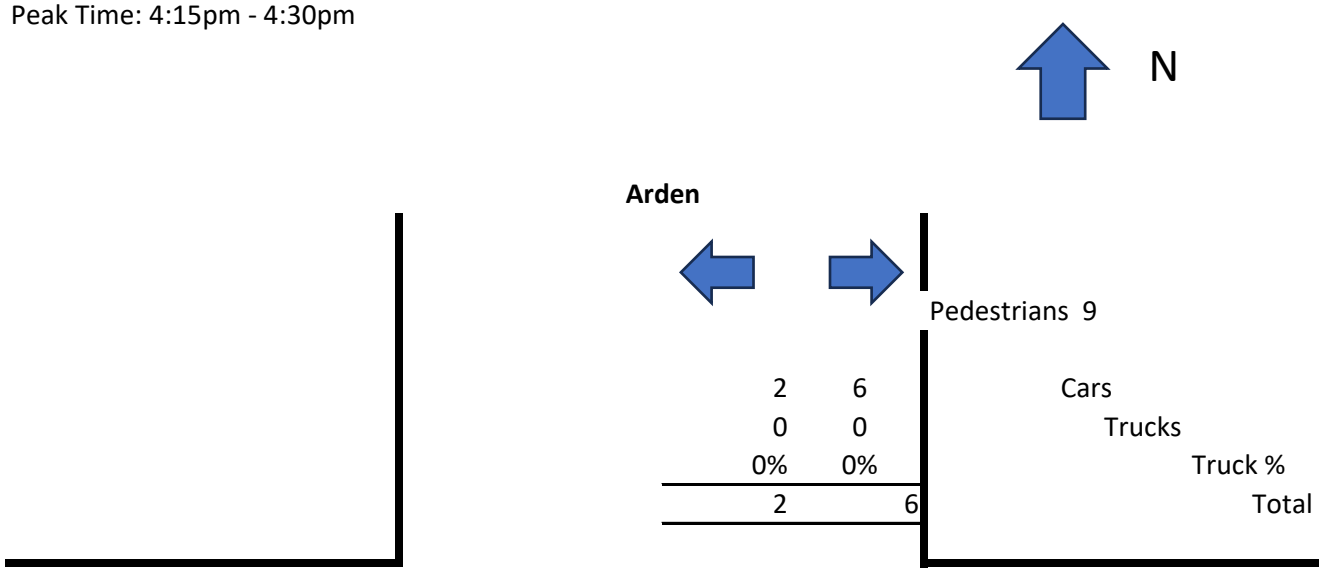
Pedestrians 1

Pedestrians	5
Cars	1 3
Trucks	0 0
Truck %	0% 0%
Total	1 3

Chippewa

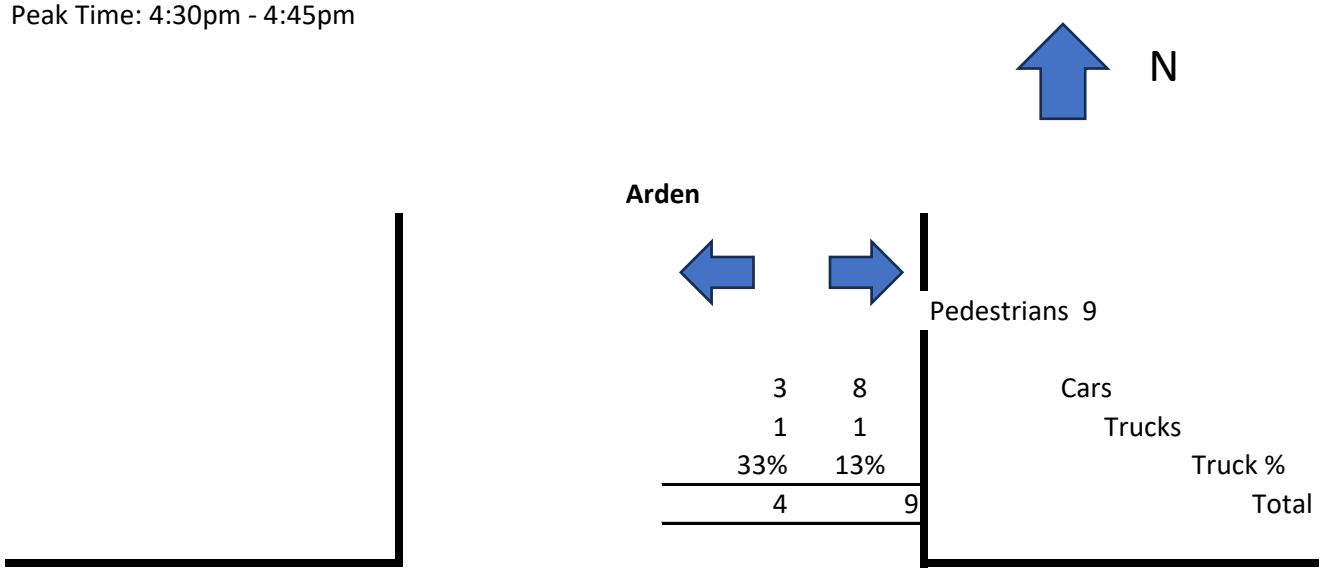
Turning Movements Report

Location: Second Line W @ Arden
Municipality: Sault Ste. Marie
Count Date: Friday December 15, 2023
Peak Time: 4:15pm - 4:30pm



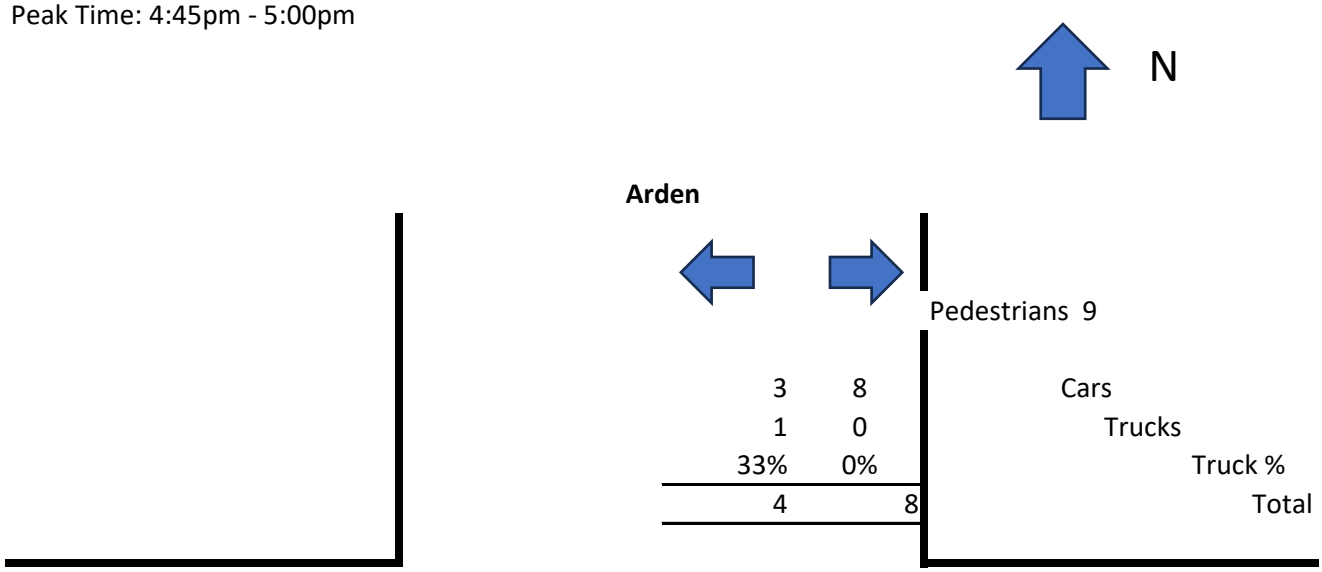
Turning Movements Report

Location: Second Line W @ Arden
Municipality: Sault Ste. Marie
Count Date: Friday December 15, 2023
Peak Time: 4:30pm - 4:45pm



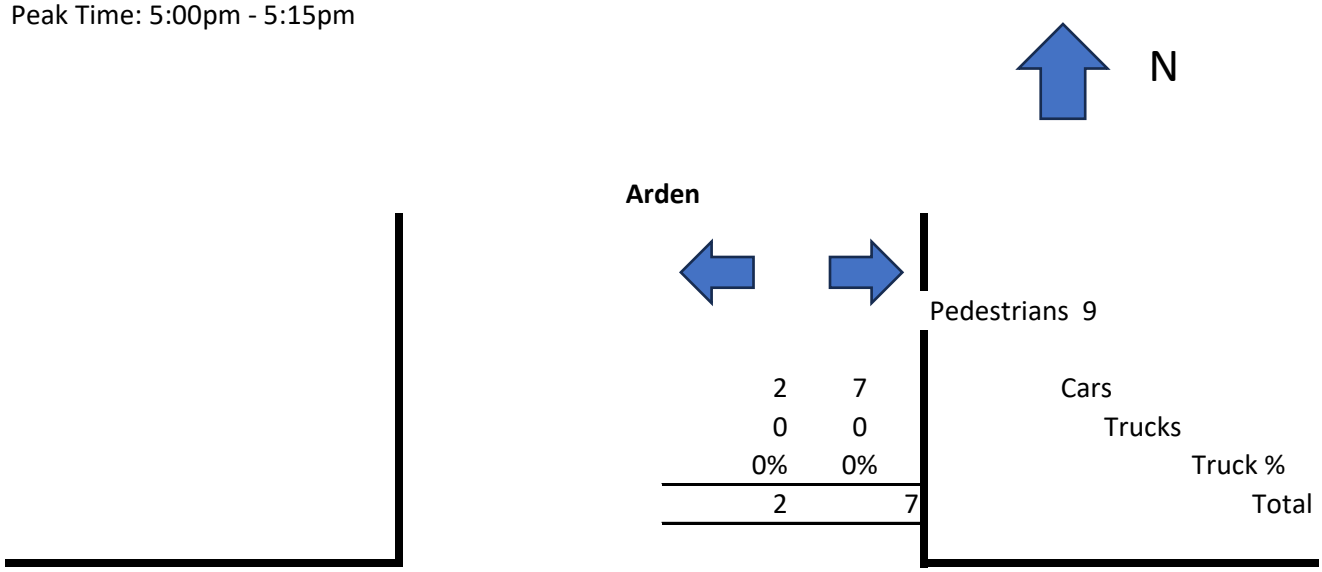
Turning Movements Report

Location: Second Line W @ Arden
Municipality: Sault Ste. Marie
Count Date: Friday December 15, 2023
Peak Time: 4:45pm - 5:00pm



Turning Movements Report

Location: Second Line W @ Arden
Municipality: Sault Ste. Marie
Count Date: Friday December 15, 2023
Peak Time: 5:00pm - 5:15pm



Turning Movements Report

Location: Broadview @ Atwater
Municipality: Sault Ste. Marie
Count Date: Monday December 19, 2023
Time: 2:00pm - 2:15pm

Broadview

		Pedestrians 1				Pedestrians 1		
4	33%	1	3		4	0	0%	4
2	0%	0	2		2	0	0%	2
					Pedestrians 1			

1	3	Cars
0	0	Trucks
0%	0%	Truck %
1	3	Total

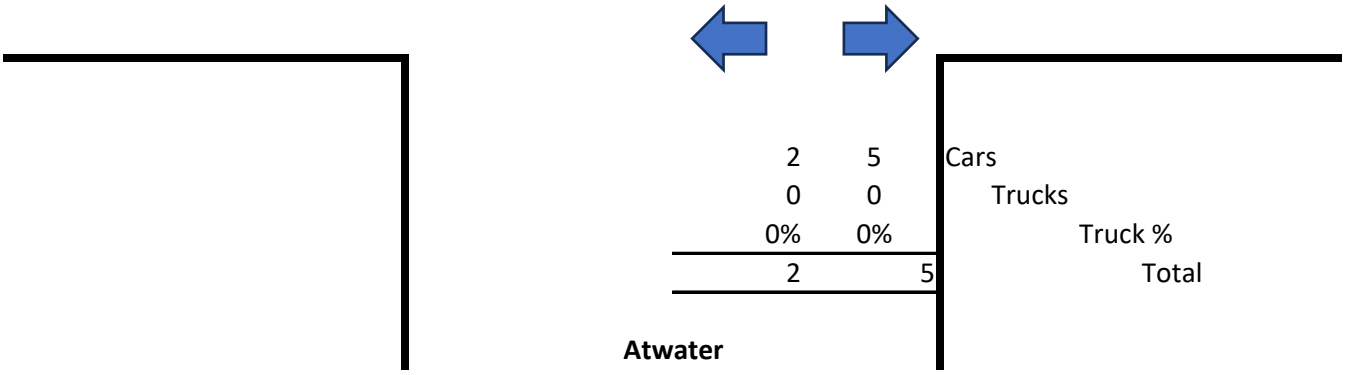
Atwater

Turning Movements Report

Location: Broadview @ Atwater
Municipality: Sault Ste. Marie
Count Date: Monday December 19, 2023
Time: 2:15pm - 2:30pm

Broadview

		Pedestrians 1				Pedestrians 2			
6	50%	2	4			2	0	0%	2
2	0%	0	2			3	0	0%	3
						Pedestrians 2			



2	5	Cars
0	0	Trucks
0%	0%	Truck %
2	5	Total

Atwater

Turning Movements Report

Location: Broadview @ Atwater
Municipality: Sault Ste. Marie
Count Date: Monday December 19, 2023
Time: 2:30pm - 2:45pm

Broadview

		Pedestrians 0				Pedestrians 0		
4	33%	1	3		4	0	0%	4
2	0%	0	2		2	0	0%	2
					Pedestrians 1			

2	4	Cars
0	0	Trucks
0%	0%	Truck %
2	4	Total

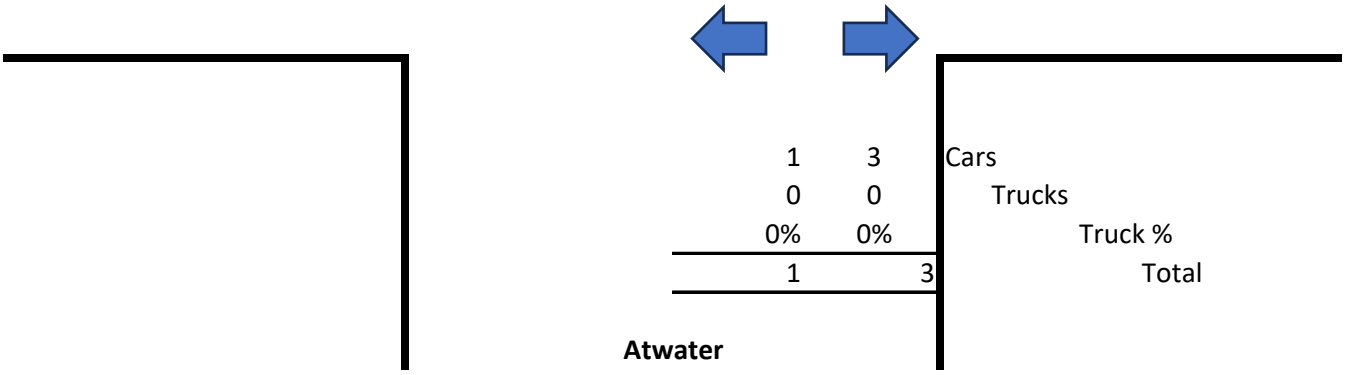
Atwater

Turning Movements Report

Location: Broadview @ Atwater
Municipality: Sault Ste. Marie
Count Date: Monday December 19, 2023
Time: 2:45pm - 3:00pm

Broadview

		Pedestrians 0				Pedestrians 0			
3	50%	1	2			3	0	0%	3
1	0%	0	1			2	0	0%	2
						Pedestrians 0			



1	3	Cars
0	0	Trucks
0%	0%	Truck %
1	3	Total

Atwater

Turning Movements Report

Location: Goulais @ Rushmere
Municipality: Sault Ste. Marie
Count Date: Monday December 18, 2023
Time: 4:15pm -4:30pm

Goulais

29	7%	2	27		25	3	12%	28
3	0%	0	3		9	0	0%	9

1	9	Cars	
0	0	Trucks	
0%	0%	Truck %	
1	9	Total	

Rushmere

Turning Movements Report

Location: Goulais @ Rushmere
Municipality: Sault Ste. Marie
Count Date: Monday December 18, 2023
Time: 4:30pm -4:45pm

Goulais

34	6%	2	32		29	3	10%	32
3	0%	0	3		11	1	9%	12

2	11	Cars
0	0	Trucks
0%	0%	Truck %
2	11	Total

Rushmere

Turning Movements Report

Location: Goulais @ Rushmere
Municipality: Sault Ste. Marie
Count Date: Monday December 18, 2023
Time: 4:45pm -5:00pm

Goulais

40	8%	3	37		34	4	12%	38
4	0%	0	4		13	1	8%	14

2	13	Cars
1	0	Trucks
50%	0%	Truck %
3	13	Total

Rushmere

Turning Movements Report

Location: Goulais @ Rushmere
Municipality: Sault Ste. Marie
Count Date: Monday December 18, 2023
Time: 5:00pm -5:15pm

Goulais

42	8%	3	39		35	4	11%	39
4	0%	0	4		13	1	8%	14

2	14	Cars
0	1	Trucks
0%	7%	Truck %
2	15	Total

Rushmere

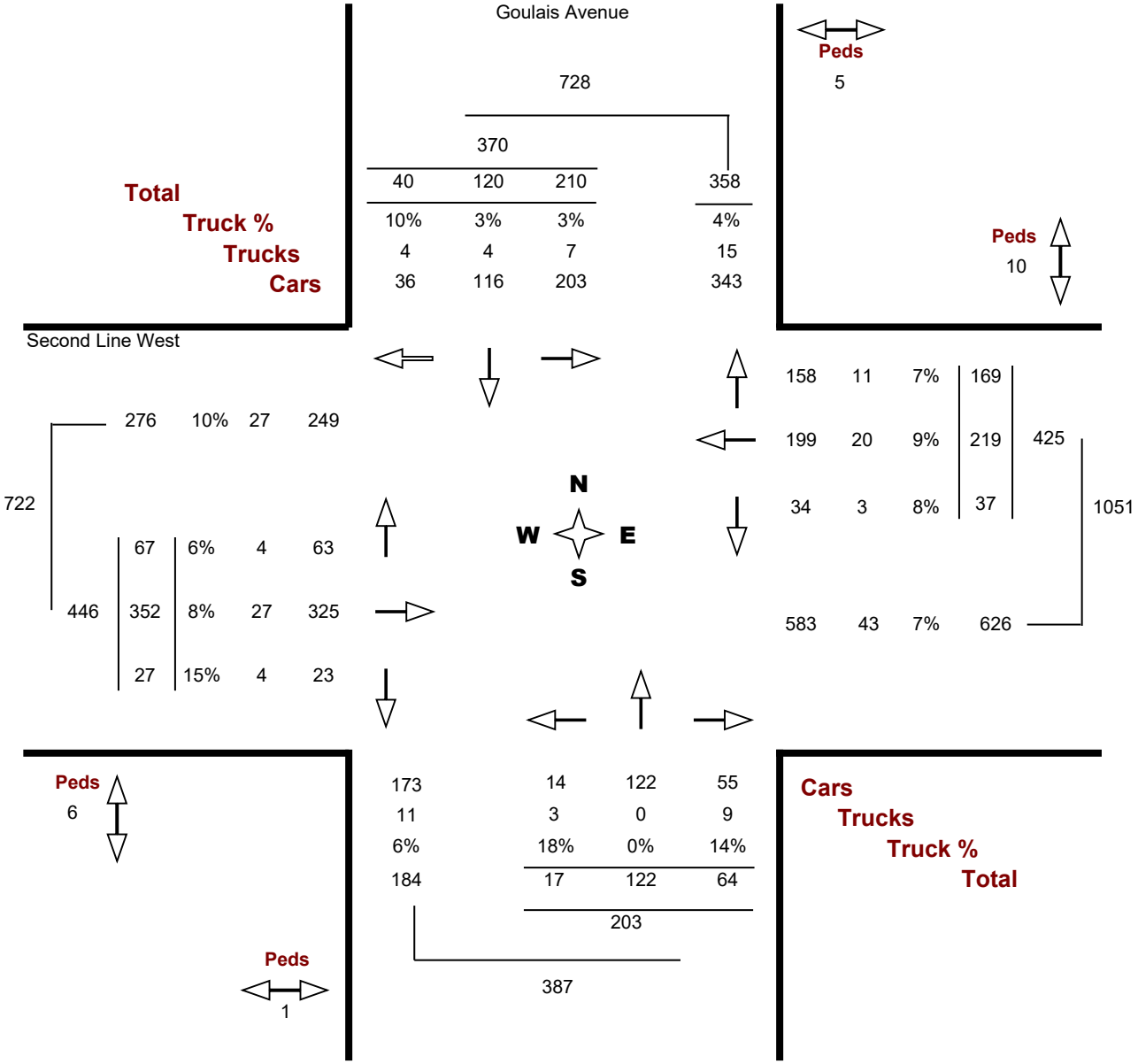
Turning Movements Report - AM Period

Location..... Goulais Avenue @ Second Line West

Municipality..... Sault Ste. Marie

GeoID..... 16339

Count Date..... Friday, 15 December, 2023 **Peak Hour.....** 08:00 AM — 09:00 AM



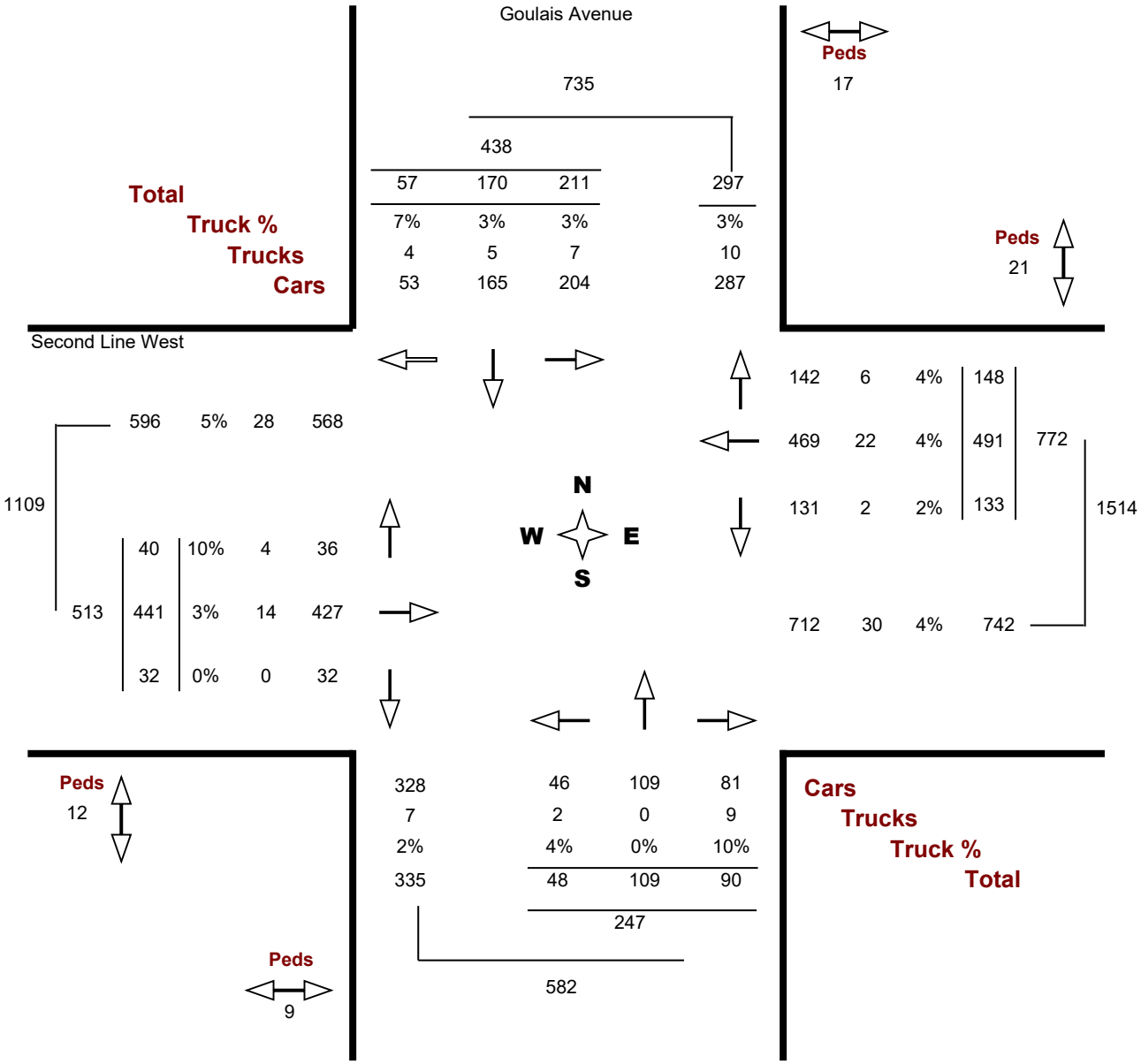
Turning Movements Report - PM Period

Location..... Goulais Avenue @ Second Line West

Municipality..... Sault Ste. Marie

GeoID..... 16339

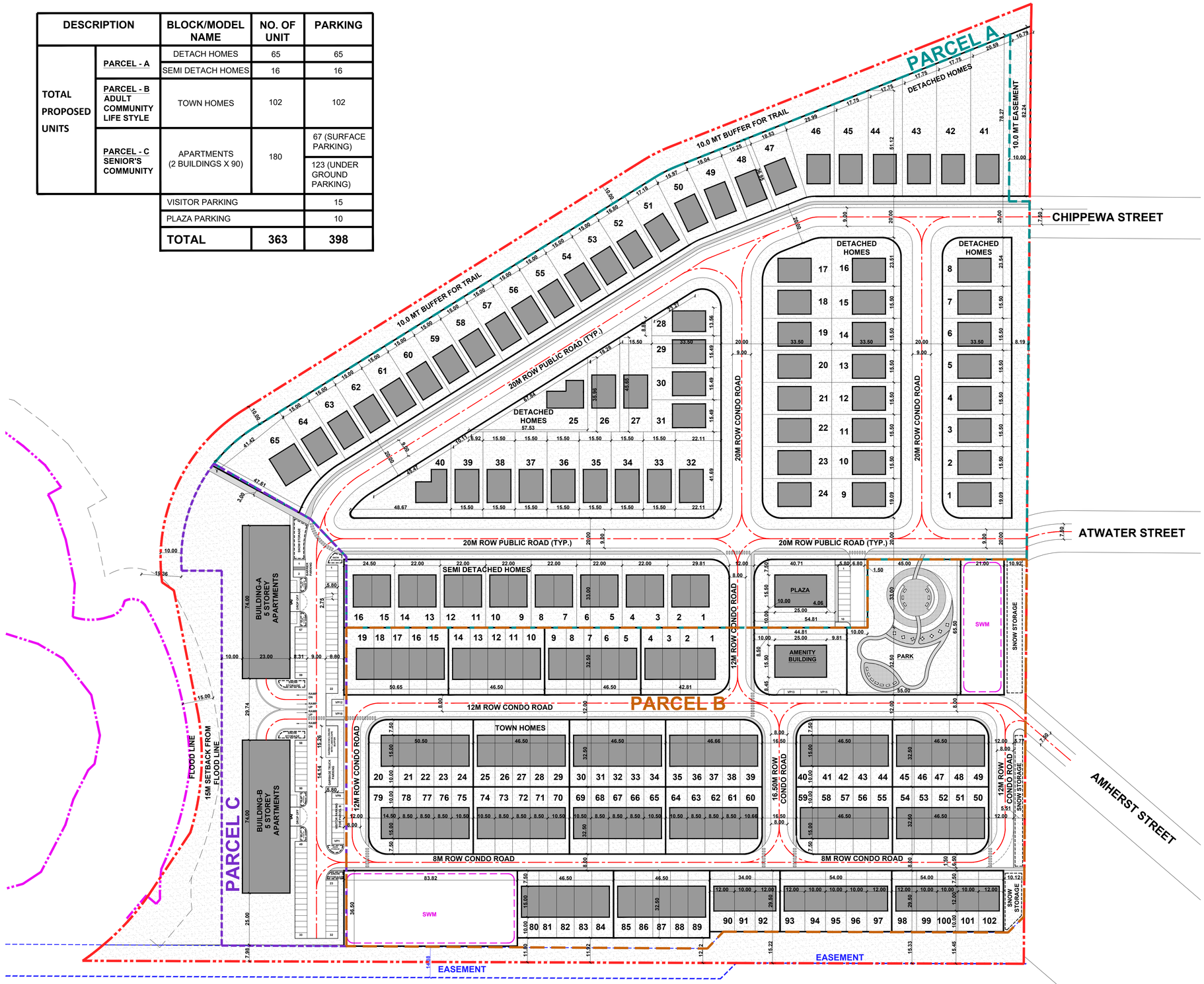
Count Date..... Friday, 15 December, 2023 **Peak Hour.....** 02:30 PM — 03:30 PM



C

Appendix C
Site Plan

DESCRIPTION		BLOCK/MODEL NAME	NO. OF UNIT	PARKING
TOTAL PROPOSED UNITS	PARCEL - A	DETACH HOMES	65	65
		SEMI DETACH HOMES	16	16
	PARCEL - B ADULT COMMUNITY LIFE STYLE	TOWN HOMES	102	102
	PARCEL - C SENIOR'S COMMUNITY	APARTMENTS (2 BUILDINGS X 90)	180	67 (SURFACE PARKING)
				123 (UNDER GROUND PARKING)
	VISITOR PARKING			15
	PLAZA PARKING			10
	TOTAL		**363**	**398**



NO.	DATE	REVISION

* NOT FOR SITE PLAN APPROVAL
* NOT FOR CONSTRUCTION
* ONLY FOR PRELIMINARY DISCUSSION

DEVELOPED BY:

MAMTA HOMES

CONSULTING ENGINEER :

KRESIN Engineering Corporation

RPDS
INTEGRATED DESIGN FIRM
SUITE 203, 7895 TRANMERE DR., MISSISSAUGA, ON L5S 1V9
MAIL: PROJECT@RPDSTUDIO.CA, CALL: 647-556-2596
WEBSITE: WWW.RPDSTUDIO.CA

PROJECT & CLIENT

0 CHIPPEWA STREET

CITY OF SAULT STE. MARIE
DISTRICT OF ALGOMA

DRAWING TITLE

CONCEPT MASTER PLAN

DRAWING NO.

N

SCALE :- 1:900

D

Appendix D
Sightline Assessment

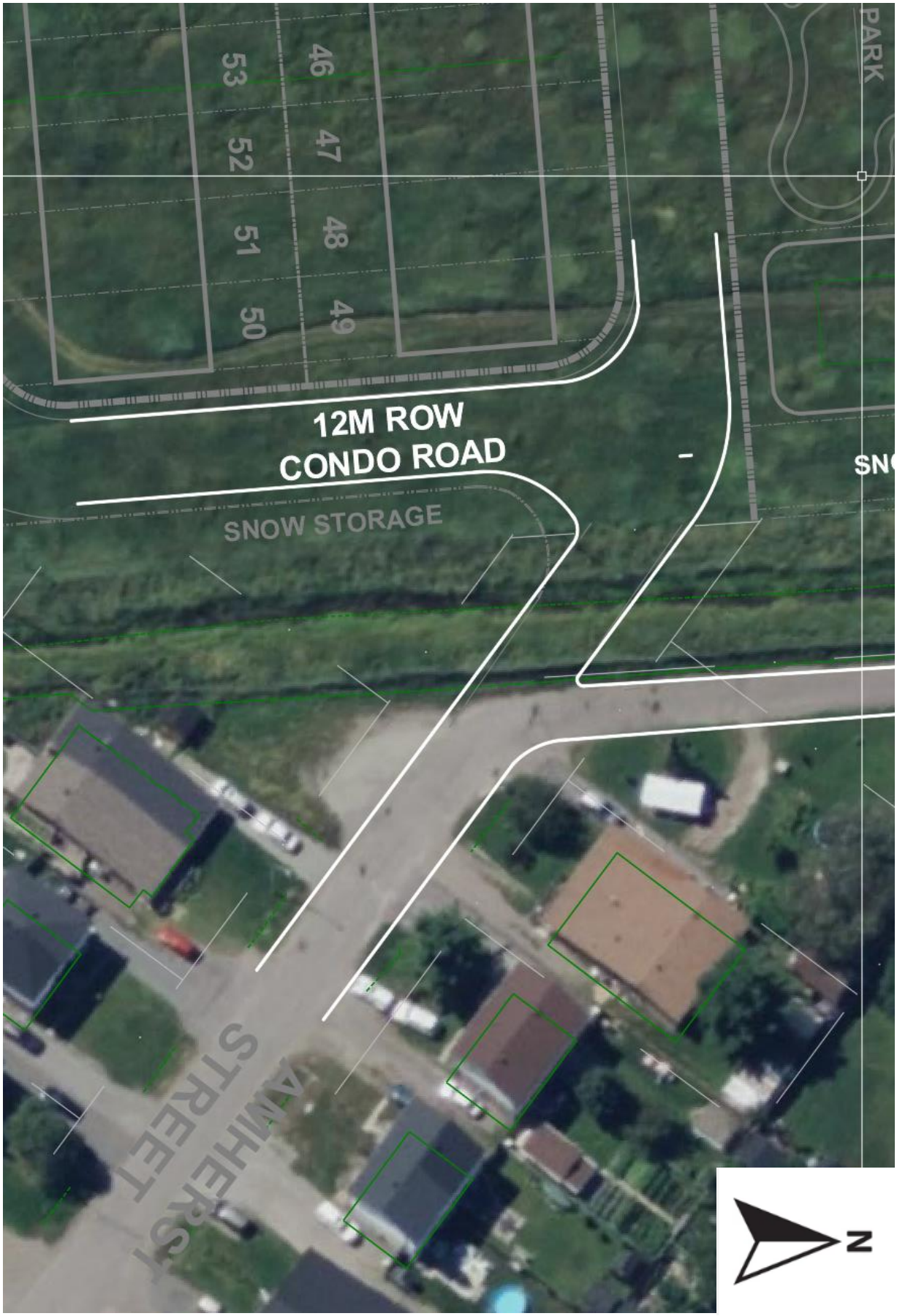

53
52
51
50
46
47
48
49
PARK
12M ROW
CONDO ROAD
SNOW STORAGE
AMHERST STREET
N

Photo Looking East

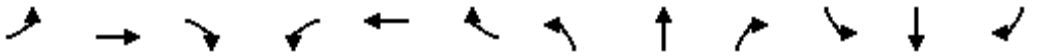
Photo Looking West

Photo Looking South

Photo Looking South from Lane

E

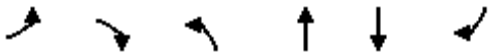
Appendix E
Existing Synchro and SimTraffic Outputs



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	67	352	27	37	219	169	17	122	64	210	120	40
Future Volume (vph)	67	352	27	37	219	169	17	122	64	210	120	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.93		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1686	3367		1768	1686		1739	1746		1765	1763	
Flt Permitted	0.37	1.00		0.51	1.00		0.65	1.00		0.40	1.00	
Satd. Flow (perm)	659	3367		950	1686		1186	1746		749	1763	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	383	29	40	238	184	18	133	70	228	130	43
RTOR Reduction (vph)	0	5	0	0	25	0	0	25	0	0	16	0
Lane Group Flow (vph)	73	407	0	40	397	0	18	178	0	228	157	0
Confl. Peds. (#/hr)	5		1	1		5	6		10	10		6
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	49.6	49.6		40.0	40.0		16.4	16.4		27.4	27.4	
Effective Green, g (s)	49.6	49.6		40.0	40.0		16.4	16.4		27.4	27.4	
Actuated g/C Ratio	0.55	0.55		0.44	0.44		0.18	0.18		0.30	0.30	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	427	1855		422	749		216	318		307	536	
v/s Ratio Prot	0.01	c0.12			c0.24			0.10		c0.06	0.09	
v/s Ratio Perm	0.08			0.04			0.02			c0.17		
v/c Ratio	0.17	0.22		0.09	0.53		0.08	0.56		0.74	0.29	
Uniform Delay, d1	10.4	10.3		14.5	18.2		30.6	33.5		27.1	23.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.3		0.4	2.7		0.2	2.3		9.3	0.3	
Delay (s)	10.6	10.6		14.9	20.8		30.7	35.8		36.4	24.2	
Level of Service	B	B		B	C		C	D		D	C	
Approach Delay (s)		10.6			20.3			35.4			31.1	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

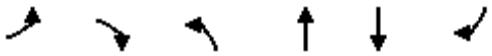
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	16	3	17	22	5
Future Volume (Veh/h)	4	16	3	17	22	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	0.80	0.75	0.85	0.79	0.63
Hourly flow rate (vph)	4	20	4	20	28	8
Pedestrians	3			16	16	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	79	51	39			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	79	51	39			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	854	1007	1580			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	24	36
Volume Left	4	4	0
Volume Right	20	0	8
cSH	977	1580	1700
Volume to Capacity	0.02	0.00	0.02
Queue Length 95th (m)	0.6	0.1	0.0
Control Delay (s)	8.8	1.2	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	1.2	0.0
Approach LOS	A		

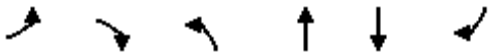
Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	18.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	51	16	176	200	11
Future Volume (Veh/h)	15	51	16	176	200	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.85	0.80	0.90	0.89	0.69
Hourly flow rate (vph)	16	60	20	196	225	16
Pedestrians	6			6	6	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	383	245	247			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	383	245	247			
tC, single (s)	6.8	7.0	4.6			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	97	92	98			
cM capacity (veh/h)	582	742	1170			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	76	85	131	241
Volume Left	16	20	0	0
Volume Right	60	0	0	16
cSH	701	1170	1700	1700
Volume to Capacity	0.11	0.02	0.08	0.14
Queue Length 95th (m)	2.9	0.4	0.0	0.0
Control Delay (s)	10.8	2.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	10.8	0.8		0.0
Approach LOS	B			

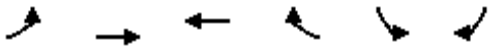
Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	75	31	312	235	40
Future Volume (Veh/h)	17	75	31	312	235	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.86	0.88	0.89	0.83
Hourly flow rate (vph)	20	88	36	355	264	48
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				371		
pX, platoon unblocked						
vC, conflicting volume	538	156	312			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	538	156	312			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	96	90	97			
cM capacity (veh/h)	465	846	1238			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	108	154	237	176	136
Volume Left	20	36	0	0	0
Volume Right	88	0	0	0	48
cSH	735	1238	1700	1700	1700
Volume to Capacity	0.15	0.03	0.14	0.10	0.08
Queue Length 95th (m)	4.1	0.7	0.0	0.0	0.0
Control Delay (s)	10.7	2.1	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.7	0.8		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	414	216	15	33	16
Future Volume (Veh/h)	16	414	216	15	33	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.83	0.73	0.75	0.83	0.80
Hourly flow rate (vph)	20	499	296	20	40	20
Pedestrians		4	4		5	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	321				854	315
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	321				854	315
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	98				87	97
cM capacity (veh/h)	1245				311	711

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	519	316	60
Volume Left	20	0	40
Volume Right	0	20	20
cSH	1245	1700	383
Volume to Capacity	0.02	0.19	0.16
Queue Length 95th (m)	0.4	0.0	4.4
Control Delay (s)	0.5	0.0	16.1
Lane LOS	A		C
Approach Delay (s)	0.5	0.0	16.1
Approach LOS			C

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	29.8	34.1	35.6	15.6	87.1	24.1	56.6	57.3	44.8
Average Queue (m)	9.4	14.3	18.7	4.9	36.1	4.7	30.1	31.2	20.9
95th Queue (m)	23.2	27.7	32.9	12.8	67.0	15.8	50.5	51.9	37.9
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)							1		
Queuing Penalty (veh)							0		

Intersection: 6: Broadview Dr & Atwater St

Movement	EB
Directions Served	LR
Maximum Queue (m)	15.8
Average Queue (m)	4.6
95th Queue (m)	12.7
Link Distance (m)	339.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Goulais Ave & Chippewa St

Movement	EB	NB	NB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (m)	19.0	9.1	1.8	1.7
Average Queue (m)	8.3	0.8	0.1	0.1
95th Queue (m)	14.3	4.9	1.3	1.2
Link Distance (m)	380.6	515.6	515.6	423.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Goulais Ave & Rushmere Dr

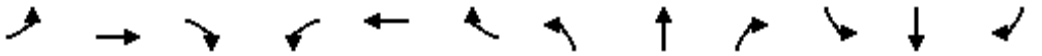
Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	23.0	12.1
Average Queue (m)	10.2	1.8
95th Queue (m)	16.9	8.2
Link Distance (m)	304.9	354.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Second Line W & Arden St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	15.8	7.8	22.6
Average Queue (m)	1.2	0.4	8.7
95th Queue (m)	8.1	3.7	17.2
Link Distance (m)	978.1	588.4	347.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

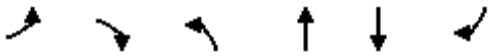
Zone wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	441	32	133	491	148	48	109	90	211	170	57
Future Volume (vph)	40	441	32	133	491	148	48	109	90	211	170	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.93		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	3365		1756	1739		1728	1691		1761	1757	
Flt Permitted	0.16	1.00		0.46	1.00		0.61	1.00		0.38	1.00	
Satd. Flow (perm)	276	3365		855	1739		1101	1691		706	1757	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	479	35	145	534	161	52	118	98	229	185	62
RTOR Reduction (vph)	0	5	0	0	10	0	0	38	0	0	16	0
Lane Group Flow (vph)	43	509	0	145	685	0	52	178	0	229	231	0
Confl. Peds. (#/hr)	17		9	9		17	12		21	21		12
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	49.4	49.4		41.2	41.2		16.6	16.6		27.6	27.6	
Effective Green, g (s)	49.4	49.4		41.2	41.2		16.6	16.6		27.6	27.6	
Actuated g/C Ratio	0.55	0.55		0.46	0.46		0.18	0.18		0.31	0.31	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	217	1847		391	796		203	311		298	538	
v/s Ratio Prot	0.01	c0.15			c0.39			0.11		c0.06	0.13	
v/s Ratio Perm	0.10			0.17			0.05			c0.18		
v/c Ratio	0.20	0.28		0.37	0.86		0.26	0.57		0.77	0.43	
Uniform Delay, d1	13.9	10.8		15.9	21.8		31.4	33.5		27.2	24.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4		2.7	11.8		0.7	2.5		11.3	0.6	
Delay (s)	14.4	11.2		18.6	33.6		32.1	36.0		38.5	25.5	
Level of Service	B	B		B	C		C	D		D	C	
Approach Delay (s)		11.4			31.0			35.2			31.7	
Approach LOS		B			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		

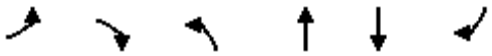
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	15	9	13	17	7
Future Volume (Veh/h)	6	15	9	13	17	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.81	0.71	0.88
Hourly flow rate (vph)	8	20	12	16	24	8
Pedestrians	4			3	2	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	74	35	36			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	74	35	36			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	99	98	99			
cM capacity (veh/h)	865	1038	1583			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	28	28	32
Volume Left	8	12	0
Volume Right	20	0	8
cSH	982	1583	1700
Volume to Capacity	0.03	0.01	0.02
Queue Length 95th (m)	0.7	0.2	0.0
Control Delay (s)	8.8	3.2	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	3.2	0.0
Approach LOS	A		

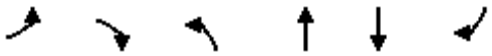
Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	18.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	23	30	177	182	5
Future Volume (Veh/h)	10	23	30	177	182	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.64	0.68	0.69	0.69	0.63
Hourly flow rate (vph)	16	36	44	257	264	8
Pedestrians	6			6	6	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	496	280	278			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	496	280	278			
tC, single (s)	6.8	7.0	4.6			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	97	95	96			
cM capacity (veh/h)	483	704	1137			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	52	130	171	272
Volume Left	16	44	0	0
Volume Right	36	0	0	8
cSH	617	1137	1700	1700
Volume to Capacity	0.08	0.04	0.10	0.16
Queue Length 95th (m)	2.2	1.0	0.0	0.0
Control Delay (s)	11.4	3.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.4	1.3		0.0
Approach LOS	B			

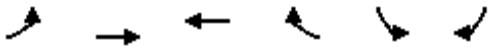
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	48	49	215	244	14
Future Volume (Veh/h)	8	48	49	215	244	14
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.80	0.88	0.88	0.86	0.88
Hourly flow rate (vph)	12	60	56	244	284	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				371		
pX, platoon unblocked						
vC, conflicting volume	526	150	300			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	526	150	300			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	97	93	96			
cM capacity (veh/h)	465	854	1251			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	72	137	163	189	111
Volume Left	12	56	0	0	0
Volume Right	60	0	0	0	16
cSH	749	1251	1700	1700	1700
Volume to Capacity	0.10	0.04	0.10	0.11	0.07
Queue Length 95th (m)	2.5	1.1	0.0	0.0	0.0
Control Delay (s)	10.3	3.5	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.3	1.6		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	8	444	367	49	30	12
Future Volume (Veh/h)	8	444	367	49	30	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	0.90	0.90	0.88	0.83	0.75
Hourly flow rate (vph)	8	493	408	56	36	16
Pedestrians		24	24		36	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		2	2		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	500				1005	496
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	500				1005	496
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	99				85	97
cM capacity (veh/h)	1042				244	538

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	501	464	52
Volume Left	8	0	36
Volume Right	0	56	16
cSH	1042	1700	293
Volume to Capacity	0.01	0.27	0.18
Queue Length 95th (m)	0.2	0.0	5.1
Control Delay (s)	0.2	0.0	19.9
Lane LOS	A		C
Approach Delay (s)	0.2	0.0	19.9
Approach LOS			C

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	26.7	41.1	46.9	77.2	178.0	38.1	54.8	59.2	59.4
Average Queue (m)	8.8	20.7	26.2	21.9	87.5	11.4	28.2	29.7	28.1
95th Queue (m)	20.2	35.6	44.0	61.9	162.2	26.4	47.3	49.0	48.0
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)						0	1		
Queuing Penalty (veh)						0	0		

Intersection: 6: Broadview Dr & Atwater St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	20.6	1.7
Average Queue (m)	5.7	0.1
95th Queue (m)	14.8	1.2
Link Distance (m)	339.8	424.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Goulais Ave & Chippewa St

Movement	EB	NB	NB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (m)	12.3	20.1	4.8	1.9
Average Queue (m)	5.8	2.4	0.2	0.1
95th Queue (m)	12.2	11.5	2.8	1.3
Link Distance (m)	380.6	515.6	515.6	423.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Goulais Ave & Rushmere Dr

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	17.7	12.8
Average Queue (m)	8.7	2.7
95th Queue (m)	16.0	10.0
Link Distance (m)	304.9	354.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Second Line W & Arden St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	18.5	27.5	19.0
Average Queue (m)	2.8	3.2	7.7
95th Queue (m)	11.6	14.7	16.4
Link Distance (m)	978.1	588.4	347.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 0

F

Appendix F
Signal Timing Plans

Intersection Location:	Second Line @ Sackville Rd	
Control Type:	Coordianted and Actuated	
Signal Timing Plan Effect Day:	Monday to Friday	
If Coordianted		
Coordinate Street:	Second Line	
Offset (s):	19	
Cycle Length (s):	90	
Signal Timing effect Time period :	6:45 am - 8:15 am & 9:30 am - 11:30 am & 1 pm - 2:40 pm & 5:40 pm - 10 pm	
Northbound Direction Street Name:	Sackville Rd	
Total Split (s):	43	
Arrow Green		
Minimum(s):	7	
Extension (s):	4	
Maximum(s):	35-40	
Arrow Amber Time (s):	3	
Arrow All-Red Time (s)	1	
Through Green		
Minimum (s):	15	
Extension (s):	4	
Maximum(s):	35-40	
Through Amber (s):	4.3	
Through All Red (s):	1.7	
Pedestrian Walk (s)	13	
Pedestrian Flash-Do Not Walk (s)	8	
Southbound Direction Street Name:	Sackville Rd	
Total Split (s)	43	
Arrow Green		
Minimum Green Time (s):	7	
Extension (s):	4	
Max Green Time(s):	35-40	
Arrow Amber Time (s):	3	
Arrow All-Red Time (s)	1	
Through Green		
Minimum (s):	15	
Extension (s):	4	
Maximum(s):	35-40	
Through Amber (s):	4.3	
Through All Red (s):	1.7	
Pedestrian Walk (s)	13	
Pedestrian Flash-Do Not Walk (s)	8	
Eastbound Direction Street Name:	Second Line	
Total Split (s)	47	
Arrow Green		
Minimum Green Time (s):	7	

Extension (s):	4
Max Green Time(s):	35-40
Arrow Amber Time (s):	3
Arrow All-Red Time (s)	1
Through Green	
Minimum (s):	20
Extension (s):	4
Maximum(s):	40-50
Through Amber (s):	5.4
Through All Red (s):	1.6
Pedestrian Walk (s)	13
Pedestrian Flash-Do Not Walk (s)	8
Westbound Direction Street Name:	Second Line
Total Split (s)	47
ArrowGreen	
Minimum Green Time (s):	7
Extension (s):	4
Max Green Time(s):	35-40
Arrow Amber Time (s):	3
Arrow All-Red Time (s)	1
Through Green	
Minimum (s):	20
Extension (s):	4
Maximum(s):	40-50
Through Amber (s):	5.4
Through All Red (s):	1.6
Pedestrian Walk (s)	13
Pedestrian Flash-Do Not Walk (s)	8

Intersection Location:	Second Line @ Sackville Rd	
Control Type:	Coordianted and Actuated	
Signal Timing Plan Effect Day:	Monday to Friday	
If Coordianted		
Coordinate Street:	Second Line	
Offset (s):	9	
Cycle Length (s):	100	
Signal Timing effect Time period :	8:15 am - 9:30 am & 11:30 an - 1:00 pm	
Northbound Direction Street Name:	Sackville Rd	
Total Split (s):	46	
Arrow Green		
Minimum(s):	14	
Extension (s):	4	
Maximum(s):	35-40	
Arrow Amber Time (s):	3	
Arrow All-Red Time (s)	1.7	
Through Green		
Minimum (s):	15	
Extension (s):	4	
Maximum(s):	35-40	
Through Amber (s):	4.3	
Through All Red (s):	1.7	
Pedestrian Walk (s)	13	
Pedestrian Flash-Do Not Walk (s)	8	
Southbound Direction Street Name:	Sackville Rd	
Total Split (s)	46	
Arrow Green		
Minimum Green Time (s):	14	
Extension (s):	4	
Max Green Time(s):	35-40	
Arrow Amber Time (s):	3	
Arrow All-Red Time (s)	1	
Through Green		
Minimum (s):	15	
Extension (s):	4	
Maximum(s):	35-40	
Through Amber (s):	4.3	
Through All Red (s):	1.7	
Pedestrian Walk (s)	13	
Pedestrian Flash-Do Not Walk (s)	8	
Eastbound Direction Street Name:	Second Line	
Total Split (s)	54	
Arrow Green		
Minimum Green Time (s):	13	

Extension (s):	4
Max Green Time(s):	35-40
Arrow Amber Time (s):	3
Arrow All-Red Time (s)	1
Through Green	
Minimum (s):	20
Extension (s):	4
Maximum(s):	40-50
Through Amber (s):	5.4
Through All Red (s):	1.6
Pedestrian Walk (s)	13
Pedestrian Flash-Do Not Walk (s)	8
Westbound Direction Street Name:	Second LIne
Total Split (s)	54
ArrowGreen	
Minimum Green Time (s):	13
Extension (s):	4
Max Green Time(s):	35-40
Arrow Amber Time (s):	3
Arrow All-Red Time (s)	1
Through Green	
Minimum (s):	20
Extension (s):	4
Maximum(s):	40-50
Through Amber (s):	5.4
Through All Red (s):	1.6
Pedestrian Walk (s)	13
Pedestrian Flash-Do Not Walk (s)	8

Intersection Location:	Second Line @ Goulais Ave	
Control Type:	Coordianted and Actuated	
Signal Timing Plan Effect Day:	Sunday to Saturday	
If Coordianted		
Coordinate Street:	Second Line	
Offset (s):	15	
Cycle Length (s):	90	
Signal Timing effect Time period :	6:45 - 22:00	
Northbound Direction Street Name:	Goulais Ave	
Total Split (s):	45	
Arrow Green		
Minimum(s):	0	
Extension (s):	0	
Maximum(s):	0	
Arrow Amber Time (s):	0	
Arrow All-Red Time (s)	0	
Through Green		
Minimum (s):	12	
Extension (s):	3	
Maximum(s):	45-55	
Through Amber (s):	4.3	
Through All Red (s):	1.7	
Pedestrian Walk (s)	7	
Pedestrian Flash-Do Not Walk (s)	20	
Southbound Direction Street Name:	Goulais Ave	
Total Split (s)	45	
Arrow Green		
Minimum Green Time (s):	7	
Extension (s):	3	
Max Green Time(s):	35-45	
Arrow Amber Time (s):	3	
Arrow All-Red Time (s)	1	
Through Green		
Minimum (s):	12	
Extension (s):	3	
Maximum(s):	45-55	
Through Amber (s):	4.3	
Through All Red (s):	1.7	
Pedestrian Walk (s)	7	
Pedestrian Flash-Do Not Walk (s)	20	
Eastbound Direction Street Name:	Second Line	
Total Split (s)	45	
Arrow Green		
Minimum Green Time (s):	7	

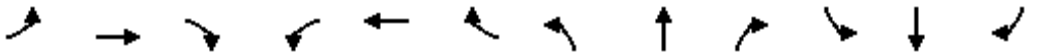
Extension (s):	3
Max Green Time(s):	35-45
Arrow Amber Time (s):	3
Arrow All-Red Time (s)	1
Through Green	
Minimum (s):	12
Extension (s):	3
Maximum(s):	45-55
Through Amber (s):	5.4
Through All Red (s):	1.6
Pedestrian Walk (s)	7
Pedestrian Flash-Do Not Walk (s)	19
Westbound Direction Street Name:	Second LIne
Total Split (s)	45
ArrowGreen	
Minimum Green Time (s):	0
Extension (s):	0
Max Green Time(s):	0
Arrow Amber Time (s):	0
Arrow All-Red Time (s)	0
Through Green	
Minimum (s):	12
Extension (s):	3
Maximum(s):	45-55
Through Amber (s):	5.4
Through All Red (s):	1.6
Pedestrian Walk (s)	7
Pedestrian Flash-Do Not Walk (s)	19

Intersection Location:	
Control Type:	
Signal Timing Plan Effect Day:	
If Coordianted	
Coordinate Street:	
Offset (s):	
Cycle Length (s):	
Signal Timing effect Time period :	
Northbound Direction Street Name:	
Total Split (s):	
Arrow Green	
Minimum(s):	
Extension (s):	
Maximum(s):	
Arrow Amber Time (s):	
Arrow All-Red Time (s)	
Through Green	
Minimum (s):	
Extension (s):	
Maximum(s):	
Through Amber (s):	
Through All Red (s):	
Pedestrian Walk (s)	
Pedestrian Flash-Do Not Walk (s)	
Southbound Direction Street Name:	
Total Split (s)	
Arrow Green	
Minimum Green Time (s):	
Extension (s):	
Max Green Time(s):	
Arrow Amber Time (s):	
Arrow All-Red Time (s)	
Through Green	
Minimum (s):	
Extension (s):	
Maximum(s):	
Through Amber (s):	
Through All Red (s):	
Pedestrian Walk (s)	
Pedestrian Flash-Do Not Walk (s)	
Eastbound Direction Street Name:	
Total Split (s)	
Arrow Green	
Minimum Green Time (s):	

Extension (s):	
Max Green Time(s):	
Arrow Amber Time (s):	
Arrow All-Red Time (s)	
Through Green	
Minimum (s):	
Extension (s):	
Maximum(s):	
Through Amber (s):	
Through All Red (s):	
Pedestrian Walk (s)	
Pedestrian Flash-Do Not Walk (s)	
Westbound Direction Street Name:	
Total Split (s)	
ArrowGreen	
Minimum Green Time (s):	
Extension (s):	
Max Green Time(s):	
Arrow Amber Time (s):	
Arrow All-Red Time (s)	
Through Green	
Minimum (s):	
Extension (s):	
Maximum(s):	
Through Amber (s):	
Through All Red (s):	
Pedestrian Walk (s)	
Pedestrian Flash-Do Not Walk (s)	

G

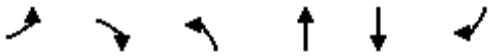
Appendix G
2032 Future Background Synchro and SimTraffic Outputs



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	385	30	40	240	185	19	133	70	230	131	44
Future Volume (vph)	73	385	30	40	240	185	19	133	70	230	131	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.93		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1686	3365		1768	1686		1739	1746		1766	1761	
Flt Permitted	0.33	1.00		0.49	1.00		0.64	1.00		0.38	1.00	
Satd. Flow (perm)	588	3365		915	1686		1168	1746		702	1761	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	418	33	43	261	201	21	145	76	250	142	48
RTOR Reduction (vph)	0	5	0	0	25	0	0	24	0	0	16	0
Lane Group Flow (vph)	79	446	0	43	437	0	21	197	0	250	174	0
Confl. Peds. (#/hr)	5		1	1		5	6		10	10		6
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	49.0	49.0		39.4	39.4		17.0	17.0		28.0	28.0	
Effective Green, g (s)	49.0	49.0		39.4	39.4		17.0	17.0		28.0	28.0	
Actuated g/C Ratio	0.54	0.54		0.44	0.44		0.19	0.19		0.31	0.31	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	388	1832		400	738		220	329		301	547	
v/s Ratio Prot	0.01	c0.13			c0.26			0.11		c0.06	0.10	
v/s Ratio Perm	0.10			0.05			0.02			c0.19		
v/c Ratio	0.20	0.24		0.11	0.59		0.10	0.60		0.83	0.32	
Uniform Delay, d1	11.1	10.8		14.9	19.2		30.1	33.4		27.9	23.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.3		0.5	3.5		0.2	2.9		17.4	0.3	
Delay (s)	11.3	11.1		15.5	22.7		30.3	36.3		45.3	24.0	
Level of Service	B	B		B	C		C	D		D	C	
Approach Delay (s)		11.1			22.1			35.8			36.1	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

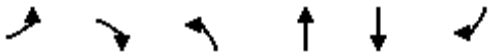
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	17	3	19	24	5
Future Volume (Veh/h)	4	17	3	19	24	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	0.80	0.75	0.85	0.79	0.63
Hourly flow rate (vph)	4	21	4	22	30	8
Pedestrians	3			16	16	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	83	53	41			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	83	53	41			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	849	1004	1577			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	25	26	38
Volume Left	4	4	0
Volume Right	21	0	8
cSH	976	1577	1700
Volume to Capacity	0.03	0.00	0.02
Queue Length 95th (m)	0.6	0.1	0.0
Control Delay (s)	8.8	1.1	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	1.1	0.0
Approach LOS	A		

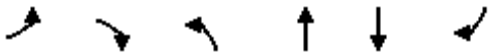
Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	18.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	56	17	192	219	12
Future Volume (Veh/h)	16	56	17	192	219	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.85	0.80	0.90	0.89	0.69
Hourly flow rate (vph)	17	66	21	213	246	17
Pedestrians	6			6	6	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	415	266	269			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	415	266	269			
tC, single (s)	6.8	7.0	4.6			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	97	91	98			
cM capacity (veh/h)	555	718	1146			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	83	92	142	263
Volume Left	17	21	0	0
Volume Right	66	0	0	17
cSH	677	1146	1700	1700
Volume to Capacity	0.12	0.02	0.08	0.15
Queue Length 95th (m)	3.3	0.4	0.0	0.0
Control Delay (s)	11.1	2.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.1	0.8		0.0
Approach LOS	B			

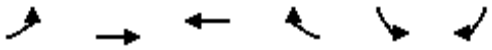
Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	82	34	341	257	44
Future Volume (Veh/h)	19	82	34	341	257	44
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.86	0.88	0.89	0.83
Hourly flow rate (vph)	22	96	40	388	289	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				371		
pX, platoon unblocked						
vC, conflicting volume	590	171	342			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590	171	342			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	95	88	97			
cM capacity (veh/h)	429	827	1207			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	118	169	259	193	149
Volume Left	22	40	0	0	0
Volume Right	96	0	0	0	53
cSH	705	1207	1700	1700	1700
Volume to Capacity	0.17	0.03	0.15	0.11	0.09
Queue Length 95th (m)	4.8	0.8	0.0	0.0	0.0
Control Delay (s)	11.1	2.1	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.1	0.8		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	453	236	16	36	17
Future Volume (Veh/h)	17	453	236	16	36	17
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.83	0.73	0.75	0.83	0.80
Hourly flow rate (vph)	21	546	323	21	43	21
Pedestrians		4	4		5	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	349				930	342
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	349				930	342
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	98				85	97
cM capacity (veh/h)	1216				280	686

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	567	344	64
Volume Left	21	0	43
Volume Right	0	21	21
cSH	1216	1700	347
Volume to Capacity	0.02	0.20	0.18
Queue Length 95th (m)	0.4	0.0	5.3
Control Delay (s)	0.5	0.0	17.7
Lane LOS	A		C
Approach Delay (s)	0.5	0.0	17.7
Approach LOS			C

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	34.5	39.0	42.1	20.5	84.8	23.5	78.2	62.2	50.9
Average Queue (m)	12.2	18.0	21.9	6.0	41.0	4.7	35.6	33.6	22.5
95th Queue (m)	26.3	32.7	39.3	14.1	71.8	15.3	62.3	55.5	41.5
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)							3		
Queuing Penalty (veh)							1		

Intersection: 6: Broadview Dr & Atwater St

Movement	EB
Directions Served	LR
Maximum Queue (m)	12.9
Average Queue (m)	4.9
95th Queue (m)	12.9
Link Distance (m)	339.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Goulais Ave & Chippewa St

Movement	EB	NB	NB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (m)	17.0	14.0	1.7	9.4
Average Queue (m)	8.2	1.4	0.1	0.5
95th Queue (m)	13.9	7.9	1.2	4.6
Link Distance (m)	380.6	515.6	515.6	423.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Goulais Ave & Rushmere Dr

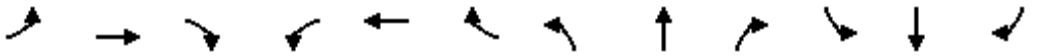
Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	19.0	12.9	1.3
Average Queue (m)	10.5	2.9	0.0
95th Queue (m)	16.7	10.2	0.9
Link Distance (m)	304.9	354.3	515.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Second Line W & Arden St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	17.0	6.0	22.8
Average Queue (m)	1.2	0.2	8.8
95th Queue (m)	8.0	3.0	17.9
Link Distance (m)	978.1	588.4	347.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

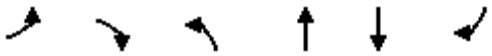
Zone wide Queuing Penalty: 1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	482	35	145	537	162	52	119	98	231	186	62
Future Volume (vph)	44	482	35	145	537	162	52	119	98	231	186	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.93		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	3365		1757	1739		1728	1691		1763	1758	
Flt Permitted	0.10	1.00		0.44	1.00		0.59	1.00		0.35	1.00	
Satd. Flow (perm)	173	3365		816	1739		1080	1691		654	1758	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	524	38	158	584	176	57	129	107	251	202	67
RTOR Reduction (vph)	0	5	0	0	9	0	0	38	0	0	16	0
Lane Group Flow (vph)	48	557	0	158	751	0	57	198	0	251	253	0
Confl. Peds. (#/hr)	17		9	9		17	12		21	21		12
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.8	48.8		40.6	40.6		17.2	17.2		28.2	28.2	
Effective Green, g (s)	48.8	48.8		40.6	40.6		17.2	17.2		28.2	28.2	
Actuated g/C Ratio	0.54	0.54		0.45	0.45		0.19	0.19		0.31	0.31	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	164	1824		368	784		206	323		291	550	
v/s Ratio Prot	0.01	c0.17			c0.43			0.12		c0.07	0.14	
v/s Ratio Perm	0.14			0.19			0.05			c0.20		
v/c Ratio	0.29	0.31		0.43	0.96		0.28	0.61		0.86	0.46	
Uniform Delay, d1	16.3	11.3		16.8	23.9		31.1	33.4		28.1	24.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.4		3.6	23.3		0.7	3.4		22.2	0.6	
Delay (s)	17.3	11.7		20.4	47.2		31.8	36.8		50.3	25.4	
Level of Service	B	B		C	D		C	D		D	C	
Approach Delay (s)		12.2			42.6			35.8			37.4	
Approach LOS		B			D			D			D	

Intersection Summary					
HCM 2000 Control Delay	32.7	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.93				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0		
Intersection Capacity Utilization	92.5%	ICU Level of Service	F		
Analysis Period (min)	15				

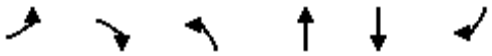
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	16	10	14	19	8
Future Volume (Veh/h)	7	16	10	14	19	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.81	0.71	0.88
Hourly flow rate (vph)	9	21	13	17	27	9
Pedestrians	4			3	2	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	80	38	40			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	80	38	40			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	99	98	99			
cM capacity (veh/h)	857	1033	1577			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	30	30	36
Volume Left	9	13	0
Volume Right	21	0	9
cSH	973	1577	1700
Volume to Capacity	0.03	0.01	0.02
Queue Length 95th (m)	0.8	0.2	0.0
Control Delay (s)	8.8	3.2	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	3.2	0.0
Approach LOS	A		

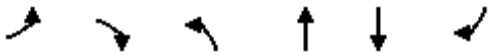
Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	25	33	194	199	5
Future Volume (Veh/h)	11	25	33	194	199	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.64	0.68	0.69	0.69	0.63
Hourly flow rate (vph)	17	39	49	281	288	8
Pedestrians	6			6	6	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	542	304	302			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	542	304	302			
tC, single (s)	6.8	7.0	4.6			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	96	94	96			
cM capacity (veh/h)	450	679	1111			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	56	143	187	296
Volume Left	17	49	0	0
Volume Right	39	0	0	8
cSH	588	1111	1700	1700
Volume to Capacity	0.10	0.04	0.11	0.17
Queue Length 95th (m)	2.5	1.1	0.0	0.0
Control Delay (s)	11.8	3.1	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.8	1.4		0.0
Approach LOS	B			

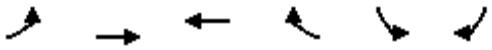
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	52	54	235	267	15
Future Volume (Veh/h)	9	52	54	235	267	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.80	0.88	0.88	0.86	0.88
Hourly flow rate (vph)	13	65	61	267	310	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				371		
pX, platoon unblocked						
vC, conflicting volume	574	164	327			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	574	164	327			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	97	92	95			
cM capacity (veh/h)	431	837	1222			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	78	150	178	207	120
Volume Left	13	61	0	0	0
Volume Right	65	0	0	0	17
cSH	723	1222	1700	1700	1700
Volume to Capacity	0.11	0.05	0.10	0.12	0.07
Queue Length 95th (m)	2.9	1.3	0.0	0.0	0.0
Control Delay (s)	10.6	3.5	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.6	1.6		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	29.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	486	401	54	33	13
Future Volume (Veh/h)	9	486	401	54	33	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	0.90	0.90	0.88	0.83	0.75
Hourly flow rate (vph)	9	540	446	61	40	17
Pedestrians		24	24		36	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		2	2		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	543				1094	536
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	543				1094	536
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	99				81	97
cM capacity (veh/h)	1005				215	510

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	549	507	57
Volume Left	9	0	40
Volume Right	0	61	17
cSH	1005	1700	260
Volume to Capacity	0.01	0.30	0.22
Queue Length 95th (m)	0.2	0.0	6.5
Control Delay (s)	0.3	0.0	22.7
Lane LOS	A		C
Approach Delay (s)	0.3	0.0	22.7
Approach LOS			C

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	26.1	44.4	48.9	122.5	228.6	49.0	80.1	60.7	72.8
Average Queue (m)	9.4	23.1	28.0	25.4	108.4	11.7	34.1	31.9	31.7
95th Queue (m)	20.6	38.6	45.4	70.2	205.6	27.6	61.8	52.1	58.9
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)							3		
Queuing Penalty (veh)							1		

Intersection: 6: Broadview Dr & Atwater St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	16.7	1.8
Average Queue (m)	4.9	0.1
95th Queue (m)	13.4	1.3
Link Distance (m)	339.8	424.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Goulais Ave & Chippewa St

Movement	EB	NB	NB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (m)	10.8	18.2	5.3	3.7
Average Queue (m)	5.7	3.0	0.2	0.1
95th Queue (m)	11.9	11.8	2.2	1.9
Link Distance (m)	380.6	515.6	515.6	423.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Goulais Ave & Rushmere Dr

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	17.0	13.1
Average Queue (m)	8.3	3.2
95th Queue (m)	15.2	10.9
Link Distance (m)	304.9	354.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Second Line W & Arden St

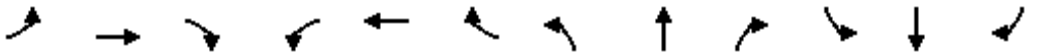
Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	40.8	32.8	22.6
Average Queue (m)	6.0	4.0	8.5
95th Queue (m)	23.7	17.7	18.0
Link Distance (m)	978.1	588.4	347.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 1

H

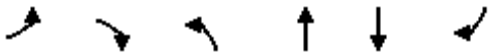
Appendix H
2035 Future Background Synchro and SimTraffic Outputs



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	397	31	41	247	191	20	137	72	237	135	45
Future Volume (vph)	75	397	31	41	247	191	20	137	72	237	135	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.93		1.00	0.95		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1686	3365		1768	1685		1739	1747		1766	1762	
Flt Permitted	0.32	1.00		0.48	1.00		0.63	1.00		0.37	1.00	
Satd. Flow (perm)	563	3365		901	1685		1162	1747		687	1762	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	432	34	45	268	208	22	149	78	258	147	49
RTOR Reduction (vph)	0	5	0	0	25	0	0	24	0	0	16	0
Lane Group Flow (vph)	82	461	0	45	451	0	22	203	0	258	180	0
Confl. Peds. (#/hr)	5		1	1		5	6		10	10		6
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.8	48.8		39.2	39.2		17.2	17.2		28.2	28.2	
Effective Green, g (s)	48.8	48.8		39.2	39.2		17.2	17.2		28.2	28.2	
Actuated g/C Ratio	0.54	0.54		0.44	0.44		0.19	0.19		0.31	0.31	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	375	1824		392	733		222	333		299	552	
v/s Ratio Prot	0.01	c0.14			c0.27			0.12		c0.07	0.10	
v/s Ratio Perm	0.10			0.05			0.02			c0.20		
v/c Ratio	0.22	0.25		0.11	0.61		0.10	0.61		0.86	0.33	
Uniform Delay, d1	11.3	10.9		15.1	19.6		30.0	33.3		28.2	23.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.3		0.6	3.8		0.2	3.1		21.7	0.3	
Delay (s)	11.6	11.3		15.7	23.4		30.2	36.5		49.9	24.0	
Level of Service	B	B		B	C		C	D		D	C	
Approach Delay (s)		11.3			22.7			35.9			38.7	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

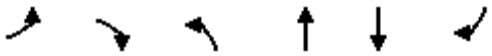
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	18	3	20	25	5
Future Volume (Veh/h)	4	18	3	20	25	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	0.80	0.75	0.85	0.79	0.63
Hourly flow rate (vph)	4	22	4	24	32	8
Pedestrians	3			16	16	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	87	55	43			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87	55	43			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	845	1001	1575			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	26	28	40
Volume Left	4	4	0
Volume Right	22	0	8
cSH	974	1575	1700
Volume to Capacity	0.03	0.00	0.02
Queue Length 95th (m)	0.7	0.1	0.0
Control Delay (s)	8.8	1.1	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	1.1	0.0
Approach LOS	A		

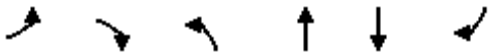
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	18.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	58	18	198	226	12
Future Volume (Veh/h)	16	58	18	198	226	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.85	0.80	0.90	0.89	0.69
Hourly flow rate (vph)	17	68	22	220	254	17
Pedestrians	6			6	6	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	428	274	277			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	428	274	277			
tC, single (s)	6.8	7.0	4.6			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	97	90	98			
cM capacity (veh/h)	544	710	1138			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	85	95	147	271
Volume Left	17	22	0	0
Volume Right	68	0	0	17
cSH	669	1138	1700	1700
Volume to Capacity	0.13	0.02	0.09	0.16
Queue Length 95th (m)	3.5	0.5	0.0	0.0
Control Delay (s)	11.2	2.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.2	0.8		0.0
Approach LOS	B			

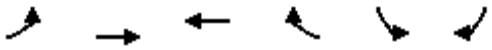
Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	84	35	351	265	45
Future Volume (Veh/h)	20	84	35	351	265	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.86	0.88	0.89	0.83
Hourly flow rate (vph)	24	99	41	399	298	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				371		
pX, platoon unblocked						
vC, conflicting volume	606	176	352			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	606	176	352			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	94	88	97			
cM capacity (veh/h)	418	821	1196			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	123	174	266	199	153
Volume Left	24	41	0	0	0
Volume Right	99	0	0	0	54
cSH	691	1196	1700	1700	1700
Volume to Capacity	0.18	0.03	0.16	0.12	0.09
Queue Length 95th (m)	5.1	0.9	0.0	0.0	0.0
Control Delay (s)	11.3	2.1	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.3	0.8		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	467	243	16	37	18
Future Volume (Veh/h)	18	467	243	16	37	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.83	0.73	0.75	0.83	0.80
Hourly flow rate (vph)	22	563	333	21	45	22
Pedestrians		4	4		5	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	359				960	352
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	359				960	352
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	98				83	97
cM capacity (veh/h)	1206				268	677

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	585	354	67
Volume Left	22	0	45
Volume Right	0	21	22
cSH	1206	1700	335
Volume to Capacity	0.02	0.21	0.20
Queue Length 95th (m)	0.4	0.0	5.9
Control Delay (s)	0.5	0.0	18.4
Lane LOS	A		C
Approach Delay (s)	0.5	0.0	18.4
Approach LOS			C

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	33.1	41.7	47.6	22.7	84.8	34.7	81.0	70.8	52.3
Average Queue (m)	12.1	18.2	23.1	6.8	40.8	6.0	33.8	34.6	23.2
95th Queue (m)	25.6	33.5	40.1	16.3	69.9	19.2	60.6	61.8	43.3
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)							2		
Queuing Penalty (veh)							0		

Intersection: 6: Broadview Dr & Atwater St

Movement	EB
Directions Served	LR
Maximum Queue (m)	17.7
Average Queue (m)	4.9
95th Queue (m)	13.3
Link Distance (m)	339.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Goulais Ave & Chippewa St

Movement	EB	NB	NB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (m)	20.5	19.7	1.8	2.9
Average Queue (m)	8.6	2.1	0.1	0.1
95th Queue (m)	16.2	10.7	1.3	1.5
Link Distance (m)	380.6	515.6	515.6	423.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Goulais Ave & Rushmere Dr

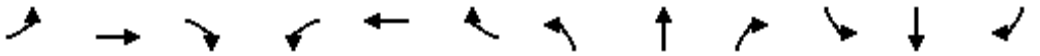
Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	22.6	10.8	1.2
Average Queue (m)	11.1	2.5	0.0
95th Queue (m)	17.9	9.2	0.9
Link Distance (m)	304.9	354.3	515.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Second Line W & Arden St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	16.4	5.4	22.6
Average Queue (m)	1.4	0.2	9.5
95th Queue (m)	9.2	2.2	17.7
Link Distance (m)	978.1	588.4	347.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

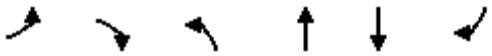
Zone wide Queuing Penalty: 0



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	497	36	149	553	167	54	123	101	238	192	64
Future Volume (vph)	45	497	36	149	553	167	54	123	101	238	192	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.93		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	3365		1757	1738		1729	1692		1763	1758	
Flt Permitted	0.09	1.00		0.43	1.00		0.59	1.00		0.34	1.00	
Satd. Flow (perm)	160	3365		803	1738		1070	1692		633	1758	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	540	39	162	601	182	59	134	110	259	209	70
RTOR Reduction (vph)	0	5	0	0	10	0	0	38	0	0	16	0
Lane Group Flow (vph)	49	574	0	162	773	0	59	206	0	259	263	0
Confl. Peds. (#/hr)	17		9	9		17	12		21	21		12
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.6	48.6		40.4	40.4		17.4	17.4		28.4	28.4	
Effective Green, g (s)	48.6	48.6		40.4	40.4		17.4	17.4		28.4	28.4	
Actuated g/C Ratio	0.54	0.54		0.45	0.45		0.19	0.19		0.32	0.32	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	157	1817		360	780		206	327		287	554	
v/s Ratio Prot	0.01	c0.17			c0.44			0.12		c0.07	0.15	
v/s Ratio Perm	0.15			0.20			0.06			c0.21		
v/c Ratio	0.31	0.32		0.45	0.99		0.29	0.63		0.90	0.48	
Uniform Delay, d1	17.2	11.5		17.1	24.6		31.0	33.3		28.5	24.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.5		4.0	30.1		0.8	3.9		29.2	0.6	
Delay (s)	18.3	11.9		21.2	54.8		31.8	37.3		57.7	25.4	
Level of Service	B	B		C	D		C	D		E	C	
Approach Delay (s)		12.4			49.0			36.2			41.0	
Approach LOS		B			D			D			D	

Intersection Summary					
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D		
HCM 2000 Volume to Capacity ratio	0.96				
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0		
Intersection Capacity Utilization	94.2%	ICU Level of Service	F		
Analysis Period (min)	15				

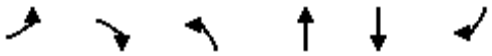
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	16	10	14	20	8
Future Volume (Veh/h)	7	16	10	14	20	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.81	0.71	0.88
Hourly flow rate (vph)	9	21	13	17	28	9
Pedestrians	4			3	2	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	82	40	41			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	82	40	41			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	99	98	99			
cM capacity (veh/h)	855	1032	1576			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	30	30	37
Volume Left	9	13	0
Volume Right	21	0	9
cSH	972	1576	1700
Volume to Capacity	0.03	0.01	0.02
Queue Length 95th (m)	0.8	0.2	0.0
Control Delay (s)	8.8	3.2	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	3.2	0.0
Approach LOS	A		

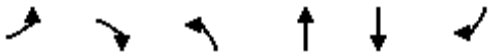
Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	18.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	26	34	200	205	5
Future Volume (Veh/h)	11	26	34	200	205	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.64	0.68	0.69	0.69	0.63
Hourly flow rate (vph)	17	41	50	290	297	8
Pedestrians	6			6	6	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	558	313	311			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	558	313	311			
tC, single (s)	6.8	7.0	4.6			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	96	94	95			
cM capacity (veh/h)	439	670	1102			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	58	147	193	305
Volume Left	17	50	0	0
Volume Right	41	0	0	8
cSH	581	1102	1700	1700
Volume to Capacity	0.10	0.05	0.11	0.18
Queue Length 95th (m)	2.7	1.1	0.0	0.0
Control Delay (s)	11.9	3.1	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.9	1.4		0.0
Approach LOS	B			

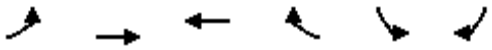
Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	54	56	242	275	15
Future Volume (Veh/h)	9	54	56	242	275	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.80	0.88	0.88	0.86	0.88
Hourly flow rate (vph)	13	68	64	275	320	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				371		
pX, platoon unblocked						
vC, conflicting volume	594	168	337			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	594	168	337			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	97	92	95			
cM capacity (veh/h)	418	831	1212			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	81	156	183	213	124
Volume Left	13	64	0	0	0
Volume Right	68	0	0	0	17
cSH	717	1212	1700	1700	1700
Volume to Capacity	0.11	0.05	0.11	0.13	0.07
Queue Length 95th (m)	3.0	1.3	0.0	0.0	0.0
Control Delay (s)	10.7	3.6	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	10.7	1.7		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	30.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	501	413	56	34	13
Future Volume (Veh/h)	9	501	413	56	34	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	0.90	0.90	0.88	0.83	0.75
Hourly flow rate (vph)	9	557	459	64	41	17
Pedestrians		24	24		36	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		2	2		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	559				1126	551
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	559				1126	551
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	99				80	97
cM capacity (veh/h)	991				206	500

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	566	523	58
Volume Left	9	0	41
Volume Right	0	64	17
cSH	991	1700	249
Volume to Capacity	0.01	0.31	0.23
Queue Length 95th (m)	0.2	0.0	7.0
Control Delay (s)	0.3	0.0	23.8
Lane LOS	A		C
Approach Delay (s)	0.3	0.0	23.8
Approach LOS			C

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	23.2	47.3	53.5	137.5	275.7	37.4	76.8	58.2	67.9
Average Queue (m)	9.8	24.9	28.6	43.8	156.5	12.8	33.7	30.4	31.4
95th Queue (m)	21.4	41.2	47.8	138.0	319.6	29.7	60.6	49.6	55.8
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)							3		
Queuing Penalty (veh)							1		

Intersection: 6: Broadview Dr & Atwater St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	18.8	3.7
Average Queue (m)	5.5	0.2
95th Queue (m)	14.8	2.3
Link Distance (m)	339.8	424.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Goulais Ave & Chippewa St

Movement	EB	NB	NB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (m)	13.7	13.6	3.7	4.4
Average Queue (m)	5.5	2.3	0.1	0.1
95th Queue (m)	12.3	10.3	1.9	1.8
Link Distance (m)	380.6	515.6	515.6	423.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Goulais Ave & Rushmere Dr

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	20.3	14.6
Average Queue (m)	9.0	3.8
95th Queue (m)	17.1	11.9
Link Distance (m)	304.9	354.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

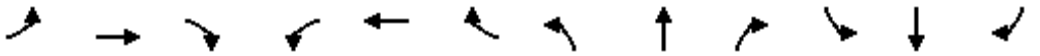
Intersection: 11: Second Line W & Arden St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	27.3	25.6	18.6
Average Queue (m)	4.0	2.8	7.9
95th Queue (m)	16.4	13.1	16.7
Link Distance (m)	978.1	588.4	347.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 1

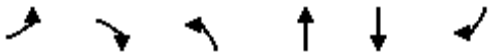
Appendix I
2032 Future Total Synchro and SimTraffic Outputs



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	73	385	30	40	252	185	19	145	70	257	159	44
Future Volume (vph)	73	385	30	40	252	185	19	145	70	257	159	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.94		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1686	3365		1768	1689		1740	1755		1766	1775	
Flt Permitted	0.32	1.00		0.49	1.00		0.62	1.00		0.36	1.00	
Satd. Flow (perm)	562	3365		915	1689		1136	1755		668	1775	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	418	33	43	274	201	21	158	76	279	173	48
RTOR Reduction (vph)	0	5	0	0	24	0	0	22	0	0	13	0
Lane Group Flow (vph)	79	446	0	43	451	0	21	212	0	279	208	0
Confl. Peds. (#/hr)	5		1	1		5	6		10	10		6
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.6	48.6		39.0	39.0		17.4	17.4		28.4	28.4	
Effective Green, g (s)	48.6	48.6		39.0	39.0		17.4	17.4		28.4	28.4	
Actuated g/C Ratio	0.54	0.54		0.43	0.43		0.19	0.19		0.32	0.32	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	373	1817		396	731		219	339		296	560	
v/s Ratio Prot	0.01	c0.13			c0.27			0.12		c0.07	0.12	
v/s Ratio Perm	0.10			0.05			0.02			c0.22		
v/c Ratio	0.21	0.25		0.11	0.62		0.10	0.63		0.94	0.37	
Uniform Delay, d1	11.4	11.0		15.2	19.7		29.8	33.3		29.2	23.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.3		0.6	3.9		0.2	3.6		37.1	0.4	
Delay (s)	11.7	11.3		15.7	23.6		30.0	36.9		66.3	24.3	
Level of Service	B	B		B	C		C	D		E	C	
Approach Delay (s)		11.4			22.9			36.3			47.7	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

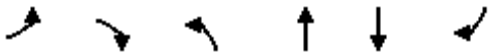
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	40	48	33	19	24	5
Future Volume (Veh/h)	40	48	33	19	24	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	0.80	0.75	0.85	0.79	0.63
Hourly flow rate (vph)	40	60	44	22	30	8
Pedestrians	3			16	16	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	163	53	41			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	163	53	41			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	95	94	97			
cM capacity (veh/h)	744	1004	1577			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	100	66	38
Volume Left	40	44	0
Volume Right	60	0	8
cSH	881	1577	1700
Volume to Capacity	0.11	0.03	0.02
Queue Length 95th (m)	3.1	0.7	0.0
Control Delay (s)	9.6	5.0	0.0
Lane LOS	A	A	
Approach Delay (s)	9.6	5.0	0.0
Approach LOS	A		

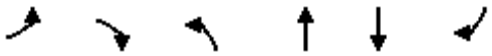
Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	25.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	33	111	29	192	219	19
Future Volume (Veh/h)	33	111	29	192	219	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.85	0.80	0.90	0.89	0.69
Hourly flow rate (vph)	35	131	36	213	246	28
Pedestrians	6			6	6	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	450	272	280			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	450	272	280			
tC, single (s)	6.8	7.0	4.6			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	93	82	97			
cM capacity (veh/h)	520	713	1135			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	166	107	142	274
Volume Left	35	36	0	0
Volume Right	131	0	0	28
cSH	661	1135	1700	1700
Volume to Capacity	0.25	0.03	0.08	0.16
Queue Length 95th (m)	7.9	0.8	0.0	0.0
Control Delay (s)	12.3	3.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	12.3	1.3		0.0
Approach LOS	B			

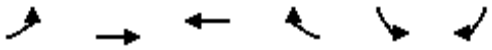
Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	82	34	353	312	44
Future Volume (Veh/h)	19	82	34	353	312	44
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.86	0.88	0.89	0.83
Hourly flow rate (vph)	22	96	40	401	351	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				371		
pX, platoon unblocked						
vC, conflicting volume	658	202	404			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	658	202	404			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	94	88	97			
cM capacity (veh/h)	388	790	1144			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	118	174	267	234	170
Volume Left	22	40	0	0	0
Volume Right	96	0	0	0	53
cSH	662	1144	1700	1700	1700
Volume to Capacity	0.18	0.03	0.16	0.14	0.10
Queue Length 95th (m)	5.2	0.9	0.0	0.0	0.0
Control Delay (s)	11.6	2.1	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.6	0.8		0.0	
Approach LOS	B				

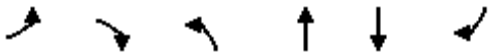
Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	453	236	28	36	48
Future Volume (Veh/h)	35	453	236	28	36	48
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.83	0.73	0.75	0.83	0.80
Hourly flow rate (vph)	44	546	323	37	43	60
Pedestrians		4	4		5	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	365				984	350
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	365				984	350
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	96				83	91
cM capacity (veh/h)	1200				254	679

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	590	360	103
Volume Left	44	0	43
Volume Right	0	37	60
cSH	1200	1700	400
Volume to Capacity	0.04	0.21	0.26
Queue Length 95th (m)	0.9	0.0	8.1
Control Delay (s)	1.0	0.0	17.1
Lane LOS	A		C
Approach Delay (s)	1.0	0.0	17.1
Approach LOS			C

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	11	11	52	72	0
Future Volume (Veh/h)	0	11	11	52	72	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	12	57	78	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	159	78	78			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	159	78	78			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	99			
cM capacity (veh/h)	826	983	1520			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	69	78
Volume Left	0	12	0
Volume Right	12	0	0
cSH	983	1520	1700
Volume to Capacity	0.01	0.01	0.05
Queue Length 95th (m)	0.3	0.2	0.0
Control Delay (s)	8.7	1.3	0.0
Lane LOS	A	A	
Approach Delay (s)	8.7	1.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	85	0	29	19	0	59
Future Volume (Veh/h)	85	0	29	19	0	59
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	0	32	21	0	64
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			92		177	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		177	92
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	93
cM capacity (veh/h)			1503		795	965

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	53	64
Volume Left	0	32	0
Volume Right	0	0	64
cSH	1700	1503	965
Volume to Capacity	0.05	0.02	0.07
Queue Length 95th (m)	0.0	0.5	1.7
Control Delay (s)	0.0	4.6	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	4.6	9.0
Approach LOS			A

Intersection Summary			
Average Delay		3.9	
Intersection Capacity Utilization		19.6%	ICU Level of Service A
Analysis Period (min)		15	

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	28.6	37.8	51.8	23.0	86.3	19.0	67.5	64.4	57.2
Average Queue (m)	12.2	17.7	22.8	6.1	42.1	5.5	34.3	34.8	26.2
95th Queue (m)	25.1	32.3	41.1	15.8	73.7	15.3	60.5	56.7	48.7
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)							3		
Queuing Penalty (veh)							1		

Intersection: 6: Broadview Dr & Atwater St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	22.8	7.2
Average Queue (m)	10.8	0.4
95th Queue (m)	18.5	3.6
Link Distance (m)	339.7	330.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Goulais Ave & Chippewa St

Movement	EB	NB	NB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (m)	25.9	17.6	4.8	4.6
Average Queue (m)	10.8	2.2	0.2	0.2
95th Queue (m)	18.7	10.3	2.5	2.4
Link Distance (m)	380.6	515.6	515.6	423.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Goulais Ave & Rushmere Dr

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	19.7	12.0	1.3
Average Queue (m)	10.7	2.9	0.0
95th Queue (m)	16.6	10.4	0.9
Link Distance (m)	304.9	354.3	515.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Second Line W & Arden St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	26.2	5.1	25.1
Average Queue (m)	4.3	0.2	11.9
95th Queue (m)	16.8	3.0	21.1
Link Distance (m)	978.1	588.4	347.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 15: Broadview Dr

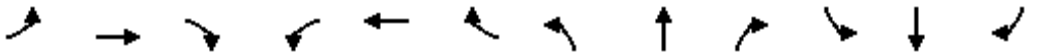
Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.1	9.0
Average Queue (m)	2.1	0.5
95th Queue (m)	7.7	3.8
Link Distance (m)	270.7	77.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 17: Broadview Dr & Chippewa St

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	7.3	14.5
Average Queue (m)	0.3	6.8
95th Queue (m)	3.0	12.8
Link Distance (m)	380.6	125.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

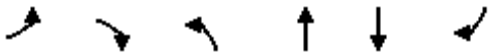
Zone wide Queuing Penalty: 1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	482	35	145	581	162	52	134	98	267	199	62
Future Volume (vph)	44	482	35	145	581	162	52	134	98	267	199	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	3365		1757	1743		1729	1704		1763	1763	
Flt Permitted	0.09	1.00		0.44	1.00		0.59	1.00		0.33	1.00	
Satd. Flow (perm)	161	3365		816	1743		1067	1704		615	1763	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	524	38	158	632	176	57	146	107	290	216	67
RTOR Reduction (vph)	0	5	0	0	9	0	0	34	0	0	14	0
Lane Group Flow (vph)	48	557	0	158	799	0	57	219	0	290	269	0
Confl. Peds. (#/hr)	17		9	9		17	12		21	21		12
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.2	48.2		40.0	40.0		17.8	17.8		28.8	28.8	
Effective Green, g (s)	48.2	48.2		40.0	40.0		17.8	17.8		28.8	28.8	
Actuated g/C Ratio	0.54	0.54		0.44	0.44		0.20	0.20		0.32	0.32	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	157	1802		362	774		211	337		286	564	
v/s Ratio Prot	0.01	c0.17			c0.46			0.13		c0.08	0.15	
v/s Ratio Perm	0.15			0.19			0.05			c0.25		
v/c Ratio	0.31	0.31		0.44	1.03		0.27	0.65		1.01	0.48	
Uniform Delay, d1	18.2	11.6		17.2	25.0		30.6	33.2		29.7	24.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.4		3.8	41.0		0.7	4.5		56.8	0.6	
Delay (s)	19.4	12.1		21.0	66.0		31.3	37.7		86.6	25.2	
Level of Service	B	B		C	E		C	D		F	C	
Approach Delay (s)		12.7			58.6			36.5			56.3	
Approach LOS		B			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	43.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		

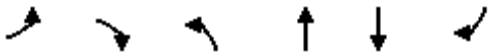
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	38	84	14	19	8
Future Volume (Veh/h)	36	38	84	14	19	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.81	0.71	0.88
Hourly flow rate (vph)	48	51	112	17	27	9
Pedestrians	4			3	2	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	278	38	40			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	278	38	40			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	92	95	93			
cM capacity (veh/h)	615	1033	1577			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	99	129	36
Volume Left	48	112	0
Volume Right	51	0	9
cSH	777	1577	1700
Volume to Capacity	0.13	0.07	0.02
Queue Length 95th (m)	3.5	1.8	0.0
Control Delay (s)	10.3	6.5	0.0
Lane LOS	B	A	
Approach Delay (s)	10.3	6.5	0.0
Approach LOS	B		

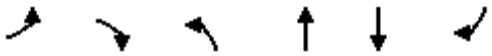
Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	74	48	194	199	17
Future Volume (Veh/h)	20	74	48	194	199	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.64	0.68	0.69	0.69	0.63
Hourly flow rate (vph)	32	116	71	281	288	27
Pedestrians	6			6	6	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	596	314	321			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	596	314	321			
tC, single (s)	6.8	7.0	4.6			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	92	83	93			
cM capacity (veh/h)	407	670	1092			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	148	165	187	315
Volume Left	32	71	0	0
Volume Right	116	0	0	27
cSH	588	1092	1700	1700
Volume to Capacity	0.25	0.07	0.11	0.19
Queue Length 95th (m)	7.9	1.7	0.0	0.0
Control Delay (s)	13.2	4.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	13.2	1.9		0.0
Approach LOS	B			

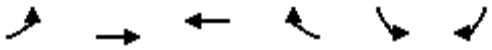
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	52	54	250	316	15
Future Volume (Veh/h)	9	52	54	250	316	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.80	0.88	0.88	0.86	0.88
Hourly flow rate (vph)	13	65	61	284	367	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				371		
pX, platoon unblocked						
vC, conflicting volume	640	192	384			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	640	192	384			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	97	92	95			
cM capacity (veh/h)	391	802	1164			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	78	156	189	245	139
Volume Left	13	61	0	0	0
Volume Right	65	0	0	0	17
cSH	682	1164	1700	1700	1700
Volume to Capacity	0.11	0.05	0.11	0.14	0.08
Queue Length 95th (m)	3.1	1.3	0.0	0.0	0.0
Control Delay (s)	11.0	3.5	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.0	1.6		0.0	
Approach LOS	B				

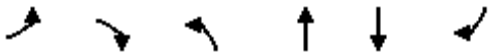
Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	39	486	401	98	33	35
Future Volume (Veh/h)	39	486	401	98	33	35
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	0.90	0.90	0.88	0.83	0.75
Hourly flow rate (vph)	39	540	446	111	40	47
Pedestrians		24	24		36	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		2	2		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	593				1180	562
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	593				1180	562
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	96				78	90
cM capacity (veh/h)	963				185	494

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	579	557	87
Volume Left	39	0	40
Volume Right	0	111	47
cSH	963	1700	279
Volume to Capacity	0.04	0.33	0.31
Queue Length 95th (m)	1.0	0.0	10.3
Control Delay (s)	1.1	0.0	23.6
Lane LOS	A		C
Approach Delay (s)	1.1	0.0	23.6
Approach LOS			C

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	11	39	98	57	0
Future Volume (Veh/h)	0	11	39	98	57	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	42	107	62	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	253	62	62			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	253	62	62			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	97			
cM capacity (veh/h)	716	1003	1541			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	149	62
Volume Left	0	42	0
Volume Right	12	0	0
cSH	1003	1541	1700
Volume to Capacity	0.01	0.03	0.04
Queue Length 95th (m)	0.3	0.7	0.0
Control Delay (s)	8.6	2.2	0.0
Lane LOS	A	A	
Approach Delay (s)	8.6	2.2	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	24.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	44	0	27	38	0	50
Future Volume (Veh/h)	44	0	27	38	0	50
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	0	29	41	0	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			48		147	48
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			48		147	48
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	95
cM capacity (veh/h)			1559		830	1021

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	48	70	54
Volume Left	0	29	0
Volume Right	0	0	54
cSH	1700	1559	1021
Volume to Capacity	0.03	0.02	0.05
Queue Length 95th (m)	0.0	0.5	1.3
Control Delay (s)	0.0	3.1	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	3.1	8.7
Approach LOS			A

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	20.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	28.2	48.5	54.9	190.0	304.1	51.5	77.2	66.0	66.4
Average Queue (m)	9.7	23.6	28.4	51.6	181.9	13.0	37.3	35.8	31.8
95th Queue (m)	21.7	40.7	46.4	188.7	365.1	32.3	64.4	58.0	55.1
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)						0	3		
Queuing Penalty (veh)						0	2		

Intersection: 6: Broadview Dr & Atwater St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	22.8	12.0
Average Queue (m)	10.8	1.4
95th Queue (m)	19.5	7.6
Link Distance (m)	339.7	333.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Goulais Ave & Chippewa St

Movement	EB	NB	NB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (m)	19.4	20.1	3.0	3.7
Average Queue (m)	8.9	3.4	0.2	0.1
95th Queue (m)	14.7	12.9	2.5	1.9
Link Distance (m)	380.6	515.6	515.6	423.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Goulais Ave & Rushmere Dr

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	18.7	18.4
Average Queue (m)	8.1	3.9
95th Queue (m)	16.3	13.2
Link Distance (m)	304.9	354.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Second Line W & Arden St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	48.8	30.7	27.0
Average Queue (m)	13.4	4.5	10.3
95th Queue (m)	35.6	18.3	19.5
Link Distance (m)	978.1	588.4	347.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 15: Broadview Dr & Amherst St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.5	5.4
Average Queue (m)	2.1	0.2
95th Queue (m)	7.9	2.7
Link Distance (m)	269.7	75.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 17: Broadview Dr & Chippewa St

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	5.4	12.4
Average Queue (m)	0.3	6.8
95th Queue (m)	3.0	12.6
Link Distance (m)	380.6	125.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

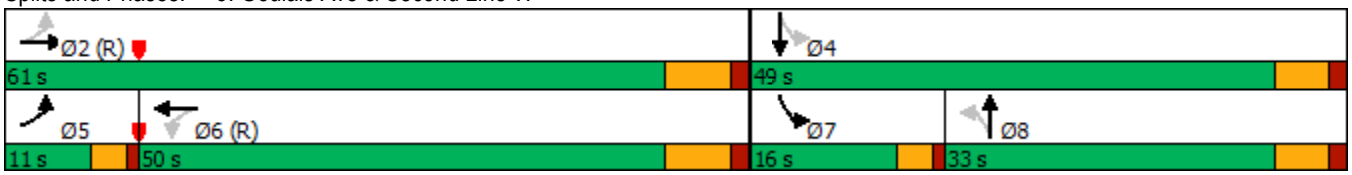
Zone wide Queuing Penalty: 2

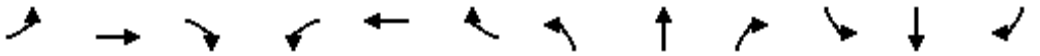
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	44	482	145	581	52	134	267	199
Future Volume (vph)	44	482	145	581	52	134	267	199
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases	5	2		6		8	7	4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	7	4
Switch Phase								
Minimum Initial (s)	7.0	12.0	12.0	12.0	12.0	12.0	7.0	12.0
Minimum Split (s)	11.0	37.0	33.0	33.0	33.0	33.0	11.0	37.0
Total Split (s)	11.0	61.0	50.0	50.0	33.0	33.0	16.0	49.0
Total Split (%)	10.0%	55.5%	45.5%	45.5%	30.0%	30.0%	14.5%	44.5%
Yellow Time (s)	3.0	5.4	5.4	5.4	4.3	4.3	3.0	4.3
All-Red Time (s)	1.0	1.6	1.6	1.6	1.7	1.7	1.0	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	7.0	6.0	6.0	4.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Splits and Phases: 3: Goulais Ave & Second Line W





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	482	35	145	581	162	52	134	98	267	199	62
Future Volume (vph)	44	482	35	145	581	162	52	134	98	267	199	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	3364		1754	1741		1724	1701		1764	1762	
Flt Permitted	0.07	1.00		0.44	1.00		0.59	1.00		0.28	1.00	
Satd. Flow (perm)	129	3364		815	1741		1063	1701		516	1762	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	48	524	38	158	632	176	57	146	107	290	216	67
RTOR Reduction (vph)	0	4	0	0	8	0	0	26	0	0	11	0
Lane Group Flow (vph)	48	558	0	158	800	0	57	227	0	290	272	0
Confl. Peds. (#/hr)	17		9	9		17	12		21	21		12
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	61.3	61.3		51.7	51.7		19.7	19.7		35.7	35.7	
Effective Green, g (s)	61.3	61.3		51.7	51.7		19.7	19.7		35.7	35.7	
Actuated g/C Ratio	0.56	0.56		0.47	0.47		0.18	0.18		0.32	0.32	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	151	1874		383	818		190	304		303	571	
v/s Ratio Prot	0.02	c0.17			c0.46			0.13		c0.10	0.15	
v/s Ratio Perm	0.16			0.19			0.05			c0.21		
v/c Ratio	0.32	0.30		0.41	0.98		0.30	0.75		0.96	0.48	
Uniform Delay, d1	20.8	12.9		19.2	28.6		39.2	42.8		33.2	29.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.4		3.3	26.6		0.9	9.6		39.8	0.6	
Delay (s)	22.0	13.3		22.4	55.2		40.1	52.3		73.1	30.3	
Level of Service	C	B		C	E		D	D		E	C	
Approach Delay (s)		14.0			49.8			50.1			51.9	
Approach LOS		B			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	97.1%	ICU Level of Service	F
Analysis Period (min)	15		

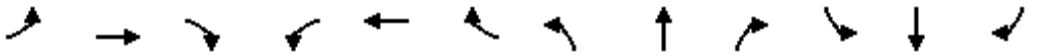
c Critical Lane Group

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	28.4	54.0	59.8	122.7	242.3	57.2	78.6	82.4	77.1
Average Queue (m)	10.4	26.0	29.1	26.4	123.9	13.7	39.5	43.4	36.8
95th Queue (m)	21.4	44.8	50.6	69.6	219.2	35.2	68.5	72.6	64.5
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)						0	6		
Queuing Penalty (veh)						0	3		

J

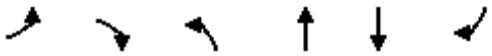
Appendix J
2035 Future Total Synchro and SimTraffic Outputs



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	397	31	41	266	191	20	156	72	279	178	45
Future Volume (vph)	75	397	31	41	266	191	20	156	72	279	178	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.94		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1686	3365		1768	1691		1740	1759		1766	1781	
Flt Permitted	0.29	1.00		0.48	1.00		0.61	1.00		0.34	1.00	
Satd. Flow (perm)	520	3365		901	1691		1114	1759		636	1781	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	432	34	45	289	208	22	170	78	303	193	49
RTOR Reduction (vph)	0	5	0	0	24	0	0	21	0	0	12	0
Lane Group Flow (vph)	82	461	0	45	473	0	22	227	0	303	230	0
Confl. Peds. (#/hr)	5		1	1		5	6		10	10		6
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.1	48.1		38.5	38.5		17.9	17.9		28.9	28.9	
Effective Green, g (s)	48.1	48.1		38.5	38.5		17.9	17.9		28.9	28.9	
Actuated g/C Ratio	0.53	0.53		0.43	0.43		0.20	0.20		0.32	0.32	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	350	1798		385	723		221	349		292	571	
v/s Ratio Prot	0.01	c0.14			c0.28			0.13		c0.08	0.13	
v/s Ratio Perm	0.11			0.05			0.02			c0.25		
v/c Ratio	0.23	0.26		0.12	0.65		0.10	0.65		1.04	0.40	
Uniform Delay, d1	12.0	11.3		15.5	20.5		29.5	33.2		29.8	23.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.3		0.6	4.6		0.2	4.3		62.8	0.5	
Delay (s)	12.3	11.6		16.1	25.0		29.7	37.5		92.6	24.3	
Level of Service	B	B		B	C		C	D		F	C	
Approach Delay (s)		11.7			24.3			36.8			62.2	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM 2000 Control Delay	33.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		

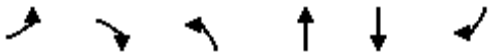
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	59	66	49	20	25	5
Future Volume (Veh/h)	59	66	49	20	25	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	0.80	0.75	0.85	0.79	0.63
Hourly flow rate (vph)	59	82	65	24	32	8
Pedestrians	3			16	16	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	209	55	43			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	209	55	43			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	91	92	96			
cM capacity (veh/h)	689	1001	1575			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	141	89	40
Volume Left	59	65	0
Volume Right	82	0	8
cSH	842	1575	1700
Volume to Capacity	0.17	0.04	0.02
Queue Length 95th (m)	4.8	1.0	0.0
Control Delay (s)	10.1	5.5	0.0
Lane LOS	B	A	
Approach Delay (s)	10.1	5.5	0.0
Approach LOS	B		

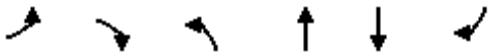
Intersection Summary			
Average Delay	7.1		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	41	143	37	198	226	22
Future Volume (Veh/h)	41	143	37	198	226	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.85	0.80	0.90	0.89	0.69
Hourly flow rate (vph)	44	168	46	220	254	32
Pedestrians	6			6	6	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	484	282	292			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	282	292			
tC, single (s)	6.8	7.0	4.6			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	91	76	96			
cM capacity (veh/h)	491	702	1122			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	212	119	147	286
Volume Left	44	46	0	0
Volume Right	168	0	0	32
cSH	644	1122	1700	1700
Volume to Capacity	0.33	0.04	0.09	0.17
Queue Length 95th (m)	11.5	1.0	0.0	0.0
Control Delay (s)	13.3	3.4	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	13.3	1.5		0.0
Approach LOS	B			

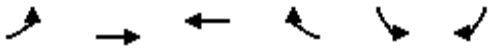
Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	84	35	370	350	45
Future Volume (Veh/h)	20	84	35	370	350	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.86	0.88	0.89	0.83
Hourly flow rate (vph)	24	99	41	420	393	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				371		
pX, platoon unblocked						
vC, conflicting volume	712	224	447			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	712	224	447			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	93	87	96			
cM capacity (veh/h)	358	765	1103			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	123	181	280	262	185
Volume Left	24	41	0	0	0
Volume Right	99	0	0	0	54
cSH	626	1103	1700	1700	1700
Volume to Capacity	0.20	0.04	0.16	0.15	0.11
Queue Length 95th (m)	5.8	0.9	0.0	0.0	0.0
Control Delay (s)	12.2	2.2	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	12.2	0.8		0.0	
Approach LOS	B				

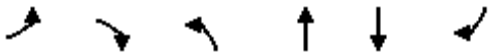
Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	45	467	243	35	37	66
Future Volume (Veh/h)	45	467	243	35	37	66
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.83	0.73	0.75	0.83	0.80
Hourly flow rate (vph)	56	563	333	47	45	82
Pedestrians		4	4		5	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		0	0		0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	385				1040	366
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	385				1040	366
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	95				81	88
cM capacity (veh/h)	1180				233	666

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	619	380	127
Volume Left	56	0	45
Volume Right	0	47	82
cSH	1180	1700	401
Volume to Capacity	0.05	0.22	0.32
Queue Length 95th (m)	1.2	0.0	10.7
Control Delay (s)	1.3	0.0	18.1
Lane LOS	A		C
Approach Delay (s)	1.3	0.0	18.1
Approach LOS			C

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	12	11	69	91	0
Future Volume (Veh/h)	0	12	11	69	91	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	13	12	75	99	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	198	99	99			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	198	99	99			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	99			
cM capacity (veh/h)	784	957	1494			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	13	87	99
Volume Left	0	12	0
Volume Right	13	0	0
cSH	957	1494	1700
Volume to Capacity	0.01	0.01	0.06
Queue Length 95th (m)	0.3	0.2	0.0
Control Delay (s)	8.8	1.1	0.0
Lane LOS	A	A	
Approach Delay (s)	8.8	1.1	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	105	0	30	29	0	79
Future Volume (Veh/h)	105	0	30	29	0	79
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	0	33	32	0	86
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			114		212	114
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			114		212	114
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	91
cM capacity (veh/h)			1475		759	939

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	114	65	86
Volume Left	0	33	0
Volume Right	0	0	86
cSH	1700	1475	939
Volume to Capacity	0.07	0.02	0.09
Queue Length 95th (m)	0.0	0.5	2.4
Control Delay (s)	0.0	3.9	9.2
Lane LOS		A	A
Approach Delay (s)	0.0	3.9	9.2
Approach LOS			A

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	21.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	30.4	39.0	45.3	19.3	95.8	42.5	72.6	73.1	58.9
Average Queue (m)	11.7	18.9	24.3	6.5	44.9	7.0	37.1	38.0	28.3
95th Queue (m)	24.2	34.2	43.6	15.3	80.3	24.6	64.6	60.9	50.1
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)						0	4		
Queuing Penalty (veh)						0	1		

Intersection: 6: Broadview Dr & Atwater St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	25.0	7.3
Average Queue (m)	13.3	0.5
95th Queue (m)	22.0	4.0
Link Distance (m)	339.7	330.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Goulais Ave & Chippewa St

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	22.0	13.2	4.8
Average Queue (m)	12.0	2.6	0.3
95th Queue (m)	19.1	10.4	3.4
Link Distance (m)	380.6	515.6	423.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: Goulais Ave & Rushmere Dr

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	21.7	14.7	1.3
Average Queue (m)	11.1	3.2	0.0
95th Queue (m)	18.0	11.1	0.9
Link Distance (m)	304.9	354.3	515.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Second Line W & Arden St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	29.0	12.9	29.3
Average Queue (m)	5.5	0.6	12.9
95th Queue (m)	18.6	6.3	22.7
Link Distance (m)	978.1	588.4	347.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 15: Broadview Dr & Amherst St

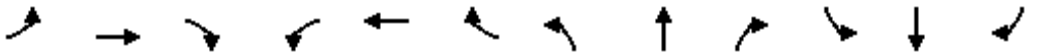
Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.3	9.1
Average Queue (m)	2.7	0.4
95th Queue (m)	8.8	3.6
Link Distance (m)	270.7	77.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 17: Broadview Dr & Chippewa St

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	10.6	18.4
Average Queue (m)	0.9	8.3
95th Queue (m)	5.5	13.2
Link Distance (m)	380.6	125.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

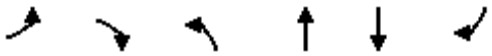
Zone wide Queuing Penalty: 1



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	497	36	149	627	167	54	148	101	294	212	64
Future Volume (vph)	45	497	36	149	627	167	54	148	101	294	212	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	3365		1757	1745		1729	1712		1764	1765	
Flt Permitted	0.09	1.00		0.43	1.00		0.58	1.00		0.31	1.00	
Satd. Flow (perm)	164	3365		803	1745		1050	1712		578	1765	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	540	39	162	682	182	59	161	110	320	230	70
RTOR Reduction (vph)	0	5	0	0	8	0	0	31	0	0	14	0
Lane Group Flow (vph)	49	574	0	162	856	0	59	240	0	320	286	0
Confl. Peds. (#/hr)	17		9	9		17	12		21	21		12
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	47.5	47.5		39.3	39.3		18.5	18.5		29.5	29.5	
Effective Green, g (s)	47.5	47.5		39.3	39.3		18.5	18.5		29.5	29.5	
Actuated g/C Ratio	0.53	0.53		0.44	0.44		0.21	0.21		0.33	0.33	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	157	1775		350	761		215	351		281	578	
v/s Ratio Prot	0.01	c0.17			c0.49			0.14		c0.09	0.16	
v/s Ratio Perm	0.15			0.20			0.06			c0.28		
v/c Ratio	0.31	0.32		0.46	1.12		0.27	0.68		1.14	0.49	
Uniform Delay, d1	19.2	12.1		17.9	25.4		30.1	33.0		29.3	24.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.5		4.4	72.4		0.7	5.4		96.5	0.7	
Delay (s)	20.3	12.6		22.3	97.8		30.8	38.5		125.7	24.9	
Level of Service	C	B		C	F		C	D		F	C	
Approach Delay (s)		13.2			85.9			37.1			77.0	
Approach LOS		B			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	60.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		

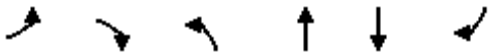
c Critical Lane Group



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	52	50	133	14	20	8
Future Volume (Veh/h)	52	50	133	14	20	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.81	0.71	0.88
Hourly flow rate (vph)	69	67	177	17	28	9
Pedestrians	4			3	2	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	0			0	0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	410	40	41			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	410	40	41			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	86	94	89			
cM capacity (veh/h)	491	1032	1576			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	136	194	37
Volume Left	69	177	0
Volume Right	67	0	9
cSH	662	1576	1700
Volume to Capacity	0.21	0.11	0.02
Queue Length 95th (m)	6.1	3.0	0.0
Control Delay (s)	11.8	7.0	0.0
Lane LOS	B	A	
Approach Delay (s)	11.8	7.0	0.0
Approach LOS	B		

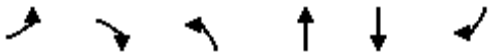
Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	28.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	26	102	59	200	205	25
Future Volume (Veh/h)	26	102	59	200	205	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.64	0.68	0.69	0.69	0.63
Hourly flow rate (vph)	41	159	87	290	297	40
Pedestrians	6			6	6	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	648	329	343			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	648	329	343			
tC, single (s)	6.8	7.0	4.6			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	89	76	92			
cM capacity (veh/h)	371	654	1069			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	200	184	193	337
Volume Left	41	87	0	0
Volume Right	159	0	0	40
cSH	566	1069	1700	1700
Volume to Capacity	0.35	0.08	0.11	0.20
Queue Length 95th (m)	12.7	2.1	0.0	0.0
Control Delay (s)	14.8	4.5	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	14.8	2.2		0.0
Approach LOS	B			

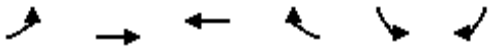
Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	54	56	267	351	15
Future Volume (Veh/h)	9	54	56	267	351	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.80	0.88	0.88	0.86	0.88
Hourly flow rate (vph)	13	68	64	303	408	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				371		
pX, platoon unblocked						
vC, conflicting volume	696	212	425			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	696	212	425			
tC, single (s)	6.8	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	96	91	94			
cM capacity (veh/h)	359	777	1124			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	81	165	202	272	153
Volume Left	13	64	0	0	0
Volume Right	68	0	0	0	17
cSH	655	1124	1700	1700	1700
Volume to Capacity	0.12	0.06	0.12	0.16	0.09
Queue Length 95th (m)	3.4	1.4	0.0	0.0	0.0
Control Delay (s)	11.3	3.6	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	11.3	1.6		0.0	
Approach LOS	B				

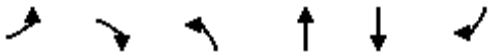
Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	58	501	413	130	34	47
Future Volume (Veh/h)	58	501	413	130	34	47
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	0.90	0.90	0.88	0.83	0.75
Hourly flow rate (vph)	58	557	459	148	41	63
Pedestrians		24	24		36	
Lane Width (m)		3.6	3.6		3.6	
Walking Speed (m/s)		1.2	1.2		1.2	
Percent Blockage		2	2		3	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	643				1266	593
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	643				1266	593
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	94				74	87
cM capacity (veh/h)	923				160	474

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	615	607	104
Volume Left	58	0	41
Volume Right	0	148	63
cSH	923	1700	267
Volume to Capacity	0.06	0.36	0.39
Queue Length 95th (m)	1.6	0.0	14.1
Control Delay (s)	1.6	0.0	26.8
Lane LOS	A		D
Approach Delay (s)	1.6	0.0	26.8
Approach LOS			D

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	11	41	147	70	0
Future Volume (Veh/h)	0	11	41	147	70	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	12	45	160	76	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	326	76	76			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	326	76	76			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	97			
cM capacity (veh/h)	648	985	1523			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	205	76
Volume Left	0	45	0
Volume Right	12	0	0
cSH	985	1523	1700
Volume to Capacity	0.01	0.03	0.04
Queue Length 95th (m)	0.3	0.7	0.0
Control Delay (s)	8.7	1.8	0.0
Lane LOS	A	A	
Approach Delay (s)	8.7	1.8	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	62	0	28	56	0	66
Future Volume (Veh/h)	62	0	28	56	0	66
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	0	30	61	0	72
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			67		188	67
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			67		188	67
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	93
cM capacity (veh/h)			1535		785	997

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	67	91	72
Volume Left	0	30	0
Volume Right	0	0	72
cSH	1700	1535	997
Volume to Capacity	0.04	0.02	0.07
Queue Length 95th (m)	0.0	0.5	1.9
Control Delay (s)	0.0	2.5	8.9
Lane LOS		A	A
Approach Delay (s)	0.0	2.5	8.9
Approach LOS			A

Intersection Summary			
Average Delay		3.8	
Intersection Capacity Utilization		21.9%	ICU Level of Service A
Analysis Period (min)		15	

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	28.4	46.3	54.2	538.9	629.7	56.9	80.8	85.3	77.8
Average Queue (m)	11.1	26.1	31.0	218.3	402.6	13.0	38.1	44.5	33.8
95th Queue (m)	23.7	43.6	49.6	491.8	676.3	33.0	64.2	76.7	59.4
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)							4		
Queuing Penalty (veh)							2		

Intersection: 6: Broadview Dr & Atwater St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	23.2	12.0
Average Queue (m)	11.6	1.2
95th Queue (m)	20.0	6.8
Link Distance (m)	339.7	333.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Goulais Ave & Chippewa St

Movement	EB	NB	NB	SB
Directions Served	LR	LT	T	TR
Maximum Queue (m)	23.9	24.5	8.2	8.9
Average Queue (m)	10.7	6.1	0.3	0.3
95th Queue (m)	18.4	18.1	3.4	4.2
Link Distance (m)	380.6	515.6	515.6	423.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Goulais Ave & Rushmere Dr

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	20.7	14.7
Average Queue (m)	9.3	4.0
95th Queue (m)	17.0	12.5
Link Distance (m)	304.9	354.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 11: Second Line W & Arden St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	58.1	32.9	32.2
Average Queue (m)	16.1	5.7	12.7
95th Queue (m)	40.9	21.2	25.3
Link Distance (m)	978.1	588.4	347.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 15: Broadview Dr & Amherst St

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.6	10.5
Average Queue (m)	2.5	1.0
95th Queue (m)	8.6	6.4
Link Distance (m)	269.7	75.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 17: Broadview Dr & Chippewa St

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	3.6	14.8
Average Queue (m)	0.2	7.5
95th Queue (m)	2.2	12.5
Link Distance (m)	380.6	125.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

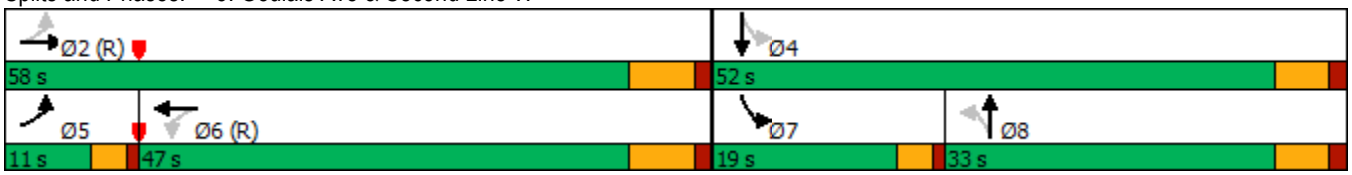
Zone wide Queuing Penalty: 2

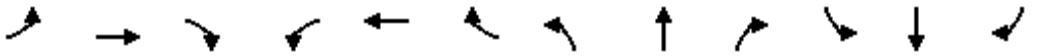
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	75	397	41	266	20	156	279	178
Future Volume (vph)	75	397	41	266	20	156	279	178
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases	5	2		6		8	7	4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	7	4
Switch Phase								
Minimum Initial (s)	7.0	12.0	12.0	12.0	12.0	12.0	7.0	12.0
Minimum Split (s)	11.0	37.0	33.0	33.0	33.0	33.0	11.0	33.0
Total Split (s)	11.0	58.0	47.0	47.0	33.0	33.0	19.0	52.0
Total Split (%)	10.0%	52.7%	42.7%	42.7%	30.0%	30.0%	17.3%	47.3%
Yellow Time (s)	3.0	5.4	5.4	5.4	4.3	4.3	3.0	4.3
All-Red Time (s)	1.0	1.6	1.6	1.6	1.7	1.7	1.0	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	7.0	6.0	6.0	4.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 3: Goulais Ave & Second Line W





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	397	31	41	266	191	20	156	72	279	178	45
Future Volume (vph)	75	397	31	41	266	191	20	156	72	279	178	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.94		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1686	3365		1768	1690		1737	1758		1767	1780	
Flt Permitted	0.30	1.00		0.48	1.00		0.61	1.00		0.29	1.00	
Satd. Flow (perm)	524	3365		901	1690		1113	1758		535	1780	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	432	34	45	289	208	22	170	78	303	193	49
RTOR Reduction (vph)	0	5	0	0	21	0	0	16	0	0	9	0
Lane Group Flow (vph)	82	461	0	45	476	0	22	232	0	303	233	0
Confl. Peds. (#/hr)	5		1	1		5	6		10	10		6
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	58.3	58.3		48.7	48.7		19.7	19.7		38.7	38.7	
Effective Green, g (s)	58.3	58.3		48.7	48.7		19.7	19.7		38.7	38.7	
Actuated g/C Ratio	0.53	0.53		0.44	0.44		0.18	0.18		0.35	0.35	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	336	1783		398	748		199	314		356	626	
v/s Ratio Prot	0.01	c0.14			c0.28			0.13		c0.12	0.13	
v/s Ratio Perm	0.12			0.05			0.02			c0.18		
v/c Ratio	0.24	0.26		0.11	0.64		0.11	0.74		0.85	0.37	
Uniform Delay, d1	14.9	14.1		18.0	23.8		37.8	42.7		28.9	26.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.4		0.6	4.1		0.2	8.7		17.4	0.4	
Delay (s)	15.2	14.4		18.6	27.9		38.1	51.4		46.3	27.0	
Level of Service	B	B		B	C		D	D		D	C	
Approach Delay (s)		14.6			27.1			50.3			37.7	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	29.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 3: Goulais Ave & Second Line W

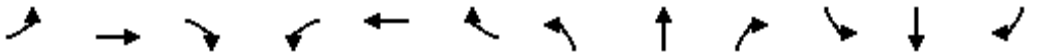
Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	38.0	42.3	47.8	23.2	108.4	50.1	78.3	76.0	62.8
Average Queue (m)	14.6	20.6	26.2	5.9	49.8	6.7	41.1	44.6	32.5
95th Queue (m)	30.3	36.9	43.4	16.5	92.5	25.8	67.3	70.9	56.0
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)							6		
Queuing Penalty (veh)							1		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	45	497	149	627	54	148	294	212
Future Volume (vph)	45	497	149	627	54	148	294	212
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases	5	2		6		8	7	4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	7	4
Switch Phase								
Minimum Initial (s)	7.0	12.0	12.0	12.0	12.0	12.0	7.0	12.0
Minimum Split (s)	11.0	37.0	33.0	33.0	33.0	33.0	11.0	37.0
Total Split (s)	11.0	82.0	71.0	71.0	33.0	33.0	25.0	58.0
Total Split (%)	7.9%	58.6%	50.7%	50.7%	23.6%	23.6%	17.9%	41.4%
Yellow Time (s)	3.0	5.4	5.4	5.4	4.3	4.3	3.0	4.3
All-Red Time (s)	1.0	1.6	1.6	1.6	1.7	1.7	1.0	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	7.0	6.0	6.0	4.0	6.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

Splits and Phases: 3: Goulais Ave & Second Line W



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	497	36	149	627	167	54	148	101	294	212	64
Future Volume (vph)	45	497	36	149	627	167	54	148	101	294	212	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.98	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	3363		1750	1741		1716	1704		1765	1760	
Flt Permitted	0.06	1.00		0.43	1.00		0.58	1.00		0.20	1.00	
Satd. Flow (perm)	98	3363		800	1741		1043	1704		378	1760	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	540	39	162	682	182	59	161	110	320	230	70
RTOR Reduction (vph)	0	4	0	0	7	0	0	18	0	0	8	0
Lane Group Flow (vph)	49	575	0	162	857	0	59	253	0	320	292	0
Confl. Peds. (#/hr)	17		9	9		17	12		21	21		12
Heavy Vehicles (%)	7%	6%	5%	2%	5%	4%	3%	0%	7%	2%	2%	6%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	77.8	77.8		68.2	68.2		24.2	24.2		49.2	49.2	
Effective Green, g (s)	77.8	77.8		68.2	68.2		24.2	24.2		49.2	49.2	
Actuated g/C Ratio	0.56	0.56		0.49	0.49		0.17	0.17		0.35	0.35	
Clearance Time (s)	4.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	118	1868		389	848		180	294		340	618	
v/s Ratio Prot	c0.02	0.17			c0.49			0.15		c0.14	0.17	
v/s Ratio Perm	0.21			0.20			0.06			c0.19		
v/c Ratio	0.42	0.31		0.42	1.01		0.33	0.86		0.94	0.47	
Uniform Delay, d1	29.5	16.7		23.1	35.9		50.8	56.3		37.7	35.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.4		3.3	33.7		1.1	21.3		33.7	0.6	
Delay (s)	31.8	17.1		26.4	69.6		51.8	77.6		71.4	35.9	
Level of Service	C	B		C	E		D	E		E	D	
Approach Delay (s)		18.2			62.7			73.0			54.2	
Approach LOS		B			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	51.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Intersection: 3: Goulais Ave & Second Line W

Movement	EB	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	30.3	53.3	60.2	152.8	312.8	57.3	144.6	101.1	93.4
Average Queue (m)	10.6	27.0	30.7	35.9	159.4	23.9	67.0	56.0	48.0
95th Queue (m)	23.2	47.5	51.6	106.0	283.7	56.7	121.4	92.3	80.1
Link Distance (m)		588.4		792.4	792.4		392.5	354.3	354.3
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	90.0		124.0			50.0			
Storage Blk Time (%)						0	26		
Queuing Penalty (veh)						0	14