November 1, 2024

Nicole Sampogna
Bradford Highlands Joint Venture c/o ARG Group
111 Creditstone Road
Concord, ON L4K 1N3
Email: nsampogna@arggroup.com

RE: BRADFORD HIGHLANDS – MZO & DPOS RESUBMISSION #2

1.0 INTRODUCTION

BA Group is retained by the Bradford Highlands Joint Venture ("the client") to provide transportation advisory services in relation to the concurrent Minister Zoning Order (MZO) and Draft Plan of Sub-Division (DPOS) applications being made to the Town of Bradford West Gwillimbury for a proposed residential development (herein referred to as "the site").

The site is currently occupied by Bradford Highlands Golf Club and two (2) single-detached residential lots located on the properties municipally known as 23 Brownlee Drive, 2820, 2824, and 2848 Line 5. The site is an irregular shape that is predominantly bordered by existing residential development. It is generally bounded by Line 6 to the north, Line 5 to the south, Brownlee Drive to the west and Inverness Way to the east.

1.1 Application Background

BA Group prepared an initial transportation study entitled *Bradford Highlands Traffic Impact Study – Transportation Considerations*, dated September 2021 (herein referred to as the "September 2021 Report") for the client as part of an initial Official Plan Amendment (OPA) application submitted to the Town of Bradford West Gwillimbury. The September 2021 Report provided a review of the concept plan, a transportation demand management plan, and an assessment of the traffic operations. At that time, the proposed development programme consisted of 864 residential units, including single-detached homes, semi-detached homes, and townhouses.

A resubmission was made in September 2023 to address Town of Bradford West Gwillimbury and the general public comments, and to provide an update to the development application. As part of this resubmission, BA Group prepared an updated transportation study entitled *Bradford Highlands Traffic Impact Study – Traffic Impact Study Update*, dated September 2023 (herein referred to as "September 2023 Report"). A total of 998 residential units, consisting of single-detached homes, semi-detached homes, and townhouses were proposed. In addition to an OPA application resubmission, an initial Zoning By-law Amendment (ZBA) and Draft Plan of Sub-Division (DPOS) application was being submitted concurrently to the Town.

Since then, Town staff have reviewed the September 2023 Report and have provided comments regarding the transportation components of the development proposal via a memorandum from Development Engineering, dated July 19, 2024.

The concept plan has since been refined and an updated MZO and DPOS resubmission is being made to the Town. This letter has been prepared to provide an update to key transportation components based on the current concept plans and to respond directly to the latest Town staff comments.

2.0 PROPOSED DEVELOPMENT

2.1 Development Programme

The concept plan has been refined since the previous submission to the Town (September 2023) as part of the on-going design and development process and in response to Town comments.

A comparison of the previous and current development programmes of the site. Note that the total number of proposed residential units has been decreased when compared to the previous September 2023 development application submission is provided in **Table 1**.

The concept plan is provided in **Appendix A**.

Table 1 Development Programme Comparison

Housing Type	September 2023 OPA/ZBA/DPOS Submission[1]	Current OPA/ZBA/DPOS Submission[2]
Single-Detached	342 units	299 units
Semi-Detached	196 units	188 units
Street Townhouse	334 units	303 units
Back-to-Back Townhouse	126 units	172 units
Total	**998 units**	**962 units**
Net Change	**-**	**-36 units**

Notes:
1. Based on site statistics provided by MGP, dated August 29, 2023.
2. Based on site statistics provided by MGP, dated October 7, 2024.

2.2 Proposed Road Network

The proposed development creates a new internal road network that has a hierarchy of streets. These new streets improve connectivity through and around the site for all users (including pedestrians and vehicles). It is noted that the design details of the proposed road network will be confirmed throughout the detailed design process.

The geometry of these streets was designed in accordance with Town of Bradford West Gwillimbury Engineering Design Criteria for collector and local roads. A summary of the recommended right-of-way in the conceptual development plan is provided in **Table 2**.

Table 2 Summary of Recommended Road Widths in Conceptual Development Plan

Street Names	Road Classification	Right-of-Way Width (m)	Pavement Width (m)	Proposed BWG Standard Drawing Number[1]
Street A	Collector	26.0	14.0	B106
Street B / Street C	Local	20.0	8.5	B103
Street D to Street Q	Local	18.0	8.0	B102

Notes:
1. Referenced from the BWG Engineering Design Criteria Manual, **Section B3.00**.

2.2.1 Street A

Street A is a new north-south road with a 26.0 metres right-of-way (14.0 metres pavement width) proposed to extend centrally through the site between Line 6 in the north and Line 5 in the south. Street A is envisioned as a new collector road, providing primary access to / from the proposed development. It is anticipated that Street A will provide all-moves access to the proposed development. The road will intersect at Line 6 and Line 5 forming new unsignalized intersections with Street A operating under STOP-control. Separate private driveway access will be provided along Street A to each of the residential homes with frontage onto Street A.

2.2.2 Street B and Street C

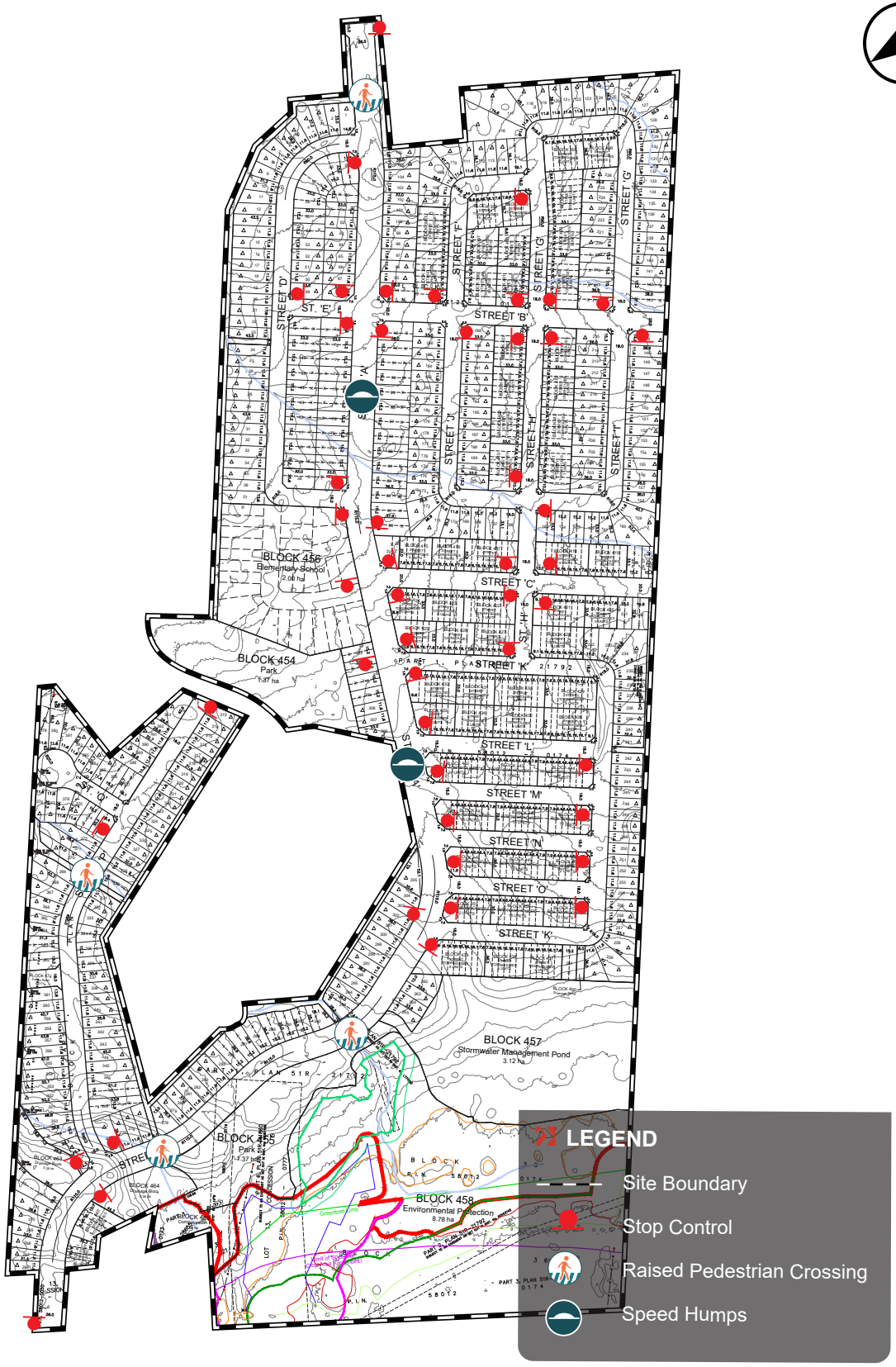
Street B and Street C are new east-west roads with a 20.0 metres right-of-way (8.5 metres pavement width) proposed to extend between Inverness Way in the east and Street A in the west. Street B and Street C are envisioned as new local roads, providing secondary access to / from the proposed development. It is anticipated that Street B and Street C will provide all-moves access to the proposed development, intersecting with Inverness Way. Street B and Street C are anticipated to form new unsignalized intersection with Inverness Way and operate under STOP-control. Separate private driveway access will be provided along Street B or Street C to each of the residential homes with frontage onto Street B or Street C, respectively.

2.2.3 Street D to Street Q

Street D to Street Q are new local roads with an 18.0 metres right-of-way (8.0 metres pavement width). These new local roads will provide internal circulation throughout the site between the residential homes and will accommodate the localized traffic that is travelling to / from the site. In addition, Street Q will provide secondary access to / from the proposed development via an all-moves intersection with Brownlee Drive. Separate private driveway access will be provided along these new roads to each of the residential home with frontage onto its respective road.

The proposed traffic calming and intersection control plan for the proposed road network is illustrated in **Figure 1**.

The future lane configuration and traffic control for external study area and the internal site are illustrated in **Figure 2** and **Figure 3**, respectively.



P:\67\20\05\Graphics\AdobeInDesign\6720-05 - Figures for Report - October 2024.indd

Aerial maps provided courtesy of: Esri, DigitalGlobe, GeoEye, Earthstar Geographies, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, the GIS User Community and/or Google Earth/Maps.

FIGURE 1 PROPOSED TRAFFIC CALMING AND INTERSECTION CONTROL PLAN

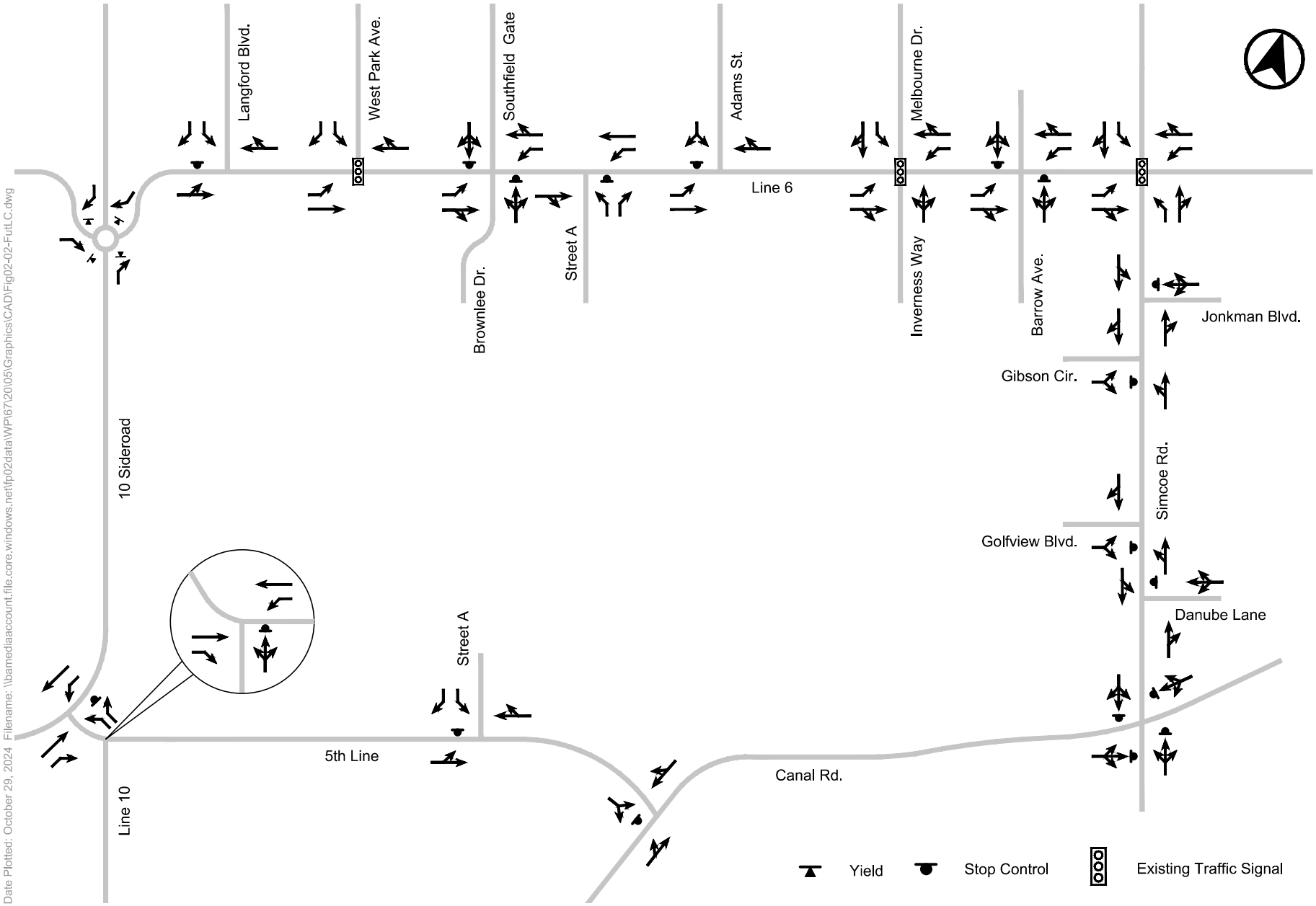
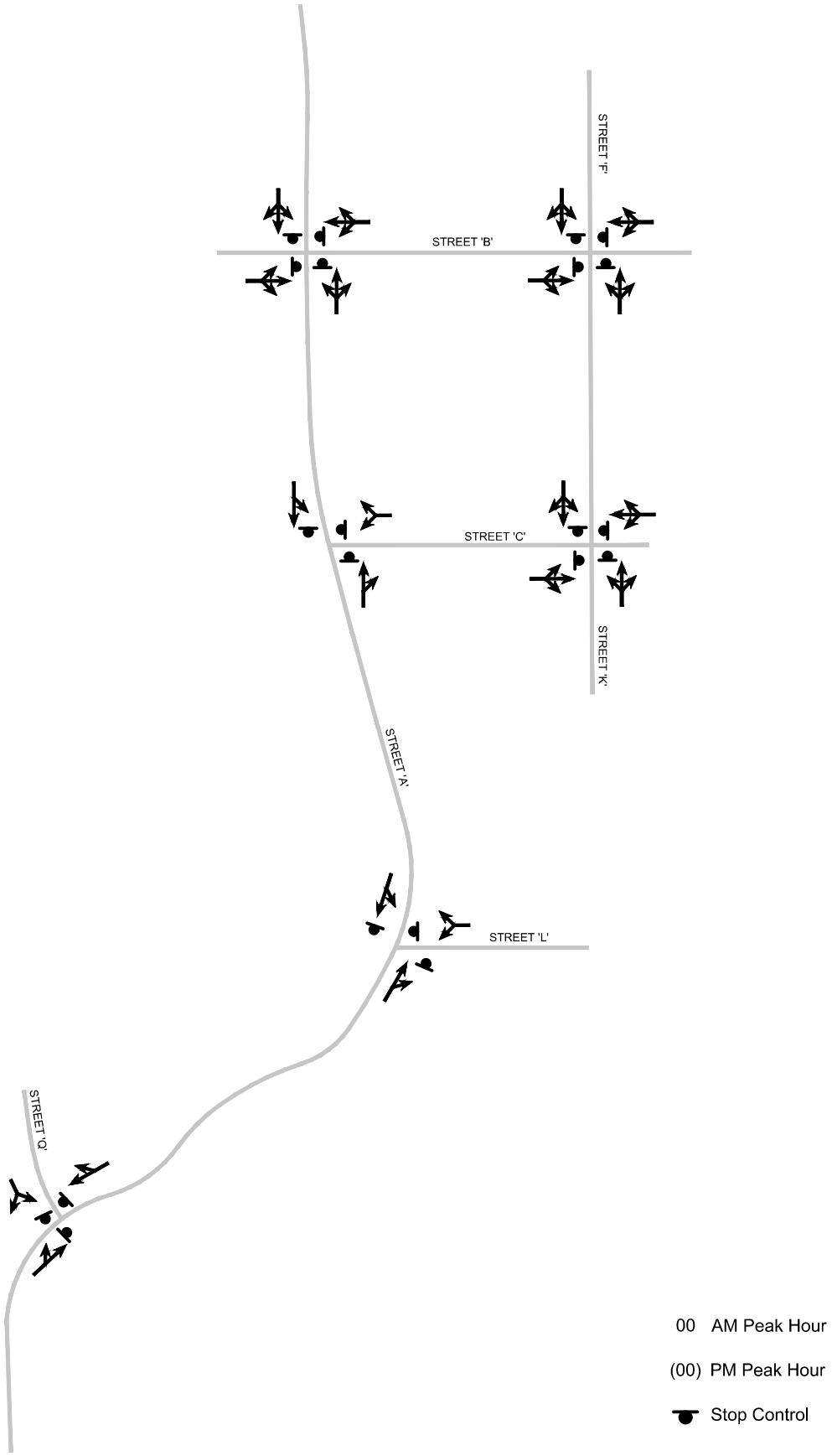


FIGURE 2 FUTURE LANE CONFIGURATION AND TRAFFIC CONTROL



Date Plotted: October 31, 2024 Filename: \\bamediaaccount.file.core.windows.net\fp02data\WP\67\20\05\Graphics\CAD\Fig03-02-FutLC.dwg

FIGURE 3 FUTURE LANE CONFIGURATION & TRAFFIC CONTROL - INTERNAL SITE

3.0 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) measures will be incorporated in all aspects of the planned development to minimize the need for automobile travel to and from the Site and to encourage and facilitate the use of non-automobile travel modes on a day-to-day basis. The following outlines the proposed physical and operational strategies that complement the site's design with the goal of encouraging a shift in the travel pattern of future residents of sustainable modes of transportation.

3.1 TDM Plan Objectives

The plan strives to reduce automobile use as part of the design and construction of the development, as well as after construction as an on-going strategy by supporting and promoting the use of non-auto travel modes.

The key objectives of the TDM plan are to reduce peak hour single occupant vehicles (SOV) traffic by promoting the use of more active and sustainable modes of transportation.

Generally, the TDM Plan has three primary objectives:

1. Reduce car dependence and the need for everyday SOV travel;
2. Make it easy and attractive for people to walk and cycle; and
3. Promote transit, a low-carbon alternative in comparison to car ownership and SOV travel.

3.2 Travel Mode Characteristics

The existing travel characteristics for the area around the site was reviewed using information provided by the 2016 Transportation Tomorrow Survey (TTS). Modal choice travel characteristics for residential land uses in the area for the peak period inbound and outbound directions are summarized in **Table 3**.

Table 3 Existing Area Travel Mode Split

Travel Mode	AM Outbound	PM Inbound
Auto Driver	66%	72%
Auto Passenger[2]	24%	16%
Transit	5%	5%
Walk	6%	7%
Cycle	0%	0%
Total	**100%**	**100%**

Notes:
1. Reflects all home-based trips made to / from the 2016 TTS data for 2006 TTS Zones 8635 and 8637 during the weekday morning and afternoon peak hour periods.
2. Includes auto passenger, taxi passenger, and paid rideshare.

Based on the most recent TTS data, 66% to 72% pf the residents living in the area regularly drive during the peak travel period, meaning a great majority of the trips made during the peak hour is via car.

3.3 Proposed TDM Plan

Strategies must be adopted to encourage the use of alternate sustainable travel modes, active transportation modes, and increase vehicle occupancy. The proposed TDM strategies are summarized in **Table 4.**

Table 4 Proposed TDM Implementation Plan

Proposed TDM Strategy	Responsibility	Cost Estimate	Approximate Timing
Sustainable Commuting Information			
Provide sustainable transportation information to new home purchasers as part of home buyers package to promote sustainable travel options	Developer to coordinate with the Town of Bradford West Gwillimbury or the County of Simcoe to obtain materials and provide them to home purchasers.	TBD	After home purchase / during construction
Pedestrian Infrastructure			
Provide internal sidewalks within the site to external connections and the park at the southeast corner of the site	Developer	TBD[1]	Construction

Notes:
1. Cost of sidewalks provided for through the Plan of Subdivision process. To be constructed as part of land development.

3.3.1 Sustainable Transportation Information

The provision of information on trails, cycling and transit maps to residents encourages the use of these alternative modes by helping educate people above their options.

Proposed Strategy:
Marketing programs aimed at new residential unit purchasers should be implemented to ensure that new residents have comprehensive information on travel choices in the area now and in the future.

The developer proposed to coordinate with the Transportation Planning Department of the Town of Bradford West Gwillimbury and the County of Simcoe, should they elect, to issue maps and travel information provided by the County to new residents as part of a new homeowner's package. These programs will also be made available at the sales centre for the new lots and will also be available to residents after the dwelling units are occupied.

3.3.2 Pedestrian Connections

High quality pedestrian connections within the site and with pedestrian facilities outside of the site can be an important design feature in the effort to ensure viability of non-automotive modes of travel. Thus, it is critical for pedestrian and sidewalk infrastructure to enhance the pedestrian experience especially as it relates to safety and convenience. Children and elder residents should feel comfortable walking within the site.

Proposed Strategy:

The proposed development will provide sidewalks on at least one side of the new Streets A through to E. The sidewalks will provide connections to the planned park in the south-eastern corner of the site, in addition to the external sidewalk network along the neighbouring roads.

4.0 TRAFFIC VOLUMES FORECAST

4.1 Existing Traffic Volumes

For the purposes of this analysis, the existing baseline traffic volumes have remained consistent with BA Group's September 2023 Report. Existing, rounded, and balanced baseline traffic volumes for the weekday morning and afternoon peak hours is illustrated in **Figure 4**.

4.2 Future Background Traffic Volumes

Traffic allowances were made within the analysis to account for general corridor traffic growth on the area arterial roads and potential future developments in the area. Details of these allowances are described in BA Group's September 2023 Report. For the purposes of this analysis, no additional traffic growth and background developments were considered since the September 2023 Report. Future background traffic volumes for the 2026, 2031, and 2036 horizon years are illustrated in **Figure 5**, **Figure 6**, and **Figure 7**, respectively.

4.3 Site Traffic

4.3.1 Trip Generation

The following provides a summary update of the traffic generation potential of the current concept plan.

Traffic volume forecasts and operation analysis assessing the impacts of the Bradford Highlands development were assessed in detail as part of the September 2023 Report submitted as part of the OPA/ZBA/DPOS application.

BA Group's September 2023 Report contained a review of the traffic-related impacts of the concept plan (i.e. 998 residential units). It included a review and assessment of the following from a traffic operations perspective:

- basis for analysis (including analysis scenarios, study area, analysis assumptions and signalized and unsignalized intersection methodology);
- traffic volumes forecasts (including existing, area growth, background developments, site traffic and future total traffic volumes); and
- traffic operations analysis undertaken on the area street system.

Based on comments received from Town of Bradford West Gwillimbury Development Engineering Department via memorandum dated July 19, 2024, Town staff generally concurs with the key findings of the study from a traffic analysis perspective and do not have any additional comments regarding the traffic volume forecast and methodology. As such, the forecasts outlined herein have been established based upon the same methodology and assumptions adopted in BA Group's September 2023 Report and will only reflect an update to the site traffic volumes due to the change in the current development programme.

Vehicle trip generation rates adopted for the residential uses for the proposed development were based on the Institute for Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. Trips generated for the proposed residential use of single-family detached units and townhouse units were based on the fitted curve equations for ITE Land Use Code 210 (Single-Family Detached Housing).

The current development programme reflects a slight decrease in number of residential units (962 dwelling units) in comparison to what was considered as part of BA Group's September 2023 Report.

A comparison of the residential trip generation forecast between the previous and current development programme is summarized in **Table 5**.

Table 5 Residential Site Trip Generation

	AM Peak Hour			PM Peak Hour		
	In	Out	2-Way	In	Out	2-Way
Previous September 2023 Report						
LUC 210 (Single-Family Detached Housing) – Fitted Curve Equation[2]	0.15	0.46	0.61	0.55	0.32	0.87
Forecast Traffic Volumes (998 units)	**155**	**450**	**605**	**545**	**320**	**865**
Current Development Proposal (October 2024)						
LUC 210 (Single-Family Detached Housing) – Fitted Curve Equation[2]	0.15	0.46	0.61	0.55	0.32	0.87
Forecast Traffic Volumes (962 units)	**145**	**440**	**585**	**525**	**310**	**835**
Changes in New Site Traffic						
Net Change	**-10**	**-10**	**-20**	**-20**	**-10**	**-30**

Notes:
1. Rounded to the nearest 5 trips.
2. AM: Ln(T) = 0.91 Ln(X) + 0.12
   PM: Ln(T) = 0.94 Ln(X) + 0.27

The current development proposal will generate 585 and 835 two-way trips in the weekday morning and afternoon peak hours, respectively. The change in proposed development programme in comparison to the September 2023 Report results in a decrease of 20 and 30 two-way trips in the weekday morning and afternoon peak hours, respectively.

4.3.2 Trip Distribution and Assignment

The trip distribution pattern for the residential site traffic was established based upon a review of 2016 Transportation Tomorrow Survey (TTS) data for home-based vehicle trips to and from the study area during the weekday morning and afternoon peak periods. The distribution of inbound and outbound residential traffic adopted for the proposed development is outlined in **Table 6**.

Table 6 Residential Site Traffic Distribution

Link	Direction	Inbound (%)	Outbound (%)
Highway 400	North	5%	5%
	South	30%	25%
Regional Road 4 / Simcoe Road	North	0%	10%
Melbourne Drive	North	5%	10%
10 Sideroad	North	0%	5%
West Park Avenue	North	20%	10%
Regional Road 1 / Bridge Street	South / East	35%	35%
Holland Street	West	5%	0%
Total		**100%**	**100%**

Notes:

1. Distribution of 2016 TTS data based home-based trips to / from 2006 TTS Zones 8635 and 8637 during weekday morning and afternoon peak periods.

Site-generated trips were assigned to the external area street network via four intersections providing access to the proposed site, consisting of the following:

- Line 6 / Melbourne Drive & Inverness Way
- Line 6 / Street A
- Line 6 / Brownlee Drive & Southfield Gate
- Line 5 / Street A

Site Traffic assigned to the external area road network are illustrated in **Figure 8.**

Internal to the site, traffic was assigned to key internal intersections consisting of the following:

- Street A / Street B
- Street B / Street K & Street F
- Street A / Street C
- Street C / Street K
- Street A / Street L
- Street A / Street Q

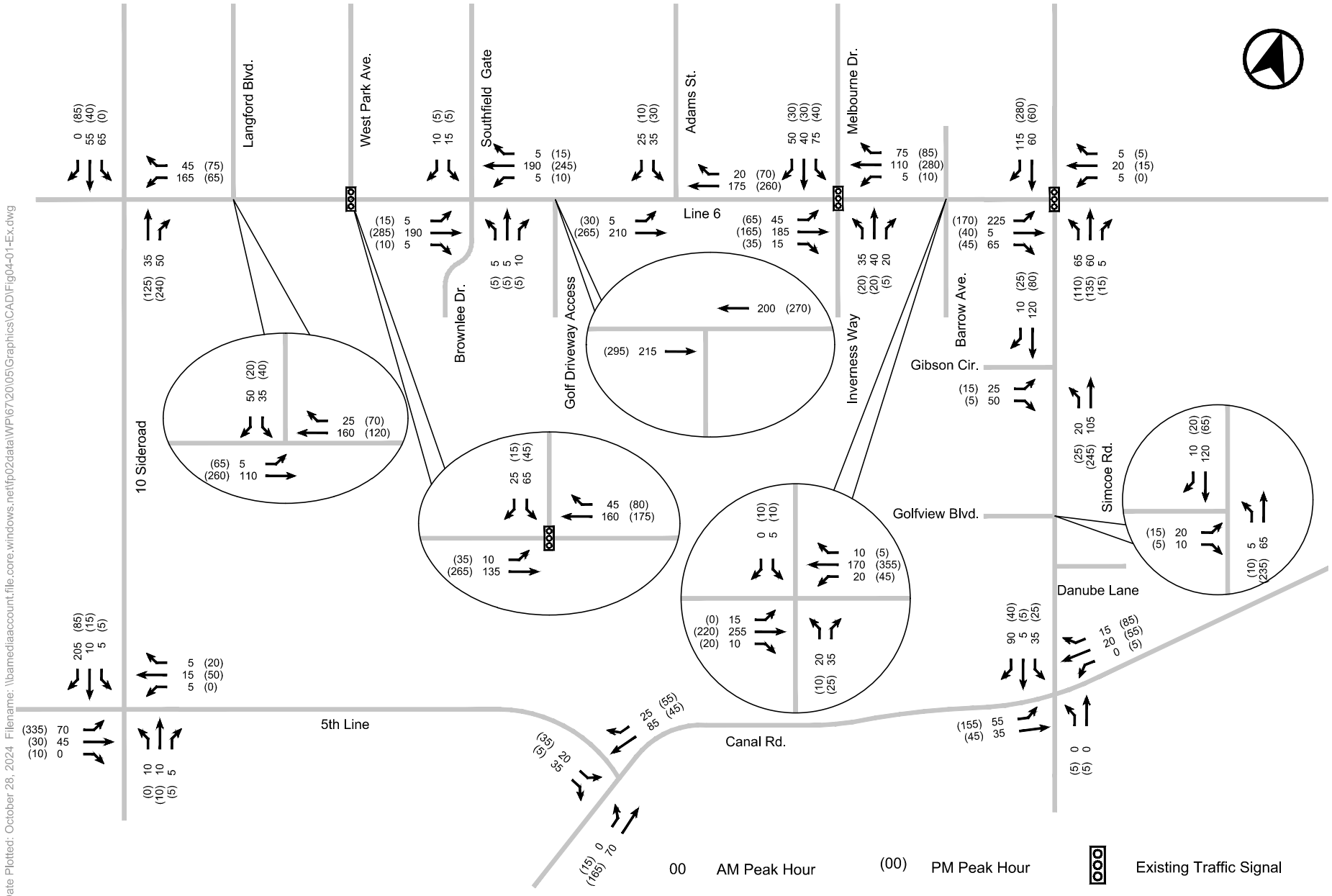
The proposed development separated into various internal zones, considering their respective locations as well as trip generation potential. Traffic was assigned from each internal zone to each external site access via the key internal

intersections listed above while accounting for the amount of inbound and outbound traffic utilizing each external site access in both peak hours.

Site traffic assigned to tine internal road network is illustrated in **Figure 9.**

4.4 Future Total Traffic Volumes

Future total traffic volumes, established by combining site-generated traffic with future background traffic volumes for the 2026, 2031, and 2036 horizon years are illustrated in **Figure 10**, **Figure 11**, and **Figure 12**, respectively.



Date Plotted: October 28, 2024 Filename: \\bamediaaccount.file.core.windows.net\fp02data\WP\67\20\05\Graphics\CAD\Fig04-01-Ex.dwg

FIGURE 4 EXISTING TRAFFIC VOLUMES

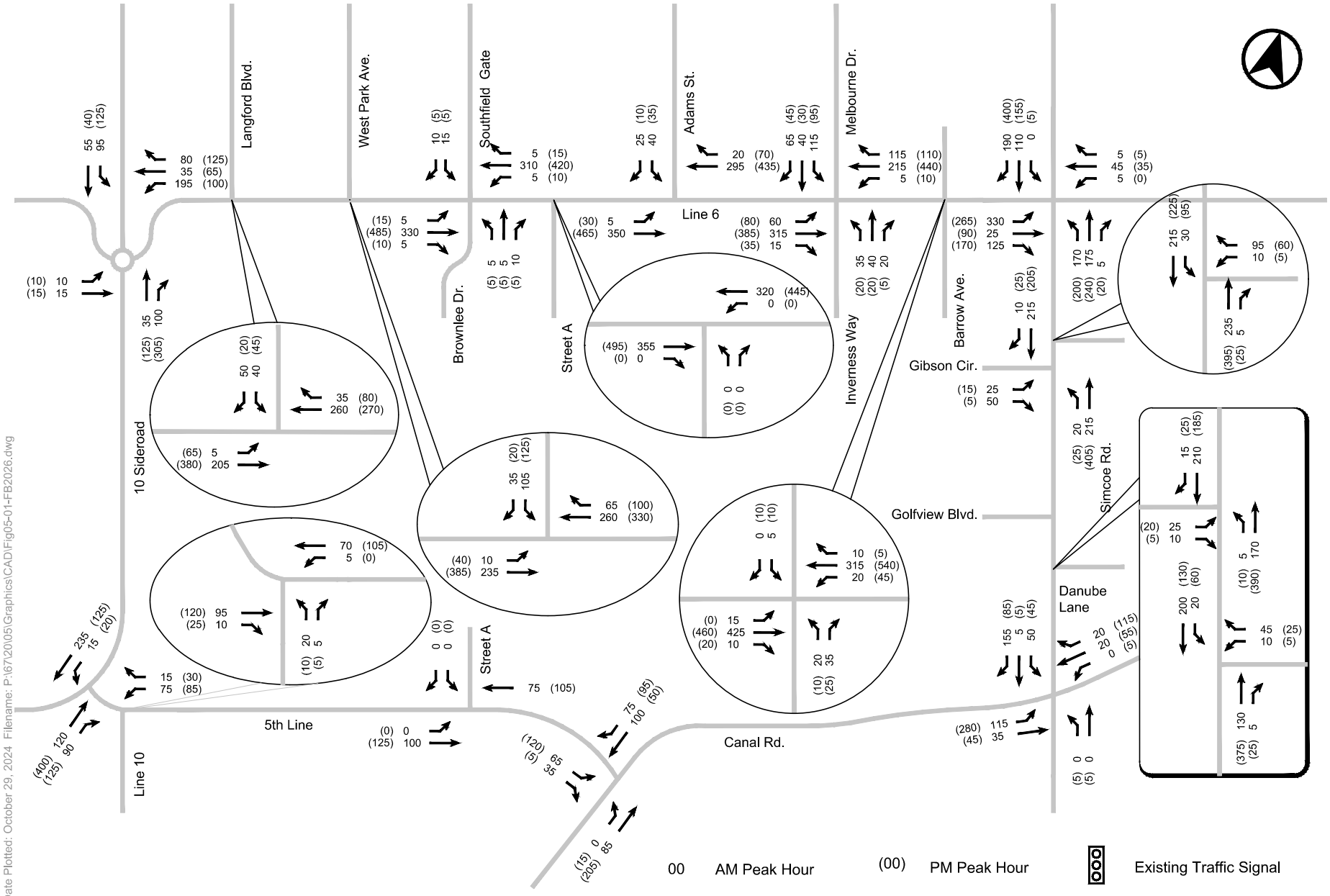


FIGURE 5 FUTURE BACKGROUND (2026) TRAFFIC VOLUMES

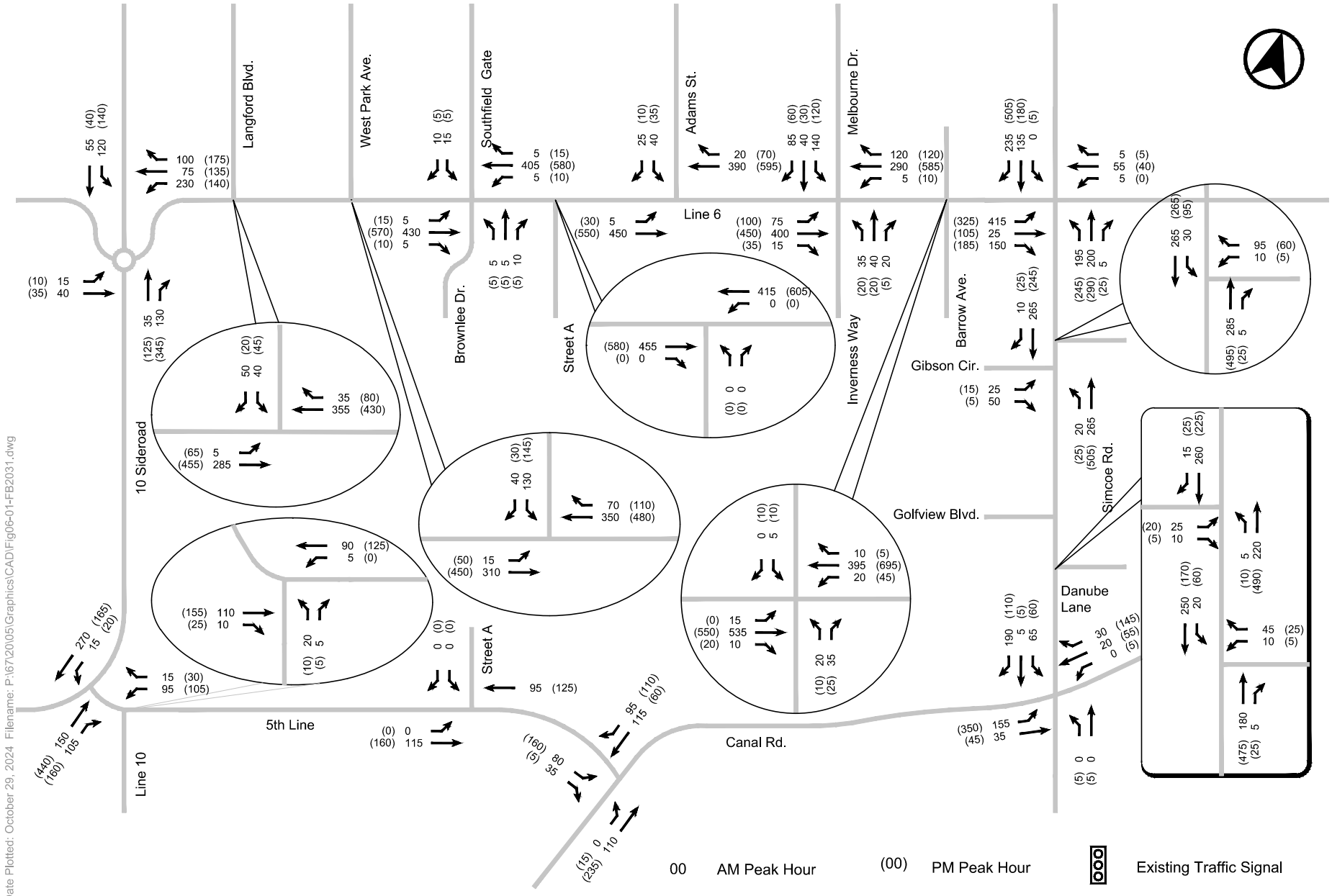


FIGURE 6 FUTURE BACKGROUND (2031) TRAFFIC VOLUMES

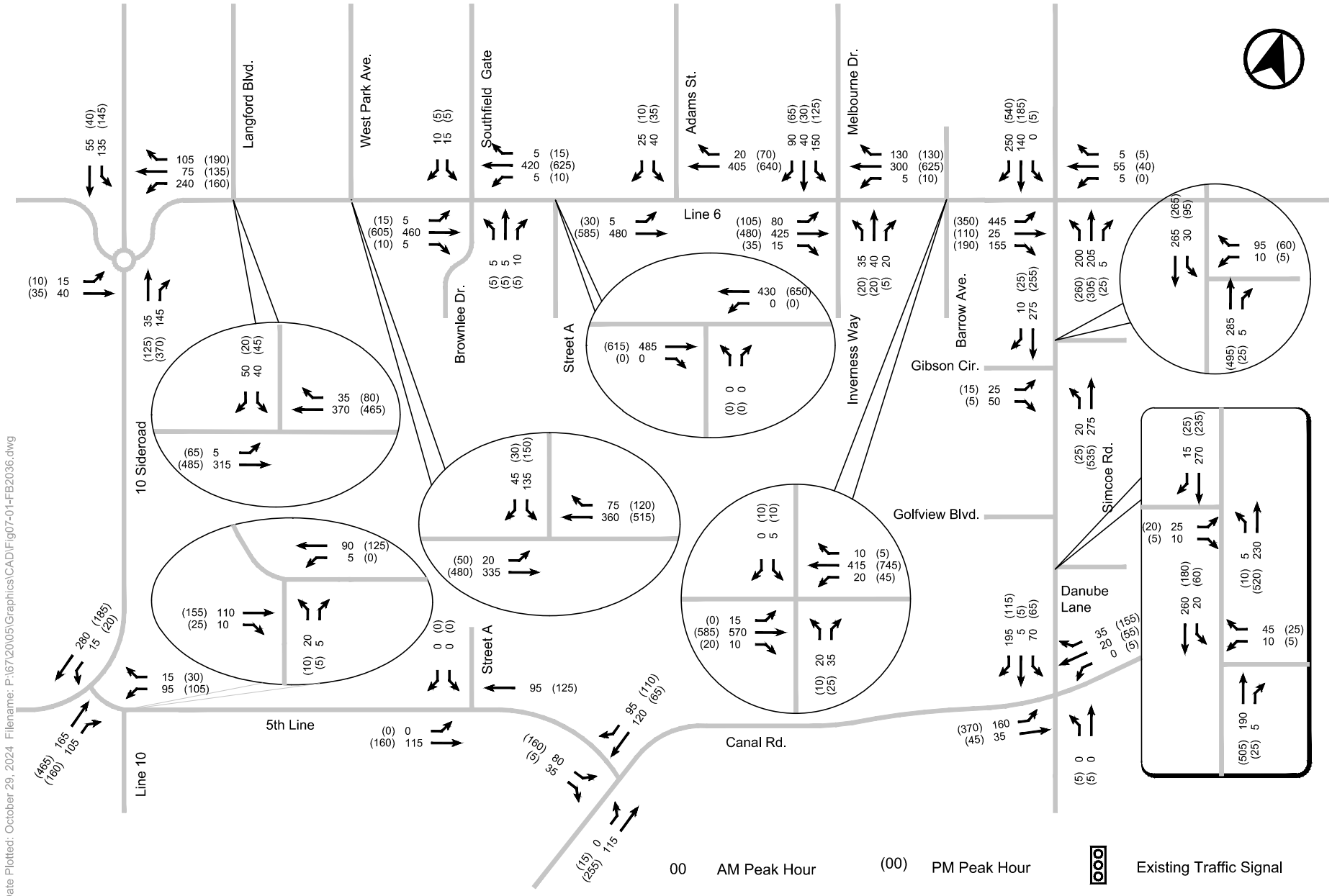
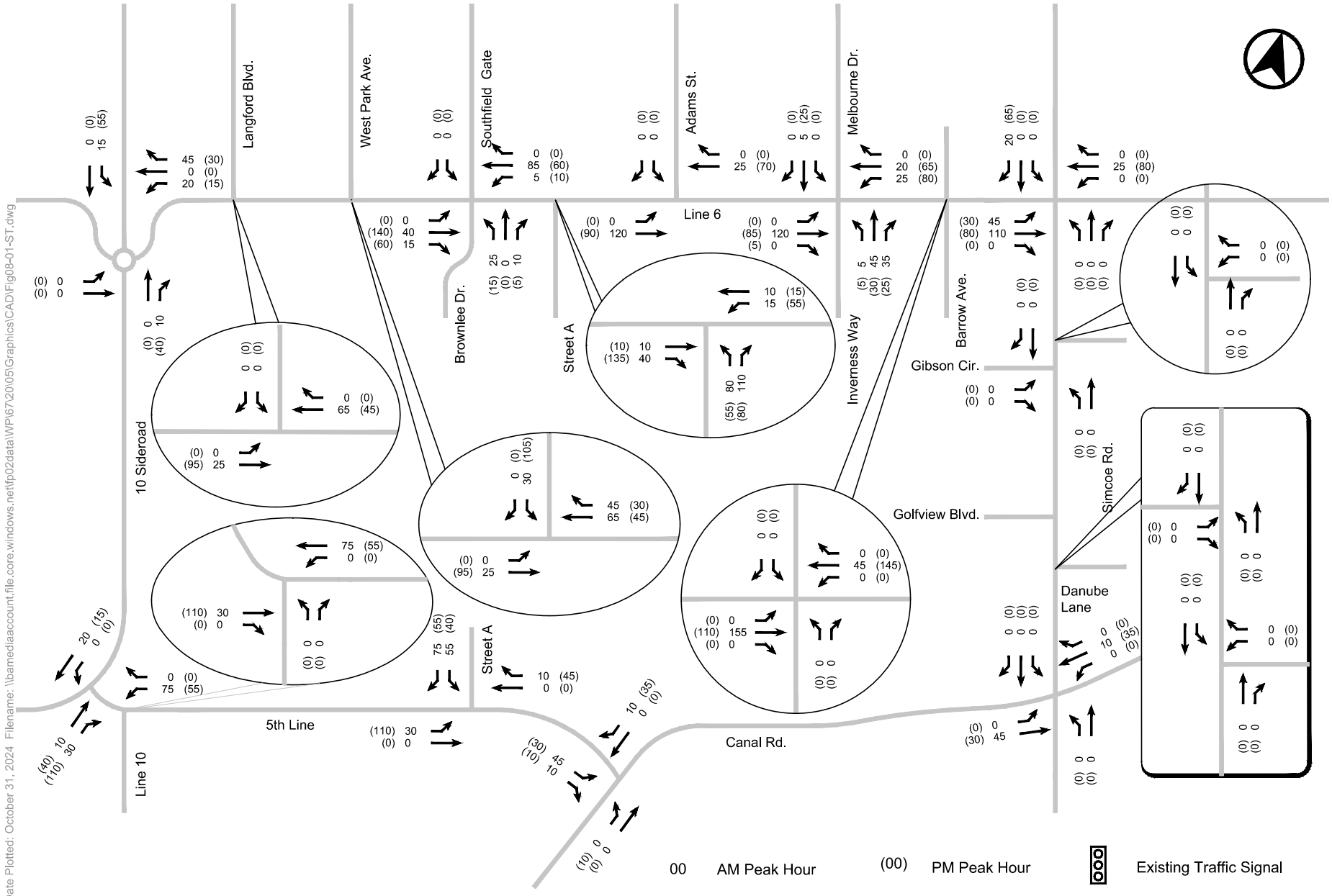
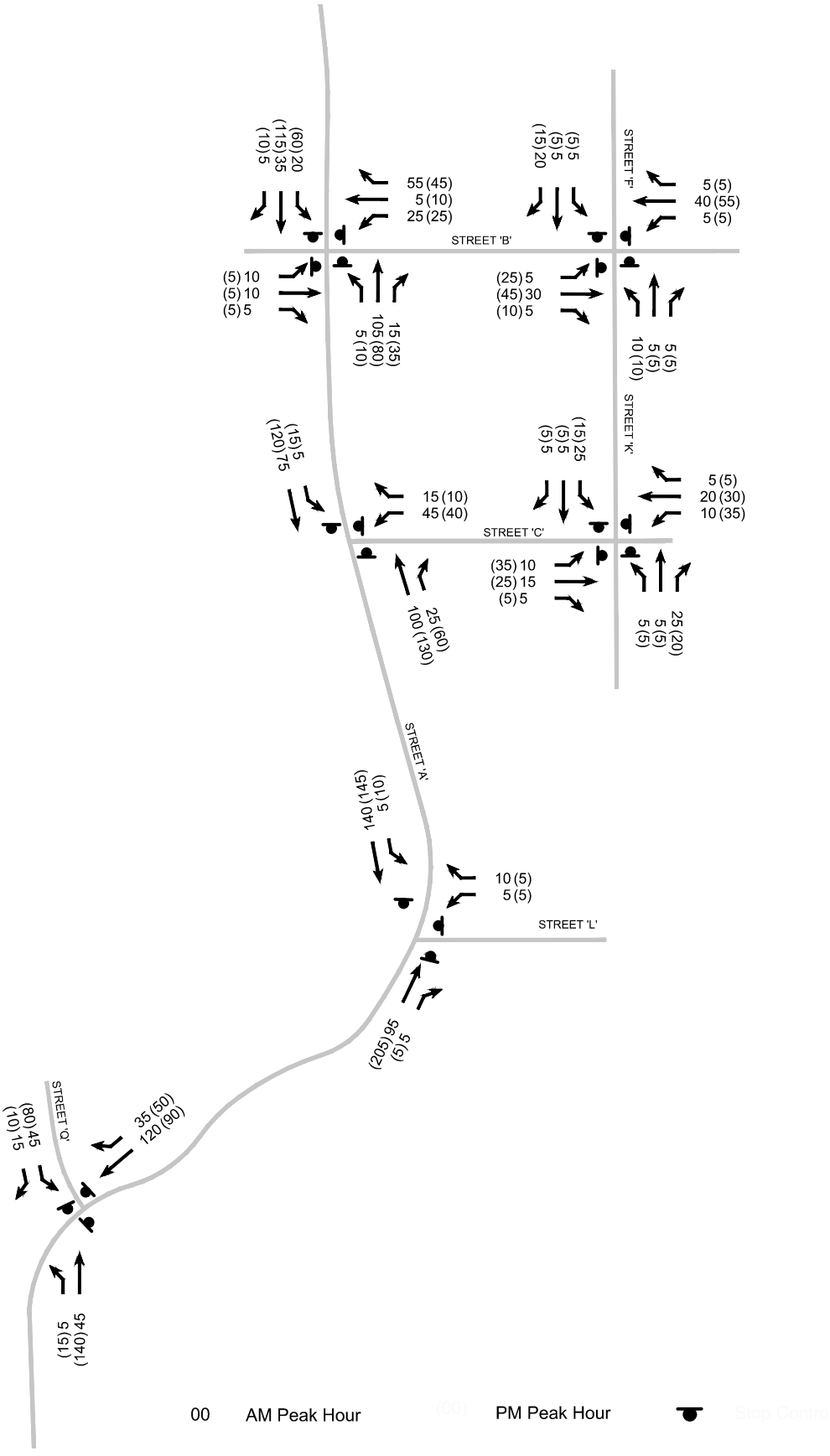


FIGURE 7 FUTURE BACKGROUND (2036) TRAFFIC VOLUMES



Date Plotted: October 31, 2024 Filename: \\bamediaaccount.file.core.windows.net\fp02data\WPI67\20\05\Graphics\CAD\Fig08-01-ST.dwg

FIGURE 8 SITE TRAFFIC VOLUMES



Date Plotted: October 31, 2024 Filename: \\bamediaaccount.file.core.windows.net\fp02data\WP\67\20\05\Graphics\CAD\Fig09-01-InternalST.dwg

FIGURE 9 INTERNAL SITE TRAFFIC VOLUMES

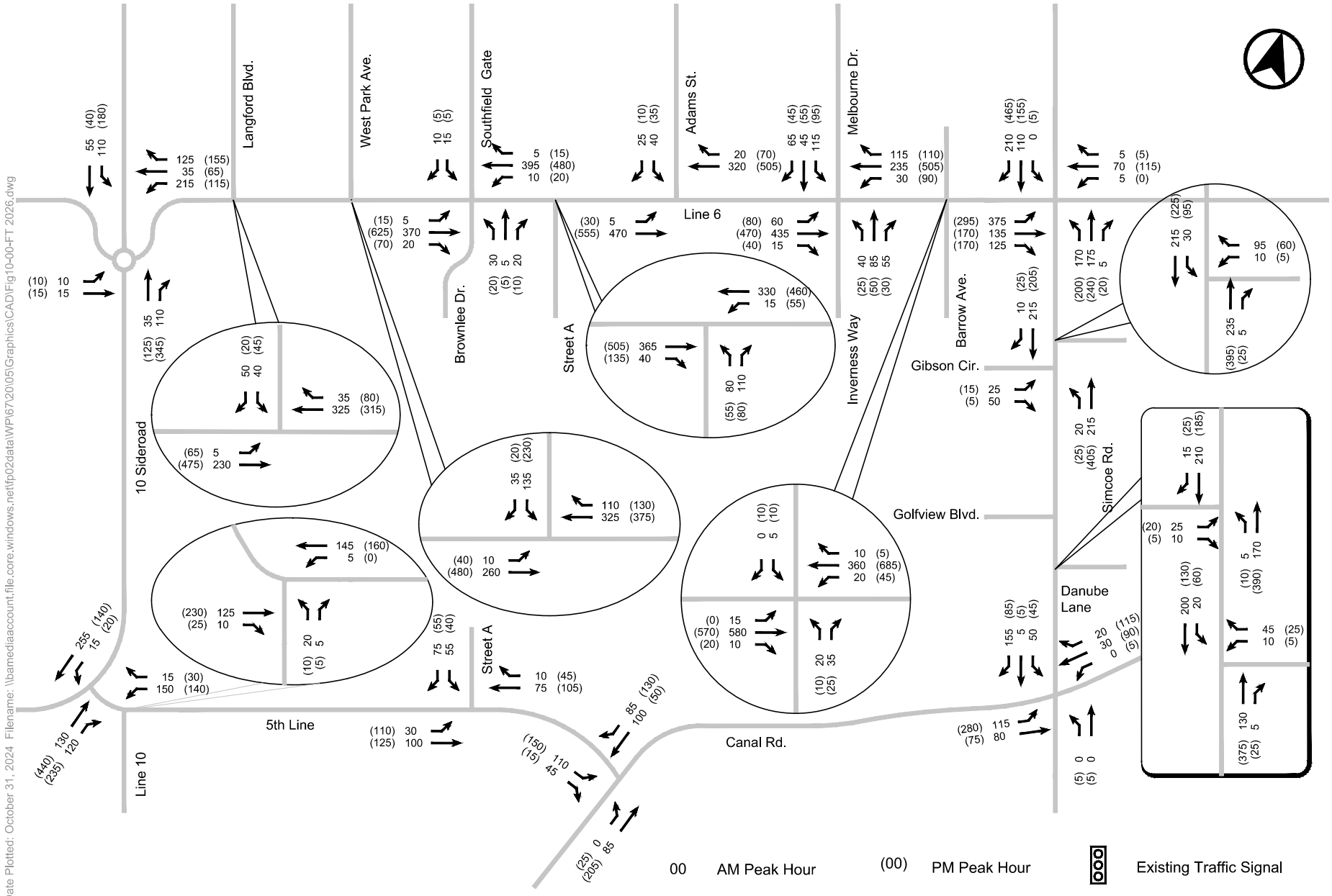


FIGURE 10 FUTURE TOTAL (2026) TRAFFIC VOLUMES

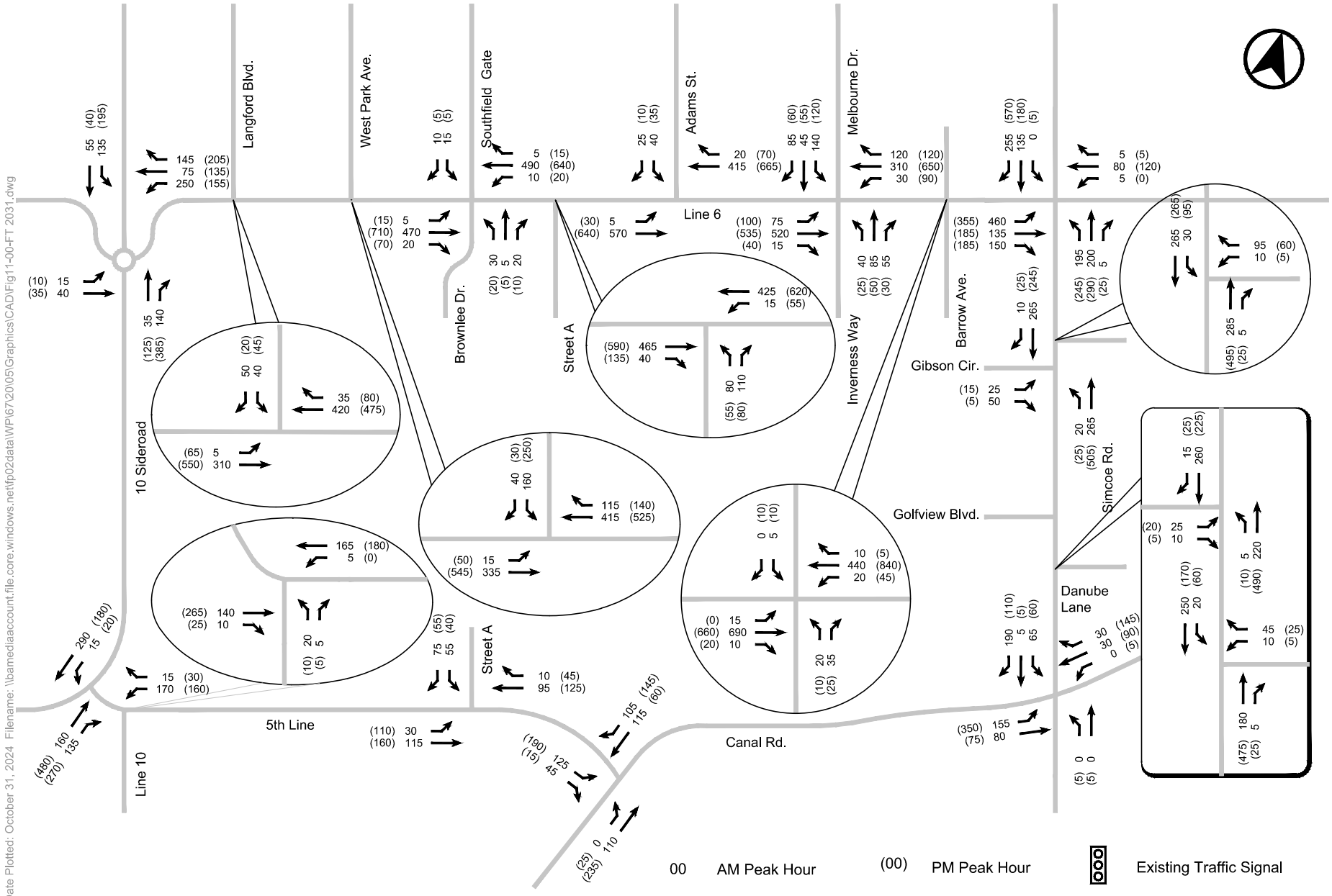


FIGURE 11 FUTURE TOTAL (2031) TRAFFIC VOLUMES

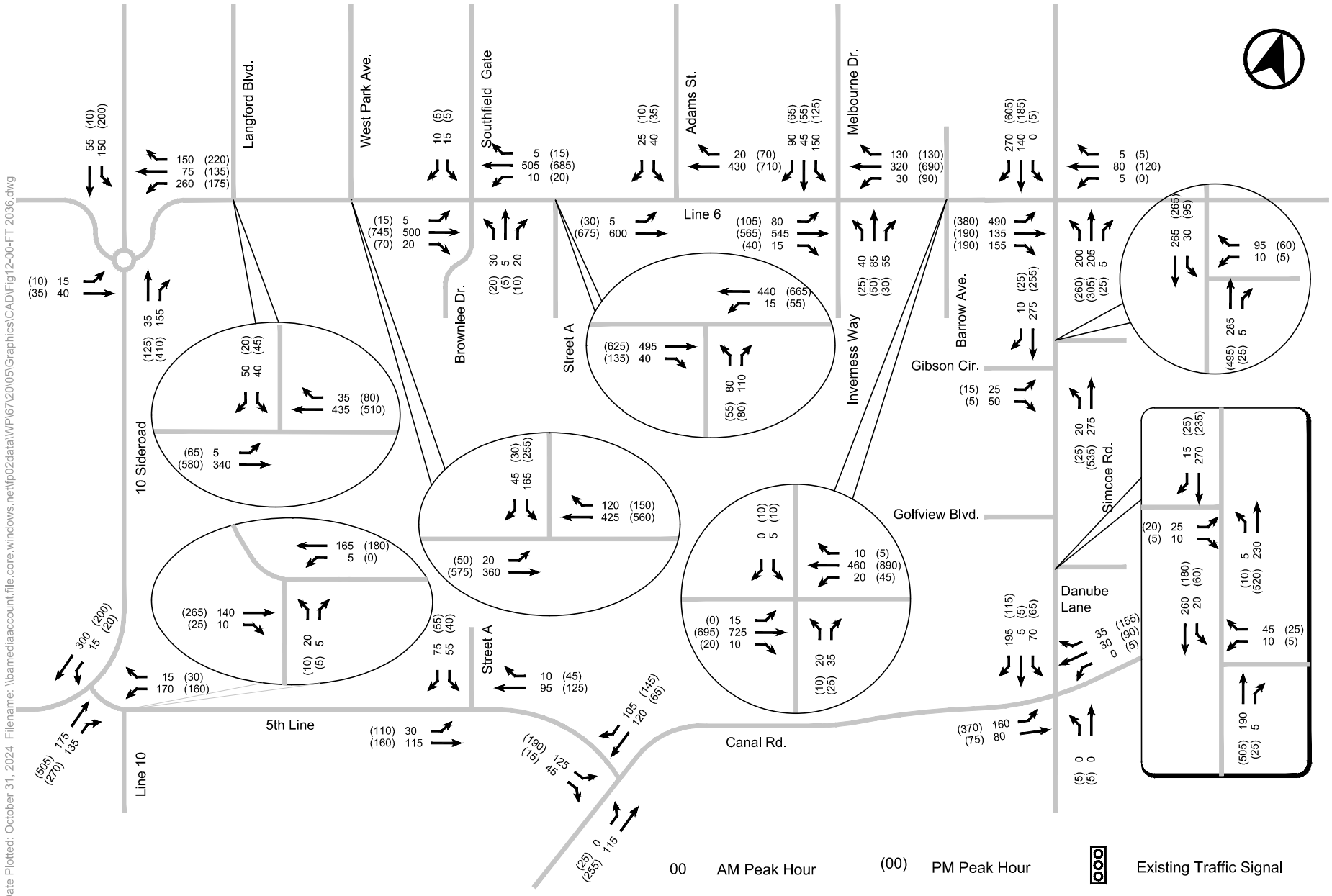


FIGURE 12 FUTURE TOTAL (2036) TRAFFIC VOLUMES

5.0 TRAFFIC OPERATIONS ANALYSIS

5.1 Methodology

5.1.1 Synchro Analysis

Traffic operations analyses for signalized and unsignalized intersections have been completed using the Synchro (Version 11.0) software package in accordance with the methodologies outlined in the Highway Capacity Manual (HCM 2000).

The key performance indicator of the signalized intersection evaluation is an intersection performance index (volume to capacity, or v/c), where a v/c index of 1.00 index indicates 'at capacity' conditions,

The key performance indicator of the unsignalized intersection / driveway analyses is an average delay per vehicle (in seconds) and a level of service (LOS) designation, where LOS A (little delay) to LOS F (extended delay) range provides an understanding of relative time a motorist may have to wait to complete a turn at an intersection or driveway.

Synchro analysis worksheets are provided in **Appendix C**.

5.1.2 Sidra Analysis

The Synchro 11 user guide states the following in regard to the modelling of roundabouts within the software:

> *The roundabout's method has not been very well developed. There are no delay or queue outputs. The method is only applicable to single lane roundabouts with up to 1200 [vehicles per hour] vph crossing volume. The output is a range of v/c values.*

Consequently, Sidra software was used to complete the roundabout analysis. The v/c, delay and LOS definitions discussed in previous section also apply in interpreting the Sidra analysis results. Detailed Sidra analysis worksheets are attached in **Appendix D**.

5.2 Input and Calibration Parameters

Road Network Assumptions

Existing lane configurations in the area road network have been assumed in the analysis for the existing conditions assessment. Future lane configurations and improvements in the area road network have been assumed in the analysis assuming the South West Arterial Road (SWAR) has been constructed as outlined in the Environmental Study Report prepared by LEA Consulting Ltd. dated May 2010 for the future 2026, 2031, and 2036 traffic conditions. Under future total traffic conditions, site accesses are provided on Line 6, Line 5 and Inverness Way. These site accesses will operate under STOP control with full vehicle movements permitted.

Signal Timing Plans

Existing traffic signal timing plans for all signalized intersections within the study area were obtained from the Town of Bradford West Gwillimbury. Analyses were undertaken using these signal timing plans for existing, future background and future total traffic conditions.

At the intersection of Line 6 / Simcoe Road, the weekday AM peak hour signal timing plan was optimized in the 2031 and 2036 horizon years, including an extension of the cycle length from 60 seconds to 80 seconds. Existing all-red and yellow times were maintained in the optimized signal timing plan. The optimized signal timing plan for the weekday AM peak hour at Line 6 / Simcoe Road is summarized in **Table 7.**

Table 7 Line 6 / Simcoe Road AM Optimized Signal Timing Plan (2031 & 2036)

Barrier 1		Barrier 2		Cycle Length
NB Split	31 s	**EB Split**	49 s	80 s
SB Split	31 s	**WB Split**	49 s	

Notes:
1. Splits inclusive of yellow and all-red times maintained from existing signal timing plan.

The existing traffic signal timing plans are provided in **Appendix E**.

Saturation Flow Rates

A base saturation flow rate of 1,900 passenger cars per hour of green time per lane (pcphgpl) was adopted as the base assumption within the Synchro analysis. This default rate was assumed in all analysis scenarios.

Heavy Vehicle Assumptions

Heavy and medium truck percentage incorporated into the analyses were based upon information obtained from observations made during existing intersection turning movement counts.

The relative proportion of heavy vehicles within the general traffic street was used as the basis for the heavy vehicle adjustment factor inputs adopted within the Synchro analysis for both existing and future scenarios.

Peak Hour Factors

The peak hour factors at the area intersections were calculated based on the existing traffic volume data extracted from the traffic counts utilized in the study of the operations analysis. A peak hour factor of 0.90 was assumed for proposed driveway accesses and future intersections.

5.3 Signalized Intersections Capacity Analysis Results

5.3.1 Line 6 / Simcoe Road

The intersection of Line 6 / Simcoe Road operates with a cycle length of 60 seconds under existing conditions. In the 2031 horizon year, the eastbound left turn approaches theoretical capacity in the weekday morning peak hour, operating at a v/c ratio of 0.97. Given that volumes are projected to increase by the 2036 horizon year, it is proposed to extend the cycle length of this intersection from 60 seconds to 80 seconds for the morning peak hour only, as discussed in **Section 5.2.**

Capacity analysis results for this intersection up until the 2031 horizon year using the existing signal timing plan are summarized in **Table 9.**

Table 8 Line 6 / Simcoe Road Capacity Analysis Summary (AM 60s CL)

Lane Group	Existing		Future Background (2026)		Future Total (2026)		Future Background (2031)		Future Total (2031)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.45 (0.39)	B (B)	0.67 (0.49)	B (B)	0.78 (0.59)	C (B)	0.85 (0.61)	C (B)	0.97 (0.72)	D (B)
EBTR	0.06 (0.10)	B (B)	0.13 (0.24)	B (B)	0.33 (0.42)	B (B)	0.15 (0.29)	B (B)	0.36 (0.46)	B (B)
WBL	0.01 (0.00)	B (A)	0.01 (0.00)	B (A)	0.02 (0.00)	B (A)	0.02 (0.00)	B (A)	0.02 (0.00)	B (A)
WBTR	0.03 (0.03)	B (B)	0.07 (0.05)	B (B)	0.11 (0.16)	B (B)	0.09 (0.06)	B (B)	0.12 (0.17)	B (B)
NBL	0.14 (0.18)	B (A)	0.39 (0.44)	B (B)	0.39 (0.44)	B (B)	0.46 (0.55)	B (B)	0.46 (0.55)	B (B)
NBTR	0.10 (0.17)	B (A)	0.30 (0.37)	B (B)	0.30 (0.37)	B (B)	0.34 (0.44)	B (B)	0.34 (0.44)	B (B)
SBTL	0.09 (0.07)	B (A)	0.17 (0.23)	B (B)	0.17 (0.23)	B (B)	0.21 (0.27)	B (B)	0.21 (0.27)	B (B)
SBR	0.08 (0.19)	B (A)	0.14 (0.27)	B (B)	0.15 (0.31)	B (B)	0.17 (0.34)	B (B)	0.19 (0.38)	B (B)
Overall	**0.30 (0.27)**	**B (B)**	**0.53 (0.47)**	**B (B)**	**0.59 (0.52)**	**B (B)**	**0.66 (0.58)**	**B (B)**	**0.72 (0.64)**	**C (B)**

Notes:
1. xx (xx) – AM (PM)

Following the extension of the signal length for the morning peak hour to 80 seconds, the intersection operates acceptably, with an overall v/c ratio of 0.74 or better and with the eastbound left turn movement operating with a v/c ratio of 0.87 during the weekday morning peak hour under future total conditions in the 2036 horizon year.

Capacity analysis results for this intersection using the optimized signal timing plan for the 2031 and 2036 horizon years are summarized in **Table 9.**

Table 9 Line 6 / Simcoe Road Capacity Analysis Summary (AM 80s CL)

Lane Group	Future Background (2031)		Future Total (2031)		Future Background (2036)		Future Total (2036)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.77 (0.61)	C (B)	0.84 (0.72)	C (B)	0.81 (0.66)	C (B)	0.87 (0.77)	C (C)
EBTR	0.15 (0.29)	B (B)	0.32 (0.46)	B (B)	0.15 (0.30)	B (B)	0.32 (0.48)	B (B)
WBL	0.01 (0.00)	A (A)	0.02 (0.00)	A (A)	0.01 (0.00)	A (A)	0.02 (0.00)	A (A)
WBTR	0.08 (0.06)	B (B)	0.11 (0.17)	A (B)	0.08 (0.06)	A (B)	0.10 (0.17)	A (B)
NBL	0.50 (0.55)	B (B)	0.52 (0.55)	B (B)	0.52 (0.59)	B (B)	0.55 (0.59)	C (B)
NBTR	0.37 (0.44)	B (B)	0.38 (0.44)	B (B)	0.38 (0.47)	B (B)	0.40 (0.47)	B (B)
SBTL	0.23 (0.27)	B (B)	0.23 (0.27)	B (B)	0.24 (0.28)	B (B)	0.25 (0.28)	B (B)
SBR	0.17 (0.34)	B (B)	0.19 (0.38)	B (B)	0.18 (0.36)	B (B)	0.20 (0.41)	B (B)
Overall	**0.65 (0.58)**	**B (B)**	**0.70 (0.64)**	**B (B)**	**0.68 (0.62)**	**B (B)**	**0.74 (0.68)**	**B (B)**

Notes:
1. xx (xx) – AM (PM)

5.3.2 Line 6 / Melbourne Drive & Inverness Way

The intersection of Line 6 / Melbourne Drive & Inverness Way operates with a FREE-running signal timing plan with a minimum cycle length of 45.7 seconds. The intersection operates acceptably under all future scenarios while maintaining the existing signal timing plan, operating with an overall v/c ratio of 0.77 or better. Capacity analysis results for this intersection are summarized in **Table 10.**

Table 10 Line 6 / Melbourne Drive & Inverness Way Capacity Analysis Results

Lane Group	Existing		Future Background (2026)		Future Total (2026)		Future Background (2031)		Future Total (2031)		Future Background (2036)		Future Total (2036)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.08 (0.11)	A (A)	0.13 (0.23)	A (A)	0.13 (0.27)	A (A)	0.19 (0.45)	A (A)	0.20 (0.59)	A (B)	0.21 (0.57)	A (B)	0.23 (0.77)	A (C)
EBTR	0.21 (0.21)	A (A)	0.37 (0.43)	A (A)	0.50 (0.52)	A (A)	0.46 (0.50)	A (A)	0.61 (0.60)	A (A)	0.49 (0.54)	A (A)	0.65 (0.63)	A (A)
WBL	0.01 (0.01)	A (A)	0.01 (0.02)	A (A)	0.07 (0.23)	A (A)	0.01 (0.02)	A (A)	0.09 (0.28)	A (A)	0.01 (0.03)	A (A)	0.10 (0.31)	A (A)
WBTR	0.17 (0.33)	A (A)	0.36 (0.56)	A (A)	0.38 (0.63)	A (A)	0.46 (0.74)	A (B)	0.49 (0.81)	A (B)	0.48 (0.79)	A (B)	0.52 (0.86)	A (B)
NBL	0.17 (0.12)	B (B)	0.15 (0.09)	B (B)	0.18 (0.11)	B (B)	0.15 (0.08)	B (B)	0.17 (0.11)	B (B)	0.15 (0.08)	B (B)	0.17 (0.11)	B (B)
NBTR	0.16 (0.09)	B (B)	0.14 (0.07)	B (B)	0.31 (0.18)	B (B)	0.14 (0.06)	B (B)	0.30 (0.17)	B (B)	0.14 (0.06)	B (B)	0.30 (0.17)	B (B)
SBL	0.38 (0.24)	B (C)	0.51 (0.42)	B (B)	0.55 (0.43)	B (B)	0.60 (0.48)	C (B)	0.64 (0.51)	C (B)	0.63 (0.50)	C (B)	0.67 (0.53)	C (B)
SBTR	0.19 (0.16)	B (B)	0.18 (0.14)	B (B)	0.19 (0.21)	B (B)	0.19 (0.14)	B (B)	0.20 (0.21)	B (B)	0.19 (0.14)	B (B)	0.21 (0.22)	B (B)
Overall	**0.25 (0.32)**	**A (A)**	**0.40 (0.53)**	**A (A)**	**0.51 (0.58)**	**A (A)**	**0.50 (0.67)**	**A (B)**	**0.62 (0.73)**	**B (B)**	**0.53 (0.71)**	**B (B)**	**0.65 (0.77)**	**B (B)**

Notes:
1. xx (xx) – AM (PM)

5.3.3 Line 6 / West Park Avenue

The intersection of Line 6 / West Park Avenue operates with a FREE-running signal timing plan with a minimum cycle length of 45.6 seconds. The intersection operates acceptably under all future scenarios while maintaining the existing signal timing plan with an overall v/c ratio of 0.76 or better. Capacity analysis results for this intersection are summarized in **Table 11.**

Table 11 Line 6 / West Park Avenue Capacity Analysis Results

Lane Group	Existing		Future Background (2026)		Future Total (2026)		Future Background (2031)		Future Total (2031)		Future Background (2036)		Future Total (2036)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
EBL	0.02 (0.05)	A (A)	0.02 (0.09)	A (A)	0.02 (0.13)	A (A)	0.04 (0.15)	A (A)	0.05 (0.27)	A (A)	0.05 (0.17)	A (A)	0.06 (0.34)	A (A)
EBT	0.13 (0.23)	A (A)	0.26 (0.38)	A (A)	0.29 (0.55)	A (A)	0.34 (0.45)	A (A)	0.37 (0.63)	A (A)	0.37 (0.48)	A (A)	0.40 (0.66)	A (B)
WBTR	0.18 (0.22)	A (A)	0.34 (0.44)	A (A)	0.46 (0.58)	A (A)	0.44 (0.60)	A (A)	0.57 (0.78)	A (B)	0.46 (0.65)	A (A)	0.58 (0.84)	A (B)
SBL	0.36 (0.25)	C (C)	0.39 (0.44)	B (B)	0.48 (0.56)	B (B)	0.47 (0.50)	B (B)	0.55 (0.59)	B (B)	0.48 (0.52)	B (B)	0.56 (0.60)	B (B)
SBR	0.02 (0.01)	C (C)	0.02 (0.01)	B (B)	0.02 (0.01)	B (B)	0.03 (0.02)	B (B)	0.03 (0.02)	B (B)	0.03 (0.02)	B (B)	0.03 (0.02)	B (B)
Overall	**0.21 (0.23)**	**A (A)**	**0.35 (0.44)**	**A (A)**	**0.46 (0.58)**	**A (B)**	**0.45 (0.58)**	**A (A)**	**0.56 (0.72)**	**A (B)**	**0.46 (0.62)**	**A (A)**	**0.58 (0.76)**	**A (B)**

Notes:
1. xx (xx) – AM (PM)

5.4 Unsignalized Intersections Capacity Analysis Results

All unsignalized intersections operate acceptably at LOS E or better under existing and future scenarios for all horizon years. It is noted that that the proposed site accesses of Line 6 / Street A and Line 5 / Street A operate acceptably with individual movements at LOS C or better under future scenarios.

Intersection capacity analysis results for the study area unsignalized intersections are summarized in **Table 12.**

Table 12 Unsignalized Intersections Capacity Analysis Summary

Lane Group	Existing		Future Background (2026)		Future Total (2026)		Future Background (2031)		Future Total (2031)		Future Background (2036)		Future Total (2036)	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
10 Sideroad / Line 6[2]														
WBTLR	12.6 (13.5)	B (B)	*Intersection converted to roundabout in future scenarios*											
SBTLR	4.3 (5.9)	A (A)												
Line 6 / Langford Boulevard														
EBL	7.8 (7.8)	A (A)	8.1 (8.3)	A (A)	8.3 (8.4)	A (A)	8.4 (8.8)	A (A)	8.6 (9.0)	A (A)	8.4 (9.0)	A (A)	8.7 (9.2)	A (A)
SBLR	10.3 (12.8)	B (B)	12.1 (17.7)	B (C)	13.1 (21.2)	B (C)	14.1 (25.0)	B (C)	15.5 (31.5)	C (D)	14.6 (27.8)	B (D)	16.2 (35.6)	C (E)
Line 6 / Brownlee Drive & Southfield Gate														
EBL	7.7 (7.9)	A (A)	8.0 (8.4)	A (A)	8.2 (8.6)	A (A)	8.2 (9.0)	A (A)	8.5 (9.2)	A (A)	8.3 (9.2)	A (A)	8.6 (9.4)	A (A)
WBL	7.8 (8.1)	A (A)	8.2 (8.7)	A (A)	8.4 (9.8)	A (A)	8.6 (9.1)	A (A)	8.8 (10.5)	A (B)	8.7 (9.3)	A (A)	8.9 (10.8)	A (B)
NBTLR	10.1 (11.5)	B (B)	11.4 (14.0)	B (B)	13.4 (17.5)	B (C)	12.5 (15.8)	B (C)	15.1 (20.8)	C (C)	12.8 (16.6)	B (C)	15.5 (22.3)	C (C)
SBTLR	10.2 (11.4)	B (B)	11.5 (13.7)	B (B)	12.5 (15.6)	B (C)	12.7 (16.0)	B (C)	13.9 (18.5)	B (C)	12.9 (16.8)	B (C)	14.2 (19.6)	B (C)
Line 6 / Adams Street														
EBL	7.7 (8.1)	A (A)	8.0 (8.8)	A (A)	8.0 (9.2)	A (A)	8.2 (9.7)	A (A)	8.3 (10.3)	A (B)	8.3 (10.1)	A (B)	8.3 (10.8)	A (B)
SBLR	10.2 (11.3)	B (B)	11.5 (13.7)	B (B)	12.2 (15.0)	B (C)	12.6 (16.0)	B (C)	13.4 (17.8)	B (C)	12.9 (16.9)	B (C)	13.7 (19.0)	B (C)
Line 6 / Barrow Avenue														
EBL	8.0 (0.0)	A (A)	8.5 (0.0)	A (A)	8.7 (0.0)	A (A)	8.8 (0.0)	A (A)	9.0 (0.0)	A (A)	8.9 (0.0)	A (A)	9.1 (0.0)	A (A)
WBL	8.0 (7.9)	A (A)	8.6 (8.7)	A (A)	9.4 (9.3)	A (A)	9.1 (9.2)	A (A)	10.2 (9.9)	B (A)	9.3 (9.4)	A (A)	10.6 (10.2)	B (B)
NBTLR	11.2 (10.9)	B (B)	13.6 (13.6)	B (B)	16.5 (15.6)	C (C)	15.7 (15.3)	C (C)	19.9 (18.1)	C (C)	16.5 (16.1)	C (C)	21.3 (19.2)	C (C)

Lane Group	Existing		Future Background (2026)		Future Total (2026)		Future Background (2031)		Future Total (2031)		Future Background (2036)		Future Total (2036)	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
SBTLR	14.8 (12.0)	B (B)	19.6 (15.1)	C (C)	25.0 (18.0)	C (C)	23.6 (18.0)	C (C)	32.0 (22.0)	D (C)	25.1 (19.2)	D (C)	34.9 (23.7)	D (C)
Simcoe Road / Gibson Circle														
EBLR	10.6 (11.2)	B (B)	12.6 (14.5)	B (B)	12.6 (14.5)	B (B)	14.0 (16.9)	B (C)	14.0 (16.9)	B (C)	14.3 (17.7)	B (C)	14.3 (17.7)	B (C)
NBTL	1.4 (0.9)	A (A)	0.9 (0.7)	A (A)	0.9 (0.7)	A (A)	0.8 (0.6)	A (A)	0.8 (0.6)	A (A)	0.8 (0.6)	A (A)	0.8 (0.6)	A (A)
Simcoe Road / Golfview Boulevard														
EBLR	9.7 (10.5)	A (B)	11.3 (13.3)	B (B)	11.3 (13.3)	B (B)	12.3 (15.2)	B (C)	12.3 (15.2)	B (C)	12.5 (15.8)	B (C)	12.5 (15.8)	B (C)
NBTL	0.7 (0.4)	A (A)	0.3 (0.3)	A (A)	0.3 (0.3)	A (A)	0.3 (0.3)	A (A)	0.3 (0.3)	A (A)	0.3 (0.3)	A (A)	0.3 (0.3)	A (A)
Simcoe Road / Canal Road														
EBTLR	8.3 (9.5)	A (A)	9.4 (13.2)	A (B)	10.0 (14.8)	A (B)	10.3 (18.4)	B (C)	11.2 (21.9)	B (C)	10.5 (20.8)	B (C)	11.4 (25.4)	B (D)
WBTLR	7.5 (8.1)	A (A)	7.8 (9.1)	A (A)	8.1 (10.0)	A (A)	8.2 (10.2)	A (B)	8.4 (11.3)	A (B)	8.3 (10.6)	A (B)	8.5 (11.8)	A (B)
NBTLR	7.4 (8.1)	A (A)	7.8 (8.9)	A (A)	7.9 (9.1)	A (A)	8.0 (9.4)	A (A)	8.2 (9.7)	A (A)	8.1 (9.6)	A (A)	8.3 (9.9)	A (A)
SBTLR	7.8 (8.1)	A (A)	8.8 (9.6)	A (A)	9.2 (9.9)	A (A)	9.9 (11.0)	A (B)	10.3 (11.4)	B (B)	10.1 (11.5)	B (B)	10.6 (12.0)	B (B)
Line 5 / Canal Road														
EBLR	9.4 (10.5)	A (B)	10.5 (12.7)	B (B)	11.3 (14.1)	B (B)	11.2 (14.5)	B (B)	12.2 (16.7)	B (C)	11.3 (15.1)	B (C)	12.4 (17.5)	B (C)
NBTL	0.0 (0.7)	A (A)	0.0 (0.6)	A (A)	0.0 (1.0)	A (A)	0.0 (0.6)	A (A)	0.0 (0.9)	A (A)	0.0 (0.5)	A (A)	0.0 (0.9)	A (A)
Line 5 / 10 Sideroad (North-West Intersection)														
EBTLR	8.9 (12.3)	A (B)	*Intersection reconfigured in future scenarios*											
WBTLR	7.9 (8.1)	A (A)												
WBLR			12.0 (16.1)	B (C)	14.6 (25.0)	B (C)	13.4 (19.8)	B (C)	17.1 (35.6)	C (E)	13.7 (21.2)	B (C)	17.9 (40.2)	C (E)
NBTLR	7.8 (8.2)	A (A)	*Intersection reconfigured in future scenarios*											
SBTLR	8.4 (8.4)	A (A)												
SBTL			1.4 (2.9)	A (A)	1.4 (2.9)	A (A)	1.3 (2.5)	A (A)	1.3 (2.6)	A (A)	1.3 (2.4)	A (A)	1.3 (2.4)	A (A)

Lane Group	Existing		Future Background (2026)		Future Total (2026)		Future Background (2031)		Future Total (2031)		Future Background (2036)		Future Total (2036)	
	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Line 5 / 10 Sideroad (South-East Intersection)														
WBTL	*Intersection reconfigured in future scenarios*		0.5 (0.0)	A (A)	0.3 (0.0)	A (A)	0.4 (0.0)	A (A)	0.2 (0.0)	A (A)	0.4 (0.0)	A (A)	0.2 (0.0)	A (A)
NBLR			9.5 (9.7)	A (A)	10.1 (10.9)	B (B)	9.7 (10.1)	A (B)	10.4 (11.3)	B (B)	9.7 (10.1)	A (B)	10.4 (11.3)	B (B)
Simcoe Road / Danube Lane														
WBLR	0.0 (0.0)	A (A)	9.7 (11.6)	A (B)	9.7 (11.6)	A (B)	10.2 (12.8)	B (B)	10.2 (12.8)	B (B)	10.3 (13.2)	B (B)	10.3 (13.2)	B (B)
SBTL	0.0 (0.0)	A (A)	0.8 (3.0)	A (A)	0.8 (3.0)	A (A)	0.7 (2.7)	A (A)	0.7 (2.7)	A (A)	0.7 (2.7)	A (A)	0.7 (2.7)	A (A)
Simcoe Road / Jonkman Boulevard														
WBLR	0.0 (0.0)	A (A)	10.7 (12.2)	B (B)	10.7 (12.2)	B (B)	11.3 (13.6)	B (B)	11.3 (13.6)	B (B)	11.3 (13.6)	B (B)	11.3 (13.6)	B (B)
SBTL	0.0 (0.0)	A (A)	1.2 (3.2)	A (A)	1.2 (3.2)	A (A)	1.0 (3.2)	A (A)	1.0 (3.2)	A (A)	1.0 (3.2)	A (A)	1.0 (3.2)	A (A)
Line 6 / Street A														
WBL	*Intersection constructed as part of proposed development*		0.0 (0.0)	A (A)	8.2 (9.2)	A (A)	0.0 (0.0)	A (A)	8.5 (9.6)	A (A)	0.0 (0.0)	A (A)	8.6 (9.8)	A (A)
NBL			0.0 (0.0)	A (A)	12.7 (15.6)	B (C)	0.0 (0.0)	A (A)	14.1 (18.9)	B (C)	0.0 (0.0)	A (A)	14.5 (20.3)	B (C)
NBR			0.0 (0.0)	A (A)	11.9 (13.9)	B (B)	0.0 (0.0)	A (A)	13.2 (15.4)	B (C)	0.0 (0.0)	A (A)	13.6 (16.0)	B (C)
Line 5 / Street A														
EBTL	*Intersection constructed as part of proposed development*		0.0 (0.0)	A (A)	1.9 (4.0)	A (A)	0.0 (0.0)	A (A)	1.7 (3.6)	A (A)	0.0 (0.0)	A (A)	1.7 (3.6)	A (A)
SBL			0.0 (0.0)	A (A)	10.4 (13.4)	B (B)	0.0 (0.0)	A (A)	10.7 (14.2)	B (B)	0.0 (0.0)	A (A)	10.7 (14.2)	B (B)
SBR			0.0 (0.0)	A (A)	9.0 (9.2)	A (A)	0.0 (0.0)	A (A)	9.1 (9.4)	A (A)	0.0 (0.0)	A (A)	9.1 (9.4)	A (A)

Notes:

1. xx (xx) – AM (PM)

5.4.1 Roundabout Analysis

The intersection of Line 6 / 10 Sideroad operates acceptably under roundabout control in the future 2026, 2031, and 2036 horizon years at LOS A for all movements. SIDRA analysis results are summarized in **Table 13.**

Table 13 Line 6 / 10 Sideroad Roundabout Capacity Analysis Results

Lane Group	Future Background (2026)		Future Total (2026)		Future Background (2031)		Future Total (2031)		Future Background (2036)		Future Total (2036)	
	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS	v/c	LOS
NBLT	0.04 (0.12)	A (A)	0.04 (0.13)	A (A)	0.04 (0.13)	A (A)	0.04 (0.14)	A (A)	0.04 (0.08)	A (A)	0.04 (0.14)	A (A)
NBTR	0.09 (0.28)	A (A)	0.10 (0.33)	A (A)	0.12 (0.32)	A (A)	0.14 (0.38)	A (A)	0.14 (0.35)	A (A)	0.15 (0.41)	A (A)
WBLT	0.16 (0.13)	A (A)	0.18 (0.16)	A (A)	0.19 (0.21)	A (A)	0.21 (0.23)	A (A)	0.20 (0.21)	A (A)	0.22 (0.25)	A (A)
WBTR	0.10 (0.13)	A (A)	0.14 (0.16)	A (A)	0.16 (0.21)	A (A)	0.20 (0.23)	A (A)	0.16 (0.21)	A (A)	0.20 (0.25)	A (A)
SBLTR	0.15 (0.15)	A (A)	0.18 (0.21)	A (A)	0.19 (0.18)	A (A)	0.22 (0.24)	A (A)	0.20 (0.19)	A (A)	0.24 (0.25)	A (A)
EBLT	0.02 (0.01)	A (A)	0.02 (0.02)	A (A)	0.03 (0.03)	A (A)	0.04 (0.03)	A (A)	0.04 (0.03)	A (A)	0.04 (0.03)	A (A)
EBTR	0.02 (0.01)	A (A)	0.02 (0.02)	A (A)	0.03 (0.03)	A (A)	0.04 (0.03)	A (A)	0.04 (0.03)	A (A)	0.04 (0.03)	A (A)
Overall	**0.16 (0.28)**	**A (A)**	**0.18 (0.33)**	**A (A)**	**0.19 (0.32)**	**A (A)**	**0.22 (0.38)**	**A (A)**	**0.20 (0.35)**	**A (A)**	**0.24 (0.41)**	**A (A)**

Notes:
1. xx (xx) – AM (PM)

5.4.2 Internal Road Network

Capacity analysis results for the six internal intersections analyzed as part of this study are summarized in **Table 14**. All internal intersections are proposed to operate under two-way or all-way stop control. The analyzed internal intersections operate acceptably at LOS A for each individual movement under future total conditions.

Table 14 Internal Intersections Capacity Analysis Summary

Lane Group	Delay (s)	LOS
Street A / Street B		
EBTLR	7.6 (7.8)	A (A)
WBTLR	7.6 (8.0)	A (A)
NBTLR	8.0 (8.1)	A (A)
SBTLR	7.7 (8.8)	A (A)
Street B / Street K & Street F		
EBTLR	7.3 (7.6)	A (A)
WBTLR	7.3 (7.5)	A (A)
NBTLR	7.2 (7.4)	A (A)
SBTLR	7.0 (7.1)	A (A)
Street A / Street C		
WBLR	7.8 (8.1)	A (A)
NBTR	7.8 (8.3)	A (A)
SBTL	7.7 (8.2)	A (A)
Street C / Street K		
EBTLR	7.3 (7.6)	A (A)
WBTLR	7.3 (7.6)	A (A)
NBTLR	6.9 (7.1)	A (A)
SBTLR	7.4 (7.4)	A (A)
Street A / Street L		
WBLR	7.3 (7.7)	A (A)
NBTR	7.7 (8.6)	A (A)
SBTL	8.0 (8.2)	A (A)
Street A / Street Q		
EBLR	7.8 (8.5)	A (A)
NBTL	7.6 (8.5)	A (A)
SBTR	8.0 (8.1)	A (A)

Notes:
1. xx (xx) – AM (PM)

6.0 INTERSECTION CONTROLS ASSESSMENT

Signal warrant analyses were performed at the proposed site accesses at Line 6 / Street A and Line 5 / Street A based on future total 2026, 2031, and 2036 volumes in accordance with the *Ontario Traffic Manual – Book 12 methodology.* Volume projections and detailed warrant analysis sheets are provided in **Appendix F**.

In accordance with the preferred approach for using future volumes with existing intersections as outlined in Justification 7 of *OTM - Book 12*, the top 8 hourly volumes were estimated and evaluated against Justifications 1, 2, and 3. At the Line 6 / Street A intersection, existing 8-hour turning movement counts were used to project future total 8-hour volumes which were compared to Justifications 1-3. In addition, average hourly volumes (AHV) were calculated and used to compare against Justification 1 and 2 in accordance with the methodology outlined in Justification 7 of *OTM - Book 12*.

At Line 5 / Street A, 8-hour existing turning movement counts were not available, thus average hourly volumes (AHV) were calculated to compare against Justifications 1 and 2 in accordance with the methodology outlined in Justification 7 of *OTM - Book 12*. Results for the signal warrant analyses are summarized in **Table 15**.

Table 15 Signal Warrant Analysis Summary

Intersection	Year	Justification 1 – Minimum Vehicular Volume		Justification 2 – Delay to Cross Traffic		Justification 3 – Combination		Justification 7 – AHV[1]			Warrant
Line 6 / Street A	2026	1A	99%	2A	96%	1	47%	1	78%	32%	NO
		1B	47%	2B	65%	2	65%	2	66%	45%	
		Not Met		*Not Met*		*Not Met*		*Not Met*			
	2031	1A	100%	2A	100%	1	47%	1	93%	32%	NO
		1B	47%	2B	65%	2	65%	2	82%	45%	
		Not Met		*Not Met*		*Not Met*		*Not Met*			
	2036	1A	100%	2A	100%	1	47%	1	97%	32%	NO
		1B	47%	2B	65%	2	65%	2	86%	45%	
		Not Met		*Not Met*		*Not Met*		*Not Met*			
Line 5 / Street A	2026	1A	--	2A	--	1	--	1	18%	22%	NO
		1B	--	2B	--	2	--	2	21%	32%	
		--		--		--		*Not Met*			
	2031	1A	--	2A	--	1	--	1	32%	22%	NO
		1B	--	2B	--	2	--	2	24%	32%	
		--		--		--		*Not Met*			
	2036	1A	--	2A	--	1	--	1	32%	22%	NO
		1B	--	2B	--	2	--	2	24%	32%	
		--		--		--		*Not Met*			

Notes:

1. Per OTM Book 12, analysis conducted using AHV must meet a compliance of 120% for future development at an existing intersection.

Based on the signal warrant analyses, signalization is not warranted at the Line 6 / Street A and Line 5 / Street A intersections. As a result, a two-way STOP-controlled operation has been proposed at these intersections. Detailed signal warrant worksheets are provided in **Appendix F**.

7.0 PARKING CONSIDERATIONS

The current concept development plan does not illustrate any driveway locations, given that it is typically designed during the detailed design stage process (i.e. Site Plan Approval). However, high level estimates have been made based on the Town of Bradford West Gwillimbury Engineering Design Standards for the purposes of this study.

It is anticipated that all residential lots within the site will be served by 2 off-street parking spaces (1 space in the driveway and 1 space in the garage).

BA Group has also prepared an on-street parking allocation plan based on the road network elements proposed for the respective public right-of-way and the location of driveways for the proposed lot fabric. The parking allocation plan (PP-01) is provided in **Appendix H**. Drawing PP-01 is illustrative and provided to demonstrate estimated on-street parking supply. Final supply is subject to further details related to coordination with the project team during the detail design process.

It should be noted that the Town does not have any engineering standards for the parallel parking spaces along curbsides between private driveways. As requested by the Town staff, BA Group has assumed the length of parking spaces to be minimum 6.0 metres for single and end proposed spaces and minimum 7.2 metres for middle spaces.

Based on the estimated on-street parking supply of 445 spaces, the site can achieve approximately 0.46 spaces per unit on-street.

8.0 SIGHT DISTANCE REVIEW

As part of the on-going design process, a sight distance review was conducted at the following proposed site access intersections:

- Line 5 / Street A
- Brownlee Drive / Street P

The review includes:

- Horizontal and vertical sight distance conditions at the proposed Line 5 / Street A intersection;
- Horizontal sight distance conditions at the proposed Brownlee Drive / Street P intersection;
- Stopping and decision sight distance analyses at the proposed site access intersections; and
- Site visit observations and findings conducted on Monday, October 7, 2024.

The sight distance analyses being undertaken have been assessed in compliance and reference to the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads – June 2017 Edition.

8.1 Proposed Site Access Intersections

The proposed site access intersections have been designed to comply with the Town's engineering standards. A summary of the key characteristics of the proposed site access intersections of interest are provided in **Table 16**.

Table 16 Proposed Site Access Overview

Proposed Site Access	Intersection Type	Proposed Width
Line 5 / Street A	Full-moves	14 metres
Brownlee Drive / Street P	Full-moves	8 metres

8.2 Sight Distance Design Standards

The TAC Geometric Design Guide for Canadian Roads (Chapter 2) provides guidelines for sight distance standards that are applicable to the proposed site driveways. Sight distance provides motorists sufficient time to react and decide whether to preform a movement and is highly dependent on the speed of incoming vehicles.

The driveway design standards / requirements and assumptions adopted as part of the analysis are summarized in **Table 17**.

Table 17 Sight Distance Standards and Assumptions

Key Value	TAC Requirement	Assumption Adopted
Driver's Eye Height	1.08 metres	1.08 metres
Departing Vehicle Setback	4.4 metres - 5.4 metres	4.4 metres
Top of Car Height	1.30 metres	1.30 metres
Object Height	0.60 metres	0.60 metres
Design Speed (Line 5)	-	60 km/hr (10 km/hr above the posted speed limit of 50 km/hr)
Design Speed (Brownlee Drive)	-	50 km/hr (10 km/hr above the posted speed limit or 40 km/hr)

8.3 Sight Distance Analysis

The site distance for the proposed site access intersections have been evaluated based on Transportation Association of Canada (TAC) design criteria. The relevant sight distance figures are provided in **Appendix I**.

As per the TAC Guidelines, the turning sight distance is determined in reference to the intersection sight distance equations provided in section 9.9.2.3 of the TAC Guidelines based on the type of manoeuvre (i.e. left turn or right turn), the type of vehicle, and the design speed of the subject roadway. These parameters affect the intersection sight distance (ISD) required for each intersection, which is calculated using equation 9.9.1:

$$ISD = 0.278 V_{major} t_g$$

Where:

- ISD = intersection sight distance (length of the leg of sight triangle along the major road) (m)
- V_{major} = design speed of the major road (km / h)
- t_g = time gap for minor road vehicle to enter the major road (s)

For this review, Line 5 and Brownlee Drive are both major roads with two lanes and the proposed site accesses are the minor roads. The time gap is referenced using TAC Table 9.9.3 for left turn from stop analysis and using TAC Table 9.9.5 for right turn from stop analysis. In addition, Line 5 is a sloped road with approximately a 6% grade at the proposed intersection with Street A. As such, the stopping sight distance for Line 5 / Street A was adjusted using adjustment factors referenced in TAC Table 2.5.3.

Further, for the purpose of the turning sight distance analysis, the driver's eye of the departing vehicle is setback at 4.4 metres from the edge of the major road, as referenced in section 9.9.2.3 of the TAC Guidelines.

The minimum sight distance requirements as outlined in Chapter 2 and 9 of the TAC Guidelines for the proposed site accesses of interest are summarized in **Table 18**.

Table 18 Minimum Sight Distance Requirements

Access	Case	TAC Minimum Turning Sight Distance Requirement	TAC Stopping Sight Distance Requirement
Line 5 / Street A	Case B1 – Left Turn from Stop	130 metres	92 metres
	Case B2 – Right Turn from Stop	110 metres	77 metres
Brownlee Drive / Street P	Case B1 – Left Turn from Stop	105 metres	65 metres
	Case B2 – Right Turn from Stop	95 metres	

8.4 Site Visit Findings

On Monday, October 7, 2024, BA Group conducted a site visit to review the available sight distance and confirm adequate and unobstructed sight lines are provided for vehicles at the proposed site access intersections.

The available sight distance measures on site are summarized in **Table 19**.

Table 19 Available Sight Distance

Access	Case	Available Turning Sight Distance	Turning Sight Distance Requirements Satisfied	Available Stopping Sight Distance	Stopping Sight Distance Requirements Satisfied
Line 5 / Street A	Case B1 – Left Turn from Stop	170 metres	Yes	154 metres	Yes
	Case B2 – Right Turn from Stop	136.4 metres	Yes	136.4 metres	Yes
Brownlee Drive / Street P	Case B1 – Left Turn from Stop	78.5 metres	No	80.2 metres	Yes
	Case B2 – Right Turn from Stop	130 metres	Yes	130 metres	Yes

Line 5 / Street A

It was observed that there were no major physical obstructions for drivers (e.g., general view at eye level) when approaching the proposed access location from Line 5. In addition, it was observed that physical objects, such as a driver and / or headlights of vehicle, inching from the proposed access location remains clearly visible at a distance greater than the required stopping and decision sight distances determined in **Section 8.3**.

It is concluded that no mitigation measures in relation to physical obstructions are required based upon the existing conditions assessment conducted during the site visit along Line 5.

Brownlee Drive / Street P

It was observed that there were generally no major physical obstructions for drivers (e.g., general view at eye level) when approaching the proposed access location from Brownlee Drive, except for vehicles turning left from Street P onto Brownlee Drive. As indicated, the turning sight distance requirement for vehicles turning left from Street P onto Brownlee Drive is not met due to existing trees on the adjacent property to the south obstructing the view. While the turning sight distance is not met, the stopping sight distance is met, which exceeds, by more than a 20% margin. Stopping sight distance represents the minimum distance a driver needs to see to stop a vehicle safely without hitting the vehicle ahead. Given that the stopping sight distance observed exceeds the requirement, the proposed Street P access onto Brownlee Drive is considered an appropriate location.

It is concluded that no mitigation measures in relation to physical obstructions are required based upon the existing conditions assessment conducted during the site visit along Brownlee Drive.

9.0 BRADFORD FUNCTIONAL TRAFFIC STUDY CHECKLIST

The Town of Bradford West Gwillimbury's Functional Internal Traffic Study (FITS) has Checklist has been applied to the proposal. The below checklist comprises of 29 items essential for the planning and design of a new subdivision. Each item has been assessed and details are provided below.

As requested in the FITS checklist, hourly volume estimates have been provided at key intersections of internal roads with boundary arterials.

The internal road network configurations are provided within **Figure 3**. The network volumes forecasts are addressed within **Section 4.0**. Projected two-way traffic volumes on the internal streets near the boundary roads are set out in **Table 20** below.

Table 20 Projected Internal Two-Way Site Traffic Volumes

Street A Intersection of:	Two-Way Vehicles Per Hour
Line 6	245 (325)
Line 5	170 (250)

Notes:
1. xx (xx) = AM (PM)

Internal Road Classification and Right-of-Way.

Three types of roads are proposed in the draft plans: a collector road with a 26m ROW, a local road with a 20m ROW, and a local road with an 18m ROW. The characteristics of the standards are outlined in Section 3.0. The TAC Manual provides guidance on the amount of daily traffic that a local and collector street should carry. The following daily traffic thresholds were considered from the Tac Manual:

- < 1000 to 5000 veh / day for local streets; and
- 1000 to 5000 veh / day for collector streets.

The hourly traffic volumes estimated in the section above were converted to daily traffic estimates and were compared to the TAC guidelines at key points in the road network, such as the intersections with the arterial roads.

Peak hour traffic volumes outlined above were converted to daily traffic projections using the following approach which is generally accepted within the transportation industry:

AADT = (AM Peak + PM Peak Hour Traffic) / 2 / 9%

The above equation yields an estimated daily traffic range for the internal streets at the boundary intersections of 2,300 to 3,100 vehicles per day projected from Street A, the proposed collector street within the development area. All other local streets within the development area internal to the site will have lower traffic volumes as traffic is distributed from the collector system to the individual local roads. The estimated traffic on local streets is therefore estimated to be less than 1,000 vehicles per day, consistent with TAC standards.

Based on our review, the estimated daily traffic volumes on the internal streets of the draft plan are consistent with the volume thresholds outlined in the TAC Manual. On this basis, the proposed cross sections accommodate the forecasted traffic flows and are acceptable.

Intersection Spacing

The proposed intersection spacing of the local streets internal to the plan are consistent with the guidance provided by the TAC manual.

Horizontal Curves, Vertical Curves, Intersection Angles, and Safe Vehicle Stopping and Turning Decision Criteria

The geometric design of the internal roads is being refined as part of the ongoing design process and will be designed to be consistent with TAC standards. More detailed designs will be designed as part of subsequent submissions.

Intersection Turning Lanes and Traffic Signals or Traffic Circle

Lane configurations and intersection control were established based upon a review of the site context and the projected future traffic demand. In this regard, the Line 6 / Street A and Line 5 / Street A intersections are proposed to operate as unsignalized intersections with stop-controlled side street approaches. Analysis of the intersections based on unsignalized configurations for the 2026, 2031, and 2036 horizon years confirms that the intersections will operate appropriately under unsignalized control.

Street Elbows

The geometric design of the internal roads is being refined as part of the ongoing design process and will be designed to be consistent with TAC standards. More detailed designs will be designed as part of subsequent submissions.

Rear Laneways

Rear laneways are not proposed within this draft plan.

Temporary Turnarounds and Cul-de-Sacs

A cul-de-sac is being proposed at the end of Street Q. The current property line radius for the cul-de-sac is 20 metres and it extends up to 90 metres in length, which meets the design standards outlined in the BWG Design Criteria Manual, Section B3.05.

Temporary turnarounds are not proposed within this draft plan.

On-Street Parking

Street parking is generally permitted on the same side as the sidewalk on local roads. In the case of the collector, which have sidewalks on both sides, the parking has been located based on best practices and engineering judgement with respect to maximizing parking along frontages, street bends, school zones, etc**.**

Traffic Calming

Traffic calming measures are proposed as part of the proposed draft plan.

Headlight Screening

Window streets are not proposed in this development, rendering this comment non-applicable.

Service and Emergency Vehicle Circulation

The use of local and collector road standards within the draft plan area will allow for efficient traffic flow for emergency vehicles, including throughout areas where on-street parking is proposed.

Curb Radii

Curb radii at intersections are currently designed to 6.0m and don't conform to the BWG Design Criteria Manual, Section B3.04. The geometric design of the internal roads is being refined as part of the ongoing design process and will be designed to be consistent with TAC standards. More detailed designs will be designed as part of subsequent submissions.

Corner Rounding / Property Daylighting

Daylighting triangles are proposed at all collector street intersections with arterial streets, Section B3.04. The geometric design of the internal roads is being refined as part of the ongoing design process and will be designed to be consistent with TAC standards. More detailed designs will be designed as part of subsequent submissions.

Pedestrian and Handicapped Accommodation

Accessible pedestrian ramps with tactile plates are proposed at all sidewalk crossings of proposed roads.

Surface Treatments

Surface treatments are not discussed as part of the traffic study for this draft plan area; however, it is noted that expected vehicle speeds will be low, with good sightlines near intersections.

Round About and Traffic Circles

The draft plan does not propose roundabouts or traffic circles.

Driveway Locations

Driveway locations have not been confirmed at this stage of development. These will be confirmed during a later stage of the draft plan review process.

Sidewalks

All sidewalks will be constructed consistent with municipal requirements. Sidewalks are proposed on one side of the road on 18 metre right of ways and on both sides of the road on 20m right of ways.

Bicycle Paths and Lanes

The geometric design of the internal roads is being refined as part of the ongoing design process and will be designed to be consistent with TAC standards. More detailed designs will follow as part of subsequent submissions.

Designated Car Pool Spaces

The proposed development plan does not propose car pool spaces.

Transit Route Pattern

BWG does not have a municipal transit operation. Notwithstanding, the proposed collector roads have been designed to accommodate a future bus route.

Bus Stop Pedestrian Pad

As there is no transit service currently planned in the community, bus stop and pad locations are not proposed at this time.

Development Integration

The proposed collector streets have been designed with additional pavement width (invert-to-invert) in order to accommodate a future transit route. No additional integration of transit is required until a transit route is proposed.

Major Public Generators and Attractors – Driveway and Entrance Locations

There are no major public generators and attractors proposed in the development.

Major Public Generators and Attractors – On-Street Parking Assessment

There are no major public generators and attractors proposed in the development.

Major Public Generators and Attractors – Traffic Device Plan for Entrances Providing Direct Access

No Traffic Device Plan is required for the northern draft plan area.

Traffic Control Device Plan

Traffic control elements, such as stop bars, and stop signs are detailed in **Figure 1**.

On-Street and Off-Street Parking Supply

The draft plan areas are primarily made up of single-detached housing on 11.6 metre (38 foot) lots. A single detached lot width of 30 to 40 feet typically allows for at least one vehicle of on-street parking in between driveways, resulting in an acceptable amount of on-street parking available to residents and visitors to the area.

10.0 RESPONSE TO COMMENTS

This section contains the comments provided by the Town of Bradford West Gwillimbury and the general public, and the responses to these comments.

10.1 Corporate Services – Town of Bradford West Gwillimbury

Comment #1

Section 9.0 Parking considerations of the Traffic Impact Study identifies that approximately .57 on street parking spaces will be provided per unit. This is a high level assessment so it is difficult for me to comment on based on this assessment alone. Any on-street parking considerations shall comply with the Towns Traffic By-Law.

Response

Given that driveway locations are typically designed during the detailed design stage process (i.e. Site Plan Approval), no driveways have been currently illustrated in the concept development plan. However, high level estimates have been made based on the Town of Bradford West Gwillimbury Engineering Design Standards for the purposes of this study.

Based on the estimated on-street parking supply of 445 spaces, the site can achieve approximately 0.46 spaces per unit on-street. The parking allocation plan (PP-01) is provided in **Appendix H**. Final supply is subject to further details related to coordination with the project team during the detail design process.

Comment #2

All accessible parking spaces shall be indicated with signage and pavement markings to comply with the Accessible Parking By-law - 2019-22.

Response

The proposed development programme consists of 962 residential units, including single-detached homes, semi-detached homes, and townhouses. The Zoning By-law indicates that accessible parking is only required for developments consisting of apartment buildings, long-term care facility, nursing home, retirement home and any non-residential uses. Given that the development is not proposing any land uses mentioned above, no accessible parking is required to be provided for the proposed development.

Comment #3

All designated Fire Routes are required to be signed and spaced at the discretion of the Fire Chief.

Response

Noted.

10.2 Development Engineering – Town of Bradford West Gwillimbury

Comment B.8

A 10 m x 10 m daylight triangle is proposed at the Street 'A' connection to both Line 6 and Line 5. As street A will be a collector roadway, and Line 6 and 5 are both major arterial roadways, a 15 m x 15 m daylight triangle will be required.

Response

The current concept plans are illustrating a 15m by 15m daylight triangle at the Line 6 / Street A and Line 5 / Street A intersections. It should be noted though that the daylight triangles are currently proposed over the existing property boundaries and will impact the adjacent private properties on Line 6 and Line 5. We recommend reducing the daylight triangle to a smaller size that can be accommodated within the property boundaries without impacting the adjacent private properties on Line 6 and Line 5.

Comment B.9

While a Transportation Impact Study (TIS) has been provided we are of the opinion that the 2036 horizon date analyzed is not reflective of a 10 year post-project completion date

Response

Buildout and 5-year post-buildout horizon years of 2026 and 2031 were analyzed as part of the initial submission in 2021. In the September 2023 submission, which was an update of the initial 2021 submission, an additional 10-year post-buildout horizon year of 2036 was analyzed on the basis that the 2026 and 2031 horizon years within the initial 2021 submission were accepted by the Town of Bradford West Gwillimbury.

For the analysis updated as part of this submission, the 10-year post-buildout horizon year of 2036 was maintained based on parameters accepted as part of the two prior submissions. It should be noted that as part of this analysis, 15 years of background growth have been applied to existing traffic levels, including 10 years of growth after the assumed buildout year of 2026. This results in traffic levels that would be reflective of a 10 year post-buildout scenario irrespective of the actual completion date of the development.

Comment B.10

The report is to be updated to include the signature / seal of a Licensed Professional Engineer (P.Eng.) in the province of Ontario.

Response

A Professional Engineer (P.Eng.) stamp is not required or permitted for a response to comments letter or TIS report as outlined in the PEO Act and *Use of the Professional Engineer's Seal*, dated March 2022. As such, no P.Eng. stamp will be provided for this updated letter.

Comment B.11

Figure 7 of the report indicates stop controlled intersections at Street A / Line 5 and Street A / Line 6 intersections. While a signal warrant analysis has concluded a signal is not warranted at these intersections, we question whether one is actually required at the Street A / Line 6 intersection based on the v/c ratios and LOS's. Please revisit this matter.

Response

Updated traffic volume projections and signal warrant analyses have been conducted as part of this submission due to the evolution of the development plan. As discussed in **Section 6.0,** traffic signal warrant analyses have been completed in accordance with the *Ontario Traffic Manual – Book 12* methodology, which showed that traffic signals are not warranted at the intersections of Line 5 / Street A and Line 6 / Street A.

At the intersection of Line 6 / Street A specifically, delays for each movement are no worse than 20 seconds on average, at LOS C, for the northbound left turn movement. This corresponds with acceptable operation under HCM methodology and is typical of two-way stop controlled intersections intersecting with arterial roads. It should be noted that the increase in delays is primarily due to significant background traffic growth along Line 6.

Comment B.12

Figure 7 indicates Street A as terminating north of Line 5. Please clarify if this is a drafting error as we understand Street A is to connect to Line 5.

Response

Street A intersects with Line 5 as shown in **Figure 2.**

Comment B.13

Section 4.3 discusses TDM measures for the proposed development, however, the Town is of the opinion the TDM measures discussed are inadequate for the proposed development type. Further consideration should be given to additional TDM measures that promote traffic calming. Items, including but not limited to, traffic bollards, round-a-bouts, raised intersections, parking bump outs, etc. should be considered. Staff would be open to discussing further options and ideas ahead of major revisions.

Response

Traffic calming measures are being proposed throughout the proposed development, particularly along the proposed Street A corridor to reduce vehicle speeds. These traffic calming measures include raised mid-block pedestrian crossings, raised intersections crossing where high pedestrian demand is anticipated, speed humps, all-way stop controlled intersections, and curb extensions / bump-outs to accommodate on-street lay-by parking and reduce the width of the road. A proposed traffic calming plan is illustrated in **Figure 1** and provided in **Appendix B**.

Comment B.14

Section 5.4.1 indicates that historical traffic count data was not available at the intersections in the vicinity of the site and that the Town's OP was reviewed in order to calculate a suitable growth rate. The Town typically considers a growth rate of 2.5 % and would ask that the report be updated to be reflective of this growth rate.

Response

In the April 22, 2022 comments received from the Town of Bradford West Gwillimbury, a minimum of 2% compound growth rate to a future horizon of 10 years after the anticipated completion date of the development was requested.

Consistent with the September 2023 Report, corridor growth was applied to major corridors (i.e. Line 6, 10 Sideroad, 5th Line and Simcoe Road). The Town of Bradford West Gwillimbury's Official Plan was reviewed to determine a suitable corridor growth rate. The calculated corridor growth rates based on the Town's Official Plan are summarized in **Table 21**.

Table 21 Corridor Growth Rates

Street	Direction of Travel	Morning / Afternoon Peak	
		Population (2021-2036)	Employment (2021-2031)
Line 6	East / West	2%	4%
5th Line	North / South	2%	4%
Simcoe Road	North / South	2%	4%

The adopted corridor growth includes 10 years of annualized employment growth at 4%, and 15 years of annualized population growth at 2%. This corresponds with an increase in corridor traffic of approximately 83% by the 2036 horizon year. An annualized growth rate of 2.5% over 15 years would result in an increase in corridor traffic of approximately 45% by the 2036 horizon year. As such, the adopted corridor growth is more conservative than the 2.5% growth typically used by the Town.

Comment B.15

Figure 12B fails to include local roadways. Please update the drawing to reflect the current street network layout indicated on the latest version of the draft plan or, at a minimum, provide additional details to demonstrate internal trip generation breakdown (i.e. indicate how the provided internal trip counts were established based on local roadway trip generation).

Response

Traffic analysis was conducted at 6 key internal intersections, which correspond with intersections that are expected to receive the most traffic demand. These are intersections that provide access to the various site driveways. It is anticipated that all other local internal intersections will operate at levels better than the 6 intersections analyzed as part of this study.

As discussed in **Section 4.3.2**, the site was split into various internal zones. Traffic from each zone was assigned via the 6 analyzed intersections within the site to each external site access. The magnitude of traffic from each internal zone to each site access was based on the number of units within each zone as well as the amount of traffic projected to use each external access in both peak hours.

Comment B.16

Table 12 indicates a LOS of E under the future total 2031 columns. This will require further review between the parties.

Response

Updated traffic volume projections and traffic operations analysis have been conducted as part of this submission due to the evolution of the development plan. As shown in **Table 9,** the individual movements of Line 6 / Simcoe Road operate at LOS C or better under all future scenarios after signal optimization.

it is important to note that "Level of Service" (LOS) indicates the delay experienced by a driver. LOS for a signalized intersection is defined in the Highway Capacity Manual (HCM) as being within specific time ranges, measured in seconds:

- LOS A: Control Delay ≤ 10s
- LOS B: 10s < Control Delay ≤ 20s
- LOS C: 20s < Control Delay ≤ 35s
- LOS D: 35s < Control Delay ≤ 55s
- LOS E: 55s < Control Delay ≤ 80s
- LOS F: Control Delay > 80s

LOS is not the industry standard for evaluating the performance of signalized intersections, nor is it an effective indication of how well an intersection operates. For signalized intersections, the delay in seconds (i.e. LOS) experienced by a user is irrelevant without considering the signal's specific context and signal timing.

For this reason, the volume-to-capacity (v/c) ratio is the more widely accepted and effective indicator of the performance of a signalized intersection. The v/c ratio is calculated by dividing the traffic volume demand by the processing capacity. This calculation requires one to consider several important factors including (but not limited to) intersection geometry, signal timing, saturation flow, distribution of volumes across different movements, and critical movements. A v/c ratio of 0 reflects zero volume, while a v/c ratio of 1.0 reflects 'at-capacity' conditions.

Left-turn movements are specifically designed by traffic engineers to operate at high v/c ratios (i.e., near or at-capacity). Left-turn volumes are typically lower than through volumes; the left-turn movement is therefore not typically prioritized over the through movement. A driver's perception of how well a signalized intersection is operating is based on whether they can clear the intersection within a single signal cycle (i.e., within a single green phase); it is not necessarily based on the time in seconds that they are waiting during their movement's red phase.

For example, at intersections with few pedestrians (e.g., at Line 6 / Simcoe Road), existing signal cycle lengths are currently 60 seconds. Thus, by default, the wait time during the red phase may exceed the threshold for LOS E. However, users will accept this delay if they are able to clear the intersection during the green phase, as indicated by the v/c ratio near or equal to 1.0.

As defined in the Highway Capacity Manual (HCM), the volume of traffic using a roadway cannot exceed the roadway's capacity. A v/c ratio that exceeds 1.0 indicates that more vehicles demand to use a roadway than can be accommodated. This means v/c ≤ 1.0 indicates that an intersection is approaching or at its theoretical capacity, whereas v/c > 1.0 indicates that an intersection is over capacity (i.e., the numerator is larger than the denominator in the equation).

Therefore, based on the HCM methodology and industry best practice, a v/c ratio equal to 1.0 for existing conditions is representative of real-life operations under saturated conditions. The selection of a specific threshold value for the v/c ratio that is less than 1.0 would be considered arbitrary and inappropriate based on the HCM.

As such, it is appropriate and reasonable for individual movements at a signalized intersection, particularly left-turns, to operate under existing conditions with a v/c ratio of 1.0 and a LOS E.

As shown in **Table 9,** the v/c ratios under future total conditions in the 2036 horizon year are 0.87 or better, which shows that each movement is operating acceptably under its theoretical capacity.

Comment B.17

Table 15 indicates a significant drop in LOS on the EBL movement from the future background to future total columns (A to E). This will require further review between the parties.

Response

Updated traffic volume projections and traffic operations analysis have been conducted as part of this submission due to the evolution of the development plan. As shown in **Table 10**, the eastbound left turn movement at Line 6 / Melbourne Drive & Inverness Way operates acceptably at LOS C and with a v/c ratio of 0.77 under future total conditions in the 2036 horizon year.

As noted in the response to **Comment B.16,** v/c ratios are a better indicator of signalized intersection performance compared to delays (and by extension, LOS).

Comment B.18

Cycle length under the 2036 scenario for all tables has been increased from 60 seconds to 80 seconds. This will require further review between the parties.

Response

Noted.

Comment B.19

Tables 21 and 22 have a few reported LOS's of D or worse. This will require further review between the parties.

Response

Noted. For unsignalized intersections, a LOS D corresponds with delays of 25 to 35 seconds while LOS E corresponds to delays of 35 to 50 seconds. This is considered an acceptable condition according to HCM 2000 and is common for unsignalized intersections to experience delays in these ranges.

Comment B.20

Table 26 indicates LOS's of C or worse for the NBLR movement under all horizon dates analyzed for the Street A / Line 6 intersection. Given that this is proposed as a stop controlled intersection, additional consideration should be given to signalizing this intersection. While we acknowledge the report includes a signal warrant analysis (Table 28) for this intersection we would like to discuss this further with the Consultant.

Response

Updated traffic volume projections and signal warrant analyses have been conducted as part of this submission due to the evolution of the development plan. As discussed in **Section 6.0,** traffic signal warrant analyses have been completed in accordance with the *Ontario Traffic Manual – Book 12* methodology, which showed that traffic signals are not warranted at the intersections of Line 5 / Street A and Line 6 / Street A.

At the intersection of Line 6 / Street A specifically, delays for each movement are no worse than 20.3 seconds on average, at LOS C, for the northbound left turn movement. This corresponds with acceptable operation under HCM methodology and is typical of two-way stop controlled intersections intersecting with arterial roads. It should be noted that the increase in delays is primarily due to significant background traffic growth along Line 6.

Comment B.21

Please revisit the reported LOS for the EBL movement reported under the future total 2036 column in table 13. Given the v/c ratios would this LOS not be E? Please clarify.

Response

Under HCM 2000 methodology, volume-to-capacity ratios are reflective of the maximum traffic volume each movement in an intersection is capable of supporting, and how close the actual traffic volume is to reaching that limit. Meanwhile, LOS is determined by average delays, which may not necessarily correlate with volume-to-capacity.

As noted in the response to **Comment B.16,** v/c ratios are a better indicator of signalized intersection performance compared to delays (and by extension, LOS).

Comment B.22

Table 29 concludes that no all way stop controls are warranted at local road intersections with Street A. While a list of these intersections have all way stops proposed in some future scenario, and to address our previous TDM comment, we question if consideration has been given to roundabouts at Street B / Street A intersection. To further address our previous TDM comment, this item could also be considered at other notable internal intersections.

Response

BA Group has reviewed the potential of providing a traffic roundabout at the proposed Street B / Street A intersection within the site. Based on our review, it was determined that a roundabout could not be accommodated due to the anticipated residential lot patterns at the proposed intersection. Given that it is not desirable to have direct driveway access to / from a roundabout intersection within 10 metres, a roundabout cannot be accommodated at the proposed Street B / Street A intersection. Providing a roundabout at the proposed intersection would result in driveways accessing the roundabout directly which is an unfavourable transportation condition in terms of safety and operations.

The proposed Street B / Street A intersection is located near the potential proposed elementary school and park blocks. A roundabout could potentially create some challenges for pedestrians to navigate safely through the intersection. Given that roundabouts typically require much larger area than a conventional intersection, pedestrians will have to loop around the roundabout and increase their walking distance to cross the intersection, making it less efficient and accessible.

Therefore, it is recommended that the proposed Street B / Street A intersection operates as a traditional all-way stop-controlled intersection.

Comment B.23

The provided pedestrian circulation plan only indicates pedestrian circulation on streets with proposed sidewalks and does not include circulation through any stormwater management, park, or amenity space blocks. The plan should be revisited to include pedestrian circulation, via trail networks, through green space blocks.

Response

An updated pedestrian circulation plan is provided in **Appendix G.**

Comment B.24

Section 9.0 indicates that driveway locations were not available on the conceptual plan at the time the report was prepared and high level estimates were made. As part of draft plan approval we would ask that proposed driveway locations be established and demonstration that on- street parking requirements can be met with the proposed driveway locations.

Response

Given that driveway locations are typically designed during the detailed design stage process (i.e. Site Plan Approval), no driveways have been currently illustrated in the concept development plan. However, high level estimates have been made based on the Town of Bradford West Gwillimbury Engineering Design Standards for the purposes of this study.

Based on the estimated on-street parking supply of 445 spaces, the site can achieve approximately 0.46 spaces per unit on-street. The parking allocation plan (PP-01) is provided in **Appendix H**. Final supply is subject to further details related to coordination with the project team during the detail design process.

Comment B.25

In section 10.0 formula AADT = (AM Peak + PM Peak hour traffic)/2/9% is used to calculate the estimated traffic range at the development boundary intersections. While the report does indicate that this is an accepted practice, we ask for a further explanation be included as to why this was chosen.

Response

The AADT formula utilized in this study is based on HCM methodology. The AM and PM peak hour traffic were averaged to determine a directional design-hour volume for the purposes of calculating AADT. The directional design-hour volume is divided by the *K-factor,* which within HCM 2000 is defined as the percentage of average daily traffic that is observed in the directional design-hour volume. HCM 2000 states,

> *The proportion of total daily traffic that occurs in the peak hour is defined by the K-factor. For many rural and urban highways, this factor falls between 0.09 and 0.10.*

Thus, a *K-factor* of 9% was selected for the purposes of this analysis.

Comment B.26

Under the "Transit Route Pattern" and "Bus Stop Pedestrian Pad" headings it appears accommodations are made for bus stop locations. Further details of a proposed bus route through the development will require to be established as part of draft plan approval.

Response

It is understood that no bus route is proposed at this time. While the proposed collector routes have been designed to accommodate a future bus route, specific infrastructure including bus stop and pad locations will be determined pending the creation of a bus service in the Town.

Comment B.27

The provided on street parking plan considers parking dimensions of 6.0 m, 6.2 m, and 6.7 m, however, the Towns requires parking spaces to be 6.0 m for single and end proposed spaces and 7.2 m for middle spaces. Please update the drawing accordingly and demonstrate that the on- street parking requirement can still be met.

Response

It should be noted that the Town does not have any engineering standards for the parallel parking spaces along curbsides between private driveways. BA Group has assumed the length of parking spaces to be minimum 6.0 metres for single and end proposed spaces and minimum 7.2 metres for middle spaces.

Based on the estimated on-street parking supply of 445 spaces, the site can achieve approximately 0.46 spaces per unit on-street. The parking allocation plan (PP-01) is provided in **Appendix H**. Final supply is subject to further details related to coordination with the project team during the detail design process.

Comment B.28

Table 7 considers surrounding area background developments but does not appear to include the BCH major development to the immediate east. Please clarify.

Response

The majority of the BCH development to the east of the subject site was constructed and occupied prior to the date of the existing turning movement counts collected in February 2021. As such, traffic generated by the development would already be accounted for under existing traffic conditions.

It is understood that an application has been submitted for Block 403 of the BCH development which considers a total of 15 new residential units. Given the relatively small scale of the new development, specific traffic allowances were not made as part of the background developments considered in the analysis. Instead, allowances were made for this development as part of the 2% annual population growth compounded over 15 years along Line 6.

10.3 Public Meeting Comments

Comment #10

There will be a lack of parking for the homes, especially the townhomes with only 1 per dwelling, as well as lack of on-street parking.

Response

It is anticipated that all residential lots within the site will be served by 2 off-street parking spaces (1 space in the driveway and 1 space in the garage). In addition, a conceptual on-street parking allocation plan has been prepared to demonstrate the estimated on-street parking supply. It has been estimated that an on-street parking supply of 445 spaces will be allocated for the site, which results in an on-street parking rate of approximately 0.46 parking spaces per unit. Effectively, the proposed development is proposing an overall parking rate of approximately 2.46 parking spaces per unit, including residents and visitors. This proposed supply meets and exceeds the minimum vehicle parking requirements of 2 parking spaces per unit for single-detached homes, semi-detached homes, and townhouses as outlined in Town of Bradford West Gwillimbury Zoning By-law 2010-050. Therefore, the proposed parking supply for the site is considered appropriate and will meet the demand needs anticipated for the site.

Comment #11

In the review and analysis of this development, there was no discussion on the impact to Line 5 or Line 6 from a traffic perspective. These roadways are narrow and already are full.

Response

The traffic impacts of the proposed development have been analyzed for intersections along Line 5 and Line 6 in both prior submissions as well as within this updated letter.

It is noted that under existing conditions, study area intersections along Line 5 and Line 6 operate with minimal delays and at significantly below their theoretical capacity. After accounting for background growth as well as traffic generated by the proposed development, all study area intersections along Line 5 and Line 6 continue to operate with acceptable delays and at under their theoretical capacity for the 2026, 2031, and 2036 horizon years.

Comment #32

Traffic roundabouts would help internal to the subdivision (or other traffic calming measures).

Response

As requested by Town staff, BA Group has reviewed the potential of providing a traffic roundabout at the proposed Street B / Street A intersection within the site. Based on our review, it was determined that a roundabout could not be accommodated due to the anticipated residential lot patterns at the proposed intersection. Given that it is not desirable to have direct driveway access to / from a roundabout intersection within 10 metres, a roundabout cannot be accommodated at the proposed Street B / Street A intersection. Providing a roundabout at the proposed intersection would result in driveways accessing the roundabout directly which is an unfavourable transportation condition in terms of safety and operations.

The proposed Street B / Street A intersection is located near the potential proposed elementary school and park blocks. A roundabout could potentially create some challenges for pedestrians to navigate safely through the intersection. Given

that roundabouts typically require much larger area than a conventional intersection, pedestrians will have to loop around the roundabout and increase their walking distance to cross the intersection, making it less efficient and accessible.

Therefore, it is recommended that the proposed Street B / Street A intersection operates as a traditional all-way stop-controlled intersection.

Notwithstanding, other traffic calming measures have been proposed throughout the development, particularly along the proposed Street A corridor to reduce vehicle speeds. These traffic calming measures include raised mid-block pedestrian crossings, raised intersections crossing where high pedestrian demand is anticipated, speed humps, all-way stop controlled intersections, and curb extensions / bump-outs to accommodate on-street lay-by parking and reduce the width of the road.

Comment #34

I am frustrated with the road allowance adjacent to his estate home (2840 Line 5) as there will be ~5,000 cars travelling past his home every day and all the problems that come along with it (noise, light, salt, etc…)

Response

Traffic impacts of the proposed development on intersections along Line 5 have been assessed as part of prior submissions and as part of this updated letter. The nearby intersection of Line 5 / Canal Road is projected to operate well after accounting for background growth and site-generated traffic. Average delays for the 2036 horizon year are expected to increase 3-7 seconds over existing delays for eastbound traffic turning onto Canal Road.

Comment #35

Line 5 already has significant traffic problems and this will make it worse.

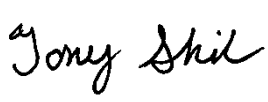
Response

The traffic impacts of the proposed development have been analyzed for intersections along Line 5 in both prior submissions as well as within this updated letter.

It is noted that under existing conditions, study area intersections along Line 5 operate with minimal delays and at significantly below their theoretical capacity. After accounting for background growth as well as traffic generated by the proposed development, all study area intersections along Line 5 continue to operate with acceptable delays and at under their theoretical capacity for the 2026, 2031, and 2036 horizon years.

Sincerely,

BA Consulting Group Ltd.



Tony Chao-Wei Shih, P.Eng.
Associate



Lefu Fang
Transportation Analyst

Appendix A:
Conceptual Development Plan

DRAFT PLAN OF SUBDIVISION
OPTION 1

Part of Block 36, Plan 51M-221 and
Part of Lot 13,
Concession 5
(Geographic Township of West Gwillimbury)
Town of Bradford-West Gwillimbury
County of Simcoe

KEY PLAN



SCHEDULE OF LAND USE

Lot/Block	Land Use	Units	Area(ha)
1-393	Single Detached min. 11.6m (38ft)	299	19.54
	Semi Detached min. 7.6m (25ft)	188	
394-441	Street Townhouses min. 6.1m (20ft)	303	6.95
442-453	B2B Townhouses min. 6.4m (21ft)	172	1.85
454-455	Parks		2.74
456	Elementary School		2.00
457	Stormwater Management Ponds		3.12
458	Environmental Protection		8.78
459	Compensation		0.38
460-464	Drainage Blocks		0.75
465	Walkway / Drainage Block		0.20
466-468	6m Walkways		1.01
469-473	Future Development		0.17
474	Future Road		0.07
Public Roads	Street 'A' 26.0m ROW 1,550m Streets 'B'-'C' 20.0m ROW 575m Streets 'D'-'Q' 18.0m ROW 3,930m		12.44
Total	6,055m	962	60.00

Approved subject to conditions in accordance with
section 51(31) of the Planning Act, RSO, Chap. P. 13, as amended

This___day of_____, 20__

Director of Planning, Development and Tourism, County of Simcoe

OWNER'S AUTHORIZATION

We, ICG Golf Inc., Bayview-Wellington (Highlands) Inc. and 2523951 Ontario Inc. hereby authorize Malone Given Parsons Ltd. to prepare and submit this Draft Plan of Subdivision to the County of Simcoe.

ICG Golf Inc. — Date

Bayview-Wellington (Highlands) Inc. — Date

2523951 Ontario Inc. — Date

SURVEYOR'S CERTIFICATE

I hereby certify that the boundaries of the lands to be subdivided as shown on this Plan and their relationship to the adjacent lands are accurately and correctly shown.

October 2, 2023
Date

R-PE Surveying Ltd.
Ontario Land Surveyors

ADDITIONAL INFORMATION

AS REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT, CHAPTER P.13 (R.S.O. 1990).

(a),(e),(f),(g),(j),(l) - As shown of the Draft Plan.

(b),(c) - As shown on the Draft and Key Plan.

(d) - Land to be used in accordance with the Schedule of Land Use.

(i) - Soil is sands, silts, clay and tills.

(h),(k) - Full municipal services to be provided.

NOTE: Contours relate to Canadian Geodetic Datum.
Contour interval is 1m with .25m interpolated.

Scale: 1:2000

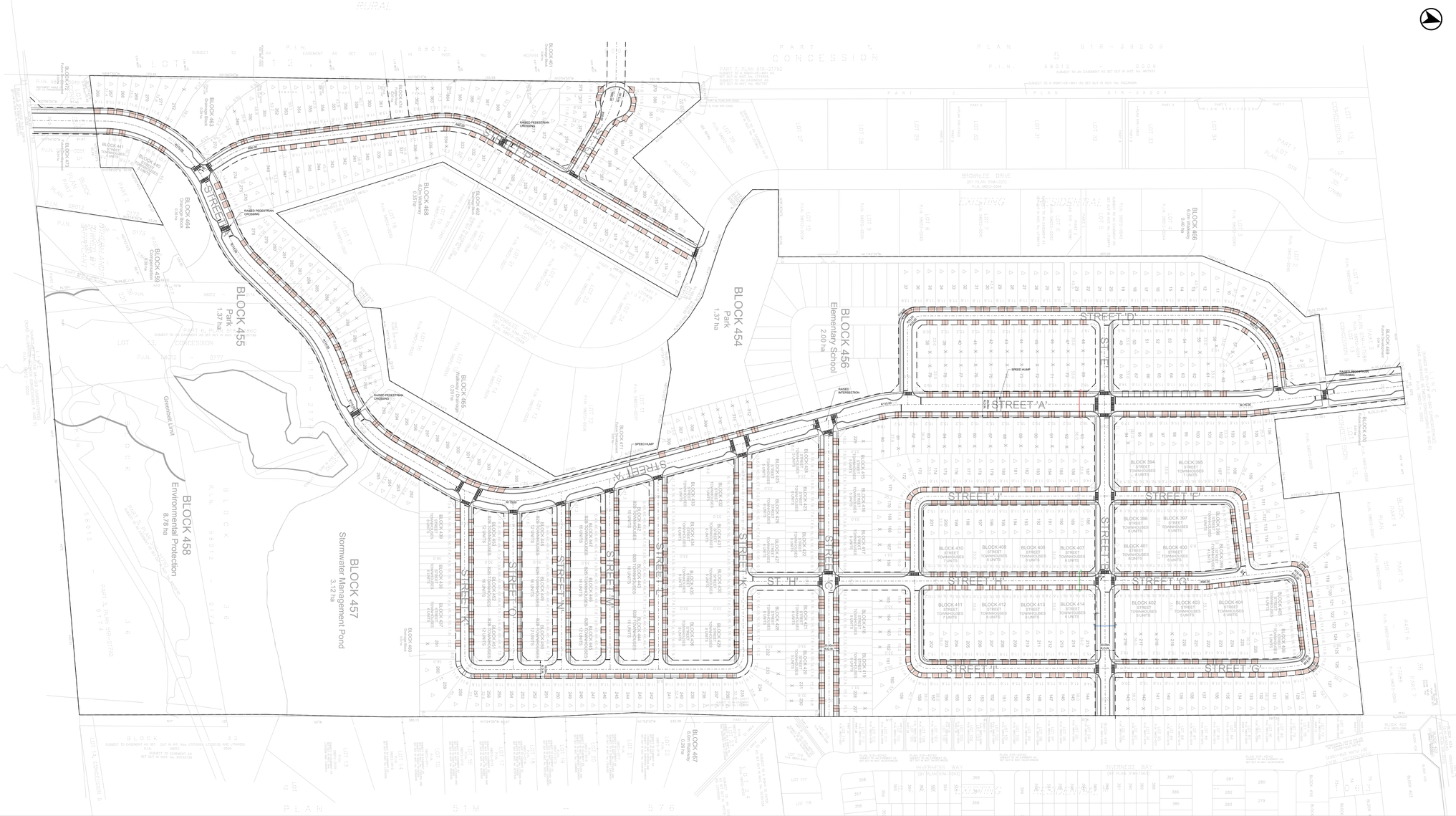
0 25 50 100 150 200m

Date	Revision	By

Prepared For:
ICG Golf Inc.
Bayview-Wellington (Highlands) Inc.
2523951 Ontario Inc.
October 7, 2024
MGP File: 15-2422

Malone Given Parsons.
140 Renfrew Drive, Suite 201 | Markham, ON
L3R 6B3 | 905 513 0170 | mgp.ca

Appendix B:
Proposed Traffic Calming Plan



GENERAL NOTES

1. ARCHITECTURAL PLAN DATED OCTOBER 2024, PREPARED BY MOP.

2. CURB / GUTTER DIMENSION HAS BEEN ADOPTED AS PER OPSD 600.040 STANDARD.

3. LOCATION OF MAILBOX AND FIRE HYDRANTS HAVE NOT BEEN DETERMINED AT THIS STAGE, WHICH WILL IMPACT ON-STREET PARKING SPACES.

4. THE SIDEWALK LOCATION IS SUBJECT TO CONFIRMATION THROUGH THE DESIGN PROCESS.

5. THE ROAD ALIGNMENT AND THE SIDEWALK SHOULD TIE INTO EXISTING.

7. THIS PLAN ILLUSTRATIVE FOR THE PURPOSE OF SHOWING PARKING ALLOCATION AND SHALL NOT BE RELIED UPON FOR DETAILED DESIGN OR CONSTRUCTION.

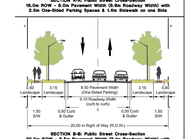
LEGEND

DRIVEWAYS

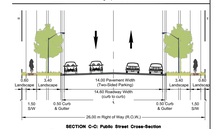
TYPICAL CROSS SECTION



SECTION A-A: Public Street Cross-Section
19.0m ROW + 8.5m Pavement Width (5.0m Roadway Width) with 2.5m One-Sided Parking Spaces & 1.5m Sidewalk on one Side



SECTION B-B: Public Street Cross-Section
20.0m ROW + 6.5m Pavement Width (5.1m Roadway Width) with 2.0m One-Sided Parking Spaces & 1.5m Sidewalk on both Sides



SECTION C-C: Public Street Cross-Section
26.0m ROW + 14.0m Pavement Width (14.0m Roadway Width) with 2.0m Two-Sided Parking Spaces & 1.5m Sidewalk on both Sides

PRELIMINARY
DRAFT
FOR DISCUSSION PURPOSES ONLY

SUBJECT TO CONFIRMATION OF BRADFORD WEST GWILLIMBURY ENGINEERING DESIGN STANDARDS

01	10-31-24	KCJ	ISSUED FOR OPA / ZBA AND DPOS RE-SUBMISSION
00	09-20-23	MA	ISSUED FOR OPA / ZBA AND DPOS RE-SUBMISSION

BA Consulting Group Ltd.
121-31 St. Clair Ave. W.
Toronto ON M4V 1S5
tel: 416.928.3282
www.bagroup@gmail.com

BRADFORD HIGHLANDS

ROAD PLAN WITH TYPICAL STREET DESIGN ELEMENTS

FUNCTIONAL ROAD PLAN

Date: October 31, 2024

Project No.: 6720-05

Scale: 1:1,000 (0 10 20 30 40 50m)

FD-01

Date Plotted: October 31, 2024 - Filename: J:\6720-05\Drawing Files\6720-01 - Oct 29\6720-05-BradfordHighlands-FP-Oct29-24-01-01.dwg

Appendix C:
Synchro Analysis Worksheets

HCM Unsignalized Intersection Capacity Analysis
1: 10 Sideroad & Line 6

Existing AM Peak Hour Period



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	165	0	45	0	35	50	65	55	0
Future Volume (Veh/h)	0	0	0	165	0	45	0	35	50	65	55	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	183	0	50	0	39	56	72	61	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	322	300	61	272	272	67	61			95		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	322	300	61	272	272	67	61			95		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.3	5.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.4	3.1			2.3		
p0 queue free %	100	100	100	72	100	95	100			95		
cM capacity (veh/h)	576	581	1004	656	606	983	1093			1427		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	233	95	133
Volume Left	0	183	0	72
Volume Right	0	50	56	0
cSH	1700	707	1093	1427
Volume to Capacity	0.00	0.33	0.00	0.05
Queue Length 95th (m)	0.0	11.5	0.0	1.3
Control Delay (s)	0.0	12.6	0.0	4.3
Lane LOS	A	B		A
Approach Delay (s)	0.0	12.6	0.0	4.3
Approach LOS	A	B		

Intersection Summary				
Average Delay	7.6			
Intersection Capacity Utilization	31.7%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Existing AM Peak Hour Period



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	110	160	25	35	50
Future Volume (Veh/h)	5	110	160	25	35	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	121	176	27	38	55
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	203				320	190
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	203				320	190
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				94	94
cM capacity (veh/h)	1300				668	852

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	121	203	93
Volume Left	5	0	0	38
Volume Right	0	0	27	55
cSH	1300	1700	1700	766
Volume to Capacity	0.00	0.07	0.12	0.12
Queue Length 95th (m)	0.1	0.0	0.0	3.3
Control Delay (s)	7.8	0.0	0.0	10.3
Lane LOS	A			B
Approach Delay (s)	0.3		0.0	10.3
Approach LOS				B

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	21.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
3: Line 6 & West Park Ave

Existing AM Peak Hour Period

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	10	135	160	65	25
Future Volume (vph)	10	135	160	65	25
Lane Group Flow (vph)	11	153	233	74	28
Turn Type	Perm	NA	NA	Prot	Prot
Protected Phases		4	8	6	6
Permitted Phases	4				
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	20.0	20.0
Total Split (s)	30.7	30.7	30.7	20.9	20.9
Total Split (%)	59.5%	59.5%	59.5%	40.5%	40.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	None
v/c Ratio	0.01	0.12	0.17	0.22	0.08
Control Delay	4.3	4.2	3.7	19.4	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	4.2	3.7	19.4	8.6
Queue Length 50th (m)	0.4	5.4	7.1	6.1	0.0
Queue Length 95th (m)	1.7	11.1	14.4	14.8	5.0
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	797	1325	1357	543	520
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.12	0.17	0.14	0.05

Intersection Summary

Cycle Length: 51.6

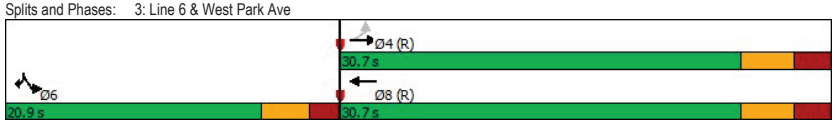
Actuated Cycle Length: 51.6

Offset: 20.9 (41%), Referenced to phase 4:EBTL and 8:WBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Existing AM Peak Hour Period

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	135	160	45	65	25
Future Volume (vph)	10	135	160	45	65	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1743	1775		1752	1615
Flt Permitted	0.61	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1050	1743	1775		1752	1615
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	153	182	51	74	28
RTOR Reduction (vph)	0	0	12	0	0	25
Lane Group Flow (vph)	11	153	221	0	74	3
Heavy Vehicles (%)	11%	9%	3%	7%	3%	0%
Turn Type	Perm	NA	NA		Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases	4					
Actuated Green, G (s)	35.0	35.0	35.0		6.0	6.0
Effective Green, g (s)	35.0	35.0	35.0		6.0	6.0
Actuated g/C Ratio	0.68	0.68	0.68		0.12	0.12
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	712	1182	1203		203	187
v/s Ratio Prot		0.09	c0.12		c0.04	0.00
v/s Ratio Perm	0.01					
v/c Ratio	0.02	0.13	0.18		0.36	0.02
Uniform Delay, d1	2.7	2.9	3.0		21.0	20.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.2	0.3		1.1	0.0
Delay (s)	2.7	3.2	3.4		22.2	20.2
Level of Service	A	A	A		C	C
Approach Delay (s)		3.1	3.4		21.6	
Approach LOS		A	A		C	

Intersection Summary

HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	10.6
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Existing AM Peak Hour Period



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	190	5	5	190	5	5	5	10	15	0	10
Future Volume (Veh/h)	5	190	5	5	190	5	5	5	10	15	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	207	5	5	207	5	5	5	11	16	0	11
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked												
vC, conflicting volume	217			212			448	446	210	455	446	214
vC1, stage 1 conf vol							220	220		224	224	
vC2, stage 2 conf vol							228	227		230	222	
vCu, unblocked vol	217			212			448	446	210	455	446	214
tC, single (s)	4.1			4.3			7.3	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.3	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	99	99	98	100	99
cM capacity (veh/h)	1359			1274			622	630	836	661	630	827

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	212	5	212	21	27
Volume Left	5	0	5	0	5	16
Volume Right	0	5	0	5	11	11
cSH	1359	1700	1274	1700	721	720
Volume to Capacity	0.00	0.12	0.00	0.12	0.03	0.04
Queue Length 95th (m)	0.1	0.0	0.1	0.0	0.7	0.9
Control Delay (s)	7.7	0.0	7.8	0.0	10.1	10.2
Lane LOS	A		A		B	B
Approach Delay (s)	0.2		0.2		10.1	10.2
Approach LOS					B	B

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	20.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Golf Driveway Access & Line 6

Existing AM Peak Hour Period



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	215	0	0	200	0	0
Future Volume (Veh/h)	215	0	0	200	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	231	0	0	215	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked						
vC, conflicting volume			231		446	231
vC1, stage 1 conf vol					231	
vC2, stage 2 conf vol					215	
vCu, unblocked vol			231		446	231
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1349		719	813

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	231	0	215	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.14	0.00	0.13	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				A
Approach Delay (s)	0.0	0.0		0.0
Approach LOS				A

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	14.6%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Existing AM Peak Hour Period

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	210	175	20	35	25
Future Volume (Veh/h)	5	210	175	20	35	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	5	226	188	22	38	27
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked						
vC, conflicting volume	215				440	204
vC1, stage 1 conf vol					204	
vC2, stage 2 conf vol					236	
vCu, unblocked vol	215				440	204
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				95	97
cM capacity (veh/h)	1361				712	838

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	226	210	65
Volume Left	5	0	0	38
Volume Right	0	0	22	27
cSH	1361	1700	1700	760
Volume to Capacity	0.00	0.13	0.12	0.09
Queue Length 95th (m)	0.1	0.0	0.0	2.2
Control Delay (s)	7.7	0.0	0.0	10.2
Lane LOS	A			B
Approach Delay (s)	0.2		0.0	10.2
Approach LOS				B

Intersection Summary			
Average Delay		1.4	
Intersection Capacity Utilization		21.2%	ICU Level of Service A
Analysis Period (min)		15	

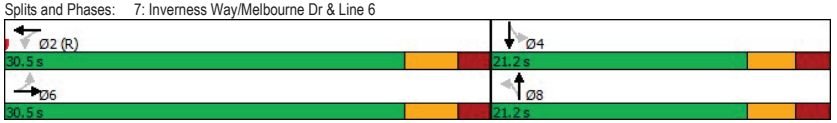
Queues
7: Inverness Way/Melbourne Dr & Line 6

Existing AM Peak Hour Period

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	45	185	5	110	35	40	75	40
Future Volume (vph)	45	185	5	110	35	40	75	40
Lane Group Flow (vph)	52	230	6	212	40	69	86	103
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	21.0	21.0	21.0	21.0
Total Split (s)	30.5	30.5	30.5	30.5	21.2	21.2	21.2	21.2
Total Split (%)	59.0%	59.0%	59.0%	59.0%	41.0%	41.0%	41.0%	41.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.07	0.20	0.01	0.18	0.14	0.18	0.32	0.25
Control Delay	6.2	6.1	6.0	4.2	16.6	12.4	19.6	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	6.1	6.0	4.2	16.6	12.4	19.6	10.1
Queue Length 50th (m)	1.8	8.2	0.2	4.5	3.3	3.8	7.3	3.8
Queue Length 95th (m)	6.9	21.5	1.7	14.9	8.0	9.8	14.4	11.2
Internal Link Dist (m)		233.8		288.6		331.7		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	710	1169	765	1148	393	550	386	561
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.20	0.01	0.18	0.10	0.13	0.22	0.18

Intersection Summary
Cycle Length: 51.7
Actuated Cycle Length: 51.7
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Existing AM Peak Hour Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	185	15	5	110	75	35	40	20	75	40	50
Future Volume (vph)	45	185	15	5	110	75	35	40	20	75	40	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		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	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	0.94		1.00	0.95		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1650	1779		1805	1709		1752	1728		1668	1686	
Flt Permitted	0.63	1.00		0.62	1.00		0.69	1.00		0.71	1.00	
Satd. Flow (perm)	1086	1779		1169	1709		1274	1728		1250	1686	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	52	213	17	6	126	86	40	46	23	86	46	57
RTOR Reduction (vph)	0	4	0	0	33	0	0	19	0	0	47	0
Lane Group Flow (vph)	52	226	0	6	179	0	40	50	0	86	56	0
Confl. Peds. (#/hr)	5					5			10	10		
Heavy Vehicles (%)	9%	5%	13%	0%	5%	1%	3%	2%	6%	7%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	31.7	31.7		31.7	31.7		9.3	9.3		9.3	9.3	
Effective Green, g (s)	31.7	31.7		31.7	31.7		9.3	9.3		9.3	9.3	
Actuated g/C Ratio	0.61	0.61		0.61	0.61		0.18	0.18		0.18	0.18	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	665	1090		716	1047		229	310		224	303	
v/s Ratio Prot		c0.13			0.10			0.03			0.03	
v/s Ratio Perm	0.05			0.01			0.03			c0.07		
v/c Ratio	0.08	0.21		0.01	0.17		0.17	0.16		0.38	0.19	
Uniform Delay, d1	4.1	4.4		3.9	4.3		18.0	17.9		18.7	18.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4		0.0	0.4		0.4	0.2		1.1	0.3	
Delay (s)	4.3	4.9		3.9	4.7		18.3	18.2		19.8	18.3	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		4.8			4.7			18.2			19.0	
Approach LOS		A			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.25			
Actuated Cycle Length (s)	51.7	Sum of lost time (s)	10.7	
Intersection Capacity Utilization	57.4%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Existing AM Peak Hour Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	255	10	20	170	10	20	0	35	5	0	0
Future Volume (Veh/h)	15	255	10	20	170	10	20	0	35	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	319	12	25	212	12	25	0	44	6	0	0
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked												
vC, conflicting volume	229			331			625	642	325	674	642	223
vC1, stage 1 conf vol							363	363		273	273	
vC2, stage 2 conf vol							262	279		401	369	
vCu, unblocked vol	229			331			625	642	325	674	642	223
tC, single (s)	4.3			4.1			7.1	6.5	6.2	8.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		7.1	5.5	
tF (s)	2.4			2.2			3.5	4.0	3.3	4.4	4.0	3.8
p0 queue free %	98			98			96	100	94	98	100	100
cM capacity (veh/h)	1230			1240			567	535	714	372	528	707

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	19	331	25	224	69	6
Volume Left	19	0	25	0	25	6
Volume Right	0	12	0	12	44	0
cSH	1230	1700	1240	1700	653	372
Volume to Capacity	0.02	0.19	0.02	0.13	0.11	0.02
Queue Length 95th (m)	0.4	0.0	0.5	0.0	2.8	0.4
Control Delay (s)	8.0	0.0	8.0	0.0	11.2	14.8
Lane LOS	A		A		B	B
Approach Delay (s)	0.4		0.8		11.2	14.8
Approach LOS					B	B

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	26.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
9: Simcoe Road & Line 6

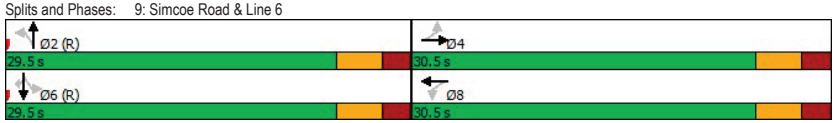
Existing AM Peak Hour Period

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	225	5	5	20	65	60	60	115
Future Volume (vph)	225	5	5	20	65	60	60	115
Lane Group Flow (vph)	253	79	6	28	73	73	67	129
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA	Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		8		2			6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.45	0.12	0.01	0.04	0.14	0.11	0.09	0.19
Control Delay	15.7	4.1	10.4	9.1	12.4	11.2	11.7	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	4.1	10.4	9.1	12.4	11.2	11.7	3.4
Queue Length 50th (m)	20.1	0.4	0.4	1.4	5.2	4.7	4.6	0.0
Queue Length 95th (m)	37.3	6.8	2.2	5.3	12.4	11.5	11.1	8.3
Internal Link Dist (m)		261.7		146.8		404.3	164.8	
Turn Bay Length (m)	50.0		20.0		110.0			
Base Capacity (vph)	567	684	444	741	511	672	724	692
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.12	0.01	0.04	0.14	0.11	0.09	0.19

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Existing AM Peak Hour Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	225	5	65	5	20	5	65	60	5	0	60	115
Future Volume (vph)	225	5	65	5	20	5	65	60	5	0	60	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.86		1.00	0.97		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1541		1436	1769		1703	1673			1810	1538
Flt Permitted	0.74	1.00		0.71	1.00		0.71	1.00			1.00	1.00
Satd. Flow (perm)	1363	1541		1067	1769		1279	1673			1810	1538
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	253	6	73	6	22	6	73	67	6	0	67	129
RTOR Reduction (vph)	0	43	0	0	4	0	0	4	0	0	0	77
Lane Group Flow (vph)	253	36	0	6	25	0	73	69	0	0	67	52
Confl. Peds. (#/hr)			5	5					5	5		
Heavy Vehicles (%)	3%	0%	4%	25%	5%	0%	6%	13%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0		25.0	25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0		25.0	25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	567	642		444	737		511	669			724	615
v/s Ratio Prot		0.02			0.01			0.04			0.04	
v/s Ratio Perm	c0.19			0.01			c0.06					0.03
v/c Ratio	0.45	0.06		0.01	0.03		0.14	0.10			0.09	0.08
Uniform Delay, d1	12.5	10.5		10.3	10.4		11.5	11.3			11.2	11.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.6	0.0		0.0	0.0		0.6	0.3			0.3	0.3
Delay (s)	13.1	10.5		10.3	10.4		12.0	11.6			11.5	11.4
Level of Service	B	B		B	B		B	B			B	B
Approach Delay (s)		12.5			10.4			11.8			11.5	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Existing AM Peak Hour Period



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	50	20	105	120	10
Future Volume (Veh/h)	25	50	20	105	120	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	34	68	27	144	164	14
Pedestrians	5			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	374	181	183			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	374	181	183			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	94	92	98			
cM capacity (veh/h)	600	849	1340			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	171	178
Volume Left	34	27	0
Volume Right	68	0	14
cSH	746	1340	1700
Volume to Capacity	0.14	0.02	0.10
Queue Length 95th (m)	3.8	0.5	0.0
Control Delay (s)	10.6	1.4	0.0
Lane LOS	B	A	
Approach Delay (s)	10.6	1.4	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		2.9		
Intersection Capacity Utilization		30.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Existing AM Peak Hour Period



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	10	5	65	120	10
Future Volume (Veh/h)	20	10	5	65	120	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	22	11	6	72	133	11
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	222	138	144			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	222	138	144			
tC, single (s)	6.5	6.2	4.6			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.7			
p0 queue free %	97	99	99			
cM capacity (veh/h)	747	915	1191			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	33	78	144
Volume Left	22	6	0
Volume Right	11	0	11
cSH	795	1191	1700
Volume to Capacity	0.04	0.01	0.08
Queue Length 95th (m)	1.0	0.1	0.0
Control Delay (s)	9.7	0.7	0.0
Lane LOS	A	A	
Approach Delay (s)	9.7	0.7	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		1.5		
Intersection Capacity Utilization		17.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Existing AM Peak Hour Period



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	55	35	0	0	20	15	0	0	0	35	5	90
Future Volume (vph)	55	35	0	0	20	15	0	0	0	35	5	90
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	65	42	0	0	24	18	0	0	0	42	6	107

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	107	42	0	155
Volume Left (vph)	65	0	0	42
Volume Right (vph)	0	18	0	107
Hadj (s)	0.26	-0.13	0.00	-0.28
Departure Headway (s)	4.5	4.2	4.4	4.0
Degree Utilization, x	0.14	0.05	0.00	0.17
Capacity (veh/h)	764	813	790	874
Control Delay (s)	8.3	7.5	7.4	7.8
Approach Delay (s)	8.3	7.5	0.0	7.8
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.9	
Level of Service			A	
Intersection Capacity Utilization		26.0%	ICU Level of Service	A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Existing AM Peak Hour Period



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	35	0	70	85	25
Future Volume (Veh/h)	20	35	0	70	85	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	24	42	0	84	102	30
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	201	117	132			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	201	117	132			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	96	100			
cM capacity (veh/h)	792	941	1466			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	66	84	132
Volume Left	24	0	0
Volume Right	42	0	30
cSH	881	1466	1700
Volume to Capacity	0.07	0.00	0.08
Queue Length 95th (m)	1.9	0.0	0.0
Control Delay (s)	9.4	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.4	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		2.2		
Intersection Capacity Utilization		16.0%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: 10 Sideroad & Line 5

Existing AM Peak Hour Period



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	70	45	0	5	15	5	10	10	5	5	10	205
Future Volume (vph)	70	45	0	5	15	5	10	10	5	5	10	205
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	85	55	0	6	18	6	12	12	6	6	12	250

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	140	30	30	268
Volume Left (vph)	85	6	12	6
Volume Right (vph)	0	6	6	250
Hadj (s)	0.24	0.03	0.03	-0.53
Departure Headway (s)	4.8	4.7	4.6	3.8
Degree Utilization, x	0.19	0.04	0.04	0.29
Capacity (veh/h)	702	699	731	903
Control Delay (s)	8.9	7.9	7.8	8.4
Approach Delay (s)	8.9	7.9	7.8	8.4
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.5	
Level of Service			A	
Intersection Capacity Utilization			33.1%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Ln

Existing AM Peak Hour Period



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	70	0	0	130
Future Volume (Veh/h)	0	0	70	0	0	130
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	0	76	0	0	141
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	217	76			76	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	217	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	100			100	
cM capacity (veh/h)	776	991			1536	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	76	141
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1536
Volume to Capacity	0.00	0.04	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			10.2%	ICU Level of Service
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Existing AM Peak Hour Period



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	130	0	0	130
Future Volume (Veh/h)	0	0	130	0	0	130
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	0	141	0	0	141
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	282	141			141	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282	141			141	
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	100			100	
cM capacity (veh/h)	712	912			1455	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	141	141
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1455
Volume to Capacity	0.00	0.08	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		10.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
1: 10 Sideroad & Line 6

Existing PM Peak Hour Period



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	65	0	75	0	125	240	85	40	0
Future Volume (Veh/h)	0	0	0	65	0	75	0	125	240	85	40	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	0	72	0	83	0	139	267	94	44	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	588	638	44	504	504	272	44			406		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	588	638	44	504	504	272	44			406		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	84	100	89	100			92		
cM capacity (veh/h)	352	363	1026	451	435	764	1577			1164		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	0	155	406	138
Volume Left	0	72	0	94
Volume Right	0	83	267	0
cSH	1700	578	1577	1164
Volume to Capacity	0.00	0.27	0.00	0.08
Queue Length 95th (m)	0.0	8.6	0.0	2.1
Control Delay (s)	0.0	13.5	0.0	5.9
Lane LOS	A	B		A
Approach Delay (s)	0.0	13.5	0.0	5.9
Approach LOS	A	B		

Intersection Summary				
Average Delay		4.2		
Intersection Capacity Utilization		46.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Existing PM Peak Hour Period

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	260	120	70	40	20
Future Volume (Veh/h)	65	260	120	70	40	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	71	286	132	77	44	22
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	209				598	170
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	209				598	170
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				90	97
cM capacity (veh/h)	1362				439	879

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	71	286	209	66
Volume Left	71	0	0	44
Volume Right	0	0	77	22
cSH	1362	1700	1700	527
Volume to Capacity	0.05	0.17	0.12	0.13
Queue Length 95th (m)	1.3	0.0	0.0	3.4
Control Delay (s)	7.8	0.0	0.0	12.8
Lane LOS	A			B
Approach Delay (s)	1.5		0.0	12.8
Approach LOS				B

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		27.6%	ICU Level of Service
Analysis Period (min)		15	

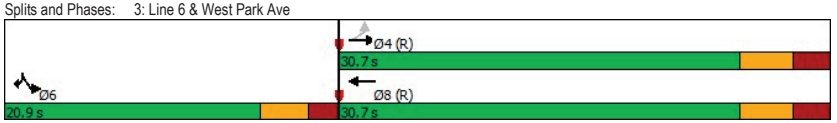
Queues
3: Line 6 & West Park Ave

Existing PM Peak Hour Period

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	35	265	175	45	15
Future Volume (vph)	35	265	175	45	15
Lane Group Flow (vph)	39	298	287	51	17
Turn Type	Perm	NA	NA	Prot	Prot
Protected Phases		4	8	6	6
Permitted Phases	4				
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	20.0	20.0
Total Split (s)	30.7	30.7	30.7	20.9	20.9
Total Split (%)	59.5%	59.5%	59.5%	40.5%	40.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	None	None
v/c Ratio	0.05	0.21	0.21	0.15	0.05
Control Delay	4.3	4.4	3.6	18.6	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	4.4	3.6	18.6	9.7
Queue Length 50th (m)	1.3	11.5	8.4	4.2	0.0
Queue Length 95th (m)	4.0	20.6	16.8	11.4	4.0
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	841	1445	1379	548	512
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.21	0.21	0.09	0.03

Intersection Summary
Cycle Length: 51.6
Actuated Cycle Length: 51.6
Offset: 20.9 (41%), Referenced to phase 4:EBTL and 8:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Existing PM Peak Hour Period



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	35	265	175	80	45	15
Future Volume (vph)	35	265	175	80	45	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.96		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1799	1900	1793		1770	1615
Flt Permitted	0.58	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1106	1900	1793		1770	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	39	298	197	90	51	17
RTOR Reduction (vph)	0	0	20	0	0	15
Lane Group Flow (vph)	39	298	267	0	51	2
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	0%	0%	1%	0%	2%	0%
Turn Type	Perm	NA	NA		Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases	4					
Actuated Green, G (s)	35.0	35.0	35.0		6.0	6.0
Effective Green, g (s)	35.0	35.0	35.0		6.0	6.0
Actuated g/C Ratio	0.68	0.68	0.68		0.12	0.12
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	750	1288	1216		205	187
v/s Ratio Prot		c0.16	0.15		c0.03	0.00
v/s Ratio Perm	0.04					
v/c Ratio	0.05	0.23	0.22		0.25	0.01
Uniform Delay, d1	2.8	3.2	3.1		20.7	20.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.4	0.4		0.6	0.0
Delay (s)	2.9	3.6	3.6		21.4	20.2
Level of Service	A	A	A		C	C
Approach Delay (s)		3.5	3.6		21.1	
Approach LOS		A	A		C	

Intersection Summary				
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	10.6
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Existing PM Peak Hour Period



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	285	10	10	245	15	5	5	5	5	0	5
Future Volume (Veh/h)	15	285	10	10	245	15	5	5	5	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	317	11	11	272	17	6	6	6	6	0	6
Pedestrians		10			10						10	
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		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked												
vC, conflicting volume	299			328			666	678	332	682	674	300
vC1, stage 1 conf vol							356	356		312	312	
vC2, stage 2 conf vol							310	321		370	362	
vCu, unblocked vol	299			328			666	678	332	682	674	300
tC, single (s)	4.1			4.2			7.1	6.5	6.5	7.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.3			3.5	4.0	3.5	3.5	4.0	3.8
p0 queue free %	99			99			99	99	99	99	100	99
cM capacity (veh/h)	1263			1188			548	526	654	534	528	629

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	328	11	289	18	12
Volume Left	17	0	11	0	6	6
Volume Right	0	11	0	17	6	6
cSH	1263	1700	1188	1700	571	577
Volume to Capacity	0.01	0.19	0.01	0.17	0.03	0.02
Queue Length 95th (m)	0.3	0.0	0.2	0.0	0.8	0.5
Control Delay (s)	7.9	0.0	8.1	0.0	11.5	11.4
Lane LOS	A		A		B	B
Approach Delay (s)	0.4		0.3		11.5	11.4
Approach LOS					B	B

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	28.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Golf Driveway Access & Line 6

Existing PM Peak Hour Period



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	295	0	0	270	0	0
Future Volume (Veh/h)	295	0	0	270	0	0
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)	321	0	0	293	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked						
vC, conflicting volume			321		614	321
vC1, stage 1 conf vol					321	
vC2, stage 2 conf vol					293	
vCu, unblocked vol			321		614	321
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1250		637	724

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	321	0	293	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.19	0.00	0.17	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				A
Approach Delay (s)	0.0	0.0		0.0
Approach LOS				A

Intersection Summary				
Average Delay			0.0	
Intersection Capacity Utilization			18.9%	ICU Level of Service A
Analysis Period (min)			15	

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Existing PM Peak Hour Period



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	265	260	70	30	10
Future Volume (Veh/h)	30	265	260	70	30	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	33	294	289	78	33	11
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked						
vC, conflicting volume	372				693	333
vC1, stage 1 conf vol					333	
vC2, stage 2 conf vol					360	
vCu, unblocked vol	372				693	333
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	97				94	98
cM capacity (veh/h)	1176				590	710

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	33	294	367	44
Volume Left	33	0	0	33
Volume Right	0	0	78	11
cSH	1176	1700	1700	616
Volume to Capacity	0.03	0.17	0.22	0.07
Queue Length 95th (m)	0.7	0.0	0.0	1.8
Control Delay (s)	8.1	0.0	0.0	11.3
Lane LOS	A			B
Approach Delay (s)	0.8		0.0	11.3
Approach LOS				B

Intersection Summary				
Average Delay			1.0	
Intersection Capacity Utilization			34.7%	ICU Level of Service A
Analysis Period (min)			15	

Queues
7: Inverness Way/Melbourne Dr & Line 6

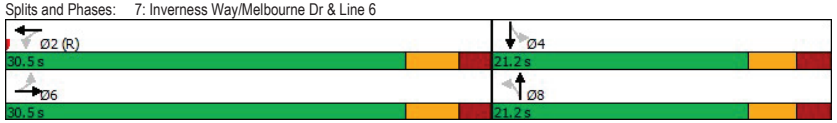
Existing PM Peak Hour Period

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	65	195	10	280	20	20	40	30
Future Volume (vph)	65	195	10	280	20	20	40	30
Lane Group Flow (vph)	73	258	11	411	22	28	45	68
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	21.0	21.0	21.0	21.0
Total Split (s)	30.5	30.5	30.5	30.5	21.2	21.2	21.2	21.2
Total Split (%)	59.0%	59.0%	59.0%	59.0%	41.0%	41.0%	41.0%	41.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.10	0.19	0.01	0.30	0.08	0.07	0.15	0.17
Control Delay	6.0	5.1	5.9	5.7	15.6	13.2	16.8	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	5.1	5.9	5.7	15.6	13.2	16.8	10.4
Queue Length 50th (m)	2.6	8.8	0.4	15.2	1.8	1.8	3.7	2.8
Queue Length 95th (m)	9.4	23.6	2.5	38.9	5.4	5.8	8.9	9.1
Internal Link Dist (m)		233.8		288.6		331.7		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	727	1357	837	1350	416	573	421	560
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.19	0.01	0.30	0.05	0.05	0.11	0.12

Intersection Summary

Cycle Length: 51.7
Actuated Cycle Length: 51.7
Offset: 0 (0%), Referenced to phase 2:WBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Existing PM Peak Hour Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	195	35	10	280	85	20	20	5	40	30	30
Future Volume (vph)	65	195	35	10	280	85	20	20	5	40	30	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		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	1.00		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	0.98		1.00	0.96		1.00	0.97		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1800	1834		1798	1818		1795	1839		1752	1735	
Flt Permitted	0.52	1.00		0.60	1.00		0.71	1.00		0.74	1.00	
Satd. Flow (perm)	987	1834		1135	1818		1347	1839		1363	1735	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	73	219	39	11	315	96	22	22	6	45	34	34
RTOR Reduction (vph)	0	8	0	0	14	0	0	5	0	0	29	0
Lane Group Flow (vph)	73	250	0	11	397	0	22	23	0	45	39	0
Confl. Peds. (#/hr)	5		5	5		5	5					5
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	33.8	33.8		33.8	33.8		7.2	7.2		7.2	7.2	
Effective Green, g (s)	33.8	33.8		33.8	33.8		7.2	7.2		7.2	7.2	
Actuated g/C Ratio	0.65	0.65		0.65	0.65		0.14	0.14		0.14	0.14	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	645	1199		742	1188		187	256		189	241	
v/s Ratio Prot		0.14			c0.22			0.01			0.02	
v/s Ratio Perm	0.07			0.01			0.02			c0.03		
v/c Ratio	0.11	0.21		0.01	0.33		0.12	0.09		0.24	0.16	
Uniform Delay, d1	3.3	3.6		3.1	4.0		19.5	19.4		19.8	19.6	
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		0.0	0.8		0.3	0.2		0.7	0.3	
Delay (s)	3.7	4.0		3.2	4.7		19.8	19.5		20.5	19.9	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		3.9			4.7			19.6			20.1	
Approach LOS		A			A			B			C	

Intersection Summary

HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	51.7	Sum of lost time (s)	10.7
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Existing PM Peak Hour Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	220	20	45	355	5	10	0	25	10	0	10
Future Volume (Veh/h)	0	220	20	45	355	5	10	0	25	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	253	23	52	408	6	11	0	29	11	0	11
Pedestrians								5			5	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked												
vC, conflicting volume	419			281			792	792	270	802	801	416
vC1, stage 1 conf vol							270	270		520	520	
vC2, stage 2 conf vol							523	523		282	281	
vCu, unblocked vol	419			281			792	792	270	802	801	416
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			96			98	100	96	98	100	98
cM capacity (veh/h)	1146			1288			468	467	771	460	459	638

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	276	52	414	40	22
Volume Left	0	0	52	0	11	11
Volume Right	0	23	0	6	29	11
cSH	1700	1700	1288	1700	655	534
Volume to Capacity	0.00	0.16	0.04	0.24	0.06	0.04
Queue Length 95th (m)	0.0	0.0	1.0	0.0	1.6	1.0
Control Delay (s)	0.0	0.0	7.9	0.0	10.9	12.0
Lane LOS			A		B	B
Approach Delay (s)	0.0		0.9		10.9	12.0
Approach LOS					B	B

Intersection Summary					
Average Delay	1.4				
Intersection Capacity Utilization	35.7%	ICU Level of Service		A	
Analysis Period (min)	15				

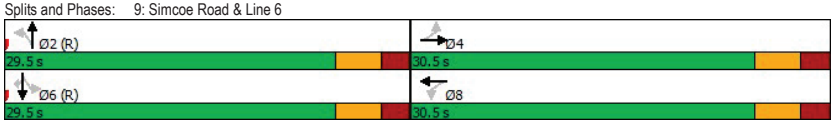
Queues
9: Simcoe Road & Line 6

Existing PM Peak Hour Period

Lane Group	EBL	EBT	WBT	NBL	NBT	SBT	SBR
Lane Configurations							
Traffic Volume (vph)	170	40	15	110	135	60	280
Future Volume (vph)	170	40	15	110	135	60	280
Lane Group Flow (vph)	183	91	21	118	161	65	301
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm
Protected Phases		4	8		2	6	
Permitted Phases	4			2			6
Detector Phase	4	4	8	2	2	6	6
Switch Phase							
Minimum Initial (s)	25.0	25.0	25.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.31	0.12	0.03	0.17	0.16	0.07	0.31
Control Delay	13.6	6.6	9.2	12.7	11.3	11.6	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.6	6.6	9.2	12.7	11.3	11.6	2.8
Queue Length 50th (m)	13.6	2.9	1.1	8.6	10.9	4.5	0.0
Queue Length 95th (m)	26.7	10.1	4.4	18.5	21.9	11.0	12.6
Internal Link Dist (m)		261.7	146.8		404.3	164.8	
Turn Bay Length (m)	50.0			110.0			
Base Capacity (vph)	589	757	760	699	978	969	976
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.12	0.03	0.17	0.16	0.07	0.31

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Existing PM Peak Hour Period

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	40	45	0	15	5	110	135	15	0	60	280
Future Volume (vph)	170	40	45	0	15	5	110	135	15	0	60	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.92			0.96		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1805	1750			1819		1787	1872			1863	1599
Flt Permitted	0.74	1.00			1.00		0.71	1.00			1.00	1.00
Satd. Flow (perm)	1413	1750			1819		1344	1872			1863	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	183	43	48	0	16	5	118	145	16	0	65	301
RTOR Reduction (vph)	0	32	0	0	3	0	0	6	0	0	0	156
Lane Group Flow (vph)	183	59	0	0	18	0	118	155	0	0	65	145
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	20.0	20.0			20.0		29.0	29.0			29.0	29.0
Effective Green, g (s)	20.0	20.0			20.0		29.0	29.0			29.0	29.0
Actuated g/C Ratio	0.33	0.33			0.33		0.48	0.48			0.48	0.48
Clearance Time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	471	583			606		649	904			900	772
v/s Ratio Prot		0.03			0.01			0.08			0.03	
v/s Ratio Perm	c0.13						0.09					c0.09
v/c Ratio	0.39	0.10			0.03		0.18	0.17			0.07	0.19
Uniform Delay, d1	15.3	13.8			13.5		8.8	8.7			8.3	8.8
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.5	0.1			0.0		0.6	0.4			0.2	0.5
Delay (s)	15.9	13.9			13.5		9.4	9.1			8.5	9.4
Level of Service	B	B			B		A	A			A	A
Approach Delay (s)		15.2			13.5			9.3			9.2	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.27			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	74.6%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Existing PM Peak Hour Period

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	5	25	245	80	25
Future Volume (Veh/h)	15	5	25	245	80	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	18	6	29	288	94	29
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	464	124	133			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	464	124	133			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	98			
cM capacity (veh/h)	544	921	1452			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	317	123
Volume Left	18	29	0
Volume Right	6	0	29
cSH	606	1452	1700
Volume to Capacity	0.04	0.02	0.07
Queue Length 95th (m)	1.0	0.5	0.0
Control Delay (s)	11.2	0.9	0.0
Lane LOS	B	A	
Approach Delay (s)	11.2	0.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Existing PM Peak Hour Period



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	5	10	235	65	20
Future Volume (Veh/h)	15	5	10	235	65	20
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)	16	5	11	255	71	22
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	369	97	103			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	369	97	103			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	625	953	1489			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	21	266	93
Volume Left	16	11	0
Volume Right	5	0	22
cSH	681	1489	1700
Volume to Capacity	0.03	0.01	0.05
Queue Length 95th (m)	0.8	0.2	0.0
Control Delay (s)	10.5	0.4	0.0
Lane LOS	B	A	
Approach Delay (s)	10.5	0.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		31.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Existing PM Peak Hour Period



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	155	45	0	5	55	85	5	5	0	25	5	40
Future Volume (vph)	155	45	0	5	55	85	5	5	0	25	5	40
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	189	55	0	6	67	104	6	6	0	30	6	49

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	244	177	12	85
Volume Left (vph)	189	6	6	30
Volume Right (vph)	0	104	0	49
Hadj (s)	0.21	-0.32	0.10	-0.28
Departure Headway (s)	4.5	4.1	5.1	4.6
Degree Utilization, x	0.31	0.20	0.02	0.11
Capacity (veh/h)	775	842	643	715
Control Delay (s)	9.5	8.1	8.1	8.1
Approach Delay (s)	9.5	8.1	8.1	8.1
Approach LOS	A	A	A	A

Intersection Summary			
Delay		8.8	
Level of Service		A	
Intersection Capacity Utilization		34.0%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Existing PM Peak Hour Period



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	5	15	165	45	55
Future Volume (Veh/h)	35	5	15	165	45	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	40	6	17	190	52	63
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	308	84	115			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	84	115			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	94	99	99			
cM capacity (veh/h)	666	981	1443			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	46	207	115
Volume Left	40	17	0
Volume Right	6	0	63
cSH	696	1443	1700
Volume to Capacity	0.07	0.01	0.07
Queue Length 95th (m)	1.7	0.3	0.0
Control Delay (s)	10.5	0.7	0.0
Lane LOS	B	A	
Approach Delay (s)	10.5	0.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		26.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
14: 10 Sideroad & Line 5

Existing PM Peak Hour Period



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	335	30	10	0	50	20	0	10	5	5	15	85
Future Volume (vph)	335	30	10	0	50	20	0	10	5	5	15	85
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	372	33	11	0	56	22	0	11	6	6	17	94

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	416	78	17	117
Volume Left (vph)	372	0	0	6
Volume Right (vph)	11	22	6	94
Hadj (s)	0.18	-0.08	-0.12	-0.46
Departure Headway (s)	4.5	4.6	5.1	4.6
Degree Utilization, x	0.52	0.10	0.02	0.15
Capacity (veh/h)	774	734	626	702
Control Delay (s)	12.3	8.1	8.2	8.4
Approach Delay (s)	12.3	8.1	8.2	8.4
Approach LOS	B	A	A	A

Intersection Summary			
Delay		11.0	
Level of Service		B	
Intersection Capacity Utilization		44.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Ln

Existing PM Peak Hour Period



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	245	0	0	70
Future Volume (Veh/h)	0	0	245	0	0	70
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	0	266	0	0	76
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	342	266			266	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	342	266			266	
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	100			100	
cM capacity (veh/h)	658	778			1310	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	266	76
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1310
Volume to Capacity	0.00	0.16	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		16.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Existing PM Peak Hour Period



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	260	0	0	105
Future Volume (Veh/h)	0	0	260	0	0	105
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	0	283	0	0	114
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	397	283			283	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	397	283			283	
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	100			100	
cM capacity (veh/h)	612	761			1291	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	283	114
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1291
Volume to Capacity	0.00	0.17	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		17.0%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Background 2026 AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	205	260	35	40	50
Future Volume (Veh/h)	5	205	260	35	40	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	225	286	38	44	55
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	324				540	305
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	324				540	305
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				91	93
cM capacity (veh/h)	1171				499	735

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	225	324	99
Volume Left	5	0	0	44
Volume Right	0	0	38	55
cSH	1171	1700	1700	607
Volume to Capacity	0.00	0.13	0.19	0.16
Queue Length 95th (m)	0.1	0.0	0.0	4.6
Control Delay (s)	8.1	0.0	0.0	12.1
Lane LOS	A			B
Approach Delay (s)	0.2		0.0	12.1
Approach LOS				B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

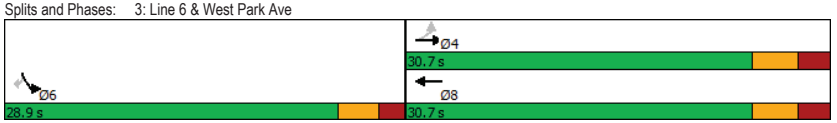
Queues
3: Line 6 & West Park Ave

Future Background 2026 AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	10	235	260	105	35
Future Volume (vph)	10	235	260	105	35
Lane Group Flow (vph)	11	267	369	119	40
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.02	0.24	0.32	0.30	0.10
Control Delay	5.1	6.2	6.3	17.3	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.1	6.2	6.3	17.3	6.7
Queue Length 50th (m)	0.4	10.2	13.8	8.4	0.0
Queue Length 95th (m)	1.9	20.9	27.5	18.6	5.2
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	589	1108	1142	917	864
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.24	0.32	0.13	0.05

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 45.9
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Line 6 & West Park Ave



Bradford Highlands
BA Group

Synchro 11 Report
FB_FT.syn

HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Background 2026 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	235	260	65	105	35
Future Volume (vph)	10	235	260	65	105	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1743	1781		1752	1615
Flt Permitted	0.54	1.00	1.00		0.95	1.00
Satd. Flow (perm)	927	1743	1781		1752	1615
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	267	295	74	119	40
RTOR Reduction (vph)	0	0	10	0	0	33
Lane Group Flow (vph)	11	267	359	0	119	7
Heavy Vehicles (%)	11%	9%	3%	7%	3%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	28.0	28.0	28.0		8.2	8.2
Effective Green, g (s)	28.0	28.0	28.0		8.2	8.2
Actuated g/C Ratio	0.60	0.60	0.60		0.18	0.18
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	554	1042	1065		306	282
v/s Ratio Prot		0.15	c0.20		c0.07	
v/s Ratio Perm	0.01					0.00
v/c Ratio	0.02	0.26	0.34		0.39	0.02
Uniform Delay, d1	3.8	4.5	4.7		17.1	16.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.1	0.2		0.8	0.0
Delay (s)	3.8	4.6	4.9		17.9	16.0
Level of Service	A	A	A		B	B
Approach Delay (s)		4.6	4.9		17.4	
Approach LOS		A	A		B	

Intersection Summary				
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.35			
Actuated Cycle Length (s)	46.8	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	38.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Background 2026 AM Peak Hour



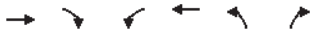
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	330	5	5	310	5	5	5	10	15	0	10
Future Volume (Veh/h)	5	330	5	5	310	5	5	5	10	15	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	359	5	5	337	5	5	5	11	16	0	11
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked												
vC, conflicting volume	347			364			730	728	362	737	728	344
vC1, stage 1 conf vol							372	372		354	354	
vC2, stage 2 conf vol							358	357		382	374	
vCu, unblocked vol	347			364			730	728	362	737	728	344
tC, single (s)	4.1			4.3			7.3	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.3	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	99	98	97	100	98
cM capacity (veh/h)	1218			1116			489	517	688	522	517	700

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	364	5	342	21	27
Volume Left	5	0	5	0	5	16
Volume Right	0	5	0	5	11	11
cSH	1218	1700	1116	1700	585	582
Volume to Capacity	0.00	0.21	0.00	0.20	0.04	0.05
Queue Length 95th (m)	0.1	0.0	0.1	0.0	0.9	1.2
Control Delay (s)	8.0	0.0	8.2	0.0	11.4	11.5
Lane LOS	A		A		B	B
Approach Delay (s)	0.1		0.1		11.4	11.5
Approach LOS					B	B

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	27.7%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Background 2026 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	355	0	0	320	0	0
Future Volume (Veh/h)	355	0	0	320	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	382	0	0	344	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked						
vC, conflicting volume			382		726	382
vC1, stage 1 conf vol					382	
vC2, stage 2 conf vol					344	
vCu, unblocked vol			382		726	382
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1188		589	670

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	382	0	344	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.22	0.00	0.20	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS				A	A
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS				A	

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	22.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Background 2026 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	350	295	20	40	25
Future Volume (Veh/h)	5	350	295	20	40	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	5	376	317	22	43	27
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked						
vC, conflicting volume	344				719	333
vC1, stage 1 conf vol					333	
vC2, stage 2 conf vol					386	
vCu, unblocked vol	344				719	333
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				93	96
cM capacity (veh/h)	1221				583	710

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	376	339	70
Volume Left	5	0	0	43
Volume Right	0	0	22	27
cSH	1221	1700	1700	626
Volume to Capacity	0.00	0.22	0.20	0.11
Queue Length 95th (m)	0.1	0.0	0.0	3.0
Control Delay (s)	8.0	0.0	0.0	11.5
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	11.5
Approach LOS				B

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	28.8%	ICU Level of Service	A	
Analysis Period (min)	15			

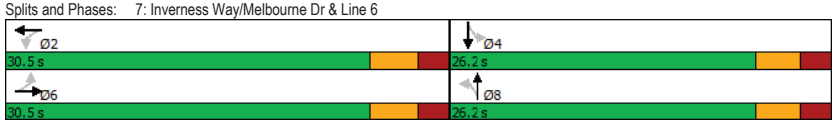
Queues
7: Inverness Way/Melbourne Dr & Line 6

Future Background 2026 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	60	315	5	215	35	40	115	40
Future Volume (vph)	60	315	5	215	35	40	115	40
Lane Group Flow (vph)	69	379	6	379	40	69	132	121
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.12	0.35	0.01	0.35	0.12	0.15	0.41	0.25
Control Delay	8.1	8.7	7.4	7.6	14.1	10.5	18.8	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	8.7	7.4	7.6	14.1	10.5	18.8	8.0
Queue Length 50th (m)	2.4	15.4	0.2	12.8	2.7	3.1	9.8	3.1
Queue Length 95th (m)	10.6	45.1	2.0	40.1	7.7	9.4	20.3	11.4
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	569	1098	621	1078	549	770	547	770
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.35	0.01	0.35	0.07	0.09	0.24	0.16

Intersection Summary
Cycle Length: 56.7
Actuated Cycle Length: 48.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Background 2026 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	315	15	5	215	115	35	40	20	115	40	65
Future Volume (vph)	60	315	15	5	215	115	35	40	20	115	40	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		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	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.95		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	1791		1805	1723		1752	1728		1669	1662	
Flt Permitted	0.54	1.00		0.54	1.00		0.68	1.00		0.71	1.00	
Satd. Flow (perm)	930	1791		1017	1723		1253	1728		1251	1662	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	69	362	17	6	247	132	40	46	23	132	46	75
RTOR Reduction (vph)	0	2	0	0	26	0	0	18	0	0	59	0
Lane Group Flow (vph)	69	377	0	6	353	0	40	51	0	132	62	0
Confl. Peds. (#/hr)	5					5			10	10		
Heavy Vehicles (%)	9%	5%	13%	0%	5%	1%	3%	2%	6%	7%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	28.4	28.4		28.4	28.4		10.2	10.2		10.2	10.2	
Effective Green, g (s)	28.4	28.4		28.4	28.4		10.2	10.2		10.2	10.2	
Actuated g/C Ratio	0.58	0.58		0.58	0.58		0.21	0.21		0.21	0.21	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	535	1031		585	992		259	357		258	343	
v/s Ratio Prot		c0.21			0.20			0.03			0.04	
v/s Ratio Perm	0.07			0.01			0.03			c0.11		
v/c Ratio	0.13	0.37		0.01	0.36		0.15	0.14		0.51	0.18	
Uniform Delay, d1	4.8	5.6		4.5	5.6		16.0	16.0		17.3	16.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.0	0.2		0.3	0.2		1.7	0.3	
Delay (s)	4.9	5.8		4.5	5.8		16.3	16.2		19.1	16.4	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		5.7			5.8			16.2			17.8	
Approach LOS		A			A			B			B	

Intersection Summary					
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.40				
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	10.7		
Intersection Capacity Utilization	68.2%	ICU Level of Service	C		
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Background 2026 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	425	10	20	315	10	20	0	35	5	0	0
Future Volume (Veh/h)	15	425	10	20	315	10	20	0	35	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	531	12	25	394	12	25	0	44	6	0	0
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked												
vC, conflicting volume	411			543			1019	1036	537	1068	1036	405
vC1, stage 1 conf vol							575	575		455	455	
vC2, stage 2 conf vol							444	461		613	581	
vCu, unblocked vol	411			543			1019	1036	537	1068	1036	405
tC, single (s)	4.3			4.1			7.1	6.5	6.2	8.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		7.1	5.5	
tF (s)	2.4			2.2			3.5	4.0	3.3	4.4	4.0	3.8
p0 queue free %	98			98			94	100	92	98	100	100
cM capacity (veh/h)	1048			1036			411	407	542	253	400	551

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	19	543	25	406	69	6
Volume Left	19	0	25	0	25	6
Volume Right	0	12	0	12	44	0
cSH	1048	1700	1036	1700	486	253
Volume to Capacity	0.02	0.32	0.02	0.24	0.14	0.02
Queue Length 95th (m)	0.4	0.0	0.6	0.0	3.9	0.6
Control Delay (s)	8.5	0.0	8.6	0.0	13.6	19.6
Lane LOS	A		A		B	C
Approach Delay (s)	0.3		0.5		13.6	19.6
Approach LOS					B	C

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	33.0%	ICU Level of Service	A	
Analysis Period (min)	15			

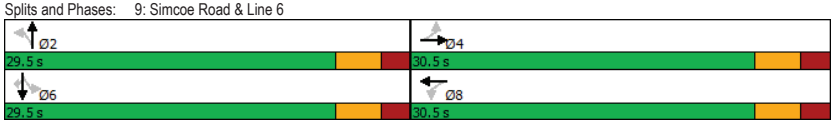
Queues
9: Simcoe Road & Line 6

Future Background 2026 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	330	25	5	45	170	175	110	190
Future Volume (vph)	330	25	5	45	170	175	110	190
Lane Group Flow (vph)	371	168	6	57	191	203	124	213
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA	Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		8		2			6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.67	0.23	0.01	0.08	0.39	0.30	0.17	0.29
Control Delay	21.6	4.2	10.6	10.1	15.9	13.7	12.4	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	4.2	10.6	10.1	15.9	13.7	12.4	3.2
Queue Length 50th (m)	33.2	1.8	0.4	3.4	15.1	15.1	8.9	0.0
Queue Length 95th (m)	60.1	11.2	2.2	9.0	29.8	28.5	18.2	10.4
Internal Link Dist (m)		261.6		146.8		400.7	164.9	
Turn Bay Length (m)	50.0		20.0		110.0			
Base Capacity (vph)	553	737	410	749	485	673	724	743
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.23	0.01	0.08	0.39	0.30	0.17	0.29

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Background 2026 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	330	25	125	5	45	5	170	175	5	0	110	190
Future Volume (vph)	330	25	125	5	45	5	170	175	5	0	110	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.88		1.00	0.98		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1574		1437	1790		1703	1678			1810	1538
Flt Permitted	0.72	1.00		0.65	1.00		0.68	1.00			1.00	1.00
Satd. Flow (perm)	1328	1574		985	1790		1214	1678			1810	1538
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	371	28	140	6	51	6	191	197	6	0	124	213
RTOR Reduction (vph)	0	82	0	0	4	0	0	2	0	0	0	128
Lane Group Flow (vph)	371	86	0	6	54	0	191	201	0	0	124	85
Confl. Peds. (#/hr)			5	5					5	5		
Heavy Vehicles (%)	3%	0%	4%	25%	5%	0%	6%	13%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0		25.0	25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0		25.0	25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	553	655		410	745		485	671			724	615
v/s Ratio Prot		0.05			0.03			0.12			0.07	
v/s Ratio Perm	c0.28			0.01			c0.16					0.06
v/c Ratio	0.67	0.13		0.01	0.07		0.39	0.30			0.17	0.14
Uniform Delay, d1	14.2	10.8		10.3	10.5		12.8	12.3			11.6	11.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.2	0.1		0.0	0.0		0.5	0.3			0.1	0.1
Delay (s)	17.4	10.9		10.3	10.6		13.3	12.5			11.7	11.5
Level of Service	B	B		B	B		B	B			B	B
Approach Delay (s)		15.3			10.5			12.9			11.6	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	74.6%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Background 2026 AM Peak Hour



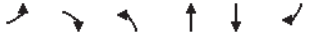
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	50	20	215	215	10
Future Volume (Veh/h)	25	50	20	215	215	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	34	68	27	295	295	14
Pedestrians	5			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	656	312	314			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	656	312	314			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	92	91	98			
cM capacity (veh/h)	410	718	1197			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	322	309
Volume Left	34	27	0
Volume Right	68	0	14
cSH	574	1197	1700
Volume to Capacity	0.18	0.02	0.18
Queue Length 95th (m)	5.1	0.6	0.0
Control Delay (s)	12.6	0.9	0.0
Lane LOS	B	A	
Approach Delay (s)	12.6	0.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Background 2026 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	10	5	170	210	15
Future Volume (Veh/h)	25	10	5	170	210	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	28	11	6	189	233	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)						
pX, platoon unblocked						
vC, conflicting volume	442	242	250			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	442	242	250			
tC, single (s)	6.5	6.2	4.6			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.7			
p0 queue free %	95	99	99			
cM capacity (veh/h)	557	802	1081			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	195	250
Volume Left	28	6	0
Volume Right	11	0	17
cSH	609	1081	1700
Volume to Capacity	0.06	0.01	0.15
Queue Length 95th (m)	1.6	0.1	0.0
Control Delay (s)	11.3	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	11.3	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization		23.0%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Background 2026 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	115	35	0	0	20	20	0	0	0	50	5	155
Future Volume (vph)	115	35	0	0	20	20	0	0	0	50	5	155
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	137	42	0	0	24	24	0	0	0	60	6	185

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	179	48	0	251
Volume Left (vph)	137	0	0	60
Volume Right (vph)	0	24	0	185
Hadj (s)	0.31	-0.15	0.00	-0.31
Departure Headway (s)	4.8	4.5	4.8	4.2
Degree Utilization, x	0.24	0.06	0.00	0.29
Capacity (veh/h)	704	733	710	820
Control Delay (s)	9.4	7.8	7.8	8.8
Approach Delay (s)	9.4	7.8	0.0	8.8
Approach LOS	A	A	A	A

Intersection Summary			
Delay		8.9	
Level of Service		A	
Intersection Capacity Utilization		34.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Background 2026 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	35	0	85	100	75
Future Volume (Veh/h)	65	35	0	85	100	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	78	42	0	102	120	90
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	267	165	210			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	267	165	210			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	95	100			
cM capacity (veh/h)	727	885	1373			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	120	102	210
Volume Left	78	0	0
Volume Right	42	0	90
cSH	775	1373	1700
Volume to Capacity	0.15	0.00	0.12
Queue Length 95th (m)	4.4	0.0	0.0
Control Delay (s)	10.5	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.5	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		2.9		
Intersection Capacity Utilization		22.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Background 2026 AM Peak Hour



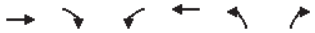
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	75	15	120	90	15	235
Future Volume (Veh/h)	75	15	120	90	15	235
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	91	18	146	110	18	287
Pedestrians						
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	380	128			256	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	380	128			256	
tC, single (s)	6.8	6.9			4.8	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.5	
p0 queue free %	85	98			98	
cM capacity (veh/h)	590	905			1108	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	109	97	159	114	191
Volume Left	91	0	0	18	0
Volume Right	18	0	110	0	0
cSH	626	1700	1700	1108	1700
Volume to Capacity	0.17	0.06	0.09	0.02	0.11
Queue Length 95th (m)	5.0	0.0	0.0	0.4	0.0
Control Delay (s)	12.0	0.0	0.0	1.4	0.0
Lane LOS	B			A	
Approach Delay (s)	12.0	0.0		0.5	
Approach LOS	B				

Intersection Summary				
Average Delay		2.2		
Intersection Capacity Utilization		28.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Background 2026 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	95	10	5	70	20	5
Future Volume (Veh/h)	95	10	5	70	20	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	100	11	5	74	21	5
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			111		190	106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			111		190	106
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			1492		801	954

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	111	79	26
Volume Left	0	5	21
Volume Right	11	0	5
cSH	1700	1492	827
Volume to Capacity	0.07	0.00	0.03
Queue Length 95th (m)	0.0	0.1	0.8
Control Delay (s)	0.0	0.5	9.5
Lane LOS		A	A
Approach Delay (s)	0.0	0.5	9.5
Approach LOS			A

Intersection Summary				
Average Delay		1.3		
Intersection Capacity Utilization		17.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Background 2026 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	100	75	0	0	0
Future Volume (Veh/h)	0	100	75	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	105	79	0	0	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	79				184	79
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	79				184	79
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1532				810	987

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	105	79	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1532	1700	1700	1700
Volume to Capacity	0.00	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS			A	

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		8.6%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Background 2026 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	45	130	5	20	200
Future Volume (Veh/h)	10	45	130	5	20	200
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)	11	49	141	5	22	217
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	404	144			146	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	404	144			146	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			98	
cM capacity (veh/h)	597	909			1448	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	60	146	239
Volume Left	11	0	22
Volume Right	49	5	0
cSH	830	1700	1448
Volume to Capacity	0.07	0.09	0.02
Queue Length 95th (m)	1.9	0.0	0.4
Control Delay (s)	9.7	0.0	0.8
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	0.8
Approach LOS	A		

Intersection Summary				
Average Delay		1.7		
Intersection Capacity Utilization		32.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Background 2026 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	95	235	5	30	215
Future Volume (Veh/h)	10	95	235	5	30	215
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)	11	103	255	5	33	234
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	558	258			260	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	558	258			260	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	87			97	
cM capacity (veh/h)	482	786			1316	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	114	260	267
Volume Left	11	0	33
Volume Right	103	5	0
cSH	741	1700	1316
Volume to Capacity	0.15	0.15	0.03
Queue Length 95th (m)	4.3	0.0	0.6
Control Delay (s)	10.7	0.0	1.2
Lane LOS	B		A
Approach Delay (s)	10.7	0.0	1.2
Approach LOS	B		

Intersection Summary				
Average Delay		2.4		
Intersection Capacity Utilization		42.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Background 2026 PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	380	270	80	45	20
Future Volume (Veh/h)	65	380	270	80	45	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	71	418	297	88	49	22
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	385				901	341
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	385				901	341
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				83	97
cM capacity (veh/h)	1173				289	706

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	71	418	385	71
Volume Left	71	0	0	49
Volume Right	0	0	88	22
cSH	1173	1700	1700	354
Volume to Capacity	0.06	0.25	0.23	0.20
Queue Length 95th (m)	1.5	0.0	0.0	5.9
Control Delay (s)	8.3	0.0	0.0	17.7
Lane LOS	A			C
Approach Delay (s)	1.2		0.0	17.7
Approach LOS				C

Intersection Summary			
Average Delay		2.0	
Intersection Capacity Utilization		36.4%	ICU Level of Service A
Analysis Period (min)		15	

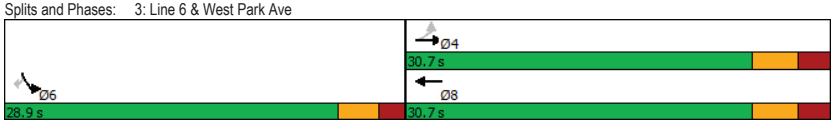
Queues
3: Line 6 & West Park Ave

Future Background 2026 PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	40	385	330	125	20
Future Volume (vph)	40	385	330	125	20
Lane Group Flow (vph)	45	433	483	140	22
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.08	0.36	0.42	0.35	0.06
Control Delay	5.8	7.0	7.2	17.8	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	7.0	7.2	17.8	7.6
Queue Length 50th (m)	1.5	18.2	19.5	10.0	0.0
Queue Length 95th (m)	5.4	36.5	40.4	21.4	3.9
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	560	1204	1162	923	853
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.08	0.36	0.42	0.15	0.03

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 46
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Background 2026 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	40	385	330	100	125	20
Future Volume (vph)	40	385	330	100	125	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1801	1900	1816		1770	1615
Flt Permitted	0.47	1.00	1.00		0.95	1.00
Satd. Flow (perm)	883	1900	1816		1770	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	45	433	371	112	140	22
RTOR Reduction (vph)	0	0	13	0	0	18
Lane Group Flow (vph)	45	433	470	0	140	4
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	0%	0%	1%	0%	2%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	28.0	28.0	28.0		8.4	8.4
Effective Green, g (s)	28.0	28.0	28.0		8.4	8.4
Actuated g/C Ratio	0.60	0.60	0.60		0.18	0.18
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	526	1131	1081		316	288
v/s Ratio Prot		0.23	c0.26		c0.08	
v/s Ratio Perm	0.05					0.00
v/c Ratio	0.09	0.38	0.44		0.44	0.01
Uniform Delay, d1	4.0	5.0	5.2		17.2	15.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.2	0.3		1.0	0.0
Delay (s)	4.1	5.2	5.5		18.2	15.9
Level of Service	A	A	A		B	B
Approach Delay (s)		5.1	5.5		17.9	
Approach LOS		A	A		B	

Intersection Summary				
HCM 2000 Control Delay	7.1	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.44			
Actuated Cycle Length (s)	47.0	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	50.4%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Background 2026 PM Peak Hour



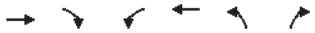
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	485	10	10	420	15	5	5	5	5	0	5
Future Volume (Veh/h)	15	485	10	10	420	15	5	5	5	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	539	11	11	467	17	6	6	6	6	0	6
Pedestrians		10			10						10	
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		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked												
vC, conflicting volume	494			550			1084	1094	554	1100	1092	496
vC1, stage 1 conf vol							578	578		508	508	
vC2, stage 2 conf vol							505	516		592	584	
vCu, unblocked vol	494			550			1084	1094	554	1100	1092	496
tC, single (s)	4.1			4.2			7.1	6.5	6.5	7.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.3			3.5	4.0	3.5	3.5	4.0	3.8
p0 queue free %	98			99			98	98	99	98	100	99
cM capacity (veh/h)	1071			981			391	395	486	380	396	481

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	550	11	484	18	12
Volume Left	17	0	11	0	6	6
Volume Right	0	11	0	17	6	6
cSH	1071	1700	981	1700	420	424
Volume to Capacity	0.02	0.32	0.01	0.28	0.04	0.03
Queue Length 95th (m)	0.4	0.0	0.3	0.0	1.1	0.7
Control Delay (s)	8.4	0.0	8.7	0.0	14.0	13.7
Lane LOS	A		A		B	B
Approach Delay (s)	0.3		0.2		14.0	13.7
Approach LOS					B	B

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	39.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Background 2026 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	495	0	0	445	0	0
Future Volume (Veh/h)	495	0	0	445	0	0
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)	538	0	0	484	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked						
vC, conflicting volume			538		1022	538
vC1, stage 1 conf vol					538	
vC2, stage 2 conf vol					484	
vCu, unblocked vol			538		1022	538
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1040		480	547

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	538	0	484	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.32	0.00	0.28	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS				A	A
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS				A	

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	29.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Background 2026 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	465	435	70	35	10
Future Volume (Veh/h)	30	465	435	70	35	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	33	517	483	78	39	11
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	566				1110	527
vC1, stage 1 conf vol					527	
vC2, stage 2 conf vol					583	
vCu, unblocked vol	455				1064	412
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	97				91	98
cM capacity (veh/h)	980				440	574

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	33	517	561	50
Volume Left	33	0	0	39
Volume Right	0	0	78	11
cSH	980	1700	1700	463
Volume to Capacity	0.03	0.30	0.33	0.11
Queue Length 95th (m)	0.8	0.0	0.0	2.9
Control Delay (s)	8.8	0.0	0.0	13.7
Lane LOS	A			B
Approach Delay (s)	0.5		0.0	13.7
Approach LOS				B

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	37.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
7: Inverness Way/Melbourne Dr & Line 6

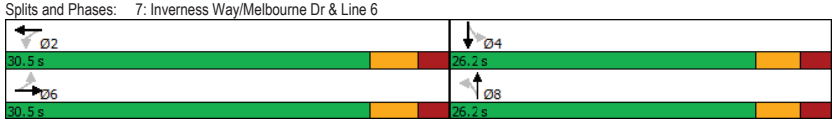
Future Background 2026 PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	80	385	10	440	20	20	95	30
Future Volume (vph)	80	385	10	440	20	20	95	30
Lane Group Flow (vph)	90	472	11	618	22	28	107	85
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.21	0.41	0.02	0.53	0.08	0.07	0.36	0.21
Control Delay	9.3	8.7	7.3	10.6	13.6	11.6	18.1	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.3	8.7	7.3	10.6	13.6	11.6	18.1	8.5
Queue Length 50th (m)	3.1	18.3	0.3	26.0	1.5	1.5	7.7	2.3
Queue Length 95th (m)	15.1	59.4	2.9	#89.0	5.2	5.5	17.0	9.5
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	423	1165	554	1156	597	831	613	793
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.41	0.02	0.53	0.04	0.03	0.17	0.11

Intersection Summary

Cycle Length: 56.7
Actuated Cycle Length: 47.1
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Background 2026 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	385	35	10	440	110	20	20	5	95	30	45
Future Volume (vph)	80	385	35	10	440	110	20	20	5	95	30	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.98	
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	0.97		1.00	0.97		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1802	1856		1801	1830		1796	1839		1752	1702	
Flt Permitted	0.36	1.00		0.47	1.00		0.70	1.00		0.74	1.00	
Satd. Flow (perm)	678	1856		884	1830		1327	1839		1363	1702	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	90	433	39	11	494	124	22	22	6	107	34	51
RTOR Reduction (vph)	0	4	0	0	12	0	0	5	0	0	41	0
Lane Group Flow (vph)	90	468	0	11	606	0	22	23	0	107	44	0
Confl. Peds. (#/hr)	5		5	5		5	5					5
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	28.3	28.3		28.3	28.3		9.0	9.0		9.0	9.0	
Effective Green, g (s)	28.3	28.3		28.3	28.3		9.0	9.0		9.0	9.0	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.19	0.19		0.19	0.19	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	399	1094		521	1078		248	344		255	319	
v/s Ratio Prot		0.25			c0.33			0.01			0.03	
v/s Ratio Perm	0.13			0.01			0.02			c0.08		
v/c Ratio	0.23	0.43		0.02	0.56		0.09	0.07		0.42	0.14	
Uniform Delay, d1	4.7	5.4		4.1	6.0		16.1	16.0		17.2	16.3	
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		0.0	0.7		0.2	0.1		1.1	0.2	
Delay (s)	5.0	5.7		4.1	6.7		16.3	16.1		18.3	16.5	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		5.6			6.7			16.2			17.5	
Approach LOS		A			A			B			B	

Intersection Summary

HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	48.0	Sum of lost time (s)	10.7
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Background 2026 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	460	20	45	540	5	10	0	25	10	0	10
Future Volume (Veh/h)	0	460	20	45	540	5	10	0	25	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	529	23	52	621	6	11	0	29	11	0	11
Pedestrians								5			5	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked				0.97			0.97	0.97	0.97	0.97	0.97	
vC, conflicting volume	632			557			1282	1282	546	1291	1290	629
vC1, stage 1 conf vol							546	546		733	733	
vC2, stage 2 conf vol							736	736		558	557	
vCu, unblocked vol	632			531			1276	1276	520	1285	1284	629
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			97	100	95	96	100	98
cM capacity (veh/h)	956			1014			325	342	543	310	329	484

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	552	52	627	40	22
Volume Left	0	0	52	0	11	11
Volume Right	0	23	0	6	29	11
cSH	1700	1700	1014	1700	459	378
Volume to Capacity	0.00	0.32	0.05	0.37	0.09	0.06
Queue Length 95th (m)	0.0	0.0	1.3	0.0	2.3	1.5
Control Delay (s)	0.0	0.0	8.7	0.0	13.6	15.1
Lane LOS			A		B	C
Approach Delay (s)	0.0		0.7		13.6	15.1
Approach LOS					B	C

Intersection Summary					
Average Delay	1.0				
Intersection Capacity Utilization	45.4%	ICU Level of Service	A		
Analysis Period (min)	15				

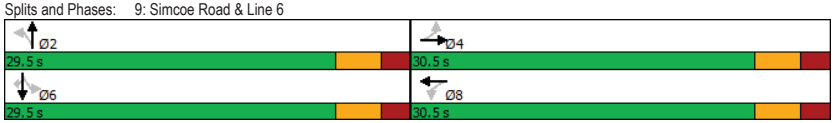
Queues
9: Simcoe Road & Line 6

Future Background 2026 PM Peak Hour

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	265	90	35	200	240	5	155	400
Future Volume (vph)	265	90	35	200	240	5	155	400
Lane Group Flow (vph)	285	280	43	215	280	0	172	430
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4	8		2		6	
Permitted Phases	4			2		6		6
Detector Phase	4	4	8	2	2	6	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	24.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.49	0.34	0.06	0.44	0.37		0.23	0.48
Control Delay	16.5	5.8	9.9	16.7	14.0		13.0	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	16.5	5.8	9.9	16.7	14.0		13.0	3.5
Queue Length 50th (m)	23.2	6.6	2.5	17.4	21.2		12.6	0.0
Queue Length 95th (m)	43.1	19.9	7.5	34.3	37.9		24.4	14.8
Internal Link Dist (m)		261.6	146.8		400.7		164.9	
Turn Bay Length (m)	50.0			110.0				
Base Capacity (vph)	577	820	778	488	756		738	897
Starvation Cap Reductn	0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0
Reduced v/c Ratio	0.49	0.34	0.06	0.44	0.37		0.23	0.48

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Background 2026 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	90	170	0	35	5	200	240	20	5	155	400
Future Volume (vph)	265	90	170	0	35	5	200	240	20	5	155	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.90			0.98		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1805	1714			1860		1787	1878			1861	1599
Flt Permitted	0.73	1.00			1.00		0.65	1.00			0.99	1.00
Satd. Flow (perm)	1385	1714			1860		1220	1878			1846	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	285	97	183	0	38	5	215	258	22	5	167	430
RTOR Reduction (vph)	0	107	0	0	3	0	0	5	0	0	0	258
Lane Group Flow (vph)	285	173	0	0	40	0	215	275	0	0	172	172
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42			0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	577	714			775		488	751			738	639
v/s Ratio Prot		0.10			0.02			0.15				
v/s Ratio Perm	c0.21						c0.18				0.09	0.11
v/c Ratio	0.49	0.24			0.05		0.44	0.37			0.23	0.27
Uniform Delay, d1	12.9	11.4			10.4		13.1	12.7			11.9	12.1
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	0.7	0.2			0.0		0.6	0.3			0.2	0.2
Delay (s)	13.5	11.5			10.5		13.7	13.0			12.1	12.3
Level of Service	B	B			B		B	B			B	B
Approach Delay (s)		12.5			10.5			13.3			12.3	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.47			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	79.4%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Background 2026 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	5	25	405	205	25
Future Volume (Veh/h)	15	5	25	405	205	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	18	6	29	476	241	29
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	800	270	280			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	800	270	280			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	98			
cM capacity (veh/h)	346	763	1283			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	505	270
Volume Left	18	29	0
Volume Right	6	0	29
cSH	401	1283	1700
Volume to Capacity	0.06	0.02	0.16
Queue Length 95th (m)	1.5	0.6	0.0
Control Delay (s)	14.5	0.7	0.0
Lane LOS	B	A	
Approach Delay (s)	14.5	0.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Background 2026 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	5	10	390	185	25
Future Volume (Veh/h)	20	5	10	390	185	25
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)	22	5	11	424	201	27
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	670	230	238			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	670	230	238			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	99			
cM capacity (veh/h)	418	805	1330			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	435	228
Volume Left	22	11	0
Volume Right	5	0	27
cSH	459	1330	1700
Volume to Capacity	0.06	0.01	0.13
Queue Length 95th (m)	1.5	0.2	0.0
Control Delay (s)	13.3	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	13.3	0.3	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		40.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Background 2026 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	280	45	0	5	55	115	5	5	0	45	5	85
Future Volume (vph)	280	45	0	5	55	115	5	5	0	45	5	85
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	341	55	0	6	67	140	6	6	0	55	6	104

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	396	213	12	165
Volume Left (vph)	341	6	6	55
Volume Right (vph)	0	140	0	104
Hadj (s)	0.22	-0.37	0.10	-0.31
Departure Headway (s)	4.8	4.5	5.7	5.0
Degree Utilization, x	0.53	0.27	0.02	0.23
Capacity (veh/h)	715	754	530	641
Control Delay (s)	13.2	9.1	8.9	9.6
Approach Delay (s)	13.2	9.1	8.9	9.6
Approach LOS	B	A	A	A

Intersection Summary				
Delay		11.3		
Level of Service		B		
Intersection Capacity Utilization		47.0%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Background 2026 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	120	5	15	205	50	95
Future Volume (Veh/h)	120	5	15	205	50	95
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	138	6	17	236	57	109
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	382	112	166			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	382	112	166			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	77	99	99			
cM capacity (veh/h)	604	947	1382			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	144	253	166
Volume Left	138	17	0
Volume Right	6	0	109
cSH	613	1382	1700
Volume to Capacity	0.23	0.01	0.10
Queue Length 95th (m)	7.3	0.3	0.0
Control Delay (s)	12.7	0.6	0.0
Lane LOS	B	A	
Approach Delay (s)	12.7	0.6	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		3.5		
Intersection Capacity Utilization		36.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Background 2026 PM Peak Hour



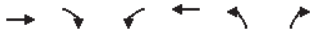
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	85	30	400	125	20	125
Future Volume (Veh/h)	85	30	400	125	20	125
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	94	33	444	139	22	139
Pedestrians						
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	627	292			583	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	627	292			583	
tC, single (s)	6.9	7.0			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	76	95			98	
cM capacity (veh/h)	400	696			1001	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	127	296	287	68	93
Volume Left	94	0	0	22	0
Volume Right	33	0	139	0	0
cSH	450	1700	1700	1001	1700
Volume to Capacity	0.28	0.17	0.17	0.02	0.05
Queue Length 95th (m)	9.2	0.0	0.0	0.5	0.0
Control Delay (s)	16.1	0.0	0.0	2.9	0.0
Lane LOS	C			A	
Approach Delay (s)	16.1	0.0		1.2	
Approach LOS	C				

Intersection Summary				
Average Delay		2.6		
Intersection Capacity Utilization		32.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Background 2026 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	120	25	0	105	10	5
Future Volume (Veh/h)	120	25	0	105	10	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	133	28	0	117	11	6
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			161		264	147
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			161		264	147
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1430		729	905

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	161	117	17
Volume Left	0	0	11
Volume Right	28	0	6
cSH	1700	1430	783
Volume to Capacity	0.09	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.5
Control Delay (s)	0.0	0.0	9.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.7
Approach LOS			A

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		17.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Background 2026 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	125	105	0	0	0
Future Volume (Veh/h)	0	125	105	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	139	117	0	0	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	117				256	117
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	117				256	117
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1484				737	941

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	139	117	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1484	1700	1700	1700
Volume to Capacity	0.00	0.07	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS			A	

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		9.9%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Background 2026 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	375	25	60	130
Future Volume (Veh/h)	5	25	375	25	60	130
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)	5	27	408	27	65	141
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	692	422			435	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	692	422			435	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	96			94	
cM capacity (veh/h)	389	636			1135	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	435	206
Volume Left	5	0	65
Volume Right	27	27	0
cSH	579	1700	1135
Volume to Capacity	0.06	0.26	0.06
Queue Length 95th (m)	1.4	0.0	1.5
Control Delay (s)	11.6	0.0	3.0
Lane LOS	B		A
Approach Delay (s)	11.6	0.0	3.0
Approach LOS	B		

Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization		44.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Background 2026 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	395	25	95	225
Future Volume (Veh/h)	5	60	395	25	95	225
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)	5	65	429	27	103	245
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	894	442			456	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	894	442			456	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	90			91	
cM capacity (veh/h)	285	619			1115	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	456	348
Volume Left	5	0	103
Volume Right	65	27	0
cSH	572	1700	1115
Volume to Capacity	0.12	0.27	0.09
Queue Length 95th (m)	3.3	0.0	2.4
Control Delay (s)	12.2	0.0	3.2
Lane LOS	B		A
Approach Delay (s)	12.2	0.0	3.2
Approach LOS	B		

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		53.4%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Total 2026 AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	230	325	35	40	50
Future Volume (Veh/h)	5	230	325	35	40	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	253	357	38	44	55
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	395				639	376
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	395				639	376
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				90	92
cM capacity (veh/h)	1101				437	670

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	253	395	99
Volume Left	5	0	0	44
Volume Right	0	0	38	55
cSH	1101	1700	1700	542
Volume to Capacity	0.00	0.15	0.23	0.18
Queue Length 95th (m)	0.1	0.0	0.0	5.3
Control Delay (s)	8.3	0.0	0.0	13.1
Lane LOS	A			B
Approach Delay (s)	0.2		0.0	13.1
Approach LOS				B

Intersection Summary			
Average Delay		1.8	
Intersection Capacity Utilization		31.2%	ICU Level of Service A
Analysis Period (min)		15	

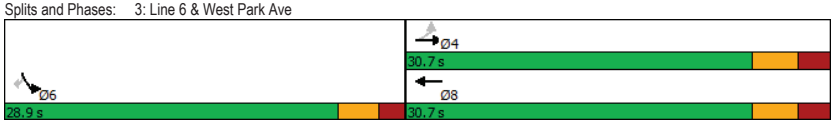
Queues
3: Line 6 & West Park Ave

Future Total 2026 AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	10	260	325	135	35
Future Volume (vph)	10	260	325	135	35
Lane Group Flow (vph)	11	295	494	153	40
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.02	0.27	0.44	0.38	0.10
Control Delay	5.6	6.6	7.6	18.2	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	6.6	7.6	18.2	6.5
Queue Length 50th (m)	0.4	11.5	20.2	11.0	0.0
Queue Length 95th (m)	2.1	24.9	42.8	22.9	5.1
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	493	1101	1128	910	858
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.02	0.27	0.44	0.17	0.05

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 46.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Total 2026 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	10	260	325	110	135	35
Future Volume (vph)	10	260	325	110	135	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1743	1764		1752	1615
Flt Permitted	0.46	1.00	1.00		0.95	1.00
Satd. Flow (perm)	780	1743	1764		1752	1615
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	11	295	369	125	153	40
RTOR Reduction (vph)	0	0	14	0	0	33
Lane Group Flow (vph)	11	295	480	0	153	7
Heavy Vehicles (%)	11%	9%	3%	7%	3%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	28.0	28.0	28.0		8.6	8.6
Effective Green, g (s)	28.0	28.0	28.0		8.6	8.6
Actuated g/C Ratio	0.59	0.59	0.59		0.18	0.18
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	462	1033	1046		319	294
v/s Ratio Prot		0.17	c0.27		c0.09	
v/s Ratio Perm	0.01					0.00
v/c Ratio	0.02	0.29	0.46		0.48	0.02
Uniform Delay, d1	4.0	4.7	5.4		17.3	15.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.2	0.3		1.1	0.0
Delay (s)	4.0	4.9	5.7		18.4	15.9
Level of Service	A	A	A		B	B
Approach Delay (s)		4.8	5.7		17.9	
Approach LOS		A	A		B	

Intersection Summary				
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	47.2	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	41.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Total 2026 AM Peak Hour



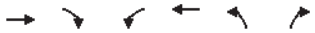
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	370	20	10	395	5	30	5	20	15	0	10
Future Volume (Veh/h)	5	370	20	10	395	5	30	5	20	15	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	402	22	11	429	5	33	5	22	16	0	11
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked												
vC, conflicting volume	439			424			885	884	413	895	892	436
vC1, stage 1 conf vol							423	423		458	458	
vC2, stage 2 conf vol							462	461		436	434	
vCu, unblocked vol	439			424			885	884	413	895	892	436
tC, single (s)	4.1			4.3			7.3	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.3	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			92	99	97	96	100	98
cM capacity (veh/h)	1127			1059			427	463	643	452	459	622

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	424	11	434	60	27
Volume Left	5	0	11	0	33	16
Volume Right	0	22	0	5	22	11
cSH	1127	1700	1059	1700	491	508
Volume to Capacity	0.00	0.25	0.01	0.26	0.12	0.05
Queue Length 95th (m)	0.1	0.0	0.3	0.0	3.3	1.3
Control Delay (s)	8.2	0.0	8.4	0.0	13.4	12.5
Lane LOS	A		A		B	B
Approach Delay (s)	0.1		0.2		13.4	12.5
Approach LOS					B	B

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	31.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Total 2026 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	365	40	15	330	80	110
Future Volume (Veh/h)	365	40	15	330	80	110
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	392	43	16	355	86	118
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked						
vC, conflicting volume			435		800	414
vC1, stage 1 conf vol					414	
vC2, stage 2 conf vol					387	
vCu, unblocked vol			435		800	414
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		84	82
cM capacity (veh/h)			1135		555	643

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	435	16	355	86	118
Volume Left	0	16	0	86	0
Volume Right	43	0	0	0	118
cSH	1700	1135	1700	555	643
Volume to Capacity	0.26	0.01	0.21	0.16	0.18
Queue Length 95th (m)	0.0	0.3	0.0	4.4	5.3
Control Delay (s)	0.0	8.2	0.0	12.7	11.9
Lane LOS		A		B	B
Approach Delay (s)	0.0	0.4		12.2	
Approach LOS				B	

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	35.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Total 2026 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	470	320	20	40	25
Future Volume (Veh/h)	5	470	320	20	40	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	5	505	344	22	43	27
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked						
vC, conflicting volume	371				875	360
vC1, stage 1 conf vol					360	
vC2, stage 2 conf vol					515	
vCu, unblocked vol	371				875	360
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				92	96
cM capacity (veh/h)	1194				517	686

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	505	366	70
Volume Left	5	0	0	43
Volume Right	0	0	22	27
cSH	1194	1700	1700	572
Volume to Capacity	0.00	0.30	0.22	0.12
Queue Length 95th (m)	0.1	0.0	0.0	3.3
Control Delay (s)	8.0	0.0	0.0	12.2
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	12.2
Approach LOS				B

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	35.1%	ICU Level of Service	A	
Analysis Period (min)	15			

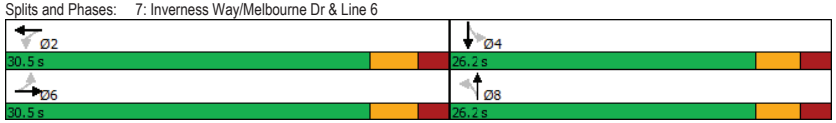
Queues
7: Inverness Way/Melbourne Dr & Line 6

Future Total 2026 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	60	435	30	235	40	85	115	45
Future Volume (vph)	60	435	30	235	40	85	115	45
Lane Group Flow (vph)	69	517	34	402	46	161	132	127
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.13	0.47	0.07	0.37	0.14	0.33	0.44	0.26
Control Delay	8.3	10.2	8.0	8.1	14.3	11.0	19.8	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	10.2	8.0	8.1	14.3	11.0	19.8	8.2
Queue Length 50th (m)	2.5	24.1	1.2	14.6	3.2	6.9	9.8	3.6
Queue Length 95th (m)	10.7	66.4	6.2	43.9	8.5	16.8	20.7	12.0
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	545	1096	490	1075	544	779	502	772
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.47	0.07	0.37	0.08	0.21	0.26	0.16

Intersection Summary
Cycle Length: 56.7
Actuated Cycle Length: 48.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Total 2026 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	435	15	30	235	115	40	85	55	115	45	65
Future Volume (vph)	60	435	15	30	235	115	40	85	55	115	45	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		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	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.95		1.00	0.94		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	1796		1805	1728		1752	1706		1671	1672	
Flt Permitted	0.52	1.00		0.42	1.00		0.68	1.00		0.66	1.00	
Satd. Flow (perm)	895	1796		803	1728		1246	1706		1152	1672	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	69	500	17	34	270	132	46	98	63	132	52	75
RTOR Reduction (vph)	0	2	0	0	24	0	0	50	0	0	59	0
Lane Group Flow (vph)	69	515	0	34	378	0	46	111	0	132	68	0
Confl. Peds. (#/hr)	5					5			10	10		
Heavy Vehicles (%)	9%	5%	13%	0%	5%	1%	3%	2%	6%	7%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	28.4	28.4		28.4	28.4		10.4	10.4		10.4	10.4	
Effective Green, g (s)	28.4	28.4		28.4	28.4		10.4	10.4		10.4	10.4	
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.21	0.21		0.21	0.21	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	513	1030		460	991		261	358		242	351	
v/s Ratio Prot		c0.29			0.22			0.07			0.04	
v/s Ratio Perm	0.08			0.04			0.04			c0.11		
v/c Ratio	0.13	0.50		0.07	0.38		0.18	0.31		0.55	0.19	
Uniform Delay, d1	4.9	6.3		4.7	5.8		16.0	16.5		17.4	16.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.4		0.1	0.2		0.3	0.5		2.5	0.3	
Delay (s)	5.0	6.7		4.8	6.0		16.4	17.0		19.9	16.4	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		6.5			5.9			16.9			18.2	
Approach LOS		A			A			B			B	

Intersection Summary					
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.51				
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	10.7		
Intersection Capacity Utilization	81.7%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Total 2026 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	580	10	20	360	10	20	0	35	5	0	0
Future Volume (Veh/h)	15	580	10	20	360	10	20	0	35	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	725	12	25	450	12	25	0	44	6	0	0
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked				0.91			0.91	0.91	0.91	0.91	0.91	
vC, conflicting volume	467			737			1269	1286	731	1318	1286	461
vC1, stage 1 conf vol							769	769		511	511	
vC2, stage 2 conf vol							500	517		807	775	
vCu, unblocked vol	467			658			1245	1264	651	1299	1264	461
tC, single (s)	4.3			4.1			7.1	6.5	6.2	8.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		7.1	5.5	
tF (s)	2.4			2.2			3.5	4.0	3.3	4.4	4.0	3.8
p0 queue free %	98			97			92	100	90	97	100	100
cM capacity (veh/h)	998			851			327	333	423	186	322	510

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	19	737	25	462	69	6
Volume Left	19	0	25	0	25	6
Volume Right	0	12	0	12	44	0
cSH	998	1700	851	1700	382	186
Volume to Capacity	0.02	0.43	0.03	0.27	0.18	0.03
Queue Length 95th (m)	0.5	0.0	0.7	0.0	5.2	0.8
Control Delay (s)	8.7	0.0	9.4	0.0	16.5	25.0
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.5		16.5	25.0
Approach LOS					C	C

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	41.1%	ICU Level of Service	A	
Analysis Period (min)	15			

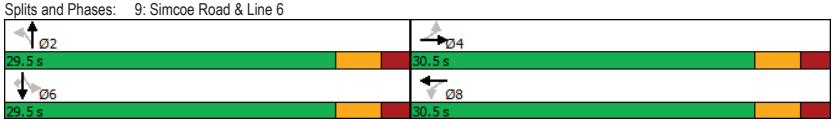
Queues
9: Simcoe Road & Line 6

Future Total 2026 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	375	135	5	70	170	175	110	210
Future Volume (vph)	375	135	5	70	170	175	110	210
Lane Group Flow (vph)	421	292	6	85	191	203	124	236
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA	Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		8		2			6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.78	0.38	0.02	0.11	0.39	0.30	0.17	0.31
Control Delay	28.2	9.7	10.6	10.7	15.9	13.7	12.4	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	9.7	10.6	10.7	15.9	13.7	12.4	3.3
Queue Length 50th (m)	40.2	14.3	0.4	5.3	15.1	15.1	8.9	0.0
Queue Length 95th (m)	#84.0	29.8	2.2	12.4	29.8	28.5	18.2	10.9
Internal Link Dist (m)		261.6		146.8		400.7	164.9	
Turn Bay Length (m)	50.0		20.0		110.0			
Base Capacity (vph)	539	767	348	751	485	673	724	756
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.38	0.02	0.11	0.39	0.30	0.17	0.31

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Total 2026 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	375	135	125	5	70	5	170	175	5	0	110	210
Future Volume (vph)	375	135	125	5	70	5	170	175	5	0	110	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.93		1.00	0.99		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1709		1438	1796		1703	1678			1810	1538
Flt Permitted	0.70	1.00		0.55	1.00		0.68	1.00			1.00	1.00
Satd. Flow (perm)	1295	1709		835	1796		1214	1678			1810	1538
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	421	152	140	6	79	6	191	197	6	0	124	236
RTOR Reduction (vph)	0	55	0	0	4	0	0	2	0	0	0	142
Lane Group Flow (vph)	421	237	0	6	82	0	191	201	0	0	124	94
Confl. Peds. (#/hr)			5	5					5	5		
Heavy Vehicles (%)	3%	0%	4%	25%	5%	0%	6%	13%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0		25.0	25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0		25.0	25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	539	712		347	748		485	671			724	615
v/s Ratio Prot		0.14			0.05			0.12			0.07	
v/s Ratio Perm	c0.33			0.01			c0.16					0.06
v/c Ratio	0.78	0.33		0.02	0.11		0.39	0.30			0.17	0.15
Uniform Delay, d1	15.1	11.8		10.3	10.7		12.8	12.3			11.6	11.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	7.2	0.3		0.0	0.1		0.5	0.3			0.1	0.1
Delay (s)	22.4	12.1		10.3	10.8		13.3	12.5			11.7	11.6
Level of Service	C	B		B	B		B	B			B	B
Approach Delay (s)		18.2			10.7			12.9			11.7	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	74.6%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Total 2026 AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	50	20	215	215	10
Future Volume (Veh/h)	25	50	20	215	215	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	34	68	27	295	295	14
Pedestrians	5			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	656	312	314			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	656	312	314			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	92	91	98			
cM capacity (veh/h)	410	718	1197			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	322	309
Volume Left	34	27	0
Volume Right	68	0	14
cSH	574	1197	1700
Volume to Capacity	0.18	0.02	0.18
Queue Length 95th (m)	5.1	0.6	0.0
Control Delay (s)	12.6	0.9	0.0
Lane LOS	B	A	
Approach Delay (s)	12.6	0.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Total 2026 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	10	5	170	210	15
Future Volume (Veh/h)	25	10	5	170	210	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	28	11	6	189	233	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)						
pX, platoon unblocked						
vC, conflicting volume	442	242	250			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	442	242	250			
tC, single (s)	6.5	6.2	4.6			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.7			
p0 queue free %	95	99	99			
cM capacity (veh/h)	557	802	1081			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	195	250
Volume Left	28	6	0
Volume Right	11	0	17
cSH	609	1081	1700
Volume to Capacity	0.06	0.01	0.15
Queue Length 95th (m)	1.6	0.1	0.0
Control Delay (s)	11.3	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	11.3	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Total 2026 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	115	80	0	0	30	20	0	0	0	50	5	155
Future Volume (vph)	115	80	0	0	30	20	0	0	0	50	5	155
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	137	95	0	0	36	24	0	0	0	60	6	185

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	232	60	0	251
Volume Left (vph)	137	0	0	60
Volume Right (vph)	0	24	0	185
Hadj (s)	0.26	-0.12	0.00	-0.31
Departure Headway (s)	4.8	4.7	4.9	4.3
Degree Utilization, x	0.31	0.08	0.00	0.30
Capacity (veh/h)	708	714	674	784
Control Delay (s)	10.0	8.1	7.9	9.2
Approach Delay (s)	10.0	8.1	0.0	9.2
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.4		
Level of Service	A		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Total 2026 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	110	45	0	85	100	85
Future Volume (Veh/h)	110	45	0	85	100	85
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	133	54	0	102	120	102
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	273	171	222			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	273	171	222			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	94	100			
cM capacity (veh/h)	721	878	1359			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	187	102	222
Volume Left	133	0	0
Volume Right	54	0	102
cSH	760	1359	1700
Volume to Capacity	0.25	0.00	0.13
Queue Length 95th (m)	7.7	0.0	0.0
Control Delay (s)	11.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.3	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	26.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Total 2026 AM Peak Hour



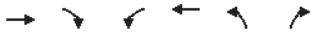
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	150	15	130	120	15	255
Future Volume (Veh/h)	150	15	130	120	15	255
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	183	18	159	146	18	311
Pedestrians						
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	424	152			305	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	424	152			305	
tC, single (s)	6.8	6.9			4.8	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.5	
p0 queue free %	67	98			98	
cM capacity (veh/h)	554	873			1056	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	201	106	199	122	207
Volume Left	183	0	0	18	0
Volume Right	18	0	146	0	0
cSH	573	1700	1700	1056	1700
Volume to Capacity	0.35	0.06	0.12	0.02	0.12
Queue Length 95th (m)	12.5	0.0	0.0	0.4	0.0
Control Delay (s)	14.6	0.0	0.0	1.4	0.0
Lane LOS	B			A	
Approach Delay (s)	14.6	0.0		0.5	
Approach LOS	B				

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Total 2026 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	125	10	5	145	20	5
Future Volume (Veh/h)	125	10	5	145	20	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	132	11	5	153	21	5
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			143		300	138
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			143		300	138
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			1452		693	916

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	143	158	26
Volume Left	0	5	21
Volume Right	11	0	5
cSH	1700	1452	727
Volume to Capacity	0.08	0.00	0.04
Queue Length 95th (m)	0.0	0.1	0.9
Control Delay (s)	0.0	0.3	10.1
Lane LOS		A	B
Approach Delay (s)	0.0	0.3	10.1
Approach LOS			B

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		21.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Total 2026 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	100	75	10	55	75
Future Volume (Veh/h)	30	100	75	10	55	75
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	105	79	11	58	79
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	90				254	84
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90				254	84
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				92	92
cM capacity (veh/h)	1518				724	980

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	137	90	58	79
Volume Left	32	0	58	0
Volume Right	0	11	0	79
cSH	1518	1700	724	980
Volume to Capacity	0.02	0.05	0.08	0.08
Queue Length 95th (m)	0.5	0.0	2.1	2.1
Control Delay (s)	1.9	0.0	10.4	9.0
Lane LOS	A		B	A
Approach Delay (s)	1.9	0.0	9.6	
Approach LOS			A	

Intersection Summary				
Average Delay		4.3		
Intersection Capacity Utilization		23.6%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Total 2026 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	45	130	5	20	200
Future Volume (Veh/h)	10	45	130	5	20	200
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)	11	49	141	5	22	217
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	404	144			146	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	404	144			146	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			98	
cM capacity (veh/h)	597	909			1448	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	60	146	239
Volume Left	11	0	22
Volume Right	49	5	0
cSH	830	1700	1448
Volume to Capacity	0.07	0.09	0.02
Queue Length 95th (m)	1.9	0.0	0.4
Control Delay (s)	9.7	0.0	0.8
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	0.8
Approach LOS	A		

Intersection Summary				
Average Delay		1.7		
Intersection Capacity Utilization		32.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Total 2026 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	95	235	5	30	215
Future Volume (Veh/h)	10	95	235	5	30	215
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)	11	103	255	5	33	234
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	558	258			260	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	558	258			260	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	87			97	
cM capacity (veh/h)	482	786			1316	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	114	260	267
Volume Left	11	0	33
Volume Right	103	5	0
cSH	741	1700	1316
Volume to Capacity	0.15	0.15	0.03
Queue Length 95th (m)	4.3	0.0	0.6
Control Delay (s)	10.7	0.0	1.2
Lane LOS	B		A
Approach Delay (s)	10.7	0.0	1.2
Approach LOS	B		

Intersection Summary				
Average Delay		2.4		
Intersection Capacity Utilization		42.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Total 2026 PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	475	315	80	45	20
Future Volume (Veh/h)	65	475	315	80	45	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	71	522	346	88	49	22
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	434				1054	390
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	434				1054	390
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				79	97
cM capacity (veh/h)	1126				233	663

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	71	522	434	71
Volume Left	71	0	0	49
Volume Right	0	0	88	22
cSH	1126	1700	1700	292
Volume to Capacity	0.06	0.31	0.26	0.24
Queue Length 95th (m)	1.6	0.0	0.0	7.5
Control Delay (s)	8.4	0.0	0.0	21.2
Lane LOS	A			C
Approach Delay (s)	1.0		0.0	21.2
Approach LOS				C

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

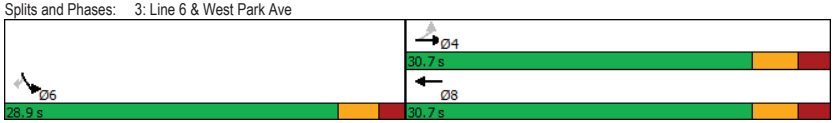
Queues
3: Line 6 & West Park Ave

Future Total 2026 PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	40	480	375	230	20
Future Volume (vph)	40	480	375	230	20
Lane Group Flow (vph)	45	539	567	258	22
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.13	0.55	0.59	0.56	0.05
Control Delay	8.2	11.1	11.4	20.5	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	11.1	11.4	20.5	6.7
Queue Length 50th (m)	1.8	27.9	27.9	19.9	0.0
Queue Length 95th (m)	7.1	61.6	64.4	36.7	3.8
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	356	987	956	882	816
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.13	0.55	0.59	0.29	0.03

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 48.3
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Line 6 & West Park Ave



Bradford Highlands
BA Group

Synchro 11 Report
FB_FT.syn

HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Total 2026 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	40	480	375	130	230	20
Future Volume (vph)	40	480	375	130	230	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1801	1900	1809		1770	1615
Flt Permitted	0.36	1.00	1.00		0.95	1.00
Satd. Flow (perm)	686	1900	1809		1770	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	45	539	421	146	258	22
RTOR Reduction (vph)	0	0	17	0	0	16
Lane Group Flow (vph)	45	539	550	0	258	6
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	0%	0%	1%	0%	2%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	25.1	25.1	25.1		12.6	12.6
Effective Green, g (s)	25.1	25.1	25.1		12.6	12.6
Actuated g/C Ratio	0.52	0.52	0.52		0.26	0.26
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	356	987	940		461	421
v/s Ratio Prot		0.28	c0.30		c0.15	
v/s Ratio Perm	0.07					0.00
v/c Ratio	0.13	0.55	0.58		0.56	0.01
Uniform Delay, d1	6.0	7.8	8.0		15.4	13.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.6	0.9		1.5	0.0
Delay (s)	6.1	8.4	8.9		16.9	13.3
Level of Service	A	A	A		B	B
Approach Delay (s)		8.2	8.9		16.6	
Approach LOS		A	A		B	

Intersection Summary				
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	48.3	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	54.8%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Total 2026 PM Peak Hour



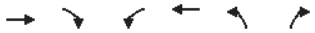
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	625	70	20	480	15	20	5	10	5	0	5
Future Volume (Veh/h)	15	625	70	20	480	15	20	5	10	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	694	78	22	533	17	22	6	11	6	0	6
Pedestrians		10			10						10	
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		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked				0.86			0.86	0.86	0.86	0.86	0.86	
vC, conflicting volume	560			772			1360	1371	743	1348	1402	562
vC1, stage 1 conf vol							767	767		596	596	
vC2, stage 2 conf vol							593	604		752	806	
vCu, unblocked vol	560			653			1337	1350	620	1323	1385	562
tC, single (s)	4.1			4.2			7.1	6.5	6.5	7.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.3			3.5	4.0	3.5	3.5	4.0	3.8
p0 queue free %	98			97			93	98	97	98	100	99
cM capacity (veh/h)	1013			771			307	315	383	295	299	439

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	772	22	550	39	12
Volume Left	17	0	22	0	22	6
Volume Right	0	78	0	17	11	6
cSH	1013	1700	771	1700	326	353
Volume to Capacity	0.02	0.45	0.03	0.32	0.12	0.03
Queue Length 95th (m)	0.4	0.0	0.7	0.0	3.2	0.8
Control Delay (s)	8.6	0.0	9.8	0.0	17.5	15.6
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.4		17.5	15.6
Approach LOS					C	C

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	50.0%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Total 2026 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	505	135	55	460	55	80
Future Volume (Veh/h)	505	135	55	460	55	80
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)	549	147	60	500	60	87
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked						
vC, conflicting volume			696		1242	622
vC1, stage 1 conf vol					622	
vC2, stage 2 conf vol					620	
vCu, unblocked vol			696		1242	622
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			93		85	82
cM capacity (veh/h)			909		398	490

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	696	60	500	60	87
Volume Left	0	60	0	60	0
Volume Right	147	0	0	0	87
cSH	1700	909	1700	398	490
Volume to Capacity	0.41	0.07	0.29	0.15	0.18
Queue Length 95th (m)	0.0	1.7	0.0	4.2	5.1
Control Delay (s)	0.0	9.2	0.0	15.6	13.9
Lane LOS		A		C	B
Approach Delay (s)	0.0	1.0		14.6	
Approach LOS				B	

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	51.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Total 2026 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	555	505	70	35	10
Future Volume (Veh/h)	30	555	505	70	35	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	33	617	561	78	39	11
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked	0.82				0.82	0.82
vC, conflicting volume	644				1288	605
vC1, stage 1 conf vol					605	
vC2, stage 2 conf vol					683	
vCu, unblocked vol	458				1242	411
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				90	98
cM capacity (veh/h)	898				385	528

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	33	617	639	50
Volume Left	33	0	0	39
Volume Right	0	0	78	11
cSH	898	1700	1700	410
Volume to Capacity	0.04	0.36	0.38	0.12
Queue Length 95th (m)	0.9	0.0	0.0	3.3
Control Delay (s)	9.2	0.0	0.0	15.0
Lane LOS	A			C
Approach Delay (s)	0.5		0.0	15.0
Approach LOS				C

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	40.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
7: Inverness Way/Melbourne Dr & Line 6

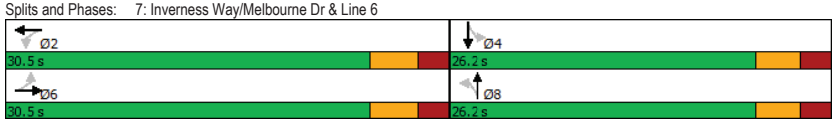
Future Total 2026 PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	80	470	90	505	25	50	95	55
Future Volume (vph)	80	470	90	505	25	50	95	55
Lane Group Flow (vph)	90	573	101	691	28	90	107	113
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.25	0.49	0.22	0.60	0.10	0.22	0.38	0.27
Control Delay	10.3	9.8	9.2	12.5	14.0	10.7	18.6	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	9.8	9.2	12.5	14.0	10.7	18.6	10.2
Queue Length 50th (m)	3.2	24.6	3.6	31.9	1.9	3.8	7.7	4.3
Queue Length 95th (m)	16.2	77.2	16.5	#118.7	6.1	11.3	17.1	12.7
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	360	1162	461	1156	580	823	578	813
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.49	0.22	0.60	0.05	0.11	0.19	0.14

Intersection Summary

Cycle Length: 56.7
Actuated Cycle Length: 47.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Total 2026 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	470	40	90	505	110	25	50	30	95	55	45
Future Volume (vph)	80	470	40	90	505	110	25	50	30	95	55	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1802	1857		1801	1837		1796	1792		1752	1751	
Flt Permitted	0.30	1.00		0.39	1.00		0.68	1.00		0.70	1.00	
Satd. Flow (perm)	577	1857		737	1837		1294	1792		1289	1751	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	90	528	45	101	567	124	28	56	34	107	62	51
RTOR Reduction (vph)	0	4	0	0	10	0	0	28	0	0	41	0
Lane Group Flow (vph)	90	569	0	101	681	0	28	62	0	107	72	0
Confl. Peds. (#/hr)	5		5	5		5	5					5
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	28.3	28.3		28.3	28.3		9.2	9.2		9.2	9.2	
Effective Green, g (s)	28.3	28.3		28.3	28.3		9.2	9.2		9.2	9.2	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.19	0.19		0.19	0.19	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	338	1090		432	1078		246	342		246	334	
v/s Ratio Prot		0.31			c0.37			0.03			0.04	
v/s Ratio Perm	0.16			0.14			0.02			c0.08		
v/c Ratio	0.27	0.52		0.23	0.63		0.11	0.18		0.43	0.21	
Uniform Delay, d1	4.9	5.9		4.8	6.5		16.1	16.3		17.2	16.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.5		0.3	1.2		0.2	0.3		1.2	0.3	
Delay (s)	5.3	6.4		5.0	7.7		16.3	16.6		18.4	16.8	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		6.2			7.4			16.5			17.6	
Approach LOS		A			A			B			B	

Intersection Summary

HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	48.2	Sum of lost time (s)	10.7
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Total 2026 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	570	20	45	685	5	10	0	25	10	0	10
Future Volume (Veh/h)	0	570	20	45	685	5	10	0	25	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	655	23	52	787	6	11	0	29	11	0	11
Pedestrians								5			5	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked				0.88			0.88	0.88	0.88	0.88	0.88	
vC, conflicting volume	798			683			1574	1574	672	1583	1582	795
vC1, stage 1 conf vol							672	672		899	899	
vC2, stage 2 conf vol							902	902		684	683	
vCu, unblocked vol	798			575			1583	1583	562	1594	1593	795
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			96	100	94	95	100	97
cM capacity (veh/h)	830			887			256	277	466	242	264	389

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	678	52	793	40	22
Volume Left	0	0	52	0	11	11
Volume Right	0	23	0	6	29	11
cSH	1700	1700	887	1700	380	299
Volume to Capacity	0.00	0.40	0.06	0.47	0.11	0.07
Queue Length 95th (m)	0.0	0.0	1.5	0.0	2.8	1.9
Control Delay (s)	0.0	0.0	9.3	0.0	15.6	18.0
Lane LOS			A		C	C
Approach Delay (s)	0.0		0.6		15.6	18.0
Approach LOS					C	C

Intersection Summary					
Average Delay	0.9				
Intersection Capacity Utilization	47.4%	ICU Level of Service	A		
Analysis Period (min)	15				

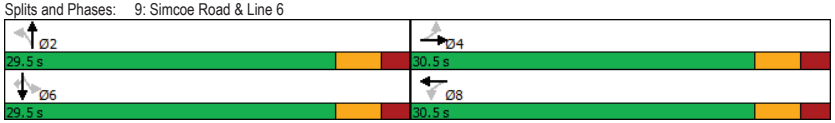
Queues
9: Simcoe Road & Line 6

Future Total 2026 PM Peak Hour

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	295	170	115	200	240	5	155	465
Future Volume (vph)	295	170	115	200	240	5	155	465
Lane Group Flow (vph)	317	366	129	215	280	0	172	500
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4	8		2		6	
Permitted Phases	4			2		6		6
Detector Phase	4	4	8	2	2	6	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	24.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.59	0.46	0.16	0.44	0.37		0.23	0.53
Control Delay	19.3	11.1	11.3	16.7	14.0		13.0	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	19.3	11.1	11.3	16.7	14.0		13.0	3.8
Queue Length 50th (m)	27.2	20.0	8.6	17.4	21.2		12.6	0.0
Queue Length 95th (m)	51.1	39.9	18.0	34.3	37.9		24.4	15.9
Internal Link Dist (m)		261.6	146.8		400.7		164.9	
Turn Bay Length (m)	50.0			110.0				
Base Capacity (vph)	533	792	788	488	756		738	939
Starvation Cap Reductn	0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0
Reduced v/c Ratio	0.59	0.46	0.16	0.44	0.37		0.23	0.53

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Total 2026 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	295	170	170	0	115	5	200	240	20	5	155	465
Future Volume (vph)	295	170	170	0	115	5	200	240	20	5	155	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.93			0.99		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1805	1758			1887		1787	1878			1861	1599
Flt Permitted	0.67	1.00			1.00		0.65	1.00			0.99	1.00
Satd. Flow (perm)	1281	1758			1887		1220	1878			1846	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	317	183	183	0	124	5	215	258	22	5	167	500
RTOR Reduction (vph)	0	60	0	0	2	0	0	5	0	0	0	300
Lane Group Flow (vph)	317	306	0	0	127	0	215	275	0	0	172	200
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42			0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	533	732			786		488	751			738	639
v/s Ratio Prot		0.17			0.07			0.15				
v/s Ratio Perm	c0.25						c0.18				0.09	0.13
v/c Ratio	0.59	0.42			0.16		0.44	0.37			0.23	0.31
Uniform Delay, d1	13.6	12.4			10.9		13.1	12.7			11.9	12.3
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.8	0.4			0.1		0.6	0.3			0.2	0.3
Delay (s)	15.4	12.7			11.0		13.7	13.0			12.1	12.6
Level of Service	B	B			B		B	B			B	B
Approach Delay (s)		14.0			11.0			13.3			12.5	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	83.4%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Total 2026 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	5	25	405	205	25
Future Volume (Veh/h)	15	5	25	405	205	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	18	6	29	476	241	29
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	800	270	280			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	800	270	280			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	98			
cM capacity (veh/h)	346	763	1283			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	505	270
Volume Left	18	29	0
Volume Right	6	0	29
cSH	401	1283	1700
Volume to Capacity	0.06	0.02	0.16
Queue Length 95th (m)	1.5	0.6	0.0
Control Delay (s)	14.5	0.7	0.0
Lane LOS	B	A	
Approach Delay (s)	14.5	0.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Total 2026 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	5	10	390	185	25
Future Volume (Veh/h)	20	5	10	390	185	25
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)	22	5	11	424	201	27
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	670	230	238			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	670	230	238			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	99			
cM capacity (veh/h)	418	805	1330			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	435	228
Volume Left	22	11	0
Volume Right	5	0	27
cSH	459	1330	1700
Volume to Capacity	0.06	0.01	0.13
Queue Length 95th (m)	1.5	0.2	0.0
Control Delay (s)	13.3	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	13.3	0.3	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		40.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Total 2026 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	280	75	0	5	90	115	5	5	0	45	5	85
Future Volume (vph)	280	75	0	5	90	115	5	5	0	45	5	85
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	341	91	0	6	110	140	6	6	0	55	6	104

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	432	256	12	165
Volume Left (vph)	341	6	6	55
Volume Right (vph)	0	140	0	104
Hadj (s)	0.21	-0.29	0.10	-0.31
Departure Headway (s)	4.9	4.7	6.0	5.3
Degree Utilization, x	0.59	0.33	0.02	0.24
Capacity (veh/h)	707	734	501	613
Control Delay (s)	14.8	10.0	9.1	9.9
Approach Delay (s)	14.8	10.0	9.1	9.9
Approach LOS	B	A	A	A

Intersection Summary				
Delay		12.4		
Level of Service		B		
Intersection Capacity Utilization		50.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Total 2026 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	150	15	25	205	50	130
Future Volume (Veh/h)	150	15	25	205	50	130
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	172	17	29	236	57	149
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	426	132	206			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426	132	206			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	69	98	98			
cM capacity (veh/h)	564	923	1336			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	189	265	206
Volume Left	172	29	0
Volume Right	17	0	149
cSH	584	1336	1700
Volume to Capacity	0.32	0.02	0.12
Queue Length 95th (m)	11.2	0.5	0.0
Control Delay (s)	14.1	1.0	0.0
Lane LOS	B	A	
Approach Delay (s)	14.1	1.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		4.4		
Intersection Capacity Utilization		42.0%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Total 2026 PM Peak Hour



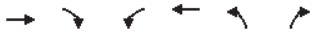
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	140	30	440	235	20	140
Future Volume (Veh/h)	140	30	440	235	20	140
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	156	33	489	261	22	156
Pedestrians						
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	742	375			750	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	742	375			750	
tC, single (s)	6.9	7.0			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	54	95			97	
cM capacity (veh/h)	336	614			868	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	189	326	424	74	104
Volume Left	156	0	0	22	0
Volume Right	33	0	261	0	0
cSH	365	1700	1700	868	1700
Volume to Capacity	0.52	0.19	0.25	0.03	0.06
Queue Length 95th (m)	22.8	0.0	0.0	0.6	0.0
Control Delay (s)	25.0	0.0	0.0	2.9	0.0
Lane LOS	C			A	
Approach Delay (s)	25.0	0.0		1.2	
Approach LOS	C				

Intersection Summary				
Average Delay		4.4		
Intersection Capacity Utilization		35.9%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Total 2026 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	230	25	0	160	10	5
Future Volume (Veh/h)	230	25	0	160	10	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	256	28	0	178	11	6
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			284		448	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			284		448	270
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1290		572	774

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	284	178	17
Volume Left	0	0	11
Volume Right	28	0	6
cSH	1700	1290	630
Volume to Capacity	0.17	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.7
Control Delay (s)	0.0	0.0	10.9
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.9
Approach LOS			B

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		23.6%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Total 2026 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	110	125	105	45	40	55
Future Volume (Veh/h)	110	125	105	45	40	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	122	139	117	50	44	61
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	167				525	142
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	167				525	142
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				91	93
cM capacity (veh/h)	1423				472	911

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	261	167	44	61
Volume Left	122	0	44	0
Volume Right	0	50	0	61
cSH	1423	1700	472	911
Volume to Capacity	0.09	0.10	0.09	0.07
Queue Length 95th (m)	2.2	0.0	2.5	1.7
Control Delay (s)	4.0	0.0	13.4	9.2
Lane LOS	A		B	A
Approach Delay (s)	4.0	0.0	11.0	
Approach LOS			B	

Intersection Summary				
Average Delay		4.1		
Intersection Capacity Utilization		34.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Total 2026 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	375	25	60	130
Future Volume (Veh/h)	5	25	375	25	60	130
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)	5	27	408	27	65	141
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	692	422			435	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	692	422			435	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	96			94	
cM capacity (veh/h)	389	636			1135	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	435	206
Volume Left	5	0	65
Volume Right	27	27	0
cSH	579	1700	1135
Volume to Capacity	0.06	0.26	0.06
Queue Length 95th (m)	1.4	0.0	1.5
Control Delay (s)	11.6	0.0	3.0
Lane LOS	B		A
Approach Delay (s)	11.6	0.0	3.0
Approach LOS	B		

Intersection Summary				
Average Delay		1.5		
Intersection Capacity Utilization		44.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Total 2026 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	395	25	95	225
Future Volume (Veh/h)	5	60	395	25	95	225
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)	5	65	429	27	103	245
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	894	442			456	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	894	442			456	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	90			91	
cM capacity (veh/h)	285	619			1115	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	456	348
Volume Left	5	0	103
Volume Right	65	27	0
cSH	572	1700	1115
Volume to Capacity	0.12	0.27	0.09
Queue Length 95th (m)	3.3	0.0	2.4
Control Delay (s)	12.2	0.0	3.2
Lane LOS	B		A
Approach Delay (s)	12.2	0.0	3.2
Approach LOS	B		

Intersection Summary				
Average Delay		2.2		
Intersection Capacity Utilization		53.4%	ICU Level of Service	A
Analysis Period (min)		15		

Queues
9: Simcoe Road & Line 6

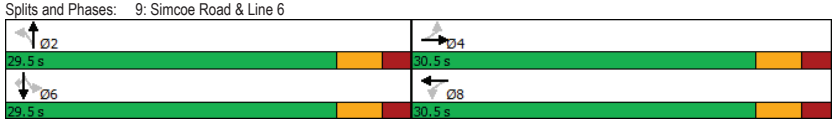
Future Background 2031 AM Peak Hour 60s CL

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	415	25	5	55	195	200	135	235
Future Volume (vph)	415	25	5	55	195	200	135	235
Lane Group Flow (vph)	466	197	6	68	219	231	152	264
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA	Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		8		2			6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.85	0.26	0.02	0.09	0.46	0.34	0.21	0.34
Control Delay	34.0	4.1	10.6	10.3	17.3	14.2	12.8	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.0	4.1	10.6	10.3	17.3	14.2	12.8	3.3
Queue Length 50th (m)	46.5	1.9	0.4	4.2	17.9	17.6	11.1	0.0
Queue Length 95th (m)	#95.9	12.0	2.2	10.4	35.0	32.2	21.6	11.5
Internal Link Dist (m)		261.6		146.8		400.7	164.9	
Turn Bay Length (m)	50.0		20.0		110.0			
Base Capacity (vph)	547	750	399	751	473	673	724	773
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.26	0.02	0.09	0.46	0.34	0.21	0.34

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Background 2031 AM Peak Hour 60s CL

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	415	25	150	5	55	5	195	200	5	0	135	235
Future Volume (vph)	415	25	150	5	55	5	195	200	5	0	135	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.87		1.00	0.99		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1565		1437	1793		1703	1679			1810	1538
Flt Permitted	0.71	1.00		0.63	1.00		0.66	1.00			1.00	1.00
Satd. Flow (perm)	1315	1565		959	1793		1184	1679			1810	1538
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	466	28	169	6	62	6	219	225	6	0	152	264
RTOR Reduction (vph)	0	99	0	0	4	0	0	2	0	0	0	158
Lane Group Flow (vph)	466	98	0	6	65	0	219	229	0	0	152	106
Confl. Peds. (#/hr)			5	5					5	5		
Heavy Vehicles (%)	3%	0%	4%	25%	5%	0%	6%	13%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0		25.0	25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0		25.0	25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	547	652		399	747		473	671			724	615
v/s Ratio Prot		0.06			0.04			0.14			0.08	
v/s Ratio Perm	c0.35			0.01			c0.19					0.07
v/c Ratio	0.85	0.15		0.02	0.09		0.46	0.34			0.21	0.17
Uniform Delay, d1	15.8	10.9		10.3	10.6		13.3	12.5			11.8	11.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	12.2	0.1		0.0	0.1		0.7	0.3			0.1	0.1
Delay (s)	28.0	11.0		10.3	10.6		14.0	12.8			11.9	11.7
Level of Service	C	B		B	B		B	B			B	B
Approach Delay (s)		22.9			10.6			13.4			11.8	
Approach LOS		C			B			B			B	

Intersection Summary

HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	83.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Background 2031 AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	285	355	35	40	50
Future Volume (Veh/h)	5	285	355	35	40	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	313	390	38	44	55
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	428				732	409
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	428				732	409
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				89	91
cM capacity (veh/h)	1070				385	642

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	313	428	99
Volume Left	5	0	0	44
Volume Right	0	0	38	55
cSH	1070	1700	1700	495
Volume to Capacity	0.00	0.18	0.25	0.20
Queue Length 95th (m)	0.1	0.0	0.0	5.9
Control Delay (s)	8.4	0.0	0.0	14.1
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	14.1
Approach LOS				B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

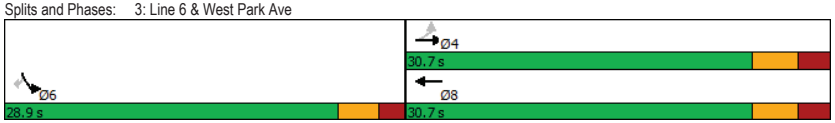
Queues
3: Line 6 & West Park Ave

Future Background 2031 AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	15	310	350	130	40
Future Volume (vph)	15	310	350	130	40
Lane Group Flow (vph)	17	352	478	148	45
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.03	0.32	0.42	0.37	0.11
Control Delay	5.6	6.9	7.5	18.1	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.6	6.9	7.5	18.1	6.3
Queue Length 50th (m)	0.6	14.4	20.0	10.6	0.0
Queue Length 95th (m)	2.8	30.0	41.3	22.2	5.5
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	508	1102	1140	911	861
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.03	0.32	0.42	0.16	0.05

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 46.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Background 2031 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	310	350	70	130	40
Future Volume (vph)	15	310	350	70	130	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1743	1791		1752	1615
Flt Permitted	0.47	1.00	1.00		0.95	1.00
Satd. Flow (perm)	803	1743	1791		1752	1615
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	17	352	398	80	148	45
RTOR Reduction (vph)	0	0	9	0	0	37
Lane Group Flow (vph)	17	352	469	0	148	8
Heavy Vehicles (%)	11%	9%	3%	7%	3%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	28.0	28.0	28.0		8.5	8.5
Effective Green, g (s)	28.0	28.0	28.0		8.5	8.5
Actuated g/C Ratio	0.59	0.59	0.59		0.18	0.18
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	477	1036	1064		316	291
v/s Ratio Prot		0.20	c0.26		c0.08	
v/s Ratio Perm	0.02					0.01
v/c Ratio	0.04	0.34	0.44		0.47	0.03
Uniform Delay, d1	4.0	4.9	5.2		17.3	15.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.2	0.3		1.1	0.0
Delay (s)	4.0	5.0	5.5		18.4	15.9
Level of Service	A	A	A		B	B
Approach Delay (s)		5.0	5.5		17.8	
Approach LOS		A	A		B	

Intersection Summary				
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	39.8%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Background 2031 AM Peak Hour



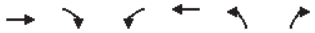
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	430	5	5	405	5	5	5	10	15	0	10
Future Volume (Veh/h)	5	430	5	5	405	5	5	5	10	15	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	467	5	5	440	5	5	5	11	16	0	11
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked												
vC, conflicting volume	450			472			940	940	470	948	940	448
vC1, stage 1 conf vol							480	480		458	458	
vC2, stage 2 conf vol							461	460		490	482	
vCu, unblocked vol	450			472			940	940	470	948	940	448
tC, single (s)	4.1			4.3			7.3	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.3	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	99	98	96	100	98
cM capacity (veh/h)	1116			1016			410	448	598	440	448	613

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	472	5	445	21	27
Volume Left	5	0	5	0	5	16
Volume Right	0	5	0	5	11	11
cSH	1116	1700	1016	1700	503	497
Volume to Capacity	0.00	0.28	0.00	0.26	0.04	0.05
Queue Length 95th (m)	0.1	0.0	0.1	0.0	1.0	1.4
Control Delay (s)	8.2	0.0	8.6	0.0	12.5	12.7
Lane LOS	A		A		B	B
Approach Delay (s)	0.1		0.1		12.5	12.7
Approach LOS					B	B

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	32.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Background 2031 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	455	0	0	415	0	0
Future Volume (Veh/h)	455	0	0	415	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	489	0	0	446	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked						
vC, conflicting volume			489		935	489
vC1, stage 1 conf vol					489	
vC2, stage 2 conf vol					446	
vCu, unblocked vol			489		935	489
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1085		509	583

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	489	0	446	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.00	0.26	0.15	0.18
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS				A	A
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS				A	

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	27.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Background 2031 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	450	390	20	40	25
Future Volume (Veh/h)	5	450	390	20	40	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	5	484	419	22	43	27
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked						
vC, conflicting volume	446				929	435
vC1, stage 1 conf vol					435	
vC2, stage 2 conf vol					494	
vCu, unblocked vol	446				929	435
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				91	96
cM capacity (veh/h)	1120				503	623

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	484	441	70
Volume Left	5	0	0	43
Volume Right	0	0	22	27
cSH	1120	1700	1700	543
Volume to Capacity	0.00	0.28	0.26	0.13
Queue Length 95th (m)	0.1	0.0	0.0	3.5
Control Delay (s)	8.2	0.0	0.0	12.6
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	12.6
Approach LOS				B

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	34.1%	ICU Level of Service	A	
Analysis Period (min)	15			

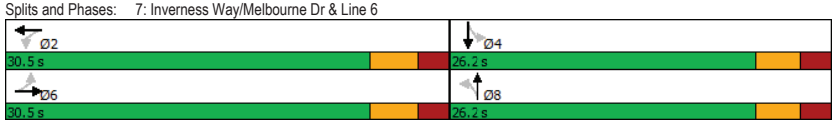
Queues
7: Inverness Way/Melbourne Dr & Line 6

Future Background 2031 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	75	400	5	290	35	40	140	40
Future Volume (vph)	75	400	5	290	35	40	140	40
Lane Group Flow (vph)	86	477	6	471	40	69	161	144
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.18	0.44	0.01	0.44	0.12	0.15	0.49	0.29
Control Delay	9.2	10.0	7.8	9.2	13.9	10.3	20.3	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.2	10.0	7.8	9.2	13.9	10.3	20.3	7.3
Queue Length 50th (m)	3.4	22.7	0.2	19.8	2.7	3.1	12.2	3.1
Queue Length 95th (m)	13.4	59.7	2.0	55.2	7.7	9.4	24.3	12.1
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	482	1091	520	1071	532	762	541	766
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.44	0.01	0.44	0.08	0.09	0.30	0.19

Intersection Summary
Cycle Length: 56.7
Actuated Cycle Length: 48.7
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Background 2031 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	400	15	5	290	120	35	40	20	140	40	85
Future Volume (vph)	75	400	15	5	290	120	35	40	20	140	40	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		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	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	0.95		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1795		1805	1737		1752	1728		1669	1639	
Flt Permitted	0.46	1.00		0.45	1.00		0.67	1.00		0.71	1.00	
Satd. Flow (perm)	795	1795		859	1737		1227	1728		1251	1639	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	86	460	17	6	333	138	40	46	23	161	46	98
RTOR Reduction (vph)	0	2	0	0	20	0	0	18	0	0	77	0
Lane Group Flow (vph)	86	475	0	6	451	0	40	51	0	161	67	0
Confl. Peds. (#/hr)	5					5			10	10		
Heavy Vehicles (%)	9%	5%	13%	0%	5%	1%	3%	2%	6%	7%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	28.4	28.4		28.4	28.4		10.7	10.7		10.7	10.7	
Effective Green, g (s)	28.4	28.4		28.4	28.4		10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.21	0.21		0.21	0.21	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	453	1023		489	990		263	371		268	352	
v/s Ratio Prot		c0.26			0.26			0.03			0.04	
v/s Ratio Perm	0.11			0.01			0.03			c0.13		
v/c Ratio	0.19	0.46		0.01	0.46		0.15	0.14		0.60	0.19	
Uniform Delay, d1	5.2	6.3		4.6	6.2		15.9	15.8		17.6	16.0	
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		0.0	0.3		0.3	0.2		3.8	0.3	
Delay (s)	5.4	6.6		4.6	6.5		16.1	16.0		21.4	16.3	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		6.4			6.5			16.0			19.0	
Approach LOS		A			A			B			B	

Intersection Summary					
HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A		
HCM 2000 Volume to Capacity ratio	0.50				
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	10.7		
Intersection Capacity Utilization	80.7%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Background 2031 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	535	10	20	395	10	20	0	35	5	0	0
Future Volume (Veh/h)	15	535	10	20	395	10	20	0	35	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	669	12	25	494	12	25	0	44	6	0	0
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked				0.94			0.94	0.94	0.94	0.94	0.94	
vC, conflicting volume	511			681			1257	1274	675	1306	1274	505
vC1, stage 1 conf vol							713	713		555	555	
vC2, stage 2 conf vol							544	561		751	719	
vCu, unblocked vol	511			628			1241	1259	621	1293	1259	505
tC, single (s)	4.3			4.1			7.1	6.5	6.2	8.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		7.1	5.5	
tF (s)	2.4			2.2			3.5	4.0	3.3	4.4	4.0	3.8
p0 queue free %	98			97			93	100	90	97	100	100
cM capacity (veh/h)	960			905			338	342	456	199	334	480

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	19	681	25	506	69	6
Volume Left	19	0	25	0	25	6
Volume Right	0	12	0	12	44	0
cSH	960	1700	905	1700	405	199
Volume to Capacity	0.02	0.40	0.03	0.30	0.17	0.03
Queue Length 95th (m)	0.5	0.0	0.7	0.0	4.9	0.7
Control Delay (s)	8.8	0.0	9.1	0.0	15.7	23.6
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.4		15.7	23.6
Approach LOS					C	C

Intersection Summary					
Average Delay	1.2				
Intersection Capacity Utilization	38.8%	ICU Level of Service		A	
Analysis Period (min)	15				

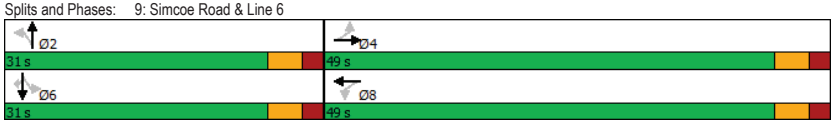
Queues
9: Simcoe Road & Line 6

Future Background 2031 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	415	25	5	55	195	200	135	235
Future Volume (vph)	415	25	5	55	195	200	135	235
Lane Group Flow (vph)	466	197	6	68	219	231	152	264
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA	Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		8		2			6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (s)	49.0	49.0	49.0	49.0	31.0	31.0	31.0	31.0
Total Split (%)	61.3%	61.3%	61.3%	61.3%	38.8%	38.8%	38.8%	38.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.78	0.24	0.01	0.08	0.50	0.37	0.23	0.36
Control Delay	24.8	3.3	9.0	9.1	22.6	18.7	17.1	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.8	3.3	9.0	9.1	22.6	18.7	17.1	4.3
Queue Length 50th (m)	46.5	1.9	0.4	4.2	18.5	18.3	11.4	0.0
Queue Length 95th (m)	81.3	10.8	2.0	10.0	51.4	48.3	32.1	15.3
Internal Link Dist (m)		261.6		146.8		400.7	164.9	
Turn Bay Length (m)	50.0		20.0		110.0			
Base Capacity (vph)	880	1102	641	1203	464	660	710	764
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	0.18	0.01	0.06	0.47	0.35	0.21	0.35

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 65.7
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Background 2031 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	415	25	150	5	55	5	195	200	5	0	135	235
Future Volume (vph)	415	25	150	5	55	5	195	200	5	0	135	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.87		1.00	0.99		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1564		1437	1793		1703	1679			1810	1538
Flt Permitted	0.71	1.00		0.63	1.00		0.66	1.00			1.00	1.00
Satd. Flow (perm)	1315	1564		959	1793		1184	1679			1810	1538
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	466	28	169	6	62	6	219	225	6	0	152	264
RTOR Reduction (vph)	0	91	0	0	3	0	0	1	0	0	0	165
Lane Group Flow (vph)	466	106	0	6	65	0	219	230	0	0	152	99
Confl. Peds. (#/hr)			5	5					5	5		
Heavy Vehicles (%)	3%	0%	4%	25%	5%	0%	6%	13%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	30.1	30.1		30.1	30.1		24.5	24.5			24.5	24.5
Effective Green, g (s)	30.1	30.1		30.1	30.1		24.5	24.5			24.5	24.5
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.37	0.37			0.37	0.37
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	603	717		440	822		442	627			675	574
v/s Ratio Prot		0.07			0.04			0.14			0.08	
v/s Ratio Perm	c0.35			0.01			c0.19					0.06
v/c Ratio	0.77	0.15		0.01	0.08		0.50	0.37			0.23	0.17
Uniform Delay, d1	14.9	10.3		9.7	10.0		15.8	14.9			14.1	13.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	6.1	0.1		0.0	0.0		0.9	0.4			0.2	0.1
Delay (s)	21.0	10.4		9.7	10.0		16.7	15.3			14.2	13.9
Level of Service	C	B		A	B		B	B			B	B
Approach Delay (s)		17.8			10.0			16.0			14.0	
Approach LOS		B			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	65.6	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	83.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Background 2031 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	50	20	265	265	10
Future Volume (Veh/h)	25	50	20	265	265	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	34	68	27	363	363	14
Pedestrians	5			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	792	380	382			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	792	380	382			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	90	90	98			
cM capacity (veh/h)	340	657	1129			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	390	377
Volume Left	34	27	0
Volume Right	68	0	14
cSH	501	1129	1700
Volume to Capacity	0.20	0.02	0.22
Queue Length 95th (m)	6.0	0.6	0.0
Control Delay (s)	14.0	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	14.0	0.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Background 2031 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	10	5	220	260	15
Future Volume (Veh/h)	25	10	5	220	260	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	28	11	6	244	289	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)						
pX, platoon unblocked						
vC, conflicting volume	554	298	306			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	554	298	306			
tC, single (s)	6.5	6.2	4.6			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.7			
p0 queue free %	94	99	99			
cM capacity (veh/h)	479	747	1026			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	250	306
Volume Left	28	6	0
Volume Right	11	0	17
cSH	533	1026	1700
Volume to Capacity	0.07	0.01	0.18
Queue Length 95th (m)	1.9	0.1	0.0
Control Delay (s)	12.3	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.3	0.3	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		25.6%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Background 2031 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	155	35	0	0	20	30	0	0	0	65	5	190
Future Volume (vph)	155	35	0	0	20	30	0	0	0	65	5	190
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	185	42	0	0	24	36	0	0	0	77	6	226

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	227	60	0	309
Volume Left (vph)	185	0	0	77
Volume Right (vph)	0	36	0	226
Hadj (s)	0.32	-0.18	0.00	-0.30
Departure Headway (s)	5.0	4.8	5.0	4.3
Degree Utilization, x	0.32	0.08	0.00	0.37
Capacity (veh/h)	676	692	660	786
Control Delay (s)	10.3	8.2	8.0	9.9
Approach Delay (s)	10.3	8.2	0.0	9.9
Approach LOS	B	A	A	A

Intersection Summary				
Delay		9.9		
Level of Service		A		
Intersection Capacity Utilization		39.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Background 2031 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	35	0	110	115	95
Future Volume (Veh/h)	80	35	0	110	115	95
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	96	42	0	133	139	114
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	329	196	253			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	329	196	253			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	95	100			
cM capacity (veh/h)	670	850	1324			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	138	133	253
Volume Left	96	0	0
Volume Right	42	0	114
cSH	716	1324	1700
Volume to Capacity	0.19	0.00	0.15
Queue Length 95th (m)	5.7	0.0	0.0
Control Delay (s)	11.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.2	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		3.0		
Intersection Capacity Utilization		25.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Background 2031 AM Peak Hour



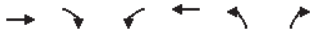
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	95	15	150	105	15	270
Future Volume (Veh/h)	95	15	150	105	15	270
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	116	18	183	128	18	329
Pedestrians						
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	448	156			311	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	448	156			311	
tC, single (s)	6.8	6.9			4.8	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.5	
p0 queue free %	78	98			98	
cM capacity (veh/h)	535	869			1050	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	134	122	189	128	219
Volume Left	116	0	0	18	0
Volume Right	18	0	128	0	0
cSH	565	1700	1700	1050	1700
Volume to Capacity	0.24	0.07	0.11	0.02	0.13
Queue Length 95th (m)	7.3	0.0	0.0	0.4	0.0
Control Delay (s)	13.4	0.0	0.0	1.3	0.0
Lane LOS	B			A	
Approach Delay (s)	13.4	0.0		0.5	
Approach LOS	B				

Intersection Summary				
Average Delay		2.5		
Intersection Capacity Utilization		31.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Background 2031 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	110	10	5	90	20	5
Future Volume (Veh/h)	110	10	5	90	20	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	116	11	5	95	21	5
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			127		226	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			127		226	122
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			1472		764	935

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	127	100	26
Volume Left	0	5	21
Volume Right	11	0	5
cSH	1700	1472	791
Volume to Capacity	0.07	0.00	0.03
Queue Length 95th (m)	0.0	0.1	0.8
Control Delay (s)	0.0	0.4	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.4	9.7
Approach LOS			A

Intersection Summary				
Average Delay		1.2		
Intersection Capacity Utilization		18.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Background 2031 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	115	95	0	0	0
Future Volume (Veh/h)	0	115	95	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	121	100	0	0	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	100				221	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	100				221	100
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1505				772	961

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	121	100	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1505	1700	1700	1700
Volume to Capacity	0.00	0.06	0.09	0.07
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS			A	

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		9.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Background 2031 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	45	180	5	20	250
Future Volume (Veh/h)	10	45	180	5	20	250
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)	11	49	196	5	22	272
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	514	198			201	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	514	198			201	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			98	
cM capacity (veh/h)	515	848			1383	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	60	201	294
Volume Left	11	0	22
Volume Right	49	5	0
cSH	758	1700	1383
Volume to Capacity	0.08	0.12	0.02
Queue Length 95th (m)	2.1	0.0	0.4
Control Delay (s)	10.2	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	10.2	0.0	0.7
Approach LOS	B		

Intersection Summary				
Average Delay		1.5		
Intersection Capacity Utilization		37.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Background 2031 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	95	285	5	30	265
Future Volume (Veh/h)	10	95	285	5	30	265
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)	11	103	310	5	33	288
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	666	312			315	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	666	312			315	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	86			97	
cM capacity (veh/h)	416	732			1257	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	114	315	321
Volume Left	11	0	33
Volume Right	103	5	0
cSH	682	1700	1257
Volume to Capacity	0.17	0.19	0.03
Queue Length 95th (m)	4.8	0.0	0.6
Control Delay (s)	11.3	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	11.3	0.0	1.0
Approach LOS	B		

Intersection Summary				
Average Delay		2.2		
Intersection Capacity Utilization		47.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Background 2031 PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	455	430	80	45	20
Future Volume (Veh/h)	65	455	430	80	45	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	71	500	473	88	49	22
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	561				1159	517
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	561				1159	517
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				76	96
cM capacity (veh/h)	1010				200	562

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	71	500	561	71
Volume Left	71	0	0	49
Volume Right	0	0	88	22
cSH	1010	1700	1700	250
Volume to Capacity	0.07	0.29	0.33	0.28
Queue Length 95th (m)	1.8	0.0	0.0	9.1
Control Delay (s)	8.8	0.0	0.0	25.0
Lane LOS	A			C
Approach Delay (s)	1.1		0.0	25.0
Approach LOS				C

Intersection Summary				
Average Delay			2.0	
Intersection Capacity Utilization			44.8%	ICU Level of Service
Analysis Period (min)			15	

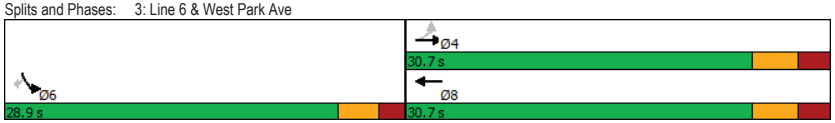
Queues
3: Line 6 & West Park Ave

Future Background 2031 PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	50	450	480	145	30
Future Volume (vph)	50	450	480	145	30
Lane Group Flow (vph)	56	506	663	163	34
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.14	0.42	0.57	0.40	0.09
Control Delay	7.0	7.9	9.6	18.4	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	7.9	9.6	18.4	6.7
Queue Length 50th (m)	2.0	22.4	32.1	11.8	0.0
Queue Length 95th (m)	7.3	46.6	69.0	24.4	4.8
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	396	1197	1161	917	853
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.14	0.42	0.57	0.18	0.04

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 46.3
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Line 6 & West Park Ave



Bradford Highlands
BA Group

Synchro 11 Report
FB_FT.syn

HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Background 2031 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	50	450	480	110	145	30
Future Volume (vph)	50	450	480	110	145	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1802	1900	1829		1770	1615
Flt Permitted	0.33	1.00	1.00		0.95	1.00
Satd. Flow (perm)	628	1900	1829		1770	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	56	506	539	124	163	34
RTOR Reduction (vph)	0	0	10	0	0	28
Lane Group Flow (vph)	56	506	653	0	163	6
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	0%	0%	1%	0%	2%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	28.1	28.1	28.1		8.7	8.7
Effective Green, g (s)	28.1	28.1	28.1		8.7	8.7
Actuated g/C Ratio	0.59	0.59	0.59		0.18	0.18
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	372	1126	1084		324	296
v/s Ratio Prot		0.27	c0.36		c0.09	
v/s Ratio Perm	0.09					0.00
v/c Ratio	0.15	0.45	0.60		0.50	0.02
Uniform Delay, d1	4.3	5.4	6.1		17.4	15.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.3	1.0		1.2	0.0
Delay (s)	4.5	5.6	7.1		18.6	15.9
Level of Service	A	A	A		B	B
Approach Delay (s)		5.5	7.1		18.2	
Approach LOS		A	A		B	

Intersection Summary				
HCM 2000 Control Delay	8.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	47.4	Sum of lost time (s)	10.6
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Background 2031 PM Peak Hour



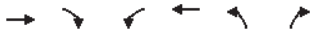
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	570	10	10	580	15	5	5	5	5	0	5
Future Volume (Veh/h)	15	570	10	10	580	15	5	5	5	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	633	11	11	644	17	6	6	6	6	0	6
Pedestrians		10			10						10	
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		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked				0.95			0.95	0.95	0.95	0.95	0.95	
vC, conflicting volume	671			644			1354	1366	648	1370	1362	672
vC1, stage 1 conf vol							672	672		684	684	
vC2, stage 2 conf vol							682	693		686	678	
vCu, unblocked vol	671			601			1347	1359	606	1364	1356	672
tC, single (s)	4.1			4.2			7.1	6.5	6.5	7.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.3			3.5	4.0	3.5	3.5	4.0	3.8
p0 queue free %	98			99			98	98	99	98	100	98
cM capacity (veh/h)	921			893			314	327	432	309	330	376

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	644	11	661	18	12
Volume Left	17	0	11	0	6	6
Volume Right	0	11	0	17	6	6
cSH	921	1700	893	1700	351	339
Volume to Capacity	0.02	0.38	0.01	0.39	0.05	0.04
Queue Length 95th (m)	0.5	0.0	0.3	0.0	1.3	0.9
Control Delay (s)	9.0	0.0	9.1	0.0	15.8	16.0
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.1		15.8	16.0
Approach LOS					C	C

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	44.3%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Background 2031 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	580	0	0	605	0	0
Future Volume (Veh/h)	580	0	0	605	0	0
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)	630	0	0	658	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked					0.85	
vC, conflicting volume			630		1288	630
vC1, stage 1 conf vol					630	
vC2, stage 2 conf vol					658	
vCu, unblocked vol			630		1251	630
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			962		395	485

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	630	0	658	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.37	0.00	0.39	0.15	0.18
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS				A	A
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS				A	

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	35.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Background 2031 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	550	595	70	35	10
Future Volume (Veh/h)	30	550	595	70	35	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	33	611	661	78	39	11
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked	0.72				0.72	0.72
vC, conflicting volume	744				1382	705
vC1, stage 1 conf vol					705	
vC2, stage 2 conf vol					677	
vCu, unblocked vol	445				1335	390
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				89	98
cM capacity (veh/h)	792				356	473

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	33	611	739	50
Volume Left	33	0	0	39
Volume Right	0	0	78	11
cSH	792	1700	1700	377
Volume to Capacity	0.04	0.36	0.43	0.13
Queue Length 95th (m)	1.0	0.0	0.0	3.6
Control Delay (s)	9.7	0.0	0.0	16.0
Lane LOS	A			C
Approach Delay (s)	0.5		0.0	16.0
Approach LOS				C

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	45.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
7: Inverness Way/Melbourne Dr & Line 6

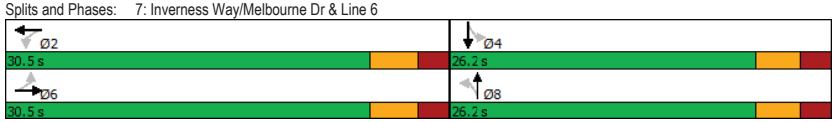
Future Background 2031 PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	100	450	10	585	20	20	120	30
Future Volume (vph)	100	450	10	585	20	20	120	30
Lane Group Flow (vph)	112	545	11	792	22	28	135	101
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.43	0.48	0.02	0.70	0.07	0.06	0.39	0.21
Control Delay	18.0	10.0	7.6	15.8	13.3	11.4	18.1	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	10.0	7.6	15.8	13.3	11.4	18.1	7.5
Queue Length 50th (m)	5.0	24.6	0.4	43.7	1.5	1.5	9.9	2.3
Queue Length 95th (m)	#30.1	72.0	2.9	#145.8	5.2	5.5	20.7	10.1
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	263	1142	468	1136	574	811	598	775
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.48	0.02	0.70	0.04	0.03	0.23	0.13

Intersection Summary

Cycle Length: 56.7
Actuated Cycle Length: 48.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Background 2031 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	450	35	10	585	120	20	20	5	120	30	60
Future Volume (vph)	100	450	35	10	585	120	20	20	5	120	30	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.98	
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	0.97		1.00	0.97		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	1859		1801	1840		1796	1839		1752	1682	
Flt Permitted	0.23	1.00		0.40	1.00		0.69	1.00		0.74	1.00	
Satd. Flow (perm)	429	1859		765	1840		1308	1839		1363	1682	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	112	506	39	11	657	135	22	22	6	135	34	67
RTOR Reduction (vph)	0	4	0	0	10	0	0	5	0	0	53	0
Lane Group Flow (vph)	112	541	0	11	782	0	22	23	0	135	48	0
Confl. Peds. (#/hr)	5		5	5		5	5					5
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	28.4	28.4		28.4	28.4		10.1	10.1		10.1	10.1	
Effective Green, g (s)	28.4	28.4		28.4	28.4		10.1	10.1		10.1	10.1	
Actuated g/C Ratio	0.58	0.58		0.58	0.58		0.21	0.21		0.21	0.21	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	247	1073		441	1062		268	377		279	345	
v/s Ratio Prot		0.29			c0.43			0.01			0.03	
v/s Ratio Perm	0.26			0.01			0.02			c0.10		
v/c Ratio	0.45	0.50		0.02	0.74		0.08	0.06		0.48	0.14	
Uniform Delay, d1	6.0	6.2		4.5	7.6		15.8	15.7		17.3	16.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.4		0.0	2.7		0.1	0.1		1.3	0.2	
Delay (s)	7.3	6.6		4.5	10.3		15.9	15.8		18.6	16.2	
Level of Service	A	A		A	B		B	B		B	B	
Approach Delay (s)		6.7			10.3			15.9			17.5	
Approach LOS		A			B			B			B	

Intersection Summary

HCM 2000 Control Delay	10.1	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.67				
Actuated Cycle Length (s)	49.2	Sum of lost time (s)		10.7	
Intersection Capacity Utilization	86.5%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Background 2031 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	550	20	45	695	5	10	0	25	10	0	10
Future Volume (Veh/h)	0	550	20	45	695	5	10	0	25	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	632	23	52	799	6	11	0	29	11	0	11
Pedestrians								5			5	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked	0.99			0.89			0.90	0.90	0.89	0.90	0.90	0.99
vC, conflicting volume	810			660			1562	1562	648	1572	1571	807
vC1, stage 1 conf vol							648	648		911	911	
vC2, stage 2 conf vol							914	914		661	660	
vCu, unblocked vol	801			559			1536	1536	546	1546	1545	797
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			96	100	94	96	100	97
cM capacity (veh/h)	817			909			257	278	481	245	267	383

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	655	52	805	40	22
Volume Left	0	0	52	0	11	11
Volume Right	0	23	0	6	29	11
cSH	1700	1700	909	1700	388	299
Volume to Capacity	0.00	0.39	0.06	0.47	0.10	0.07
Queue Length 95th (m)	0.0	0.0	1.5	0.0	2.7	1.9
Control Delay (s)	0.0	0.0	9.2	0.0	15.3	18.0
Lane LOS			A		C	C
Approach Delay (s)	0.0		0.6		15.3	18.0
Approach LOS					C	C

Intersection Summary					
Average Delay	0.9				
Intersection Capacity Utilization	47.4%	ICU Level of Service	A		
Analysis Period (min)	15				

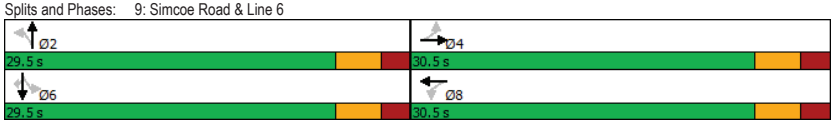
Queues
9: Simcoe Road & Line 6

Future Background 2031 PM Peak Hour

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	325	105	40	245	290	5	180	505
Future Volume (vph)	325	105	40	245	290	5	180	505
Lane Group Flow (vph)	349	312	48	263	339	0	199	543
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4	8		2		6	
Permitted Phases	4			2		6		6
Detector Phase	4	4	8	2	2	6	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	24.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.61	0.38	0.06	0.55	0.45		0.27	0.56
Control Delay	19.2	6.7	10.0	19.3	15.2		13.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	19.2	6.7	10.0	19.3	15.2		13.4	4.0
Queue Length 50th (m)	30.1	9.2	2.9	22.5	26.8		14.9	0.0
Queue Length 95th (m)	55.2	23.8	8.1	43.8	46.6		27.9	16.4
Internal Link Dist (m)		261.6	146.8		400.7		164.9	
Turn Bay Length (m)	50.0			110.0				
Base Capacity (vph)	574	821	779	476	756		738	965
Starvation Cap Reductn	0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0
Reduced v/c Ratio	0.61	0.38	0.06	0.55	0.45		0.27	0.56

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Background 2031 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	325	105	185	0	40	5	245	290	25	5	180	505
Future Volume (vph)	325	105	185	0	40	5	245	290	25	5	180	505
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.90			0.98		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1805	1718			1864		1787	1877			1861	1599
Flt Permitted	0.73	1.00			1.00		0.63	1.00			0.99	1.00
Satd. Flow (perm)	1379	1718			1864		1190	1877			1846	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	349	113	199	0	43	5	263	312	27	5	194	543
RTOR Reduction (vph)	0	106	0	0	3	0	0	5	0	0	0	326
Lane Group Flow (vph)	349	206	0	0	45	0	263	334	0	0	199	217
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42			0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	574	715			776		476	750			738	639
v/s Ratio Prot		0.12			0.02			0.18				
v/s Ratio Perm	c0.25						c0.22				0.11	0.14
v/c Ratio	0.61	0.29			0.06		0.55	0.44			0.27	0.34
Uniform Delay, d1	13.7	11.6			10.5		13.9	13.1			12.1	12.5
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	1.8	0.2			0.0		1.4	0.4			0.2	0.3
Delay (s)	15.5	11.8			10.5		15.3	13.6			12.3	12.8
Level of Service	B	B			B		B	B			B	B
Approach Delay (s)		13.8			10.5			14.3			12.7	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	85.9%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Background 2031 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	5	25	505	245	25
Future Volume (Veh/h)	15	5	25	505	245	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	18	6	29	594	288	29
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	964	318	327			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	964	318	327			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	98			
cM capacity (veh/h)	276	719	1234			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	623	317
Volume Left	18	29	0
Volume Right	6	0	29
cSH	327	1234	1700
Volume to Capacity	0.07	0.02	0.19
Queue Length 95th (m)	1.9	0.6	0.0
Control Delay (s)	16.9	0.6	0.0
Lane LOS	C	A	
Approach Delay (s)	16.9	0.6	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Background 2031 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	5	10	490	225	25
Future Volume (Veh/h)	20	5	10	490	225	25
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)	22	5	11	533	245	27
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	824	274	282			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	824	274	282			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	99			
cM capacity (veh/h)	340	760	1281			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	544	272
Volume Left	22	11	0
Volume Right	5	0	27
cSH	379	1281	1700
Volume to Capacity	0.07	0.01	0.16
Queue Length 95th (m)	1.8	0.2	0.0
Control Delay (s)	15.2	0.3	0.0
Lane LOS	C	A	
Approach Delay (s)	15.2	0.3	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		45.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Background 2031 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	350	45	0	5	55	145	5	5	0	60	5	110
Future Volume (vph)	350	45	0	5	55	145	5	5	0	60	5	110
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	427	55	0	6	67	177	6	6	0	73	6	134

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	482	250	12	213
Volume Left (vph)	427	6	6	73
Volume Right (vph)	0	177	0	134
Hadj (s)	0.22	-0.40	0.10	-0.31
Departure Headway (s)	5.1	4.8	6.3	5.4
Degree Utilization, x	0.68	0.33	0.02	0.32
Capacity (veh/h)	685	702	478	598
Control Delay (s)	18.4	10.2	9.4	11.0
Approach Delay (s)	18.4	10.2	9.4	11.0
Approach LOS	C	B	A	B

Intersection Summary				
Delay		14.5		
Level of Service		B		
Intersection Capacity Utilization		55.4%	ICU Level of Service	B
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Background 2031 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	160	5	15	235	60	110
Future Volume (Veh/h)	160	5	15	235	60	110
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	184	6	17	270	69	126
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	436	132	195			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	436	132	195			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	67	99	99			
cM capacity (veh/h)	561	923	1349			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	190	287	195
Volume Left	184	17	0
Volume Right	6	0	126
cSH	568	1349	1700
Volume to Capacity	0.33	0.01	0.11
Queue Length 95th (m)	11.7	0.3	0.0
Control Delay (s)	14.5	0.6	0.0
Lane LOS	B	A	
Approach Delay (s)	14.5	0.6	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		4.3		
Intersection Capacity Utilization		40.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Background 2031 PM Peak Hour



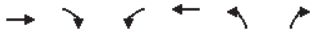
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	105	30	440	160	20	165
Future Volume (Veh/h)	105	30	440	160	20	165
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	117	33	489	178	22	183
Pedestrians						
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	714	334			667	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	714	334			667	
tC, single (s)	6.9	7.0			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	67	95			98	
cM capacity (veh/h)	351	654			932	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	150	326	341	83	122
Volume Left	117	0	0	22	0
Volume Right	33	0	178	0	0
cSH	391	1700	1700	932	1700
Volume to Capacity	0.38	0.19	0.20	0.02	0.07
Queue Length 95th (m)	14.1	0.0	0.0	0.6	0.0
Control Delay (s)	19.8	0.0	0.0	2.5	0.0
Lane LOS	C			A	
Approach Delay (s)	19.8	0.0		1.0	
Approach LOS	C				

Intersection Summary				
Average Delay		3.1		
Intersection Capacity Utilization		34.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Background 2031 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	155	25	0	125	10	5
Future Volume (Veh/h)	155	25	0	125	10	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	172	28	0	139	11	6
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			200		325	186
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			200		325	186
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1384		673	861

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	200	139	17
Volume Left	0	0	11
Volume Right	28	0	6
cSH	1700	1384	729
Volume to Capacity	0.12	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.6
Control Delay (s)	0.0	0.0	10.1
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.1
Approach LOS			B

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		19.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Background 2031 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	160	125	0	0	0
Future Volume (Veh/h)	0	160	125	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	178	139	0	0	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	139				317	139
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	139				317	139
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1457				680	915

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	178	139	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1457	1700	1700	1700
Volume to Capacity	0.00	0.08	0.09	0.07
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS			A	

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		11.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Background 2031 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	475	25	60	170
Future Volume (Veh/h)	5	25	475	25	60	170
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)	5	27	516	27	65	185
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	844	530			543	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	844	530			543	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			94	
cM capacity (veh/h)	315	553			1036	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	543	250
Volume Left	5	0	65
Volume Right	27	27	0
cSH	495	1700	1036
Volume to Capacity	0.06	0.32	0.06
Queue Length 95th (m)	1.7	0.0	1.6
Control Delay (s)	12.8	0.0	2.7
Lane LOS	B		A
Approach Delay (s)	12.8	0.0	2.7
Approach LOS	B		

Intersection Summary			
Average Delay		1.3	
Intersection Capacity Utilization		52.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Background 2031 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	495	25	95	265
Future Volume (Veh/h)	5	60	495	25	95	265
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)	5	65	538	27	103	288
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	1046	552			565	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1046	552			565	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	88			90	
cM capacity (veh/h)	230	538			1017	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	565	391
Volume Left	5	0	103
Volume Right	65	27	0
cSH	491	1700	1017
Volume to Capacity	0.14	0.33	0.10
Queue Length 95th (m)	4.0	0.0	2.7
Control Delay (s)	13.6	0.0	3.2
Lane LOS	B		A
Approach Delay (s)	13.6	0.0	3.2
Approach LOS	B		

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		60.8%	ICU Level of Service B
Analysis Period (min)		15	

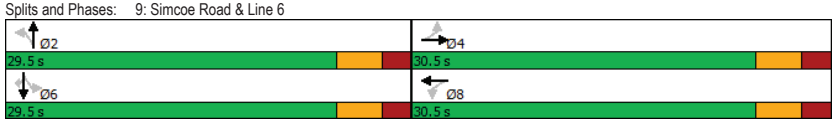
Queues
9: Simcoe Road & Line 6

Future Total 2031 AM Peak Hour 60s CL

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	460	135	5	80	195	200	135	255
Future Volume (vph)	460	135	5	80	195	200	135	255
Lane Group Flow (vph)	517	321	6	96	219	231	152	287
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA	Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		8		2			6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.97	0.42	0.02	0.13	0.46	0.34	0.21	0.36
Control Delay	53.0	9.7	10.6	10.8	17.3	14.2	12.8	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.0	9.7	10.6	10.8	17.3	14.2	12.8	3.3
Queue Length 50th (m)	55.9	15.2	0.4	6.1	17.9	17.6	11.1	0.0
Queue Length 95th (m)	#112.3	31.9	2.2	13.8	35.0	32.2	21.6	12.0
Internal Link Dist (m)		261.6		146.8		400.7	164.9	
Turn Bay Length (m)	50.0		20.0		110.0			
Base Capacity (vph)	534	770	327	753	473	673	724	787
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.42	0.02	0.13	0.46	0.34	0.21	0.36

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Total 2031 AM Peak Hour 60s CL

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	460	135	150	5	80	5	195	200	5	0	135	255
Future Volume (vph)	460	135	150	5	80	5	195	200	5	0	135	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.92		1.00	0.99		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1691		1439	1798		1703	1679			1810	1538
Flt Permitted	0.69	1.00		0.52	1.00		0.66	1.00			1.00	1.00
Satd. Flow (perm)	1282	1691		785	1798		1184	1679			1810	1538
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	517	152	169	6	90	6	219	225	6	0	152	287
RTOR Reduction (vph)	0	67	0	0	4	0	0	2	0	0	0	172
Lane Group Flow (vph)	517	255	0	6	93	0	219	229	0	0	152	115
Confl. Peds. (#/hr)			5	5					5	5		
Heavy Vehicles (%)	3%	0%	4%	25%	5%	0%	6%	13%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0		25.0	25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0		25.0	25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	534	704		327	749		473	671			724	615
v/s Ratio Prot		0.15			0.05			0.14			0.08	
v/s Ratio Perm	c0.40			0.01			c0.19					0.07
v/c Ratio	0.97	0.36		0.02	0.12		0.46	0.34			0.21	0.19
Uniform Delay, d1	17.1	12.0		10.3	10.8		13.3	12.5			11.8	11.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	30.6	0.3		0.0	0.1		0.7	0.3			0.1	0.1
Delay (s)	47.7	12.3		10.3	10.8		14.0	12.8			11.9	11.8
Level of Service	D	B		B	B		B	B			B	B
Approach Delay (s)		34.2			10.8			13.4			11.9	
Approach LOS		C			B			B			B	

Intersection Summary					
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.72				
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0		
Intersection Capacity Utilization	85.9%	ICU Level of Service	E		
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Total 2031 AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	310	420	35	40	50
Future Volume (Veh/h)	5	310	420	35	40	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	341	462	38	44	55
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	500				832	481
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	500				832	481
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				87	91
cM capacity (veh/h)	1005				336	585

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	341	500	99
Volume Left	5	0	0	44
Volume Right	0	0	38	55
cSH	1005	1700	1700	440
Volume to Capacity	0.00	0.20	0.29	0.22
Queue Length 95th (m)	0.1	0.0	0.0	6.8
Control Delay (s)	8.6	0.0	0.0	15.5
Lane LOS	A			C
Approach Delay (s)	0.1		0.0	15.5
Approach LOS				C

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		36.2%	ICU Level of Service
Analysis Period (min)		15	

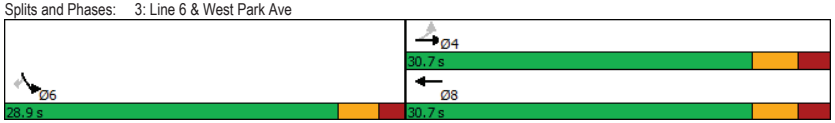
Queues
3: Line 6 & West Park Ave

Future Total 2031 AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	15	335	415	160	40
Future Volume (vph)	15	335	415	160	40
Lane Group Flow (vph)	17	381	603	182	45
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.04	0.35	0.54	0.44	0.11
Control Delay	6.2	7.5	9.3	18.9	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.2	7.5	9.3	18.9	6.1
Queue Length 50th (m)	0.6	15.9	27.7	13.4	0.0
Queue Length 95th (m)	3.0	35.3	61.6	26.4	5.3
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	399	1092	1124	902	853
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.35	0.54	0.20	0.05

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 46.7
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Total 2031 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	15	335	415	115	160	40
Future Volume (vph)	15	335	415	115	160	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1743	1776		1752	1615
Flt Permitted	0.37	1.00	1.00		0.95	1.00
Satd. Flow (perm)	636	1743	1776		1752	1615
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	17	381	472	131	182	45
RTOR Reduction (vph)	0	0	12	0	0	37
Lane Group Flow (vph)	17	381	591	0	182	8
Heavy Vehicles (%)	11%	9%	3%	7%	3%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	28.1	28.1	28.1		9.0	9.0
Effective Green, g (s)	28.1	28.1	28.1		9.0	9.0
Actuated g/C Ratio	0.59	0.59	0.59		0.19	0.19
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	374	1026	1046		330	304
v/s Ratio Prot		0.22	c0.33		c0.10	
v/s Ratio Perm	0.03					0.01
v/c Ratio	0.05	0.37	0.57		0.55	0.03
Uniform Delay, d1	4.1	5.2	6.0		17.5	15.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.2	0.7		2.0	0.0
Delay (s)	4.2	5.4	6.7		19.5	15.8
Level of Service	A	A	A		B	B
Approach Delay (s)		5.3	6.7		18.8	
Approach LOS		A	A		B	

Intersection Summary				
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	47.7	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	46.5%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Total 2031 AM Peak Hour



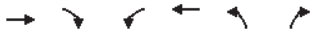
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	470	20	10	490	5	30	5	20	15	0	10
Future Volume (Veh/h)	5	470	20	10	490	5	30	5	20	15	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	511	22	11	533	5	33	5	22	16	0	11
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked												
vC, conflicting volume	543			533			1098	1097	522	1108	1106	540
vC1, stage 1 conf vol							532	532		562	562	
vC2, stage 2 conf vol							566	565		546	543	
vCu, unblocked vol	543			533			1098	1097	522	1108	1106	540
tC, single (s)	4.1			4.3			7.3	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.3	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			91	99	96	96	100	98
cM capacity (veh/h)	1032			963			359	401	559	380	398	543

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	533	11	538	60	27
Volume Left	5	0	11	0	33	16
Volume Right	0	22	0	5	22	11
cSH	1032	1700	963	1700	417	433
Volume to Capacity	0.00	0.31	0.01	0.32	0.14	0.06
Queue Length 95th (m)	0.1	0.0	0.3	0.0	4.0	1.6
Control Delay (s)	8.5	0.0	8.8	0.0	15.1	13.9
Lane LOS	A		A		C	B
Approach Delay (s)	0.1		0.2		15.1	13.9
Approach LOS					C	B

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	36.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Total 2031 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	465	40	15	425	80	110
Future Volume (Veh/h)	465	40	15	425	80	110
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	500	43	16	457	86	118
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked						
vC, conflicting volume			543		1010	522
vC1, stage 1 conf vol					522	
vC2, stage 2 conf vol					489	
vCu, unblocked vol			543		1010	522
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		82	79
cM capacity (veh/h)			1036		480	559

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	543	16	457	86	118
Volume Left	0	16	0	86	0
Volume Right	43	0	0	0	118
cSH	1700	1036	1700	480	559
Volume to Capacity	0.32	0.02	0.27	0.18	0.21
Queue Length 95th (m)	0.0	0.4	0.0	5.2	6.3
Control Delay (s)	0.0	8.5	0.0	14.1	13.2
Lane LOS		A		B	B
Approach Delay (s)	0.0	0.3		13.6	
Approach LOS				B	

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	40.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Total 2031 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	570	415	20	40	25
Future Volume (Veh/h)	5	570	415	20	40	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	5	613	446	22	43	27
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked						
vC, conflicting volume	473				1085	462
vC1, stage 1 conf vol					462	
vC2, stage 2 conf vol					623	
vCu, unblocked vol	473				1085	462
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				90	96
cM capacity (veh/h)	1095				448	601

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	613	468	70
Volume Left	5	0	0	43
Volume Right	0	0	22	27
cSH	1095	1700	1700	497
Volume to Capacity	0.00	0.36	0.28	0.14
Queue Length 95th (m)	0.1	0.0	0.0	3.9
Control Delay (s)	8.3	0.0	0.0	13.4
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	13.4
Approach LOS				B

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	40.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
7: Inverness Way/Melbourne Dr & Line 6

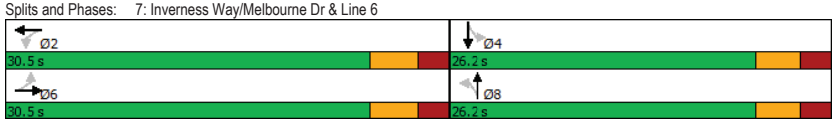
Future Total 2031 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	75	520	30	310	40	85	140	45
Future Volume (vph)	75	520	30	310	40	85	140	45
Lane Group Flow (vph)	86	615	34	494	46	161	161	150
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.19	0.57	0.09	0.46	0.13	0.30	0.49	0.28
Control Delay	9.5	12.9	8.7	9.8	13.9	10.6	20.6	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.5	12.9	8.7	9.8	13.9	10.6	20.6	7.4
Queue Length 50th (m)	3.5	33.8	1.3	22.2	3.2	6.9	12.4	3.5
Queue Length 95th (m)	13.6	#91.0	6.4	59.2	8.6	16.8	24.9	12.8
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	458	1085	392	1067	566	824	534	817
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.57	0.09	0.46	0.08	0.20	0.30	0.18

Intersection Summary

Cycle Length: 56.7
Actuated Cycle Length: 46.6
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Total 2031 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	520	15	30	310	120	40	85	55	140	45	85
Future Volume (vph)	75	520	15	30	310	120	40	85	55	140	45	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		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	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.96		1.00	0.94		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1798		1805	1740		1752	1706		1672	1649	
Flt Permitted	0.44	1.00		0.34	1.00		0.66	1.00		0.66	1.00	
Satd. Flow (perm)	760	1798		651	1740		1220	1706		1153	1649	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	86	598	17	34	356	138	46	98	63	161	52	98
RTOR Reduction (vph)	0	1	0	0	20	0	0	49	0	0	76	0
Lane Group Flow (vph)	86	614	0	34	474	0	46	112	0	161	74	0
Confl. Peds. (#/hr)	5					5			10	10		
Heavy Vehicles (%)	9%	5%	13%	0%	5%	1%	3%	2%	6%	7%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	26.6	26.6		26.6	26.6		10.5	10.5		10.5	10.5	
Effective Green, g (s)	26.6	26.6		26.6	26.6		10.5	10.5		10.5	10.5	
Actuated g/C Ratio	0.56	0.56		0.56	0.56		0.22	0.22		0.22	0.22	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	422	1000		362	968		267	374		253	362	
v/s Ratio Prot		c0.34			0.27			0.07			0.04	
v/s Ratio Perm	0.11			0.05			0.04			c0.14		
v/c Ratio	0.20	0.61		0.09	0.49		0.17	0.30		0.64	0.20	
Uniform Delay, d1	5.3	7.1		5.0	6.5		15.1	15.6		16.9	15.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.1		0.1	0.4		0.3	0.5		5.2	0.3	
Delay (s)	5.5	8.3		5.1	6.9		15.4	16.0		22.1	15.5	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		7.9			6.7			15.9			18.9	
Approach LOS		A			A			B			B	

Intersection Summary

HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	47.8	Sum of lost time (s)	10.7	
Intersection Capacity Utilization	86.2%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Total 2031 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	690	10	20	440	10	20	0	35	5	0	0
Future Volume (Veh/h)	15	690	10	20	440	10	20	0	35	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	862	12	25	550	12	25	0	44	6	0	0
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked	0.99			0.80			0.81	0.81	0.80	0.81	0.81	0.99
vC, conflicting volume	567			874			1506	1523	868	1555	1523	561
vC1, stage 1 conf vol							906	906		611	611	
vC2, stage 2 conf vol							600	617		944	912	
vCu, unblocked vol	560			722			1485	1506	714	1546	1506	554
tC, single (s)	4.3			4.1			7.1	6.5	6.2	8.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		7.1	5.5	
tF (s)	2.4			2.2			3.5	4.0	3.3	4.4	4.0	3.8
p0 queue free %	98			97			91	100	87	96	100	100
cM capacity (veh/h)	912			715			263	272	345	140	260	445

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	19	874	25	562	69	6
Volume Left	19	0	25	0	25	6
Volume Right	0	12	0	12	44	0
cSH	912	1700	715	1700	310	140
Volume to Capacity	0.02	0.51	0.03	0.33	0.22	0.04
Queue Length 95th (m)	0.5	0.0	0.9	0.0	6.7	1.1
Control Delay (s)	9.0	0.0	10.2	0.0	19.9	32.0
Lane LOS	A		B		C	D
Approach Delay (s)	0.2		0.4		19.9	32.0
Approach LOS					C	D

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	46.9%	ICU Level of Service	A	
Analysis Period (min)	15			

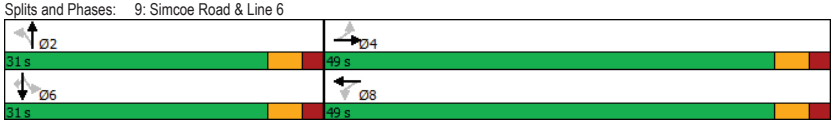
Queues
9: Simcoe Road & Line 6

Future Total 2031 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	460	135	5	80	195	200	135	255
Future Volume (vph)	460	135	5	80	195	200	135	255
Lane Group Flow (vph)	517	321	6	96	219	231	152	287
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA	Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		8		2			6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (s)	49.0	49.0	49.0	49.0	31.0	31.0	31.0	31.0
Total Split (%)	61.3%	61.3%	61.3%	61.3%	38.8%	38.8%	38.8%	38.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.84	0.37	0.02	0.11	0.52	0.39	0.24	0.39
Control Delay	29.0	8.0	8.6	9.0	25.0	20.6	18.9	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.0	8.0	8.6	9.0	25.0	20.6	18.9	4.6
Queue Length 50th (m)	55.9	15.5	0.4	6.1	22.2	22.0	13.7	0.0
Queue Length 95th (m)	99.5	30.9	2.1	13.3	51.4	48.3	32.1	16.0
Internal Link Dist (m)		261.6		146.8		400.7	164.9	
Turn Bay Length (m)	50.0		20.0		110.0			
Base Capacity (vph)	821	1121	511	1154	444	631	679	756
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.29	0.01	0.08	0.49	0.37	0.22	0.38

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 68.8
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Total 2031 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	460	135	150	5	80	5	195	200	5	0	135	255
Future Volume (vph)	460	135	150	5	80	5	195	200	5	0	135	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.92		1.00	0.99		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1690		1438	1798		1703	1679			1810	1538
Flt Permitted	0.69	1.00		0.53	1.00		0.66	1.00			1.00	1.00
Satd. Flow (perm)	1282	1690		799	1798		1184	1679			1810	1538
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	517	152	169	6	90	6	219	225	6	0	152	287
RTOR Reduction (vph)	0	57	0	0	3	0	0	1	0	0	0	184
Lane Group Flow (vph)	517	264	0	6	93	0	219	230	0	0	152	103
Confl. Peds. (#/hr)			5	5					5	5		
Heavy Vehicles (%)	3%	0%	4%	25%	5%	0%	6%	13%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	33.1	33.1		33.1	33.1		24.6	24.6			24.6	24.6
Effective Green, g (s)	33.1	33.1		33.1	33.1		24.6	24.6			24.6	24.6
Actuated g/C Ratio	0.48	0.48		0.48	0.48		0.36	0.36			0.36	0.36
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	617	814		384	866		423	601			648	550
v/s Ratio Prot		0.16			0.05			0.14			0.08	
v/s Ratio Perm	c0.40			0.01			c0.19					0.07
v/c Ratio	0.84	0.32		0.02	0.11		0.52	0.38			0.23	0.19
Uniform Delay, d1	15.5	10.9		9.3	9.7		17.4	16.4			15.5	15.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	9.7	0.2		0.0	0.1		1.1	0.4			0.2	0.2
Delay (s)	25.2	11.2		9.3	9.8		18.4	16.8			15.6	15.3
Level of Service	C	B		A	A		B	B			B	B
Approach Delay (s)		19.8			9.8			17.6			15.4	
Approach LOS		B			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	68.7	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	85.9%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Total 2031 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	50	20	265	265	10
Future Volume (Veh/h)	25	50	20	265	265	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	34	68	27	363	363	14
Pedestrians	5			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	792	380	382			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	792	380	382			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	90	90	98			
cM capacity (veh/h)	340	657	1129			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	390	377
Volume Left	34	27	0
Volume Right	68	0	14
cSH	501	1129	1700
Volume to Capacity	0.20	0.02	0.22
Queue Length 95th (m)	6.0	0.6	0.0
Control Delay (s)	14.0	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	14.0	0.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Total 2031 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	10	5	220	260	15
Future Volume (Veh/h)	25	10	5	220	260	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	28	11	6	244	289	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)						
pX, platoon unblocked						
vC, conflicting volume	554	298	306			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	554	298	306			
tC, single (s)	6.5	6.2	4.6			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.7			
p0 queue free %	94	99	99			
cM capacity (veh/h)	479	747	1026			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	250	306
Volume Left	28	6	0
Volume Right	11	0	17
cSH	533	1026	1700
Volume to Capacity	0.07	0.01	0.18
Queue Length 95th (m)	1.9	0.1	0.0
Control Delay (s)	12.3	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.3	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		25.6%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Total 2031 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	155	80	0	0	30	30	0	0	0	65	5	190
Future Volume (vph)	155	80	0	0	30	30	0	0	0	65	5	190
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	185	95	0	0	36	36	0	0	0	77	6	226

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	280	72	0	309
Volume Left (vph)	185	0	0	77
Volume Right (vph)	0	36	0	226
Hadj (s)	0.28	-0.15	0.00	-0.30
Departure Headway (s)	5.0	4.9	5.2	4.5
Degree Utilization, x	0.39	0.10	0.00	0.39
Capacity (veh/h)	679	674	625	752
Control Delay (s)	11.2	8.4	8.2	10.3
Approach Delay (s)	11.2	8.4	0.0	10.3
Approach LOS	B	A	A	B

Intersection Summary			
Delay		10.5	
Level of Service		B	
Intersection Capacity Utilization		41.7%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Total 2031 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	125	45	0	110	115	105
Future Volume (Veh/h)	125	45	0	110	115	105
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	151	54	0	133	139	127
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	336	202	266			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336	202	266			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	94	100			
cM capacity (veh/h)	664	843	1310			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	205	133	266
Volume Left	151	0	0
Volume Right	54	0	127
cSH	703	1310	1700
Volume to Capacity	0.29	0.00	0.16
Queue Length 95th (m)	9.7	0.0	0.0
Control Delay (s)	12.2	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.2	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		4.1		
Intersection Capacity Utilization		28.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Total 2031 AM Peak Hour



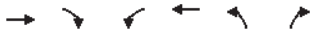
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	170	15	160	135	15	290
Future Volume (Veh/h)	170	15	160	135	15	290
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	207	18	195	165	18	354
Pedestrians						
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	490	180			360	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	490	180			360	
tC, single (s)	6.8	6.9			4.8	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.5	
p0 queue free %	59	98			98	
cM capacity (veh/h)	503	838			1001	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	225	130	230	136	236
Volume Left	207	0	0	18	0
Volume Right	18	0	165	0	0
cSH	519	1700	1700	1001	1700
Volume to Capacity	0.43	0.08	0.14	0.02	0.14
Queue Length 95th (m)	17.3	0.0	0.0	0.4	0.0
Control Delay (s)	17.1	0.0	0.0	1.3	0.0
Lane LOS	C			A	
Approach Delay (s)	17.1	0.0		0.5	
Approach LOS	C				

Intersection Summary				
Average Delay		4.2		
Intersection Capacity Utilization		36.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Total 2031 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	140	10	5	165	20	5
Future Volume (Veh/h)	140	10	5	165	20	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	147	11	5	174	21	5
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			158		336	152
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			158		336	152
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			1434		661	899

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	158	179	26
Volume Left	0	5	21
Volume Right	11	0	5
cSH	1700	1434	696
Volume to Capacity	0.09	0.00	0.04
Queue Length 95th (m)	0.0	0.1	0.9
Control Delay (s)	0.0	0.2	10.4
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	10.4
Approach LOS			B

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		22.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Total 2031 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	115	95	10	55	75
Future Volume (Veh/h)	30	115	95	10	55	75
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	121	100	11	58	79
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	111				290	106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	111				290	106
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				92	92
cM capacity (veh/h)	1492				689	954

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	153	111	58	79
Volume Left	32	0	58	0
Volume Right	0	11	0	79
cSH	1492	1700	689	954
Volume to Capacity	0.02	0.07	0.08	0.08
Queue Length 95th (m)	0.5	0.0	2.2	2.2
Control Delay (s)	1.7	0.0	10.7	9.1
Lane LOS	A		B	A
Approach Delay (s)	1.7	0.0	9.8	
Approach LOS			A	

Intersection Summary				
Average Delay		4.0		
Intersection Capacity Utilization		24.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Total 2031 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	45	180	5	20	250
Future Volume (Veh/h)	10	45	180	5	20	250
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)	11	49	196	5	22	272
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	514	198			201	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	514	198			201	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			98	
cM capacity (veh/h)	515	848			1383	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	60	201	294
Volume Left	11	0	22
Volume Right	49	5	0
cSH	758	1700	1383
Volume to Capacity	0.08	0.12	0.02
Queue Length 95th (m)	2.1	0.0	0.4
Control Delay (s)	10.2	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	10.2	0.0	0.7
Approach LOS	B		

Intersection Summary				
Average Delay		1.5		
Intersection Capacity Utilization		37.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Total 2031 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	95	285	5	30	265
Future Volume (Veh/h)	10	95	285	5	30	265
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)	11	103	310	5	33	288
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	666	312			315	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	666	312			315	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	86			97	
cM capacity (veh/h)	416	732			1257	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	114	315	321
Volume Left	11	0	33
Volume Right	103	5	0
cSH	682	1700	1257
Volume to Capacity	0.17	0.19	0.03
Queue Length 95th (m)	4.8	0.0	0.6
Control Delay (s)	11.3	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	11.3	0.0	1.0
Approach LOS	B		

Intersection Summary				
Average Delay		2.2		
Intersection Capacity Utilization		47.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Total 2031 PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	550	475	80	45	20
Future Volume (Veh/h)	65	550	475	80	45	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	71	604	522	88	49	22
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	610				1312	566
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	610				1312	566
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				70	96
cM capacity (veh/h)	969				161	528

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	71	604	610	71
Volume Left	71	0	0	49
Volume Right	0	0	88	22
cSH	969	1700	1700	206
Volume to Capacity	0.07	0.36	0.36	0.35
Queue Length 95th (m)	1.9	0.0	0.0	11.7
Control Delay (s)	9.0	0.0	0.0	31.5
Lane LOS	A			D
Approach Delay (s)	0.9		0.0	31.5
Approach LOS				D

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		47.2%	ICU Level of Service A
Analysis Period (min)		15	

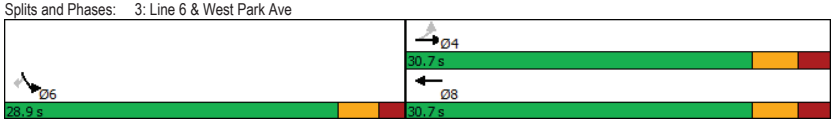
Queues
3: Line 6 & West Park Ave

Future Total 2031 PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	50	545	525	250	30
Future Volume (vph)	50	545	525	250	30
Lane Group Flow (vph)	56	612	747	281	34
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.27	0.63	0.79	0.59	0.07
Control Delay	12.5	13.0	19.0	20.9	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	13.0	19.0	20.9	5.8
Queue Length 50th (m)	2.5	34.6	46.1	22.0	0.0
Queue Length 95th (m)	11.0	77.0	#124.3	39.8	4.5
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	206	974	948	871	812
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.63	0.79	0.32	0.04

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 48.9
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Total 2031 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	50	545	525	140	250	30
Future Volume (vph)	50	545	525	140	250	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1803	1900	1822		1770	1615
Flt Permitted	0.21	1.00	1.00		0.95	1.00
Satd. Flow (perm)	402	1900	1822		1770	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	56	612	590	157	281	34
RTOR Reduction (vph)	0	0	14	0	0	25
Lane Group Flow (vph)	56	612	733	0	281	9
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	0%	0%	1%	0%	2%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	25.1	25.1	25.1		13.2	13.2
Effective Green, g (s)	25.1	25.1	25.1		13.2	13.2
Actuated g/C Ratio	0.51	0.51	0.51		0.27	0.27
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	206	975	935		477	435
v/s Ratio Prot		0.32	c0.40		c0.16	
v/s Ratio Perm	0.14					0.01
v/c Ratio	0.27	0.63	0.78		0.59	0.02
Uniform Delay, d1	6.7	8.5	9.7		15.5	13.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	1.3	4.4		1.9	0.0
Delay (s)	7.4	9.8	14.1		17.4	13.1
Level of Service	A	A	B		B	B
Approach Delay (s)		9.6	14.1		16.9	
Approach LOS		A	B		B	

Intersection Summary				
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	48.9	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Total 2031 PM Peak Hour



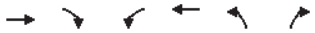
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	710	70	20	640	15	20	5	10	5	0	5
Future Volume (Veh/h)	15	710	70	20	640	15	20	5	10	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	789	78	22	711	17	22	6	11	6	0	6
Pedestrians		10			10						10	
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		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked				0.78			0.78	0.78	0.78	0.78	0.78	
vC, conflicting volume	738			867			1633	1644	838	1620	1674	740
vC1, stage 1 conf vol							862	862		774	774	
vC2, stage 2 conf vol							771	782		847	901	
vCu, unblocked vol	738			688			1671	1685	650	1655	1724	740
tC, single (s)	4.1			4.2			7.1	6.5	6.5	7.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.3			3.5	4.0	3.5	3.5	4.0	3.8
p0 queue free %	98			97			91	98	97	97	100	98
cM capacity (veh/h)	870			678			244	257	333	236	244	342

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	867	22	728	39	12
Volume Left	17	0	22	0	22	6
Volume Right	0	78	0	17	11	6
cSH	870	1700	678	1700	266	279
Volume to Capacity	0.02	0.51	0.03	0.43	0.15	0.04
Queue Length 95th (m)	0.5	0.0	0.8	0.0	4.0	1.1
Control Delay (s)	9.2	0.0	10.5	0.0	20.8	18.5
Lane LOS	A		B		C	C
Approach Delay (s)	0.2		0.3		20.8	18.5
Approach LOS					C	C

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	54.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Total 2031 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	590	135	55	620	55	80
Future Volume (Veh/h)	590	135	55	620	55	80
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)	641	147	60	674	60	87
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked					0.83	
vC, conflicting volume			788		1508	714
vC1, stage 1 conf vol					714	
vC2, stage 2 conf vol					794	
vCu, unblocked vol			788		1510	714
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			93		81	80
cM capacity (veh/h)			840		319	434

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	788	60	674	60	87
Volume Left	0	60	0	60	0
Volume Right	147	0	0	0	87
cSH	1700	840	1700	319	434
Volume to Capacity	0.46	0.07	0.40	0.19	0.20
Queue Length 95th (m)	0.0	1.8	0.0	5.4	5.9
Control Delay (s)	0.0	9.6	0.0	18.9	15.4
Lane LOS		A		C	C
Approach Delay (s)	0.0	0.8		16.8	
Approach LOS				C	

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	55.7%	ICU Level of Service		B
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Total 2031 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	640	665	70	35	10
Future Volume (Veh/h)	30	640	665	70	35	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	33	711	739	78	39	11
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked	0.63				0.63	0.63
vC, conflicting volume	822				1560	783
vC1, stage 1 conf vol					783	
vC2, stage 2 conf vol					777	
vCu, unblocked vol	426				1595	364
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	95				87	97
cM capacity (veh/h)	709				310	431

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	33	711	817	50
Volume Left	33	0	0	39
Volume Right	0	0	78	11
cSH	709	1700	1700	330
Volume to Capacity	0.05	0.42	0.48	0.15
Queue Length 95th (m)	1.2	0.0	0.0	4.2
Control Delay (s)	10.3	0.0	0.0	17.8
Lane LOS	B			C
Approach Delay (s)	0.5		0.0	17.8
Approach LOS				C

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	49.3%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
7: Inverness Way/Melbourne Dr & Line 6

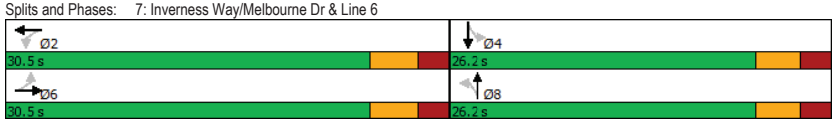
Future Total 2031 PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	100	535	90	650	25	50	120	55
Future Volume (vph)	100	535	90	650	25	50	120	55
Lane Group Flow (vph)	112	646	101	865	28	90	135	129
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.55	0.57	0.27	0.76	0.09	0.19	0.41	0.26
Control Delay	27.6	12.2	10.7	18.3	13.6	10.2	18.6	9.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	12.2	10.7	18.3	13.6	10.2	18.6	9.1
Queue Length 50th (m)	5.5	31.8	3.9	51.6	1.9	3.8	10.0	4.2
Queue Length 95th (m)	#35.1	#107.2	17.7	#165.2	6.1	11.3	21.0	13.3
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	203	1142	381	1138	558	805	565	795
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.57	0.27	0.76	0.05	0.11	0.24	0.16

Intersection Summary

Cycle Length: 56.7
Actuated Cycle Length: 48.2
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Total 2031 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	535	40	90	650	120	25	50	30	120	55	60
Future Volume (vph)	100	535	40	90	650	120	25	50	30	120	55	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.94		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	1860		1802	1845		1796	1792		1752	1729	
Flt Permitted	0.18	1.00		0.33	1.00		0.67	1.00		0.70	1.00	
Satd. Flow (perm)	333	1860		622	1845		1275	1792		1289	1729	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	112	601	45	101	730	135	28	56	34	135	62	67
RTOR Reduction (vph)	0	4	0	0	9	0	0	27	0	0	53	0
Lane Group Flow (vph)	112	642	0	101	856	0	28	63	0	135	76	0
Confl. Peds. (#/hr)	5		5	5		5	5					5
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	28.4	28.4		28.4	28.4		10.2	10.2		10.2	10.2	
Effective Green, g (s)	28.4	28.4		28.4	28.4		10.2	10.2		10.2	10.2	
Actuated g/C Ratio	0.58	0.58		0.58	0.58		0.21	0.21		0.21	0.21	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	1071		358	1062		263	370		266	357	
v/s Ratio Prot		0.35			c0.46			0.04			0.04	
v/s Ratio Perm	0.34			0.16			0.02			c0.10		
v/c Ratio	0.59	0.60		0.28	0.81		0.11	0.17		0.51	0.21	
Uniform Delay, d1	6.7	6.8		5.3	8.3		15.9	16.1		17.3	16.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.5	0.9		0.4	4.6		0.2	0.2		1.5	0.3	
Delay (s)	11.2	7.7		5.7	12.8		16.0	16.3		18.8	16.5	
Level of Service	B	A		A	B		B	B		B	B	
Approach Delay (s)		8.2			12.1			16.2			17.7	
Approach LOS		A			B			B			B	

Intersection Summary

HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	10.7	
Intersection Capacity Utilization	89.9%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Total 2031 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	660	20	45	840	5	10	0	25	10	0	10
Future Volume (Veh/h)	0	660	20	45	840	5	10	0	25	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	759	23	52	966	6	11	0	29	11	0	11
Pedestrians								5			5	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked	0.98			0.80			0.81	0.81	0.80	0.81	0.81	0.98
vC, conflicting volume	977			787			1856	1856	776	1866	1865	974
vC1, stage 1 conf vol							776	776		1078	1078	
vC2, stage 2 conf vol							1081	1081		788	787	
vCu, unblocked vol	968			610			1894	1894	595	1906	1905	965
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			94	100	93	94	100	96
cM capacity (veh/h)	705			781			200	223	405	189	212	305

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	782	52	972	40	22
Volume Left	0	0	52	0	11	11
Volume Right	0	23	0	6	29	11
cSH	1700	1700	781	1700	316	234
Volume to Capacity	0.00	0.46	0.07	0.57	0.13	0.09
Queue Length 95th (m)	0.0	0.0	1.7	0.0	3.4	2.5
Control Delay (s)	0.0	0.0	9.9	0.0	18.1	22.0
Lane LOS			A		C	C
Approach Delay (s)	0.0		0.5		18.1	22.0
Approach LOS					C	C

Intersection Summary					
Average Delay	0.9				
Intersection Capacity Utilization	54.5%	ICU Level of Service		A	
Analysis Period (min)	15				

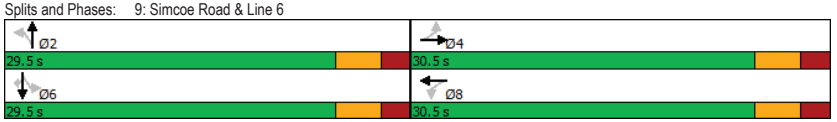
Queues
9: Simcoe Road & Line 6

Future Total 2031 PM Peak Hour

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	355	185	120	245	290	5	180	570
Future Volume (vph)	355	185	120	245	290	5	180	570
Lane Group Flow (vph)	382	398	134	263	339	0	199	613
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4	8		2		6	
Permitted Phases	4			2		6		6
Detector Phase	4	4	8	2	2	6	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	24.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.72	0.50	0.17	0.55	0.45		0.27	0.61
Control Delay	24.5	12.0	11.4	19.3	15.2		13.4	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	24.5	12.0	11.4	19.3	15.2		13.4	4.3
Queue Length 50th (m)	35.2	22.9	9.0	22.5	26.8		14.9	0.0
Queue Length 95th (m)	#75.3	44.9	18.6	43.8	46.6		27.9	17.2
Internal Link Dist (m)		261.6	146.8		400.7		164.9	
Turn Bay Length (m)	50.0			110.0				
Base Capacity (vph)	531	792	788	476	756		738	1007
Starvation Cap Reductn	0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0
Reduced v/c Ratio	0.72	0.50	0.17	0.55	0.45		0.27	0.61

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Total 2031 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	185	185	0	120	5	245	290	25	5	180	570
Future Volume (vph)	355	185	185	0	120	5	245	290	25	5	180	570
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.93			0.99		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1805	1758			1887		1787	1877			1861	1599
Flt Permitted	0.67	1.00			1.00		0.63	1.00			0.99	1.00
Satd. Flow (perm)	1275	1758			1887		1190	1877			1846	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	382	199	199	0	129	5	263	312	27	5	194	613
RTOR Reduction (vph)	0	60	0	0	2	0	0	5	0	0	0	368
Lane Group Flow (vph)	382	338	0	0	132	0	263	334	0	0	199	245
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42			0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	531	732			786		476	750			738	639
v/s Ratio Prot		0.19			0.07			0.18				
v/s Ratio Perm	c0.30						c0.22				0.11	0.15
v/c Ratio	0.72	0.46			0.17		0.55	0.44			0.27	0.38
Uniform Delay, d1	14.6	12.6			11.0		13.9	13.1			12.1	12.8
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	4.6	0.5			0.1		1.4	0.4			0.2	0.4
Delay (s)	19.2	13.1			11.1		15.3	13.6			12.3	13.1
Level of Service	B	B			B		B	B			B	B
Approach Delay (s)		16.1			11.1			14.3			12.9	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	100.2%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Total 2031 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	5	25	505	245	25
Future Volume (Veh/h)	15	5	25	505	245	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	18	6	29	594	288	29
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	964	318	327			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	964	318	327			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	98			
cM capacity (veh/h)	276	719	1234			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	623	317
Volume Left	18	29	0
Volume Right	6	0	29
cSH	327	1234	1700
Volume to Capacity	0.07	0.02	0.19
Queue Length 95th (m)	1.9	0.6	0.0
Control Delay (s)	16.9	0.6	0.0
Lane LOS	C	A	
Approach Delay (s)	16.9	0.6	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Total 2031 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	5	10	490	225	25
Future Volume (Veh/h)	20	5	10	490	225	25
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)	22	5	11	533	245	27
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	824	274	282			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	824	274	282			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	99	99			
cM capacity (veh/h)	340	760	1281			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	544	272
Volume Left	22	11	0
Volume Right	5	0	27
cSH	379	1281	1700
Volume to Capacity	0.07	0.01	0.16
Queue Length 95th (m)	1.8	0.2	0.0
Control Delay (s)	15.2	0.3	0.0
Lane LOS	C	A	
Approach Delay (s)	15.2	0.3	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		45.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Total 2031 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	350	75	0	5	90	145	5	5	0	60	5	110
Future Volume (vph)	350	75	0	5	90	145	5	5	0	60	5	110
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	427	91	0	6	110	177	6	6	0	73	6	134

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	518	293	12	213
Volume Left (vph)	427	6	6	73
Volume Right (vph)	0	177	0	134
Hadj (s)	0.21	-0.33	0.10	-0.31
Departure Headway (s)	5.2	5.0	6.6	5.6
Degree Utilization, x	0.75	0.41	0.02	0.33
Capacity (veh/h)	518	680	459	573
Control Delay (s)	21.9	11.3	9.7	11.4
Approach Delay (s)	21.9	11.3	9.7	11.4
Approach LOS	C	B	A	B

Intersection Summary				
Delay		16.6		
Level of Service		C		
Intersection Capacity Utilization		58.8%	ICU Level of Service	B
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Total 2031 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	190	15	25	235	60	145
Future Volume (Veh/h)	190	15	25	235	60	145
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	218	17	29	270	69	167
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	480	152	236			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	480	152	236			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	58	98	98			
cM capacity (veh/h)	523	899	1302			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	235	299	236
Volume Left	218	29	0
Volume Right	17	0	167
cSH	540	1302	1700
Volume to Capacity	0.44	0.02	0.14
Queue Length 95th (m)	17.5	0.5	0.0
Control Delay (s)	16.7	0.9	0.0
Lane LOS	C	A	
Approach Delay (s)	16.7	0.9	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		5.5		
Intersection Capacity Utilization		47.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Total 2031 PM Peak Hour



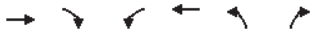
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	160	30	480	270	20	180
Future Volume (Veh/h)	160	30	480	270	20	180
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	178	33	533	300	22	200
Pedestrians						
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	827	416			833	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	827	416			833	
tC, single (s)	6.9	7.0			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	40	94			97	
cM capacity (veh/h)	296	577			809	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	211	355	478	89	133
Volume Left	178	0	0	22	0
Volume Right	33	0	300	0	0
cSH	320	1700	1700	809	1700
Volume to Capacity	0.66	0.21	0.28	0.03	0.08
Queue Length 95th (m)	35.1	0.0	0.0	0.7	0.0
Control Delay (s)	35.6	0.0	0.0	2.6	0.0
Lane LOS	E			A	
Approach Delay (s)	35.6	0.0		1.0	
Approach LOS	E				

Intersection Summary				
Average Delay		6.1		
Intersection Capacity Utilization		39.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Total 2031 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	265	25	0	180	10	5
Future Volume (Veh/h)	265	25	0	180	10	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	294	28	0	200	11	6
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			322		508	308
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			322		508	308
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1249		528	737

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	322	200	17
Volume Left	0	0	11
Volume Right	28	0	6
cSH	1700	1249	587
Volume to Capacity	0.19	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.7
Control Delay (s)	0.0	0.0	11.3
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.3
Approach LOS			B

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		25.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Total 2031 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	110	160	125	45	40	55
Future Volume (Veh/h)	110	160	125	45	40	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	122	178	139	50	44	61
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	189				586	164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	189				586	164
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				90	93
cM capacity (veh/h)	1397				434	886

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	300	189	44	61
Volume Left	122	0	44	0
Volume Right	0	50	0	61
cSH	1397	1700	434	886
Volume to Capacity	0.09	0.11	0.10	0.07
Queue Length 95th (m)	2.3	0.0	2.7	1.8
Control Delay (s)	3.6	0.0	14.2	9.4
Lane LOS	A		B	A
Approach Delay (s)	3.6	0.0	11.4	
Approach LOS			B	

Intersection Summary				
Average Delay		3.9		
Intersection Capacity Utilization		37.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Total 2031 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	475	25	60	170
Future Volume (Veh/h)	5	25	475	25	60	170
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)	5	27	516	27	65	185
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	844	530			543	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	844	530			543	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			94	
cM capacity (veh/h)	315	553			1036	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	543	250
Volume Left	5	0	65
Volume Right	27	27	0
cSH	495	1700	1036
Volume to Capacity	0.06	0.32	0.06
Queue Length 95th (m)	1.7	0.0	1.6
Control Delay (s)	12.8	0.0	2.7
Lane LOS	B		A
Approach Delay (s)	12.8	0.0	2.7
Approach LOS	B		

Intersection Summary				
Average Delay		1.3		
Intersection Capacity Utilization		52.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Total 2031 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	495	25	95	265
Future Volume (Veh/h)	5	60	495	25	95	265
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)	5	65	538	27	103	288
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	1046	552			565	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1046	552			565	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	88			90	
cM capacity (veh/h)	230	538			1017	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	565	391
Volume Left	5	0	103
Volume Right	65	27	0
cSH	491	1700	1017
Volume to Capacity	0.14	0.33	0.10
Queue Length 95th (m)	4.0	0.0	2.7
Control Delay (s)	13.6	0.0	3.2
Lane LOS	B		A
Approach Delay (s)	13.6	0.0	3.2
Approach LOS	B		

Intersection Summary				
Average Delay		2.1		
Intersection Capacity Utilization		60.8%	ICU Level of Service	B
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Background 2036 AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	315	370	35	40	50
Future Volume (Veh/h)	5	315	370	35	40	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	346	407	38	44	55
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	445				782	426
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	445				782	426
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	100				88	91
cM capacity (veh/h)	1054				360	628

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	346	445	99
Volume Left	5	0	0	44
Volume Right	0	0	38	55
cSH	1054	1700	1700	472
Volume to Capacity	0.00	0.20	0.26	0.21
Queue Length 95th (m)	0.1	0.0	0.0	6.3
Control Delay (s)	8.4	0.0	0.0	14.6
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	14.6
Approach LOS				B

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		33.5%	ICU Level of Service A
Analysis Period (min)		15	

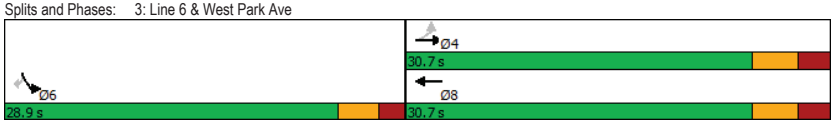
Queues
3: Line 6 & West Park Ave

Future Background 2036 AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	20	335	360	135	45
Future Volume (vph)	20	335	360	135	45
Lane Group Flow (vph)	23	381	494	153	51
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.05	0.35	0.43	0.38	0.12
Control Delay	5.8	7.2	7.7	18.2	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	7.2	7.7	18.2	6.1
Queue Length 50th (m)	0.8	15.9	20.8	11.0	0.0
Queue Length 95th (m)	3.4	33.3	43.5	22.9	5.8
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	493	1101	1139	910	863
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.35	0.43	0.17	0.06

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 46.2
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Background 2036 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	335	360	75	135	45
Future Volume (vph)	20	335	360	75	135	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1743	1790		1752	1615
Flt Permitted	0.46	1.00	1.00		0.95	1.00
Satd. Flow (perm)	780	1743	1790		1752	1615
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	23	381	409	85	153	51
RTOR Reduction (vph)	0	0	9	0	0	42
Lane Group Flow (vph)	23	381	485	0	153	9
Heavy Vehicles (%)	11%	9%	3%	7%	3%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	28.0	28.0	28.0		8.6	8.6
Effective Green, g (s)	28.0	28.0	28.0		8.6	8.6
Actuated g/C Ratio	0.59	0.59	0.59		0.18	0.18
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	462	1033	1061		319	294
v/s Ratio Prot		0.22	c0.27		c0.09	
v/s Ratio Perm	0.03					0.01
v/c Ratio	0.05	0.37	0.46		0.48	0.03
Uniform Delay, d1	4.0	5.0	5.4		17.3	15.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.2	0.3		1.1	0.0
Delay (s)	4.1	5.2	5.7		18.4	15.9
Level of Service	A	A	A		B	B
Approach Delay (s)		5.2	5.7		17.8	
Approach LOS		A	A		B	

Intersection Summary				
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.46			
Actuated Cycle Length (s)	47.2	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	40.7%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Background 2036 AM Peak Hour



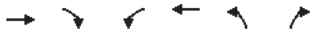
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	460	5	5	420	5	5	5	10	15	0	10
Future Volume (Veh/h)	5	460	5	5	420	5	5	5	10	15	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	500	5	5	457	5	5	5	11	16	0	11
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked												
vC, conflicting volume	467			505			990	990	502	998	990	464
vC1, stage 1 conf vol							512	512		474	474	
vC2, stage 2 conf vol							478	477		524	515	
vCu, unblocked vol	467			505			990	990	502	998	990	464
tC, single (s)	4.1			4.3			7.3	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.3	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	99	98	96	100	98
cM capacity (veh/h)	1100			987			394	433	573	422	433	599

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	505	5	462	21	27
Volume Left	5	0	5	0	5	16
Volume Right	0	5	0	5	11	11
cSH	1100	1700	987	1700	483	480
Volume to Capacity	0.00	0.30	0.01	0.27	0.04	0.06
Queue Length 95th (m)	0.1	0.0	0.1	0.0	1.1	1.4
Control Delay (s)	8.3	0.0	8.7	0.0	12.8	12.9
Lane LOS	A		A		B	B
Approach Delay (s)	0.1		0.1		12.8	12.9
Approach LOS					B	B

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	34.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Background 2036 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	485	0	0	430	0	0
Future Volume (Veh/h)	485	0	0	430	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	522	0	0	462	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked						
vC, conflicting volume			522		984	522
vC1, stage 1 conf vol					522	
vC2, stage 2 conf vol					462	
vCu, unblocked vol			522		984	522
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1055		492	559

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	522	0	462	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.31	0.00	0.27	0.19	0.20
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS				A	A
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS				A	

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	28.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Background 2036 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	480	405	20	40	25
Future Volume (Veh/h)	5	480	405	20	40	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	5	516	435	22	43	27
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked						
vC, conflicting volume	462				977	451
vC1, stage 1 conf vol					451	
vC2, stage 2 conf vol					526	
vCu, unblocked vol	462				977	451
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				91	96
cM capacity (veh/h)	1105				486	610

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	516	457	70
Volume Left	5	0	0	43
Volume Right	0	0	22	27
cSH	1105	1700	1700	528
Volume to Capacity	0.00	0.30	0.27	0.13
Queue Length 95th (m)	0.1	0.0	0.0	3.6
Control Delay (s)	8.3	0.0	0.0	12.9
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	12.9
Approach LOS				B

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	35.7%	ICU Level of Service	A	
Analysis Period (min)	15			

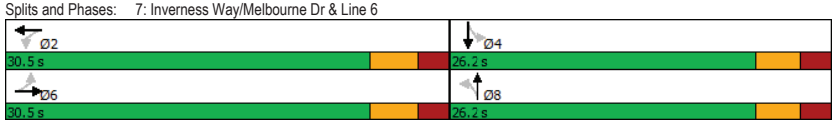
Queues
7: Inverness Way/Melbourne Dr & Line 6

Future Background 2036 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	80	425	5	300	35	40	150	40
Future Volume (vph)	80	425	5	300	35	40	150	40
Lane Group Flow (vph)	92	506	6	494	40	69	172	149
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.20	0.47	0.01	0.46	0.12	0.14	0.52	0.29
Control Delay	9.7	10.4	7.8	9.6	13.8	10.2	20.9	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	10.4	7.8	9.6	13.8	10.2	20.9	7.2
Queue Length 50th (m)	3.8	25.3	0.2	21.7	2.7	3.1	13.2	3.1
Queue Length 95th (m)	14.5	64.7	2.0	58.7	7.7	9.4	26.0	12.2
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	459	1086	491	1067	528	759	539	765
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.47	0.01	0.46	0.08	0.09	0.32	0.19

Intersection Summary
Cycle Length: 56.7
Actuated Cycle Length: 48.9
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Background 2036 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	425	15	5	300	130	35	40	20	150	40	90
Future Volume (vph)	80	425	15	5	300	130	35	40	20	150	40	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		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	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	0.95		1.00	0.95		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1796		1805	1735		1752	1728		1669	1635	
Flt Permitted	0.44	1.00		0.43	1.00		0.66	1.00		0.71	1.00	
Satd. Flow (perm)	761	1796		813	1735		1222	1728		1251	1635	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	92	489	17	6	345	149	40	46	23	172	46	103
RTOR Reduction (vph)	0	2	0	0	21	0	0	18	0	0	81	0
Lane Group Flow (vph)	92	504	0	6	473	0	40	51	0	172	68	0
Confl. Peds. (#/hr)	5					5			10	10		
Heavy Vehicles (%)	9%	5%	13%	0%	5%	1%	3%	2%	6%	7%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	28.4	28.4		28.4	28.4		10.9	10.9		10.9	10.9	
Effective Green, g (s)	28.4	28.4		28.4	28.4		10.9	10.9		10.9	10.9	
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.22	0.22		0.22	0.22	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	432	1020		461	985		266	376		272	356	
v/s Ratio Prot		c0.28			0.27			0.03			0.04	
v/s Ratio Perm	0.12			0.01			0.03			c0.14		
v/c Ratio	0.21	0.49		0.01	0.48		0.15	0.14		0.63	0.19	
Uniform Delay, d1	5.3	6.5		4.7	6.4		15.8	15.8		17.7	16.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4		0.0	0.4		0.3	0.2		4.7	0.3	
Delay (s)	5.6	6.9		4.7	6.8		16.1	15.9		22.5	16.2	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		6.7			6.8			16.0			19.6	
Approach LOS		A			A			B			B	

Intersection Summary					
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B		
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	10.7		
Intersection Capacity Utilization	81.8%	ICU Level of Service	D		
Analysis Period (min)	15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Background 2036 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	570	10	20	415	10	20	0	35	5	0	0
Future Volume (Veh/h)	15	570	10	20	415	10	20	0	35	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	712	12	25	519	12	25	0	44	6	0	0
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked	1.00			0.91			0.91	0.91	0.91	0.91	0.91	1.00
vC, conflicting volume	536			724			1325	1342	718	1374	1342	530
vC1, stage 1 conf vol							756	756		580	580	
vC2, stage 2 conf vol							569	586		794	762	
vCu, unblocked vol	532			647			1297	1316	640	1351	1316	526
tC, single (s)	4.3			4.1			7.1	6.5	6.2	8.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		7.1	5.5	
tF (s)	2.4			2.2			3.5	4.0	3.3	4.4	4.0	3.8
p0 queue free %	98			97			92	100	90	97	100	100
cM capacity (veh/h)	938			863			319	325	431	185	316	465

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	19	724	25	531	69	6
Volume Left	19	0	25	0	25	6
Volume Right	0	12	0	12	44	0
cSH	938	1700	863	1700	382	185
Volume to Capacity	0.02	0.43	0.03	0.31	0.18	0.03
Queue Length 95th (m)	0.5	0.0	0.7	0.0	5.2	0.8
Control Delay (s)	8.9	0.0	9.3	0.0	16.5	25.1
Lane LOS	A		A		C	D
Approach Delay (s)	0.2		0.4		16.5	25.1
Approach LOS					C	D

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	40.6%	ICU Level of Service	A	
Analysis Period (min)	15			

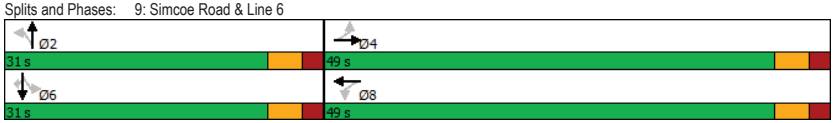
Queues
9: Simcoe Road & Line 6

Future Background 2036 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	445	25	5	55	200	205	140	250
Future Volume (vph)	445	25	5	55	200	205	140	250
Lane Group Flow (vph)	500	202	6	68	225	236	157	281
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA	Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		8		2			6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (s)	49.0	49.0	49.0	49.0	31.0	31.0	31.0	31.0
Total Split (%)	61.3%	61.3%	61.3%	61.3%	38.8%	38.8%	38.8%	38.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.81	0.25	0.01	0.08	0.52	0.38	0.24	0.38
Control Delay	26.8	3.2	8.8	8.8	24.1	19.7	18.0	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	3.2	8.8	8.8	24.1	19.7	18.0	4.4
Queue Length 50th (m)	52.1	1.8	0.4	4.2	21.3	20.8	13.2	0.0
Queue Length 95th (m)	91.3	10.9	2.0	10.0	53.2	49.3	33.2	15.8
Internal Link Dist (m)		261.6		146.8		400.7	164.9	
Turn Bay Length (m)	50.0		20.0		110.0			
Base Capacity (vph)	862	1084	625	1179	453	646	696	764
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.19	0.01	0.06	0.50	0.37	0.23	0.37

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 67.1
Natural Cycle: 65
Control Type: Actuated-Uncoordinated

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Background 2036 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	445	25	155	5	55	5	200	205	5	0	140	250
Future Volume (vph)	445	25	155	5	55	5	200	205	5	0	140	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.87		1.00	0.99		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1563		1437	1793		1703	1679			1810	1538
Flt Permitted	0.71	1.00		0.63	1.00		0.66	1.00			1.00	1.00
Satd. Flow (perm)	1315	1563		954	1793		1178	1679			1810	1538
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	500	28	174	6	62	6	225	230	6	0	157	281
RTOR Reduction (vph)	0	92	0	0	3	0	0	1	0	0	0	178
Lane Group Flow (vph)	500	110	0	6	65	0	225	235	0	0	157	103
Confl. Peds. (#/hr)			5	5					5	5		
Heavy Vehicles (%)	3%	0%	4%	25%	5%	0%	6%	13%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	31.4	31.4		31.4	31.4		24.5	24.5			24.5	24.5
Effective Green, g (s)	31.4	31.4		31.4	31.4		24.5	24.5			24.5	24.5
Actuated g/C Ratio	0.47	0.47		0.47	0.47		0.37	0.37			0.37	0.37
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	617	733		447	841		431	614			662	563
v/s Ratio Prot		0.07			0.04			0.14			0.09	
v/s Ratio Perm	c0.38			0.01			c0.19					0.07
v/c Ratio	0.81	0.15		0.01	0.08		0.52	0.38			0.24	0.18
Uniform Delay, d1	15.2	10.1		9.5	9.8		16.6	15.6			14.7	14.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	7.9	0.1		0.0	0.0		1.1	0.4			0.2	0.2
Delay (s)	23.1	10.2		9.5	9.8		17.8	16.0			14.9	14.6
Level of Service	C	B		A	A		B	B			B	B
Approach Delay (s)		19.4			9.8			16.9			14.7	
Approach LOS		B			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	66.9	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	85.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Background 2036 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	50	20	275	275	10
Future Volume (Veh/h)	25	50	20	275	275	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	34	68	27	377	377	14
Pedestrians	5			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	820	394	396			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	820	394	396			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	90	89	98			
cM capacity (veh/h)	327	645	1116			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	404	391
Volume Left	34	27	0
Volume Right	68	0	14
cSH	487	1116	1700
Volume to Capacity	0.21	0.02	0.23
Queue Length 95th (m)	6.3	0.6	0.0
Control Delay (s)	14.3	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	14.3	0.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Background 2036 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	10	5	230	270	15
Future Volume (Veh/h)	25	10	5	230	270	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	28	11	6	256	300	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)						
pX, platoon unblocked						
vC, conflicting volume	576	308	317			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	576	308	317			
tC, single (s)	6.5	6.2	4.6			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.7			
p0 queue free %	94	99	99			
cM capacity (veh/h)	464	736	1016			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	262	317
Volume Left	28	6	0
Volume Right	11	0	17
cSH	518	1016	1700
Volume to Capacity	0.08	0.01	0.19
Queue Length 95th (m)	1.9	0.1	0.0
Control Delay (s)	12.5	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.5	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		26.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Background 2036 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	160	35	0	0	20	35	0	0	0	70	5	195
Future Volume (vph)	160	35	0	0	20	35	0	0	0	70	5	195
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	190	42	0	0	24	42	0	0	0	83	6	232

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	232	66	0	321
Volume Left (vph)	190	0	0	83
Volume Right (vph)	0	42	0	232
Hadj (s)	0.32	-0.19	0.00	-0.30
Departure Headway (s)	5.1	4.8	5.1	4.4
Degree Utilization, x	0.33	0.09	0.00	0.39
Capacity (veh/h)	670	686	651	779
Control Delay (s)	10.5	8.3	8.1	10.1
Approach Delay (s)	10.5	8.3	0.0	10.1
Approach LOS	B	A	A	B

Intersection Summary			
Delay		10.1	
Level of Service		B	
Intersection Capacity Utilization		40.2%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Background 2036 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	35	0	115	120	95
Future Volume (Veh/h)	80	35	0	115	120	95
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	96	42	0	139	145	114
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	341	202	259			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	341	202	259			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	95	100			
cM capacity (veh/h)	659	844	1317			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	138	139	259
Volume Left	96	0	0
Volume Right	42	0	114
cSH	706	1317	1700
Volume to Capacity	0.20	0.00	0.15
Queue Length 95th (m)	5.8	0.0	0.0
Control Delay (s)	11.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.3	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		2.9		
Intersection Capacity Utilization		25.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Background 2036 AM Peak Hour



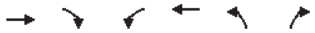
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	95	15	165	105	15	280
Future Volume (Veh/h)	95	15	165	105	15	280
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	116	18	201	128	18	341
Pedestrians						
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	472	164			329	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	472	164			329	
tC, single (s)	6.8	6.9			4.8	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.5	
p0 queue free %	78	98			98	
cM capacity (veh/h)	517	857			1032	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	134	134	195	132	227
Volume Left	116	0	0	18	0
Volume Right	18	0	128	0	0
cSH	546	1700	1700	1032	1700
Volume to Capacity	0.25	0.08	0.11	0.02	0.13
Queue Length 95th (m)	7.7	0.0	0.0	0.4	0.0
Control Delay (s)	13.7	0.0	0.0	1.3	0.0
Lane LOS	B			A	
Approach Delay (s)	13.7	0.0		0.5	
Approach LOS	B				

Intersection Summary				
Average Delay		2.4		
Intersection Capacity Utilization		31.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Background 2036 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	110	10	5	90	20	5
Future Volume (Veh/h)	110	10	5	90	20	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	116	11	5	95	21	5
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			127		226	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			127		226	122
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			1472		764	935

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	127	100	26
Volume Left	0	5	21
Volume Right	11	0	5
cSH	1700	1472	791
Volume to Capacity	0.07	0.00	0.03
Queue Length 95th (m)	0.0	0.1	0.8
Control Delay (s)	0.0	0.4	9.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.4	9.7
Approach LOS			A

Intersection Summary				
Average Delay		1.2		
Intersection Capacity Utilization	18.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Background 2036 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	115	95	0	0	0
Future Volume (Veh/h)	0	115	95	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	121	100	0	0	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	100				221	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	100				221	100
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1505				772	961

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	121	100	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1505	1700	1700	1700
Volume to Capacity	0.00	0.06	0.10	0.07
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS			A	

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization	9.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Background 2036 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	45	190	5	20	260
Future Volume (Veh/h)	10	45	190	5	20	260
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)	11	49	207	5	22	283
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	536	210			212	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	536	210			212	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			98	
cM capacity (veh/h)	500	836			1370	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	60	212	305
Volume Left	11	0	22
Volume Right	49	5	0
cSH	744	1700	1370
Volume to Capacity	0.08	0.12	0.02
Queue Length 95th (m)	2.1	0.0	0.4
Control Delay (s)	10.3	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	0.7
Approach LOS	B		

Intersection Summary				
Average Delay		1.4		
Intersection Capacity Utilization		38.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Background 2036 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	95	285	5	30	265
Future Volume (Veh/h)	10	95	285	5	30	265
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)	11	103	310	5	33	288
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	666	312			315	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	666	312			315	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	86			97	
cM capacity (veh/h)	416	732			1257	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	114	315	321
Volume Left	11	0	33
Volume Right	103	5	0
cSH	682	1700	1257
Volume to Capacity	0.17	0.19	0.03
Queue Length 95th (m)	4.8	0.0	0.6
Control Delay (s)	11.3	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	11.3	0.0	1.0
Approach LOS	B		

Intersection Summary				
Average Delay		2.2		
Intersection Capacity Utilization		47.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Background 2036 PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	485	465	80	45	20
Future Volume (Veh/h)	65	485	465	80	45	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	71	533	511	88	49	22
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	599				1230	555
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	599				1230	555
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				73	96
cM capacity (veh/h)	978				181	535

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	71	533	599	71
Volume Left	71	0	0	49
Volume Right	0	0	88	22
cSH	978	1700	1700	228
Volume to Capacity	0.07	0.31	0.35	0.31
Queue Length 95th (m)	1.9	0.0	0.0	10.2
Control Delay (s)	9.0	0.0	0.0	27.8
Lane LOS	A			D
Approach Delay (s)	1.1		0.0	27.8
Approach LOS				D

Intersection Summary			
Average Delay		2.0	
Intersection Capacity Utilization		46.6%	ICU Level of Service A
Analysis Period (min)		15	

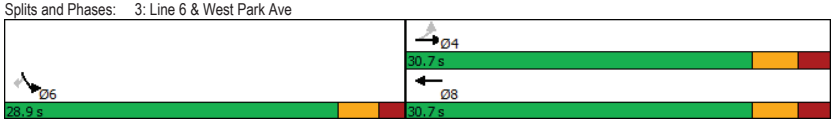
Queues
3: Line 6 & West Park Ave

Future Background 2036 PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	50	480	515	150	30
Future Volume (vph)	50	480	515	150	30
Lane Group Flow (vph)	56	539	714	169	34
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.16	0.45	0.62	0.41	0.08
Control Delay	7.5	8.3	11.2	18.5	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	8.3	11.2	18.5	6.6
Queue Length 50th (m)	2.0	24.5	36.3	12.3	0.0
Queue Length 95th (m)	7.7	51.6	#85.3	25.1	4.8
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	352	1195	1158	915	851
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.16	0.45	0.62	0.18	0.04

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 46.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Background 2036 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	50	480	515	120	150	30
Future Volume (vph)	50	480	515	120	150	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1802	1900	1828		1770	1615
Flt Permitted	0.29	1.00	1.00		0.95	1.00
Satd. Flow (perm)	559	1900	1828		1770	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	56	539	579	135	169	34
RTOR Reduction (vph)	0	0	10	0	0	28
Lane Group Flow (vph)	56	539	704	0	169	6
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	0%	0%	1%	0%	2%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	28.1	28.1	28.1		8.8	8.8
Effective Green, g (s)	28.1	28.1	28.1		8.8	8.8
Actuated g/C Ratio	0.59	0.59	0.59		0.19	0.19
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	330	1124	1081		327	299
v/s Ratio Prot		0.28	c0.39		c0.10	
v/s Ratio Perm	0.10					0.00
v/c Ratio	0.17	0.48	0.65		0.52	0.02
Uniform Delay, d1	4.4	5.5	6.4		17.4	15.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.3	1.4		1.4	0.0
Delay (s)	4.6	5.9	7.9		18.8	15.9
Level of Service	A	A	A		B	B
Approach Delay (s)		5.7	7.9		18.3	
Approach LOS		A	A		B	

Intersection Summary				
HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	47.5	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	58.7%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Background 2036 PM Peak Hour



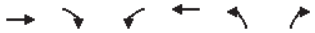
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	605	10	10	625	15	5	5	5	5	0	5
Future Volume (Veh/h)	15	605	10	10	625	15	5	5	5	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	672	11	11	694	17	6	6	6	6	0	6
Pedestrians		10			10						10	
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		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked				0.92			0.92	0.92	0.92	0.92	0.92	
vC, conflicting volume	721			683			1444	1454	688	1460	1452	722
vC1, stage 1 conf vol							712	712		734	734	
vC2, stage 2 conf vol							732	743		725	717	
vCu, unblocked vol	721			611			1439	1450	616	1456	1447	722
tC, single (s)	4.1			4.2			7.1	6.5	6.5	7.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.3			3.5	4.0	3.5	3.5	4.0	3.8
p0 queue free %	98			99			98	98	99	98	100	98
cM capacity (veh/h)	883			855			292	306	411	288	309	350

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	683	11	711	18	12
Volume Left	17	0	11	0	6	6
Volume Right	0	11	0	17	6	6
cSH	883	1700	855	1700	329	316
Volume to Capacity	0.02	0.40	0.01	0.42	0.05	0.04
Queue Length 95th (m)	0.5	0.0	0.3	0.0	1.4	0.9
Control Delay (s)	9.2	0.0	9.3	0.0	16.6	16.8
Lane LOS	A		A		C	C
Approach Delay (s)	0.2		0.1		16.6	16.8
Approach LOS					C	C

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	46.7%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Background 2036 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	615	0	0	650	0	0
Future Volume (Veh/h)	615	0	0	650	0	0
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)	668	0	0	707	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked					0.79	
vC, conflicting volume			668		1375	668
vC1, stage 1 conf vol					668	
vC2, stage 2 conf vol					707	
vCu, unblocked vol			668		1342	668
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			931		369	462

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	668	0	707	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.39	0.00	0.42	0.19	0.20
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS				A	A
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS				A	

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	37.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Background 2036 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	585	640	70	35	10
Future Volume (Veh/h)	30	585	640	70	35	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	33	650	711	78	39	11
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked	0.66				0.66	0.66
vC, conflicting volume	794				1471	755
vC1, stage 1 conf vol					755	
vC2, stage 2 conf vol					716	
vCu, unblocked vol	433				1456	374
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				88	98
cM capacity (veh/h)	739				331	446

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	33	650	789	50
Volume Left	33	0	0	39
Volume Right	0	0	78	11
cSH	739	1700	1700	351
Volume to Capacity	0.04	0.38	0.46	0.14
Queue Length 95th (m)	1.1	0.0	0.0	3.9
Control Delay (s)	10.1	0.0	0.0	16.9
Lane LOS	B			C
Approach Delay (s)	0.5		0.0	16.9
Approach LOS				C

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	48.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Queues
7: Inverness Way/Melbourne Dr & Line 6

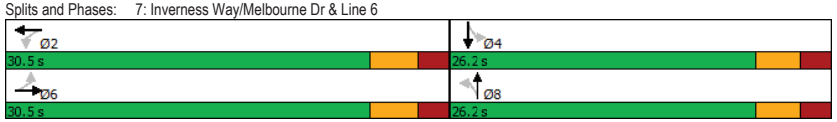
Future Background 2036 PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	105	480	10	625	20	20	125	30
Future Volume (vph)	105	480	10	625	20	20	125	30
Lane Group Flow (vph)	118	578	11	848	22	28	140	107
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.54	0.51	0.03	0.75	0.07	0.06	0.40	0.22
Control Delay	25.9	10.4	7.7	17.5	13.3	11.4	18.3	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.9	10.4	7.7	17.5	13.3	11.4	18.3	7.4
Queue Length 50th (m)	5.8	26.9	0.4	49.5	1.5	1.5	10.3	2.3
Queue Length 95th (m)	#35.7	78.5	2.9	#160.8	5.2	5.5	21.5	10.3
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	218	1142	440	1136	570	810	598	776
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.51	0.03	0.75	0.04	0.03	0.23	0.14

Intersection Summary

Cycle Length: 56.7
Actuated Cycle Length: 48.2
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Background 2036 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	480	35	10	625	130	20	20	5	125	30	65
Future Volume (vph)	105	480	35	10	625	130	20	20	5	125	30	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.98	
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	0.97		1.00	0.97		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	1860		1801	1840		1796	1839		1752	1676	
Flt Permitted	0.19	1.00		0.38	1.00		0.69	1.00		0.74	1.00	
Satd. Flow (perm)	357	1860		718	1840		1301	1839		1363	1676	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	118	539	39	11	702	146	22	22	6	140	34	73
RTOR Reduction (vph)	0	3	0	0	10	0	0	5	0	0	58	0
Lane Group Flow (vph)	118	575	0	11	838	0	22	23	0	140	49	0
Confl. Peds. (#/hr)	5		5	5		5	5					5
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	28.4	28.4		28.4	28.4		10.1	10.1		10.1	10.1	
Effective Green, g (s)	28.4	28.4		28.4	28.4		10.1	10.1		10.1	10.1	
Actuated g/C Ratio	0.58	0.58		0.58	0.58		0.21	0.21		0.21	0.21	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	206	1073		414	1062		267	377		279	344	
v/s Ratio Prot		0.31			c0.46			0.01			0.03	
v/s Ratio Perm	0.33			0.02			0.02			c0.10		
v/c Ratio	0.57	0.54		0.03	0.79		0.08	0.06		0.50	0.14	
Uniform Delay, d1	6.6	6.4		4.5	8.1		15.8	15.7		17.3	16.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.5		0.0	4.0		0.1	0.1		1.4	0.2	
Delay (s)	10.4	6.9		4.5	12.0		15.9	15.8		18.7	16.2	
Level of Service	B	A		A	B		B	B		B	B	
Approach Delay (s)		7.5			11.9			15.9			17.6	
Approach LOS		A			B			B			B	

Intersection Summary

HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	10.7	
Intersection Capacity Utilization	89.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Background 2036 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	585	20	45	745	5	10	0	25	10	0	10
Future Volume (Veh/h)	0	585	20	45	745	5	10	0	25	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	672	23	52	856	6	11	0	29	11	0	11
Pedestrians								5			5	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked	0.97			0.86			0.88	0.88	0.86	0.88	0.88	0.97
vC, conflicting volume	867			700			1660	1660	688	1669	1668	864
vC1, stage 1 conf vol							688	688		968	968	
vC2, stage 2 conf vol							971	971		701	700	
vCu, unblocked vol	848			572			1608	1608	559	1619	1617	845
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			94			95	100	94	95	100	97
cM capacity (veh/h)	772			868			237	259	457	226	249	354

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	695	52	862	40	22
Volume Left	0	0	52	0	11	11
Volume Right	0	23	0	6	29	11
cSH	1700	1700	868	1700	364	276
Volume to Capacity	0.00	0.41	0.06	0.51	0.11	0.08
Queue Length 95th (m)	0.0	0.0	1.5	0.0	2.9	2.1
Control Delay (s)	0.0	0.0	9.4	0.0	16.1	19.2
Lane LOS			A		C	C
Approach Delay (s)	0.0		0.5		16.1	19.2
Approach LOS					C	C

Intersection Summary					
Average Delay	0.9				
Intersection Capacity Utilization	49.5%	ICU Level of Service		A	
Analysis Period (min)	15				

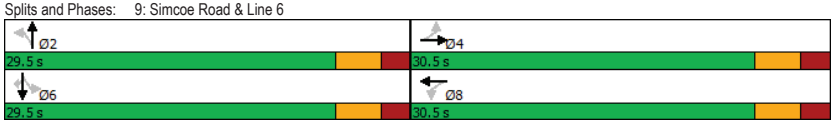
Queues
9: Simcoe Road & Line 6

Future Background 2036 PM Peak Hour

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	350	110	40	260	305	5	185	540
Future Volume (vph)	350	110	40	260	305	5	185	540
Lane Group Flow (vph)	376	322	48	280	355	0	204	581
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4	8		2		6	
Permitted Phases	4			2		6		6
Detector Phase	4	4	8	2	2	6	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	24.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.66	0.39	0.06	0.59	0.47		0.28	0.59
Control Delay	20.7	7.1	10.0	20.4	15.5		13.4	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	20.7	7.1	10.0	20.4	15.5		13.4	4.1
Queue Length 50th (m)	33.4	10.2	2.9	24.5	28.4		15.3	0.0
Queue Length 95th (m)	61.0	25.5	8.1	47.4	49.1		28.5	16.8
Internal Link Dist (m)		261.6	146.8		400.7		164.9	
Turn Bay Length (m)	50.0			110.0				
Base Capacity (vph)	574	820	779	474	756		738	988
Starvation Cap Reductn	0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0
Reduced v/c Ratio	0.66	0.39	0.06	0.59	0.47		0.28	0.59

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Background 2036 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	350	110	190	0	40	5	260	305	25	5	185	540
Future Volume (vph)	350	110	190	0	40	5	260	305	25	5	185	540
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.90			0.98		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1805	1719			1864		1787	1878			1861	1599
Flt Permitted	0.73	1.00			1.00		0.63	1.00			0.99	1.00
Satd. Flow (perm)	1379	1719			1864		1185	1878			1846	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	376	118	204	0	43	5	280	328	27	5	199	581
RTOR Reduction (vph)	0	104	0	0	3	0	0	5	0	0	0	349
Lane Group Flow (vph)	376	218	0	0	45	0	280	350	0	0	204	232
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42			0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	574	716			776		474	751			738	639
v/s Ratio Prot		0.13			0.02			0.19				
v/s Ratio Perm	c0.27						c0.24				0.11	0.15
v/c Ratio	0.66	0.30			0.06		0.59	0.47			0.28	0.36
Uniform Delay, d1	14.0	11.7			10.5		14.1	13.3			12.1	12.6
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	2.7	0.2			0.0		2.0	0.5			0.2	0.4
Delay (s)	16.7	11.9			10.5		16.1	13.7			12.3	13.0
Level of Service	B	B			B		B	B			B	B
Approach Delay (s)		14.5			10.5			14.8			12.8	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	88.0%	ICU Level of Service	E	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Background 2036 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	5	25	535	255	25
Future Volume (Veh/h)	15	5	25	535	255	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	18	6	29	629	300	29
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1012	330	339			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1012	330	339			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	98			
cM capacity (veh/h)	259	708	1221			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	658	329
Volume Left	18	29	0
Volume Right	6	0	29
cSH	308	1221	1700
Volume to Capacity	0.08	0.02	0.19
Queue Length 95th (m)	2.0	0.6	0.0
Control Delay (s)	17.7	0.6	0.0
Lane LOS	C	A	
Approach Delay (s)	17.7	0.6	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Background 2036 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	5	10	520	235	25
Future Volume (Veh/h)	20	5	10	520	235	25
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)	22	5	11	565	255	27
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	866	284	292			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	866	284	292			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	99			
cM capacity (veh/h)	321	751	1271			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	576	282
Volume Left	22	11	0
Volume Right	5	0	27
cSH	359	1271	1700
Volume to Capacity	0.08	0.01	0.17
Queue Length 95th (m)	1.9	0.2	0.0
Control Delay (s)	15.8	0.3	0.0
Lane LOS	C	A	
Approach Delay (s)	15.8	0.3	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		46.9%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Background 2036 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	370	45	0	5	55	155	5	5	0	65	5	115
Future Volume (vph)	370	45	0	5	55	155	5	5	0	65	5	115
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	451	55	0	6	67	189	6	6	0	79	6	140

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	506	262	12	225
Volume Left (vph)	451	6	6	79
Volume Right (vph)	0	189	0	140
Hadj (s)	0.22	-0.41	0.10	-0.30
Departure Headway (s)	5.2	4.9	6.5	5.5
Degree Utilization, x	0.73	0.36	0.02	0.35
Capacity (veh/h)	677	689	465	586
Control Delay (s)	20.8	10.6	9.6	11.5
Approach Delay (s)	20.8	10.6	9.6	11.5
Approach LOS	C	B	A	B

Intersection Summary				
Delay		15.9		
Level of Service		C		
Intersection Capacity Utilization		57.9%	ICU Level of Service	B
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Background 2036 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	160	5	15	255	65	110
Future Volume (Veh/h)	160	5	15	255	65	110
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	184	6	17	293	75	126
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	465	138	201			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	465	138	201			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	66	99	99			
cM capacity (veh/h)	540	916	1342			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	190	310	201
Volume Left	184	17	0
Volume Right	6	0	126
cSH	547	1342	1700
Volume to Capacity	0.35	0.01	0.12
Queue Length 95th (m)	12.4	0.3	0.0
Control Delay (s)	15.1	0.5	0.0
Lane LOS	C	A	
Approach Delay (s)	15.1	0.5	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		4.3		
Intersection Capacity Utilization		41.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Background 2036 PM Peak Hour



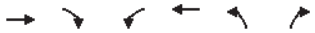
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	105	30	465	160	20	185
Future Volume (Veh/h)	105	30	465	160	20	185
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	117	33	517	178	22	206
Pedestrians						
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	753	348			695	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	753	348			695	
tC, single (s)	6.9	7.0			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	65	95			98	
cM capacity (veh/h)	331	640			910	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	150	345	350	91	137
Volume Left	117	0	0	22	0
Volume Right	33	0	178	0	0
cSH	370	1700	1700	910	1700
Volume to Capacity	0.40	0.20	0.21	0.02	0.08
Queue Length 95th (m)	15.3	0.0	0.0	0.6	0.0
Control Delay (s)	21.2	0.0	0.0	2.4	0.0
Lane LOS	C			A	
Approach Delay (s)	21.2	0.0		0.9	
Approach LOS	C				

Intersection Summary				
Average Delay		3.2		
Intersection Capacity Utilization		35.0%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Background 2036 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	155	25	0	125	10	5
Future Volume (Veh/h)	155	25	0	125	10	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	172	28	0	139	11	6
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			200		325	186
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			200		325	186
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1384		673	861

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	200	139	17
Volume Left	0	0	11
Volume Right	28	0	6
cSH	1700	1384	729
Volume to Capacity	0.12	0.00	0.02
Queue Length 95th (m)	0.0	0.0	0.6
Control Delay (s)	0.0	0.0	10.1
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.1
Approach LOS			B

Intersection Summary				
Average Delay		0.5		
Intersection Capacity Utilization		19.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Background 2036 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	160	125	0	0	0
Future Volume (Veh/h)	0	160	125	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	178	139	0	0	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	139				317	139
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	139				317	139
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1457				680	915

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	178	139	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1457	1700	1700	1700
Volume to Capacity	0.00	0.08	0.10	0.07
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS			A	

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		11.8%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Background 2036 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	505	25	60	180
Future Volume (Veh/h)	5	25	505	25	60	180
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)	5	27	549	27	65	196
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	888	562			576	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	888	562			576	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			94	
cM capacity (veh/h)	296	530			1007	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	576	261
Volume Left	5	0	65
Volume Right	27	27	0
cSH	472	1700	1007
Volume to Capacity	0.07	0.34	0.06
Queue Length 95th (m)	1.7	0.0	1.7
Control Delay (s)	13.2	0.0	2.7
Lane LOS	B		A
Approach Delay (s)	13.2	0.0	2.7
Approach LOS	B		

Intersection Summary				
Average Delay		1.3		
Intersection Capacity Utilization		54.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Background 2036 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	495	25	95	265
Future Volume (Veh/h)	5	60	495	25	95	265
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)	5	65	538	27	103	288
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	1046	552			565	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1046	552			565	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	88			90	
cM capacity (veh/h)	230	538			1017	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	565	391
Volume Left	5	0	103
Volume Right	65	27	0
cSH	491	1700	1017
Volume to Capacity	0.14	0.33	0.10
Queue Length 95th (m)	4.0	0.0	2.7
Control Delay (s)	13.6	0.0	3.2
Lane LOS	B		A
Approach Delay (s)	13.6	0.0	3.2
Approach LOS	B		

Intersection Summary				
Average Delay		2.1		
Intersection Capacity Utilization		60.8%	ICU Level of Service	B
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Total 2036 AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	340	435	35	40	50
Future Volume (Veh/h)	5	340	435	35	40	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	5	374	478	38	44	55
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	516				881	497
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	516				881	497
tC, single (s)	4.2				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.3
p0 queue free %	99				86	90
cM capacity (veh/h)	991				314	573

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	374	516	99
Volume Left	5	0	0	44
Volume Right	0	0	38	55
cSH	991	1700	1700	420
Volume to Capacity	0.01	0.22	0.30	0.24
Queue Length 95th (m)	0.1	0.0	0.0	7.2
Control Delay (s)	8.7	0.0	0.0	16.2
Lane LOS	A			C
Approach Delay (s)	0.1		0.0	16.2
Approach LOS				C

Intersection Summary			
Average Delay		1.7	
Intersection Capacity Utilization		37.0%	ICU Level of Service A
Analysis Period (min)		15	

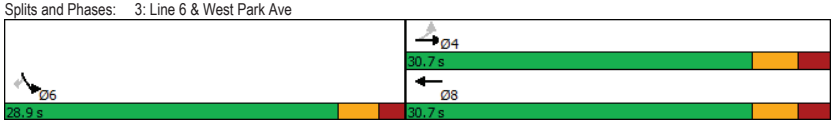
Queues
3: Line 6 & West Park Ave

Future Total 2036 AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	20	360	425	165	45
Future Volume (vph)	20	360	425	165	45
Lane Group Flow (vph)	23	409	619	188	51
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.06	0.38	0.55	0.45	0.12
Control Delay	6.5	7.9	9.7	19.1	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	7.9	9.7	19.1	5.9
Queue Length 50th (m)	0.8	17.4	28.9	13.9	0.0
Queue Length 95th (m)	3.8	38.9	64.9	27.1	5.7
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	385	1090	1121	900	854
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.06	0.38	0.55	0.21	0.06

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 46.8
Natural Cycle: 60
Control Type: Actuated-Uncoordinated

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Total 2036 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	20	360	425	120	165	45
Future Volume (vph)	20	360	425	120	165	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1743	1775		1752	1615
Flt Permitted	0.36	1.00	1.00		0.95	1.00
Satd. Flow (perm)	615	1743	1775		1752	1615
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	23	409	483	136	188	51
RTOR Reduction (vph)	0	0	12	0	0	41
Lane Group Flow (vph)	23	409	607	0	188	10
Heavy Vehicles (%)	11%	9%	3%	7%	3%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	28.1	28.1	28.1		9.1	9.1
Effective Green, g (s)	28.1	28.1	28.1		9.1	9.1
Actuated g/C Ratio	0.59	0.59	0.59		0.19	0.19
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	361	1024	1043		333	307
v/s Ratio Prot		0.23	c0.34		c0.11	
v/s Ratio Perm	0.04					0.01
v/c Ratio	0.06	0.40	0.58		0.56	0.03
Uniform Delay, d1	4.2	5.3	6.2		17.6	15.8
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.3	0.8		2.2	0.0
Delay (s)	4.3	5.6	7.0		19.7	15.8
Level of Service	A	A	A		B	B
Approach Delay (s)		5.5	7.0		18.9	
Approach LOS		A	A		B	

Intersection Summary				
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.58			
Actuated Cycle Length (s)	47.8	Sum of lost time (s)	10.6	
Intersection Capacity Utilization	47.6%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Total 2036 AM Peak Hour



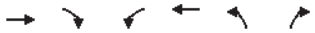
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	500	20	10	505	5	30	5	20	15	0	10
Future Volume (Veh/h)	5	500	20	10	505	5	30	5	20	15	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	543	22	11	549	5	33	5	22	16	0	11
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked												
vC, conflicting volume	559			565			1146	1145	554	1156	1154	556
vC1, stage 1 conf vol							564	564		578	578	
vC2, stage 2 conf vol							582	581		578	575	
vCu, unblocked vol	559			565			1146	1145	554	1156	1154	556
tC, single (s)	4.1			4.3			7.3	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.3	5.5		6.1	5.5	
tF (s)	2.2			2.4			3.7	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			90	99	96	96	100	98
cM capacity (veh/h)	1018			936			346	389	536	366	385	532

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	5	565	11	554	60	27
Volume Left	5	0	11	0	33	16
Volume Right	0	22	0	5	22	11
cSH	1018	1700	936	1700	402	419
Volume to Capacity	0.00	0.33	0.01	0.33	0.15	0.06
Queue Length 95th (m)	0.1	0.0	0.3	0.0	4.2	1.6
Control Delay (s)	8.6	0.0	8.9	0.0	15.5	14.2
Lane LOS	A		A		C	B
Approach Delay (s)	0.1		0.2		15.5	14.2
Approach LOS					C	B

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	37.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Total 2036 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	495	40	15	440	80	110
Future Volume (Veh/h)	495	40	15	440	80	110
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	532	43	16	473	86	118
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked						
vC, conflicting volume			575		1058	554
vC1, stage 1 conf vol					554	
vC2, stage 2 conf vol					505	
vCu, unblocked vol			575		1058	554
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		81	78
cM capacity (veh/h)			1008		464	536

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	575	16	473	86	118
Volume Left	0	16	0	86	0
Volume Right	43	0	0	0	118
cSH	1700	1008	1700	464	536
Volume to Capacity	0.34	0.02	0.28	0.19	0.22
Queue Length 95th (m)	0.0	0.4	0.0	5.4	6.7
Control Delay (s)	0.0	8.6	0.0	14.5	13.6
Lane LOS		A		B	B
Approach Delay (s)	0.0	0.3		14.0	
Approach LOS				B	

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	42.0%	ICU Level of Service		A
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Total 2036 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	600	430	20	40	25
Future Volume (Veh/h)	5	600	430	20	40	25
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	5	645	462	22	43	27
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked						
vC, conflicting volume	489				1133	478
vC1, stage 1 conf vol					478	
vC2, stage 2 conf vol					655	
vCu, unblocked vol	489				1133	478
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				90	95
cM capacity (veh/h)	1080				433	589

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	5	645	484	70
Volume Left	5	0	0	43
Volume Right	0	0	22	27
cSH	1080	1700	1700	482
Volume to Capacity	0.00	0.38	0.28	0.15
Queue Length 95th (m)	0.1	0.0	0.0	4.0
Control Delay (s)	8.3	0.0	0.0	13.7
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	13.7
Approach LOS				B

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	42.0%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
7: Inverness Way/Melbourne Dr & Line 6

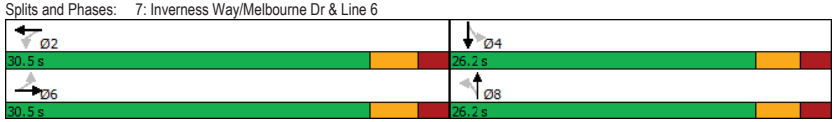
Future Total 2036 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	80	545	30	320	40	85	150	45
Future Volume (vph)	80	545	30	320	40	85	150	45
Lane Group Flow (vph)	92	643	34	517	46	161	172	155
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.21	0.59	0.09	0.49	0.13	0.30	0.51	0.28
Control Delay	10.1	13.9	8.9	10.3	13.8	10.5	20.8	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	13.9	8.9	10.3	13.8	10.5	20.8	7.2
Queue Length 50th (m)	4.0	37.4	1.4	24.4	3.2	6.9	13.4	3.6
Queue Length 95th (m)	14.7	#105.9	6.5	63.0	8.6	16.8	26.7	12.9
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	436	1082	365	1063	576	841	545	833
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.59	0.09	0.49	0.08	0.19	0.32	0.19

Intersection Summary

Cycle Length: 56.7
Actuated Cycle Length: 46.3
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Total 2036 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	545	15	30	320	130	40	85	55	150	45	90
Future Volume (vph)	80	545	15	30	320	130	40	85	55	150	45	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		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	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	0.96		1.00	0.94		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1799		1805	1738		1752	1706		1672	1645	
Flt Permitted	0.42	1.00		0.32	1.00		0.66	1.00		0.66	1.00	
Satd. Flow (perm)	727	1799		608	1738		1215	1706		1153	1645	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	92	626	17	34	368	149	46	98	63	172	52	103
RTOR Reduction (vph)	0	1	0	0	21	0	0	49	0	0	80	0
Lane Group Flow (vph)	92	642	0	34	496	0	46	112	0	172	75	0
Confl. Peds. (#/hr)	5					5			10	10		
Heavy Vehicles (%)	9%	5%	13%	0%	5%	1%	3%	2%	6%	7%	0%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	26.2	26.2		26.2	26.2		10.5	10.5		10.5	10.5	
Effective Green, g (s)	26.2	26.2		26.2	26.2		10.5	10.5		10.5	10.5	
Actuated g/C Ratio	0.55	0.55		0.55	0.55		0.22	0.22		0.22	0.22	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	401	994		336	960		269	377		255	364	
v/s Ratio Prot		c0.36			0.29			0.07			0.05	
v/s Ratio Perm	0.13			0.06			0.04			c0.15		
v/c Ratio	0.23	0.65		0.10	0.52		0.17	0.30		0.67	0.21	
Uniform Delay, d1	5.4	7.4		5.0	6.6		14.9	15.4		16.9	15.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.5		0.1	0.5		0.3	0.4		6.9	0.3	
Delay (s)	5.7	8.8		5.2	7.1		15.2	15.8		23.8	15.3	
Level of Service	A	A		A	A		B	B		C	B	
Approach Delay (s)		8.4			7.0			15.7			19.8	
Approach LOS		A			A			B			B	

Intersection Summary

HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	47.4	Sum of lost time (s)	10.7	
Intersection Capacity Utilization	87.5%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Total 2036 AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	725	10	20	460	10	20	0	35	5	0	0
Future Volume (Veh/h)	15	725	10	20	460	10	20	0	35	5	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	19	906	12	25	575	12	25	0	44	6	0	0
Pedestrians											5	
Lane Width (m)											3.6	
Walking Speed (m/s)											1.2	
Percent Blockage											0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked	0.98			0.77			0.78	0.78	0.77	0.78	0.78	0.98
vC, conflicting volume	592			918			1575	1592	912	1624	1592	586
vC1, stage 1 conf vol							950	950		636	636	
vC2, stage 2 conf vol							625	642		988	956	
vCu, unblocked vol	572			748			1534	1555	740	1596	1555	566
tC, single (s)	4.3			4.1			7.1	6.5	6.2	8.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		7.1	5.5	
tF (s)	2.4			2.2			3.5	4.0	3.3	4.4	4.0	3.8
p0 queue free %	98			96			90	100	86	95	100	100
cM capacity (veh/h)	890			673			246	256	321	126	243	432

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	19	918	25	587	69	6
Volume Left	19	0	25	0	25	6
Volume Right	0	12	0	12	44	0
cSH	890	1700	673	1700	289	126
Volume to Capacity	0.02	0.54	0.04	0.35	0.24	0.05
Queue Length 95th (m)	0.5	0.0	0.9	0.0	7.3	1.2
Control Delay (s)	9.1	0.0	10.6	0.0	21.3	34.9
Lane LOS	A		B		C	D
Approach Delay (s)	0.2		0.4		21.3	34.9
Approach LOS					C	D

Intersection Summary				
Average Delay	1.3			
Intersection Capacity Utilization	48.8%	ICU Level of Service	A	
Analysis Period (min)	15			

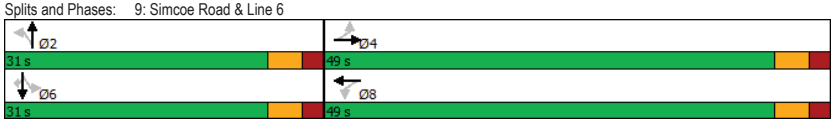
Queues
9: Simcoe Road & Line 6

Future Total 2036 AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	490	135	5	80	200	205	140	270
Future Volume (vph)	490	135	5	80	200	205	140	270
Lane Group Flow (vph)	551	326	6	96	225	236	157	303
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA	Perm
Protected Phases		4		8		2	6	
Permitted Phases	4		8		2			6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	30.5	29.5	29.5	29.5	29.5
Total Split (s)	49.0	49.0	49.0	49.0	31.0	31.0	31.0	31.0
Total Split (%)	61.3%	61.3%	61.3%	61.3%	38.8%	38.8%	38.8%	38.8%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
v/c Ratio	0.87	0.37	0.02	0.11	0.55	0.40	0.25	0.41
Control Delay	31.5	7.8	8.4	8.8	27.1	21.9	20.0	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	7.8	8.4	8.8	27.1	21.9	20.0	4.7
Queue Length 50th (m)	62.3	15.7	0.4	6.1	25.5	24.9	15.7	0.0
Queue Length 95th (m)	#125.9	31.1	2.1	13.3	53.2	49.3	33.2	16.4
Internal Link Dist (m)		261.6		146.8		400.7	164.9	
Turn Bay Length (m)	50.0		20.0		110.0			
Base Capacity (vph)	797	1091	493	1120	429	613	659	753
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.30	0.01	0.09	0.52	0.38	0.24	0.40

Intersection Summary
Cycle Length: 80
Actuated Cycle Length: 70.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Total 2036 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	490	135	155	5	80	5	200	205	5	0	140	270
Future Volume (vph)	490	135	155	5	80	5	200	205	5	0	140	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.92		1.00	0.99		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1687		1438	1798		1703	1679			1810	1538
Flt Permitted	0.69	1.00		0.53	1.00		0.66	1.00			1.00	1.00
Satd. Flow (perm)	1282	1687		795	1798		1178	1679			1810	1538
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	551	152	174	6	90	6	225	230	6	0	157	303
RTOR Reduction (vph)	0	57	0	0	3	0	0	1	0	0	0	198
Lane Group Flow (vph)	551	269	0	6	93	0	225	235	0	0	157	105
Confl. Peds. (#/hr)			5	5					5	5		
Heavy Vehicles (%)	3%	0%	4%	25%	5%	0%	6%	13%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	35.1	35.1		35.1	35.1		24.6	24.6			24.6	24.6
Effective Green, g (s)	35.1	35.1		35.1	35.1		24.6	24.6			24.6	24.6
Actuated g/C Ratio	0.50	0.50		0.50	0.50		0.35	0.35			0.35	0.35
Clearance Time (s)	5.5	5.5		5.5	5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	636	837		394	892		409	584			629	535
v/s Ratio Prot		0.16			0.05			0.14			0.09	
v/s Ratio Perm	c0.43			0.01			c0.19					0.07
v/c Ratio	0.87	0.32		0.02	0.10		0.55	0.40			0.25	0.20
Uniform Delay, d1	15.7	10.7		9.0	9.5		18.6	17.5			16.5	16.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	11.9	0.2		0.0	0.1		1.6	0.5			0.2	0.2
Delay (s)	27.6	10.9		9.0	9.5		20.2	17.9			16.7	16.3
Level of Service	C	B		A	A		C	B			B	B
Approach Delay (s)		21.4			9.5			19.0			16.4	
Approach LOS		C			A			B			B	

Intersection Summary				
HCM 2000 Control Delay	19.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	87.6%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Total 2036 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	50	20	275	275	10
Future Volume (Veh/h)	25	50	20	275	275	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	34	68	27	377	377	14
Pedestrians	5			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	820	394	396			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	820	394	396			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	90	89	98			
cM capacity (veh/h)	327	645	1116			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	404	391
Volume Left	34	27	0
Volume Right	68	0	14
cSH	487	1116	1700
Volume to Capacity	0.21	0.02	0.23
Queue Length 95th (m)	6.3	0.6	0.0
Control Delay (s)	14.3	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	14.3	0.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Total 2036 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	10	5	230	270	15
Future Volume (Veh/h)	25	10	5	230	270	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	28	11	6	256	300	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)						
pX, platoon unblocked						
vC, conflicting volume	576	308	317			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	576	308	317			
tC, single (s)	6.5	6.2	4.6			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.7			
p0 queue free %	94	99	99			
cM capacity (veh/h)	464	736	1016			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	262	317
Volume Left	28	6	0
Volume Right	11	0	17
cSH	518	1016	1700
Volume to Capacity	0.08	0.01	0.19
Queue Length 95th (m)	1.9	0.1	0.0
Control Delay (s)	12.5	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	12.5	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		26.1%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Total 2036 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	160	80	0	0	30	35	0	0	0	70	5	195
Future Volume (vph)	160	80	0	0	30	35	0	0	0	70	5	195
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	190	95	0	0	36	42	0	0	0	83	6	232

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	285	78	0	321
Volume Left (vph)	190	0	0	83
Volume Right (vph)	0	42	0	232
Hadj (s)	0.28	-0.16	0.00	-0.30
Departure Headway (s)	5.1	4.9	5.3	4.5
Degree Utilization, x	0.40	0.11	0.00	0.41
Capacity (veh/h)	672	667	616	746
Control Delay (s)	11.4	8.5	8.3	10.6
Approach Delay (s)	11.4	8.5	0.0	10.6
Approach LOS	B	A	A	B

Intersection Summary			
Delay		10.7	
Level of Service		B	
Intersection Capacity Utilization		42.5%	ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Total 2036 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	125	45	0	115	120	105
Future Volume (Veh/h)	125	45	0	115	120	105
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	151	54	0	139	145	127
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	348	208	272			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	348	208	272			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	94	100			
cM capacity (veh/h)	653	837	1303			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	205	139	272
Volume Left	151	0	0
Volume Right	54	0	127
cSH	694	1303	1700
Volume to Capacity	0.30	0.00	0.16
Queue Length 95th (m)	9.9	0.0	0.0
Control Delay (s)	12.4	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.4	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		4.1		
Intersection Capacity Utilization		29.1%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Total 2036 AM Peak Hour



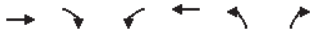
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	170	15	175	135	15	300
Future Volume (Veh/h)	170	15	175	135	15	300
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	207	18	213	165	18	366
Pedestrians						
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	514	189			378	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	514	189			378	
tC, single (s)	6.8	6.9			4.8	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.5	
p0 queue free %	57	98			98	
cM capacity (veh/h)	486	827			983	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	225	142	236	140	244
Volume Left	207	0	0	18	0
Volume Right	18	0	165	0	0
cSH	502	1700	1700	983	1700
Volume to Capacity	0.45	0.08	0.14	0.02	0.14
Queue Length 95th (m)	18.3	0.0	0.0	0.4	0.0
Control Delay (s)	17.9	0.0	0.0	1.3	0.0
Lane LOS	C			A	
Approach Delay (s)	17.9	0.0		0.5	
Approach LOS	C				

Intersection Summary				
Average Delay		4.3		
Intersection Capacity Utilization		36.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Total 2036 AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	140	10	5	165	20	5
Future Volume (Veh/h)	140	10	5	165	20	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	147	11	5	174	21	5
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			158		336	152
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			158		336	152
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			1434		661	899

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	158	179	26
Volume Left	0	5	21
Volume Right	11	0	5
cSH	1700	1434	696
Volume to Capacity	0.09	0.00	0.04
Queue Length 95th (m)	0.0	0.1	0.9
Control Delay (s)	0.0	0.2	10.4
Lane LOS		A	B
Approach Delay (s)	0.0	0.2	10.4
Approach LOS			B

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		22.7%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Total 2036 AM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	115	95	10	55	75
Future Volume (Veh/h)	30	115	95	10	55	75
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	121	100	11	58	79
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	111				290	106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	111				290	106
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				92	92
cM capacity (veh/h)	1492				689	954

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	153	111	58	79
Volume Left	32	0	58	0
Volume Right	0	11	0	79
cSH	1492	1700	689	954
Volume to Capacity	0.02	0.07	0.08	0.08
Queue Length 95th (m)	0.5	0.0	2.2	2.2
Control Delay (s)	1.7	0.0	10.7	9.1
Lane LOS	A		B	A
Approach Delay (s)	1.7	0.0	9.8	
Approach LOS			A	

Intersection Summary				
Average Delay		4.0		
Intersection Capacity Utilization		24.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Total 2036 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	45	190	5	20	260
Future Volume (Veh/h)	10	45	190	5	20	260
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)	11	49	207	5	22	283
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	536	210			212	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	536	210			212	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			98	
cM capacity (veh/h)	500	836			1370	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	60	212	305
Volume Left	11	0	22
Volume Right	49	5	0
cSH	744	1700	1370
Volume to Capacity	0.08	0.12	0.02
Queue Length 95th (m)	2.1	0.0	0.4
Control Delay (s)	10.3	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	0.7
Approach LOS	B		

Intersection Summary				
Average Delay		1.4		
Intersection Capacity Utilization		38.4%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Total 2036 AM Peak Hour



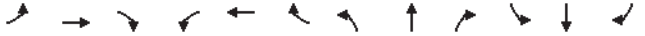
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	95	285	5	30	265
Future Volume (Veh/h)	10	95	285	5	30	265
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	103	310	5	33	288
Pedestrians						
Lane 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	666	312			315	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	666	312			315	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	86			97	
cM capacity (veh/h)	416	732			1257	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	114	315	321
Volume Left	11	0	33
Volume Right	103	5	0
cSH	682	1700	1257
Volume to Capacity	0.17	0.19	0.03
Queue Length 95th (m)	4.8	0.0	0.6
Control Delay (s)	11.3	0.0	1.0
Lane LOS	B		A
Approach Delay (s)	11.3	0.0	1.0
Approach LOS	B		

Intersection Summary				
Average Delay		2.2		
Intersection Capacity Utilization		47.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
20: Street A & Street B

Future Total 2036 AM Peak Hour



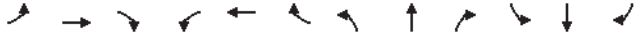
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	10	5	25	5	55	5	105	15	20	35	5
Future Volume (vph)	10	10	5	25	5	55	5	105	15	20	35	5
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.90	0.90	0.90	0.90	0.92
Hourly flow rate (vph)	11	11	5	28	5	61	5	117	17	22	39	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	27	94	139	66
Volume Left (vph)	11	28	5	22
Volume Right (vph)	5	61	17	5
Hadj (s)	0.00	-0.30	-0.03	0.06
Departure Headway (s)	4.5	4.1	4.2	4.4
Degree Utilization, x	0.03	0.11	0.16	0.08
Capacity (veh/h)	762	836	825	784
Control Delay (s)	7.6	7.6	8.0	7.7
Approach Delay (s)	7.6	7.6	8.0	7.7
Approach LOS	A	A	A	A

Intersection Summary					
Delay			7.8		
Level of Service			A		
Intersection Capacity Utilization			22.5%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
21: Street K/Street F & Street B

Future Total 2036 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	30	5	5	40	5	10	5	5	5	5	20
Future Volume (vph)	5	30	5	5	40	5	10	5	5	5	5	20
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	33	6	6	44	6	11	6	6	6	6	22

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	45	56	23	34
Volume Left (vph)	6	6	11	6
Volume Right (vph)	6	6	6	22
Hadj (s)	-0.02	-0.01	-0.03	-0.32
Departure Headway (s)	4.1	4.1	4.1	3.8
Degree Utilization, x	0.05	0.06	0.03	0.04
Capacity (veh/h)	868	870	841	913
Control Delay (s)	7.3	7.3	7.2	7.0
Approach Delay (s)	7.3	7.3	7.2	7.0
Approach LOS	A	A	A	A

Intersection Summary					
Delay			7.2		
Level of Service			A		
Intersection Capacity Utilization			13.4%	ICU Level of Service	A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
22: Street A & Street C

Future Total 2036 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	45	15	100	25	5	75
Future Volume (vph)	45	15	100	25	5	75
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	50	17	111	28	6	83

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	67	139	89
Volume Left (vph)	50	0	6
Volume Right (vph)	17	28	0
Hadj (s)	0.03	-0.09	0.05
Departure Headway (s)	4.4	4.1	4.2
Degree Utilization, x	0.08	0.16	0.10
Capacity (veh/h)	773	861	828
Control Delay (s)	7.8	7.8	7.7
Approach Delay (s)	7.8	7.8	7.7
Approach LOS	A	A	A

Intersection Summary			
Delay		7.8	
Level of Service		A	
Intersection Capacity Utilization	18.1%	ICU Level of Service	A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
23: Street K & Street C

Future Total 2036 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	15	5	10	20	5	5	5	25	25	5	5
Future Volume (vph)	10	15	5	10	20	5	5	5	25	25	5	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	17	6	11	22	6	6	6	28	28	6	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	34	39	40	40
Volume Left (vph)	11	11	6	28
Volume Right (vph)	6	6	28	6
Hadj (s)	-0.01	0.00	-0.36	0.08
Departure Headway (s)	4.1	4.1	3.7	4.2
Degree Utilization, x	0.04	0.04	0.04	0.05
Capacity (veh/h)	855	856	930	841
Control Delay (s)	7.3	7.3	6.9	7.4
Approach Delay (s)	7.3	7.3	6.9	7.4
Approach LOS	A	A	A	A

Intersection Summary			
Delay		7.2	
Level of Service		A	
Intersection Capacity Utilization	17.0%	ICU Level of Service	A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
24: Street A & Street L

Future Total 2036 AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	5	10	95	5	5	140
Future Volume (vph)	5	10	95	5	5	140
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	11	106	6	6	156

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	17	112	162
Volume Left (vph)	6	0	6
Volume Right (vph)	11	6	0
Hadj (s)	-0.28	0.00	0.04
Departure Headway (s)	4.2	4.1	4.1
Degree Utilization, x	0.02	0.13	0.18
Capacity (veh/h)	801	860	870
Control Delay (s)	7.3	7.7	8.0
Approach Delay (s)	7.3	7.7	8.0
Approach LOS	A	A	A

Intersection Summary				
Delay	7.8			
Level of Service	A			
Intersection Capacity Utilization	21.4%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
25: Street A & Street Q

Future Total 2036 AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	45	15	5	45	120	35
Future Volume (vph)	45	15	5	45	120	35
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	50	17	6	50	133	39

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	67	56	172
Volume Left (vph)	50	6	0
Volume Right (vph)	17	0	39
Hadj (s)	0.03	0.06	-0.10
Departure Headway (s)	4.4	4.3	4.0
Degree Utilization, x	0.08	0.07	0.19
Capacity (veh/h)	774	813	878
Control Delay (s)	7.8	7.6	8.0
Approach Delay (s)	7.8	7.6	8.0
Approach LOS	A	A	A

Intersection Summary				
Delay	7.9			
Level of Service	A			
Intersection Capacity Utilization	18.5%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
2: Line 6 & Langford Boulevard

Future Total 2036 PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	65	580	510	80	45	20
Future Volume (Veh/h)	65	580	510	80	45	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	71	637	560	88	49	22
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	648				1383	604
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	648				1383	604
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				66	96
cM capacity (veh/h)	938				146	502

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	71	637	648	71
Volume Left	71	0	0	49
Volume Right	0	0	88	22
cSH	938	1700	1700	187
Volume to Capacity	0.08	0.37	0.38	0.38
Queue Length 95th (m)	2.0	0.0	0.0	13.2
Control Delay (s)	9.2	0.0	0.0	35.6
Lane LOS	A			E
Approach Delay (s)	0.9		0.0	35.6
Approach LOS				E

Intersection Summary				
Average Delay			2.2	
Intersection Capacity Utilization			49.0%	ICU Level of Service A
Analysis Period (min)			15	

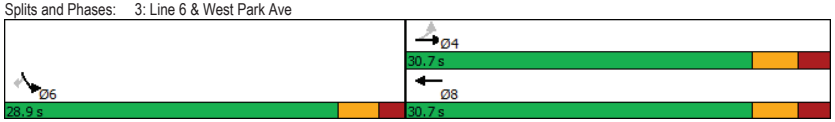
Queues
3: Line 6 & West Park Ave

Future Total 2036 PM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	50	575	560	255	30
Future Volume (vph)	50	575	560	255	30
Lane Group Flow (vph)	56	646	798	287	34
Turn Type	Perm	NA	NA	Prot	Perm
Protected Phases		4	8	6	
Permitted Phases	4				6
Detector Phase	4	4	8	6	6
Switch Phase					
Minimum Initial (s)	25.0	25.0	25.0	10.0	10.0
Minimum Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (s)	30.7	30.7	30.7	28.9	28.9
Total Split (%)	51.5%	51.5%	51.5%	48.5%	48.5%
Yellow Time (s)	3.3	3.3	3.3	3.0	3.0
All-Red Time (s)	2.4	2.4	2.4	1.9	1.9
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.7	5.7	5.7	4.9	4.9
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	Min	Min	Min	None	None
v/c Ratio	0.34	0.67	0.85	0.60	0.07
Control Delay	15.7	14.3	22.7	21.0	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	14.3	22.7	21.0	5.8
Queue Length 50th (m)	2.6	38.0	52.6	22.6	0.0
Queue Length 95th (m)	12.6	#85.3	#138.7	40.5	4.5
Internal Link Dist (m)		582.6	325.3	441.0	
Turn Bay Length (m)	110.0				
Base Capacity (vph)	166	971	944	869	810
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.34	0.67	0.85	0.33	0.04

Intersection Summary
Cycle Length: 59.6
Actuated Cycle Length: 49.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Line 6 & West Park Ave



HCM Signalized Intersection Capacity Analysis
3: Line 6 & West Park Ave

Future Total 2036 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	50	575	560	150	255	30
Future Volume (vph)	50	575	560	150	255	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.7	5.7	5.7		4.9	4.9
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1803	1900	1822		1770	1615
Flt Permitted	0.17	1.00	1.00		0.95	1.00
Satd. Flow (perm)	324	1900	1822		1770	1615
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	56	646	629	169	287	34
RTOR Reduction (vph)	0	0	14	0	0	25
Lane Group Flow (vph)	56	646	784	0	287	9
Confl. Peds. (#/hr)	5			5		
Heavy Vehicles (%)	0%	0%	1%	0%	2%	0%
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4					6
Actuated Green, G (s)	25.1	25.1	25.1		13.3	13.3
Effective Green, g (s)	25.1	25.1	25.1		13.3	13.3
Actuated g/C Ratio	0.51	0.51	0.51		0.27	0.27
Clearance Time (s)	5.7	5.7	5.7		4.9	4.9
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	165	973	933		480	438
v/s Ratio Prot		0.34	c0.43		c0.16	
v/s Ratio Perm	0.17					0.01
v/c Ratio	0.34	0.66	0.84		0.60	0.02
Uniform Delay, d1	7.1	8.8	10.2		15.5	13.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.2	1.7	6.9		2.0	0.0
Delay (s)	8.3	10.6	17.1		17.5	13.1
Level of Service	A	B	B		B	B
Approach Delay (s)		10.4	17.1		17.1	
Approach LOS		B	B		B	

Intersection Summary				
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	49.0	Sum of lost time (s)	10.6
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: Brownlee Drive/Southfield Gate & Line 6

Future Total 2036 PM Peak Hour



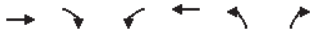
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	745	70	20	685	15	20	5	10	5	0	5
Future Volume (Veh/h)	15	745	70	20	685	15	20	5	10	5	0	5
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	17	828	78	22	761	17	22	6	11	6	0	6
Pedestrians		10			10						10	
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		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		349										
pX, platoon unblocked				0.74			0.74	0.74	0.74	0.74	0.74	
vC, conflicting volume	788			906			1722	1733	877	1710	1764	790
vC1, stage 1 conf vol							901	901		824	824	
vC2, stage 2 conf vol							821	832		886	940	
vCu, unblocked vol	788			700			1799	1814	661	1782	1855	790
tC, single (s)	4.1			4.2			7.1	6.5	6.5	7.1	6.5	6.7
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.3			3.5	4.0	3.5	3.5	4.0	3.8
p0 queue free %	98			97			90	97	96	97	100	98
cM capacity (veh/h)	833			639			225	238	313	218	226	319

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	17	906	22	778	39	12
Volume Left	17	0	22	0	22	6
Volume Right	0	78	0	17	11	6
cSH	833	1700	639	1700	247	259
Volume to Capacity	0.02	0.53	0.03	0.46	0.16	0.05
Queue Length 95th (m)	0.5	0.0	0.9	0.0	4.4	1.2
Control Delay (s)	9.4	0.0	10.8	0.0	22.3	19.6
Lane LOS	A		B		C	C
Approach Delay (s)	0.2		0.3		22.3	19.6
Approach LOS					C	C

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	56.3%	ICU Level of Service	B	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
5: Street A & Line 6

Future Total 2036 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	625	135	55	665	55	80
Future Volume (Veh/h)	625	135	55	665	55	80
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)	679	147	60	723	60	87
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				346		
pX, platoon unblocked					0.76	
vC, conflicting volume			826		1596	752
vC1, stage 1 conf vol					752	
vC2, stage 2 conf vol					843	
vCu, unblocked vol			826		1626	752
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			93		80	79
cM capacity (veh/h)			813		295	413

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2
Volume Total	826	60	723	60	87
Volume Left	0	60	0	60	0
Volume Right	147	0	0	0	87
cSH	1700	813	1700	295	413
Volume to Capacity	0.49	0.07	0.43	0.20	0.21
Queue Length 95th (m)	0.0	1.9	0.0	6.0	6.3
Control Delay (s)	0.0	9.8	0.0	20.3	16.0
Lane LOS		A		C	C
Approach Delay (s)	0.0	0.7		17.8	
Approach LOS				C	

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	55.7%	ICU Level of Service		B
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
6: Line 6 & Adams Street

Future Total 2036 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	675	710	70	35	10
Future Volume (Veh/h)	30	675	710	70	35	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	33	750	789	78	39	11
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (m)			258			
pX, platoon unblocked	0.57				0.57	0.57
vC, conflicting volume	872				1649	833
vC1, stage 1 conf vol					833	
vC2, stage 2 conf vol					816	
vCu, unblocked vol	393				1763	324
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	95				86	97
cM capacity (veh/h)	655				287	408

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	33	750	867	50
Volume Left	33	0	0	39
Volume Right	0	0	78	11
cSH	655	1700	1700	307
Volume to Capacity	0.05	0.44	0.51	0.16
Queue Length 95th (m)	1.3	0.0	0.0	4.6
Control Delay (s)	10.8	0.0	0.0	19.0
Lane LOS	B			C
Approach Delay (s)	0.5		0.0	19.0
Approach LOS				C

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	51.7%	ICU Level of Service		A
Analysis Period (min)	15			

Queues
7: Inverness Way/Melbourne Dr & Line 6

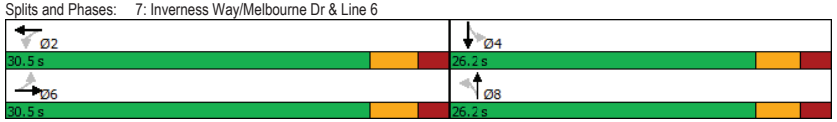
Future Total 2036 PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	105	565	90	690	25	50	125	55
Future Volume (vph)	105	565	90	690	25	50	125	55
Lane Group Flow (vph)	118	680	101	921	28	90	140	135
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		6		2		8		4
Permitted Phases	6		2		8		4	
Detector Phase	6	6	2	2	8	8	4	4
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	25.0	10.0	10.0	10.0	10.0
Minimum Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (s)	30.5	30.5	30.5	30.5	26.2	26.2	26.2	26.2
Total Split (%)	53.8%	53.8%	53.8%	53.8%	46.2%	46.2%	46.2%	46.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.0	3.0	3.0	3.0
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.2	5.2	5.2	5.2
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Min	Min	Min	Min	None	None	None	None
v/c Ratio	0.72	0.60	0.29	0.81	0.09	0.19	0.42	0.27
Control Delay	46.6	13.1	11.4	21.1	13.6	10.2	18.9	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.6	13.1	11.4	21.1	13.6	10.2	18.9	8.8
Queue Length 50th (m)	6.9	34.8	4.0	58.5	1.9	3.8	10.4	4.2
Queue Length 95th (m)	#40.3	#116.9	18.5	#180.2	6.1	11.3	21.8	13.5
Internal Link Dist (m)		233.8		288.7		331.6		165.8
Turn Bay Length (m)	50.0		50.0					
Base Capacity (vph)	164	1140	352	1136	555	804	564	794
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.60	0.29	0.81	0.05	0.11	0.25	0.17

Intersection Summary

Cycle Length: 56.7
Actuated Cycle Length: 48.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 7: Inverness Way/Melbourne Dr & Line 6



HCM Signalized Intersection Capacity Analysis
7: Inverness Way/Melbourne Dr & Line 6

Future Total 2036 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	565	40	90	690	130	25	50	30	125	55	65
Future Volume (vph)	105	565	40	90	690	130	25	50	30	125	55	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.94		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	1861		1802	1845		1796	1792		1752	1722	
Flt Permitted	0.14	1.00		0.30	1.00		0.67	1.00		0.70	1.00	
Satd. Flow (perm)	267	1861		576	1845		1268	1792		1289	1722	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	118	635	45	101	775	146	28	56	34	140	62	73
RTOR Reduction (vph)	0	3	0	0	9	0	0	27	0	0	58	0
Lane Group Flow (vph)	118	677	0	101	912	0	28	63	0	140	77	0
Confl. Peds. (#/hr)	5		5	5		5	5					5
Heavy Vehicles (%)	0%	1%	0%	0%	0%	1%	0%	0%	0%	3%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	28.4	28.4		28.4	28.4		10.2	10.2		10.2	10.2	
Effective Green, g (s)	28.4	28.4		28.4	28.4		10.2	10.2		10.2	10.2	
Actuated g/C Ratio	0.58	0.58		0.58	0.58		0.21	0.21		0.21	0.21	
Clearance Time (s)	5.5	5.5		5.5	5.5		5.2	5.2		5.2	5.2	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	153	1072		331	1062		262	370		266	356	
v/s Ratio Prot		0.36			c0.49			0.04			0.04	
v/s Ratio Perm	0.44			0.18			0.02			c0.11		
v/c Ratio	0.77	0.63		0.31	0.86		0.11	0.17		0.53	0.22	
Uniform Delay, d1	8.0	7.0		5.4	8.8		15.9	16.1		17.4	16.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.0	1.2		0.5	7.1		0.2	0.2		1.9	0.3	
Delay (s)	29.0	8.2		5.9	15.8		16.0	16.3		19.3	16.5	
Level of Service	C	A		A	B		B	B		B	B	
Approach Delay (s)		11.3			14.8			16.2			17.9	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	10.7	
Intersection Capacity Utilization	92.8%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Barrow Ave & Line 6

Future Total 2036 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	695	20	45	890	5	10	0	25	10	0	10
Future Volume (Veh/h)	0	695	20	45	890	5	10	0	25	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	0	799	23	52	1023	6	11	0	29	11	0	11
Pedestrians								5			5	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		2			2							
Upstream signal (m)		313			286							
pX, platoon unblocked	0.97			0.77			0.78	0.78	0.77	0.78	0.78	0.97
vC, conflicting volume	1034			827			1954	1954	816	1963	1962	1031
vC1, stage 1 conf vol							816	816		1135	1135	
vC2, stage 2 conf vol							1138	1138		828	827	
vCu, unblocked vol	1019			622			1989	1989	607	2001	2000	1016
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			94	100	92	94	100	96
cM capacity (veh/h)	664			739			183	207	382	173	196	281

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	0	822	52	1029	40	22
Volume Left	0	0	52	0	11	11
Volume Right	0	23	0	6	29	11
cSH	1700	1700	739	1700	294	214
Volume to Capacity	0.00	0.48	0.07	0.61	0.14	0.10
Queue Length 95th (m)	0.0	0.0	1.8	0.0	3.7	2.7
Control Delay (s)	0.0	0.0	10.2	0.0	19.2	23.7
Lane LOS			B		C	C
Approach Delay (s)	0.0		0.5		19.2	23.7
Approach LOS					C	C

Intersection Summary					
Average Delay	0.9				
Intersection Capacity Utilization	57.1%	ICU Level of Service		B	
Analysis Period (min)	15				

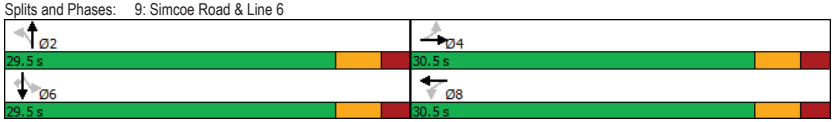
Queues
9: Simcoe Road & Line 6

Future Total 2036 PM Peak Hour

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations								
Traffic Volume (vph)	380	190	120	260	305	5	185	605
Future Volume (vph)	380	190	120	260	305	5	185	605
Lane Group Flow (vph)	409	408	134	280	355	0	204	651
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4	8		2		6	
Permitted Phases	4			2		6		6
Detector Phase	4	4	8	2	2	6	6	6
Switch Phase								
Minimum Initial (s)	25.0	25.0	25.0	24.0	24.0	24.0	24.0	24.0
Minimum Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (s)	30.5	30.5	30.5	29.5	29.5	29.5	29.5	29.5
Total Split (%)	50.8%	50.8%	50.8%	49.2%	49.2%	49.2%	49.2%	49.2%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5		5.5	5.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	Min	Min	Min	Min	Min
v/c Ratio	0.77	0.52	0.17	0.59	0.47		0.28	0.63
Control Delay	27.6	12.3	11.4	20.4	15.5		13.4	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	27.6	12.3	11.4	20.4	15.5		13.4	4.5
Queue Length 50th (m)	38.9	23.9	9.0	24.5	28.4		15.3	0.0
Queue Length 95th (m)	#83.3	46.4	18.6	47.4	49.1		28.5	17.7
Internal Link Dist (m)		261.6	146.8		400.7		164.9	
Turn Bay Length (m)	50.0			110.0				
Base Capacity (vph)	531	792	788	474	756		738	1030
Starvation Cap Reductn	0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0	0	0		0	0
Reduced v/c Ratio	0.77	0.52	0.17	0.59	0.47		0.28	0.63

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Simcoe Road & Line 6



HCM Signalized Intersection Capacity Analysis
9: Simcoe Road & Line 6

Future Total 2036 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	190	190	0	120	5	260	305	25	5	185	605
Future Volume (vph)	380	190	190	0	120	5	260	305	25	5	185	605
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.93			0.99		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1805	1758			1887		1787	1878			1861	1599
Flt Permitted	0.67	1.00			1.00		0.63	1.00			0.99	1.00
Satd. Flow (perm)	1275	1758			1887		1185	1878			1846	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	409	204	204	0	129	5	280	328	27	5	199	651
RTOR Reduction (vph)	0	60	0	0	2	0	0	5	0	0	0	391
Lane Group Flow (vph)	409	348	0	0	132	0	280	350	0	0	204	260
Heavy Vehicles (%)	0%	0%	0%	0%	0%	3%	1%	0%	0%	0%	2%	1%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Effective Green, g (s)	25.0	25.0			25.0		24.0	24.0			24.0	24.0
Actuated g/C Ratio	0.42	0.42			0.42		0.40	0.40			0.40	0.40
Clearance Time (s)	5.5	5.5			5.5		5.5	5.5			5.5	5.5
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	531	732			786		474	751			738	639
v/s Ratio Prot		0.20			0.07			0.19				
v/s Ratio Perm	c0.32						c0.24				0.11	0.16
v/c Ratio	0.77	0.48			0.17		0.59	0.47			0.28	0.41
Uniform Delay, d1	15.0	12.7			11.0		14.1	13.3			12.1	12.9
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	6.8	0.5			0.1		2.0	0.5			0.2	0.4
Delay (s)	21.8	13.2			11.1		16.1	13.7			12.3	13.3
Level of Service	C	B			B		B	B			B	B
Approach Delay (s)		17.5			11.1			14.8			13.1	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	11.0	
Intersection Capacity Utilization	100.8%	ICU Level of Service	G	
Analysis Period (min)	15			
c Critical Lane Group				

HCM Unsignalized Intersection Capacity Analysis
10: Simcoe Road & Gibson Circle

Future Total 2036 PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	5	25	535	255	25
Future Volume (Veh/h)	15	5	25	535	255	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	18	6	29	629	300	29
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1012	330	339			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1012	330	339			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	98			
cM capacity (veh/h)	259	708	1221			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	658	329
Volume Left	18	29	0
Volume Right	6	0	29
cSH	308	1221	1700
Volume to Capacity	0.08	0.02	0.19
Queue Length 95th (m)	2.0	0.6	0.0
Control Delay (s)	17.7	0.6	0.0
Lane LOS	C	A	
Approach Delay (s)	17.7	0.6	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
11: Simcoe Road & Golfview Blvd

Future Total 2036 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	5	10	520	235	25
Future Volume (Veh/h)	20	5	10	520	235	25
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)	22	5	11	565	255	27
Pedestrians	10			5		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	866	284	292			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	866	284	292			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	99	99			
cM capacity (veh/h)	321	751	1271			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	576	282
Volume Left	22	11	0
Volume Right	5	0	27
cSH	359	1271	1700
Volume to Capacity	0.08	0.01	0.17
Queue Length 95th (m)	1.9	0.2	0.0
Control Delay (s)	15.8	0.3	0.0
Lane LOS	C	A	
Approach Delay (s)	15.8	0.3	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		46.9%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
12: Canal Rd

Future Total 2036 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	370	75	0	5	90	155	5	5	0	65	5	115
Future Volume (vph)	370	75	0	5	90	155	5	5	0	65	5	115
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	451	91	0	6	110	189	6	6	0	79	6	140

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	542	305	12	225
Volume Left (vph)	451	6	6	79
Volume Right (vph)	0	189	0	140
Hadj (s)	0.21	-0.34	0.10	-0.30
Departure Headway (s)	5.3	5.1	6.7	5.8
Degree Utilization, x	0.79	0.43	0.02	0.36
Capacity (veh/h)	668	671	452	571
Control Delay (s)	25.4	11.8	9.9	12.0
Approach Delay (s)	25.4	11.8	9.9	12.0
Approach LOS	D	B	A	B

Intersection Summary				
Delay		18.6		
Level of Service		C		
Intersection Capacity Utilization		61.3%	ICU Level of Service	B
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
13: Line 5 & Canal Rd

Future Total 2036 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	190	15	25	255	65	145
Future Volume (Veh/h)	190	15	25	255	65	145
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	218	17	29	293	75	167
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	510	158	242			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	510	158	242			
tC, single (s)	6.5	6.2	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.3			
p0 queue free %	57	98	98			
cM capacity (veh/h)	503	892	1296			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	235	322	242
Volume Left	218	29	0
Volume Right	17	0	167
cSH	520	1296	1700
Volume to Capacity	0.45	0.02	0.14
Queue Length 95th (m)	18.6	0.5	0.0
Control Delay (s)	17.5	0.9	0.0
Lane LOS	C	A	
Approach Delay (s)	17.5	0.9	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		5.5		
Intersection Capacity Utilization		48.6%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
14: Line 5 & 10 Sideroad

Future Total 2036 PM Peak Hour



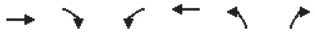
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	160	30	505	270	20	200
Future Volume (Veh/h)	160	30	505	270	20	200
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	178	33	561	300	22	222
Pedestrians						
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	866	430			861	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	866	430			861	
tC, single (s)	6.9	7.0			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	36	94			97	
cM capacity (veh/h)	279	565			789	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	211	374	487	96	148
Volume Left	178	0	0	22	0
Volume Right	33	0	300	0	0
cSH	303	1700	1700	789	1700
Volume to Capacity	0.70	0.22	0.29	0.03	0.09
Queue Length 95th (m)	38.8	0.0	0.0	0.7	0.0
Control Delay (s)	40.2	0.0	0.0	2.4	0.0
Lane LOS	E			A	
Approach Delay (s)	40.2	0.0		1.0	
Approach LOS	E				

Intersection Summary				
Average Delay		6.6		
Intersection Capacity Utilization		40.0%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
16: Line 10 & Line 5

Future Total 2036 PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	265	25	0	180	10	5
Future Volume (Veh/h)	265	25	0	180	10	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	294	28	0	200	11	6
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			322		508	308
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			322		508	308
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1249		528	737

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	322	200	17
Volume Left	0	0	11
Volume Right	28	0	6
cSH	1700	1249	587
Volume to Capacity	0.19	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.7
Control Delay (s)	0.0	0.0	11.3
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.3
Approach LOS			B

Intersection Summary				
Average Delay		0.4		
Intersection Capacity Utilization		25.5%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
17: Line 5 & Street A

Future Total 2036 PM Peak Hour



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	110	160	125	45	40	55
Future Volume (Veh/h)	110	160	125	45	40	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	122	178	139	50	44	61
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	189				586	164
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	189				586	164
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				90	93
cM capacity (veh/h)	1397				434	886

Direction, Lane #	EB 1	WB 1	SB 1	SB 2
Volume Total	300	189	44	61
Volume Left	122	0	44	0
Volume Right	0	50	0	61
cSH	1397	1700	434	886
Volume to Capacity	0.09	0.11	0.10	0.07
Queue Length 95th (m)	2.3	0.0	2.7	1.8
Control Delay (s)	3.6	0.0	14.2	9.4
Lane LOS	A		B	A
Approach Delay (s)	3.6	0.0	11.4	
Approach LOS			B	

Intersection Summary				
Average Delay		3.9		
Intersection Capacity Utilization		37.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
18: Simcoe Road & Danube Lane

Future Total 2036 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	25	505	25	60	180
Future Volume (Veh/h)	5	25	505	25	60	180
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)	5	27	549	27	65	196
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	888	562			576	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	888	562			576	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			94	
cM capacity (veh/h)	296	530			1007	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	32	576	261
Volume Left	5	0	65
Volume Right	27	27	0
cSH	472	1700	1007
Volume to Capacity	0.07	0.34	0.06
Queue Length 95th (m)	1.7	0.0	1.7
Control Delay (s)	13.2	0.0	2.7
Lane LOS	B		A
Approach Delay (s)	13.2	0.0	2.7
Approach LOS	B		

Intersection Summary				
Average Delay		1.3		
Intersection Capacity Utilization		54.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
19: Simcoe Road & Jonkman Blvd

Future Total 2036 PM Peak Hour



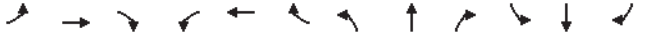
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	60	495	25	95	265
Future Volume (Veh/h)	5	60	495	25	95	265
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	65	538	27	103	288
Pedestrians						
Lane 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	1046	552			565	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1046	552			565	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	88			90	
cM capacity (veh/h)	230	538			1017	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	565	391
Volume Left	5	0	103
Volume Right	65	27	0
cSH	491	1700	1017
Volume to Capacity	0.14	0.33	0.10
Queue Length 95th (m)	4.0	0.0	2.7
Control Delay (s)	13.6	0.0	3.2
Lane LOS	B		A
Approach Delay (s)	13.6	0.0	3.2
Approach LOS	B		

Intersection Summary				
Average Delay		2.1		
Intersection Capacity Utilization		60.8%	ICU Level of Service	B
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
20: Street A & Street B

Future Total 2036 PM Peak Hour



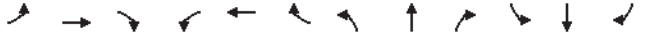
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	5	5	5	25	10	45	10	80	35	60	115	10
Future Volume (vph)	5	5	5	25	10	45	10	80	35	60	115	10
Peak Hour Factor	0.92	0.92	0.92	0.90	0.92	0.90	0.92	0.90	0.90	0.90	0.90	0.92
Hourly flow rate (vph)	5	5	5	28	11	50	11	89	39	67	128	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	15	89	139	206
Volume Left (vph)	5	28	11	67
Volume Right (vph)	5	50	39	11
Hadj (s)	-0.10	-0.24	-0.12	0.07
Departure Headway (s)	4.7	4.5	4.2	4.4
Degree Utilization, x	0.02	0.11	0.16	0.25
Capacity (veh/h)	698	744	813	794
Control Delay (s)	7.8	8.0	8.1	8.8
Approach Delay (s)	7.8	8.0	8.1	8.8
Approach LOS	A	A	A	A

Intersection Summary				
Delay			8.4	
Level of Service			A	
Intersection Capacity Utilization			29.3%	ICU Level of Service
Analysis Period (min)			15	
				A

HCM Unsignalized Intersection Capacity Analysis
21: Street K/Street F & Street B

Future Total 2036 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	25	45	10	5	55	5	10	5	5	5	5	15
Future Volume (vph)	25	45	10	5	55	5	10	5	5	5	5	15
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	28	50	11	6	61	6	11	6	6	6	6	17

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	89	73	23	29
Volume Left (vph)	28	6	11	6
Volume Right (vph)	11	6	6	17
Hadj (s)	0.02	0.00	-0.03	-0.28
Departure Headway (s)	4.1	4.1	4.3	4.0
Degree Utilization, x	0.10	0.08	0.03	0.03
Capacity (veh/h)	858	860	805	860
Control Delay (s)	7.6	7.5	7.4	7.1
Approach Delay (s)	7.6	7.5	7.4	7.1
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.5	
Level of Service			A	
Intersection Capacity Utilization			21.0%	ICU Level of Service
Analysis Period (min)			15	
				A

HCM Unsignalized Intersection Capacity Analysis
22: Street A & Street C

Future Total 2036 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	40	10	130	60	15	120
Future Volume (vph)	40	10	130	60	15	120
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	44	11	144	67	17	133

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	55	211	150
Volume Left (vph)	44	0	17
Volume Right (vph)	11	67	0
Hadj (s)	0.07	-0.16	0.06
Departure Headway (s)	4.7	4.0	4.3
Degree Utilization, x	0.07	0.24	0.18
Capacity (veh/h)	697	869	818
Control Delay (s)	8.1	8.3	8.2
Approach Delay (s)	8.1	8.3	8.2
Approach LOS	A	A	A

Intersection Summary				
Delay	8.2			
Level of Service	A			
Intersection Capacity Utilization	28.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
23: Street K & Street C

Future Total 2036 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	35	25	5	35	30	5	5	5	20	15	5	5
Future Volume (vph)	35	25	5	35	30	5	5	5	20	15	5	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	39	28	6	39	33	6	6	6	22	17	6	6

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	73	78	34	29
Volume Left (vph)	39	39	6	17
Volume Right (vph)	6	6	22	6
Hadj (s)	0.09	0.09	-0.32	0.03
Departure Headway (s)	4.2	4.2	3.9	4.3
Degree Utilization, x	0.09	0.09	0.04	0.03
Capacity (veh/h)	836	839	868	804
Control Delay (s)	7.6	7.6	7.1	7.4
Approach Delay (s)	7.6	7.6	7.1	7.4
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.5			
Level of Service	A			
Intersection Capacity Utilization	15.1%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
24: Street A & Street L

Future Total 2036 PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Traffic Volume (vph)	5	5	205	5	10	145
Future Volume (vph)	5	5	205	5	10	145
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	6	228	6	11	161

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total (vph)	12	234	172
Volume Left (vph)	6	0	11
Volume Right (vph)	6	6	0
Hadj (s)	-0.17	0.02	0.05
Departure Headway (s)	4.6	4.1	4.2
Degree Utilization, x	0.02	0.27	0.20
Capacity (veh/h)	709	859	845
Control Delay (s)	7.7	8.6	8.2
Approach Delay (s)	7.7	8.6	8.2
Approach LOS	A	A	A

Intersection Summary				
Delay	8.4			
Level of Service	A			
Intersection Capacity Utilization	25.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
25: Street A & Street Q

Future Total 2036 PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	80	10	15	140	90	50
Future Volume (vph)	80	10	15	140	90	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	89	11	17	156	100	56

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	100	173	156
Volume Left (vph)	89	17	0
Volume Right (vph)	11	0	56
Hadj (s)	0.15	0.05	-0.18
Departure Headway (s)	4.8	4.4	4.2
Degree Utilization, x	0.13	0.21	0.18
Capacity (veh/h)	701	796	829
Control Delay (s)	8.5	8.5	8.1
Approach Delay (s)	8.5	8.5	8.1
Approach LOS	A	A	A

Intersection Summary				
Delay	8.4			
Level of Service	A			
Intersection Capacity Utilization	31.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Appendix D:
SIDRA Analysis Worksheets

LANE SUMMARY

Site: FB_2026_AM [Line 6 / 10 Sideroad - FB26 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FB_2026_AM
Site Category: FB_2026_AM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	40	6.8	40	6.8	1146	0.035	39[5]	1.9	LOS A	0.1	0.9	Full	1160	0.0	0.0
Lane 2[d]	111	4.0	111	4.0	1237	0.090	100	2.4	LOS A	0.3	2.5	Full	1160	0.0	0.0
Approach	151	4.7	151	4.7		0.090		2.3	LOS A	0.3	2.5				
East: Line 6															
Lane 1[d]	217	1.0	217	1.0	1351	0.160	100	9.6	LOS A	0.7	4.8	Full	500	0.0	0.0
Lane 2	128	4.9	128	4.9	1253	0.102	64[5]	3.3	LOS A	0.4	3.0	Full	500	0.0	0.0
Approach	344	2.4	344	2.4		0.160		7.3	LOS A	0.7	4.8				
North: 10 Sideroad															
Lane 1[d]	162	10.1	162	10.1	1068	0.152	100	8.0	LOS A	0.6	4.3	Full	500	0.0	0.0
Approach	162	10.1	162	10.1		0.152		8.0	LOS A	0.6	4.3				
West: Line 6															
Lane 1	14	2.0	14	2.0	931	0.015	100	9.6	LOS A	0.1	0.4	Full	500	0.0	0.0
Lane 2[d]	15	1.9	15	1.9	1008	0.015	100	4.1	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	29	1.9	29	1.9		0.015		6.7	LOS A	0.1	0.4				
All Vehicles	687	4.7	687	4.7		0.160		6.3	LOS A	0.7	4.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	39	-	40	6.8	1146	0.035	39[5]	NA	NA
Lane 2	-	-	111	111	4.0	1237	0.090	100	NA	NA

Approach	1	39	111	151	4.7		0.090			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	217	-	-	217	1.0	1351	0.160	100	NA	NA
Lane 2	-	39	89	128	4.9	1253	0.102	64[5]	NA	NA
Approach	217	39	89	344	2.4		0.160			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	100	61	1	162	10.1	1068	0.152	100	NA	NA
Approach	100	61	1	162	10.1		0.152			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	3	-	14	2.0	931	0.015	100	NA	NA
Lane 2	-	14	1	15	1.9	1008	0.015	100	NA	NA
Approach	11	17	1	29	1.9		0.015			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	687	4.7	0.160

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FB_2026_PM [Line 6 / 10 Sideroad - FB26 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FB_2026_PM
Site Category: FB_2026_PM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	140	3.0	140	3.0	1137	0.123	45[5]	1.9	LOS A	0.5	3.5	Full	1160	0.0	0.0
Lane 2[d]	339	0.0	339	0.0	1232	0.275	100	2.6	LOS A	1.3	9.0	Full	1160	0.0	0.0
Approach	479	0.9	479	0.9		0.275		2.4	LOS A	1.3	9.0				
East: Line 6															
Lane 1	157	0.0	157	0.0	1172	0.134	100	8.1	LOS A	0.6	3.9	Full	500	0.0	0.0
Lane 2[d]	165	2.5	165	2.5	1228	0.134	100	3.7	LOS A	0.5	3.8	Full	500	0.0	0.0
Approach	322	1.3	322	1.3		0.134		5.8	LOS A	0.6	3.9				
North: 10 Sideroad															
Lane 1[d]	184	0.7	184	0.7	1209	0.153	100	8.5	LOS A	0.6	4.4	Full	500	0.0	0.0
Approach	184	0.7	184	0.7		0.153		8.5	LOS A	0.6	4.4				
West: Line 6															
Lane 1	14	2.0	14	2.0	1014	0.014	100	9.2	LOS A	0.0	0.4	Full	500	0.0	0.0
Lane 2[d]	15	2.0	15	2.0	1090	0.014	100	3.8	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	29	2.0	29	2.0		0.014		6.4	LOS A	0.0	0.4				
All Vehicles	1014	1.0	1014	1.0		0.275		4.7	LOS A	1.3	9.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	139	-	140	3.0	1137	0.123	45[5]	NA	NA
Lane 2	-	-	339	339	0.0	1232	0.275	100	NA	NA

Approach	1	139	339	479	0.9		0.275			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	111	46	-	157	0.0	1172	0.134	100	NA	NA
Lane 2	-	26	139	165	2.5	1228	0.134	100	NA	NA
Approach	111	72	139	322	1.3		0.134			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	139	44	1	184	0.7	1209	0.153	100	NA	NA
Approach	139	44	1	184	0.7		0.153			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	3	-	14	2.0	1014	0.014	100	NA	NA
Lane 2	-	14	1	15	2.0	1090	0.014	100	NA	NA
Approach	11	17	1	29	2.0		0.014			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1014	1.0	0.275

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FT_2026_AM [Line 6 / 10 Sideroad - FT26 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FT_2026_AM
Site Category: FT_2026_AM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	40	6.8	40	6.8	1120	0.036	35[5]	2.0	LOS A	0.1	1.0	Full	1160	0.0	0.0
Lane 2[d]	122	4.0	122	4.0	1211	0.101	100	2.5	LOS A	0.4	2.8	Full	1160	0.0	0.0
Approach	162	4.7	162	4.7		0.101		2.4	LOS A	0.4	2.8				
East: Line 6															
Lane 1[d]	239	1.0	239	1.0	1351	0.177	100	9.6	LOS A	0.8	5.4	Full	500	0.0	0.0
Lane 2	178	5.5	178	5.5	1250	0.142	80[5]	3.3	LOS A	0.6	4.3	Full	500	0.0	0.0
Approach	417	2.9	417	2.9		0.177		7.0	LOS A	0.8	5.4				
North: 10 Sideroad															
Lane 1[d]	184	10.6	184	10.6	1043	0.177	100	8.5	LOS A	0.7	5.1	Full	500	0.0	0.0
Approach	184	10.6	184	10.6		0.177		8.5	LOS A	0.7	5.1				
West: Line 6															
Lane 1	14	2.0	14	2.0	891	0.016	100	9.8	LOS A	0.1	0.4	Full	500	0.0	0.0
Lane 2[d]	15	1.9	15	1.9	968	0.016	100	4.3	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	29	1.9	29	1.9		0.016		6.9	LOS A	0.1	0.4				
All Vehicles	792	5.0	792	5.0		0.177		6.4	LOS A	0.8	5.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	39	-	40	6.8	1120	0.036	35[5]	NA	NA
Lane 2	-	-	122	122	4.0	1211	0.101	100	NA	NA

Approach	1	39	122	162	4.7		0.101			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	239	-	-	239	1.0	1351	0.177	100	NA	NA
Lane 2	-	39	139	178	5.5	1250	0.142	80[5]	NA	NA
Approach	239	39	139	417	2.9		0.177			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	122	61	1	184	10.6	1043	0.177	100	NA	NA
Approach	122	61	1	184	10.6		0.177			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	3	-	14	2.0	891	0.016	100	NA	NA
Lane 2	-	14	1	15	1.9	968	0.016	100	NA	NA
Approach	11	17	1	29	1.9		0.016			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	792	5.0	0.177

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FT_2026_PM [Line 6 / 10 Sideroad - FT26 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FT_2026_PM
Site Category: FT_2026_PM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	140	3.0	140	3.0	1073	0.130	40[5]	2.2	LOS A	0.5	3.7	Full	1160	0.0	0.0
Lane 2[d]	383	0.0	383	0.0	1170	0.328	100	2.9	LOS A	1.6	11.1	Full	1160	0.0	0.0
Approach	523	0.8	523	0.8		0.328		2.7	LOS A	1.6	11.1				
East: Line 6															
Lane 1	182	0.0	182	0.0	1172	0.155	100	8.1	LOS A	0.7	4.6	Full	500	0.0	0.0
Lane 2[d]	190	2.7	190	2.7	1226	0.155	100	3.7	LOS A	0.6	4.5	Full	500	0.0	0.0
Approach	372	1.4	372	1.4		0.155		5.8	LOS A	0.7	4.6				
North: 10 Sideroad															
Lane 1[d]	246	0.5	246	0.5	1193	0.206	100	9.0	LOS A	0.9	6.2	Full	500	0.0	0.0
Approach	246	0.5	246	0.5		0.206		9.0	LOS A	0.9	6.2				
West: Line 6															
Lane 1	14	2.0	14	2.0	943	0.015	100	9.5	LOS A	0.1	0.4	Full	500	0.0	0.0
Lane 2[d]	15	1.9	15	1.9	1020	0.015	100	4.1	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	29	1.9	29	1.9		0.015		6.7	LOS A	0.1	0.4				
All Vehicles	1170	1.0	1170	1.0		0.328		5.1	LOS A	1.6	11.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	139	-	140	3.0	1073	0.130	40[5]	NA	NA
Lane 2	-	-	383	383	0.0	1170	0.328	100	NA	NA

Approach	1	139	383	523	0.8		0.328			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	128	54	-	182	0.0	1172	0.155	100	NA	NA
Lane 2	-	18	172	190	2.7	1226	0.155	100	NA	NA
Approach	128	72	172	372	1.4		0.155			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	200	44	1	246	0.5	1193	0.206	100	NA	NA
Approach	200	44	1	246	0.5		0.206			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	3	-	14	2.0	943	0.015	100	NA	NA
Lane 2	-	14	1	15	1.9	1020	0.015	100	NA	NA
Approach	11	17	1	29	1.9		0.015			
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	1170	1.0		0.328						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FB_2031_AM [Line 6 / 10 Sideroad - FB31 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FB_2031_AM
Site Category: FB_2031_AM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	40	6.8	40	6.8	1081	0.037	30[5]	2.1	LOS A	0.1	1.0	Full	1160	0.0	0.0
Lane 2[d]	144	4.0	144	4.0	1173	0.123	100	2.7	LOS A	0.5	3.4	Full	1160	0.0	0.0
Approach	184	4.6	184	4.6		0.123		2.5	LOS A	0.5	3.4				
East: Line 6															
Lane 1[d]	256	1.0	256	1.0	1344	0.190	100	9.7	LOS A	0.8	5.8	Full	500	0.0	0.0
Lane 2	194	4.0	194	4.0	1253	0.155	82[5]	3.3	LOS A	0.7	4.8	Full	500	0.0	0.0
Approach	450	2.3	450	2.3		0.190		6.9	LOS A	0.8	5.8				
North: 10 Sideroad															
Lane 1[d]	196	1.3	196	1.3	1052	0.186	100	8.7	LOS A	0.7	5.3	Full	500	0.0	0.0
Approach	196	1.3	196	1.3		0.186		8.7	LOS A	0.7	5.3				
West: Line 6															
Lane 1	30	2.0	30	2.0	875	0.034	100	8.3	LOS A	0.1	0.9	Full	500	0.0	0.0
Lane 2[d]	32	1.9	32	1.9	952	0.034	100	4.4	LOS A	0.1	0.8	Full	500	0.0	0.0
Approach	62	2.0	62	2.0		0.034		6.3	LOS A	0.1	0.9				
All Vehicles	892	2.5	892	2.5		0.190		6.3	LOS A	0.8	5.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	39	-	40	6.8	1081	0.037	30[5]	NA	NA
Lane 2	-	-	144	144	4.0	1173	0.123	100	NA	NA

Approach	1	39	144	184	4.6		0.123			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	256	-	-	256	1.0	1344	0.190	100	NA	NA
Lane 2	-	83	111	194	4.0	1253	0.155	82[5]	NA	NA
Approach	256	83	111	450	2.3		0.190			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	133	61	1	196	1.3	1052	0.186	100	NA	NA
Approach	133	61	1	196	1.3		0.186			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	17	13	-	30	2.0	875	0.034	100	NA	NA
Lane 2	-	31	1	32	1.9	952	0.034	100	NA	NA
Approach	17	44	1	62	2.0		0.034			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	892	2.5	0.190

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FB_2031_PM [Line 6 / 10 Sideroad - FB31 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FB_2031_PM
Site Category: FB_2031_PM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	140	3.0	140	3.0	1096	0.128	40[5]	2.1	LOS A	0.5	3.7	Full	1160	0.0	0.0
Lane 2[d]	383	0.0	383	0.0	1192	0.322	100	2.8	LOS A	1.6	10.9	Full	1160	0.0	0.0
Approach	523	0.8	523	0.8		0.322		2.6	LOS A	1.6	10.9				
East: Line 6															
Lane 1	244	0.0	244	0.0	1172	0.208	100	7.7	LOS A	0.9	6.5	Full	500	0.0	0.0
Lane 2[d]	256	2.3	256	2.3	1230	0.208	100	3.7	LOS A	0.9	6.4	Full	500	0.0	0.0
Approach	500	1.2	500	1.2		0.208		5.7	LOS A	0.9	6.5				
North: 10 Sideroad															
Lane 1[d]	201	0.7	201	0.7	1089	0.185	100	9.1	LOS A	0.8	5.3	Full	500	0.0	0.0
Approach	201	0.7	201	0.7		0.185		9.1	LOS A	0.8	5.3				
West: Line 6															
Lane 1	25	2.0	25	2.0	958	0.026	100	7.2	LOS A	0.1	0.7	Full	500	0.0	0.0
Lane 2[d]	27	2.0	27	2.0	1034	0.026	100	4.0	LOS A	0.1	0.6	Full	500	0.0	0.0
Approach	51	2.0	51	2.0		0.026		5.6	LOS A	0.1	0.7				
All Vehicles	1276	1.0	1276	1.0		0.322		5.0	LOS A	1.6	10.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	139	-	140	3.0	1096	0.128	40[5]	NA	NA
Lane 2	-	-	383	383	0.0	1192	0.322	100	NA	NA

Approach	1	139	383	523	0.8		0.322			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	156	88	-	244	0.0	1172	0.208	100	NA	NA
Lane 2	-	62	194	256	2.3	1230	0.208	100	NA	NA
Approach	156	150	194	500	1.2		0.208			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	156	44	1	201	0.7	1089	0.185	100	NA	NA
Approach	156	44	1	201	0.7		0.185			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	13	-	25	2.0	958	0.026	100	NA	NA
Lane 2	-	25	1	27	2.0	1034	0.026	100	NA	NA
Approach	11	39	1	51	2.0		0.026			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1276	1.0	0.322

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FT_2031_AM [Line 6 / 10 Sideroad - FT31 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FT_2031_AM
Site Category: FT_2031_AM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	40	6.8	40	6.8	1053	0.038	28[5]	2.3	LOS A	0.1	1.0	Full	1160	0.0	0.0
Lane 2[d]	156	4.0	156	4.0	1146	0.136	100	2.8	LOS A	0.5	3.8	Full	1160	0.0	0.0
Approach	196	4.6	196	4.6		0.136		2.7	LOS A	0.5	3.8				
East: Line 6															
Lane 1[d]	278	1.0	278	1.0	1344	0.207	100	9.7	LOS A	0.9	6.5	Full	500	0.0	0.0
Lane 2	244	4.6	244	4.6	1248	0.196	95[5]	3.3	LOS A	0.9	6.3	Full	500	0.0	0.0
Approach	522	2.7	522	2.7		0.207		6.7	LOS A	0.9	6.5				
North: 10 Sideroad															
Lane 1[d]	212	11.0	212	11.0	963	0.220	100	9.2	LOS A	0.8	6.5	Full	500	0.0	0.0
Approach	212	11.0	212	11.0		0.220		9.2	LOS A	0.8	6.5				
West: Line 6															
Lane 1	30	2.0	30	2.0	836	0.036	100	8.6	LOS A	0.1	0.9	Full	500	0.0	0.0
Lane 2[d]	32	1.9	32	1.9	912	0.036	100	4.6	LOS A	0.1	0.9	Full	500	0.0	0.0
Approach	62	2.0	62	2.0		0.036		6.5	LOS A	0.1	0.9				
All Vehicles	992	4.8	992	4.8		0.220		6.4	LOS A	0.9	6.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	39	-	40	6.8	1053	0.038	28[5]	NA	NA
Lane 2	-	-	156	156	4.0	1146	0.136	100	NA	NA

Approach	1	39	156	196	4.6		0.136			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	278	-	-	278	1.0	1344	0.207	100	NA	NA
Lane 2	-	83	161	244	4.6	1248	0.196	95[5]	NA	NA
Approach	278	83	161	522	2.7		0.207			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	150	61	1	212	11.0	963	0.220	100	NA	NA
Approach	150	61	1	212	11.0		0.220			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	17	13	-	30	2.0	836	0.036	100	NA	NA
Lane 2	-	31	1	32	1.9	912	0.036	100	NA	NA
Approach	17	44	1	62	2.0		0.036			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	992	4.8	0.220

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FT_2031_PM [Line 6 / 10 Sideroad - FT31 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FT_2031_PM
Site Category: FT_2031_PM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	140	3.0	140	3.0	1034	0.135	36[5]	2.4	LOS A	0.5	3.8	Full	1160	0.0	0.0
Lane 2[d]	428	0.0	428	0.0	1132	0.378	100	3.2	LOS A	1.9	13.3	Full	1160	0.0	0.0
Approach	568	0.7	568	0.7		0.378		3.0	LOS A	1.9	13.3				
East: Line 6															
Lane 1	269	0.0	269	0.0	1172	0.229	100	7.8	LOS A	1.0	7.3	Full	500	0.0	0.0
Lane 2[d]	281	2.4	281	2.4	1229	0.229	100	3.7	LOS A	1.0	7.2	Full	500	0.0	0.0
Approach	550	1.2	550	1.2		0.229		5.7	LOS A	1.0	7.3				
North: 10 Sideroad															
Lane 1[d]	262	0.5	262	0.5	1075	0.244	100	9.6	LOS A	1.0	7.4	Full	500	0.0	0.0
Approach	262	0.5	262	0.5		0.244		9.6	LOS A	1.0	7.4				
West: Line 6															
Lane 1	25	2.0	25	2.0	891	0.028	100	7.5	LOS A	0.1	0.7	Full	500	0.0	0.0
Lane 2[d]	27	1.9	27	1.9	967	0.028	100	4.3	LOS A	0.1	0.7	Full	500	0.0	0.0
Approach	51	2.0	51	2.0		0.028		5.9	LOS A	0.1	0.7				
All Vehicles	1431	0.9	1431	0.9		0.378		5.3	LOS A	1.9	13.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	139	-	140	3.0	1034	0.135	36[5]	NA	NA
Lane 2	-	-	428	428	0.0	1132	0.378	100	NA	NA

Approach	1	139	428	568	0.7		0.378			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	172	96	-	269	0.0	1172	0.229	100	NA	NA
Lane 2	-	54	228	281	2.4	1229	0.229	100	NA	NA
Approach	172	150	228	550	1.2		0.229			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	217	44	1	262	0.5	1075	0.244	100	NA	NA
Approach	217	44	1	262	0.5		0.244			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	13	-	25	2.0	891	0.028	100	NA	NA
Lane 2	-	25	1	27	1.9	967	0.028	100	NA	NA
Approach	11	39	1	51	2.0		0.028			
	Total	%HV	Deg.Satn (v/c)							
All Vehicles	1431	0.9		0.378						

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FB_2036_AM [Line 6 / 10 Sideroad - FB36 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FB_2036_AM
Site Category: FB_2036_AM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	40	6.8	40	6.8	1064	0.038	27[5]	2.2	LOS A	0.1	1.0	Full	1160	0.0	0.0
Lane 2[d]	161	4.0	161	4.0	1156	0.139	100	2.7	LOS A	0.5	3.9	Full	1160	0.0	0.0
Approach	201	4.6	201	4.6		0.139		2.6	LOS A	0.5	3.9				
East: Line 6															
Lane 1[d]	267	1.0	267	1.0	1344	0.198	100	9.7	LOS A	0.9	6.2	Full	500	0.0	0.0
Lane 2	200	4.1	200	4.1	1252	0.160	81[5]	3.3	LOS A	0.7	4.9	Full	500	0.0	0.0
Approach	467	2.3	467	2.3		0.198		6.9	LOS A	0.9	6.2				
North: 10 Sideroad															
Lane 1[d]	212	1.2	212	1.2	1043	0.203	100	8.9	LOS A	0.8	5.9	Full	500	0.0	0.0
Approach	212	1.2	212	1.2		0.203		8.9	LOS A	0.8	5.9				
West: Line 6															
Lane 1	30	2.0	30	2.0	853	0.035	100	8.5	LOS A	0.1	0.9	Full	500	0.0	0.0
Lane 2[d]	32	1.9	32	1.9	929	0.035	100	4.5	LOS A	0.1	0.9	Full	500	0.0	0.0
Approach	62	2.0	62	2.0		0.035		6.4	LOS A	0.1	0.9				
All Vehicles	942	2.5	942	2.5		0.203		6.4	LOS A	0.9	6.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	39	-	40	6.8	1064	0.038	27[5]	NA	NA
Lane 2	-	-	161	161	4.0	1156	0.139	100	NA	NA

Approach	1	39	161	201	4.6		0.139			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	267	-	-	267	1.0	1344	0.198	100	NA	NA
Lane 2	-	83	117	200	4.1	1252	0.160	81[5]	NA	NA
Approach	267	83	117	467	2.3		0.198			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	150	61	1	212	1.2	1043	0.203	100	NA	NA
Approach	150	61	1	212	1.2		0.203			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	17	13	-	30	2.0	853	0.035	100	NA	NA
Lane 2	-	31	1	32	1.9	929	0.035	100	NA	NA
Approach	17	44	1	62	2.0		0.035			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	942	2.5	0.203

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FB_2036_PM [Line 6 / 10 Sideroad - FB36 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FB_2036_PM
Site Category: FB_2036_PM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	90	3.0	90	3.0	1090	0.083	24[5]	2.1	LOS A	0.3	2.3	Full	1160	0.0	0.0
Lane 2[d]	411	0.0	411	0.0	1186	0.347	100	2.9	LOS A	1.7	12.1	Full	1160	0.0	0.0
Approach	501	0.5	501	0.5		0.347		2.7	LOS A	1.7	12.1				
East: Line 6															
Lane 1	263	0.0	263	0.0	1228	0.214	100	7.7	LOS A	1.0	6.8	Full	500	0.0	0.0
Lane 2[d]	275	2.3	275	2.3	1285	0.214	100	3.5	LOS A	0.9	6.7	Full	500	0.0	0.0
Approach	539	1.2	539	1.2		0.214		5.6	LOS A	1.0	6.8				
North: 10 Sideroad															
Lane 1[d]	207	0.6	207	0.6	1069	0.193	100	9.2	LOS A	0.8	5.6	Full	500	0.0	0.0
Approach	207	0.6	207	0.6		0.193		9.2	LOS A	0.8	5.6				
West: Line 6															
Lane 1	25	2.0	25	2.0	933	0.026	100	7.3	LOS A	0.1	0.7	Full	500	0.0	0.0
Lane 2[d]	27	2.0	27	2.0	1009	0.026	100	4.1	LOS A	0.1	0.7	Full	500	0.0	0.0
Approach	51	2.0	51	2.0		0.026		5.7	LOS A	0.1	0.7				
All Vehicles	1298	0.9	1298	0.9		0.347		5.1	LOS A	1.7	12.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	89	-	90	3.0	1090	0.083	24[5]	NA	NA
Lane 2	-	-	411	411	0.0	1186	0.347	100	NA	NA

Approach	1	89	411	501	0.5		0.347			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	178	86	-	263	0.0	1228	0.214	100	NA	NA
Lane 2	-	64	211	275	2.3	1285	0.214	100	NA	NA
Approach	178	150	211	539	1.2		0.214			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	161	44	1	207	0.6	1069	0.193	100	NA	NA
Approach	161	44	1	207	0.6		0.193			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	13	-	25	2.0	933	0.026	100	NA	NA
Lane 2	-	25	1	27	2.0	1009	0.026	100	NA	NA
Approach	11	39	1	51	2.0		0.026			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1298	0.9	0.347

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FT_2036_AM [Line 6 / 10 Sideroad - FT36 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FT_2036_AM
Site Category: FT_2036_AM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	40	6.8	40	6.8	1035	0.039	25[5]	2.3	LOS A	0.1	1.0	Full	1160	0.0	0.0
Lane 2[d]	172	4.0	172	4.0	1128	0.153	100	2.9	LOS A	0.6	4.3	Full	1160	0.0	0.0
Approach	212	4.5	212	4.5		0.153		2.8	LOS A	0.6	4.3				
East: Line 6															
Lane 1[d]	289	1.0	289	1.0	1344	0.215	100	9.7	LOS A	1.0	6.8	Full	500	0.0	0.0
Lane 2	250	4.7	250	4.7	1248	0.200	93[5]	3.4	LOS A	0.9	6.5	Full	500	0.0	0.0
Approach	539	2.7	539	2.7		0.215		6.7	LOS A	1.0	6.8				
North: 10 Sideroad															
Lane 1[d]	229	11.3	229	11.3	951	0.241	100	9.5	LOS A	0.9	7.2	Full	500	0.0	0.0
Approach	229	11.3	229	11.3		0.241		9.5	LOS A	0.9	7.2				
West: Line 6															
Lane 1	30	2.0	30	2.0	813	0.037	100	8.7	LOS A	0.1	0.9	Full	500	0.0	0.0
Lane 2[d]	32	1.9	32	1.9	889	0.037	100	4.7	LOS A	0.1	0.9	Full	500	0.0	0.0
Approach	62	2.0	62	2.0		0.037		6.6	LOS A	0.1	0.9				
All Vehicles	1042	4.9	1042	4.9		0.241		6.5	LOS A	1.0	7.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	39	-	40	6.8	1035	0.039	25[5]	NA	NA
Lane 2	-	-	172	172	4.0	1128	0.153	100	NA	NA

Approach	1	39	172	212	4.5		0.153			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	289	-	-	289	1.0	1344	0.215	100	NA	NA
Lane 2	-	83	167	250	4.7	1248	0.200	93[5]	NA	NA
Approach	289	83	167	539	2.7		0.215			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	167	61	1	229	11.3	951	0.241	100	NA	NA
Approach	167	61	1	229	11.3		0.241			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	17	13	-	30	2.0	813	0.037	100	NA	NA
Lane 2	-	31	1	32	1.9	889	0.037	100	NA	NA
Approach	17	44	1	62	2.0		0.037			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1042	4.9	0.241

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

LANE SUMMARY

Site: FT_2036_PM [Line 6 / 10 Sideroad - FT36 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

FT_2036_PM
Site Category: FT_2036_PM
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: 10 Sideroad															
Lane 1	140	3.0	140	3.0	1029	0.136	34[5]	2.4	LOS A	0.5	3.9	Full	1160	0.0	0.0
Lane 2[d]	456	0.0	456	0.0	1126	0.405	100	3.2	LOS A	2.1	14.7	Full	1160	0.0	0.0
Approach	596	0.7	596	0.7		0.405		3.1	LOS A	2.1	14.7				
East: Line 6															
Lane 1	288	0.0	288	0.0	1172	0.245	100	8.0	LOS A	1.1	8.0	Full	500	0.0	0.0
Lane 2[d]	301	2.4	301	2.4	1229	0.245	100	3.7	LOS A	1.1	7.8	Full	500	0.0	0.0
Approach	589	1.2	589	1.2		0.245		5.8	LOS A	1.1	8.0				
North: 10 Sideroad															
Lane 1[d]	268	0.5	268	0.5	1055	0.254	100	9.7	LOS A	1.1	7.7	Full	500	0.0	0.0
Approach	268	0.5	268	0.5		0.254		9.7	LOS A	1.1	7.7				
West: Line 6															
Lane 1	24	2.0	24	2.0	868	0.028	100	7.7	LOS A	0.1	0.7	Full	500	0.0	0.0
Lane 2[d]	27	1.9	27	1.9	944	0.028	100	4.4	LOS A	0.1	0.7	Full	500	0.0	0.0
Approach	51	2.0	51	2.0		0.028		6.0	LOS A	0.1	0.7				
All Vehicles	1503	0.9	1503	0.9		0.405		5.4	LOS A	2.1	14.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program
d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: 10 Sideroad

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	1	139	-	140	3.0	1029	0.136	34[5]	NA	NA
Lane 2	-	-	456	456	0.0	1126	0.405	100	NA	NA

Approach	1	139	456	596	0.7		0.405			
East: Line 6										
Mov. From E To Exit:	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	194	93	-	288	0.0	1172	0.245	100	NA	NA
Lane 2	-	57	244	301	2.4	1229	0.245	100	NA	NA
Approach	194	150	244	589	1.2		0.245			
North: 10 Sideroad										
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	222	44	1	268	0.5	1055	0.254	100	NA	NA
Approach	222	44	1	268	0.5		0.254			
West: Line 6										
Mov. From W To Exit:	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	11	13	-	24	2.0	868	0.028	100	NA	NA
Lane 2	-	26	1	27	1.9	944	0.028	100	NA	NA
Approach	11	39	1	51	2.0		0.028			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	1503	0.9	0.405

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

5 Lane under-utilisation found by the program

Merge Analysis

	Exit Lane Number	Short Lane Length m	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Line 6				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: 10 Sideroad				
Lane 1	0.0	0.0	0.0	0.0
West: Line 6				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0

Appendix E:
Signal Timing Plans

Traffic Signal Timing Plan

Intersection: 6th Line & Simcoe Road

City/Town: Bradford West Gwillimbury

Date: 16-Sep-08

Startup of signals to be set to flashing Red on all approaches.

Signal Operation	Sixth Line Eastbound	Sixth Line Westbound	Simcoe Road Northbound	Simcoe Road Southbound
Phase #	4	8	2	6
Minimum Green	25	25	24	24
Amber Clearance	3.3	3.3	3.3	3.3
All Red	2.2	2.2	2.2	2.2
Walk	10	10	10	10
Ped Clearance (FDW)	15	15	14	14

Cycle Length: 60 seconds

Notes: -Based on 2011 traffic conditions from February 2008 ESR
-Amber Clearance, All Red, and Ped timing from MTO Book 12

Traffic Signal Timing Plan

Intersection: Sixth Line & West Park Avenue

City/Town: Bradford West Gwillimbury

Date: 16-Sep-08

Startup of signals to be set to flashing Red on all approaches.

Signal Operation	Sixth Line Eastbound	Sixth Line Westbound	West Park Avenue Southbound
Phase #	4	8	6
Minimum Green	25	25	10
Extension	-	-	3
Maximum Green	-	-	16 [1]
Amber Clearance	3.3	3.3	3
All Red	2.4	2.4	1.9
Walk	10	10	10
Ped Clearance (FDW)	15	15	14

Min. Cycle Length: 45.6 seconds

Notes: [1] Maximum green time when pedestrian phase not activated
-Signals operate under semi-actuated control (loop detectors on West Park Avenue)
-Amber Clearance, All Red, and Ped timing from MTO Book 12
-Based on 2011 traffic conditions from February 2008 ESR

ACTIVATION
MARCH 26/09
11:10 AM. M/L

Traffic Signal Timing Plan

Intersection: Sixth Line & Melbourne Drive
City/Town: Bradford West Gwillimbury
Date: 16-Sep-08

Startup of signals to be set to flashing Red on all approaches.

Signal Operation	Sixth Line ~~Eastbound~~ WEST	Sixth Line ~~Westbound~~ EAST	Melbourne Drive Southbound
Phase #	2 ~~4~~	6 ~~8~~	4 ~~8~~
Minimum Green	25	25	10
Extension	-	-	3
Maximum Green	-	-	16 [1]
Amber Clearance	3.3	3.3	3
All Red	2.2	2.2	2.2
Walk	10	10	10
Ped Clearance (FDW)	15	15	11

Min. Cycle Length: 45.7 seconds

Notes: [1] Maximum green time when pedestrian phase not activated
-Signals operate under semi-actuated control (loop detectors on Melbourne Drive)
-Amber Clearance, All Red, and Ped timing from MTO Book 12
-Based on 2011 traffic conditions from February 2008 ESR

DET.
NOTE: ch. 3 CALL Ø4

DET.
CH. 4 CALL Ø4 Delay = 5 SEC.

Appendix F:
Signal Warrant Analysis

5th Line / Street A

2026		AM	PM		AHV
	NBL	0	0		0
	NBT	0	0		0
Street A	NBR	0	0		0
&	SBL	55	40		24
5th Line	SBT	0	0		0
	SBR	75	55		33
	EBL	30	110		35
	EBT	100	125		56
	EBR	0	0		0
	WBL	0	0		0
	WBT	75	105		45
	WBR	10	45		14
				Total	**207**

2036		AM	PM		AHV
	NBL	0	0		0
	NBT	0	0		0
Street A	NBR	0	0		0
&	SBL	55	40		24
5th Line	SBT	0	0		0
	SBR	75	55		33
	EBL	30	110		35
	EBT	115	160		69
	EBR	0	0		0
	WBL	0	0		0
	WBT	95	125		55
	WBR	10	45		14
				Total	**230**

2031		AM	PM		AHV
	NBL	0	0		0
	NBT	0	0		0
Street A	NBR	0	0		0
&	SBL	55	40		24
5th Line	SBT	0	0		0
	SBR	75	55		33
	EBL	30	110		35
	EBT	115	160		69
	EBR	0	0		0
	WBL	0	0		0
	WBT	95	125		55
	WBR	10	45		14
				Total	**230**

Existing **Line 6 / Street A**

Hour ending	Approach Total	Relative % vs. AM	Relative % vs. PM
08:00:00	281	74%	0
09:00:00	381	100%	0
14:00:00	271	0%	56%
15:00:00	324	0%	66%
16:00:00	447	0%	92%
17:00:00	488	0%	100%
18:00:00	426	0%	87%
19:00:00	313	0%	64%

2026 Projected

Hour ending	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
08:00:00	0	269	30	59	0	81	11	243	0
09:00:00	0	365	40	80	0	110	15	330	0
14:00:00	0	280	75	31	0	44	31	255	0
15:00:00	0	335	90	37	0	53	37	305	0
16:00:00	0	463	124	50	0	73	50	421	0
17:00:00	0	505	135	55	0	80	55	460	0
18:00:00	0	441	118	48	0	70	48	402	0
19:00:00	0	324	87	35	0	51	35	295	0

2031 Projected

Hour ending	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
08:00:00	0	343	30	59	0	81	11	313	0
09:00:00	0	465	40	80	0	110	15	425	0
14:00:00	0	328	75	31	0	44	31	344	0
15:00:00	0	392	90	37	0	53	37	412	0
16:00:00	0	540	124	50	0	73	50	568	0
17:00:00	0	590	135	55	0	80	55	620	0
18:00:00	0	515	118	48	0	70	48	541	0
19:00:00	0	378	87	35	0	51	35	398	0

2036 Projected

Hour ending	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR
08:00:00	0	365	30	59	0	81	11	325	0
09:00:00	0	495	40	80	0	110	15	440	0
14:00:00	0	347	75	31	0	44	31	369	0
15:00:00	0	415	90	37	0	53	37	442	0
16:00:00	0	572	124	50	0	73	50	609	0
17:00:00	0	625	135	55	0	80	55	665	0
18:00:00	0	546	118	48	0	70	48	581	0
19:00:00	0	401	87	35	0	51	35	427	0

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Line 6 / Street A

What is the direction of the Main Road street? East-West

When was the data collected? Future Total 2026 - AHV

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban **Population >= 10,000 AND Speed < 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AHV	0	218	44	34	0	48	18	198	0				
AHV	0	218	44	34	0	48	18	198	0				
AHV	0	218	44	34	0	48	18	198	0				
AHV	0	218	44	34	0	48	18	198	0				
AHV	0	218	44	34	0	48	18	198	0				
AHV	0	218	44	34	0	48	18	198	0				
AHV	0	218	44	34	0	48	18	198	0				
AHV	0	218	44	34	0	48	18	198	0				
Total	**0**	**1,744**	**352**	**272**	**0**	**384**	**144**	**1,584**	**0**	**0**	**0**	**0**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	
13-24	
25-36	

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume									
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds									
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2026 - AHV

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
1A	480	720	600	900	560	560	560	560	560	560	560	560		
	COMPLIANCE %				78	78	78	78	78	78	78	78	622	78
1B	180	255	180	255	82	82	82	82	82	82	82	82		
	COMPLIANCE %				32	32	32	32	32	32	32	32	257	32

Restricted Flow Signal Justification 1:

Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
2A	480	720	600	900	478	478	478	478	478	478	478	478		
	COMPLIANCE %				66	66	66	66	66	66	66	66	531	66
2B	50	75	50	75	34	34	34	34	34	34	34	34		
	COMPLIANCE %				45	45	45	45	45	45	45	45	363	45

Restricted Flow Signal Justification 2:

Both 2A and 2B 100% fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	AHV	478	82	272	30 %	30 %
	AHV	478	82	272	30 %	
	AHV	478	82	272	30 %	
	AHV	478	82	272	30 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2026 - AHV

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2026 - AHV

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	78	%	☐	☑
	B	Crossing Volume	32	%		
2. Delay to Cross Traffic	A	Main Road	66	%	☐	☑
	B	Crossing Road	45	%		
3. Combination	A	Justificaton 1	32	%	☐	☑
	B	Justification 2	45	%		
4. 4-Hr Volume			30	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Line 6 / Street A

What is the direction of the Main Road street? East-West

When was the data collected? Future Total 2026

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban Population >= 10,000 AND Speed < 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
8:00	0	269	30	59	0	81	11	243	0				
9:00	0	365	40	80	0	110	15	330	0				
14:00	0	280	75	31	0	44	31	255	0				
15:00	0	335	90	37	0	53	37	305	0				
16:00	0	463	124	50	0	73	50	421	0				
17:00	0	505	135	55	0	80	55	460	0				
18:00	0	441	118	48	0	70	48	402	0				
19:00	0	324	87	35	0	51	35	295	0				
Total	**0**	**2,982**	**697**	**395**	**0**	**563**	**282**	**2,712**	**0**	**0**	**0**	**0**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	
13-24	
25-36	

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume									
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds									
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2026

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00		
1A	480	720	600	900	693	940	716	856	1,182	1,290	1,126	827		
	COMPLIANCE %				96	100	99	100	100	100	100	100	796	99
1B	180	255	180	255	140	190	75	90	124	135	118	87		
	COMPLIANCE %				55	75	29	35	48	53	46	34	376	47
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours ☐ Yes ☑ No Lesser of 1A or 1B at least 80% fulfilled each of 8 hours ☐ Yes ☑ No									

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00		
2A	480	720	600	900	553	750	641	767	1,058	1,155	1,008	741		
	COMPLIANCE %				77	100	89	100	100	100	100	100	766	96
2B	50	75	50	75	59	80	31	37	50	55	48	35		
	COMPLIANCE %				79	100	41	49	67	73	64	47	520	65
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours ☐ Yes ☑ No Lesser of 2A or 2B at least 80% fulfilled each of 8 hours ☐ Yes ☑ No									

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	15:00	767	90	162	55 %	89 %
	16:00	1,058	124	91	100 %	
	17:00	1,155	135	80	100 %	
	18:00	1,008	118	100	100 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2026

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2026

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	99	%	☐	☑
	B	Crossing Volume	47	%		
2. Delay to Cross Traffic	A	Main Road	96	%	☐	☑
	B	Crossing Road	65	%		
3. Combination	A	Justificaton 1	47	%	☐	☑
	B	Justification 2	65	%		
4. 4-Hr Volume			89	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Line 6 / Street A

What is the direction of the Main Road street? East-West

When was the data collected? Future Total 2031 - AHV

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban Population >= 10,000 AND Speed < 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AHV	0	264	44	34	0	48	18	261	0				
AHV	0	264	44	34	0	48	18	261	0				
AHV	0	264	44	34	0	48	18	261	0				
AHV	0	264	44	34	0	48	18	261	0				
AHV	0	264	44	34	0	48	18	261	0				
AHV	0	264	44	34	0	48	18	261	0				
AHV	0	264	44	34	0	48	18	261	0				
AHV	0	264	44	34	0	48	18	261	0				
Total	**0**	**2,112**	**352**	**272**	**0**	**384**	**144**	**2,088**	**0**	**0**	**0**	**0**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	
13-24	
25-36	

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume									
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds									
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2031 - AHV

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
1A	480	720	600	900	669	669	669	669	669	669	669	669		
	COMPLIANCE %				93	93	93	93	93	93	93	93	743	93
1B	180	255	180	255	82	82	82	82	82	82	82	82		
	COMPLIANCE %				32	32	32	32	32	32	32	32	257	32

Restricted Flow Signal Justification 1:

Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
2A	480	720	600	900	587	587	587	587	587	587	587	587		
	COMPLIANCE %				82	82	82	82	82	82	82	82	652	82
2B	50	75	50	75	34	34	34	34	34	34	34	34		
	COMPLIANCE %				45	45	45	45	45	45	45	45	363	45

Restricted Flow Signal Justification 2:

Both 2A and 2B 100% fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	AHV	587	82	226	36 %	36 %
	AHV	587	82	226	36 %	
	AHV	587	82	226	36 %	
	AHV	587	82	226	36 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision | GO TO Justification:

Intersection: Line 6 / Street A | Count Date: Future Total 2031 - AHV

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2031 - AHV

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	93	%	☐	☑
	B	Crossing Volume	32	%		
2. Delay to Cross Traffic	A	Main Road	82	%	☐	☑
	B	Crossing Road	45	%		
3. Combination	A	Justificaton 1	32	%	☐	☑
	B	Justification 2	45	%		
4. 4-Hr Volume			36	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Line 6 / Street A

What is the direction of the Main Road street? East-West

When was the data collected? Future Total 2031

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban Population >= 10,000 AND Speed < 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
8:00	0	343	30	59	0	81	11	313	0				
9:00	0	465	40	80	0	110	15	425	0				
14:00	0	328	75	31	0	44	31	344	0				
15:00	0	392	90	37	0	53	37	412	0				
16:00	0	540	124	50	0	73	50	568	0				
17:00	0	590	135	55	0	80	55	620	0				
18:00	0	515	118	48	0	70	48	541	0				
19:00	0	378	87	35	0	51	35	398	0				
Total	**0**	**3,551**	**697**	**395**	**0**	**563**	**282**	**3,621**	**0**	**0**	**0**	**0**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	
13-24	
25-36	

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume									
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds									
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision | GO TO Justification:

Intersection: Line 6 / Street A | Count Date: Future Total 2031

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00		
1A	480	720	600	900	837	1,135	852	1,019	1,406	1,535	1,340	985		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
1B	180	255	180	255	140	190	75	90	124	135	118	87		
	COMPLIANCE %				55	75	29	35	48	53	46	34	376	47
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☐ No ☑									
					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑									

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00		
2A	480	720	600	900	697	945	777	930	1,282	1,400	1,222	898		
	COMPLIANCE %				97	100	100	100	100	100	100	100	797	100
2B	50	75	50	75	59	80	31	37	50	55	48	35		
	COMPLIANCE %				79	100	41	49	67	73	64	47	520	65
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours — Yes ☐ No ☑									
					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑									

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	9:00	945	190	114	100 %	100 %
	16:00	1,282	124	80	100 %	
	17:00	1,400	135	80	100 %	
	18:00	1,222	118	80	100 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2031

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2031

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	100	%	☐	☑
	B	Crossing Volume	47	%		
2. Delay to Cross Traffic	A	Main Road	100	%	☐	☑
	B	Crossing Road	65	%		
3. Combination	A	Justificaton 1	47	%	☐	☑
	B	Justification 2	65	%		
4. 4-Hr Volume			100	%	☑	☐
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Line 6 / Street A

What is the direction of the Main Road street? East-West

When was the data collected? Future Total 2036 - AHV

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban **Population >= 10,000 AND Speed < 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AHV	0	280	44	34	0	48	18	276	0				
AHV	0	280	44	34	0	48	18	276	0				
AHV	0	280	44	34	0	48	18	276	0				
AHV	0	280	44	34	0	48	18	276	0				
AHV	0	280	44	34	0	48	18	276	0				
AHV	0	280	44	34	0	48	18	276	0				
AHV	0	280	44	34	0	48	18	276	0				
AHV	0	280	44	34	0	48	18	276	0				
Total	**0**	**2,240**	**352**	**272**	**0**	**384**	**144**	**2,208**	**0**	**0**	**0**	**0**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	
13-24	
25-36	

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume									
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds									
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2036 - AHV

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
1A	480	720	600	900	700	700	700	700	700	700	700	700		
	COMPLIANCE %				97	97	97	97	97	97	97	97	778	97
1B	180	255	180	255	82	82	82	82	82	82	82	82		
	COMPLIANCE %				32	32	32	32	32	32	32	32	257	32

Restricted Flow Signal Justification 1:

Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
2A	480	720	600	900	618	618	618	618	618	618	618	618		
	COMPLIANCE %				86	86	86	86	86	86	86	86	687	86
2B	50	75	50	75	34	34	34	34	34	34	34	34		
	COMPLIANCE %				45	45	45	45	45	45	45	45	363	45

Restricted Flow Signal Justification 2:

Both 2A and 2B 100% fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	AHV	618	82	213	38 %	38 %
	AHV	618	82	213	38 %	
	AHV	618	82	213	38 %	
	AHV	618	82	213	38 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2036 - AHV

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2036 - AHV

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	97	%	☐	☑
	B	Crossing Volume	32	%		
2. Delay to Cross Traffic	A	Main Road	86	%	☐	☑
	B	Crossing Road	45	%		
3. Combination	A	Justificaton 1	32	%	☐	☑
	B	Justification 2	45	%		
4. 4-Hr Volume			38	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Line 6 / Street A

What is the direction of the Main Road street? East-West

When was the data collected? Future Total 2036

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban Population >= 10,000 AND Speed < 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
8:00	0	365	30	59	0	81	11	325	0				
9:00	0	495	40	80	0	110	15	440	0				
14:00	0	347	75	31	0	44	31	369	0				
15:00	0	415	90	37	0	53	37	442	0				
16:00	0	572	124	50	0	73	50	609	0				
17:00	0	625	135	55	0	80	55	665	0				
18:00	0	546	118	48	0	70	48	581	0				
19:00	0	401	87	35	0	51	35	427	0				
Total	**0**	**3,766**	**697**	**395**	**0**	**563**	**282**	**3,856**	**0**	**0**	**0**	**0**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	
13-24	
25-36	

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume									
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds									
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2036

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00		
1A	480	720	600	900	870	1,180	897	1,072	1,479	1,615	1,410	1,036		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
1B	180	255	180	255	140	190	75	90	124	135	118	87		
	COMPLIANCE %				55	75	29	35	48	53	46	34	376	47
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours					Yes ☐		No ☑		
					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours					Yes ☐		No ☑		

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	8:00	9:00	14:00	15:00	16:00	17:00	18:00	19:00		
2A	480	720	600	900	730	990	822	983	1,356	1,480	1,292	949		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
2B	50	75	50	75	59	80	31	37	50	55	48	35		
	COMPLIANCE %				79	100	41	49	67	73	64	47	520	65
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours					Yes ☐		No ☑		
					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours					Yes ☐		No ☑		

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	9:00	990	190	104	100 %	100 %
	16:00	1,356	124	80	100 %	
	17:00	1,480	135	80	100 %	
	18:00	1,292	118	80	100 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2036

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Line 6 / Street A

Count Date: Future Total 2036

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	100	%	☐	☑
	B	Crossing Volume	47	%		
2. Delay to Cross Traffic	A	Main Road	100	%	☐	☑
	B	Crossing Road	65	%		
3. Combination	A	Justificaton 1	47	%	☐	☑
	B	Justification 2	65	%		
4. 4-Hr Volume			100	%	☑	☐
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? 5th Line / Street A

What is the direction of the Main Road street? East-West

When was the data collected? Future Total 2026 - AHV

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban **Population >= 10,000 AND Speed < 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AHV	35	56	0	0	0	0	0	45	14	24	0	33	
AHV	35	56	0	0	0	0	0	45	14	24	0	33	
AHV	35	56	0	0	0	0	0	45	14	24	0	33	
AHV	35	56	0	0	0	0	0	45	14	24	0	33	
AHV	35	56	0	0	0	0	0	45	14	24	0	33	
AHV	35	56	0	0	0	0	0	45	14	24	0	33	
AHV	35	56	0	0	0	0	0	45	14	24	0	33	
AHV	35	56	0	0	0	0	0	45	14	24	0	33	
AHV	35	56	0	0	0	0	0	45	14	24	0	33	
Total	**280**	**448**	**0**	**0**	**0**	**0**	**0**	**360**	**112**	**192**	**0**	**264**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	
13-24	
25-36	

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume									
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds									
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: 5th Line / Street A

Count Date: Future Total 2026 - AHV

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
1A	480	720	600	900	207	207	207	207	207	207	207	207		
	COMPLIANCE %				29	29	29	29	29	29	29	29	230	29
1B	180	255	180	255	57	57	57	57	57	57	57	57		
	COMPLIANCE %				22	22	22	22	22	22	22	22	179	22

Restricted Flow Signal Justification 1:

Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
2A	480	720	600	900	150	150	150	150	150	150	150	150		
	COMPLIANCE %				21	21	21	21	21	21	21	21	167	21
2B	50	75	50	75	24	24	24	24	24	24	24	24		
	COMPLIANCE %				32	32	32	32	32	32	32	32	256	32

Restricted Flow Signal Justification 2:

Both 2A and 2B 100% fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	AHV	150	57	445	13 %	13 %
	AHV	150	57	445	13 %	
	AHV	150	57	445	13 %	
	AHV	150	57	445	13 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: 5th Line / Street A

Count Date: Future Total 2026 - AHV

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: 5th Line / Street A

Count Date: Future Total 2026 - AHV

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	29	%	☐	☑
	B	Crossing Volume	22	%		
2. Delay to Cross Traffic	A	Main Road	21	%	☐	☑
	B	Crossing Road	32	%		
3. Combination	A	Justificaton 1	22	%	☐	☑
	B	Justification 2	21	%		
4. 4-Hr Volume			13	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? 5th Line / Street A

What is the direction of the Main Road street? East-West

When was the data collected? Future Total 2031 - AHV

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban **Population >= 10,000 AND Speed < 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
Total	**280**	**552**	**0**	**0**	**0**	**0**	**0**	**440**	**112**	**192**	**0**	**264**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	
13-24	
25-36	

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume									
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds									
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: 5th Line / Street A

Count Date: Future Total 2031 - AHV

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
1A	480	720	600	900	230	230	230	230	230	230	230	230		
	COMPLIANCE %				32	32	32	32	32	32	32	32	256	32
1B	180	255	180	255	57	57	57	57	57	57	57	57		
	COMPLIANCE %				22	22	22	22	22	22	22	22	179	22
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours ☐ Yes ☑ No Lesser of 1A or 1B at least 80% fulfilled each of 8 hours ☐ Yes ☑ No									

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
2A	480	720	600	900	173	173	173	173	173	173	173	173		
	COMPLIANCE %				24	24	24	24	24	24	24	24	192	24
2B	50	75	50	75	24	24	24	24	24	24	24	24		
	COMPLIANCE %				32	32	32	32	32	32	32	32	256	32
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours ☐ Yes ☑ No Lesser of 2A or 2B at least 80% fulfilled each of 8 hours ☐ Yes ☑ No									

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	AHV	173	57	432	13 %	13 %
	AHV	173	57	432	13 %	
	AHV	173	57	432	13 %	
	AHV	173	57	432	13 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: 5th Line / Street A

Count Date: Future Total 2031 - AHV

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: 5th Line / Street A

Count Date: Future Total 2031 - AHV

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	32	%	☐	☑
	B	Crossing Volume	22	%		
2. Delay to Cross Traffic	A	Main Road	24	%	☐	☑
	B	Crossing Road	32	%		
3. Combination	A	Justificaton 1	22	%	☐	☑
	B	Justification 2	24	%		
4. 4-Hr Volume			13	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? 5th Line / Street A

What is the direction of the Main Road street? East-West

When was the data collected? Future Total 2036 - AHV

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 3

d.- What is the operating environment? Urban **Population >= 10,000 AND Speed < 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
AHV	35	69	0	0	0	0	0	55	14	24	0	33	
Total	**280**	**552**	**0**	**0**	**0**	**0**	**0**	**440**	**112**	**192**	**0**	**264**	**0**

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	
13-24	
25-36	

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume									
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	100%		50%		0%		0%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									6,411

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds									
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	100%		50%		0%		0%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: 5th Line / Street A

Count Date: Future Total 2036 - AHV

Justification 1: Minimum Vehicle Volumes

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
1A	480	720	600	900	230	230	230	230	230	230	230	230		
	COMPLIANCE %				32	32	32	32	32	32	32	32	256	32
1B	180	255	180	255	57	57	57	57	57	57	57	57		
	COMPLIANCE %				22	22	22	22	22	22	22	22	179	22
Restricted Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours ☐ Yes ☑ No Lesser of 1A or 1B at least 80% fulfilled each of 8 hours ☐ Yes ☑ No									

Justification 2: Delay to Cross Traffic

Restricted Flow Urban Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☐	RESTR. FLOW ☑	FREE FLOW ☐	RESTR. FLOW ☐	AHV	AHV	AHV	AHV	AHV	AHV	AHV	AHV		
2A	480	720	600	900	173	173	173	173	173	173	173	173		
	COMPLIANCE %				24	24	24	24	24	24	24	24	192	24
2B	50	75	50	75	24	24	24	24	24	24	24	24		
	COMPLIANCE %				32	32	32	32	32	32	32	32	256	32
Restricted Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours ☐ Yes ☑ No Lesser of 2A or 2B at least 80% fulfilled each of 8 hours ☐ Yes ☑ No									

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	AHV	173	57	432	13 %	13 %
	AHV	173	57	432	13 %	
	AHV	173	57	432	13 %	
	AHV	173	57	432	13 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: 5th Line / Street A

Count Date: Future Total 2036 - AHV

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

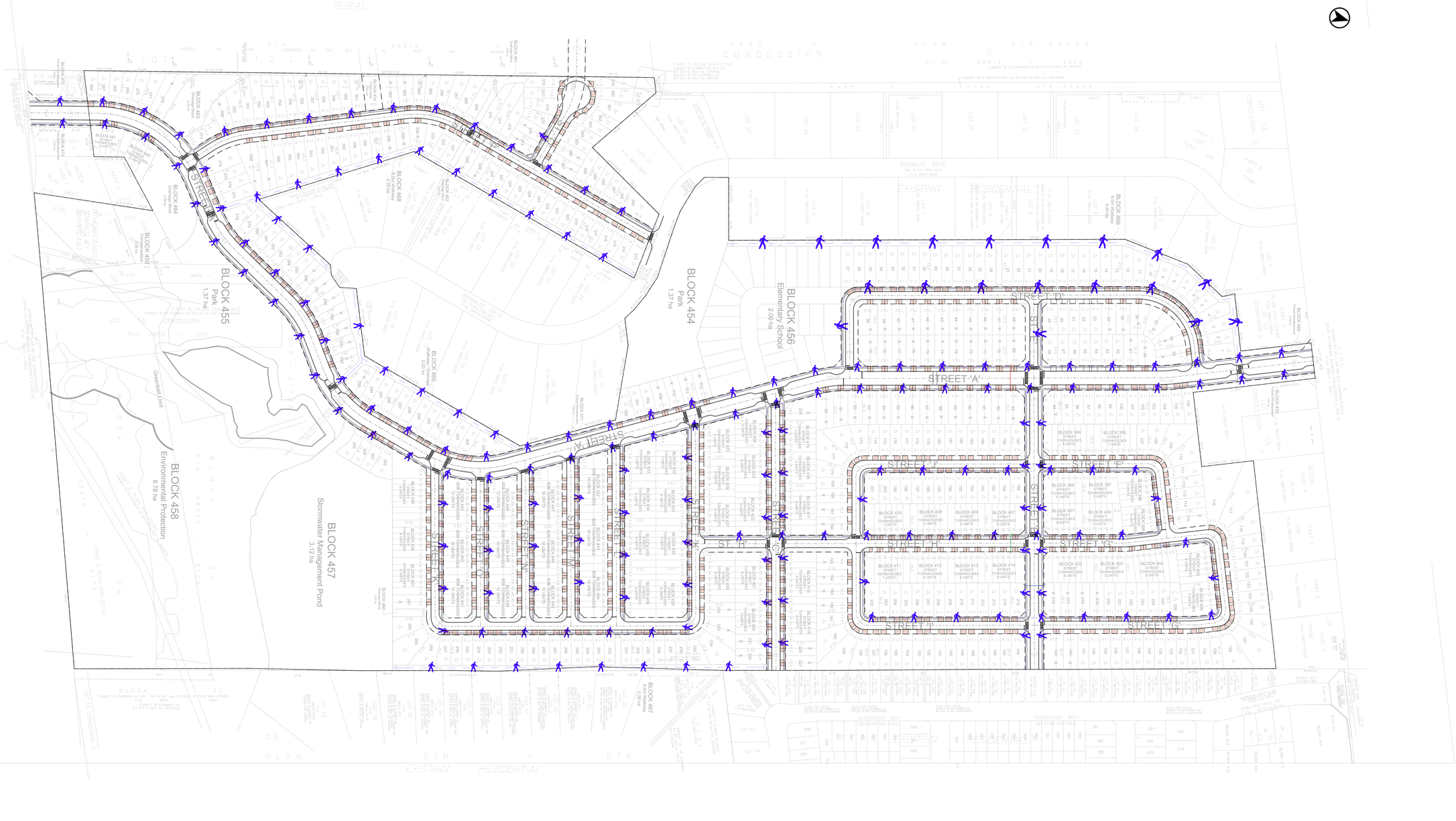
Intersection: 5th Line / Street A

Count Date: Future Total 2036 - AHV

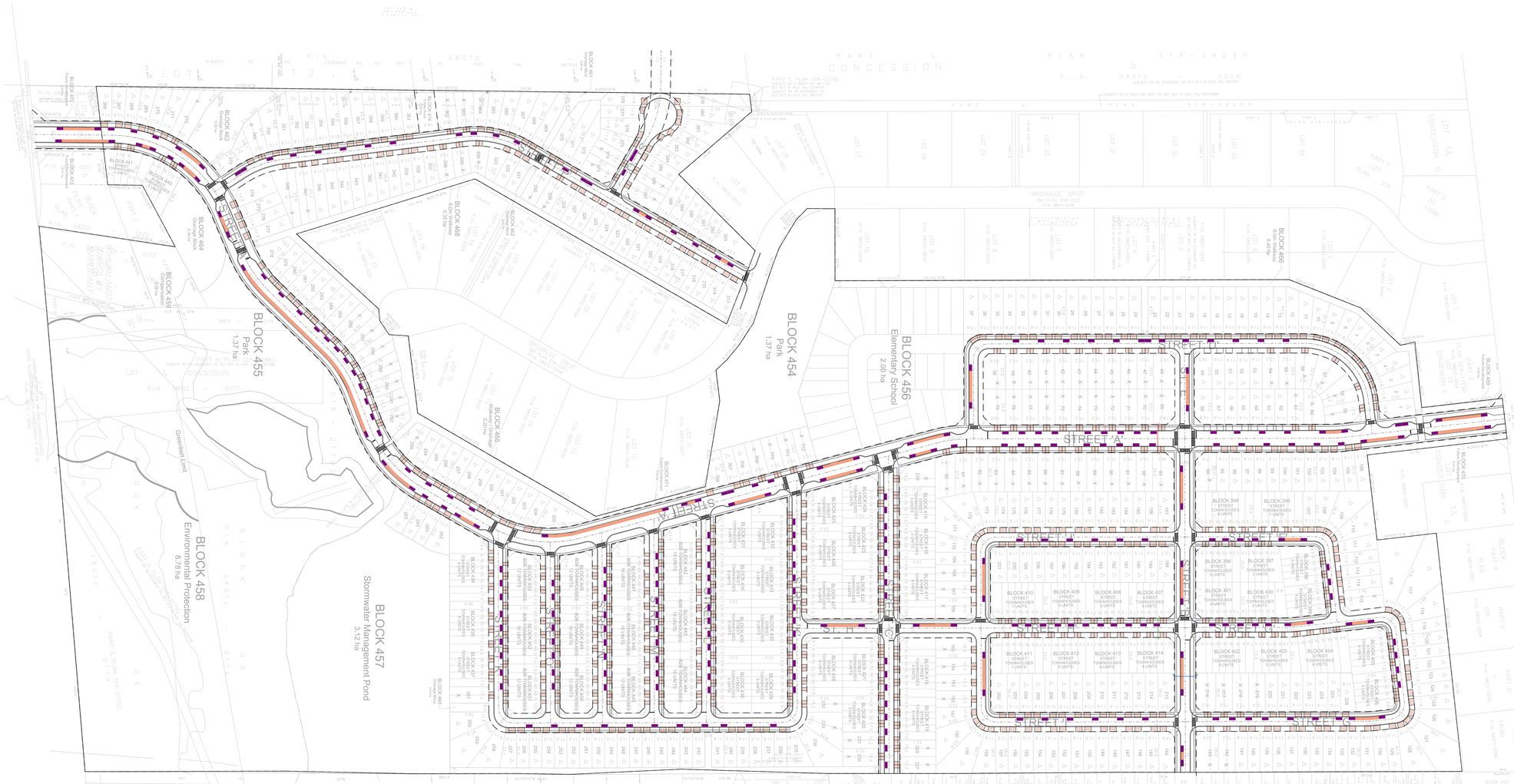
Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	32	%	☐	☑
	B	Crossing Volume	22	%		
2. Delay to Cross Traffic	A	Main Road	24	%	☐	☑
	B	Crossing Road	32	%		
3. Combination	A	Justificaton 1	22	%	☐	☑
	B	Justification 2	24	%		
4. 4-Hr Volume			13	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Appendix G:
Pedestrian Circulation Plan


BLOCK 455
Park
1.37 ha
BLOCK 454
Park
1.37 ha
BLOCK 456
Elemenary School
2.00 ha
BLOCK 457
Stormwater Management Pond
3.12 ha
BLOCK 458
Enviromental Protection
8.78 ha
BLOCK 468
0.30 ha
BLOCK 466
0.40 ha
BLOCK 467
0.26 ha
BLOCK 465
0.07 ha
BLOCK 469
0.07 ha
BLOCK 470
0.07 ha
BLOCK 471
0.07 ha
BLOCK 472
0.07 ha
BLOCK 473
0.07 ha
BLOCK 474
0.07 ha
BLOCK 475
0.07 ha
BLOCK 476
0.07 ha
BLOCK 477
0.07 ha
BLOCK 478
0.07 ha
BLOCK

Appendix H:
Conceptual On-Street Parking Plan



ON-STREET PARKING MODULE

Restricted Condition (6.1m Street Townhouses): 1 Parking Space Between Paired Driveways



6.1m Street Townhouses: 1 Parking Space Between Paired Driveways



6.4m B-B Townhouses: 1 Parking Space Between Paired Driveways



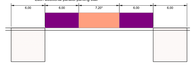
7.6m Semi-Detached: 1 Parking Space Between Paired Driveways



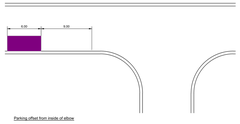
11.6m Single Detached: 1 Parking Space Between Driveways



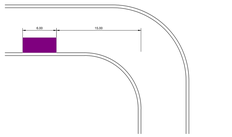
12 Parking Spaces
(Including 1 Barrier Free)
* Each additional parallel parking stall



Parking offset from intersection



Parking offset from inside of elbow



GENERAL NOTES

1. ARCHITECTURAL PLAN DATED OCTOBER 2024, PREPARED BY MOP.
2. CURB / GUTTER DIMENSION HAS BEEN ADOPTED AS PER OPSD 600.040 STANDARD.
3. LOCATION OF MAILBOX AND FIRE HYDRANTS HAVE NOT BEEN DETERMINED AT THIS STAGE, WHICH WILL IMPACT ON-STREET PARKING SPACES.
4. THE SIDEWALK LOCATION IS SUBJECT TO CONFIRMATION THROUGH THE DESIGN PROCESS.
5. THE ROAD ALIGNMENT AND THE SIDEWALK SHOULD TIE INTO EXISTING.
7. THIS PLAN IS LISTRATIVE FOR THE PURPOSE OF SHOWING PARKING ALLOCATION AND SHALL NOT BE RELIED UPON FOR DETAILED DESIGN OR CONSTRUCTION.

LEGEND

- DRIVEWAYS
- 7.2m PARALLEL PARKING SPACE
- 6.0m PARALLEL PARKING SPACE

DRIVEWAY WIDTHS

STREET TOWNHOUSES: 6.1m LOTS - PAIRED DRIVEWAYS	6.0m
B2B TOWNHOUSES: 6.4m LOTS - PAIRED DRIVEWAYS	6.0m
SEMI DETACHED RESIDENTIAL: 15.2m LOTS - PAIRED DRIVEWAYS	6.0m
SINGLE DETACHED RESIDENTIAL: 11.6m LOTS - SINGLE DRIVEWAYS	6.0m

ON-STREET PARKING SUPPLY

Units	Parking	Ratio (Parking/unit)
962	445	0.46

PRELIMINARY DRAFT
FOR DISCUSSION PURPOSES ONLY

SUBJECT TO CONFIRMATION OF BRADFORD WEST GWILLIMBURY ENGINEERING DESIGN STANDARDS

01	10-31-24	KCJ	ISSUED FOR OPA / ZBA AND DPOS RE-SUBMISSION
00	09-20-23	MA	ISSUED FOR OPA / ZBA AND DPOS RE-SUBMISSION

BA Consulting Group Ltd.
100-45 St. Clair Ave. W.
Toronto ON M4V 1K9
tel: 416 961 7110
www.baconsulting.com

BRADFORD HIGHLANDS

ROAD PLAN WITH TYPICAL STREET DESIGN ELEMENTS

PARKING SUPPLY DIAGRAM

Date: November 1, 2024

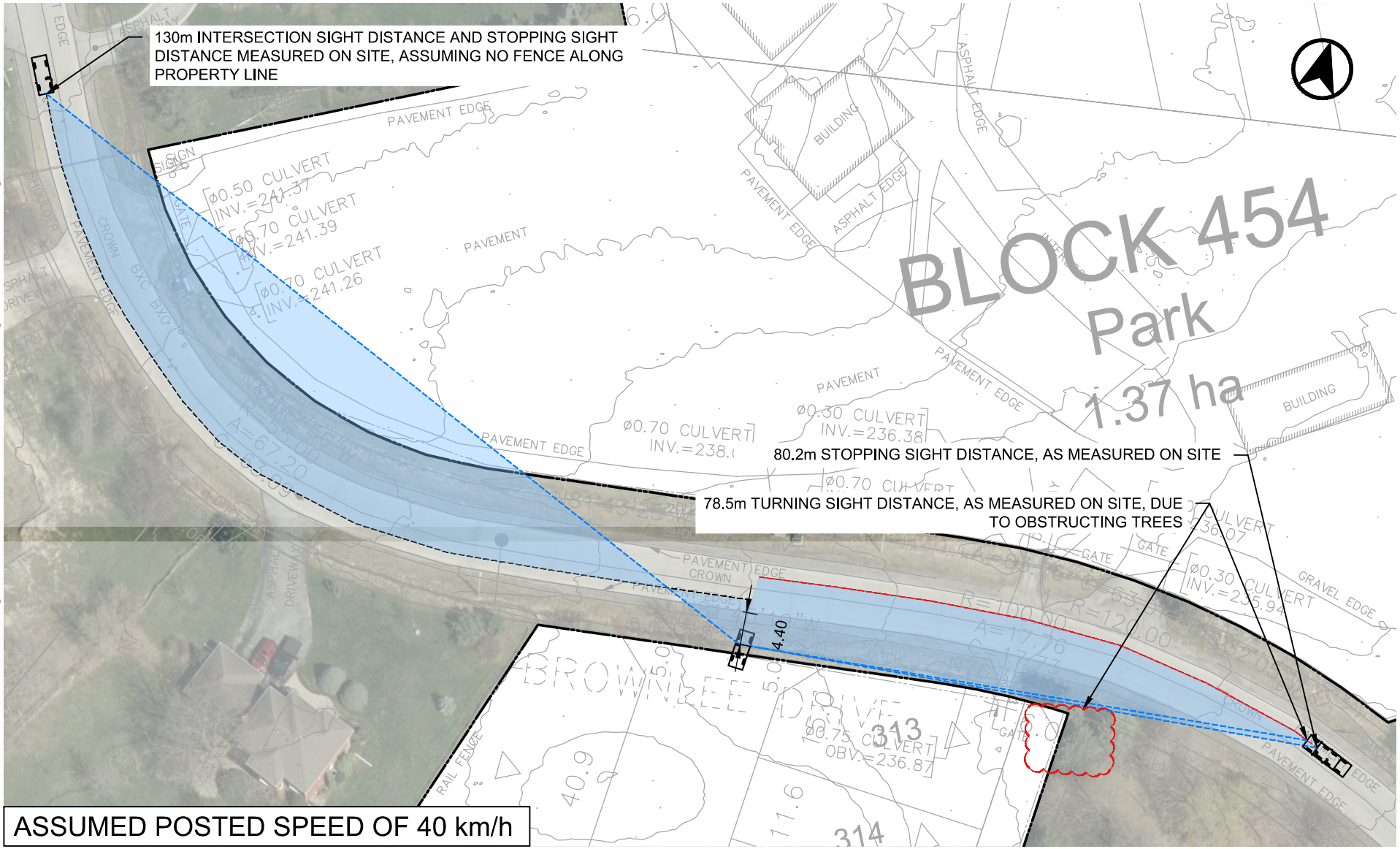
Project No.: 6720-05

Scale: 1:1,000 (0 10 20 30 40 50m)

PP-01

Date Plotted: November 1, 2024 - File name: I:\projects\current\6720-05\CAD\Drawings\Plan\20241101-720-05-PP-Bradford Highlands-PP-01-R00.dwg

Appendix I:
Sight Distance Analysis



1:750 0 15 30m Scale

Date Plotted: November 1, 2024 Filename: J:\6720-05\BA\Sight Distance Review\2024\2.Oct15-24\BA-Bradford Highlands-SD-01-6720-05.dwg

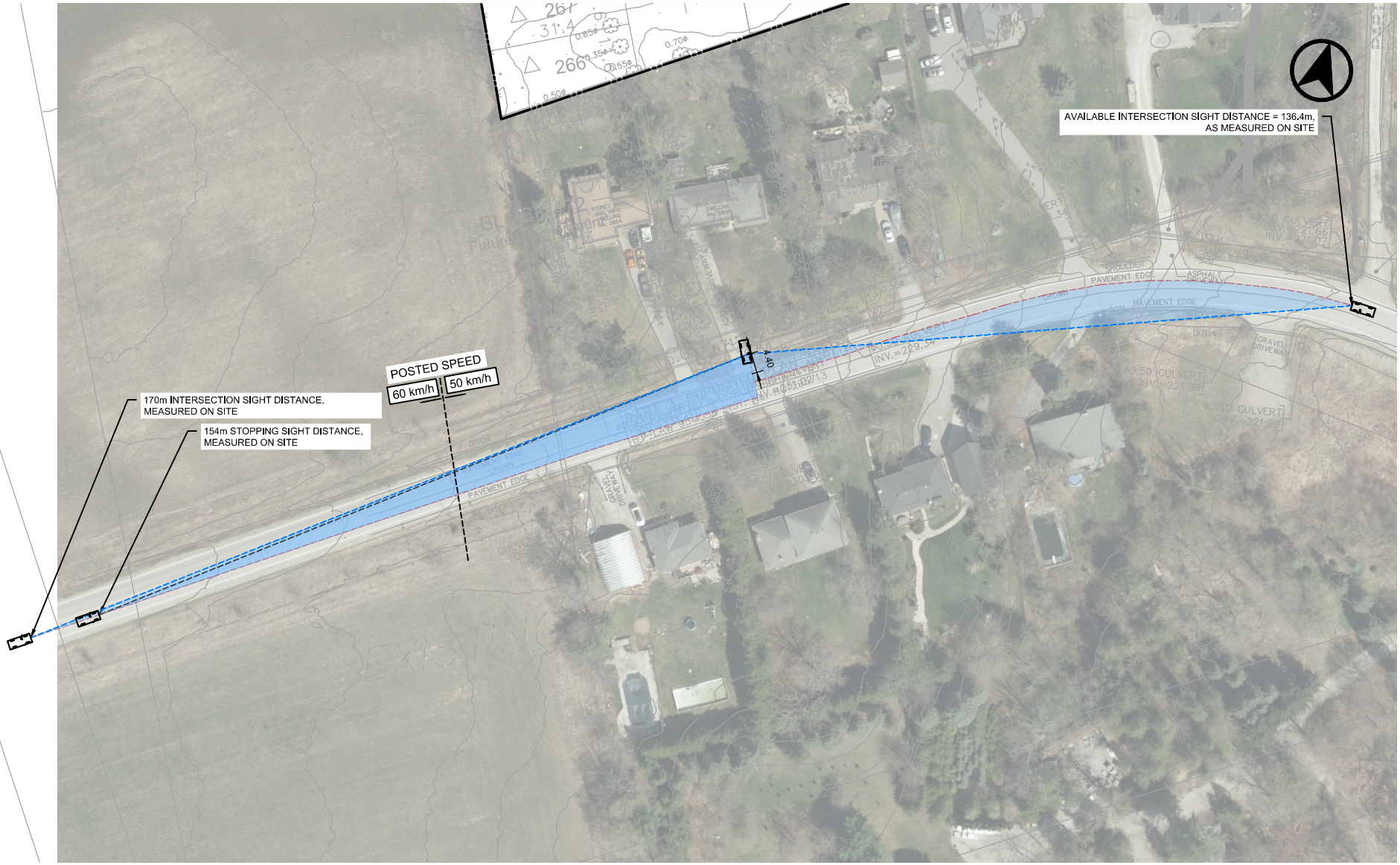
BA Group

BRADFORD HIGHLANDS

SIGHT DISTANCE REVIEW - AS MEASURED ON SITE

STREET Q / BROWNLEE DRIVE

Project:	BRADFORD HIGHLANDS
Project No.	6720-05
Date:	October 31, 2024
Revised:	--
Drawing No.	SD-01



0 25 50m

1:1,250 Scale

Date Plotted: November 1, 2024 Filename: J:\6720-05\BA\Sight Distance Review\2024\Oct15-24\BA-Bradford Highlands-SD-01-01-24.dwg

BA Group

BRADFORD HIGHLANDS

SIGHT DISTANCE REVIEW - AS MEASURED ON SITE

STREET A / 5TH LINE

Project:	BRADFORD HIGHLANDS
Project No.	6720-05
Date:	October 31, 2024
Revised:	--
Drawing No.	SD-02